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Service



Environmental Assessment

Ochoco Wild Horse Herd Management Plan and Forest Plan Amendment

Lookout Mountain and Paulina Ranger Districts, Ochoco National Forest

Crook County, Oregon

Legal Location: T. 13 S., R 20 E., Sections 20, 21, 27- 35; T. 13 S., R 19 E., Sections 34-36; T. 14 S., R. 19 E., Sections 1-4, 9-16, 21-24; T. 14 S., R. 20 E., Sections 2-10, 14-18.
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Important Notice: Comments received in response to this solicitation, including names and addresses of those who comment, will be considered part of the public record on this proposed action and will be available for public inspection. Comments submitted anonymously will be accepted and considered; however, those who only comment anonymously will not have standing to appeal the subsequent decision under 36 CFR Part 215. Reviewers must provide the Forest Service with their comments during the review period of this Draft Environmental Assessment. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental analysis, thus avoiding undue delay in the decision-making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewer's position and contentions. *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final environmental impact statement. *City of Angoon, v. Hodel* (9th Circuit, 1986) and *Wisconsin Heritages, Inc. v. Harris*, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the Draft Environmental Assessment should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

Acronyms used in this Document:

AML	Appropriate Management Level
AUM	Animal Unit Month
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMP	Best Management Practices
BST	Big Summit Territory
BO	Biological Opinion
C&T	Condition and Trend
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWD	Coarse Woody Debris
CWM	Coarse Woody Material
DMA	Designated Monitoring Area
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
FPA	Forest Plan Amendment
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSR	Forest Service Road
GIS	Geographical Information Systems
HMA	Herd Management Area
HMP	Herd Management Plan
IDT	Interdisciplinary Team
INFISH	Inland Native Fish Strategy
LRMP	Ochoco National Forest Land and Resource Management Plan
MA	Management Area
MIIH	May Impact Individuals or Habitat but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
MIS	Management Indicator Species
NE	No Effect
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act

NHPA	National Historic Preservation Act
NI	No Impact
NOA	Notice of Availability
NOI	Notice of Intent
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-Highway Vehicle
PFC	Proper Functioning Condition
PNV	Potential Natural Vegetation
PZP	Porcine Zona Pellucid
RHCA	Riparian Habitat Conservation Area
S&G	Standard and Guide
TES	Threatened, Endangered, Sensitive
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WFRHBA	Wild Free-Roaming Horse and Burro Act

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Chapter 1: Purpose and Need for Project

Introduction

The Lookout Mountain Ranger District is proposing management strategies for the Ochoco wild horse herd that resides on the Big Summit Territory (BST). The BST is located within Crook County, Oregon, about 25 miles east of Prineville, Oregon. The BST comprises about 25,434 acres.¹ Of this, 98% is National Forest System lands administered by the Ochoco National Forest’s Lookout Mountain and Paulina Ranger Districts. The location of the territory in Oregon is displayed in Figure 1.

The Forest Service has prepared this Draft Environmental Assessment to disclose the effects of the management plan alternatives on the human environment. Three Alternatives are addressed in detail. A herd management plan (also referred to as a “territory plan”) is an operational plan for managing one or more herd units of wild free-roaming horses and burros and describes the desired population level, detailed management practices, interagency coordination, scheduling and monitoring requirements for managing each herd unit, within the direction established in the Forest Plan (Forest Service Manual 2200, Chapter 2260).

Figure 1: Location of the Big Summit Territory (Project Area) within Oregon.



¹ Acres calculated using the Ochoco National Forest Geographic Information System (GIS)

Background

Early accounts of horses in the Ochoco Mountains are varied, so it is difficult to know the herd's exact origins. Most sources agree that horses once roamed beyond the limits of the present Territory, and were said to be good quality animals as ranchers would selectively turn breeding stock loose to ensure a supply of horses would be available when needed for ranch work. It is known that the U.S. Army's Remount program influenced the lineage of Euro-American settlers' herds, which then escaped or were turned loose to establish or augment the wild horse bands. In later years, Thoroughbred racing stock may have been released in the area. According to the 1975 Ochoco Wild and Free Roaming Horse Management Plan, the first horses in the Territory (around 1925) were animals that escaped from, or were set loose by, different ranches in the surrounding areas of Post, Mitchell, and Prineville.

With the passage of the Wild Free-Roaming Horses and Burros Act (WFRHBA) in 1971, the Forest Service and BLM were required to manage unbranded and unclaimed wild horses and burros in the areas where they were found (in 1971) as an integral part of the national system of public lands. Wild horses share the Territory with wildlife and seasonally with domestic sheep; there are no permitted cattle.

In 1975 the Forest Service completed an environmental analysis (EA) and management plan to address management of the wild horses on the Ochoco National Forest (USDA Forest Service 1975). That plan established the Big Summit Territory boundary and determined an appropriate management level (AML) for the wild horses to be within a range of 55 to 65 animals. The EA described this as "a safe range and that all uses and activities can exist in continuity at this number with the initiation of management activities to protect resources and control numbers."

In 1989 the Ochoco National Forest Land and Resource Management Plan (LRMP) provided direction that "wild horses within the original territory will be managed at a maximum of 60 head." Horse numbers above this level were to be considered excess and were required to be removed. Horses that had moved outside the Big Summit Territory were identified as first priority for removal. Adoption of excess horses was managed, until recently, through a 1988 interagency agreement with the Bureau of Land Management. (USDA Forest Service 1989).

Current Conditions

A 2018 census in the Territory counted 135 animals.² This is over double the high end of the current Appropriate Management Level (AML) established in the 1975 management plan and the 1989 LRMP. Wild horse herds can grow at an average rate of 20% annually (National Research Council 2013). The average population growth of this herd appears to be around 7-8% with high annual variation. Two recent studies of the wild horses in the BST indicated low genetic variability (Cothran 2011 and Mills 2010). Low genetic variability can lead to lowered resilience and increased expression of recessive traits. According to the National Academy of Sciences, "Theoretical and empirical studies have demonstrated substantial fitness costs associated with the loss of genetic diversity in both free ranging and captive populations... Isolation and small population size, in combination with the effects of genetic drift, may reduce genetic diversity to the point where herds suffer from the reduced fitness often associated with inbreeding. That would compromise the ability of herds to persist under changing environmental conditions." (National Academy of Sciences, 2013. Using Science to Improve the BLM Wild Horse and Burro Program: A Way Forward)

Big Summit Territory is named after the adjacent Big Summit prairie, a privately owned five-by-seven-mile basin at an elevation of 4,500 feet. Most of the Territory is forested with dry grand fir (32%) and Douglas-fir (32%) forest types covering nearly 65% of the Territory. The other 35% is covered by ponderosa pine, moist grand fir, western juniper, subalpine fir, or is non-forested such as meadows. Forage conditions in the

² The census was conducted by Owyhee Air with infrared technology and identified 119 horses; an additional 16 known horses were outside the flight area. A 2018 annual census conducted by volunteers counted 125 horses.

forested areas vary based on the amount of canopy cover present. Horses prefer riparian areas, which at 926 acres, is a small proportion of the Territory (2%). Riparian forage is in an unsatisfactory condition.

Both the number of horses currently present, and their year-round use appear to be contributing to the negative effects of a number of springs and seeps within the Territory. These areas have exhibited bare soil and alteration from trampling in excess of 70 percent, residual stubble heights of less than 2 inches at the end of the grazing season, denuded vegetation, and the presence of annual vegetation and other undesirable plants.

Purpose and Need for Action

The purpose of the proposed action is to develop a new herd management plan³ to replace the 1975 plan, incorporating best available science, and to be consistent with the 1971 Wild Free Roaming Horses and Burros Act as amended (WFRHBA), 36 CFR 222 Subpart D, Forest Service Manual 2260 and other pertinent direction.

The Forest Service is mandated by the WFRHBA to ensure wild horses are managed in a thriving natural ecological balance with other uses and the productive capacity of their habitat as required.

The need for a new herd management (territory) plan is demonstrated by:

An increased wild horse population above the AML established in the 1975 plan and more than double the maximum number allowed by the Ochoco Forest Plan. The Forest Service must maintain a herd size that the habitat within the Territory boundary can sustain. A thorough, science-based approach to determine an appropriate management level (AML) that considers the current habitat conditions that have evolved since 1975 is overdue. Although there is ample summer range available within the territory, winter range is limited. A relatively low availability of forage in the areas where horses spend the winter can result in poorer body condition during harsh winters; therefore, there is a need to account for winter range being a limiting factor in determining AML. New information on capture methods and other elements of wild horse management that have evolved since 1975 need to be considered.

Better understanding of fertility control methods and better understanding of genetics, plus a desire to improve the genetic variability of the wild horse herd for long-term sustainability. The existing plan does not address the genetic health of the Ochoco wild horses and it does not account for new fertility control methods that have become available.

The Ochoco National Forest Land and Resource Management Plan (LRMP) includes direction that is based on the 1975 herd management plan. There is a need to amend the LRMP must be amended to replace direction that is based on the 1975 Plan. The purpose of amendments is to update guidance and allow adjustments to the AML based on changing conditions.

Proposed Action

The Forest Service proposed action (that was scoped with the public in the summer of 2017) is the development of a management plan for the wild free-roaming horses of the Big Summit Territory that would include the following elements:

- Establish an appropriate management level (AML) based on current habitat conditions and the most limiting factors for essential habitat needs. The most limiting factors in the Big Summit Territory are winter forage and space.

³ Forest Service Manual 2260 refers to “Territorial Plans.” This EA uses Herd Management Plan and Territorial Plan interchangeably.

- Manage for genetic variability through introduction of new genes, or other actions.
- Slow the herd's rate of growth using approved fertility control methods, adjustments of the sex ratio, and/or adjusting age distribution.
- Develop an Emergency Action Framework for effectively and humanely managing situations such as sick, lame, or old horses or public safety concerns.
- Develop an off-range plan to include protocols for capturing horses, handling horses, adoption, training programs and sale of horses. The corral at Ochoco Ranger Station compound is one location that may be used for off-range management.
- Amend the Ochoco National Forest Land and Resource Management Plan (LRMP) to provide overall management objective consistent with the Act.

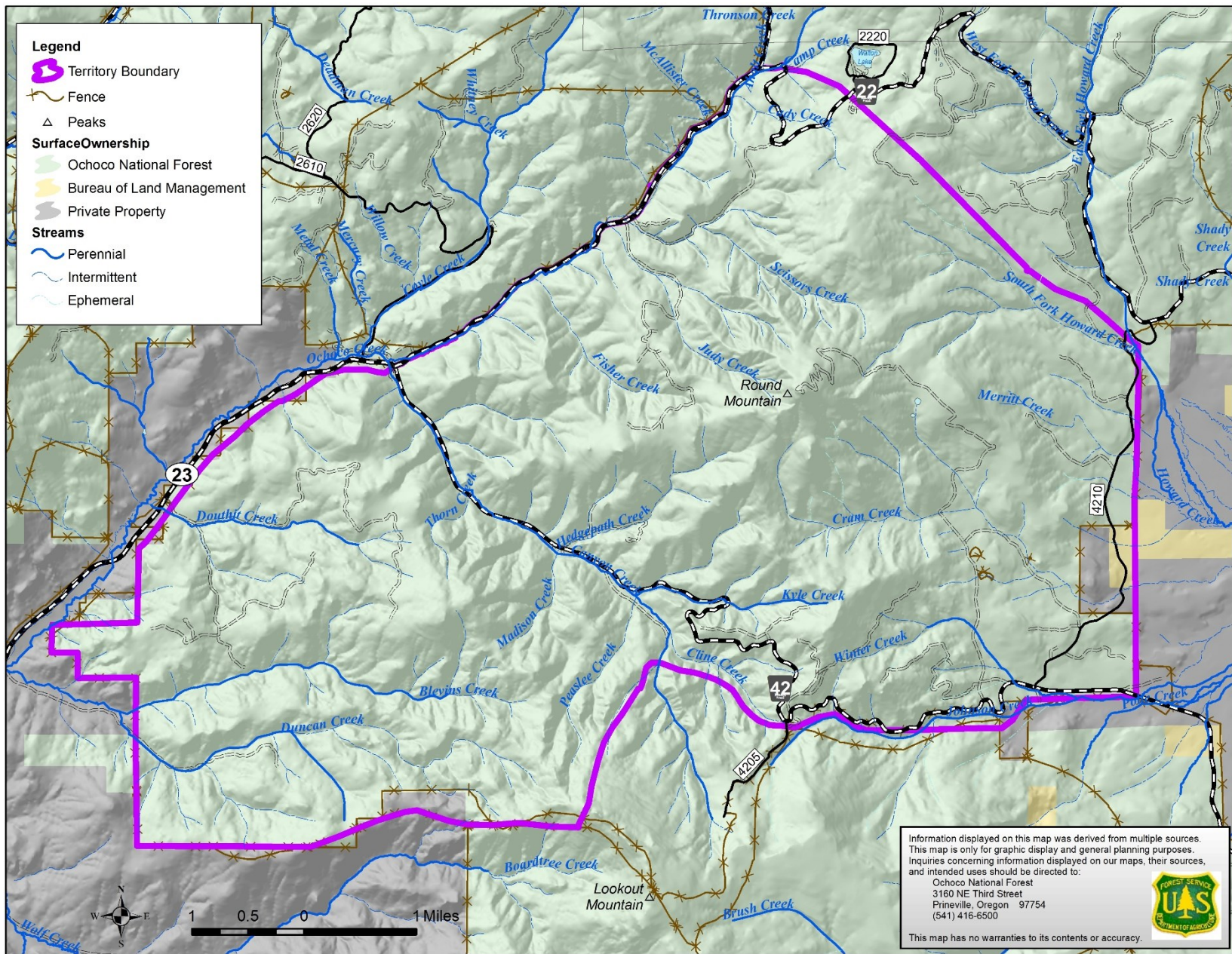


Figure 2: Big Summit Wild Horse Territory

Scoping and Issue/Alternative Development

The Forest Supervisor issued a letter dated June 19, 2017 announcing the release of the proposal to write a new herd management (territory) plan. The letter was distributed to 127 individuals, organizations, and government agencies. The proposal was also posted to the Forest Service web page on June 17th. A Notice of Intent to prepare an Environmental Impact Statement was published in the Federal Register on June 21, 2017 (Vol. 82, No. 118), which began the 30-day scoping period.⁴ A total of 27 responses were received during the specified time period.

The comments received in response to the June 2017 scoping notice were reviewed by the IDT and Responsible Official. The comments were categorized into topics that then became either a key issue (which could lead to an alternatives), an “other” issue, or as an issue outside the scope of this project that will not be considered further in the EA. These issue categories are described below.

Key Issue

Key issues are those that represent a point of debate or concern that cannot be resolved without consideration of the trade-offs involved. These issues spur the design of alternatives to the proposed action that provide a different path to achieve project objectives. Trade-offs can be more clearly understood by developing alternatives and displaying the relative impacts of these alternatives weighed against the proposed action.

Key Issue 1: Appropriate Management Level

A primary concern of those interested in the Ochoco wild horse herd is the size of the herd, or appropriate management level (AML). Commenters expressed concern that the agency is intending to set a lower AML for the herd than is in the current plan or set an AML that is lower than the current herd size.⁵ There is a cause/effect relationship between the wild horse population range and potential impacts to the wild horses and other natural resources in the Territory.

Winter Forage as Most Limiting Factor: Appendix B discloses the analysis process that led to the Forest Service proposed AML of 12 to 57 horses. The analysis considers winter forage as the most limiting factor in the Territory. Some commenters suggested that winter forage availability should not be used as an excuse to lower the herd size because there was apparently enough forage to support a herd size of approximately 122 through the 2016-17 winter. Comments also stated that animals would suffer in harsh conditions of prolonged and deep snow regardless of the size of the herd and that it should be dealt with by allowing emergency feeding (see *Comments Considered but not Addressed in Alternatives*).

Providing for Genetic Variability: Some commenters feel that the current AML is too low to provide for genetic variability and that the agency should increase the AML to improve the genetic variability. Many commenters state that a population of about 150 horses is necessary for the population to be genetically viable. The proposed action states that the process to determine AML will consider management of the genetic variability of the wild horse herd and that the Forest will introduce new genes, adjust the sex ratio, or use other methods. Based on the best available science, the genetic variability of the Ochoco horse herd is limited. The ability to improve the genetic health of the herd by introducing new genes is a tool considered under Alternative 2. Alternative 3 does not include that as a tool in order to address the issue. The question to be assessed and compared by alternative is whether or not allowing the population to

⁴ The Forest later withdrew that notice on the decision to issue an Environmental Assessment rather than an Environmental Impact Statement because, upon preliminary evaluation, no potential significant impacts to the human environment are anticipated.

⁵ The 1975 Plan calls for an AML of 55-65; the LRMP states that horses will be managed at a maximum of 60 head. The current herd size at the time of this analysis is estimated to be 135.

expand and managing for a higher AML alone, as some have suggested, would improve genetic variability.⁶

This key issue is addressed by comparing alternatives with different ranges of AML. Alternative 1 is the current plan AML of 55-65; Alternative 2 has an AML of 12-57 based on an analysis process outlined in Appendix B, and Alternative 3 has an AML of 150-200 based on requests from those who feel this level of AML will address concerns about genetic variability. Analysis will consider the effects to wild horses and natural resources that would result from managing herd size and habitat within the AML established as a population range with a lower and an upper limit. Indicators of effect will include: forage availability, genetic variability and population growth.

Other Issues

Impacts to Natural Resource Conditions

The scoping letter noted that the wild horses are causing some resource damage, particularly in riparian areas (Figure 3). Some commenters wish to see evidence that problems actually exist and that it is the fault of the horses. Many commenters think the problems are more likely resulting from sheep and cows. Some commenters claim a benefit to other wildlife from horses congregating around water.



Figure 3: Photo of a riparian area denuded of vegetation.

Horses create impacts to natural resources including soils, vegetation, and riparian/wetland areas. Larger numbers of horses can have a greater expanse and intensity of effect. Horses prefer riparian areas and larger numbers of horses has a greater impact in riparian areas. Soils are affected by reduced vegetation in localized areas, trailing, and trampling. Grazing by horses reduces vegetation and can cause areas to be denuded of vegetation, and horses moving through the forest can contribute to the spread of invasive plants. The analysis will address the potential for effects to the natural resource in the territory due to wild horse use on a year-round basis. Natural resources that will be analyzed include: soil, riparian condition, stream health and water quality, fisheries, wildlife, range, and botanical resources.

⁶ Some public comments also stated that the current genetic makeup of the herd is unique and should be maintained. That statement is conjectural and not supported by scientific evidence. Determining if the Ochoco wild horse herd is a distinct and unique population is outside the scope of the purpose of this project, which is to prepare a management plan that ensures the herd is managed as a population of healthy animals in a thriving natural ecological balance with other uses.

Competition between Wild Horses and Livestock

Horses share the Big Summit Territory with native wildlife species and permitted livestock; therefore growing numbers of horses increases competition for forage with big game and permitted livestock. Some scoping respondents are concerned that the increasing herd size is negatively impacting riparian areas and availability of forage. Others are concerned that livestock are having impacts on natural resources that are being blamed on wild horses and that modifying livestock grazing practices could improve forage conditions for the wild horses.

The scope of the analysis and decision to be made do not involve the determination of whether livestock grazing should take place in the Big Summit Territory or how many livestock should be permitted. The Ochoco Forest Plan provides allowable use standards for livestock, wildlife, and wild horses for all areas of the Ochoco National Forest including the Big Summit Territory. The analysis in this EA will address how management for wild horses affects the availability of forage for wild horses, livestock, and wildlife. Additionally, the cumulative impacts of managing a wild horse herd, domestic livestock, other ungulates, and other uses will be addressed in the EA.

The alternatives will also be assessed based upon the amount of forage available to horses, big game, and livestock under the different AML levels called for in the alternatives. The cumulative effect of livestock grazing in addition to a wild horse herd in the Territory is also included in the analysis.

Impacts to Social Values

The existence of a wild horse herd on the Big Summit Territory is a valued feature of public land in central Oregon and of the Ochoco National Forest. As an asset, it presents opportunity for the public to engage in wild horse viewing and photography. Some people come to the Ochocos for the purpose of catching a glimpse of the wild horses. The year-round presence of wild horses also has the potential to impact recreation and other uses of the Forest.

Social values to be considered in the EA include heritage resources, hunting opportunity and success, recreation (dispersed camping, watchable wildlife, and horse viewing), and the economic impact to livestock operators.

Population Control Methods

The proposed action states that the Forest Service will implement actions to slow the herd's rate of growth as needed to maintain the population within the identified AML range. Some commenters stated that fertility control is generally preferred for regulating herd numbers. Scoping respondents also had specific comments related to Porcine Zona Pellucid (PZP)⁷ (e.g. when and how it should be administered). Some expressed opposition to the use of permanent fertility control, such as sterilization and sex-ratio adjustments. Alternatives will vary on the AML level; but once the AML is determined, the size of the herd may need to be adjusted (if the existing herd size is above AML) to within the selected range through gathering, placement, or sale. Once AML has been reached, contraception could be one method of fertility control used for maintaining that herd size. However, managing to an AML level with the use of contraceptives alone is very uncommon and may not be feasible for the Big Summit Territory. Planning guidance instructs the Forest Service to list all "acceptable methods of control," as well as the extent of natural predation occurring within the territory. The revised plan will provide a list of available tools, using best available science and incorporating new technologies as they arise. The intent is to not eliminate outright the Forest's ability to use any tool to control population. All action alternatives will include the same approach.

⁷ Porcine Zona Pellucid (PZP) has been used as a wildlife contraception since the late 1980s and is approved by the National Wild Horse and Burro Advisory Board. It can be administered to captured animals via a standard syringe or administered to free ranging wildlife with a dart gun. The contraceptive effect lasts for approximately one year in horses and can potentially be extended by including a controlled-release PZP component.

Comments Considered but not Addressed in Alternatives or Analysis

Some comments that were received by the Forest Service were considered, but did not lead to developing a component of an alternative and were not carried through into analysis. The reasons may be one of the following: 1) the comment raises an issue that is outside the scope of the proposed action; 2) raises an issue that is already decided by law, regulation, Forest Plan, or other higher level decision; 3) raises an issue that is adequately addressed in all alternatives; 4) raises an issue that is conjectural and not supported by scientific or factual evidence.

Big Summit Wild Horse Territory should be enlarged. A number of commenters expressed frustration, claiming that the Big Summit Territory was incorrectly designated because it didn't account for the full extent of where wild horses were present in 1971. They also feel that the small size of the territory is preventing management of a larger herd and constraining genetic variability. One commenter feels that territory delineation is not in accordance with the Act.

The Forest Service is not considering any additions to the territory. In accordance with the WFRHBA, the management of wild horses and burros is limited to the areas where wild horses and burros were found in 1971, which is the area identified in the 1975 EA.

The scoping notice included a proposed adjustment to the territory boundary to remove private property; however, the Forest is no longer considering that modification to the territory and will use the boundary description and map included in the 1975 environmental assessment, while recognizing that the Ochoco National Forest has no authority to designate management commitments on non-National Forest System lands. The boundary is as depicted in Figure 3. The size of the Territory is a component of the AML analysis, Appendix B.

Responding to Wild Horses in Crises. Scoping respondents felt that the Forest Service should consider and plan for many different kinds of emergencies including dealing with sick and lame horses, starving horses, or wildfires threatening horses. There were also comments that the agency needed to have better response times to emergencies.

Although nothing in the WFRHBA or associated regulation compels the Forest Service to react to rescue wild horses in situations or incidents such as wildfire or deep long-lasting snow that may reduce forage supply, the Forest Service has committed to incorporating an emergency action framework into the management plan. This framework serves as Best Management Practices and must comply with the regulations and agency policy governing wild horse management on public lands. For example, in the event of old, sick, or lame animals, the WFRHBA Act directs the land managing agency to destroy the animal in the most humane manner possible. The WFRHBA requires all management activities to be at the "minimal feasible level." Additionally, emergency situations or horses in crisis have to be dealt with on a case by case basis; therefore, the plan will provide a framework rather than contemplate all potential situations. The approach will be the same for all alternatives.

Supplemental Feeding: A primary concern of many scoping respondents is the desire to see supplemental feeding of wild horses when harsh winter conditions make it difficult for them to find food. As stated above, the Emergency Action Framework (Appendix D) does not identify specific actions that would be taken, such as feeding the horses, but would provide line officers a decision-making guide when faced with an emergency situation in which a wild horse may be suffering.⁸

⁸ It should be noted that supplemental feeding is not consistent with Forest Service policy and has the potential to exacerbate problems within a wild horse herd. Supplemental feeding may facilitate population growth above the AML, leading to other future negative resource impacts resulting in ecological imbalance. Supplemental feeding could also lead to habituation of horses to people and disrupt the movement and migration of horses across the territory, again

Provide a Buffer to Ensure Survival of Population. One argument for a larger herd size that came from scoping responses is that more animals would survive a severe winter (or other threats such as disease or predators) if there were more animals going into it. Managing for the current AML of up to 65 horses is seen by some people as potentially disastrous for the population (i.e. a “bottleneck” situation), if a harsh season causes mortality. Although the EA considers an alternative with a larger AML, the environmental effects to wild horses are based on forage availability and resulting body condition. The wild horses in the Big Summit Territory are considered as part of the metapopulation of all wild horses in the western United States therefore, loss of horses in one Territory does not constitute loss of a population (National Academy of Sciences 2013).

“The agency lacks expertise to manage wild horses. Forest Service should allow COWHC or others to implement wild horse herd management.” The comment is outside the scope of the analysis to be conducted in the EA. Forest Service regulations require the Forest Service organization to provide the administration of wild horses rather than by the granting of leases and permits for maintenance of these animals to individuals and organizations (36 CFR 222.61(1)(2)). Forest Service Manual states “Do not issue permits to individuals or organizations for management of animals on NFS lands. Consider entering into agreements whereby individuals or organizations may provide funds for management purposes, improvement of water supply, fencing, or other habitat needs.” FSM 2264.2. Participation of a well-informed public is desirable and can often be achieved through public meetings, contacts with wild horse protection groups, local livestock associations, or organizations with scientific expertise or special knowledge of wild horses and burros. The Ochoco National Forest will continue to promote public participation through volunteer agreements; however, primary responsibility for management falls to the Forest Service.

Forest vegetation management should be undertaken to improve forage availability. Some people express a desire to see the Forest Service maximize winter forage availability by cleaning up surface fuels and adjusting livestock grazing in winter range areas; giving more forage allocation to horses rather than livestock. Although forage conditions across the territory are a primary component of the AML analysis and the effects analysis, forest vegetation management is outside the scope of this analysis. Vegetation management follows Forest Plan goals and objectives for the management areas within the Big Summit Territory. Treatments such as thinning and fuels reduction that are undertaken have transitory effects on forage availability and the ability to implement treatments is subject to capacity and funding. The territory plan will focus on management of horses in a thriving natural ecological balance with the environmental conditions as they are today, knowing that forest conditions are dynamic. More information on the potential for improved forage availability is included in the AML analysis (Appendix B). Conducting vegetation management and fuels treatments is outside the scope of the herd management plan and would require separate NEPA analysis.

The Forest Service should create a horse park where horses can be tamed and the public can visit. This suggestion is outside the scope of this project and not in accordance with the Act. The Forest must prepare a management plan in accordance with law, regulation, and policy. The Act states they are “to be considered in the area where presently found, as an integral part of the natural system of the public lands with minimal feasible management.”

General opposition to herd management (e.g. “I don’t want one horse hurt or taken off the land they are on. The attack and assaults on Americans honored valued wild horse population is absolutely depraved”). This issue is already decided by law. The Act directs the agency to manage the wild horse herd, including the removal of excess animals or destruction of old, sick, or lame animals in the most humane manner possible. Territory management plans describe acceptable methods of controlling the population.

leading to other negative natural resource impacts. A need for supplemental feeding may be an indication that the population is too high, and not in a thriving ecological balance.

Modify the current livestock grazing practices. The scope of the analysis and decision to be made do not involve the determination of whether livestock grazing should take place in the Big Summit Territory or how many livestock should be permitted. Grazing is managed through the implementation of allotment management plans and issuance of annual operating instructions following Forest Service range management handbook and manual procedure. The effect of wild horse management on livestock grazing is addressed in Chapter 3.

Planning Framework

Development of this analysis follows implementing regulations of the National Forest Management Act (NFMA); Title 36, Code of Federal Regulations, Part 219 (36 CFR 219); Forest Service NEPA Regulations Title 36, Code of Federal Regulations, Part 220 (36 CFR 220); Council of Environmental Quality NEPA Regulations, Title 40; CFR, Parts 1500-1508. This section describes applicable Forest Plan management direction and policy, as well as current laws, regulation, and executive order.

The Wild Free-Roaming Horses and Burros Act of 1971

Under the WFRHB Act, wild free-roaming horses and burros were described as living symbols of the historic and pioneer spirit of the west, contributing to diversity of life forms in the United States and enriching the lives of American people. The basis for management and protection of wild horses and burros is determining and achieving the appropriate management level. The Act also provides direction on dealing with excess animals, dealing with wild free-roaming horses or burros that stray onto privately-owned land, and criminal provisions for harassing, killing, or removing wild horse or burro from public lands without authority.

There have been several amendments to the WFRHB Act:

- The Federal Land Policy and Management Act of 1976 permitted the use of helicopters in the capture of wild and free roaming horses and burros and the use of motor vehicles for their transport.
- The Public Rangelands Improvement Act of 1978 amended the WFRHB to “continue the policy of protecting wild free-roaming horses and burros from capture, branding, harassment, or death, while at the same time facilitating the removal and disposal of excess wild free-roaming horses and burros which pose a threat to themselves and their habitat and to other rangeland values.”
- The Omnibus Parks and Public Lands Management Act of 1996 required the recognition and protection of wild and free roaming horses in the Ozark Scenic Riverways.
- The Consolidated Appropriations Act of 2005 amended the WFRHBA to require the BLM and FS to sell (without limitation) excess animals more than 10 years old or which have been offered for adoption three times.
- Further Consolidated Appropriations Act of 2020 placed a limitation on the funding appropriated by the act for both the BLM and FS, making funding unavailable for the destruction of any healthy, unadopted wild horse and/or burro under their jurisdiction or the sale of a wild horse and/or burro that results in the destruction of the animal for processing into a commercial product.

The WFRHB Act’s implementing regulations for the Forest Service are at 36 CFR 222, Subpart D. Forest Service Manual (FSM) Chapter 2260 outlines the agency’s policy regarding management of wild horses under the authority of the WFRHB Act, including direction on the development of territory management plans such as under consideration in this EA.

Ochoco National Forest Land and Resource Management Plan

The 1989 Ochoco Land and Resource Management Plan (LRMP, also referred to as “Forest Plan”), as amended, provides guidance and direction for management activities on all lands managed by the Ochoco National Forest. The LRMP establishes goals, objectives, and standards and guidelines on both a forest-wide as well as on a management area specific basis. Management direction for the Big Summit Wild Horse Territory is included in Appendix I of the LRMP (See Appendix A of this EA for details). The LRMP will

have to be amended to be consistent with the new management plan. The Big Summit Wild Horse Territory is not a separate management area under the LRMP. The Territory includes several management area designations, as displayed in Table 1 and Figure 4. Table 1 states briefly the management area goals and objectives.

Table 1: LRMP Management Areas Goals/Objectives and Acres.

Management Area	Management Emphasis	Acres
MA-F6 Old Growth	Provide habitat for wildlife species dependent on old growth stands.	396
MA-F11 Lookout Mountain Rec. Area	Maintain a natural setting; provide continued opportunities for high-quality, semi-primitive recreational activities, and wildlife habitat, while maintaining healthy forests.	3,657
MA-F13 Developed Recreation	Provide safe, healthful, and aesthetic facilities for people to utilize while they are pursuing a variety of recreational experiences within a relatively natural outdoor setting.	4
MA-F15 Riparian	Manage streamside vegetation and habitat to maintain or improve water quality. Meet temperature and turbidity levels as required by state standards under the Clean Water Act.	914**
MA-F21 General Forest Winter Range	Manage for timber production with management activities designed and implemented to recognize big game habitat needs.	4,336
MA-F22 General Forest	Produce timber and forage while meeting the Forest-wide standards and guidelines for all resources. In ponderosa pine stands, management will emphasize production of high value timber.	13,575
MA-F26 Visual Management Corridors	Maintain the natural appearing character of the Forest along major travel routes, where management activities are usually not evident or are visually subordinate to the surrounding landscape.	2,057
Other Ownership – Bureau of Land Management*	Managed by the Department of the Interior, Bureau of Land Management (BLM). The Forest Service does not impose any wild horse management obligations on this land.	78
Other Ownership – Private Property*	A portion of the Territory delineated in 1975 falls on privately-owned lands. The Forest Service does not impose any wild horse management obligations on this property.	319
Forest Plan Total		25,434

*Although included in the original delineation of the Territory, the Forest Service does not have management authority on these lands.

**These acres are overlapping other management allocations

INFISH: Riparian management guidelines of the LRMP were amended by the Inland Native Fish Strategy (INFISH) (USDA 1995). INFISH provides direction to protect habitat and populations of resident native fish outside of anadromous fish habitat and provides standards and guidelines for activities within Riparian Habitat Conservation Areas (RHCAs). INFISH established landscape-scale interim Riparian Management Objectives (RMOs) which describe desired conditions for fish habitat. To meet RMOs, projects are designed to not retard the rate of or prevent recovery of habitat. RHCAs are to be managed to maintain or restore water quality, stream channel integrity and channel processes, sediment regimes, instream flows, diversity and productivity of plant communities in riparian zones, and riparian and aquatic habitats to foster unique genetic fish stocks that evolved within the specific region. RHCAs overlay other LRMP management allocations.

Eastside Screens: The Eastside Screens amendment to the LRMP does not apply to this project because the project does not involve timber sales.

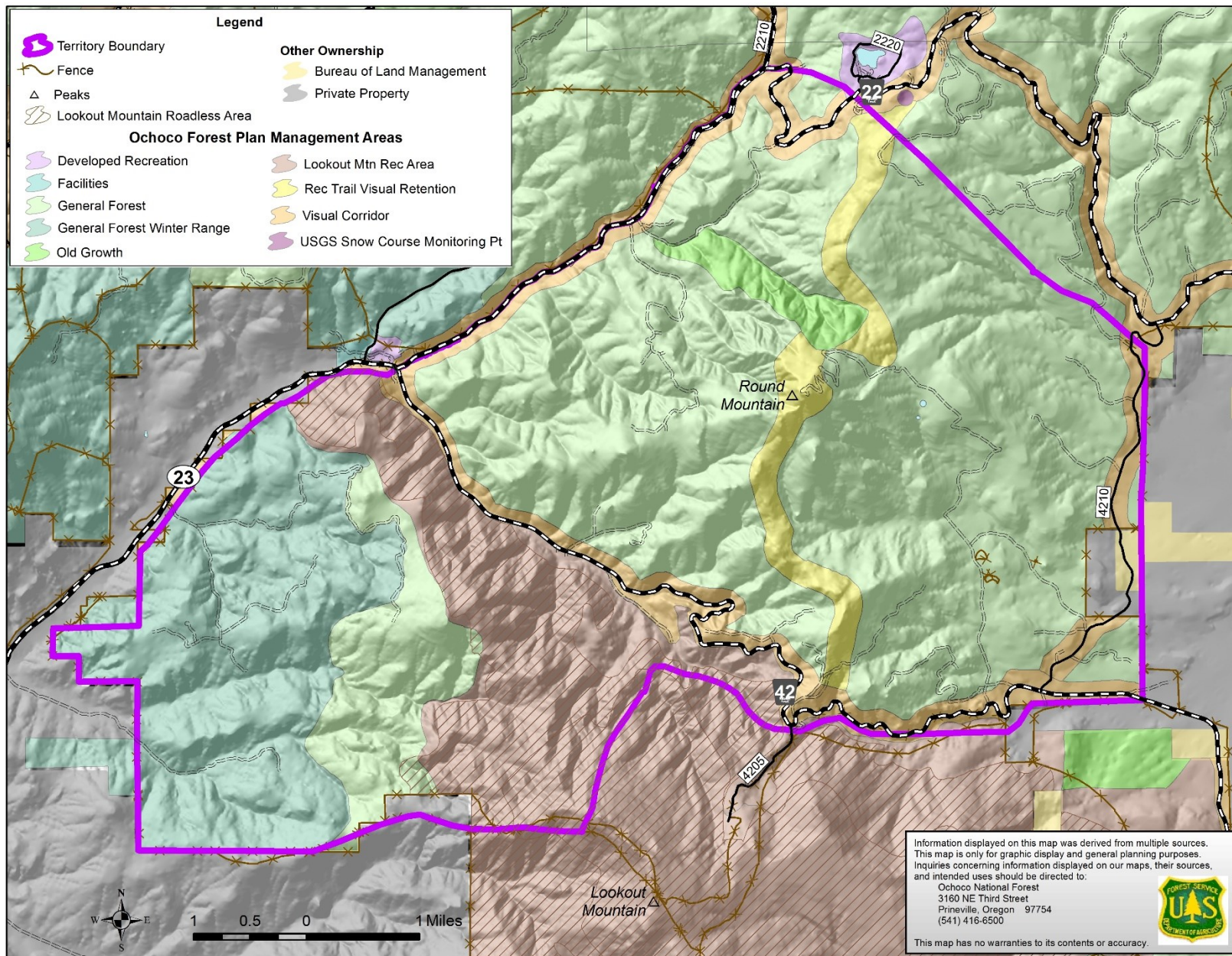


Figure 4: Big Summit Wild Horse Territory and Forest Plan management allocations.

Project Record

This EA hereby incorporates by reference the Project Record (40 CFR 1502.21). The Project Record contains Specialist Reports and other technical documentation used to support the analysis and conclusions in this EA. Chapter 3 provides a summary of the Specialist Reports in adequate detail to support the decision rationale; appendices provide supporting documentation. For some resources, separate reports were not prepared.

Incorporating these Specialist Reports and the Project Record help implement the Council on Environmental Quality (CEQ) Regulations provision that agencies should reduce NEPA paperwork (40 CFR 1500.4), that the document shall be “analytic rather than encyclopedic,” and that the document “shall be kept concise and no longer than absolutely necessary” (40 CFR 1502.0). The objective is to furnish adequate site-specific information to demonstrate a reasoned consideration of the environment impacts of the alternative and how these impacts can be mitigated, without repeating detailed analysis and background information available elsewhere. The Project Record is located at the Ochoco National Forest office at 3160 NE Third Street, Prineville, Oregon, Monday through Friday 8:00 a.m. to 4:30 p.m. Much of the record also available on the project web page at <https://www.fs.usda.gov/project/?project=46228>.

Decision Framework

The deciding official for the project will be the Forest Supervisor of the Ochoco National Forest. Given the purpose and need for action, and based upon the effects of the alternatives, the deciding official will select a management strategy for the Ochoco wild horse herd and their habitat. The selected management actions, together with the associated management and monitoring objectives will guide management of the wild horse herd over the life of the plan. The Forest Supervisor will determine:

- The appropriate management level expressed as a population range with an upper and lower level;
- Whether or not to amend the Forest Plan;
- Techniques to be used to maintain or improve the herd’s genetic health;
- Population growth reduction methods that may be implemented to slow herd growth rates and reduce number of excess animals that would have to be removed over time;
- Criteria to be considered when determining whether excess wild horses are present and require removal;
- Methods used for gathering and removing excess wild horses; and
- Off-range management

Chapter 2: Alternatives

Introduction

This chapter describes and compares the alternatives considered for the Ochoco Wild Horse Herd Management Plan Project. Based on the Key Issue described in Chapter 1, a total of three alternatives are described and analyzed in detail. Three other alternatives were considered but dismissed from detailed review as explained in section 2.6.

Alternatives Considered In Detail

Alternative 1 – Continue Existing Management Plan (No Action)

This is the No Action alternative that is required by law to provide a basis for comparing the effects of other alternatives. Under No Action, wild horse management would continue under the existing management plan (USFS 1975) and Ochoco Forest Plan (LRMP 1989). The existing plan has an objective to manage a wild horse population within the AML range of 55-65 wild horses. The LRMP prescribes a maximum head of 60 wild horses. The LRMP would not be amended.

Population Management

Population growth is to be controlled by culling, with priorities for capture and removal of 1) outside territory, 2) old or lame, and 3) others to reach AML. There would be no breeding program or management of genetic strains. The current plan calls for shooting old, sick, and lame horses.

Horses above the high AML are considered excess. Gathers to remove excess wild horses last took place in 2011. Prior to 2011, the Forest trapped wild horses almost annually. Under Alternative 1, gathers would take place regularly (e.g. annually or biannually) to remove excess horses. Gathers are the only population control method under Alternative 1.

There is no breeding program or management of genetic strains.

Off-range Management

Horses that are removed from the range may be adopted or destroyed in a humane manner, if adoption resources do not exist. A Forest Service corral or Burns corral would be used for holding.

Emergency Action

Actions necessary to deal with emergency situations are taken on a case by case basis at the direction of the Forest Supervisor.

Action Alternatives

The following describes the components of Alternatives 2 and 3 that differ based on the key issue.

Alternative 2

Population

Under this alternative, the Forest Service would establish an AML as a population range of 12-57 wild horses. This AML range was determined through an in-depth analysis guided by the methodology described in BLM Handbook 4700-1, which considers the most limiting factor of the essential habitat components of water, forage, cover, and space. For the Big Summit Territory, the most limiting factor is winter forage. The lower limit reflects forage availability when considering wildlife presence within the Territory during winters of above-average snowfall. The goal is to plan annual or biannual gathers to maintain numbers at or just

below the high end of AML. Gathers are described in more detail below under Management Components Common to Both Action Alternatives. See Appendix B for details on the AML analysis process. Population growth control methods common to Alternative 2 and 3 are described on the following page.

Genetic Health

Under Alternative 2, the Forest would manage the wild horse herd for an acceptable level of genetic variability, i.e. observed heterozygosity values for DNA-based samples according to best available science. The Forest would establish baseline genetic variability by sampling a portion of the herd during the initial gather and removal operations conducted under this Plan.

Genetic variability would be managed in consultation with wild horse genetics experts with the introduction of new genes in young mares from similar habitats. It may be necessary to introduce more than one or two young mares initially, in order to increase genetic variability in a timely manner.

Alternative 3

Population

This alternative addresses the public issue of wanting to maintain a higher number of horses in the territory for the reasons listed in Chapter 1. Under this alternative the Forest would maintain the wild horse herd size in the range of 150 to 200 wild horses. Population growth control methods common to Alternatives 2 and 3 are described in the following section “Management Components Common to Both Action Alternatives.”

Genetic Health

The AML of 150-200 would provide for an effective population size of at least 50. There would be no outside inputs for genetic variability.

Management Components Common to Both Action Alternatives

The following would be included in herd management under either Alternative 2 or 3:

Population Growth Control

Wild horses will be managed so that the AML can be achieved. Horses above the high AML are considered excess.

Population growth will be managed by:

- Conducting gathers to remove excess wild horses as needed to maintain the wild horse herd size within the high end of the established AML. Gathers are described in the Wild Horse section of this EA beginning on page 46. The Off-Range Plan guidance (below) applies to horses removed from NFS lands.
- Implementing fertility control methods to slow population growth rates, reduce gather frequency, and decrease the number of excess wild horses which need to be removed over time.

Consecutive gathers to remove excess wild horses would begin as soon as a final NEPA Decision is made to attain population size within AML.

- Highest priority would be to gather and remove wild horses residing outside the Territory and in areas where resource damage is occurring due to overpopulation.
- Second priority would be to gather and remove horses as necessary to achieve and maintain numbers at or just below the high end of AML.

- A selective removal criteria may be used for all gathers to facilitate meeting genetic variability and/or population growth rate objectives (based on consultation from wild horse genetic experts).
- Once AML is achieved, gathers to maintain population size within, but near the high end of AML will occur as needed, which is considered implementation of the herd management plan.

Bait trapping would be the primary gather method and may occur throughout the year. Six bait trap locations have been identified as permanent sites where temporary structures would be put up. Other locations can be used for temporary bait trap sites as needed and would be routed through specialists to address resource concerns. Frequent monitoring of bait trap locations is necessary to verify if horses are present in the traps.

Other gather methods, such as use of helicopters, fixed-wing aircraft and motor vehicles would follow direction in 36 CFR 22, Subpart D, 222.64.

The Comprehensive Animal Welfare Program Standards (USDI 2015) developed by the BLM would be followed during the gather operations (see Appendix C). This document was modified for Forest Service use in the Big Summit Territory.

After wild horses are gathered, they would either be: 1) transported to the BLM Burns corral facility or 2) transported to a Forest Service corral or to temporary/mobile corrals constructed by the Forest Service or 3) transported to leased or contracted private facilities, where they will be prepared for adoption or sale.

Fertility control methods will be used to slow the population growth. Fertility control methods include contraception, sterilization and manipulation of sex ratios.

- Contraception will be our preferred method of fertility control to reduce population growth and achieve AML in conjunction with gathers. Contraception tools like PZP will be utilized with a Best Management Plan (Included in this EA as Appendix E) developed to ensure attention to promoting genetic variation with fertility control. Any future contraception methods approved by the Wild Horse and Burro Advisory Board will be considered for use on the wild horses.
- Sterilization may be used to help manage population growth and promote genetic health in the herd. For example, sterilization of studs may be used to promote a sex ratio that favors a slower population growth. Future sterilization methods approved by the Wild Horse and Burro Advisory Board will be considered for use in management of the Big Summit wild horses.
- Manipulation of sex ratios is expected to be the tool that is the lowest priority for consideration to slow population growth because of concerns about its effect on genetic variation. If needed, ratios may be adjusted to slightly favor males (up to 60/40 males/females) by selective gathering, to assist in slowing population growth.
- Other methods to slow population growth would be considered only if approved by the Wild Horse and Burro Advisory Board or other governing agencies.

Emergency Action Framework

The Emergency Action Framework will be guided under the values of: humane treatment of wild horses off range; long-term well-being of the wild horse herd; and honoring and maintaining the “wildness” of the herd (see Appendix D).

Humane destruction of wild horses would follow direction in 36 CFR 222, Subpart D, 222.69. This includes the destruction in the most humane manner possible, sick, lame or old animals.

- Sick means a wild horse with failing health, infirmness, or disease from which there is a poor prognosis for recovery.
- Lame means a wild horse with malfunctioning muscles, ligaments or limbs that impair freedom of movement.

- Old means a wild horse characterized by inability to fend for itself because of age, physical deterioration, suffering or closeness to death.

Any destruction of a wild horse as an act of mercy would be fully documented. Documentation would describe the health of the animal (which may include Henneke Body Condition Score), reason for its destruction and cause of injury or circumstances leading to the animal's condition if known.

Off-Range Plan

All horses placed into private custody through adoption would have some form of unique identifier for future tracking (e.g. freeze brand).

Initially, attempts would be made to place excess wild horses in private care through adoption. The Forest Service or Forest Service-approved volunteer personnel would be responsible for adoption compliance and subsequent title transfer of these animals.

Animals that meet the sale-eligibility criteria would be offered for sale. Animals must meet the sale-eligibility criteria under the WFRHB Act of 1971, Pub. L. 92-195, 1333 (e) 2004. While the Act as amended only addresses sale without limitation, subsequent enactment of riders prohibiting the BLM's and Forest Service use of appropriated funds for the sale or slaughter of wild free-roaming horses and burros resulted in BLM's construction of a sale with limitation whereby purchasers declare in their purchase application to, "... not sell or transfer ownership of any such animals that I purchase to any person or organization that intends to resell, trade, or give away such animals for processing into commercial products." While current Forest Service policy is to follow the mandates of the Act as amended, it will comply with appropriations language limitations. Sales of excess wild horses without limitations, would be similar to the majority of livestock sales in the state whereby the owner has ultimate determination of the future use of the animal within the restrictions of state animal treatment and care laws. Sales of excess wild horses with limitations similar to those declared in the application to purchase BLM horses and burros would be expected to prevent the transfer of animals that previously had status as wild horses or burros for processing into commercial products. Under both types of sales, once sold, horses lose their protected status under the Act (16 U.S.C., Chap 30, §1333(e) (4)).

As a last resort, animals for which there is no adoption or sale demand would be euthanized in the most humane and cost efficient manner possible (36 CFR 222.69 (5)).

Utilization Monitoring

The Ochoco LRMP established standards for allowable use of forage for the multiple resources managed by the Ochoco National Forest. Monitoring these standards is intended to help determine if riparian areas are meeting the desired future condition (LRMP 4-139). The Designated Monitoring Areas (DMAs) are located in riparian areas that represent grazing use. However, areas should not include crossings or main water sites. A DMA should: 1) be representative of grazing use specific to riparian areas and 2) reflect actual use of accessible riparian areas, not an average use. The premise for the DMAs is "if proper management occurs on the (DMA), the remainder of the pasture or use area will also be managed within requirements" (Burton, 2004).

Table 13 on page 44 shows the forage utilization standard for riparian communities. These standards are based on residual stubble height to ensure that there is enough vegetation remaining after the growing season to protect the riparian areas during high water events like spring run-off.

Grazing utilization is measured on the most palatable species within the DMA. The Ochoco National Forest uses the Final Range Resource Implementation Monitoring Module (July 2002) with the following additions:

- Monitoring is done at least twice to gather information on grazing use and effects. The first monitoring occurs on selected DMAs during the growing season (mid-season monitoring). The second monitoring occurs at the end of the growing season (end-of-season monitoring).

Resource Protection Measures Common to All Alternatives

Gather Operations / Locating Traps

- Consult District Archaeologist if new trap locations are needed to ensure they are not placed on cultural resource sites.
- See Invasive Plant Prevention Measures

Invasive Plant Prevention Measures

- The Forest Service would inspect equipment needed for moving horses off the Territory such as horse trailers or trap components. Vehicles requiring cleaning would be moved to a site designated by the Forest Service if cleaning is needed prior to the start of operations.
- During wild horse capture, existing non-native invasive plant infestations would be avoided to the greatest extent possible.
- Inform and include district invasive plant coordinator with project planning and implementation so that any newly discovered invasive plant infestations identified during implementation are documented and prioritized for treatment.
- Monitor trap sites for new and/or increased invasive plant populations.

Botany Project Design Criteria for Sensitive Plants

- To protect sensitive species associated with riparian and scabland habitats, gathering and trapping would be avoided in these habitats unless approved by District Botanist.

Wildlife Project Design Criteria for Gray Wolves

- Design criteria aimed at minimizing impacts to gray wolves associated with the implementation of actions outlined in the proposed alternatives is incorporated by reference (USDI Fish and Wildlife Service 2020a).

Forest Plan Amendment

In order to implement one of the action alternatives, the 1989 Ochoco National Forest Land and Resource Management Plan (Forest Plan) would need to be amended. The Big Summit Wild Horse Territory is not a separate management area under the LRMP. LRMP 4-140 states that The Big Summit Ranger District wild horse territory will be managed for a base herd of 60 horses, as outlined in the Wild Horse Management Plan, Appendix I. The decision resulting from this analysis would replace that statement and Appendix I of the LRMP with overall guidance that allows for an adjustment to the AML based on ecological conditions. See Appendix A for a description of the amendment and the substantive requirements that are relevant to this amendment pursuant to planning regulations at 36 CFR 219.8 – 219.11.

Comparison of the Alternatives

The following chart displays the AML range for each alternative Figure 5. The horizontal line indicates the minimum horse numbers currently in or around the territory based on recent census data. Alternatives 1 and 2 show AMLs that are below the current number of horses, while Alternative 3 shows an AML range above the current number of horses.

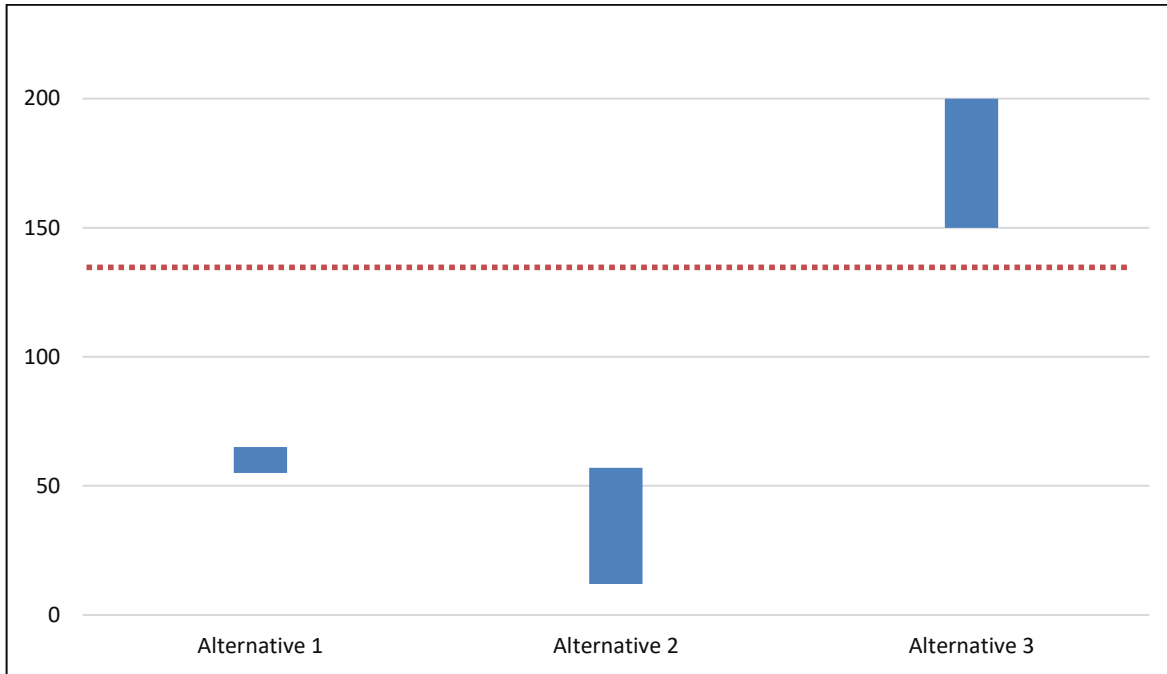


Figure 5: AML range by alternative and current estimate of number of wild horses.

The following table on the following page displays a summary of the Key Issue analysis (Table 2).

Table 2: Comparison of the Alternatives for the Key Issue of AML.

	Alternative 1	Alternative 2	Alternative 3
Attribute	AML of 55-65	AML of 12-57	AML of 150-200
Forage Availability and Condition	Exceedance of allowable use standard and guideline at high AML during above-average snowfall years. High riparian utilization levels with continued unsatisfactory riparian conditions. Projected winter range riparian use level 46% - 32% during above-average winters	Allowable use levels would be exceeded in riparian areas until AML reached; recovery of riparian conditions in the long term. Projected winter range riparian use level 30% during above-average winters	High utilization levels in riparian areas and exceedance of allowable use standard and guideline; long-term negative impacts to riparian condition. Projected winter range riparian use level 86% - 73% during above-average winters
Genetic Health	Observed heterozygosity is expected to remain below recommended critical level and continue to decline. Fitness of the herd would be expected to decline.	Increase in observed heterozygosity is expected due to importing wild horse mares. Continuous monitoring of genetic variability and input based on expert recommendations would guide future actions to maintain genetic variability.	Observed heterozygosity is expected to remain below recommended critical level and continue to decline. Fitness of the herd would be expected to decline.
Population Growth Control	Capture and removal only, requiring longer time to reach	Capture and removal of about 78 excess horses to bring numbers	

	Alternative 1	Alternative 2	Alternative 3
	high AML. 70 excess horses to be removed; then approximately 11-26 excess horses to be removed during periodic gathers. Estimated 5-10 years to reach AML	below but near high AML; then 10 to 20 excess horses to be removed during periodic gathers. Fertility control would be implemented to stabilize herd size and minimize need for gathers. Estimated up to 5 years to reach AML	Fertility control would be implemented once population grows to AML to stabilize herd size and minimize need for gathers.

Summary of Alternatives Considered but not Analyzed in Detail

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action expressed concerns they had with the proposed action and in some cases provided suggestions for a different course of action. Most of those issues are addressed with analysis or were used to develop the Alternatives, as described previously in this chapter. Alternatives or project design that were considered but dismissed from detailed consideration are summarized below.

No Capture

Some people have expressed opposition to horse capture practices. An alternative that would address this was considered. The population level would have to be managed by methods other than capturing and removing wild horses in excess of the identified AML. This alternative will not be analyzed in detail because it is not consistent with law, regulation, and policy; there is no known method for reducing the population to the desired AML when an overpopulation exists without capturing the excess horses and therefore it would not be feasible; the Act requires that horses above AML be removed from the range.

No Active Management

This alternative would have addressed public opposition to active horse management. The current number of wild horses in the Territory (about 135) would be considered the high end of the AML range, with 55 being the low end. The main component of this alternative is that the population would not be managed to maintain the AML. This alternative sets an arbitrary AML based on the number of horses that are currently present without considering a thriving natural ecological balance. The AML is not based on resource concerns or consideration of the limiting factors in the territory. The high end of this AML is close to the low end of the Alternative 3 AML; therefore effects would be similar at least in the short term, particularly in terms of exceeding seasonal forage availability and off territory movement of horses. This alternative would not meet the purpose and need, is not consistent with law, regulation and policy, and therefore will not be analyzed in detail.

Chapter 3: Affected Environment and Environmental Consequences

Introduction

This section of the EA considers the environmental consequences of implementation of the various alternatives. The following discussion of effects follows CEQ guidance for scope (40 CFR 1508.25(c)) by categorizing the effects as direct, indirect, and cumulative. The focus is on cause and consequences. For this analysis, in general, direct and indirect effects have been discussed in the context that most readers are accustomed to: those consequences which are caused by the action and either occur at the same time and place, or are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR 1508.8). Cumulative effects are discussed where there is an effect to the environment which results from the incremental effect of the action when added to other past, present, or reasonably foreseeable future actions (40 CFR 1508.7).

The temporal and spatial scale of the analysis is variable depending upon the resource concern being evaluated, particularly for cumulative effects. The landscape within the Big Summit Territory is the focus of this EA, but adjacent lands are considered in portions of this analysis process where applicable.

Interdisciplinary Team Specialist Reports

The interdisciplinary team (IDT) includes Forest specialists for each discipline (see Chapter 4, section 4.4 for team members and their qualifications). Specialists on the IDT prepared technical reports to address the affected environment and expected environmental consequences of proposed action and alternatives. All reports are maintained in the project file, located at the Ochoco National Forest headquarters office in Prineville, Oregon. In some cases, this chapter provides a summary of the report and may only reference technical data upon which conclusions were based. When deemed appropriate, those parts of specialist reports that are not included in this EA are incorporated by reference (40 CFR 1502.41). For some resources there is no separate specialist report on file and the entire topic is contained in the EA.

Role of Science

Scientific information improves the ability to estimate consequences and risks of alternative decisions. The effects of each alternative are predicted based on scientific literature and the professional experience of the Interdisciplinary Team (IDT) specialists. The conclusions of the IDT specialists are based on the best available science and current understanding. Relevant and available scientific information is incorporated by reference and a complete bibliography is included at the end of this EA. Referenced material is a consideration of the best available science.

Cumulative Effects

The following section on environmental consequences includes discussion of cumulative effects. Where there is an overlapping zone of influence, or an additive effect, this information is disclosed. In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed to those effects. This approach is consistent with Forest Service NEPA regulations at 36 CFR 220.4(f).

The following table shows projects and activities that have been considered by the interdisciplinary team when conducting cumulative effects analysis. Within each resource section, the specific activities that may

contribute to cumulative effects are described. Some resources may include more activities. See individual reports for details. The geographic scale of cumulative effects considerations can vary by resource.

Table 3: Ongoing and reasonably foreseeable future actions to be considered in cumulative effects analysis. Some of these projects or activities overlap the Bit Summit Wild Horse Territory; some are within a larger cumulative effects analysis area and do not overlap the Territory. Some resources may consider additional activities; see individual effects analysis.

Project / Activity	Status	Description
Vegetation Management		
Canyon Fuels and Vegetation Management Project (ROD 2010)	Implementation ongoing	Pre-commercial thinning, fuels management; hardwood and upland shrub restoration and road management; commercial treatments complete and are part of existing condition.
Howard Elliot Johnson Fuels and Vegetation Management Project (ROD 2011)	Implementation ongoing	Pre-commercial thinning, fuels management; Hardwood and upland shrub restoration; stream restoration; road management; commercial treatments complete and are part of existing condition.
Invasive Plant Treatments (EIS 2012)	Ongoing	Treatment of invasive plants based on annual plan, including riparian and wet meadow areas. Reduces extent of invasive plant infestations and protects areas not yet infested.
Walton Lake Restoration Project	Planning	Commercial and pre-commercial treatments, fuels management
Recreation / Special Uses		
Trails	Ongoing	Snowmobile, hiking and mountain bike trails
Powerline Maintenance	Ongoing	Maintenance includes removal of trees near powerlines, sometimes within RHCAs.
Travel Management (EIS 2011)	Ongoing	Motorized road and trail system area designated. Limits cross-country motorized access.
Grazing		
Marks Creek AMP, Big Summit AMP	Ongoing	Cattle and sheep grazing authorized through allotment management plans
Reservoir Allotment	Ongoing	Sheep grazing of two bands of 1,100 ewe/lamb pairs from June 16 to September 30

Wild Horses

Introduction

This section will cover the existing conditions in the Big Summit Territory including existing conditions of the wild horse herd, as well as the data and science providing the basis for those condition determinations. This section also provides the analysis of effects of the alternatives on wild horses, including the Key Issue. The Key Issue to be addressed is the AML as described in Chapter 1. The AML, or range of wild horse numbers to be managed within the Big Summit Territory, affects other natural resources like forage conditions, riparian vegetation, big game habitat, and permitted livestock. The AML also affects the wild horse herd, their cover and space needs, genetics, and social behaviors.

Regulatory Framework

Laws:

- The Wild Free-Roaming Horses and Burros Act of 1971 as amended (WFRHBA)
- The Federal Land Policy and Management Act of 1976 (FLPMA)
- The Public Rangelands Improvement Act of 1978 as amended (PRIA)

Regulation:

- 36 CFR 222 Subpart D, Management of Wild Free-Roaming Horses and Burros

Forest Service Policy and Direction:

- Forest Service Manual 2260-Wild Free-Roaming Horses and Burros (FSM 2260)
- Ochoco National Forest Land and Resource Management Plan (LRMP)
 - Forage and Livestock Use (4-11)
 - Forage Utilization Standards and Guidelines (4-141)

Analysis Methods

The analysis method is based on the review of existing conditions in the Big Summit Territory, relevant scientific literature, Forest Service Manual direction and professional expertise.

The existing conditions for the land and the wild horse herd were determined based on various data sets collected inside the Big Summit Territory including: surveys, photo points, Geographical Information System (GIS) data and personal observations. This will be discussed in detail in the Affected Environment section.

The factors to be analyzed for wild horses are:

- Herd Size (AML)
- Genetic variability
- Forage availability
- Fertility control
- Social behavior
- Wild horse capture and/or removal
- Off-range management

Affected Environment and Existing Conditions

The Big Summit Territory is located approximately 30 miles east of Prineville on the Ochoco National Forest. The Territory includes approximately 25,434 acres of forested habitat including Round Mountain and Duncan Butte. The general description of the Territory is a mix of ponderosa pine, Douglas-fir and other conifer trees with a variety of shrubs and grasses, creeks and small mountain meadows.

The Big Summit Territory is located in portions of the same legal description described in the 1975 EA:

T. 13 S., R. 20 E., Sections 20, 21, 27, 28, 29, 30, 31, 32, 33, 34, and 35

T. 13 S., R 19 E., Sections 34, 35 and 36

T. 14 S., R19 E., Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, and 24

T. 14 S., R 20 E., Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, and 18

The legal description from 1975 also estimated the acres at approximately 27,300 acres, of which, 27,060 acres is National Forest System lands, 160 acres are private ownership and 80 acres are public lands managed by the Bureau of Land Management (BLM). The 1975 EA also referenced a map which is shown in Figure 6. The Forest had previously used maps that depicted only the T.R.S. legal description; however, this map from the 1975 EA reflects the official Territory boundary and how the Territory has been actively managed on the ground because of fence locations, and it has been digitized into the Forest's Geographic Information System. GIS calculates the acres at 25,434, of which, 25,037 acres are National Forest System lands, 319 acres are private ownership and 78 acres are BLM. This is 7% less than the 27,300-acre figure

which was based on the legal description (see above) and which has previously been used in Forest Service documents related to the Territory (including the scoping notice for this project).

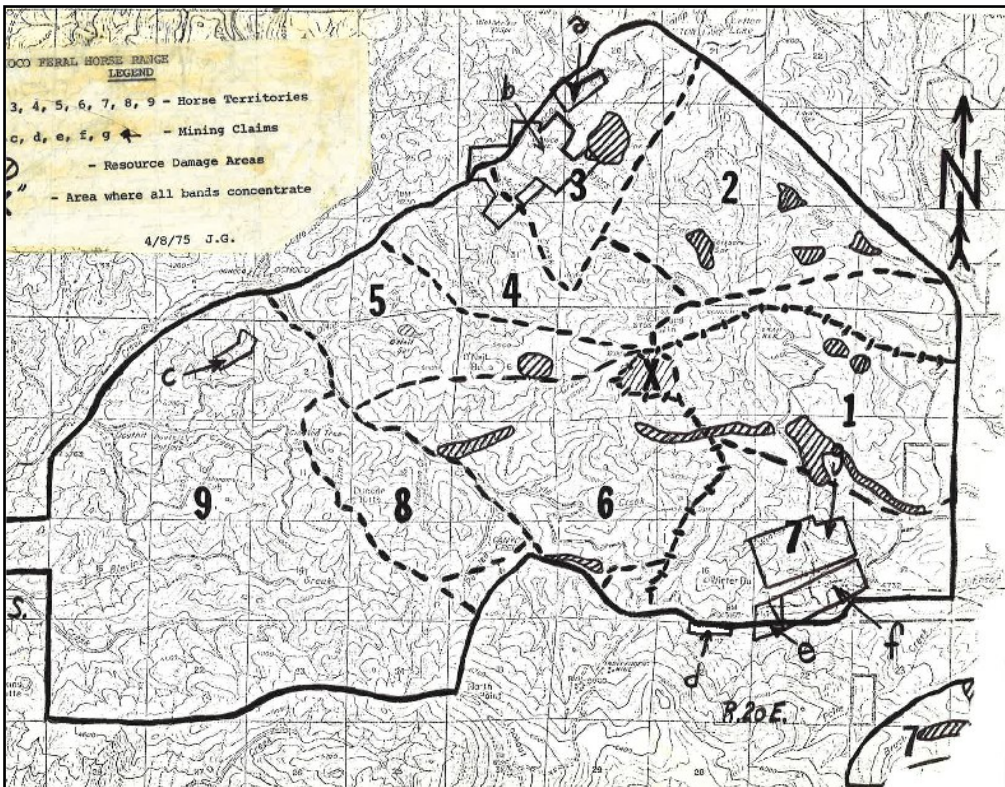


Figure 6: Big Summit Territory Map as delineated in the 1975 Environmental Assessment

There will be no effect on wild horses associated with this re-digitizing of the Territory because the Forest has always attempted to keep the horses on the eastside of the western boundary. For example, in 2008 and 2009, the majority of the horses were located west of the western boundary in the Coyle Creek area. The fence had an opening that in 2008 was replaced with a metal gate, and salt blocks were placed in the Territory and gates opened to lure horses back into the Territory. These salt blocks and gates were checked several times in 2008. Then on October 23, 2009, 24 horses were moved back inside the Territory from Coyle Creek by horseback.

Wild horses in the Big Summit Territory form several dynamic bands that range in size and kind; there are bachelor bands of between 3-5 horses and family bands anywhere from 3-20 plus horses depending on the time of year. Most horses tend toward dark bay and black coat colors with unique facial or body markings. In the late spring to summer, horses can be observed grazing in open meadows in great body condition while in the winter time, horses can be observed roaming for forage at the base of trees or on southern slopes where the snow is less of a barrier. During the winter horses tend to be in poorer body condition, with general body condition declining as the harshness of the winter increases.

The existing Ochoco Wild and Free-Roaming Horse Management Plan (Plan) was approved in 1975 following the passage of the Wild Free-Roaming Horse and Burro Act of 1971. This Plan set an Appropriate Management Level (AML) of 55-65 horses. The Ochoco National Forest Land and Resource Management Plan (LRMP) was approved in 1989 and states that the Territory will be managed at a maximum of 60 horses. The latest estimate (September of 2018) of the number of wild horses in and around the Big Summit Wild Horse Territory is 135 horses.

The resource elements selected to be focused on in this report are wild horses, upland forage, riparian forage and forage availability. Because this is an EA to develop an updated Herd Management (Territorial) Plan (HMP) for the wild horses in the Big Summit Territory, wild horses are the main focus. This would include

a description of the horses themselves, how they use the Territory, their social and genetic makeup and management actions. The other resource elements are focused on forage, a basic need for wild horses, but also the point of competition with other multiple uses managed for inside the Big Summit Territory and the driver for the AML.

Resource Element 1 – Wild Horses

Background

Horses originated in the project area around the 1920s according to the existing Herd Management (Territorial) Plan (USDA Forest Service, 1975a). According to this source these horses escaped from or were set loose by different ranchers in the surrounding areas including Post, Mitchell and Prineville. Ultimately, these free-roaming horses established their territories around Round Mountain and their numbers were kept at around 60 horses by local “horse chasers,” natural deaths and predators (USDA Forest Service, 1975a).

The passage of the Wild Free-Roaming Horses and Burros Act (Act) of 1971 established a need to protect horses and burros from “continuing depredation by man” (US Congress, 1971). When the Act passed, it gave authority to the Secretaries of Interior and Agriculture to manage wild free-roaming horses and burros as an integral part of the natural system. The Act also directed the Secretaries to designate specific areas on public lands for management and protection of horses. Any horses that were unbranded and unclaimed on designated public lands at the passing of the Act, would be protected and managed.

Once the Act was passed, Ochoco National Forest staff began the process to determine how many unbranded and unclaimed horses were on the public lands and where to establish the territory boundary. During that process, several claims were made of horses on public lands owned by surrounding individuals, those horses were then considered not unclaimed and removed off public lands and reunited with their owners. Ochoco National Forest staff also determined how many unbranded and unclaimed horses were occupying public lands at that time. They identified ten bands of horses, approximately 60 horses total, on approximately 27,300 acres the boundary of which was mapped and designated as the Big Summit Territory (USDA Forest Service, 1975b, Figure 7). They then completed an Environmental Analysis and established an AML of 55-65 horses.



Figure 7: Photograph of a wild horse band from 1977

The Ochoco wild horses on Big Summit Territory are typically of bay to black coloring and short stature. Many of the horses have some sort of unique markings to help identify individuals, including blazes (white facial markings) or stockings (white coloring on legs). Every June since 2003, in partnership with the Central Oregon Wild Horse Coalition, Forest Service volunteers have gathered for a three-day ground based wild horse inventory. The results of that annual inventory provide a minimum herd number which can be used to estimate a general trend over time (see Figure 8). Starting in 2014, individual horses were identified with photos and individual information was cataloged. A total of 123 horses are currently cataloged by the staff at the Lookout Mountain Ranger District. There are 57 studs, 55 mares and 11 unknowns identified, a proportion of 46% studs, 45% mares and 9% unknown. In 2018, in addition to the June ground based inventory which counted a minimum of 125 horses, in September 2018, an infrared flight detected 119 horses (Owyhee Aerial Research Inc. 2018), and when combined with the 16 horses observed by Forest Service staff outside the survey area, the number of horses at that time was estimated at a minimum of 135, which is over 2 times the maximum level of 60 horses allowed in the LRMP. Since it is reasonable to assume the gender ratio of the uncatalogued animals is similar to the ratio of the horses that have been catalogued we project that at that time we had at least 62 studs and 61 mares with 12 horses of unknown gender.

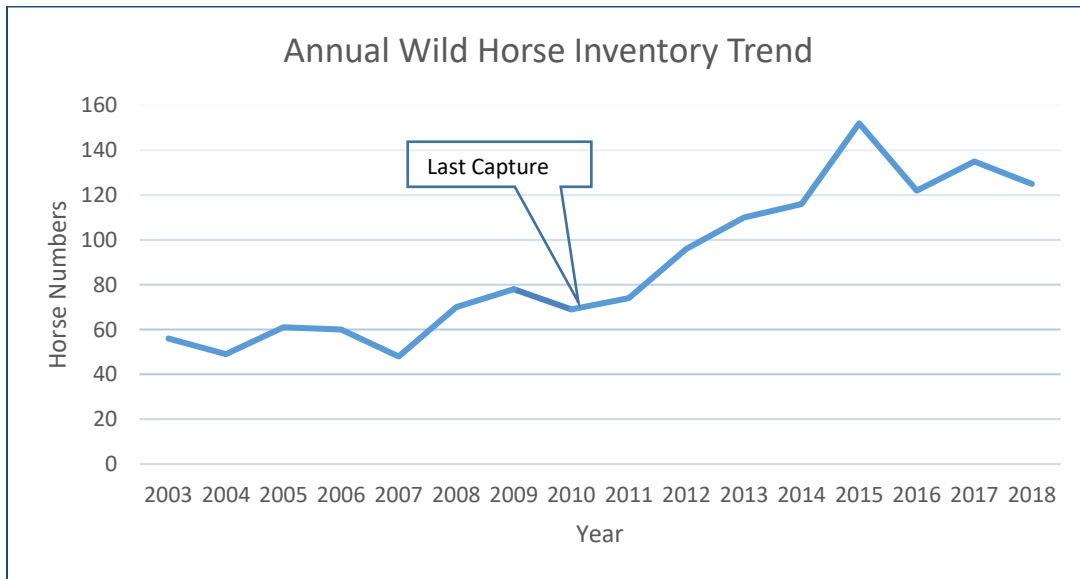


Figure 8: Herd size trends based on ground-based inventory.

The herd has been managed for the AML of 55-65 until the last capture of 2010, since then the herd has increased. The average population growth of this herd appears to be around 7-8% with high annual variation (see Figure 9 for annual variation). This growth rate does not account for annual changes in the number of wild horses due to gathers or known deaths in the Territory. The population changes are taken from the annual inventory which can have a high variability of detection; therefore, the annual inventory represents a minimum number of horses on the territory. Horse detection varies based on number of volunteers present, area covered, horse location, horse behavior, weather variabilities and so forth. There is little evidence of predation on the herd as a factor affecting population growth. While we know there are black bears and cougars present in the Territory, there are few personal observations of black bear or cougar kills on wild horses in the Territory. Lack of natural predators can exacerbate continued population growth above sustainable levels.

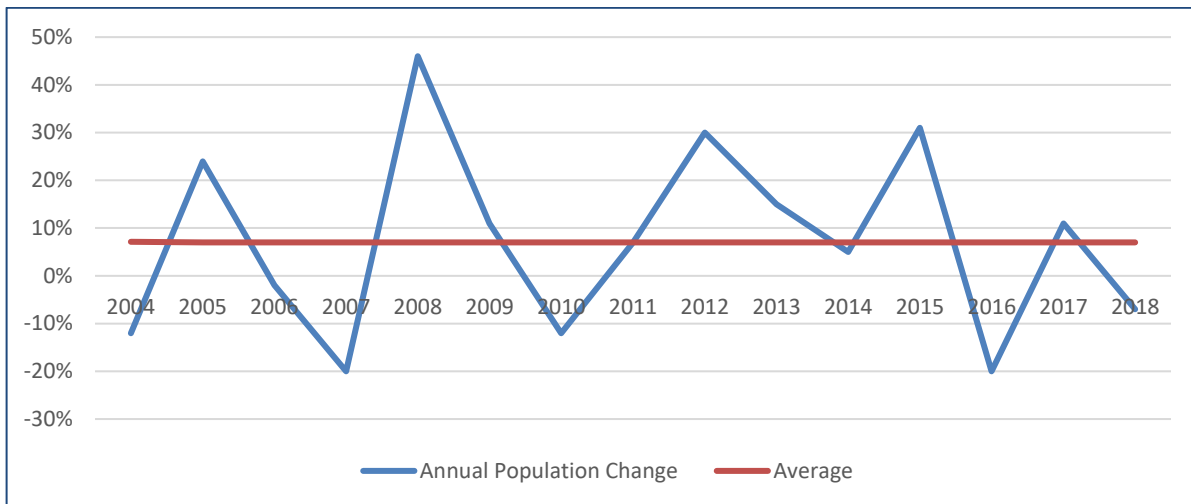


Figure 9: Annual population change of herd over time based on annual inventory. This does not account for annual changes to the inventory from gathers or known deaths in the Territory.

When the 1975 Ochoco wild horse plan was finished, implementation of the plan began with the first capture of wild horses in 1977. Continuous captures were then used to maintain the AML of 55-65 horses until 2011 (Table 4). In the 1970s through the early 2000s, excess horses were captured primarily using a combination of tranquilizer guns, wing traps and wranglers. Until 1981, excess wild horses were cared for and prepared for adoption through the corral located on the Ochoco National Forest near the old Big Summit Ranger Station (Figure 10). Beginning in 1981, excess wild horses were transported to the Burns wild horse facility in Hines, Oregon under an Interagency Agreement where they were processed, cared for and adopted out. In the early 2000s the primary method for capture and removals of excess wild horses was bait trapping. Excess wild horses were captured to maintain AML until 2011.



Figure 10: Photo of a horse off-range in the 1970s.

Table 4: Capture and Removal Data for the Big Summit Territory*

Date	Horses Gathered	Comments
1977	41	60% horses removed were studs, wing trap method, very little snow, all horses adopted within 2 months
1981-1982	27	About 50% horses removed were studs, all horses hauled to Burns BLM facility
8/3-8/25 1982	15	4 studs, 6 mares, 4 colts and 1 filly hauled to Burns BLM facility
1983	26	About 1/3 horses removed were studs, hauled to Burns BLM facility
1984	32	Just under 50% horses removed were studs, hauled to Burns BLM facility
1985	1	1 stud removed and hauled to BLM facility
1988	12	1/3 horses removed were studs, hauled to Burns BLM facility
1993	19	Severe winter in January required removal of horses staying on country road due to public safety concern, majority of horses in poor condition, hauled to the Burns BLM facility
1998	5	Hauled to the Burns BLM facility
1999	16	Hauled to the Burns BLM facility
2000	2	Hauled to the Burns BLM facility
2002	23	1/3 horses removed were studs, contract bait trap removal, hauled to the Burns BLM facility
2003	3	Bachelor band removed that was outside Territory, hauled to the Burns BLM facility
2004	2	Hauled to the Burns BLM facility
2005	1	Stud located on private land, hauled to the Burns BLM facility
2006	12	Hauled to the Burns BLM facility
2007	4	Hauled to the Burns BLM facility
2009	4	BLM capture contract, wing trap and helicopter, hauled to the Burns BLM facility
2010	18	3 bands captured by bait trap, 8 horses returned including 2 horses from the South Steins HMA
2012	1	Hauled to the Burns BLM facility
2015	2	Injured foal captured and Colt captured and adopted locally
2016	1	Injured mare adopted locally
2017	1	Yearling stud captured and removed, heavy winter left stud in poor condition, adopted locally
2018	1	Stud captured and adopted locally

* This does not include known and unknown deaths, shootings or Acts of Mercy of horses that occurred in the Territory.

Forest Service operations changed in 2014. First, the National Agreement between the Forest Service and BLM was changed to authorize payment for holding by the BLM of only Forest Service wild horses that were currently in long-term or short-term care and adoption of Forest Service wild horses that were in BLM facilities prior to October 13, 2013. According to the existing National agreement in the future local Forest Service offices are required to enter into local agreements if they wish to use the BLM to meet additional needs for handling wild horses newly removed from the Territory. These changes affected the gather and removal process for Forest Service wild horses and their placement into BLM holding facilities. Second, the Ochoco National Forest was preparing to update the herd management plan, including evaluating the AML determination based on changed conditions in the Territory.

Habitat

Within the approximately 25,434 acre Big Summit Territory, there are a variety of plant communities, conditions, slopes and aspects that make some areas primary habitat for horses and other areas less suitable. Horse observations within the Big Summit Territory appear to be consistent with research that shows that wild horses prefer slopes ranging from 0-19% (Ganskopp & Vavra, 1987). Also, research shows that canopy cover has direct effects on understory plants, which provide forage for wild horses. Specifically, once overstory canopy cover is higher than 40%, the understory resources are very limited (Jameson, 1967 and McConnell & Smith, 1965). This is classified as transitory range, the primary component of the Big Summit Territory. There are many studies that look at habitat use by horses, but they are primarily in very different habitats than occur within the Big Summit Territory (Ganskopp & Vavra, 1986, Miller, 1983, Crane et al., 1997, Salter & Hudson, 1979). Three conclusions from these studies appear to be applicable to the Big Summit Territory:

- Riparian areas are preferred habitat (Crane et al., 1997)
- Horses spend most of their time feeding (Crane et al., 1997 and Salter & Hudson, 1979)
- The availability of preferred forage plants appeared to be the primary habitat use indicator during all seasons (Salter & Hudson, 1979).

The Big Summit Territory has a wide variety of habitat in the 25,434 acres. For example, there are approximately 926 acres of riparian areas in the Territory. There is also a variable amount of varying slope and canopy cover categories throughout the Territory, that are open to the use of wild horses. Figure 11 below shows the acreage break out of different slope (up to 50%) and canopy cover categories in the Territory. In each of the three slope classes, over 40% is the dominant canopy cover category. Acreage in this canopy cover category would be considered the least suitable for wild horse habitat, however they would still be expected to occasionally travel through these areas.

Based on the apparent preferences listed above, not all areas are well suited to provide for the needs of wild horses nor are all areas utilized equally. The most suitable areas would be represented by abundant forage and gentle slopes; therefore, horses would be expected to primarily utilize the areas with 0-20% slope and less than 40% canopy cover (highlighted in Figure 11), which occurs on approximately 6,191 acres, or 24%, of the 25,434 acre Territory.

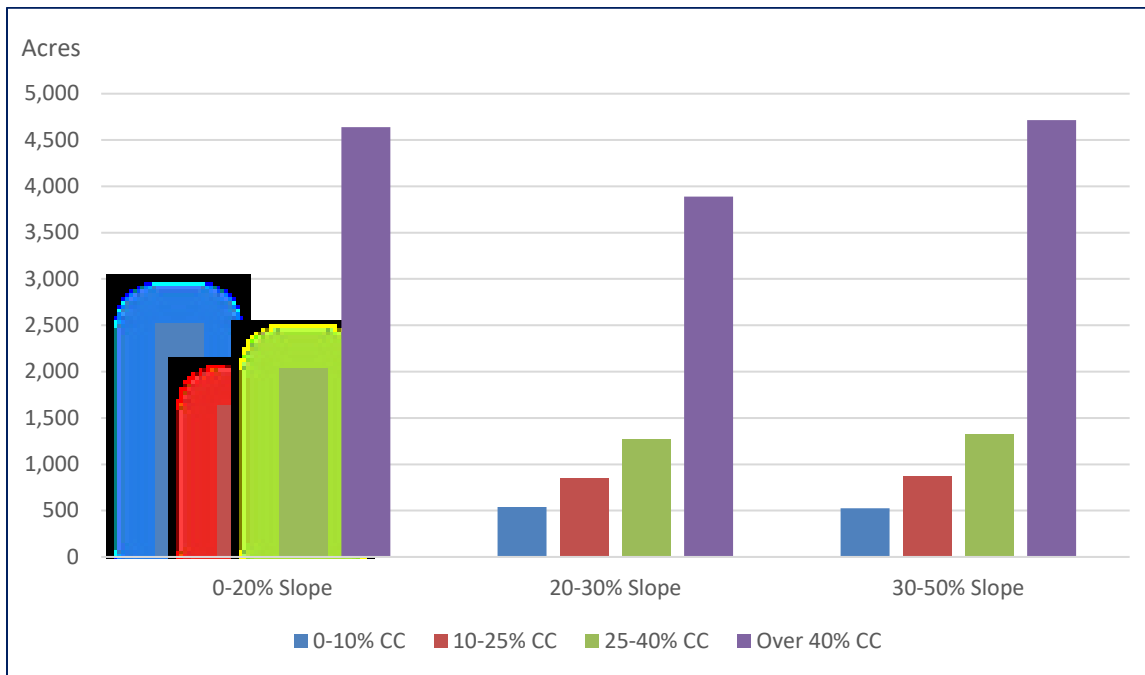


Figure 11: Big Summit Territory acres by Slope and Canopy Cover (CC)

Since 2003, a ground based inventory has been conducted annually including attempts to count horses that are outside of the Big Summit Territory. Although there is no discernable relation between total herd size and the number of horses outside the Territory, personal observations seem to indicate increased numbers has resulted in increased pressure on horses to attempt to move further outside of the Territory. Horses have been counted outside of the Territory every year although there is no way to determine how many horses are missed either inside or outside the Territory each year. While the Territory itself is free of any fences, there are fence lines that border the west side and eastside of the Territory and the south side is a mix of natural barriers and fences. The north side of the Territory is not bounded by a fence, but a let-down fence occurs 1-2 miles outside of the Territory boundary.

Wild Horse Winter Range

The determination of wild horse winter range (the area wild horses primarily use during winters with above average snowfall for which NRCS’s calculation of Snow Water Equivalent is used as a general surrogate) is a key component of the AML Analysis (see Appendix B). Through that process, we identified a winter range inside the Big Summit Territory of an estimated 4,942 acres to be used for forage calculations. This winter range was based on two winters with above average snowfall, 2008 (see Figure 12) and 2016, and the observed presence of horses during those winters. This wild horse winter range also partially overlaps with the General Forest Winter Range management area of the Ochoco LRMP, with a diverse mix of plant communities ranging from meadows to forested communities. There is also a high variety of slopes and canopy covers within this area. The wild horse’s pattern of habitat use during the winter varies depending upon the severity of the winter and the production of the prior growing season, however wild horses are consistently present in the area determined to be wild horse winter range during winter time.

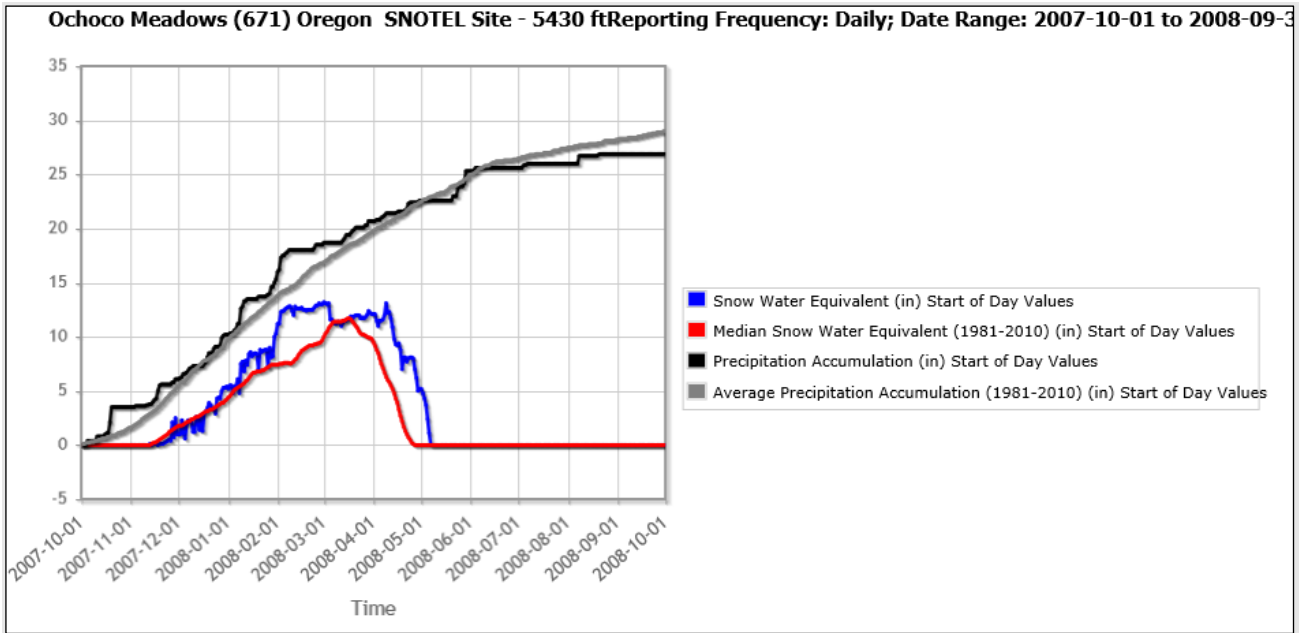


Figure 12: Graph of 2008 snow depth peak percentage

While there is not a clear pattern of habitat use, Salter & Hudson found, the horses in their 1979 study in the foothills of the Alberta Rockies, that the availability of preferred forage plants appeared to be the primary habitat use indicator during all seasons (Salter & Hudson, 1979). Salter and Hudson observed horses foraging in snow up to 60 cm (approximately 2 feet) in depth (the deepest snow during the study) and found that horses would paw in deep snow and horses could feed in shallow snow without pawing using their muzzle to push the snow away. Horses also took advantage of reduced snow-depths at tree bases and on south-facing slopes where reduced snow depth throughout the winter may be found (Salter & Hudson, 1979). Preferred forage plants are located on flatter slopes with canopy cover less than 40%, this makes up 839 acres, or 17%, of the estimated 4,942 acre winter range (highlighted in Figure 13). Slopes in the winter range vary from less than 5% to over 50%. Slopes and canopy cover classes are displayed by acres in the following chart (Figure 12).

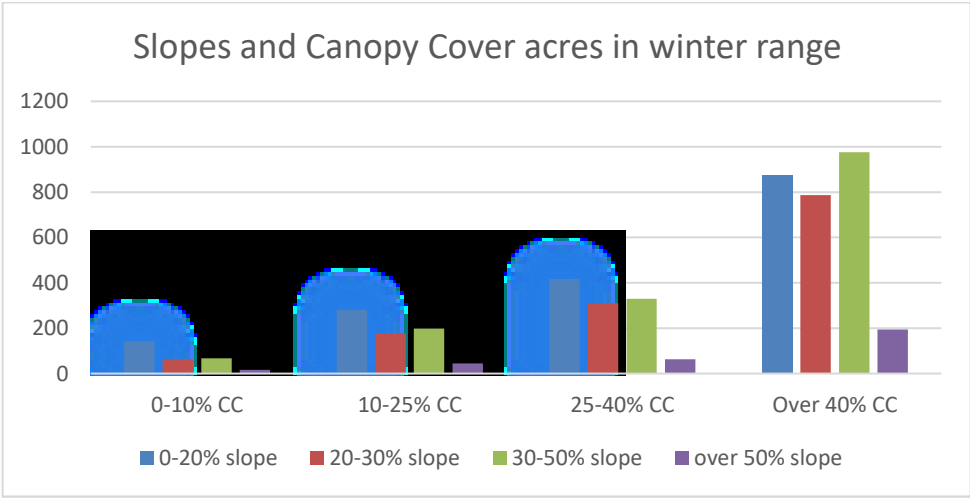


Figure 13: Slope and canopy cover class by acres in the wild horse winter range

Genetic Health

In the 2013 National Research Council's synthesis chapter for, Genetic Diversity in Free-Ranging Horse and Burro Populations, they indicate that, "Isolation and small population size in combination with the effects of genetic drift, may reduce genetic diversity to the point where herds suffer from the reduced fitness often associated with inbreeding. ... The maintenance of genetic diversity in a population is a function of the genetic effective population size. ... It was originally thought that an effective population size of at least 50 was necessary to avoid short-term inbreeding depression, but empirical work suggest that if maintenance of fitness is important, effective population sizes much larger than 50 are necessary. Theoretical studies suggest that the figure could be closer to 5000 for several reasons. ... so no single HMA or complex could be considered to have a [minimum viable population] size for the long term ..." (National Research Council 2013). Since it can easily be argued that maintenance of genetic health of a wild horse herd is required in order to meet the "thriving natural ecological balance" standard of the Act a description of the current genetic condition of the herd and how subsequent management actions associated with the alternatives will both monitor and manage the genetic condition of the herd are advisable.

Two genetic studies have been conducted on the Big Summit wild horses; both studies indicate low genetic variability. The first study, led by Dr. Mills from Florida International University, began in 2006 with the purpose of identifying a non-invasive sampling method for genetic testing and counting of the horses in the Big Summit Territory. The study unsuccessfully attempted to use fecal samples to identify individual horses. This method of sampling was not successful because the technology used could not distinguish between plant and animal DNA. As an alternative, horse hair samples were collected from captured and adopted horses or from "noon trees" within the Big Summit Territory. Horse DNA was successfully extracted from hair samples and amplified. This study also showed many of the captured horses were closely related which could be indicative of a small herd that is inbred; alternatively, the hair samples may have come from whole family units captured before the offspring and siblings could naturally disperse to other areas (Mills, 2010). An article published from the study (Deshpande et al., 2019) further discusses the deficiency of heterozygosity and a positive inbreeding coefficient from 33 samples of the Big Summit wild horses.

The second study was a genetics analysis of the Big Summit Territory horses which was completed in 2011 by E. Gus Cothran from Texas A&M University utilizing 12 samples which came from two different captured bands of six. DNA was extracted from the samples and tested for variation at 12 microsatellite (mSat) systems. As described in BLM Manual H-4700-1 Wild Horse and Burros Management Handbook, Section 4.4.6.2 Interpreting Genetics Data, the observed heterozygosity (H_o) is a measure of how much diversity is found, on average, within individual animals in a wild horse herd. H_o is insensitive to sample size, although the larger the sample, the more robust the estimate. The 2011 report indicated that the values related to allelic diversity are not reliable due to the smaller sample size but H_o is below the critical level and this measurement is not influenced by sample size. The mean H_o values for each band was 0.653 and 0.583, BLM identifies anything below 0.66 as at critical risk.

The genetic report concluded that, "[o]verall similarity of the Big Summit [Territory] herd to domestic breeds was low for a feral herd which is expected with a small sample size. Highest mean genetic similarity of the Big Summit [Territory] herd for both samplings was with the Old-World Iberian breeds, and the herd clustered with the Andalusian consistently. ... Although it is difficult to have much confidence in this result, the consistent evidence for Spanish relationship should be examined with a larger sample if possible (Cothran 2011). Cothran summarized that current variability levels for the Big Summit herd are below the critical level. Cothran explained that the H_o values suggest that the herd has serious variability reduction and that more information is needed before specific management actions can be recommended.

Resource Element 2-Upland Vegetation

Of the 25,434 acres inside the Big Summit Territory, approximately 24,508 acres or 96% is composed of upland plant associations that provide some forage. These plant associations are categorized as transitory range. Transitory range is defined as forested lands that are suitable for grazing for a limited time following



a complete or partial forest removal (Holechek et al., 2000). These transitory range uplands primarily consist of an overstory tree canopy, typically ponderosa pine or Douglas-fir, with an understory of mixed grasses and forbs. These areas have been mapped into plant association groups (PAG) in Geographical Information Systems (GIS). Seventy-five percent of the upland forage acreages in the Big Summit Territory falls into 5 plant association groups, these are listed in Table 5. The remaining twenty-five percent of forage acreage is a mix of non-forested plant association groups including those characterized by shrubs and juniper.

Table 5: Five major plant association groups (PAG) comprising 75% of upland forage acreage in the Big Summit Territory

PAG Code	Plant Association Group	Acres	Percent of Uplands
CWG113	Grand fir/pinegrass	7,576	31%
CDG112	Douglas-fir/pinegrass	5,202	21%
CWG211	Grand fir/brome	2,583	11%
CPG222	Ponderosa pine/bitterbrush/elk sedge	1,517	6%
CDS D	Douglas-fir/mountain mahogany	1,386	6%

Upland vegetation ratings were assessed using existing Parker 3-Step Condition and Trend (C&T) transects (Parker, 1951) in or adjacent to the Territory. The adjacent clusters (Reservoir 1 & 2) were used to represent conditions of the Territory because there are no barriers between the Territory and the clusters so horses can be, and there is evidence of them being present in those areas. C & T clusters consider frequency of upland species along a 100 foot transect(s) including identifying species presence. When this protocol is repeated over time, changes can be detected and apparent trends of vegetation changes can be determined. There are two C & T clusters that were utilized for determining upland vegetation ratings in the Big Summit Territory (Figure 14). At the monitoring sites, the vegetation ratings were fair to poor, with the latest reading on the clusters in 2015. The data from these vegetative ratings displays a downward trend (see Table 6) from 2004 to 2015.

Table 6: Conditions and Trend (C & T) Parker 3-Step Upland Vegetation Ratings within the Big Summit Territory

	Plant Association Group	Vegetation Rating			
		Reading 1 (1964)	Reading 2 (2004)	Reading 3 (2015)	Overall Trend
Canyon Creek C&T2a	Ponderosa pine/elk sedge	FAIR	GOOD	FAIR	
Reservoir C&T 2*	Ponderosa pine/elk sedge	GOOD	GOOD	FAIR	

*Adjacent to the Territory



Figure 14: Photos of Canyon Creek C & T 2a, Transect 3 (example)

Nested Frequency transects in and adjacent to the Territory were also established in 2015 and read at existing C&T monitoring sites. Nested Frequency is another way to collect upland vegetation frequency data and detect changes over time which represent apparent trends (Figure 15). The nested approach has the advantage of more sensitivity in capturing the frequency of each lifeform and is less sensitive to the effect of year-to-year climatic fluctuations and the subsequent variation in plant canopy coverage that occurs (USDA Forest Service, 2007).



Figure 15: Photo of Canyon Creek Nested Frequency 2a, Belt 1 (example)

Because only one reading has occurred, no trend information is available from the data. These measures and rating results are represented in the Table 7 that follows.

Table 7: Nested Frequency Data results in the Big Summit Territory

Site	Plant Association Group	Successional Stage	Dominant Cover Type
Canyon Creek NF 1	Dry Meadow	Mid-seral	Litter (45%)
Canyon Creek NF 2	Dry Meadow	Mid-seral	Litter (61%)
Canyon Creek NF 2a	Ponderosa pine/elk sedge	Mid-seral	Litter (74%)
Reservoir NF 1	Dry Meadow	Early to Mid-seral	Litter (52%)
Reservoir NF 2	Ponderosa pine/elk sedge	Mid-seral	Litter (78%)

The Ochoco National Forest LRMP sets forage objectives and Desired Future Condition (DFC) (USDA Forest Service, 1989). Specifically, the forage objectives and DFCs are to have range conditions in good or excellent. Based on the C & T data at the two ponderosa pine/elk sedge upland communities, which represents upland forage condition, neither of these sites have met the forage objective of good condition, they are currently in fair condition with an apparent downward trend. Furthermore, the LRMP provides forage upland utilization standards and guidelines to be applied based on a site's current conditions (satisfactory or unsatisfactory). Satisfactory condition is defined in the LRMP as forage condition is at least fair, with stable trend while unsatisfactory condition simply does not meet the criteria for satisfactory condition. Therefore, currently our uplands inside the Big Summit Territory are in unsatisfactory forage condition and do not meet the forage objectives or DFCs of the LRMP.

There are many factors that have led to the current forage condition of the uplands. These include historic grazing practices and increased forest canopy cover because of limited vegetation management activities, specifically logging activities and fire management. As stated previously, the majority of upland vegetation is transitory range whose production declines as forest canopies fill in and close, usually requiring a disturbance that opens the forest canopy in order to increase forage production. In other words, understory production is inversely related to overstory cover, "cutting and burning of the forest may promote development of understory vegetation" (Holechek, et al., 2000).

