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Lolo National Forest 2021 Biennial Monitoring and Evaluation Report

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List of Acronyms Commonly Used Throughout This Document

CFR	Code of Federal Regulations
DC	Desired Conditions
FW	Forestwide
GDL	Guideline
GO	Goal
LAND	Lands
MIN	Minerals
MON	Monitoring
NA	Not Applicable
OBJ	Objective
PROC	Process
SOC	Social
STD	Standard
STRM	Streams
SUIT	Suitability
RDS	Roads
REC	Recreation
RNG	Range
USDA	United States Department of Agriculture
VEG	Vegetation
VIS	Visual Quality
WLF	Wildlife

Introduction

Policy and Regulations

Monitoring and evaluation requirements have been established through the National Forest Management Act (NFMA) at 36 CFR 219. Additional direction is provided by the Forest Service in Chapter 30 – Monitoring – of the Land Management Handbook (FSH 1909.12).

The Lolo Forest Plan Monitoring Program (PMP) was updated in August 2016 for consistency with the 2012 planning regulations [36 CFR 219.12 (c)(1)]. The 1986 Lolo National Forest Land Resource Management Plan (herein referred to as the, *Lolo Forest Plan*) was administratively changed to include the updated plan monitoring program, herein referred to as the *2016 Forest Monitoring Program Transition*. For a copy of the current monitoring program go to following weblink: https://www.fs.usda.gov/main/lolo/landmanagement/planning. Monitoring questions and indicators were selected to inform the management of resources on Lolo Forest Plan area and not every plan component was determined necessary to track [36 CFR 219.12(a)(2)].

Providing timely, accurate monitoring information to the responsible official and the public is a key aspect of Lolo Forest Plan monitoring program. This report is the vehicle for disseminating this information.

Purpose of the Monitoring Evaluation Report (Biennial Monitoring Evaluation Report)

The purpose of the biennial evaluation is to:

1. Make the information obtained from monitoring available to the public in a form that is readily understandable.
2. Transform monitoring data into information that supports adaptive management so that the Responsible Official may consider making changes to Lolo Forest Plan, management activities, or Lolo Forest Plan monitoring program itself; or to begin a new assessment.

In the context of forest management there are three main goals:

1. Determine that we are implementing the Lolo Forest Plan properly, meeting management targets and project guidelines (implementation monitoring).
2. Determine if forest plan management goals and desired outcomes are being achieved (effectiveness monitoring).
3. Does our hypothesis testing indicate we may need to change Lolo Forest Plan (validation monitoring)?

The Biennial Monitoring Evaluation Report is designed to evaluate the three above monitoring goals for the purposes of providing this information to help the responsible official determine a course of action based on the recommended management adjustments of this Biennial Monitoring Evaluation Report. This report considers information related to forest plan components to evaluate if recommended changes are needed in forest plan direction, such as plan components or other plan content, that guide management of resources in Lolo Forest Plan area (such as, the Lolo Forest Plan, management activities, monitoring program or forest assessment). The full 2021 biennial monitoring report for the Lolo National Forest is available at the following weblink: https://www.fs.usda.gov/main/lolo/landmanagement/planning.

The biennial monitoring evaluation report is not a decision document—it evaluates monitoring questions and indicators presented in the 2016 Forest Monitoring Program Transition, in relation to management actions carried out in Lolo Forest Plan area.

Monitoring and evaluation are continuous learning tools that form the backbone of adaptive management. For this reason, we will produce an evaluation report every two years. This is the first written report of this evaluation since the 2016 Forest Monitoring Program Transition was finalized, following a postponement due to post-fire activities in 2018.

Plan implementation monitoring is important for tracking progress and accomplishments. However, it is effectiveness and validation monitoring that drive and support the adaptive management process. Effectiveness monitoring evaluates condition and trend relative to desired conditions. Validation monitoring tests hypotheses and provides information that might necessitate changes to desired conditions in Lolo Forest Plan (such as, is what we think the desired state should be really accurate?).

Objectives

To achieve the goals and purposes outlined above, this Biennial Monitoring Evaluation Report includes the following objectives (*as guided by FSH 1909.12_34*):

- Document implementation of the plan monitoring program, including changed conditions or status of key characteristics used to assess accomplishments and progress toward achievement of the selected Lolo Forest Plan components.
- Evaluate assumptions, changed conditions, management effectiveness, and progress towards achieving the selected desired conditions, objectives, and goals described in Lolo Forest Plan
- Assess the status of previously recommended options for change based on previous monitoring & evaluation reports.
- Document any scheduled monitoring actions that have not been completed and the reasons and rationale why it has not.
- Present any new information not outlined in the current plan monitoring program that is relevant to the evaluation of the selected monitoring questions.
- Incorporate broader scale monitoring information from the Regional Broader Scale Monitoring Strategy that is relevant to the understanding of the selected monitoring question.
- Present recommended change opportunities to the responsible official.

Monitoring Evaluation and Adaptive Findings

The following section presents the most current information (data and evaluations) for all monitoring questions contained within the Lolo Forest Plan. Each monitoring item includes 1) a summary of the monitoring question, its indicator(s), and Lolo Forest Plan components the monitoring question is assessing; 2) monitoring results and discussion; and 3) evaluation of the results to determine an adaptive management finding on whether recommended management changes are warranted or not.

Wildlife

MON-WLF-01

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide habitat for viable populations of all indigenous wildlife species and for increasing population of big-game animals" (p. II-1).

Objectives – "This Lolo Forest Plan improves the environmental quality of the Forest…that emphasizes…enhancement of wildlife and fish habitats…" (p. II-2). "Management is designed to increase the Forest's nationally significant big-game populations, particularly elk" (p. II-2).

Desired Future Condition (DFC) – "As a result of elk habitat improvements such as burning to increase forage and the coordination of timber sale programs, elk winter range will have been improved" (p. II-6). "Effects on big-game summer range will have been minor as a result of meeting specific management objectives (i.e., road closures) on key areas" (p. II-6).

Standards 21, 22, 23, 26, 27 – "Wildlife features… will be protected" (p. II-13). "The Forest wildlife biologist will examine and recommend vegetative objectives for managing and protecting all winter range" (p. II-13). "The document "Coordinating Elk and Timber Management" will be used as a basic tool for assessing the effects of timber harvest upon elk habitat, and for making decision that effect the overall big-game resource" (p. II-13). "Provide a variety of hunting recreation opportunities…to assist the Montana Department of Fish, Wildlife, and Parks in meeting their goal of maintaining long hunting seasons with minimum restrictions" (p. II-14). "Habitat for management indicator species, which include the elk… will be monitored. (p. II-14). "Elk population data, collected by the Department of Fish, Wildlife, and Parks will be compared against habitat data to test elk/habitat relationships" (p. II-14).

Management Areas (MA) – See MAs 22, 23, 24, 25, and 26 (p. III-107 to III-140).

Table 1. MON-WLF-01: Monitoring Item Summary

Monitoring Question	Indicators*	Data collection interval	Data Source/Partner	Point of Contact
MON-WLF-01: What is the current population status of elk on National Forest System Lands?	Reduction in Miles of Open Road (N) Bull Elk Harvest Rates (N) Hunting Season Length (N) Elk Numbers (U) Acres of foraging habitat improved (FS action) (U)	2 Years	INFRA MTFWP MTFWP MTFWP FACTS/WIT	Bryson Bell, Lolo Forest Wildlife Biologist

(*Influenced by climate change? Y, N, Uncertain)

Table 2. MON-WLF-01: Monitoring Collection Summary

MON-WLF-01	Year
Data was last collected or compiled in:	Various
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Overview

Elk are a management indicator species (MIS) on the Lolo National Forest. Forest Plan Standard 27 (p. II-14) in the Lolo Forest Plan states, “Habitat for management indicator species, which include the elk, goshawk, and pileated woodpecker, will be monitored. Elk population data, collected by the Department of Fish Wildlife and Parks (MTFWP), will be compared against habitat data to test elk/habitat relationships.” Forest Plan Standard 22 (II-13) directs the forest wildlife biologist to “examine and recommend vegetative objectives for all winter range whenever activity is proposed within it. forest plan Standard 23 (II-13) focuses on the use of the best science at the time for “coordinating elk and timber management” and is understood to be using the best available science to assess effects and make decisions related to the big game resource. Forest Plan Standard 52 (II-18) subparts c and d focus on limiting roads to 1.1 miles of road per square mile in areas of important summer range and also implementing year-round closures in areas of moderate big game summer range.

Management areas (MAs) 18, 19, 22 and 23 are all winter range designations under the 1986 Plan and each have MA specific standards for big game. The focus of these standards is to maintain cover: forage ratios and to reduce road and timber harvest related disturbance. Note that not all of these MAs have both standards. MA 26 represents mappable portions of the Forest’s critical elk summer range outside of wilderness and roadless areas. This MA has several standards focused on maintaining quality big game summer range. Big game, particularly elk, was a focus of the 1986 plan and the management of cover forage ratios on winter range and regulation of motorized access and logging activity in areas of winter and summer range were priorities.

Results and Discussion

Methods

The most recent elk population and harvest data pertinent to the Lolo was obtained from MTFWP. Based on conversations with MTFWP biologists involved in the data collection, the data is not specific to FS lands and there is no mechanism/methodology available to analyze populations of elk/big game only on public lands. These data are available on the MTFWP website along with the hunting regulations which includes maps showing hunting districts that overlap with the boundary (summarized below): https://myfwp.mt.gov/fwpPub/harvestReports.

The FACTS database was queried for several different treatment types that are known to be beneficial to elk and big game. These treatment types were stratified between elk winter range management areas (MAs) and non-winter range areas. Most non-winter range areas would be used by elk during summer months but not all of the non-winter range occurs within MA26a. A detailed process paper on how queries were conducted can be found in appendix B to this monitoring and evaluation report.

Results

Table 3. MON-WLF-01: Elk population status in MTFWP hunting districts overlapping the Lolo National Forest. These data are based on aerial observation surveys and have obvious limitations.

Elk Management Unit	Hunting District	2020 Data (and year of last survey)	MTFWP Mgmt Objective Status	Confounding factors, observations from MTFWP
Lower Clark Fork	121	1,418 (2019)	At Objective	No data
Salish	122	NA	No Stated Objective	No data
Lower Clark Fork	123	428 (2019)	At Objective	No data
Lower Clark Fork	124	138 (2008)	At Objective	No data
Lower Clark Fork	200	266 (2019)	At Objective	Low end of objective
Lower Clark Fork	202	291 (N portion - 2019)	At Objective	No data
Salish	120	125 (2010)	At Objective	No data
Ninemile	201	832 (2019)	Over Objective	No data
Ninemile	203	853 (2019)	At Objective	Many more elk on the east side of the unit versus Fish and Burdette Creeks which are found on the west
Bitterroot	260	123 (2019)	Over Objective	This unit has a very low objective of 50 elk
Bitterroot	240	1,010 (2019)	At Objective	
Rock Creek	204	891 (2019)	Over Objective	Lack of access to private lands causing hunting harvest to be very low

Elk Management Unit	Hunting District	2020 Data (and year of last survey)	MTFWP Mgmt Objective Status	Confounding factors, observations from MTFWP
Rock Creek	216	557 (2020)	Over Objective	No data
Rock Creek	210	2,311 (2020) - includes 211	Over Objective	No data
Garnet	292	691 (2019)	At Objective	No data
Garnet	298	865 (2019) - includes 290	Over Objective	No data
Garnet	290	see 298	Over Objective	No data
Garnet	West 283	146 (2019)	Below Objective	No data
Garnet	Central 283	89 (2019)	At Objective	No data
Garnet	East 283	119 (2019)	Below Objective	No data
Bob Marshall	285	643 (2020) - includes 282	Below Objective	No data
Bob Marshall	282	see 285	Below Objective	No data
Bob Marshall	281	370 (2019)	Below Objective	No data
Bob Marshall	280	NA	No Wintering Elk	No data

Table 4. MON-WLF-01: Montana Fish, Wildlife and Parks, elk harvest data for 2016 – 2019 in Hunting Districts (HDs) overlapping the Lolo National Forest. This information is based on game check station data and hunter reported success.

Elk Management Unit	Hunting District	Total Harvest	Bulls	Cows	Calves
Lower Clark Fork	121	974	513	448	14
Lower Clark Fork	123	246	158	86	2
Lower Clark Fork	124	95	53	44	0
Lower Clark Fork	200	118	94	24	0
Lower Clark Fork	202	227	183	42	2
Salish	120	128	117	11	0
Salish	122	239	178	59	3
Ninemile	201	484	258	213	13
Ninemile	203	256	143	108	5
Bitterroot	260	196	66	127	5
Bitterroot	240	884	344	532	9
Rock Creek	204	468	239	222	7
Rock Creek	216	220	141	78	0
Rock Creek	210	1371	501	842	28
Garnet	292	559	308	240	11
Garnet	298	428	151	253	24
Garnet	290	259	72	173	13
Garnet	283	362	243	113	5
Bob Marshall	285	399	275	124	0
Bob Marshall	282	83	29	48	5
Bob Marshall	281	538	376	148	14
Bob Marshall	280	90	69	20	0
2016 - 2019 Grand Totals		8624	4511	3955	160

Also see 2019 elk population and objective maps here - https://fwp.mt.gov/conservation/species/elk/population-and-distribution.

Table 5. MON-WLF-01: Natural wildfire and projects on Lolo National Forest associated with elk/big game habitat improvement 2014 – 2020.