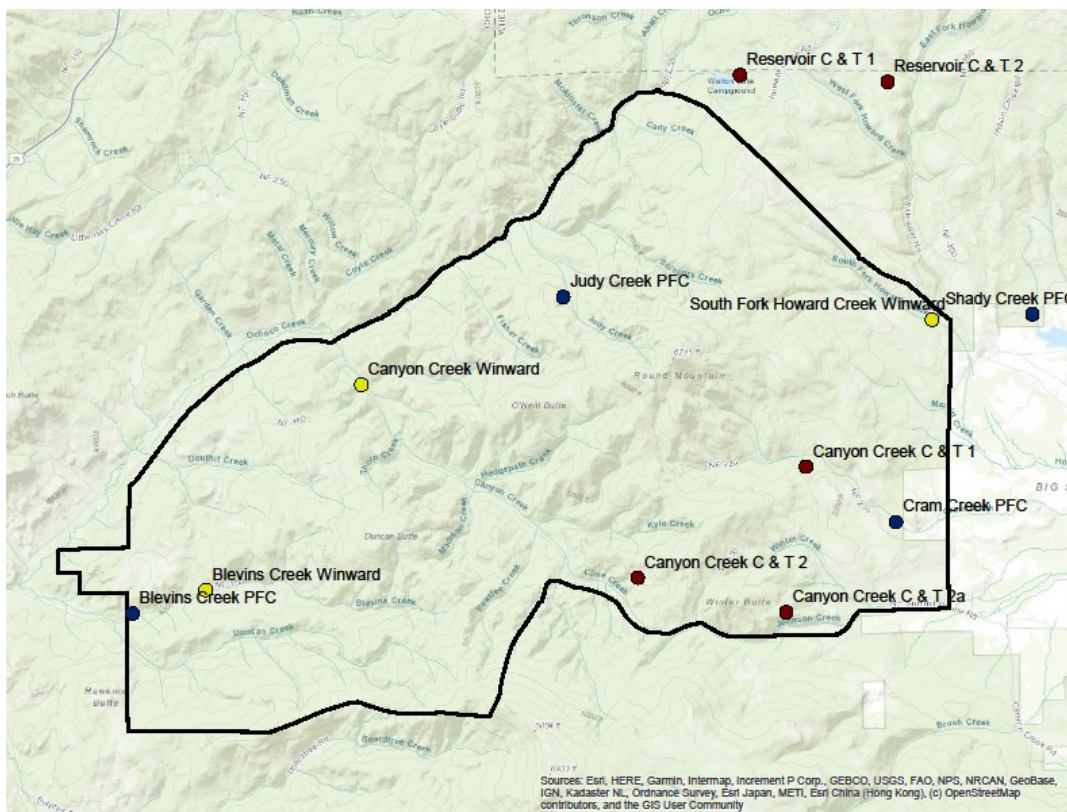


Figure 16: Data points spread throughout and adjacent to the Territory

Resource Element 3 – Riparian Vegetation

There are approximately 926 acres of riparian areas producing forage inside the Big Summit Territory. Plant Association Groups (PAG) are mapped for these areas in the Potential Natural Vegetation (PNV) layer of our Geographical Information Systems (GIS). There are six Plant Association Groups (PAGs) that comprise the riparian areas inside the Big Summit Territory, these are listed in Table 8.

Table 8: PNV groups of riparian forage in the Big Summit Territory

PNV Code	Plant Association Group	Acres	Percent of Riparian Areas
FW50	Wetlands	336	36%
SW20	Alder wetlands	254	27%
MD	Dry Meadow	152	16%
MW	Wet Meadow	133	14%
HQ	Quaking Aspen	40	4%
HC	Poplar Bottomlands	11	1%

Riparian vegetation was assessed using the C & T surveys for the Dry Meadows, Winward Riparian Studies and Proper Functioning Condition (PFC) assessments. The C & T data summaries can be found below in Table 9. For the three C & T clusters in Dry Meadows, one cluster was in fair vegetative rating and two were in poor vegetative rating. Data from clusters Canyon Creek 2 displays poor vegetative condition and is in an apparent static trend from 2004 to 2015, data from Canyon Creek 1 displays a fair forage condition with a downward trend from 1964 to 2015 and data from Reservoir 1 (Figure 17) displays a poor forage condition in a downward trend from 2004 to 2015.

Table 9: Conditions and Trend (Parker 3-Step) Data Summaries for Riparian Areas




	Community Type	Vegetation Rating			
		Reading 1 (1964)	Reading 2 (2004)	Reading 3 (2015)	Overall Trend
Canyon Creek C&T 1	Dry Meadow	GOOD	Not located	FAIR	
Canyon Creek C&T 2	Dry Meadow	POOR	POOR	POOR	
Reservoir C&T 1	Dry Meadow	POOR	POOR	POOR	



Figure 17: Reservoir C & T 1, Transect 2 (example)

Winward Riparian Studies consider three indicators of riparian conditions: greenline composition, vegetation cross section composition and woody species regeneration (USDA Forest Service, 2007 and Winward, 2000). Greenline composition indicates the relative cover of a plant species or community type in relation to other species or types along the water’s edge. Vegetation cross section composition identifies the percentage of each vegetation community type in the riparian complex. Woody species regeneration captures the presences and condition of woody species on the greenline. Successional status can be derived from the greenline composition and vegetation cross section data collected. This in turn provides a general representation of riparian vegetation. In addition, woody species conditions and apparent trends can be determined. There were three Winward Riparian Studies read in the Big Summit Territory in 2015. Each of the three sites display variable conditions, the only consistency across the Territory is that all three sites display early to mid-seral successional status meaning the existing vegetation is indicative of the composition expected relatively recently following a disturbance. See Table 10 for information on the data collected at the studies.

Table 10: Winward Riparian Study data results for riparian vegetation in the Big Summit Territory

Drainage	Year	Cross-section Status	Greenline Status	Greenline Stability
Canyon Creek	2005	Early-seral	Mid-seral	Good
	2015	Early-seral	Mid-seral	Moderate
	TREND	↑	↑	↓
Blevins Creek	2005	Early-seral	Mid-seral	Good
	2015	Early-seral	Mid-seral	Moderate
	TREND	↓	↓	↓
SF Howard Creek	2005	Early-seral	Early-seral	Moderate
	2015	Early-seral	Mid-seral	Moderate

Drainage	Year	Cross-section Status	Greenline Status	Greenline Stability
	TREND	↓	↑	↔

Ratings from Winward data are categorized as successional status, the higher percentage of undisturbed community types (late seral), the later the successional status. A determination of whether a forage range condition is satisfactory or unsatisfactory can be derived by considering the successional status. Fair to good range conditions usually are associated with mid and high (equivalent to late) seral stages (equivalent to successional status) or potential natural vegetation (E.L. Smith, et al., 1995) and very early and early (equivalent to low) seral stages are considered roughly equivalent to poor range condition. The vegetation cross-section composition data may be considered the most informative regarding site response to grazing disturbance because it generally includes the range of vegetation communities within the riparian complex, including those that may be preferred by livestock and those that are most sensitive to grazing related disturbance. The data displays that all three sites in the Territory are dominated by early-seral species in the cross section ranging from 74-79% early seral species. Two of them are in an apparent downward trend from 2005-2015 (Figure 18) and one in an apparent upward trend from 2005-2015. Because all three sites are dominated by early-seral species, this could be considered roughly equivalent to a poor range condition, confirming that these riparian areas are in unsatisfactory condition.



Figure 18: Photo of Winward Blevins Creek-Cross-Section 3 (example)

Three Proper Functioning Condition (PFC) assessments were conducted inside the Big Summit Territory and one, Shady Creek, is adjacent to the Territory where horses have been seen and have no barriers for moving in and out of the area. The User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas (USDI BLM, 1998) states that, “Proper functioning condition (PFC) is a qualitative method for assessing the condition of riparian-wetland areas.” Under the PFC protocol, creeks are broken into reaches and each reach is walked by an inter-disciplinary team and rated considering hydrologic, vegetative and erosional/depositional attributes and processes. Functional ratings and trends are qualitative, providing an initial assessment of condition. See Table 11 for PFC ratings conducted within the Big Summit Territory by the ID Team(s).

Table 11: Proper Functioning Condition Assessment Results for the Big Summit Territory

Drainage	Reach	Distance	Functional Rating / Trend
Blevins Creek	1	0.75 miles	Functioning at Risk with No Apparent Trend
	2	0.25 miles	Functioning at Risk with No Apparent Trend
	3	0.25 miles	Functioning at Risk with No Apparent Trend
	4	0.75 miles	Functioning at Risk with No Apparent Trend
Cram Creek	1	0.75 miles	Functioning at Risk with a Downward Trend
	2	0.75 miles	Functioning at Risk with No Apparent Trend
	3	0.5 miles	Functioning at Risk with No Apparent Trend
	4	0.75 miles	Functioning at Risk with No Apparent Trend
	5	0.5 miles	Functioning at Risk with a Downward Trend
	6	0.5 miles	Functioning at Risk with No Apparent Trend
Judy Creek	3	0.75 miles	Functioning at Risk with a Downward Trend
	4	0.5 miles	Nonfunctional
	5	0.75 miles	Proper Functioning Condition
Shady Creek	1	0.5 miles	Functioning at Risk with an Upward Trend
	2	0.25 miles	Functioning at Risk with a Downward Trend

Additional information on riparian areas, such as stream survey data, can be found in the Aquatics Report; this additional data is consistent with a general unsatisfactory rating for the majority of the riparian areas in the Big Summit Territory.

The Ochoco National Forest LRMP sets objectives and describes desired future conditions for rangeland vegetation (USDA Forest Service, 1989). Specifically, the LRMP sets an objective and expresses a desire that forest management will result in most riparian areas being in excellent condition by 2040. Based on the data collected from the C & T clusters at the three dry meadow communities, the three Winward riparian studies and the four PFC assessments, none of the riparian areas assessed within the wild horse winter range are in good or excellent condition. Utilization rate standards and guidelines are set forth in the LRMP and are determined for each site depending upon, community type, current condition and “range resource management level” (management intensity). Satisfactory condition is defined in the LRMP as forage condition is at least fair, with stable trend, while unsatisfactory condition simply does not meet the criteria for satisfactory condition. Currently the riparian areas inside the wild horse winter range are in unsatisfactory condition and do not meet the forage goal of the LRMP (Figure 19). Therefore utilization rate standards and guidelines that should be applied for riparian areas within the Big Summit Territory are those that apply to riparian areas in unsatisfactory condition.



Figure 19: Photo Wild Horses using Riparian Area on Douthit Creek

There are many factors that have led to the existing conditions for the riparian areas in the Big Summit Territory. These are similar to the factors which affected upland range conditions which include historic grazing practices and vegetation management practices like logging and fire management. While upland forage production has an inverse relationship with overstory canopy cover, riparian forage production is inversely related to depth of water tables. Many stream channels within the project area have down cut at some point in the past, resulting in a lowering of the water table and a loss of riparian forage. Riparian forage is often utilized by many species and occurs in areas of gentle slopes that most foraging species prefer. At current wild horse numbers, riparian areas within the wild horse winter range (and elsewhere) are showing consistent exceedance of the LRMP utilization rate standards and guidelines.

In the 1975 Environmental Analysis for the original herd management plan, 14 springs were identified in the Territory with five showing heavy use, seven medium use and one light use. In addition, 18 creeks in the Territory were referred to in that analysis with 12 showing heavy use, five medium use and one light use. Although monitoring efforts in recent years did not mimic all of the data collection that occurred for the 1975 analysis, there are still springs and creeks in the Territory that range from heavy through light use, for example, both Douthit spring (Figure 19) and Cram creek (Figure 20) currently display heavy use.



Figure 20: Photo showing hardwood utilization on Cram Creek inside the Territory

Competition for riparian forage between livestock, horses, and wildlife is limiting the regeneration and growth of hardwoods within the project area. While Winward Riparian data (Table 12) shows that there are an increase in the percent of young and saplings over time and there are more young than decadent or dead hardwoods present, livestock, horses and wildlife are limiting their growth by browsing. In this photo example above (Figure 20), the hardwood would be considered a young or mature tree based on the number of stems and should be between 4.5 to 6 feet tall (Burton, et al., 2007), instead the hardwood is less than 12 inches tall due to the heavy browsing. Horses have been documented frequently in riparian areas and some studies have shown that horses consume or otherwise impact riparian shrubs decreasing the shrubs' height or impacting shrub presence (Davies & Boyd, 2019) (Beever & Brussard, 2000). In addition, both Nordquist, et.al. (2012) and Bork, et.al. (2012) found that horse use of browse increased in the winter. This is evident in the growth form and heavy browse use of hardwoods found throughout the wild horse winter range (Figure 21).

Table 12: Winward Riparian Study data results for hardwoods in the Big Summit Territory

Drainage	Year	Hardwoods				
		% Seedling/ Sprout	% Young/ Sapling	% Mature	% Deca- dent	% Dead
Canyon Creek	2005	5%	10%	81%	0%	5%
	2015	7%	22%	63%	8%	0%
Blevins Creek	2005	4%	29%	66%	0%	0%

	2015	0%	68%	25%	0%	0%
SF Howard Creek	2005	5%	15%	77%	1%	2%
	2015	40%	23%	12%	10%	15%



Figure 21: Photo of hardwood growth form in wild horse winter range

Resource Element 4-Forage Allocation

The designation of a Territory in accordance with the Wild and Free Roaming Horses and Burros Act (as amended) authorizes the additional multiple use of wild horses on those public lands, not the exclusive use. As stated in the Senate Report that accompanies the Act, “the principal goal of the Act was to provide for protection of horses from man and not...the single use management of areas for the benefit of wild free-roaming horses and burros. It is the intent of the committee that the wild free-roaming horses and burros be specifically incorporated as a component of the multiple-use management plans governing the use of the public lands” (US Congress, 1971).

The LRMP provides guidelines for allowable use of forage for the multiple resources managed by the Ochoco National Forest. The standard and guideline allows for different allowable use levels depending upon: community type (riparian communities or primary range communities) Range Resource Management Level (B-D based on management intensity), and the forage condition of the communities (satisfactory or unsatisfactory). These tables prescribe the allowable cumulative annual use by big game and livestock which includes wild horses in the Big Summit Territory. See Table 13 and Table 14 for specific allowable use levels.

Table 13: Forest Plan Riparian Communities Forage Utilization (LRMP 4-141)

Range Resource Management Level	Grassland Communities		Shrubland Communities	
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
B-Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range.	40%	0-30%	30%	0-25%
C-Livestock management to achieve full utilization of allocated forage. Management systems designated to obtain distribution and maintain plant vigor include fencing and water developments.	45%	0-35%	40%	0-30%
D-Livestock managed to optimize forage production and utilization. Cost-effective cultural practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50%	0-40%	50%	0-35%

Table 14: Forest Plan Primary Range Communities (except Riparian) Forage Utilization (LRMP 4-141)

Range Resource Management Level	Forested Communities		Grassland Communities		Shrubland Communities	
	Sat.*	Unsat.*	Sat.*	Unsat.*	Sat.*	Unsat.*
B-Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range.	40%	0-30%	40%	0-30%	30%	0-25%
C-Livestock management to achieve full utilization of allocated forage. Management systems designated to obtain distribution and maintain plant vigor include fencing and water developments.	45%	0-35%	45%	0-35%	40%	0-30%
D-Livestock managed to optimize forage production and utilization. Cost-effective cultural practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50%	0-40%	50%	0-40%	50%	0-35%

Since the Wild Free-Roaming Horse and Burro Act of 1971 (WFRHBA) requires the Secretary to manage wild horses at a “minimal feasible level” range resource management level B is the level that corresponds to this management intensity. Because actual utilization levels within the Big Summit Territory and many research studies indicate that wild horses prefer riparian areas with flat slopes (Ganskopp & Vavra, 1987), the riparian communities allowable use rates are expected to be reached first. Lastly, as previously discussed riparian community conditions inside the wild horse winter range are in unsatisfactory condition.

The allowable use standard and guideline (for use by big game, livestock and wild horses) for Grassland Riparian Communities in unsatisfactory condition, managed under the Range Resource Management Level B is 0-30% (see Figure 22 on allowable forage use). The remaining 70% of the forage production in the Grassland Riparian Communities in the Territory is reserved to meet the objectives of “improving ecological condition and plant community stability” (LRMP 4-11).

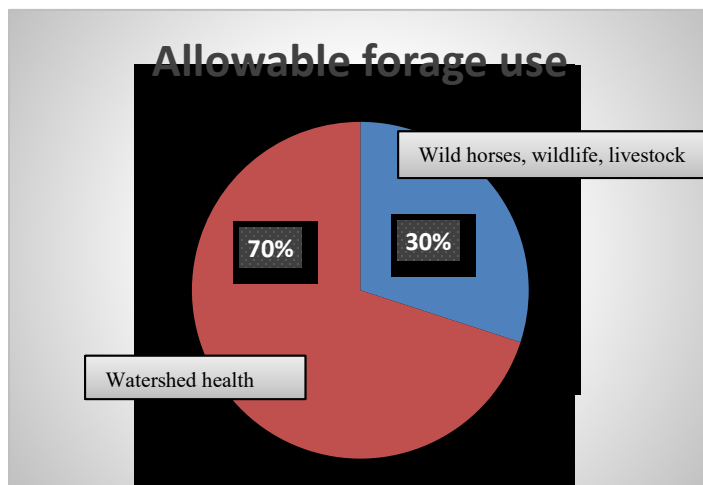


Figure 22: LRMP allowable forage use standard.

When considering the AML for the Big Summit Territory, other multiple-uses in the area must be considered and the allowable use standard and guideline from the LRMP must be followed. Forage available under the cumulative allowable use rate of 0-30% (see Appendix B: AML Analysis) must be divided amongst wild horses, wildlife and permitted livestock. On October 26, 2017, three riparian area sites in the winter range were measured for utilization and ranged from 71-80% riparian forage utilization. On September 27, 2018, these same three riparian areas were measured for utilization and ranged from 58-77% riparian forage utilization with permitted livestock rested this year. While permitted livestock numbers have stayed the same since the 1975 plan was written, both wildlife and wild horse numbers have increased causing a current shortfall of available forage based on resource conditions and periodic exceedance of allowable use rates as shown in the winter range utilization monitoring.

Summary of Affected Environment

Summary of the monitoring information indicates that overall resource conditions have declined since the 1975 Herd Management plan was implemented. There are several factors that have contributed to this resource decline. The biggest factor that appears to have affected upland forage condition is the increased conifer canopy cover. However, there appear to be several factors that have affected riparian condition, including conifer encroachment and loss of water table as well as a shortfall of available forage resulting in periodic exceedance of the allowable use standard and guideline. The current number of wild horses are contributing to the declined riparian conditions, as riparian areas have been repeatedly over-utilized. The allowable use level standard and guideline is based on current resource conditions and must be partitioned among all of the multiple species competing for forage; in the Big Summit Territory this includes permitted

livestock, wildlife species and wild horses. While permitted livestock numbers have remained the same since 1975, wildlife and wild horse numbers have increased resulting in an available forage shortfall.

Environmental Consequences

All three Alternatives include actions that will have varying effects on wild horses and forage. The affected environment discussion above categorized the four resource elements considered in this section: wild horses, upland vegetation, riparian vegetation and allowable use of forage and discussed the existing conditions in these categories. Table 15, below, lists the attributes and measures that are used in the effects analysis to compare the alternatives.

Table 15: Attributes and measures for assessing environmental consequences.

Plan Component	Attribute	Measured by
AML	Wild Horses	Herd size
	Riparian Vegetation	Horse body condition
	Upland Vegetation	Forage utilization
	Allowable use of Forage	Forage utilization
	Wild Horses	Observed heterozygosity
Managing for Genetic Diversity	Wild Horses	Observed heterozygosity
Population Growth Control	Wild Horses	Annual reproductive rates
Off-Range Plan	Wild Horses	Horse stress and injury

Effects from Gather of Excess Wild Horses (Bait Trapping)-All Alternatives

Gathering wild horses identified in excess of AML on the Big Summit Territory is a management tool used to reduce population size and minimize negative impacts by wild horses on range and forest resources. Other management activities such as fertility control treatments, can be employed once horses have been gathered to AML. The primary method of gathering excess wild horses on the Big Summit Territory or ones that have strayed off the Territory onto adjacent public or private lands is bait trapping. Bait trapping can be conducted year-round but is often more effective during certain seasons, such as fall and winter.

Bait trapping requires erecting temporary corrals constructed of metal panels and associated gate closure and latching mechanisms (traps). As animals are drawn to the bait (feed, water, minerals, or another horse) they concentrate within each trap or holding facility. The mechanical disturbance associated with their hoof movement results in mortality and elimination of most vegetation. Bait and manure is often spread across the entire trap and the soil surface is heavily disturbed. Six bait trap sites have been identified on sites such as dispersed campsites that are already disturbed and that are large enough to erect a temporary trap, temporary holding corral and allow for truck and trailer maneuverability. Other bait trap sites can be identified on a case by case basis following IDT review and recommendation, and approval by the authorized Forest officer.

Bait trapping is generally considered the least stressful of the standard capture techniques for wild horses and has been utilized successfully since the early 2000s on the Big Summit Territory (Figure 23). The Comprehensive Animal Welfare Program Standards (USDI BLM, 2015) would be modified for guidance during all gather operations (see Appendix D). Use of helicopters, fixed-wing aircraft and motor vehicles would follow direction in 36 CFR 222, Subpart D, 222.64. These standards and direction have been developed to ensure that a safe and humane gather operation occurs and potential stress and injury to wild horses is minimized.



Figure 23: Wild horses in bait trap in 2010

A GAO Report, (GAO-09-77) dated October 2008, indicated for the 6 of 10 states reporting between 2005 and 2007 that BLM experienced a 1.2% death loss to wild horses as a result of gathers during that time.

Various impacts to wild horses from gather operations have been observed. Direct impacts include stress from capture, handling, sorting, and transportation. The intensity of these impacts varies by individual animal and methods, bait trapping being the least stressful. Post gather observations show that captured animals acclimate quickly to holding, becoming accustomed to water tanks, hay, and human presence.

An independent report prepared by four academia-based equine veterinarian or equine specialists, concluded "horses did not exhibit undue stress or show signs of extreme sweating or duress due to the helicopter portion of the gather, maintaining a trot or canter gait only as they entered the wings of the trap. Rather, horses showed more anxiety once they were closed in the pens in close quarters; however, given time to settle, most of the horses engaged in normal behavior...." (Greene, et al. 2010). Transport and sorting of captured animals is completed as quickly and safely as possible to reduce the occurrence of fighting, and to move animals to large holding pens so they can settle in with hay and water. During sorting and transport, animals may receive superficial wounds of the rump, face, or legs. Occasionally, an animal may make contact with trap and holding pen panels hard enough to sustain a fatal injury. Since 2002, there has been one horse death on the Ochoco (out of 52 horses captured) due to complications of bait trapping.

Indirect effects are those effects which are caused by the action that occur to individual horses later in time or further removed in distance from the action but which are still reasonably foreseeable. These may include, miscarriages in mares, increased social displacement and conflict among stallions. Of the 52 horses that have been captured and removed since 2002 from the Big Summit Territory by bait trap, one mare had complications with her pregnancy when she arrived at the Burns BLM short term holding facility. A veterinary check revealed that the mare had a dead foal inside of her. The veterinarian removed the dead foal but the mare died of complications from the procedure. Whether this incident was related to the gather is unknown. Conflicts among stallions may occur when an individual animal is hauled in a trailer or sorted into the stallion pen. There may be a posturing and even a brief physical encounter that generally ends when one animal retreats. Such encounters usually result in bites and kicks and tend to be minor in nature (personal observations). On rare occasions, an aggressive animal may continue to exhibit aggressive behavior beyond initial encounters.

A small number of foals may be temporarily separated or orphaned during gather operations (Greene, et al. 2010), however use of bait trapping generally decreases the likelihood of this result. Orphaning may be a result of the mare rejecting the foal, the foal and mare becoming separated during gather operations, the mare dying or being euthanized during the gather, or other reasons. During bait trapping operations, the occurrence of orphaning foals is very limited because bands are typically captured together with limited handling. If a mare and foal are separated during the capturing process, the band is held in a safe area within the trap and the trap is reset to allow the band to be together.

Foals that are already orphans (prior to gathering) due to the mother rejecting it or dying from natural causes are rarely gathered. Orphans encountered during gathers are cared for promptly and rarely die or have to be euthanized (Appendix C).

It is anticipated that gathers will occur on the Big Summit Territory between October and March with October through December being the preferred period. At that time most foals would be between 5 and 8 months of age, and ready for weaning from their mothers. At this age the foals would be of such a size and stature as to reduce the probability of their accidental injury from other horses in the trap.

In accordance with Forest Service policy (FSM 2265.61), animals that are severely injured or seriously ill will be immediately destroyed in the most humane manner possible under the supervision of a Forest officer delegated such authority. Humane euthanasia of an animal as an act of mercy is fully documented by the person who destroys the animal.

Effects from Helicopter-Assisted Gather of Excess Wild Horses – All Alternatives

While bait trapping is the preferred method of capture, helicopter assisted gather method of capture is also included as part of all Alternatives. Helicopter assisted gather has been used on the Big Summit Territory in the past with limited success. However, there could be a change in the environment, like a wildfire that removes all tree canopy, or a change in methods that would increase the success of helicopter assisted gathering on the Big Summit Territory, therefore, it is included as a part of all Alternatives. The USFS and Contractor would implement the most current approved Standard Operating Procedures (SOPs) (refer to Appendix 2 for the SOPs currently in effect). The SOPs have been developed to ensure that a safe and humane gather operation occurs and potential stress and injury to wild horses is minimized.

Helicopter assisted trapping requires erecting temporary traps, wings and holding facilities generally constructed of metal panels. As animals concentrate within each trap or holding facility, the mechanical disturbance associated with their hoof movement results in mortality and possible elimination of most vegetation. Prior to assembly and use, all new potential traps sites, wings and holding facilities, an IDT review and recommendation would be identified and approved by the authorized Forest officer.

A GAO Report, (GAO-99-77) dated October 2008, indicated for the 6 of 10 states reporting between 2005 and 2007 that BLM experienced a 1.2% death loss to wild horses from accidents during gathers and those euthanized for various reasons. This data shows that the use of helicopters and motorized vehicles has proven to be a safe, humane and effective means for the gather and removal of wild horses from public lands. In order to avoid negative impacts to pregnant mares, the agencies (BLM and USFS) avoid helicopter gathering during the six weeks prior and the six weeks following the peak of foaling (i.e., no helicopter assisted gathers are conducted during March 1 through June 30).

Various impacts to wild horses from gather operations have been observed. Direct impacts include stress from capture, handling, sorting, and transportation. The intensity of these impacts varies by individual animal. Post gather observations show that captured animals acclimate quickly to the holding corral situation, becoming accustomed to water tanks and hay, and human presence (Greene, et al. 2010).

Injuries resulting from helicopter gathers include nicks to the face, legs or body from tree limbs while being herded by the helicopter. These injuries are not fatal and can be treated at the trap site or temporary holding facility with medicinal spray until a veterinarian examines the animal. These types of injuries are minimized by conducting gathers in accordance with the current SOPs (Appendix C).

An independent report prepared by four academia-based equine veterinarian or equine specialists, concluded "horses did not exhibit undue stress or show signs of extreme sweating or duress due to the helicopter portion of the gather, maintaining a trot or canter gait only as they entered the wings of the trap. Rather, horses showed more anxiety once they were closed in the pens in close quarters; however, given time to settle, most of the horses engaged in normal behavior...." (Heleski, et al. 2010).

Though some members of the public deem helicopter removals inhumane, most documented injuries have occurred once the animals are captured, not during the helicopter gathering operation. Similar injuries would be expected during bait and water trapping as animals would still need to be sorted, aged, transported and otherwise handled.

Indirect effects are those effects which are caused by the action that occur to individual horses later in time or further removed in distance from the action but which are still reasonably foreseeable. These may include miscarriages in mares, increased social displacement and conflict among stallions. Conflicts among stallions may occur when an individual animal is sorted into the stallion pen. There may be a posturing and even a brief physical encounter that generally ends when one animal retreats. Such encounters usually result in bites and kicks that tend to be minor in nature (personal observations). On rare occasions, an aggressive animal may continue to exhibit aggressive behavior beyond initial encounters. In such cases, the offending animal is often penned separately.

A small number of foals may be temporarily separated or orphaned during gather operations (Greene, et al. 2010), this may be due to the mare rejecting the foal, the foal and mare becoming separated during gathering or sorting, the mare dying or being euthanized during the gather, or other reasons.

Foals that are already orphans (prior to gathering), due to the mother rejecting it or dying from natural causes are rarely gathered. Orphans encountered during gathers are cared for promptly and rarely die or have to be euthanized (Appendix C).

It is anticipated that helicopter assisted gathers will occur on the Big Summit Territory between August and October with September/October being the preferred period. At that time most foals would be between 4 and 5 months of age, and ready for weaning from their mothers. At this age the foals would be of such a size and stature as to reduce the probability of their accidental injury from other horses in the trap.

In accordance with Forest Service policy (FSM 2265.61), animals that are severely injured or seriously ill will be immediately destroyed in the most humane manner possible under the supervision of a Forest officer delegated such authority. Humane euthanasia of an animal as an act of mercy is fully documented by the person who destroys the animal.

Effects to Herd Social Structure-All Alternatives

Horses are highly social animals with a strong mother-infant bond (National Academy of Sciences, 2013). Wild horse bands form complex social structures but this structure is often unstable. Berger (1986) found that although older females showed greater stability relative to younger females, less than 50% of the older females remained with the original band during his 5 year study of wild horses in the Granite Range of Northern Nevada. Additionally he found that for stallions, tenure averaged only 3.16 (+/- 1.98) years. This data indicates that band social structure is not a static condition and, in fact, can be very dynamic. Personal observations of the bands in the herd on Big Summit Territory are consistent with these findings showing the social interaction of horses in the territory to be very dynamic and ever-changing with no clear pattern or correlations.

All alternatives have the potential to disrupt the social structure of individual bands of wild horses to some degree. Such disruption could be caused by the potential for gathering only a portion of a band, turning back individual mares after fertility control treatments as well as for other reasons. Bait trapping operations can be used to increase the likelihood of capturing entire bands over time if that is the desire.

Annual gathers would be necessary under Alternative 1 and may be necessary for Alternatives 2 and 3. These annual gathers have the potential to disrupt the social structure of some individual bands every year (depending upon trapping locations selected). The initial effects for Alternatives 1 and 2 would be high because of the high number of horses needing to be removed to get to AML. Once AML is achieved for both Alternatives 1 and 2, the smaller number of animals gathered each year under these Alternatives would result in a minimal effect to the individual bands. Mixing of social bands can also improve the genetic diversity of the herd once the observed heterozygosity is above the critical level.

Effects to Wild Horses Removed from the Big Summit Territory

All alternatives include varying degrees of gather and removal of excess wild horses from the Big Summit Territory. Wild horses removed from the Big Summit Territory would be transported to a short-term holding facility in trailers. All vehicles and trailers used in the transport of wild horses would be inspected prior to use to minimize injury during transport. Because bait trapping usually captures one band at a time, transportation of the band together would be done to the extent possible.

Time restriction for transporting animals to a short-term facility is limited to a maximum of ten hours, which is more restrictive than Manual policy, although in almost all cases the actual amount of time in a trailer is much shorter. During transport, potential impacts include stress, slipping and falling, and kicks and bites from other animals. If animals are in extremely poor condition, there is potential for individuals to die during transport, however this is extremely rare; since 2002, there has been one minor injury of a horse being transported to the Burns BLM short-term facility (out of 52 horses captured).

Upon arrival at the short-term facility, animals are off-loaded by trailer compartment and put into pens with good quality hay and water. Most animals settle down quickly and begin eating hay and drinking water. A crew inspects animals as they arrive and those with injuries are treated. Those with more than minor injuries or that are in a very thin condition are put into “sick” pens and cared for separately. Any animals with a chronic or incurable disease, or those with serious physical defects (such as tooth loss or excessive wear, club foot, or other deformities) would be humanely destroyed in the most humane manner possible under the supervision of a Forest officer delegated with such authority. Humane euthanasia of an animal as an act of mercy is fully documented by the person who destroys the animal.

After recently captured animals become acclimated to the facility, they are prepared for adoption or sale. The preparation includes pulling hair for genetic monitoring, vaccinations, boosters, identification, castration of males and deworming. Injuries or death resulting from preparation activities are rare but can potentially occur (GAO-99-77).

Forest Service policy allows placement of excess animals with qualified individuals, Government agencies, or other entities, as long as there is a written agreement. Individuals are allowed to adopt no more than four animals per year, unless the applicant is found capable of caring for more than four animals. Individuals adopting animals are subject to terms relating to humane treatment and care. This is the preferred method of handling excess animals that have been removed from the Big Summit Territory.

Excess wild horses that meet the sale-eligibility criteria would be offered for sale. Animals must meet the sale-eligibility criteria under the WFRHBA (as amended) in order to be offered for sale. The WFRHBA states that an excess animal that: is more than 10 years of age or, has been offered unsuccessfully for adoption at least three times, shall be made available for sale without limitation (16 U.S.C., Chap 30, §1333(e)). While the Act as amended only addresses sale without limitation, subsequent enactment of riders prohibiting the BLM’s and Forest Service use of appropriated funds for the sale or slaughter of wild free-roaming horses and burros resulted in BLM’s construction of a sale with limitation whereby purchasers declare in their purchase application to, “... not sell or transfer ownership of any such animals that I purchase to any person or organization that intends to resell, trade, or give away such animals for processing into commercial products.” While current Forest Service policy is to follow the mandates of the Act as amended, the agency will comply with appropriations language limitations. Sales of excess wild horses without limitations, would be similar to the majority of livestock sales in the state whereby the owner has ultimate

determination of the future use of the animal within the restrictions of state animal treatment and care laws. Sales of excess wild horses with limitations similar to those declared in the application to purchase BLM horses and burros would be expected to prevent the transfer of animals that previously had status as wild horses or burros for processing into commercial products. Under both types of sales, once sold, horses lose their protected status under the Act (16 U.S.C., Chap 30, §1333(e) (4)).

As a last resort, following Forest Service policy and in compliance with the WFRHBA, excess horses for which there is no adoption or sale demand would be destroyed in the most humane and cost efficient manner possible (36 CFR 222.69 (5)).

Effects to Wild Horse with the Emergency Action Framework

For all alternatives, an Emergency Action Framework will be used to help guide decisions (Appendix D). This framework will be anchored under the values of:

- Humane treatment of wild horses (36 CFR 222 Subpart D defines both the terms “humane” and “inhumane” and the context of their appropriate usage as relates to wild horses and burros”)
- Long-term well-being of the wild horse herd
- Honor and maintain the “wildness” of the herd

The implementation of an Emergency Action Framework anchored in the above values will provide a framework to ensure that wild horses are humanely treated and will decrease any unnecessary suffering.

Cumulative Effects common to all Alternatives

There are several ongoing vegetation management projects that overlap or border the Big Summit Territory (see Table 16). In general, activities in these projects include ongoing pre-commercial thinning and fuels management, which are expected to continue through 2028. Both pre-commercial thinning and prescribed burning will most likely reduce available forage for the first year or two, but after recovery, forage will increase. These activities would increase access and availability of upland forage for wild horses in the long-term (post 2 years), riparian forage would receive less grazing pressure long-term until the upland forage is out-competed by the overstory. With the fuels management activities, in the short-term (less than 2 years) upland forage may be reduced putting more pressure on riparian areas temporarily. Treatments will take place in a mosaic pattern and over a time span so short term loss of forage will be minimal and should have little to no negative impact on the wild horse herd helping achieve a Thriving Natural Ecological Balance (TNEB). Wild horses would not be fed due to any pre-commercial or prescribed burning activities and the short-term reduction in available forage.

During vegetation management activities it is possible that individual groups of wild horses will temporarily move within the Big Summit Territory as a result of the presence of increased numbers of people and noise in activity treatment areas. This movement to avoid disturbance is expected to be minimal due to the fact that all activities will take place in a mosaic pattern and over the span of several years. There have been no documented incidents of wild horses being injured as a result of any vegetation management activities that have occurred in the Big Summit Territory thus far and we do not expect any in the future because wild horses tend to avoid activity treatment areas during operations.

Ongoing noxious weed treatments are occurring in the Big Summit Territory. These treatments are expected to improve both upland and riparian forage conditions and have a long-term beneficial effect.

Table 16: Projects that Have Cumulative Effects to Wild Horses in the Project Area

Project	Activities	Year	Cumulative Effect
Canyon Fuels & Vegetation Management Project	Pre-commercial thinning and prescribed burning.	Implementa-tion	Both pre-commercial thinning and prescribed burning will most likely reduce available forage for the first year or two, but after recovery, forage is expected to increase until canopy covers close and reduce upland

Project	Activities	Year	Cumulative Effect
(ROD, 2010)			forage production again (mid to long term). Activities will take place in a mosaic pattern over several years minimizing short term loss of forage resulting in minimal to no negative impact on wild horses.
Howard Elliott Johnson Fuels & Vegetation Management Project (ROD, 2011)	Pre-commercial thinning and prescribed burning.	Implementa-tion	Both pre-commercial thinning and prescribed burning will most likely reduce available forage for the first year or two, but after recovery, forage is expected to increase until canopy covers close and reduce upland forage production again (mid to long term). Activities will take place in a mosaic pattern over several years minimizing short term loss of forage resulting in minimal to no negative impact on wild horses.
Invasive Plant Treatments FEIS (ROD, 2012)	Reduces the extent of specified invasive plant infestations at identified sites and protects areas not yet infested from future introduction and spread.	Implementa-tion	Long-term beneficial effect. Improves both upland and riparian forage.
Powerline Maintenance	Maintenance includes removal of trees near powerlines.	Ongoing	Forage is expected to increase until canopy covers close and reduce upland forage production again (mid to long term). Activities will take place in a mosaic pattern over several years minimizing short term loss of forage resulting in minimal to no negative impact on wild horses.
Blue Mountains Forest Resiliency Project	Pre-commercial thinning and prescribed burning.	Planning	Both pre-commercial thinning and prescribed burning will most likely reduce available forage for the first year or two, but after recovery, forage is expected to increase until canopy covers close and reduce upland forage production again (mid to long term). Activities will take place in a mosaic pattern over several years minimizing short term loss of forage resulting in minimal to no negative impact on wild horses.

Alternative 1 – No Action

Allowable use of Forage

The AML for Alternative 1 will remain 55-65. This alternative is expected to result in a forage shortfall within the wild horse winter range during winters of above average snowfall when the horse herd is above 57 head. This in turn is expected to result in exceedance of LRMP allowable use standards in riparian areas within the wild horse winter range. Table 17 displays the anticipated forage shortfall for two scenarios: the first is providing for all species in the Big Summit Territory within the wild horse winter range during above-average snowfall, and the second is providing only for sheep and wild horse needs in the Big Summit Territory within wild horse winter range under the assumption that big game would move off of the Territory.

Table 17: Alternative 1 forage availability based on species' needs within wild horse winter range during winters of above-average snowfall

Animal Needs	Providing for all species within Big Summit territory	Wildlife needs provided outside Big Summit Territory
Permitted Sheep forage needs	160,875 lbs.	160,875 lbs.
Elk forage needs	155,506 lbs.	0 lbs.
Deer forage needs	11,778 lbs.	0 lbs.
Wild Horse forage needs (65)	241,540 lbs.	241,540 lbs.
Total Forage Needs	569,699 lbs.	402,415 lbs.
30% Allowable forage availability	372,160 lbs.	372,160 lbs.
Forage balance	-197,539 lbs.	-30,255 lbs.
Projected winter range riparian use levels	46%	32%

Under the current AML, there is a forage shortfall of about 197,539 lbs, providing for all species. Even assuming that wildlife would move to other areas during winters with above-average snow fall (approximately 110% or more snowfall using Snow Water Equivalent as a surrogate), there would still be a forage shortfall of 30,255 lbs. (Table 17). It is expected under both scenarios that the Forest Plan allowable use standard and guideline will be exceeded at the high AML for this Alternative, the low AML of 55 horses is expected to have a projected winter range riparian use of 43% with wildlife and 29% without.

Again, these calculations are based on winters with above average snowfall which does not occur every year so the exceedance of the Forest Plan allowable use standard and guideline and the shortfall in forage production would not be expected to occur every year but would be expected to occur periodically. These periodic levels of exceedance would be expected to slow or stall riparian forage condition recovery.

Data collected in the wild horse winter range in the falls of 2017 and 2018 showed riparian utilization levels ranging from just under 60% to approximately 80% with evidence of wild horses being the primary contributor of utilization. In fact, in 2018 when riparian utilization levels ranged from just under 60% to just under 80%, domestic sheep did not graze in the area. These levels of utilization may have a long-term effect on the quality and availability of riparian forage depending upon timing and species grazed (Holechek et al., 2000). For most graminoid species, if the plants are continuously heavily utilized, the vigor of the plants is decreased and over time other more grazing resistant plants can replace these species, as grazing resistant plants become relatively more competitive for resources under that degree of grazing pressure (Holechek et al., 2000). This level of riparian utilization is of even more importance when considered in the context that wild horses show a marked preference for riparian areas for grazing, and apparent trends make restoration of unsatisfactory riparian conditions doubtful (Clary & Leininger, 2000).

The WFRHBA requires minimal feasible management when dealing with wild horse, therefore, we expect localized exceedance of allowable use standards on riparian areas within the Territory even when horse numbers are within the range of 55-65 AML. However, the expectation is that these localized exceedances of the allowable use standard and guideline will shift in location from one year to the next minimizing

riparian species composition drift from grazing pressure. This shifting of areas where utilization exceeds the allowable use standards and guidelines from one year to the next is also expected to minimize the negative effects of this disturbance on stream bank dynamics. However, as horse numbers climb above the range of AML (like the current number of 135 is) the extent of riparian areas where utilization exceeds the allowable use standard and guideline will increase and the probability that any given riparian area will receive use levels that exceed the allowable use standard and guideline over multiple years will increase as well. Repeated exceedance of the allowable use standard and guideline, when over upper AML of 65, over multiple years increases the probability that this and associated disturbance will result in negative impacts to long term riparian conditions.

The current horse numbers are at least 135, with the population control tool of only capture and removal, it is estimated that it may take up to 10 years to achieve the AML of 55-65 for this Alternative. Until then, there will be continued short-term effects for upland forage and long-term effects for riparian forage.

Genetic Health

Alternative 1 does not provide any tools for managing the genetic health of the Big Summit Territory horses but only allows for the progress of natural selection. Under this Alternative, the existing observed heterozygosity of 0.65 and 0.58 from two samples (Cothran, 2011) will remain below the recommended critical level of 0.66 (USDI, BLM, 2010). This indicates that the genetic variability of the herd is low. Low genetic variability can lead to poorer overall health and vigor of the herd and loss of adaptability in the long run (Cothran, 1991). Because Alternative 1 does not include any management tools to address genetic health, genetic depression is expected to continue to occur and the fitness of the herd is expected to continue to decline. As a result, the observed heterozygosity would likely fall lower than the values most recently measured. This could lead to lower birth rates, increased mortality and the decreased ability to adapt to environmental changes (Cothran, 2000) for the wild horse herd on Big Summit Territory.

Population Growth Control

The only management controls of population growth included under Alternative 1 are the capture and removal of excess wild horses. Excess wild horses will be determined in accordance with the WFRHBA based on the comparison of the current inventory to the AML range of 55 to 65 and/or other criteria found in the WFRHBA and Forest Service regulations (36 CFR 222 Subpart D). If current inventories indicate more horses than the AML range, those will be excess horses.

Bait trapping is expected to be the primary gather method for capture and removal of excess wild horses although other capture methods like helicopter assisted gathering can be used. Based on the current inventory (Owyhee Aerial Research Inc., 2018) of 135 horses, under Alternative 1 there would be at least 70 excess horses if this Alternative is selected. Consecutive gathers to remove the excess wild horses would begin as soon as possible based on budget and resource availability. First priority would be for gathers of excess wild horses residing outside of the Territory. A selection criteria for removal may be used based on age class. These horses would be gathered and transported to a BLM facility, Forest Service facility or leased/contracted private facility where they would be prepared for adoption or sale. Once AML is reached, population growth rates could reach up to 20% annually and maintenance gathers are expected to occur annually or bi-annually with approximately 11-26 horses removed. The number of excess wild horses to be gathered annually or bi-annually will be based on the current inventory number and how many horses are above the AML range.

For Alternative 1, the only tool available to control population growth and maintain the AML is capture and removal of excess wild horses. As discussed above, the initial capture needs will be much higher because of the difference between the current inventory of horses (135) and the AML range of 55-65, at least 70 excess horses would need to be removed as soon as budgets and resources allow. Once the AML range is achieved, continued maintenance gathers are expected to occur every year or two with a range of approximately 11-26 horses needing to be removed. Refer to the discussion above for the direct effects to wild horses for actions

taken in capture and removal including effects to horses by gathering with bait trap or helicopter, effects to the herd social structure and the effects to horses once removed from the Territory.

Cumulative Effects

See the previous discussion of cumulative effects common to all alternatives.

The focus of this cumulative effects discussion is on winter range forage utilization and competition for that forage. Wild horses, permitted livestock and wildlife species all compete for available forage within the Territory. From mid-June to the end of September there are two bands of sheep permitted to graze on allotments that overlap with the Big Summit Territory. Forage competition for upland and riparian forage occurs between sheep and horses although dietary overlap between the two species in the summer time is small, sheep prefer forbs while horses prefer grasses. One study found a 21% dietary overlap in the summertime between wild horses and domestic sheep (Olsen and Hansen, 1977). Relative to this project, one band of sheep is authorized to spend approximately 19 days in June grazing in the wild horse winter range. Permitted sheep use was voluntarily decreased because of a lack of forage (see Range Resource Report) from 2017-2019. The last ten years of stubble height measurements in the DMAs inside the winter range were all above twelve inches which show light utilization by sheep in the winter range. Specifically, wild horse winter range riparian utilization monitoring done in the fall of 2017 (sheep present) and 2018 (sheep not present) show a difference of at the most 13%, suggesting that sheep utilization in the winter range may be around 13%.

In addition to permitted livestock, wildlife species, specifically elk and deer compete with wild horses for forage in the Territory. Dietary overlap is greatest between elk and horses (Hosten, 2007, Salter and Hudson, 1980). The current population levels for both elk and deer, while still below the Management Objectives, are higher than when the 1975 plan was developed. The Act limits agency authority to manage for horses to where they occurred at the time of enactment. Therefore, the Territory must supply the complete forage needs for the horses year-round while elk and deer are free to roam to adjacent lands (see Wildlife Resource Report).

In Alternative 1, the AML would remain the same as established in 1975 at 55-65 horses. Riparian utilization levels at this AML when combined with the use of permitted livestock and wildlife are expected to remain at the same level. Utilization monitoring data in three sites in the winter range prior to 2010 when horse numbers were within the AML range, has consistently been below 30% utilization with one exception. If the Forest Plan allowable use standard is exceeded in the riparian areas of the wild horse winter range or there is above average snowfall winter(s), it would be expected to be more difficult for horses to maintain desirable body condition levels (above Henneke Body Score 2) through the winter. As body conditions decline other health and reproductive issues increase such as foal miscarriage or contraction of viral or bacterial infections. Until horse numbers reach the 55-65 AML, which may take up to 10 years, exceedance of the Forest Plan allowable use levels in riparian areas will continue and is expected to prevent recovery of riparian areas in unsatisfactory condition.

Forage utilization may also have a cumulative impact on riparian resource conditions. While the Forest Plan allowable use standard and guideline for riparian communities in unsatisfactory condition is up to 30% of combined permitted livestock, wildlife and wild horse use in the Territory, there is more forage available so exceedance of this standard and guideline is expected to occur on occasion especially since riparian areas are preferred habitat for horses and we have minimum feasible management practice direction (WFRHBA) so herding or other management practices to move horses out of riparian areas will not occur. Therefore, repeated utilization exceedance over time increases the likelihood or probability of decline of the competitive advantage of species sensitive to grazing which in turn can result in species composition shift and ultimately riparian condition remaining in unsatisfactory condition.

In summary, the focus of the cumulative effects analysis for Alternative 1 is on competition between wild horses, permitted livestock and wildlife for winter range forage and the resultant expected levels of utilization. At the established AML of 55-65, upland and riparian range conditions are expected to remain

the same, however, vegetation management projects are expected to temporarily improve upland forage conditions. The competition for forage on wild horse winter range has increased since the AML was established in 1975, especially between wild horses and wildlife. As the demand for forage has increased and upland and riparian range conditions have declined over time it is expected that the Forest Plan allowable use standard and guideline for riparian areas will be exceeded more often across more riparian communities within the wild horse winter range. This is expected to shift the competitive advantage of some grazing sensitive riparian species preventing riparian condition recovery. During winters with above average snowfall, unsatisfactory range conditions can result in a forage shortfall that may be reflected in poorer wild horse body conditions and associated reproductive and health issues.

Alternative 2 – Direct, Indirect, and Cumulative Effects

Allowable use of Forage

The AML for Alternative 2 would be 12-57. This AML was based on the process described in the BLM Handbook 4700-1 for wild horses (see AML Analysis) and was calculated based on the most limiting factor of winter range forage availability during winters of above average snowfall inside the Big Summit Territory. It also considered the Forest Plan riparian allowable use level of 30 percent due to the existing unsatisfactory conditions of riparian communities within the wild horse winter range. The wild horse winter range was based on occurrence of horses during winters of above-average (greater than 110 percent) snowfall (see Figure 24 for years of above-average snowfall). The high AML also considers expected wildlife behavior during winters of above average snowfall when big game is expected to move to other areas that provide better winter habitat. Table 18 below displays the anticipated forage shortfall under this alternative for two scenarios: the first is providing for all species inside the Big Summit Territory within wild horse winter range during above-average snowfall, the second is providing only for sheep and wild horse needs within the wild horse winter range under the assumption that big game would move off of the Territory.

Table 18: Alternative 2 forage availability based on species’ needs within wild horse winter range during winters of above-average snowfall.

Animal Needs	Providing for all wildlife species needs within Big Summit Territory	Wildlife needs provided outside of Big Summit Territory
Sheep forage needs	160,875 lbs.	160,875 lbs.
Elk forage needs	155,506 lbs.	0 lbs.
Deer forage needs	11,778 lbs.	0 lbs.
Wild Horse forage needs	44,592 lbs. (12 horses)	211,812 lbs. (57 horses)
Total Forage Needs	372,751 lbs.	372,687 lbs.
30% Allowable forage availability	372,160 lbs.	372,160 lbs.
Forage balance	-591 lbs.	-527 lbs.
Projected winter range riparian use levels	30%	30%

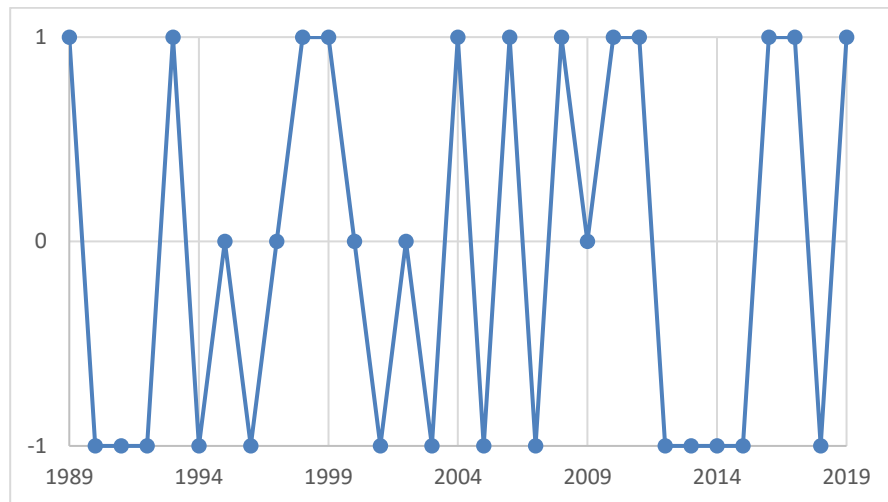


Figure 24: Above- and below-average winter snow-fall by year. “1” = above average; “-1” = below average.

Bringing the Big Summit Territory’s wild horse numbers to within the range of 12-57 is expected to facilitate minimum feasible management of wild horses during most conditions that occur in the Territory. The current inventory indicates that at least 135 horses occupy the area within and around the Big Summit Territory. Until horse numbers are brought within AML it is expected that the Forest Plan allowable use levels will be exceeded in riparian communities within the Territory. For most graminoid species, if the plants are continuously heavily utilized, the vigor of the plants are decreased and over time other, more grazing resistant plants, can replace these species as grazing resistant plants become relatively more competitive for resources under that degree of grazing pressure (Holechek et al., 2000). Current unsatisfactory conditions in riparian areas would not be expected to improve in the short-term. With the greater diversity of tools available for use under Alternative 2, it is estimated to take up to 5 years to reach AML. It is expected that the Forest Plan allowable use standard and guideline will continue to be repeatedly exceeded on riparian areas within the wild horse winter range until AML is reached.

Once the AML is within the range (in up to 5 years) given the common wild horse population growth rate of 20 percent, around 10 head of horses would need to be captured annually or 20 to 25 head of horses would need to be captured every other year to maintain AML if fertility control methods are unsuccessful at reducing population growth rates, which is not expected. Since the bait trap method is the most effective and efficient capture method (as well as the least stressful on wild horses) because of Big Summit Territory’s difficult terrain, capture will be conducted every year or every other year in order to balance resource capacity with the minimum feasible management goal from the Act. The goal is plan bait trap gathers every year or every other year to maintain at or somewhat below the high AML of 57 (see Appendix B for AML Analysis details).

Genetic Health

The proposal for management of genetic diversity under Alternative 2 is to manage for an acceptable level of observed heterozygosity which is above the critical level of 0.66 (USDI, BLM, 2010). The observed heterozygosity for the herd would be increased by the translocation of genes through importing wild horse mares from source herds as recommended by genetics experts. The National Research Council recommends that groups of HMAs (Territories) constitute a single population and manage them by using natural or assisted migration (translocation) whenever necessary to maintain or supplement genetic diversity (National Academy of Sciences, 2013). Initially, it may take translocation of several mares to get the observed heterozygosity above the critical level of 0.66 because most recent monitoring indicates that it is below that

critical level, at 0.65 and 0.58 (Cothran, 2011). Observed heterozygosity will be monitored by collecting DNA-based samples at gathers and having them analyzed by genetic experts. Monitoring reports and translocation recommendations will be requested from genetic experts with access to an adequate wild horse genetic database from which to make such recommendations, Texas A & M University is an example. Once monitoring indicates observed heterozygosity is above the critical level for this herd, the threats of low genetic variability such as to overall health and adaptability will be decreased. However, genetic variability will require continuous management and will continue to be monitored and managed with translocation of genes imported as recommended by genetic experts. This Alternative will have a positive effect on the genetic variability of the wild horse herd in the Big Summit Territory and will promote managing the horses in a thriving natural ecological balance.

Population Growth Control

Under Alternative 2, population growth will be controlled through capture and removal of excess wild horses and implementation of fertility control measures. The combination of both of these tools will have the greatest effect for achieving and maintaining AML with the minimal feasible management required by the WFRHBA.

Excess wild horses will be determined in accordance with the WFRHBA based on the current inventory or other criteria found in the WFRHBA. Bait trapping will be the primary gather method for capture and removal of excess wild horses. Based on the current inventory (Owyhee Aerial Research Inc., 2018) of 135 horses, under Alternative 2 there would be at least 78 excess horses if this Alternative is selected. Consecutive gathers to remove the excess wild horses would begin as soon as possible following a decision as limited by budget, resource availability and weather. Excess wild horses residing outside of the Territory will have highest priority for capture and removal. Age class can also be used as a criteria for capture and removal. These horses would be gathered and transported to a BLM facility, Forest Service facility or leased or contracted private facility where they would be prepared for adoption or sale.

Under Alternative 2, fertility control measures would be implemented in conjunction with capture and removal to reach and maintain the AML range. These measures would be used to slow population growth however, the capture and removal of excess animals to within the range of AML would be highest priority. Fertility control and capture/removal will also take into account the genetic health recommendations. Fertility control measures would be implemented: on horses that are gathered and released, or by remote darting. Implementation of fertility control measures would suppress population growth which would reduce how many horses would need to be gathered over time. Fertility control would be conducted in accordance with the Standard Operating Procedures (SOPs) described in Appendix 4 of the Wild Horse Specialist Report. All fertility control methods recommended by the Wild Horse and Burro Advisory Board and approved for equine use by the EPA, FDA, or other governmental regulatory body, may be used, including contraception tools and sterilization tools as well as sex ratios.

Contraception tools recommended by the Wild Horse and Burro Advisory Board and approved by the EPA, FDA, or other governmental regulatory body will be administered as soon as possible by trained personnel, either in conjunction with achieving AML or once AML is achieved (in up to 5 years). Fertility control measures may include application of Porcine Zona Pellucida (PZP, trade name Zonastat-H) or GonaCon but is not limited to these two drugs. Applications would be recorded, and treatments would be monitored to attempt to match the estimated population growth to achieve a stable herd size within AML and minimize the need for gathers. The ability to achieve this depends on the Forest capacity, available resources and opportunities for treatment in the Big Summit Territory. The BLM conducted a literature review and effects discussion, a summary of effects is described below, more details can be found in Appendix 3 of the Wild Horse Specialist Report.

In March of 2016, a PZP trial was conducted in the Big Summit Territory with the objectives of testing the feasibility of PZP field treatments, the efficacy of PZP treatments, efficiency and safety of administration of PZP and the economic sustainability of PZP treatments. Two types of field treatment methods were tested,

trapped horses and untrapped horses, to determine the efficacy of each method. A band of eight horses was trapped in March 2016 and six mares were treated with the initial and booster treatments of PZP required for effectiveness. These trapped horses were held in the trap for three weeks and humanely cared for until the booster could be administered and horses were released. That same year, a total of sixteen field days were spent locating and administering the initial PZP treatments to seventeen mares and booster treatments to five mares. Twelve mares of the ones that received the initial treatment were never given the booster treatment of PZP because they could not be relocated. The application of only the initial treatment on these mares had no effect on their reproductive success. Mares that were already pregnant in 2016 had their foals with no observed effects to the foals. Of the eleven mares treated by one or the other method with both the initial and booster, none of the mares had foals in 2017. In 2018, of those eleven mares treated with both the initial and booster, three had foals which is a reproductive rate of 18% for this sample size. The only observed adverse effect of the PZP trial was the development of a small granuloma on the hip of one mare where the PZP was administered.

When administered, the PZP (antigen) causes the mare's immune system to produce antibodies that bind to the mare's own eggs, effectively blocking sperm binding and fertilization (Science and Conservation Center, 2013). PZP is relatively inexpensive, widely used, safe for mares and the environment, and can be relatively easy to administer in the field once horses are located. The PZP contraceptive also appears to be completely reversible. The administration of the vaccine is limited to those specifically trained to handle, mix and deliver the product. Appendix E lists standard operating procedures for this method.

Kirkpatrick et al., (2012) established that PZP administered to pregnant mares has no effect on the fetus and the mare will carry and give birth to a foal as normal. The vaccine has also been shown to have no apparent effects on the health of the offspring, or behavior of treated mares (Turner et al., 1997).

GonaCon™ is another fertility control vaccine that received EPA approval for use on wild horses and burros (February 13, 2013). The vaccine works by simulating the production of antibodies that bind to the gonadotropin-releasing hormone (GnRH) in the animal's body. GnRH signals the production of sex hormones (e.g., estrogen, progesterone and testosterone). By binding to GnRH, the antibodies reduce GnRH's ability to stimulate the release of these sex hormones. All sexual activity is decreased, and animals remain in a non-reproductive state as long as a sufficient level of antibody activity is present. The product can be delivered by hand injection, jab stick, or darting.

From a study completed at the Nevada State Penitentiary, Carson City, NV, by Killian, et al (2006) it was reported that the efficacy of GonaCon™ was 94% for the first breeding season, 60% during the second breeding season and 53% during the third year. These data show that the efficacy of GonaCon™ is higher than published research regarding PZP. Another difference found is that while PZP does not inhibit breeding behavior, GonaCon™ decreases breeding activity.

Fertility control tools may also include permanent sterilization of wild horses. The current (recommended by the Wild Horse Advisory Board) sterilization procedures conducted is castration of studs done at a facility and then returned to the Territory. The National Research Council recommends that one of the three most promising methods of fertility control is chemical vasectomy (National Research Council, 2013) but discusses the limitations with chemical vasectomies because the effects of the permanent sterilization of studs will be self-corrected by younger studs rising through the ranks. However, there are tools and models developed to help consider sterilization to promote or maintain genetic diversity. The USGS suggests that wild horse managers consider permanent contraceptive techniques, as long as results are monitored and adjustments are made if necessary (USGS, 2015). Sterilization would also decrease the need for annual application of fertility control and captures and removals which all add some level of stress to horses. Sterilization for horses on Big Summit Territory is a tool that would be considered for population growth control and/or helping improve genetic diversity.

For Alternative 2, in addition to capture and removal of excess wild horses, fertility control tools such as contraceptives and sterilization, will be used for population growth control. The initial capture needs will be

high because of the difference between the current inventory of horses (135) and the AML range of 12-57, at least 78 excess horses would need to be removed as soon as budgets and resources allow. Refer to the discussion under Effects from Gather of Excess Wild Horses (Bait Trapping)-All Alternatives, Effects from Gather of Excess Wild Horses (Helicopter)-All Alternatives, Effects to Herd Social Structure-All Alternatives, Effects to Wild Horses Removed from the Big Summit Territory and Effects to Wild Horse with the Emergency Action Framework for the direct effects to wild horses for actions taken. Once the AML range is achieved, continued maintenance gathers may occur every year or two with a range of approximately 11-26 horses needing to be removed or fertility control tools may change the number of horses in excess to the AML, ideally with little to no horses captured and removed each year.

Cumulative Effects

See the previous discussion of cumulative effects common to all alternatives.

The focus of this cumulative effects discussion is on winter range forage utilization and competition for that forage. Wild horses, permitted livestock and wildlife species all compete for available forage within the Territory. Permitted livestock grazing overlaps with the Big Summit Territory. From mid-June to the end of September there are two bands of sheep permitted to graze on allotments that overlap with the Big Summit Territory. Forage competition for upland and riparian forage occurs between sheep and horses although dietary overlap between the two species in the summer time is small, sheep prefer forbs while horses prefer grasses. One study found a 21% dietary overlap in the summertime between wild horses and domestic sheep (Olsen and Hansen, 1977). Relative to this project, one band of sheep spends approximately 19 days in June grazing in the wild horse winter range. Permitted sheep use was voluntarily decreased because of a lack of forage (see Range Resource Report) from 2017-2019.

In addition to permitted livestock, wildlife species, specifically elk and deer compete with wild horses for forage in the Territory. Dietary overlap is greatest between elk and horses (Hosten, 2007) (Salter and Hudson, 1980). The current population levels for both elk and deer, while still below the Management Objectives, are higher than when the 1975 plan was developed. The Act limits agency authority to manage for horses to where they occurred at the time of enactment. Therefore, the Territory must supply the complete forage needs for the horses year-round while elk and deer are free to roam to adjacent lands (see Wildlife Resource Report).

In Alternative 2, the AML was calculated to be 12-57 horses (AML Analysis, Appendix 5). Riparian utilization levels at this herd size, when combined with the use of permitted livestock and wildlife, is not expected to repeatedly exceed 30% on the wild horse winter range, the level of expected utilization would depend primarily on whether big game resides on the Territory during winters of above average snowfall. Until horse numbers reach the 12-57 AML, which is estimated to take up to 5 years, because Alternative 2 also allows fertility control methods to slow population growth rates, exceedance of the Forest Plan allowable use levels in riparian areas is expected to continue and is expected to prevent recovery of riparian areas in unsatisfactory condition. In addition, until AML is reached, it will be more difficult for horses to maintain desirable body condition levels (above Henneke Body Score 2) through the above average snowfall winters. As body conditions decline other health and reproductive issues increase such as foal miscarriage or contraction of viral or bacterial infections. Once the AML is reached, because of the increase in wildlife, in a below to average winter, exceedance of the Forest Plan allowable use levels could still occur, however, wildlife can roam outside of the Territory, where horses are required to remain inside the Territory year-round.

Forage utilization may also have a cumulative impact on upland/riparian resource conditions. While the Forest Plan allowable use standard and guideline for riparian communities in unsatisfactory condition is up to 30% of combined permitted livestock, wildlife and wild horse use in the Territory, there is more forage available so exceedance of this standard and guideline is expected to occur on occasion especially since riparian areas are preferred habitat for horses and we have minimum feasible management practice direction (WFRHBA) so herding or other management practices to move horses out of riparian areas will not occur.

Therefore, repeated utilization exceedance over time increases the likelihood or probability of decline of the competitive advantage of species sensitive to grazing which in turn can result in species composition shift and ultimately riparian condition remaining in unsatisfactory condition.

In summary, the focus of the cumulative effects analysis for Alternative 2 is on competition between wild horses, permitted livestock and wildlife for winter range forage and the resultant expected levels of utilization. At the proposed AML of 12-57, riparian conditions are expected to improve because of forage utilization levels of up to 30%. Until the AML is reached, in up to 5 years, it is expected that the Forest Plan allowable use standard and guideline for riparian areas will continue to be regularly exceeded particularly during winters of above average snowfall. During winters with above average snowfall, unsatisfactory range conditions can result following a forage shortfall that may be reflected in poorer wild horse body conditions and associated reproductive and health issues.

Alternative 3 – Direct, Indirect, and Cumulative Effects

Forage Availability

The AML for Alternative 3 would be 150-200. This AML was based upon public input which encouraged the agency to consider an alternative with this herd size as a way to address maintenance of genetic variability and other concerns. Forage needs and the shortfall anticipated during winters of above average snowfall are calculated in the following Table 19. Table 19 displays the anticipated forage shortfall for two scenarios: the first is providing for all species inside the Big Summit Territory within the wild horse winter range during above-average snowfall, and the second is providing only for sheep and wild horse needs within the wild horse winter range under the assumption that big game would move off of the Territory.

Table 19: Alternative 3 forage availability based on species’ needs within wild horse winter range during winters of above-average snowfall.

Animal Needs	Providing for all species	Wildlife Needs provided outside Big Summit Territory
Sheep forage needs	160,875 lbs.	160,875 lbs.
Elk forage needs	155,506 lbs.	0 lbs.
Deer forage needs	11,778 lbs.	0 lbs.
Wild Horse forage needs (200)	743,200 lbs.	743,200 lbs.
Total Forage Needs	1,071,359 lbs.	904,075 lbs.
30% Allowable forage availability	372,160 lbs.	372,160 lbs.
Forage balance	-699,199 lbs.	-531,915 lbs.
Projected winter range riparian use levels	86%	73%

At an AML of 150-200 horses, a forage shortfall on the wild horse winter range would be expected to occur regularly during most winters (based on fall utilization measures taken in 2017 and 2018). The projected winter range riparian use levels during winters of above average snowfall would range from 58-71% at the low AML with and without wildlife winter needs provided for in the Territory to 73-86% use at the high AML. As a result, it is expected that utilization levels on riparian areas within the wild horse winter range will range from 60 to over 80 percent during winters of above average snowfall. It is anticipated that under

this alternative the Forest Plan allowable use standard and guideline for riparian areas will be regularly exceeded in many of the riparian areas within the wild horse winter range regardless of snowfall.

Under this alternative even if all other grazing were eliminated (sheep and wildlife), contrary to direction in the act to maintain a “multiple-use relationship in the area,” a herd size of 150-200 would be expected to result in forage utilization measurements of 45-60% on riparian areas within the wild horse winter range during winters of above-average snowfall. With a herd size of at least 135 head and the provision for other grazing use to occur to maintain a multiple use relationship in the area, utilization measurements on the wild horse winter range prior to winter in 2017 displayed riparian utilization levels that ranged from just over 70% to approximately 80%. While riparian utilization levels ranged from almost 60% to just under 80% in the fall of 2018 which included only wildlife use and use by a wild horse herd of at least 125 horses as the grazing allotment was voluntarily rested from permitted livestock use.

While the measured utilization levels in 2017 and 2018 occurred prior to winters of below average snowfall, the modeled calculations above are based on winters of above average snowfall which do not occur every year therefore the projected utilization rates should not be expected to occur every year, but would be expected to occur periodically. Drought conditions could produce lower levels of annual forage production than were considered in this analysis which could result in less forage availability once winter conditions evolve. With projected higher levels of utilization on a more regular basis, the extent of riparian areas where utilization exceeds the Forest Plan allowable use standard and guideline will increase and the probability that any given riparian area will receive use levels that exceed the allowable use standard and guideline over multiple years will increase as well. Repeated exceedance of the allowable use standard and guideline over multiple years increases the probability that this and associated disturbance will result in negative impacts to long term riparian conditions within the wild horse winter range inside the Big Summit Territory.

During the 2017 ground count inventories (held in June), 63 horses were counted in the base camp unit which represents the bulk of the wild horse winter range and 65 horses were again counted in base camp unit in 2018. It was also noted that in 2018, the same bands counted in 2017 were the ones seen in 2018. The utilization measurements taken prior to the winter of 2017-2018 showed utilization levels of approximately 71-80% cumulative with the bulk of utilization occurring from horses. These levels of utilization (which far exceed the Forest Plan riparian allowable use standard and guideline) occurred with minimum wild horse populations of 135 in 2017 and 125 in 2018, both of these population numbers are below the proposed AML for Alternative 3. Figure 25 below shows a spring that receives heavy use in the wild horse winter range, the photo on the left was taken in 2005 when the minimum horse numbers was 61 head. The photo on the right was taken in 2019 when the minimum horse numbers were 135 head. The AML of 150-200 horses will continue to exceed the Forest Plan allowable use standard and guideline for riparian communities which is expected to prevent recovery of unsatisfactory riparian conditions.



2005



2019

Figure 25: Photo of a spring in the Big Summit Territory winter range in 2005 and in 2019.

Annual ground count inventories since the last wild horse capture and removal in 2010 showed an initial rapid increase in horse numbers followed by an apparent plateau in the number of horses associated with the Big Summit Territory (Figure 26).

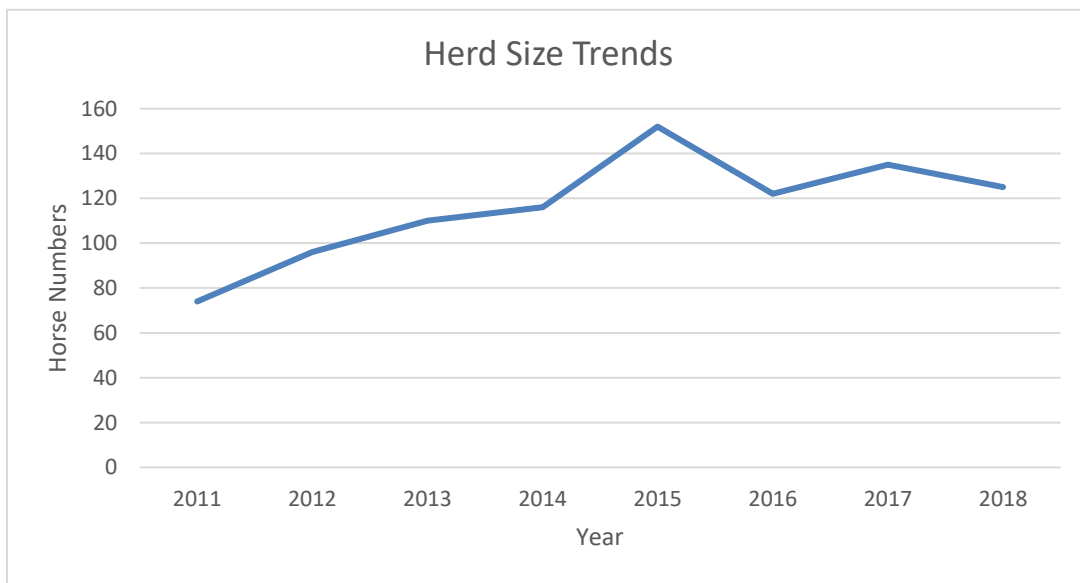


Figure 26: Horse numbers since last capture and removal

This might suggest that there could be some self-limiting of herd size. The primary way that self-limiting occurs is with increased competition for forage at higher densities, which results in smaller quantities of forage per animal, poorer body condition and decreased natality and survival rates (National Research Council, 2013). The literature suggests that when self-limiting occurs in horse herds there will probably be an increased number of animals in poor body condition and high numbers of animals dying from starvation (National Research Council, 2013). While there is currently no evidence, other than an apparent plateau in population growth, that shows an increase in horses in poor body condition or high numbers of horses dying in the Big Summit Territory, horses are moving further outside the Territory and measured forage utilization rates within the wild horse winter range and observed utilization rates throughout the Territory are very high. There have been a few incidences when horses have been monitored in the winter with poor body condition, or removed due to poor body condition (see Figure 27). A herd size of 150-200 would require a higher intensity of management including capturing and removing horses in poor body condition and capture and transport of horses outside the territory back into the territory. A self-regulated system is not necessarily natural, due to human disruptions (National Academy of Sciences, 2013). A self-limiting herd, therefore, may not be in a thriving natural ecological balance.



Figure 27: Horse during winter in poor body condition.

When horses move outside of the Territory, there is an increase in necessary management actions and concentration of resource impacts. Horses outside of the Territory need to be relocated back inside either by physical movement usually on horseback or foot or by trapping and hauling to an area inside the Territory. If horses move to adjacent private land, the horses must be removed immediately when the Forest is requested to do so by the private landowners. The grazing allotments on adjacent National Forest System lands surrounding the Territory are all cattle allotments which have smaller fenced areas (pastures) than most sheep allotments have. Confinement of wild horse bands and their associated disturbances to these smaller areas tends to amplify the resource impacts by horses, especially in riparian areas.

Genetic Health

The AML for Alternative 3 is based on the public's request to analyze a population level of 150-200 wild horses because they desire to see an alternative analyzed that addresses maintenance of genetic variety through what they call this minimally viable herd size. Genetics management of populations uses a concept called Minimum Viable Populations (MVP) (Cothran, 1991). MVP is the minimum number of breeding individuals that must be maintained for a population to survive a given time period (Cothran, 1991). Furthermore, Cothran suggests that in random mating populations, found in most mammalian species, the MVP should not be less than 50 individuals and with an AML of 150-200, there would be at least 50 breeding individuals to maintain genetic variability. However, since some factors, such as low levels of

heterozygosity, indicate the wild horses in the Big Summit Territory may be displaying genetic depression, having an MVP of 50 or more individuals would not be expected to improve the observed heterozygosity to above the recommended critical level of 0.66 (USDI, BLM, 2010). In a letter dated July 16, 2009, Cothran states that enlarging a population's size does not increase the population's genetic variation, it only slows the rate of loss of existing variation (Cothran, 2009). The Big Summit herd already has a low genetic variability (Cothran, 2011, Mills, 2010). Because Alternative 3 does not include any actions to increase genetic variation, under this alternative the observed heterozygosity of the herd will continue to decline below the critical level and the fitness of the herd is expected to continue to decrease as well. This could lead to lower birth rates, increased mortality and a decreased ability to adapt to environmental changes (Cothran, 2000) for the wild horse herd on Big Summit Territory.

Population Growth Control

Under Alternative 3, population growth would be controlled through capture and removal of excess wild horses and implementation of fertility control measures. The combination of both of these tools will have the greatest effect for achieving and maintaining AML with the minimal feasible management required by the WFRHBA.

Excess wild horses will be determined in accordance with the WFRHBA based on the current inventory or other criteria found in the WFRHBA. Bait trapping will be the primary gather method for capture and removal of excess wild horses. Based on the current inventory (Owyhee Aerial Research Inc., 2018) of 135 horses, under Alternative 3 current horse numbers are below the AML and no capture and removal or fertility control measures would be necessary until horse numbers approach the high end of AML. In fact, with the use of fertility control and the potential for the Big Summit Territory herd to self-limit during winters of above average snowfall, the need for capture and removal of excess horses could be very minimal potentially generating very few to no effects associated with the gather and removal of horses from the Territory.

Under Alternative 3, fertility control measures would be implemented when the herds reach the low end of the AML range. Implementation of fertility control measures would slow down the population growth and reduce the need to initiate removals. Fertility control measures would be conducted in accordance with the SOPs described in Appendix 4. All fertility control methods recommended by the Wild Horse and Burro Advisory Board and approved for equine use by the EPA, FDA, or other governmental regulatory authority will be considered for use including contraception tools and sterilization tools as well as manipulation of sex ratios. The effects of the fertility control measures on horses are the same as described in Alternative 2.

See the previous discussion of effects common to all alternatives for effects directly related to wild horses with capture and removal, off-range and the Emergency Action Framework.

Cumulative Effects

See the previous discussion of cumulative effects common to all alternatives.

The focus of this cumulative effects discussion is on winter range forage utilization and competition for that forage. Wild horses, permitted livestock, and wildlife species all compete for available forage within the Territory. Permitted livestock grazing overlaps with the Big Summit Territory. From mid-June to the end of September there are two bands of sheep permitted to graze on allotments that overlap with the Big Summit Territory. Forage competition for upland and riparian forage occurs between sheep and horses although dietary overlap between the two species in the summer time is small, sheep prefer forbs while horses prefer grasses. One study found a 21% dietary overlap in the summertime between wild horses and domestic sheep (Olsen and Hansen, 1977). Relative to this project, one band of sheep spends approximately 19 days in June grazing in the wild horse winter range. Permitted sheep use was voluntarily decreased because of a lack of forage from 2017-2019 (see Range Resource Report).

In addition to permitted livestock, wildlife species, specifically elk and deer compete with wild horses for forage in the Territory. Dietary overlap is greatest between elk and horses (Hosten, 2007) (Salter and Hudson, 1980). The current population levels for both elk and deer, while still below the Management

Objectives, are higher than when the 1975 plan was developed. The Act limits agency authority to manage for horses to where they occurred at the time of enactment. Therefore, the Territory must supply the complete forage needs for the horses year-round while elk and deer are free to roam to adjacent lands (see Wildlife Resource Report).

In Alternative 3, the AML would be set at 150-200 horses. Riparian utilization levels at this herd size, when combined with the use of permitted livestock and wildlife, is expected to range from 70-over 80%, and is expected to repeatedly exceed the Forest Plan allowable use standard and guideline of a maximum of 30% utilization (USDA, 1989). While permitted livestock numbers have stayed the same since 1975, elk populations have increased since 1975; this will continue to affect forage utilization levels and potentially range conditions, especially in riparian areas. Repeated regular exceedance of the Forest Plan riparian allowable use standard and guideline is expected to prevent arresting downward trends and recovery of unsatisfactory riparian community conditions. In addition, lack of available forage in preferred habitats and limited space for harem occupancy is expected to result in increased horse movement outside of the Territory boundaries into adjacent National Forest System lands and onto adjacent private lands. As utilization of forage in the wild horse winter range increases prior to the onset of winter conditions or there is an above average snowfall winter, horses will have an increasingly harder time maintaining desirable body condition levels (above Henneke Body Score 2). Poorer body conditions through the winter are expected to result in reproductive and general health issues including miscarriages and increased contraction of diseases.

Forage utilization may also have a cumulative impact on upland/riparian resource conditions. While the Forest Plan allowable use standard and guideline for riparian communities in unsatisfactory condition is up to 30% of combined permitted livestock, wildlife and wild horse use in the Territory, there is more forage available so exceedance of this standard and guideline is expected to occur since riparian areas are preferred habitat for horses and we have minimum feasible management practice direction (WFRHBA) so herding or other management practices to move horses out of riparian areas will not occur. Therefore, repeated utilization exceedance over time increases the likelihood or probability of decline of the competitive advantage of species sensitive to grazing which in turn can result in species composition shift and ultimately riparian condition remaining in unsatisfactory condition and/or degrading.

In summary, the focus of the cumulative effects analysis for Alternative 3 is on competition between wild horses, permitted livestock and wildlife for winter range forage and the resultant expected levels of utilization. At the proposed AML of 150-200, repeated regular exceedance of the Forest Plan allowable use standard and guideline is expected across most riparian areas in the wild horse winter range regardless of winter snowfall amounts. This is expected to prevent recovery of riparian communities in unsatisfactory condition. However, vegetation management projects will temporarily improve upland forage conditions but not remove the exceedance of allowable use level within riparian areas since they are the preferred areas. Competition for forage on the wild horse winter range has increased since 1975, especially between wild horses and wildlife.

Summary of Effects

In summary, all of the Alternatives are expected to require some level of capture and removal of horses although that level is expected to vary between Alternatives with Alternatives 1 and 2 expected to require the largest number of captured and removed horses and Alternative 3 requiring the least. The action of capture and removal is expected to have similar potential effects on each horse captured (and on the remaining horses on the territory), however, the number of horses affected and frequency that these capture and removals effect horses remaining on the territory would be expected to vary between alternatives. These effects are discussed at the beginning of the effects section.

The largest variation between Alternatives lies in three action items: AML determination, Genetic Health management actions and Population Growth Control measures. Under Alternative 1 bringing herd size to within the AML range of 55-65 is expected to meet the Forest Plan riparian allowable use standard and guideline on most riparian communities, most years, with the exception of winters with above average

snowfall. With a herd size within the range of AML under Alternative 2 it is expected that the Forest Plan riparian allowable use standard and guideline would be met on most riparian areas on all but the most extreme snow depth winters, with little to no repeated exceedance. Under Alternative 3 there is no expectation that the Forest Plan riparian allowable use standard and guideline would ever be met on most of the riparian areas in the wild horse winter range. For riparian community conditions, both Alternatives 1 and 2 would be expected to improve riparian communities with forage utilization levels meeting Forest Plan standards most if not all of the time across the Territory. Alternative 3 would not be expected improve riparian community conditions and it is expected that most if not all of the riparian communities in the Territory would exceed Forest Plan standards. Alternative 2 is the only Alternative that is expected to improve the genetic variation of the herd, this Alternative allows the use of translocation as a tool to increase observed heterozygosity of the herd. Finally, population growth control measures and their associated effects vary by Alternative. Alternative 1 would only control population growth through capture and removal of excess horses. This represents the highest intensity of management and horse risk exposure of the alternatives analyzed. Alternative 2 would include both capture and removal of excess horses and the application of fertility control measures to address population growth. This Alternative could rely on both in the beginning to reduce numbers to within AML, exposure to a relatively high level of risk for horses during capture, but would allow for minimum feasible management once the AML is achieved. Lastly, Alternative 3 would utilize tools of capture and removal and fertility control for population growth management; however, because the AML is so high in this Alternative, the need to capture horses may be less than any other Alternative, but the adverse effects to riparian community condition and horse body condition associated with allowing the horse herd to approach a self-limiting status are expected to fail to comply with the thriving natural ecological balance mandate of the Act (Table 20).

Table 20: Comparison of Projected Riparian Community Utilization to Forest Plan Riparian Allowable Use Standard and Guideline by Alternative at High AML

Forest Plan Riparian Allowable Use Standard and Guideline	Alternative 1	Alternative 2	Alternative 3
0-30%	32-46%	0-30%	73-86%

Range Resources

This section of the EA discusses the effects and consequences of the alternatives on available forage and management of livestock grazing within the Big Summit Wild Horse Territory (Territory). The Territory is within the Reservoir grazing allotment (Figure 28). The wild horse Appropriate Management Level (AML) numerical ranges will be the only issue discussed in terms of having an effect on livestock operations and management. All other proposed actions related to wild horse management as described in Chapter 2 have no effect, because they are related to how the AML will be managed for and achieved. This section provides a discussion of short and long-term, direct, indirect, and cumulative effects associated with the implementation of the AML ranges of each of the three alternatives on forage availability and permitted livestock management.

Affected Environment

General Analysis Area Description

The Territory is approximately 25,434 acres in size and located in both the Lookout Mountain and Paulina Ranger Districts, approximately 25 miles northeast of Prineville, Oregon (Figure 28). Landscapes within the analysis area are comprised mainly of steep-timbered slopes, juniper/sagebrush ridgelines, and open meadows and are about 99% National Forest System (NFS) lands. The Territory is almost entirely within the Reservoir Allotment, although there is nearly 9,000 additional acres within the allotment that are not part of the Territory. Although the Reservoir Allotment is not physically divided by a fence into two pastures, the allotment has been divided in two sheep band areas – which will be referred to as pastures in this document: Canyon Creek and Reservoir. The Reservoir Allotment has a Term Grazing Permit issued to a permittee authorizing two bands of sheep, with 1,100 ewe/lamb pairs each to graze from June 16 to September 30. Table 21 below depicts the permitted livestock use within the Canyon Creek and Reservoir pastures.

Table 21: Permitted livestock use within the Reservoir Allotment

Pastures	Total Acres	Permitted Numbers	Kind & Class	Season of Use	AUMs	Acres / AUM
Canyon Creek	20,500	1,100	Sheep - Ewe/Lamb	06/16 - 09/30	1,161	18
Reservoir	13,915	1,100	Sheep - Ewe/Lamb	06/16 - 09/30	1,161	12

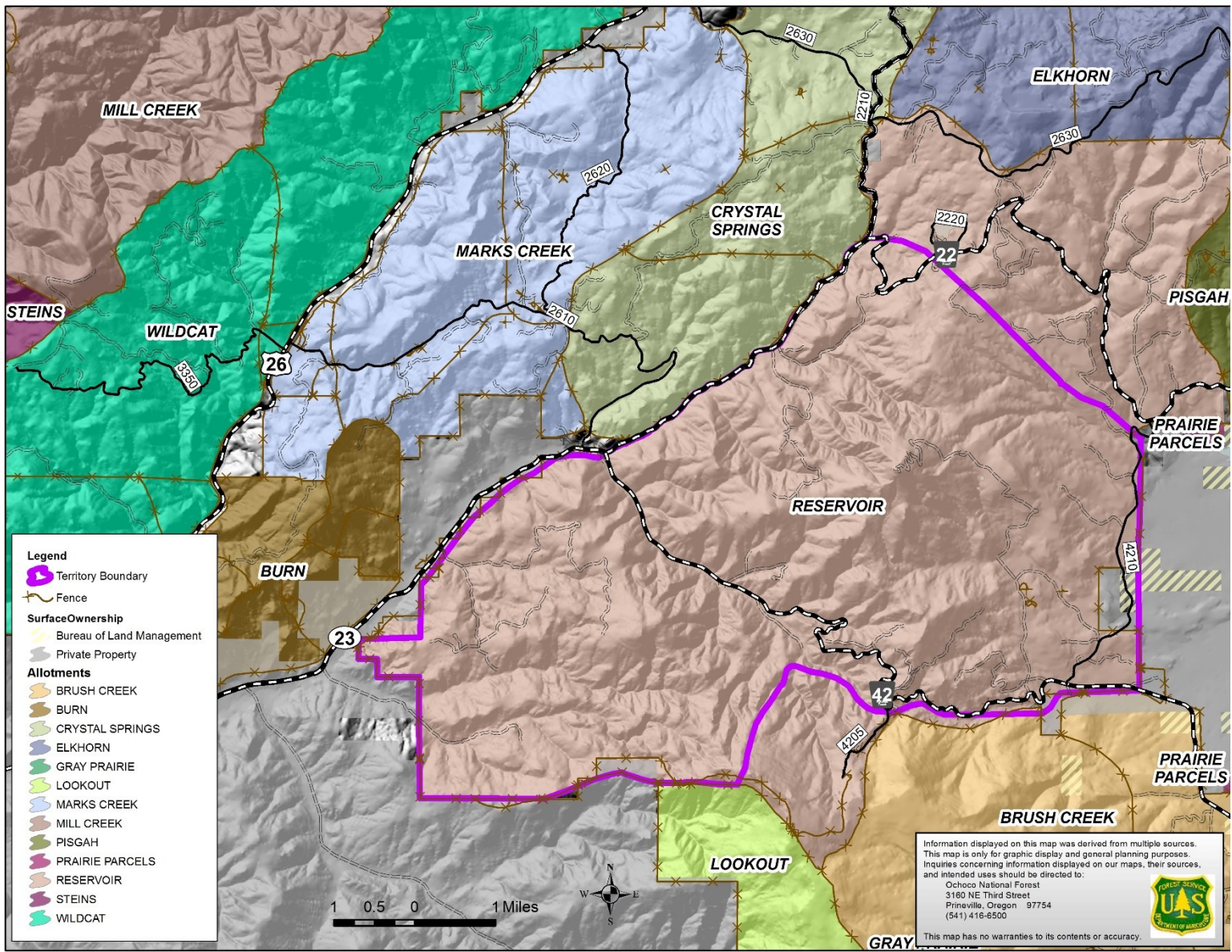


Figure 28: Map of Grazing Allotments within and near the Big Summit Territory

Grazing History within the Analysis Area

Grazing of domestic livestock (cattle, sheep, and horses) has occurred in the analysis area since the late 1800s. In both subject pastures within the analysis area, large bands of sheep (ranging from 1,000 to 3,000 ewe/lamb pairs) were grazed until after the establishment of the Ochoco National Forest in 1907. A.S. Ireland, Forest Supervisor of The Western Division of the Blue Mountain Reserve and The Maury Mountain Forest Reserve – precursor to the Ochoco National Forest – estimated that in 1906 a total of 340,000 sheep and 30,000 cattle and horses grazed the Western Division Blue Mountain Reserve (Hodgson, 1913). During this time, heavy livestock use impacts to soil and vegetative resources were severe and these impacts continue to affect the ecosystems of the Ochoco National Forest.

Since the establishment of the Ochoco National Forest, an effort was made to reduce livestock numbers to correspond to the actual carrying capacity of the land. During this effort Animal Unit Months (AUMs) of available forage were determined for the designated grazing allotments. (*For the purposes of this document an AUM is calculated on an Animal Unit Equivalent of 0.30 for a ewe with a nursing lamb.*) According to records, although allotment boundaries and names have changed over the years, only sheep have been permitted to graze the analysis area since the establishment of the Ochoco National Forest.

In 1975 when the *Ochoco Wild & Free Roaming Horse Management Plan* was written, the Canyon Creek and the Reservoir pastures were each permitted for 1,100 ewe/lamb pairs between June 16 and September 30 as it is permitted now. Over the past ten years, sheep band numbers for the Canyon Creek and Reservoir pastures have been below permitted stocking rates. Figure 29 depicts the use for the past 10 years. In 2017 and 2018 the permittee requested non-use due to resource concerns, to rest one pasture each year. Reduction in numbers in the previous years was a result in the decrease in forage availability and forage quality, based on conversations with the current permittee and confirmed by vegetation data collected within the analysis area (*see Wild Horse Specialist Report*). Figure 29 below depicts the stocking information of each band by grazing year.

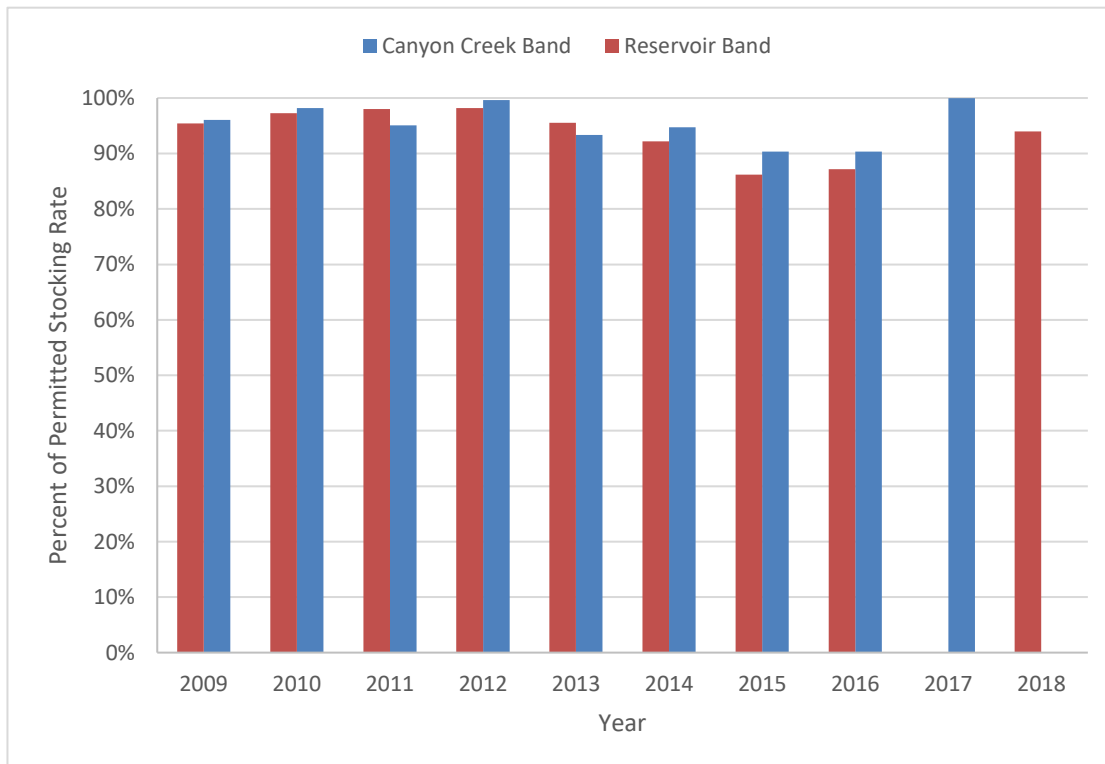


Figure 29: Percent of permitted use based on authorized stocking rates for the Canyon Creek and Reservoir bands over the past ten years.

Allowable Use

The LRMP (1989) dedicates forage utilization tables based on types of communities, range management levels and the existing range conditions of those communities. These allowable utilization levels are a cumulative annual use by big game, wild horses and permitted livestock. The allowable use standard and guideline is determined based on the forage conditions, range resource management level, and community type within that allotment. See Wild Horse section on forage allocation for more information. The actual use, or utilization measurement, within the allotment is based on the residual stubble heights measurements of graminoid species, as described in Implementation Monitoring Biological Program for Pacfish and Infish (USDA, 2003) otherwise known as annual implementation monitoring. This monitoring helps determine the utilization levels within grazing allotments and/or pastures.

Annual implementation monitoring is generally done at Designated Monitoring Areas (DMAs) that are located in areas that most likely receive the highest grazing pressure by livestock, postulating that the entirety of the community type measured within the pasture would show the same stubble heights, or a greater stubble height. Therefore, it is important to note that the DMAs that are discussed hereafter were established in the late 1990s when horse numbers were below the maximum AML (65) and were specifically located in areas that would be representative of the use of the permitted sheep bands. There are four DMAs within the Territory aimed at assessing permitted livestock use. At each DMA the residual stubble height of the key forage species, generally mixed grasses or sedges, is measured at mid-season and at the end of the growing season. The residual stubble heights are recorded between 1-inch and 12-inches, any stubble heights greater than 12-inches are recorded as “>12”. Utilization cages, installed and moved annually at each DMA within the analysis area beginning in 2014, were used to provide an ungrazed comparison to gauge annual production of the key forage species at the end of the growing seasons.

Average height/weight curves were created for each DMA from data collected in 2014 through 2018 to calculate utilization. The wild Horse section of this EA discusses that the 30 percent utilization level was used in the AML analysis due to the Wild Free-Roaming Horse and burro Act of 1971 requiring management of wild horses at the “minimal feasible level.” See AML Analysis (Appendix B) and the Wild Horse section. The median stubble height of each mid and end-of-season visit to the DMA is then converted to percent utilization using the average height/weight curves. However, if the median stubble height is “>12”, then utilization is considered to be unmeasurable but, based on the height/weight data collected, utilization is within the allowable use standard of 30 percent (+/- 5%). Just as the DMAs reflect the shortest stubble height, they also reflect the highest percent utilization. The rest of the pasture would show the same percentage of utilization or less. As this report looks at the interactions of permitted livestock grazing within the Territory, Table 22 shows utilization when the sheep have left the pastures (mid-season). This data is maintained within the analysis file for this project at the Lookout Mountain Ranger District Office.

Table 22: Depicts whether or not utilization was measured within the 30% utilization level by DMA for the past ten years.

DMA	2009	2010	2011*	2012	2013	2014	2015	2016	2017	2018
Canyon Creek-1	Y	Y	NM	Y	Y	Y	Y	Y	Y	Y
Canyon Creek-2	Y	Y	NM	Y	Y	Y	Y	Y	Y	Y
Reservoir-1	Y	Y	NM	Y	Y	Y	Y	N	N	Y
Reservoir-2	N	Y	NM	Y	Y	Y	Y	Y	Y	Y

*NM = not measured - DMA data was not collected during the 2011 grazing season.

Scasta et al (2016) in their meta-analysis of prior research on wild horse competition for forage with livestock and big game wildlife showed competition with sheep during the spring and summer grazing periods. These findings match what has been observed on the Reservoir allotment. The permitted sheep AUMs have been voluntarily decreased because of a lack of forage the permittee and the sheep herder have noticed since 2012. Data collected on riparian areas in the Territories winter range in the fall of 2017 and 2018 show utilization levels ranging from 58-80% with evidence of wild horses being the highest contributor

of utilization. In fact, in 2018 in the Canyon Creek pasture when utilization levels ranged from 58-77%, sheep did not graze in the area. More information is provided in the Wild Horse section of this EA and the Wild Horse Specialist Report.

Livestock Management

The Territory is grazed by two bands of sheep that graze both the Canyon Creek and Reservoir pastures. Generally, the Reservoir band grazes east of Round Mountain, while the Canyon Creek band grazes on the west side. Detailed instruction manuals, “*Canyon Creek Allotment Sheep Trailing Instructions*” and “*Reservoir Allotment Trailing Instructions*”, were written specifically for each sheep band by the permittee with cooperation from the U.S. Forest Service in 1999 and amended over the years as conditions and situations have changed. A copy of these instruction manuals can be found on file at the Lookout Mountain District Office. The permittee currently feels that the increasing wild horse numbers and the associated competition for forage has made following the instructions untenable, due to the horse use prior to and while the sheep move between camp areas. Therefore, the Forest Service authorized resource protection non-use in 2017, 2018 and 2019. The instruction manuals give specific directions for band movements and other general logistics on a daily basis to efficiently and effectively graze the pastures with minimal impacts to the environment, i.e. instructions specifically dictate that bedding areas are located away from streams. Further details on band movements are discussed later in this section.

Shepherd Camps and Herding Practices

Throughout the Canyon Creek and Reservoir pastures there are established camps from which sheep grazing operations (i.e. grazing, watering, bedding, etc.) for the area are based. There are 31-32 camps utilized by the Reservoir sheep band and 34-38 camps utilized by the Canyon Creek band in the Territory. The instruction manuals give specific directions from each camp location to where the band is to graze, water, siesta/bed-down on each day they are at that camp. Established camps are utilized between 1 and 6 days, depending on abundance of nearby resources necessary for the sheep band. These instructions ensure that localized riparian areas are only grazed for a short duration, which allows for regrowth compared to season-long grazing. Each band is moved along its respective trailing route between camps, as described in the instruction manual for that band, by at least one herder with dogs for herding and livestock protection.

Distribution and Structural Range Improvements

Structural range improvements (i.e. water developments, fences, etc.) are intended to influence livestock distribution on their associated allotments. Permittees are responsible for the maintenance of all of the structural range improvements that are assigned to them in their Term Grazing Permit. Maintenance requirements can range from simple mending of wire or pipeline to replacement of structure components to replacement of the entire system. Due to the intensive management by the shepherders and dogs in the Reservoir Allotment, fencing is not needed to manage distribution of the sheep and water developments are utilized only for providing water to the sheep.

Although there is no pasture fencing within the Territory, there is approximately 21.5 miles of fencing that follow portions of the boundary. These fences were constructed to maintain livestock within their respective allotments and are located mainly along the northwest, west, east, and portions of the southern boundary. There are also approximately 0.6 miles of fence associated with a few small enclosures, protecting sensitive areas. It should also be noted that there are no fences along the northeast boundary and a portion of the southern boundary of the Territory. As a result, wild horses have access to areas within the Reservoir Allotment that are not considered part of the Territory.

There are fourteen water developments associated with livestock management and listed on the Term Grazing Permit within the Territory. Of those fourteen developments, eleven are troughs, two are undeveloped, and one is a pond. These water developments are not only used by livestock, but by wild horses, big game and other wildlife as well.

Environmental Consequences

The following section discusses the direct, indirect, and cumulative effects of each alternative with consideration to the livestock operations and management within the Territory. The wild horse Appropriate Management Level (AML) ranges will be the only action that will be discussed in terms of having an effect on livestock operations and management. All other proposed actions related to wild horse management as described in Chapter 2 have no effect, therefore those proposed actions will not be discussed.

The environmental effects discussed in this chapter will reflect the conditions within the Territory in regard to the wild horse herd being within the established AML range. This recognizes the fact that no matter which alternative is selected, reaching the established AML range will not occur immediately following the initiation of implementation. That being said, the environmental effects resulting from the current number of wild horses within the Territory and the current level of management are expected to persist for the short term until the AML range has been reached.

Effects Common to All Alternatives

Forage allowed for use by big game, wild horses, and domestic livestock is established by the LRMP, as previously discussed in the “*Allowable Use*” section of Chapter 3. Therefore, implementing any of the three alternatives will have no effect to allowable use of forage, only forage availability.

Regardless of the size of the wild horse herd, the wild horses are not managed like the sheep bands and predicting when and where the wild horses will be grazing specifically is not possible. Therefore, there are differing levels of competition for forage between wild horses and the permitted livestock, as well as wildlife. As outlined in the *Affect Environment* section above, there is the potential for competition between the wild horses and the permitted sheep during the spring and summer. This means that isolated areas of the allotment will receive varying levels of utilization by the wild horses prior to the sheep bands utilizing the same areas. This affects the management of the sheep once they start utilizing the areas, possibly shortening the length of time at each camp area or available grazing locations based on forage conditions (competition).

Components of the range improvements within the Territory can be subject to year-round damage and displacement due to wild horses rubbing against them or fighting nearby. The fences around portions of the Territory boundary also receive pressure from wild horses that may be trying to access better feed on the other side of the fence or trying to escape danger. Since these wild horse affects occur year-round, maintenance frequency and intensity necessary for these range improvements may be greater within the Territory, or at the Territory boundary, compared to range improvements removed from the Territory. This maintenance would need to be completed by the private land owners or the permittees whose allotments border the Territory.

Direct and Indirect Effects of each Alternative

Alternative 1 – No Action

Alternative 1 proposes the continued implementation of the current *Ochoco Wild & Free Roaming Horse Management Plan* (1975) in the Territory with an AML range between 55 and 65 horses. This AML range was determined with consideration of the permitted use described in the Term Grazing Permit in 1975. Since permitted use is the same as described on the current Term Grazing Permit, there would be little to no effects to forage availability from implementing this alternative. Alterations to sheep band management due to wild horse utilization within the Territory during the grazing season may occur. However, these changes in management are expected to be infrequent and may also be related to climatic conditions as well as wild horse forage utilization.

Implementing Alternative 1 is expected to result in isolated occasions where range improvements will need maintenance in relation to wild horse damage, specifically if the damage results in rendering the development nonfunctional.

Alternative 2

The AML under Alternative 2 is a range between 12 and 57 wild horses within the Territory. This new range was determined based on the changes in environmental conditions and the improvements to analytical tools (i.e. GIS, LIDAR, etc.) compared to 1975. The effects of implementing this alternative on the amount of available forage to sustain livestock grazing during the permitted grazing season are expected to be similar to Alternative 1, where alterations to sheep grazing patterns may occur. Again, these changes in management are expected to be infrequent and may also be related to climatic conditions. With this alternative the effects are expected to be less and occur less frequently as AML levels have the possibility to be lower, resulting in a lower likelihood for competition.

The effects of implementing Alternative 2 to range improvements are expected to be dependent on the number of wild horses. When wild horse numbers reach the AML range, the frequency and magnitude of maintenance demands are expected to be very low and isolated. However, as the number of wild horses increase the frequency and magnitude of range improvement maintenance may increase due the potential for possible damage.

Alternative 3

Under alternative 3 the AML would be raised to a range between 150 and 200 wild horses within the Territory. This alternative was added to address public comments during scoping. The effects of implementing this alternative would have the greatest negative impact on permitted livestock grazing within the Territory. Currently there are at least 135 horses on the Territory, and since 2008 minimum horse counts have shown the population above the current AML upper limit of 65 horses. As outlined in the *Affected Environment* section above, at the current inventory of at least 135 horses, fall forage utilization levels have exceeded the Forest Plan allowable use standard and guideline in multiple locations within the winter range. Depending on the resource conditions resulting from 150 to 200 horses, camps and grazing patterns would need to be adjusted to reduce competition and reduce resource concerns.

These high levels of utilization may have long-term negative effects on the quality and availability of upland and riparian forage (Holechek et al., 2000). If plants are continuously over-utilized, plant vigor decreases and desirable species can be replaced with more competitive, undesirable species. This vegetative shift in riparian areas, due to differences in plants capabilities to hold streambanks together, can lead to unstable streambanks, downcutting, and lowering of the water table, further changing riparian vegetative conditions. These changes may lead to a decrease in available forage and increased competition.

Clary and Webster (1989) conclude that, for healthy plant vigor, grazing in riparian areas must provide for re-growth of riparian plants after use, or should leave sufficient vegetation at the time of grazing for maintenance of plant vigor and stream bank protection. With fall utilization levels of 58-80% within the winter range of the Territory there is no opportunity for re-growth nor does it leave sufficient vegetation for plant maintenance or stream bank protection. The current inventory of 135 horses is below the proposed AML for this alternative, therefore once the AML is reached, over-utilization would be expected to continue at an even higher rate and forage availability would be reduced for the permitted livestock as well as big game and the wild horses. For the last two years when horse numbers have been 135 & 125, the permittee has volunteered to rest one band each year for resource concerns, only grazing half the permitted AUMS. This trend may continue, to protect plant vigor, but it causes direct effects to the permittee and his ability to sustain his grazing operation. Furthermore, the conditions of upland and riparian forage would be expected to continue on a downward trend within the already unsatisfactory riparian areas.

The effects of implementing Alternative 3 to range improvements are expected to have a greater negative effect than any other alternative. When wild horse numbers reach the AML range, the frequency and magnitude of maintenance demands are expected to increase the frequency and magnitude of range improvement maintenance necessary due to possible damage by horses.

Cumulative Effects for all Alternatives

For each alternative the cumulative actions considered in this report would include the non-commercial thinning, fuels management, and riparian restoration activities prescribed under the Canyon and HEJ Vegetation Management EIS documents.

Alternatives 1 and 2

Under Alternative 1 cumulative effects from the vegetative management activities may alleviate concerns of forage availability once AML is reached. These effects would be only slight and would have mid to long term positive effects depending on the timing of the activities and how long it takes to reach the number of horses prescribed in the AML levels.

Alternative 3

Under Alternative 3 there would be no anticipated cumulative effects from the vegetative management activities as forage availability would continue to be diminished for the permitted livestock.

Wildlife

Regulatory Framework

Federally Listed Species

Biological evaluations (BE) provide a process to review all Forest Service planned, funded, executed or permitted programs and activities for possible effects on threatened, endangered, proposed or sensitive species (FSM 2672.4). BEs are intended to help ensure that Forest Service actions do not contribute to a loss of viability on any native or desired non-native plant or animal species, or contribute to trends toward Federal listing of any species. They provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process (FSM 2672.41).

The effects analysis in the BE is required to address any direct, indirect, and cumulative effects of an action on threatened or endangered species or their critical habitat (50 CFR 402.02) and on sensitive species or their habitat (FSM 2672.42).

The BE also complies with Section 7 of the Endangered Species Act (ESA), which requires all Federal Agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service, to insure that their actions are not likely to jeopardize the continued existence of threatened, endangered or proposed species or adversely modify their habitat. Management policy and direction for threatened, endangered, proposed, and sensitive species is also contained in Forest Service Manual 2670 and under Forest Plan standards and guidelines for threatened or endangered species.

Current management direction on desired conditions for threatened, endangered, proposed and sensitive species on the Ochoco National Forest can be found in the following documents:

- Forest Service Manual and Handbooks (FSM/H 2670/2609)
- National Forest Management Act (NFMA)
- Endangered Species Act (ESA)
- Migratory Bird Treaty Act (MBTA)
- National Environmental Policy Act (NEPA)
- Ochoco National Forest Land and Resource Management Plan, as amended
- Recovery Plans (species specific)
- Regional Forester policy and management direction

Other Species of Concern

In addition to Federally listed species (i.e. threatened, endangered, proposed, and sensitive species) the Forest Service Manual requires the evaluation of proposed project effects on management indicator species (MIS) (FSM 2620). The Forest is to “identify and consider, as appropriate for the species and area, factors that may affect the continued downward trend of the population” (FSM 2621.2).

On the Ochoco National Forest the principle policy document relevant to wildlife management is the Ochoco National Forest Land and Resource Management Plan (LRMP) (USDA Forest Service 1989*b*). This plan outlines numerous wildlife species or groups of species, including management indicator species, that have standards and guidelines associated with them. In the evaluation process for any action, proposed effects to these species are considered and effects disclosed to ensure the proposed action and subsequent alternatives are consistent with the corresponding standards and guidelines in the LRMP.

In 1995, the Regional Forester’s Forest Plan Amendment #2 adopted interim management direction establishing riparian, ecosystem, and wildlife standards for timber sales. Amendment #2 requires that all timber sales incorporate associated standards for old growth, old growth connectivity, snags, large down logs, and northern goshawks. The Regional Forester has periodically distributed letters clarifying direction in Amendment #2 (Regional Forester, October 2, 1997; October 23, 1997; June 11, 2003, September 10, 2015). However, this project does not propose any commercial timber harvest and therefore is exempt from these interim wildlife standards.

Additional management direction is provided for the conservation of migratory landbirds. This direction is consolidated in the Forest Service Landbird Strategic Plan (USDA Forest Service 2000) and further developed through the Partners in Flight Program. Altman and Bresson (2017) identifies priority habitats with associated focal species for the Blue Mountains in Oregon. This strategy is used to address the requirements contained in Executive Order 13,186 (2001) as well as those agreed upon by the USDA Forest Service and USDI Fish and Wildlife Service (USDA Forest Service 2008, 2014) regarding responsibilities of federal agencies to protect migratory birds.

The terrestrial wildlife species resource report prepared for this project satisfies the requirements of the above regulations and is contained within this document.

The Regional Forester’s Special Status Species List was updated in July, 2015 (USDA Forest Service 2015).

Analysis Methods

Species presence/absence determinations were based on species range, habitat presence, wildlife surveys, recorded wildlife sightings, observations made during reconnaissance, and non-Forest Service databases and literature.

Field reconnaissance is normally used to determine the presence of species or habitat, if the species or habitat is suspected to be present, or if their occurrence is unknown. Field reconnaissance is also used to gather information relative to potential effects of the proposed project. If species occurrence or habitat is known and the project impacts can be sufficiently mitigated, field reconnaissance would not be done and the process goes to the conflict determination phase. Field reconnaissance was performed in 2016, 2017, and 2018.

A geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. The information can be related to visual data (maps), tabular data (tables, spreadsheets, or data bases), and used to run models (create new data sets from existing data based on criteria or specific conditions). ArcMap 10.5.1 is a component of the ArcGIS program developed by Economic and Social Research Institute and was used for the processing of GIS data for this report.

While modeled habitats or components generally match conditions known to occur on the ground, modeling does not necessarily match a specific point but rather gives conditions that may occur given the assumptions

of the model. Since it was used identically for all alternatives, it provides a basis for comparison. Reproductive habitat for the various wildlife species was determined using district occurrence data, scientific literature, various data sets, and professional experience.

Effects on species will be determined by assessing how the alternatives affect the structure and function of vegetation relative to current, projected, and historical distributions. Effects on habitats are discussed, with the assumption that if appropriate habitat is available for a species, then that species occupies or could occupy the habitat.

For this project proposal, effect boundaries are considered to be the smallest identified area where the potential direct and indirect effects from different management practices could occur.

Cumulative effects are analyzed in respect to past, ongoing and reasonably foreseeable future activities that overlap in both time and space. Spatial and temporal bounding for cumulative effects were determined for each wildlife species individually. The 5 subwatersheds (HUC 12) that overlap the Big Summit Wild Horse Territory in space were considered for cumulative effects for a majority of the species analyzed because these subwatersheds, when combined, encompass habitat and territory size for a number of wildlife species. While this boundary may encompass more habitat than is necessary to properly evaluate effects to some species, it represents the most logical boundary as incorporating the watersheds (HUC 10) that overlap with project effects would not refine the analysis enough to discern actual impacts. This boundary allows for the proper consideration of cumulative effects to certain wide-ranging species from past, present, and reasonably foreseeable future actions adjacent to the project area (see Appendix A for activities considered and a map of effects bounding).

The duration of effects on the wildlife resource is described according to the following terms and definitions: Short-term – 0 to 5 years; Mid-term – 5 to 25 years; Long-term – 25+ years

Rather than addressing all wildlife species, the Forest Plan focuses on two categories of wildlife: 1.) threatened, endangered, proposed and sensitive species which are addressed in the biological evaluation, and 2.) management indicator species (MIS) which are addressed in the wildlife resource report. In addition, Executive Order 13186 requires all Federal agencies to avoid or minimize the adverse impact of their actions on migratory birds and develop a Memorandum of Understanding with the US Fish and Wildlife Service to incorporate migratory bird conservation into agency planning processes whenever possible. Therefore, landbirds including neotropical migratory birds are also addressed in the Wildlife Resource report.

Categories are summarized below:

- ❑ **Threatened, Endangered, Proposed, and Sensitive Species** — A threatened species is an animal or plant species listed under the ESA that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. An endangered species is an animal or plant species listed under the ESA that is in danger of extinction throughout all or a significant portion of its range. A proposed species is one that is being considered for listing as threatened or endangered under the ESA.

Sensitive species are animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species existing distribution.

- ❑ **Management Indicator Species (MIS)** — Management indicator species are species selected because their welfare is presumed to be an indicator of the welfare of other species using the same habitat or whose condition can be used to assess the impacts of management actions on a particular area, or other species of selected major biological communities. Management indicator species are selected from several categories including state or federal threatened or endangered species lists; species commonly hunted, fished, or trapped; non-game species of special interest; and species with special habitat needs that may be influenced significantly by planned management programs. Where population monitoring data are not available, due to lack of funding or feasibility of monitoring

populations, the amount and quality of habitat can be used as a proxy for determining viability effects of projects on MIS.

This analysis uses management indicator species and direction identified in the Forest Plan. Forest-wide standards and guidelines of the Forest Plan directs land managers to “protect habitat from adverse modification through curtailment of conflicting activities, modification of activities, seasonal restriction of activities, or avoiding the area” if the species use of the area is because it is essential habitat for that species.

- ❑ **Landbirds including Neotropical Migratory Birds** — Landbirds, including neotropical migratory birds, have diverse habitat needs spanning nearly all plant community types and successional stages. Long-term population data on many of these species indicate downward population trends. Under direction from Executive Order 13186 and the 2017 extension of the 2008 MOU with US Fish and Wildlife Service the Forest Service shall: Address the conservation of migratory bird habitat and populations when developing, amending, or revising management plans for national forests and grasslands, consistent with National Forest Management Act, Endangered Species Act, and other authorities listed above. When developing the list of species to be considered in the planning process, consult the current USFWS Birds of Conservation Concern, 2008, state lists, and comprehensive planning efforts for migratory birds. Within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors.

Species presence/absence determinations were based on habitat presence, wildlife surveys, recorded wildlife sightings, observations made during reconnaissance, non-Forest Service databases, and status/trend and source habitat trends documented for the Interior Columbia Basin. Informal wildlife surveys were conducted for some species.

Wildlife: Threatened, Endangered, Proposed, and Sensitive Species

Affected Environment and Environmental Consequences

The U.S. Department of Interior Fish and Wildlife Service (USFWS) provides a list of threatened, endangered, proposed, and sensitive species that have the potential to occur in Crook County for consideration in analysis. Currently the gray wolf is the only terrestrial threatened, endangered, proposed, or sensitive species that may occur within the county identified on the USFWS list (USDI Fish and Wildlife Service 2020*b*). In addition, no designated or proposed critical habitat for terrestrial threatened or endangered species exists in the affected subwatersheds.

Sensitive species that are not listed as documented or suspected on the Regional Forester’s sensitive species list for the Ochoco National Forest are not analyzed for potential effects. There are 16 terrestrial species on the 2015 Regional Forester’s special status species list (USDA Forest Service 2015) that are known or suspected to occur on the Ochoco National Forest. However, only 10 species have potential habitat in the proposed project area. Species listed as strategic are not addressed in this analysis.

The Columbia spotted frog is addressed in the aquatics biological evaluation and therefore will not be discussed further in this section. Table 23 describes threatened, endangered, and sensitive species considered in the analysis of the Big Summit WHT Management Plan. The wolverine, pygmy rabbit, American peregrine falcon, greater-sage grouse, bufflehead, tri-colored blackbird, upland sandpiper, and horned grebe do not have habitat within the project area and are not documented or suspected to occur in the general vicinity of project activities, and were not considered for further analysis. In addition, though the Townsend’s big eared bat, bald eagle, white-headed woodpecker, and Johnson’s hairstreak have habitat within the project area and are either known or suspected to occur there, proposed management actions will not impact these species in a measurable way, and therefore were not considered for further analysis.

Table 23: Threatened, endangered, proposed and sensitive species for the Ochoco National Forest and Crooked River National Grassland: occurrence within the project area and consideration of potential for impact.

Common Name	Species Occurrence in the Project Area and Consideration of Potential Impact for Further Analysis
gray wolf <i>Canis lupus</i>	Considered. This species is currently known to utilize the Territory as dispersal habitat, but is not known to occupy it, or the Ochoco National Forest, on a permanent basis. Potential exists for prey species to be impacted by number of horses present.
wolverine <i>Gulo gulo</i>	Not Considered. Species is not known or suspected to occur within the Territory. No suitable habitat in the form of isolated areas with consistent snow pack exists within the Territory. Project would not impact habitat for this species.
pygmy rabbit <i>Brachylagus idahoensis</i>	Not Considered. Species is not known or suspected to occur within the Territory. Project would not impact habitat for this species.
American peregrine falcon <i>Falco peregrinus</i>	Not Considered. Species is not known or suspected to occur within the Territory. Project would not impact cliff habitat for this species.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	Not Considered. Species has one documented occurrence roosting in a man-made structure within Territory. Project would not impact cave, mine, or other nesting/roosting structures for this species.
bald eagle <i>Haliaeetus leucocephalus</i>	Not Considered. Species is not known to nest within Territory. No large bodies of water are present which might serve as foraging habitat. Project would not impact habitat for this species.
white-headed woodpecker <i>Picoides albolarvatus</i>	Not Considered. Species is suspected to occur within Territory, however proposed actions would not impact live or dead tree components and would therefore not impact this species or its habitat.
Lewis's woodpecker <i>Melanerpes lewis</i>	Considered. Species is suspected to occur within riparian habitats or burned areas within Territory, though no observations have been documented. Potential exists for riparian habitat to be impacted by horses.
greater sage-grouse <i>Centrocercus urophasianus</i>	Not Considered. Species is not known or suspected to occur within the Territory. Project would not impact habitat for this species.
bufflehead <i>Bucephala albeola</i>	Not Considered. Species is not known or suspected to occur within the Territory. No large bodies of water are present which might serve as foraging or nesting habitat. Project would not impact habitat for this species.
tricolored blackbird <i>Agelaius tricolor</i>	Not Considered. Species is not known or suspected to occur within the Territory. No large marsh areas are present which might serve as foraging or nesting habitat. Project would not impact habitat for this species.
upland sandpiper <i>Bartramia longicauda</i>	Not Considered. Species is not known or suspected to occur within the Territory. No large-scale open prairie habitats are present which might serve as foraging or nesting habitat. Project would not impact habitat for this species.
silver-bordered fritillary <i>Boloria selene</i>	Considered. Species was documented within riparian areas associated with moist meadow habitats near Big Summit Prairie within Territory. Potential exists for riparian and moist meadow habitat to be impacted by horses.
Johnson's hairstreak <i>Callophrys johnsoni</i>	Not Considered. Species is not known or suspected to occur within the Territory, or on the Ochoco National Forest. Habitat exists for this species in the form of mistletoe infected conifer trees, however project would not impact live conifer trees and would therefore not impact habitat for this species.
western bumblebee <i>Bombus occidentalis</i>	Considered. Species was documented foraging in riparian vegetation along Cram Creek within Territory. Potential exists for flowering vegetation within riparian and moist meadow habitat to be impacted by horses.
horned grebe <i>Podiceps auritus</i>	Not Considered. Species is not known or suspected to occur within the Territory. No large bodies of water are present which might serve as foraging or nesting habitat. Project would not impact habitat for this species.

The project area straddles the eastern boundary of the Lookout Mountain Ranger District and the western edge of the Paulina Ranger District, approximately 20 miles east of Prineville, Oregon. It includes about 25,434 acres primarily within the Upper Ochoco Creek and Upper North Fork Crooked River watersheds. Elevation ranges from 3,850 feet to 6,750 feet with dry grand fir (32%) and Douglas-fir (32%) forest types covering nearly 65% of the project area landscape, with the other 35% covered by ponderosa pine, moist grand fir, western juniper, subalpine fir, or non-forested areas such as meadows. The Territory is 99% National Forest System lands.

A variety of activities have influenced the existing conditions, including historic and current livestock grazing, timber harvesting, road construction, and the loss of beaver. Prior to settlement, moist meadow and riparian habitats were more abundant than what currently exist today. Many stream channels within the project area have down cut, resulting in a lowering of the water table and a loss of riparian vegetation, including cottonwood, aspen, dogwood, birch and willow species. Effects from grazing may have caused shifts in plant species composition and abundance through selection of more palatable forage species. The conditions of some riparian areas and aspen habitats has been improved by new management practices and restoration activities in the last two decades, but some areas are still not fully restored. Competition for resources such as water and sunlight due to encroaching conifers, as well as browsing by sheep, horses, and wildlife is limiting the regeneration of hardwoods within the Territory. According to numerous indicators the existing watershed condition for the Territory can be characterized as fair/ functioning at risk as a whole, however both riparian/wetland vegetation and aquatic habitat rated out as poor.

In September 2018, an aerial count of horses within the Territory utilizing a fixed wing aircraft and infrared survey technology detected 119 horses (Owyhee Aerial Research Inc. 2018), and when combined with the 16 horses detected by Forest Service staff outside of the survey area, the number of horses currently present (Fall 2018) is estimated at 135. This number, which represents a minimum count, greatly exceeds the current appropriate management level range of 55-65. In addition, due to increased numbers, distribution of horses is expanding to areas not previously utilized by this species, including areas outside of the Territory. This expansion equates to increased detrimental effects to riparian and moist meadow habitats, and competition for space and forage with big game.

Horses share the Territory with multiple species of wildlife including big game such as elk, mule deer, and the infrequent visit from antelope, as well as seasonally with domestic sheep. Within the Territory and adjacent pastures, 2,200 ewe/lamb pairs are authorized to graze between mid-June and the end of September.

Both year-round use, and the excess numbers of horses currently present, appear to be contributing to the nonfunctional condition of a number of springs and seeps within the Territory. These areas exhibit bare soil and alteration from trampling in excess of 70 percent, residual stubble heights of less than 2 inches at the end of the grazing season, denuded vegetation, and the presence of annuals and other undesirable plants.

Gray Wolf (*Canis lupus*)

Since 2011, radio-collared wolves from various packs have been confirmed travelling through the Ochoco National Forest (Oregon Department of Fish and Wildlife 2016), however individuals' use of the Forest appears to be of short duration as they move through to other habitats. The Oregon Department of Fish and Wildlife (ODFW) designates areas of known wolf activity throughout the state of Oregon on an annual basis. ODFW defines these areas as those where wolves are permanent residents, or have sustained use during periods of the year, and often include denning and rendezvous sites. In addition, no areas of wolf activity have been designated on the Ochoco, with the closest areas located > 50 miles northwest of the project area (Oregon Department of Fish and Wildlife 2020b). According to the USFWS, "occupied wolf range" is defined as follows: areas of confirmed presence of resident breeding packs of wolves or an area consistently used by > 1 resident wolf or wolves over a period of at least one month (USDI Fish and Wildlife Service 1994). By this definition, the Ochoco National Forest does not contain any identified occupied wolf range.

The closest area that would meet this definition would be approximately 55 miles to the northwest of the project area (Oregon Department of Fish and Wildlife 2020b).

ODFW also conducts depredation investigations which are made available on a monthly basis throughout the year. According to these reports there have been no confirmed wolf depredations of livestock in Crook or Wheeler counties as of October, 2020 (ODFW 2020a).

In an effort to corroborate and supplement known radio-collared wolf data provided by ODFW and USFWS, numerous surveys aimed at determining wolf activity levels have been conducted on the Forest. In 2018, a remote-sensing camera observed a single dispersing individual on a single day. Thus far, these sources represent the only physical evidence of wolf use on the Forest. Anecdotal observations of wolves have occurred on the Forest, however, none of these reports have been corroborated or confirmed with physical evidence.

There are approximately 238,000 acres of available habitat for the gray wolf on the District. Within the Big Summit Wild Horse Territory, approximately 25,434 acres of suitable habitat exists, as well as abundant prey in the form of deer and elk. High road densities and human presence may limit wolf presence within the project area.

As the Ochoco National Forest does not contain any identified areas of known wolf activity (as designated by ODFW), nor does it meet the USFWS definition for occupied wolf range, the project area primarily serves as dispersal habitat for transient wolves.

Areas within and adjacent to the Big Summit Wild Horse Territory have varying densities of roads and associated levels of human use. In general, use of the Forest is higher during summer and fall seasons, with the majority of use during daylight hours. Areas with lower human use exist within and surrounding the Territory and are represented by wilderness areas, unroaded areas, and areas with effectively closed roads. These areas are available for use by this species as it moves across the landscape should human disturbance factors cause it to shift away from areas with higher human use. In addition, times of reduced human use would occur each day, as well as outside the peak seasonal use of the Forest in which dispersing wolves would continue to be able to move through the area with less influence from human use.

Movement of dispersing wolves would not be inhibited by topography or other natural factors within the Forest or Wild Horse Territory as the Forest does not contain a multitude of topographical relief or large bodies of water that would restrict or funnel movement.

Direct and Indirect Effects – Alternatives 1, 2, and 3

Wolves are not known to reside on the Ochoco National Forest. Therefore, no effects are anticipated to established packs, dens, or rendezvous sites, as they are not known or suspected to occur on the Forest, or within the Big Summit Wild Horse Territory.

The project area serves as dispersal habitat for transient wolves. Effects to dispersing wolves were evaluated based on a change in the following criteria; 1) human use, 2) barriers to movement, and 3) prey availability. In addition, the duration and exposure to potential effects were evaluated.

Over the past 8 years, 3 known wolves have dispersed across the Ochoco National Forest, for an approximate duration of less than 20 days total during that time, none of which traveled through the Big Summit Wild Horse Territory. This would indicate that use of the area, and therefore exposure to potential effects is of limited duration.

Roads and trails present across the Forest, including within the Wild Horse Territory, facilitate a high amount of human disturbance. All alternatives include human use of the area, however, the levels of use are not substantially greater than existing levels of human use found within the project area currently. No alternative proposes to remove human use from the area entirely. In addition, this project does not increase road or trail density. Therefore, there is no overall measureable change in human use from the implementation of any alternative associated with this project.

There are no proposed activities which might serve as a barrier to movement for gray wolves. As fencing used on the Forest to manage the herd does not create a physical barrier for this species, the ability of the species to maneuver through the landscape would not be impeded by any proposed action under any alternative.

This project is not expected to significantly affect distribution or population size of prey species for wolves to such a degree that prey would be unavailable for the needs of the species under any of the alternatives. While prey species such as deer and elk may increasingly avoid the territory as horse numbers increase, there is abundant habitat outside of the territory where dispersing wolves may find prey. Alternative 2 proposes to reduce the AML which would alleviate displacement factors associated with social avoidance, congregation around critical habitats, and forage competition for elk and deer. Alternative 1 would potentially show a reduction in competition factors between horses and big game over the long-term after the AML is achieved through capture and removal. Effects from alternative 3 on gray wolves would differ than those from alternative 1 or 2 as there is potential for primary prey species such as elk and deer to be displaced to a greater degree over the mid- to long-term as an increase in horses within the Territory would lead to a continuation of degraded habitat conditions for these species, as well as potential for social avoidance. This displacement may make it increasingly difficult for dispersing wolves to secure prey year-round within the Territory. Prey such as elk and mule deer may be displaced onto nearby private lands, which in turn may encourage wolves to occupy those same habitats as they disperse through the area increasing the potential for conflicts with private landowners. For a more detailed explanation of effects to big game species see the Rocky Mountain elk and mule deer analysis in the management indicator species section. In addition to deer and elk, horses have the potential to serve as opportunistic prey for wolves, particularly at higher horse densities as well as during foaling season. There have been no confirmed cases of predation to date within the Big Summit Wild Horse Territory, but predation is known to occur in other areas where wolves and horses overlap. It is difficult to determine if horses could become a substitute prey base, but potential exists for horses to be a supplemental food source to wolves more typical diet of deer and elk. This may be more apparent should resident wolves become established within or near the Territory.

Therefore, due to the scope and scale of the project, the abundance of suitable habitat located in close proximity to proposed activities, the limited duration of potential disturbance and exposure, and the lack of detrimental effects to prey species, any potential effects to wolves dispersing through the project area would be insignificant and discountable.

Cumulative Effects– Alternatives 1, 2, and 3

The cumulative effects boundary includes the 6 subwatersheds that fall within or immediately adjacent to the Big Summit Wild Horse Territory (see Appendix A of the Wildlife Report for map). All of the activities listed in Appendix A of the Wildlife Report were considered for their cumulative effects to the gray wolf or its habitat.

Effects from other commercial and noncommercial treatments previously implemented within the project area were included in the existing condition. Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed actions, include non-commercial harvest as well as prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road closures) would combine with actions proposed in the Big Summit Wild Horse Territory management plan to both improve habitat conditions for prey species of the gray wolf as well as degrade habitat conditions.

Existing allotment management plans previously authorized within and adjacent to the project area, combined with annual operating instructions, adhere to the Forest Plan Standards and Guides which are intended to maintain forage for big game as well as maintain or improve riparian conditions in specified locations. Effects from these actions would combine with effects from alternatives 1 and 2 to improve

habitat conditions for the gray wolf and its prey, while alternative 3 would not contribute beneficially to ongoing habitat improvement occurring within the cumulative effects boundary.

Determination– Alternatives 1, 2, and 3

Activities associated with the implementation and management of the Big Summit Wild Horse herd would not impact established wolf packs, dens or rendezvous sites as no populations currently occupy the Ochoco National Forest, nor are there any areas of known wolf activity (as identified by ODFW) on the Forest. In addition, the Ochoco National Forest does not meet the USFWS definition of occupied wolf range, where potential impacts to the species should be considered. Wolves dispersing across the project area would not be inhibited by the implementation of this project, as no physical barriers are proposed, nor does the project propose to increase human use above existing levels. The potential for disturbance to dispersing wolves is considered low because both documented and suspected use of the project area by wolves is infrequent in nature. In addition, suitable source habitats and diurnal patterns of human use provide relief should a dispersing individual's movements be influenced by any human use. Proposed activities associated with horse management would generally not impact wolves, and would therefore not be expected to impact species use of the area. Effects to prey species from project implementation may cause minor shifts in distribution seasonally, however these impacts are insignificant at the landscape scale and would not impact population levels or viability and are therefore discountable. Alternative 3 has the potential in the long-term to reduce the suitability of the habitat to such a degree that primary prey species for wolves may be displaced for extended periods of time which may impact the ability of dispersing wolves to locate and secure food while traveling through the Territory. Proposed activities associated with wild horse management would generally not impact wolves, and would therefore not be expected to influence species use of the area. Therefore, the determination for wolves is May Effect, not Likely to Adversely Affect (NLAA) for all alternatives. In addition, on March 17, 2020 the Forest received concurrence from the USFWS that implementation of numerous activities (including wild horse management) with associated Project Design Criteria is not likely to adversely affect the gray wolf (USFWS 2020a).

Lewis' Woodpecker (*Melanerpes lewis*)

The Lewis' woodpecker's nesting habitat consists of two distinct types in eastern Oregon: riparian areas with large cottonwoods, and fire maintained or burned old-growth ponderosa pine forests (NatureServe 2014).

Current grazing by wild horses in the uplands and along streams has affected nesting and foraging habitat for Lewis' woodpecker, as these animals reduce ground cover and riparian shrub habitat through trampling or consuming vegetation, and decreasing insect availability. The conditions of some riparian areas and aspen habitats has been improved by new management practices and restoration activities in more recent years, but some areas are still not fully restored to conditions that are most suitable for Lewis' woodpecker.

Large diameter hardwood trees such as aspen and cottonwood that might serve as suitable reproductive habitat for this species are present but abundance is low, and distribution is scattered. Competition for resources such as water and sunlight due to encroaching conifers, as well as browsing by sheep, horses, and wildlife is limiting the regeneration of hardwoods within the project area.

The Ochoco National Forest has had several stand replacing wildfires in the last 5 years that provide suitable foraging or nesting habitat for the Lewis' woodpecker within close proximity to the Territory, however there are no documented observations of the Lewis' woodpecker in the Territory, and historically only a few sightings on the Ochoco National Forest.

Direct and Indirect Effects– Alternatives 1, 2, and 3

Under alternative 1 riparian areas would continue to see similar impacts as the existing condition in the mid-term (approximately 10 years) until horse numbers reach the AML range. Once the AML is reached, should the limited tools available under this alternative allow for proper future management of the herd, then riparian areas are likely to improve in the mid- to long-term. This alternative would utilize current management tools and techniques and would take longer to reach the proposed AML (approximately 10

years, depending on funding), versus utilizing additional management tools proposed in alternative 2 which would reach the AML in approximately 5 years depending on funding. Therefore, the length of time until riparian habitats and moist meadows would see reduced effects from horses would be much longer under alternative 1 than alternative 2.

Under alternative 2 a reduction in the total number of horses would equate to fewer hooves trampling riparian vegetation and stream banks and fewer mouths meaning a reduction in the overall amount of grazing and browsing on riparian vegetation including regenerating hardwoods. This change from current management has the potential to reduce, but not eliminate, horse impacts to stream banks, springs, and other critical habitat components within riparian areas as it reduces the amount of trailing and hoof action as well as degradation due to congregating of herds that may occur. The reduction in overall impacts, most especially in forage and herbivory, would improve the health and vigor of understory vegetation and in turn improve insect productivity. Browsing on shrubs and other vegetation would be expected to continue to occur by elk and mule deer, however effects would no longer be compounded to the same degree as the existing condition, and thus vegetative conditions in the mid- to long-term may improve, improving foraging and nesting habitat for the Lewis' woodpecker.

Conversely, alternative 3 proposes to increase the AML to above the current population of horses that exist in the territory. This alternative would result in an increase in adverse impacts to shrub and riparian hardwood plant communities above existing conditions. Alternative 3 has the greatest adverse impact and would reduce the foraging potential within riparian habitats for this species across the project area. Over the long-term riparian and vegetative conditions would be substantially degraded, reducing the suitability of the habitat for foraging or nesting for the Lewis' woodpecker.

Cumulative Effects– Alternatives 1, 2, and 3

The cumulative effects boundary includes the 6 subwatersheds that fall within or immediately adjacent to the Big Summit Wild Horse Territory (see Appendix A for map). All of the activities listed in Appendix A were considered for their cumulative effects to the Lewis' woodpecker or its habitat.

Effects from other commercial and noncommercial treatments previously implemented within the project area were included in the existing condition. Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed activities, include non-commercial harvest as well as prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road closures) would combine with actions proposed in alternatives 1 and 2 (i.e. reduced numbers of horses and their associated impacts to habitat) to improve habitat conditions for the Lewis' woodpecker by improving health and vigor of riparian and hardwood communities. Effects to Lewis' woodpecker specific to those projects' activities can be found in those analyses and are incorporated here by reference (USDA Forest Service 2011; USDA Forest Service 2010).

Activities outlined in the various allotment management plans, both within the Territory (i.e. Big Summit, Reservoir) and within the cumulative effects boundary (i.e. Bear Creek, Marks Creek), should cumulatively enhance and expand habitat and connectivity of riparian habitats through riparian restoration and aspen enhancement and protection. Expanding and enhancing riparian habitats and hardwood species, particularly cottonwood, would combine with effects from alternatives 1 and 2 in this project to improve habitat conditions for the Lewis' woodpecker. Alternative 3 would detract from other habitat improvements occurring within the cumulative effects boundary for this species.

Determination– Alternatives 1, 2, and 3

The determination for alternative 1 and 2 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** in the short- to mid-term until the proposed AML is reached, but would have a **Beneficial Impact (BI)** in the mid- to long-term as these alternatives reduce overall effects to riparian habitats and host plants by reducing the AML. In addition, alternative

2 provides additional tools for the management of horses increasing the rate at which AML will be achieved. However this benefit is somewhat limited as it would not likely change the habitat on a large enough scale to support a measurable change in the presence or abundance of this species within the project area.

The determination for alternative 3 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** due to a lack of reduction in the AML, and the inability to utilize multiple tools to achieve management objectives. Alternative 3 would have the strongest adverse effect on this species of all the alternatives as it has the highest AML and therefore the highest corresponding amount of potential degradation to important habitat features for this species.

Silver-bordered Fritillary (*Boloria selene*)

Only two primary colonies of silver-bordered fritillary are found in Oregon, one near Big Summit prairie in the Ochoco Mountains and one in the Strawberry Mountains of the Malheur National Forest (Miller and Hammond 2007).

On the Ochoco National Forest 307 acres of potential habitat have been identified, though additional acreage is likely present outside of these areas. Potential habitat is in close association with meadow systems. Approximately 3 of these identified acres occur within the Territory along Howard Creek where it meets Big Summit Prairie. This habitat is currently functioning in a manner consistent with the needs of this species and surveys conducted in June, 2015 observed 5 individuals at this site (Ross 2015). Other stream and meadow systems that were surveyed for their suitability within the Territory included Cram Creek, where it was noted that horses were the main threat to this species (Ross 2015). Field observers documented over 100 horses during butterfly survey efforts and indicated damage to riparian and adjacent habitats including stream bank alteration was occurring (Ross 2015). The timing of these surveys correspond with the highest recorded horse count on the Forest at 152 horses.

Direct and Indirect Effects– Alternatives 1, 2, and 3

The violet plants that may host eggs or larvae are close to the ground and not as easy for horses to graze as the preferred grass species, however they are vulnerable to trampling, especially since horses tend to congregate around moist areas during the summer months. Therefore, grazing by horses may impact this species in all life stages from trampling eggs and larvae to reduction of foraging resources for adults and suitable host plants for reproduction. All alternatives would potentially impact individuals or groups of individuals as no alternative proposes to remove all horses from the Territory.

Under alternative 1 riparian areas, meadows, and source habitats for this species would continue to see similar impacts as the existing condition in the mid-term (approximately 10 years) until horse numbers reach the AML range. Once the AML is reached, should the limited tools available under this alternative allow for proper future management of the herd, then riparian areas, including source habitats for this species, are likely to improve over time. This alternative would utilize current management tools and techniques and would take longer to reach the proposed AML (approximately 10 years), versus utilizing additional management tools including fertility control proposed in alternative 2 which would reach the AML in approximately 5 years depending upon funding. Therefore, the length of time until riparian habitats and moist meadows would see reduced effects from horses would be much longer under alternative 1 than alternative 2.

Under alternative 2 a reduction in the total number of horses would equate to fewer hooves trampling riparian vegetation, host plants, and stream banks as well as fewer mouths meaning a reduction in the overall amount of grazing and browsing on riparian vegetation. This change from current management has the potential to reduce, but not eliminate, horse impacts to stream banks, springs, and other critical habitat components within riparian areas as it reduces the amount of trailing and hoof action as well as degradation due to congregating of herds that may occur. The reduction in overall impacts, including potential for

trampling, would improve in the short-term (0 to 5 years) as horse numbers are reduced to meet the AML. Seasonal presence of elk and mule deer may potentially increase with a decrease in horse use, however year-round effects to this species would no longer be compounded to the same degree as the existing condition, and thus vegetative conditions in the mid- to long-term may improve.

Conversely, alternative 3 would result in an increase of adverse impacts to riparian and moist meadow habitats, above existing conditions. Alternative 3 has the greatest adverse impact and would increase the potential for trampling of host plants or larvae within suitable habitats for this species. Observational data suggest that horses have continually been present outside of the Territory even when populations are lower than the existing condition. A natural threshold likely exists when degraded habitat conditions, a lack of forage, or intraspecific pressures cause horses to shift their distribution both within and outside of the Territory to more suitable habitat. However, this threshold is unknown. What can be assumed is that an increase in the number of horses above existing levels to proposed population numbers in alternative 3 (150 to 200 horses) has the potential to increase the likelihood of reaching this threshold, and thus increase the likelihood that Howard Creek would receive use by horses as suitable conditions deteriorate in other parts of the Territory or intraspecific pressures force movement of horses to other areas. Over the short-, mid-, and long-term riparian and vegetative conditions would be degraded, reducing the ability of the habitat to serve as potential habitat for the silver-bordered fritillary.

Cumulative Effects– Alternatives 1, 2, and 3

The cumulative effects boundary includes the 6 subwatersheds that fall within or immediately adjacent to the Big Summit Wild Horse Territory (see Appendix A for map). All of the activities listed in Appendix A were considered for their cumulative effects on the silver-bordered fritillary or its habitat.

Effects from other commercial and noncommercial treatments previously implemented within the project area were included in the existing condition. Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed activities, include non-commercial harvest as well as prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road closures) would combine with actions proposed in alternatives 1 and 2 (i.e. reduced horse numbers and associated impacts to habitat) to improve habitat for the silver-bordered fritillary by maintaining and improving moisture levels in meadow habitats adjacent to streams. Effects to silver-bordered fritillary specific to those projects' activities can be found in those analyses and are incorporated here by reference (USDA Forest Service 2011; USDA Forest Service 2010).

Activities outlined in the various allotment management plans, both within the Territory (i.e. Big Summit, Reservoir) and within the cumulative effects boundary (i.e. Bear Creek, Marks Creek), should allow for improved management of livestock and less impact on riparian habitats. Range improvements, including riparian restoration, habitat protection, water developments, and fence reconstruction would occur within existing allotments. These activities are expected to improve the current condition of the riparian and adjacent meadow habitats within the project areas where it overlaps, and has the potential to increase the available suitable habitat for this species.

The continued implementation of the Deschutes and Ochoco Travel Management Plan will continue to limit cross-country motorized access within the project area. These restrictions would combine with effects from alternatives 1 and 2 to reduce the loss of individuals or habitat through direct crushing of host plants or larvae/pupae.

Therefore, the combined effect of the proposed action alternatives from the Big Summit WHT management plan, with these current and reasonably foreseeable actions would be that the abundance and distribution of potential habitat would be expected to be maintained across the cumulative effects boundary, with a slight potential for expansion in alternatives 1 and 2. Conversely, alternative 3 would detract from other habitat improvements occurring within the cumulative effects boundary for this species.

Determination– Alternatives 1, 2, and 3

The determination for alternatives 1 and 2 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** in the short- to mid-term until the proposed AML is reached, but would have a **Beneficial Impact (BI)** in the mid- to long-term as this alternative reduces overall effects to riparian habitats and host plants by reducing the AML and providing tools for the management of horses. In addition, alternative 2 provides additional tools for the management of horses increasing the rate at which AML will be achieved.

The determination for alternative 3 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** due to a lack of reduction in the AML, and the inability to utilize multiple tools to achieve management objectives. Alternative 3 would have the strongest adverse effect on this species of all the alternatives as it has the highest AML and therefore the highest corresponding amount of potential degradation to critical habitat features for this species.

Western Bumblebee (*Bombus occidentalis*)

Western bumble bees gather pollen and nectar from a wide variety of flowering plants, from which they obtain all their nutrition. Therefore a constant supply of flowers in bloom from spring to autumn is necessary to provide suitable habitat for this species (Evans et al 2008).

Recent survey records for this species are lacking across the Forest and Grassland, including the Big Summit Wild Horse Territory. A single historic observation was recorded in 1968 in Cram Creek. Potential habitat for this species is likely present in small, isolated patches in open meadows, grass-dominated understories, or riparian areas where suitable populations of flowering plants are present.

Direct and Indirect Effects– Alternatives 1, 2, and 3

Flowering vegetation necessary for this species is vulnerable to trampling, especially since horses tend to congregate in all the areas where flowering vegetation is most likely found including meadows, grass-dominated understories, and riparian habitats. Therefore, grazing and the general presence of horses may impact this species in all life stages from trampling ground level nests to reducing critical nectar resources. All alternatives would potentially impact individuals or groups of individuals as no alternative proposes to remove all horses from the Territory, however impacts vary in degree of effect.

Under alternative 1 riparian areas, meadows, and grass-dominated understories would continue to see similar impacts as the existing condition in the short- to mid-term until horse numbers reach the AML range (approximately 10 years, depending on funding). Once the AML is reached, should the limited tools available under this alternative allow for proper future management of the herd, then these habitats may see a reduction in effects from horses and conditions are likely to improve over time.

In the short-term (0-5 years) proposed actions under alternative 2 (i.e. continued presence of horses at higher numbers while working towards AML) may impact individuals or habitat through disturbance of vegetation and overwintering sites, however in the mid- to long-term (5 to 25+ years) reducing the AML would reduce the overall impacts from horses on habitats and flowering vegetation within the Territory, having a beneficial impact. This would be evident over time as herbaceous and shrubby understory plants, meadow habitat, and riparian vegetation would receive less trampling and pressure from year-round grazing, and presence of horses would decrease significantly from existing levels. Alternative 2 would help promote an increased abundance of potential foraging habitat. Seasonal presence of elk and mule deer may potentially increase with a decrease in horse use, however year-round effects to this species would no longer be compounded to the same degree as the existing condition, and thus vegetative conditions in the mid- to long-term may improve.

Conversely alternative 3 would increase pressures to critical habitat components by authorizing a higher AML corresponding to additional trampling and further degradation of suitable habitats. Alternative 3 has the greatest adverse impact of all the alternatives and over the long-term flowering vegetation conditions

would be significantly degraded, reducing the ability of the habitat to serve as potential habitat for the western bumblebee.

Cumulative Effects– Alternatives 1, 2, and 3

The cumulative effects boundary includes the 6 subwatersheds that fall within or immediately adjacent to the Big Summit Wild Horse Territory (see Appendix A for map). All of the activities listed in Appendix A were considered for their cumulative effects on western bumblebee or its habitat.

Effects from other commercial and noncommercial treatments previously implemented within the project area were included in the existing condition. Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed activities, include non-commercial harvest as well as prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road closures) would combine with actions proposed in alternative 2 to improve habitat for the western bumblebee. Proposed actions in alternative 1 and 2 may combine with ongoing projects to increase disturbance and degrade habitat conditions in the short-term, but in the long-term would result in a cumulative improvement of habitat conditions for this species as ongoing project activities would invigorate riparian habitats, restore moisture to meadows, and reduce overall disturbance post-implementation.

Activities outlined in the various allotment management plans, both within the Territory (i.e. Big Summit, Reservoir) and within the cumulative effects boundary (i.e. Bear Creek, Marks Creek), should allow for improved management of livestock and less impact on riparian habitats. Range improvements, including riparian restoration, habitat protection, water developments, and fence reconstruction would occur within existing allotments. These activities are expected to improve the current condition of the riparian and adjacent meadow habitats, and potentially improve the connectivity of riparian habitats within the project areas where it overlaps. Expanding and enhancing riparian habitats and flowering vegetation, would combine with effects from alternatives 1 and 2 (i.e. reduced number of horses and their associated impacts to habitat) to improve habitat conditions for the western bumblebee. Alternative 3 would detract from other habitat improvements occurring within the cumulative effects boundary for this species.

The continued implementation of the Deschutes and Ochoco Travel Management Plan will continue to limit cross-country motorized access within the project area. These restrictions help to reduce degradation of flowering vegetation and riparian habitats from off-road vehicle use throughout the year.

Therefore, the combined effect of the proposed action alternatives from the Big Summit Wild Horse project, with these current and reasonably foreseeable actions would be that the abundance and distribution of potential nesting and foraging habitat for western bumblebees would be expected to be maintained across the project area, with a chance of improvement to foraging habitat and nesting habitat in alternatives 1 and 2.

Determination– Alternatives 1, 2, and 3

The determination for alternatives 1 and 2 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** in the short- to mid-term until the proposed AML is reached, but would have a **Beneficial Impact (BI)** in the mid- to long-term as these alternatives reduce overall effects to meadows, grass-dominated understories, and riparian habitats by reducing the AML and providing tools to properly maintain the population. Benefits may be on a large enough scale to support a measurable change in the presence or abundance of suitable habitat within the Territory.

The determination for alternative 3 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** due to a lack of reduction in the AML, and the inability to utilize multiple tools to achieve management objectives. Alternative 3 would have the strongest adverse effect on this species of all the alternatives as it has the highest AML and therefore the highest corresponding amount of potential degradation to critical habitat features for this species.

Wildlife: Management Indicator Species

Affected Environment and Environmental Consequences

The National Forest Management Act directs the Forest Service to provide habitat to maintain viable populations of existing native and desired non-native vertebrate species. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to ensure its continued existence is well distributed in the planning area. The planning area is the Forest and Grassland. In order to ensure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area. Maintaining viable populations was addressed in the Final Environmental Impact Statement for the Ochoco National Forest Land and Resource Management Plan by defining management requirements for those species that were considered limiting or sensitive to management activities (USDA Forest Service 1989a). Management indicator species (MIS) were selected for emphasis in planning and are assessed during Forest Plan implementation in order to determine the effects of management activities on their populations and the populations of other species with similar habitat needs. For project-level planning and environmental analysis the use of habitat abundance and quality, and the distribution of habitat have been used to estimate project effects on MIS. It has been determined by court decision that where population monitoring data are not available, due to lack of funding or feasibility of monitoring populations, the amount and quality of habitat can be used as a proxy for determining viability effects of projects on MIS (Lands Council v. McNair, 2010).

Table 24 lists the terrestrial species selected as MIS in the Forest Plan. Of these species, or groups of species, all have habitat present in the project area except the prairie falcon. Only the Rocky Mountain elk and mule deer have potential to be impacted in a measurable way by proposed management actions. Effects of the proposed alternatives would not adversely affect habitat for any of the other MIS and therefore would not contribute to a negative trend in viability on the Ochoco National Forest for these species.

Table 24: Management indicator species identified in the Ochoco National Forest Land and Resource Management Plan (USDA Forest Service 1989b).

MIS Species	Representing	Habitat Requirements	Habitat Present in Project Area	Species Present in Project Area	Potential for Impacts from Proposed Management Actions
primary cavity excavators	snag habitat	snag habitat	Yes	Yes	No
pileated woodpecker	old growth habitat	closed canopy, late-seral subalpine, montane and lower montane forests	Yes	Yes	No
common (northern) flicker	old growth juniper	forest habitat generalist	Yes	Yes	No
golden eagle & prairie falcon	cliff, talus, or cave habitats	nesting habitat includes ledges along rims and cliffs	golden eagle – Yes prairie falcon – No	Yes No	No No
bald eagle	State or Federal Threatened or Endangered Species	associated with large bodies of water and nests in forested areas near water	Yes	Yes	No

MIS Species	Representing	Habitat Requirements	Habitat Present in Project Area	Species Present in Project Area	Potential for Impacts from Proposed Management Actions
Rocky Mountain elk & mule deer	species that are commonly hunted	habitat generalist – mixture of successional stages in both forest and grasslands	Yes	Yes	Yes

Rocky Mountain Elk (*Cervus elaphus*) & Mule Deer (*Odocoileus hemionus*)

Rocky Mountain elk and mule deer are species that are commonly hunted and were chosen as terrestrial MIS for populations of big game and their habitat (USDA Forest Service 1989b). The desired condition is to provide forage, thermal cover, and security habitats (i.e. hiding cover) to maintain healthy populations of Rocky Mountain elk and mule deer that are consistent with population management objectives established by the Oregon Department of Fish and Wildlife (USDA Forest Service 1989b). The Big Summit Wild Horse Territory lies within the Ochoco Wildlife Management Unit which is currently below the population management objectives for both elk and mule deer (Table 25).

Table 25: Management objectives and population estimates for Rocky Mountain elk and mule deer in the Ochoco Wildlife Management Unit.

Year	Population	
	Elk	Mule Deer
Management Objective	4,500	20,500
2019	4,200	6,875
2018	4,150	8,181
2017	4,100	8,774
2016	4,150	9,919
2015	4,050	15,000
2014	4,200	14,800

The Forest Plan established the use of the habitat effectiveness index with corresponding minimum habitat effectiveness standards for various Management Areas in the evaluation of effective elk habitats. In addition, the Forest Plan identifies minimum standards for cover and open road density. Quantity and quality of cover, and open road density are the main factors influencing the index. Grazing or browsing by horses does not have an impact on the abundance or distribution of hiding or thermal cover as it does not alter overstory conditions, nor does this project change the current density of open roads in any proposed alternative. Therefore, because the main factors contributing to the HEI calculation (i.e. cover and roads) are not expected to change in a measurable way, the habitat effectiveness index was not recalculated for this project.

Elk and mule deer may be present in or adjacent to the project area throughout a large part of the year. Due to the high road density associated with the Territory and more specifically the winter range, habitat effectiveness is low for elk and deer (ODFW personal communication 2019). Observations of elk in the wild horse winter range is uncommon especially during winters with above average snowfall. Although elk utilize the area, use is likely incidental. As a result, on winters of above average snowfall, wildlife are expected to move to areas necessary to retrieve forage and provide better security (ODFW personal communication February 11, 2019), often to lower elevations on the Forest or private lands.

Calving and fawning can occur throughout the project area although they primarily occur in proximity to riparian areas that provide high quality forage and cover. Aspen stands and other riparian hardwoods such as willow are likely to be attractive areas for calving and fawning.

The Forest Plan identifies allowable use levels for forage for wildlife and livestock. Within the Territory, forage allowed for horse use is also considered and is included within this allowable use level. For a more in depth discussion on allowable use of forage see the Range and/or Wild Horse resource reports.

Fences are known to create hazards and barriers for wildlife, including big game species like elk and mule deer; hindering and often blocking daily and seasonal movements, and access to forage and water (Mackie 1981; Scott 1992; Paige 2012). When animals collide with or become entangled in fences they can be injured or killed (Harrington and Conover 2006; Paige 2012). Currently within the project area there are approximately 21.5 miles of fence associated, at least in part, with the management of horses.

Direct and Indirect Effects– Alternatives 1, 2, and 3

Horses and their management may impact elk and mule deer or their habitats in a variety of ways including displacement, forage competition, degradation of habitat, and disturbance.

All alternatives authorize the presence of horses within the Territory so displacement of mule deer and elk that may be occurring due to competition for forage, degradation of habitat, or social avoidance would be expected to continue, differing only in degrees depending upon alternative.

Horses have the potential to displace elk and mule deer from preferred habitats such as riparian areas, seeps, and springs within the Territory to upland habitats with steeper slopes where forage potential and nutrition are greatly reduced for these species. This impact is exacerbated by the overall number of horses present within the Territory as horses tend to congregate around these critical habitats during all times of the year. Displacement would occur more so during years of drought as competition for forage resources would be more intense, likely causing deer and elk to forage outside of the Territory on adjacent Forest Service land, or private land. Private lands within 6 miles of the Territory in all cardinal directions were identified in a joint effort between multiple agencies and partners including the U.S. Forest Service and the Oregon Department of Fish and Wildlife as having chronic damage to agricultural crops, orchards, residential landscaping, tree and plant nurseries, or range fences, from elk and deer (Blue Mountains Elk Initiative 2016). If the current horse numbers are maintained or increase, damage would continue to occur on these private lands and likely increase in the mid- to long-term as habitat conditions continue to degrade over time. Alternatives 1 and 2 propose to reduce the AML which would alleviate displacement factors associated with social avoidance, congregation around critical habitats, and forage competition, though this alleviation would not occur in the short-term as it will likely take approximately 5 years to reach AML under alternative 2 and approximately 10 years under alternative 1. Conversely, alternative 3 increases the AML from the existing number of horses in the Territory which would compound all these factors and would likely cause an increase in displacement of elk and mule deer in the mid- to long-term with the potential for damage conflicts with nearby private lands.

Dietary overlap is the greatest between elk and horses during early spring and late summer/fall as elk typically favor grasses and forbs during these critical foraging times, while horses' diets are comprised predominately of grass with little variation during the year (McInnis and Vavra 1987; Hosten et al 2007). Mule deer diets are predominately comprised of forbs in the spring and summer, and browse in the winter (Verts and Carraway 1998), suggesting that dietary overlap between deer and horses is relatively low. Cook et al. (2005) found that small differences in the quality of forage consumed by elk in late summer and fall can effect overall nutrition, growth of calves and yearlings, and pregnancy rates in elk. Horses are largely restricted to eating within the Territory year-round, while it is widely assumed that deer and elk move freely between the Territory and adjacent land in close association with annual snow levels (ODFW personal communication February 11, 2019). As a result of reducing the AML in alternatives 1 and 2, there would be less interspecific competition, a larger partition of forage available for wildlife, and a likely increase in the overall abundance of nutritional forage for elk and mule deer. Alternative 1 would potentially show a

reduction in competition for forage over the mid- to long-term, however as gathering is the only proposed method of population management authorized under this alternative, reaching the current AML would take approximately 10 years depending on funding as the use of fertility control tools is not authorized under this alternative. Under alternative 2 it would take approximately 5 years to achieve AML, dependent upon funding, as additional tools are proposed under this alternative such as fertility control. Alternative 3 compounds the issue of late summer/fall forage availability and competition factors between elk, deer, and horses, increasing the number of horses present on the Territory year-round. In addition, due to the increase in horse population numbers authorized under alternative 3, forage utilization would be expected to be in non-compliance with the standards in the Forest Plan. The upper end of the range for alternative 1 would also be expected to be in non-compliance during winters of above average snowfall.

Impacts to habitat would be expected under all alternatives as horses still occupy the Territory, however these impacts would vary in degrees by alternative. Riparian habitats may show an upward trend under alternatives 1 and 2 as the number of horses is reduced. This may over time increase the quantity and quality of calving/fawning habitat. Conversely, alternative 3, and an increased AML, would continue the declining riparian habitat trends. Stream conditions, health and vigor of aspen stands, meadows, and moist riparian areas would be expected to degrade as they serve as areas of congregation for horses, further limiting the quantity and quality of these critical habitat components for deer and elk. As numbers of horses increase, the potential for trampling riparian vegetation and degradation of springs and seeps increases. These areas serve important life functions for elk and deer as calving/fawning and wallow habitats. The loss of these habitats over time may increase displacement of these species from the Territory, or impact deer and elk reproduction. Alternative 1 would potentially in the long-term show a positive trend in riparian habitats. This alternative would utilize current management tools and techniques and would take longer to reach the proposed AML (approximately 10 years depending upon funding), versus utilizing additional management tools proposed in alternative 2 which, depending upon funding, would reach the AML in 5 years. Therefore, the length of time until riparian habitats and moist meadows would see reduced effects from horses would be much longer under alternative 1 than alternative 2.

Potential for disturbance to big game exists during management actions associated with all alternatives. Actions associated with an increased human presence within the Territory which may disturb individuals or groups are: fertility control, gathers, bait traps, inventories, act of mercy, or euthanasia. However, disturbance associated with these actions, outside of bait traps or gathers, would not increase human disturbance above ambient levels and therefore would not likely impact elk and mule deer within the Territory. Gathering and bait traps have the potential to capture or harm individual elk or mule deer, however the chance of occurrence is very low. In addition, locations utilized would likely be in areas of existing disturbance (i.e. dispersed campsites and/or roadsides) so potential effects to elk and deer from disturbance would be minimal and isolated to these locations only.

Cumulative Effects– Alternatives 1, 2, and 3

The cumulative effects boundary includes the 6 subwatersheds that fall within or immediately adjacent to the Big Summit Wild Horse Territory (see Appendix A of Wildlife Report for map). All of the activities listed in Appendix A of the Wildlife Report were considered for their cumulative effects to Rocky Mountain elk, mule deer, and their habitat.

Effects from other commercial and noncommercial treatments previously implemented within the project area were included in the existing condition. Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed activities, include non-commercial harvest as well as prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road closures) would combine with actions proposed in alternatives 1 and 2 to improve foraging and parturition habitat for elk and mule deer by reducing overall stand densities, invigorating riparian habitats, improving the cover to forage ratio, increasing amount of available forage, creating more edge and patch habitat, restoring moisture to

meadows, and reducing overall disturbance post-implementation. Proposed activities such as captures or gathers associated with the management of the Big Summit wild horse population may combine with these other actions to increase disturbance in the short-term, but in the long-term would result in a cumulative improvement of habitat conditions for these species.

Activities outlined in the various allotment management plans, both within the Territory (i.e. Big Summit, Reservoir) and within the cumulative effects boundary (i.e. Bear Creek, Marks Creek), should allow for improved management of livestock and less impact on riparian habitats. Range improvements, including riparian restoration, habitat protection, water developments, and fence reconstruction would occur within existing allotments. These activities are expected to improve the current condition of the riparian and adjacent meadow habitats, and potentially improve the connectivity of riparian habitats within the project areas where it overlaps. Expanding and enhancing riparian habitats and hardwood species, would combine with effects (i.e. reduced numbers of horse and related impacts to habitat) from alternatives 1 and 2, to improve calving and fawning habitat conditions for big game species in the mid- to long-term, while alternative 3 would detract from other habitat improvements occurring.

The continued implementation of the Deschutes and Ochoco Travel Management Plan will continue to limit cross-country motorized access within the project area. These restrictions help to reduce disturbance to big game throughout the year as they provide for an increase in security habitat away from open roads.

Therefore, the combined effect of the proposed action alternatives from the Big Summit WHT project, with these current and reasonably foreseeable actions would be that the abundance and distribution of potential foraging, calving, and fawning habitat would be expected to be maintained across the cumulative effects boundary under alternatives 1 and 2, with a chance for improvement. Conversely, alternative 3 would detract from other habitat improvements occurring within the cumulative effects boundary and may impact the current abundance and distribution of habitats.

Conclusion

Alternative 2 proposes the adoption of a lower AML and additional population management tools, as well as removal of horses from the Territory to reach the new AML. Alternative 2 will improve the overall social and biological conditions for Rocky Mountain elk and mule deer within the project area. Increases in forage availability, natural recovery of vegetation and riparian habitats, and a reduction in social pressures from horses would likely expand the distribution of mule deer and elk within the project area. Alternative 1 limits the population management tools that can be used and does not provide options for as low of an AML as alternative 2 and therefore would not improve conditions for these species to the same degree as alternative 2. Alternative 3 proposes to increase the AML from existing levels of horses present within the Territory. Actions proposed in this project, specifically the increased AML in alternative 3, when combined with effects from past, present and reasonably foreseeable future actions is not expected to degrade habitat conditions beyond a threshold in which the viability of populations on the Ochoco National Forest would be in jeopardy. However, habitat conditions under alternative 3 would be expected to continue to degrade in the mid- to long-term, increasing competition, reducing forage, and displacing elk and deer during critical times of the year, with the potential for displacement year-round.

Wildlife: Other Species or Habitat Identified in the Forest Plan

The Forest Plan provides standards and guidelines for an additional suite of species identified as “other species”. This section analyzes the affects to the other species identified in the Forest Plan (see Table 26) but does not include species already analyzed as threatened, endangered, proposed, sensitive, or management indicator species. Effects to pronghorn antelope would be similar to Rocky Mountain elk and mule deer previously discussed, although pronghorn would be impacted to a lesser degree as they are not consistently utilizing any part of the project area.

Table 26: Other species identified by the Forest Plan for the Ochoco National Forest (USDA Forest Service 1989b).

Species	Management Direction	Habitat Present in the Project Area	Potential for Impacts from Proposed Management Actions
Antelope	Activities will be in accordance with Oregon Department of Fish and Wildlife population objectives.	Yes	Yes
Raptor Habitat	Protect nest sites and nesting habitat. Minimize disturbance during the nesting period.	Yes	Yes
Hawks and Owls	Protect nest sites and nesting habitat. Minimize disturbance during the nesting period.	Yes	Yes
Northern Goshawk	In 1995 the Regional Forester's Eastside Forest Plan Amendment #2 amended the Forest Plan. This amendment included interim management guidelines for northern goshawk in regards to timber sales.	Yes	Yes

Raptor Habitat (including Hawks and Owls & Northern Goshawk)

Raptors are birds of prey, of which numerous species occur or have been observed throughout the project area. The Forest Plan provides guidance for: the protection of nests, the protection of habitat surrounding nests, and minimizing disturbance to nesting or roosting individuals.

A variety of raptors are known to be within the area of influence of this project or have been documented within the Wild Horse Territory including: American kestrel, red-tailed hawk, Cooper's hawk, sharp-shinned hawk, bald eagle, golden eagle, northern goshawk, great grey owl, northern pygmy owl, and great horned owl. Known nesting occurrences within the Territory include: 4 goshawk territories, and 1 historic great horned owl nest.

Activities associated with horses or their management have little direct impact on raptors or their habitat. Forest raptor nests are typically located off the ground where there would be no risk of trampling. Habitat conditions preferred by each species vary according to various forest structural conditions. Generally, grazing or browsing does not affect the live or dead mature tree component within the Territory and as a result would not affect nesting or roosting habitat. In addition, effects to raptor nesting habitat would be mitigated as stated in the Forest Plan, therefore none of the alternatives would affect nesting habitat or disturb raptors. However, there are no land use provisions for protecting foraging habitat for raptors and this analysis would focus on effects to the prey base by alternative. Only habitats that are likely to be impacted in a measurable way by horses will be discussed (i.e. riparian areas), and therefore not all raptor species, nor their wide array of prey will be represented in this analysis.

Direct and Indirect Effects– Alternatives 1, 2, and 3

Hardwoods, shrubs and herbaceous vegetation, often associated with riparian habitats in dry forests, are critical components for small mammals and songbirds which serve as typical prey species for many raptors. These habitat components are vulnerable to trampling and grazing by horses, especially since horses tend to congregate in moist habitats including meadows, springs, seeps, streams and other riparian habitats. Therefore, the general presence of horses may impact raptor prey species as it would degrade cover and forage resources. All alternatives would potentially impact individuals or groups of individuals as no alternative proposes to remove all horses from the Territory, however impacts vary in degree by alternative.

Under alternative 1 riparian habitats would continue to see similar impacts as the existing condition in the mid-term (10 years) until horse numbers reach the AML range. Once the AML is reached, should the limited tools available under this alternative allow for proper future management of the herd, then these habitats may see a reduction in effects from horses and conditions may improve slightly over time. This alternative would

utilize current management tools and techniques and would take longer to reach the proposed AML (approximately 10 years), versus utilizing additional management tools proposed in alternative 2 which would reach the AML in 5 years. Therefore, the length of time until riparian habitats and moist meadows would see reduced effects from horses would be much longer under alternative 1 than alternative 2. For raptors that forage in habitats outside riparian areas, impacts from actions in alternative 1 would be expected to be less consequential as these habitats are impacted to a lesser degree by horses. In addition, some individual species of small mammals prefer more heavily grazed vegetative conditions and are likely found in drier, open habitats within the Territory, where adverse impacts from horses are not as concentrated.

Under alternative 2 a reduction in the total number of horses would equate to fewer hooves trampling riparian vegetation, shrubs, young hardwoods, and stream banks as well as fewer mouths meaning a reduction in the overall amount of grazing and browsing on riparian vegetation. This change from current management has the potential to reduce, but not eliminate, horse impacts to stream banks, springs, and other critical habitat components for raptor prey species as it reduces the amount of trailing and hoof action as well as degradation due to congregating of herds that may occur. The reduction in overall impacts, including potential for trampling, would improve over time (0 to 5 years) as horse numbers are reduced to meet the AML. Seasonal presence of elk and mule deer may potentially increase with a decrease in horse use, thus offsetting some of the reduction in potential trampling and hoof action, however year-round effects to this species would no longer be compounded to the same degree as the existing condition, and thus vegetative conditions in the mid- to long-term (5 to 25+ years) may improve.

Conversely, alternative 3 would result in a continuation of adverse impacts to herbaceous vegetation within riparian habitats. Alternative 3 has the greatest adverse impact and would increase the potential for trampling and grazing within riparian habitats for prey species. Over the long-term riparian and vegetative conditions would be significantly degraded, reducing the ability of the habitat to serve as quality foraging habitat for many forest raptors.

Cumulative Effects– Alternatives 1, 2, and 3

The cumulative effects boundary includes the 6 subwatersheds that fall within or immediately adjacent to the Big Summit Wild Horse Territory (see Appendix A of Wildlife Report for map). All of the activities listed in Appendix A were considered for their cumulative effects to prey species for raptors.

Effects from other commercial and noncommercial treatments previously implemented within the project area were included in the existing condition. Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed activities, include non-commercial harvest as well as prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road closures) would combine with actions proposed in alternatives 1 and 2 to improve habitat conditions for raptor species that select for more open stand conditions by reducing overall stand densities and creating more edge and patch habitat. The majority of raptor species that inhabit the project area would benefit from project activities which invigorate riparian habitats, restore moisture to meadows, and reduce overall disturbance post-implementation as these actions improve habitat conditions of raptor prey species.

Activities outlined in the various allotment management plans, both within the Territory (i.e. Big Summit, Reservoir) and within the cumulative effects boundary (i.e. Bear Creek, Marks Creek), should allow for improved management of livestock and less impact on riparian habitats. Range improvements, including riparian restoration, habitat protection, water developments, and fence reconstruction would occur within existing allotments. These activities are expected to improve the current condition of the riparian and adjacent meadow habitats, and potentially improve the connectivity of riparian habitats within the project areas where it overlaps. Expanding and enhancing riparian habitats and hardwood species, would combine with effects from alternatives 1 and 2 to improve habitat conditions for raptor prey species, while alternative 3 would detract from other habitat improvements occurring.

The continued implementation of the Deschutes and Ochoco Travel Management Plan will continue to limit cross-country motorized access within the project area. These restrictions help to reduce disturbance to nesting raptors throughout the year as they provide for an increase in security habitat away from open roads.

Therefore, the combined effect of the proposed action alternatives from the Big Summit Wild Horse management plan, with these current and reasonably foreseeable actions would be that the abundance and distribution of potential nesting and foraging habitat for raptors would be expected to be maintained across the project area, with a chance of improvement to riparian foraging habitats and nesting habitat for those species that select for open habitat conditions.

Conclusion

Alternative 2 proposes the adoption of a lower AML and additional population management tools, followed by the subsequent removal of horses from the Territory to reach the new AML. This reduction will improve the natural recovery of vegetation and thus riparian habitats would likely improve over the mid- to long-term, subsequently improving the abundance of raptor prey species within the Territory. Alternative 1 limits the population management tools that can be used and does not provide options for as low of an AML as alternative 2 and therefore would not improve riparian vegetative conditions for many raptor prey species to the same degree as alternative 2. Alternative 1 and 2 would not be expected to contribute to a negative trend in viability on the Ochoco National Forest for these species. Alternative 3 proposes to increase the AML from existing levels of horses present within the Territory. Alternative 3 would be expected to contribute towards a negative trend in viability on the Ochoco National Forest for raptor prey species that inhabit riparian and wet meadow habitats as those habitat conditions would be expected to continue to degrade in the short-, mid-, and long-term, increasing degradation of riparian habitats, reducing critical foraging and cover vegetation, and potentially displacing small mammals and birds seasonally.

Wildlife: Migratory and Resident Landbirds

Migratory birds breed in the U.S. and winter south of the border in central and South America. Continental and local declines in population trends for migratory and resident landbirds have developed into an international concern and led to the creation of the North American Bird Conservation Initiative. Under this initiative, plans have been developed for the conservation of waterbirds, shorebirds, seabirds and landbirds. The landbird initiative known as Partners-In-Flight has developed a series of bird conservation plans for every state.

Birds of Conservation Concern

The Birds of Conservation Concern (BCC) species list (USDI Fish and Wildlife Service 2008a) was reviewed to determine which species may occur in the project area. Those species and habitats that are within the project area are incorporated and effects disclosed in this analysis. Table 27 displays the list of BCC species found within Bird Conservation Region 10 which includes the Northern Rocky Mountains exclusively within the United States, and within which the Ochoco National Forest is located. This list identifies species, subspecies, and populations of migratory and resident birds not already designated as federally threatened or endangered that represent the highest conservation priorities and are in need of additional conservation actions.

Table 28 displays habitat present in the project area that may be impacted by proposed project activities and the corresponding focal species from Altman and Bresson (2017).

Table 27: Birds of Conservation Concern (BCC) as identified by the U.S. Fish and Wildlife Service within Bird Conservation Region 10 Northern Rockies U.S. portion only, that are known or likely to be present, with the potential to be impacted by management actions in the Big Summit Wild Horse Territory.

BCC Species	General Habitat Requirements	Impacts to Habitat		
		Alternative 1	Alternative 2	Alternative 3
calliope hummingbird <i>(Stellula calliope)</i>	Predominantly a montane species found in open shrub sapling seral stages (8-15 years) at higher elevations and riparian areas.	Continued overall decline of riparian habitats including shrubs and hardwoods in the short- to mid-term until AML is achieved and maintained. Potential for beneficial trend in the long-term as habitat recovers under lower overall number of horses.	Potential dramatic improvement in riparian conditions across Territory in the long-term due to reduced AML and additional tools to maintain and manage population.	Continued decline of riparian areas and shrubs as a result of increased AML, further exacerbated by the continued disproportionate utilization of riparian habitats within the project area.
willow flycatcher <i>(Empidonax traillii)</i>	Associated with riparian shrub dominated habitats, especially brushy/willow thickets. In southeast Washington also found in xeric brushy uplands.	Continued overall decline of riparian habitats including shrubs and hardwoods in the short- to mid-term until AML is achieved and maintained. Potential for beneficial trend in the long-term as habitat recovers under lower overall number of horses.	Potential dramatic improvement in riparian conditions across Territory in the long-term due to reduced AML and additional tools to maintain and manage population.	Continued decline of riparian areas and shrubs as a result of increased AML, further exacerbated by the continued disproportionate utilization of riparian habitats within the project area.

Table 28: Effects to habitat types and their associated focal species as identified by the Conservation of Landbirds and Associated Habitats and Ecosystems in the Northern Rocky Mountains of Oregon and Washington (Altman and Bresson 2017) which are present in the Big Summit Wild Horse Territory and are likely to be impacted by management actions.

Habitat Type	Habitat Attribute	Focal Species	Impacts to Habitat		
			Alternative 1	Alternative 2	Alternative 3
Riparian Woodland	Large snags	red-naped sapsucker	Continued inability for future recruitment of large diameter hardwood snags in the short- to mid-term due to over-utilization of riparian habitats in areas of high use by horses until the AML is achieved and maintained. Potential for	Potential improvement in riparian conditions across Territory in the long-term due to reduced AML and additional tools to maintain and manage population. Potential for increase in	Continued decline of future recruitment of large diameter hardwood snags, further exacerbated by the increased number of horses present in the Territory. A continuation of the disproportionate utilization of riparian habitats by horses and an

Habitat Type	Habitat Attribute	Focal Species	Impacts to Habitat		
			Alternative 1	Alternative 2	Alternative 3
			beneficial trend in the long-term as habitat recovers under lower overall number of horses.	large-diameter snags per acre.	anticipated downward trend in overall riparian health.
	High canopy and subcanopy cover and foliage volume	red-eyed vireo & yellow warbler	Over-utilization and degradation of riparian habitats including hardwood species, reducing the canopy and subcanopy cover due to a lack of future recruitment of young trees in the short- to mid-term. Once AML is achieved and maintained, potential for beneficial trend in the long-term as habitat recovers under lower overall number of horses.	Potential improvement in riparian conditions across Territory in the long-term due to reduced AML and additional tools to maintain and manage population. Potential improvement of health and vigor of vegetation due to fewer horses present.	Continued decline of riparian areas including loss of large shrubs and young hardwood trees as a result of increasing the AML, further exacerbated by the continued disproportionate utilization of riparian habitats by horses and an anticipated downward trend in overall riparian health.
	Patches of dense understory foliage cover	MacGillivray's warbler	Continued decline of shrubs, forbs, and grasses in areas of high use by horses including riparian habitats in the short-term (0 to 5 years) until the AML is achieved and maintained. Potential for beneficial trend in the long-term as habitat recovers under lower overall number of horses.	Potential improvement in riparian conditions across Territory in the long-term due to reduced AML and additional tools to maintain and manage population. Potential improvement of health and vigor of vegetation due to fewer horses present.	Continued decline of riparian areas, shrubs, and forbs as a result of increased AML, further exacerbated by the continued disproportionate utilization of riparian habitats by horses within the Territory and an anticipated downward trend in overall riparian health.
	Broken canopies with extensive habitat contrast edges	western wood pewee	Percent of canopy dominated by riparian hardwoods, as well as the overall canopy cover, may be decreased in the short- to mid-term. Once AML is achieved and maintained, potential for beneficial trend in the long-term as habitat recovers due to a lower number of horses.	Potential improvement in riparian conditions across Territory including canopy cover and percent of hardwoods in canopy, which may improve habitat conditions for this species in long-term. Potential for shrub cover to exceed threshold until mature hardwoods are present.	Continued reduction in total canopy cover of hardwoods due to anticipated downward trend in overall riparian health.

Habitat Type	Habitat Attribute	Focal Species	Impacts to Habitat		
			Alternative 1	Alternative 2	Alternative 3
Unique Habitats	Aspen	warbling vireo	Continued decline of hardwoods including aspen in the short- to mid-term.. Once the AML is achieved and maintained, potential for beneficial trend in the long-term as habitat recovers under lower overall number of horses.	Potential improvement in riparian hardwood conditions across Territory in the long-term due to reduced AML and additional tools to maintain and manage population.	Continued decline of riparian areas and shrubs as a result of increased AML, further exacerbated by the continued disproportionate utilization of riparian habitats within the project area.

Cumulative Effects– Alternatives 1, 2, and 3

The cumulative effects boundary includes the six subwatersheds that fall within or immediately adjacent to the Big Summit Wild Horse Territory (see Appendix A of Wildlife Report for map). All of the activities listed in Appendix A were considered for their cumulative effects to migratory and resident landbirds.

Effects from other commercial and noncommercial treatments previously implemented within the project area were included in the existing condition. Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed activities, include non-commercial harvest as well as prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road closures) would combine with actions proposed in alternatives 1 and 2 to improve habitat for birds that select for riparian woodlands or more open forested conditions. Proposed actions may combine with ongoing projects to increase disturbance and degrade habitat conditions in the short-term, but in the long-term would result in a cumulative improvement of habitat conditions for this suite of species by reducing overall stand densities, invigorating riparian habitats, creating more edge and patch habitat, restoring moisture to meadows, and reducing overall disturbance post-implementation.

Activities outlined in the various allotment management plans, both within the Territory (i.e. Big Summit, Reservoir) and within the cumulative effects boundary (i.e. Bear Creek, Marks Creek), should allow for improved management of livestock and less impact on riparian habitats. Range improvements, including riparian restoration, habitat protection, water developments, and fence reconstruction would occur within existing allotments. These activities are expected to improve the current condition of the riparian and adjacent meadow habitats, and potentially improve the connectivity of riparian habitats within the project areas where it overlaps. Expanding and enhancing riparian habitats and hardwood species, would combine with effects from this project to enhance habitat conditions for riparian woodland obligate species.

Actions proposed in this project, specifically the increased AML in Alternative 3, when combined with effects from past, present and reasonably foreseeable future actions does not degrade habitat conditions beyond a threshold in which the viability of populations on the Ochoco National Forest would be in jeopardy. Degraded riparian woodland conditions would be expected to continue under Alternative 3 within the Territory, but additional habitat outside of the Territory, within the cumulative effects boundary, where habitat improvement actions are currently in implementation, would continue to exist and be available should individuals choose to vacate the area.

Hydrology and Aquatic Species

Introduction

This section includes the Biological Evaluation (BE) for Threatened, Endangered, and Sensitive aquatic species in the Big Summit Wild Horse Territory (BST) project area. The BE documents the review and findings of the Forest Service planned programs and activities for possible effects on species (1) listed or proposed for listing by the US Fish and Wildlife Service (USFWS) as Threatened or Endangered; or (2) designated by the Pacific Northwest Regional Forester as Sensitive; or (3) required consultation with the National Marine Fisheries Service (NMFS) under the Magnuson-Stevens Fishery Conservation Act (MSA). It is prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3, FSM 2672.4, and the Endangered Species Act of 1973, as amended (ESA) (Subpart B; 402.12, Section 7 Consultation). The R6 Regional Forester's Special Status Species List from 2015 will be used.

Pertinent Rules and Regulations

Water Quality

Direction for managing water quality, water quantity, and riparian areas on the Ochoco National Forest are found in the Forest Service Manual, Title 2500 - Watershed and Air Management (FSM 1984), Forest Service Inland Native Fish Strategy Environmental Assessment (INFISH 1995), Code of Federal Regulations (36 CFR 219), National Best Management Practices for Water Quality Management on National Forest System Lands (BMP 2012), the Clean Water Act (CWA 1972), Executive Orders 11988, 11990 and 12088, the Organic Administration Act of 1897, Watershed Condition Framework (U.S. Forest Service Watershed Condition Classification Technical Guide, 2010) and the Ochoco National Forest Land Resource and Management Plan (LRMP 1989).

The goals and objectives of Ochoco National Forest along with desired future conditions can be found in the Ochoco National Forest Land Resource and Management Plan along with Forest-Wide standards and guidelines for water.

Management Area Prescriptions – Riparian

A management area is composed of lands with similar capabilities or characteristics and is allocated to emphasize a resource or mix of resources. In conjunction with Forest-wide standards and guidelines, management areas provide a site-specific management emphasis and desired future condition for that area.

Riparian areas include land adjacent to water, where plants that are dependent on a perpetual source of water occur. They normally have high water tables and soils which exhibit characteristics of wetness. Riparian areas provide food, cover, and a source of large woody material for aquatic insects, fish and land animals. The vegetation of streamside areas filter sediment and shade the water surface to help maintain stable stream temperatures. Management emphasis for riparian areas include managing streamside vegetation and habitat to maintain or improve water quality. This includes meeting temperature and turbidity levels as required by state standards under the Clean Water Act. In summary, desired future condition for riparian areas include a low, but apparent level of management, adequate shade from deciduous and coniferous vegetation, diverse vegetation, and banks that are well vegetated and protected. A complete list of desired future conditions for riparian management areas can be found in the Ochoco Forest Plan (USDA Forest Service 1989).

Management Area Standards and Guidelines - Water

Temperature – Standard and Guideline

- The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. Where this cannot be attained, 100 percent of the potential for shade is the standard.
- Shade requirements may be reduced in cases where management is necessary to sustain a thrifty community of shade providing species over time, but activities may not result in an increase in temperatures above the limits specified (MA-F15 Riparian).

Turbidity – Standard and Guideline

- Allow no more than 10 percent cumulative increase in stream turbidity. Short-term (less than five days) deviations from this standard to accommodate emergency or other legitimate activities will comply with state requirements for notification and approval (MA-F15 Riparian).

Project Activities – Standard and Guideline

- Special attention shall be given to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation. No management practices causing

detrimental changes in water temperature or chemical composition, blockages, or deposits of sediment which seriously and adversely affect water conditions or fish habitat shall be permitted within these areas.

- Preferential consideration shall be given to riparian-dependent resources over other resources in cases of unresolvable conflicts.

Vegetation and ground cover requirements

- Where site potential and topographic factors permit, manage riparian areas to provide the shade necessary to meet stream temperature goals.
- Maintain upper streambanks in a stable condition along at least 80 percent of the length of a stream.
- Retain at least 80 percent of the potential ground cover in grass-forb riparian communities. Also, retain at least 80 percent of the potential tree or shrub cover in riparian areas dominated by trees or shrubs. In riparian areas with mixed layers, the cover requirement may be met by taking credit for the effective cover provided by all vegetative layers of the riparian community including shrubs, tree understories, and the dominant overstory. Consider the mitigating effect of stream size and orientation as well as surrounding topography when determining the amount of cover that may be removed.

Inland Native Fish Strategy

Inland Native Fish Strategy (INFISH) (USDA Forest Service 1995a) provides direction to protect habitat and populations of resident native fish outside of anadromous fish habitat in eastern Oregon, eastern Washington, Idaho, western Montana, and portions of Nevada. For the Territory, INFISH provides protection for resident Inland Columbia Basin Redband trout (*Onchorhynchus mykiss gairdneri*).

Riparian Management Objectives (RMOs) describing good habitat were developed to describe desired condition for fish habitat. See Appendix A (USDA Forest Service 1995a; USDA Forest Service 1995b; Rosgen 1996; Rosgen and Silvey 1998). INFISH Riparian Management Objectives that will be discussed in this report relate to pools, temperature, bank stability and width to depth ratios. These parameters are indicators of effects to Redband trout and Columbia spotted frog habitat as a result of wild horse management. Although sediment is not an INFISH RMO, it is an indicator of effects to Redband trout and Columbia spotted frog and will be discussed in the effects section of this report.

There is one standard and guideline specific to wild horse and burro management. It states:

- GM-4: Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

Implementing INFISH is to achieve a high level of habitat diversity and complexity through a combination of habitat features, to meet the life-history requirements of the fish community inhabiting a watershed. Project proposals are to not retard the attainment of RMOs. To “retard” would mean to slow the rate of recovery below the near natural rate of recovery if no additional human caused disturbance was placed on the system (USDA Forest Service 1995a p. A-3).

Riparian Management Objectives

Riparian Management Objectives (RMOs) describing good habitat were developed to describe desired condition for fish habitat. The reference information for RMOs better describe the habitat in the Territory than INFISH.

Table 29 is taken from Table A-1. Interim Riparian Management Objectives (RMOs) from INFISH (USDA Forest Service 1995a). As discussed below, some of these INFISH standards are used to describe aquatic conditions in the Territory. Additionally, desired conditions are included based on best available science for the area.

Table 29: Applicable Riparian Management Objectives for the Territory (USDA Forest Service 1995a). Large wood is not discussed because large wood is unaffected by wild horse management.

Habitat Feature	Interim Objective	Desired Condition Based on Best Available Science For the Area									
Pool Frequency (all systems)	Varies by channel width:										Same as Interim Objective
	Wetted width (feet)	10	20	25	50	75	100	125	120	200	
	Pools per mile	96	56	47	26	23	18	14	12	9	
Water Temperature	No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperatures below 59F within adult holding habitat and below 48F within spawning and rearing habitats.										Oregon State standards (340-041-0028, approved by EPA Mar 2004): the seven-day-average maximum temperature of streams identified as having salmon and trout rearing and migration should not exceed 18.0°C (64.4°F).
Bank Stability (non-forest systems)	>80 percent stable.										Same as Interim Objective
Width/depth ratios (all systems)	<10, mean wetted width divided by mean depth										Refer to Table #30

Aquatic Species

This report analyzes the effects of proposed project alternatives upon fish, amphibians, and aquatic resources in the Territory. Sensitive species that are listed as documented or suspected on the latest Regional Foresters Sensitive Species list for the Ochoco National Forest are analyzed for potential effects, while other species are not specifically analyzed for potential effects. There are two aquatic sensitive species within the Territory, resident native Inland Columbia Basin Redband trout (*Oncorhynchus mykiss gairdneri*) and Columbia spotted frog (*Rana luteiventris*), which are found in the following stream systems: Duncan, Blevins, Douthit, Ochoco, Canyon, Kyle, Judy, Scissors, Cady, South Fork Howard, Cram, Winter and Johnson Creeks. Other small unnamed perennial and intermittent streams also exist. Proposed activities and potential effects have been compared to Forest Plan standards and guidelines to determine consistency.

Management Indicator Species Occurrence and Status

Forest Plan designation - Brook and rainbow trout

Fish species identified as Management Indicator Species (MIS) are listed in the FEIS for the Forest Plan. These species are rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*). In the past, both species were stocked on the Forest by the Oregon Department of Fish and Wildlife (ODFW). ODFW no longer stocks either species on the Forest.

Brook trout are a non-native trout that were planted for fishing opportunities in the 1920s and 1930s. They are known to exist in only a few streams on the Forest, but not within the Territory.

For purposes of this analysis, Redband trout are described in the Threatened, Endangered, and Sensitive Species section and will act as a surrogate for MIS fish species effects analysis (Rife, 2011). Additionally, effects to Redband trout are considered to be the same as effects to brook trout. An MIS analysis is located later on in this document.

Threatened, Endangered, and Sensitive Species Occurrence and Status

There are no known Threatened or Endangered aquatic species or designated critical habitat within the Territory, under the federal Endangered Species Act (ESA). Therefore, regulatory ESA consultation procedures are not applicable to the territory. Columbia spotted frog and MIS-surrogate, Redband trout, are the only two USFS Region 6-designated aquatic Sensitive species known or suspected to inhabit the Territory. Species listed as Strategic are not addressed in this analysis.

USFS Pacific Northwest (Region 6) Sensitive Listed Species (2015)

The following USFS Region 6 sensitive aquatic species are included in this Biological Evaluation (Table 30).

Table 30: Analyzed aquatic species, their Forest-wide status, and occurrence within the territory.

Species	Scientific Name	Status	Occurrence
Columbia spotted frog	<i>Rana luteiventris</i>	S	HD/D
Redband Trout	<i>Oncorhynchus mykiss gairdneri</i>	S	HD/D
S: Sensitive per 2015 Regional Forester’s Special Status Species List; HD/D: Species and Habitat Documented or suspected within the project area or near enough to be impacted by project activities			

Analysis Design

The following components of the aquatic ecosystem were not analyzed for this project:

- Roads are a major source of erosion and stream sedimentation on forested lands. Roads can increase erosion rates and turbidity three orders of magnitude greater than the undisturbed forest condition (Megahan 1974). Sediment eroded from the road prism can be delivered to a forest stream, resulting in increased turbidity, sediment loads, and degraded habitat for fish. Research has shown that roads have the greatest effect on erosion relative to other forest management practices (Megahan and King 2004). There are ~154 miles of Forest roads within the Territory that are affecting the existing condition of the streams within most of the area; however, no road management actions are being proposed as part of the project.
- Water yield is particularly affected by changes in the water budget, which includes changes to precipitation, evaporation, and transpiration from vegetation, infiltration, and runoff. Changes in water yield can influence bank erosion, stream temperatures, stream form, and habitat for fish. Grazing by wild horses has very limited impact on changes in water yield; however, bank instability and erosion caused by large ungulates frequenting riparian areas can lead to changes in channel morphology. Resulting channel incision can reduce connection to floodplains and therefore reduce potential water retention across a valley section (Davie and Boyd, 2019). In addition, no tree removal will occur under any alternative.
- Large woody debris (LWD) is an important feature in streams across the Ochoco National Forest. It helps slow the flow of water, traps gravel that is important for fish spawning habitat, helps decrease

water temperature, provides hiding cover and habitat for fish, helps reinforce streambanks and traps organic material. LWD is unaffected by wild horses because they do not remove active or potential large wood from the landscape. Therefore, it will not be discussed further in this analysis. It should be noted that it can be inferred that the greater the presence of LWD in a stream the less the potential horse utilization and potential riparian degradation through inaccessibility.

Of the four sub-watersheds that encompass the Territory, there are parts of the sub-watersheds that lie outside of the project area. Similar effects to riparian conditions exist in these areas and horse numbers likely have an effect as they do inside of the Territory but will not be analyzed.

Methods

Watershed Condition Framework

In 2010 and 2011 there was a national initiative to establish the existing ‘watershed condition’ for each 12-field subwatershed on every National Forest. The primary intent of doing so was to establish a systematic process for determining watershed condition class that all National Forests could apply consistently and to improve Forest Service reporting and tracking of watershed condition.

The product of this effort was a baseline watershed condition class established for every subwatershed on every national forest. With an established baseline, condition could be tracked over time with events and projects such as riparian and upland restoration, wildfires or any other event that may change watershed condition.

Stream Surveys

PFC, also known as Proper Functioning Condition (USDI, 2015 TR 1737-15 and the Supporting Science for Lotic Areas, Bureau of Land Management, USFS) is a methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian-wetland area. In either case, PFC defines a minimum or starting point. In the Territory, there were four streams and 16 stream reaches surveyed for PFC in 2015.

Level II (Region 6 Stream Inventory Level II Surveys, US Forest Service) and Bottom Line Survey (BLS; The Bottom Line Survey: An Approach to Evaluate the Attainment of Riparian Area Standard and Guidelines on the Ochoco National Forest, USFS 1992) data have been collected in the Territory. Information from these data sets can serve as a useful tool in evaluating the condition of streams as well as a benchmark for monitoring trends. All of the most recent survey data was compiled and analyzed and was comprised of a mixture of BLS and Level II data from 1992-2016. It is recognized that the data are not entirely reflective of current management (last 3-5 years). For some of the stream systems there is data from the early 1990s and 2000s which has been compared to recently collected data (2009-2016). Using this, assessments of current conditions and trends in habitat are assumed to be reflective of management action effectiveness. Evaluation of streams with only recent data was compared to RMOs to determine habitat condition as long term trends could not be determined. Extrapolations will be made from currently collected data across the entire project, since data was not collected on every stream.

This analysis acknowledges that inherent variability and observer error exists in the measurement of the various aquatic parameters collected under the individual stream survey methodologies. This analysis assumes that in general, the error/variability in the measurement of each of the aquatic parameters is 5%. Therefore, no determination of consistency of an individual parameter to a specific standard or guide should be inferred if the measured value was within 5% of the standard. For example, the standard for stream shade for a specific site is 80%, if shade on the site was measured at 76% we would not be able to state with confidence that the standard is not being met because it falls within the 5% error/variability. Similarly, no determination of trend was applied to the comparison of more than one measure if the values were within 5%. For example, if stream shade was measured at 68% in 1995, and re-measured in 2006 at 71%, we would not be able to state with confidence that an upward trend exists.

PACFISH/INFISH Biological Opinion Effectiveness Monitoring Program data were utilized in select streams (2001 through 2017) (USDA Forest Service 2015). The following parameters were used to evaluate stream conditions that contained PIBO monitoring sites: pool frequency, width to depth ratios, percent surface fines, percent stable banks, and large woody debris frequency.

Indicators

The indicators below are used to qualitatively assess the effects of each alternative. A qualitative assessment of the effects is used to compare how each indicator would change with the different AML for each alternative. The indicators, along with how they are measured, are listed below. These indicators are also used to assess if each alternative is consistent with INFISH and the LRMP.

Sensitive Species Habitat (Channel Morphology)

The width-to-depth ratio is an index of the cross-sectional channel shape, where both width and depth are measured at the bankfull level. Changes in discharge, bank stability, sediment load and/or bedload can rapidly alter the width and/or depth of the channel. Whether a stream erodes downwards or outwards or both can be influenced by bank shear stress, channel substrate type and the amount of riparian vegetation present on stream banks. Bank vegetation increases the resistance to erosion through its soil binding effects on banks, with erosion decreasing as the percentage of roots in the soil increases.

Bankfull width/depth ratios are primary indicators of channel stability and thus are directly related to both pool quantity and quality. Channel width and abundance of large woody debris have been found to strongly influence pool frequency (pool to pool spacing) in forested streams and is an indicator of whether a stream can properly dissipate and distribute flow energy and transport sediment (Seixas et al. 2020 and Montgomery et al. 1995). An inverse relationship between bankfull width and pool to pool spacing has been well documented by Rosgen (1996). For example, a stable B-type channel with a bankfull width of 10 feet will have about half the number of pools (88-132 pools/mile) when compared to a typical A-type channel that averages 5 feet wide at bankfull (264-285 pools/mile). Large woody debris loading will be unaffected by the alternatives proposed and any changes to AML.

INFISH (USDA Forest Service 1995) directs that channel width/depth ratios in streams that support bull trout populations be less than 10. In this watershed analysis area, some of the A, B and C-type channels currently have width/depth ratios that are greater than 10. Since the streams in the analysis area support Redband trout populations, not bull trout populations, which are more sensitive to habitat disturbances, a more desired condition may be those based on channel type as defined by Rosgen (1996). For example, field observations of redband trout have suggested that they are able to withstand a wide range of water temperatures as compared to bull trout (Idaho Power Company 2003). This coincides with the statement above that bull trout are more sensitive to habitat disturbances. See Table 31 for these ratios.

As the width/depth ratio increases, the surface area exposed to solar radiation also increases, potentially resulting in elevated stream temperatures. Streamside vegetation also becomes less effective in providing shade to these widened channels. Discharge amounts provided by the affected drainages in this watershed are not substantial in late summer, thus a reduction in the width/depth ratios in the affected drainages may not have any significant influence on downstream temperatures.

Width to depth is affected and changed by livestock use in streams and outer riparian areas. When livestock are more concentrated in streams and riparian areas, they trample banks and, in areas of heavy concentrations, can cause bank erosion. As banks erode, they become wider and shallower, increasing the width to depth ratio in the stream. As this widening occurs, it can destabilize riparian vegetation and cause continual increases in width to depth ratios. Over time, as width to depth ratios increase, riparian hardwoods and other riparian-dependent species will decline.

Existing condition for width-to-depth in the Territory streams was compiled from stream surveys and rated as poor, fair, or good. Good ratings indicate that width-to-depth is meeting the standard as described in Table

31. The table rates width-to-depth by channel type. If it meets the channel type width-to-depth, it is rated good, if it is within one number of good, it is rated fair; if it is more than one number away from good, it is rated poor.

Table 31: Width to Depth Ratio by Channel Type (Rosgen; Silvey 1998)

Channel Type	A	B	C	D	DA	E	F	G
Width/Depth Ratio	<12	>12	>12	>40	<40	<12	>12	<12

The entrenchment ratio is defined by Rosgen (1996) as the flood-prone width divided by the bankfull width. Flood-prone width is the width of the stream at twice maximum bankfull depth. Entrenched streams are typically vertically confined (within cutbanks) due to vertical channel erosion and have entrenchment ratios that are less than 1.4 (see Figure 30); higher entrenchment ratios indicate that channels are not confined and have access to floodplain. G and F-type channels are entrenched. Rosgen (1996) refers to the width to depth ratio as the bankfull width divided by the bankfull depth.

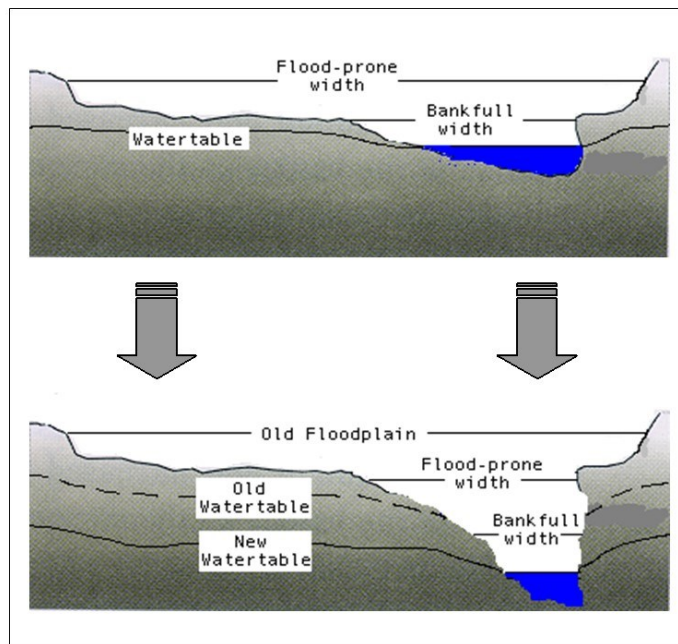


Figure 30: Changes in Channel Morphology and Water Table Elevation Associated with Entrenchment

Existing condition for entrenchment in Territory streams was compiled from stream surveys and rated as poor, fair, or good. Good ratings indicate that entrenchment is meeting the standard as described in Table 32. The table rates entrenchment by channel type. If it meets the channel type entrenchment ratio it is rated good, if it is within one number of good, it is rated fair; if it is more than one number away from good, it is rated poor.

Table 32: Entrenchment Ratios by Channel Type. (Rosgen 1998)

Channel Type	A	B	C	D	DA	E	F	G
Entrenchment Ratio	<1.4	1.4-2.2	>2.2	n/a	>2.2	>2.2	<1/4	<1/4

Stream Temperature

The temperatures in the INFISH Interim Riparian Management Objectives are based on bull trout presence or potential. Redband trout are the only salmonid currently present in the watershed. The Oregon Department of Environmental Quality did not identify any bull trout habitat in the planning area (Oregon Water Quality Standards, Fish Use Maps, Figure 130A). State water quality standards may be accessed at:

www.deq.state.or.us/wq/standards.standards.htm. The Ochoco National Forest has incorporated into the LRMP to not measurably increase the 7-day moving average daily maximum water temperature on any adult holding habitat or spawning or rearing habitats in the planning area based on these interim RMOs. The state water quality standards more accurately reflect attainable conditions and target species (Redband trout) found in the Territory. The state standards (340-041-0028, approved by EPA Mar 2004) say the seven-day-average maximum temperature of streams identified as having salmon and trout rearing and migration should not exceed 18.0°C (64.4°F). The state of Oregon assumes that waters meeting this standard will provide water temperatures suitable for Redband trout spawning.

Within the Territory there are three streams with assessed water quality impairments related to summer water temperature. These include Ochoco Creek (14 miles listed), Canyon Creek (5.5 miles listed) and Howard Creek (9.5 miles listed). These streams are on Oregon's 2012 Section 303(d) List of "Water Quality Limited Waterbodies."

Reductions in solar input resulting from shading are a primary factor affecting stream temperature. The term "stream shade" often refers to all shade on any part of the stream that blocks solar input to the stream channel. Shade functions generally occur within 100-200 feet of the channel (Beschta, et al. 1987). Stream shade is primarily a function of stream orientation, channel width, tree heights adjacent to the stream, and ground slope above the bankfull channel.

On the Ochoco National Forest, the Forest Plan standards and guidelines direct that at least 80 percent of stream surfaces should be shaded, or that 100 percent of potential shade levels should be present when 80 percent shade cannot be attained (e.g. open wet meadow areas). Stream shade comes from adjacent conifer forests, topographic shading in steep drainages, or riparian vegetation near the stream. Open meadow areas are common in the watershed area and have a low potential for meeting the 80 percent shade criteria due to the absence of bordering forest and hillsides. The sources of shade in open meadows generally include sedges, rushes and other riparian vegetation that tends to flourish where the water table is high most of the year. However, many of the meadow systems in the Territory have been impacted to varying degrees by an assortment of legacy issues and past practices (e.g. undersized culverts, ditching, irrigation); therefore, it is assumed that a portion of the potential shade for these meadow areas cannot be met without active restoration.

Table 33: Summary of Stream Temperature Analysis Measure and Condition Status Rating.

Analysis Measure	Parameter	Condition Status Rating		
		Good	Fair	Poor
Stream Temperature	Shade	> 80%*	60-80%*	< 60%*
	7-Day moving average temperature	At least 90% of observations are meeting standards; <18°C	At least 50% of observations are meeting standards; <18°C	Over 50% of observations are not meeting standard; ≥18°C

* The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. However, where this cannot be attained (such as in a meadow system), 100% percent

of the potential for shade is the standard. Meadow systems would not meet the 80% stream shade standard but may still be properly functioning.