Year Completed	Winter Range Improvement (acres)	Non-winter Range Improvement (acres)
2014	3,474	4,735
2015	4,073	7,863
2016	1,769	10,969
2017	4,529	1,625
2018	10,997	155,924
2019	1,660	6,647
2020	688	1,408

Discussion

Population and Harvest Data

Recent MTFWP population and hunter harvest monitoring data on elk across the Lolo National Forest indicate the following:

- Elk populations are at or above MTFWP management objectives in almost all hunting districts overlapping the Lolo National Forest. The Forest doesn't directly manage elk populations, nor does it set population objectives as this is within MTFWP's role and MTFWP may adjust hunting restrictions for any hunting district including the four hunting districts (281, 282, 283, and 285) below MTFWP management objectives.

- Total elk harvest across the hunting districts covering the Lolo National Forest exceeds about 2000 elk per year and hunters are successful at both bull and cow elk harvest.

These monitoring data should be considered with the following caveats/clarifications:

- A high percentage of these hunting districts occur on Lolo National Forest lands; thus, the Forest is likely contributing (in many areas) to the successful management of elk across the area AND the Forest is providing hunter access across the spectrum of roaded, roadless, and wilderness areas.

- Within these hunting districts, some lands are NOT managed by the Lolo National Forest and thus success or failure of elk is only partially determined by USFS actions and decisions and resultant habitat conditions.

- Hunting seasons, regulations, and bag limits of both elk and their predators (wolves, bears, and other carnivores) are not managed by the USFS. These issues can affect elk populations beyond USFS habitat management.

- Large wildfires can have widespread habitat effects that influence forage, predation, and even hunter success. The topic of fire management and the ecological implication of wildfire is a broad subject. Interpretations of elk population dynamics and habitat quality on federal lands are certainly made more challenging due to large wildfires on Lolo National Forest lands in recent years.

- Lower population levels in wilderness districts could be the result of a variety of influences including wildfire, disease, harvest, predation, or other factors. However, the lack of Lolo National Forest habitat management in wilderness indicates that forest management actions are likely not a contributing factor for those elk populations.

- USFS actions, both specifically to benefit elk, and to achieve the remainder of the USFS mission, have occurred during this monitoring period. These activities were present as elk populations remained at high numbers and allowed for high levels of harvest success.

Hunting Season Information

Hunting season information is not included in the report as it is not highly relevant and is difficult to summarize. Hunting season duration for elk in western Montana has not decreased in recent years. In fact, in many hunting districts, season length has increased in attempts to reduce crop damage and to displace habituated elk from private lands. More information is available at: https://fwp.mt.gov/hunt/regulations/elk.

Habitat Improvement Information

Table 5 above presents a summary of vegetative treatments known to be beneficial to elk and big game habitat conditions. Acres of wildfire are also included as fire is a disturbance mechanism that generally creates favorable forage conditions for big game species in a mosaic pattern on the landscape. In summary for the 7-year period, an average of 3,884 acres of big game winter range on the Lolo National Forest have been treated annually (including natural wildfire). Across non-winter range MAs, an average of 27,024 acres were treated annually with fire being a major factor.

Roads Information

The density of roads open to motorized vehicles is used here as a measure of disturbance to elk instead of comparing the reduction of miles of open roads. It should be noted that open roads reductions cannot occur indefinitely - so a better metric related to roads in areas determined to be important to elk would be maintaining a desired level of open roads rather than reporting on reductions. Further, any measure of open roads may need to be more specific to better demonstrate attainment of plan components. Currently, the measure isn't clear because it could be interpreted as either open roads reductions on winter range, summer range or across all areas so to clarify the spatial extent, the analysis should consider management areas (MAs) related to elk: MA 18, 19, 22, 23, and 26 even though, Lolo Forest Plan only identifies MA26 as summer elk range and a desired level of open road density at less than 1.1 mile per section. For several areas of the Forest, we have information on open roads (and other roads metrics) that pertain to grizzly bears (see grizzly bear section) where the data shows the various grizzly management areas have a fairly consistent level of open road density across the analyzed time period. Although the grizzly bear road metrics were not designed for elk, these data can provide useful information for elk and other species as a general measure of open road density.

Conclusions

The status of elk populations and habitat conditions on the Lolo appears to be good (based on results in Table 3). As indicated in table 4, the Forest continues to conduct a variety of treatments for big game habitat improvement. These treatments include noxious weed management, prescribed burning, hand and mechanical thinning of conifer encroachment, and road closures/restrictions. Wildfires play a role in shaping the mosaic of successional stages and associated habitat conditions as well. In addition, the Forest continues to acquire lands previously owned and managed by private entities. These acquisitions ensure these lands will not be developed into residential or commercial real estate. Further, this ownership

provides the Forest an opportunity to evaluate the need for the roads on acquired lands and may reduce the miles of roads that should be considered beneficial to elk and other big game.

Roads open to motorized travel could disturb elk, at least temporary, if the roads occur in elk habitat. The amount of disturbance resulting from these roads is difficult to precisely estimate but it can be assumed that more open roads could result in increased levels of elk disturbance.

As stated above, elk population estimates are a complex issue to address as habitat conditions/quality and actual numbers of animals present at any given time are not necessarily correlated. Hunter harvest, predation, climatic conditions (bad winters, hot dry summers) and refugia created on large blocks of private lands are all factors, although not entirely independent of habitat quality on public lands, that may increase or decrease big game numbers or rearrange distribution on the landscape.

Increasingly and since 2000, wildfires have resulted in large scale habitat changes across the western Montana landscape. These changes are at a scale much larger than any active management the Forest Service currently accomplishes. The results of these large-scale disturbances are not always beneficial to big game species and in the long term the impact of these changes is hard to predict across the ecological spectrum. Changes in big game habitat resulting from large fires should be considered while assessing habitat at the project scale.

Evaluation of Results for Adaptive Management Finding

Table 6. MON-WLD-01: Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
MON-WLF-01: What is the current population status of elk on National Forest System Lands?	2021	(E) Yes. Elk are not trending downward since Plan inception and based on the MTFWP data and habitat improvement, elk populations meet the intention of Lolo Forest Plan.	Yes, recommend updating indicators to include open road density as the measure and refining the spatial extent of this to management areas 18, 19, 22, 23, and 26 which have a focus on elk.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired**.**

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-WLF-02

Plan Component(s) being assessed by this monitoring item:

Objectives – "The Lolo Forest Plan provides habitat for viable populations of the diverse wildlife and fish species on the Forest, with special attention given to species dependent on snags, old growth areas, and riparian zones" (p. II-2).

Desired Future Condition (DFC) – "There will be sufficient old-growth habitat available to meet the needs of old-growth dependent wildlife (p. II-6).

Standard 27 – "…habitat parameters include old-growth acres and condition…will be monitored as an indicator of population trend" (p. II-14).

Management Areas (MA) – See MA 21 (p. III-104 to 106).

Table 7. MON-WLF-02: Monitoring Item Summery

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-WLF-02: What is the quantity of old growth on the Forest?	Acres of old growth moving towards Region 1 Old Growth Definition minimum criteria (Green et al) (Y)	5 years	Forest Inventory and Analysis (Forest Inventory and Analysis)	Kurt Wetzstein, Lolo Forest Vegetation Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 8. MON-WLF-02: Monitoring Collection Summary

MON-WLF-02	Year
Data was last collected or compiled in:	Collected 2006-2015, compiled 2021
Next scheduled data collection/compilation:	2022 (Forest Inventory and Analysis is collected 10% annually)
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2018
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

Methods

- The national Forest Inventory and Analysis (Forest Inventory and Analysis) program provides a congressionally mandated, statistically based, continuous inventory of the forest resources of the United States. The Forest Inventory and Analysis inventory design is based on a spatially balanced sample of inventory plots.

- The Forest Inventory and Analysis sampling frame uniformly covers all forested lands, regardless of management emphasis; therefore, wilderness areas, roadless areas, and actively managed lands all have the same probability of being sampled and data collection standards are strictly controlled by Forest Inventory and Analysis protocols.

- The most current Forest Inventory and Analysis dataset is the R1 Hybrid 2015 Analysis Dataset version (updated January 2021), using data collected from 2006-2015, on 363 Forest Inventory and Analysis plots scattered across the Forest. For detailed information on Forest Inventory and Analysis and the associated Region 1 analysis dataset, see *https://usfs.app.box.com/v/R1-Forest Inventory and Analysis-IntGrid-Data-pdf*

- For analysis, the Old Growth algorithm is defined in Old Growth Forest Types of the Northern Region, (Green et al.). If a plot meets old growth minimum criteria based on old growth habitat type group, species or species group with plurality of basal area 9"+ dbh, plot basal area, and the number of trees above diameter and age thresholds as defined in the document, then it meets the criteria for Old Growth.

- Due to the unbiased and systematic nature of Forest Inventory and Analysis data collection, this methodology was chosen as the most feasible, effective, and accurate method to depict landscape scale data such as Old Growth habitat.

- Old Growth estimates depicted below were derived using the R1 Forest Inventory and Analysis Summary Database Estimator; for more information see: *https://usfs.box.com/v/R1-SDB-Rep-Util*

Results

Current data using the 2015 Hybrid Analysis dataset show that at the Forest level, an estimated 166,701 acres meet the Old Growth criteria. That is summarized below, in Table 9 along with the 90 percent confidence interval:

Table 9. MON-WLF-02: Summary of Lolo Forest acres that meet are consistent with old growth criteria.

Forest/District	Estimate Old Growth Acres	90% CI - Lower Bound	90% CI - Upper Bound
Lolo	166,701	129,876	201,388
Missoula	34,720	18,820	50,092
Ninemile	27,494	13,690	42,719
Plains/Thompson Falls	38,710	21,881	56,216
Seeley Lake	35,256	19,036	53,465
Superior	30,811	15,809	46,653

The Forest was segregated into 16 Landscapes to help describe forest conditions in the Analysis of the Management Situation (AMS) in the Lolo Forest Plan (1986). Table 10 and Figure 1 below display the acreage and location of each landscape that meet the Old Growth criteria:

Table 10. MON-WLF-02: Acres of each landscape that meet old growth criteria.

Landscape Name	Old Growth Acres	90% CI Low	90% CI High
Dunham	13,279	4,526	23,237
Lolo	16,626	6,158	27,383
Ninemile Mill	13,572	3,619	25,334
North Fork Blackfoot	3,076	0	8,019
Petty Fish	8,023	1,502	16,106
Plains East	7,571	0	16,656
Rattlesnake Mineral	15,472	3,918	28,015
Sapphires North	7,718	0	16,208
Sapphires South	0	n/a	n/a
St. Regis Prospect	13,544	4,206	24,336
Sunset Tamarack	3,892	0	9,340
Superior North	14,616	5,847	24,848
Superior South	16,296	6,306	27,592
Thompson Murr	3,692	0	11,077
Upper Clearwater	15,995	5,699	29,714
West Thompson	13,959	4,014	24,893
Total*	167,331		

*Note: The total of acres above is slightly different than the sum total for the Forest as reflected in the prior table, as a result of the statistical variability associated with bootstrapping calculations used to derive the estimates. More information on bootstrapping can be found here: http://fsweb.r1.fs.fed.us/forest/inv/r1_tools/BS_Explain.pdf.

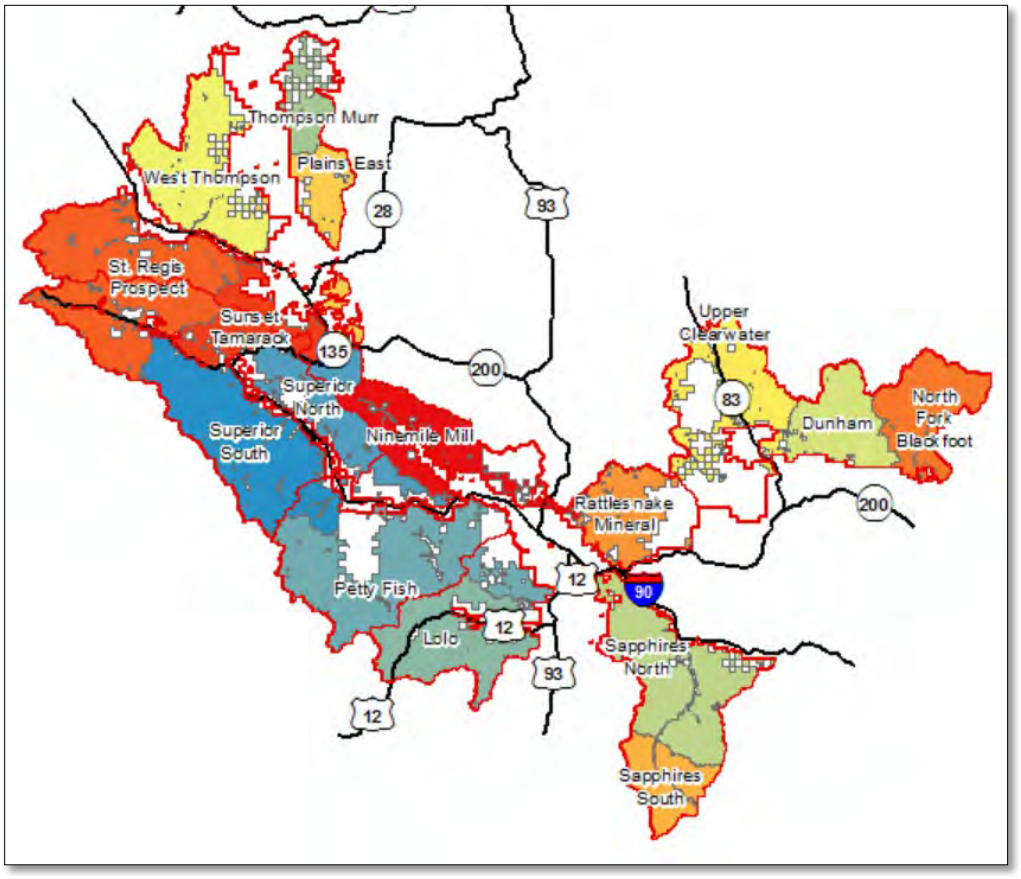

Figure 1. MON-WLF-02 - Lolo National Forest 16 landscapes

Discussion

The Lolo Forest Plan Environmental Impact Statement describes the importance of old growth forest being distributed across the Forest for old growth dependent and associated wildlife species (Forest Plan, Environmental Impact Statement p. II-61). To ensure old growth habitat is well distributed across the Forest, a strategy was developed in 1994 which provides for a consistent implementation of an old growth strategy within the context of Forest Plan direction. The strategy states, "To conserve biological diversity, including old growth dependent species, we will retain 8 percent of the Forest land in old growth reserves (per Lolo Forest Plan); manage landscape using ecological principles; prescribe treatment that consider the range of natural variation, age distribution and natural process. This will result in landscapes containing old growth trees in addition to the 8 percent" (USDA, 1994).