Existing condition of stream shade in Territory streams were compiled from stream surveys and rated as Good, Fair and Poor. Good ratings indicate that stream shade is greater than 80 percent; Fair conditions indicate stream shade between 60 and 80 percent; and a Poor rating is associated with stream shade of less than 60 percent (see Table 33).

In order to compare the proposed alternatives relative to stream temperatures in the Territory, monitored summer stream temperatures within and directly adjacent to the project boundary were compiled and 7-day-average maximum temperatures were determined for all sites. Observations of exceedances and trends were then determined through analysis.

Sediment/Turbidity

Environmental effects of unstable streambanks include increased turbidity and sediment yield, development of cutbanks, and changes in channel morphology. The result of these changes may result in water quality conditions that are lethal to many aquatic organisms. Changes in channel morphology would primarily be seen with changes in entrenchment and width to depth ratios (Marcuson 1977, Duff 1979). Streams with unstable banks typically erode laterally (i.e. become wider and shallower), which increases the width to depth ratio.

Turbidity is the degree to which suspended material in the water impedes light penetration. Turbidity is expressed in Nephelometric Turbidity Units (NTUs). There can be a close correlation between turbidity and suspended sediment in a given stream, but the correlation can change as organic material increases over the summer or if the percent of sediment from different sources in the drainage changes. The correlation is poor in sediment-limited systems. Turbidity is not a good indicator of the amount of total sediment being transported as bedload. At turbidity levels above 25 NTU salmonid sight-feeding may be reduced. Most measurable effects to aquatic life result from sediment instead of turbidity.

Current State water quality standards direct that turbidity levels should not exceed background levels by more than 10 percent. There is no quantitative standard for sediment in the current Oregon DEQ water quality rules. The Narrative Criteria section (340-041-0007-12); however, states that activities can not result in the formation of appreciable organic or inorganic deposits deleterious to fish or other aquatic life, but this is more of an objective than a standard. The State appears to be using turbidity as a surrogate for sediment.

The numerous organisms forming the base of the aquatic food chain find shelter and habitat in the open spaces within stream gravel and cobble. Filling these spaces with sediment reduces the habitable volume of the stream. As sediment sources and delivery exceed 20 percent of the total area on the substrate, deposits within the larger cobble material of the streambed produce an embedded channel, with consequent loss of aquatic habitat. Gravel embeddedness of less than 20 percent is essential to maintain a healthy salmonid population, particularly in those areas identified as potential or existing spawning areas (Bjorn and Reiser, 1991). If fine sediment exceeds 20 percent, the spaces between the rocks in the substrate are filled and oxygenation of eggs is reduced. Reduced oxygenation results in reduced success of fish and frog eggs surviving.

Soil disturbance on ridges or side slopes may never affect water quality, but disturbance of a channel bed or bank is immediately reflected in downstream sediment levels. Unstable stream banks associated with mechanical disturbance (including trampling), loss of vegetative root strength, decreases in roughness associated with LWD and vegetation removal, or channelized stream banks are highly susceptible to changes in flow or sediment load. These stream banks can account for most of the sediment load in a drainage system. If the discharge and/or the sediment load are substantially increased, the flow may erode the streambanks or deposit sediment to reach a new equilibrium. A high incidence of raw banks (i.e. cutbanks), headcuts, and/or braided channels (Rosgen channel type D) are indicative of unstable stream banks.

Two measurement factors were used to assess existing condition of bank stability for streams in the Territory: percent stable banks and percent fines from stream reach pebble counts. Each measurement factor was given a good, fair, or poor rating based on measured values. Percent Bank Stability was estimated and summarized from the most recent Level II and Bottom Line Survey data for each stream reach. Percent fines were estimated as percent of total particles that are less than 2 mm (median axis diameter) from Wolman Pebble Counts conducted as part of the Level II stream surveys for select stream reaches. Measurement factor values associated with condition ratings for the two surrogate sediment measurement parameters are summarized in Table 34.

Table 34: Summary of Sediment/Turbidity Analysis Measure and Condition Status Ratings

Sediment/Turbidity Analysis Measure	Parameter	Condition Status Rating		
		Good	Fair	Poor
	Bank Stability	>80%	60-80%	> 60%
	Fine Sediment	< 20%	20-40%	> 40 %

Riparian Vegetation

Riparian vegetation condition is important when assessing the existing condition and effects to streams, because it impacts not only stream shade, but bank stability, stream temperature, and stream form. In order to assess the riparian vegetation condition, estimates of hardwood shade from BLS and Level II Stream Surveys in combination with PFC Survey descriptions of riparian vegetation were utilized. Riparian vegetation condition was rated good if greater than 50 percent stream shade is from hardwoods, fair for 30 to 49 percent, and below 30 percent was rated as poor. The requirements for shade along streams will generally correspond to provisions for more than 80 percent of the surface shaded. However, where this cannot be attained (such as in a meadow system), 100% percent of the potential for shade is the standard. Meadow systems would not meet the 80% stream shade standard but may still be properly functioning. In absence of hardwood shade estimates, PFC Survey descriptions of riparian vegetation were used to rate the condition as good, fair or poor.

Existing Condition

Watersheds

The greater Territory resides within the Upper North Fork of the Crooked River and Upper Ochoco Creek watersheds which combined cover roughly 209,000 acres. The Territory covers 25,434 acres (~12% of the two watersheds combined acreage). The proposed action will be assessed using individual subwatershed boundaries within the Territory. These subwatersheds include: Headwaters of Ochoco Creek, Howard Creek, Johnson-Elliott Creek, and Duncan Creek-Ochoco Creek. Situated on the west side of the forest, the Territory is relatively moist, with a mean annual precipitation of 23 inches, ranging from 17 inches at lower elevations to 31 inches at the higher elevations.

Streams

Of the 58.4 miles of streams in the planning area, there are a total of 28.8 miles of perennial stream (Figure 31). Several year-round (perennial) and intermittent flowing streams drain the subwatersheds of the project area. These streams include: Blevins Creek, Cady Creek, Canyon Creek, Cline Creek, Cram Creek, Douthitt Creek, Duncan Creek, Fisher Creek, Hedgepath Creek, Johnson Creek, Judy Creek, Kyle Creek, Madison Creek, Merritt Creek, Ochocho Creek, O’Neil Creek, Peaslee Creek, Scissors Creek, South Fork Howard Creek, and Winter Creek. Eight of these systems are classified as having year-round flow based on the United States Geological Survey (USGS) National Hydrography Dataset with the remainder identified as intermittent; however, it has been observed in recent years that the majority of these systems have lost late summer and early fall flows making them more functionally intermittent in nature. There are approximately 31 miles of fish-bearing streams (Class I-II) within the territory.

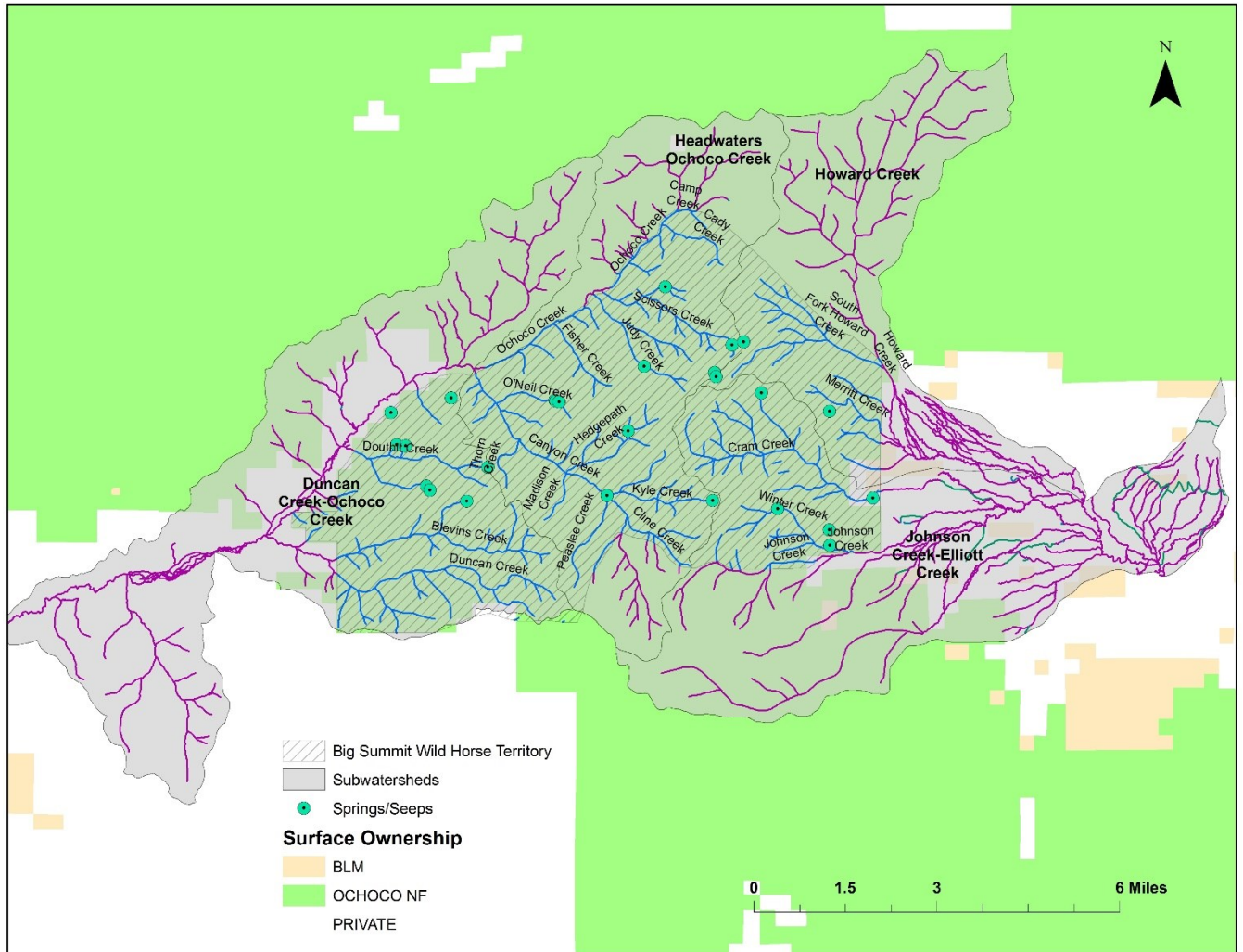


Figure 31: Streams and springs within the four affected sub-watersheds.

Sensitive Species

Redband Trout

Prior to human disturbance, Redband trout may have occupied more aquatic habitat within the Territory project area than presently. Road densities, wild horse and livestock grazing, timber harvest, and mining have contributed to a reduction in suitable habitat and increased fish passage barriers.

Redband trout typically inhabit cooler, well-oxygenated water that is less than 70°F, although they tolerate a wider range of water temperatures (from 32°F up to 80°F) better than many other salmonid species (Wydoski and Whitney 1979). Current research indicates that Redband trout have developed phenotypic traits that allow them to tolerate marginal trout habitats in the high desert areas of Oregon (Rodnick et. al. 2004, Gamperl et. al. 2002). Despite various phenotypic traits, the preferred temperature for optimum metabolic performance in Redband is 55.4°F (Gamperl et al., 2002) and the upper lethal temperature limits are 84.7-85.1°F, very similar to temperature profiles observed in most other *Oncorhynchus* species (Rodnick et. al. 2004).

Redband trout typically spawn between March and the end of June depending on water temperatures and timing of spring runoff. Egg deposition occurs in stream areas that have adequate water depth and velocity and appropriately sized gravels for redd construction. Water temperatures influence the number of days eggs incubate in the gravel before fry emergence. During the fry and parr life stages, Redband trout are often observed along stream margins in slower waters. Adults are most often observed in pools near large wood or available cover. Food sources for young and adults include aquatic insects, amphipods, fish and eggs and adults may also eat crustaceans when they are available (Wydoski and Whitney 1979).

There is little life history information specific for the populations in the Territory. Redband trout inhabit perennial streams in the Duncan Creek/Ochoco Creek, Headwaters Ochoco Creek, Howard Creek and Johnson Creek/Elliott Creek subwatersheds within the Territory.

Over the past 50 years (Stuart et al. 2007), lower numbers of Redband trout have resulted from the cumulative effects of loss of riparian vegetation (particularly hardwood trees), bank erosion, increased sedimentation (which can suffocate incubating trout eggs), entrenched streams, loss of beaver and woody debris, and altered stream channels.

Columbia Spotted Frog

Historically the Columbia spotted frog was found at elevations ranging from near sea level to 7,370 feet. Their range extended from southeast Alaska through British Columbia, eastern Washington and Oregon to northeast California and eastward to western Montana and Wyoming, and northern Utah. Columbia spotted frogs have been found throughout the Ochoco National Forest and are present within the Territory.

Columbia spotted frogs are highly aquatic, thus they are generally found near water in riparian habitat. In winter months, the frogs burrow into mud in wet meadows or in streams. They breed in shallow water areas such as stream margins or pond edges, flooded meadows, or in pools of water formed by snow melt from early March through the end of May. Timing of breeding is dependent on snowmelt and rising water temperatures. After hatching, the larval stage (tadpole) remains in the water until metamorphosis into the adult form. Adults utilize both water habitat and nearby riparian areas for foraging and refuge needs.

The causes of decline are not fully understood, but like most amphibians a major threat is the destruction, fragmentation and degradation of streams and wetlands. Land use activities have initiated or accelerated the channel incision process, which has changed the hydrologic function of meadow systems (USFWS 2011). These changes in the hydrology of meadows, mainly the lowering of the water table, can cause the vegetation communities to shift from wet meadow communities to dry upland plant communities. The loss of meadow complexes reduces the available habitat for Columbia spotted frogs. Natural fluctuations in environmental conditions (e.g., drought) tend to exacerbate the adverse effects of land use activities (USFWS 2011). Improvements in stream and wetland hydrology and riparian plant communities would improve Columbia spotted frog habitat.

Formal Columbia spotted frog surveys have not been conducted, but frog sightings have occurred in the Territory. Vegetation preferred by frogs such as sedges, willows, and alders are limited, but available along some of the streams in the Territory. There is no information about their population size, distribution, growth, survival, life history diversity and isolation, or persistence in Territory subwatersheds. We assess the

relative difference in potential effects to habitat for each alteration with the assumption that they are present throughout the territory.

Sensitive Species Habitat

For the Territory, channel width-to-depth ratios, entrenchment ratios, and number of pools per mile were analyzed for condition of sensitive species habitat.

Width to Depth Ratio

Based on the data from the surveys, the general condition of width to depth ratio of streams within the Territory can be generalized as fair to good with no apparent trend in changing conditions with the exception of Canyon Creek exhibiting an improving trend. Fairly stable stream banks have led to most of the channel adjustment occurring vertically (downward) rather than horizontally (to either side of the main channel) resulting in down-cut channels and narrower bankfull widths.

Entrenchment Ratio

Although entrenchment (vertical containment of a river) is not part of INFISH analysis, it is a reflection of streams degrading. Within the Territory, most of the streams exhibit poor entrenchment ratios which correlates with field observations of historic incision/down cutting of the stream channel in every stream and an overall disconnection from floodplains. Historic grazing, logging practices, and road building have contributed to the loss of high stream flow energy dissipating mechanisms such as large woody debris, access to floodplains at a variety of flows, stable stream pattern and high pool frequency. Recent data indicates no apparent trend in changing conditions which supports the assertion that most of these systems are existing in a stable degraded state because of poor streamflow access to the floodplain. This lack of floodplain access is in part due to lack of large woody debris within the channel to help capture sediment and raise the base elevation of the channel.

Pools

Pool characteristics are generally shallow exhibiting little habitat complexity. The majority of streams within the Territory fall well short of meeting management objectives of more than 96 pools per mile with no apparent trend in changing conditions (Figure 32). Streams that exhibit less than 50 pools/mile include: Cady Creek, Canyon Creek, Cram Creek, Douthit Creek, Duncan Creek, Howard Creek, Judy Creek and Scissors Creek. Data from 2015 indicates a drastic decrease in pools per mile from the 2001 data in Judy Creek in particular. The lack of pools in these systems can be directly attributed to conditions that create poor channel morphology such as lack of large woody material within the channel and loss of streamflow access to the historic floodplain.

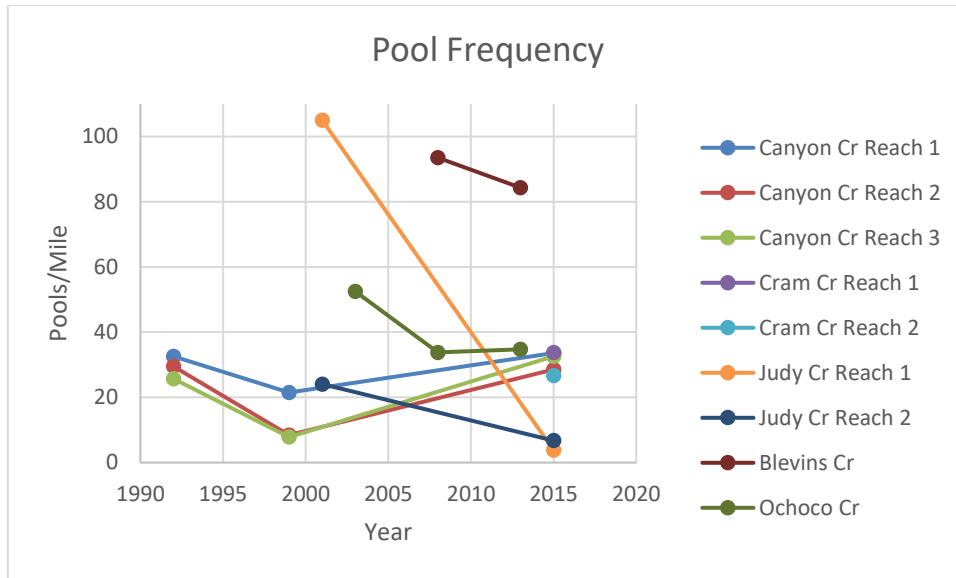


Figure 32: Pool frequency for selected stream systems within the Territory.

Stream Temperature

Temperature

Only a portion of the identified streams within the Territory have been targeted for long-term temperature monitoring; however, the streams where long term monitoring exist are the systems that have historically exhibited perennial flows. In general, most streams located within the Territory have exhibited a decreasing trend in stream temperature from measurements taken during the early 1990s. In contrast, measurements from Blevins and Duncan Creeks have highlighted an increasing trend in stream temperatures though these average maximum values have not exceeded RMO thresholds for adult holding water habitat.

Some of the streams that exhibit a decreasing trend in stream temperature continue to exceed the RMO threshold for adult holding water habitat of 59 degrees F. Ochoco Creek, Canyon Creek, and Howard Creek are currently 303d listed for water temperature.

Shade

Due to the forested nature of the territory, it was assumed that 80% of shaded surface was the minimum standard for all stream systems. Observations from data collected from the early 1990s through present indicate that most of the streams within the Territory were not meeting management objectives of 80% shaded surface or greater, though there is a trend of increasing shade for many of these systems. Much of the riparian hardwood vegetation contributing to an increasing shade trend appears to be a maturing Mountain/Thinleaf Alder component that has been observed in recent habitat assessments and field visits. Many species of Alder are known to colonize areas that experience infrequent but intense disturbance as well as repeatedly disturbed riparian areas (Harrington et al., 1994) and this supports the observation of increasing shaded stream surfaces even though other RMOs are not being met in many of the stream areas within the Territory. Recent data collected in 2015 and 2016 from Douthit Creek, Cram Creek (Reach 1), and Canyon Creek (Reaches 2&3) show LRMP objectives for shade are still not being met.

Riparian Condition

Poor riparian vegetation conditions across the Ochoco National Forest have resulted from historic grazing and logging practices, road building and channel incision which caused a lowering of local water tables in the riparian zone. Riparian woody species (long rooted species) bind the soil together and create a stable

streambank. The woody species also create a shaded climate for fish, frogs and insects that are fish and frog food. Woody species provide hiding cover from predators of Redband trout and Columbia Spotted Frogs. Data collection from 2015 PFC surveys highlight all of Blevins Creek as “Functional At Risk-No Apparent Trend.” Most of Cram Creek was identified as “Functional At Risk-No Apparent Trend”; however, Reach 1 was identified as “Functional At Risk-Downward Trend” and on the verge of being non-functional. Reach 6 of Cram Creek was identified as “Functional At Risk-Downward Trend” with specific notes regarding 10 active headcuts and 22 wild horses using the area at the time of the survey. PFC survey data from Judy Creek in 2015 highlighted the uppermost Reach (5) as properly functioning; however, Reach 3 was identified as “Functional At Risk-Downward Trend” and Reach 4 identified as “Non-Functional” with evidence of recent erosion and sedimentation.

The Watershed Condition Framework assessment consisted of 12 indicators with 24 total attributes (the indicator value is an average of its corresponding attribute values). Aquatics Report Appendix A, Tables 1-4 shows how each of these indicators/attributes rated out for the four subwatersheds within the BST proposed action area. Each attribute had its own set of criteria for rating. The overall ratings for the Territory came out as ‘fair/functioning at risk’ for the four subwatersheds (see Aquatics Report Appendix 1, Tables 1-4). Those common attributes for riparian areas for the four subwatersheds within the Territory that received a rating less than ‘good’ are:

- Riparian/Wetland Vegetation- rated out either “fair” or “poor” or
- Aquatic Habitat- rated out either “fair” or “poor”

Springs

There are a total of 25 identified springs located in the Territory. There are 13 identified unnamed springs along with Crooked Tree, Chuckwagon, Davis, Douthit, Hedgepath, Judy, Kyle, Mary’s Trough, Monument, O’Neil, Scissors and Winter Springs. There is no established monitoring schedule for these springs; however, some of them have been targeted for Groundwater Dependent Ecosystem (GDE) Level I Inventory surveys in the past and recent surveys of many of these springs have occurred in 2019. Year-round use by wild horse numbers in excess of the established AML appears to be contributing to the degraded conditions of several springs and seeps within the Territory. An October 2015 GDE survey conducted on an unnamed spring East of Winter Spring within the Territory highlighted detrimental effects from ungulate grazing to include what appeared to be frequent horse utilization given the number and concentration of horse tracks in the immediate spring area. Soil alteration identified during the survey included compaction, displacement, erosion, pedestals and slumping. The vegetation composition and condition were identified as not meeting management indicators as well as herbivory adversely affecting the site. These conditions are similar to what has been observed at Douthit and an unnamed spring at Cram Creek and have received frequent visits from District specialists due to the heavy resource damage that has been observed in recent years. These areas exhibit bare soil and alteration from trampling in excess of 70 percent, residual stubble heights of less than 2 inches at the end of the grazing season, denuded vegetation, and the presence of annuals and other undesirable plants.

Sediment/Turbidity

Actual direct sediment turbidity monitoring is not a component of standard habitat assessment surveys currently being used by the agency; however, percent fines obtained from pebble count data and percent stable banks is used as a surrogate for sediment and turbidity for smaller particle sizes. Data for estimating sediment conditions are not available for all the streams within the BST. Existing data from the early 1990s and 2000s indicate that percent fines were generally considered as fair throughout the BST with Duncan Creek and Canyon Creek identified as poor at the time. Recent data from 2015 and 2016 indicate poor ratings in Cram Creek and Judy Creek and improving conditions in Canyon Creek rated as good. Existing data from the early 1990s and 2000s indicate that the majority of the streams in the BST exhibited very stable banks, above 90%; however, recent data indicates an overall downward trend in bank stability in Cram

Creek, Canyon Creek (Reaches 1 & 3), Douthit Creek, and Judy Creek. It should be noted that frequent wild horse utilization has been observed in each of these identified systems.

Climate Change Vulnerability Assessment

In 2019, the US Forest Service published the “Climate Change Vulnerability and Adaptation in South-Central Oregon” assessment (General Technical Report PNW-GTR0974). The document assesses the vulnerability of natural resources to climate change and developed adaptation options that minimize the impacts of climate change and facilitate transition of diverse ecosystems to a warmer climate.

In general, the vulnerability assessment shows that the effects of climate change on hydrology in south-central Oregon will be highly significant. Decreased snowpack and earlier snowmelt will shift the timing and magnitude of streamflow; peak flows will be higher, and summer low flows will be lower. Projected changes in climate and hydrology will have far-reaching effects on aquatic and terrestrial ecosystems, especially as frequency of extreme climate events (drought, low snowpack) and ecological disturbances (flooding, wildfire, insect outbreaks) increase.

In the territory, it is predicted that the largest impacts from climate change to hydrology and aquatic species will be in the form of increases to peak flows, warmer mean August stream temperatures, and decreases in snow water equivalent and snow residence times. For example, the eastern side of the territory in the headwaters of the North Fork Crooked River are expected to experience a 20-30% increase in peak flows by 2080, and the rest of the territory is anticipated to see at least a 10-20% increase in that time period. Summer flows are expected to be lower by 2080, with a 20-30% reduction in Upper Ochoco Creek and the headwaters of the North Fork Crooked River. Mean August stream temperatures are expected to also increase by at least 3°C between historic temperatures and 2080. In terms of snowpack, it is predicted there will be a snow-water equivalent percent decrease at the Ochoco Divide SNOTEL site of 90-99%, which is the closest SNOTEL site to the project area (which basically indicates there will be none, to very little snow at this site). It is predicted that there will be a 20-30 day decrease in snow residence time at this site, which likely corresponds closely to the territory due to elevation and proximity.

There are specific actions for minimizing the impacts of climate change to aquatic species and water resources that can apply within the territory. These include: increase the abundance of riparian vegetation along waterbodies, protect springs and other cold water source areas, and improve grazing management by reducing pressure on riparian areas by providing more upland forage.

Environmental Consequences

Three basic factors that have been considered for the environmental consequences are: the effects of horse hoof actions causing shear stress on stream banks (and subsequent disturbance causing sediment exposure and mobilization); horse hoof action through congregating in riparian areas and springs/seeps that cause soil compaction and subsequent reduction in the ability of surface water to percolate into the soils and be retained within the floodplains; and horse browsing on young riparian vegetation that has not reached a height to be able to withstand a certain amount of browsing by large ungulates. These factors can be considered to be common to all of the action alternatives given that horses will remain within the Territory, but the effects will vary in degree by alternative because of more or fewer horses. Analysis assumptions are that more horses will equate to increased bank instability through hoof action, increased soil compaction within the floodplains and around springs, and increased suppression of riparian hardwoods leading to less shade and increased stream temperatures.

Effects Common to All Alternatives

Gathers, such as bait trapping and helicopter assisted gathering, and off-territory management are management plan components included in all alternatives. These actions were analyzed and determined to have no effect to aquatic species, their habitat, and hydrology. Bait trap and gather locations occur in previously impacted sites such as dispersed campsites. The addition of bait trapping infrastructure and

horses for a short period of time will not have additional effects to aquatic species, their habitat, and hydrology because the effects have already been realized at these locations. Additionally, these actions only occur for a short period of time. Therefore, these actions were determined to have no effect and will not be discussed further in the Environmental Consequences section of this report.

Alternative 1 – No Action

Direct and Indirect Effects

Sensitive Species

Redband trout and Columbia spotted frog are vulnerable to direct effects from wild horses. Research suggests preference of feral horses for riparian areas during summer months with the potential for reduction in plant species richness, height, and cover and for alteration of plant community composition (Ganskopp and Vavra, 1986; Crane et al., 1997; Beever and Brussard, 2000). Redband trout and Columbia spotted frogs breed around the same time period from early March to June. Horses can congregate in areas such as wet meadows, riparian areas and streams where Redband trout and Columbia spotted frogs breed and eggs incubate. There is a risk of direct trampling and destruction of eggs. Indirectly, sensitive species habitat is expected to improve as the AML is reduced to 55-65 horses through improvements to width to depth ratios, entrenchment ratios, water temperature/shade and sediment/turbidity. These improvements will increase growth and survival, reproduction rates, and decrease stress in sensitive species. However, until an AML of 55-65 is reached, degradation of habitat that can lead to reduction in suitable habitat through increased width to depth and entrenchment ratios, increased stream temperatures and higher sedimentation is expected. The risk would be reduced as the AML range of 55-65 horses is reached, but lack of current management tools and techniques since 2011 have not enabled sustainable management of the herd.

Sensitive Species Habitat

Too many horses over a small area have been shown to have a negative effect on stream habitat in terms of width to depth and entrenchment ratios due to bank trampling and continual browsing of riparian vegetation that can lead to bank instability that widens streams over time. This leads to wider, shallower streams that are not connected to their floodplain and an overall decrease in pool frequency. As the number of horses decreases back down to an AML of 55-65 from the estimated 135, the effects of wild horse use are expected to be reduced and stream form and function is expected to improve throughout the territory. Fewer horses would mean less impacts to streambank alteration that results in streams downcutting, disconnection from floodplains and channel widening and loss of depth. Improvements in width/depth and entrenchment ratios will ultimately lead towards improved pool frequency.

Stream Temperature

Too many horses over a small area have been shown to have a negative effect on stream temperature by reducing stream shade through the repeated browsing of hardwood vegetation, which results in increased instream temperatures, increasing the potential for thermal stress on Redband trout, Columbia spotted frogs, and other aquatic biota. As the number of horses decreases back to an AML of 55-65 from the estimated 135, the negative effects to stream temperature, shade, and aquatic biota should lessen through the Territory. Fewer horses would result in less browse on hardwood vegetation that is important for shading and cooler temperatures on streams in the Territory, benefitting Redband trout, Columbia spotted frogs, and other aquatic biota.

Riparian Condition, Including Seeps and Springs

Too many horses over a small area have been shown to have a negative effect on riparian areas, wet meadows, seeps, springs and streams due to streambank trampling and year-round utilization of riparian vegetation. Unlike domestic livestock, wild horse grazing is difficult to manage on a rotational or deferred basis due to difficulties associated with moving horses, resulting in continuous or near-continuous use of rangeland plant communities (Boyd et al. 2017). Strong decreases in shrub populations with unrestricted

horse grazing have been previously reported for spring-associated plant communities in Nevada (Beever and Brussard, 2000), and Davies et al. (2014) found decreased sagebrush density in horse-grazed uplands adjacent to riparian areas. Boyd et al. (2017) found that in their study site, which was grazed by horses throughout the year with no fencing to restrict access, horse grazing may be limiting vertical (hardwood) structure of riparian habitats at larger scales. Additionally, Kaweck et al. (2018) found that horses had a greater effect on riparian attributes such as stubble height, streambank disturbance and herbaceous biomass than cattle did in the same area. The larger effect of horses may have been caused by their greater individual forage consumption, which has a subsequently greater impact on vegetation (Kaweck et al. 2018).

As the number of horses decreases back down to an AML of 55-65 from the estimated 135, the effects to riparian vegetation condition will decrease. Fewer horses would mean less utilization of riparian vegetation and trampling of wet meadows, seeps and springs.

Sediment/Turbidity

Too many horses over a small area have been shown to have a negative effect on sediment and turbidity in streams in the Territory due to streambank trampling and continual browsing of hardwood vegetation that causes bank instability that contributes excessive sediment. As the number of horses decrease back to an AML of 55-65 from the estimated 135, the effects to sediment/turbidity (including bank stability) should improve throughout the Territory. Fewer horses would mean less impacts to streambank alteration/unstable banks producing less sediment.

The risk of sediment deposition on eggs of Redband trout and Columbia spotted frog would decrease as horse numbers reach the AML of 55-65. Again, lack of current management tools and techniques since 2011 have not enabled sustainable management of the herd, therefore resulting in double to triple the current AML, attributing to the degradation of riparian and moist meadow habitat in the Territory.

Conclusion

Under Alternative 1, streams, riparian areas and wetland/wet meadows would continue to see similar impacts as the existing condition in the mid- to long-term (estimated in 10 years but is dependent on funding) until horse numbers reach the AML range of 55-65. Once the AML is reached with the limited tools available under this alternative for proper future management of the herd, then habitat for Redband trout and Columbia spotted frog may see a reduction in effects from horses and conditions are expected to improve over time.

Alternative 1 Cumulative Effects

The cumulative effects boundary includes the four subwatersheds that overlap with the Territory (see Figure 31). All of the activities listed in Table B-1 in Appendix B of the Aquatics Report were considered for the cumulative effects on hydrology, aquatics species and their habitat. Past activities are considered in the description of the existing condition.

In general, beneficial effects from hardwood restoration, stream stabilization/headcut repair and reduction in the road system through travel management and project implementation will benefit riparian areas, streams, wet meadows, and aquatic species habitat in the Territory in localized areas. Some projects will have short-term (defined as less than 1 year) effects to sediment, such as the Ochoco Summit and Walton Lake projects, but long-term will either have no or beneficial effects. Active management of grazing and range improvements in surrounding areas will also minimize effects to bank stability and riparian condition.

Considering all past, present and reasonably foreseeable actions, along with Alternative 1, aquatic habitat, stream form and function, and riparian and wet meadow condition would continue on the same trend until the AML reaches 55-65. Once the AML reaches 55-65, we anticipate that these attributes would begin on an improving trajectory long-term (10 years, but dependent on funding) with the reduction of horses. As discussed in direct and indirect effects, lack of current management tools and techniques since 2011 have not enabled sustainable management of the herd, therefore resulting in double to triple the current AML, attributing to the degradation of riparian and moist meadow habitat in the Territory. For example, Figure 33

shows Douthit Spring in the Territory in September of 2018, an area with documented heavy horse utilization. Impacts at Douthit Spring would continue to persist as shown in the photos. Thus, there will continue to be negative effects to riparian condition, bank stability, sedimentation, stream temperatures and aquatic habitat/channel morphology. Once AML is reached (estimated at 10 years but is dependent on funding) there would be fewer horses congregating at this particular spring though effects would still be present as this is a very productive water source during the driest of summers and consistently selected by horses.



Figure 33: Conditions at Douthit Springs and Douthit Creek in September of 2018.

Determination for Redband Trout and Columbia Spotted Frogs

Based on the above activities that are contributing to cumulative effects, Alternative 1 will have a negative effect on channel morphology, aquatic habitat, stream temperature, riparian condition and sediment/turbidity until the AML of 55-65 is reached. At that point, trends should begin to improve with less horses; however, some attributes such as channel morphology and aquatic habitat recovery will occur over a period greater than 10 years, and may require active restoration at some point in the future to improve conditions in order to realize the ecological benefits sooner. The rate of recovery will be slow, as the reduction of wild horse numbers is expected to be long-term with the tools available in Alternative 1 with only the ability to capture and remove. The determination for both species for Alternative 1 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** in the short- to mid-term until the proposed AML is reached, but would have a **Beneficial Impact (BI)** in the long-term (10 years, but is dependent on funding) as this alternative reduces effects to riparian condition, sediment/turbidity, stream temperature and channel morphology with the reduction in horses. In some instances, channel morphology and instream aquatic habitat may never fully recover without active

restoration, but there will be improvements overall as the number of horses are reduced to AML in Alternative 1.

Consistency with Forest Plan Direction and Other Laws/Regulations

Alternative 1 would increase the chance of obtaining forest plan goals where they are impacting riparian areas and streams as there would be fewer horses in the Territory. Long-term, it would be consistent with the water goals and maintaining cutbank (unstable bank) levels to below 20 percent and maintaining 80 percent shade or 100 percent of potential shade as outlined in the LRMP given that fewer horses would decrease the amount of bank alteration in the form of hoof shear and would decrease the amount of utilization of riparian vegetation.

A review of the standards and guidelines provided in INFISH found that activities in the Big Summit Herd Management Plan are within INFISH requirement and direction long-term when the AML of 55-65 is reached, even though RMOs are currently not being met in the Territory.

GM-4 - Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

The four RMOs affected by wild horses in the Big Summit Herd Management Area are pool frequency, water temperature, bank stability and width/depth ratios. Currently, RMOs are not being met in many streams in the Territory. Legacy impacts such as road construction, timber harvest, historic grazing and direct stream manipulation have, in part, caused degradation of RMOs in the Territory. Horses are also having an effect on these RMO attributes through grazing and browse in riparian areas and bank trampling and trailing, especially in areas where frequent use has been observed. A decrease in the number of horses down to an AML of 55-65 will not prevent attainment of RMOs or adversely affect inland native fish because there will be less bank trampling, trailing in riparian areas, and browse of riparian vegetation that have a negative impact on the four RMOs discussed above. Again, lack of current management tools and techniques since 2011 have not enabled sustainable management of the herd, resulting in double to triple the current AML, so it is expected that reaching the AML will be very long-term. Thus, the improvement in RMOs under Alternative 1 is expected to take a long amount of time (over 10 years, and is contingent on funding levels).

Alternative 2

Direct and Indirect Effects

Sensitive Species

As discussed under Alternative 1, Redband trout and Columbia spotted frog are vulnerable to direct effects from wild horses. Redband trout and Columbia spotted frogs breed around the same time period from early March to June. Horses congregate in areas such as wet meadows, riparian areas and streams where Redband trout and Columbia spotted frogs breed and eggs incubate. There is a risk of direct trampling and destruction of eggs under Alternative 2. Indirectly, sensitive species habitat will improve as the AML is reduced to 12-57 horses through improvements to width to depth ratios, entrenchment ratios, water temperature/shade and sediment/turbidity. These improvements will improve growth and survival, reproduction rates, and decrease stress in sensitive species. The risk of direct effects to incubating eggs and indirect effects to instream habitat and water quality is the smallest under Alternative 2 due to the least number of horses on the landscape and the increased availability of management tools to reduce to the AML at the quickest rate.

Sensitive Species Habitat

Too many horses over a small area have been shown to have a negative effect on stream habitat in terms of width to depth and entrenchment ratios due to bank trampling and year-round utilization of riparian vegetation that can lead to bank instability that widens streams over time. This leads to wider, shallower streams that are not connected to their floodplain. As the number of horses decreases down to an AML of

12-57 from the estimated 135, the effects are expected to be reduced and stream form and function is expected to improve throughout the territory. These effects will still be present with a decreased AML; however, they will be on a smaller scale and with less intensity overall. Fewer horses would mean less impacts to streambank alteration that results in streams downcutting, disconnection from floodplains and channel widening and loss of depth. Improvements in width/depth and entrenchment ratios will ultimately lead towards improved pool frequency. The rate of recovery would be faster than Alternative 1 because Alternative 2 allows for more management tools to reduce to the AML at the quickest rate and thus, a lower number of horses would result in a greater reduction of negative effects.

Stream Temperature

Too many horses over a small area have been shown to have a negative effect on stream shade through the repeated browsing of hardwood vegetation and leads to an increase in stream temperatures. As the number of horses decreases down to an AML of 12-57 from the estimated 135, stream temperature and shade should improve throughout the Territory. Fewer horses would mean less browse on hardwood vegetation that is important for shading streams in the Territory. The rate of recovery would be faster than Alternative 1 because Alternative 2 allows more management tools to reduce the AML at the quickest rate. With a lower number of horses there would be a greater reduction of negative effects.

Riparian Condition, Including Seeps and Springs

Too many horses over a small area have been shown to have a negative effect on riparian areas, springs, seeps, wet meadows and streams (see discussion under Alternative 1). The proposed AML in Alternative 2 was established in part from consideration of the poor riparian conditions in wild horse winter range. A decrease in utilization will have a direct benefit to riparian condition in the project area. As the number of horses decreases to an AML range of 12-57, effects to riparian vegetation condition will be reduced and conditions will improve throughout the Territory. These effects will still be present with a decreased AML; however, they will be on a smaller scale and with less intensity overall. This would be evident over time as herbaceous and shrubby understory plants, meadow habitat and riparian vegetation would be expected to receive less trampling and pressure from year-round grazing, and the presence of horses would be expected to decrease significantly from existing levels. The rate of recovery would be faster than Alternative 1 because Alternative 2 allows for more management tools to reduce the AML at the quickest rate. With a lower number of horses there would be a greater reduction of negative effects. It is estimated that Alternative 2 will take 5 years to reach AML but is also dependent on funding. Based on this estimated, it may take 5 years for riparian areas to recover after reaching AML.

As the number of horses decrease to an AML of 12-57 from the estimated 135, the effects to riparian vegetation condition will decrease. Fewer horses would mean less utilization of riparian vegetation and trampling of wet meadows, seeps and springs.

Sediment/Turbidity

Too many horses over a small area have been shown to have a negative effect on sediment and turbidity in streams in the Territory due to bank trampling and repeated browsing of hardwood vegetation that causes bank instability that contributes excessive sediment. As the number of horses decrease to an AML of 12-57 from the estimated 135, effects will be reduced throughout the Territory. Fewer horses would mean less impacts to streambank alteration/unstable banks producing less sediment. The risk of sediment deposition on eggs of Redband trout and Columbia spotted frog would decrease as the AML of 12-57 is reached. The rate of recovery would be faster than Alternative 1 because Alternative 2 allows for more management tools to reduce the AML at the quickest rate and thus results in a greater reduction of negative effects. With a lower number of horses there would be a greater reduction of negative effects.

Conclusion

Under Alternative 2, streams, riparian areas, springs, seeps and wetland/wet meadows would continue to see similar impacts as the existing condition in the short-term until horse numbers reach the AML range of 12-57 (5 years but is dependent on funding levels). Once the AML is reached, then habitat for Redband trout and Columbia spotted frog may see a reduction in effects from horses and conditions are expected to improve over time. Herd management tools proposed under Alternative 2 will allow for the quickest reduction in herd size, a lower AML, which equates to a greater reduction of negative effects, and will promote faster recovery of heavily impacted riparian areas (such as those seen in Figure 33 in Douthit Springs).

Alternative 2 Cumulative Effects

The cumulative effects boundary includes the four subwatersheds that overlap with the Big Summit Herd Management Area (Territory) (see Figure 30). All of the activities listed in Table B-1 in Appendix B of the Aquatics Report were considered for the cumulative effects on hydrology, aquatics species and their habitat.

In general, beneficial effects from hardwood restoration, stream stabilization/headcut repair and reduction in the road system through travel management and project implementation will benefit riparian areas, streams, wet meadows and aquatic species habitat in the Territory in localized areas. Some projects will have short-term (less than 1 year) effects to sediment, such as the Ochoco Summit and Walton Lake projects, but long-term will either have no or beneficial effects. Active management of grazing and range improvements in surrounding areas will also minimize effects to bank stability and riparian condition.

Considering all past, present and reasonably foreseeable actions, along with Alternative 2, aquatic habitat, stream form and function, and riparian and wet meadow condition would continue on the same trend until the AML reaches 12-57. Once the AML reaches 12-57, we anticipate that these attributes would begin on an improving trajectory long-term (5 years but is dependent on funding) with the reduction of horses. Herd management tools proposed under Alternative 2 with the lower AML will allow for the quickest reduction in herd size, which equates to greater reduction in negative effects and in turn will promote faster recovery of heavily impacted riparian areas. The rate of recovery to channel morphology, aquatic habitat, stream temperature, riparian condition and sediment/turbidity will be the fastest under Alternative 2.

Determination for Redband Trout and Columbia Spotted Frogs

As horse numbers are reduced and approach the AML of 12-57, negative effects from horse use will correspondingly decrease until riparian conditions begin to improve. At that point, trends should begin to improve at the fastest rate with less horses under Alternative 2; however, some attributes such as channel morphology and aquatic habitat recovery will be very long-term, and may require active restoration at some point in the future to restore within the range of historic variability. The rate of recovery will be faster than Alternative 1 due to the lower AML and increased options in herd management available under Alternative 2. The determination for both species for alternative 2 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or trend toward federal listing (MIIH)** in the short-term (5 years, but is dependent on funding) until the AML is reduced to 12-57 horses, but would have a **Beneficial Impact** mid-to long-term as this alternative reduces effects to riparian condition, sediment/turbidity, stream temperature and channel morphology with the reduction in horses. In some instances, channel morphology and instream aquatic habitat may never fully recover without active restoration, but there will be improvements overall as the number of horses are reduced to AML in Alternative 2. Alternative 2 would have the fastest recovery to Redband trout and Columbia spotted frog due to the lower AML and availability of additional management actions to reduce herd size at the fastest rate.

Consistency with Forest Plan Direction and Other Laws/Regulations

Alternative 2 would be consistent with the Ochoco National Forest Plan in the mid- to long-term when the AML of 12-57 is reached. It would be consistent with the water goals and maintaining cutbank (unstable bank) levels to below 20 percent and maintaining 80 percent shade or 100 percent of potential shade as outlined in the LRMP given that fewer horses would decrease the amount of bank alteration in the form of hoof shear and would decrease the amount of browsing on riparian vegetation.

A review of the standards and guidelines provided in INFISH found that activities in the Big Summit Herd Management (Territorial) Plan are within INFISH requirement and direction when the AML of 12-57 is reached.

GM-4 - Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

The four RMOs affected by wild horses in the Big Summit Herd Management Area are pool frequency, water temperature, bank stability and width/depth ratios. Currently, RMOs are not being met in many streams in the Territory. Legacy impacts such as road construction, timber harvest, historic grazing and direct stream manipulation have, in part, caused degradation of RMOs in the Territory. Horses are also having a negative effect on these RMO attributes through grazing and utilization of riparian areas and bank trampling and trailing. A decrease in the number of horses down to an AML of 12-57 is not expected to retard or prevent attainment of RMOs or adversely affect inland native fish because there will be less bank trampling, trailing in riparian areas, and utilization of riparian vegetation that have a negative impact on the four RMOs discussed above. This alternative will take the shortest amount of time for recovery of RMOs due to reduced AML and additional management actions available to reduce herd size at the fastest rate.

Alternative 3

Direct and Indirect Effects

Sensitive Species

Redband trout and Columbia spotted frog are vulnerable to direct effects from wild horses. Redband trout and Columbia spotted frogs breed around the same time period from early March to June. Horses can congregate in areas such as wet meadows, riparian areas and streams where Redband trout and Columbia spotted frogs breed and eggs incubate. There is a risk of direct trampling and destruction of eggs. Indirectly, sensitive species habitat is expected to continue to degrade through continued impacts to width to depth ratios, entrenchment ratios, water temperature/shade and sediment/turbidity. These impacts will continue to effect growth and survival, reproduction rates, and increase stress in sensitive species. The risk of direct trampling and destruction of eggs and indirect effects to aquatic habitat and water quality is the highest under Alternative 3 because this alternative allows for the highest number of horses in the Territory; therefore, the highest corresponding amount of potential degradation to eggs.

Sensitive Species Habitat

Too many horses over a small area have been shown to have a negative effect on stream habitat in terms of width to depth and entrenchment ratios due to bank trampling and year-round utilization of riparian vegetation that can lead to bank instability that widens streams over time. This leads to wider, shallower streams that are not connected to their floodplain. As the number of horses increase to an AML of 150-200 from the estimated 135, the effects will increase, and conditions will decline in the Territory. More horses would mean more impact to streambank alteration which results in stream downcutting, disconnection from the floodplain and stream channel widening and corresponding reduction in overall stream depth. Degradation in stable width/depth and entrenchment ratios will ultimately lead towards decreased pool frequency.

Stream Temperature

Too many horses over a small area have been shown to have a negative effect on stream shade through the repeated browsing of hardwood vegetation and leads to an increase in stream temperatures. As the number of horses increase to an AML of 150-200 from the estimated 135, the effects will increase and conditions will degrade throughout the Territory. More horses would mean more browse on hardwood vegetation that is important for shading of streams in the Territory.

Riparian Condition, Including Seeps and Springs

Too many horses over a small area have been shown to have a negative effect on riparian areas, wet meadows and streams (see discussion under Alternative 1). Alternative 3 would have the most detrimental effects to riparian vegetation condition, bank stability (and in turn sediment production), stream form and function, aquatic habitat and stream temperatures in the Territory. The risk of sediment deposition on eggs of Redband trout and Columbia spotted frog would be the highest as compared to Alternatives 1 and 2. Where occurring, the rate of recovery of many of the streams, riparian areas and wet meadows in the Territory would be either slowed or eliminated with the AML of 150-200 horses. In some cases, areas may continue to degrade with a negative rate of recovery. For example, Cram Creek on the east side of the territory is at risk of continued degradation with an increased number of horses (Figure 34).



Figure 34: Perennial spring in the vicinity of Cram Creek that has documented heavy horse utilization.

Sediment/Turbidity

Too many horses over a small area have been shown to have a negative effect on sediment and turbidity in streams in the Territory due to bank trampling and repeated browsing of hardwood vegetation that causes bank instability that contributes excessive sediment. As the number of horses increase to an AML of 150-200 from the estimated 135, the effects will increase, and the conditions will continue to degrade throughout the Territory. More horses would be expected to result in more streambank alteration/unstable banks producing more sediment. The risk of sediment deposition on eggs of Redband trout and Columbia spotted frog would increase as the AML reaches 150-200.

Alternative 3 Cumulative Effects

The cumulative effects boundary includes the four subwatersheds that overlap with the Big Summit Herd Management Area (Territory) (see Figure 31). All of the activities listed in Table B-1 in Appendix B of the Aquatics Report were considered for the cumulative effects on hydrology, aquatics species and their habitat.

In general, beneficial effects from hardwood restoration, stream stabilization/headcut repair and reduction in the road system through travel management and project implementation will benefit riparian areas, streams, wet meadows and aquatic species habitat in the Territory in localized areas. Some projects will have short-term (less than 1 year) effects to sediment, such as the Ochoco Summit and Walton Lake projects, but long-term will either have no or beneficial effects. Active management of grazing and range improvements in surrounding areas will also minimize effects to bank stability and riparian condition.

Considering all past, present and reasonably foreseeable actions, along with Alternative 3, aquatic habitat, stream form and function, and riparian and wet meadow condition would be expected to degrade within the Territory. These attributes would be on a declining trajectory long-term with the increase in AML. For example, conditions would be expected to be exacerbated at places like Douthit Spring and Creek, and Cram Creek as shown in Figure 33 and Figure 34.

Determination for Redband Trout and Columbia Spotted Frogs

Based on the above activities that are contributing to cumulative effects, Alternative 3 is expected to have a negative effect on channel morphology, aquatic habitat, stream temperature, riparian condition and sediment/turbidity. In some instances, the rate of recovery that is being seen in some areas in the territory will either be reduced or eliminated to a point where recovery is no longer occurring. The determination for both species for alternative 3 is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)**. This determination is based on approximately 4% of their habitat on the Ochoco National Forest is located within the Territory. Long-term, Alternative 3 is expected to have the greatest adverse impact to Redband trout and Columbia spotted frog, and over the long-term riparian, stream and wet meadow conditions would be expected to be degraded, reducing the availability of quality habitat for Redband trout and Columbia spotted frog.

Consistency with Forest Plan Direction and Other Laws/Regulations




















Alternative 3 would not be consistent with the Ochoco National Forest Plan. Long-term, it is expected that cutbank levels and shade would be reduced due to an increased number of horses. Thus, it is inconsistent with the water goals and maintaining cutbank levels to below 20 percent and maintaining 80 percent shade or 100 percent of potential shade as outlined in the LRMP.

A review of the standards and guidelines provided in INFISH found that activities in the Big Summit Herd Management (Territorial) Plan is not within INFISH requirement and direction long-term.

GM-4 - Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

The four RMOs affected by wild horses in the Territory are pool frequency, water temperature, bank stability and width/depth ratios (Table 35). Currently, RMOs are not being met in many streams in the Territory. Legacy impacts such as road construction, timber harvest, historic grazing and direct stream manipulation have, in part, caused degradation of RMOs in the Territory. Horses are also having an effect on these RMO attributes through grazing and browse in riparian areas and bank trampling and trailing. An increase in the number of horses would prevent attainment of RMOs and may adversely affect inland native fish through the reduction of high-quality habitat, including spawning habitat.

Table 35: Impacts to selected indicators (up arrow indicates an improving trend and down arrow indicates a downward/degrading trend)

Rate of change	Sensitive Species (Redband Trout & Columbia Spotted Frog)	Sensitive Species Habitat	Stream Temp (Max Ave Daily Temp F)	Riparian Condition	Sediment /Turbidity
5-10 years  					
>10 years  					
Alternative #1					
Alternative #2					
Alternative #3					

Aquatic Management Indicator Species (MIS) Viability Analysis

Fish species identified as management indicator species are listed in the FEIS for the Forest Plan. These species are rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*). In the past, these fish have been stocked by the Oregon Department of Fish and Wildlife. They are no longer stocked in the streams in the Territory but may naturally reproduce in many streams (Classes I and II). For purposes of this analysis, effects to Redband trout will act as a surrogate for MIS fish species. No further evaluation for brook trout will be discussed in this section.

Riparian ecosystems occur at the margins of standing and flowing water, including intermittent stream channels, ephemeral ponds, and wetlands. The aquatic MIS were selected to indicate healthy stream and riparian ecosystems across the landscape. Attributes of a healthy aquatic ecosystem includes: cold and clean water; clean channel substrates; stable streambanks; healthy streamside vegetation; complex channel habitat created by large wood, cobbles, boulders, streamside vegetation, and undercut banks; deep pools; and waterways free of barriers. Healthy riparian areas maintain adequate temperature regulation, nutrient cycles, natural erosion rates, and provide for instream wood recruitment.

The existing condition of Redband trout habitat and extent of Redband trout populations in the project area is displayed in the section of this report titled “Existing Condition”. Refer to this section of the report for more information on conditions for Redband trout in the project area.

Limiting factors and threats for Redband trout are similar throughout their range on the Ochoco National Forest and Crooked River National Grassland. The predominate threats are increases in stream temperature due to channel degradation due to riparian area management issues and population fragmentation from upstream passage issues mostly related to culverts at stream crossings.

Causal factors include legacy impacts from past heavy grazing, logging and road building in the 20th century. In most cases channels are currently recovering from these impacts, especially grazing and logging; however, road building issues that constricted floodplains continue to cause impacts to fish habitat. Road crossings on the Ochoco are being replaced on a yearly basis with over 60 culverts either removed or replaced in the last 16 years. This has increased the ability of Redband trout to move freely within and between watersheds.

There are no models developed to determine viability of the Redband trout based on habitat. However, based on the local science from Stuart et al. (2007) and the estimated habitats from the Inter-Columbia Basin Management Plan there appears to be appropriate habitat that is well distributed and available for Redband trout across the Ochoco National Forest. In conclusion, the viability assessment indicates that habitat of the

Redband trout is still available in adequate amounts, distribution, and quality to maintain Redband trout viability on the Ochoco National Forest and Crooked River National Grassland.

This project will have no effect on fragmentation because there is no road construction or other activities that would restrict free movement of Redband trout into other habitats. In terms of stream temperatures, Alternative 1 will improve long-term stream temperatures in the project area, but this is expected to be very long-term, as lack of current management tools and techniques since 2011 have not enabled sustainable management of the herd.

If the herd is reduced to 55-65, stream temperatures long-term could recover. Alternative 2 will lead to the fastest improvement in stream temperatures, but again, this is mid-to long-term recovery until the herd is reduced to the appropriate AML. Then the response of riparian hardwood vigor would take several years before benefits are realized. Alternative 3 would lead to a degradation in hardwood shade long-term with an increase in the number of horses in the territory. This is expected to increase stream temperatures in the territory and long-term could be detrimental to Redband trout within the project area. Because of the expansive nature of Redband trout on the Forest, their populations would remain viable under all alternatives, but Alternative 3 may reduce Redband trout populations in the Territory through increased stream temperatures that are uninhabitable.

Climate Change Effects

Based on the climate change vulnerability assessment, streams in the project area are expected to see increases in peak flows, warmer summer water temperatures, and reduced summer flows. Currently, too many horses over a relatively small area are having a negative impact on the resiliency of the landscape to climate change due to impacts on riparian areas, wet meadows, seeps, springs and streams (e.g. streambank trampling and year-round utilization of riparian vegetation). Alternative 1 will reduce the herd to 55-65 but is estimated to take 10 years to get down to an AML of 55-65, so until then, the resiliency of the territory to climate change will be adversely impacted. Alternative 2 proposes a smaller AML and will only take 5 years to achieve (depending on funding), so it is expected that the territory will become more resilient to climate change at a faster rate. Alternative 3 proposes a larger AML and is anticipated to have continual degradation of riparian areas, seeps, springs and streams due to horses. This alternative will continue to lead to a less resilient landscape in the face of climate change in the territory.

Botany

Introduction and Regulatory Framework

This Biological Evaluation (BE) discusses the existing condition and analyzes the effects of the proposed action and Alternatives on sensitive plants and noxious weeds within the Territory. This report outlines the steps of the Biological Evaluation conducted for plant species that are currently identified as sensitive by the Regional Forester of the Pacific Northwest Region (R6), collectively called Threatened Endangered and Sensitive (TES) species (USDA Forest Service R6 Sensitive Species List 2015), within the Territory, and provides the rationale for the determination of effects.

This BE analyzes effects to sensitive plant species that are documented or suspected to occur within the Territory. Furthermore, only those species which may possibly be directly, indirectly, or cumulatively affected by the proposed actions are considered. Species that are not suspected to occur within the analysis area, or are eliminated from consideration due to other factors, are not described and are not considered in the detailed effects analysis [as per 40 CFR 1500.4, 40 CFR 1500.1(b)]. However, information on these species is available at the district office of the Ochoco National Forest (OCH), upon request.

Sensitive plants are to be managed consistent with standards and guidelines to ensure population viability and prevent downward trends that would lead toward federal listing (FSM 2672.1, 1995). The desired future

condition for sensitive plant species analyzed in this report is to ultimately remove them from the US Fish & Wildlife Service Species of Concern List, and from the Regional Forester’s Sensitive Species List. Ensuring that the species are well distributed with viable, increasing populations within the OCH can contribute to this effort.

Analysis Methods

There are three steps in a plant biological evaluation which fulfill the requirements dictated by FSM (2672.4): pre-field review, field reconnaissance, and analysis of effects. A pre-field review is used to determine the probability that TES species or their respective habitats are located within or adjacent to the project area; to determine the extent and intensity of previous survey efforts; and determine the need and intensity of field surveys.

The following sources were consulted for the pre-field review:

- Regional Forester’s Sensitive Species List (July, 2015).
- Oregon Biodiversity Information Center ORBIC, Rare, Threatened and Endangered Species of Oregon (August, 2016).
- The Forest Service’s Geographic Information System (GIS) corporate database: Natural Resource Manager - Threatened, Endangered, and Sensitive Plant species (NRIS-TESP 2013), LiDAR, existing vegetation maps (Plant Association Group (PAG) and Potential Natural Vegetation (PNV) spatial data layers).
- Species Fact Sheets provided by the Interagency Special Status Sensitive Species Program (ISSSSP) website [<http://www.fs.fed.us/r6/sfpnw/issssp/>] of the Pacific Northwest Region.
- USFS personnel and District botany records.
- Reports on ISSSP-funded rare species projects on OCH; Conservation Assessments and Conservation Strategies on file at the OCH Supervisor’s Office.

Surveys/Field Reconnaissance of Affected Environment

After pre-field review was completed, field surveys and reconnaissance was performed by Ochoco NF botanists. The purpose of field reconnaissance is to conduct sensitive and rare plant surveys within the affected area; produce accurate sensitive plant habitat maps; and determine the extent and condition of any TES species populations that are encountered. Areas identified in the pre-field analysis as having potential TES habitat were the primary focus of the surveys. Intuitive controlled surveys were conducted according to standardized procedures. Surveys documented Peck’s mariposa lily (*Calochortus longebarbatus* var. *peckii*) within the project area (Table 36).

Documented Rare or Sensitive Species

Table 36: Rare or sensitive species documented within project area.

Plant name	Location	Status	Notes
<i>Calochortus longebarbatus</i> var. <i>peckii</i> (Peck’s mariposa lily)	T14S R20E Sections 2, 3, 11, 14 & 15	Sensitive	5 sites with 17 subpopulations

Conflict Determination (Effects) & Bounding

Determination effects for all sensitive species listed on the OCH are assessed below. Sensitive species are grouped by habitat types including: riparian areas which include moist meadows, riparian habitat conservation areas, seeps, springs, ground-water fed wetlands, and fen like habitat; juniper

woodland/sagebrush steppe and scabland habitat; upland forests; and other variable habitat. Effects to all species within the habitat groupings will be determined by assessing how each alternative affects the vegetation and functioning of habitat relative to historical and current respects.

Analysis of direct and indirect effects is bounded in space by the project area boundary. Being rooted in the ground, most direct and indirect effects to sensitive plants take place where project actions overlap with habitat or populations. That said, many sensitive plant species may be rare due to dispersal limitations or rare habitat and maintaining viable populations at the watershed level also helps contribute to viability across the range of the species. Cumulative effects analysis is bounded to the Territory, for the same reasons described above for the direct and indirect effects boundary. For this analysis, short-term impacts are defined as those effects lasting less than 5 years and long-term impacts are defined as those lasting more than 30 years as assumptions regarding trends may not be valid beyond that.

Affected Environment

Threatened, Endangered, and Sensitive Species

There are no known occurrences of federally listed threatened or endangered plants within the Territory. The OCH has no habitat recognized as essential for the listed or proposed plant species' recovery under the Endangered Species Act (ESA). There are currently 38 sensitive species on the Regional Forester's Sensitive Species List that are documented or suspected to occur on the OCH (Table 37). Each sensitive species listed in the table below was ranked with a probability of occurrence within the project area as HIGH, MODERATE, or LOW, based on occurrence records and habitat information. Species were ranked with a HIGH probability of occurrence if there was a documented population within the project area. Species determined to have a MODERATE probability of occurrence are those for which habitat is present and the species may occur on the OCH, but there are no documented occurrences in the analysis area. Species determined to have a LOW probability are those for which habitat is not present within the analysis area or are not suspected to occur in the area because the project is outside of the potential distribution and geographic range of the species.

Table 37: R6 Regional Forester's Sensitive Species List for the OCH (July 2015)

Species	Habitat	Probability of Occurrence	Rationale
<i>Achnatherum hendersonii</i> Henderson's needlegrass	Sagebrush scablands	MODERATE	Habitat Present
<i>Achnatherum wallowaensis</i> Wallowa needlegrass	Sagebrush scablands	MODERATE	Habitat Present
<i>Astragalus diaphanus var. diurnus</i> South fork john day milk-vetch	Dry barren slopes in gravelly soil over basalt, juniper woodland openings	MODERATE	Habitat Present
<i>Astragalus peckii</i> Peck's milkvetch	Sage/juniper/lodgepole pumice/coarse soils	LOW	No Habitat
<i>Astragalus tegetarioides</i> Bastard milkvetch	Juniper sagebrush steppe/open ponderosa pine	MODERATE	Habitat present
<i>Botrychium ascendens</i> Ascending moonwort	Wet meadows, springs, seeps	MODERATE	Habitat present
<i>Botrychium crenulatum</i> Crenulate moonwort	Wet meadows, springs, seeps	MODERATE	Habitat present
<i>Botrychium montanum</i> Mountain moonwort	Wet meadows, springs, seeps	MODERATE	Habitat present
<i>Botrychium paradoxum</i> twin-spike moonwort	Wet meadows, springs, seeps	MODERATE	Habitat present

<i>Calochortus longebarbatus</i> var. <i>peckii</i> Peck's mariposa lily	Vernally moist meadows, streambanks	HIGH	Plant present
<i>Carex diandra</i> Lesser panicled sedge	Sphagnum bog, lakeshores	MODERATE	Habitat present
<i>Carex lasiocarpa</i> var. <i>americana</i> Slender sedge	Very wet sedge meadows, along lakes/streams	MODERATE	Habitat present
<i>Carex retrorsa</i> Retorse sedge	Swamps, marsh, meadows, along lakes, streams	MODERATE	Habitat present
<i>Cheilanthes feei</i> Fee's lip fern	Basalt cliffs but occasionally limestone	LOW	No Habitat
<i>Cyperus lupulinus</i> ssp. <i>lupulinus</i> Great Plains flatsedge	Riparian edge but dry hackberry, wheatgrass	LOW	No habitat
<i>Elatine brachysperma</i> Short-seeded waterwort	Muddy shores, shallow pools	MODERATE	Habitat present
<i>Eleocharis bolanderi</i> Bolander's spikerush	Seasonally wet; low sage/Sandberg bluegrass in basalt	LOW	No Habitat
<i>Eremothera pygmaea</i> Dwarf evening-primrose	Sagebrush steppe, on gravel in steep talus, dry washes, banks, road cuts	MODERATE	Habitat Present
<i>Eriogonum cusickii</i> Cusick's buckwheat	Juniper/big sage and low sage scabland, dry soil over weathered basalt	MODERATE	Habitat Present
<i>Erythranthe inflatula</i> Disappearing monkeyflower	Gravelly or rocky sites, vernal mesic; Pinyon Juniper woodlands and low montane coniferous forests	MODERATE	Habitat present
<i>Heliotropium curassavicum</i> Salt heliotrope	Moist to dry, saline soils	LOW	No habitat
<i>Lipocarpa aristulata</i> Aristulate liptocarpa	Wet soil and mud, comprised of fine sand & silt, elevations up to 500ft	LOW	No Habitat
<i>Lomatium ochocense</i> Ochoco lomatium	Sagebrush scablands	MODERATE	Habitat Present
<i>Muhlenbergia minutissima</i> Annual dropseed	Sandy gravelly drainages, rocky slopes, and open sites, pinyon juniper woodlands, sagebrush scrub	MODERATE	Habitat present
<i>Penstemon peckii</i> Peck's penstemon	Ponderosa pine forests in dry volcanic soil, stream banks and disturbed areas	LOW	No Habitat
<i>Phemeranthus spinescens</i> spiny fameflower	Cliffs, ledges, and outcrops in basaltic soil up to 3600 feet, sagebrush scablands	LOW	No Habitat
<i>Potamogeton diversifolius</i> Water thread pondweed	Lakes, ponds, ditches, rivers, streams	MODERATE	Habitat present
<i>Pyrola dentata</i> Toothleaf pyrola	Mixed conifer forest and Pine woodlands, coarse sand or gravel near rocky outcrops	MODERATE	Habitat present
<i>Rorippa columbiae</i> Columbia yellowcress	Wet meadows, moist plains, riverbanks, streams	MODERATE	Habitat present

<i>Rotala ramosior</i> Lowland toothcup	Lakes, streams, irrigation ditches, sand and silt below high water, low elevations	MODERATE	Habitat present
<i>Salix wolfii</i> Bebb Wolf's willow	Riparian	MODERATE	Habitat present
<i>Thelypodium eucosmum</i> Arrow leaf thelypody	Dry slopes in vernal drainages	LOW	Outside doc. range
<i>Utricularia minor</i> Lesser bladderwort	Lowland and montane fens, sedge meadows	MODERATE	Habitat present
Bryophytes and lichens			
<i>Encalypta brevipes</i> Candle snuffer moss	Soil on ledges and in crevices on cliffs	LOW	No Habitat
<i>Entosthodon fascicularis</i> Banded cord moss	Seasonally wet seeps, along intermittent streams; sites < 3000 ft. elevation.	LOW	Suitable habitat types within project area, but elevations too low
<i>Schistidium cinclidodonteum</i> Schistidium moss	Wet/dry rocks or soil along intermittent streams; at elevations 5,000-11,000 ft.	LOW	Suitable habitat types within project area, but elevations too high
<i>Tortula mucronifolia</i> Mucronleaf tortula moss	Riparian <i>Populus</i> , montane <i>Abies</i>	MODERATE	Habitat present
<i>Texosporium sancti-jacobi</i> Woven spore lichen	Often old root clumps of Sandberg or scat	LOW	No habitat

Of the 38 species known or suspected to occur on the Ochoco National Forest, 25 occur or have suitable habitat within the Territory. These species are highlighted in blue and will be discussed further in the analysis. The other 13 species with a LOW probability of occurrence in the Territory will not be discussed further in the analysis since these species would not be affected by the proposed project. Likewise, there are no known occurrences of federally listed endangered or threatened plant species within the Territory and no habitat is present for listed species. Therefore, for all alternatives, no effect to proposed, endangered, or threatened plant species is expected. These species are not discussed further in the analysis.

Riparian Habitats

Existing Condition

Riparian habitats in the Territory include riparian habitat conservation areas, moist meadows, seeps, springs, ground-water fed wetlands, and fen like habitat. Riparian habitat is associated with 16 of the 25 sensitive plant species with potential habitat in the project area (Table 37). Compared with historic conditions, riparian habitat has declined in extent and suitability for many sensitive plant species due to the impacts described below.

Past management in the analysis area, including timber harvest, a century of historic livestock use, an increase in wild horse utilization, the lack of beavers in riparian systems, stream channeling, fire suppression, wildfires, and road construction, have resulted in areas of degraded riparian conditions, shifting and altering hydrologic regimes. Many stream channels have widened and incised, thus losing floodplain area and the

associated vegetation that depends on wet conditions. Stream banks have become exposed from the loss of soil holding root masses provided riparian hardwoods, sedges and rushes. As stream channel morphology has changed and degraded over time, loss of sensitive plant habitat is imminent with some habitat already being compromised.

Riparian plant communities in the project area have been altered by non-native plants and invasive weed populations, including exotic rhizomatous grasses such as smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*). Canada thistle (*Cirsium arvense*) is of concern because it readily establishes in riparian zones, and has the ability to form large patches of rhizomatous growth. Treatment and control options for these species are limited due to the rhizomatous growth form, proximity to water, and the large extent of infestations. The annual invasive grass, *Ventenata dubia*, is also present along some intermittent streams. Other invasive plants are present in the project area outside of riparian areas. These plants are discussed further in the Invasive Plants and Risk Assessment portion of this report.

Major streams within the Reservoir allotment were assessed in 2015 as to overall condition using the Proper Functioning Condition method. Fifteen reaches across the project area were subjected to PFC and resulted in the following: One reach was rated at Proper Functioning Condition; one reach was Functioning-At Risk with an upward trend; eight were rated at Functional-At Risk with no apparent trend; four reaches were rated at Functional-At Risk with a downward trend; and one reach was Nonfunctional.

Species Associated with Riparian Habitats

Moonwort or Grape Ferns

***Botrychium ascendens* W.H. Wagner** upward-lobed moonwort

Natural Heritage Program: G3/S2

ORBIC: List 1

R-6 Sensitive Species List

***Botrychium crenulatum* W.H. Wagner** crenulate grape-fern

Natural Heritage Program: G3/S2

ORBIC: List 1

R-6 Sensitive Species List

***Botrychium montanum* W.H. Wagner** mountain moonwort

Natural Heritage Program: G3/S2

ORBIC: List 2

R-6 Sensitive Species List

***Botrychium paradoxum* W.H. Wagner** two-spike moonwort

Natural Heritage Program: G3G4/S1

ORBIC: List 1

R-6 Sensitive Species List

Botrychium spp., are small primitive plants closely related to ferns. They are considered rare and have wide, scattered distributions that occur in small isolated populations (Ashlenslager & Potash 2007; Beatty et al 2003; Zika 1994). All four of these species are on the Regional Forester's Sensitive Species List (USDA Forest Service, July 2015) and have been documented on OCH. *B. ascendens*, *B. crenulatum*, and *B. paradoxum* are on the Oregon Biodiversity Information Center (ORBIC 2016) List 1, meaning these species are considered by the ORBIC to be threatened with extinction throughout their range. *B. montanum* is on the ORBIC List 2, meaning this species is considered by the ORBIC to be threatened with extirpation from the State of Oregon.

The four sensitive *Botrychium spp.* documented on the OCH occupy similar riparian habitats, and are discussed as one group. Forty-eight sites of *Botrychium* are documented in OCH TESP-IS (Threatened, Endangered, & Sensitive Plants –Invasive Species) database. All of these sites are on the eastern half of the forest and all, where elevations are reported, occur at elevations above 5000 feet. Many of the OCH

Botrychium sites appear to be wetted primarily by seasonal groundwater discharge. There are no documented *Botrychium* sites within the Territory; and the nearest *Botrychium* site is approximately 11.3 miles SE of the project area, at Porter Creek and the OCH westernmost site.

Most authorities maintain that *Botrychium spp.* are dependent on some level of disturbance, and the ensuing lack of competition from other plant species for reproduction. These disturbances can be natural, such as flooding or wildfire that occasionally create small openings for spores to become established, but can include clearcutting or road construction, though colonization often takes a decade or more (Zika 1994; Farrar 2006). Wild horses can directly impact *Botrychium spp.* sites primarily by grazing, trampling plants and gouging, displacing, or compacting soil. It has not been demonstrated that deciduous species of *Botrychium spp.* can withstand repeated defoliation by grazing. Wild horses and livestock can also indirectly affect plants by contributing to hydrological changes (stream down-cutting) that can damage habitat.

Maintaining suitable habitat is the key to continued viability. Along with excessive disturbance that directly damages populations and habitat, hydrological change is probably the most potentially damaging to *Botrychium* populations. While existing plants may have the capacity to survive droughty periods, establishment of new plants requires ample moisture. For this reason, effects to *Botrychium spp.* are related to the anticipated effects on riparian or groundwater discharge habitats.

***Calochortus longebarbatus* S. Watson var *peckii* Ownbey** Pecks Mariposa Lily

Natural Heritage Program: G4/S3

ORBIC: List 1

R-6 Sensitive Species List 1

Peck's mariposa lily is a restricted local endemic, known only from the Ochoco Mountains of central and eastern Oregon. Populations occur in Crook, Wheeler and Harney Counties. It is currently on the ORBIC 2016 List 1, meaning this taxon is considered by the ORBIC to be threatened with extinction throughout its range. It is also on the Regional Forester's Sensitive Species list. There are approximately 3404 acres of Peck's mariposa lily throughout its range, 40.8 acres of which occur in the Territory (about 1.0% of the global population). Peck's mariposa lily is a sterile triploid, which reproduces through asexual reproduction of bulblets that form in leaf axils and flower bracts (Fredricks 1989; Fiedler 1987). Moisture levels determine the level of flowering within the population and there is significant variation in phenology from year to year which makes inventory and monitoring of the species difficult (Fredricks 1989).

The primary habitat of this species is open meadows and partially shaded to open riparian edges along seasonal and perennial streams. Habitat for this taxon can be described as "transitional riparian" as this species occupies the edge of riparian habitat. The Conservation Strategy for *Calochortus longebarbatus* Wats. var. *peckii* Ownbey (Dewey 2011), describes the major threats to maintaining viable populations as follows: 1) alterations in local hydrology (roads, channel down-cutting, soil compaction), 2) non-native invasive plants, 3) fire suppression (accumulation of litter, expansion of adjacent forest communities), and 4) direct physical impacts (heavy equipment, slash and skidded logs, ATV's and trampling by livestock, wild horses, and native ungulates). Flash grazing or light grazing most likely reduces competition from surrounding vegetation and possibly simulates the early successional conditions favorable to this species. However, longer durations of wild horse and livestock grazing are more common on the OCH and may have significant negative impacts to the Peck's Mariposa Lily. The Conservation Strategy for *C. longebartus* var *peckii* (Dewey 2011) recommends maintaining or improving riparian habitats to address the habitat needs of this species, along with later-season grazing to protect plants from grazing and trampling. Unfortunately, this is not an option with management of wild horse grazing.

Sensitive Sedge Species (*Carex* sp.)

***Carex diandra* Schrank** lesser panicled sedge

Natural Heritage Program: G5/S1

ORBIC: List 2

R-6 Sensitive Species List

***Carex lasiocarpa* Ehrh. var. *americana* Fernald** slender sedge

Natural Heritage Program: G5/S2

ORBIC: List 2

R-6 Sensitive Species List

***Carex retrorsa* Schwein** retrorse sedge

Natural Heritage Program: G5/S1

ORBIC: List 2

R-6 Sensitive Species List

All three of the sedges listed above are sensitive species suspected of occurring on the OCH, may occur in the Territory, and have habitat that occurs in the Territory. These listed *Carex spp.* are all on the ORBIC list 2 (2016), species considered to be threatened with extirpation from the State of Oregon. These sedge species occupy moist to very wet environments and are found over a wide geographic range in Oregon.

Other Riparian Species

Elatine brachysperma Short-seeded waterwort

Natural Heritage Program: G5/S1

ORBIC: List 2

R-6 Sensitive Species List

Elatine brachysperma is a tiny, glabrous annual, growing submerged or exposed, that roots freely at the nodes and forms small mats. It is on the ORBIC (2016) list 2 and can be found in shallow waters, shores and mudflats of lakes and ponds in valleys. Habitat is present in the analysis area.

***Muhlenbergia minutissima* (Steud) Swallen** Annual dropseed

Natural Heritage Program: G5/S2

ORBIC: List 2

R-6 Sensitive Species List

Muhlenbergia minutissima is a small annual bunch grass that occurs throughout the western United States and into Mexico. It is on the ORBIC list 2 (2016) and grows in a variety of habitats, usually moist disturbed sites from 1,200-7,000 feet in elevation. Can be found in sandy gravelly drainages, rocky slopes, and open sites in pinyon juniper woodlands and sagebrush scrub. Habitat is present in the Territory.

***Potamogeton diversifolius* Raf.** waterthread pondweed

Natural Heritage Program: G5/S1

ORBIC: List 2

R-6 Sensitive Species List

Potamogeton diversifolius, also known as Rafinesque's pondweed, is on ORBIC List 2 (2016). It is a perennial aquatic forb found in most states in shallow ponds, marshes, and reservoirs in sage grassland or pine woodland communities. Habitat is present in the analysis area.

Rorippa columbiana Columbia cress

Natural Heritage Program G3/S3

ORBIC: List 1

R-6 Sensitive Species List

Rorippa columbiana, also known as Columbia cress, is on the ORBIC List 1 (2016). It is a perennial forb growing prostrate and can be found in moist to wet, sandy habitat types including playas and dry lakebeds. Habitat is present in the analysis area.

Rotala ramosior Lowland toothcup

Natural Heritage Program G5/S2

ORBIC: List 2
R-6 Sensitive Species List

Rotala ramosior, or Lowland toothcup, is on the ORBIC List 2 (2016), which includes species considered to be threatened with extirpation from the State of Oregon. It is an annual forb that can be found in sandy, muddy soil in water on the edge of ponds, lakes, and in depressions, wet soils, marshes, and ditches. Habitat is present in the Territory.

***Salix wolfii* Bebb** Wolf's willow
Natural Heritage Program G5/S2
ORBIC: List 2
R-6 Sensitive Species List

Salix wolfii, or Wolf's willow, is on ORBIC List 2 (2016). In Oregon, it has been documented in Wallowa, Harney and Klamath Counties, and has also been documented in Idaho, Nevada, and the Rocky Mountain states. It is primarily a high elevation species associated with sites that collect cold air (Brunsfeld and Johnson 1985). Habitat is present in the Territory.

***Tortula mucronifolia* Schwagr.** mucronleaf tortula moss
Natural Heritage Program: G5/S2
ORBIC List 2
R-6 Sensitive Species

Tortula mucronifolia, or mucronleaf tortula moss, is on ORBIC List 2 (2016) Habitat is present for this species in the analysis area. The closest known site is located on the Malheur National Forest. In Oregon it has been documented in Harney, Jackson, and Wheeler Counties, and throughout the Northern Hemisphere, Africa, and New Zealand. This moss is found on a variety of habitats, ranging from 5000-7000 feet. In Oregon, documented sites include vegetation types ranging from riparian aspen stands (*Populus tremuloides*) in a high elevation southeast Oregon site, to white fir *Abies concolor* in Southwest Oregon. It forms on small tufts of grass, or cushions on soil, tree roots, and sheltered ledges and crevices of rock outcrops and cliffs. Given the variety of vegetation types that can provide habitat for this species, habitat is present in the analysis area. The species fact sheet describes conservation considerations that include managing known sites and surveying for new sites until more information is known about this species in the northwest (Christy 2006). In 2005 and 2007, surveys were completed in selected, largely riparian habitats on OCH for sensitive lichen and moss species (Dewey 2006, 2008). Additional bryophyte surveys were conducted on Mt. Pisgah and on the Lookout Mountain District in 2013 and no *Tortula mucronifolia* was found. Largest threats include livestock and wild horse bedding and trampling as well as quarrying and road construction.

Utricularia minor Lesser bladderwort (flowering plant)
Natural Heritage Program: G5/S2
ORBIC: List 2
R-6 Sensitive Species

Utricularia minor, or lesser bladderwort is on the ORBIC list 2 (2016). It can be found in shallow standing water over peat in groundwater-rich fens. The nearest known site is located on the Deschutes National Forest. Habitat is present in the analysis area.

Environmental Consequences/Effect Determination for Species Associated with Riparian Habitats

Effects Common to All Alternatives-Direct and Indirect Effects

The effects of wild horse use on TES botanical species and habitats are generally the same for all Alternatives, however the difference between Alternatives would be the degree of the same impacts. The extent and magnitude of effects, rather than different kind of impacts is the rationale of the effects analysis.

The improvement of ecological conditions by removal of wild horses to an AML range of 12-57 horses is examined more thoroughly below and also in the range report. A qualitative comparison of Alternatives would deduce, that with an AML range of 12-57 horses under Alternative 2 the effects would be the lowest; an AML range of 55-65 horses under Alt.1 the effects would be moderate; and an AML range of 150-200 horses under Alternative 3 the effects would be the highest. Although the risk of losing sensitive riparian habitat and consequent declines in sensitive riparian plant populations is the greatest under Alternative 3 in the short and long term, it is not expected to result in trends toward federal listing for any sensitive species.

Proposed management actions that may have measures of change include the following: (amount of) year round grazing and browsing by wild horses; (amount of) year round congregating, trailing and hoof action by wild horses; wild horse herding and movement throughout the Territory; wild horses being removed through all gather methods including the use of bait traps; annual wild horse inventory; fertility control; off range horses; translocation of wild horses for genetic variability; and acts of mercy or euthanizing. The actions of the annual wild horse inventory, fertility control, off range horses, translocation of wild horses for genetic variability, and acts of mercy or euthanization have minimal to no effect on botanical resources in any habitat and will no longer be discussed. The other actions mentioned have measurable effects with many having similar effects from those actions. Other recurring management activities including sheep grazing, fire suppression, treatment of invasive plants using chemical, manual, or biological controls, and public recreational use would continue throughout the Territory.

Wild horse grazing has a two-fold effect on rare plants: 1) Direct physical impacts from plant consumption and trampling, and 2) Indirect ecological impacts through changes in habitat conditions, hydrology, habitat microclimate and selective grazing that changes species composition. Physical impacts result in loss of plant vigor, a decline in reproduction, and up-rooting (Stoddart et al. 1975). Year round grazing and browsing can be qualitatively evaluated between Alternatives, all of which may lead to displacement and/or damage to sensitive species; an increase in invasive plants; an increase in bare soil and erosion; and a decrease in native vegetation and recruitment related to the number of wild horses in the AML. Year-round exposure to wild horse grazing can result in changes in plant community structure and composition. The most apparent of those changes are related to plant community structural and ground cover attributes. Bare ground decreased dramatically with horse exclusion in association with a strong increase in ground cover of litter (Boyd et al 2017). Livestock grazing later in the season when sensitive plants are dormant can reduce these negative impacts (Dewey 2011); however, wild horses graze throughout the year and their movement is not managed the way sheep in the allotment are.

Wild horses congregating, trailing, and their hoof action may lead to burying or injuring sensitive plants; soil impacts including loss in soil productivity due to erosion, terracing, compaction, soil crust alteration, and an increase in bare soil; declining vegetation condition especially in riparian areas, seeps, and springs due to the fragility of the soils with persistent wild horse presence; and a potential to introduce and spread invasive plants. An increase in the amount of horses in the territory and horse herding, will provide less security for sensitive plant populations and habitat for long-term viability since understory vegetation conditions would be expected to deteriorate over the short to long term. There would be more exposed peat and subsequent loss in fens due to wild horse trampling and loss of peat forming species. Sensitive plants would be expected to recover slower with more grazing pressure, which would result in decreased population density and vigor, and in decreased reproductive capacity. Because wild horses and livestock often concentrate in riparian areas, they can indirectly contribute to the factors that result in hydrological changes by causing soil compaction and damaging stream banks and riparian vegetation in the long term. Stream down-cutting is of particular concern because it has resulted in lower water tables, which can result in the loss of suitable riparian habitat for sensitive species. Selectivity, diets, and utilization indicate any detrimental impacts from excessive numbers of wild horses would first be apparent in the streamside, bog/meadow, and secondarily in mountain sagebrush habitats. These habitats were preferentially selected by feral horses during the growing season, the most probable season of negative grazing impact (Crane et al 1997).

Gather methods for wild horse removal have effects of soil compaction and potential to introduce and spread invasive species as well, however, Project Design Criteria (PDC) will ensure known sensitive plants occurrences and habitat along with documented invasive plant locations are avoided which minimize effects.

Wild horses can increase risk of introduction and spread of non-native invasive plants that could displace sensitive riparian species in the short and long term. Non-native invasive plants can increase due to selection by wild horses. Spiny broadleaf species, such as Canada thistle (*Cirsium arvense*) tend to be avoided (Morishita 1999), favoring a shift in the dominant species within these communities (Callihan and Evans 1991). Trampling can also result in exposed soils that can increase potential for invasion by non-native invasive plants (Lacey et al. 1990; Richman 1998; Sheley et al. 1999b; DiTomaso 2000). Additional discussion of non-native invasive plants is included later in this report.

Major streams within the allotments were assessed in 2015 as to overall condition using Proper Functioning Condition (Weixelman and Cooper. 2009) and apparent trends indicate recovery in only one reach. A PFC summary is included in the aquatics report. Fifteen reaches across the project area were subjected to PFC including the following: One reach was rated at Proper Functioning Condition; one reach was Functioning-At Risk with an upward trend; eight were rated at Functional-At Risk with no apparent trend; four reaches were rated at Functional-At Risk with a downward trend; and one reach was Nonfunctional. An increase in the number of wild horses under Alternative 3 would increase the amount of effects on all reaches as well as decrease the rate and potentially reverse recovery where occurring, in turn having a potential detrimental effect to sensitive riparian plants and habitat. And conversely, a reduction in the number of horses with Alternatives 1 and 2 could allow conditions to improve over time. Adjusting livestock numbers, season of use, distribution, and resting a pasture or an allotment to allow for natural recovery of resource conditions when monitoring and periodic assessments indicate consistent noncompliance are common National BMPs for Water Quality Management on NFS Land (USDA 2012). These practices would allow recovery to occur to proper functioning condition and are utilized for sheep grazing management in the Territory but cannot be employed with wild horses.

Cumulative Effects Common to All Alternatives

Wild horses are one factor that can contribute to degraded riparian conditions, which in turn, affects rare species viability. Continued implementation of the Deschutes and Ochoco Travel Management plan and public firewood cutting, along with other proposed management projects would contribute to the cumulative effects as well. In the long-term, sensitive plant habitat resulting from better riparian conditions is expected from improved native plant composition with a decrease in the number of wild horses in the Territory and less grazing pressure under Alternative 2, compared to Alternatives 1 or 3.

Vegetation management treatments currently in the implementation phase, which have the potential to overlap in time and space with proposed actions, include non-commercial harvest, and prescribed burning. Activities proposed in the Howard Elliot Johnson and Canyon Fuels and Vegetation Management projects (i.e. thinning of dense forest stands within upland and riparian habitats, stream restoration, prescribed burning, hardwood enhancement, and road management) combine with actions proposed in the Territory to both improve and degrade habitat conditions for sensitive species in the short and long term. Removing understory trees mimics the low intensity, frequent fires that occurred before European settlement. Thinning helps keep the amount of over story shade low, reduces competition, and keeps plant communities in an early successional state, which is beneficial to upland rare species habitat. Pre-commercial thinning within Peck's mariposa lily habitat and prescribed burning increases sunlight to the forest floor and reduces competition. Detrimental effects include soil compaction and the creation of bare ground, which increases the risk of invasion by non-native invasive plants. Current timber harvest does not have direct effects to sensitive plant populations because populations are avoided by PDC. However, detrimental cumulative effects from changes in microclimate from soil compaction and other things do affect rare plants, particularly Botrychium and fen dependent species. Road management and construction occurs in conjunction with timber harvest. Roads that cross or run parallel to streams have effects on the channel and vegetation. Roads alter stream drainage

patterns by confining the stream, reducing the area within the floodplain, so floodplain interaction is disturbed. This in turn affects riparian habitat and its function. It is speculated that Peck's mariposa lily is spread by bulblets moving downstream during high water flow. Roads, even temporary roads that cross drainages can affect bulblet dispersal.

Existing allotment management plans previously authorized within the project area, combined with annual operating instructions, adhere to the Forest Plan Standards and Guides which are intended to maintain or enhance riparian conditions in specified locations and maintain forage for wildlife. Range improvements, including water developments, and fence reconstruction would occur within existing allotments. These activities are expected to improve the current condition of the riparian and adjacent meadow habitats, and potentially improve the connectivity of riparian habitats within the project areas where it overlaps. Effects from these actions would combine with effects from Alternative 2 to improve riparian habitat conditions, while 3 would diminish ongoing habitat improvement occurring within the cumulative effects boundary in the short and long term.

Wildlife and wild horse use, sheep grazing, vehicle use, and recreating cumulatively add to the amount of disturbed ground. These activities displace native vegetation and act as vectors for spreading seeds and populations of invasive plants, in turn contributing to the invasion of non-native invasive plants. Medusahead, spotted knapweed, diffuse knapweed, whitetop, Canada thistle, butter and eggs, scotch cotton thistle, lesser burdock, and fuller's teasel are all documented within the project area. Treatment of many of these species is currently being conducted per the Record of Decision for the Deschutes and Ochoco National Forest Invasive Plant FEIS (USDA 2012). Invasive plant infestations within the Territory pose a short to long term risk for the loss of suitable riparian habitat for sensitive species if left untreated and allowed to spread. If these populations are left to expand the most under Alternative 3, as a result of the continued increase in AML, they may threaten the viability of rare plant populations, while under Alternative 2 invasive plant introduction and spread would be the least.

Alternatives 1, 2 and 3 Effects Determination

The determination for all Alternatives is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** for all sensitive riparian species including *Botrychium spp's*, *Calochortus longebarbatus var peckii*, *Carex spp's*, *Eleocharis bolanderi*, *Potamogeton diversifolius*, *Rorippa columbiae*, *Rotala ramosior*, *Salix wolfii*, *Tortula mucronifolia*, and *Utricularia minor*. Overall, Alt.1, does not have the greatest negative effects of the three Alternatives to sensitive riparian plant species and riparian habitats, however it doesn't have the least negative effects either. Under Alt.1 it would take approximately 10 years to reach the AML with continuous capture. Under Alt.2, decreasing the number of wild horses in the territory would decrease the frequency and magnitude of use in turn decreasing the pressure on these riparian systems as well as the sensitive plant species that depend on the proper functioning of the system to survive and thrive. The effects to sensitive riparian plant species and habitat would decrease the most under this Alternative. Under Alt.2 it would take approximately 5 years to reach the AML, the fastest of all possible alternatives, completing continuous capture as well as incorporating fertility control methods. Alt.3 allows for the greatest increase in wild horses, increasing the associated pressures that are placed on riparian systems and habitat condition. An AML of 150-200 horses is well above the current estimated horse population of 135 which is having negative effects on riparian areas. Alt.3 has the greatest potential detrimental effects of the three Alternatives to sensitive riparian plant species and habitats in the short and long term.

Juniper Woodlands, Sagebrush Steppe, and Scabland Habitat

Existing Condition

Although there is no documented sensitive scabland species in the project area, there is a small percentage of Juniper woodland/sagebrush steppe at 1%, and non-forest plant associations mapped at 4%, which have potential habitat for some of these sensitive species. Scabland habitat is characterized by lithosols composed

of heavy clay to gravelly soils, usually shallow and sparsely vegetated. Plant communities are often composed of soil biocrusts of mosses and lichens, as well as rigid or low sage, (*Artemisia rigida*, and *Artemisia arbuscula*) Sandburg's bluegrass (*Poa secunda*) and one-spike oatgrass (*Danthonia unispicata*), although the gravelly soils are frequently bare. Scablands are commonly found on topographic high ground and are particularly subjected to summer heat and dryness. During winter and early spring, the shallow scabland soils are subject to severe water saturation and frost heaving. Soil biocrusts are known to be a key component of these arid scabland habitats because they retain soil moisture, release nutrients, prevent sedimentation and erosion, and impede invasion of annual grasses (Belnap et al. 2001, 2006, Deines 2007, Peterson 2013). Physical trampling of bio-crust is damaging and recovery in these habitats is very slow (Belnap et al 2001, Warren and Eldridge 2001). Potential early season use may contribute to negative effects, since these areas can open and green up prior to other areas, and therefore be grazed in a fragile state when soils are wet. Other papers suggest that wild horse grazing can alter upland vegetation and soil resources within rangeland ecosystems at local (Fahnestock and Detling 1999a, Ostermann-Kelm et al. 2009), and landscape scales (Beever et al.2008; Zeigenfuss et al. 2014).

Scablands, sagebrush steppe and juniper woodland habitat are associated with 6 of the 25 sensitive plant species with potential habitat in the Territory. Scablands are one of the few sensitive plant habitats recognized with specific direction in the Ochoco Forest Plan. The OCH Land and Resource Management Plan (LRMP 1991) emphasizes protection and provides direction regarding scablands including minimizing disturbance, as mitigation and revegetation are nearly impossible (USFS 1989). Compared with historic conditions, scabland habitat has declined in extent and suitability for many sensitive plant species and degraded primarily by road building, localized disturbances such as mineral sources, wild horse use, livestock grazing, loss of soil biocrust, and especially by establishment of exotic annual grasses such as Japanese brome and similar annual brome species, medusahead, and ventenata. The latter species have formed large, nearly monoculture stands on some scablands on the OCH, while other scablands have scattered or patchy ventenata populations or are free of infestations.

It is believed that fire was not a fundamental process historically in scablands, as they have very little in the way of fuels capable of carrying wildfire. Scablands may have functioned as natural fuel breaks, influencing the disturbance patch size and burn patterns on the landscape. There is growing concern that scablands with high density Medusahead and Ventenata populations could contribute to the spread of uncharacteristic wildfire. Both the high density of exotic annual grasses and the higher burn severity could be very detrimental to sensitive scabland plant species.

Past and ongoing management including a century of historic livestock use, disking of sagebrush steppe to remove sagebrush, fire suppression, wildfires, and road construction, have and are contributing to the degraded conditions of scabland areas. These activities are well-documented and listed in the cumulative effects table. Scablands have been used as landing piles for past logging operations, scraped for rock for road construction and roads built through them, and some accidentally plowed while completing wildland fire operations, all of which have left long-lasting impacts. Sheep grazing in this habitat has also resulted in degradation including the impacts of soil biocrust loss, soil erosion, increased susceptibility to exotic annual grasses, and hoof action in wet soils.

Species Associated with Juniper Woodlands, Sagebrush Steppe, and Scabland Habitat

***Achnatherum hendersonii* Vasey** Henderson's ricegrass

ODA-Candidate

Natural Heritage Program: G3S2

ORBIC: List 1

R-6 Sensitive Species List

***Achnatherum wallowaensis* Maze & K.A.Robson** Wallowa ricegrass

Natural Heritage Program: G2G3S2S3

ORBIC: List 1

R-6 Sensitive Species List

Henderson's ricegrass and Wallowa ricegrass were split from one former species *Oryzopsis hendersonii* and named *Achnatherum hendersonii* and *Achnatherum wallowensis*, which are now described as needlegrasses (Maze and Robson 1996). These perennial grasses are regional endemic species. Both species are on the ORBIC (2016) list 1 and are considered threatened with extinction throughout their entire range. These species are distributed sporadically in central and northeastern Oregon on rocky, shallow, scabland soils known as lithosols, associated with *Artemisia rigida*, *Poa secunda*, and *Danthonia unispicata*. Both *Achnatherum wallowensis* and *Achnatherum hendersonii* are found on OCH and have habitat in the Territory, but do not have documented sites within it.

Non-native invasive annual grasses such as *Ventenata dubia* and *Taeniatherum caput-medusae* are considered the biggest threat to maintaining viable populations of *Achnatherum hendersonii* and *Achnatherum wallowensis*. Recent studies have shown that soil bio-crusts inhibit the invasion of annual grasses (Belnap et al. 2001, 2006) and that physical disturbances, including trampling by livestock damage delicate bio-crusts, and recovery is slow (Belnap et al. 2001; Warren 2001; Farris 2013). The next biggest threat to these sensitive plant populations is wild horse and livestock grazing, particularly if changes to the grazing season would result in more or earlier use on scablands than has occurred historically. Earlier or increased use on scablands could lead to damage of this fragile habitat, and threaten the viability of sensitive scabland species. Range readiness guidelines designed to authorize turnout of livestock only when soils become sufficiently dry and plants are sufficiently developed help minimize the impacts to scabland habitats from livestock but do not apply to wild horses. Also, the only livestock use in the project area is shepherding, and keeping sheep off the scablands is a very direct and practical measure to protect these sensitive needlegrass species and the habitat that supports it.

Astragalus diaphanous* var. *diurnus South fork John Day milk-vetch

Natural Heritage Program: G4T2Q/S2

ORBIC: List 1

R-6 Sensitive Species List

Astragalus diaphanous var. *diurnus*, is a prostrate annual or biennial arising from a slender taproot that grows in shallow gravelly soil over basalt, sandbars or sandy banks of intermittent rivers. It can be found in openings in juniper woodland at elevations ranging from 2500-3600. It is on ORBIC list 1(2016), and habitat is present in the analysis area.

Eremothera pygmaea Dwarf evening-primrose

Natural Heritage Program: G3/S1

ORBIC: List 1

R-6 Sensitive Species List

Eremothera pygmaea, also known as dwarf evening primrose is an erect annual forb. It is regionally endemic to Eastern WA, OR, and ID. It can be found in sagebrush steppe, on unstable soil or gravel in steep talus, dry washes, banks, and road cuts. Associated species include big sagebrush (*Artemisia tridentata*), buckwheat (*Eriogonum spp.*), *Cryptantha spp.*, blazingstar (*Mentzelia spp.*), and cheatgrass (*Bromus tectorum*). It is on ORBIC List 1(2016) and has habitat present in the analysis area.

***Eriogonum cusickii* M.E. Jones** Cusick's buckwheat

ODA-Candidate

Natural Heritage Program: G2S2

ORBIC: List 1

R-6 Sensitive Species List

Eriogonum cusickii, also known as Cusick's buckwheat, is on the ORBIC list 1 (2016), and is a Candidate species for the State of Oregon. In Oregon it has been documented in Harney and Lake Counties with occurrences in Crook and Deschutes counties which may have been misidentifications. It has habitat present in the analysis area and can be found in sage scablands and big sage habitat (*Artemisia tridentata*).

***Lomatium ochocense* Helliwell & Constance Ochoco Lomatium**

Natural Heritage Program: G2S2

ORBIC: List 1

R-6 Sensitive Species List

Lomatium ochocense, or Ochoco lomatium, is an endemic species discovered in 1994, and described as a new species in 2010. It is on ORBIC List 1 (2016), and restricted to basaltic scablands on shallow lithosols. There is one known site on the OCH, with several more sites located to the south on BLM lands. Potential habitat is present in the analysis area.

Environmental Consequences/Effects for Sensitive Scabland Species

Effects Common to All Alternatives-Direct and Indirect Effects

The effects of wild horse use on TES botanical species in juniper woodlands, sagebrush steppe, and scabland habitats are generally the same for all Alternatives, however the difference between Alternatives would be the degree of the same impacts. A qualitative comparison of Alternatives would deduce that the lowest AML range in Alt.2 would have the least effects, and the highest AML range in Alt.3 would have the most effects with Alt.1 falling in between. Although the risk of losing sensitive scabland habitat and consequent declines in sensitive plant populations is the greatest under Alt.3 in the short and long term, it is not expected to result in trends toward federal listing for any sensitive species.

Management plan actions that may have measures of change to these habitats include the following: (amount of) year round grazing and browsing by wild horses; (amount of) year round congregating, trailing and hoof action by wild horses; and wild horse herding and movement throughout the Territory. The action of wild horses being removed through gather methods including the use of bait traps would be conducted outside of scabland and similar habitat through PDC to minimize effects, therefore effects of these actions would be greatest under Alt.3. Other recurring management activities including sheep grazing, fire suppression, treatment of invasive plants using chemical, manual, or biological controls, and public recreational use would continue throughout the Territory.

Year round wild horse grazing, congregating, trailing, hoof action, and herd movement throughout the Territory has direct and indirect effects. Wild horses may be drawn to scabland habitat earlier in the season when native and non-native vegetation is greening up. Earlier in the growing season if conditions are moist, wild horses walking through these clay soils can cause damage to soil crusts from trampling; changes in microclimate surrounding needlegrass plants from compaction; uproot plants while grazing on them; create soil erosion and increase bare soil; interrupt moisture flow; and reduce infiltration through compaction. Native plant communities would become more vigorous, diverse and recover faster with a lower AML compared to a higher AML due to fewer hooves on the ground and horses utilizing resources, although some areas would still have wildlife and recreational use. The other risk to this habitat is the spread of non-native invasive weed seeds and shifts in species composition to non-native invasive annual grasses and other increasers such as yarrow, and tarweed. Changes in microclimate surrounding sensitive scabland species from trampling biocrust would also decrease with a lower AML in Alt.2. Livestock grazing later in the season when sensitive plants are dormant can reduce these negative impacts (Dewey 2013); however, wild horses graze throughout the year and their movement is not managed the way sheep in the allotment are.

Cumulative Effects Common to All Alternatives

Present and foreseeable actions impacting scabland habitat in the Territory include sheep grazing, wildlife use, recreation, dispersed camping, vehicle use, firewood cutting, invasive plant treatments, and road maintenance. Sensitive plant habitat degradation on scablands has primarily been the result of past road building, current and past livestock grazing, loss of soil biocrusts, and continued infestation of scablands with invasive annual grasses. The Reservoir allotment management plan includes measures to reduce sheep impacts to scabland habitat, such as range readiness guidelines designed to authorize turnout only when soils become sufficiently dry and plants are sufficiently developed to help minimize the impacts to scabland

habitats. The only livestock use in the Territory is use by sheep, and keeping sheep off the scablands through herding is a very direct and practical measure used to protect these sensitive species and the habitat that supports them, but cannot be applied to wild horses.

The actions cited may cumulatively add to the amount of disturbed ground in turn contributing to an increase in invasive plant infestations in the short and long term. As mentioned previously, multiple invasive plants are documented within the Territory and treatment of many of these species is currently being conducted per the Record of Decision for the Deschutes and Ochoco National Forest Invasive Plant FEIS (USDA 2012). Invasive plant infestations within the Territory pose a short to long term risk of loss of suitable scabland, sagebrush steppe, and juniper woodland habitat for sensitive species if left untreated and allowed to spread. If these populations are left to increase the most under Alt.3, they may threaten the viability of rare plant populations, while under Alt.2 invasive plant introduction and spread would be the least. Once more, less than 5% of the Territory is mapped as Juniper woodland/steppe, scabland habitat, and non-forest plant associations which have potential habitat for the sensitive species listed, therefore the effects are limited in scope and scale.

Alternative 1, 2 & 3 Effects Determination

The determination for all Alternatives is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** for all sensitive sagebrush steppe, juniper woodland, and scabland species including: *Achnatherum hendersonii*, *Achnatherum wallowaensis*, *Astragalus diaphanous* var. *diurnus*, *Eriogonum cusickii*, *Eremothera pygmaea*, and *Lomatium ochochense*. Overall, Alt.1, does not have the greatest negative effects of the three Alternatives to sensitive scabland plant species and habitats, however it doesn't have the least negative effects either. Alt.2 would provide the greatest protection for sensitive plants of scabland habitats, as decreasing the AML would decrease the frequency and magnitude of use in turn decreasing the pressure on these scabland systems as well as the native plant communities making them more resilient to disturbance and resistant to non-native invasive plants. Alt. 3 would increase the AML the most of the Alternatives in the short and long term, creating qualitatively the most effects on these scabland systems. In addition, the time to reach AML under Alt.1 with continuous capture would be 10 years while under Alt. 2, 5 years is expected with the addition of fertility control.

Upland Forests

Existing Condition

The most common upland forest plant associations in the project area include dry grand fir (38%) and Douglas-fir (32%) forest types, and the other almost (25%) covered by ponderosa pine, moist grand fir, and subalpine fir. While often associated with riparian areas, small aspen stands and meadows are also scattered in moister upland sites, which skew the percentages. Upland forest habitats constitute the majority of the project area and have not been mapped separately as a sensitive plant habitat, as upland forest is a broad category that includes large areas that are likely not suitable for sensitive plant species. There are no habitat models and very limited occurrence records that could inform a more nuanced and accurate approach to identifying sensitive upland forest plant habitat.

Upland forest habitat has been influenced by human activities and associated impacts over the last century. These activities include logging, road building, livestock grazing, an increase in wild horse utilization, and fire suppression. Grazing, and particularly, fire suppression, have altered the species composition and tree density of upland forests, resulting in increased density of fire intolerant conifers such as grand fir and Douglas-fir and reduced density of understory vegetation. Habitat for many plant species adapted to frequent, low severity surface fire has been degraded due to fire suppression and succession to higher density forest. Upland forest has also been negatively impacted by roads and invasive plant infestations. Roads alter runoff patterns, can contribute to soil erosion, interrupt and fragment the continuity of native plant communities, and provide corridors for invasive plants as vehicles and animals use them to travel. In order to support past

timber harvest activities, many roads were located in upland forest habitat. Many of these roads remain on the landscape as open system roads.

Species Associated with Upland Forest

Astragalus tegetarioides Bastard milkvetch

Natural Heritage Program: G3/S3

ORBIC: List 1

R-6 Sensitive Species List

Astragalus tegetarioides is associated with openings in upland forest habitats. It is currently on the ORBIC List 1 (2016) and has habitat present in the Territory. It occurs in openings, swales, and canyon bottoms in ponderosa pine forests and open stands of juniper with low and big sagebrush. There is one 14.2 acre documented population on the OCH outside of the project area, and is the northernmost documented population in its range which is primarily the John Day drainage.

Erythranthe inflatula Disappearing monkeyflower

Natural Heritage Program: G3/S2

ORBIC List 1

R-6 Sensitive Species List

Erythranthe inflatula, or Disappearing monkeyflower, is on the ORBIC List 1 (2016) and has habitat present in the Territory. It can be found on gravelly or rocky sites and vernal mesic areas in pinyon juniper woodlands and low montane coniferous forests.

Pyrola dentata Toothleaf pyrola

Natural Heritage Program: G4/S2?

ORBIC List 2

R-6 Sensitive Species List

Toothleaf pyrola has been considered a part of the *Pyrola picta* species complex but recent molecular work has resulted in renewed recognition of toothleaf pyrola as a distinct species. It is found in a range of forested habitats, from dense mixed-conifer forest to sunny, rocky slopes at elevations ranging (in the east slope Cascades) from 3,200 to 4,800 feet. The species is widely distributed throughout mountainous regions of Oregon and other western states and can be found in mixed conifer forest and pine woodlands, coarse sand or gravel near rocky outcrops. It is currently on the ORBIC List 2 (2016) and has habitat present in the Territory.

Environmental Consequences/Effects for Species Associated with Upland Forests

Effects Common to All Alternatives-Direct, Indirect, and Cumulative Effects

The effects of wild horse use on sensitive botanical species in upland forests are generally the same for all alternatives as well, however the difference between alternatives would be the degree of the same impacts. Wild Horses in forest and woodland systems have similar direct and indirect effects as riparian and scabland habitats, including: plant consumption, trampling, and ecological impacts through changes in habitat conditions and microclimate. Associated changes in species composition; an increase in bare soil and erosion; a decrease in soil moisture and soil productivity are other indirect effects due to soil disturbance with a higher AML of wild horses in the territory that would occur in the short and long term. Sensitive plants recover slower with more grazing pressure, which would result in decreased population density and vigor, and in decreased reproductive capacity in the long term. There would also be an increase in the amount of introduction and potential spread of invasive plant species as wild horse AML numbers increase in the territory, although some noxious weed spread would still occur from livestock, wildlife, people recreating, and other vectors including vehicles. Forested systems are generally not grazed and used to the same extent and magnitude as other habitats such as riparian systems and are not as fragile as scabland

habitats, therefore, these habitats are generally more resilient to disturbance and resistant to invasive species introduction and spread.

Past and ongoing management including timber harvest, a century of historic livestock use, an increase in wild horse utilization, fire suppression, wildfires, and road construction, have resulted in shifting and altering hydrologic regimes. Seeding with non-native rhizomatous grasses after projects and livestock grazing has resulted in shifts in plant community species composition from high diversity of native forbs, sedges, and grasses to lower diversity non-native cultivars and invasive grasses such as smooth brome, timothy, Kentucky bluegrass and cheat grass. Activities within the project area that have incrementally added to the condition described include pre-commercial thinning, commercial thinning, regeneration harvests, overstory removal and understory/jackpot burning. There are both beneficial and detrimental effects by these actions in the short and long term. Removing understory trees mimics the low intensity, frequent fires that occurred before European settlement. Thinning helps keep the amount of overstory shade low, reduces competition, and keeps plant communities in an early successional state, which is beneficial to upland rare species habitat. Detrimental effects include soil compaction and the creation of bare ground, which increases the risk of invasion by non-native invasive plants. Recent timber harvest generally does not have direct effects to sensitive plant populations because populations are avoided by project design criteria. Generally, timber harvest prior to the late 1980s did not vary treatment within riparian areas, therefore cutting timber up to the stream channel. Because these influences have altered habitat quality and plant species diversity in both upland and riparian areas, sensitive plant species and their habitats are likely to have been more abundant in the past. Activities including wild horse use, livestock grazing, and recreating have cumulatively added to the amount of disturbed and bare ground, displaced native vegetation, and have acted as vectors for spreading weed seeds and populations of multiple weed species, in turn contributing to the invasion and spread of non-native invasive plants. It is likely that wild horse use is contributing to the challenges facing current invasive plant management practices within the Territory, but is not the only challenge. If these populations continually expand, which is promoted as a result of an increase in AML, they could threaten the viability of rare plant populations in the long term.

Alternative 1, 2 & 3 Effects Determination

The determination for all Alternatives is **May Impact Individuals or Habitat, but not likely to result in loss of viability or a trend toward federal listing (MIIH)** for *Astragalus tegetarioides*, *Erythranthe inflatula*, and *Pyrola dentata*. Alt.1, does not have the greatest negative effects of the three Alternatives to sensitive forested plant species and habitats, however it doesn't have the least negative effects either. Overall, there may be a detrimental effect to sensitive species in forested habitats through all Alternatives, but Alt.2 would provide the greatest protection due to the decrease in frequency and magnitude of use, followed by Alt.1. Alt.3 would increase the AML in the Territory the most creating qualitatively the most effects on these forested habitats in the short and long term. In addition, the time to reach AML under Alt.1 with continuous capture would be 10 years while under Alt.2, 5 years is expected with the addition of fertility control.

Summary of Effects & Conclusion

Table 38 contains the expected effects to sensitive plants for each of the Alternatives in the Territory. These determinations are based on the assumption that all of the elements in the proposed action are implemented, and design criteria and proper coordination at implementation is completed. The environmental consequences section of this document provides the rationale for each determination of sensitive plant species that have suitable habitat or are present in the Territory.

Table 38: Summary of Each Alternative’s Effects to Sensitive Plants in the Territory

Sensitive Plant Species	Alt 1	Alt 2	Alt 3
<i>Achnatherum hendersonii</i>	MIIH	MIIH	MIIH
<i>Achnatherum wallowaensis</i>	MIIH	MIIH	MIIH
<i>Astragalus diaphanous var. diurnus</i>	MIIH	MIIH	MIIH
<i>Astragalus peckii</i>	NI	NI	NI
<i>Astragalus tegetarioides</i>	MIIH	MIIH	MIIH
<i>Botrychium ascendens</i>	MIIH	MIIH	MIIH
<i>Botrychium crenulatum</i>	MIIH	MIIH	MIIH
<i>Botrychium montanum</i>	MIIH	MIIH	MIIH
<i>Botrychium paradoxum</i>	MIIH	MIIH	MIIH
<i>Calochortus longebarbatus var. peckii</i>	MIIH	MIIH	MIIH
<i>Carex diandra</i>	MIIH	MIIH	MIIH
<i>Carex lasiocarpa var. americana</i>	MIIH	MIIH	MIIH
<i>Carex retrorsa</i>	MIIH	MIIH	MIIH
<i>Cheilanthes feei</i>	NI	NI	NI
<i>Cyperus lupulinus ssp. lupulinus</i>	NI	NI	NI
<i>Elatine brachysperma</i>	MIIH	MIIH	MIIH
<i>Eleocharis bolanderi</i>	NI	NI	NI
<i>Eremothera pygmaea</i>	MIIH	MIIH	MIIH
<i>Eriogonum cusickii</i>	MIIH	MIIH	MIIH
<i>Erythranthe inflatula</i>	MIIH	MIIH	MIIH
<i>Heliotropium curassavicum</i>	NI	NI	NI
<i>Lipocarpha aristulata</i>	NI	NI	NI
<i>Lomatium ochocense</i>	MIIH	MIIH	MIIH
<i>Muhlenbergia minutissima</i>	MIIH	MIIH	MIIH
<i>Penstemon peckii</i>	NI	NI	NI
<i>Phemeranthus spinescens</i>	NI	NI	NI
<i>Potamogeton diversifolius</i>	MIIH	MIIH	MIIH
<i>Pyrola dentata</i>	MIIH	MIIH	MIIH
<i>Rorippa columbiae</i>	MIIH	MIIH	MIIH
<i>Rotala ramosior</i>	MIIH	MIIH	MIIH
<i>Salix wolfii</i>	MIIH	MIIH	MIIH

<i>Thelypodium eucosmum</i>	NI	NI	NI
<i>Utricularia minor</i>	MIIH	MIIH	MIIH
Bryophytes and lichens			
<i>Encalypta brevipes</i>	NI	NI	NI
<i>Entosthodon fascicularis</i>	NI	NI	NI
<i>Schistidium cinclidodonteum</i>	NI	NI	NI
<i>Tortula mucronifolia</i>	MIIH	MIIH	MIIH
<i>Texosporium sancti-jacobi</i>	NI	NI	NI

Lowering the AML to 12-57 horses under Alternative 2 is expected to have the least amount of detrimental effects to rare plant species viability and habitat, and move the Territory towards the desired future condition faster than the other two Alternatives. Estimates are approximately 5 years using fertility controls and continuous capture, although that range is dependent on funding levels. Alternative 2 meets the purpose and need and also has the lowest invasive plant risk assessment based on the quantitative numbers (refer to the invasive plant section below for a more thorough examination of risk assessments by Alternative). It will also implement methods to slow the rate of growth as needed to maintain AML, since wild horse herds can grow at an average rate of 20% annually (National Research Council, 2013).

Setting the AML for wild horses and burros through the analysis conducted under Alternative 2, will ensure a thriving natural ecological balance and protect the range from the deterioration associated with overpopulation to the greatest extent of the three Alternatives in the short and long term. Alternative 1 would affect rare plant species and habitat more slowly than Alternative 3, however it would not be as efficient as Alternative 2 in ensuring rare species viability in the future. Only two of the fifteen stream reaches measured under PFCs are in satisfactory condition or have an upward trend. Any increase in the number of wild horses in the territory beyond the AML set under Alternative 2, would increase the amount of negative effects on these reaches and decrease the rate at which recovery would occur to proper functioning condition, in turn having a greater potential detrimental effect to sensitive riparian plants and habitat where wild horses tend to concentrate. The highest AML numbers under Alternative 3 would have the greatest effect on sensitive plants and their habitat due to the qualitative numbers as well as the highest invasive plant risk in the short and long term, followed by Alternative 1.

Invasive Plants

Introduction and Regulatory Framework

Non-native invasive plants are species that have the ability to spread into natural habitats where they can alter plant communities by displacing native species. Non-native invasive plant species are introduced into the United States from other geographic regions, so there are few biological agents to control their populations. “Noxious weeds” are non-native invasive plants designated by state and county weed laws that are injurious to public health, agriculture, recreation, wildlife or any public or private property. In sufficient numbers, they can reduce biological diversity; increase fire risk; poison humans, wild horses, wildlife, and livestock; and reduce the quality of forage. See Appendix A of the Botany Report for the Ochoco National Forest Invasive Plant List.

Management of invasive plants is regulated by:

- The Federal Noxious Weed Act of 1974, as amended (7 U.S.C 2801 et seq.) requires cooperation with state, local, and other federal agencies in the application and enforcement of all laws and regulations relating to management and control of noxious weeds.
- U.S. Forest Service Manual (FSM) 2080 directs the Forest Service to use an integrated weed management approach to control and contain the spread of invasive plants on National Forest System (NFS) lands and from NFS lands to adjacent lands.
- Executive Order 13112 (1999) directs federal agencies to reduce the spread of invasive plants.
- In October 2004, the Chief of the Forest Service released a National Strategy and Implementation Plan for Invasive Plant Species Management - part of the President's Healthy Forest Initiative. It focuses on four key elements: preventing invasive species before they arrive; finding new infestations before they spread and become established; containing and reducing existing infestations; and rehabilitating and restoring native habitats and ecosystems.
- Invasive plant management direction contained in the LRMP of the OCH was amended by the Pacific Northwest Region Invasive Plant Program - Preventing and Managing Invasive Plants Record of Decision (USDA Forest Service, 2005). This site-specific EA follows the Standards and Guidelines established in the regional document. The regional Record of Decision also released the USDA Forest Service from direction provided by the 1988 Environmental Impact Statement and 1988 Record of Decision for Competing and Unwanted Vegetation, and the associated 1989 Mediated Agreement for invasive plant management. The R6 2005 ROD added goals, objectives, and standards for invasive plant management by amending the OCH LRMP (see Appendix B of the Botany Report).
- Local prevention measures are outlined in the "Deschutes and Ochoco National Forests and Crooked River National Grassland Invasive Plant Prevention Practices" dated January 2006 (see Appendix B of the Botany Report). The invasive plant prevention practices are provided to minimize the introduction of invasive plants; minimize conditions that favor the establishment or spread of invasive plants; and to facilitate the integration of invasive plant management practices into resource programs.
- Treatment of noxious weeds and other non-native invasive plants are authorized by the 2012 Ochoco and Deschutes National Forests Invasive Plant Treatments FSEIS. (USDA Forest Service 2012).

Analysis Methods & Bounding

The existence, introduction, and spread of invasive plants are difficult to quantify and attribute specifically to any one vector on a landscape. Wild horses are a physical vector of invasive plant introduction and spread, and cause soil disturbance that creates a susceptible environment. Most invasive plant infestations begin on disturbed areas, such as road shoulders, harvest landings, burned areas, intensively thinned forest stands, recreation sites, and heavily-grazed compacted ground with bare soil. As a result, this effects analysis will provide a qualitative assessment of the Alternatives on the risk potential for invasive plant introduction, spread, and enhancement from ground disturbance and creation of bare soil. An Invasive Plant Risk Assessment (IPRA) is used to determine the level of risk associated with an action or activity in the introduction and spread of Oregon State listed noxious weeds. See Appendix C of the Botany Report for detailed IPRA for all Alternatives. Field observations and local knowledge of invasive plant species and their particular response to disturbance also form an important basis of the IPRA.

Most effects from invasive plants take place where project actions overlap with invasive populations; however, many invasive plant species are introduced and spread by a variety of vectors at the watershed level. The watershed level was considered for spatial bounding to include the Upper Ochoco Creek and North Fork Crooked River Watersheds, since invasive plant populations can cross ownership boundaries and are often managed at a watershed scale. However, the further the distance from the Territory boundary, the

less effects are anticipated, so the two watershed areas encompassing the Territory would be excessive for assessing risk. Therefore, analysis of effects within the Territory boundary is sufficient to assess risk and effects with respect to invasive plants. For this analysis, short-term effects are defined as those lasting less than 5 years and long-term effects are defined as those lasting more than 30 years. Cumulative effects are analyzed in respect to past, ongoing and reasonably foreseeable future activities that overlap in both time and space.

Assumptions used in the analysis:

- Wild horses have effects on native plant communities and are a vector for the establishment and spread of invasive plants. The more wild horses in the Territory, the greater amount of soil disturbance and the potential for invasive plant introduction and spread.
- All areas in the Territory would continue to receive use by wildlife, sheep grazing, vehicle use, firewood cutting, recreation, and dispersed camping, which also contribute to bare ground and the introduction and spread of invasive plants.
- PDC for invasive plants would be implemented and enforced.

Many invasive plant infestations on the OCH are being treated using an integrated approach of control methods including manual, mechanical, cultural, chemical, and biological. As of May 2012, invasive plants have been treated in accordance with the Invasive Plant Treatments Record of Decision for the Deschutes and OCH (USDA FS, 2012). It describes site specific analysis for all existing invasive plant infestations as well as analysis and design criteria for newly discovered infestations under Early Detection Rapid Response (EDRR) treatment.

Surveys/Field Reconnaissance of Affected Environment

Formal data sources consulted during pre-field review include:

- NRM TESP-IS (Natural Resource Manager-Threatened, Endangered, and Sensitive Plants-Invasive Species) Database.
- Surveys from prior projects.
- Forest Service Corporate GIS layers-FACTS (Forest Activities Database) and transportation/roads layers, fire history, and vegetation.

After pre-field review was completed, field surveys were performed in 2016-2018 by Ochoco National Forest botany staff. Additional surveys were completed from previous projects within the Territory. The purpose of field reconnaissance is to conduct invasive plant surveys within the Territory and determine the extent and condition of invasive plants that are encountered to produce accurate occurrence maps in order to more properly assess risk. Areas identified in the pre-field analysis as having potential invasive plant habitat were the primary focus of the surveys. Intuitive controlled surveys were conducted according to standardized procedures. Although surveys were completed, undetected invasive plant species and populations may exist within the Territory. Unknown populations would contribute an unknown amount of additional risk of invasive plant establishment and spread. The amount of existing soil disturbance within the project area is also unknown and existing soil disturbance is associated with a higher risk of invasive plant introduction and spread.

Existing Condition

Past management; timber harvest; a century of historic livestock use; stream channeling; an increase in wild horse utilization; the lack of beavers in riparian systems; disking of sagebrush steppe to remove sagebrush; wildfires; fire suppression; and road construction and closures, have resulted in areas of soil disturbance and degraded riparian, scabland, and upland conditions as well as an increase in the introduction and spread of invasive plants. Other ongoing activities such as road maintenance, unauthorized recreation, and off-road-

vehicles, have contributed to the introduction and spread of invasive plants. There is a diverse invasive plant community documented in the Territory, and the invasive plant species of highest management concern are inventoried in the TESP-IS database. A summary of known invasive plant occurrences within the Territory is in Table 39.

Table 39: Summary of Invasive Plant Occurrence within the Territory

Common name	Scientific name	Species Code	Priority	# of Populations	Acres
Spotted knapweed	<i>Centaurea biebersteinii/Centaurea stoebe ssp. micranthos</i>	CEBI2/CESTM	B	21	183.3
Medusahead	<i>Taeniatherum caput-medusae</i>	TACA8	A	3	8.9
Diffuse knapweed	<i>Centaurea diffusa</i>	CEDI3	B	2	4.6
Canada thistle	<i>Cirsium arvense</i>	CIAR4	C	13	1.7
Common burdock	<i>Arctium minus</i>	ARMI2	C	2	0.9
Fuller's teasel	<i>Dipsacus fullonum</i>	DIFU2	B	3	0.3
Scotch cottonthistle	<i>Onopordum acanthium</i>	ONAC	A	1	0.3
Whitetop	<i>Cardaria draba</i>	CADR	B	1	0.2
Yellow toadflax	<i>Linaria vulgaris</i>	LIVU2	A	2	0.2
Totals				48	208.5

Table 39 does not include many low priority C species such as North Africa grass, cheatgrass, bull thistle, common mullein, or other species that are not currently tracked in databases kept by the Forest. “C” Designated weeds are either common, well established, and economical control is not feasible, or their ecological impact and spread potential is low due to abundance or level of priority. At the time of writing this report, North Africa Grass (*Ventemata dubia*) is being considered as a higher priority on weed lists and will likely be mapped and treated more on the Forest in the future. Canada thistle and common burdock are also under-represented in Table 4 because the Forest stopped keeping records on small populations due to abundance. Nine invasive plants are represented at 48 populations occupying a total area of 208.5 acres, or 0.7% of the Territory. Invasive plant occurrence, as used here, can be as small as one plant, to as large as thousands of plants but are spatially separated from other occurrences. While 9 invasive plant species are documented within the Territory, just two of these species account for nearly 92% of total mapped invasive plant acreage within it. These species with mapped acreages are spotted knapweed (183.3) and medusahead (8.9).

Spotted knapweed is perhaps best regarded as a short-lived perennial. This species can be found in many different types of disturbed settings and can expand into relatively open sites showing little evidence of recent disturbance. Within the Territory, however, spotted knapweed is strongly associated with road corridors which are regularly treated due to the high potential of spread.

Medusahead is a winter annual grass, which like cheatgrass and ventenata, is well-adapted to completing its life cycle in winter and spring, utilizing often limited soil water sources at a time when the water demands of most local, competing vegetation are still low. The primary vectors for the weed’s movement within the Territory are not clearly identified, although hooves, fur and tires are all likely fruit-bearing surfaces at times. Non-native invasive plants including medusahead are known to occur in the general area of private land where the sheep grazing permittee maintains the herds as well. Medusahead is known to be spread by sheep

that can carry the seeds in their coat, and possibly in their digestive tract (Furbush 1953). The grazing permittee was contacted regarding prevention measures with the Reservoir Allotment permit reauthorization (2007), and although medusahead is present on the ranch, sheep are moved off the ranch in late spring before medusahead is mature and less susceptible to transport in the wool of sheep. Review of the trailing area through private land between the ranch and the Forest was not completed. The bedding areas used by sheep as they first enter the Forest were reviewed under the permit reauthorization and no medusahead was found in these areas. Prevention measures considered included maintaining sheep in a weed-free holding pasture for 1 day to eliminate seed in the sheep digestive tract, however this was determined to be unnecessary because the sheep are trailed for 2-3 days before they enter the Forest. Measures such as shearing sheep immediately prior to moving onto the Forest were determined impractical for ranch operations.

All of the invasive plant species listed in Table 39 have the potential to spread within the Territory, and habitats susceptible to these invasive species are present throughout the Territory. Moister habitats with deeper, more developed soils are more likely habitat for Canada thistle, scotch thistle, whitetop, teasel, burdock, and the knapweeds. Scablands and dry forest are vulnerable to medusahead, ventenata, and cheatgrass. National Forest Service lands adjacent to the forest boundary on the east side of the Territory are also more vulnerable to spread from infestations on private and other ownerships, and likewise, the opposite occurs.

Riparian systems have been degraded by non-native plant populations. Canada thistle is of concern because it readily establishes in riparian zones, and has the ability to form large patches of rhizomatous growth. Treatment and control options are limited due to the rhizomatous growth form and proximity to water. Riparian habitats in the Territory also have extensive stands of non-native cultivars including smooth brome, timothy, and Kentucky bluegrass that typically occur in open meadows, which are also habitat for the documented sensitive plant Peck's mariposa lily. Non-native, rhizomatous grasses may have increased their extent in drying riparian areas as a result of stream down cutting, and invasive grasses lowered water tables, and seeding of cultivars. Stream banks have become exposed from the loss of soil holding root masses provided by willows, sedges and rushes. As stream channel morphology has changed and degraded, loss of native plant habitat has increased along with an increase in non-native and invasive plants. As mentioned, these grasses have been seeded in some areas, as seeding with grass cultivars was a common management practice in restoration from the 1950s-1970s. Ventenata has impacted riparian habitat for Peck's mariposa lily as well, and this invasive annual grass appears to be spreading rapidly into the available seasonally wet habitat preferred. Some populations of Peck's mariposa lily are now dominated by ventenata, where previous observations took no note of its presence.

Sensitive scabland and sagebrush steppe plant habitat in the Territory has been degraded by exotic annual grasses, including: medusahead, ventenata, Japanese brome, and cheatgrass as well. Both medusahead and ventenata are currently of limited extent within the Territory outside of documented road corridors but pose a substantial threat to these sensitive plant habitats, due to the ability to spread rapidly, compete with native plants for early season moisture, exclude native plants with thatch build up and possibly allelopathic effects, and alter fire regimes through the production of fine fuels. These exotic grasses have not occupied all potential habitat within the Territory, and thus have the potential to spread to new areas of sensitive plant habitat. Scablands have also been used as landing piles for past logging operations, scraped for rock for road construction and roads built through them, all of which have left long-lasting impacts.

Environmental Consequences

Effects Common to All Alternatives-Direct, Indirect, and Cumulative Effects

The effects of wild horses on invasive plants are generally the same for all Alternatives, however the difference between Alternatives would be the degree of the impacts. The extent and magnitude of effects of soil disturbance and creation of bare soil, rather than different kind of impacts is the rationale of the effects analysis. A qualitative comparison of Alternatives would deduce, that with an AML range of 12-57 horses under Alt. 2 the effects would be the lowest; an AML range of 55-65 horses under Alt 1 the effects would be

moderate; and an AML range of 150-200 horses under Alternative 3 the effects would be the highest in the short and long term.

Management plan actions that have measures of change include the following: (amount of) year round grazing and browsing by wild horses; (amount of) year round congregating, trailing and hoof action by wild horses; wild horse herding and movement throughout the Territory; wild horses being removed through all gather methods including the use of bait traps; annual wild horse inventory; fertility control; off range horses; translocation of wild horses for genetic variability; and acts of mercy or euthanization. The actions of the annual wild horse inventory, fertility control, off range horses, translocation of wild horses for genetic variability, and acts of mercy or euthanization have minimal to no effect on invasive plants and will no longer be discussed. The other actions mentioned have measurable effects of soil disturbance and creation of bare soil.

As discussed, areas of soil disturbance are more susceptible to weed establishment than areas occupied by intact native vegetation (Di Tomasi 2000; Reisner 2010). All animals (wild horses, livestock, and wildlife) can transport weed seeds in their digestive tract, or attached to their hair and hooves (Parks et al. 2004). As wild horses can serve as effective dispersal vectors for weed fruits, seeds and other propagules, decreasing the AML would result in a lower risk of introduction and spread of noxious weeds throughout the Territory since less ground would be disturbed. The lowest AML would allow more native plants to be able to undergo natural phenological cycles of flowering, setting seed, and undergoing natural processes of succession, therefore, improving native plant composition, diversity, and vigor and increase resiliency against invasive plants. The lowest AML would also provide for the least amount of bare soil and disturbed ground produced from wild horse grazing, trampling, congregating, trailing, hoof action, herding, and movement throughout the Territory. Although wild horses consume invasive plants as a direct benefit, they often prefer native perennial bunchgrasses and other native species, which provide invasive plants a better opportunity to become more prolific frequently negating any benefits. Other direct and indirect effects of wild horse use include: increased soil compaction; sloughing of stream banks from accessing water; and disturbance or mudding up of seeps and springs. Under all Alternatives, wild horses would continue to contribute to the introduction and spread of invasive plants and act as vectors in the short and long term.

Other vectors including vehicles, wildlife, sheep grazing, recreating, public firewood cutting, road maintenance, unauthorized recreation, continued implementation of the Deschutes and Ochoco Travel Management plan, and other proposed vegetation management projects would contribute to the direct, indirect, and cumulative effects and be present across all Alternatives, in turn contributing to the overall weed risk. Various projects mentioned have produced negative effects including vegetation and soil displacement, soil compaction, bare soil creation, invasive species invasion and spread, degraded streambanks, stream down cutting, and hydrologic shifts. The stream channels that have down-cutting have lost connection with the floodplain, in turn leaving riparian plants lacking moisture necessary for long-term sustainability opening up areas for invasive plants.

The continued implementation of the Ochoco and Deschutes National Forest Invasive Plant Record of Decision (ROD) (USDA 2012) provides site specific treatment analysis for all established invasive plant sites and for treating newly discovered sites in accordance with the EDRR strategy that has had an overall positive effect. The ROD greatly increases our ability to control and reduce existing invasive plant infestations as well as eradicate new introductions, using a variety of herbicides that are specific to each species and the sites they occupy. Some treatments can have negative effects though, including, potential herbicide drift which can kill adjacent native vegetation, along with pre-emergent herbicides used to treat invasive annual grasses which could potentially prevent native species from becoming established in turn contributing to bare soil and invasive plant invasion. While many prevention measures and resource protection measures would also help to minimize establishment and spread of these species, the current lack of active inventory and control limits the effectiveness of such measures. Under all Alternatives, further establishment and spread of these species can be expected.

Environmental Consequences and Invasive Plant Risk Assessments

A detailed IPRA report for all Alternatives for the Territory including the risk ranking and narrative is in Appendix C of the Botany Report. All three Alternatives will continue to have wild horses in the Territory which increases the risk for introduction and spread of noxious weeds. Although other activities not proposed in these Alternatives that act as vectors are highly likely to result in the introduction and spread of invasive plants as well, these actions will be occurring independently of selection of any of these Alternatives.

Effects Determination for All Alternatives

All three Alternatives rank as High for risk of introduction and spread of invasive plants, however, the degree of each Alternative will vary. Overall, Alternative 1, does not have the greatest negative effects of the three Alternatives, however it doesn't have the least negative effects either. Because effects of wild horse use and activity can increase the risk for introduction and spread of non-native invasive plants, not decreasing the AML increases the invasive plant risk more than Alternative 2 but not as much as Alternative 3. Because Alternative 2 proposes the lowest AML, it has the lowest risk for introduction and spread of non-native, invasive plant species, and the greatest expected improvement of long term vegetation conditions in the Territory. It is understood that removing horses from the Territory will likely result in short-term local disturbances to soil and native plant communities that could promote invasive plant establishment. However, the expected short and long term vegetation condition and habitat improvements as manifested in lowered rates of soil disturbance, improved soil stability, and improved condition of an array of native plant communities, will offset those detrimental effects. Also, in order to minimize effects of proposed activities in Alternative 2, invasive plant prevention measures will be followed. Alternative 3 would be the highest risk of the introduction and spread of non-native, invasive plant species in the short and long term due to the extent and magnitude of wild horses and the potential susceptibility to invasive plant introduction and spread when native vegetation and the soil organic layer is lost. Alternative 3, increases the AML in the Territory the most, consequently, creating the greatest potential detrimental effects of the three Alternatives. Due to current vegetation conditions, the Territory would recover from effects of soil disturbance at the quickest rate under Alternative 2, followed by Alternative 1 then Alternative 3. The longer the duration of recovery, the more susceptible the Territory is to invasive plant establishment and the resulting consequences to resources. In addition, the time to reach AML under Alternative 1 with continuous capture would be 10 years while under Alternative 2, 5 years is expected with the addition of fertility control although that range is dependent on funding levels.

Recreation

Introduction

This section of the EA discusses the potential for wild horses and wild horse management to affect the recreation experience and infrastructure. Recreational pursuits in the Big Summit Territory (Territory) are primarily dispersed in nature or are focused on the developed trails that pass within the boundary of the Territory. The primary recreational uses in the Territory include hiking, mountain biking, horseback riding, hunting, and dispersed camping. Additionally, cross-country skiing, snowshoeing, and snowmobiling are popular in the winter months. A visitor may experience high levels of interaction with other individuals along the main travel corridors and near water, but opportunity can be found for a remote setting if desired. People also visit the Forest for the specific activity of viewing wild horses.

Regulatory Framework

Forest Plan Direction

There are no specific standards and guidelines for wild horse management related to recreation. Most of the Territory is General Forest or General Forest Winter Range. Visual corridors run through the area on major roads and recreational trails

Approximately 2,794 acres of the 16,000-acre Lookout Mountain Recreation Area (LMRA) lies within the Territory (Figure 35). The Recreation Opportunity Spectrum is Semiprimitive Non-motorized except for snowmobiles. Backcountry recreational opportunities for hiking, horseback riding, and mountain biking are to be promoted in this area. The LMRA coincides generally with the Lookout Mountain Inventoried Roadless Area, where tree cutting and road building are prohibited, with some exceptions.

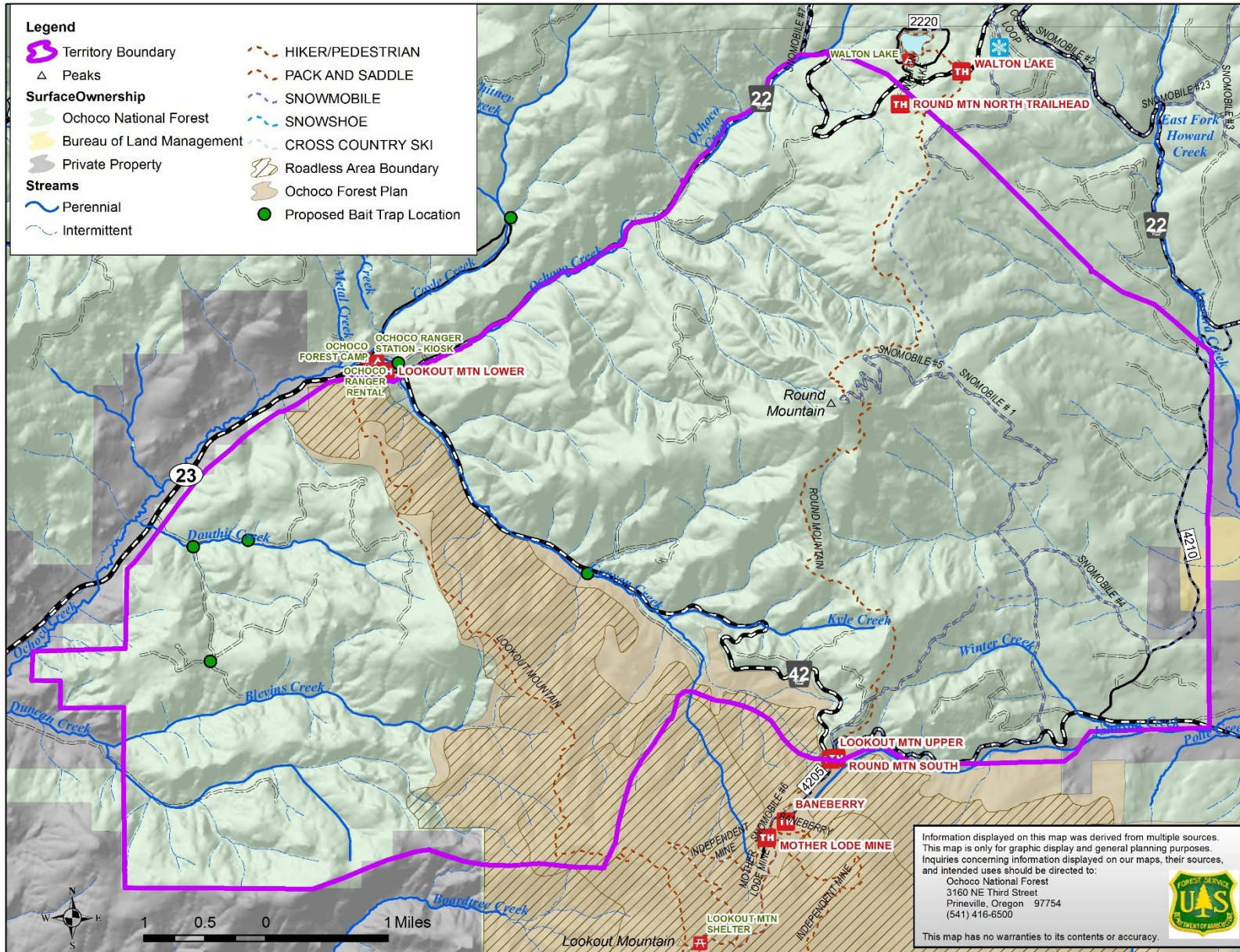
Analysis Methods

The Ochoco National Forest corporate GIS data layers were used to identify recreation sites, roads, and trails within the Territory.

Wild horses and wild horse management can affect recreation activities and infrastructure. This analysis considers effects to the following recreation indicators:

- Dispersed Recreation Sites – disturbance to visitors, access, and naturalness of sites. The spatial boundaries for analyzing direct, indirect, and cumulative effects is limited to the dispersed recreation sites
- Trails – physical impacts to trails, disturbance to visitors. Spatial boundary of effects is limited to the trails and trailheads.
- Wild Horse Viewing /Sightseeing – Ability to see horses in Territory.
- Hunting – Dispersed campsite condition and access, big game competition and hunting success. The spatial boundary for direct, indirect, and cumulative effects is the Territory.

Figure 35: Recreation Sites within the Big Summit Wild Horse Territory



Affected Environment

There are no developed recreation sites within the Territory. The most popular campground on the Ochoco NF, Walton Lake, is located just outside of the northern boundary. Just outside the western boundary is the old Ochoco Ranger Station, Ochoco Forest Camp, and a recreation rental (see Figure 35). Horses are known to leave the territory and are often seen around this area.

Dispersed Recreation Sites

Camping outside of developed campgrounds is a popular activity on the Ochoco National Forest. Dispersed camping is allowed anywhere on the Forest that is not specifically closed to camping or other uses (year-round or seasonal). Dispersed recreation sites are found throughout the Ochoco National Forest, including within the Territory, and generally occur along roads, riparian areas, and streams.

Dispersed recreation sites are not static. The number and location of sites change over time as new sites are developed by Forest visitors; sites are removed or damaged by natural disturbances (e.g. fire, floods, windblown trees); sites are removed to protect resources (e.g. water quality); sites are naturally reclaimed by vegetation due to lack of use; or road conditions deteriorate and sites become inaccessible. Because the number and location of dispersed recreation sites is constantly changing an active inventory is not maintained.

Wild horses are free to roam within the Territory and are known to congregate within dispersed sites, particularly when they occur in riparian areas and near water sources. These are generally the same type of sites preferred by dispersed campers for their shaded but open understory and access to water.

Trails

Approximately 6 miles of Lookout Mountain Trail and 9 miles of Round Mountain Trail are within the Territory (see Figure 1). Popular trailheads located at the boundary of the BST include Round Mountain and Lookout Mountain. The Lookout Mountain trail is very popular with hikers and mountain bikers alike. Because of the proximity to Prineville and the ability to get to a peak with 360-degree scenic views Lookout and Round Mountain are the two most popular trails on the forest. They receive low, but consistent, levels of equestrian use and moderate levels of mountain bike and hiking use. Higher levels of use occur on weekends and holidays during the summer months.

There are approximately 18 miles of snowmobile trail that crosses the Territory, originating at Walton Lake Snopark just north of the Territory boundary. Snowmobile use within the Territory in this area is low. Most riders originating from Walton Lake Snopark head to trails near Mt. Pisgah and Indian Prairie as a destination.

Wild Horse Viewing

The activity of viewing and photographing wild horses is also a recreational pursuit on the Ochoco National Forest, and focused within the Territory. Input from the public during the scoping phase included comments about the wild horses being an important component of the Ochocos because of their uniqueness, providing a tourism asset. For some, the wild horses represent history and culture of the area and they are perceived as a valuable resource for the local community.

Hunting

Hunting is extremely popular on the Ochoco National Forest. The Territory is located within ODFW's Wildlife Management Unit (#37). The following hunting seasons occurred within Unit #37 in 2018 (Table 40). These seasons and number of tags available can be changed annually by ODFW.

Table 40: ODFW Hunting Seasons that Overlap the Big Summit Territory

Season	Date	# of Tags
Archery Elk and Deer (Ochoco elk tag required)	August 25 – September 23	762
Buck Deer	September 29 – October 10	2,585
Elk Number 1	October 24 – October 28	218
Elk Number 2	November 3 - November 11	214
Youth Elk Number 1	August 1 – December 31	10
Youth Elk Number 2	October 13 – October 21	100
Pronghorn Antelope	August 11 – August 19	95
Coyote	Year Round	Unlimited
Cougar	Year Round	Unlimited tags, until Blue Mountain quota of 270 is met
Black Bear	Year Round	Unlimited tags, 1 bear per tag
Grouse	September 1 – January 31	3/day, 9 in possession
Turkey Youth	April 7 – April 8	1/tag
Turkey General	April 15 – April 31	1/tag, up to 3 tags issued/year

Environmental Consequences

Wild horse effects to recreation are not quantitatively measurable, but a general qualitative analysis can be made with positive and negative ratings associated with each indicator. In the table below, it is clear that Alternative 2 shows the most benefit to the Recreation experience, while Alternative 3 shows more negative ratings overall than both Alternatives 1 and 2. Discussion of the effects follow Table 41.

Table 41: Summary Comparison of Recreation Attributes by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
Dispersed Camp Sites	--	+	--
Trails	--	+	--
Wild Horse Viewing	--	--	+
Hunting	--	+	--

Dispersed Recreation

Horses utilize many of the same dispersed sites popular with campers. Often horses are attracted to the same areas that humans are for dispersed camping due to presence of water and shade, open areas to gather, and open travel corridors to access the site itself. As such, vegetative trampling at dispersed sites can occur by humans or wild horses, but the degree correlates directly to recreation use or horse presence. Wild horses can affect the naturalness of a site by denuding vegetation, churning soil, digging holes and leaving manure in camping locations (Figure 36).

Figure 36: Holes and tree root damage caused by wild horses at a dispersed recreation site in the Territory.



Five sites are proposed for trapping operations, but the Forest only has the infrastructure to deploy two trapping operations at a time. All five sites have been known to be used as dispersed camp sites, especially during hunting season. These sites would not be closed during trapping operations, but it is likely the public would avoid these areas when traps are set up.

The potential for differences in effects between the alternatives is primarily in the degree of effect.

Alternative 1 – No Action

The AML in the current management plan is 55-65 horses which is far less than the current estimated wild horse population of 135. Fewer wild horses and smaller bands would reduce the degree and extent of effect from wild horses occupying dispersed recreation sites.

Under this alternative, occasional occupation of dispersed sites for trapping operations would continue on an as needed basis. Beginning with about 135 horses, it is expected that it will take approximately 10 years of trapping to reach the AML of 55-65 horses.

Alternative 2 – Direct and Indirect Effects

With a lower AML of 12-57 wild horses, the effects to dispersed recreation sites can be expected to be reduced, with fewer horses congregating in the sites and associated riparian areas. It will take up to about five years to reach AML.

In the short term more frequent occupation of dispersed sites would occur until objectives are met. In the long term (> five years), visitors would notice less frequent occupation and impacts to dispersed sites once objectives are achieved.

Alternative 3 – Direct and Indirect Effects

This alternative would allow the wild horse population to range up to 200 wild horses. Compared to Alternatives 1 and 2 there would be less frequent occupation of dispersed sites for use in bait trapping in the short term. Long-term, managing the horse population would require occasional occupation of dispersed sites for trapping operations.

The AML of 150-200 wild horses is more than the current herd estimate of 135. If the wild horses continue to congregate in larger bands, the effects to dispersed recreation sites would become more severe and longer-lasting.

All Alternatives – Cumulative Effects

Within the BST, there are no ongoing or reasonably foreseeable future projects that have the potential to affect dispersed recreation sites; therefore managing wild horses under any of the alternatives would not have a cumulative effect to dispersed recreation sites.

Trails

Wild horses do travel on the designated system trails, which can contribute to erosion and can cause trail damage. During muddy conditions trail users generally avoid using trails while wild horses use the path of least resistance and will often use system trails to move across the forest during muddy conditions. This can result in cupping and rutting of the trail tread. Cupped trails are unpleasant for hikers and mountain bikers. Rutted trails carry more water and increase the speed of runoff contributing to the erosion of the trail tread. Additionally, horse bands can create braids in the trails and crossings that can make it hard to distinguish the system trail from paths created by wild horses.

Alternative 1 – No Action

The AML in the current management plan is 55-65 horses which is far less than the current estimated wild horse population of 135. Fewer wild horses and smaller bands would reduce the degree and extent of effect from wild horses utilizing the system trails.

Under this alternative, it is expected that it will take approximately 5 to 10 years of trapping to reach the AML of 55-65 horses. Trail damage due to wild horses would be reduced over that time.

Alternative 2 – Direct and Indirect Effects

With a lower AML of 12-57 wild horses, the effects to developed trails can be expected to be reduced, with fewer horses traveling along these trails.

In the short term trail users could see slowly diminishing numbers of horses traveling on the system trails. In the long term (> five years), trail users would see much lower numbers of wild horses using the trails and diminishing effects over time.

Alternative 3 – Direct and Indirect Effects

This alternative would allow the wild horse population to range up to 200 wild horses. Compared to Alternatives 1 and 2 there would be more wild horses utilizing the system trails increasing the potential damage of trails due to cupping, rutting, and braiding.

The AML of 150-200 wild horses is more than the current herd estimate of 135. If the wild horses continue to congregate in larger bands, the effects to developed trails would become more severe and longer-lasting requiring increasing levels of annual trail maintenance.

All Alternatives – Cumulative Effects

There are no reasonably foreseeable future projects that could impact trails in the Territory. Therefore there would be no cumulative effect to trails from managing wild horses in the Territory.

Wild Horse Viewing

The public's wild horse viewing experience can be affected by the presence or absence of wild horses. Word of mouth and social media posts by repeat visitors can alert the public to areas where their wild horse viewing attempts would be most successful.

Alternative 1 – No Action – Direct and Indirect Effects

The AML in the current management plan is 55-65 horses which is far less than the current estimated wild horse population of 135. Fewer wild horses and smaller bands would reduce the success of viewing wild horses and may reduce the popularity of the activity over time.

Under this alternative, it is expected that it will take approximately 10 years of trapping to reach the AML of 55-65 horses and over that time successfully finding horses for viewing opportunities would decrease.

Alternative 2 – Direct and Indirect Effects

With a lower AML of 12-57 there would be fewer wild horses and smaller bands would reduce the success of viewing wild horses and may greatly reduce the popularity of the activity over time.

Successful viewing would continue to diminish as horses are removed from the territory and it would be expected that because of the unlikelihood of finding wild horses the activity would decrease even more than Alternative 1.

Alternative 3 – Direct and Indirect Effects

This alternative would allow the wild horse population to range up to 200 wild horses. Compared to Alternatives 1 and 2 there would be more wild horses in the area increasing the success of viewing opportunities in the Territory.

All Alternatives – Cumulative Effects

Within the Territory, there are no ongoing or reasonably foreseeable future projects that the potential to effect wild horse viewing; therefore, managing wild horses under any of the alternatives would not have a cumulative effect other than direct effects to viewing opportunities described above.

Hunting

Wild horses do have an effect on dispersed campsite conditions and that can contribute to reduced visitor satisfaction with the camping experience.

Wild horses occasionally interact with domestic horses in hunting and equestrian riding camps, in addition to equestrian events. This can also contribute to decreased visitor satisfaction.

Wild Horses compete directly with big game for space and forage and generally avoid each other. It is reasonable to expect that hunter success would decrease in areas with high concentrations of wild horses during the hunting season.

Alternative 1 – No Action – Direct and Indirect Effects

The AML in the current management plan is 55-65 horses which is far less than the current estimated wild horse population of 135. Fewer wild horses and smaller bands would reduce the impacts to hunting activities.

Under this alternative, it is expected that it will take approximately 10 years of trapping to reach the AML of 55-65 horses and over that impacts to hunting activities would continue to decrease.

Alternative 2 – Direct and Indirect Effects

With a lower AML of 12-57 wild horses, negative effects to the hunting experience would continue to diminish as horses are removed from the territory and the positive effects would be more noticeable than Alternative 1.

Alternative 3 – Direct and Indirect Effects

This alternative would allow the wild horse population to range up to 200 wild horses. Compared to Alternatives 1 and 2 there would be more wild horses competing for the same resources as game species.

The AML of 150-200 wild horses is more than the current herd estimate of 135. If the wild horse numbers continue to increase, it can be expected that the negative effects to the hunting experience would also increase with the rise in population.

All Alternatives – Cumulative Effects

Within the Territory, there are no ongoing or reasonably foreseeable future projects with the potential to effect hunting opportunities; therefore managing wild horses under any of the alternatives would not have a cumulative effect. The Forest does not control or issue hunting tags. Changes in the allocated tags and seasons would come from ODFW and would be the only factor affecting hunting opportunities on the Forest.

Soils

This section of the EA discusses the types of soils that are present within the Big Summit Territory, and the kinds of effects that wild horses have on soils. The alternatives are compared based on the anticipated level of detrimental soil disturbance from the different AMLs.

Analysis Methods

The following sources were used to describe and assess the existing condition:

GIS FACTS database outlines past harvest activities, thinning activities and fuels treatments. Soils Resource Inventory Layer (Paulson, 1977): outlines basic soils differences at the one inch to the mile scale.

The current condition of upland soils was assessed using Parker 3-Step Condition and Trend transects (Parker, 1951) established in the 1950s and 1960s, Ecological Site Inventory data and paced transects (USFS-R-6).

Riparian soil status was assessed using 1) US Forest Service Region Six Bottom Line Survey method, 2) the protocol in Monitoring the Vegetation Resources in Riparian Areas, commonly known as the Winward method (Winward, 2000), 3) Area 4 Riparian Monitoring or (“Riegel”) plots (USDA/USDI 1996), and 4) Proper Functioning Condition assessments (Riparian Area Management TR 1737-15, 1998).

The following resource elements will be used to demonstrate effects of the alternatives to the soils resource: extent of detrimental soil disturbance and amount of coarse woody material and surface organic matter. Detrimental soil disturbance is assessed by estimating the area in detrimental soil condition and coarse woody material is assessed with professional judgement and a qualitative assessment of sufficiency as well as percent effective ground cover or tons per acre.

Affected Environment

The Territory contains a wide variety of soils and landtypes. Parent materials are largely John Day/Clarno formation basalts/andesites according to the Soil Resource Inventory (Paulson, 1977). Volcanic ash from Mt. Mazama blanketed the area about 7700 years ago and has been subsequently reworked by water and air. Ash soils occur over 32 percent of the area or 8,211 acres on USFS lands commonly on northern, northeastern, eastern and southeastern aspects and in swales and meadows. The balance of the watershed is largely residual soil which is clay-loam or clay texture. Some of the planning area is non-commercial ground and is scabland, sage, juniper, rock outcrop, low site ponderosa or wet meadow, moist meadow or dry meadow.

This Territory spans a variety of elevations ranging from near 4,000 feet at the forest border at Blevins Creek to 6,753 feet at the top of Round Mountain. Since this area is largely forested, it is classified as transitory range for sheep, deer and elk and also is transitory for wild horses. Herded domestic sheep graze this area in the spring through summer and early fall months. Winters can be severe with snow depths ranging up to 10 feet deep or more at higher elevations. This makes for a very inhospitable environment for grazing animals in the winter time. The identified wild horse winter range is between the ONF boundary, at ca. 4000 feet and 4,600 feet in elevation, which is the average persistent snow line elevation in this territory.

When Mazama ash was deposited here approximately 7700 years ago the apparent prevailing winds were from the southwest. These winds helped deposit approximately 1.5 feet of largely sandy loam and loamy sand ash over this area. After subsequent wind and water erosion there are varying depths of ash soils throughout the area. The Territory contains approximately 8,211 acres (32 %) of ash soils having at least 7 inches of surface ash. The deepest ash soils occur on the common north and eastern aspects. The southern and western aspects have the least amount of ash deposits. Wild horse hoof action as a contributor to erosion, particularly along streams, is most pronounced along streams with ashy banks. The thickest ash banks are along streams with N and NE aspects.

These are also soils with little or no ash capping. They commonly have clay loam surface A horizons quickly grading to heavier clay. These are generally on south and west facing aspects which are hotter and drier than north or east aspects. These soils are not generally as susceptible to detrimental compaction depending on the depth to the smectitic clay which shrinks and swells with each wet and dry season. Surface cracks are common in these soils and they are classified as Vertic intergrades of Argixerolls or Haploxererts. These soils are susceptible to detrimental puddling (destruction of soil ped structure) via hoof action and will be susceptible to post holing, plugging and trail erosion during wet conditions such as thunderstorms or spring thaws. Sheet and rill erosion is naturally higher on southern exposures. This is due in part to slower permeability, infiltration and the common presence of vesicular crusting. Riparian areas, seeps, springs and scablands often contain these type of soils especially in exposed banks or on southern aspects.

Riparian Soils: The zone most affected by wild horse, large ungulate and sheep hoof action in terms of erosion and delivered sediment is viewed as the 20 foot zone (10 feet each side) of an average class II and III stream. This is based partly on a Montana study which showed that 94 to 99 percent of sediment was retained in 6 meter (ca. 20 feet) wide buffer regardless of vegetation type or slope (Hook 2003). This is viewed as the zone most likely to be affected by wild horse and large ungulate grazing such as cattle and elk.

Scablands: Scablands are recognized as among the most fragile ecosystems on the Ochoco National Forest. Damage to the soil and vegetation as a result of management activities is nearly impossible to mitigate. This is a result of their having very shallow soils which are subject to severe water saturation and frost heaving during winter, thus making revegetation virtually impossible. Long-term data (45 to 50 years of monitoring) by Fred Hall, retired USFS ecologist, has shown that scablands throughout the ONF are some of the most stable ecosystems under dry season grazing (Hall, 2002, personal communication and on-site monitoring on scablands).

Fens: There are a number of fens with organic soil character in the Territory. Fens are generally characterized by a mounded surface feature with an upwelling (positive pressure) of water occurring as vents usually in the top portion of the mound. Anaerobic conditions created by the constant saturation of these soils prevents the oxidation of organic matter such as moss, lichens, and carex resulting in organic matter accumulations creating the mounded feature. There are a few small fens scattered throughout the Territory such as below the main springs in Douthit Creek. Post holing and plugging along with trailing damage is common on these small fens due to elk and wild horses.

Wetlands: Obligate wetlands occurring on the ONF and CRNG total approximately 1,072 acres. This mapped association is the one that can be distinguished at the 1/24,000 mapping scale. These are usually greater than 5 acres in size. Approximately 188 acres of other small wetlands occur throughout the project area which are unmapped at this scale.

Non-Forest plant associations in the Territory include scablands (see above discussion), juniper steppes, hellebore wetlands, meadows, rocky slopes, willow wetlands and alder wetlands so production varies widely. These areas along with the transitory range in the forests are selectively used depending on grass and sedge production for each association. The meadows and wetlands have the highest production of grass and sedge for grazing animals.

Existing Condition

As documented by Buckley in his thesis entitled *The Desertification of Camp Creek*, 1992, much of the damage from bovine/equine livestock occurred before 1900. Logging influences were minimal until the introduction of caterpillar type tractors in the 1930s. Train logging was not extensively practiced on the Ochoco in contrast to the Deschutes.

Grazing has been a major factor in the cumulative impacts of European settlement. Heavy grazing has caused compaction, loss of effective cover, head cutting, post holing, puddling and smearing. Some impacts occurred from elk but most were due to the historic concentrated herds of cattle, feral horses, and sheep. Currently this area is within a sheep allotment.

With the increasing use of caterpillar type tractors and eventually rubber tired skidders, much of the acreage below 30-40 percent slope was tractor logged with a cumulative forest-wide average from multiple entries and mechanized fuels treatment of 10-40 percent of the commercial forest acreage in a detrimentally compacted or displaced condition- (includes skid trails, landings and areas traversed for machine piling).

Currently the net amount of road in the USFS lands in the Territory is ca. 153.7 miles based on an average of 1 percent of the project acres (@ 1.82 acres/mile for an average road width of 15 feet = approx. 280 acres). Roads are important travel corridors for wild horses. They allow horses to move more quickly throughout the Territory.

Many of the streambank soils are recovering but the levels of entrenchment are such that recovery will take a long time (50 to 100 years) in the absence of anthropic inputs such as stream structures comprised of rock and/or wood or the use of plug and fill techniques to raise water tables such that streams can interact with their floodplains. See Hydro and Aquatic Species section for more information on streambank condition.

Detrimental Compaction/Displacement: Increased erosion from past livestock heavy grazing has removed large amounts of upland and riparian soil. The overall productivity of many soils has been reduced by at least one site class. Detrimental compaction has reduced the productivity of tractor timber ground by 15 to 20 percent. A small proportion of each pasture (0.3 to 2 percent in this project area) has congregation areas around water sources (ponds, troughs and springs), bedding areas, salting areas, trails along fences and pasture corners which show more impacts than the rest of the pasture. Compaction and bank trampling impacts from introduced bovines or equines are outside of the natural range of variability, since they concentrate more in riparian bottoms compared to native ungulates. These areas are less productive due to detrimental compaction, displacement, postholing, bank sloughing and trampling.

Past activities that contributed to existing conditions and trends:

Livestock grazing has caused impacts to effective ground cover, bank stability, and infiltration resulting in high levels of sheet/rill erosion and channel erosion during historic times. As documented by Buckley, most of the impacts occurred in the 20 to 30 years before 1900 due to the combined impacts of cattle, sheep, and feral horses. The mainstem of many creeks such as Blevins Creek, Douthit Creek and Cram Creek were heavily impacted. Formerly hydric soils have been drained and the drainage has been channelized. Large amounts of sediment have moved and are moving from these localized areas.

There are approximately 14 existing water developments located on National Forest lands in the Big Summit Wild Horse Territory. These are comprised of mainly springs. Each water development is estimated to include approximately one acre of land immediately adjacent to the development that has detrimentally impacted soils associated with livestock and wild horse use of the development. Impacts include compacted, displaced, post holed/plugged and exposed soils. These areas are generally denuded of vegetation. The estimated 14 acres of detrimentally impacted soils associated with the existing developments is a normal impact inherent to grazing animals.

There are approximately 21.5 miles of existing fence that follow portions of the boundary of the Territory and about 0.6 miles of enclosure fencing within the Territory. Primary impacts are associated with the use of motorized vehicles ranging from OHVs to pickups to transport materials from roads to the site of the construction. Soil compaction and displacement would be limited to areas where vehicles were driven. Assuming a 10-foot wide “road,” one mile of fence would result in approximately 1.2 acres of soil experiencing detrimental soil impacts.

Salting/Mineral-Protein supplements for domestic sheep: Assume short duration, dry season grazing with salt block/tub pick up and transport to actively grazed areas of the sheep allotment. Approximately a 10 foot by 10 foot (100 square feet) of detrimentally disturbed soil per site with 10 to 20 salt sites per each 1,100 sheep band (2 bands total); therefore, salting impacts range from approximately 0.05 acres to 0.1 acres within the Territory.

Based on data from the GIS and FACTS activity database dating back to the 1970s, approximately 17,271 acres of the Territory have been harvested in the past with about 13.5% of those acres having detrimental disturbance; this equates to about 9% of the Territory having detrimental disturbance.

Environmental Consequences

The geographic scope of the analysis is the boundary for the Big Summit Wild Horse Territory. The effects are either short term (the next 3 to 10 years) or long term (the next 10 to 50 years). Estimates of detrimental soils conditions are based on estimated acres grazed, stream miles grazed, number of range improvement water developments, salt/supplement sites, and fence miles.

Streambank alteration may be a short or long term impact. Some features are temporary and seasonal such as hoof prints and shallow postholing. Deeper postholing, pedestalling and bank shearing are longer term impacts. Early on (spring or early summer) grazing impacts are largely seasonal and will

most likely be revegetated in the average year. (USDA; 2003; Implementation Monitoring Program for Pacfish, Infish and the 1998 Biological Opinions for Salmon, Steelhead and Bull Trout, Program Manual; Appendix E-4, pages 79-82; Protocol for Measuring Bank Trampling).

Trampling (compaction and plant cover removal) damages ranges of all soil types, soil moisture levels, plant species, or animal species. Forage yield are reduced most when animals graze on wet soils. Compaction from trampling reduces moisture infiltration into the soil.

Horse urine and manure has benefits as they are recycled into the soil. This recycling is random and, therefore, has different effects on various plants in the field. The growth and regrowth of plants is directly influenced by fertilization. A small percentage of the acreage is affected especially since excreta is often concentrated near water or salt sources and shade spots (Oregon State University, 2018).

Effects Common to All Alternatives

Direct and Indirect Effects include physical impacts such as:

Compaction. Compaction is defined as an increase in soil bulk density caused by wild horse hooves which reduces surface soil porosity. This causes reductions in water infiltration, percolation and air exchange in the soil. There is also an increase in resistance to root growth. Detrimental compaction is defined as a 15 percent increase in soil bulk density for residual soils and a 20 percent increase in bulk density for ashy soils. As discussed below this effect is largely seasonal. These effects do have short term impacts on overland flow especially for summer thunderstorms. This may increase the runoff peak and cause more surface and bank erosion than on ungrazed soils. These effects are usually shallow, short lived, seasonal compaction on sandy loam textured surface soils (Ahmed H. Abdel-Magid, G. E. Schuman and R. H. Hart; 1987). In this study on a sandy loam soil in Wyoming, “No significant differences in infiltration between stocking (moderate and heavy) existed in the spring, indicating that the freeze-thaw activity each winter alleviated any detrimental soil compaction that reduced infiltration.”

Although the compactive effects may be seasonal, there is concern that horse-occupied sites have more compacted soil surfaces and lower abundance of ant mounds (mostly thatch/formica ants and harvester ants) in the Territory. Both wild horses and sheep (compared to cattle) use more of the steeper ground in this area which may cause additional erosion (compared to cattle grazing) during summer thunderstorms and spring runoff (Beever and Herrick 2006).

Physical degradation of the soils refers to adverse changes in soil physical properties, including porosity, permeability, bulk density and structural stability (F.A.O. 1979). The most important processes of physical degradation are surface sealing, crusting and compaction. The presence of rock fragments will usually reduce the intensity of physical degradation in fine textured soils (Poesen and Lavee 1994).

Post-holing, plugging and pedestalling via hoof action. Hooves shear the protective sod mats and create holes and mixing throughout which induces a condition which is susceptible to rill and gully formation. These vertical hoof holes are called post holes. Commonly these areas appear hummocky and show signs of erosion in between the hummocks. This can be particularly damaging around wet meadows, springs, seeps and streams. The term hummock and pedestal are used interchangeably (Boyd et al. 2016).

Bank erosion due to sloughing. Hoof action, rubbing and wallowing commonly cause bank failure on streams with banks composed of fine alluvium such as sand, silt, clay and gravels. They can create hydraulic roughness which can increase tractive force. Sheep and wild horses can also reduce erosion resistance by removing protective vegetation and loosening soil. This results in more sediment delivery to the stream especially during high flow events. Some small areas, such as in livestock enclosures, (various types and sizes occur throughout the Territory) are currently excluded from wild horse grazing. Potential impacts are still of concern along Class IV drainways which have a defined channel but do not

have live water or riparian vegetation. (Platts and Nelson 1985). Stubble height is used as a surrogate for hydraulic roughness to ensure that adequate protection exists for these small intermittent streams (Clary 1989). If the pasture is meeting stubble height standards in LRMP, then it is viewed as meeting basic resource protection measures for a particular pasture. See Hydrology and Aquatic Species report in reference specifically to bank erosion data from Level II Hankin-Reeves stream survey and the Bottom Line Survey.

Different stream types vary in their susceptibility to wild horse and large ungulate impacts. For instance, streams with more vertical stability in the channel bottom due to rock and/or clay are more susceptible to stream widening via hoof action on the banks. This includes small Rosgen B and C type channels. This often increases the surface area to capture solar energy which warms the stream to unhealthy levels for fish and amphibians. Also, the overall depth is decreased in these situations which further creates problems with lack of suitable habitat components. In streams with vertical banks, such as gullies (Rosgen G and steeper sided F channels), banks are very susceptible to wild horse hoof shearing and collapsing which directly contributes sediment to the active channel. Examples of this are found throughout the Big Summit Wild Horse Territory, such as in Duncan Creek, Blevins Creek, Cram Creek and around multiple springs and seeps.

Mixing and incorporation of organic matter into surface horizon. This has both positive and negative impacts. Mixing helps incorporate and conserve organic matter. It also reduces the mulching effect of organic matter which may leave the soil somewhat less protected from wind and water erosion (Potter et al. 2000; Schuman, Reeder, Morgan, Lecain and Hart, 1998)

Impacts to Microbiotic and Vesicular Crusts. Microbiotic crusts occur to some degree over most of the non-forested areas (scabland, juniper steppe, shrub steppe), juniper woodland and dry pine areas. They are most evident in the spring time. Historically these crusts were probably more evident than today. Microbiotic crusts and the closely associated vesicular crust (a platy surface crust, usually 1.5 to 3 inches which is formed by raindrop impact and contains vesicular pores) form a thin surface layer comprised of biotic and abiotic features. The vesicular crust along with the microbiotic crust (if present) provides a resistant layer to surface and rill erosion as well as wind erosion.

Biological soil crusts, also known as microbiotic crusts, cryptogamic crusts, or cryptobiotic crusts, are an important part of the arid and semi-arid ecosystems of the intermountain west. These crusts are composed of lichens, mosses, microfungi, bacteria, and green algae that grow on top of the soil in a rough, uneven carpet, in the interspaces between shrubs and grasses. They function as a “biological mulch”, helping to reduce wind and water erosion, fix atmospheric nitrogen, contribute to soil organic matter, retain soil moisture, enhance vascular plant regeneration, and help prevent noxious weed establishment, including cheatgrass (U.S. Department of the Interior Technical Report 1730-2, *Biological Soil Crusts: Ecology and Management*, 2001).

Sometime in the past 150 years, cheatgrass (*Bromus tectorum*), corn brome (*Bromus squarrosus*), rattlesnake brome (*Bromus briziformis*), japanese brome (*Bromus japonicus*) and ventenata grass (*Ventenata dubia*) entered the project area and have never left. Cheatgrass is an annual exotic grass and as such can pose a long-term threat to biological soil crusts (USDI 2001, et al). Such invasions have been shown to inhibit crust development (USDI 2001, et al).

Arid soils (such as on scablands, south facing shrub steppe, juniper steppe, juniper woodland and dry pine plant association groups) appear particularly vulnerable especially in regards to microbiotic crusts. These crusts are easily disturbed by livestock hoof action. This breaks up the crust and causes desiccation and increases susceptibility to wind and water erosion (Harper and Marble, et al). Comparison of grazed and ungrazed sites revealed lower cover of biotic crusts, nitrogen-fixing lichens, crust dominated soil surface roughness, and lower species richness in the grazed transects. There was more bare ground in the grazed transects. Ponzetti, Jeanne M. and McCune, Bruce P.; 2001; Biotic Soil

Crusts of Oregon's Shrub Steppe: Community Composition in Relation to Soil Chemistry, Climate and Livestock Activity; *The Bryologist* 104(2):212-225. 2001.

Impacts to soil microorganisms. Grazing animal behavior influences the distribution of nutrients to various landscape positions. Animals may graze in one area and move to another area to rest or drink. Dung and urine may thus be more plentiful in the resting area and around a watering place than in the grazing area, a fact affecting the soil fertility of both areas, resulting in a net transfer of nutrients from the grazed area to the resting and watering areas.

Grazing promotes nutrient cycling through rapid breakdown of organic matter into smaller particles in the system, so organic matter is available more readily for soil microorganisms such as soil bacteria and fungi. Microorganisms use the organic matter as an energy source and can release nutrients back into the soil for plant uptake. Thus, grazing may increase the rate at which nutrients cycle through an ecosystem. It may be argued that if nutrients are not bound up in soil or organic matter, then they are more vulnerable to being lost to the system. Management is important for ensuring that nutrient resources within the ecosystems are not depleted and that nutrients lost from the system are replenished through natural processes or by fertilizer additions. Krueger, W. A; Sanderson, M. A.; Cropper, J. B; and others, 2002, *Environmental Impacts of Livestock on U. S. Grazing Impacts*; Council for Agricultural Science and Technology; Issue Paper Number 22.

The diversity and abundance of soil organisms is influenced not only by available food resources, but by changes to physical and chemical properties of the soil. Studies in southern British Columbia have shown significant differences in prostigmatid mite populations (a common mite in tundra, desert and tropical grassland habitats) in grazed and ungrazed sites. There were significant effects on mite populations due to season, depth and grazing as well as a significant season by grazing interaction. (Battigelli, J. P. and McIntyre, G. S.; 1999; *Effects of Long-Term Grazing on Abundance and Diversity of Soil Mesofauna*, IN: *Effects of long-term grazing on soil quality in Southern British Columbia*. Edited by M. Krzic; K. Broersma; D. Thompson; and A. Bomke. Report No. 3 (April 1998-March 1999). Beef Cattle Industry Development Fund (Project No. 58). Pp 25-30. The significance of this difference in mite populations to soil function has yet to be determined.

Effects by Alternatives

Common to all alternatives: Water developments help to spread out wild horse use across the WHT. Fourteen water developments (mainly spring developments) occur in the Territory. Using about one acre per development of detrimental soil conditions, this totals 14 acres.

Alternative 1 - Current AML 55-65

Upland soils would show horse trails from feeding grounds to water sources. Scabland soils would show impacts from wildlife and wild horses. Bank erosion and sloughing via wild horse hoof action would be a contributing factor to potential erosion. Evidence of bank erosion, especially in the entrenched and gullied portions on Rosgen class C, D and E channels, would take time (5 to 50 years) to recover because the channels would still be entrenched. Horse trailing will occur along and on streambanks and down fence lines. Overall streambank stability would be lessened due to decreased vegetative cover. If the Territory were considered a project unit, this alternative would meet Forest and Regional standards and guidelines for thresholds of detrimental soil disturbance such as compaction and displacement as most horse grazing impacts would be less than 3 percent of the total grazed acres

Alternative 2: Proposed AML 12-57

This proposed alternative has the lowest AML of the three alternatives. Less horse numbers equals less potential impacts depending on how heavy they concentrate in specific areas. Horse impacts to soils, in

the form of trails, wallows along streams, and bank trampling damage on stream banks, seeps and springs will still be evident in localized areas such as Douthit Creek, Blevins Creek and Cram Creek.

Alternative 3 – Increased AML (150 to 200 horses)

This alternative has the most potential for continued adverse impacts (including detrimental compaction and bank damage), as it increases the wild horse AML to 3 to 4 times the original wild horse AML established in the early 1970s. Wild horse impacts will be 3 to 4 times what would be expected under the original 55 to 65 head of wild horses. The existing population (about 135) is currently affecting bank stability and stubble heights (as a surrogate for roughness) throughout this Wild Horse Territory.

Streambank Alteration: Target level specified to be no more than 20% (INFISH Standards). The existing overall percentage of riparian area soils affected by wild horses is higher than 10 percent and is approaching or is over 20 percent for a number of streams such as Cram Creek. See fisheries and range reports for specific data.

Cumulative Effects

The spatial boundary for analyzing the cumulative effects to soils is the Big Summit Wild Horse Territory (WHT), because actions outside the WHT would have little or no effect on soil productivity within the WHT. An activity area is defined as “the total area of ground impacted by an activity, and is a feasible unit for sampling and evaluating” (FSM 2520). The temporal boundaries consider the potential for both short- and long-term effects. Analysis of short-term effects looks at changes to soil properties that would generally recover or revert to pre-existing conditions within five years of completing proposed activities. Long-term effects are those that would substantially remain for five years or longer in the absence of restoration treatments. Both temporal bounds are considered because short-term effects may be visually evident immediately after planned activities but have only short-lived and minor impacts to soil productivity (e.g., low-level shallow compaction that returns to normal levels through freeze-thaw action in a couple of seasons), while long-term effects may persist for years or decades, dramatically affect soil productivity, and be worsened by repeated entries or management actions (e.g., compaction on skid trails that persists from historic harvests and may be worsened by wildlife, sheep and wild horse trailing).

Cumulative Effect Alternative 1

The cumulative effect of managing for 55 to 65 wild horses when considered in addition to other ongoing impacts will meet Forest and Regional standards and guidelines for detrimental soil disturbance such as compaction and displacement as most livestock, wildlife, and wild horse grazing is estimated to impact less than 3 percent of the total grazed acres.

Cumulative Effect of Alternative 2

Sheep grazing would continue as described in the Range Resources section, which contributes to utilization but use has been shown to be less than Forest Plan standards allow. Problem areas with chronic low stubble heights (high utilization levels) occur in the Blevins Creek, Douthit Creek and Cram Creek areas among others due to the current population of wild horses. Herders would help to keep sheep moving up into the uplands and help reduce sheep impacts on streambank soils. Effective ground cover should be increased also as a result. This alternative would have the fewest wild horses and therefore would contribute the lowest level of cumulative effects.

Cumulative Effects of Alternative 3: This alternative has the most potential for continued adverse impacts (including detrimental compaction and bank damage), as it increases the wild horse AML to 3 to 4 times the original wild horse AML established in the early 1970s. This alternative would meet Forest and Regional standards and guidelines for soils because the overall sum of detrimental disturbance including logging, roading and grazing impacts are still less than 20 percent of the Territory.

Summary

The effects of alternatives are within a relatively narrow range when put in context of the entire Territory; however, horses do have preferred habitats and tend to use riparian areas more (see Wild Horse section), so it is reasonable to assume more soil impacts in those areas and lower impacts away from them, with intensity of impacts increasing with increasing AML.

Under the proposed action, horse numbers would be reduced to fall within the AML range of 12 to 57 wild horses in about 5 years. Soil quality would not be diminished further, but would remain compromised where heavy horse trailing and trampling exists along stream banks, wet meadows, wallow areas and springs/seeps. Although disturbed soils would continue to slowly recover naturally from the effects of past management, the current levels of detrimental soil conditions would likely remain unchanged for an extended period of time (up to 5 to 10 years or more). This horse territory would have the most detrimental soil conditions under Alternative 3 due to the high AML specified to be in the 150 to 200 horses range. The original AML would be much less disturbing with only 55 to 65 horses managed for over time.

Monitoring data/best professional judgment suggest that most of the Wild Horse Territory meets Forest Plan S&Gs for ground cover and have sufficient coarse woody debris for the ecosystem services described herein. Exceptions occur along some heavily grazed streams, springs and seeps as lower acreage impact zones.

Heritage Resources

Regulatory Framework

Federal Law / Regulation

The legal framework that mandates the Forest to consider the effects of its actions on cultural resources is wide-ranging. In this case, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (amended in 1976, 1980, and 1992) is the foremost legislation that governs the treatment of cultural resources during project planning and implementation. Implementing regulations that clarify and expand upon the NHPA include 36 CFR 800 (Protection of Historic Properties), 36 CFR 63 (Determination of Eligibility to the National Register of Historic Places). The Pacific Northwest Region (Region 6) of the Forest Service, The Advisory Council on Historic Preservation (ACHP), and the Oregon State Historic Preservation Office signed a programmatic agreement (PA) regarding the management of cultural resources on National Forest Systems lands in 2004. The 2004 PA outlines specific procedures for the identification, evaluation, and protection of cultural resources during activities or projects sponsored by the Forest Service. It also establishes the process that SHPO utilized to review Forest Service undertakings for NHPA compliance.

The National Environmental Policy Act (NEPA) is also a cultural resource management directive, as it calls for agencies to analyze the effect of their action on socio-cultural elements of the environment. Other laws such as the National Forest Management Act (NFMA) of 1976, the Archaeological Resources Protection Act of 1979, and its implementing regulations at 36 CFR 296 (Protection of Archaeological Resources), Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, also guide the Forest Service decision making as it relates to cultural resources. The American Indian Religious Freedom Act (AIRFA) of 1978 requires that federal agencies consider the effects of their projects on the free exercise of traditional Indian religions.

Executive Orders

Executive Order 13007 (Indian Sacred Sites) guides agencies responsible for management of Federal lands to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites.

Manual and Handbook Direction

Forest Service Manual (FSM) 2360

- 2363.1 Cultural Resource Identification: The agency official is responsible for identification of historic properties on any NFS lands likely to contain cultural resource and on National Forest Service (NFS) lands subject to the effect of Forest Service or Forest Service-authorized undertakings.
- 2364.03 Policy: It is the policy of the Forest Service to:
 - a. Ensure that Land use decisions and management practices do not have an inadvertent adverse effect on the characteristics that qualify cultural resources for listing on the National Register or on the uses determined appropriate through the evaluation and allocation processes.
 - b. Determine whether proposed Forest Service or Forest Service-permitted undertakings will have effects on National Register listed or eligible properties and take those effects into account in land use decisions, following the procedures set forth in 36 CFR part 800, or national, regional, or state programmatic agreements that are applicable to the undertaking proposed.
 - c. Consult with the SHPO, Indian Tribes, Advisory Council, and the interested public.

Forest Plan Direction

The Ochoco National Forest Land and Resource Management Plan (LRMP) provides standards and guidelines for Cultural Resources.

Cultural Resources

- Conduct Cultural Resource Surveys (inventories) in advance of all ground-disturbing actions (Page 4-122).
- Submit project Cultural Resource Reports for State Historic Preservation Office (SHPO) review and Section 106 (National Historic Preservation Act, as amended) compliance prior to issuance of the Decision Notice and Environmental Assessment or Environmental Impact Statement (Page 4-122).
- Document Through the NEPA process the results of cultural resource surveys for all proposed ground-disturbing projects (Federal, Federally-funded, or permitted) or projects determined to have an effect upon cultural resource sites or values (Page 4-123).
- Prepare a determination of Effect for all projects and submit for Oregon SHPO Review and consultation (i.e. No Effect, No Adverse Effect, or Adverse Effect) (Page 4-123).
- Mitigate adverse effects to eligible and significant sites under consultation with the Oregon SHPO, Advisory Council on Historic Preservation, and interested publics. In ranked order the following treatment options will be considered (Page 4-123):
 - Avoidance through project design modification or abandonment (No Effect).
 - Combination of project modification and scientific data recovery under an approved data recovery plan (No Adverse Effect or Mitigation of Adverse Effect).

- Data recovery and analysis such that cultural resource values are protected and preserved in forms useful to various scientific, government, ethnic and local groups (Mitigation of Adverse Effect).

Burial Sites

- Project planning for management activities in the site vicinity shall consider burial location in planning decisions and if necessary modify implementation so as to avoid direct and indirect impact to the burial site (4-124).

Religious Freedom

- Meet all requirements of the American Indian Religious Freedom Act (AIRFA) (Page 4-124).
- This includes the gathering and processing of plants for food, medicinal, or craft uses; the construction of sweat lodges, or “vision quest” structures, and the like.

Treaty Rights

- Honor the rights reserved by the Confederated Tribe of Warm Springs Indians for lands ceded to the Federal Government through the Treaty of 1855 (Page 4-124).
 - On ceded land, the Tribes have the right to take fish in streams running through and bordering the Reservation and at all other usual and accustomed stations in common with the citizens of the United States.
 - The right of hunting, gathering roots and berries, and pasturing stock on unclaimed lands in common with citizens was also secured within the ceded lands.

Monitoring

- Monitor cultural resources on an annual basis. Review environmental analyses and project work plans; systematic field inspection during project activities. Inspection of selected projects to determine effectiveness of mitigation actions (Page 5-14).

Analysis Methods

The Area of Potential Effect (APE) for this project was identified as the Big Summit Territory boundary. A search of the Forest Service Heritage database, historic files, ethnographic information, General Land Office (GLO) records, as well as other documents, was undertaken to determine whether known cultural resource sites and Historic Properties are present within the APE. Historic Properties are cultural resources that have been determined to be eligible for inclusion in the National Register of Historic Places (NRHP). Additionally, any cultural resource that has not been evaluated for its eligibility for inclusion in the NRHP would be treated as “eligible.”

Areas of high concentration of horses and areas of known impacts in riparian zones were visited as part of interdisciplinary team field work. Additionally identified trap locations were surveyed for the presence of cultural resources.

Affected Environment

Within the Big Summit Territory there have been 9 previous cultural resource inventories conducted over the last thirty-five years which resulted in a combined total of 6,669 acres inventoried. To date approximately 26% of the total area has been inventoried for the presence of cultural resources. A total of 50 cultural resource sites have been recorded entirely or partially within the territory. This includes 17 prehistoric sites, and 33 historic sites.

Environmental Consequences

Alternative 1 – No Action

Managing wild horse herd within the AML of 55-65 horses would minimize the potential negative effects associated with trampling the peripheral areas adjacent to natural springs, riparian areas and watering places. This AML would reduce the numbers traversing prehistoric concentrations of lithic materials under muddy soil conditions which has the potential to laterally displace and transport those cultural materials.

Surface vegetation, primarily grasses and browse heavily utilized by wild horses would also potentially increase, allowing for better surface vegetation coverage, and reducing overall surface visibility. This would help mask surface identification of cultural remains (e.g., surface lithics). Increased surface visibility due to wild horse heavy utilization allows for illegal artifact collectors to easily see surface artifacts and increases the risk of illegal collecting. However an increase in surface vegetation (fuels) may result in slightly increased potential for high temperature wildfires which would negatively affect surface obsidian artifacts by altering or destroying the Obsidian “hydration “ rind that is useful in dating the age of cultural sites.

Capture of wild horses using traps has the potential to effect cultural sites by concentrating animals in and around the traps for an extended period of time. Use of salt or other minerals as a bait source can also result in digging of the soils surrounding the salt or mineral licks. Trap placement can result in displacement of both surface and subsurface artifacts. For this project the trap locations have been identified and surveys have been conducted for those areas to identify the presence of cultural sites. No sites were identified at the currently proposed trap locations. As a need for new or more trap locations arises the district archaeologist should be consulted to ensure traps are not placed on cultural sites.

Cumulative Effects

The past, present and future foreseeable effects result from livestock grazing, impacts from other activities such as water developments, road construction and maintenance, and vegetation management actions. However, with vegetation management actions we manage to avoid and protect the resources and therefore there would be no cumulative effects from vegetation management activities. Livestock range improvements are handled in much the same way, all water developments and new fence constructions are designed to avoid and protect cultural resources. The only instance where there may be cumulative effects to cultural resources is where grazing animals’ presence on the landscape overlaps with the wild horses. Both grazing livestock and wild horses as they move across the forest landscape can have an effect on cultural resources by potentially displacing and causing breakage to surface artifacts.

Alternative 2 – Direct, Indirect, and Cumulative Effects.

Managing a wild horse herd within the AML of 12-57 horses would be expected to have the lowest potential for disturbance by reducing the number of horses in the management area. A reduction in numbers of animals on the landscape would result in reduced disturbances and degradation due to trampling, lateral displacement, re-distribution, and breakage of artifacts.

As described in alternative 1 visibility would be decreased and fuels in the form of grasses and other small vegetation would increase, decreasing the potential for illegal artifact collection and increasing the negative effects to artifacts from fire.

Capture of wild horses using traps has the potential to effect cultural sites by concentrating animals in and around the traps for an extended period of time. Use of salt or other minerals as a bait source can also result in digging of the soils surrounding the salt or mineral licks. Trap placement can result in displacement of both surface and subsurface artifacts. For this project the trap locations have been identified and surveys have been conducted for those areas to identify the presence of cultural sites. No

sites were identified at the currently proposed trap locations. As a need for new or more trap locations arises the district archaeologist should be consulted to ensure traps are not placed on cultural sites.

Cumulative Effects

The past, present and future foreseeable effects include results of livestock grazing, impacts from other activities such as water developments, road construction and maintenance, and vegetation management actions. However, with vegetation management actions we manage to avoid and protect the resources and therefore there would be no cumulative effects from vegetation management activities. Livestock range improvements are handled in much the same way, all water developments and new fence constructions are designed to avoid and protect cultural resources. The only instance where there may be cumulative effects to cultural resources is where grazing animals' presence on the landscape overlaps with the wild horses. Both grazing livestock and wild horses as they move across the forest landscape can have an effect on cultural resources by potentially displacing and causing breakage to surface artifacts.

This alternative would have the greatest potential to reduce the risk of negative impacts to heritage resources as it would manage for the lowest number of animals (12-57) year-round.

Alternative 3 – Direct, Indirect, and Cumulative Effects

This alternative would allow an increase in the horse population which would be maintained at an AML of 150-200 horses. This would increase the potential risk of site disturbances and degradation due to trampling, lateral displacement or redistribution of artifacts, and soil compaction. Included risks from this alternative would be increased surface visibility, greater risk of illegal surface artifact removal, and increased erosion of exposed soils which would degrade cultural deposits.

Capture of wild horses using traps has the potential to effect cultural sites by concentrating animals in and around the traps for an extended period of time. Use of salt or other minerals as a bait source can also result in digging of the soils surrounding the salt or mineral licks. Trap placement can result in displacement of both surface and subsurface artifacts. For this project the trap locations have been identified and surveys have been conducted for those areas to identify the presence of cultural remains. No sites were identified at the currently proposed trap locations. As a need for new or more trap locations arises the district archaeologist should be consulted to ensure traps are not placed on cultural resource sites.

Cumulative Effects

The past, present and future foreseeable effects include impacts from livestock grazing, impacts from other activities such as water developments, road construction and maintenance, and vegetation management actions. However, with vegetation management actions we manage to avoid and protect the resources and therefore there would be no cumulative effects from vegetation management activities. Livestock range improvements are handled in much the same way, all water developments and new fence constructions are designed to avoid and protect cultural resources. The only instance where there may be cumulative effects to cultural resources is where grazing animals' presence on the landscape overlaps with the wild horses. Both grazing livestock and wild horses as they move across the forest landscape can have an effect on cultural resources by potentially displacing and causing breakage to surface artifacts.

Alternative 3 would have the greatest potential for negative effects to cultural resources. Managing 150-200 horses year round would increase the potential for impacts to cultural resources through trampling, lateral displacement and breakage of artifacts.

Summary of Effects

All alternatives propose to manage the herd numbers through trapping the horses. This activity is common across all alternatives and has a high potential to affect cultural resources. Management designed to maintain the number of wild horses within the Territory at the current AML (as in Alternative 1), or at the level called for in Alternative 2 would substantially reduce the negative effects to cultural resources. Conversely management direction that would allow an increase in the current wild horse populations as in Alternative 3, would be expected to affect cultural resources to a greater degree than the numbers identified in Alternatives 1 or 2, although Alternative 3 would probably require less trapping.

Other Disclosures

Estimated Costs of Management Plan Actions

Management actions as part of a management plan for the Big Summit Wild Horse Territory have costs associated with them. The following table shows estimated costs of some management actions.

Table 42: Estimated cost of some management actions.

Management Component	Action	Cost
Fertility Control		
	PZP administration in trap	\$245.00 per PZP dose (FS figures)
	PZP administration in the field	\$525.00 per PZP dose (FS figures)
	Burns BLM castration	\$60.00 per horse (BLM estimates)
Capture & Off-Range		
	Capture & Transport to Burns BLM (in-house crew)	\$500.00 per horse (BLM estimates)
	Capture & Transport to Burns BLM (contract crew)	\$1,300.00 per horse (BLM estimates)
	Short term care at Burns BLM	\$3.95 per horse/per day (BLM estimates)
	Burns BLM adoption	\$300.00 per horse (BLM estimates)
Inventory		
	Fixed-wing aerial (unsuccessful)	\$1,000.00 total
	Drone (unsuccessful)	\$1,000.00 total
	Fecal Samples (unsuccessful)	\$5,000 FS contribution, \$16,596.00 total project cost
	Line-intercept ground sampling (unsuccessful)	\$10,217.36 total
	Infrared fixed-wing aerial	\$13,700.00 total

Climatic Changes

The Intergovernmental Panel on Climate Change has summarized the contributions to climate change of global human activity sectors in its Fifth Assessment Report (IPCC 2014). In 2010, human-caused contributors to greenhouse gas emissions came from several sectors: Industry, transportation, and

building (41%); energy production (35%); agriculture (12%); forestry and other land uses (12%). The management of wild horses at an AML would have effects on the forage availability and condition, most notably in riparian areas of the Territory. The wild horse herd does not have an effect on the forested condition of the Territory and is not a main contributor of greenhouse gas emissions.

Climate change may have an effect on water, vegetation, and wildlife in the Territory. In 2019 the Forest Service published *Climate Change Vulnerability and Adaptation in South-Central Oregon* (Halofsky et al, 2019). The document assesses the vulnerability of key natural resources to climate change and offers adaptation options that minimize negative impacts of climate change and facilitate transition of diverse ecosystems to a warmer climate.

In south-central Oregon, average warming is projected to increase from 1.3 to 4.0 °C by 2050, and from 2.7 to 4.8 °C by 2080. Precipitation may increase slightly in the winter, although the magnitude is uncertain. This will have significant effects on the hydrology: decreased snowpack and earlier snowmelt will shift the timing and magnitude of streamflow: peak flows will be higher and summer low flows will be lower. Projected changes in climate and hydrology will have far-reaching effects on aquatic and terrestrial ecosystems, especially as frequency of extreme climate events (drought, low snowpack) and associated effects on ecological disturbance (flooding, wildfire, insect outbreaks) increase. Adaptation options developed by the South-Central Oregon Vulnerability Partnership may be useful at the Forest scale in planning for the anticipated changes due to a warming climate and could inform future management actions on the Forest including in the Big Summit Territory.

Civil Rights and Environmental Justice

Agencies of the US Department of Agriculture are to ensure to the greatest extent practicable that minority and low-income populations do not experience disproportionately high and adverse effects from USDA programs and activities. Crook County has a lower minority population than Oregon and the United States, but a similar Alaska Native or American Indian population as the larger geographic areas. In Crook County the largest ethnic minority is Hispanic or Latino, at 7.8% of the population. Minority populations would not be affected by any of the wild horse management alternatives. Low income populations in Crook County would also not be affected by the management of the wild horses under any alternative.

Energy Requirements

Energy consuming activities directly related to this project include the use of vehicles primarily. There will be no unusual energy requirements from implementation of this decision.

Prime Farm, Range, and Forestlands

There are no Prime Farm, Range, or Forestlands located within the Big Summit Territory.

Chapter 4: Public Notification & Participation

Consultation with Other Agencies and Governments

Tribal Governments

In February 2017, the tribal governments of the Burns-Paiute, Confederated Tribes of the Warm Springs, and Klamath Tribes were contacted via letter with an invitation to participate in the Section 106 process.

U.S. Environmental Protection Agency

The initial response from the Environmental Protection Agency (EPA) dated July 20, 2017, during the scoping phase included a list of recommendations for analysis and project design. The Forest Service has addressed these recommendations in the EA.

U.S. Fish and Wildlife Service

A Representative of the Fish and Wildlife Service participated in public working group meetings and the sound board meetings that are described in Chapter 1. Proposed activities associated with wild horse management would generally not impact wolves, and would therefore not be expected to influence species use of the area. The Forest has determined that proposed activities associated with wild horse management May Effect, not Likely to Adversely Affect (NLAA) gray wolf for all alternatives. On March 17, 2020 the Forest received concurrence from the USFWS that implementation of numerous activities (including wild horse management) with associated Project Design Criteria is not likely to adversely affect the gray wolf (USFWS 2020a).

Oregon Department of Fish and Wildlife

ODFW staff have participated in the Wild Horse Sounding Board and were consulted on big game populations and use within the Big Summit Territory.

Oregon State Historic Preservation Office

The Forest has completed necessary reporting for the State Historic Preservation Office (SHPO) following guidelines in the Regional Programmatic Agreement among USDA-Forest Service, the Advisory Council on Historic Preservation, and the Oregon SHPO.

Public Participation

Scoping

The Forest Supervisor issued a letter dated June 19, 2017 announcing the release of the proposal to write a new herd management (Territorial) plan. The letter was distributed to 127 individuals, organizations, and government agencies. The proposal was also posted to the Forest Service web page on June 17th. A Notice of Intent to prepare an Environmental Impact Statement was published in the Federal Register on June 21, 2017 (Vol. 82, No. 118), which began the 30-day scoping period. A total of 27 responses were received during the specified time period.

Other Public Engagement

The Forest Service has been involved in other public outreach activities. Forest staff participated in a public wild horse working group beginning in late 2015. The group facilitated by Central Oregon Intergovernmental Council (COIC) brought stakeholders together to explore social and management issues surrounding wild horse management.

Between November 2017 and June 2018, the Forest was involved with a stakeholder group that was convened by the COIC to elicit feedback on matters related to wild horse management on the Ochoco NF.

This group was called a Sound Board because it provides diverse public response to various elements of a wild horse herd management (Territorial) plan and the options that the Forest Service has to consider.

Forest Service staff shared information on wild horse management (territory) planning at the invitation of several groups: Crook County Court, Bend Chapter Oregon Hunters Association, and Rotary Club of Crook County. The Forest also held a public open house in November 2015 to discuss the planning revision of the management plan.

Environmental Assessment Public Comment Period

A 30-day public comment period was provided on this EA per NEPA regulations (40 CFR 1503; 36 CFR 215). The previously mentioned government agencies and 266 additional individuals or organizations were notified of the availability of the EA for comment or sent a copy of the document. The mailing list is located in the project file. The Forest Service's consideration of the public comments is provided as an appendix to the Decision Notice.

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Appendices

Appendix A - Amendment to the Land and Resource Management Plan

The Ochoco National Forest Land and Resource Management Plan (LRMP) was authorized in 1989. The LRMP provides a long-range strategy for managing the Ochoco National Forest and provides standards and guidelines for resource management Forest-wide and within Management Areas.

Wild horse management is addressed in the 1989 LRMP under Forest-wide Forage and Livestock Use direction at 4-11: "Wild horses are found on particular areas of the Big Summit Ranger District. The number of wild horses is currently estimated at 60 and is expected to be maintained at that level indefinitely." Appendix I of the LRMP provides more direction on the management of wild horses:

Appendix I

Management of Wild Horses

Objectives

The objective of managing wild and free roaming horses on the Ochoco National Forest is to provide for their protection, management, and control in a manner consistent with the Wild and Free Roaming Horse and Burro Act of 1971 and subsequent amendments.

These horses will be managed under the authority of Public Law 92-195 (85 Stat. 649, 16 USC 1331-1340). Other laws applicable to National Forest System lands also apply to the administration of these animals. Management actions must be consistent with the intent of the Multiple Use-Sustained Yield Act of 1960 (74 Stat. 215, 16 USC 528-531).

Operations

The bands of horses within the original territory will be managed at a maximum of 60 head. When horse numbers exceed this level removal of excess horses will be required. The Forest has experienced difficulty in getting horses from this territory adopted because of their undesirable size and confirmation. In order to improve the adoptability factor over the next few years, excess animals will be selectively removed. Initially, animals to be retained in the herd will be selected on the basis of physical soundness, quality of conformation, and young breeding age. This will result in a base herd which is healthy, vigorous, and of a quality that will produce adoptable offspring.

Horses that establish new territories beyond those which they inhabited prior to December 1971 are designated excess animals in accordance with the 1971 Act. These horses will be first priority for removal, and will be captured and put up for adoption.

Excess horses removed from the territory will be disposed of through horse adoption procedures in accordance with the Interagency Agreement between the Bureau of Land Management and the Forest Service signed in December 1988.

Management will be directed toward the overall herd as a viable unit, instead of toward certain bands or individuals within the herd.

Various practices will be used in removing excess horses. Included are the use of roundups, tranquilizer darts, and catch pens. The use of aircraft will be limited to locating and inventorying animals, and in observing approved removal efforts.

Excess animals which are too old, too lame, or permanently injured may be removed using lethal doses from tranquilizer guns. Judgement will be exercised in these cases. All disposal activities will be in accordance with State Health codes.

NFMA implementing regulations at 36 CFR 219.13 state that:

“A plan may be amended at any time. Amendments may be broad or narrow, and should be used to keep plans current and help units adapt to new information or changing circumstances. The responsible official has the discretion to determine whether and how to amend the plan.”

To address the purpose and need for action, the proposed action would require plan-level amendments to the Ochoco LRMP. The amendments proposed in this EA are specific to the area of the Big Summit Territory and they allow the Forest Plan to adapt to changing conditions in the area. Amendments as follows:

Table A-1: Proposed Amendments to the Ochoco LRMP

Existing	Amendment
<p>Ochoco LRMP at 4-11, third paragraph under “Objectives”</p> <p>Wild horses are found on particular areas of the Big Summit Ranger District. The number of wild horses is currently estimated at 60 and is expected to be maintained at that level indefinitely (See Appendix I, Management of Wild Horses)</p>	<p>Replace paragraph with:</p> <p><i>Conduct wild horse management on the Big Summit Territory to ensure the maintenance of a self-sustaining population of horses in a thriving natural ecological balance with other uses and the productive capacity of their habitat. Manage the wild horse herd for a diverse age structure and phenotype, distribution (historic use patterns), and genetic diversity.</i></p>
<p>Ochoco LRMP Appendix I</p>	<p>Add the following paragraph:</p> <p><i>Desired Condition: A viable, free-roaming wild horse herd (consistent with the desire of the herd management plan in effect at the time of project level planning) that is genetically diverse and is in ecological balance with other approved multiple uses is present within the Big Summit Wild Horse Territory. In concert, this leads toward stable or improving habitat conditions.</i></p>
<p>Ochoco LRMP Appendix I Operations Section</p>	<p>Replace with:</p> <p><i>Conduct livestock management on the Big Summit Wild Horse Territory to ensure that resource conditions meet management goals and standards. Wild horses will be managed so that the AML can be achieved. Horses above the high AML are considered excess.</i></p> <p><i>Population growth will be managed by:</i></p> <p><i>Conducting gathers to remove excess wild horses as needed to maintain the wild horse herd size within the established AML.</i></p> <p><i>Implementing fertility control methods to slow population growth rates, reduce gather frequency, and decrease the number of excess wild horses which need to be removed over time.</i></p>

Substantive Planning Rule Provisions

36 CFR 219.14 states that a decision document must include 1) the rationale for approval of an amendment; 2) an explanation of how the plan components meet the sustainability requirements of 219.8, the diversity requirements of 219.9, the multiple use requirements of 219.10, and the timber requirements of 219.11. Only the rule provisions that are directly related to the amendment are applicable to the amendment. The following table lists the provisions which are directly related to the wild horse management amendments based on the purpose of the amendments or the beneficial effects of the amendments (219.13(b)(5)(i)).

Table A-2: Planning Rule Substantive Requirements Pertinent to LRMP Amendments Addressing Wild Horse Management.