The 8 percent reserves of old growth across the Forest were based upon the total amount of National Forest System lands on the Lolo National Forest in 1986, which at that time was 2,083,192 acres. 8 percent of this total is 166,655 acres. As shown above in the results section, there are approximately 167,000 acres that currently meet the Old Growth Criteria as defined by Green et al., thereby slightly exceeding the 8 percent of old growth, and consequently providing levels of habitat for viable populations of fish and wildlife species including old growth dependent and associated wildlife species. As noted below in recommendations, a more contemporary assessment of old growth is warranted that considers additional acres the Lolo National Forest has acquired since 1986 through land acquisitions as well as the effects wildfire and other disturbance events have had on old growth stands across the Forest.

Analysis done in 2018 utilizing the previous Hybrid 2011 Forest Inventory and Analysis dataset *(Bush, R. 2018. Assessment of Snags and Old Growth for the Lolo National Forest Report # 18-11 v2.0.)* shows an estimated 185,000 acres of Old Growth, using the same landscapes.

Table 11. MON-WLF-02: Hybrid 2011 Forest Inventory and Analysis dataset acres that meet old growth criteria

Landscape Name	Old Growth Acres	90% CI Low	90% CI High
Lolo National Forest (Total)	184,808	146,402	224,315
Dunham	13,637	4,148	24,888
Lolo	20,151	7,803	33,165
Ninemile Mill	14,121	4,161	24,684
North Fork Blackfoot	9,687	1,158	21,311
Petty Fish	8,577	1,716	17,692
Plains East	10,364	2,082	20,358
Rattlesnake Mineral	14,791	3,522	26,765
Sapphires North	10,291	2,013	20,581
Sapphires South	4,658	0	11,804
St. Regis Prospect	16,623	6,012	28,946
Sunset Tamarack	3,839	0	9,340
Superior North	15,110	6,182	25,961
Superior South	13,568	4,585	23,796
Thompson Murr	0	0	0
Upper Clearwater	17,959	7,483	31,704
West Thompson	9,054	0	19,952

Comparing the most current Forest Inventory and Analysis dataset (Hybrid 2015, with data representing 2006-2015) to the most recent one prior to that (Hybrid 2011, representing 2003-2011) indicates a reduction of approximately 18,000 acres. As current management practices retain the minimum required Old Growth criteria at the stand level, this reduction can be attributed to natural disturbances, including fire and insect and disease activity that occurred during the updated reporting period.

Previous monitoring efforts unfortunately do not provide a comparative basis for the number of acres of Old Growth across the Forest. The 2006-2010 Old Growth Monitoring Study did not assess the number of acres, nor did the 2000-2001 Forest Plan Monitoring Report.

It is important to note that the reduction in the number of acres of old growth on the Forest is attributed to disturbances, primarily wildfire, and not as a result of management activities. Timber harvesting and prescribed burning do occur in old growth stands, but management prescriptions and Resource Protection Measures are in place to ensure that management activities do not reduce stand characteristics below the

minimum criteria identified in Green et al. (1992). It is common practice to survey project areas for Old Growth; in areas that meet the minimum criteria, management prescriptions are designed to perpetuate Old Growth conditions. In areas that are close to meeting the minimum criteria but are lacking one of the components (usually age), prescriptions typically are designed to provide for succession to meet Old Growth in the future across the Forest, which is aligned with the goals stated in Management Area 21.

Additionally, the Forest has acquired roughly 174,000 acres of land since 1986. The bulk of these lands were previously managed by industrial timber companies, and generally have very little tree stocking present. Since the Forest Inventory and Analysis plots located on these lands are now under Forest Service ownership, they are contributing to the vegetation estimates produced, and may be reducing the number of acres that are moving towards the old growth minimum criteria.

Recommendations

- Additional investigation is warranted to determine a more contemporary estimate of old growth on the Forest, as the most current dataset (2006-2015) does not depict the significant fire season that occurred in 2017. As of the date of this report, the Forest is planning to remeasure the Forest Inventory and Analysis plots that have experienced fire recently to derive more real-time estimates of Forest level old growth.
- Develop a management strategy for newly acquired lands, to promote restoration and resilience of these lands over the long term.
- Develop an updated strategy for old growth at the Forest scale that incorporates recent disturbances, land acquisition and a dynamic climate to serve in the interim until updated Forest Plan direction is available, including consideration of acquired lands.
- Continue to evaluate Forest Inventory and Analysis data on an annual basis to monitor trends in the amount of old growth at the Forest scale.

In conclusion, this report can serve as a comparative basis in future Biennial Monitoring Evaluation Reports to track changes in amount and distribution of old growth across the Forest to ensure management activities continue to trend towards desired conditions.

Evaluation of Results for Adaptive Management Finding

Table 12. MON-WLF-02: Summary of findings for all Plan Monitoring Items

Monitoring Item	Year Updated	Plan Implementation Status [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	Recommendation Based on the evaluation of monitoring results, may changes be warranted?	Management If a change may be warranted, where may the change be needed? [2]
MON-WLF-02: What is the quantity of old growth on the Forest?	2021	(B) Uncertain. More time/data are needed to understand status or progress of the Plan Component(s).	Yes, recommend the following: A more current estimate of the quantity of old growth on the Forest is warranted that considers newly acquired lands and recent disturbance regimes. Consider updating the Forest strategy for old growth at the Forest scale.	Monitoring Plan: a more current estimate of Old Growth present on the Lolo Forest is warranted. Management Activities: Update Lolo Forest Old Growth Strategy.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-WLF-03

Plan Component(s) being assessed by this monitoring item:

Objectives – "The Lolo Forest Plan provides habitat for viable populations of the diverse wildlife and fish species on the Forest, with special attention given to species dependent on snags, old growth areas, and riparian zones" (p. II-2).

Standard 25 – "In the portion of the Forest more than 200 feet from all system roads, sufficient snags and dead material will be provided to maintain 80 percent of the population of snag-using species normally found in an unmanaged forest. (See Appendix N, Procedures to Implement the Forest Snag Standard)" (p. II-14).

Standard 27 – "…snag densities will be monitored as an indicator of population trend" (p. II-14).

Table 13. MON-WLF-03: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON–WLF-03: What is the quantity of large snags on the Forest?	Number of large snags 10, 15, 20"+ DBH and >40' in height (Y)	5 years	Forest Inventory and Analysis (Forest Inventory and Analysis), R1 Snag Analysis Groups	Kurt Wetzstein

(*Influenced by climate change? Y, N, Uncertain)

Table 14. MON-WLF-03 - Monitoring Collection Summary

MON-WLF-03	Year
Data was last collected or compiled in:	**Collected 2006-2015, compiled 2021**
Next scheduled data collection/compilation:	2022 (Forest Inventory and Analysis is collected 10 percent annually)
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2018
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Reference is made in Lolo Forest Plan in several locations regarding the quantity of large snags, which are critical habitat components to a multitude of wildlife species.

Results and Discussion

Methods

- The national Forest Inventory and Analysis (Forest Inventory and Analysis) program provides a congressionally mandated, statistically-based, continuous inventory of the forest resources of the United States. The Forest Inventory and Analysis inventory design is based on a spatially-balanced sample of inventory plots.
- The Forest Inventory and Analysis sampling frame uniformly covers all forested lands, regardless of management emphasis; therefore, wilderness areas, roadless areas, and actively managed lands all have the same probability of being sampled and data collection standards are strictly controlled by Forest Inventory and Analysis protocols.
- The regionally produced “Snag and Live Tree Density Reports” were not updated with the Forest Inventory and Analysis Hybrid 2015 dataset in time for the 2021 Forest Plan Monitoring report. It is anticipated that these reports will be available for the next monitoring cycle. Therefore, the primary dataset is the R1 Hybrid 2011 version (updated October 2020) with data collected from 2003-2011 on 352 plots, including the description of snag analysis groups, posted at: https://usfs.app.box.com/v/WM-Forest Inventory and Analysis-2011-SngLg-tree-est-pdf. These data are depicted in Table 15 and Table 16 below, snags per acre by 10”, 15” and 20” diameter classes.
- The most current Forest Inventory and Analysis dataset is the R1 Hybrid 2015 version (updated January 2021), using data collected from 2006-2015, on 363 Forest Inventory and Analysis plots scattered across the Forest. For detailed information on Forest Inventory and Analysis and the associated Region 1 analysis, see https://usfs.app.box.com/v/R1-Forest Inventory and Analysis-IntGrid-Data-pdf. This dataset was used for Table 17, Snags per acre by 10”, 15”, and 20” diameter classes, by Lolo landscapes.
- Due to the unbiased and systematic nature of Forest Inventory and Analysis data collection, this methodology was chosen as the most feasible, effective, and accurate method to depict landscape scale data such as the presence of snags by size class.
- Data was collected on the Lolo National Forest in 1995-1996 (Bollenbacher etal, 2009, https://usfs.box.com/v/2009-R1-WMT-Snag-Estimates-pdf) and compiled for Western Montana Forests; information is summarized below in Table 18.

Results

Using the R1 Hybrid 2011 dataset, snags per acre estimates are shown in Table 15 and Table 16 below.

Table 15. MON-WLF-03: Estimates of snags per acre densities with 90 percent confidence interval, by diameter thresholds, inside and outside of wilderness/roadless areas by Snag Analysis Groups and Size Class.

Forest	Area	Snag Analysis Group	Size Class	Snags per Acre 10"+			Snags per Acre 15"+			Snags per Acre 20"+			Total Number PSUs	Number Forested PSUs	Total Number subplots w/forested PVT
				Mean	90% CI - Lower Bound	90% CI - Upper Bound	Mean	90% CI - Lower Bound	90% CI - Upper Bound	Mean	90% CI - Lower Bound	90% CI - Upper Bound			
Lolo	In Wilderness/Roadless	PICO	0-4.9	34.6	0.0	66.2	6.0	0.0	12.0	0.0			5	4	17
			5-14.9	19.6	11.9	28.4	2.6	0.8	4.9	0.4	0.0	0.9	37	37	149
			15+										0	0	0
		Warm Dry	0-4.9	0.0			0.0			0.0			1	1	5
			5-14.9	16.3	7.3	26.8	5.2	1.8	9.5	2.1	0.0	5.3	17	17	66
			15+	7.4	1.2	14.4	3.3	0.0	7.7	2.0	0.0	6.0	9	9	36
		Warm Moist	0-4.9										0	0	0
			5-14.9	16.3	3.0	32.3	4.9	0.0	11.1	2.0	0.0	6.0	6	6	25
			15+	9.0	0.0	18.1	6.0	0.0	18.1	0.0			2	2	8
		Cold Cool Moist	0-4.9	48.1	0.0	84.3	18.1	0.0	34.1	8.0	0.0	18.1	3	3	12
			5-14.9	20.8	14.3	27.7	4.8	2.2	7.9	2.0	0.7	3.4	40	40	156
			15+	16.4	8.4	25.5	6.8	2.7	11.5	2.6	0.6	5.0	14	14	55
	Outside Wilderness/Roadless	PICO	0-4.9	20.1	0.0	60.2	0.0			0.0			3	3	12
			5-14.9	7.5	0.9	17.3	0.6	0.0	1.8	0.6	0.0	1.8	12	12	52
			15+										0	0	0
		Warm Dry	0-4.9	16.5	1.0	39.7	3.8	0.0	9.0	0.8	0.0	2.7	8	8	33

			5-14.9	8.5	5.1	12.7	2.2	1.2	3.4	0.8	0.2	1.4	57	57	231
			15+	10.7	6.2	15.8	5.2	2.7	8.1	1.0	0.2	2.0	27	27	111
		Warm Moist	0-4.9	0.0			0.0			0.0			1	1	5
			5-14.9	13.9	8.6	19.6	5.2	2.8	7.8	1.8	0.4	3.4	22	22	89
			15+	11.6	3.6	22.9	2.1	0.0	5.0	0.4	0.0	1.4	7	7	28
		Cold Cool Moist	0-4.9	16.4	0.0	44.0	0.0			0.0			5	5	21
			5-14.9	19.1	11.8	27.4	3.0	0.9	5.7	0.8	0.1	1.9	33	33	133
			15+	18.4	10.4	27.1	6.7	2.3	11.8	1.3	0.0	3.3	10	10	39
	In Wilderness/Roadless	Cold	0-4.9	66.2	0.0	90.3	24.1	0.0	36.1	12.0	0.0	24.1	1	1	4
			5-14.9	24.8	12.7	38.0	9.3	2.4	17.8	3.3	0.4	7.1	13	13	49
			15+	17.4	0.0	24.1	1.3	0.0	2.7	1.3	0.0	2.7	1	1	3
		Cool Moist	0-4.9	39.1	0.0	86.7	15.0	0.0	36.1	6.0	0.0	18.1	2	2	8
			5-14.9	18.9	11.4	27.1	2.6	1.0	4.5	1.3	0.2	2.6	27	27	107
			15+	16.3	7.7	26.1	7.2	2.8	12.1	2.7	0.5	5.3	13	13	52
	Outside Roadless	Cold	0-4.9										0	0	0
			5-14.9	46.1	0.0	96.3	8.0	0.0	24.1	2.0	0.0	6.0	3	3	12
			15+	43.1	0.0	56.1	25.1	0.0	31.1	7.0	0.0	8.0	1	1	4
		Cool Moist	0-4.9	16.4	0.0	44.0	0.0			0.0			5	5	21
			5-14.9	16.3	9.8	23.9	2.5	0.6	4.9	0.7	0.0	1.9	30	30	121
			15+	15.6	8.4	23.6	4.7	1.2	8.6	0.7	0.0	2.4	9	9	35

Table 16. MON-WLF-03 - Percent of plots having at least one snag on plot with 90 percent confidence interval, by diameter thresholds, inside and outside of wilderness/roadless areas by Snag Analysis Groups.

Forest	Wilderness/ Roadless	Snag Analysis Group	Percent Plats w/ Snags 10"+			Percent Plots w/ Snags 15"+			Percent Plots w/ Snags 20"+			Total # PSU	Number Forested PSU	Total Number subplots w/ forested PVT
			Mean	90% CI - Lower Bound	90% CI - Upper Bound	Mean	90% CI - Lower Bound	90% CI - Upper Bound	Mean	90% CI - Lower Bound	90% CI - Upper Bound			
Lolo	IN	PICO	36.1	26.0	46.5	9.8	4.4	15.9	1.8	0.0	4.4	42	41	166
		Warm Dry	31.1	19.7	43.1	14.2	6.9	22.3	5.0	0.9	10.0	30	30	118
		Warm Moist	38.1	16.7	60.0	17.5	3.1	34.2	6.3	0.0	16.7	8	8	33
		Cold – Cold Moist	46.4	38.5	54.4	22.1	15.7	28.8	11.9	7.1	17.0	68	68	266
	OUT	PICO	19.0	5.8	34.0	2.7	0.0	8.6	2.7	0.0	8.6	15	15	64
		Warm Dry	24.7	19.3	30.4	12.0	8.4	16.0	4.1	2.0	6.6	93	93	378
		Warm Moist	36.3	25.9	47.3	18.8	10.8	27.6	8.9	2.9	15.9	30	30	122
		Cold – Cold Moist	40.0	31.4	48.9	11.2	5.8	17.4	5.6	1.4	10.6	49	49	197
	IN	Cold	54.4	40.4	68.2	27.0	14.5	40.3	11.1	4.2	19.3	21	21	80
		Cool Moist	42.9	33.3	52.5	19.9	12.6	27.7	12.2	6.3	18.9	47	47	186
	OUT	Cold	68.8	25.0	100.0	31.3	0.0	75.0	31.3	0.0	75.0	4	4	16
		Cool Moist	37.5	28.6	46.5	9.4	4.6	15.0	3.3	0.5	7.2	45	45	181

Data using the most recent 2015 Hybrid dataset is reflected below, aggregated by the Lolo landscapes, wherein the Forest was aggregated into 16 Landscapes to help describe forest conditions in the Analysis of the Management Situation (AMS) in the Lolo Forest Plan (1986).

Table 17. MON-WLF-03: Snags per acre by 10", 15", and 20" diameter classes, by Lolo landscapes, and Forest average total.

Landscape Name	# of Snags > 10" DBH per acre			# of Snags > 15" DBH per acre			# of Snags > 20" DBH per acre		
	Mean	90% CI - Lower Bound	90% CI - Upper Bound	Mean	90% CI - Lower Bound	90% CI - Upper Bound	Mean	90% CI - Lower Bound	90% CI - Upper Bound
Dunham	34.2	22.3	46.9	9.8	4.3	16.3	2.5	0.5	5.1
Lolo	9.8	4.7	15.8	3.3	0.9	6.0	1.1	0	2.9
Ninemile Mill	19.8	10.8	29.8	3.0	1.1	5.1	1.3	0.2	2.7
North Fork Blackfoot	29.8	16.0	44.9	8.3	3.7	13.9	1.5	0	3.5
Petty Fish	11.9	7.2	17.3	2.2	1.0	3.6	0.2	0	0.6
Plains East	17.5	4.8	34.3	2.7	0	6.6	1.1	0	3.0
Rattlesnake Mineral	13.0	7.2	19.4	3.6	0	8.0	1.2	0	3.3
Sapphires North	9.9	4.8	15.5	3.4	0.7	6.7	1.0	0	2.4
Sapphires South	17.4	8.4	27.4	2.8	0	7.3	2.3	0	6.1
St. Regis Prospect	14.0	10.0	18.4	4.0	2.3	5.9	1.0	0.3	1.9
Sunset Tamarack	6.0	2.1	10.9	2.3	0.6	4.3	1.7	0	3.5
Superior North	14.0	7.0	23.1	2.7	1.0	4.7	0.3	0	1.0
Superior South	13.4	7.7	20.3	3.8	2.0	5.8	0.9	0.1	1.9
Thompson Murr	37.1	14.0	65.0	10.0	0	27.1	5.0	0	13.0
Upper Clearwater	14.6	7.1	23.0	2.4	0	5.4	0.3	0	1.1
West Thompson	19.1	11.6	27.7	3.9	1.3	7.4	1.9	0.4	4.0
Forest Total	16.1	14.1	18.2	3.9	3.2	4.7	1.2	0.8	1.6

Figure 1 above displays the landscape distribution of the areas listed in Table 17 above.

The indicator associated with this monitoring question is for snags that are ≥10, ≥15, or ≥20 inches in DBH equal to or greater than 40 feet tall. While information is available on snag height within the Forest Inventory and Analysis dataset, regional reports currently do not consider snag height when analysis is done on snags. Additional queries could be run to incorporate a height metric, but that data was not

available at the time this report is due. Furthermore, snag height by size class is not a very valuable measure in and of itself; the primary value for wildlife species is snags that are large in diameter. As a result, I am recommending that we no longer include the height metric during snag analysis for future monitoring efforts.

Discussion

The Lolo Forest Plan emphasizes the need for snags as an important habitat component, especially for snag associated wildlife species. Given the series of wildfires over the years across the Forest, there is an abundance of snags where wildfire has resulted in tree mortality, particularly in areas with more recent wildfire such as the 2017 and 2021 wildfires. Wildfire burns across a spectrum of intensity and can result in diverse patterns of severity within varying tree species mix and age classes, thus creating a variety of snag abundances to accommodate several species' snag habitat needs. This analysis provides looks at the general distribution of snags across several landscapes covering the Forest.

Previous Forest Plan monitoring efforts unfortunately do not a provide a comparative basis for the number of snags across the Forest. The 2006-2010 Old Growth Monitoring Study did not assess the number of snags, nor did the 2000-2001 Forest Plan Monitoring Report.

Using data collected in 1995-1996 (*Bollenbacher et al, 2009*, https://usfs.box.com/v/2009-R1-WMT-Snag-Estimates-pdf) a comprehensive snag analysis was conducted for all Forests in the Northern Region. This provides a good comparative basis as the analysis was done in a similar fashion using Forest Inventory and Analysis data. The Table below reflects the 2009 analysis for snags by size class and wilderness/roadless designation with 90 percent confidence intervals:

Table 18. MON-WLF-03 - 2009 analysis for snags by size class and wilderness/roadless designation with 90 percent confidence intervals.

Area	Wilderness/ Roadless	Snags per acre 10"+			Snags per acre 15"+			Snags per acre 20"+			Total Number PSUs	Number Forested PSUs
		Mean	90% CI Lower Bound	90% CI Upper Bound	Mean	90% CI Lower Bound	90% CI Upper Bound	Mean	90% CI Lower Bound	90% CI Upper Bound		
Western MT	IN	11.4	10.1	12.9	3.5	3.0	3.9	1.0	0.8	1.2	625	625
Lolo National Forest		10.9	8.6	13.4	3.4	2.5	4.4	1.0	0.6	1.4	144	144
Western MT	OUT	8.1	7.0	9.1	2.3	2.0	2.7	0.8	0.7	1.0	618	618
Lolo National Forest		6.6	4.9	8.4	2.6	1.9	3.4	0.8	0.5	1.1	183	183

Below is a comparison dataset, using the 2015 Hybrid dataset, with the same metrics, for the Lolo National Forest.

Table 19. MON-WLF-03 – Comparison dataset using the 2015 Hybrid dataset, with the same metrics, for the Lolo National Forest

	Snags per Acre 10"+			Snags per Acre 15"+			Snags per Acre 20"+		
	Mean	90% CI Lower	90% CI Upper	Mean	90% CI Lower	90% CI Upper	Mean	90% CI Lower	90% CI Upper
In Wilderness /Roadless	21.5	17.9	25.2	5.4	4.0	6.9	1.7	1.1	2.4
Outside Wilderness /Roadless	11.9	9.7	14.3	2.8	2.1	3.6	0.8	0.4	1.1

In the smallest size class, the number of snags has roughly doubled inside and outside of wilderness/roadless, while the 15"+ class rose dramatically in wilderness/roadless but only marginally outside of it. The 20"+ class mirrored those trends, with a substantial increase in wilderness/roadless, and stayed the same outside of it.

Table 20. MON-WLF-03 –Proportional change by snag class (* indicates *increase*).

	Mean Snags per Acre 10"+	Mean Snags per Acre 15"+	Mean Snags per Acre 20"+
In Wilderness /Roadless	*97%	*59%	*70%
Outside Wilderness /Roadless	*80%	*8%	0%

Bear in mind that the most recent dataset presented above is using data collected from 2006 to 2015. This does not account for the fire season of 2017, where approximately 226,000 acres of Lolo National Forest administered lands burned. Real time snag estimates are not available but would certainly be much higher than the figures presented above. Given the current estimates and likely substantial increase in snags following these fires, habitat for snag associated wildlife species including populations of snag-dependent species normally found in unmanaged forest have an adequate, and locally abundant, number of snags to provide a spectrum of snag size and density.

Evaluation of Results for Adaptive Management Finding

Table 21. MON-WLF-03: Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-WLF-03: What is the quantity of large snags on the Forest?	2021	(E) Yes. Based on increases in snag size class proportion that are providing habitat for viable populations of wildlife and fish species.	Yes, recommend updating indicators by removing the height by size class metric for future monitoring, including the three size classes currently included in metrics.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-WLF-04

Plan Component(s) being assessed by this monitoring item:

Goals – "For threatened and endangered species occurring on the Forest…. manage to contribute to the recovery of each species to non-threatened status" (p. II-1).

Objectives – "The Plan provides for the recovery of threatened species on the Forest." "The Plan supports expansions in populations of the endangered peregrine falcon, bald eagle, and gray wolf through Forest goals and standards" (p. II-2).

Desired Future Condition (DFC) – "Habitat to support threatened and endangered species will have been protected consistent with recovery goals" (p. II-7). "Sufficient habitat will exist for threatened and endangered species to meet the objectives of the recovery plans. Factors limiting recovery will have been eliminated where possible" (p. II-7).

Standard 24 – "All threatened and endangered species occurring on the Lolo…will be managed for recovery to non-threatened status" (p. II-13).

Standard 27 – "Management practices in essential habitat of threatened and endangered species must be compatible with habitat needs of the species…consistent with the goal of recovery to non-threatened status" (p. II-14).

Table 22. MON-WLF-04: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-WLF-04: What progress has been made towards habitat improvement for Threatened and Endangered Species recovery through forest management activities?	Actions completed to improve TE species habitat. (N) Acres treated to improve TE species habitat. (N) Miles treated to improve TE species habitat. (N) Examples include: food storage orders enacted, road miles decommissioned or stored, culverts (N) removed, stream miles restored, habitat condition acres restored) (U) Indicators as Reported for the Following Species: Lynx – see Northern Rockies Lynx Management Direction objectives, standards and guidelines (N) Grizzly Bear – see Cabinet Yaak Ecosystem Grizzly Bear Management Plan, and Northern Continental Divide Ecosystem Draft Grizzly Bear Conservation Strategy (N) Bull Trout: See Monitoring Item MON-FISH-01 below	Lynx: Annually	NRM NRIS FACTS TIM INFRA	Chad Bell, Lolo Forest Biologists

(*Influenced by climate change? Y, N, Uncertain)

Table 23. MON-WLF-04: Monitoring Collection Summary

MON-WLF-04	Year
Data was last collected or compiled in:	2019
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2016
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2021

Introduction

Threatened and Endangered Species (T and E) Recovery is an important goal (Goal 7, p. II-1) of the 1986 Lolo Forest Plan. Overarching Plan standards #24 and #27 are specifically focused on T and E species conservation and recovery. In the Plan, there are specific targeted acres for T and E species habitat improvement (Table II-1, p. II-3 and Table V-1, p. V-6). Since the Plan was published in 1986, the list of species has changed, and the issues for each T&E species are different. Bald eagles, peregrine falcons, and gray wolves have all been delisted. Canada lynx was listed as threatened in 2000 and since that time, it has been considered a T and E species on the Lolo National Forest. Grizzly bear and bull trout are addressed in separate sections of this document.