Planning Regulation Section		Applicable Subpart
219.8 Sustainability	(a) Ecological Sustainability	(2) Air, Soil, and Water. The plan must include plan components, including standards or guidelines, to maintain or restore: (ii) soils and soil productivity, including guidance to reduce soil erosion and sedimentation, (iii) water quality
		(3) Riparian Areas. The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of riparian areas in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, taking into account: [A] water temperature, [B] blockages of water courses, [D] deposits of sediments, [E] ecological connectivity, [F] restoration needs, and [G] floodplain values and risk of flood loss.
219.10 Multiple Use	(a) Integrated resource management for multiple use	The plan must include plan components, including standards or guidelines, for integrated resource management to provide for ecosystem services and multiple uses in the plan area. When developing plan components for integrated resource management, to the extent relevant to plan area and public participation process, the responsible official shall consider: (1) Aesthetic values, air quality, cultural and heritage resources, ecosystem services, fish and wildlife species, forage, geologic features, grazing and rangelands, habitat and habitat connectivity, recreation settings and opportunities, riparian areas, scenery, soil, surface and subsurface water quality, timber, trails, vegetation, viewsheds, wilderness, and other relevant resources and uses. (5) Habitat conditions, subject to the diversity requirements of Sec. 219.9, for wildlife, fish, and plants commonly enjoyed and used by the public; for hunting, fishing, trapping, gathering, observing, subsistence, and other activities (in collaboration with federally recognized Tribes, other federal agencies, and state and local governments). (10) Opportunities to connect people with nature.

Appendix B: Appropriate Management Level Analysis

Big Summit Wild Horse Territory

Determination of Appropriate Management Level (AML)

Summary

The Appropriate Management Level (AML) for the Big Summit Wild Horse Territory on the Ochoco National Forest was determined through an in-depth analysis and considered criteria from the Bureau of Land Management (BLM) Wild Horse and Burros Management Handbook (4700-1), Forest Service policy (FSM 2260), and the principals of the Wild Free-Roaming Horses and Burros Act (WFRHBA) of 1971 as amended. Consideration was also given to conclusions found in “Using Science to Improve the BLM Wild Horse and Burros Program” chapter on Establishing and Adjusting Appropriate Management Levels (National Research Council, 2013). This is considered to be a compilation of the best available science on the subject and is consistent with direction and other wild horse Territories across the Western United States.

The proposed AML for the Big Summit Wild Horse Territory is 12 to 57 horses to achieve a Thriving Natural Ecological Balance (TNEB) with existing conditions inside the Territory while regulating their population and accompanying need for forage and habitat in correlation with uses recognized under the Multiple-Use Sustained Yield Act of 1960. This AML range is different from the existing AML range determined in the 1975 Herd Management Plan of 55 to 65.

The AML analysis has determined the Big Summit Territory has sufficient water, forage, cover, and space to support a wild horse population and healthy rangelands over the long term. The AML upper limit of 57 wild horses was determined by considering the criteria included within the BLM Handbook 4700-1, which considers the most limiting factor of the essential habitat components of water, forage, cover and space that results in a TNEB, and avoids deterioration of the rangelands while providing for recognized multiple-uses. The most limiting factor for the Big Summit Territory is winter range forage because that is the essential habitat component critical in achieving a TNEB given the resources provided in the Big Summit Territory. The upper limit focused on winter forage available on winters with above average snowfall when wildlife would be displaced to other locations, the lower limit is a number that looked at winters of above-average snowfall but with consideration that forage needs for wildlife would have to be provided inside the Territory.

A herd size of 12 to 57 horses is not large enough to provide genetic variability and there are two previous studies on the Ochoco wild horses (Cothran, 2011 and Mills, 2010) and a recent publication (Deshpande et al., 2019) that indicate a low level of genetic variability already occurs within the Big Summit horses. Implementation of monitoring and management actions are expected to be needed to maintain the genetic variability of the herd over the long term. Possible actions include the following:

- Adjust the sex ratio to favor males to encourage formation of additional breeding harems.
- Translocation of animals that come from herds living in similar conditions to introduce new genetics to the herd.

Big Summit Territory

The Big Summit Territory is located approximately 30 miles east of Prineville on the Ochoco National Forest. The Territory includes approximately 25,434 acres of forested habitat including Round Mountain and Duncan Butte. The general description of the Territory is a mix of ponderosa pine, Douglas-fir and other conifer trees with a variety of shrubs and grasses, creeks and small mountain meadows.

Within the Big Summit Territory, there are various management areas developed from the Ochoco National Forest Land and Resource Management Plan (LRMP) (USDA, 1989). These management areas include General Forest (the majority of the Territory), General Forest Winter Range, Old Growth, Visual Corridors, Lookout Mountain Rec Area and Developed Recreation. In addition to managing wild horses in the Territory, other multiple uses must be considered.

Scope and Methodology

Scope

The scope of this evaluation is limited to determining an AML that would achieve a TNEB for wild horses in the Big Summit Territory. This evaluation will identify an AML range for the wild horses within the Big Summit Territory consistent with current law, regulation and direction using current available information and the best available science.

Methodology

Evaluation of AML considered criteria outlined in H-4700-1 (Wild Horses and Burros Management Handbook, BLM, July 2010). This handbook presents a multi-tiered analysis process to establish and adjust the AML:

- Tier One-determine whether the four essential habitat components (forage, water, cover and space) are present in sufficient amounts to sustain healthy Wild Horse & Burro (WH & B) populations and healthy rangelands over the long-term. In making this determination, the most limiting factor(s) within the Territory should be considered.
- Tier Two-determine the amount of sustainable forage available for WH & B use.
- Tier Three-determine whether or not the projected WH&B herd size is sufficient to maintain genetically diverse WH & B populations.

Tier 1

The four essential habitat components to sustain healthy WH & B populations and healthy rangeland over time are: water, forage, cover and space. The sufficiency for supporting a healthy WH population and healthy rangeland of all four of these components were considered in this analysis, however, there are limiting factors which drive the calculation of AML as explained in the analysis below.

Of the four essential habitat components (forage, water, cover and space), the most limiting factor is winter range forage. Because of a recurring pattern of wild horses moving outside the Territory, cover and space were also considered as a limiting factors.

Table 1: Four essential habitat components for proposed AML

Wild Horse Territory	Forage		Water		Cover		Space	
	Sufficient	Insufficient	Sufficient	Insufficient	Sufficient	Insufficient	Sufficient	Insufficient
Big Summit Territory	----X----		----X----		----X----		-----X	

Forage

Forage is an essential habitat component to sustain healthy wild horses. The amount of sustainable forage available for wild horses has been calculated based on plant association mapping and productivity estimates derived from the Plant Associations of the Blue and Ochoco Mountains (Johnson, Jr. and Clausnitzer, 1992) and Plant Communities of the Blue Mountains in Eastern Oregon (Hall, 1973).

Wild horses are required to be managed for inside designated Territories based on the Wild Free-Roaming Horse and Burro Act of 1971 that states they are to be considered in the area where they are presently (December 15, 1971) found. This means that all essential habitats components must be provided for, year-round, inside the Territory only, and as part of the natural system. The ability to capture and immediately place horses due to a shortfall of essential habitat components is limited by funding, personnel capacity, facility space and local animal behavior.

A horse digestive system allows them to subsist on low-quality vegetation by typically maximizing intake (National Research Council, 2013). However, winter weather conditions can have effects on horse population dynamics, specifically, winter weather can directly affect horses through thermal stress, but more often indirectly with snow cover that affects forage availability (National Research Council, 2013). This situation, as found in the Big Summit Territory, creates a temporally density-dependent population where horses are limited to the food-limited carrying capacity in seasonally cold environments, with snow cover. The National Research Council, 2013 displays this on pages 71-72 where the following discussion takes place:

“In climatically variable environments, the importance of density-independent population dynamics increases. The implication of strong density independence is that, in climatically variable environments, herbivore populations should not be expected to reach a steady state in which population density is in stable equilibrium with forage production. Climatic variations include severe winters and droughts. When the coefficient of variation of annual rainfall, and presumably food availability, exceeds 30 percent, population size is less likely to be determined by mean food-limited carrying capacity (Caughley, 1987; see also the section “Understanding Ecosystem Dynamics” in Chapter 7). Saether (1997) also theorized that lags in the responses of populations to environmental variations, in the absence of predation, will make a stable equilibrium between ungulates and their food resources unlikely. As a result, horse populations may not necessarily decline rapidly during moderate droughts despite reductions in plant growth, and the grazing pressure, expressed as a percentage offtake, may periodically increase above average values.

Ellis and Swift (1988) proposed that plant-herbivore systems in climatically variable environments are unlikely to be equilibrational and that traditional concepts of food-limited carrying capacity have relatively little value in predicting herbivore population sizes and

dynamics in such environments. They proposed that a herbivore population in an environment subject to periodic droughts is periodically reduced to a low level independently of density. The population then recovers slowly until the next drought causes another reduction. As a result, the population is kept below food-limited carrying capacity—it is unable to use available food resources fully because of low density. That idea was supported by a model of zebra population dynamics (Georgiadis et al., 2003) that provided realistic predictions for 2 decades (Georgiadis et al., 2007). The model captured the fundamental mechanism of rapid population decline during dry periods and slow increase during wet periods. The greater the variability in rainfall, the greater the proportion of time that the population spends below carrying capacity.

The Ellis and Swift (1988) study generated controversy: some interpreted it to suggest that plant-herbivore systems would be generally nonequilibrium and herbivore populations would naturally be held below food-limited carrying capacity and thus below sizes that would cause overgrazing and degradation. The conclusions of Ellis and Swift, however, were limited to environments that had a high degree of climatic variability, and the implication was that such systems have nonequilibrium tendencies, not that they are absolutely nonequilibrium. Illius and O'Connor (1999, 2000) showed that herbivore populations in drought-prone environments would be “disequilibrium,” still in quasiequilibrium with critical food supplies during dry periods. Thus, plant resources should appear to be lightly used during wet periods, and on the average a small fraction of plant growth should be used. Illius and O'Connor recognized the importance of key resource areas on the landscape, such as natural dry-season grazing reserves that define the dry-season bottlenecks and thus limit herbivore populations to a particular density. **Density dependence therefore exists, but it is temporally variable inasmuch as food-limited carrying capacity varies with precipitation and, in seasonally cold environments, with snow cover.**” [emphasis added].

To minimize resource damage or adverse impacts to animal health, the upper limit of AML will be established in consideration of winter range forage available during winters of above-average snowfall. This is also consistent with a TNEB required by the WFRHBA.

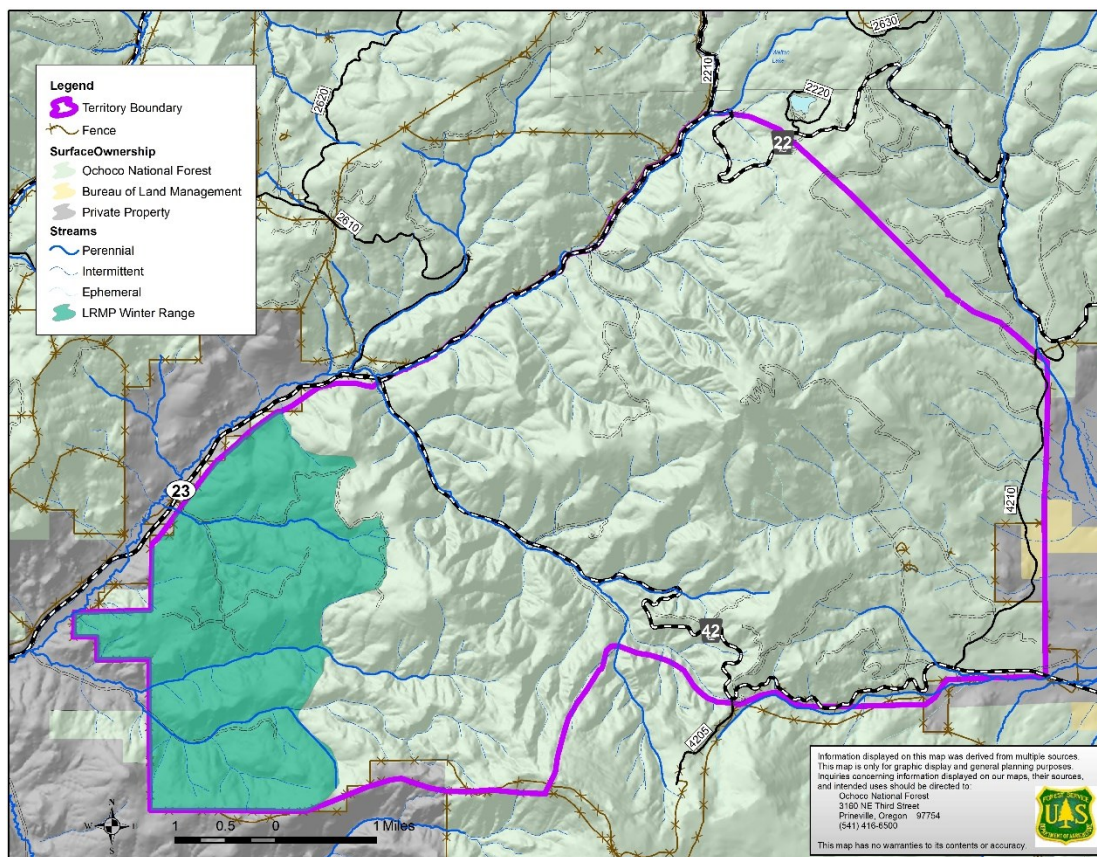
Winter Range

To determine winter range forage availability inside the Big Summit Territory, an in-depth, multi-step analysis was conducted:

1. First, a winter range was mapped. The mapped winter range is that area which readily provides forage for wild horses during winters of above average snowfall. In determining the extent of wild horse winter range the following were considered:
 - a. Ochoco LRMP designated big game winter range within the Big Summit Territory
 - b. Winter survey data from winters of above average snowfall showing wild horse forage use during winter months.
 - c. Potential Natural Vegetation (PNV) communities in combination with aspect. In an attempt to determine areas of limited snow depth providing more favorable thermal conditions and forage availability during the winter time.
 - d. Elevation thresholds above which snow depth, thermal conditions or forage availability would make forage not readily available to wild horses.

2. Next forage production values (lbs./acre) for PNV communities within the mapped wild horse winter range were adjusted based on factors affecting both site production (tree canopy cover) and accessibility/usage (slope).
3. Next Ochoco LRMP Allowable use factors were determined based upon riparian area existing conditions.
4. Finally forage allocations were determined based upon other multiple-use management direction and consultation with the Oregon Department of Fish and Wildlife and United States Fish and Wildlife Service.

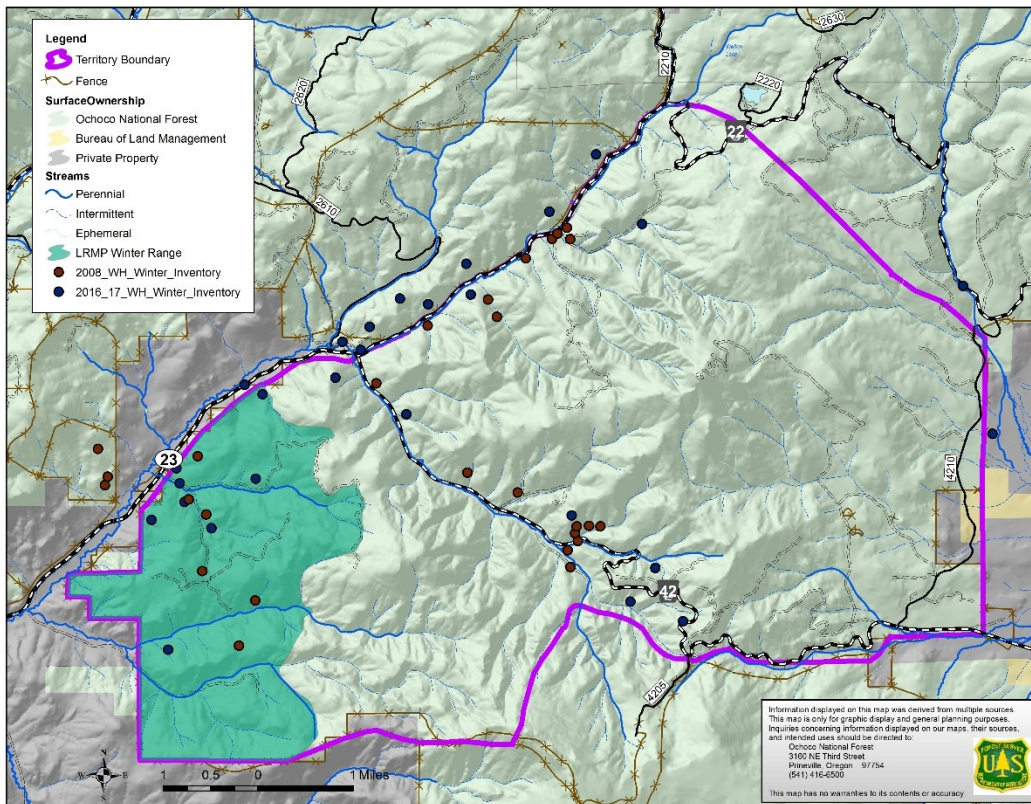
The Ochoco LRMP designated a total of 4,336 acres of General Forest Winter Range for wildlife within the 25,434 acre Big Summit Territory. These acres are located in the southwest part of the Territory bordering private land. Most of the winter range is between 4,000' to 4,600' elevation with the largest range from 3,800' to 4,800'. Nothing in the Ochoco LRMP General Forest Winter Range management area is above 4,800 feet elevation. The General Forest Winter Range inside the Territory was designated based on the presence of wildlife species during the winter time, specifically deer and elk.



Map 1: LRMP General Forest Winter Range inside Big Summit Territory

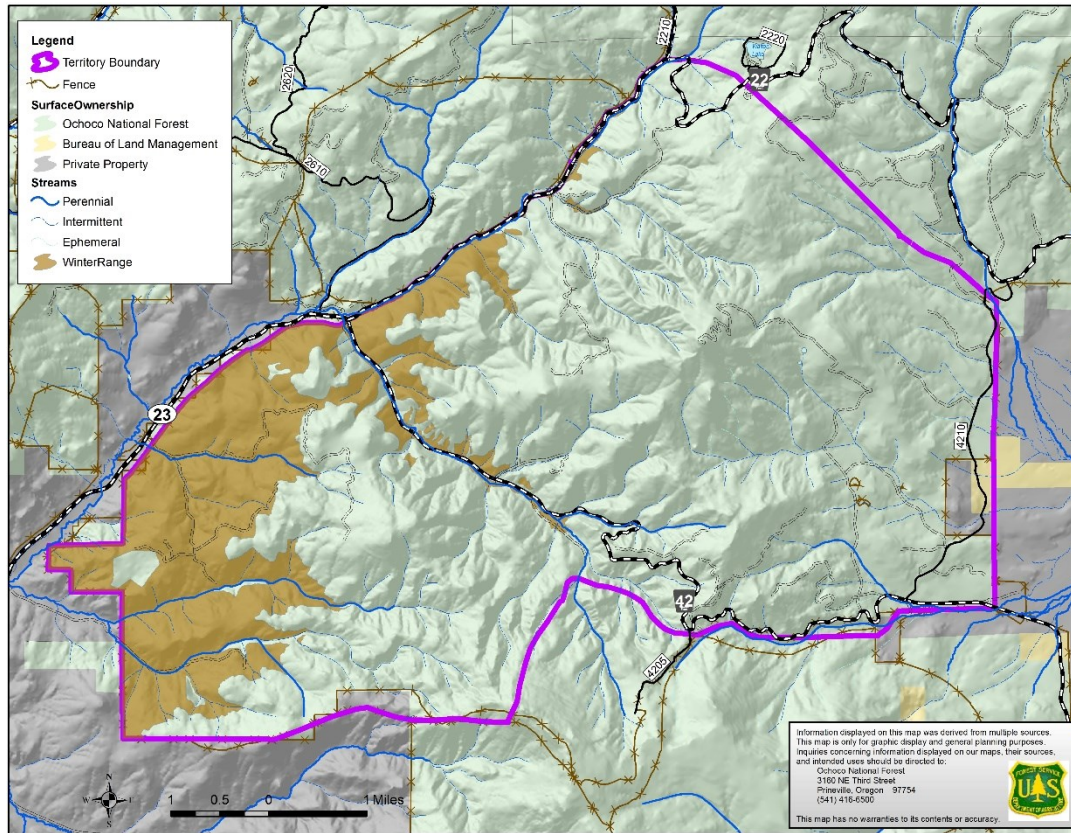
There did not seem to be a good correlation between use of wild horses based on winter range survey data from winters of above average snowfall, and the Ochoco LRMP General Forest Winter Range Management Area designation within the Big Summit Wild Horse Territory. While the area identified as General Forest Winter Range does show traditional winter use patterns by the horses, it is not the only places where horses are repeatedly seen in the Territory during winters with above average

snowfall. During these winters horses are also usually seen going up the 22 road to not far below the 22 and 2210 junction as well as along the 42 road on the southern slopes up towards the old Canyon Creek campground. An official winter survey was done in February of 2008 by a collection of volunteers on foot. Results from that survey concluded the repeatable observations of horses were not seen above the 4,600' elevation. February of 2008 showed an above average winter with an average of 146% above the Period of Record percent of official snow water equivalent (National Resource Conservation Service, 2018), overall that winter's snowfall was 117% of average. Winter wild horse surveys were also conducted in February of 2017, that overall winter was 127% of average. The map below shows the comparison of the identified General Forest Winter Range and the survey points from winter horse surveys in 2008 and 2017.



Map 2: Winter Horse Observation Points Compared to General Forest Winter Range

Observed horse occurrence during the winter surveys conducted in 2008 and 2017, did not correspond well to the General Forest Winter Range Management Area designated within the Big Summit Wild Horse Territory but rather seemed to more closely align with an elevation threshold of 4,600'. Based on observation data, during winters with above average snowfall wild horses are commonly found in the lower southwest corner of the Territory where snow depth, thermal conditions and forage are readily available for horses. We also requested data and feedback from members of the public who have information or knowledge on wild horse locations in winter time. Usable feedback received from the public confirmed the apparent alignment with an elevation of 4,600' so we expanded the area to be considered as wild horse winter range. Other factors that did not align with winter observation data include, southern slopes only and certain Potential Natural Vegetation (PNV) communities representing drier environments. Approximately 4,942 acres of the Big Summit Territory falls below the 4,600' elevation threshold that is consistent with most of the known sightings of horses during winters of above average snowfall (Map 3).



Map 3: Wild Horse Winter Range

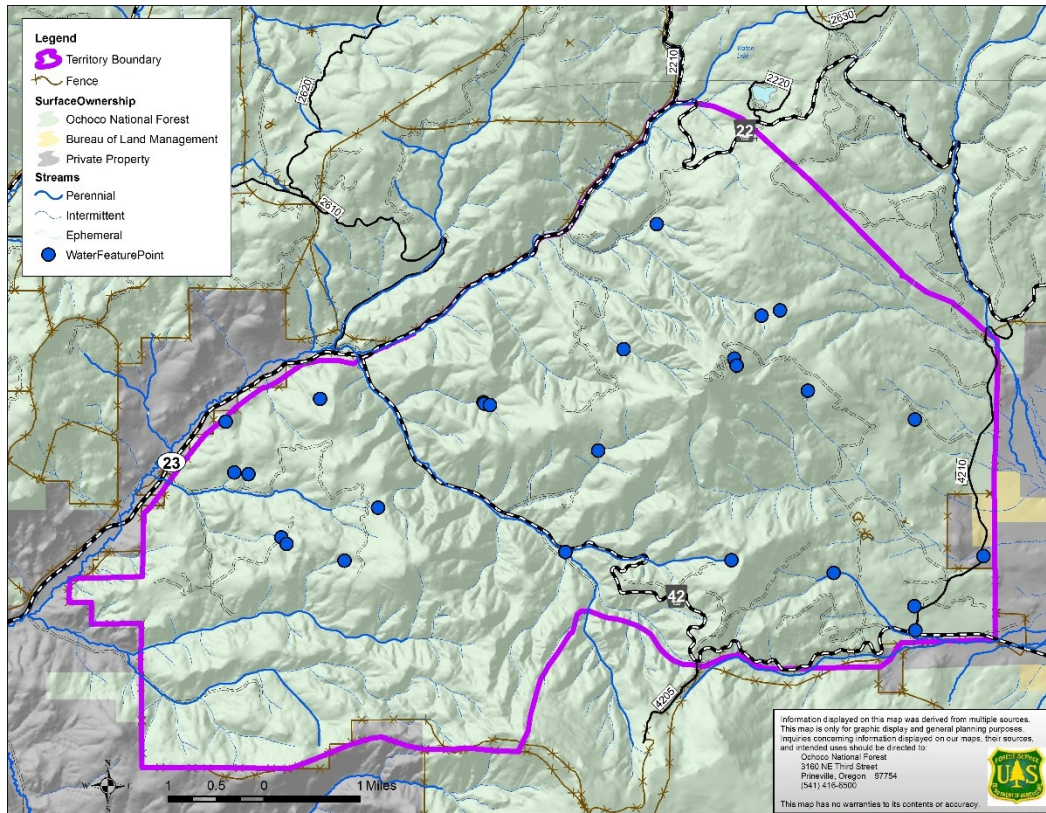
Water

Water is not a factor limiting healthy WH&B populations and healthy rangelands inside the Big Summit Territory. There are 25 miles of perennial streams inside the Territory and 26 mapped springs. Based on stream survey data collected inside the Territory, streams can provide approximately 121,714.6 gallons per day of water during the summer (see Table 2). The perennial streams also provide a source of flowing water during the winter. Horses require 15 gallons of water a day so with 121,714 gallons per day, other factors are far more limiting than water. There is adequate water for healthy horses inside the Territory leaving enough water for the other resources such as fish and wildlife species.

Table 2: Stream Discharge Data inside Big Summit Territory

Stream Name	Reach Location	Date of Survey	Discharge (cubic feet per second)
Cady Creek	Confluence with Ochoco Creek	08/08/93	0.3
Canyon Creek	Canyon Cr. R1	08/11/2015	3
Canyon Creek	Canyon Cr. R2	07/28/2015	3
Canyon Creek	Canyon Cr. R3	08/03/2015	3
Coyle Creek	Confluence with Ochoco Creek	07/20/93	1
Coyle Creek	180600142 2	08/15/2001	0
Cram Creek	Forest Boundary to 1.3 miles upstream	07/07/2015	0
Cram Creek	1.3 miles from Forest Boundary – reach length 1.7 miles	07/14/2015	0
Cady Creek	At confluence with Ochoco Creek	08/22/2005	0
Duncan Creek	At Forest Boundary	07/10/2001	0
Duncan Creek	At 2300-100 road crossing	07/10/2001	0
Duncan Creek	At 2300-150 road crossing	07/10/2001	0
Howard Creek	Forest Boundary	07/10/1991	3
Howard Creek	Just below SF Howard Creek confluence	06/27/1994	2.4
Judy Creek	At confluence with Ochoco Creek	07/02/2001	0
Judy Creek	At 2200-050 road crossing	07/02/2001	0
Judy Creek	At confluence with Ochoco Creek	08/03/2015	0
Ochoco Creek	At Forest Boundary	05/11/1992	10
Ochoco Creek	At Forest Boundary	07/07/1999	4
Scissors Creek	Entire Length	07/2001	dry

In addition to perennial stream water resources, springs also provide water for most of the year. There are 26 mapped springs inside the Territory (Map 4). Data collected on one of two springs inventoried in 2016 showed a flow of 0.24 gallons/minute. Assuming this flow for the remaining 25 springs, these sources would provide an additional 8,986 gallons per day.



Map 4: Known Springs in Big Summit Territory

Cover and Space

According to the BLM Handbook, the analysis of adequate space is derived largely from whether the horses stay within the Territory. The “Using Science to Improve the BLM Wild Horse and Burro Program” book from the National Research Council states that the space needs for wild horses is not clear in scientific literature but recommends a discussion of spatial movement of wild horses. For the Big Summit Territory, there is a re-occurring pattern of horses moving off of the Territory. In addition, there is spatial movement of bands inside and outside the Territory with very little pattern evidence. In general, horses tend to move to higher elevations in the late spring and summer and move down in elevation if winter dictates movement for available forage. There appear to be times when horses stay through part or all of the year in the lower elevations evident by the winter range occupied by horses year-round.

Vegetation provides necessary cover for horses and there are two key vegetation communities that all wild horses seek, open meadows and tree canopy. For example, horses are often seen in the Territory in more open, flat meadows grazing or at seeps or springs either drinking, grazing or mud-bathing. If not found in meadows, they are often seen seeking shade in tree canopy cover pockets adjacent to meadows. A Geographical Information System (GIS) analysis looked at what we call high probability habitat where horses have the highest preference based on flat, open areas. The GIS analysis used selection criteria of less than 8% slope (Ganskopp & Vavra, 1987) and less than 40% canopy cover (Jameson, 1967) and mapped 1,728 acres in the Big Summit Territory.

Horses are also often found under what is locally known as “noon trees”. Trees provide shade that allows horses to avoid direct insolation during the hottest times of the day and a rubbing surface that

they can use to scratch (National Research Council, 2013). Wild horses prefer low elevation, drier habitats during winter (Wockner et al., 2003) when they also take advantage of reduced snow-depths at tree bases for foraging (Salter & Hudson, 1979). They will also paw in to feed under snow up to two feet deep or use their muzzle to push the shallower snow away to forage (Salter & Hudson, 1979).

According to the BLM Handbook, horses require enough space to allow the herd to move freely between water and forage within seasonal habitats (USDI BLM Handbook), though exact space requirements are unknown. Cover and space are interrelated. If the Territory has barriers preventing free movement between forage and water, (either natural, such as rivers, or human-induced, such as fences), then the Territory would not have sufficient cover and space. An indication that the Territory does not have sufficient cover and space for the number of horses is a recurring pattern of horses moving outside of the Territory. Such egress is evident in the Big Summit Territory and requires constant management to move horses back into areas where their occupancy is authorized.

A simple comparison of acres per animal was looked at for the Big Summit Territory and all other Herd Management Areas (HMA) in the state of Oregon. We recognize that most of the other HMAs are in a High Desert environment and not a timbered environment but just comparing acres per horse, which is a measurement of space, with the exception of Cold Springs HMA, the Big Summit Territory has the lowest number of acres per horse at the existing Low AML and fourth lowest number of acres per horse at the existing High AML.

Table 3: Oregon wild horse AML/Acre comparison

HMA	Acreage	Low AML	High AML	Low AML/Acre	High AML/Acre
Pokegana	16,894	30	50	563.13	337.88
Hog Creek	21,814	30	50	727.13	436.28
Kiger	26,874	51	82	526.94	327.73
Big Summit	25,434	55	65	462.43	391.29
Liggit Table	28,101	10	25	2810.10	1124.04
Riddle mountain	28,346	33	56	858.97	506.18
Cold Springs	29,883	75	150	398.44	199.22
Three Fingers	62,509	75	150	833.45	416.73
Jackies Butte	65,211	75	150	869.48	434.74
Palimino buttes	71,668	32	64	2239.63	1119.81
Stinkingwater	78,305	40	80	1957.63	978.81
Murderer's Creek	107,859	50	140	2157.18	770.42
South steens	126,720	159	304	796.98	416.84
Sand Springs	192,524	100	200	1925.24	962.62
Sheepshead-Health Creek	198,845	161	302	1235.06	658.43
Paisley	297,802	60	150	4963.37	1985.35
Beatys Butte	399,714	100	250	3997.14	1598.86
Warm Springs	474,501	111	202	4274.78	2349.01

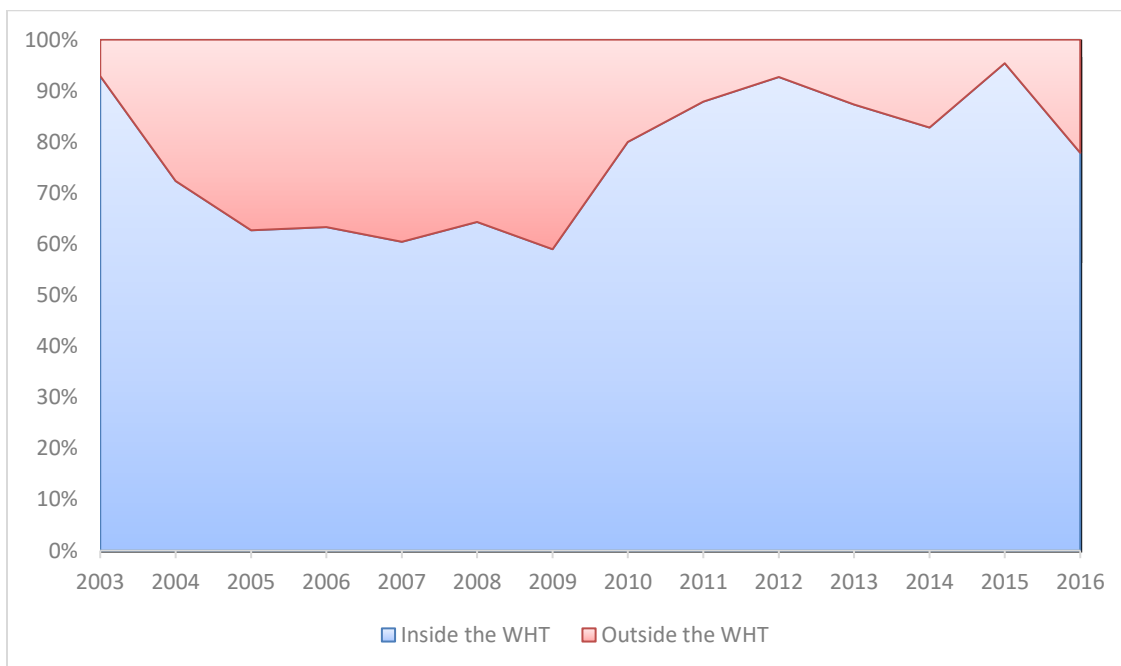
HMA	Acreage	Low AML	High AML	Low AML/Acre	High AML/Acre
Coyote Lake/ Alvord Tule	553,603	198	390	2795.97	1419.49

Looking at the history of captures in the Territory from 2002-2010, 5 out of 6 captures targeted horses outside of the Territory. In that same time period, 3 out of the 6 annual census counted horses within the 1975 AML of 55-65 (Table 4). Boundary fences surrounding the Territory were known to be compromised in that time period as well as a lack of management actions to immediately get horses moved back into the Territory. This complicates any evidence of a pattern, therefore, there is not a clear correlation between the number of horses counted for and the amount seen outside of the Territory (Graph 1).

Table 4: Wild Horse Captures Inside and Outside Territory and whether Population was within or Above the AML, 2002-2010.

Year of Capture	Captures Inside Territory	Captures Outside Territory	Population within 1975 AML	Population above 1975 AML
2002		X		X
2003		X	X	
2005		X	X	
2006	X		X	
2009		X		X
2010		X		X

Graph 1: Comparison of horses inventoried inside/outside Territory



Another possible indicator of cover and space may be based on horse behavior in the Big Summit Territory. Wild horses usually collect in small bands with a lead stallion and lead mare as well as other mares and recent off-spring (USDA Forest Service, 1975). These bands are dynamic and usually protected by the ability of the lead stallion to maintain the number of mares his capability allows. Typically small herds will be sprinkled throughout a Territory with some small changes occurring annually. When the Territory was established in 1975, there were 10 bands identified ranging in size from 2-10 horses. This was the pattern seen in the Big Summit Territory until around 2010 when a large concentration of horses started to collect in the Cram creek area during June where they remained for most of the summer. This collection started with at least 45 horses in 2010 to a high of 134 horses in 2015. This is not typical behavior of wild horses and the current poor distribution of horses may indicate inadequate cover and space, preventing achievement of a TNEB.

Currently, there is not clear scientific literature on the space needs for wild horses (National Research Council, 2013) therefore, we recognized there is a repeated pattern of horses moving outside of the Big Summit Territory and as the numbers have increased, horses have moved further away from the Territory, however, no adjustments to the AML will be made based on cover and space because there is no clear process described in the literature for how to make such a determination.

Tier 1 of the AML analysis determined that the four essential habitat components for horses (forage, water, cover and space) are present to sustain a healthy wild horse population of undetermined size and healthy rangelands over the long-term; the key is to determine how many horses can be sustained with the essential habitat components present on the Big Summit Territory. In order to make an AML determination it is required to consider the most limiting factor(s) of these essential habitat components for a TNEB. As discussed previously forage availability during winters of above average snowfall is considered to be the most limiting factor for the Big Summit Territory.

Tier 2

Tier 2 of the AML analysis determines the amount (AUMs) of sustainable forage that is available for horse use during winters of above average snowfall within the Big Summit Territory. In determining the amount of available sustainable forage, the principles of multiple use recognized under the Multiple-Use Sustained Yield Act of 1960 including wildlife and permitted livestock must be considered. This determination must also take our current Forest Plan direction into account.

In order to do this, we followed a three-step process:

1. Calculate annual forage production in the wild horse winter range.
2. Determine allowable forage utilization levels for animals from the Ochoco LRMP.
3. Calculate annual forage allocations available for use by all animals.

Under step 1, GIS mapping was used to calculate plant association acreage based upon the Potential Natural Vegetation (PNV) layer within the estimated 4,942-acre wild horse winter range. Each plant association has an associated herbage production derived from references “Plant Associations of the Blue & Ochoco Mountains (Johnson and Clausnitzer, 1991) and “Plant Communities of the Blue Mountains in Eastern Oregon (Hall, 1973) which collectively represent the best available science for production on these lands. This GIS exercise determined that approximately 4,868 acres of the wild horse winter range has a plant association with herbaceous production that would be available as forage while 74 acres is rocky land that has minimum vegetative production potential and is therefore not considered available as forage.

Within the estimated 4,942 acres of wild horse winter range, approximately 215 acres are in riparian plant communities, and approximately 4,727 acres fall into plant associations that would be categorized as transitory range. Transitory range is defined as forested lands that are suitable for grazing for a limited time following a complete or partial forest removal (Holechek et al., 2000); there is an inverse relationship between the overstory cover and herbaceous production. Research has

shown that there is a competitive relationship between overstory and understory vegetation for resources (McConnell and Smith, 1965; Jameson, 1967; Riegel et al., 1992). Because of this, canopy cover data derived from Lidar was mapped in GIS and used to adjust herbage production within the range prescribed by the plant association guides referenced previously. Acreage in the wild horse winter range is listed by canopy cover category and associated production values as follows (Table 5):

Table 5: Canopy Cover and Forage Production Relationships

Canopy Cover Category	Acres	Forage Production
0-25%	995	Highest forage production assumed for particular plant association group.
25-40%	1,119	Average forage production assumed for particular plant association group.
Over 40%	2,828	Lowest forage production assumed for particular plant association group.

There is abundant literature that establishes that there is an inverse relationship between slope and utilization: as slope increases, animal distribution and utilization decreases. Specific to horses, the best available science shows decreased utilization on slopes of 20-50% and highest use on slopes ranging from 0-20% (Ganskopp & Vavra, 1987). Because of this, slope utilization reduction rates were applied. The amount of acreage found in the wild horse winter range by slope category and the associated utilization reduction rates are listed as follows (Table 6):

Table 6: Slope Categories and Forage Utilization Reductions

Slope Category	Acres	Utilization reduction
0-20%	1,712	No reduction assumed.
21-30%	1,339	30% utilization reduction assumed.
31-50%	1,572	70% utilization reduction assumed.
Over 50%	319	Not utilized.

Using these criteria for canopy cover relationships and slope utilization reduction, we calculated an adjusted total annual forage production of 1,240,533 pounds in the wild horse winter range (Table 7 shows details of total forage production).

Table 7: Forage Production Calculations by PNV in the Wild Horse Winter Range

PNV Label	Acres	Total Annual Production
CDG111-Doug fir, elk sedge	265	36,091 lbs.
CDG112-Doug fir, pinegrass	1,916	392,399 lbs.
CDS624-Doug fir, snowberry	61	10,769 lbs.
CDS625-Doug fir, mountain snowberry	0.30	89 lbs.
CSDS-Doug fir, dry shrub mix	193	28,070 lbs.
CJS1-juniper, low sage	3	1,718 lbs.
CJS321-juniper, bitterbrush, bunchgrasses	55	11,192 lbs.
CJS4-juniper, mountain mahogany, bunchgrasses	54	16,286 lbs.
CPG111-ponderosa pine, bluebunch wheatgrass	64	21,754 lbs.
CPG112-ponderosa pine, Idaho fescue	22	4,933 lbs.
CPG221-ponderosa pine, pinegrass	26	8,810 lbs.
CPG222-ponderosa pine, elk sedge	760	251,416 lbs.
CPS1-ponderosa pine, sagebrush	10	2,922 lbs.
CPS222-ponderosa pine, bitterbrush, elk sedge	388	52,265 lbs.
CPS232-ponderosa pine, mountain mahogany, elk sedge	59	6,710 lbs.
CPS233-ponderosa pine, mountain mahogany, bluegrass	88	11,067 lbs.
CPS234-ponderosa pine, mountain mahogany, bunchgrasses	65	13,149 lbs.
CPS524-ponderosa pine, snowberry	21	13,619 lbs.
CWG111-grand fir, elk sedge	10	752 lbs.
CWG113-grand fir, pinegrass	468	69,795 lbs.
CWG211-grand fir, brome grass	20	2,016 lbs.
CWS812-grand fir, huckleberry	0.27	117 lbs.
GB4911-scabland grasses	12	2,472 lbs.
HC-riparian cottonwood	9	10,620 lbs.
HQ-quaking aspen	0.60	753 lbs.
MD-dry meadow	7	3,783 lbs.
SD4111-mountain mahogany, bunch grasses	94	24,183 lbs.
SW20-alder wetlands	198	242,784 lbs.
TOTAL	4,869	1,240,534 lbs.

Under Step 2, LRMP direction (USDA, 1989) displays allowable forage utilization based on types of communities, range management levels and the existing range conditions of those communities. The allowable forage utilization is a cumulative annual use by big game, wild horses and permitted livestock. See Tables 8 & 9 below for specific LRMP direction.

Table 8: Forest Plan Riparian Communities Forage Utilization

Range Resource Management Level	Grassland Communities		Shrubland Communities	
	Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
B-Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range.	40%	0-30%	30%	0-25%
C-Livestock management to achieve full utilization of allocated forage. Management systems designated to obtain distribution and maintain plant vigor include fencing and water developments.	45%	0-35%	40%	0-30%
D-Livestock managed to optimize forage production and utilization. Cost-effective cultural practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50%	0-40%	50%	0-35%

Table 9: Forest Plan Primary Range Communities (except Riparian) Forage Utilization






Range Resource Management Level	Forested Communities		Grassland Communities		Shrubland Communities	
	Sat.*	Unsat.*	Sat.*	Unsat.*	Sat.*	Unsat.*
B-Livestock use managed within current grazing capacity by riding, herding, salting, and cost-effective improvements used only to maintain stewardship of the range.	40%	0-30%	40%	0-30%	30%	0-25%
C-Livestock management to achieve full utilization of allocated forage. Management systems designated to obtain distribution and maintain plant vigor include fencing and water developments.	45%	0-35%	45%	0-35%	40%	0-30%
D-Livestock managed to optimize forage production and utilization. Cost-effective cultural practices improving forage supply, forage use and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50%	0-40%	50%	0-40%	50%	0-35%

*Sat.=Satisfactory, Unsat.=Unsatisfactory

The amount of forage use allowed is based on resource management level, range condition and community type. A range resource management level of B will be used for the Big Summit Wild Horse Territory because the Wild Free-Roaming Horse and Burro Act of 1971 (WFRHBA) requires the Secretary to manage wild horses at a “minimal feasible level”. Because the highest level of utilization by wild horses occurs in riparian areas with flat slopes (Ganskopp & Vavra, 1987), this is also confirmed with site specific riparian utilization surveys during the fall of 2017 & 2018 in the wild horse winter range showing utilization rates ranging from 58-80%. The riparian communities forage utilization rates (Table 8) will be considered the most limiting and will therefore be the basis upon which allowable use is calculated. Lastly, in determining allowable use levels for riparian communities, riparian community conditions inside the wild horse winter range need to be categorized as either satisfactory or unsatisfactory condition. The LRMP defines satisfactory condition as forage range condition as at least fair, with anything in poorer condition being in unsatisfactory condition. Data collected inside the Territory was used to determine the current riparian community condition.

Data was collected from five Condition and Trend (C&T) plots inside the Big Summit Territory in 2015, all of these plot locations are outside of the wild horse winter range. These C&Ts were established in 1964 and are permanently-staked upland monitoring sites. Data collected from C&T plots can show plant species composition changes over time. Three of these plots were in fair condition and two of the plots were in poor condition, both plots in poor condition were in dry meadow communities. The table below presents range condition upon reading as well as trends (see Table 10).







Table 10: Condition and Trend Data inside Territory




CONDITIONS ANDS TREND (PARKER 3-STEP)					
	Community Type	Vegetation Rating			
		1964	2004	2015	Overall Trend
Canyon Creek C&T 1	Dry Meadow	GOOD		FAIR	
Canyon Creek C&T 2	Dry Meadow	POOR	POOR	POOR	
Canyon Creek C&T2a	Ponderosa pine/elk sedge	FAIR	GOOD	FAIR	
Reservoir C&T 1	Dry Meadow	POOR	POOR	POOR	
Reservoir C&T 2	Ponderosa pine/elk sedge	GOOD	GOOD	FAIR	

There were three Winward Riparian Study plots collected inside the Big Summit Territory, two of which, the plots on Canyon Creek and Blevins Creek, were inside the wild horse winter range. Alma H. Winward’s Monitoring the Vegetation Resources in Riparian Areas provides information on three sampling methods used to inventory and monitor the vegetation resources in riparian areas (Winward, 2000). Vegetation composition data from Winward’s cross-section or greenline measurements may be used to categorize seral status of the site, not forage range conditions so a direct determination of LRMP satisfactory or unsatisfactory riparian community condition is difficult to determine. However, fair to good range conditions are usually associated with mid, high or potential

seral stages (E.L. Smith, et al., 1995). Therefore, early-seral status would generally be considered equal to poor range condition. The cross-section data is the most important relative to grazing because it measures the vegetation on the meadows adjacent to streams where utilization occurs the most by horses. Both the Canyon Creek and Blevins Creek Winward plots located in the wild horse winter range show dominant early-seral species, equivalent to poor range condition. The full data results are displayed in Table 11.

Table 11: Winward Riparian Study Results

WINWARD RIPARIAN STUDY									
DRAINAGE	YEAR	Cross-section Status	Greenline Status	Greenline Stability	WOODY SPECIES				
					% Seedling/Sprout	% Young/Sapling	% Mature	% Decadent	% Dead
Canyon Creek	2005	Early-seral	Mid-seral	Good	5%	10%	81%	0%	5%
	2015	Early-seral	Mid-seral	Moderate	7%	22%	63%	8%	0%
	TREND				N/A	N/A	N/A	N/A	N/A
Blevins Creek	2005	Early-seral	Mid-seral	Good	4%	29%	66%	0%	0%
	2015	Early-seral	Mid-seral	Moderate	0%	68%	25%	0%	0%
	TREND				N/A	N/A	N/A	N/A	N/A
SF Howard	2005	Early-seral	Early-seral	Moderate	5%	15%	77%	1%	2%

WINWARD RIPARIAN STUDY									
DRAINAGE	YEAR	Cross-section Status	Greenline Status	Greenline Stability	WOODY SPECIES				
					% Seedling/Sprout	% Young/Sapling	% Mature	% Decadent	% Dead
	2015	Early-seral	Mid-seral	Moderate	40%	23%	12%	10%	15%
TREND					N/A	N/A	N/A	N/A	N/A

Four Proper Functioning Condition assessments were conducted inside the Big Summit Territory, the one on Blevins Creek is inside the wild horse winter range. A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Systems (USDI 1998) states that, “Proper functioning condition (PFC) is a qualitative method for assessing the condition of riparian-wetland areas.” With PFC, creeks are broken into reaches and each reach is walked with an inter-disciplinary team and rated based on multiple factors. Functional ratings and trends (or apparent trends) are qualitative but the process provides an initial assessment on condition. See Table 12 for PFC Information.

Table 12: PFC results for the Big Summit Territory

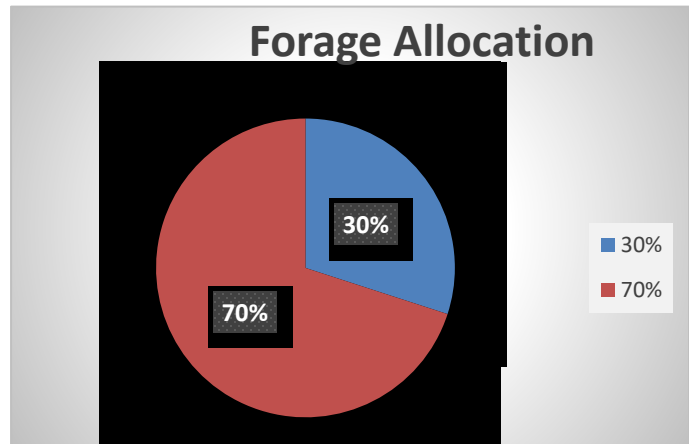
PROPER FUNCTIONING CONDITIONS			
DRAINAGE	REACH	DISTANCE	FUNCTIONAL RATING/TREND
Blevins Creek	1	0.75 miles	Functioning at Risk with No Apparent Trend
	2	0.25 miles	Functioning at Risk with No Apparent Trend
	3	0.25 miles	Functioning at Risk with No Apparent Trend
	4	0.75 miles	Functioning at Risk with No Apparent Trend
Cram Creek	1	0.75 miles	Functioning at Risk with a Downward Trend
	2	0.75 miles	Functioning at Risk with No Apparent Trend
	3	0.5 miles	Functioning at Risk with No Apparent Trend
	4	0.75 miles	Functioning at Risk with No Apparent Trend
	5	0.5 miles	Functioning at Risk with a Downward Trend
	6	0.5 miles	Functioning at Risk with No Apparent Trend
Judy Creek	3	0.75 miles	Functioning at Risk with a Downward Trend
	4	0.5 miles	Nonfunctional
	5	0.75 miles	Proper Functioning Condition

Shady Creek	1	0.5 miles	Functioning at Risk with an Upward Trend
	2	0.25 miles	Functioning at Risk with a Downward Trend

Additional riparian area data like stream survey data can be found in the Aquatics Report and are consistent with an unsatisfactory rating for riparian areas in the wild horse winter range.

In summary, to determine allowable cumulative annual forage utilization from the Ochoco LRMP, factors were selected based on direction and data. Those factors are Grassland Riparian Communities, managed under the Range Resource Management Level B for unsatisfactory condition. All of these selected variables leads to an allowable cumulative annual utilization by big game, wild horses and permitted livestock of 0-30%, leaving 70% for watershed health (see adjacent graph).

Based on our Forest Plan allowable use standards and guidelines, we multiplied the total annual forage production in the wild horse winter range of 1,240,534 pounds by 30% to get an annual cumulative maximum allowable use of winter forage of 372,160 pounds during years of above average snowfall. In the context of providing for multiple uses this available herbaceous production must provide forage for sheep, big game and wild horses.



1,100 ewe/lamb pairs of sheep are permitted to graze in the wild horse winter range inside the Territory during the summer months for approximately 19 days. This level of permitted livestock use has been authorized on these lands since long before the Big Summit Territory came into existence. Each ewe/lamb pair consumes approximately 8 lbs. of forage a day. The total sheep use in the winter range during the early summer time is 160,875 pounds. This value was subtracted from the maximum allowable use of winter range forage available during winters of above average snowfall (Table 13).

Within the Big Summit Territory, the wild horse winter range overlaps the General Forest Winter Range by 72% and based on current elk populations, which are below the Herd Management Objective, the wild horse winter range should provide winter forage for 151 elk. Each elk demands approximately 15.6 lbs of forage a day, of which about 44% consists of herbaceous vegetation in the winter time (defined as 12/1-4/15 based on Sno-tel average snow depth), a direct dietary overlap with wild horses. If all elk remain on the forest during the winter a total of 155,506 pounds of forage is needed for elk in the winter time (Table 13).

Also, because there is a 72% general forest winter range overlap, deer populations must be considered as well. Current deer populations are estimated at 302, which is also below the Herd Management Objective, with an annual forage demand of 5 lbs. a day of which only 5% consists of herbage matter in the winter time. Therefore, deer require a total of 11,778 pounds of forage in the winter time, which was also subtracted from the allowable use of forage (Table 13).

Table 13. Allowable Annual Winter Forage Allocation

Total Forage Production	1,240,533 lbs.
30% forage allocation	372,160 lbs.
Sheep forage needs	160,875 lbs.
Elk forage needs	155,506 lbs.
Deer forage needs	11,778 lbs.
Wild Horse forage needs	44,001 lbs.

In order to ensure a TNEB between wild horses, the environment and other multiple use resources, we calculated the average forage need for wild horses through winter and start spring in a good body condition. The nutritional requirements of horses, like many other species, varies greatly between individuals depending upon many variables including size, gender, reproductive status, base metabolism, health status and climatic and environmental conditions. On average horses require 26 pounds of forage daily (USDI, 2010) but research has shown that for every 10 degree F drop in temperature below freezing, forage intake requirements increase by 2 pounds per day (NDSU Extension Service, 2013). We looked at lowest temperatures recorded daily for the five coldest years (1980, 1982, 1987, 1993, 2007) in the last 30 years (NOAA, 2018). We then tallied the days that the lowest temperature was 30 degrees, 20 degrees, 10 degrees, 0 degrees, -10 degrees and -20 degrees and averaged that across the total winter time period from December 1 to April 15th (135 days). Using these numbers of days, we calculated a daily forage demand during the winter time based on the coldest temperature of the day, the daily winter forage demand averaged 27.5 pound per day per horse. Table 14 shows the breakdown of coldest temperatures during the winter time period. Therefore, with all of the other multiple uses accounted for, the remaining forage would provide enough feed for about 12 horses while not exceeding allowable use levels within the winter range during winters of above average snowfall. This would represent the low end of the AML range.

Table 14. Temperature days and daily forage demand for winter forage needs

Coldest Daily Temperature	# of Days	Daily Forage Demand
30 degrees	70	26 pounds
20 degrees	43	28 pounds
10 degrees	11	30 pounds
0 degrees	7	32 pounds
-10 degrees	3	34 pounds
-20 degrees	1	36 pounds

When defining the wild horse forage available on winter range, we focused on winters with above average snowfall as a limiting factor in order to base our TNEB for wild horses on years that periodically provide harsher situations. Under the Act, wild horses must be managed only in the defined Territory, however, wildlife are not confined physically or legislatively to the territory or

National Forest System lands. Due to the high road density associated with the area determined to be wild horse winter range, habitat effectiveness is low for wildlife. Observations of elk in the wild horse winter range are uncommon especially during winters with above average snowfall. Although elk use the area, use is at low densities and is likely incidental. As a result, on winters with above average snowfall, wildlife move to areas where they can retrieve forage and that provide better security, leaving more winter forage available for wild horses (ODFW, 2019). Considering that this occurs, and big game moves off of the wild horse territory during winters of above average snowfall, forage would be available for an additional 45 horses and allow for a high AML of 57 horses.

Summer Forage

Consideration of availability of summer forage was done mirroring the calculations for winter forage but was not used to determine the AML because forage availability during winters with above average snowfall was far more limiting than summer forage availability. In 2006 an analysis was completed to determine the forage availability and proper stocking rates for the two permitted sheep bands within the Big Summit Territory. The analysis looked at the PNV, canopy cover and percent slope on the landscape and made adjustments to the productivity based on those factors. While the two sheep allotments overlap the Big Summit Territory, they are larger than just the Territory, equaling approximately 34,020 acres so the forage production considered for the sheep grazing allotments was larger than what was calculated for the Territory but again, summer forage is not the limiting factor. See Table 15 for a summary of available summer forage.

Table 15: Allowable Annual Summer Forage Allocation

Total Forage Production	9,820,369 lbs.
30% forage allocation	2,946,111 lbs.
Sheep forage needs	1,836,120 lbs.
Elk forage needs	523,620 lbs.
Deer forage needs	28,660 lbs.
Wild Horse needs (high AML of 57)	540,930 lbs.
Remaining forage	16,781 lbs.

Proper stocking calculations were done for sheep on Designated Monitoring Areas (DMAs) located in the Big Summit Territory using utilization measures (based on residual stubble heights and site-specific height weight curves and actual use documentation). Residual stubble height measurements were recorded annually at DMAs located in the Territory, three of the four DMAs are also located inside the wild horse winter range. These DMAs are set up to measure permitted livestock grazing in the Territory but also measures horse use (Burton, 2004). For at least three years at each of the four DMAs located inside the Territory, height/weight curves were generated from forage produced within utilization cages in addition to stubble height. The stubble height measurements were compared to the average height/weight production curves (based on at least three years of data) for their respective DMA. The stubble height measurement protocol used during this time only recorded actual stubble heights up to 12-inches, anything over 12-inches was recorded as >12 inches, as a result, during the years that stubble height was >12 inches, a value of 13 inches was used in calculations to provide the most conservative calculations of stubble height. For example, the two DMAs in Canyon Creek,

which are also located in the wild horse winter range, measured 7 and 5 of 9 times >12 inches. When used in conjunction with the DMA specific height/weight curves this yielded an average utilization at each DMA. Each of these were compared to the allowed utilization standard in order to calculate proper stocking for each of the given years measured (see Table 16). The proper pasture stocking calculations for each pasture generated an average proper pasture stocking over a ten year period and that stocking rate was then converted to AUMs.

Table 16: Proper stocking use calculations for DMAs in Big Summit Territory

YEAR	NUMBERS	DAYS	AUMs	USE STANDARD	MEASURED USE*	% OF STANDARD
Canyon Creek Herd (WEST)						
2016	994	107	1049	30%	31%	103%
2015	994	107	1049	30%	25%	83%
2014	1042	107	1100	30%	25%	83%
2013	1027	107	1084	30%	25%	83%
2012	1096	107	1157	30%	25%	83%
2011	1046	107	1104	30%	NM	NM
2010	1080	107	1140	30%	25%	83%
2009	1057	107	1115	30%	27%	90%
2008	1091	107	1151	30%	36%	120%
2007	1061	107	1120	30%	31%	103%
AVERAGE	1049	107	1107	30%	28%	92%

*Measured use included above 12 inches stubble height conservative assumption of 13 inches, making this an over-estimate of use.

YEAR	NUMBERS	DAYS	AUMS	USE STANDARD	MEASURED USE*	% OF STANDARD
Reservoir Herd (EAST)						
2016	959	107	1012	30%	34%	113%
2015	948	107	1000	30%	45%	150%
2014	1014	107	1070	30%	29%	97%
2013	1051	107	1109	30%	34%	113%

2012	1080	107	1140	30%	26%	87%
2011	1078	107	1138	30%	NM	NM
2010	1070	107	1129	30%	22%	73%
2009	1050	107	1108	30%	22%	73%
2008	1074	107	1133	30%	22%	73%
2007	1077	107	1137	30%	NM	NM
AVERAGE	1040	107	1098	30%	29%	97%

*Measured use included above 12 inches stubble height conservative assumption of 13 inches, making this an over-estimate of use.

Assuming the DMAs meet the DMA selection criteria (that they reach standard at the same time or before the rest of the pasture) then the calculated average stocking should represent the average animal days of forage that can be consumed to just reach, but not exceed, standards in the pasture. According to our calculations, the summer forage utilization for sheep and horses is consistently below the 30% allocated with a few exceptions, the highest being 45%. This was in 2015 when, based on our annual census, we had the highest number of horses and horse use was very evident in that DMA while sheep grazing remained the same as previous years. These measurements and utilization amounts may include wildlife use during the summer season. Because three of the four DMAs are located in the wild horse winter range, this confirms that summer use, especially for sheep, does not exceed standards.

Prior to winter in October of 2017 and September of 2018, in addition to the DMAs, utilization data was collected on three riparian sites in the wild horse winter range. On October 26, 2017, utilization rates ranged from 71-80% on these sites with high evidence of horse use. On September 27, 2018, utilization rates at these same three sites ranged from 58-77% with high evidence of horse use, the sheep did not graze in this area in 2018. Both years, utilization exceeded LRMP utilization standards and both years horse numbers were above the proposed AML.

Tier 3

Tier 3 of the analysis requires determining if the AML generated by habitat components is sufficient to maintain a genetically variable wild horse population. A minimum herd size of 50 effective breeding animals (a total size of about 150-200 animals) is recommended to avoid inbreeding (Cothran, 1991.). If the AML alone is not sufficient to maintain genetic variability, the management options listed below should be considered for inclusion in the management plan to maintain and monitor the genetic variability of the herd:

1. Removing the area's designation as a Territory through the NEPA process.
2. Maximizing the number of breeding age horses in the herd (age 6-10 years).
3. Adjusting the sex ratio to favor males to encourage formation of additional breeding harems.
4. Introducing 1-2 young mares from another HMA or Territory every generation (about every 10 years).

The Big Summit wild horses have had two different small genetic studies conducted; both of these studies indicate low genetic variability. The first study began in 2006 with the purpose of obtaining a non-invasive sampling method for genetic testing and counting of the horses in the Big Summit Territory. Fecal sampling during this study was not effective in identifying individual horses. Thirty-six horse hair samples were collected from captured and adopted horses or from "noon trees" within the Big Summit Territory. Hair sampling allowed for the development of a small DNA database. This study showed many of the small sample of captured horses were "closely related/inbred with 70-80%

of the 14 DNA markers assayed being identical.” This could be indicative of a small herd that is inbred or these captures may have removed whole family units before the offspring and siblings could naturally disperse to other areas (Mills, 2010 and Deshpande et al., 2019).

The second study was done in 2011 from 12 samples of horses that were captured in the Big Summit Territory in 2010. Hair samples from two different bands of six horses were analyzed and the results for observed heterozygosity, the chosen measure of genetic variability, was 0.65 and 0.58. The guidance from the BLM handbook is that observed heterozygosity below 0.66 is at critical risk for genetic health. This study concluded that the genetic variability of the herd is low even with the low sample size. This is because the genetic variation, indicated by heterozygosity, is below the critical level and this measure is not influenced by sample size (Cothran, 2011).

Management of wild horses on the Big Summit Territory must balance preserving the horse herd and maintaining the ecosystem they live on (Cothran, 1991). Genetic monitoring can be a tool for maintaining small populations to create/maintain a TNEB. In random mating populations, inbreeding considerations alone require that a minimum viable population (MVP) should not be less than 50 individuals (Franklin, 1980). However, if genetic variation is limited, as is evident in the horses on Big Summit Territory, then enlarging the population size does not increase the genetic variation (Cothran, 2009).

There are other tools that can be used to improve the genetic health of a wild horse herd, such as facilitating smaller breeding units (Cothran, 1991). With the exception of unique herds, like the Kiger mustang, the wild horse populations have been subdivided into smaller herds among the various tracts of land (Cothran, 1991). The Big Summit wild horses are part of a larger Meta population that includes other HMAs and Territories across the west that all may have similar ancestry so introducing new genetics from these HMAs or Territories will improve genetic variability of horses in the Big Summit Territory. In 2010, 2 horses from another HMA were relocated into the Big Summit Territory and have successfully reproduced increasing the genetic variation of the wild horses on Big Summit Territory. Bringing new genes from other Territories or HMAs is the primary tool that is prescribed to maintain genetic variation within Territory where habitat components limit appropriate management level.

Because the Territory alone cannot support the number of horses necessary to maintain genetic variation (if genetic depression has not already occurred) and because the horses on the Territory already have low genetic variation, a monitoring program will be utilized to guide corrective actions such as the introduction of new genes from similar Territories or Herd Management Areas or adjusting sex ratios.

Conclusion

This analysis has determined that the Big Summit Territory has the four essential habitat components to maintain a healthy wild horse population at the proposed AML of 12-57 horses. This herd size is expected to result in a TNEB that is consistent with the management objectives and compliant with LMP direction and the multiple use mandate of public lands. The AML was determined by considering the most limiting factor of winter range forage availability during winters of above average snowfall while meeting allowable use standards and LRMP goals and objectives inside the Big Summit Territory. This forage availability was considered in the context of a variety of multiple uses that need to be managed for inside the Big Summit Territory. This population size is inadequate to prevent genetic depression and the lack of genetic variety will require active management to establish and maintain the genetic health of the horses within the territory.

The following represents many factors that have changed between the time the existing AML of 55 to 65 was calculated and the calculation of the proposed AML of 12 to 57.

- Available forage decreased due to an overall increase in canopy cover.

- A much better understanding of the relationship between forage utilization and slope has been developed which represents a change in the best available science in this area.
- Populations of elk have increased.
- Since 1975, The guidance from the Ochoco LRMP has more detailed direction regarding allowable use of forage.

All of these factors have led to a proposed change in the AML and are displayed in Table 17 below.

Table 17: Comparison of AML factors

	1975	Current	Change
Pounds of Forage	1,482,600 lbs.	1,240,533 lbs.	-242,067 lbs.
Deer	9,048 lbs. (232)	11,778 lbs. (302)	-2,730 lbs.
Elk	20,592 lbs. (20)	155,506 lbs. (151)	-134,914 lbs.
Sheep	160,875 lbs. (1,100 e/l)	160,875 lbs. (1,100 e/l)	0
Forage Use Allocation	33%	30%	-3%

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Appendix C: Comprehensive Animal Welfare Best Management Practices

Comprehensive Animal Welfare BMPs for Wild Horse and Burro Gatherers

I. Facility Design

A. Trap Site and Temporary Holding Facility

1. The trap site and temporary holding facility must be constructed of stout materials and must be maintained in proper working condition, including gates that swing freely and latch or tie easily.
2. The trap site should be moved close to WH&B locations whenever possible to minimize the distance the animals need to travel.
3. Fence panels in pens and alleys must be not less than 6 feet high for horses, 5 feet high for burros, and the bottom rail must not be more than 12 inches from ground level.
4. There must be no holes, gaps or openings, protruding surfaces, or sharp edges present in fence panels or other structures that may cause escape or possible injury.
5. Hinged, self-latching gates must be used in all pens and alleys except for entry gates into the trap, which may be secured with tie ropes.
6. Finger gates (one-way funnel gates) used in bait trapping must not be constructed of materials that have sharp ends that may cause injuries to WH&Bs, such as "T" posts, sharpened willows, etc.
7. The design of pens at the trap site should be constructed with rounded corners where possible.
8. Non-essential personnel and equipment must be located to minimize disturbance of WH&Bs.
9. Trash, debris, and reflective or noisy objects should be eliminated from the trap site.

B. Loading and Unloading Areas

1. Facilities in areas for loading and unloading WH&Bs at the trap site must be maintained in a safe and proper working condition, including gates that swing freely and latch or tie easily.
2. There must be no holes, gaps or openings, protruding surfaces, or sharp edges present in fence panels or other structures that may cause escape or possible injury.
3. All gates and doors must open and close easily and latch securely.
4. Trailers must be properly aligned with loading and unloading chutes and panels such that minimum size gaps exist between the chute/panel and floor or sides of the trailer not creating a situation where a WH&B could injure itself.
5. Stock trailers should be positioned for loading or unloading such that there is no more than 18" clearance between the ground and floor of the trailer for horses.

II. Capture Technique

A. Capture Techniques

1. WH&Bs gathered on a routine basis for removal or return to range must be captured by the following approved procedures under direction of the Forest:
 - a. Helicopter
 - b. Bait trapping
2. WH&Bs must not be captured by snares or net gunning.
3. Chemical immobilization must only be used for capture under exceptional circumstances and under the direct supervision of an on-site veterinarian experienced with the technique.

B. Helicopter Drive Trapping

1. The helicopter must be operated using pressure and release methods to herd the animals in a desired direction and should not repeatedly evoke erratic behavior in the WH&Bs causing injury or exhaustion. Animals must not be pursued to a point of exhaustion; the on-site veterinarian must examine WH&Bs for signs of exhaustion.
2. The rate of movement and distance the animals travel must not exceed limitations set by Forest staff who will consider terrain, physical barriers, access limitations, weather, condition of the animals, urgency of the operation (animals facing drought, starvation, fire, etc.) and other factors on a case by case basis
 - a. WH&Bs that are weak or debilitated must be identified by Forest staff or the authorized contractors. Appropriate gather and handling methods should be used according to the direction of the Forest staff.
 - b. The appropriate herding distance and rate of movement must be determined on a case-by-case basis considering the weakest or smallest animal in the group (e.g., foals, pregnant mares, or horses that are weakened by body condition, age, or poor health) and the range and environmental conditions present.
 - c. Rate of movement and distance travelled must not result in exhaustion at the trap site, with the exception of animals requiring capture that have an existing severely compromised condition prior to gather. Where compromised animals cannot be left on the range or where doing so would only serve to prolong their suffering, euthanasia will be performed in accordance with Forest Service policy.
3. WH&Bs must not be pursued repeatedly by the helicopter such that the rate of movement and distance travelled exceeds the limitation set by the Forest. Abandoning the pursuit or alternative capture methods may be considered by the Forest in these cases.
4. When WH&Bs are herded through a fence line en route to the trap, the Forest must be notified by the contractor. The Forest must determine the appropriate width of the opening that the fence is let down to allow for safe passage through the opening. The Forest must decide if existing fence lines require marking to increase visibility to WH&Bs.
5. The helicopter must not come into physical contact with any WH&B. The physical contact of any WH&B by helicopter must be documented by the Forest along with the circumstances.
6. WH&Bs may escape or evade the gather site while being moved by the helicopter. If there are mare/dependent foal pairs in a group being brought to a trap and half of an identified pair is thought to have evaded capture, multiple attempts by helicopter may be used to bring the missing half of the pair to the trap or to facilitate capture by roping. In these instances, animal

condition and fatigue must be evaluated by the Forest staff or on-site veterinarian on a case-by-case basis to determine the number of attempts that can be made to capture an animal.

7. Horse captures must not be conducted when ambient temperature at the trap site is below 10°F or above 95°F without approval of the Forest.

C. Roping

1. The roping of any WH&B must be approved prior to the procedure by the Forest staff.
2. The roping of any WH&B must be documented by the Forest along with the circumstances. WH&Bs may be roped under circumstances which include but are not limited to the following: reunite a mare or jenny and her dependent foal; capture nuisance, injured or sick WH&Bs or those that require euthanasia; environmental reasons such as deep snow or traps that cannot be set up due to location or environmentally sensitive designation; and public and animal safety or legal mandates for removal.
3. Ropers should dally the rope to their saddle horn such that animals can be brought to a stop as slowly as possible and must not tie the rope hard and fast to the saddle so as to intentionally jerk animals off their feet.
4. WH&Bs that are roped and tied down in recumbency must be continuously observed and monitored by an attendant at a maximum of 100 feet from the animal.
5. WH&Bs that are roped and tied down in recumbency must be untied within 30 minutes.
6. If the animal is tied down within the wings of the trap, helicopter drive trapping within the wings will cease until the tied-down animal is removed.
7. Sleds, slide boards, or slip sheets must be placed underneath the animal's body to move and/or load recumbent WH&Bs.
8. Halters and ropes tied to a WH&B may be used to roll, turn, position or load a recumbent animal, but a WH&B must not be dragged across the ground by a halter or rope attached to its body while in a recumbent position.

D. Bait Trapping

1. WH&Bs may be lured into a temporary trap using bait (feed, mineral supplement, water) or sexual attractants (mares/jennies in heat) with the following requirements:
 - a. The period of time water sources other than in the trap site are inaccessible must not adversely affect the wellbeing of WH&Bs, wildlife or livestock, as determined by the Forest staff.
 - b. Unattended traps must not be left unobserved for more than 24 hours.
 - c. Mares/jennies and their dependent foals must not be separated unless for safe transport.
 - d. WH&Bs held for more than 24 hours during winter conditions and 12 hours during summer conditions must be provided with accessible clean water at a minimum rate of twenty gallons per 1000 pound animal per day, adjusted accordingly for larger or smaller horses, burros and foals and environmental conditions.
 - e. WH&Bs held for more than 24 hours must be provided good quality hay at a minimum rate of 20 pounds per 1000 pound adult animal per day, adjusted accordingly for larger or smaller horses, burros and foals.
 - i. Hay must not contain poisonous weeds, debris, or toxic substances.

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- ii. Hay placement must allow all WH&Bs to eat simultaneously.

III. Wild Horse and Burro Care

A. Veterinarian

1. On-site veterinary support must be provided for all helicopter gathers and on-site or on-call support must be provided for bait trapping.
2. Veterinary support must be under the direction of the Forest staff. The on-site/on-call veterinarian will provide consultation on matters related to WH&B health, handling, welfare, and euthanasia at the request of the Forest. All decisions regarding medical treatment or euthanasia will be made by the Forest.

B. Care

1. Feeding and Watering
 - a. Adult WH&Bs held in traps or temporary holding pens for longer than 24 hours must be fed daily with water available at all times other than when animals are being sorted or worked.
 - b. Water must be provided at a minimum rate of twenty gallons per 1000 pound animal per day, adjusted accordingly for larger or smaller horses, burros and foals, and environmental conditions.
 - c. Good quality hay must be fed at a minimum rate of 20 pounds per 1000 pound adult animal per day, adjusted accordingly for larger or smaller horses, burros and foals.
 - i. Hay must not contain poisonous weeds or toxic substances.
 - ii. Hay placement must allow all WH&Bs to eat simultaneously.
 - d. When water or feed deprivation conditions exist on the range prior to the gather, the Forest should adjust the watering and feeding arrangements in consultation with the on-call veterinarian as necessary to provide for the needs of the animals.
2. Dust abatement
 - a. Dust abatement by spraying the ground with water must be employed when necessary at the trap site and temporary holding facility.
3. Trap Site
 - a. Dependent foals (less than 300lbs) or weak/debilitated animals must be separated from other WH&Bs at the trap site to avoid injuries during transportation to the temporary holding facility. Separation of dependent foals from mares must not exceed four hours unless the Forest authorizes a longer time or a decision is made to wean the foals.
4. Temporary Holding Facility
 - a. All WH&Bs in confinement must be observed at least once daily to identify sick or injured WH&Bs and ensure adequate food and water.
 - b. Foals must be reunited with their mares/jennies at the temporary holding facility within four hours of capture unless the Forest authorizes a longer time or foals are old enough to be weaned during the gather.

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- c. Non-ambulatory WH&Bs must be located in a pen separate from the general population and must be examined by the BLM horse specialist and/or on-call or on-site veterinarian as soon as possible, no more than four hours after recumbency is observed. Unless otherwise directed by a veterinarian, hay and water must be accessible to an animal within six hours after recumbency.
 - d. Alternate pens must be made available for the following:
 - i. WH&Bs that are weak or debilitated
 - ii. Mares/jennies with dependent foals
 - e. Aggressive WH&Bs causing serious injury to other animals should be identified and relocated into alternate pens when possible.
 - f. WH&Bs in pens at the temporary holding facility should be maintained at a proper stocking density such that when at rest all WH&Bs occupy no more than half the pen area.

IV. Handling

A. Willful Acts of Abuse

1. Hitting, kicking, striking, or beating any WH&B in an abusive manner is prohibited.
2. Dragging a recumbent WH&B without a sled, slide board or slip sheet is prohibited.
3. There should be no deliberate driving of WH&Bs into other animals, closed gates, panels, or other equipment.
4. There should be no deliberate slamming of gates and doors on WH&Bs.
5. There should be no excessive noise (e.g., constant yelling) or sudden activity causing WH&Bs to become unnecessarily flighty, disturbed or agitated.

B. General Handling

1. All sorting, loading or unloading of WH&Bs during gathers must be performed during daylight hours except when unforeseen circumstances develop and the Forest approves the use of supplemental light.
2. WH&Bs should be handled to enter runways or chutes in a forward direction.
3. WH&Bs should not remain in single-file alleyways, runways, or chutes longer than 30 minutes.
4. Equipment except for helicopters should be operated and located in a manner to minimize flighty behavior.

C. Handling Aids

1. Handling aids such as sorting sticks, flags and shaker paddles must be the primary tools for driving and moving WH&Bs during handling and transport procedures. Contact of the flag or paddle end of primary handling aids with a WH&B is allowed. Ropes looped around the hindquarters may be used from horseback or on foot to assist in moving an animal forward or during loading.
2. Electric prods must not be used routinely as a driving aid or handling tool. Electric prods may be used in limited circumstances only if the following guidelines are followed:

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- a. Electric prods must only be a commercially available make and model that uses DC battery power and batteries should be fully charged at all times.
 - b. The electric prod device must never be disguised or concealed.
 - c. Electric prods must only be used after three attempts using other handling aids (flag, shaker paddle, voice or body position) have been tried unsuccessfully to move the WH&Bs.
 - d. Electric prods must only be picked up when intended to deliver a stimulus; these devices must not be constantly carried by the handlers.
 - e. Space in front of an animal must be available to move the WH&B forward prior to application of the electric prod.
 - f. Electric prods must never be applied to the face, genitals, anus, or underside of the tail of a WH&B.
 - g. Electric prods must not be applied to any one WH&B more than three times during a procedure (e.g., sorting, loading) except in extreme cases with approval of the Forest.
 - h. Any electric prod use that may be necessary must be documented daily by Forest staff including time of day, circumstances, handler, location (trap site or temporary holding facility), and any injuries (to WH&B or human).

V. Transportation

A. General

1. All sorting, loading, or unloading of WH&Bs during gathers must be performed during daylight hours except when unforeseen circumstances develop and the Forest approves the use of supplemental light.
2. Wild horses identified for removal should be shipped from the temporary holding facility to a short-term facility within 48 hours.
 - a. Shipping delays for animals that are being held for release to range or potential on-site adoption must be approved by Forest staff.
3. Shipping should occur in the following order of priority; 1) debilitated animals, 2) pairs, 3) weanlings, 4) dry mares and 5) studs.
4. Planned transport time to the temporary short-term holding facility from the trap site or temporary holding facility must not exceed 10 hours.
5. WH&Bs should not wait in stock trailers and/or semi-trailers at a standstill for more than a combined period of three hours during the entire journey.

B. Vehicles

1. Straight-deck trailers and stock trailers must be used for transporting WH&Bs.
 - a. Two-tiered or double deck trailers are prohibited.
 - b. Transport vehicles for WH&Bs must have a covered roof or overhead bars containing them such that WH&Bs cannot escape.

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2. WH&Bs must have adequate headroom during loading and unloading and must be able to maintain a normal posture with all four feet on the floor during transport without contacting the roof or overhead bars.
 3. The width and height of all gates and doors must allow WH&Bs to move through freely.
 4. All gates and doors must open and close easily and be able to be secured in a closed position.
 5. The rear door(s) of the trailers must be capable of opening the full width of the trailer.
 6. Loading and unloading ramps must have a non-slip surface and be maintained in proper working condition to prevent slips and falls.
 7. Transport vehicles more than 18 feet and less than 40 feet in length must have a minimum of one partition gate providing two compartments; transport vehicles 40 feet or longer must have at least two partition gates to provide a minimum of three compartments.
 8. All partitions and panels inside of trailers must be free of sharp edges or holes that could cause injury to WH&Bs.
 9. The inner lining of all trailers must be strong enough to withstand failure by kicking that would lead to injuries.
 10. Partition gates in transport vehicles should be used to distribute the load into compartments during travel.
 11. Surfaces and floors of trailers must be cleaned of dirt, manure and other organic matter prior to the beginning of a gather.

C. Care of WH&Bs during Transport Procedures

1. WH&Bs that are loaded and transported must be fit to endure travel.
 - a. WH&Bs that are non-ambulatory, blind in both eyes, or severely injured must not be loaded and shipped unless it is to receive immediate veterinary care or euthanasia.
 - b. WH&Bs that are weak or debilitated must not be transported without approval of the Forest in consultation with the on-call veterinarian. Appropriate actions for their care during transport must be taken according to direction of the Forest.
2. WH&Bs should be sorted prior to transport to ensure compatibility and minimize aggressive behavior that may cause injury.
3. Trailers must be loaded using the minimum space allowance in all compartments as follows:
 - a. 12 square feet per adult horse.
 - b. 6.0 square feet per dependent horse foal.
 - c. 8.0 square feet per adult burro.
 - d. 4.0 square feet per dependent burro foal.
4. Saddle horses must not be transported in the same compartment with WH&Bs.

VI. Euthanasia or Death

A. Euthanasia Procedure during Gather Operations

1. An authorized, properly trained, and experienced person as well as a firearm appropriate for the circumstances must be available at all times during gather operations. When the travel time between the trap site and temporary holding facility exceeds one hour or if radio or cellular communication is not reliable, provisions for euthanasia must be in place during the gather operation.
2. Euthanasia must be performed according to American Veterinary Medical Association euthanasia guidelines (2013) using methods of gunshot or injection of an approved euthanasia agent.
3. The decision to euthanize and method of euthanasia must be directed by the Authorized Officer or their Authorized Representative(s) that include but are not limited to Forest staff who must be on site and may consult with the on-site/on-call veterinarian.
4. Photos needed to document an animal's condition should be taken prior to the animal being euthanized.
5. Any WH&B that dies or is euthanized must be documented by Forest staff including time of day, circumstances, euthanasia method, location, a description of the age, gender, and color of the animal and the reason the animal was euthanized.

B. Carcass Disposal

1. The Forest must ensure that appropriate equipment is available for the timely disposal of carcasses when necessary.
2. Disposal of carcasses must be in accordance with state and local laws.
3. WH&Bs euthanized with a barbiturate euthanasia agent must be buried or otherwise disposed of properly.
4. Carcasses left on the range should not be placed in washes or riparian areas where future runoff may carry debris into ponds or waterways. Trenches or holes for buried animals should be dug so the bottom of the hole is at least 6 feet above the water table and 4-6 feet of level earth covers the top of the carcass with additional dirt mounded on top where possible.

Appendix D: Emergency Action Framework

The Emergency Action Framework is a guide to help decision makers in the event of an emergency situation in which a wild horse may be suffering. Any emergency involving a wild horse will be looked at on a case-by-case basis with regards to the humane treatment of the horse, the long-term well-being of the wild horse herd and maintaining the “wildness” of the herd as priority. The Emergency Action Framework will focus on euthanasia of wild horses for reasons related to health, handling and act of mercy.

Final decisions regarding euthanasia of a wild horse rest solely with the authorize officer (36 CFR 222.60 Subpart D). It is understood that there will be cases where this decision must be made in the field and cannot always be anticipated. Appropriate wild horse personnel at facilities and in the field should be consulted for information needed to make a decision. A task force may be assembled for the emergency if the authorizing officer deems necessary and/or consultation with a veterinarian may be sought. Euthanasia as an act of mercy will be carried out following the direction in FSM 2260. The death record should specify that euthanasia was performed and the reason that it was performed.

A Forest Service authorized officer shall use these definitions for guidance:

- Sick- a wild horse with failing health, infirmness, or disease from which there is little chance of recovery or poor prognosis.
- Lamé-a wild horse with malfunctioning muscles, ligaments or limbs that impair freedom of movement.
- Old-a wild horse characterized by inability to fend for itself because of age, physical deterioration, suffering or closeness to death.

A Forest Service Authorized officer will euthanize or authorize euthanasia of a wild horse when any of the following conditions exist:

- Displays a poor prognosis for life;
- Falls under the definitions of sick, lame or old;
- Would require continuous treatment for the relief of pain and suffering in a domestic setting;
- Is incapable of maintaining a Henneke body condition score (see Attachment 1) greater than or equal to a 2 in its present environment;
- Has an acute or chronic illness, injury, physical condition or lameness that would not allow the animal to live and interact with other horses, keep up with its peers or maintain an acceptable quality of life constantly or for the foreseeable future;
- Where a State or Federal animal health official orders the humane destruction of the animal(s) as a disease control measure;
- Exhibits dangerous characteristics beyond those inherently associated with the wild characteristics of wild horses or is a public safety threat (ORS 498.012).

When euthanasia will be performed and how decisions will be made and recorded in a variety of circumstances is described below.

Euthanasia in field situations (includes on-the-range and during gathers):

- If an animal is affected by a condition as described in 1-7 above that causes acute pain or suffering and immediate euthanasia would be an act of mercy, the authorized officer should promptly euthanize the animal.
- The authorized officer will document any euthanasia under act of mercy.

Euthanasia at short-term holding facilities:

Ideally, no horse would arrive at short-term holding facilities with conditions that require euthanasia. However, problems can develop during or be exacerbated by handling, transportation or captivity. In these situations that authority for euthanasia should be applied as follows:

- If an animal is affected by a condition as described in 1-7 above that causes acute pain or suffering and immediate euthanasia would be an act of mercy, the authorized officer should promptly euthanize the animal.
- If an animal is affected by a condition as described in 1-7 above, but is not in acute pain, the authorized officer has the authority to euthanize the animal, but should first consult a veterinarian.
- If the authorized officer concludes, after consulting with a veterinarian, that a wild horse in a short-term holding facility cannot tolerate the stress of transportation or adoption preparation then the animal should be euthanized.

Humane Destruction of unusually dangerous animals:

Unusually aggressive wild horses can pose an unacceptable risk of injury when maintained in enclosed spaces where some level of handling is required. When a horse is unusually dangerous, it is reasonable to conclude that an average adopter could not humanely care for the animals as required by regulations. When deciding to euthanize an animal because it is unusually dangerous, the authorized officer, in consultation with a veterinarian or task force, should determine that the animal poses a significant and unusual danger to people or other animals beyond that normally associated with wild horses. The authorized officer should document the aspects of the animal's behavior that make it unusually dangerous. Oregon statute (ORS 499.012) authorizes, "... taking any wildlife that is causing damage, is a public nuisance or poses a public health risk ..."

Euthanasia of a large number of animals for reasons related to health, handling and acts of mercy:

When the need for euthanasia of an unusually large number of animals is anticipated, the likely course of action should be identified and outlined in advance whenever possible. Arrangements should be made for a USDA Animal and Plant Health Inspection Service (APHIS), State or other veterinarian to visit the site and consult with the authorized officer on the euthanasia decisions. This consultation should be based on an examination of the animals by the veterinarian. It should include a detailed, written evaluation of the conditions, circumstances or history of the situation and the number of animals involved.

Appendix E: Standard Operating Procedures (SOPs) for Wild Horse Population-Level Fertility Control Treatments

Any fertility control contraceptives or sterilization methods recommended by the Wild Horse and Burro Advisory Board and approved by the EPA, FDA, or other governmental regulatory body will be available for use. The following implementation and monitoring requirements are part of the Proposed Action:

Contraceptives (currently PZP and GonaCon)

1. Fertility control methods would be administered through darting, jab sticks or hand injection by trained USFS or BLM personnel or collaborating research partners or volunteers. For any darting operation, the designated personnel must have successfully completed a nationally recognized wildlife darting course.
2. Horses treated would receive the prescribed dose loaded into darts at the time a decision has been made to dart a specific horse.
3. The fertility control dose is administered using appropriate equipment.
4. Only designated darters would prepare the vaccine/adjuvant and prepare the emulsion. Vaccine-adjuvant emulsion would be loaded into darts at the darting site and delivered by means of a capture gun.
5. Delivery of the vaccine would follow application directions.
6. Safety for both humans and the horse is the foremost consideration in deciding to dart a horse.
7. No attempts would be taken in high wind or when the horse is standing at an angle where the dart could miss the hip/gluteal region and hit the rib cage. The ideal is when the dart would strike the skin of the horse at a perfect 90° angle.
8. If a loaded dart is not used within two hours of the time of loading, the contents would be transferred to a new dart before attempting another horse. If the dart is not used before the end of the day, it would be stored according to manufactures direction and the contents transferred to another dart the next day. Refrigerated darts would not be used in the field.
9. No more than two people should be present at the time of a darting. The second person is responsible for locating fired darts. The second person should also be responsible for identifying the horse, record keeping and keeping onlookers at a safe distance.
10. To the extent possible, all darting should be carried out in a discrete manner. However, if darting is to be done within view of non-participants or members of the public, an explanation of the nature of the project should be carried out either immediately before or after the darting.
11. Attempts will be made to recover all darts. To the extent possible, all darts which are discharged and drop from the horse at the darting site should be recovered before another darting occurs. In exceptional situations, the site of a lost dart may be noted and marked, and recovery efforts made at a later time. All discharged darts should be examined after recovery in order to determine if the charge fired and the plunger fully expelled the vaccine.
12. All mares targeted for treatment will be photographed in a manner to aid in their identification to the greatest degree possible to enable researchers and wild horse managers to positively identify the animals during the project and at the time of removal during subsequent gathers.
13. In the event of a veterinary emergency, darting personnel would immediately contact the on-call veterinarian, providing all available information concerning the nature and location of the incident.

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14. In the event that a dart strikes a bone or imbeds in soft tissue and does not dislodge, the darter should follow the affected horse until the dart falls out or the horse can no longer be found. The darter is responsible for daily observation of the horse until the situation is resolved.

Field Castration (Gelding)

Gelding will be performed with general anesthesia and by a veterinarian. The combination of pharmaceutical compounds used for anesthesia, method of physical restraint, and the specific surgical technique used will be at the discretion of the attending veterinarian with the approval of the Forest Service officer.

Pre-surgery Animal Selection, Handling and Care

1. Stallions selected for gelding will be greater than 6 months of age and less than 20 years of age.
2. All stallions selected for gelding will have a Henneke body condition score of 3 or greater. No animals which appear distressed, injured or in failing health or condition will be selected for gelding.
3. Whenever possible, a separate holding corral system will be constructed on site to accommodate the stallions that will be gelded. These gelding pens will include a minimum of 3 pens to serve as a working pen, recovery pen(s), and holding pen(s). An alley and squeeze chute built to the same specifications as the alley and squeeze chutes used in temporary holding corrals (solid sides in alley, minimum 30 feet in length, squeeze chute with non-slip floor) will be connected to the gelding pens.
4. When possible, stallions selected for gelding will be separated from the general population in the temporary holding corral into the gelding pens, prior to castration.
5. When it is not possible or practical to build a separate set of pens for gelding, the gelding operation will only proceed when adequate space is available to allow segregation of gelded animals from the general population of stallions following surgery. At no time will recently anesthetized animals be returned to the general population in a holding corral before they are fully recovered from anesthesia.
6. All animals in holding pens will have free access to water at all times. Water troughs will be removed from working and recovery pens prior to use.
7. Prior to surgery, animals in holding pens may be held off feed for a period of time (typically 12-24 hours) at the recommendation and direction of the attending veterinarian.
8. The final determination of which specific animals will be gelded will be based on the professional opinion of the attending veterinarian in consultation with the Authorized Officer.
9. Whether the procedure will proceed on a given day will be based on the discretion of the attending veterinarian in consultation with the Authorized Officer taking into consideration the prevailing weather, temperature, ground conditions and pen set up. If these field situations can't be remedied, the procedure will be delayed until they can be, the stallions will be transferred to a prep facility, gelded, and later returned, or they will be released to back to the range as intact stallions.

Gelding Procedure

1. All gelding operations will be performed under a general anesthetic administered by a qualified and experienced veterinarian. Stallions will be restrained in a portable squeeze chute to allow the veterinarian to administer the anesthesia.
2. The anesthetics used will be based on a Xylazine/ketamine combination protocol. Drug dosages and combinations of additional drugs will be at the discretion of the attending veterinarian.

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3. Animals may be held in the squeeze chute until the anesthetic takes effect or may be released into the working pen to allow the anesthesia to take effect. If recumbency and adequate anesthesia is not achieved following the initial dose of anesthetics, the animal will either be redosed or the surgery will not be performed on that animal at the discretion of the attending veterinarian.
 4. Once recumbent, rope restraints or hobbles will be applied for the safety of the animal, the handlers and the veterinarian.
 5. The specific surgical technique used will be at the discretion of the attending veterinarian.
 6. Flunixin meglumine or an alternative analgesic medication will be administered prior to recovery from anesthesia at the professional discretion of the attending veterinarian.
 7. Tetanus prophylaxis will be administered at the time of surgery.

The animal would be sedated then placed under general anesthesia. Ropes are placed on one or more limbs to help hold the animal in position and the anesthetized animals are placed in either lateral or dorsal recumbency. The surgical site is scrubbed and prepped aseptically. The scrotum is incised over each testicle, and the testicles are removed using a surgical tool to control bleeding. The incision is left open to drain. Each animal would be given a Tetanus shot, antibiotics, and an analgesic.

Any males that have inguinal or scrotal hernias would be removed from the population, sent to a regular facility and be treated surgically as indicated, if possible, or euthanized if they have a poor prognosis for recovery (FSM 2260). Horses with only one descended testicle may be removed from the population and managed at a regular facility according to policy or anesthetized with the intent to locate the undescended testicle for castration. If an undescended testicle cannot be located, the animal may be recovered and removed from the population if no surgical exploration has started. Once surgical exploration has started, those that cannot be completely castrated would be euthanized prior to recovering them from anesthesia according to policy (FSM 2260). All animals would be rechecked by a veterinarian the day following surgery. Those that have excessive swelling, are reluctant to move or show signs of any other complications would be held in captivity and treated accordingly. Once released no further veterinary interventions would be possible.

Selected stallions would be shipped to the facility, gelded, and returned to the range within 30 days. Gelded animals could be monitored periodically for complications for approximately 7-10 days following release. In the proposed alternatives, gelding is not part of a research study, but additional monitoring on the range could be completed either through aerial reconnaissance, if available, or field observations from major roads and trails. It is not anticipated that all the geldings would be observed but if the goal is to detect complications on the range, then this level of casual observation may help determine if those are occurring. Periodic observations of the long term outcomes of gelding could be recorded during routine resource monitoring work. Such observations could include but not be limited to band size, social interactions with other geldings and harem bands, distribution within their habitat, forage utilization and activities around key water sources. Periodic population inventories and future gather statistics could provide additional anecdotal information about how logistically effective it is to manage a portion of the herd as non-breeding animals.

Spaying

Any spaying methods recommended by the Wild Horse and Burro Advisory Board and approved by the EPA, FDA, or other governmental regulatory body will be available for use. SOPs will be developed following the direction from the BLM.

Monitoring and Tracking of Treatments

1. At a minimum, estimation of population growth rates using ground or aerial surveys will be conducted before any subsequent gather. During these surveys it is not necessary to identify which

foals were born to which mares; only an estimate of population growth is needed (i.e. # of foals to # of adults).

2. Population growth rates of herds selected for intensive monitoring will be estimated every year post-treatment using ground or aerial surveys. During these surveys it is not necessary to identify which foals were born to which mares, only an estimate of population growth is needed (i.e. # of foals to # of adults).
3. A fertility control data sheet will be used by field applicators to record all pertinent data relating to identification of the horse (including photographs) and date of treatment. A copy of the form and data sheets and any photos taken will be maintained at the field office.

Appendix F – Consideration of Public Comments

All written comments and public input have been considered during the decision-making process for the Ochoco Wild Horse Herd Management Plan project. Pursuant to 36 CFR 218.5(a), opportunity for public comment on an Environmental Assessment includes during scoping or any other instance where the responsible official seeks written comments. For the Ochoco Wild Horse Herd Management Plan and Forest Plan Amendment Environmental Assessment (EA), a public comment period took place from April 17 to May 18, 2020. This appendix documents the Forest’s consideration of comments received during the 30-day public comment period on the EA. A total of 126 comment letters were received from individuals or organizations. The Forest also received about 60 phone calls; the comments provided by phone were in opposition to the proposed action. Full text of all comment letters are on file at the Ochoco National Forest.

Some commenters submitted additional citations and documents to be considered with their comments. The Interdisciplinary Team has reviewed the cited documents provided by the commenters and provided consideration of relevant peer-reviewed science. The Interdisciplinary Team has documented in the project file where they determined that submitted documentation is either opinion, non-peer reviewed science, or is not applicable to the alternative(s) actions or their effects on the environment.

The responses provided here fulfill the agency’s requirement to assess and consider comments individually and collectively. Some comments have resulted in modifications to the EA including the addition of clarifying language, improved or modified analysis, or factual corrections.

Table F-1: List of commenters

1	American Wild Horse Campaign, Brieannah Schwartz	49	Barbara Flores	97	Sharol Bjorgo
2	Friends of Animals, Courtney McVean	50	Bonnie Kohlriter	98	Shelley Mckee
3	Wild Horse and Burro Fund, Craig Downer	51	Robert & Gretchen Pederson	99	Sarah manson
4	Central Oregon Wild Horse Coalition, Gayle Hunt	52	Shontae Thomas	100	Sonya Petrusse
5	In Defense of Animals, Ginger Fedak	53	Laurie Solomon	101	Sue Rasmussen
6	The Cloud Foundation, Ginger Kathrens	54	Kate Mabry	102	Teresa Tyler
7	Return to Freedom	55	Greg Griffin	103	Tracy Baker
8	Wild Horse Education, Laura Leigh	56	Jolie Siegel	104	Susan Carter
9	Theodore Roosevelt Conservation Partnership, Michael O’Casey	57	Joseph Arrington	105	Bicki Pardee
10	Rocky Mountain Elk Foundation, Blake Henning	58	Ann Ryan	106	Sue Rasmussen
11	Oregon Hunters Association, Jim Akenson	59	Amy Hansen	107	Becky Pettit
12	Juniper Group Sierra Club, Mathieu Federspiel	60	Arushi Brinks	108	Beth Berghofer
13	Citizens in Support of Public Lands, Mathieu Federspiel	61	Alison James	109	Sheryl Barnes

14	Blue Mountains Biodiversity Project, Karen Coulter	62	Allen Tannock	110	Carolyn Wiedemer
45	(letter withdrawn)	63	Susan Tannock	111	C G
16	Oregon Department of Fish and Wildlife, Sara Gregory	64	Janelle Earnshaw	112	Christine Frei
17	Hay Creek Ranch, Gordon Clark	65	Heather Hudson	113	Christy Lundstrom
18	Gil Muhleman	66	Heidi Heishman	114	Dayla Gentry
19	Greg Broxson	67	Jason Williams	115	Dawn Onesty
20	David Krajczynski	68	Jennifer Baker	116	DeAne Urban
21	Jeffrey Richardson	69	Jimmy Hurley	117	Dory Wilson
22	Frank Porfily	70	Spencer Ward	118	Dominique Simon
23	Debbie Coffey	71	Bonnie Johnson	119	Deborah Long
24	Kathleen Gregg	72	Carolina Hood	120	Debby Long
25	Melinda Kestler	73	Mark Canright	122	Darla Brunner
26	Sherry Oster	74	Kaelyn Jensen	123	Dustin Kampert
27	Robert Bauer	75	Kathy Pabst	124	Dr. A. Ryan
28	Michele Anderson	76	Kerick Walters	125	Elaine Varela
29	Marybeth Devlin	77	Kimberly Johnson	126	Emily Harris
30	Lynn Ashby	78	Kima Garrison		
31	Kenny Wolfore	79	Kimberly Ogle		
32	Judith Fader	80	Laura Berry		
33	Joe Hudspeth	81	Mary Siani		
34	Jerry West	82	Mary Siani		
35	Heidi Supkis	83	Maya Elson		
36	Debra Matthews	84	Melissa Warfield		
37	Debra Hunt	85	Michael Gannon		
38	Debra Koetitz	86	Nancy Pearlman		
39	Eileen Hennessy	87	Nicole		
40	Elise Lowe-Vaughn	88	Neta Martin		
41	Erica Christensen	89	Paige Smith		
42	Gayle Casselman	90	Patricia Mannos		
43	George Johnson	91	Patricia Martin		
44	Charlotte Roe	92	Peter Puc		
45	Carol Statton	93	Rose Covert		
46	Davis Aichele	94	Rebecca Dante		
47	In Defense of Animals Signatories	95	Robin Kennedy		
48	Dan Hammond	96	Rosalyn Goodman		

Comments and Responses

The following comments, arranged by topic, are followed by the Forest Service response. Similar comments are grouped and given one response. Not every comment is listed here and statements may have been summarized or paraphrased to reduce paperwork, but sufficient representative statements are provided to reflect the sentiment, issue, or concern. General statements of support or opposition or alternative preference were noted by the IDT and responsible official but are not included here. The number following the comment indicates the commenter as listed above in Table A-1, though due to the high volume of comment letters, not all commenters who shared the same sentiment may be noted.

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Purpose & Need / Range of Alternatives

***Comment:** This herd has been relatively static at 130 for many years. Population control is unnecessary. [2, 23, 44, 55, 71]*

The Big Summit wild horses are survivors and, like all wild horses, are self-sustaining, as is clear by their “stable” population numbers. [2, 50]

From the data you & others present over a number of years, the BST wild horse population is generally self-stabilizing. We should let the wild horses inform us as to what their “appropriate level” is, rather than arbitrarily dictate a population size that leaves their ecological niche largely unfilled. [3]

Nature has without management been able to establish its own AML, not only of wild equine, but all organisms, ruminant and ungulates alike and without human intervention.... Wild horses are self-regulating. [27]

Consideration: Figure 8 in the EA at page 27 depicts the herd size over the last 16 years. According to the ground-based inventory, this herd has high annual variation in population and about a 7-8% average growth rate. The herd size trend is discussed in the EA (p. 63-64). There appears to have been a “plateau” in the number of horses since the last capture and removal in 2010; however, there is no available data to discern if this means the herd is self-limiting, which occurs when there is increased competition for food, decreasing natality and survival rates and poorer body condition. EA p. 64. In addition, evidence of horses outside of the Territory continues with further indication of an increased number of horses resulting in an increase in pressure and distance outside of the Territory (EA p. 31).

The WFRHBA and associated regulations directs the agency to manage the wild horse herd inside the designated Territory, including the removal of excess animals. Territory management plans describe acceptable methods of controlling the population (EA p. 11). The EA considered alternatives of No Capture and No Active Management and explained why those alternatives were not analyzed in detail (EA pp. 20-21).