Overview – Lynx

The Lolo National Forest currently has 55 lynx analysis units (lynx analysis units) which have been delineated according to Forest Service Region 1 direction (USFS 2016). These lynx analysis units represent putative female lynx home ranges and are used in project analysis and planning. In total, the Lolo National Forest lynx analysis units encompass approximately 1,744,800 acres across multiple ownerships. Most of these acres are on Forest Service lands (See Table 1, Appendix C to this monitoring and evaluation report). Within these lynx analysis units, habitat is mapped following Northern Region, regional direction and in coordination with USFWS and the Lynx Science Team. The Lolo National Forest has recently updated its mapping and lynx analysis units delineation (USFS 2020).

The Forest followed management direction in the Lynx Conservation Assessment and Strategy (Ruediger et al., 2000, LCAS) upon the lynx threatened designation in 2000. In 2007, the Northern Rockies Lynx Management Direction amended many Forest Plans in the western U.S. including the Lolo Forest Plan (USFWS 2007). Consultation was conducted on the NRLMD and an associated Biological Opinion (BiOp) was issued (USFWS 2007). In 2017 the USFWS issued an amended Incidental Take Statement (ITS) for the NRLMD which included some modified reporting requirements (USFWS 2017). All of which were used in amending the Lolo Forest Plan.

The NRLMD contains objectives, standards, and guidelines (OSGs) which are designed to facilitate/implement conservation and recovery of lynx on federal lands. Forest Service projects are designed to attain objectives by adhering to standards and guidelines (with exceptions). In addition, the NRLMD Biological Opinion have terms and conditions with monitoring requirements as well as conservation measures. The Forest Service reports on these requirements annually as well as during project level consultation with USFWS (USFWS 2017, pp. 11-14).

The eastern portion of the Lolo National Forest overlaps the Northern Rockies Critical Habitat Unit (see Figure 1, Appendix C to this monitoring and evaluation report). The critical habitat designation for lynx was finalized in 2014 and in 2017, consultation was completed for the effects of the NRLMD on critical habitat (USFWS 2017). There is no other lynx critical habitat on the Lolo National Forest.

In addition to demonstrating consistency with standards, the Forest continues to be involved in a variety of activities to improve our understanding of lynx and conserve habitat for the species. The Forest has been a leader in extensive long-term monitoring in the Southwest Crown of the Continent. (https://www.swcrown.org/monitoring-1#wildlife-monitoring). This work has helped to inform the newly launched Regional Carnivore Monitoring Project. Large scale land acquisitions on the east side of the Forest, largely in partnership with The Nature Conservancy, have resulted in thousands of acres of potential lynx habitat coming under federal ownership. Survey and habitat monitoring work on the western portion of the forest have added insight into the status of lynx habitat in areas beyond the Seeley Lake Ranger District.

Lolo Specific Relevant Information - Note: Unlike grizzly bear, there is no recovery plan for lynx and as such there are no well-established monitoring or reporting methods or recovery goals and objectives.

1. Population Status and Trend – For the Seeley Lake Ranger District (RD) and small portions of the Missoula Ranger district, the Lolo National Forest has had a long history of conducting carnivore surveys. We also have lynx information collected from Rocky Mountain Research Station during numerous studies beginning in 1998. For the rest of the Forest, surveys are more sporadic and less intensive. Lynx are known to be present on the Seeley Lake RD and appear to be persisting in similar areas and at similar levels as when research began in the late 1990s. Aside from a few documented

locations of GPS collared lynx on the Missoula RD, there is little recent information indicating that lynx occur on other RDs on the Lolo. Preliminary analysis of DNA from a putative lynx track on Lolo Pass is pending but there appears to be a new male detected that has not been previously detected per the National Genomics Center since 1999 plus there have been unverified sightings of lynx in that area over the past 20 years.

2. Based on this information, it appears lynx are not expanding from the Seeley RD to other areas of the Forest. As stated, general trends for the Seeley RD indicate that the population is relatively static although recent large fires may be shifting areas of occupancy across the Southwest Crown of the Continent landscape. These statements are based on preliminary information presented in this report or citations referenced, and nothing is conclusive, or peer reviewed and published.
3. Mortality –Very little is known about lynx mortality other than what has been presented in Squires et al. (2000). Starvation, human caused mortality, and predation by mountain lions are believed to be the 3 primary causes of lynx mortality in areas where lynx were studied.
4. Compliance with biological opinion reporting and any other standalone biological opinion – see below.
5. Habitat Improvement – The amount of lynx habitat is important and there are many possible factors or events that can change the amount of habitat on the Forest. Wildfire can change the amount and distribution of habitat across a large area while Forest management many change habitat in a more localized area.

Results and Discussion

Methods and Reporting Requirements of the NRLMD?

Required Monitoring and Reporting - Monitoring is designed to show adherence to standards which are designed to move towards conservation and recovery goals.

The NRLMD Record of Decision (2007) incorporated the NRLMD Biological Opinion (USFWS 2007) Terms and Conditions into the Lolo Forest Plan as amended. The Lolo Forest Plan was amended again in 2017 with an updated incidental take statement (ITS) (USFWS 2017, pp. 11-14). The following information is from the 2017 NRLMD Biological Opinion and incorporated into the Lolo Forest Plan. Please reference the Lolo Forest Plan amendments for full details. The information below is abbreviated.

Reporting Requirements (as simplified from NRLMD Biological Opinion)

1. Report wild urban interface and precommercial thinning projects for other resource benefit in occupied lynx habitat.
2. Report any two or more adjacent lynx analysis units that have more than 30 percent of the lynx habitat in them in stand initiation structural stage that does not yet provide winter snowshoe hare habitat, either because of natural events, vegetation management, or a combination of these or other causes
3. Report the acres of occupied lynx habitat treated using the exceptions to the NRLMD vegetation standards related to precommercial thinning projects for other resource benefit.

Results

These results are focused on our Biological Opinion and Incidental Take reporting requirements, as incorporated in the Lolo Forest Plan, which are designed to minimize negative impacts and are moving towards long term conservation and recovery goals.

The Lolo recently submitted our draft report to the Regional Office for review (USFS 2021).

Specific Reporting Information

Reporting #1 - From 2017 to present, the Lolo National Forest has completed NEPA and signed decisions authorizing 46 acres of lynx habitat treatment in the wild urban interface to be exempted. Of these 46 acres, 10 are located within lynx critical habitat. The existing balance of acres on the Lolo National Forest that could be exempted under the Northern Rockies Lynx Management Direction (NRLMD) wild urban interface ruleset is 59,423 acres.

Reporting #2 - Due largely to recent large wildfires on the Lolo National Forest, there are 20 lynx analysis units with early stand initiation (early stand initiation) conditions of greater than 30 percent. These lynx analysis units are in Table 2 of Appendix C below and represent 36 percent of the lynx analysis units on the Forest.

There are currently four clusters of lynx analysis units with >30 percent early stand initiation.

- Boles and Placid lynx analysis units on the Seeley Lake RD were impacted by the Jocko Lakes Fire of 2007 and the Liberty Fire of 2017. In addition, these lynx analysis units have some areas of recently acquired lands that were under Plum Creek Timber Company ownership until recently – this translates to some additional areas of early stand initiation from regen harvesting.

- On the east side of Seeley Lake RD there are 5 adjacent lynx analysis units with > 30 percent early stand initiation. This is largely due to the 160,000-acre Rice Ridge Fire of 2017. These are the Morrell, Cottonwood-Dunham, Monture, Lake and Scapegoat lynx analysis units. As of February 2021, we know that most of these lynx analysis units on the Seeley RD are still occupied by lynx in spite of the large areas of recent conversion to early stand initiation.

- The Wyman, Ranch Face, Ranch and Gilbert lynx analysis units in the Rock Creek drainage, Missoula RD are all adjacent and currently > 30 percent early stand initiation due to several large and recent fires.

- Chippy, Little Thompson and Murr lynx analysis units on the Plains-T Falls RD are all above 30 percent early stand initiation due primarily to the 2007 Chippy Fire.

Reporting #3 - As per the Thinning Exceptions in the table we submitted to the RO, the Lolo National Forest has utilized the exception for thinning on one project from 2017 to present. The Spruce Creek Whitebark Pine Project in the Thompson lynx analysis units treated 121 acres of lynx habitat under this exception. This leaves the Lolo National Forest a balance of 2,079 acres that could be treated with these exceptions. Standard Veg S1 was not exceeded and the Thompson lynx analysis units currently has less than 1 percent of its lynx habitat in the early stand initiation structural stage.

The Lolo National Forest has not deviated from any guidelines from 2017 to present so there is nothing else to report here.

The Lolo National Forest is providing this information to USFWS on project specific consultations.

Discussion

Lynx and its associated prey, snowshoe hare, are reliant on quality habitat conditions for viable populations. The results in this analysis indicate that active management on the Lolo National Forest is affecting very few acres of lynx habitat unlike wildfires which can reduce many acres of lynx habitat by consuming multistoried forest for lynx and reducing dense vegetation for snowshoe hare habitat thus,

creating early stand initiation conditions. Although wildfires that burn at higher severity appear to be the driving factor affecting the distribution and amount of lynx and snowshoe hare habitat in the short-term, these habitat conditions can improve over time with the regeneration of the forest, likely starting with snowshoe hare habitat when shrubs and trees grow tall enough to provide cover and browse for snowshoe hares.

Lynx population status across the Forest has not been thoroughly studied, but it appears that Seeley Lake RD has continued to be occupied, even in the face of very large wildfires and conversion of lynx analysis units to early stand initiation. However, lynx detections on the Superior and Plains Ranger Districts are very rare and habitat is far more marginal than on the Seeley Lake RD (Wrobleski 2020).

In addition, the Lolo National Forest continues to work on land acquisitions with partnering organizations in areas that are important for lynx. Biologists on the Forest continue to partner with the Region, Rocky Mountain Research Station and a variety of NGOs to conduct monitoring and facilitate research on lynx across the forest and especially on the Seeley Lake RD.

Evaluation of Results for Adaptive Management Finding for Lynx

Table 24. MON-WLF-04: Summary of findings for Lynx

MONITORING ITEM	YEAR UPDATED	PLAN INTENT [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-WLF-04: What progress has been made towards habitat improvement for Threatened and Endangered Species recovery through forest management activities?	2021	(E) Yes. Lynx habitat is not limited on the Forest and management continues to follow practices to aid in the recovery of the lynx, however, lynx do not appear to be expanding their range on the Forest indicating more information is needed.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Overview – Grizzly Bear

The Lolo National Forest encompasses portions of 3 grizzly bear recovery areas including the Northern Continental Divide (NCDE), the Cabinet Yaak Ecosystem and the Bitterroot Ecosystem. The NCDE comprises the largest area on the Lolo National Forest with 7 subunits (representing putative female home ranges) located on the Seeley Lake (6 of 7) and Missoula Ranger Districts (1 of 7); see Appendix D below.

Since the original Plan was signed in 1986, there have been Forest Plan Amendments, with associated biological opinions, put in place for both the NCDE and Cabinet Yaak grizzly bear ecosystems. Included

in these documents are standards and guidelines designed to move towards conservation and recovery objectives within each ecosystem. In addition, there are monitoring and reporting requirements which help the Forest assess if and how specific standards and guidelines are being met. Lolo National Forest information, in compliance with these requirements, will be reported on in the results section below. Based on the standards and monitoring/reporting requirements, the motorized access (roads) information, for which INFRA is the FS database of record, is the relevant quantitative information for our ongoing habitat improvement/conservation efforts on the Lolo National Forest.

In addition to demonstrating consistency with standards and guidelines, the Forest continues to be involved in a variety of activities to maintain and improve grizzly bear habitat, with emphasis on the NCDE and Cabinet Yaak Ecosystem recovery areas. Land acquisitions are but one example of such efforts. The successes of these combined actions are apparent, particularly within and adjacent to the NCDE Recovery Area where grizzly bears are documented to be expanding their distribution and population size and have met numerous recovery goals for multiple years. *See Conservation Strategy and associated documents.*

Less than 10,000 acres of the Bitterroot Ecosystem Recovery Zone occurs on the Forest and all of those acres occur within the wilderness. There are no Forest Plan amendments specifically for the Bitterroot Ecosystem.

NCDE Specific Information

1. Population Status and Trend – There is a wealth of information on the NCDE grizzly bear population related to status and trend. Relevant new scientific and monitoring information is contained in the 2018 (updated 2020) NCDE Grizzly Bear Conservation Strategy. Key findings include:
    a. "…NCDE subcommittee believes that the grizzly bear population in the NCDE is recovered from threats to its long-term persistence" (NCDE Conservation Strategy (CS), 2018 at p. 34)
    b. "Females with young have been documented consistently in all 23 BMUs within the PCA, as well as throughout Zone 1 and in some areas of Zone 3 along the Rocky Mountain Front (Costello et al. 2016, Costello and Roberts 2016, Costello and Roberts 2017, Costello and Roberts 2018) (Figure 3)" (NCDE CS p. 34).
    c. Regarding population growth in the NCDE CS p. 35 states, "Based on stochastic population modeling of these observed vital rates, they estimated the annual population growth rate was 1.023, or 2.3 percent growth per year. Assuming an initial population size of 765 individuals in 2004 (Kendall et al. 2009), the median estimated population size was 960 grizzly bears in 2014 with a 95th percentile of 837–1,089 individuals. Stochastic modeling indicated a 0.5 percent chance that the NCDE grizzly bear population declined during 2004–2014." No change in these vital rates has been observed during 2015–2017, and updated analysis indicates the estimated population size in 2017 was 1,029 individuals with a 95th percentile of 884–1,190 (MFWP, unpublished data). And from p. 37, "In the NCDE, we know the population consisted of approximately 765 (95 percent CI = 715 – 831) individuals in 2004 and that it has been increasing approximately 2–3 percent annually since then (Kendall et al. 2009, Mace et al. 2012, Costello et al. 2016, MFWP, unpublished data). This trend estimate incorporates all sources of mortality, both known and unknown, and assures managers that mortality has been at or below levels that will sustain the grizzly bear population."
2. May be present - As stated above, the entire Lolo National Forest is now considered an area where grizzly bears may be present and grizzly bears have been documented on all districts of the Forest.