Comment: *Dr. Eggert noted that in the event there is sufficient scientific evidence that shows wild horses are the cause of the range damage in the WHT, the most prudent management plan would be Alternative 1, an AML of 55-65 individuals, with the addition of genetic monitoring and the introduction of 1-2 unrelated mares every generation (10-15 years). Her proposal is a hybrid of Alternatives 1 and 2 and should be seriously considered by the USFS in the final EA. [1]*

Consideration: This alternative is within the range of alternatives analyzed and scope of effects discussed in the EA.

Comment: *The Forest Service should consider the following alternatives which focus on maintaining, and potentially increasing, the wild horse AML and monitoring for genetic viability:*

- *Increase the AML to a genetically viable and sustainable population range. Implement a comprehensive genetic monitoring program to ensure that the wild horse population’s genetic viability trends in the correct direction.*
- *Implement a comprehensive fertility control program in the WHT utilizing the scientifically proven PZP fertility control vaccine to stabilize the population as currently found on the WHT. If necessary, since consistent and comprehensive PZP application will stabilize the population, incremental removals should occur over time and only when there is room in a holding facility and a need in adoption demand.*
- *Reduce or eliminate livestock use within the WHT. Wild horses are federally protected animals that the USFS is proposing to manage within their federally designated habitat. However, livestock grazing is not required to fulfill the agency’s “multiple use” mandate. It is also far more cost effective to curtail taxpayer-subsidized commercial livestock grazing in this area than it is to permanently remove wild horses from the range.*

Impacts to the wild horse population would be mitigated under these alternatives by decreasing livestock grazing on public lands and increasing the wild horse AML with genetics monitoring to ensure herd health. [1]

I suggest the FS select Alternative 1 but that Alternative 1 be amended to include the use of PZP for stabilizing the number of wild horses and creative water sources are researched and utilized. [37]

Consideration: This alternative is not unlike a combination of Alternatives 2 and 3 for wild horse management and would therefore fall within the range of alternatives analyzed absent the removal of livestock from the Territory. The Forest Service received comments suggesting that livestock be

removed from the Territory and addressed this suggestion in the EA (p. 11); the effects of livestock use of the Territory is discussed in the EA pp. 68-75.

Comment: *What is also absent from this EA is any meaningful suggestion of mitigative measures when the horses may be actually and definitively shown to create resource damage. [4]*

There is an inadequate range of alternatives in that none strike a balance between maintaining a genetically diverse, viable, and healthy wild horse population and significantly improving highly degraded riparian conditions within a reasonable amount of time. [14, 41]

Consider fencing the creeks to solve the problems in riparian areas. [22]

According to the Conference language, and the context within the Wild Free-Roaming Horses and Burros Act, reducing horse numbers when provable damage can be alleviated through other means is consistent with Minimal Feasible Level Management. Whether this means traditional fencing of vulnerable resources, or some other measure, this strategy should evolve from a much deeper understanding of the interrelationships between the wild horses and their natural habitat. [4]

With acknowledged long-term legacy degradation why is there no discussion of riparian restoration efforts in the Territory? The Forest Service usually proposes active riparian restoration to start repairing the legacy degradation. [14, 53, 73, 83]

Consideration: The decision to be made in this project is described in the EA p. 14. This project will not preclude the Forest from undertaking riparian restoration activities.

Comment: *As a member of the National Horse & Burro Rangeland Management Coalition, the Rocky Mountain Elk Foundation (RMEF) expresses continued concern related to the increasing number of wild horses and burros spanning 45 million acres in 10 states and two Canadian provinces. While the Appropriate Management Level (AML) that the rangeland can ecologically support is approximately 27,000 animals across the United States, the 2019 estimated population is more than 80,000. There are additional horses and burros in holding facilities costing taxpayers nearly \$50 million annually. Significant long-term damage is occurring across vital range landscapes, including forage and water resources needed to support wildlife. [10]*

Consideration: Although there are wild horse and burro territories and Herd Management Areas across public lands in the United States, planning for the management of the Ochoco Wild Horses and the scope of this analysis is specific to the conditions present and the potential effects within the 24,000 acres of the Big Summit Territory.

Comment: *The Department recommends the final plan include criteria for selection of gather sites and Additional details regarding ecological monitoring of impacts to both upland and riparian sites for each Alternative and their connection to Forest Standard & Guidelines. [16]*

Consideration: In the EA outlines resource protection measures that are to be used when locating trap sites. One criterion includes giving preference to trap locations in areas that have previously been disturbed, i.e. dispersed campgrounds and gravel pits. A description of utilization monitoring has been added to the description of management components common to both action alternatives.

Comment: *We suggest an alternative with the minimum AML numbers of wild horse being 60 and the maximum 125 and including bait trapping, temporary horse contraceptives, no helicopter use, no sterilization, introduction of mares, riparian restoration such as exclusion fencing and shrub planning, prohibiting sheep use of winter range, considering reduction in sheep numbers, and monitoring of decisions to euthanize captured wild horses by outside group such as COWHC. See letter for rationale. [14, 41, 53, 70]*

Consider modifications to Alternative 2: a herd size of no fewer than 60 and up to 100 (give/take 5% overage) wild horses would much better insure genetic variability as well as sustainability to better

withstand varying seasonal conditions and the potential, yet-undetermined stresses of climate change; no surgical spaying; selective castration done humanely with sedation and follow-up care; introduction of mares. [42]

I'm opposed to the three alternatives and recommend to stay with the current 135-head group for the following reasons: plenty of forage is available, including year round and all existing competition. [22]

The AML should be raised to 150 horses with humane, reversible fertility control as needed. [55]
Specifically on fertility control, AWHC supports consideration of an alternative that analyzes the implementation of a comprehensive PZP fertility control program to manage wild horses at the current population found in the WHT. The USFS must consider the possibility of implementing this option at current population levels utilizing Catch Treat and Release ("CTR") methods for the vaccination of all mares over 1 year of age with the PZP-22 or native PZP fertility control vaccine. In addition, should the USFS analyze this alternative in the final EA, the USFS must also outline future plans to continue the PZP fertility control program in order to continue the population growth suppression and forgo removals. [1]

Alternative 3 precludes introducing wild mares from other herds to immediately increase genetic diversity, which is needed, since two studies have confirmed low existing genetic diversity in the Big Summit herds. We see this as a form of blackmail to force the choice of Alternative 2, which is the only alternative that includes boosting genetic diversity. [14]

Consideration: These suggestions are within the range of alternatives and scope of effects discussed in the EA.

Comment: *Horses are not native to the Ochocos and thus should be managed as invasive and their impacts must be taken into consideration. Nothing against horses, but they don't belong here. [18]*

Over 10 years ago I saw the problems Wild Horses were making to Murderers Creek unit. Damage to watershed and fragile ecosystems. It looked as if motorcycles had run tracks throughout the country I was totally disgusted. I did a trip to the Steens not long after and noticed large piles of manure all over in this country. That was ten years ago. I now see wild horses everywhere I like to venture. I spend about 80. days in the field. I hunt, fish, forage, hike, and explore. My lands are being destroyed by these animals. Are they beautiful and intriguing? yes Are they dangerous to our ecosystems? yes Is Oregon out of balance and in need of a plan to deal with this? Yes [19]

There are plenty of wild horses next door in Murderers Creek. Ochocos do not need wild horses. If you are forced to have them, which is ridiculous, then keeping it to as few as possible. They compete with native wildlife and they really destroy waterways by denuding the riparian areas. Also just the general cost to deal with them when they inevitably overpopulate. You cannot give the things away when you do a roundup. Since they are protected their populations are always on the increase. The annual costs, as you well know, is astronomical to keep in the feed lots. Get rid of the wild horses in the Ochoco unit. [20]

Consideration: The EA points out that the Forest Service is mandated by the WFRHBA to ensure wild horses are managed in a thriving natural ecological balance with other uses and the productive capacity of their habitat (p. 3). The proposed action is intended to maintain the population at a level where riparian damage is reduced. The Forest Service coordinates with managers of the Malheur NF when wild horses from the Murderers Creek herd are located on the Ochoco NF.

Comment: *"The Forest Service has prepared this Draft Environmental Assessment to disclose the effects of the management plan alternatives on the human environment." Interesting statement when the subject is the wild horses and they have a duty to protect them under the WHFRBA, perhaps they should start over and look at it from that angle. [25]*

Consideration: NEPA requires federal agencies to consider the environmental consequences of federal actions. 40 CFR 1500.1(c). The proposed action must be consistent with the WFRHB Act (EA p. 11) and the EA considers the effects to wild horses as part of the analysis (EA pp. 23-67).

Comment: *The Forest Service failed to consider other alternatives that would include viable herd numbers, but without certain fertility control measures. [23]*

Population Control methods should focus first and foremost on natural controls such as predators. These are primarily mountain lions and wolves and to some extent bears. [49]

Consideration: Fertility control measures are included in Alternatives 2 and 3 in order to slow the herd's rate of population growth. Alternative 3 may not even require fertility control if the population cannot get to this level because of self-limiting factors. This would decrease gather frequency and decrease the number of excess wild horses which need to be removed over time. EA p. 16. Contraception is the Forest Service preferred method of fertility control to reduce population growth. EA p. 17.

Comment: *Consider selling tags for people to help manage and control the feral horse population. [69]*

Consideration: Such an option would be a violation of the Wild Free Roaming Horses and Burros Act.

Comment: *We stated that "The Big Summit Herd MUST be managed to at least the minimum viable number of 50 breeding adults, or 150-200 total animals, depending on use of fertility control and other +factors." This was a Minimum Viable Population recommendation, and not expressed by Dr. Cothran or by us as an "AML", nor were we suggesting the herd total of 150- 200 should be the AML. The number of 150-200 is an estimate of the total number in a herd where there are 50 breeding adults. In the Big Summit herd, since younger and older herd members are especially vulnerable in a Territory having harsh winters a high likelihood of predation, the herd total could be less than 150. [4]*

Consideration: Alternative 3 was developed to respond to scoping comments that reflected a desire to see an alternative with a minimum of 150 wild horses and in reference to "viable" herd size of at least 150. EA p. 6-7.

Existing Conditions

Comment: *Re: pages 27-28. ONF is overlooking various mortality factors including natural predation, first year mortality, disease-caused mortality & human-caused removal & mortality. My in field & document investigations indicate that the latter is quite major! (See <http://rtfitchauthor.com/2014/04/28/report-wild-horse-population-growth>.) [3]*

Black bear, cougar, wolf, and disturbed humans are all documented within the Territory. Evidence of human predation has been confirmed in some cases and is highly probable in many others. Predation on foals can be assumed, though traces of small horse remains, with soft bones and low body mass, are not likely to be found. [4]

It is the time to acknowledge the horse numbers persisting on the Forest into 1971, in spite of unlawful horse-chasers" and other brutal forms of past population control. [4]

Horse numbers have been reduced by people shooting them, wolves, cats, and bears killing them, and people adopting them. [22]

Little evidence of predation is because carcasses are eaten by bears and wolves. [25]

Consideration: The Forest Service keeps an inventory of the wild horse herd but does not and cannot document all instances of mortality in the wild horse herd. The EA acknowledges that black

bears and cougars are present, but that there are few personal observations of black bear or cougar kills on wild horses in the Territory. EA p. 27. The EA also acknowledges that, in addition to deer and elk, horses have the potential to serve as opportunistic prey for wolves, particularly at higher horse densities as well as during foaling season. EA p. 82 In addition, Table 4 in the EA (p. 29) shows the history of capture and removals of horses acknowledging that it does not include the known deaths showing that this has occurred over time but is impossible to manage for. A footnote to Table 4 in the EA states that the table does not include known or unknown deaths including shootings, euthanasia, accidents, acts of mercy. Etc. **Comment:** P. 42. *It seems you go out of your way to minimize the Winward Riparian data (Table 12), which shows an increase in young saplings here in the BST, then you bring in outside studies by Davis & Boyd 2018 & Beaver & Brussard 2000 to form your depreciative conclusions aimed at the wild horses. [3]*

Consideration: EA p. 42 acknowledges that Winward riparian data indicates that young and sapling riparian hardwoods increased between 2005 and 2015. The riparian hardwood discussion continues by indicating that growth form of hardwood shrubs indicates heavy browsing in recent years.

Comment: *Re: Table 13 (Forest Plan Riparian Communities Forage Utilization). Inspecting this, it is apparent you are skewing data & particularly the interpretation of such in order to favor the ongoing livestock predominance & “justify” the minimization of the wild horses. [3]*

P. 45. Here you continue an unbalanced interpretation of data in order to blame wild horses & favor ranchers, etc. [3]

Consideration: Table 13 (EA p. 44) does not present data or interpretation of data; rather it is displaying the allowable use level of forage and browse (by percentage range) based on the management intensity and forage condition of riparian grassland and shrubland communities. The source of this table is the Ochoco Forest Plan 4-141, Table 4-30.

Table 14 (EA p. 44) displays the allowable use level of forage (by percentage range) based on the management intensity and forage condition of non-riparian plant communities. The source of this table is the Ochoco Forest Plan 4-141, Table 4-31.

The Forest Plan standard and guideline provides that the allowable use for big game, livestock, and wild horses is 0 to 30% based on the unsatisfactory condition of the riparian communities. The methods used to determine the unsatisfactory rating for riparian communities are based on C & T Surveys, Winward Riparian Studies, and Proper Functioning Condition assessments as described in the EA (pp. 37-43).

Comment: *Figure 22. Here you lump together wild horses, wildlife & livestock, rather than distinguish the separate effects & niches of each species. This leads to a sloppy assessment that trickily permits you to blame wild horses – your target – while not only continuing but increasing the status quo monopolization by the BST ranchers & their livestock &, to a lesser degree, the exploitive interests of loggers & big game hunters, chiefly. [3]*

Consideration: Figure 22 displays graphically the allowable use standards and guideline from the Ochoco Forest Plan (EA p. 45). It is not an assessment of the conditions or effects in the Territory.

Comment: *When considering wildlife presence the analyses within the Plan Revision document often make it seem like wild horses are the only animals affecting vegetative degradation. [e.g., one example: “... removing horses will lead to the fastest improvement in stream temperatures”]. What about all the other large and impactful animals (particularly cattle, elk, sheep) that share the same areas and resources? [42]*

Consideration: This statement is in the context of a relative comparison of the alternatives on the response of riparian hardwood vegetation. The change between alternatives is the maximum

number of wild horses present and therefore the amount of utilization within riparian areas. The analysis assumes that sheep and big game use would continue at present levels. The way sheep use the Territory is described in the EA p. 72 and big game use of the area is described on pp. 90-91.

Comment: *The FS has failed to prove there are no other contributing factors to riparian damage. [25]*

The Forest Service failed to provide parameters on how it concluded that horses impacted specific riparian areas, rather than, or exclusive of, livestock. [23, 38, 49]

Studies have found that livestock tend to congregate in riparian areas, which negatively impacts the biodiversity and biophysical functioning of these ecosystems (Fleischner, 1994) (Marlow, Pogacnik, 1986). [24, 40]

Non-specific, but nonetheless condemnatory, statements such as (page 4) "Horses have been documented frequently in riparian areas and some studies have shown that horses consume or otherwise impact riparian shrubs decreasing the shrubs' height or impacting shrub presence" does not separate horse and cattle impacts. [4]

Consideration: No cattle have been authorized or permitted within the Big Summit Territory since establishment of the Ochoco National Forest (EA p. 68). The management of sheep within the Territory is described on p. 72. The Forest Service acknowledges other ongoing uses of the Territory as well as legacy impacts from past management practices (EA p. 36, 42, 46, 70, 80). Though other uses of the Forest can and do impact resources, the focus of this EA is on the proposed management of the wild horse herd and how management can address the purpose and need outlined on page 3 of the EA and reduce impacts that are due to the horses' year-round use and concentrated use in riparian areas.

Comment: *The EA acknowledges the historic livestock use was severe, resulting in long-term negative impacts to soil and vegetative resources and these impacts continue to affect the ecosystems of the Ochoco National Forest today. [6]*

The EA does not attribute resource conditions to grazing, historic abuse, and modern forest management practices. [4]

All the still-apparent legacy degradation (logging, grazing, road building) created the existing condition and is not just due to the wild horses and will not be restored to better functioning condition just by removal of wild horses. [14, 25, 44, 53, 59, 73]

Consideration: See EA p. 36, 41 for discussion of various factors leading to the current conditions in upland and riparian areas within the Territory. Wild horses are contributing to the declined riparian conditions, as riparian areas have been repeatedly over-utilized.

Comment: *Winter Range is absolutely not limited to 4942 acres. All the projections, calculations, and citations in this EA cannot occlude the obvious: 1) the current wild horse population survived some of the worst winters on record 2) the ONF has not proven and cannot prove that the entire censused wild horse population has ever resided within the 4942-acre designated winter range or that no horses ever wintered outside the designated winter range during winters of above-average snowfall 3) the ONF requested the Central Oregon Wild Horse Coalition identify areas where horses had been sighted during winter and received that documentation. We provided a map of personal and credible winter sightings, which was mentioned only in passing in this EA and in the context of being unuseful 4) the formula used in calculating winter range was glaringly inaccurate, inconsistent with BLM Handbook procedures, and suspiciously skewed against wild horses. [4, 22]*

If you ignore relevant data that was produced and turned into the FS (re winter horse sightings), you are arbitrarily and capriciously "cherry picking" your data to match your predetermined

alternative..... Looking at the map where they say the horses go during the winter, they blatantly ignored the data that was hand-delivered to Slater Turner on Sept. 7 2018. [25]

Consideration: The 4,942 acres of mapped wild horse winter range is an estimate necessary for forage calculations and is not intended to represent the only places that a horse will ever occupy or cross during an above average snowfall winter. Language has been added to the EA to clarify this point. While the Central Oregon Wild Horse Coalition (COWHC) did provide a map for horses and horse trails sighted during the winters of 2016, 2017 and 2018, only two of those winters represented above average snowfall and the map provided did not differentiate which sightings occurred on which years. Since this information is necessary to make a winter range determination (EA pp. 31-32, 62, 195-198) The Ochoco National Forest requested this additional information from leadership of the COWHC in an email dated September 10, 2018 but never received a response.

Comment: The Forest Service did not provide the public with any population census maps in the EA, indicating how many horses were noted in specific locations on specific dates. [23]

Consideration: The population census is generally an annual activity that occurs roughly the same time each year (EA p. 27). Locations of horses during the census only represent a snapshot in time of occupancy which is quite variable. Although the location data collected during the census is quite useful to prevent double counting and to determine if known groups have been missed in the census, the primary utility of effort is in determining horse numbers at the time of census.

Comment: The ONF fails to mention that Douthit Spring, though heavily used by horses, is adjacent to a dispersed campsite which is anything but "natural" with meat hanging poles, a trashy fire ring, and two pieces of vintage columnar basalt furniture, all in area denuded of vegetation and rutted with tire tracks. Campers have traditionally run ATVs through Douthit Creek and left the stream primed for bank erosion, sedimentation, and temperature increase. Horses have been observed licking the top surface of one of the imported boulders, indicating the presence of human-placed salt blocks at some point, which is consistent with the excavated tree root system shown in one of the ONF's photos of "wild horse resource damage". This cavity is identical to evidence of salt blocks placed for livestock, which then dissolve into the soil and invite further digging by wildlife. [4]

The ONF considers the Douthit Spring condition, regardless of adjacent human-caused and actual resource damage, a heavy to severe impact. Had the ONF used the formula prescribed in the BLM Handbook (page 71), the actual acreage of the heavy or severe impact would only be one component in the equation which determines overall utilization, and this must be documented for at least three years. To merely point to specific areas of extreme use does not establish a basis for determining "there are too many horses." It is also incumbent on the ONF to ascertain the extent to which the mud hole may be contributing to downward trends in riparian condition. At the Douthit Spring site, water from the spring eventually flows into Douthit Creek, which dead-ends at a pond on private land less than a mile downstream. A tributary originating at Monument Spring, compromised by ONF vegetation treatments, not by wild horses, was dammed up by public at the intersection of the 2300-200 and 220 roads, and the dam was never deconstructed. There are no data evident in this EA which document the quality of outflow from Douthit Spring, whether current or historic, or actual impacts on Red Band Trout or Columbia Spotted Frog habitat. [4]

Consideration: Riparian conditions were not based upon a single site but were based upon data and evaluations of several sites within the Territory (EA pp. 113-116). While the Forest Service is not bound by the direction and policy described in the BLM Wild Horse and Burro Handbook, under the first tier of the BLM's AML establishment and adjustment process the limited habitat available for wild horse use on either the summer or winter range is considered (EA pp. 193-194, BLM Handbook p. 67).

Comment: *"Perennial spring in the vicinity of Cram Creek that has documented heavy horse utilization" In the wild, horses create their own mud holes by pawing at the ground surrounding natural springs, then drinking from this. The pawing stirs up minerals the horses seek in their diet, which they drink along with the water. [25]*

Horses do not normally like to hang around watering holes. (Feist and McCullough 1976; Berger 1977). [25]

Consideration: The EA (p. 30) shares several studies on habitat use by horses and one of the trends found was that riparian areas are preferred habitat for horses. In both of the observational studies cited by the commenter a portion of the methodology was to set up observation points at known watering locations because several groups of horses would regularly cycle through the area to drink, usually on a daily basis.

Comment: *As shown further in our comments, livestock forage allocations have indeed increased since 1975, and apparently the proof of over-utilization by horses is that (page 148 Wild Horse report) "The cross-section data is the most important relative to grazing because it measures the vegetation on the meadows w(h)ere utilization occurs most by horses." But, the species attribution evidence remains elusive. What is also missing from this "analysis" is any suggestion of alternative explanations for greater wild horse use of certain springs (if there is indeed greater wild horse use), other than horse numbers. E.g. increased predator pressure or search for minerals. [4]*

Consideration: "In 1975 when the *Ochoco Wild & Free Roaming Horse Management Plan* was written, the Canyon Creek and the Reservoir pastures were each permitted for 1,100 ewe/lamb pairs between June 16 and September 30 as it is permitted now." (EA p. 70). While on page 214 the EA states, "[p]rior to winter in October of 2017 and September of 2018, in addition to the DMAs, utilization data was collected on three riparian sites in the wild horse winter range. On October 26, 2017, utilization rates ranged from 71-80% on these sites with high evidence of horse use. On September 27, 2018, utilization rates at these same three sites ranged from 58-77% with high evidence of horse use, the sheep did not graze in this area in 2018. Both years, utilization exceeded LRMP utilization standards and both years horse numbers were above the proposed AML."

Comment: *ONF also contradicts itself to say "There is no discernible relationship between total herd size and the number of horses outside the Territory" and then "Personal observations seem to indicate increased numbers has resulted in increased pressure on horses to attempt to move further outside the Territory." [4]*

Consideration: Appendix B in the EA (pgs. 201-202) discusses cover and space as part of Tier 1 and includes several examples of past inventories and captures looking for any relationships between the two which is noted there are not any. There is also mention of fences known to be in poor condition which could have influenced the situation. So while there is no best available science of space, there is personal observations of horses getting further away from the Territory as numbers have increased.

Comment: *Measuring riparian forage utilization at pinpoint locations where horses seek life-sustaining elements within that micro-environment, is not only outside the AML development guidance in the BLM Handbook, it makes as much sense as measuring grass at livestock watering troughs. [4]*

Consideration: Utilization is measured at Designated Monitoring Areas (DMAs) following the guidance of Burton which states that DMAs should be areas of higher use that can represent the entire pasture (EA p. 212). The BLM's AML development guidance does not reflect Forest Service policy and does not provide guidance for how to measure riparian forage utilization; however, the AML calculations of Alternative 2 are affected by the existing conditions of riparian

areas per Forest Plan allowable use factors and the determination that riparian areas are in unsatisfactory condition. Due to the unsatisfactory condition, the amount of riparian forage allocated to wildlife, wild horses, and livestock is capped at 30% (rather than 40% if the conditions were satisfactory). EA pp. 44-46, and EA Appendix B pp. 196, 206-211.

Comment: *Comparing 1975 riparian conditions to current conditions is inadequate research data for comparison. Data used against each other must be identically collected over a period of time as too many variables can influence the conclusion. [25]*

Consideration: The EA is simply pointing out that springs and creeks that were identified as heavy to light use in 1975 are still ranging from heavy through light use. EA p. 41.

Comment: *The statement that "livestock numbers have remained the same since 1975" is patently false. According to the 1975 Wild Horse EA, a total of 2200 HEAD of sheep are permitted on all 27,300 acres of the Big Summit Territory. The total lbs. of allocated forage is 1,523,875. Calculations to arrive at the current forage allocated to sheep could be computed on a straight multiplication of .3 AUMs x 2200 x 26 lbs. x 107 days, which would equal 1,836,120 lbs., OR 160,875 lbs. of riparian forage consumed by 1100 sheep for 19 days = 8467.10 lbs. per day x 2 = 2200 x 107 days = 1,811,120 lbs. Either way, the difference between the 1975 and 2020 forage consumption by permitted sheep would sustain 30-32 horses year- round; of course, ignoring the 21% dietary overlap which is absent in any of the forage allocations and comparisons in this EA. [4]*

The 1975 EA stated 2200 head of sheep; this EA states 2200 ewe/lamb pairs. [25]

Consideration: The EA (p.55) cites a study that indicates a dietary overlap of 21% between sheep and wild horses during the summertime. The Appropriate Management Level Analysis (Appendix B) calculated summer forage and determined ample summer forage further supporting the limiting factor of winter forage, during a time when sheep are not concurrently grazing.

The number of livestock has not changed. The 1976 Term Grazing Permit for Canyon Creek and Reservoir allotments shows 1100 for each band. While the class of livestock (i.e. ewe/lamb pairs) was not defined on the permit other records of ewes and lambs were running on the allotments under that authorization. While the method of calculating forage needs could have changed over time, the method described in the Draft EA is in alignment with current agency practice.

Comment: *The one vector which cannot introduce new populations of invasive plants is the wild horse. They live and die on the Forest. Still, the ONF states in this section that wild horses are responsible for invasive plant introductions. [4]*

Consideration: The EA acknowledges that the existence, introduction, and spread of invasive plants are difficult to quantify and attribute specifically to any one vector on the landscape (EA p. 147); however, wild horses, along with wildlife, sheep, vehicles, recreators, and other vectors do contribute to the spread of invasive plants. EA p. 148.

Comment: *This EA also fails to identify the boundaries of the Affected Environment, other than to confine physical Effects to the Big Summit Wild Horse Territory with exceptions such as horses allegedly driving elk to private lands. [4]*

Consideration: The area considered for environmental effects is usually the Big Summit Territory because that is where wild horses are authorized to be present. The boundary of effects analysis is may vary by resource.

Comment: *"Horses have been documented frequently in riparian areas and some studies have shown that horses consume or otherwise impact riparian shrubs decreasing the shrubs' height or impacting shrub presence (Davies & Boyd, 2019; Beaver & Brussard, 2000). In addition, both Nordquist, et.al. (2012) and Bork, et.al. (2012) found that horse use of browse increased in the winter. This is evident in the growth form and heavy browse use of hardwoods found throughout the wild horse winter range*

(Figure 21)." *This is a flagrant outright manipulation of data. The article reads, "Horses also consumed riparian shrubs and thereby greatly decreased the shrubs' height. Although the difference was not significant, the juvenile sagebrush density...." The FS misquoted and took a quote out of context to try and make it apply to this study. However, this study was done in semi- arid climate rangeland with sagebrush (not this ecosystem or herd) and important information was intentionally omitted. [25]*

Consideration: The entire paragraph in question from Davies & Boyd 2019 is as follows, "In shrub-occupied riparian and upland habitats, the exclusion of free-roaming horses increased shrub density (Beever and Brussard 2000, Davies et al. 2014a, Boyd et al. 2017). Horses also consumed riparian shrubs and thereby greatly decreased the shrubs' height. Although the difference was not significant, the juvenile sagebrush density in areas from which horses had been excluded was 7.8 times greater than that in horse-occupied areas (Davies et al. 2014a). Juvenile sagebrush density was not significantly different between occupied and unoccupied areas because of large variability, and one of the replicates essentially had no juveniles because it was fully occupied by mature sagebrush. The results from Davies and colleagues (2014a) and Boyd and colleagues (2017) suggest that free-roaming horses limit the recruitment of shrubs and thereby prevent their recovery. Mature sagebrush was twice as dense in areas from which horses had been excluded than in those horses occupied (Davies et al. 2014a). Shrub cover was also generally greater in areas from which horses had been excluded than in those horses occupied (Beever et al. 2008, Davies et al. 2014a). The exclusion of unmanaged use by other large herbivores also increased shrub cover in shrub-steppe communities in the Rocky Mountains (Manier and Hobbs 2006)." It should be noted that "sagebrush" is an upland shrub not a "riparian shrub". So when Davies & Boyd 2019 state, "[h]orses also consumed riparian shrubs and thereby greatly decreased the shrubs' height.", they are not referring to sagebrush, but to the study by Beever and Brussard 2000 which compared shrub heights within and outside of spring enclosures which included species of Salix. However, that study was of riparian systems within greater sagebrush landscapes.

Comment: "Data collected in the wild horse winter range in the falls of 2017 and 2018 showed riparian utilization levels ranging from just under 60% to approximately 80% with evidence of wild horses being the primary contributor of utilization". *Was there any consideration of recovery since the sheep had grazed in prior years? Two years do not show a trend and inconclusive. [25]*

Consideration: Utilization data is not used to determine ecological trend. It is included in many rangeland inventory or monitoring programs as an effective management tool to evaluate and modify the impact of grazing animals on vegetation resources.

Comment: *The key point that I believe was totally or 100% missed, at least in emphasis, was the random grazing patterns of the horses; the horses totally overgraze on a random basis. Certain areas are deteriorating year by year. [17]*

Consideration: The EA states that "...predicting when and where the wild horses will be grazing specifically is not possible." In the wild horse habitat discussion of the EA (p. 30) it states that a pattern of use observed and studied is areas with slopes ranging from 0-19% which also tend to be riparian areas. Riparian areas are the areas that are monitored for utilization. In addition, on page 53 the EA discusses this very concept in a discussion of the effects of Alternative 1 as follows, "... we expect localized exceedance of allowable use standards on riparian areas within the Territory even when horse numbers are within the range of 55-65 AML. However, the expectation is that these localized exceedances of the allowable use standard and guideline will shift in location from one year to the next minimizing riparian species composition drift from grazing pressure. This shifting of areas where utilization exceeds the allowable use standards and guidelines from one year to the next is also expected to minimize the negative effects of this disturbance on stream bank dynamics. However, as horse numbers climb above the range of AML (like the current number of 135 is) the extent of riparian areas where utilization

exceeds the allowable use standard and guideline will increase and the probability that any given riparian area will receive use levels that exceed the allowable use standard and guideline over multiple years will increase as well. Repeated exceedance of the allowable use standard and guideline, when over upper AML of 65, over multiple years increases the probability that this and associated disturbance will result in negative impacts to long term riparian conditions.” A similar discussion of the effects of Alternative 3 occurs on page 62 of the EA.

Comment: *Figure 16 indicates that there only 9 data points in the entire Territory were used. What was the criteria for the selection of these particular data points (as opposed to other locations)? Why were there so few data points for such a large area of territory? Such limited data would seem to skew the outcome/analysis of the data. [23]*

Consideration: Figure 16 (EA p. 36) shows the Condition and Trend (C & T) locations, Winward and Proper Functioning Condition (PFC), twelve locations total. The five C & T locations were established in the 1960s and are a good tool to identify trend since they were last read. The three Winward locations were established in a previous study in the 2000s for sheep grazing and again can provide trend data since that time. The final four PFC locations were selected to fill in data gaps related to horse use of riparian areas in the Territory. Additional information about riparian conditions can be derived from stream survey data collected in the territory (EA pp. 105- 110 and 113-116).

Comment: *There are only 3 years of data collection since the inception of the 1975 plan, totally contrary to the direction as so prescribed, though 1975 EA states it would be collected on a five-year interim basis. [25]*

Consideration: In the Range section of the EA (p. 71), utilization monitoring, part of the monitoring plan of the 1975 Herd Management Plan, from the late 1990s is discussed and in Table 22 (p. 71) of the EA, the last 10 years of utilization data for those sites is presented.

Comment: *Based on your data no mention of which horses or bands are present at any given time, and the frequency, just a generalized statement that they are in the area. There are some but where are the rest? Was the diet composition analyzed to determine by identification of plant fragments in the feces? [25]*

Consideration: Data on individual horses and bands and determining precise diet composition through analysis of feces is unnecessary for the scope of the decision to be made. The Forest Service is not conducting research such as the studies referenced in the comment. The information presented in Appendix B and summarized in the body of the EA was determined to be adequate to assess an Appropriate Management Level. The Act requires a current inventory of horses but not specific locations of bands, frequency, etc. The EA (p. 55, 60 ,66 and 91) discusses diet selection of horses based on best available science.

Calculation of Appropriate Management Level

Comment: *The Forest failed to disclose methodology for calculating forage; seem to overstate use of forage by wild horses. [14]*

Consideration: The EA states “The amount of sustainable forage available for wild horses has been calculated based on plant association mapping and productivity estimates derived from the Plant Associations of the Blue and Ochoco Mountains (Johnson, Jr. and Clausnitzer, 1992) and Plant Communities of the Blue Mountains in Eastern Oregon (Hall, 1973). EA p. 194. Appendix B of the EA (pp. 192-216) shares the complete, multi-stepped process for the AML determination including forage calculating. Canopy cover was used to adjust forage production as described on pages 203-204. The estimate for wild horse use of forage is adjusted based on slope (EA p. 204). Horse forage needs are adjusted for thermal regulation during winter months (EA p. 211).

Comment: *Since the proposed action is also considering the implementation of fertility control to help stabilize the population, the USFS should also discuss that because an AML range is established to allow the population to grow in the years between roundups, an AML range would be unnecessary if the population is being managed properly with PZP fertility control. [1]*

Consideration: The AML range for Alternative 2 is based on winter forage utilization levels (EA p. 56). However, the EA (p. 58) also states that the goal for AML would not be to get to the low range ever four years but rather capture a small amount every 1-2 years to maintain the high range of AML and that fertility control methods might be successful in maintaining population growths at that high AML number.

Comment: *The Forest Service notes that population growth rate of this herd is only 7-8 percent. Thus, reference to the NRC's estimation that some wild horse herds can grow at 20 percent is not applicable to this population. The Forest Service must manage the population under the assumption that the growth rate is far lower than the 20 percent estimate, at 7-8 percent. [1, 29, 40]*

The birth rate — an ephemeral blip in the data — is not the population-growth rate.... While there will be variability, simple subtraction shows that the true growth rate is likely, at most, around 4% for wild horse herds. [29]

Consideration: The EA discloses that the average population growth rate for the Ochoco wild horses appears to be 7-8%. EA pp. 2, 27. The Forest Service is sharing the apparent population growth in Figure 9 of the EA (p. 28) with an average growth rate of 7-8% but as the graph in Figure 9 displays, there is high annual variability. The population growth rate is not a factor that we manage for but rather contemporary population growth will influence subsequent management actions needed to keep the herd numbers within AML. The population growth rate will be a reflection of the current inventory.

Comment: *Alternative 3 AML assignment of 150 low to 200 high horses with a mean of 175, though not really adequate for long-term viability, at least is a step in the right direction. At the mean level there would be 25,434 acres divided by 175 = 145 acres per individual horse. A horse density in this amount in this region of higher rainfall & productivity than more arid areas in the West where the wild horses live would not be excessive, especially given the horses' positive contribution to & symbiotic mutualism in the ecosystem as their soil building, seed dispersal & other positives indicate. [3]*

Consideration: This comment assumes that the wild horses would distribute evenly across the entire Territory, which is not the case. For example, there are areas of steep slopes and heavy forest canopy that are not fully utilized by the wild horses, horses tend to congregate in riparian areas, and they are limited in range and forage during winters of above average snowfall. The EA discusses habitat for wild horses in the Territory and identifies the amount of acres of best habitat See EA p. 30. Also in Appendix B, Appropriate Management Level Analysis, of the EA (pp. 200-203), cover and space are analyzed for the Territory and ultimately determined to not be the limiting factor in management of wild horses.

Comment: *This EA states that ONF wild horse staff relied on the BLM's 2010 Wild Horse and Burro Management Handbook (BLM Handbook 4700-1) to guide the determination of AML; but only selected tidbits of the BLM guidance were used. In the instance of the ONF's EA, the 3-5 years of actual utilization data required to establish forage sufficiency for the current number of horses is not evident. Instead, the ONF decided to estimate forage production capacity.... there are pages of further analysis in the form of stocking and utilization charts, and various statements, none of which fit within the formulas prescribed in BLM Handbook 4700-1. [4]*

If any of this data has merit, it lacks transparency as to how metrics were described and applied and what other factors were considered. For example, it is unclear how an assignment of a 30% limit on summer forage utilization equates to Minimum Feasible Level Management. [4]

Consideration: Appendix B of the EA, Appropriate Management Level Analysis (pp. 192-216) covers the step by step process of determining forage availability. In addition, the EA (pp. 43-45) also shows the process for determining forage availability and discusses the forage allocation ties to minimum feasible management. While the Forest Service is not bound by the direction and policy described in the BLM Wild Horse and Burro Handbook, under the first tier of the BLM's AML establishment and adjustment process the limited habitat available for wild horse use on either the summer or winter range is considered (EA p. 194, BLM Handbook p. 67) as is the general process of determining the amount of sustainable forage available for WH&B use (EA p. 203-214, BLM Handbook p. 67). The consideration and determination to use this approach was reviewed and documented in consultation with Area Ecologist Greg Riegel and scientific consultant Marty Vavra.

Comment: *The AML must have a baseline — a starting point — of at least 2,500 horses — the minimum-viable population (MVP) for a wild herd. Where does this number — 2,500 — originate? Is it the recommendation of the International Union for Conservation of Nature (IUCN), the world's oldest and largest global environmental organization. Upper bound should be higher still. [29]*

Consideration: The EA (p. 33) discusses that the minimum viable population, based on best available science could be closer to 5,000. The Big Summit Territory would not be able to support a wild horse herd with numbers necessary for a minimum viable population. Instead, the approach to the genetic health of the herd involves the addition of new genes into the herd to increase genetic variability (EA p. 57-58).

Comment: *The National Academy of Science's 2013 report also clearly stated that considerations of environmental variability and change, changes in social values, and the discovery of new information require that AMLs be adaptable. [42]*

Consideration: The purpose of the Forest Plan Amendment included in the action alternatives is to provide for flexibility, as opposed to the current Forest Plan stated maximum head of wild horses. EA p. 19.

Comment: *It is unfortunate that BLM and Forest Service both narrow down the habitat needs of wild horses and burros to the "four essentials" of forage, water, cover, and space. A wild horse needs these essential amenities, but also - salt, minerals, medicinal plants, insect control, wind breaks and wind currents, predator protection, mud and dust, companionship of their choice, freedom, and countless other things whose necessity the horses cannot express nor can we fathom. [4]*

Consideration: The essential habitat components for wild horses are analyzed in the EA. Recognition of these essential habitat components is not intended to imply that there are no other necessary factors that wild horse habitat provides.

Comment: *The 2013 NAS report makes the following observations about BLM's (by extension, Forest Service) approach to AMLs: FINDING: How AMLs are established, monitored, and adjusted is not transparent to stakeholders, supported by scientific information, or amenable to adaptation with new information and environmental and social change. [4]*

As you already know, by way of the 2013 NAS report, there is no science-based support AML figures, especially in a herd of this size and consistency in numbers. There is not yet research, called for by the GAO, to evaluate and separate livestock and wildlife impacts from the impacts of wild horses. [5]

Consideration: Appendix B of the EA (pp. 192-216) covers the step by step process used to calculate the AML. In addition, several public meetings were held with stakeholders to go over topics involved in the AML Analysis (EA pp. 175-176).

Comment: (EA, p. 56) AML is set at a range so that the low end can be achieved and then there is sufficient time between gathers (as the population creeps up from the low to the high AML). The AML for the territory was determined based on gather-and-removal-only management scenarios. The Ochoco FS should bring AML into context with this management plan, which includes fertility control, and, thus, a decreased population growth rate. This could allow for a higher low AML, a reduction in friction with local wild horse advocacy groups, and less horses removed and placed into either a saturated adoption market or a holding facility. [8]

Consideration: Gathers would be conducted as needed to maintain the wild horse herd size within the established AML range. The intent is not to achieve the low end of the AML range. Once AML has been achieved initially, the use of fertility control methods would reduce the frequency of gathers needed. Additional clarifying information has been added to the EA. The only population management tool available under Alternative 1 (current management) is capture and removal to maintain AML (EA p. 54). However, the analysis of Alternative 2 (EA p. 58) and Alternative 3 (EA p. 65) both recognize that fertility control may decrease the need for annual or bi-annual capture and removals to remain below the high AML. The AML range under Alternative 2 is calculated based on forage utilization of species and forage allocation, not population growth rates (EA pp. 56-58 and Appendix B).

Comment: Seasonal fluctuation in the weather is a factor in the overall composition and availability of forage. Therefore the AML (50-65) already addresses the possible deep snowfall and limited Winter Range. I would argue that more importantly, the factor to consider in the equation for determining AML should be "MEGA DROUGHT", limited precipitation. Global Climate Change is for real. Inadequate rainfall limit forage production. [35]

Consideration: A Climate Change Vulnerability Assessment was completed in 2019 for South-Central Oregon. The EA (p. 116) describes what climate change may mean for natural resources in the area of the Big Summit Territory. In addition, the analysis of effects specifically considers drought (EA p. 62, 91, 112).

Comment: While some may feel a larger population is necessary for survival, the EA addresses this by pointing out that this is just a small segment of wild horses that inhabit the whole western portion of the U.S. (p. 10). [12, 13]

Consideration: The EA p. 10 is addressing the suggestion that more horses would survive a severe winter (or other natural even) if there were more horses going into it.

DETERMINING WILD HORSE WINTER RANGE

Comment: The Forest Service based its proposals on flawed data that only considers 4,900 acres, which constitutes the wild horses' winter range, instead of the 25,434 total acres of the Big Summit Wild Horse Territory. [2, 5, 6, 23, 24, 26, 28, 33, 44, 47, 71]

You state that the Wild Horse Winter Range is only 4,942 acres & use this as a convenient excuse to declare a woefully low AML of only 12 to 57, mean 35, horses. I see this as a ruse & clearly not based on the greater facts & an honest overall view of the BST ecosystem! Your claim that the horses are restricted to these 4,942 acres during winter is not supported by observations by those concerned citizens who have been monitoring this herd for many years. [3]

The premise on which the preferred alternative is founded, that the Big Summit Herd's winter range amounts to only 4,942 acres, is utterly ridiculous. All the calculations, supposed studies of slope and habitat preference, random sightings, and inconclusive surveys do not add up basis for reducing a

viable herd to a number which assures certain and swift extinction. (reference enclosures including map submitted to District, and District request for information.) The information provided was dismissed and excluded from determining winter range. [4]

The burden of proof of the suppositions regarding the horse' strict use of exactly 4,942 acres during winter is placed squarely on the Forest Service. Methodology questioned as to whether it's verified the entire population could be or had ever been located within the winter range, or that no horses were located outside the winter range. There is no easy way to verify 100% presence or 100% absence. [4]

The 2017 winter survey, whatever it consisted of, appeared to be neither definitive nor comprehensive ; just random sightings. Our winter sighting map was not represented to be a complete winter count, but a sample of widely-distributed occupancy. It showed unequivocally that horses find, and follow historic patterns of, thermal pockets, leeward snow accumulations, microclimates, and perhaps specific available vegetation - all well beyond their appointed winter range. [4]

Since 2002, regardless of the toll of the winter before, the June census has never reflected a survival of only 57 horses. [4]

According to the USFS maps provided in the EA it is clear that the wild horses utilize more than the USFS designated winter range. The survival of the horses and their general good health indicates the winter range is sufficient. [6, 25]

If the forage in a specified area is the limiting factor, then your data has to be inaccurate based on the herd's survival rate. These are assumptions with no scientific empirical data to support your alleged finding. You have not proved how, why or where the horses survive. The sustainability of the herd through the winters is scientific proof and evidence of enough winter forage, regardless of where you want to claim they stay in the winter. [25, 28, 29, 52]

Consideration: The method of determining the winter range of the Big Summit Territory is described in Appendix B pp. 194-197. The identification of the wild horse winter range is based on winters with above-average snowfall.

In the EA (p. 31), we acknowledge that habitat use depends on the severity of the winter and is variable, but what is consistent is that the defined wild horse winter range shows consistent presence of wild horses during the winter regardless of the severity of snowfall.

In the EA (p. 197), we discuss the request of data from the public about winter range and wild horse winter use and how useable data we received from the public aligned with the wild horse winter range determination. In the project folder, copies of letters sent to members of the public that expressed knowledge of wild horse winter use can be found as well as information received. Most of the information received was not useable because it was either information outside of the Territory, information from average or below average snowfall winters, or opinions or other sources of data without actual data point information. In addition, as the EA on pages 40 and 41 explains, survival is not the determinant of adequate forage, but the ability to generally meet riparian utilization standards as set in the LRMP. Standards have been regularly exceeded in the wild horse winter range with recent horse numbers (EA pp. 41, 45, 53, 62, 71-72, 214).

Comment: Management action can increase available winter forage for Federally-protected wild horses; sheep grazing plans, slash treatment, spring prescribed burns as opposed to fall burns, and enforcement of travel rules intended to protect all wildlife. [4]

I would strongly like to see the Forest Service maximize winter forage availability by adjusting livestock grazing in wild horse winter range areas, thereby giving more forage allocation to horses

rather than livestock and better insuring they successfully survive the winters. This would help lessen 'harsh winter forage conditions' cited in the Plan Revision document. Another consideration: climate change also may mitigate this 'harsh winter forage' situation considerably, by causing less-harsh winters. [42]

Consideration: In the EA (p. 203) the wild horse winter range habitat type is broken into riparian areas and transitory range, of which, 4,727 acres are transitory range. Transitory range is defined as forested lands that are suitable for grazing for a limited time following a complete or partial forest removal (p. 203). In other words, the range is always transitioning from less forage to more overstory canopy cover with an inverse relationship. Unless the entire 4,727 acres was completely or partially (at least less than 40% canopy cover) removed every year, the winter forage availability would always be changing.

The EA (p. 8) states that the scope of analysis and decision to be made does not involve the determination of whether livestock grazing should take place in the Big Summit Territory or how many livestock should be permitted.

Comment: *Utilizing that range more would lessen the impact the horses make in the other areas. Develop a winter range within the HMA and open gates to allow horses to naturally move there. Trees such as aspen provide alternative feed in winter for many animals, not just horses. Improve the winter range by planting more aspen and brush horses eat in winter. They don't just eat grass. [52]*

The EA states (page 194) that "winter weather conditions can have effects on horse population dynamics..." and "This situation, as found on the Big Summit Territory, creates a temporally density-dependent population where horses are limited to the food-limited carrying capacity in seasonally cold environments, with snow cover." (attributed to the 2013 NRC Report) As the Central Oregon Wild Horse Coalition has maintained, there may be degrees of irrelevancy between the wild horse population and the number of horses lost to winter. This is what the NRC Report actually states:

Density-Independent mortality was documented by Berger (1983a) in the Granite Range of Nevada. Two horse groups perished as a result of severe winter snowstorms. High-altitude, snow-induced mortality may be common. He concluded that unpredictably heavy snow accumulation is a principal mortality agent in the Granite Range, as it may be elsewhere in the Great Basin. Berger (1983a) referred to the winter of 1977, when an estimated 300 horses (50 percent of the population) died in the Buffalo Hills near the Granite Range. Berger (1986) reported a pattern of low mortality in most years but markedly higher mortality in occasional years of bad weather. In Wyoming's Red Desert, abortions and stillbirths after a severe winter reduced natality by one-third (Boyd, 1979). Reduction in Equilibrial Tendencies by Density Independence In climatically variable environments, the importance of density-INdependence population dynamics increases. (emphasis added) [4]

A certain number of horses will die as a result of extreme winter conditions. A number of horses will die as a result of average winter conditions, but this is factored into a fairly stable population which is censused at approximately 125-150 each summer. That includes a certain amount of winter kill, likely due to temperatures and predation as much as any other variable. It's the extreme winters that are destined to result in atypical mortality which is independent of available forage in the mystical winter range. And this is exactly why it is imperative that the ONF abandon its determined, unsupported preference for Alternative 2, or any alternative which does not provide for both genetic viability and fundamental numbers resiliency. [4]

Consideration: The following quote from NAS (2013) p.71-72 will be added to the body of the EA:

"In climatically variable environments, the importance of density-independent population

dynamics increases. The implication of strong density independence is that, in climatically variable environments, herbivore populations should not be expected to reach a steady state in which population density is in stable equilibrium with forage production. Climatic variations include severe winters and droughts. When the coefficient of variation of annual rainfall, and presumably food availability, exceeds 30 percent, population size is less likely to be determined by mean food-limited carrying capacity (Caughley, 1987; see also the section “Understanding Ecosystem Dynamics” in Chapter 7). Saether (1997) also theorized that lags in the responses of populations to environmental variations, in the absence of predation, will make a stable equilibrium between ungulates and their food resources unlikely. As a result, horse populations may not necessarily decline rapidly during moderate droughts despite reductions in plant growth, and the grazing pressure, expressed as a percentage offtake, may periodically increase above average values.

Ellis and Swift (1988) proposed that plant-herbivore systems in climatically variable environments are unlikely to be equilibrating and that traditional concepts of food-limited carrying capacity have relatively little value in predicting herbivore population sizes and dynamics in such environments. They proposed that a herbivore population in an environment subject to periodic droughts is periodically reduced to a low level independently of density. The population then recovers slowly until the next drought causes another reduction. As a result, the population is kept below food-limited carrying capacity—it is unable to use available food resources fully because of low density. That idea was supported by a model of zebra population dynamics (Georgiadis et al., 2003) that provided realistic predictions for 2 decades (Georgiadis et al., 2007). The model captured the fundamental mechanism of rapid population decline during dry periods and slow increase during wet periods. The greater the variability in rainfall, the greater the proportion of time that the population spends below carrying capacity.

The Ellis and Swift (1988) study generated controversy: some interpreted it to suggest that plant-herbivore systems would be generally nonequilibrating and herbivore populations would naturally be held below food-limited carrying capacity and thus below sizes that would cause overgrazing and degradation. The conclusions of Ellis and Swift, however, were limited to environments that had a high degree of climatic variability, and the implication was that such systems have nonequilibrating tendencies, not that they are absolutely nonequilibrating. Illius and O’Connor (1999, 2000) showed that herbivore populations

in drought-prone environments would be “disequilibrium,” still in quasiequilibrium with critical food supplies during dry periods. Thus, plant resources should appear to be lightly used during wet periods, and on the average a small fraction of plant growth should be used. Illius and O’Connor recognized the importance of key resource areas on the landscape, such as natural dry-season grazing reserves that define the dry-season bottlenecks and thus limit herbivore populations to a particular density. **Density dependence therefore exists, but it is temporally variable inasmuch as food-limited carrying capacity varies with precipitation and, in seasonally cold environments, with snow cover.**” [emphasis added]

The preferred Alternative provides for genetic variability by monitoring horse genetics through sampling captured horses and working with genetic experts to trans-locate individuals with appropriate genetics (EA p. 58). Alternative 3 analyzes the effects of a 150-200 animals without importing individuals to increase genetic variability.

DETERMINING FORAGE NEEDS AND ALLOWABLE USE OF FORAGE

***Comment:** The Service also utilized an absurd 30% riparian zone calculation to account for transitional areas between dry land and bodies of water, despite only 4% of the winter range actually designated as “riparian.” [2, 5, 23, 24, 44, 47]*

Regarding Table 18 -Riparian areas are present on 215 acres of the 4,942-acre designated wild horse winter range, yet all forage utilization is held to the 30% Forest Plan standard. [4]

Consideration: The amount of allowable forage use is based on resource management level, range condition, and community type. This is described in the EA p. 43 and Appendix B. For riparian communities in unsatisfactory condition, the allowable use of forage for wildlife, wild horses and livestock is zero to 30% of the forage.

***Comment:** As spelled out in the 1971 Wild Free-Roaming Horses and Burro Act (WFRHBA), forage allocation needs to be designated “principally but not necessarily exclusively to wild horses.” At the very least, wild horses should have 51 percent of that allocation. [44]*

Congress told the USFS those lands are (must be) devoted principally to these federally protected animals. Had Congress wanted to provide USFS with discretion, the word “may” would have been used rather than “is”. [5]

Consideration: The quoted phrase from the WFRHBA actually states: “‘Range’ means the amount of land necessary to sustain an existing herd or herds of wild free-roaming horses and burros, which does not exceed their known territorial limits, and which is devoted principally but not necessarily exclusively to their welfare in keeping with the multiple-use management concept for the public lands.” 36 CFR 222.60 (13 and 14) and 36 CFR 222.61 (a)(3) clearly indicate that the terms “territory” and “range” do not have the same meaning and are not interchangeable. There is no requirement in the Act to allocate a certain proportion of forage to the wild horses in the Territory and there was no special designation made for the Big Summit Territory that would require exclusive or even principle management of wild horses

It is Forest Service policy to determine population levels by considering the animals' forage and habitat requirements, wildlife, permitted livestock, and other uses recognized under the Multiple Use-Sustained Yield Act (FSH 2260.3).

***Comment:** Not only is the supposed definition of Minimum Feasible Management Level found in this EA well outside any reasonable meaning intended by this term, especially since it originated in the*

Wild Free- Roaming Horses and Burros Act wherein there is no mention of livestock, but the various Range Resource Management Levels where Minimum Feasible Management Level was defined by Level B is where very puzzling utilization tables also occur (Wild Horse report page 25, 26 and other locations). It seems backward. We aren't questioning the content of the table, other than the figures as related to their respective Satisfactory/Unsatisfactory designations. It would seem reasonable that if utilization was shown to be within 0-30%, that would be Satisfactory, rather than Unsatisfactory. Why is it more satisfactory to utilize 40% than 0%? If this is meant to show remaining forage, as in 30% actually means 70% utilization, it might begin to make sense, except that there would be allowance for 100% utilization under all management intensity levels. Too, there are gradients of from 5% to 15% between Satisfactory and Unsatisfactory. How are those mid-point areas scored? This is concerning, when these tables seem to help determine that there are "too many horses". [4]

Consideration: Minimum feasible management is a goal of the WFRHBA; The EA does not provide a definition of Minimum Feasible Management Level.

The Tables in question (see Tables 13 and 14, EA pp. 44, and Tables 8 and 9, EA Appendix B p. 206) come from page 4-141 of the Ochoco LRMP. One first determines if the plant community is in satisfactory or unsatisfactory condition, then uses the table to determine what forage utilization is allowed; therefore, because riparian grassland communities are in unsatisfactory condition, the allowed forage utilization is 0-30% (and 70-100% is for watershed health as demonstrated in Figure 22, EA p. 45). If the conditions were satisfactory, the allowed forage utilization could go up to 40%.

Comment: *The EA produces estimates of forage needs for elk and deer during the winter and summer (Tables 13 and 15). However, there is no reference to what science or analysis was used to calculate forage needs. RMEF strongly recommends inclusion of recent studies for calculating appropriate forage needs for elk using the Elk Forage Index (Vales et al. 2017) and dietary digestible energy (Rowland et al. 2018). In addition, because these forage calculations were used to set the proposed AML, RMEF recommends a revised analysis be completed to update the habitat suitability as well as wildlife and horse population calculations. [10]*

Consideration: Thank you for your comments and continued support. As you are aware, the Ochoco National Forest is a southern segment of the Blue Mountains and as a result is part of the Blue Mountain Elk Initiative. Thank you for identifying and providing two very current and relevant publications that address elk forage needs and forest management (Vales 2017) and elk nutrition modeling (Rowland 2018). Although both of these publications are very relevant to habitat partitioning, the research associated with these publications occurs within western Oregon and Washington. Western Oregon and Washington and associated vegetation communities are very different from those on the Ochoco NF and specifically the Big Summit Wild Horse Territory. Western Oregon and Washington have a much higher annual rainfall and as a result the productivity is much higher than that of the Ochoco NF, so the science and model does not completely translate to the Ochoco National Forest.

Mary Rowland and her colleagues at the Starkey Experimental Forest are currently working on the Blue Mountain Elk Model. This model will inform our management within the Blue Mountain Forests, through an adaptive management approach. In addition, ODFW is actively collaring elk on the Ochoco NF, to improve our knowledge of the seasonal distribution of elk across the Forest and throughout the Ochoco Wildlife Management Unit. In the interim, the Ochoco NF has used the best available science and guidance, with the help and input from the Oregon Department of Fish and Wildlife, to inform the process that was completed to analyze available forage for ungulate use within the Big Summit Wild Horse Territory. As the Blue Mountain Elk model becomes available as well as data from the ongoing elk collar study, the Ochoco NF will utilize this information to inform our ongoing management decisions.

Comment: *Regarding Table 18 - Elk, Deer, and Wild Horse dietary overlaps are not evident in Figure 18. The mention of elk consumption of 44% herbaceous forage during winter (page 209) does not constitute a scientific basis for the assumption that wild horses and elk must then have a "direct dietary overlap." [4]*

Regarding Table 18 - Big Game Winter Range within the Territory is adjacent to, or very nearby, additional designated winter range totaling roughly twice the area of that overlapping with the assigned wild horse winter range. The "151" elk supposedly residing in the Territory could easily feed there, or anywhere else. [4]

Allowing more than 151 elk, more than 301 deer and only 12 wild horses is not equitable multiple use and is not allowing for a THRIVING ecological BALANCE for the wild horses in the Big Summit Territory. [50]

Consideration: The project record includes several scientific studies on the dietary overlap between elk and horses and is the basis for determining a 44% dietary make-up of grasses and forbs. In Table 18 of the EA (p. 56), the total forage need (by weight) of 151 elk already takes into consideration the dietary overlap. Additional details of forage calculations for the AML can be found in the project folder.

In the EA, under Alternative 2, the high AML of 57 horses provides for no winter use by wildlife assuming they roam outside of the Territory (Table 18, p. 56). In addition, under Alternative 2, the low range of AML was calculated if the territory had to provide winter forage for its proportionate number of big game. However, under Alternative 2 the low AML of 12 wild horses would not be the goal, but rather the agency would manage for the higher AML as big game are expected to forage elsewhere during winters of above average snowfall (p. 58).

Comment: *Regarding Table 18 - According to the USDA NRCS National Range and Pasture Handbook, one elk = .60 AUM. This would mean their average forage needs per day would be 15.6 pounds per day, not 26 (page 209). Neither amount seems to fit the forage allocation shown in Table 18. [4]*

Consideration: That is correct that elk daily forage demands are 15.6 pound per day, not 26 pounds. This was corrected in the EA, AML Analysis and wild horse resource report. The figure for total elk forage needs in Table 18 was calculated using a formula found in the current AML calculations spreadsheet found in the project record. This formula included the daily dietary needs of elk at 15.6 pounds, a total wintertime of 150 days, a total of 151 elk of the total estimated 209 elk because the winter range overlap in the Territory between elk and horses

Comment: *OHA has real concerns with giving critical big game winter forage to wild horses for maintaining the upper part of the 12-57 horse range allowed for in Alternative 2. If the upper figure in this range (57) could be identified as a trigger point for action to reduce horse herd size then our organization would be much more supportive of this preferred alternative (2). [11]*

The EA states that elk and deer are not commonly seen on the winter range in the project area and can travel to other locations on the Forest, suggesting that forage considerations are not essential. It has been documented that wild horses have the potential to displace deer and elk from their preferred habitats and the TRCP suggests that the Forest Service consider this in setting the upper range of the AML. [9, 10]

Consideration: The amount of forage utilization allowed in the Territory is based on Table 13 in the EA and is to provide for wildlife, livestock, and wild horses. The assumption used for the upper end of the AML is based on information from Oregon Dept. of Fish and Wildlife (ODFW personal communication 2019).

Gathers would remove excess horses down to about 45-50 and then based on population growth, more gathers would take place once population came back up to 57. The upper end of the AML is an estimate based on the process described in Appendix B of the EA.

Comment: *Regarding Table 18 - Sheep aren't present in winter. Later in the document this is explained; apparently the number represents the 19 days sheep are permitted to graze, in early June, within the designated winter range. Then, the forage evidently did not recover by the following winter. If this is the case, and observations of sheep trampling more forage than they consume abound, then the ONF should consider terminating the grazing permit. Even so, forage consumed in the month of June is not recorded for any other species in Figure 18. [4]*

Consideration: The EA recognizes that sheep grazing occurs in the wild horse winter range and that the potential for regrowth can occur as observations indicate it generally has across many areas on the Ochoco National Forest. However, the degree of regrowth is not well documented, is highly variable based on annual climatic conditions, and is not readily available in applicable science. Therefore, in order to be conservative, regrowth of forage allocated for use by sheep, even though it is consumed in the summer, was not factored into the analysis in order to mimic drought years when no regrowth might occur.

Comment: *The USFS has estimated that the current 27,300 acres of the WHT produce 300 pounds of air-dry forage per acre, for a total of 8,190,000 pounds per year. However, 5,486,225 pounds of that amount — 67% of them — are excluded, as follows: 927,000 pounds For “aesthetics”; 4,095,000 pounds Thought to be inaccessible; 464,225 pounds Available, but not being used; 5,486,225 pounds Total Excluded. The then-available remaining forage — 2,703,775 pounds (33%) — was apportioned to big game, sheep, wild horses (29.3%). Thus, the wild horses are not receiving principal benefit of their habitat’s resources, as the Act requires.*

First, there is no telling why USFS allocated a lower amount of forage to deer than would be required. The deer-in-question are identified as mule deer, not one of the smaller species. The forage-allocation for elk is very close to the mark. It’s slightly lower than projected, per the weight of the animal. There is at least one reason why USFS would estimate the daily forage-consumption of sheep higher than their average weight would suggest they consume. That is because 1 AUM includes the grazing of 5 ewes and their lambs. Further, ewes typically birth twins and, sometimes, triplets. [29]

Consideration: These comments are on the 1975 Environmental Assessment. The Forest Service is only considering comments on the current Environmental Assessment.

Comment: *You maintain 372,160 of 1,240,533 lbs of forage is available in winter with above average snowfall. You give 160,875 lbs. to 1100 ewe/lambs pairs for 19 days in SUMMER, not in winter. You give 155,506 lbs. to 151 elk Dec 1-Apr. 15 and you give 11,778 lbs. to 304 deer, but you admit they don’t have to be there and maybe aren’t there. You suggest all the horses are there but you don’t give proof. You give all the lbs first to ewes/lambs, elk, and deer and give what’s left to horses. You show from monitoring the number of the horses on the range yearly from 2003-2019, that on average, from 2012 to 2019 122 horses have been in the Territory yearly over a 7 year period. It would seem that, if winter forage with over average snowfall during that time were prevalent, numbers closer to your 12 number would be present, more damage to that winter forage area would be present, more horses would have moved elsewhere and/or decreased numbers among wildlife due to horses would be recorded. Yet none of this has been documented. [50]*

Consideration: The high end of the AML range in Table 18 of the EA (p. 56) does not include providing forage for wildlife inside the Territory. While ewe/lamb pairs are permitted to graze in the wild horse winter range during the summer, there is no data to help determine the amount of regrowth that would occur and would be expected to be highly variable. In fact, during years of drought little to no regrowth would be expected for the horses to utilized during winter.

In Table 2 of the EA (p. 20), the analysis of Alternatives 1 and 3 anticipate an over-utilization of forage which would be expected to continue to contribute to the unsatisfactory conditions of riparian areas in the project area. So while we may have a current herd size close to Alternative 3, the EA shows we are regularly exceeding Forest Plan allowable use standards (EA pp. 42, 46, 54, 62-63, 71-72, 74, 213) nor are we complying with the WFRHBA in terms of managing horses inside the Territory.

The EA (p. 31) acknowledges the pattern of wild horse habitat use varies in the winter.

Comment: *Unless other users of the forest give up some resources, the wild horse population must be reduced to an appropriate level. That is, if the amount of livestock grazing was reduced, there would be more forage for horses. Or if a smaller population of elk was supported, there would be more forage for horses. Yet even this would not help with the severe limitations winter forage puts on the horse population (EA, p. 6 and Appendix B). [12, 13]*

Consideration: The EA p. 8 states, “The scope of the analysis and decision to be made do not involve the determination of whether livestock grazing should take place in the Big Summit Territory or how many livestock should be permitted.” In addition, the EA discussed the dynamic relationship between the need to provide forage for elk and for wild horses (EA p. 55, 60, 66, 82, 90-93). Winter forage limitations are reflected in the Low AML (p. 211).

Comment: *The Forest Plan allowable use level for forage in winter range is 30%, meaning horse numbers up to at least 65 are compatible with total winter range forage use below the 30% standard.*

Consideration: Several Tables in the EA (Table 2, p. 20; Table 17, p. 53; Table 20, p.67) display the anticipated forage utilization levels by horse numbers considering above-average winters and multiple-use management. At the existing high AML of 65, without providing forage for any wildlife inside the Territory, forage utilization would be expected to reach 32% on riparian areas within wild horse winter range, during winters of above average snowfall, just above the Forest Plan standard.

COVER AND SPACE

Comment: *The ONF does not know where these horses are at a given time, therefore they do not possess sufficient data to ascertain whether adequate space exists within the Territory. [4]*

Consideration: The EA acknowledges that exact space requirements are unknown (p. 200). Analysis of the Big Summit Territory and the Ochoco wild horses does not provide a clear answer as to whether cover and space are inadequate (see pp. 200-203). For this reason, cover and space were not factored into the analysis of AML.

Comment: *The ONF vacillates continually between hard statements that population levels drive outbound migration, and that no such correlation has been documented. The associated graphics don't support the correlation, nor does our personal experience spanning two decades. The ONF states (page 200) "An indicator that the Territory does not have sufficient cover and space for the number of horses is a recurring pattern of horses moving outside the Territory. Such egress is evident in the Big Summit Territory and requires constant management to move horses back into areas where their occupancy is authorized." We are not aware of the ONF's constant management in this regard. It is important to note that nearly all of these relocations/removals occurred when horse numbers were substantially lower than current levels.[4]*

Consideration: The EA has presented the best information available about spatial movement of the wild horses as recommended by the National Research Council. Table 4 of Appendix B (EA p. 202) does note whether or not the population was within or above the current AML when the captures occurred. The EA also states that, “[b]oundary fences surrounding the Territory were known to be compromised in that time period as well as a lack of management

actions to immediately get horses moved back into the Territory. This complicates any evidence of a pattern, therefore, there is not a clear correlation between the number of horses counted for and the amount seen outside of the Territory (Graph 1).”

EFFECTS OF ALTERNATIVE 2 AML

Comment: *By bringing the herd to such an artificially low level, you would be setting it up for more probable extinction due to severe weather events, whether winter storms or summer droughts, diseases, illegal capture & killings, etc., many of which are linked to the increasing instability, elevating average temperatures & extreme oscillations caused by Global Climate Change. [3, 32, 38, 39, 44]*

The ill-conceived AML proposed in the Preferred Alternative will result in certain and immediate extinction of the Big Summit Herd, as it does not allow for the herd size resiliency necessary to assure surviving members following any catastrophe or predators. [4, 24, 48]

The proposed AML of 12-57 is a planned annihilation for this herd, and will be seen for just that. The AML for this herd must be raised to at least 150 which would allow genetic viability without the need to introduce horses from another area. [5, 26, 44, 47, 49, 78]

A dozen or more wild horses could easily perish in one severe winter or one extreme drought year and larger numbers are needed for long-term genetic variability and associated horse health. [14, 24]

Since wild horses are always managed at the lowest end of any AML, reducing the population to 12 animals would be the equivalent of allowing ONE wild horse on 500 acres of public land while thousands of sheep would be granted permission to eat the lion's share of available forage to their heart's content. [39]

Consideration: In the EA, (p. 58) there is information regarding the intent to manage the AML for Alternative 2. It states that it is not intended to manage at the low AML of 12 but rather maintain the high AML of or slightly below 57 with annual or bi-annual gathers.

Alternative 3 does look at a higher AML of 150-200 and the effects associated with that. The analysis of this alternative states, “since the wild horses in the Big Summit Territory are displaying genetic depression and associated low levels of heterozygosity, having an MVP of 50 or more individuals would not be expected to improve the observed heterozygosity to above the recommended critical level of 0.66 (USDI, BLM, 2010). In a letter dated July 16, 2009, Cothran states that enlarging a population’s size does not increase the population’s genetic variation, it only slows the rate of loss of existing variation (Cothran, 2009).” (EA p. 65).

Population Control Methods

Comments: *One study that has not been done on the Big Summit herd is what their maximum breeding period is....The wild horses are different from the domestic ones and cannot be treated as if they will respond to a breeding farm plan. [25]*

Consideration: Literature cited in the EA (p. 181) from Jay Kirkpatrick discusses the scientific findings of two different herds that were followed for birth dates and found no significant changes of birth dates between horses treated with PZP and horses not treated.

Comment: *P. 50. Effect on Herd Social Structure: Your devastating reduction of herd size would obliterate the horses’ valuable social structure. [3]*

Wild behaviors are the basis for the rich and complex natural social structure of wild horses. The following should be precluded from management actions: sex ratio skewing which causes stallion aggression due to the unnatural ratio of males to females; , ovariectomy and other surgical sterilization that alters the animal's ability to produce natural hormones; and any fertility control (e.g. Gonacon) that alters the production of natural hormones. [6]

Consideration: The EA (pp. 16-17) describes in detail the type of population control methods approved for use under Alternatives 2 and 3. These include contraceptives and sterilization but notes only those methods approved by the Wild Horse and Burro Advisory Board. In addition, Appendix E of the EA (pp. 227-230) lists the Best Management Practices for fertility control.

Gathers and Removal

Comments: *Specifically, AWHC asks that the roundup and removal of the majority of wild horses currently in the WHT be eliminated from consideration in this EA. However, if the USFS moves forward with its analysis of a roundup and removal action, the agency must note that the WHA requires the USFS to manage wild horses and burros at the minimum feasible level. Such a roundup and removal operation will fail to meet that standard. Instead, the proposed action will continue the business as usual approach of “management” by removal and stockpiling more wild horses in off-range holding facilities.*

Consideration: Various actions for population control are considered under Alternatives 2 and 3 of the EA. These include: gather and removal, contraception, sterilization, skewing sex ratios and future methods approved by the Wild Horse Advisory Board (EA pp. 16-17). In addition, regarding gathered and removed horses the EA states, “[a]fter wild horses are gathered, they would either be: 1) transported to the BLM Burns corral facility or 2) transported to a Forest Service corral or to temporary/mobile corrals constructed by the Forest Service or 3) transported to leased or contracted private facilities, where they will be prepared for adoption or sale.” (EA p. 18).

A no capture Alternative was considered (EA p. 21) but eliminated because of its inconsistencies with laws, regulations and policies. In addition, on p. 58 of the EA, the tool of fertility control under Alternative 2 was mentioned to be the most minimum feasible management and could decrease the need for capture.

The EA must further analyze the risks of helicopter drive trapping to the environment and the horses as well as the economic and welfare concerns related to increasing the off-range holding population of wild horses. [1]

Consideration: Helicopter gathers are addressed in the EA pp. 48-49.

In any subsequent NEPA actions, such as a roundup plan, the USFS must explicitly state for the public where the horses will be transferred and how the agency plans to ensure their safety after removal. This includes clarification as to what facilities the USFS was referring to in the EA when it notes that removed wild horses could go to leased or contracted private facilities. The EA must list any of these facilities that currently exist, any that the USFS is soliciting, and the policies that these facilities will follow in the care and handling of wild horses in their care. This also includes the USFS’s plan for tracking the horses that are removed from the range, through holding, and adoption or sale (if completed). The agency must disclose and explain how it plans to track and keep record of every horse while they are in USFS, BLM, or private contractor custody. [1]

Consideration: Regarding gathered and removed horses the EA states, “[a]fter wild horses are gathered, they would either be: 1) transported to the BLM Burns corral facility or 2) transported to a Forest Service corral or to temporary/mobile corrals constructed by the Forest Service or 3) transported to leased or contracted private facilities, where they will be prepared for adoption or sale.”

(EA p. 17). Regarding handling and treatment of gathered, held or adopted wild horses the EA states, “[t]he Comprehensive Animal Welfare Program Standards (USDI 2015) developed by the BLM would be followed during the gather operations (see Appendix C). This document was modified for Forest Service use in the Big Summit Territory.” (EA p. 17). Regarding tracking of horses removed from the range, the EA states, “[a]ll horses placed into private custody through adoption would have some form of unique identifier for future tracking (e.g. freeze brand).” (EA p. 18).

The EA fails to adequately address the protection of wild horses during the proposed roundup. USFS must improve upon the BLM’s woefully inadequate “Comprehensive Animal Welfare Program (CAWP)” for establishing humane standards for the treatment of wild horses and burros during a roundup. [6]

Consideration: The EA includes Appendix C: Comprehensive Animal Welfare Best Management Practices (EA pp. 217-224). Effects of bait trapping gathers, which would be the primary method of gathering excess wild horses, are described in the EA pp. 46-49.

Comment: *The ONF’s willingness to consider helicopter-assisted gathers is unacceptable. Regardless of any significant loss of timber cover, the terrain of the Territory would present real and glaringly obvious danger. This only punctuates the deficit of knowledge of wild horses and concern for their welfare which stains this entire EA. [4]*

If helicopters are to be used as a part of any management, the plan must consider, analyze and implement humane standards as outlined in the below recommendations. (see list included in letter). [6]

Helicopter use for rounding up wild horses can create a high level of stress in the horses and increase potential injuries when they enter the holding corral. [41, 53]

Consideration: The EA points out that the primary method would be bait-trapping. Best management practices are outlined in Appendix C and the effects are disclosed on pages 46-49.

Comment: *By removing horses from this herd, you are contributing to exacerbating high population growth rates in the herd through compensatory reproduction which has been scientifically documented by the NAS and NRC. There is no need to remove horses due to the fact that the Big Summit herd has remained relatively stable at 130 for many years. This is in part due to the extreme weather conditions found in the including severely harsh winters. [5, 28, 29]*

Consideration: Various actions for population control are considered under Alternatives 2 and 3 of the EA. These include gather and removal, contraception, sterilization, skewing sex ratios and future methods approved by the Wild Horse Advisory Board or other governing agency (EA pp. 16-17). In Table 2 of the EA (pp. 20-21), the analysis of Alternatives 1 and 3 anticipates an over-utilization of forage which would be expected to continue to contribute to the unsatisfactory conditions of riparian areas in the project area. So while we may have a current herd size close to Alternative 3, the EA shows we are regularly exceeding Forest Plan allowable use standards (EA pp. 42, 46, 54, 62-63, 71-72, 74, 213) nor are we complying with the WFRHBA in terms of managing horses inside the Territory.

Fertility Control - PZP and GonaCon

Comment: *The EA dismisses immunocontraception as unfeasible as a sole method of keeping wild horse population in balance. No reason is given. Please explain what the USFS experience has been using this technique. The Ochoco herd is relatively small. Herds multiple times this size have and are being successfully treated with PZP. [44]*

Consideration: The EA states that managing to an AML level with the use of contraceptives alone is very uncommon and may not be feasible for the Big Summit Territory. (EA p. 8). The

BLM conducted literature review and effects discussion, found in Appendix 3 of the Wild Horse Specialist Report referred to on page 59 of the EA states, “Contraception has been shown to be a cost-effective and humane treatment to slow increases in wild horse populations or, when used with other techniques, to reduce horse population size (Bartholow 2004, de Seve and Boyles-Griffin 2013). All fertility control methods in wild animals are associated with potential risks and benefits, including effects of handling, frequency of handling, physiological effects, behavioral effects, and reduced population growth rates (Hampton et al. 2015). Contraception by itself does not remove excess horses from an HMA’s population, so if a wild horse population is in excess of AML, then contraception alone would result in some continuing environmental effects of horse overpopulation.”

Comment: *Though the USFS notes it will have “all ‘acceptable methods of control’” available to stabilize the wild horse population, AWHC again asks that the USFS proceed first, and exclusively, with a comprehensive fertility control vaccine program. The WHT is a smaller range with a small population of horses. Such circumstances should be ideal for the implementation of humane fertility control vaccines as the preferred method of fertility control. In order to properly analyze the implementation of a comprehensive fertility control program in the WHT, the USFS must disclose more information relative to how such a program would be structured. This includes, but is not limited to, information such as:*

- *Stating how many mares would be darted, what time of year they would be darted, whether boosters would be given, and how the vaccine and booster would be administered; (note that studies have shown, with both PZP and GonaCon, boosters increase effectiveness. See attachments 1 and 2 to AWHC Letter);*
- *Explaining the database used for tracking which mares have received a vaccine and/or booster and the records system to be implemented with the program;*
- *Explaining how the program will research and track the effectiveness of the fertility control vaccine on the population and individual levels, and how the USFS plans to track an adverse reactions to the fertility control vaccine; and*
- *Explaining how a comprehensive fertility control program would affect the genetic viability of the herd for the duration of the plan.*

Consideration: Various actions for population control are considered under Alternatives 2 and 3 of the EA. These include: gather and removal, contraception, sterilization, skewing sex ratios and future methods approved by the Wild Horse Advisory Board (EA p. 16-17). Page 58 of the EA states, “[f]ertility control would be conducted in accordance with the Standard Operating Procedures (SOPs) described in Appendix 4 of the Wild Horse Specialist Report.” (EA p. 58). The preferred Alternative provides for genetic variability by monitoring horse genetics through sampling captured horses and working with genetic experts to trans-locate individuals with appropriate genetics (EA p. 58)

Comment: *AWHC asks that the USFS pursue a PZP program in the WHT. However, if in the final EA the USFS continues to leave the door open to other tools, then the final EA must adequately analyze and discuss those in turn. AWHC is basing this next portion of our comments primarily in response to the Standard Operating Procedures included with the EA at Appendix E since the draft EA is silent on which options will be chosen. The Appendix notes that the included tools “will be available for use” and “are part of the Proposed Action.” [1]*

Consideration: The majority of the EA discusses the effects of proposed actions in the action alternatives. In addition, the EA references associated specialist reports that include further discussion of effect of proposed actions included in the action alternatives.

Comment: PZP fertility control has been proven safe, effective, and reversible for decades, with numerous scientific peer-reviewed studies to support it. The Forest Service should avail itself on the experts in this field and the volunteers who stand ready and able to help institute a PZP fertility control remote darting program with the documentation software necessary. That, of course, would be on an “as needed” basis if the population would start to grow – which it hasn’t for many years. [5]

Consideration: The use of PZP and other fertility control measures are included in Alternatives 2 and 3 (EA p. 17). The EA states that fertility control measures, “... will be administered as soon as possible by trained personnel ... The administration of the [PZP] vaccine is limited to those specifically trained to handle, mix and deliver the product.” (EA p. 59).

Comment: The use of immune-contraceptive vaccines is more efficient if utilized immediately, as opposed to delaying use until AML is achieved. There are two reasons for this: (1) with every application of vaccine, there is a potential drop in reproductive growth rate of the herd (not necessarily immediate if the mare is pregnant at inoculation) and (2) the savings on capture, processing, transport, and lifetime care necessary when an animal is removed permanently from the range is also potentially reduced. There is a propensity among the wild horse managing agencies to describe fertility control as effective only when AML is reached, and we understand the logistics and political reasons for this (emphasis on gathering to AML so that animals are not put back out onto the range above AML; desire to limit hands-on types of management). However, modeling gathers alongside fertility control (assuming a 15-20% population growth rate, a 50:50 ratio of male to female animals, and 70% of mares being of a treatable age) shows that reproductive growth rate reduction begins to reduce both the number of gathers necessary over time, as well as the number of animals needing removal. This translates to savings for the program down the line as a result of transporting or separating/preparing for holding fewer animals and providing for their care in short- or long-term facilities. [8]

At this time, we encourage immuno-contraceptive vaccine use only for population control for wild horses. We do not advise sex-ratio skewing for wild horses for these reasons: (1) management of populations via sex skewing is temporary (populations return to their normal ratios), and (2) healthy populations rely on whatever the norms are in terms of that population’s demographics – adjusting a population of wild horses to skew for more or less of anything does not attain a natural state for that population, with behavior ramifications that are not yet understood (potential heightened aggression in stallions, for example). We do not advise gelding as a population management tool since there are not sufficient studies to understand the behavioral effects of gelding some proportion of a population, and modeling for population effects is a guess, at best. Surgical sterilization of mares for management purposes is unacceptable. [8]

Consideration: The EA states, “[c]ontraception tools recommended by the Wild Horse and Burro Advisory Board and approved by the EPA, FDA, or other governmental regulatory body will be administered as soon as possible by trained personnel, either in conjunction with achieving AML or once AML is achieved (in up to 5 years).” (EA p. 58). The BLM conducted literature review and effects discussion, found in Appendix 3 of the Wild Horse Specialist Report referred to on page 58 of the EA states, “Contraception has been shown to be a cost-effective and humane treatment to slow increases in wild horse populations or, when used with other techniques, to reduce horse population size (Bartholow 2004, de Seve and Boyles-Griffin 2013). Adjustment of sex ratios is not included for consideration under Alternative 1 (EA p. 15), therefore, consideration of this recommendation falls within the scope of the alternatives analyzed.

Comment: Since EPA originally granted the registration, independent research has been published identifying previously undisclosed effects of PZP on wild horses. Among the findings, it is now known that PZP poses the risk of immediate physical damage to the dosed mares, can increase the

mortality rate in foals born to treated mares after the PZP loses its effectiveness, can result in social disruptions among herds with treated mares that can damage long-term herd cohesion that is critical to the health of the animals. [24, 26]

PZP and GonaCon are NOT vaccines ... they are PESTICIDES. [24]

The FS must stop use of PZP immediately. It is poor management to foist birth-control on a severely under-populated and genetically-at-risk little herd. PZP causes ovarian dystrophy, induces auto-immune oophoritis, destroys oocytes in growing follicles, and depletes resting follicles. The pesticide-sterilant GonaCon may be even worse. Avoid it too. [29]

Concerning Population Control Methods, I oppose the cruel, insensitive & unwise tampering with the horses' reproductive physiology as by PZP and GonaCon injection. PZP in particular produces serious short- & long-term consequences that jeopardize the survival of the horses by weakening their immune systems as well as causing social disruption & their extreme suffering & death (See

<https://www.horsetalk.com.nz/2020/03/24/pzp-wild-horses-do-not-belong-together.>) [3]

Consideration: The effects of PZP and GonaCon application are summarized on pages 58-61 of the EA and are more fully discussed in Appendix 3 of the Wild Horse Report.

Comment: *Waiting for AML to be achieved is not the ideal way to implement fertility control. A slower, multi-faceted approach to wild horse management would include some removals, some on-range fertility control (via remote darting), and some gather-administer-release fertility control. This is more effective at creating and maintaining sustainable wild horse management, with less dependence on transportation and short-term holding, where a majority of program budgets are spent. Though AML may not be achieved immediately, progress towards AML is made, population growth rates will decline at each gather, and the burden on holding facilities will be reduced. [8]*

Consideration: The EA states, “[c]ontraception tools recommended by the Wild Horse and Burro Advisory Board and approved by the EPA, FDA, or other governmental regulatory body will be administered as soon as possible by trained personnel, either in conjunction with achieving AML or once AML is achieved (in up to 5 years).” (EA p. 58). The BLM conducted literature review and effects discussion, found in Appendix 3 of the Wild Horse Specialist Report referred to on page 58 of the EA states, “Contraception has been shown to be a cost-effective and humane treatment to slow increases in wild horse populations or, when used with other techniques, to reduce horse population size (Bartholow 2004, de Seve and Boyles-Griffin 2013). Adjustment of sex ratios is not included for consideration under Alternative 1 (EA p. 15), therefore, consideration of this recommendation falls within the scope of the alternatives analyzed.

Comment: *AWHC asks that the USFS include further analysis on GonaCon in the final EA. More research on the effects to wild and free-roaming behaviors of the mares is necessary before this vaccine would be appropriate for broad use as a management tool. [1]*

Additionally, the NAS specifically noted that: Preserving natural behaviors is important, so GonaCon seems [emphasis] more appropriate for use in females in that some research has suggested [emphasis] that female sexual behavior continues. However, further studies on behavioral effects of this product are needed. (Attachment 4, p.7). [1, 44]

Thus, the final EA must note that the NAS clearly thought that GonaCon required further study. Since published research on GonaCon in horses is limited, there are remaining questions regarding negative impacts to pregnant mares (including association with abortion when given in early stages of pregnancy), long-term physiological effects, and whether the vaccine is a permanent sterilant or reversible. Even the short-term social/behavioral effects are not yet established. Thus, this

experimental fertility control drug is not yet appropriate for field use and the USFS should proceed with PZP as explained above instead. [1]

PZP and GonaCon restrict the growth of the herd, but the long-term indirect effect to the reproductive health and genetic viability and impact on the individual animals and the herds are scientifically uncertain. [24]

Consideration: The effects of GonaCon are summarized on pages 59-60 of the EA and are more fully discussed in Appendix 3 of the Wild Horse Report. While NAS (2013) did state, “[t]hus, to the extent that GonaCon preserves natural behavior patterns while effectively preventing reproduction, it is a promising candidate as a female-directed fertility-control method. However, further studies of its behavioral effects are needed.” The effects analysis in Appendix 3 of the Wild Horse Report incorporates a study more recent than NAS (2013).

Fertility Control - Gelding and Spaying

Comment: *The EA gives the public the impression that sterilization is preferred form of population control. This negates the fact that for over 2 decades there have been highly vetted reversible fertility-control drugs used successfully both internationally and in the U.S. The FS has not budgeted for fertility control and has created a mismanagement crisis. [40]*

Consideration: The EA states that contraception will be the Forest Service preferred method of fertility control to reduce population growth. It also states that sterilization would be considered for future use if the Wild Horse and Burro Advisory Board were to approve sterilization methods (EA p. 17).

Comment: *Under no circumstances is surgical sterilization acceptable. It is barbaric, rejected by veterinarians, and can be fatal. [47, 49]*

I am outraged that the USFS is even considering pursuing such inhumane, barbaric and wasteful surgery on wild horses and I find the USFS's EA to be woefully inadequate. [24]

The sterilization procedure that USFS is proposing to conduct on federally protected wild mares are dangerous, costly and impractical for use in the field, including any USFS or other holding facility due to the extremely serious health risks they pose to the wild horses. The EA is completely inadequate in analyzing the impacts of these experimental procedures on wild mares. [24]

Additionally, the proposed alternative (Alternative 2) suggests a particularly brutal form of surgical sterilization, which involves the barbaric and painful removal of mares' reproductive organs. Friends of Animals does not support any aspect this cruel and unnecessary management alternative, and the proposed action is clearly contrary to the Wild Free-Roaming Horses and Burros Act. [2]

Surgical sterilization falls short of the WHA requirement that all management activities be at the minimal feasible level. Such procedures are invasive, inhumane, and risky than other non-surgical methods of fertility control. [1]

I also object to any sterilizations of either sex. These are forms of domestication & contrary to the true spirit & intent of the WFHBA. I recommend your adoption of the sound principles of Reserve Design in order to establish: (a) a truly long-term, genetically & in other ways viable population; (b) a harmoniously eco-adapted wild horse population & (c) a naturally self-stabilizing population (see www.gofundme.com/mstngreservedesign for further details). [3]

Consideration: While the effects of sterilization are summarized on page 59 of the EA, those effects are more fully discussed in Appendix 3 of the Wild Horse Report. Sterilization is not an activity included under Alternative 1, therefore, consideration of this recommendation falls within the scope of the alternatives analyzed.

Comment: AWHC asks that the USFS abandon consideration of gelding in the WHT, but if the USFS plans to implement a gelding program, or, as a consequence, manage a portion of the Big Summit horses as non-reproducing, then that must be clearly analyzed and disclosed in the final EA. In violation of NEPA, the draft EA gives no analysis or consideration to the scientific controversy surrounding the use of gelding as a management tool in wild and free-roaming horses. The final EA should include a lengthy discussion that acknowledges and analyzes the serious risks that gelding represents to stallions and also disclose the castration side effects and deaths for all of the stallions in either USFS or Bureau of Land Management (“BLM”) holding facilities. (Note: BLM statistics should be included here because of the agreement between the USFS and the BLM which notes that the BLM is holding horses transferred from the USFS and holding is usually where stallions are gelded).

Additionally, the analysis should note and consider the often-severe impacts of gelding on wild stallions who will be returned to the range where they will be expected to fend for themselves and live in often-harsh conditions. In fact, the impacts cannot only affect these animals’ physiology and ability to survive but also their behavior and therefore their influence on or relationship to the herd. [1]

At the very least, the final EA must consider the NAS recommendation against gelding stallions who live on the range (AWHC Attachment 4): However, some or total loss of sex drive would be likely in castrated stallions, and this is counter to the often-stated public interest in maintaining natural behaviors in free-ranging horses. With respect to effects at the population level, it is not clear how castration of males would be better than vasectomy, which does not affect testosterone or male-type behaviors. Ultimately, the growth rate of any population that includes reproductive horses of both sexes will be commensurate with the number of fertile females in the population. (p. 156) and A potential disadvantage of both surgical and chemical castration is loss of testosterone and consequent reduction in or complete loss of male-type behaviors necessary for maintenance of social organization, band integrity, and expression of a natural behavior repertoire. (p. 142). [1]

Bruce Nock, Ph.D., tenured faculty member at Washington University School of Medicine and an expert in the physiological effects of stress, suggests that gelding may compromise a horse’s ability to survive on the range. He writes (AWHC Attachment 5). [1]

Dr. Kirkpatrick, the Director of Science and Conservation Biology at Zoo Montana and a foremost authority on wildlife reproductive biology, focuses his comments (Attachment 6) on how gelding effects the herd (AWHC Attachment 6). [1]

The USFS must analyze in full the controversy surrounding gelding in the final EA and how the tool may be used within the WHT in the future. [1]

Consideration: While castration as an action is discussed in passing on page 60 of the EA, a discussion of the effects of castration is included in Appendix 3 of the Wild Horse Report. Sterilization (including castration) is not an activity included under Alternative 1, therefore, consideration of this recommendation falls within the scope of the alternatives analyzed.

Comment: AWHC asks that the USFS abandon any consideration for spaying horses in the WHT, but if the USFS plans to implement a spay program, or, as a consequence, manage a portion of the Big Summit horses as non-reproducing, then that must be clearly analyzed and disclosed in the EA. In violation of NEPA, the draft EA gives no analysis or consideration to the scientific controversy surrounding the use of mare sterilization, commonly referenced as spaying, as a management tool in wild and free-roaming horses. [1]

The WFRHBA requires determinations to use sterilization to be made in conjunction with other wildlife agencies and experts independent of government, such as those recommended by the NAS. [1]

The NAS concluded that spaying was inadvisable and recommended against gelding (AWHC attachment 4). [1, 30]

Spaying is infeasible. There are few veterinarians who can do this procedure relative to the high number of mares that would need to be treated to have any substantive impact on population growth rates. [8]

There are no substantive studies to evaluate long-term health of ovariectomized mares. [8]

In addition, the 2015 NRC report (Attachment 7) found: Domestic mares are typically cross-tied (after ovariectomy via colpotomy) to keep them standing for 48 hours post-surgery to prevent evisceration through the unclosed incision in the anterior vagina. That protocol would not be possible in free-roaming mares because they cannot be held still for so long. Therefore, there is some concern that the investigator may see more fatalities after surgery than the 1% quoted in the protocol, based on domestic mares. [1]

However, despite the scientific recommendation from the NAS/NRC against ovariectomy (even laparoscopic) as a method to control population growth and despite the overwhelming scientific controversy generally, the USFS has nevertheless vaguely proposed to pursue a dangerous, precedent-setting and extreme plan to sterilize wild mares in the WHT. [1, 40]

The final EA must consider not only the methods but also the risks when analyzing ovariectomies, and the other methods of mare sterilization, for use in the WHT. Highlights of concern – and impacts that must be adequately analyzed in this proposed analysis – follow below: [1]

- *Impacts on physiology due to reduction of estrus and alteration of hormones.*
- *Risk of infection under conditions that may not be entirely sterile.*
- *Risk of sedation and restraint in wild horses.*
- *Risks of hemorrhage, evisceration, colic and infection due to inability to provide the required post-operative care.*
- *The risk of post-operative pain in these mares and the USFS's inability to provide adequate post-operative pain relief.*
- *Consider the risks of the procedure when performed by veterinarians that lack training in this outdated procedure.*
- *The risks to pregnant mares. Including but not limited to abortion, stress, and hemorrhage.*
- *The risks to dependent foals when the mother undergoes the procedure and due to pain or complication may not let a foal nurse, may not produce milk, or may injure the foal when reacting to pain.*
- *The feasibility of the proposed procedures for use on the range, including cost, and lack of sterile environment for surgery.*

The USFS must acknowledge the serious health risks that ovariectomy, and other invasive surgical sterilization techniques, represent to wild mares and the careful post-operative monitoring and care, including pain relief and restricted movement, necessitated by the procedures when performed on wild horses. [1]

Consideration: While spaying as an action is discussed in passing on page 230 of the EA, a discussion of the effects of spaying is included in Appendix 3 of the Wild Horse Report (referred to on page 58 of the EA.). Sterilization (including spaying) is not an activity included under Alternative 1, therefore, consideration of this recommendation falls within the scope of the alternatives analyzed. Currently spaying for wild mares lacks field testing which would allow for more widespread use.

Comment: *The USFS fails to adequately analyze how geldings and sterilized mares will affect wild horse management in the WHT, including any negative effects experienced by the wild horses after the procedures, any behavioral changes to the horses after being re-released, etc. The USFS cannot move forward and continue to implement a supposed management tool without any consideration for*

at least how that tool has or has not worked on wild horses in other WHTs or even Herd Management Areas where BLM has already implemented it. The USFS should have made any and all information and data about other gelding populations available to the public for consideration in writing comments on this proposed action. [1]

Consideration: A discussion of the effects of gelding and spaying wild horses is included in Appendix 3 of the Wild Horse Report (referred to on page 58 of the EA.) Sterilization is not an activity included under Alternative 1, therefore, consideration of this recommendation falls within the scope of the alternatives analyzed. Currently spaying for wild mares lacks field testing which would allow for more widespread use.

Comment: *Castration and ovariectomy and are primarily used on domestic horses to alter behaviors – to make the animals more docile and conducive to training. This is literally done to kill the “wild” and make the animals more tolerant of human dominance. Interfering in this way with wild horses or burros is counter to the very spirit of the WFRHBA. [6, 26, 39]*

Consideration: Appendix 3 (p. 68-119) of the Wild Horse Resource Report (referred to on page 58 of the EA) summarizes the best available science associated with use of Fertility Control including castration of wild stallions. Field ovariectomy is currently not an approved method of sterilization of wild mares. This document also states how fertility control is in alignment with the WFRHBA, “The WFRHBA of 1971 specifically provides for contraception and sterilization (section 3.b.1).”

Comment: *The agency failed to consider opposing viewpoints from experts about gelding and spay, and failed to provide an opportunity to comment on the specific protocols that the agency plans to implement these options, or the management of partially non-reproducing herds; either now or in the future life of the plan. [1]*

Consideration: The Wild Horse Resource Report Appendix 3 (p. 68-119 referred to on page 58 of the EA) includes a literature review of fertility control of wild horses.

Comment: *Altering a mare’s hormones through spaying or ovariectomy would result in the consequent reduction in or complete loss of natural lead-mare-type behaviors necessary for maintenance of social organization, band integrity, and expression of a natural behavior repertoire. In fact, the impacts of sterilization on wild horses can be severe, affecting their physiology and ability to survive, as well as their behavior and therefore impact on the herd. See excerpts. [6]*

Consideration: In Appendix 3 of the Wild Horse Resource Report (p. 95-97 referred to on page 59 of the EA) the Behavioral Effects of Gelding are discussed. The Anticipated Effects on Mare Health and Behavior on the Range is discussed on pages 101-106. Sterilization (including spaying) is not an activity included under Alternative 1, therefore, consideration of this recommendation falls within the scope of the alternatives analyzed. Currently spaying for wild mares lacks field testing which would allow for more widespread use.

Comment: *In addition to the behavioral changes, the reduction of estrus and alteration of hormones undeniably has an impact on the physiology of any mammal. The EA fails to consider and analyze available research that outlines the hormonal changes and the implication that has on bone density and other physiological implications. Ovariectomy causes premature menopause and, in turn, has a cascading impact on various bodily functions, processes and conditions – including bone conditions (Attachment 4). [6]*

Consideration: The anticipated effects on mare health and behavior on the range (including effects on bone density) can be found in Appendix 3 (p101-106, referred to on page 58 of the EA) of the Wild Horse Resource Report.

Sex Ratio Manipulation

Comment: The EA also notes that sex ratio skewing is a possible action for implementation with the proposed action. AWHC asks that establishing skewed sex ratios as part of the management plan for the WHT be eliminated from consideration. However, if the USFS chooses to consider skewed sex ratios as a management tool, the final EA must analyze how skewing of sex ratios is not scientifically supported and is unreasonable if the majority of mares will be treated with an immunocontraceptive vaccine. Further, at the very least, if skewed sex ratios are to be implemented in the WHT the final EA must disclose the ratio which the USFS plans to implement.

The EA fails to provide any scientific information or data to support the artificial skewing of the sex ratio. The EA fails to specify the proposed equation of the skewed ratios. [6]

AWHC notes for the USFS that the BLM has detailed the negative impacts of sex ratio skewing in several NEPA actions over the years:

Wild horse populations will produce roughly equal numbers of males and females over time (4700 WHB Handbook, 4.4.1). Re-establishing a 50/50, male to female, sex ratio is also expected to avoid consequences found to be caused by skewing the ratio in either direction. Sex ratio typically adjusted in such a way that 60 percent of the horses are male result in slightly reduced populations (Bartholow 2004), implying that ratios would need to be adjusted even further to account for a significant slowing of population growth. In the Pryor Mountain Wild Horse Range, Singer and Schoeneker (2000) found that increases in the number of males on this HMA lowered the breeding male age but did not alter the birth rate. In addition, bachelor males will likely continue to seek matings, thus increasing the overall level of male-male aggression (Rubenstein, 1986). (2015 Cold Springs HMA and 2017 Stinkingwater HMA Population Management Plans, Attachment 12, p. 25 and Attachment 13, p. 21).

If selection criteria leave more studs than mares, band size would be expected to decrease, competition for mares would be expected to increase, recruitment age for reproduction among mares would be expected to decline, and size and number of bachelor bands would be expected to increase. . . . (emphasis added). (Beatys Butte EA DR FONSI 2009, Attachment 14)

Skewing the sex ratio of stallions v. mares would result in a destabilization of the band (stallion, mare and foal) structure moving it from five to six animals to three animals. Social band structure will be lost resulting in combative turmoil as surplus stallions attack a band stallion trying to capture his mare. This could result in the foal being either killed or lost. The mare and foal will not be allowed to feed or water naturally as the stallion tries to keep them away from the bachelor bands of stallions, resulting in stress to the mare during her lactation condition. (emphasis added). (EA FONSI for the South Steens Wild Horse Gather, Attachment 15).

At bottom, the USFS must disclose and analyze the impacts of these methods if any consideration is going to be given to these tools as management options in the WHT. Without this information, it is impossible for the public to provide meaningful comment on the proposed management plan.

Further, it is equally impossible for the USFS to justify this management plan without at least a complete analysis of the above-mentioned factors. [1]

The skewing of the natural sex ratio to 60% male to 40% female would create an unnatural social structure that would result in much more agonistic, or aggressive, behaviors between stallions, much more discontent among females & consequent abandonment of stallions & bands as well as a failure to educate the younger members of bands. This would impede/thwart the horses' harmonious adaptation to this particular ecosystem & be very much contrary to the true interpretation of the

WFHBA as concerns the wild horses' principle rights to resources within their legal areas (Section 2 c of WFHBA). [3]

Consideration: Reference to Bartholow, J.M. 2004. *An economic analysis of alternative fertility control and associated management techniques for three BLM wild horse herds. U.S. Geological Survey, Biological Resources Discipline, Open File Report* was added to the Wild Horse resource report. This paper suggests that sex ratios should be re-examined to maintain natural sex ratios and that sex ratios would have to be highly skewed in order to adjust population growth. This research further supports the proposal to have sex ratio adjustments as the lowest priority tool for population control.

F.J. Singer and K.A. Schoeneker. 2000. *Manager's Summary: Ecological Studies of the Pryor Mountain Wild Horse Range. U.S. Department of Interior U.S. Geological Survey.* This paper suggests that sex ratios should remain at 1:1 and that altering sex ratios did not lower birth rates but rather lowered the breeding male age. Reference to this paper was added to the Wild Horse report and further supports keeping the adjustment of sex ratios as the lowest priority tool for population growth management.