3. Food Storage – The Lolo National Forest has had a Forest wide food and attractant storage order in place since 2011 (USFS 2011).
4. Mortality – See NCDE Grizzly Bear Population Monitoring Team Annual Report 2019 (Costello and Roberts 2020). For more information see: http://igbconline.org/grizzly-bear-monitoring.
5. Habitat Improvement – Habitat improvement is strongly associated with access management considerations. The Forest does not generally track vegetation treatments in regard to grizzly bear habitat improvement given the general habitat use of grizzlies.

Cabinet Yaak Ecosystem Specific Information

1. Population Status and Trend – The population has a positive growth rate (very small) of 1.019 percent between 1983 and 2019 with a 60% likelihood that the population is increasing (USFWS 2020b).
2. Records – Radio-collared male bears inhabit BMU 22 on the Lolo National Forest. Three radio collared male bears have home ranges that overlap a portion of the BMU since 2016 (USFWS 2020b).
3. Food Storage – Food Storage orders are in place on the entire Lolo, Kootenai, and Idaho Panhandle National Forests covering food storage in the entire Cabinet-Yaak Grizzly Recovery Zone.
4. Mortality – 4 bear mortalities within 16km of Cabinet Yaak Ecosystem in 2019 and, of which, 2 were human caused (USFWS 2020b).
    a. 2019 FWP Region 1 Cabinet Yaak Ecosystem Grizzly Bear Report (MT FWP 2019)
    b. Wakkinen and Kasworm (2004) Demographics and population trends

Bitterroot Specific Information

1. The portion of the Bitterroot Ecosystem on the Forest is located in the wilderness.
2. Records - There are known occurrences of bears in the recovery zone although no sow and cubs have been confirmed yet.
3. Food Storage – Food Storage orders are in place on the entire Lolo, Kootenai, and Idaho Panhandle National Forests covering food storage in the entire Cabinet-Yaak Grizzly Recovery Zone.
4. Mortality – no recorded bear mortalities

Results and Discussion

Methods and Reporting Requirements

NCDE specific Forest Plan components

Following direction in the NCDE Grizzly Bear Conservation Strategy and associated Forest Plan Amendments, the following components were evaluated:

1. NCDE-STD-AR-02. In each bear management subunit within the NCDE primary conservation area, there shall be no net decrease to the baseline for secure core and no net increase to the baseline for open motorized route density or total motorized route density on NFS lands during the non-denning season.
2. NCDE-Lolo National Forest Zone 1-STD-01. Within zone 1 (outside the Ninemile demographic connectivity area) on the Lolo National Forest, there shall be no net increase above the baseline in the density of roads open to public motorized use during the non-denning season on National Forest

System lands. Inside the Ninemile demographic connectivity area, there shall be no net increase above the baseline (see glossary) in the density of roads and trails open to public motorized use during the non-denning season on National Forest System lands. Density is calculated by dividing the total miles open to public motorized use on NFS lands during the non-denning season, by the total square miles of NFS lands in that same area.

3. NCDE-MON-01. Within the NCDE primary conservation area, the levels of secure core, open motorized route density (> 1 mile/mile^2), and total motorized route density (> 2 miles/mile^2) within each bear management unit subunit during the non-denning season will be monitored and compared to the baseline.
4. The Forest Service shall continue to implement food/attractant storage and handling programs in the PCA, zone 1 (including the Salish and Ninemile DCAs) and zone 2. This includes ensuring all Forest Service employees and contractors adhere to appropriate protocols, and educating the public on measures to avoid conflicts and/or food conditioning of grizzly bears.

Cabinet Yaak Ecosystem specific Forest Plan components

Following direction in the 2011 Cabinet Yaak Ecosystem Amendment of Lolo Forest Plan, the following components were evaluated:

1. The OMRD, TMRD, and percent core standards displayed in Table 25 would be established for the BMUs in the Cabinet-Yaak Ecosystem.
2. The Forests shall coordinate with State and federal agency biologists to collect credible grizzly bear observations that occur outside of the Recovery Zone boundaries and add this information to the 6th-order HUC database for inclusion into the annual report.

Table 25. MON-WLD-04: Comparison of the Selected Action with Forest Plan standards and the existing condition

	OMRD ≥ 1 mile/mile^2 (Percent of BMU)	TMRD ≥ 2 mile/mile^2 (percent of BMU)	Core Area (Percent of BMU)
Forest Plan Standard	≤33%	≤35%	≥55%
Existing Condition	34.7%	37%	52.9%
BMU22Compliance Project – Draft decision notice, 2/2021*	31.8%	32.2%	56.0%

*The Selected Action is designed to be slightly better than the standards to provide flexibility for future land management actions.

In addition to Lolo Forest Plan amendments, the Forest has agreed to monitoring gates and closures within Bear Management Unit (BMU) 22. The following statement from the 2020 consultation update on the BMU 22 portion of the Cabinet Yaak Ecosystem provides details on that monitoring.

“In 2010, the Forests, in consultation with the Service, proposed monitoring 30 percent of closure devices (gates and barriers) annually within the respective grizzly bear ecosystems, so as to ensure the effective implementation of the open road density parameter of their Access Amendment (USFS 2010a, p. 12). The 30 percent target was arrived at through consideration of the Lolo Forest Planning team’s knowledge of past monitoring efforts and results (for example, USFS 2010b, pp. 65-67), the anticipated staff capacity and budgets; and would result in at least 90 percent verification over a three-year cycle. The Service acknowledged and considered this design element in our 2011 Biological Opinion (USFWS 2011a, p. 17). The Forests signed the Access Amendment Record of Decision on November 9, 2011, adopting this

monitoring plan (USFS 2011b, ROD, p. 14, 63). Consequently, beginning in 2012, the Access Amendment Forests were required to ensure that at least 30 percent of their gates and barriers within the recovery zones were monitored annually."

Bitterroot Ecosystem specific Forest Plan components

There are no Forest Plan components for the Bitterroot Ecosystem specifically.

Results

These results presented here include reporting requirements that pertain to Forest Plan amendments.

NCDE Ecosystem Information

From NCDE Conservation Strategy Amendment Biological Opinion, p. 61

"Compliance with the terms and conditions of the 1996 incidental take statement led to substantial restrictions and decommissioning of roads on the Lolo National Forest, which has been beneficial for the grizzly bear population. Currently, five of the seven bear management subunits on the Lolo National Forest are fully consistent with the criteria for motorized route density and security core (Table 26 below). The Mission subunit does not, but less than 75 percent of the land in this subunit is administered by the Lolo National Forest. As a result, this subunit has been managed under a no net loss strategy. The Swan subunit also are not fully consistent with the road density and security core criteria. In 2011, the Lolo National Forest reinitiated consultation for the access management strategy for the Swan bear management subunit due to noncompliance with portions of the 1996 incidental take statement. In recognition of its unique characteristics, the requirements were modified to no more than 17 percent TMRD; no more than 31 percent OMRD, with no more than 22 percent OMRD during the spring; and at least 55 percent security core (USFWS 2011c)."

Table 26. MON-WLD-04: Baseline levels for motorized route density and secure core by bear management subunits on the Lolo National Forest. From Effects of Incorporating Habitat Management Direction for the NCDE Grizzly Bear Population into the Helena, Lewis and Clark, Kootenai, and Lolo Forest Plans on Grizzly Bears. USFWS, 2017, p. 13. Included in BiOp for NCDE Conservation Strategy Amendments, p. 62.

Bear management Subunit	> 75% NFS Lands	OMRD (percent > 1 mi/mi^2)	TMRD (percent > 2 mi/mi^2)	Secure Core (percent of area)
Monture	yes	1	1	99
Mor-Dun	yes	19	14	76
North Scapegoat	yes	0	0	100
South Scapegoat	yes	13	17	74
Mission	no	25	45	39
Rattlesnake	yes	3	11	79
Swan	yes	33	17	54

Table 27. MON-WLD-04: 2011 baseline and 2017 and 2019 existing conditions for Zone 1 and the Ninemile DCA on the Lolo National Forest.

Area name	Year	Open Route (miles)	Motorized Trails (miles)	NFS lands (square miles)	Linear Density (miles/square miles)
Ninemile DCA, Zone 1	2011	539.360	36.426	361.868	1.6
Ninemile DCA, Zone 1	2017	613.354	37.191	399.109	1.6
Ninemile DCA, Zone 1	2019[1]	606.821	37.308	400.860	1.6
Zone 1 outside DCA	2011	301.649	1.300	239.189	1.3
Zone 1 outside DCA	2017	320.633	0.958	243.946	1.3
Zone 1 outside DCA	2019	262.020	0.957	245.475	1.1

Table 28. MON-WLD-04: Baseline (2011) conditions in the Lolo National Forest portion of the Primary Conservation Area (PCA). OMRD – open motorized route density. TMRD – total motorized route density. Target levels are OMRD < 19 percent of subunit at <1mi/sq mi, TMRD < 19 percent of subunit at <2 mi/sq mi, Core >68 percent.

	2011			2017			2019		
Subunit Name	OMRD	TMRD	CORE	OMRD	TMRD	CORE	OMRD	TMRD	CORE
Mission	23	57	32	25	47	39	24	49	37
Monture	1	0	99	1	1	99	1	1	99
Mor-Dun	17	17	78	18	14	77	18	14	77
N-Scapegt	0	0	100	0	0	100	0	0	100
Rattlesnake	3	9	83	3	11	82	6	11	81
S-Scapegt	13	14	76	12	17	75	12	16	75
Swan	32	16	55	32	16	55	32	19	54

[1] 2019 data pending final edits

Cabinet Yaak Ecosystem Information

Table 29. MON-WLD-04: History of Access Amendment Motorized Route Density and Core Habitat Metrics in BMU 22 (USFWS 2020c, p. 3).

Bear Year	OMRD	TMRD	CORE	# of Restricted Roads Exceeding Administrative Use Levels
2010	38	37	51	0
2011	38	37	51	1
2012	38	37	51	0
2013	37	38	50	6a
2014	38	37	51	0
2015	38	38	51	2
2016	37	38	51	25[b]
2017	38	38	51	Xc
2018	39	38	51	Xd
2019[e]	34.7	37	52.9	In prep.
Proposed	31.8	32.2	55.9	n/a
AA Standard	33	35	55	Goal = 0

[a.] In BY2013, the Forest reported: "Anticipated use of roads for harvest-related activities in the Fishtrap Timber Sale on 6 roads. These (and other) roads were offset by closures early in the Fishtrap Project."

[b.] In BY2016, the Forest reported: "During 2016 as a result of the Copper King Fire suppression efforts many roads were accessed and many exceeded administrative use, and because of the emergency nature of this the Lolo National Forest did not track which roads were used by every fire crew throughout the season."

[c.] In BY2017, the Forest reported: "Within BMU 22 the Copper King Salvage Sale area was active, and use on individual roads was not tracked as the Project BA considered them open for the analysis period. Please refer to the Copper King Salvage Sale BA."

[d.] In BY2018, the Forest reported: "Within BMU 22 the Copper King Salvage Sale area was active, and use on individual roads was not tracked as the Project BA considered them open for the analysis period. Please refer to the Copper King Salvage Sale BA."

[e.] The Bear Year 2019 Report is scheduled for completion in Spring 2020. These figures reported from Bear Management Unit 22 Compliance Project scoping letter, August 28, 2019.

[f.] Proposed action: Bear Management Unit 22 Compliance Project scoping letter, August 28, 2019.

Table 30. MON-WLD-04: History of Road Closure Device Monitoring in BMU 22 From USFWS 2020c, p. 4 - BMU 22 Re-initiation, USFWS.

Bear Year	# of Closure Devices	% Monitored*
2010	N/A	N/A
2011	N/A	N/A
2012	50	100
2013	61	82
2014	50	100
2015	50	100
2016	50	100

Bear Year	# of Closure Devices	% Monitored*
2017	50	100
2018	50	100
2019[a]	In prep.	In prep.

*No monitoring was required and no explicit results were reported for Lolo National Forest in Annual Monitoring Report for respective year. Beginning in 2012, the Forests were required to ensure at least 30 percent of their gates and barriers within the respective recovery zone were monitored annually. This column reports monitoring within BMU 22 even though 30 percent minimum was not required by BMU.

a. The Bear Year 2019 Report is scheduled for completion in Spring 2020. Wrobleski and Barr (pers. comm. December 6, 2019) report that from 2018-2019, two closures in BMU 22 needed to be repaired.

Bitterroot Ecosystem Information

There are no Forest Plan components specifically for the Bitterroot Ecosystem and the portion of the Bitterroot Ecosystem located on the Forest is within the wilderness which already has a series of Forest Plan components that are designed to retain wilderness characteristics. This would include a restriction on motorized routes and most management actions.

Discussion

This report outlines grizzly bear reporting measures to illustrate how Lolo Forest Plan in conjunction with USFWS consultation continues to support grizzly bear conservation and recovery through forest management activities. Grizzlies continue to expand their range as evident of the USFWS report of where bears may be present (USFWS 2020b). As highlighted below, we have made great progress and we will continue to work towards recovery standards.

Overall, Lolo Forest Plan, as amended through the conservation strategy, advancing science, and consultation with the USFWS, continues to aid in the recovery of the grizzly bear. The Forest has improved habitat by reducing the miles of roads and utilizing seasonal closures for many roads. The Forest continues to work with visitors on reducing attractants and consequently, reducing bear and human interactions. Further, the Forest continues to acquire lands that will ensure bear habitat over the long term.

Within the NCDE recovery area:

- 5 of the 7 subunits on the Lolo are consistent with the 19-19-68 habitat standards.
    - The Mission subunit is not trending towards the desired level for motorized road density largely due to the high proportion of roads on non-FS ownership within the subunit.
    - The Swan subunit is a long and narrow subunit, which makes it very difficult to move toward standard. The Lolo National Forest has a stand-alone consultation to incorporate the circumstances of this subunit.
- Long standing, forest-wide food storage orders are in place.
- The forest has low levels of stock animal grazing.
- Recreation sites are consistent with baseline requirements.
- Human caused grizzly bear mortality is very low on Lolo National Forest lands over a 20-year period.
- Recovery goals are being met and the population is increasing/expanding.

Within Zone 1 and the Ninemile DCA:

- The 2011 baseline for open roads was chosen as the baseline because it represents a period of time when grizzly bear population has been expanding their spatial distribution and exhibiting population growth from 2004 – 2011.
- The Lolo National Forest is maintaining open road linear miles in accordance with the 2011 baseline open roads standard.
- Recent FWP reports show that female grizzly bears with cubs are occupying the Ninemile DCA.
- Human caused grizzly bear mortality is very low on FS lands

Within the Cabinet Yaak Ecosystem recovery area:

- The Lolo National Forest is meeting reporting requirements as specified in Lolo Forest Plan and the USFWS Biological Opinion
- The population growth rate within the Cabinet Yaak Ecosystem is positive but not increasing at a rate comparable to the NCDE
- BMU 22 on the Lolo National Forest has resident male bears but no known resident females at this time

Within the Bitterroot Recovery Area

- In recent years, grizzly bears have been reported in and adjacent to this recovery area
- The Lolo National Forest portion of this area is roadless and is designated wilderness. As such it is conducive for grizzly bear occupancy

Area of the Lolo outside designated recovery areas/zones with standards

- The entire Lolo National Forest is now considered as an area where grizzly bears may be present based on detections/sightings
- The recent/ongoing expansion of grizzly bears across the Forest indicates that habitat connectivity and linkage are adequate for grizzly bears to move across the landscape

In summary, since the Lolo Forest Plan was written in 1986, the population and distribution status of grizzly bears on the Forest has improved significantly. This is likely due to changes in road management, changes in food and attractant storage, reduction in grazing allotments, large land acquisitions and changing public attitudes – along with other related efforts by FWP and other agencies/entities.

Evaluation and Findings for Grizzly Bear

The following findings and recommendations resulted from the evaluation of monitoring results.

Table 31. MON-WLD-04: Summary of findings for Lynx

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-WLF-04: What progress has been made towards habitat improvement for Threatened and Endangered Species recovery through forest management activities?	2021	(E) Yes. Grizzly bears appear to have an increase in population and are expanding their range.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Recommendation Details

There are multiple factors influencing T&E species on the Forest. Recent large land acquisitions added to the Lolo National Forest have probably been one of the most significant positive factors in T and E species recovery/conservation. In addition, wildfire in recent years has resulted in significant structural stage changes across the Lolo National Forest. Management actions like food storage and road decommissioning are hugely important. Vegetation management is not highly relevant for grizzlies since grizzly's use a variety of habitat and are considered more of a generalist species. The emphasis Forest Plan monitoring may provide better insight through utilizing grizzly bear Amendments Recovery Plan(s), and biological opinions.

As per the above, the indicators and data source are too broad and should be modified accordingly. For grizzly the reporting should follow the requirements in the current Biological Opinions.

Aquatic Environment and Fisheries Habitat

MON-FISH-01

Plan Component(s) being assessed by this monitoring item:

Objectives – "This Forest Plan improves the environmental quality of the Forest…that emphasizes… enhancement of wildlife and fish habitats…" (p. II-2). "The Lolo Forest Plan provides habitat for viable populations of the diverse wildlife and fish species on the Forest…" (p. II-2).

Desired Future Condition (DFC) – "Fisheries on the Forest will have improved slightly…" (p. II-7). "Fisheries on the Forest will have improved. Fish habitat improvements accomplished during the first decade will have had a maintenance program that protected the improvements" (p. II-8).

Standard 28 – "Land management practices shall be designed to have a minimum impact on the aquatic ecosystem, free from permanent or long-term unnatural imposed stress." (p. II-14). "Project level assessments will address the potential impacts of management activities on off-Forest aquatic resources by considering and evaluating downstream data wherever available" (p. II-14).

Management Areas (MA) – See MA 13 (p. III-56 to III-63).

Forest Plan Amendment 21A - Inland Native Fish Strategy (INFISH) – "The goals establish an expectation of the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. Since the quality of water and fish habitat in aquatic systems is inseparably related to the integrity of upland and riparian areas within the waters, [t]he strategy identifies several goals for watershed, riparian, and stream channel conditions" (see Riparian Goals 1-8) (INFISH p. A-1 to A-2). Also see INFISH Objectives, Standards and Guidelines, and Monitoring. (INFISH p. A-2 to A-15).

Table 32. MON-FISH-01: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-FISH-01: What is the status of native fish including, but not limited to west slope cutthroat trout and bull trout?	Presence/Absence, Distribution, Abundance, Trend, and/or Genetic Status of: Westslope Cutthroat Trout (Y) BullTrout (Y) PearlshellMussel (Y) Native Amphibians (Y) Macroinvertebrates (Y) Other fish and aquatic species (Y)	Annual, Biennial, or project specific	eDNA samples Electro-Shocking Surveys Snorkel Surveys Redd Counts Watershed Improvements Tracking (WIT) Pacfish Infish Biological Opinion (PIBO) Metrics (macroinvertebrates) Montana FWP, Montana Fisheries Information System (MFISH) (http://fwp.mt.gov/fishing/mFish/) Montana FWP, Angling Pressure Surveys (http://fwp.mt.gov/fishing/anglingData/anglingPressureSurveys/default.html) Montana FWP, Fish Stocking Plans and Reports (http://fwp.mt.gov/fishing/planAFishingTrip/fishStocking/default.html)	Traci Sylte, Lolo Soil, Water, and Fisheries Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 33. MON-FISH-01: Monitoring Collection Summary

MON-FISH-01	Year
Data was last collected or compiled in:	2017-2019
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	NA
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Table 32 displays a summary of the monitoring question for MON-FISH-01 as revised during the Planning Rule Transition effort accompanied by indicator(s) that may be used to assist with addressing the question, Forest Plan Components monitored, potential data sources, and a point of contact. Table 33 displays the general monitoring collection schedule. The management indicators listed in Table 32 represent potential methods to evaluate fish status that occur on the Forest. This monitoring report displays data from two of the indicators (bull trout redd counts and eDNA) because this information is very relevant in understanding bull trout status, represents some of the best available science, and was readily available because Lolo National Forest biologists are actively engaged with bull trout redd counts and USFS eDNA monitoring. In addition, the results of bull trout monitoring can be informative to understanding some trends in other native fish.

Data and information outside of forest management jurisdiction is needed to fully understand specific and overall native fisheries status and viability issues. MT Fish, Wildlife, and Parks (FWP) is the agency responsible for fisheries population management in Montana, and the US Fish and Wildlife Service is responsible for threatened and endangered species management. FWP manages the state's fisheries data base, Montana Fisheries Information System (MFISH). Currently the database needs updating and cannot be utilized as the most updated best available science. FWP has a significant amount of fisheries data and was contacted; they plan to have all fisheries data aggregated and readily available in 2-3 years. Useful FWP data links are provided in Table 32.

Relative to Forest Plan Components, the Inland Native Fish Strategy Environmental Assessment (1995), INFISH, amended the Lolo Forest Plan, providing interim direction (until the Plan is formally revised) to protect habitat and populations of resident native fish outside of anadromous fish habitat. INFISH consists of provisions that specifically focus on operations within forest management jurisdiction (i.e., fisheries viability is beyond the capability of national forest management because many factors beyond USFS control significantly affect fisheries status such as dams (E. Fork Rock Creek, Kerr, Thompson Falls, Hungry Horse, Libby, Noxon, and Cabinet Gorge), invasive species, water withdrawal, diversions/fish screens, climate change exposures, habitat quality, among others). As such, INFISH direction is in the form of riparian management objectives, riparian buffers, standards and guidelines, and monitoring requirements with management activities restrictions focused on maintaining or improving habitat for inland native fish species.

Methods

Bull trout spawning surveys are conducted annually primarily by MT FWP with assistance from USFS biologists and others. A fish spawning site is called a redd, and redd data is one of the most useful datasets for long-term monitoring of trends for both resident and fluvial bull trout. Surveys of spawning activity

are repeated each year at specific “index reaches.” Redd surveys on other streams are also conducted as personnel resources are available. Surveys occur in September during key spawning timing and are conducted by, or under the guidance of, experienced biologists who walk designated and repeatable stream segments to locate, measure, and record the number of redds. Redd size relates to fish size with smaller redds created by resident fish (fish that remain within a local area or tributary) and larger redds made by fluvial fish (fish that migrate between larger streams and tributaries).

The second indicator, environmental DNA (eDNA), is a reliable and cost-effective methodology to determine if a species is present and how the population may be distributed throughout a basin, watershed, and/or tributary. eDNA sampling has many advantages when compared to traditional sampling techniques and is increasingly utilized. Data presented has been downloaded and compiled from a database managed by the USFS Rocky Mountain Research Station, which supports a Rangewide bull trout eDNA collection effort to better understand bull trout occupancy. The Lolo National Forest through the Fisheries Program has funded additional eDNA sampling to address project- and program-level information and reporting needs. Collection and analysis protocols are rigorous (Carim et. al. 2016a; Wilcox et. al. 2015a). For additional information reference https://fs.usda.gov/rmrs/projects/aquatic-ednatlas-project.

Results and Discussion

Indicator 1: Bull Trout Redd Counts

The following charts display bull trout redd count trends for the Pend Oreille and Lower Clark Fork (Figure 2), Middle Clark Fork (Figure 3), Blackfoot (Figure 4), Clearwater Lakes (Figure 5), and Rock Creek (Figure 6) Bull Trout Core Areas within the Columbia Headwaters Recovery Unit. Reference Bull Trout Recovery Plan at http://www.fws.gov/pacific/bulltrout/Planning.html for complete details and map units. Trend data begins from the late 1990s or 2000s, when established and consistent redd surveys began, to 2018. Although surveys have been completed for 2019 and 2020, data had not been compiled at the time of this report.

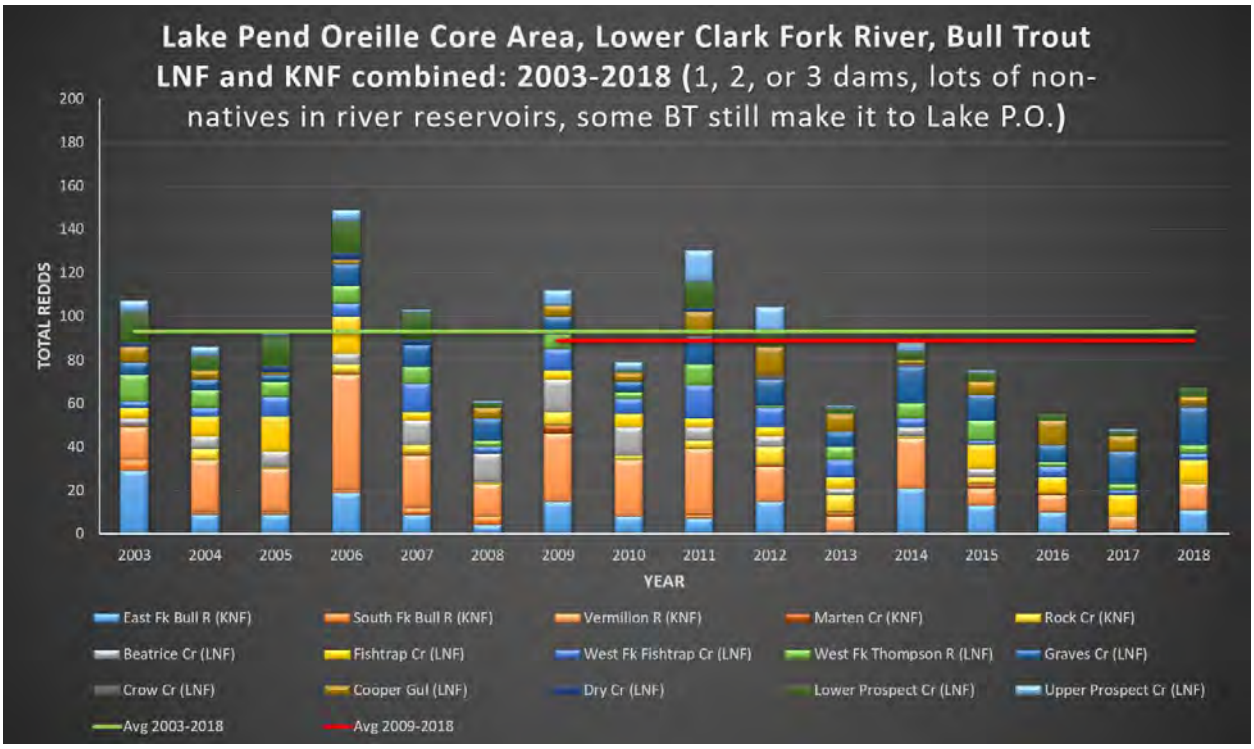

Figure 2. MON-FISH-01: Total Redds and Trend in Core Areas 2003-2018.