Genetic Health of the Wild Horse Herd

Comment: *The USFS is required to carefully consider its mandate (The Wild Free-Roaming Horse and Burro Act) with respect to long-term genetic viability of populations of wild horses and burros. See: Genetic Variation in Horse Populations (excerpts), BLM Resource Notes No. 27, DATE 07/20/00; By: E. Gus Cothran, PhD., Department of Veterinary Science, University of Kentucky [24]*

In 1991, Cothran suggested that to achieve an Ne of 50 individuals, a herd would have to easily exceed 100 animals (Cothran 1991). Consequently, he concluded that "it is critical that genetic considerations be included in management plans for wild equid populations." [24]

According to Dr. Cothran's analysis & your own admission, the BST herd is below the critical level of heterogeneity (Ho) with results of 0.653 & 0.583. Any figure below 0.66 is at critical risk. [4]

Consideration: Alternative 2 includes managing for an acceptable level of genetic variability. EA p. 16. In addition, on page 65 the EA points out that, "[I]n a letter dated July 16, 2009, Cothran states that enlarging a population's size does not increase the population's genetic variation, it only slows the rate of loss of existing variation (Cothran, 2009)." The EA (p. 57) points out, "[t]he National Research Council recommends that groups of HMAs (Territories) constitute a single population and manage them by using natural or assisted migration (translocation) whenever necessary to maintain or supplement genetic diversity (National Research Council, 2013).

Comment: *Reducing the number of horses in this already genetically-compromised herd fails to protect these horses. The EA fails to present any real-life evidence that adding a few horses to a herd actually increases genetic variability - this premise is entirely based on statistical calculations and has never been shown to be true. [26, 32, 57]*

The proposed action would further result in exasperating the already low genetic variability present in this wild horse population. A herd of just 12 horses, as proposed under Alternative 2, would likely sentence the herd to immediate extinction, and any number below the current population would render the herd's genetic viability futile. [2, 40]

The USFS notes in the EA that the herd is already genetically compromised. Allowing the herd to be taken down to 12 individuals will not help the genetic health of the remaining animals. [1, 50, 53]

Best available science contradicts the plan to reduce the herd size to 12 to 57 animals which is far too low to ensure genetic viability. [14, 29, 30, 43]

The USFS must consider how any future use of fertility control with such a low AML could affect the health and genetic viability of the herd. Merely adding a couple of horses to a management area does not prevent inbreeding and genetic problems. Dr. Gus Cothran has personally informed AWHC that once genetic viability is low, it takes generations to correct and that adding a few horses does not prevent inbreeding in small herds. [1]

I am concerned that reducing the size below the current level will put the future of wild horses in the Ochocos in jeopardy. Both from the viewpoint of continued genetic variability as well as attrition of aging horses or environmental factors that could reduce the size such as harsh climate or wildfire. [31]

Consideration: The goal for AML management under Alternative 2 is to maintain at or around the high AML, not get to low AML (EA, p.58). Also on page 58 of the EA, the preferred Alternative 2 summarizes how this alternative proposed to manage genetic health. Alternative 2 includes translocation of animals from genetically similar herd into the Big Summit herd as recommended by genetic experts and also summarizes the recommendations of the National Research Council which includes translocation. Lastly, Cothran (2009 and personal communications) states that enlarging a population's size does not increase the population's genetic variation (p. 65) which is already below the recommended level of variation (p. 58).

Comment: *Further Dr. Lori Eggert personally informed AWHC of her initial thoughts regarding the genetic viability of the Big Summit herd under the USFS's proposed action. A reduction of the herd to 12-57 individuals could have deleterious effects on the genetic diversity. In order to work to prevent this, the USFS must manage, at the very least, to the high end of the range and make sure that the individuals who remained were the least related because the breeding of those individuals would not necessarily result in a large loss of diversity or an increase in inbreeding in the first few generations. However, the USFS would have to be dedicated to closely monitoring the genetic health of the herd. To Dr. Eggert, the two largest concerns with maintaining such a small herd are that driving the herd down to such a small number would risk destroying the existing band structure and that at such a small size, the fecundity of females will be maximal, driving up the population growth rates. [1]*

Consideration: The goal for Alternative 2 would be to maintain at or around the high AML of 57 (EA p. 58). The EA states, "Observed heterozygosity will be monitored by collecting DNA-based samples at gathers and having them analyzed by genetic experts. Monitoring reports and translocation recommendations will be requested from genetic experts with access to an adequate wild horse genetic database from which to make such recommendations, Texas A & M University is an example." (EA p.58).

Comment: *Please note that Big Summit Wild Horse Territory is geographically isolated from other wild horse herds. Smaller, isolated herds (<200 total census size) are particularly vulnerable when the number of animals participating in breeding drops below a minimum needed level. Big Summit's population is significantly lower than 200, and worse yet, the herd's mares have already been dosed with PZP. [2]*

Consideration: While isolated or smaller herds can be vulnerable to decreased genetic variability, after consultation with the wild horse genetic expert, Gus Cothran (personal comm 9/13/2017, found in project folder) he recommend that we base the AML on the size that the resources in the Territory could provide for and translocate animals from genetically similar herds to manage genetic diversity. Dr Cothran also noted that allowing a herd with already low in genetic diversity to increase in numbers would not increase the genetic diversity of the herd.

Comment: *2,500 individual horses is the recommended population level for true viability in the wild (Duncan, P. 1992. Zebras, Asses, and Horses: An Action Plan for the Conservation of Wild Equids. IUCN Species Survival Commission, Equid Specialist Group. Gland, Switzerland). [3, 24]*

Consideration: The National Research Council (2013) suggests that a minimum 5,000 individual horses could be necessary to be viable and therefore it recommends management of wild horses as a metapopulation in the form of natural and assisted movement of animals among Territories and Herd Management Areas. The AML analysis (EA, Appendix B) displays the limited capacity of the territory to provide for horses while meeting LRMP resource objectives.

Comment: *Other research indicates that an “absolute minimum” of 139-185 wild horses are needed to maintain a population that undergoes several removal disturbances during a generation (Singer, Aegnefuss, 2000). This number represents an “absolute minimum” and is not an ideal population size (Johnston, 2011). [24]*

Consideration: Singer and Aegnefuss (2000) notes that IF 50 effective breeding animals is the goal then the total population would need to be 139-185. However, the author also notes, "Management could greatly alter this relationship by: (a) altering breeding sex ratios to increase N_e through removals, (b) increasing generation length through removal scenarios (which reduces the rate of loss of genetic resources, or (c) introducing breeding animals periodically from other genetically similar herds to maintain genetic resources. Only one to two breeding animals per generation (= about every 10 years in wild horses) would maintain the genetic resources in small populations of about 100 animals, thus obviating the need for larger populations in all cases." These actions are proposed under Alternative 2. While this paper is not specifically referenced in the Draft EA, a paper co-authored by Cothran and Singer, "Analysis of Genetic Variation in the Pryor Mountain Wild Horse Herd." which presents the same information is included in the analysis.

Comment: *Whether or not Dr. Cothran stated in 2009 that increasing population numbers won't increase genetic variation, it certainly won't hurt. Decreasing the herd size certainly will hurt. Compared to a total herd size of 57, or even 65, allowing the herd to remain roughly at the current population level would assure more random matings and an unknown rate of ongoing mutations commensurate with more horses. [4]*

Consideration: Personal communications with Dr. Cothran (9/13/2017, project folder) summarizes Dr. Cothran's recommendation to manage an AML that the Territory resources can support and translocate animals for maintaining genetic health. Dr. Cothran's specific recommendation for the Big Summit Territory is "...for managing the genetics of our herd based upon existing information is to maintain the herd at the maximum level provided by the resources in the territory, and introduce a new mare to the population every two to four years." This is why we are proposing in Alternative 2 to maintain at or around the high AML (EA p.58).

Comment: *The statement made by the ONF (page 65) "However, since the wild horses in the Big Summit Territory are displaying genetic depression and associated levels of heterozygosity, having an MVP of 50 or more breeding individuals would not be expected to improve the observed heterozygosity to above the recommended level of 0.66." is inaccurate. The definition of genetic depression requires that a loss of "fitness" is apparent; provably attributable to a significant decline in genetic diversity. While the 2019 report (Desphande et al) cites "communication with USDA/FS personnel" to document the manifestation of the Big Summit Herd's genetic condition: "Inbreeding seems to already be impacting these horses, as they appear more susceptible to diseases and have more physical deformities. Additionally, the herd suffers from high infant morbidity and mortality (USDA-FS)" there has been no study of this correlation. This constitutes the highest levels of conjecture and misrepresentation; within a document where such affronts to real science are already prevalent to the point of redundancy. [4]*

Consideration: In order to maintain the accuracy of the statement, the EA on page 65 of has been changed to state, "However, since some factors such as low levels of heterozygosity, indicate the wild horses in the Big Summit Territory may be displaying genetic depression, having an

MVP of 50 or more individuals would not be expected to improve the observed heterozygosity to above the recommended critical level of 0.66 (USDI, BLM, 2010).”

The BLM Handbook indicates that observed heterozygosity values of less than 0.66 indicate critical risk. This question was asked of Dr. Cothran in a personal communication (3/12/2018, project folder) and while Dr. Cothran stated that there are many conditions that determine ideal values, the number of 0.66 was a critical number chosen based on statistics only.

There are only two genetic studies that exist on the Big Summit Territory (EA p. 33) therefore, the monitoring recommendations (EA p. 58) will be followed to provide the best management practices for genetic health for this herd.

Comment: *We had previously provided Dr. DeEtta Mills with a diary of physical issues affecting the Big Summit Herd. We do not know if these were the examples provided to Desphande. We certainly do not know what evidence was provided by the ONF to substantiate the comment that "they appear more susceptible to disease." That is simply false. [4]*

The anomalies described MAY be related to genetic decline; or they MAY represent genetic predisposition to environmental factors; or they MAY be entirely environmental; or they MAY be caused by something completely different. [4]

Consideration: There are only two genetic studies that exist on the Big Summit Territory that are specific to the genetic variability of the animals tested (EA p. 33). Any other conclusions would be speculation. A word search of the EA did not yield a result for “susceptible”, nor did the word search for “disease” locate any reference that is related to the ONF stating, “they appear more susceptible to disease.”

Comment: *We do not find any discussion in t is EA of allelic variability; the other measure of genetic health. Although the studies cited may offer some mention of this, it is simply not factored into the conclusions drawn by the ONF in this EA. ...Because loss of alleles leads to a reduction in heterozygosity, evaluation of the robustness of predictions should always consider two measures, allelic richness and heterozygosity, because they give you different snapshots of genetic health. Yet allelic richness was not even assessed for the herd because adequate sample sizes could not be attained. Really? This is an important omission, because there is no way to assess how allelically diverse the population might actually be.... [4]*

Consideration: The EA (p.33) states that the 2011 report indicated that the values related to allelic diversity are not reliable due to the smaller sample size but H_o is below the critical level and this measurement is not influenced by sample size. Dr. Cothran also reiterated in a personal conversation (9/13/2017, project folder) that what we are confident, based on these samples, that genetic variability is limited. The BLM Handbook recommends managing for an observed heterozygosity of at least 0.66, this is what the Big Summit wild horse herd will be managed for.

Comment: *The USFS is required to allow established populations to successfully produce viable offspring which shall, in turn, produce viable offspring, and so on over the long term. The main focus of genetic management, especially for the smaller populations (<200 total census size), becomes the attempt to preserve as much of the existing genetic diversity as possible. [24, 29]*

Consideration: The focus of genetic management for the Big Summit wild horse herd will be to manage for an observed heterozygosity of at least 0.66. Under Alternative 2 this would be done in consultation with genetic experts, through monitoring and the translocation of animals from genetically similar herds (EA p. 16).

Comment: *The Forest Service augmented the heard with two mares from the Steens and administered doses of PZP before studying the effects. [25]*

Consideration: The augment of two mares was done in consultation with and following a recommendation from Dr. Mills after results of the genetic monitoring in 2010 indicated a low genetic diversity. The application of PZP was done as a trial under a CE. Effects and feasibility were studied during the trial as planned in the CE. Both of these actions were specifically sanctioned at the time, by the local wild horse advocacy group.

Introducing Mares

Comments: *The idea of removing horses and then bringing in more horses from another area is both an exercise of futility and nonsensical. There is no need to introduce other horses for genetic viability if the herd size is at least 150, as referenced by equine geneticist Gus Cothran, and widely accepted. [5, 52]*

With numbers as low as 12 it is unlikely bringing in 1-2 mares will strengthen the genetic viability of the horses particularly with the harsh winters in the Big Summit Territory. [50]

The guidance for importing horses into new herds is weak, providing virtually nothing to date in regard to the ratio of imported horses to herd size being translocated to. Imported horses can be rejected, and can suffer for lack of adaptedness to the new environment. The success of these actions is not scientifically documented and especially, is not documented for the translocation of two South Steens mares to the Big Summit Territory. This points to the larger issue; the ONF does not have current data on the genetic condition of the Big Summit Herd, and therefore cannot propose future management actions which could cause further deterioration of the present situation. It is relevant here to point out that, contrary to what is stated in this EA regarding Dr. Mills' success in ultimately showing fecal sampling to be valuable in genetic study, she was indeed successful in doing so. Dr. Mills was able to isolate equine DNA from that of other organisms found in horse fecal matter due to their digestive processes. Though fecal sampling may not presently be useful in censusing populations, it has been proven to yield genetic material which potentially could provide the updated genetic diversity profile sought for the Big Summit Herd. [4]

The 2018 aerial census identified 16 horses outside of the Territory. The Forest omitted information about the 16 horses who are led by a mare that was brought in from the Steens. If augmentation is used, the whole area needs to be fenced. This is an argument against augmentation. [25]

Consideration: Personal communications with Dr. Cothran (9/13/2017, project folder) summarizes Dr. Cothran's recommendation to manage an AML that the Territory resources can support and translocate animals for maintaining genetic health. Dr. Cothran's specific recommendation for the Big Summit Territory is "...for managing the genetics of our herd based upon existing information is to maintain the herd at the maximum level provided by the resources in the territory, and introduce a new mare to the population every two to four years." This is why we are proposing in Alternative 2 to maintain at or around the high AML (EA p. 58).

Genetic Testing and Monitoring

Comment: *The USFS has failed to include the specific protocols for genetic viability testing and for the introduction of individuals since this herd has been determined to be genetically compromised. [1]*

Consideration: The focus of genetic management for the Big Summit wild horse herd will be to manage for an observed heterozygosity of at least 0.66. Under Alternative 2 this would be done in consultation with genetic experts, through monitoring and the translocation of animals from genetically similar herds (EA p. 16).

Comment: *The ONF must also consider that the 2019 Report (Desphande et al) suggests that sampling may be more opportunistic than statistical; when horse bands are sampled there is obvious familial relatedness which could skew observed heterozygosity. [4]*

USFS needs to conduct a 100-percent evaluation of the Big Summit herd's genetic health per DNA samples tested by the Equine Genetics Lab. Per those results, guidance from Dr. Gus Cothran, and consultation with wild-horse-and-burro advocates, USFS must then development practices to restore and maintain gene-pool diversity via a robust population-level. [29]

The FS is not affluent enough in genetics to realize how the collection of the "entire trapped band" could or would corrupt this study's findings.... "However, given the small sample sizes, the horse's hierarchal social structure, and the serendipitous capture methods used, these results may be reflective of existing family groups being captured together", (Dr. Mills). Hair samples were pulled from bands (entire families), no wonder why they look closely related. One again flawed data that is going to be used for critical decision making. [25]

I have also told all of you that there is new technology and you need to do current testing – submitting it to the above parties.... If you had followed my advice and gotten written documentation from the World's leading experts you could have saved a lot of time and paper. Your document totally blew it. The problem (inbreeding) is still there – and it is HUGE. [17]

The Forest Service is not using best available science because the 2006 genetic test failed and the 2011 test is not current. [23]

If you don't know if the herd is genetically depressed how can you proceed with monitoring program and corrective action of introducing new genes of similar territories or adjusting sex ratio (see EA p. 214 "if genetic depression has not already occurred." [25]

Consideration: The focus of genetic management for the Big Summit wild horse herd will be to manage for an observed heterozygosity of at least 0.66. Under Alternative 2 this would be done in consultation with genetic experts, through monitoring and the translocation of animals from genetically similar herds (EA p. 16).

Genetic Character and Origins of Ochoco Wild Horse Herd

Comments: Furthermore, this herd preserves Old World Iberian lineages of close relation to Andalusians. – This is a unique & valuable herd & you should be increasing its numbers to assure its long-term viability – not cutting it to the quick as you are proposing! [3]

By bringing in outside horses to bolster genetic heterogeneity, you would adulterate the BST herd's special character & set back many generations of natural adaptation accomplished by this herd. [3]

These are ancient genetics, and these horses are uniquely-adapted to the Ochoco Mountain environment. The ONF needs to abandon the old origin story, however convenient. [4]

It is time to recognize the genetic evidence of this herd's actual heritage, and to protect it while more analysis is completed to fully understand the unique attributes of the MtDNA hoofprint; only two founding matrilineal branches represented; Lusitano and Andalusian predominance; evidence of Konik heritage which links to the extinct Tarpan. [4]

Consideration: The focus of genetic management for the Big Summit wild horse herd will be to manage for an observed heterozygosity of at least 0.66. Under Alternative 2 this would be done in consultation with genetic experts, through monitoring and the translocation of animals from genetically similar herds (EA p. 16).

Comments: In the 1990s the origins of the Big Summit Herd were hazy, at best. Common belief was in the typical lore of local individuals losing or releasing horses to the wild, sometimes to be kept approachable by tying tires to the lead mares' legs, or by lacing her nostrils shut with barbed wire. Whether any or all of these accounts are factual, the origin story loses some credibility by factors of survival, acceptance of domestic horses, and the fact that farm/ranch horses were often the product of regional wild horse capture and training brokers. Too, as the Wild Free-Roaming Horses and Burros

Act took shape, these same locals reclaimed the most desirable (domestic) horses from the Big Summit Herd. Mitochondrial DNA study since the 1990s fails to affirm predominant domestic breeds in the Big Summit lineage.

The Big Summit herd is an island population. We have key element components for keeping herd size up - APEX PREDATORS, mountain lions, bears and wolves and man. The herd by its own merits in and of itself is resilient. These horses make it through the winter because these are mountain timber horses.....These are totally different horses in a totally different environment. [25]

By reducing it to such a low level, you set back generations of valuable adaptations by these particular horses to this particular ecosystem & break up the family bands & inclusive herd structures, education of young by mature horses & the general harmony that these horses, in their ongoing struggle to survive, have been developing for many generations. [3]

Consideration: The goal for AML management under Alternative 2 is to maintain at or around the high AML, not get to low AML (EA p. 16, 46, 58). Also on pages 57- 58 of the EA, the preferred Alternative 2 summarizes how this alternative proposed to manage genetic health. Alternative 2 includes translocation of animals from genetically similar herd into the Big Summit herd as recommended by genetic experts and also summarizes the recommendations of the National Research Council which includes translocation. Lastly, Cothran (2009 and personal communications) states that enlarging a population's size does not increase the population's genetic variation (p. 65) which is already below the recommended level of variation.

Comment: *Stochastic events — random, chance happenings —can eliminate important survival-supporting, adaptive genes from a population. USFS' currently-inadequate AML, enforced through sudden, draconian removals and mass contraceptive vaccinations, could randomly wipe out certain traits that are valuable and well-worth conserving. [29]*

The herd should not be augmented because of their personality traits and trainability. Anyone who has owned, worked, or trained a wild horse would understand my next point. The Big Summit Herd is known for their temperament. If you were to try and inject a Kiger or any other horse of similar traits, you would destroy this herd's likeability and trainability. [25]

Consideration: The focus of genetic management for the Big Summit wild horse herd will be to manage for an observed heterozygosity of at least 0.66. Under Alternative 2 this would be done in consultation with genetic experts, through monitoring and the translocation of animals from genetically similar herds (EA p. 16).

Comment: *In light of Dr. Mills' et al finding that the Big Summit horses show evidence of Konik lineage, not inherited from the recently-cultivated Polish breed but more likely from shared Tarpan beginnings, following is an excerpt from one of several studies of rewilding programs featuring wild horses; Konik Polski horses as a means of biodiversity maintenance in post-agriculture and forest areas: an overview of Polish experiences: "Presented overview confirms that the idea of introducing horses into wastelands and forest habitats was generally purposeful. The ability to cope with local wildlife in different natural environments without provoking any harm to highly valued plant species was confirmed by all persons that introduced them into wastelands for plant and animal biodiversity maintenance. As expected, grazing increased observed plant, invertebrate and bird biodiversity and all programs of free-roaming year- round maintenance of Konik polski herds are continued, even after main sources of funding have expired." [4]*

Consideration: The paper referenced represents several case studies of abandoned agricultural and forested lands in Poland which have anthropogenic character and where historically, farm animals such as cattle, horses, sheep, pigs, goats and geese were pastured. These ecological systems bear little similarity to the ecological systems represented in the Draft EA project area.

This would account for the failure of the ecological systems in the project area to respond to impacts from horse grazing in a manner similar to those reported in this paper.

Comment: *However, with this EA, citing the National Forest Management Act's direction to "provide habitat to maintain viable populations of existing native and desired non-native vertebrate species", the question of the wild horse as a Native species is firmly on the table. It is difficult to locate a uniform definition for Native species, since Executive Order 13112 replaced EO 11987, and was then amended by 13751. This EA refers to 13112 in its Invasive Plants section, which demonstrates that the Native species designation has diminished in importance compared to the heavier emphasis on invasive species necessary to recover natural ecosystems. (see definitions of native species incorporated in to comments). [4]*

Consideration: The WFRHBA mandates that wild horses be managed in a thriving natural ecological balance with other uses and the productive capacity of their habitat (EA p. 3).

Comment: *The ONF reference to the 2013 National Research Council Report Using Science to Improve the BLM Wild Horse and Burro Program; A Way Forward regarding the discussion of all America's wild horses comprising a "metapopulation" is a misrepresentation of the Report's full text. [see page 2 letter #4 and cited references]. [4]*

This EA reference to the horses being part of the metapopulation of all wild horses is taking a piece of the NAS report out of context and completely changing the meaning of that reference. It does NOT apply to this herd as the Big Summit horses have genetic uniqueness. [5, 30, 39, 40, 49]

"The wild horses in the Big Summit Territory are considered as part of the metapopulation of all wild horses in the western United States therefore, loss of horses in one Territory does not constitute loss of a population (National Research Council 2013)." These horses are in OUR county, in OUR FOREST and they belong to the PEOPLE. They are part of our life, enjoyment, and culture. They are an important component of our ecosystem in our forest. The wild horses are in and of the forest. [25]

Consideration: The sample sizes of existing genetic studies of is inadequate to make definitive origin determinations for the herd but are adequate to indicate that genetic variability is lacking (Cothran personal communication 9/13/2017, EA p. 2 and 33). "Management of equids as a metapopulation is necessary for the long-term genetic health of horses and burros at the HMA or HMA-complex level." (p. 8, NAS, 2013) , was a major finding of the National Research Council committee. While there were some caveats associated with this finding, there is not adequate data to determine their application (Cothran personal communication 9/13/2017) and increasing genetic variability in the herd is an overriding concern. Genetic monitoring under Alternative 2 and associated consultation with genetics experts is intended to provide the genetic health of the herd (EA p. 21).

Off Range Plan

Comments: *Adoptions will remain a component of off-range management, but cannot be assumed on a scale commensurate with captures. [4]*

Consideration: Under both Alternatives 2 and 3, "[a]fter wild horses are gathered, they would either be: 1) transported to the BLM Burns corral facility or 2) transported to a Forest Service corral or to temporary/mobile corrals constructed by the Forest Service or 3) transported to leased or contracted private facilities, where they will be prepared for adoption or sale."(EA p. 17). The EA p. 18 further describes adoptions, sales and compliance checking.

Comments: *This EA is alarmingly vague about their off-range vision and non-committal on the matter of disposition of captured horses.*

Any new Big Summit Wild Horse Management Plan must set forth, with absolute clarity, its intentions to assure appropriate adoptions and sales including compliance follow-up, regardless of the alternative selected. This element is weak and disturbing in its lack of specificity. [4]

Consideration: Under both Alternatives 2 and 3, “[a]fter wild horses are gathered, they would either be: 1) transported to the BLM Burns corral facility or 2) transported to a Forest Service corral or to temporary/mobile corrals constructed by the Forest Service or 3) transported to leased or contracted private facilities, where they will be prepared for adoption or sale.”(EA p. 17). The EA p. 18 further describes adoptions, sales and compliance checking.

Comments: *We are also concerned about the subjective eligibility for the Sales Authority program, given the Wild Horse and Burro Advisory Board recommendations.*

(EA, p. 18) We understand this to mean that current riders only allow for the FS to sell with limitation, but that if such riders were lifted, then the FS would pursue sale without limitation. In an unprecedented step, the FS set out in 2018 to sell captured older horses from the Devil’s Garden Wild Horse Territory without restriction. As a result, RTF and other advocacy organizations filed suit to stop the sale; the public and federal lawmakers strongly opposed the plan, resulting appropriations language specifically barring FS from conducting unrestricted sales of wild horses and burros; and California state lawmakers subsequently passed a law to tighten sales. These consequences were a direct result of what the public and lawmakers felt to be a violation of the spirit of the 1971 Act. We strongly urge FS to adopt a clear-cut sales policy consistent with BLM’s prohibiting a single buyer from purchasing no more than four sale-eligible wild horses or burros during a period of six months. We would also encourage FS to collaborate with BLM on a database of known or suspected kill buyers in keeping with the states wishes of Congress and the public that formerly free- roaming wild horses and burros are not to be slaughtered. An investment into clarity and transparency regarding sales and an effort to place wild horses and burros into good homes will pay dividends of increased trust from the public and lawmakers in FS wild horses and burro management. [8]

Consideration: On page 51, the EA states, “The WFRHBA states that an excess animal that: is more than 10 years of age or, has been offered unsuccessfully for adoption at least three times, shall be made available for sale without limitation (16 U.S.C., Chap 30, §1333(e)). While the Act as amended only addresses sale without limitation, subsequent enactment of riders prohibiting the BLM’s and Forest Service use of appropriated funds for the sale or slaughter of wild free-roaming horses and burros resulted in BLM’s construction of a sale with limitation whereby purchasers declare in their purchase application to, “... not sell or transfer ownership of any such animals that I purchase to any person or organization that intends to resell, trade, or give away such animals for processing into commercial products.” While current Forest Service policy is to follow the mandates of the Act as amended, the agency will comply with appropriations language limitations.”

Comment: *Another omission of fact which the public has the right to know is: The possibility that the FS may have the right to shoot the horses which are deemed in excess number over the AML. [25]*

Consideration: Although the local wild horse advocacy group has been very successful at finding adoptive homes for all wild horses from the Big Summit Territory needing placed, the EA states, “[a]s a last resort, animals for which there is no adoption or sale demand would be euthanized in the most humane and cost efficient manner possible (36 CFR 222.69 (5)).” (EA p. 18).

Comments: *Since the time that the FS could not process horses through BLM there is no data of how the horses have been successfully rescued and adopted through the Central Oregon Wild Horse Coalition. The Coalition offered to set up an adoption and training facility on one of our properties with no cost to the Forest Service. To date, no considerations or conversations have taken place. [25]*

I strongly disagree with the statement on how these horses are not adoptable---it has been since 2010 since the last major gather and from what this shows these horses that were gathered was adopted at 100% adoption rate. [36]

Please remove your statement that these horses have undesirable size and conformation so that makes them less likely to be adopted. It's simply not true and a local organization has adopted out every single Ochoco horse made available proving again that these horses are desirable and adoptable. [52]

Consideration: Following response to scoping it was ensured that no statement is in the EA indicating that Big Summit wild horses are not adoptable (this statement came from the 1975 EA). Table 4 on page 29 of the EA shows that all Big Summit wild horses removed from the Territory since 2015 were adopted.

Comment: *I suggest we allow the herd to thrive and encourage any entrepreneur to develop a dude ranch style resort that offers tours and viewing of these majestic beauties, with some proceeds going towards veterinarian care and other expenses. [77]*

Consideration: This proposal lies outside of the scope of this analysis.

Emergency Response

Comment: *The Emergency Response Plan in this EA consists only of provisions related to euthanasia although COWHC has submitted a list of potential situations affecting wild hoes including emergency starvation relief. [4]*

Consideration: The Central Oregon Wild Horse Coalition's proposal for emergency starvation relief was inconsistent with Forest Service Policy regarding supplemental feeding of wild horses (EA p. 9) and is therefore, not included in the Emergency Response Plan in the EA.

Comment: *The new motion should consider monitoring any decision to euthanize captured wild horses by an outside group supportive of wild horses, such as the Central Oregon Wild Horse Coalition. Only wild horses not likely to survive on their own and currently suffering should be euthanized; this decision should not be made based on behavior or the old age of wild horses. [56]*

Consideration: Procedures and circumstances appropriate for the consideration of euthanasia are discussed in Appendix C of the EA.

Comment: *We also restate the importance of avoiding the situation in 1992/93 which was likely the cause of the "bottleneck effect" present in the Big Summit Herd today. The ONF must take responsibility for this event and strive to prevent similar occurrences in the future. [4]*

We reiterate that the genetic "bottleneck" referred to in this EA was very likely the result of the ONF's "do not feed" policy during the extreme winter conditions of 1992-93. Employees were threatened with termination, and concerned public with jail time, if they attempted to alleviate suffering and certain starvation. Because of the sudden and persistent nature of the snow accumulation, untold numbers of wild horses, deer, and elk were entrapped and ultimately perished. [4]

Consideration: Table 4, on page 29 of the EA indicates that in 1993 only 19 horses remained on the territory due to a, "[s]evere winter in January required removal of horses staying on country road due to public safety concern, majority of horses in poor condition, hauled to the Burns BLM facility". The focus of genetic management for the Big Summit wild horse herd will be to manage for an observed heterozygosity of at least 0.66. Under Alternative 2 this would be done in consultation with genetic experts, through monitoring and the translocation of animals from genetically similar herds (EA p. 16).

Comments: *In this EA, the suggestion of emergency feeding is summarily dismissed as being against policy, deleterious to the natural behavior of wild horses, and for artificially elevating the carrying capacity of the Territory. It is also implied that wild horse advocates recommended this as a regular practice, rather than as a last-resort means of preventing mass mortality in the event of a bonafide catastrophe (which was the intent of the Working Group). [4]*

The Ochoco NF and top-level Forest Service management, contend that feeding the horses would violate law. The ONF has threatened public, who were suspected of providing hay to specific horses, with jail time regardless of the void of statutory basis for prosecution. (working group outline and attorney correspondence attached). [4]

The working group's recommendations were aligned with the following "The Report to Congress by The Secretary of the Interior and The Secretary of Agriculture on Administration of the Wild Free-Roaming Horse and Burro Act, June 1974, states (page 20): (f) The Board recommended that the two Agencies follow the policy of not resorting to supplemental feeding of wild horses and burros except in extreme emergency. The agencies concur with this recommendation." *We asked only that under the most dire of circumstances, the ONF prevent cruel suffering and death, and our intent was to create a preparedness framework which would eliminate logistical delays in delivering life-saving feed. [4]*

Note: Starvation is recoverable, when agencies are vigilant and a plan is in place which facilitates action prior to a non-recoverable situation. [4]

Consistent with the extreme/catastrophic filter for emergency feeding, the Working Group designed a decision protocol and advance preparation/logistical outline. We envisioned a response plan for the numerous other potential emergencies we delineated in our reply to the ONF Scoping letter. Rather than including any sort of plan, even incorporated by reference, the ONF's emergency contingencies consist of arbitrary standards governing the euthanasia of wild horses. [4]

Consideration: The EA p. 9 states, "[i]t should be noted that supplemental feeding is not consistent with Forest Service policy and has the potential to exacerbate problems within a wild horse herd. Supplemental feeding may facilitate population growth above the AML, leading to other future negative resource impacts resulting in ecological imbalance. Supplemental feeding could also lead to habituation of horses to people and disrupt the movement and migration of horses across the territory, again."

Comments: *I suggest the policy be changed to provide some food for the wild horses as was done in other places in Oregon in the winter of 2016. [22]*

Animals would suffer in harsh conditions of prolonged and deep snow regardless of the size of the herd and that it should be dealt with by allowing emergency feeding. I don't feel this should be an ongoing action, but in certain rare instances is viable. Precedent does exist; example: emergency feeding of elk in the Reserve near Jackson, WY. [42]

It is not humane to let an animal die just because they are in a catastrophic situation and there is no correlation to your statement of too many horses. Other wildlife is fed around the country for that reason. You are referencing ORS 499.012 under Humane Destruction of Unusually Dangerous Animals, which does not seem to exist. If the federal agency can overlook supremacy law and apply state law, then that means state laws would pertain to the FS. If that is fact, then there are numerous laws in the state which apply to animal abuse. [25]

Consideration: The EA p. 9 states, “[i]t should be noted that supplemental feeding is not consistent with Forest Service policy and has the potential to exacerbate problems within a wild horse herd. Supplemental feeding may facilitate population growth above the AML, leading to other future negative resource impacts resulting in ecological imbalance. Supplemental feeding could also lead to habituation of horses to people and disrupt the movement and migration of horses across the territory, again.” It should be noted that other options exist in such situations including the capture actions taken in the winter of 1992-1993 (Table 4, p. 29).

Livestock in the Territory

Comment: *As the EA notes, since the establishment of the Ochoco National Forest, livestock use has been adjusted to correspond to the carrying capacity of the land. The EA also notes that allotment boundaries have changed over the years, and as such it is reasonably foreseeable that the allotment boundaries within the WHT may change again. [1]*

Consideration: Although the EA p. 70 states, “[a]ccording to records, although allotment boundaries and names have changed over the years, only sheep have been permitted to graze the analysis area since the establishment of the Ochoco National Forest.”, the EA p. 11 states, “[t]he scope of the analysis and decision to be made do not involve the determination of whether livestock grazing should take place in the Big Summit Territory or how many livestock should be permitted. Grazing is managed through the implementation of allotment management plans and issuance of annual operating instructions following Forest Service range management handbook and manual procedure.”

Comment: *The EA also notes how the permittee “currently feels” that there is not currently enough forage available which led the USFS to designate non-use 2017-2019. Thus, with the fluctuating history of livestock grazing within the WHT it is reasonably foreseeable that the USFS could choose to permanently eliminate or significantly reduce sheep Animal Unit Months (“AUMs”) within the WHT in the foreseeable future. [1]*

Consideration: The Big Summit Territory is a multiple use area, two of the many uses in the area is wild horse management and permitted livestock grazing. “The designation of a Territory in accordance with the Wild and Free Roaming Horses and Burros Act (as amended) authorizes the additional multiple use of wild horses on those public lands, not the exclusive use. As stated in the Senate Report that accompanies the Act, ‘the principal goal of the Act was to provide for protection of horses from man and not...the single use management of areas for the benefit of wild free-roaming horses and burros.’” (EA p. 43). The EA p. 11 states, “[t]he scope of the analysis and decision to be made do not involve the determination of whether livestock grazing should take place in the Big Summit Territory or how many livestock should be permitted. Grazing is managed through the implementation of allotment management plans and issuance of annual operating instructions following Forest Service range management handbook and manual procedure.”

Comment: *The USFS has a statutory mandate to protect wild horses, while livestock grazing is permitted only as a discretion. Livestock grazing is not required to fulfill the agency’s “multiple use” mandate.*

Domestic livestock are not “authorized” on public lands, they are only “permitted.”

[1, 6, 23, 24, 25, 26, 42]

Consideration: As stated in the EA (p. 43) the WFRHBA was not intended to make wild horses a single use in an area and permitted livestock grazing is one of the multiple use actions for which the Ochoco LRMP analyzed and allowed for during its analysis and subsequent decision. There

are examples of case law that show the uses of permitted livestock and wild horse management compatible (American Horse Protection Ass'n Inc. v Frizzell, 1975, American Wild Horse Preservation Campaign v Vilsack, 2015).

Comment: *The USFS must analyze how the implementation of range improvements, such as the development of additional water sources and removal of fencing, could affect the management plan. For example, the removal of any fencing would enhance the ability of the wild horses in the WHT to utilize the entire designated habitat area instead of forcing them to concentrate in certain areas or move outside of the boundaries. The analysis must include a map that shows the boundaries, livestock allotments, wild horse distribution (census map for all seasons), water sources and fencing. Accurate data on wild horse use and distribution relative to the features of the WHT will lead to implementation of the most effective and beneficial future range improvement actions over the course of the management plan. [1]*

Care must also be taken to preserve their free-roaming life style, by eliminating the blockage or piping of public water sources and especially the fencing and cross-fencing of the public lands. [24]

Consideration: There are no range improvements proposed in any alternatives in the project. As described in the Range section of the EA (p. 72) there are existing water developments but as summarized in the AML Analysis (EA Appendix B, p. 198) water is not a limiting factor in the Territory. In addition, on p. 72 of the EA, the Territory has no internal cross fences in it because of the intensive management of sheep and in fact, some fences lie beyond the Territory boundary allowing greater access to areas outside the Territory to wild horses thereby not impinging upon the ability of horses to be free-roaming. A map of grazing allotments and fences relative to the boundary of the wild horse territory is found on page 69 of the EA. Projected riparian winter range utilization levels during winters of above average snow fall are displayed in Table 2, page 20 of the EA. The EA pages 56-57 discuss utilization in the wild horse winter range. Map 3 in Appendix B, page 198 of the EA displays the estimated extent of the wild horse winter range during winters of above average snowfall.

Comment: *In order for the public to meaningfully provide public comment on the proposed action the USFS must disclose the following information for the planning area from the past 10 years. This includes, but is not limited to, such information as:*

- *A complete breakdown of livestock grazing in the WHT, including active and actual AUM allocations for each of the past 10 years;*
- *All rangeland health assessments for grazing allotments in the WHT. All monitoring data should also be included and the USFS should clearly describe the data delineating the separate impacts of livestock use versus wild horse use;*
- *All census data of the wild horse population for each of the past 10 years. This includes amending the EA to be consistent with the initially noted actual population increase of 7- 8 percent, and not the national estimated increase of 20 percent, throughout the EA. The agency must also include an accurate dispersal accounting for all wild horses within the WHT during the winter season, see maps at Attachment 18 as an example and note how this data demonstrates the wild horse use in the WHT is throughout the territory during the winter; and*
- *A detailed map of all water sources and fencing within the WHT, and disclosure of water allocations for all uses in the WHT, as well as an explanation of how fencing and engineering of wells and springs for livestock grazing has affected water availability for wild horses and other wildlife species.*

In addition, the final EA must accurately depict and differentiate the impacts from both livestock and wild horse use. For example, two U.S. Department of Commerce, National Oceanic and

Atmospheric Administration, National Marine Fisheries Service biological opinions (Attachments 19 and 20), analyzed livestock use in the allotments which overlap with the Murderers Creek Joint Management Area (“JMA”) and wild horse use in the JMA; the 2011 livestock opinion notes that the BLM has non-discretionary duties to monitor, report and regulate livestock use in order to prevent take. Such an intensive review would be beneficial and necessary before the USFS moves forward with implementation of this management plan for the Big Summit WHT. As written, the draft EA does not disclose any clear evidence that demonstrates wild horses are the direct cause of any riparian damage that the USFS is currently claiming exists within the WHT. Thus, an intensive biological review of both livestock and wild horse use of the Big Summit WHT is needed before any final management plan can be implemented accurately.

Further, given the Government Accountability Office’s 2017 report, “Animal Welfare: Information on the U.S. Horse Population,” AWHC calls into question the agency’s ability to measure and differentiate the impacts of wild horses and from those of livestock. The report states, “Officials and documentation, research that evaluates and separates cattle and wildlife impacts from wild horse impacts has not been conducted, and studies on horse grazing effects are needed.” (Attachment 10, p. 32). Therefore, the draft EA must disclose all monitoring and reporting data that the USFS has collected specifically on livestock use which fulfills its duties to prevent take and demonstrates documentation that can separate livestock impacts from wild horse impacts. [1]

Consideration: Livestock grazing information including stocking rates and utilization levels are available in the EA (pp. 70-71). Rangeland health assessments (as a data collection protocol) are often not conducted on transitory range (forested) but other, quantitative data was collected sampling upland forage condition (EA pp. 33-36) and riparian forage condition (EA pp. 37-43) .

Census data is displayed on p. 27 of the EA for the summer inventory conducted annually and winter census data is discussed in Appendix B of the EA (p. 196). Attachment 18 references a map displaying accurate dispersal accounting for all wild horses within the WHT during the winter season. This map was sought out by the agency trying to collect wild horse winter range information. This map was provided by the public but was considered unusable because of the lack of associated data including sighting dates, number of horses seen, or other evidence of horses sighted. This information was formally requested but never received. This was discussed in the AML Analysis (Appendix B) on page 196 of the EA.

Attachments 18 and 19 include a letter of concurrence and associated Biological Opinion for Allotments with wild horses in them that have endangered species habitat. There is no endangered species habitat in the Big Summit Territory. This letter is referenced in the comments associated with the need to differentiate the impacts from both livestock and wild horse use. There are examples in the EA (pp. 55 and 62) where utilization levels are differentiated by livestock and wild horses with wildlife. However, the Forest Plan standards set allowable use levels that are cumulative for all species based on the existing conditions of the area.

Comment: *Moreover, the Draft EA conveniently omits mention of severe damage from 100 years of logging interests and ranchers grazing exploited livestock on our public land, as well as more recent human ATV usage. The Forest Service cannot simply ignore relevant data and historic damage in its analyses. [2, 5, 23, 24, 40]*

Livestock, specifically sheep, are having impacts on natural resources that are being blamed on wild horses and that modifying livestock grazing practices could improve forage conditions for the wild horses. The Forest Service should not place the needs of livestock and ranchers above the needs of wild horses. See REPORT ON FIVE WILD HORSE HERDS AND HERD MANAGEMENT AREAS (HMA) IN OREGON, WITH RESULTS OF DETAILED ECOLOGICAL EVALUATIONS ON TWO HMAs CONDUCTED IN 2017, April 2018, available at <https://thewildhorseconspiracy.org/wp-content/uploads/2018/04/REPORT-ON-OREGON-WILD-HORSE-HERDS-AND-HABITATS-ON->

THEIR-LEGAL-BLM-AND-USFS-AREAS-Table-of-Contents-version-of-4-6-18_r.pdf (specifically, see attached, Appendix F of this Report). [2, 49]

Comment: *Re: P. 16. Concerning competition between horses & livestock, your statement is superficial & lacks objective analysis of the greater list of factors operating in BST, including especially livestock. [3]*

Consideration: Past management like historic grazing and logging management is mentioned as a contributing factor for existing conditions in the EA for both upland forage conditions (p. 36) and riparian forage conditions (p. 42). There are examples in the EA (pp. 55 and 62) where utilization levels are differentiated by livestock and wild horses with wildlife. However, the Forest Plan standards set allowable use levels that are cumulative for all species based on the existing conditions of the area. The Big Summit Territory portion of the *Report of Five Wild Horse Herds and Herd Management Areas (HMA) in Oregon, With Results of Detailed Ecological Evaluations of Two HMAs Conducted in 2017* authored by commenter Downer, Craig, 2018 of the Wild Horse and Burro Fund, does not represent peer-reviewed science. In addition, this report makes claims that are unsubstantiated and contradictory to Forest documentation.

Comment: *Perhaps more critically, though we may not know if the writers of the 1975 Wild Horse Plan meant "head of sheep" or "ewe/lamb pairs", the public needs to view the sheep presence as numbers of hooves as well as numbers of mouths. The lambs, by the time they spend a summer on the ONF, are barely distinguishable from their mothers. They will have a similar trampling impact on the forage and soils and a similar impact on stream banks as they cross creeks as a herd of approximately 2000. We cannot discern from this EA whether a set of twin lambs counts as one lamb, and this would, of course, multiply impacts. As with all commercial livestock, individual animals are bred to be bigger and heavier with every generation. The ONF needs to be transparent regarding the reality of permitted sheep grazing. This includes statements about the permittee voluntarily grazing his sheep elsewhere for three seasons, especially when 2019 should have yielded above-average forage whether consumed by an elk, a sheep, or a wild horse. [4]*

Consideration: Grazing records on the Reservoir allotment which includes the Reservoir and Canyon Creek bands indicate ewe/lamb pairs have been permitted since 1975 (located at the Lookout Mountain Ranger District office). These records also indicate the regular shipment of lambs off of the allotment from FS corrals in August. Actual use records are not available for every year, but those records available indicate consistent use since 1975. The Forest Service Animal Unit factor for a ewe/lamb pair, regardless of twins or a single lamb, is 0.30 (EA, p. 70).

Comment: *The ONF then authorized "resource protection non-use" for the years 2017, 2018, and 2019 (page 72). Our understanding was that the ONF authorized the displaced sheep to graze on another part of the Forest. What is questionable about this arrangement is that in 2019, though the winter was mild, deep snow accumulations occurred in February and persisted due to cloud cover and low temperatures. Wildlife and wild horses suffered until new grass finally grew, about a month later than is typical. But any herbivore or pollinator which survived the protracted end of winter was blessed with forage and water that flourished beyond all expectations. There could be no disguising any purely false assertion that the summer of 2019 was one of a dire competition for forage. [4]*

Consideration: Non-use was taken by one or both of the bands of sheep that graze in the Big Summit Territory from 2017-2020 and was not authorized to graze elsewhere on the Ochoco National Forest (records on file at Lookout Mountain Ranger District).

Comment: *If the concerns amounted to something other than low forage quantity it is unclear. "In 2017 and 2018 the permittee requested non-use due to resource concerns, to rest one pasture each year." We do not have access to the Allotment Plan, but are aware that pasture rest is normally built into a livestock permit. Whether or not the timing of this non-use represents any level of collusion related to the writing of this EA, we cannot say. We only know that many comments were heard*

regarding the excellent forage condition of the Territory these past few years. Muddying the facts a shade more, this EA lacks a definitive dietary overlap figure between sheep and wild horses. It might be 21%, according to a study cited in the Wild Horse report (page 38), or the overlap might be closer to the findings of another study between Pronghorn and horses. We've long been admonished by the ONF that the sheep don't eat the wild horses' forage, as "sheep only eat forbs" and one would expect the converse to be true. Until the dietary overlap figure is firmly established, it doesn't serve sheep or horses well to fight over forage allocations, and the ONF certainly does not have a solid basis from which to assess impacts on the sheep permittee operating in the Big Summit Territory or to present resource degradation data as "the best available science". [4]

Consideration: In the EA (p. 70) the range resource section states the permittee requested non-use based on resource concerns and was granted non-use for 2017 and 2018. Those same two years, utilization levels were calculated in the wild horse winter range in the fall and showed use levels beyond exceeding the Forest Plan standards (EA p. 62). The Reservoir allotment is not managed under a rest rotation, therefore resting the allotment was outside of the planned grazing system.

The EA (p. 55) also identifies dietary overlaps for sheep and wild horses in the summer with suggestions of low overlap. These overlaps are specific to summer dietary preference and the EA determined that summer forage is not a limiting factor, winter forage is (EA p. 3). There is little available science that would suggest any re-growth values for grazing in the summer going into the winter so no re-growth adjustments were made for sheep grazing in the wild horse winter range.

Comment: *Given the need for wild horses and elk and deer to use the winter range area for forage during winters, the permitted sheep should not be allowed to use the winter range area, as this could reduce forage at least by 13% and sheep do not need to be allowed to use the winter range area. [14]*

The Forest Service should have made observations and recommended the sheep permittee not graze when there was a lack of sufficient forage – indicates bad grazing management by Forest Service. [14]

Consideration: The wild horse winter range overlaps the Reservoir allotment which permits the Canyon Creek band access to the area and forage available in the area. Monitoring data for sheep grazing can be found in Table 22 of the EA (p. 71) which shows that the majority of the time, sufficient forage or standards are being met. The EA p. 11 states, "[t]he scope of the analysis and decision to be made do not involve the determination of whether livestock grazing should take place in the Big Summit Territory or how many livestock should be permitted. Grazing is managed through the implementation of allotment management plans and issuance of annual operating instructions following Forest Service range management handbook and manual procedure."

Comment: *As outlined in the 1989 LRMP, USFS resisted adequately reducing livestock grazing and has penalized the Big Summit horses for this mismanagement practice in the establishment of the absurdly low AML. [6]*

Livestock grazing in the Forest existed at the time the WFRHBA was enacted; yet the intent of the WFRHBA was not implemented by the USFS in the Big Summit Territory. This is the first time, since 1975, that the USFS is revising the management plan for the Big Summit wild horses. The USFS is required to conduct an EIS to address this inconsistency. Clearly the USFS has designated the majority of the forage in the Territory for private commercial livestock and not wild horses; an EIS is necessary to analyze this discrepancy with the dictates of the WFRHBA. [6]

USFS continues to permit approximately 2,000 AUMs for private livestock in the WHT and set the high AML of 780 AUMs (65 horses); this means there is a total of 2,780 AUMs permitted for livestock and wild horses in the WHT. Since the WFRHBA specifically states this area should be

“principally devoted” to the welfare of wild horses, at minimum 55-65% of the 2,780 AUMs (1,529-1,807 AUMs or 127-151 year-round horses) must be devoted to wild horses. [6]

It is far more cost effective to curtail taxpayer-subsidized commercial livestock grazing in this area than it is to permanently remove wild horses from the range. Thus, a clear future action that the USFS must analyze in the final EA is the reduction or elimination of sheep AUMs within the WHT and how the AUMs currently designated to sheep could be transferred to the wild horses. [1]

Reduce livestock grazing in and around the Territory to provide habitat for wild horses as required by the 1971 Act. [26, 28, 30, 32, 54, 56, 78]

The TGA also provides that the Secretary “is authorized, in his discretion, to . . . classify any lands within a grazing district, which are . . . more valuable or suitable for any other use,” 43 U.S.C. § 315f, including use by wild horses that are required to be protected under the WHA. [6]

If USFS seeks to reduce forage use in winter range, reducing livestock grazing earlier in the year (June to September) would ensure additional forage will remain for the winter usage. [6]

A substantial reduction of the amount of forage allocated to private/corporate ranchers for grazing their domestic livestock within the Big Summit wild horse lands must be seriously considered per the law § 4710.5 Closure to livestock grazing. The United States of America Code of Federal Regulations states: § 4710.5 Closure to livestock grazing. (a) If necessary to provide habitat for wild horses or burros, to implement herd management actions, or to protect wild horses or burros, to implement herd management actions, or to protect wild horses or burros from disease, harassment or injury, the authorized officer may close appropriate areas of the public lands to grazing use by all or a particular kind of livestock. [24, 30]

I also strongly believe in the principles of multiple use and sustained yield being applied to non-wilderness national forest lands. So I offer no blanket objection to domestic livestock utilizing this area. However, although not the focus of this EA, I think a case has been made nonetheless to take a closer look at sheep and cattle grazing in this area in the not-too-distant future to be certain that best management practices are being applied to protect the same resources being compromised by the horse herd. [21]

Consideration: As stated in the EA (pp. 8 and 11) the scope and analysis of the project does not include considering any changes to permitted livestock and the effects of livestock grazing were analyzed for each alternative (EA pp. 55-56, 60-61 & 66-67).

There is no violation of the WFRHBA by having permitted livestock and wild horses occupy the same area. In the Senate Report that accompanied the Act, wild horses are not to be managed as a single use (EA p. 45).

The CFR 4710.5 is for the Department of Interior (BLM), the Code of Federal Regulations for the Department of Agriculture (Forest Service) is 222.61 and does not include anything regarding permitted livestock.

The quoted phrase from the WFRHBA actually states: “‘Range’ means the amount of land necessary to sustain an existing herd or herds of wild free-roaming horses and burros, which does not exceed their known territorial limits, and which is devoted principally but not necessarily exclusively to their welfare in keeping with the multiple-use management concept for the public lands.” 36 CFR 222.60 (13 and 14) and 36 CFR 222.61 (a)(3) clearly indicate that the terms “territory” and “range” do not have the same meaning and are not interchangeable. There is no requirement in the Act to allocate a certain proportion of forage to the wild horses in the Territory and there was no special designation made for the Big Summit Territory that would require exclusive or even principle management of wild horses.

Comment: *The Forest Service has omitted any data in this EA if there have been any reductions in authorizations for forage on grazing allotments, unauthorized livestock grazing or violations of the grazing permits. It seems there were also no livestock monitoring reports made available to the public. Was there any monitoring of livestock? [23]*

What is the extent of unauthorized grazing? There is a need for an environmental analysis of the BSWHT that details unauthorized grazing and damage to riparian areas from logging and livestock overgrazing, whether historical or current. [44]

Consideration: Permitted livestock grazing monitoring, forage allocation and effects are described in the EA (pp. 68-75). The Big Summit Territory is surrounded by permitted cattle grazing and cattle do get into the Territory for short periods of time, typically by way of an open gate or down fence. However, the amount of use by unauthorized cattle is incidental and there is no record of unauthorized grazing in the DMAs.

Comment: *It's pure speculation that maintenance of range improvements may be greater within the territory where horses can cause year-round damage and displacement. There is no evidence of this. [25]*

"...water developments are utilized only for providing water to the sheep." Not any other animals? I guess that's why the wildlife have to use the riparian zones. Water belongs to the state, and thus belongs to the wildlife, the water developments are built with taxpayers' money on public land. There have been complaints on the annual census ride that the sheep herders will not let the riders water their horses. [25]

Consideration: There are no proposed water or range improvements associated with this project for wild horse management. All water and range improvements in the project area are assigned for maintenance to permittees under their grazing permit (EA p. 72), however wildlife and wild horses utilize and derive benefit from them. The mechanisms by which wild horses have to potential to impact range improvements are described on page 73 of the EA.

Comment: *I have seen the sheep herders run the bands right down the riparian areas, scaring wildlife off. The FS relies on the few herders and dogs to keep track of 2200 sheep pairs which normally produce twins which would total approx. 4400 to 6600 head to keep track of. The FS cannot say that the sheep don't present problems with camps. [25]*

Consideration: The sheep herders follow trailing instructions summarized in the EA p. 72. More details are located in the project folder. These trailing instructions include details on designed to address resource concerns such as sensitive plant locations, riparian enclosures and keep sheep far from public camp sites. Table 22 (EA p. 71) shows utilization levels at the Designated Monitoring Areas for sheep located in riparian areas. Most measurements indicate meeting standards.

Comment: *When the transient sheep graze in the forest they are supplemented minerals of some sort by the owner. The FS stated that they have no idea what it is and have failed to verify that it would not have adverse effect on the environment or any other animals or persons which come in contact with it. [25]*

Consideration: The EA (p. 72) references the sheep trailing instructions for the two allotments which can be found in the project folder. The trailing instructions include instructions for salting sheep.

Other Multiple Uses in the Territory

Comment: *There is no calling into question the predominant forage consumers: the various permitted ranchers' livestock, mainly sheep, as well as the serious impacts that logging operations,*

off-highway-vehicles (OHV) & their roads & trails, big game hunting activities, rule-ignoring campers & recreationalists & erectors of barbed-wire fences are causing. [3]

You should at least opt for Alternative 3 with its AML of 150 to 200 horses & take steps to secure more adequate resources for the wild horses by cutting back on livestock & curbing loggers, hunters, OHV'ers & other natural harmony disrupters dominating the scene. [3]

The Forest Service has also failed to calculate impact and damage to the forest by all use including human use. [28, 34]

Consideration: The Ochoco National Forest is required to follow many laws including the WFRHBA as well as the Multiple-Use Sustained Yield Act of 1960 which identifies the need to manage for multiple uses on National Forest System lands. The Purpose and Need for Action in this document is found on page 3 of the EA and is limited to wild horse management. Alternative 3 was analyzed and considered and the anticipated effects are disclosed in the EA.

Comment: *The wild horses of Big Summit Territory were here before dispersed camping, hiking trails, mountain bikes, off-road systems, or the level of hunting which inundates the Territory for much of the summer and fall. It is completely backward that this discussion would be about wild horses damaging trails which were created by humans in the horses' habitat. We question whether any analysis of impacts TO the wild horses was ever completed prior to the construction of the trail systems within the Territory or the designation of the Lookout Mtn. Recreation Area. [4]*

Consideration: The public has been camping, hunting, and using trails on the Forest long before the 1975 WFHBA. Many of the earliest trails are now part of the road system. Designation of the Lookout Mountain Recreation Area was analyzed in the Final Environmental Impact Statement for the Ochoco national Forest Land and Resource Management Plan and incorporates the Round Mountain Trail which is a National Recreation Trail.

Comment: *P. 44. Top paragraph seeks to understate & minimize wild horse protections by the WFHBA. It ignores its Section 2 c whereby the BST land & resources should be "devoted principally to the welfare and benefit" of the wild horses themselves, not the livestock ranchers, loggers, hunters, etc. Also, you violate the true spirit of fairness that is in the Multiple Use & Sustainability Act, NEPA, FLPMA, PRIA and, I believe, the very Endangered Species Act, which also covers rare populations such as that of the BST mustangs. [3]*

Consideration: Page 44 in the EA relates to forage allocation and references the senate report that accompanied the Act that clarified the intent of the Act which included the practice of wild horse as part of the multiple use system and not for single use management. The forage allocation standards come from the Ochoco LRMP and include allocation for permitted livestock, wildlife and, inside the Big Summit Territory, wild horses. The quoted phrase from the WFRHBA actually states: "'Range' means the amount of land necessary to sustain an existing herd or herds of wild free-roaming horses and burros, which does not exceed their known territorial limits, and which is devoted principally but not necessarily exclusively to their welfare in keeping with the multiple-use management concept for the public lands.'" 36 CFR 222.60 (13 and 14) and 36 CFR 222.61 (a)(3) clearly indicate that the terms "territory" and "range" do not have the same meaning and are not interchangeable. There is no requirement in the Act to allocate a certain proportion of forage to the wild horses in the Territory and there was no special designation made for the Big Summit Territory that would require exclusive or even principle management of wild horses. Wild horses are not a federally listed threatened or endangered species.

Comment: *FLPMA requires that USFS "balance wild horse and burro use with other resources" which equates at minimum to a 50-50 allocation of available forage between horses and livestock on WHTs. The USFS needs to consider the nonmarket value of wild horses. [6]*

This plan is in violation of FLPMA, because by focusing the “blame” for a lack of forage or damage to riparian areas on wild horses, the Forest Service is clearly favoring other uses. [23]

In fact, the horses and their ability to roam freely do much less damage than the human hunters, recreators, atv/utv users and campers that leave their garbage and tear up meadows. [31]

By not analyzing all past causes of impacts and only looking at current conditions, you are basically giving a pass and an excuse to all the other negative human and domestic animal impacts by saying that what you do now will be a change or "proxy" for those negative impacts that have occurred cumulatively. Therefore, by keeping fewer wild horses on these lands, all other negative impacts that have occurred and will occur will be ok. [37]

Consideration: Pages 36 and 42 of the EA acknowledges the past factors that have led to the existing conditions. The existing unsatisfactory conditions for riparian areas determine that allowable use levels for permitted livestock, wildlife and wild horses may not exceed 30% of annual growth. In the preferred alternative, Alternative 2, for the low AML of 12, 43% of the allowable use level is allocated to permitted livestock and 57% is allocated to wildlife and wild horses. The high AML of 57 43% is still allocated to permitted livestock and 57% to wild horses.

Comment: *Thriving Natural Ecological Balance cannot be achieved on a landscape which the ONF admits was subjected to heavy logging, road building, and 100 years of intensive livestock grazing. The Multiple Use-Sustained Yield Act meant to guide the intelligent use and preservation of Forest Service-managed natural resources is invoked to include more abuse of a finite environment than it can hope to sustain. Yet, wild horses are the only "use" of the ONF to be held to the Thriving Natural Ecological Balance standard. [4]*

Consideration: Wild horses are subject to the “thriving natural ecological balance” standard because it is written into the WFHBA. Other uses are subject to their own standards and regulation. Past harvest practices and heavier past livestock grazing contributed to the current conditions for some resources as stated in the EA (p. 36 and 42)

Benefits of Wild Horses

Comment: *Friends of Animals is concerned that the Draft EA does not address the benefits of wild horses, and instead unfairly attributes any natural resource issues to wild horses. See attached Craig C. Downer. The Horse and Burro as Positively Contributing Returned Natives in North America. American Journal of Life Sciences. Vol. 2, No. 1, 2014, pp. 5-23. Doi: 10.11648/j.ajls.20140201.12 [2]*

Horses are more suitable than most ruminant herbivores in reducing large quantities of ground vegetation, because their post-gastric, caecal digestive system contributes less decomposed feces to soils. And as a consequence, these droppings create more vital humus content in the soils. And humus makes them more nutrient rich & water-retaining, elevating water tables & causing the whole ecosystem to become more species-rich, robust, resilient & stable. (See above references p. 18.) [3, 42]

I notice you're consistently minimizing or ignoring the horses' value and contribution to the life community, alongside a consistent implication of blame placed upon this herd. [3, 25, 26]

They actually enhance the life community & benefit other species including ruminant, cloven-hooved herbivores. [see references] [3, 29]

re: P. 15: This is an exaggeration aimed at discrediting the wild horses. It ignores the substantial positive contributions made by wild horses to ecosystems, e.g. feces greatly bolstering humus content of soils & major intact seed dispersible including many natives as well as water retention of soils thus enriched by horses leading to greater water stored in the earth, i.e. water tables/aquifers. (See references.) [3, 23, 44]

P. 46. Yet the fact of the matter is that the naturally living horses actually complement ruminant herbivores, because they restore a more balanced ecosystem: enrich soils, disperse intact seeds of greater variety, open up thickets, create natural water catchments, etc. [3, 27, 64, 65]

Consideration: The cited publication authored by Craig Downer represents an opinion piece that was published in an open source publication. The claims in the opinion piece have no basis in the body of science; submitted science about beneficial effects are not relevant to this area.

Comments: *Table 12, Figure 21. Taking off the lower limbs should be considered beneficial fuels reduction. [3]*

In related fashion, the horses here are perfect reducers of large quantities of ground vegetation that later in the drier seasons become dry tinder. [3]

Wild horses provide a very valuable catastrophic-wildfire-preventive service. The horses are perfect reducers of large quantities of ground vegetation that later in the drier seasons become dry tinder. [26, 29, 44]

EA should provide an evaluation of the role horses play in fire suppression based on forage they select. [65]

The study should include fuel removed off forest floor for wildfire protection, instead of using taxpayer's money to do prescribed burns with the possibility of those burns escaping. They provide a service by not having to burn off grasses and the smoke not causing a detrimental hazardous effect to humans. Special consideration should be given to the current "no Burning" due to the adverse effects of smoke on humans complicating the "current" pandemic. They may possibly aid in fighting the chronic wasting disease in the deer population (studies are being done by Colorado University). [25]

Consideration: While any grazer that removes vegetation will have some effect on fire behavior by removing some fine fuels, the EA states on page 10 that, “[a]lthough forage conditions across the territory are a primary component of the AML analysis and the effects analysis, forest vegetation management is outside the scope of this analysis.”

Comment: *Regardless of the horse population size, the expanded water hole will be a habitat component. Many of these mud holes within the Territory were not riparian areas until the horses created them, only to be blamed for destroying them. One such mud hole was effectively obliterated by an entire fir tree which was felled and dragged to the hole. Without this type of uninformed interference, mud holes develop into habitat for invertebrates, amphibians, and specialized plants, as well as providing dissolved minerals for multiple species, insect protection, cool relief from the heat, and where spring sources flow directly from the earth, a free water source when most are frozen. In essence, then, a horse-created mud hole fulfills much of the same purpose as an elk wallow. On page 92 of this EA, the horses are denigrated for creating wallows where an elk may want to create a wallow. [4]*

In some cases, it is not clear whether horses created them. There are no reference points as to whether the offending holes are part of a stream system, or what function they might perform without the presence of horses. There are no data showing how the mud holes may be dispersing animal use or reducing trips to fragile stream banks. There is no analysis of the micro- environments of the most enduring of these mud holes. There are no data regarding the benefit to other ungulates during all seasons. [4]

Consideration: The effects of the alternative actions including the effects of wild horses on aquatic species and habitats are discussed on pages 117 through 127 of the EA. The EA states that year-round use by horses is contributing to degraded conditions of several springs and seeps within the Territory. Mud holes created by wild horses in riparian areas is considered resource damage and not a benefit to aquatic or terrestrial wildlife. Too many horses over a small area have been shown to have a negative effect on stream habitat in terms of width to depth and

entrenchment ratios due to bank trampling and continual browsing of riparian vegetation that can lead to bank instability and that widens streams over time.

Comment: *It is quite important to note that among large North American herbivores, wild horses (an American native species are uniquely immune to prions, arguably so through some evolutionary process, which we do not yet understand. And by abating grasses and brush (each horse consuming 30lbs. of dry grass and brush daily) one of the suspected vectors, wild horses can meaningfully reduce environmental prions affecting other grazing animals, including cervids. [25, 29]*

With enough wild horses, they can protect the health of staff and area-residents by reducing invasive plants without herbicides. [29]

Consideration: The effects the alternative actions including the effects of wild horses on invasive species and invasive species risk are discussed on pages 146 through 152 of the EA.

Big Summit Territory Boundary

Comments: *The Territory boundary was redrawn to exclude such logical use areas as the entire corridor to the northwest of the 22 Rd., the former Ochoco Ranger Station compound, and, of course, the sections mentioned in the 1975 Big Summit Wild Horse Management Plan which were included in their entirety during the public involvement process. We have been told emphatically and repeatedly that "adjusting the Territory boundary would require an act of Congress", yet the ONF has capriciously redrawn this same boundary numerous times, and has chosen to disregard historic documentation of the 1971 areas of use which should have been included; in 1975 and 2020. [4]*

The EA states, "The legal description from 1975 also estimated the acres at approximately 27,300 acres, of which, 27,060 acres is National Forest System lands..." [p24] Today, the USFS states "GIS calculates ... 25,037 acres are National Forest System lands." The EA states "is 7% less." A reduction of 2,023 acres (>3 square miles) or 7.5% reduction in area from the 1975 map. The USFS claims this discrepancy is due to the "Forest's Geographic Information System" calculations. [6]

Consideration: The Territory boundary in GIS was corrected to reflect the original Territory map from the 1975 EA (EA p. 25). As described in the EA (pp. 24-25) this correction reflects how the active management has occurred on the ground since the Territory was established and will have no effect on the horses.

Comment: *I further recommend an expansion of the BST to include the original 1971 habitat where the wild horses have legal right & also through the setting up of Cooperative Agreements, as Sections 4 & 6 of the WFHBA allow, so that an even greater AML can be assigned given expanded habitat. [3, 26]*

They never followed the WHBA in naming where the wild horses were found as so evidenced by the 1975 EA. [25]

Big Summit's demarcation as a WHT was contrived. The true habitat always was — and still is — the Ochoco Forest — all 850,000 acres of it. [29]

Despite the claim that boundary delineations and estimated 1971 wild horse numbers are "already decided" and therefore outside the scope of this EA, the validity and integrity of any Big Summit Wild Horse Management Plan rests upon the accurate representation the wild horse locations and total numbers in 1971. This is the time to correct the early failures of the ONF to adhere to the Wild Free-Roaming Horses and Burros Act; adjusting Territory boundaries to include areas clearly shown to be occupied by horses in 1971 but without increasing AML based on boundary correction. [4, 28, 43]

We also know (personal communication) that the Biologist who counted horses between 1971 and 1975 was told to do so within boundaries already drawn; he was NOT tasked with locating horses within the total Ochoco National Forest land base. [4]

We have shown that even in the 1975 Plan EA (p. 10), it was known that horses resided outside the current boundary, specifically north to Cupp Spring and south to Brush Creek, and that this was during a time when the herd was supposedly at approximately 60. [4]

The EA fails to disclose or take a hard look at the original census taken in the 1970s – (1) disclose the date(s) of the original census; (2) did the original census document natural seasonal movement of wild horses; (3) was an administrative error made in creating the boundaries of the WHT by not including all seasonal movement of the horses; and (4) should USFS consider replacing the proposed reduction of acreage with other Forest lands that would address any limiting factors. [5]

Consideration: In the 1975 EA, there were 10 known bands of a total of 60 horses, all of which resided in the current Territory. According to the 1975 EA, “there was a band in the Cup Springs area but had branched off since 1971 (5 horses).” This is the documentation available to identify where the wild horses were found at the time of passage of the Act.

Comment: *Horses migrate outside of an invisible line on the ground that corresponds to a random felt-tip marker track on an 8 1/2 x 11 Forest map. They will continue to do this regardless of population size, because wild horses migrate. It is part of their strategy to avoid overuse of resources and to maintain genetic health. The ONF admits in this EA that no studies exist to substantiate the correlation between population size and horse travel. [4]*

USFS census shows that horses regularly move out of the Territory, further supporting that the boundaries of the Territory have been erroneous since they were originally drawn. [6]

Wildlife are free to roam adjacent lands according to your own statement. Therefore, why are the horses being put in a competitive category of all the wildlife forge needs in this small territory? [25]

The EA must analyze whether the current WHT boundary is in conformance with the horses' natural, lifesaving seasonal movement. [26, 32, 53]

The final EA must include an alternative that examines the current boundaries of the HMA and makes adjustments to ensure that the horses have adequate summer and winter ranges to sustain them. [30, 53]

Consideration: In accordance with the WFRHBA, the management of wild horses and burros is limited to the areas where wild horses and burros were found in 1971, which is the area identified in the 1975 EA (EA p. 9). There are several examples of case law regarding the subject of Territory boundaries. For example, Forest Service has interpreted the Act to mean that only public lands that were home to wild horses at the time of the passage of the Act could qualify as territory (American Wild Horse Preservation campaign v. Vilsack, 2015). Or, the [territory] is an “amount of land” within those “territorial limits” (where horses were found in 1971) that is necessary to sustain an existing herd or herds of wild horses (Habitat for Horses v. Salazar, 2010). Or, Horses “permanently residing” outside [territories] are in areas not designated for wild horses and are “excess” animals (Habitat for Horses v. Salazar, 2010). In addition, the Forest Plan states that horses that establish new territories beyond those which they inhabited prior to December 1971 are “excess” animals. Also, at the time of the 1975 EA, there were 10 known bands of a total of 60 horses, all of which resided in the current Territory. According to the EA, “there was a band in the Cup Springs area but had branched off since 1971 (5 horses)”.

Social and Economic Effects

Comment: *The USFS and BLM are facing an escalating fiscal crisis off-the-range as a result of the mass removal of wild horses from the range and the stockpiling of captured mustangs in government holding facilities. The removal of more wild horses from the WHT will add wild horses to taxpayer-funded holding facilities. These factors must be disclosed and analyzed in the EA. [1]*

See AWHC attachment 16: 1982 NRC report:

Attitudes and values that influence and direct public priorities regarding the size, distribution, and condition of horse herds, as well as their accessibility to public viewing and study, must be an important factor in the determination of what constitutes excess numbers of animals in any area. . . [A]n otherwise satisfactory population level may be controversial or unacceptable if the strategy for achieving it is not appropriately responsive to public attitudes and values. . . .

Biologically, the area may be able to support 500 cattle and 500 horses, and may be carrying them. But if the weight of public opinion calls for 1,000 horses, the area can be said in this context to have an excess of 500 cattle. For these reasons, the term excess has both biological and social components. In the above example, biological excess constitutes any number of animals, regardless of which class above 1,000. Social excess depends on management policies, legal issues, and prevailing public preference...” [1]

Consideration: While this comment reflects the challenge agencies face in implementing laws passed by legislative bodies while public perception and expectation shifts over time, the comment does not change the mandates that the law places on agencies for management of wild horses (EA p. 11).

Comment: *USFS must also evaluate how utilizing PZP fertility control in this area as a means of controlling wild horse population numbers without perpetual roundups, which are costly to American taxpayers and the horses themselves, will decrease unnecessary and wasteful spending of taxpayer funds. The cost savings of comprehensive PZP use is substantial. For example, an economic model published in a peer review article predicted that BLM could attain its population goals and save \$8 million in one Herd Management Area by using PZP fertility control and reducing and eventually eliminating removals. (AWHC Attachment 17). As such, the use of PZP to manage this WHT is clearly a viable and economically responsible management choice.*

Consideration: The use of PZP (or other fertility control agents) as a component of population control is included in Alternatives 2 and 3 of the EA (pp. 16-17).

Comment: *Further, the USFS should note that roughly 80 percent of Americans want to see wild horses managed humanely on public lands and given their fair share of the resource. Thus, the social and economic analysis of the proposed action must also review how reducing livestock use could be an economic and social benefit to the agency, the horses, and the American public. [1, 25]*

The cultural and economic factor has not been analyzed. There are also spiritual connections for some people with these horses, they give them solitude and help them with their PTSD. Some people can connect with these animals which provides them spiritual comfort and hope in this troubled world. [25]

There is no mention of the human component anywhere in this EA, but it is an especially important one The people who like and want the herd to be preserved with its heritage which preserves our culture have rights under NEPA. [25]

I have many friends that are responsible users of the forest that come to enjoy the territory with a hope of seeing the horses and never feel as though they are restricting other opportunities such as hunting, biking, hiking, driving...in fact they feel it enhances those experiences to have the horses in the habitat. [31]

The EA fails to adequately consider the importance of the accessibility of the Big Summit wild horses and fails to adequately analyze how the Proposed Action will cause harm to the human environment and that members of the public will suffer harm if the Proposed Action is implemented. [6]

Consideration: Under the description of the Purpose and Need for Action on page 3 of the EA it states that, “[t]he Forest Service is mandated by the WFRHBA to ensure wild horses are managed in a thriving natural ecological balance with other uses and the productive capacity of their habitat as required.” It is believed that in so doing the Forest will be providing for spiritual, emotional

and cultural needs of the people who enjoy this very special resource of the Ochoco National Forest.

Comment: *P. 16. Social Values: This section downplays the great public values of the BST wild horses. For example, no surveys are presented where you objectively questioned visitors to BST about their views of and interactions with wild horses. From what I learned, they are a real positive attraction to the majority. [3]*

People can view horses from asphalt roads in this Territory....The Ochoco horses personality trait is different because they don't flee from the public....It would be sad if people wouldn't come to the forest to view our horses if you reduced the herd for extinction or your breeding program would produce deformed horses, or zeroing out the herd, as there is no scientific proof that any of your proposed actions will work. [25]

Consideration: The Forest accepted public comment during scoping and on the EA. Many people submitted comments about their views of interactions with wild horses. Though the EA acknowledges that some members of the public enjoy viewing wild horses in the Territory, the management plan is not focused on that as a recreational activity. Rather it is focused on using science to determine the appropriate management level and to make use of new information and tools regarding fertility control and genetics. Conducting gathers and reducing the current herd size to AML would not cause extinction and there is no "breeding program" proposed that would be expected to cause deformities. Under the description of the Purpose and Need for Action on page 3 of the EA it states that, "[t]he Forest Service is mandated by the WFRHBA to ensure wild horses are managed in a thriving natural ecological balance with other uses and the productive capacity of their habitat as required." It is believed that in so doing the Forest will be providing for spiritual, emotional and cultural needs of the people who enjoy this very special resource of the Ochoco National Forest.

Comment: *There is no analysis on the impacts to the economy if the horse herd disappears or the augmentation changes their temperaments to be viewed by the public. [25]*

As a major tourist attraction and an important part of the history of the national forest, the preservation of the unique and highly valued Ochoco mustang herd through humane management would greatly benefit the area economically by ensuring their continued presence in viable numbers as an integral part of the visitor experience and for the benefit of future generations. [39]

Consideration: The EA acknowledges that some members of the public enjoy viewing wild horses in the Territory, but it is not considered a major part of the recreation on the Forest and does not produce any more economic benefit to the community than other forms of sightseeing or wildlife viewing. The effects of the alternatives analyzed to wild horse viewing are described on page 159 of the EA.

Comment: *Under the Civil Rights and Environmental Justice section: "Low income populations in Crook County would also not be affected by the management of the wild horses under any alternative." This is without merit and data evidence to back up such a reason for this. I am objecting to the FS not producing an EIS based on this statement.*

Consideration: Agencies are to ensure minority and low-income populations do not experience disproportionately high and adverse effects of USDA programs and activities. There is no evidence that minority or low-income populations would experience disproportionate adverse effects at any scale.

Comment: *The EA fails to state the costs involved in its preferred alternative. Reducing this herd to 12-57 horses would result in completely wasteful taxpayer expenses for roundup and holding; requiring capture of 78-123 horses for which there is no removal justification. [44]*

Consideration: The EA provides an estimate of the cost of management plan actions. (p. 173).

Fisheries and Wildlife

Comment: *The EA suggests that elk and deer are rarely seen on the winter range and thus forage considerations are not essential. Rather, RMEF suggests that elk and deer are likely displaced by the increasing horse herd size and the degraded winter range habitat, and would likely use the winter range if in better condition. [10]*

The winter range designations are important, and we can certify that deer and elk DO utilize these ranges in winter. We have also observed deer, elk, and wild horses in the same place at the same time, and on many occasions, deer and elk promptly exiting Douthit Spring and of course, leaving tracks. [4]

Consideration: The LRMP outlines standards and guidelines related to the winter range management area (MA-20), which guide the management emphasis and considerations for winter range (LRMP 4-82 and 4-83). These guidelines include forage considerations for big game. These considerations are granted by the area designation and are not contingent upon the animals being present on the landscape to receive. For additional information on forage allocation for big game see the AML analysis EA pp. 192 - 215.

Comment: *Given the stated impacts horse populations have to riparian and associated calving and fawning areas, RMEF recommends the analysis include potential impacts of riparian degradation to elk and deer reproduction. [10]*

Consideration: Additional language has been included in the EA addressing impacts of riparian degradation to elk and deer reproduction EA p. 92.

Comment: *OHA recommends stronger language to accommodate the needs of wintering big game animals within Alternative 2. [11]*

Consideration: An analysis of effects to big game (EA pg. 90-93) and effects to winter range habitat and forage allocation (EA pp. 56-58; 192-215) was conducted and is available within the EA. The EA states that under Alternative 2, projected winter range riparian use level by wild horses is estimated at 30% during above-average winters at the high end of the range, and when wildlife forage needs are taken into account the low end (EA p. 57). Alternative 2 provides a range for the AML allowing managers the ability to adapt to various conditions as needed including (but not limited to) providing for increased winter range forage for all wintering animals if new data suggests that need. This project does not preclude the Forest Service from improving winter range habitat conditions for big game through vegetation manipulation, improvement to security habitat, or other restoration techniques in the future.

Comment: *The EA's information on big game numbers states that both deer and elk have increased in the past 50 years and that is not accurate with regards to mule deer, which are considerably lower in population than in 1971 – the benchmark date stated for comparison. [11]*

Consideration: This has been corrected in the EA.

Comment: *The EA could have expanded upon how the lack of a natural population of large predators exasperates the continued population growth above sustainable limits, but this was only mentioned on p. 27. [12, 13]*

Consideration: Additional language has been included in the EA discussing this issue. EA p. 27.

Comment: *Wolf, cougar, and bear occur in the area and should be considered as predators to the wild horses. [48]*

Consideration: There is potential for wolves, cougars, and/or bears to occur in the project area. These animals may opportunistically predate on wild horses, though this would likely be a rare or

abnormal occurrence, and even then is likely only to occur on young or sick/injured horses. There is little evidence of predation on the herd as a factor affecting population growth (EA p. 27).

Comment: *The Gray Wolf is present on the ONF. As we stated earlier, we provided photographs of adult wolf tracks in the Douthit Creek/Crooked Tree Spring area, observed on two occasions this past winter, more than a month apart. On one of these occasions, tracks of a large adult cougar were present, of the same vintage and in the same area. A herd of elk numbering from 100 - 200 was also seen in the area, though they are reportedly seldom seen in their winter range during winter. [4]*

We have photos of wolf tracks in the winter range which took place at different times this year. They were discovered when we were checking the wild horse cameras, a volunteer program. Photos were sent to Monty at the FS, with no response back. Numerous people have seen tracks in the Ochocos. For the agency to say they do not exist or live in the forest is based on the fact they are hardly ever up in the forest, especially the wild horse team. If you don't look you won't find! That includes predators and wild horses. [25]

The Sheriff's has its own wolf tracking unit. Did the FS ask them for this data in writing the EA? [25]

Consideration: Wolves are known to periodically occur on the Ochoco National Forest, but there are no known resident wolf populations at this time (EA pp. 80 - 83). Information utilized for analysis in this EA included the most recent information from ODFW and USFWS including ODFW annual wolf reports, wolf observation reports, livestock depredation investigation reports, gps-collared wolf data, and the Forest's own remote sensor camera data from the last 5 years. ODFW works in conjunction with local law enforcement officials in investigation of livestock depredation.

There is no evidence that a wild horse herd of 150-200 animals will negatively impact prey species in the Territory. In fact, sheep eat the same forage species as deer, and 2,200 sheep would likely have more impact on available deer forage (primarily forbs) than 150-200 wild horses who eat primarily grasses. Wild horses also provide a prey source for grey wolves, and the wolves can help keep the wild horse population in balance. [49]

Consideration: The alternatives are analyzed as a comparison to one another. A higher AML as proposed in alternative 3 has a higher potential to displace wildlife including deer and elk due to forage consumption and impacts to preferred habitats such as riparian areas (see big game analysis EA pp. 90-93). Changes to forage management for livestock such as sheep is outside the scope of this analysis. There have been no confirmed cases of predation on horses by wolves to date, and while wolves are known to occur on the ONF there are no known resident wolves and use of the Forest appears to be of short duration (EA p. 80).

Comment: *This EA does not address the threats to other wildlife populations. There are potential impacts from the drugs given to these mares, such as flunixin meglumine, and others. Such toxins will be released into the environment should the mares die soon after being returned to the wild or over time. [40]*

Consideration: The EA does not mention the use of flunixin meglumine, but does however mention the use of PZP and GonaCon, both approved for use by the EPA and FDA (EA pp. 58-60) The Environmental Protection Agency described the ecological effects from PZP as follows: "Since the product is labeled only for injection to target animals by hand or dart, is expected to be deactivated in the digestive tract, and has a short half-life in treated mammals, the limited potential risks to non-target organisms resulting from the proposed registration of ZonaStat-H (PZP) are not expected to exceed the Agency's concern levels." The document goes on to say that "available

data suggest that potential exposures to non-target animals is not expected to result in any significant risk concerns to terrestrial or aquatic organism from the proposed use” (EPA 2012).

Comment: *Lastly, reports (one source I believe is the 1989 Ochoco NF LRMP) show that the current elk population is many multiples greater than historically, putting much greater demand on available vegetation, especially in winter. Yet the wild horse population has increased nowhere near that amount. Horses should not have to ‘pay for’ the increased elk numbers and their consequent demands on forage and landscape. [42]*

Consideration: Big game wildlife management objectives are determined by the Oregon Department of Fish and Wildlife and are outside the scope of this analysis.

Comment: *I question the veracity (and equitability) of this statement found in the Plan Revision document: “Therefore, the Territory must supply the complete forage needs for the horses year-round while elk and deer are free to roam to adjacent lands (see Wildlife Resource Report).” This puts forth that, although the wild horses have to ‘stay home’ (within their designated territory), the elk and deer do not (of course) BUT they’re also allowed to eat the horses’ food thus reducing forage volume and availability for the horses. [42]*

Consideration: Allowable use levels for big game, livestock, and wild horses were established by the LRMP and this project does not propose to change those levels. In addition, placing restrictions on where elk and deer may forage is not feasible at this scale, nor is it within the scope of this analysis.

Comment: *I support the protection of predators like mountain lions. They are nature’s way of controlling population and should be protected at all costs. It is the Cost of Freedom for wild horses as it is for all creatures of the wild. Compared to the cost of captivity, it is worth the price (re: Wildlife Services and culling of predators). [26, 29]*

Consideration: Protections for predators such as mountain lions is not a part of any proposed action associated with this project and thus is outside the scope of analysis.

Comment: *Will you cull out deer and elk if they get overpopulated? [62]*

Consideration: Big game wildlife management objectives are determined by the Oregon Department of Fish and Wildlife and are outside the scope of this analysis. Harvest limits for mule deer and elk are set and adjusted by ODFW based on a number of factors but are largely influenced by population numbers.

Comment: *The section ends with the pronouncement that “While permitted livestock numbers have remained the same since 1975, wildlife and wild horse numbers have increased resulting in an average forage shortfall.” This sentence is problematic for two reasons. The ONF, in other sections, perpetuates the myth that wild horses are pushing elk away from - ironically – mud holes and calving areas and may push them onto private lands, causing conflicts. This clashes with wildlife increasing in numbers and eating forage, which doesn’t necessarily even correspond to the forage consumed by horses due to dietary overlap ratios. [4]*

Consideration: Elk numbers are increasing, while mule deer numbers have not. That increase is identified for a larger area than just the territory, but includes the Ochoco as a whole. As horse and big game numbers increase so does potential for competition for forage, degradation of habitat, and/or social avoidance factors (EA p. 91). Dietary overlap is predominately between elk and horses and mainly consists of grass (EA p. 91). Dietary overlap between deer and horses is relatively low (EA p. 91).

NEPA Process

Comment: *An EIS is required due to the breadth and scope of the project. The proposed action will span years and impact thousands of acres of land with the conduct of multiple roundups, removals, and other largely unproven and potentially inhumane management practices on wild horses. [1, 25]*

An EIS must be prepared for this proposed action to fully examine all direct, indirect and cumulative impacts. The Proposed Action should be rejected because the EA fails to provide sufficient analysis of readily available alternative actions and is in violation of governing laws and statutes. [6]

Consideration: This project does not fall within a class of action normally requiring an EIS per 36 CFR 220.5. All reasonable alternatives were considered and adequately analyzed to determine the potential for significant effects.

Comments: *Significance factor triggered: The degree to which the effects on the quality of the human environment are likely to be highly controversial. Significant scientific controversy over the proposed analysis already exists, as many of its components are contrary to the findings of the NAS in its 2013 report (attachment 4). [1, 6]*

The Forest Service cannot ignore social acceptability when considering the breadth and scope of controversy that surrounds some of the proposed elements in this analysis. An EIS provides more rigorous requirements for public participation and for disclosure and consideration of reasonable opposing viewpoints. [1, 6]

This topic is highly, even violently, controversial, and no less so at the local level. An EIS must be post truthful, objective, and authentically scientific facts and analysis possible. [4]

The controversial aspects of this proposal include: Castration and ovariectomy have not been implemented as management strategies either by the USFS or BLM; these strategies are highly controversial. The Proposed Action cannot implement these fertility controls without an EIS because they would be precedent-setting and could later be used for management in other WHTs. Therefore, an EIS is required to thoroughly analyze the impacts of these proposed actions. [6]

Consideration: The Forest has reviewed and considered all comments on the EA including submitted documents. There is no controversy in the relevant body of science about the nature of the effects.

Comment: *Significance factors triggers: Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic river, or ecologically critical areas. Lookout Mtn./Paulina Ranger Districts are not known for their glacial vistas, world-class fly fishing, or trees for people to drive cars through. It is a forest of placid meadows and sheltering pines, quiet streams, and enclaves of solitude, and gentle, inviting, grass-covered slopes. The unique history of this place is that many have found refuge here, since the first human and the first horse. It has not attracted (yet) the attention of glittering destination promoters, but those who know - who come from other states and other nations - will defend the place and its docile wild horses to the death. The subject of this EA cannot be described with such limited analysis. [4]*

Consideration: This is a characterization of the Ochoco National Forest and does not provide evidence of potential significant effects to a unique characteristic of the area that would warrant analysis in an EIS.

Comment: *Significance factor triggered: The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks. The USFS is considering several new approaches that are controversial and remain unproven. The level of uncertainty and unknown risk is demonstrated by the proposal to consider surgical sterilization and the use of the unproven vaccine, GonaCon. Not much is known about the long-term safety, efficacy, and impacts to*

wild horse behaviors and natural social behaviors when either GonaCon or surgical techniques are used. Therefore, the decision to implement these unproven management tool options will have highly uncertain or unknown impacts. [1]

Consideration: The effects of fertility control methods proposed are summarized on pages 58-61 of the EA and are more fully discussed in Appendix 3 of the Wild Horse Report. The Forest Service would only use tools and methods approved by the Wild Horse and Burro Advisory Board or other government agency.

Comment: *Significance factor triggered: The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration. Not only will the adoption of any Wild Horse Management Plan firmly establish policy for the ONF, it will set precedents for other Forest Service wild horse management actions. This EA will establish future Wild Horse management policies and practices, entrenching them in F handbooks for many years to come. [4]*

Significance factor triggered: The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration. [1, 40]

With this proposed action, the USFS is adopting a new approach that could set a precedent for how future actions proceed in numerous regards:

- *The reduction in the number of wild free-roaming, reproductively intact wild horses and the management of the WHT population to such a low AML. Currently there is no research regarding the impacts of a similar plan to maintain a significant portion of an already small wild horse population as non-reproducing;*
- *The reduction in the AML primarily in response to a periodic occurrence of potentially limited winter forage. The USFS cannot arbitrarily reduce the AML of wild horses in*
- *WHT primarily because of above average snowfall that will not always occur;*
- *Potential use of GonaCon as a management tool in a USFS herd before research documenting its behavioral effects is completed; and*
- *The potential release of geldings or sterilized mares. The USFS has never before released geldings or sterilized mares to the range as a non-reproducing population and management strategy. Research on the impacts to the environment and to the wild horses of this action has not been completed. This untested action could set precedent for the management of wild horses in WHT's across the West.*

Consideration: The AML range under Alternative 2 would be managed at or around the high AML, not the low AML (EA p. 58). In considering the BLM Handbook for the AML Establish and Adjustment Process, it states in Tier 1 of the process to consider the most limiting factor(s) to calculate AML, for the Big Summit Territory, that is available winter forage during winters of above average snowfall. The effects of fertility control methods proposed are summarized on pages 59-60 of the EA and are more fully discussed in Appendix 3 of the Wild Horse Report.

Comment: *Significance factor triggered: The action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*

There can be no legitimate dispute that surgical sterilization, including gelding, risks serious adverse impacts to the wild and free-roaming behaviors of individual burros and the herds to which they belong. USFS's pursuit of gelding and mare sterilization as management tools is inherently inconsistent with the fundamental Congressional intent in the WHA to "protect" wild horses.

Surgical sterilization does not meet the requirement of the WHA that all management activities be at the minimal feasible level. Such procedures are more invasive, inhumane, and risky than other non-

surgical methods of fertility control, such as PZP, and cannot be said to constitute the minimal feasible level of management. Sterilization also destroys the free-roaming behavior of wild horses in violation of the WHA. The USFS failure to consider social acceptability of surgical sterilization threatens a significant violation of the WHA because it was enacted due to the social and cultural importance of wild horses. [1]

Consideration: In the Wild Horse Resource Report (Appendix 3: BLM Fertility Control Literature Review and Effects Discussion), a summary of the best available science regarding fertility control methods including sterilization is presented. At the beginning of the Appendix, it also states that the WFRHBA of 1971 specifically provides for contraception and sterilization (section 3.b.1).

Comment: re Comments Considered but not Addressed in Alternatives or Analysis

- the comment raises an issue that is outside the scope of the proposed action

The Proposed Action is to "develop a new herd management plan to replace the 1975 plan..." This equates to a very broad scope; a Wild Horse Territory Plan in 2020 should speak to the multi-faceted aspects of integrated, fluid, holistic resource management where the habitat needs and contributions of wild horses are considered intelligently and objectively. The ONF has limited the scope of this EA to the justification of a ridiculous AML and the means by which excess horses can be disposed of.

Consideration: The EA indicates that, "Forest Service Manual (FSM) Chapter 2260 outlines the agency's policy regarding management of wild horses under the authority of the WFRHB Act, including direction on the development of territory management plans such as under consideration in this EA" (EA p. 11).

Comment: re Comments Considered but not Addressed in Alternatives or Analysis

- the comment raises an issue that is already decided by law, regulation, Forest Plan, or other higher level decision

The merit of this category is predicated on adherence to the law. The Wild Free-Roaming Horses and Burros Act serves as the preeminent, not the incidental, guidance for the management of wild horses. Other Congressional Acts interface, but cannot conflict with, the Wild Free-Roaming Horse and Burros Act. Agency regulations must be consistent with the Act. Local Forest Plans implement the Act, but not to the extent that they effectively re-write or conflict with the Act. This EA cannot be assumed to be reflective of matters "decided by law" and there are several examples of this disparity in this EA.

- *raises an issue that is adequately addressed all alternatives*
Given the unlikelihood that any salient issue has been adequately addressed in all alternatives, there may have been important comments submitted which were not "adequately addressed in alternatives or analysis."
- *raises an issue that is conjectural and not supported by scientific or factual evidence*
The majority of analysis within this EA is conjectural and not supported by scientific or factual evidence. [4]

Consideration: This comment fails to indicate specific inadequacies of the analysis in order to allow for response or redress.

Comment: *The Ochoco National Forest borders the Murderers Creek Wild Horse Joint Management Area, which is located on and managed jointly by the Bureau of Land Management (BLM) and US Forest Service. RMEF strongly recommends working with BLM and the Malheur National Forest to consider the cumulative impacts of both herds on the landscape and to collaboratively manage both*

horse herds that are severely over population. The Murderers Creek Joint Management Area Plan is currently in revision and offers a unique opportunity for landscape-level planning across Forests. [10]

Consideration: There is an existing Memorandum of Understanding (MOU) between the Malheur National Forest, Prineville BLM and Ochoco National Forest that provides for coordination of wild horse management. However, management of the Murderer's Creek wild horses and territory is beyond the scope of this analysis.

Comment: The Forest Service did not provide a public notification of the change from an EIS to an EA. The public's response to the scoping was on a reliance of the FS doing an EIS and not dismissing certain relevant data (value of the horses to the community whether it be beliefs or based on economic factors) that might have conflicted with their desired outcome. [25]

Consideration: The Forest Service published a Notice of Withdrawal of the intent to prepare an environmental impact statement in the Federal Register on June 17, 2019. The stated purpose of the withdrawal was that upon preliminary evaluation, the Forest Service did not foresee any potential significant impacts to the human environment associated with the project.

Comment: No Action alternative should be actually no action (no management), and not continuation of current management. Current management is in fact no management because there have not been gathers and only one application of PZP. [25]

Looking at the 3 alternatives is confusing. Alt #1 was said "To be no changes" yet it involved removing 75 horses. From where I stand Alt#3 looks like the "Make no Change" choice rather than Alt #1 considering we have a documented count of 135 horses. [43]

Consideration: The purpose of the proposed action is a new updated management plan considering current conditions and best available science. The EA describes that the No Action would mean a continuation of the existing Plan with an AML of 55-65 wild horses. The EA did consider a No Active Management alternative based on the current population, but dismissed it from detailed study as explained on EA p. 21.

Comment: The Forest Service has not put forward the analysis to show that the proposed amendments will not result in a significant change to the 1989 LRMP or alter the long-term objectives for the Big Summit WHT. Significant amendments require a lengthy and detailed amendment process. Amendments that may create a significant environmental effect require preparation of an EIS. 36 CFR 219.13(b)(3). [1]

Consideration: The EA and draft DN follow all amendment requirements laid out in 36 CFR 219.13. Thirty-six CFR 219.13(b)(3) states that a proposed amendment that may create a significant environmental effect and thus requires preparation of an environmental impact statement is considered a significant change in the plan for the purposes of the NFMA. The amendment proposed here is analyzed in an EA and no significant environmental effects were identified.

Comment: The departure from a fixed AML of "60 head" to an ambiguous AML that allows for "changing conditions" is a huge departure and precedent-setting change to the language of the LRMP. An EIS would provide a more effective analysis of the amendments. [1]

Consideration: The LRMP currently states that "wild horses within the original territory will be managed at a maximum of 60 head." (EA p. 2). The current proposed plan would change the maximum number of wild horses to 57 which is not a huge departure. By amending the LRMP to allow for future adjustments to the AML based on changed conditions, the AML could potentially also allow for increased numbers should major changes occur within the Territory, without additional Forest Plan amendments.

Comment: Amended guidance should not refer to wild horses as livestock. [1]

Consideration: Appendix A (EA p. 190) has been changed from “conduct livestock management...” to “conduct wild horse management...”.

Miscellaneous Comments

Comment: *The FS doesn't disclose the history of the Act or the trend of agency and rancher dislike of wild horses. [14]*

Consideration: Disclosing legislative history is not required in an environmental assessment which is to be a concise public document to “briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

Comment: *Judicious forest thinning & mulching/composting of slash to recycle nutrients could increase available forage for the wild horses & work compatibly with locals to benefit both the wild horses & the economy. [3]*

Targeted tree thinning that respects the natural character of the BST ecosystem could considerably increase forage for wild horses & provide economic benefit to locals. [3]

This is the time to insist that the Big Summit Wild Horse Territory be recognized in the Ochoco Forest Plan and for the habitat needs of the wild horses to be considered in all Forest actions going forward (yes, it is within the scope of this document to ask that Forest actions such as prescribed burning of winter forage be accomplished in spring, and that thinning slash be treated immediately in Big Game winter range shared by wild horses). [4]

Consideration: Vegetation management actions have transitory effects but do take place. The Canyon fuels project authorized in 2010 involves thinning and fuels reduction that has beneficial effects on forage. See discussion in the EA p. 10.

Comment: *Much of the data you present & the conclusions you draw from this seem lacking in depth & indicate a high degree of arbitrariness, as though you knew beforehand what conclusions you wished to draw. [3]*

Consideration: The commenter does not specify which data or conclusions are lacking depth, or what they're lacking exactly, therefore the Forest Service cannot form a response.

Comment: *Observing the strong & extensive fences at certain BST borders near where I camped & elsewhere, as well as inspecting on-ground evidence & interviewing people familiar with BST, including locals, lead me to discern that considerable illegal capture & removal of the BST horses has & continues to occur – & that little is being done about this! The fences around the BST often have gaps in them that make it easy for people on quads to drive the horses outside their territory & then quietly herd them into corrals & later into trailers to haul them off to an uncertain fate. Much more concerned & continuous vigilance of this herd throughout the BST is needed by authorities & cooperating wild horse defending volunteers! [3]*

Consideration: 36 CFR 261.23 describes the prohibitions designed to protect wild horses and burros on National Forest System lands. Law enforcement officials are dedicated to enforcing these regulations within the constraints of the resources provided to them. Changing of regulations and law enforcement resource constraints are outside of the scope of this project.

Comment: *Contrary to the direction of the Wild Free-Roaming Horses and Burros Act, the current Advisory Board is comprised of cattle industry loyalists, anti-horse biologists, pro-sterilization veterinarians, the Director of the Society for Range Management, a few random anti-horse placeholders, and a couple of supposed wild horse advocates with questionable knowledge or commitment to wild horse and burro welfare. [4]*

Consideration: The composition of the Advisory Board is outside the scope of this project.

Comment: *Essentially, the science amounts to "if negative impacts are acceptable at the AML of 12-57, then the higher the AML, the worse the negative impacts are expected to be."* [4]

Consideration: The science relied upon for describing the potential effects of wild horses are cited throughout the EA (see for example Holechek et al. 2000, Range Management Principals and Procedures p. 34, 54, 57, 74, 202). The EA assumes that effects of wild horses (through eating, walking, congregating, etc.) would increase in scale and intensity as wild horse numbers increase.

Comment: *What is the significance and what is the age of the horse in the EA photo on page 65? Figure 27: horse during winter in poor body condition.* [24]

Consideration: Figure 27 demonstrates a wild horse that would be considered in poor body condition.

Comment: *The FS has failed to inform the public of how the 1989 LRMP achieved their number of 60 horses.* [25]

Consideration: The 1975 EA is available to the public upon request. The current EA provides a thorough description of the analysis process leading to the proposed AML.

Comment: *The 1975 EA withheld information from the public...Horses were captured in the 1970s prior to the 1975 EA...No raw forage data or trend study is in the 1975 EA...Inventory of the wild horses in 1975 was inadequate.* [25]

Consideration: The contents of the 1975 EA are outside the scope of this proposed action; the Decision Notice was signed some 40 years ago and opportunity for administrative review has long since passed. The purpose of the current project is to use the current conditions and best information on wild horse numbers to update the Forest's management of wild horses in the Big Summit Territory.

Comments: *I recommend you employ Reserve Design in order to have a long-lasting-viable mustang population here, one that is allowed to harmoniously adapt to its surroundings & to fill its ancestral niche. This would enhance the ecosystem & result in a self-stabilizing mustang herd, provided the sound principles of Reserve Design are adhered to & faithfully & conscientiously implemented.* [3]

The Forest Service would do well to designate portions of the Forest as "wildlife quiet areas" (WQAs). Establishing quiet-zones would have important benefits to the wild-horse herd and to other wildlife. [29]

Consideration: The Big Summit Wild Horse Territory was established in 1971 and is recognized in the Forest Plan. Within and around the Territory are areas allocated by the Forest Plan for certain emphasis or designated by Congress for protection. Additional land management allocation is outside the scope of this proposed action.

Comment: *Consider turning the herds of wild horses into money-making tourist attractions; tourist dollars could pay for their ongoing care and feeding.* [108]

Consideration: There is interest in wild horse viewing within the Big Summit Territory; however, there is not a mechanism or authority for charging fees for this activity and because they are to be considered wild animals, "ongoing care and feeding" of them on the Territory is outside the scope of what the Forest Service is considering in the wild horse management plan.