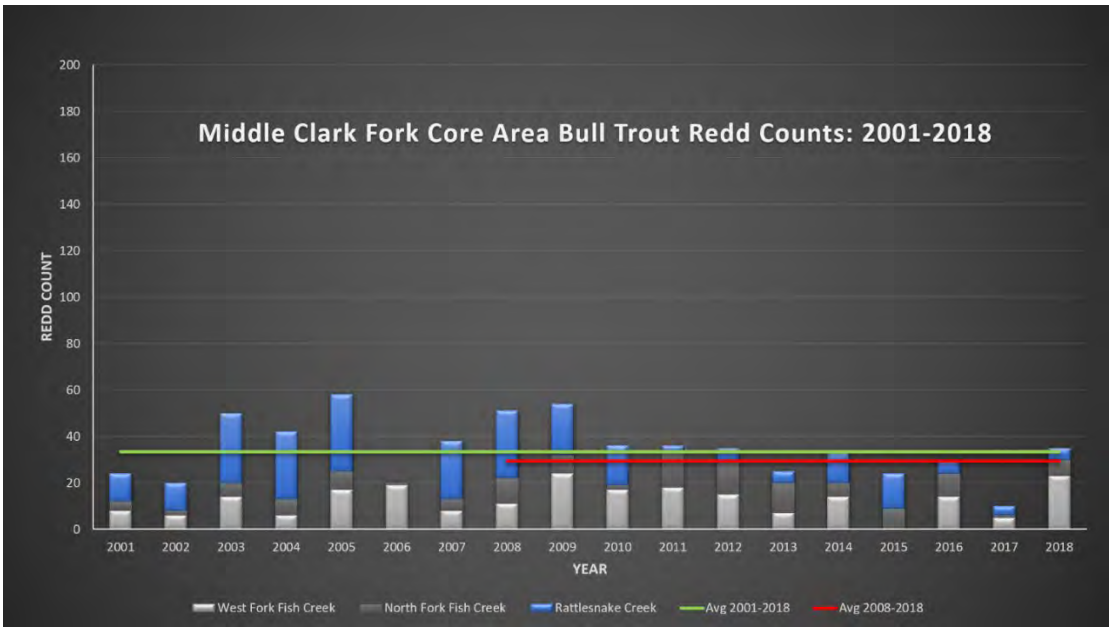

Figure 3. MON-FISH-01: Middle Clark Fork Core Area Redd Counts

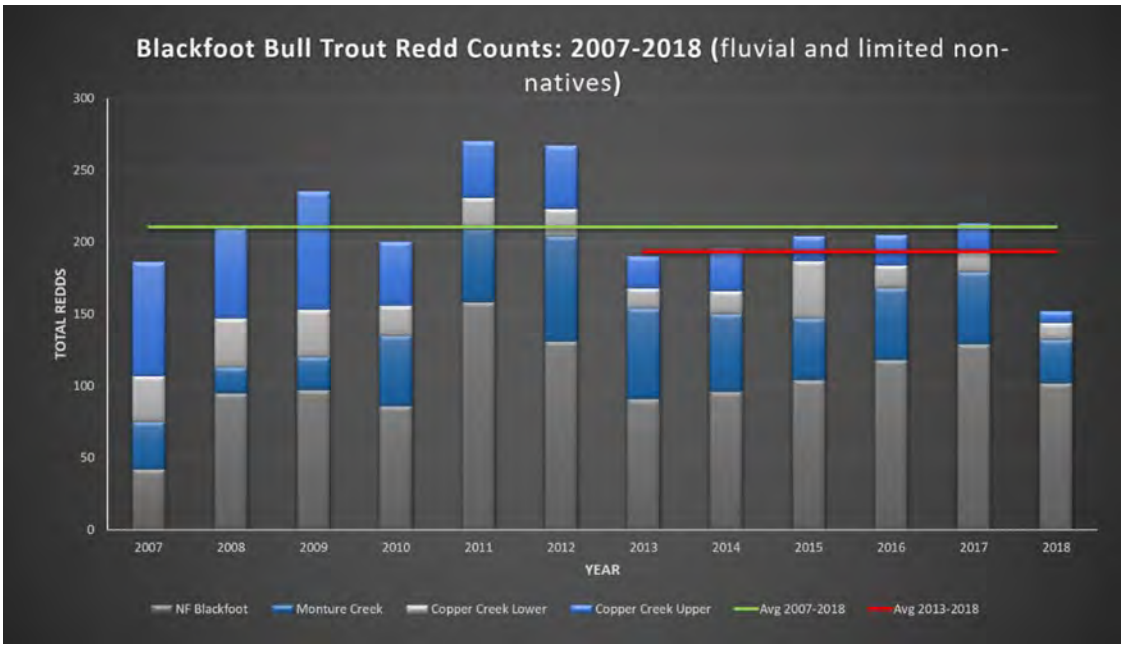

Figure 4. MON-FISH-01: Blackfoot River Core Area Redd Counts

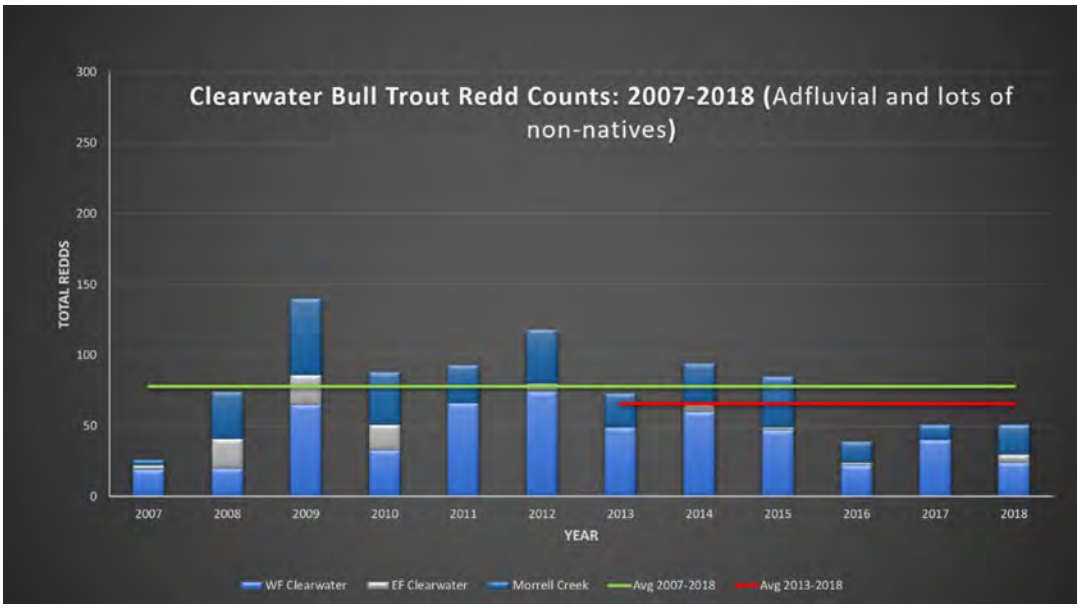

Figure 5. MON-FISH-01: Clearwater Core Area Redd Counts.

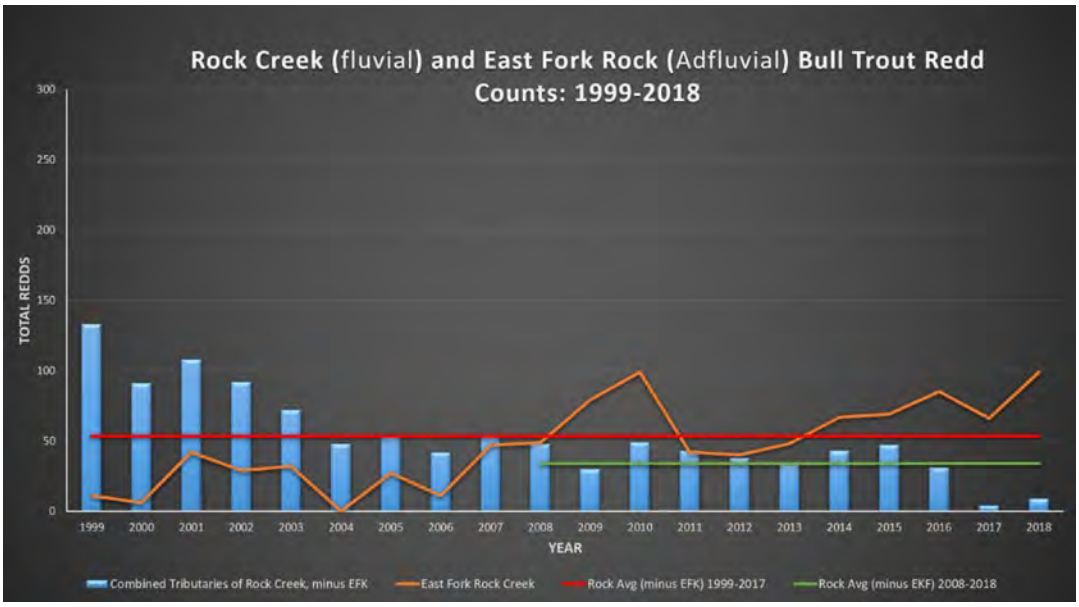

Figure 6. MON-FISH-01: Rock Creek Core Area Redd Counts.

As displayed in Figures 2-6, annual redd count variability is high for both individual populations (segments of bars in chart Figures 2-6) and overall annual (total bar height in chart) as compared to both recent year average (red line in all charts except Rock Creek (Figure 6) where colors are reversed) and overall long-term trend (green horizontal line in all charts except Rock Creek (Figure 6) where colors are reversed). In all core areas, the more recent averages are lower than the long-term average indicating a downward trend in all core areas. One exception is the specific stream, East Fork of Rock Creek where separate data (Figure 6, orange line) is indicating an upward trend that is presumed causal to reservoir flow augmentation favoring spawning from the East Fork of Rock Creek Dam (overall redd counts are declining in Rock Creek).

Results generally indicate these findings:

- Productive lakes (with predatory lake trout controlled) and reservoirs (that can augment baseflows) have the strongest, most stable populations (Figure 2, Pend Oreille and Lower Clark Fork and East Fork of Rock Creek Tributary (Figure 6) displaying much higher redd counts and with long and recent averages nearly the same).
- Populations that must migrate past Lower Clark Fork River mainstem dams appear to be declining (Figure 3 through Figure 6) as indicated by lower recent year average as compared to overall average).
- Upper Blackfoot River local populations are relatively stable when compared to lower river local populations which appear to be in rapid decline.
- All Upper Clark Fork populations appear to be declining (Figure 2 through Figure 6) as represented by comparisons of overall average to recent year average, red and green lines in charts).
- Rock Creek redd counts (Figure 6) were substantively lower in 2017 and 2018 than any other years in the monitoring period.

Indicator 2: Bull Trout eDNA

Samples of eDNA have been collected across the Lolo National Forest. For example, Figure 7 displays sampling sites in Twelvemile Creek where eDNA monitoring began in 2016 as a required condition by the FWS associated with the 12Tamarack EA. As staffing is available, the Lolo Fisheries Program intends to display and summarize the data. Updated data will be available by 2023 reporting. It's important to note that variability in redd counts can occur for many reasons with substantive uncertainty in accurately accounting for causes because of many confounding variables in any given year and/or 4-5year bull trout life stage (a life stages/movement patterns are generally: emergence, rearing, overwintering, out-migration, return-migration, spawning). Influences on spawning success are many such as, but not limited to: stream discharges (dams and barriers, base flows relating to adequate flows for migration/movement and suitable spawning sites; climate-related increases in winter rain-on-snow events and substrate scour affecting substrate conditions for newly emerged fish from eggs, other); natural and human-accelerated disturbances (accelerated bank erosion from loss of riparian vegetation, wildfire, debris flow, flooding, roads and other); water quality and substrate health (substrate sedimentation, climate-related lethal stream temperature increases and/or thermal barriers, other); stream complexity (suitable large wood, spawning gravel, channel depth, velocities); suitable overwintering and rearing habitat); beaver influences (rearing habitat, habitat complexity and hyporheic substrate creation and exchange vs. potential barriers); fishing mortality (unintentional and illegal targeting), among other. As such, this data set warrants much more additional assessment to improve understanding of causal sources of declines. Stratification of the data by individual streams, flow year and baseflow/winter flow regime, stream type and habitat complexity, substrate suitability, temperature regime, developed/undeveloped watersheds, among others could greatly assist understanding of causal decline effects.

Some important discussion points for bull trout monitoring efforts and results are:

- The number of bull trout present in each core area, including local, non-migratory populations are very important to understand relative to species status and persistence (resiliency).
- Redd counts do not represent all populations or equate directly to adult population estimates.
- Populations can show high variability because of many influences. Trends become apparent over time and with consistency in monitoring efforts.
- Resident populations are not well represented because redd count data primarily focuses on fluvial populations.
- There are many influences affecting bull trout status and fisheries viability is beyond the capability of national forest management because many factors beyond USFS control significantly affect fisheries status such as dams (E. Fork Rock Creek, Kerr, Thompson Falls, Hungry Horse, Libby, Noxon, and Cabinet Gorge), invasive species, water withdrawal, diversions/fish screens, climate change exposures, poor stream health and habitat quality, among others).

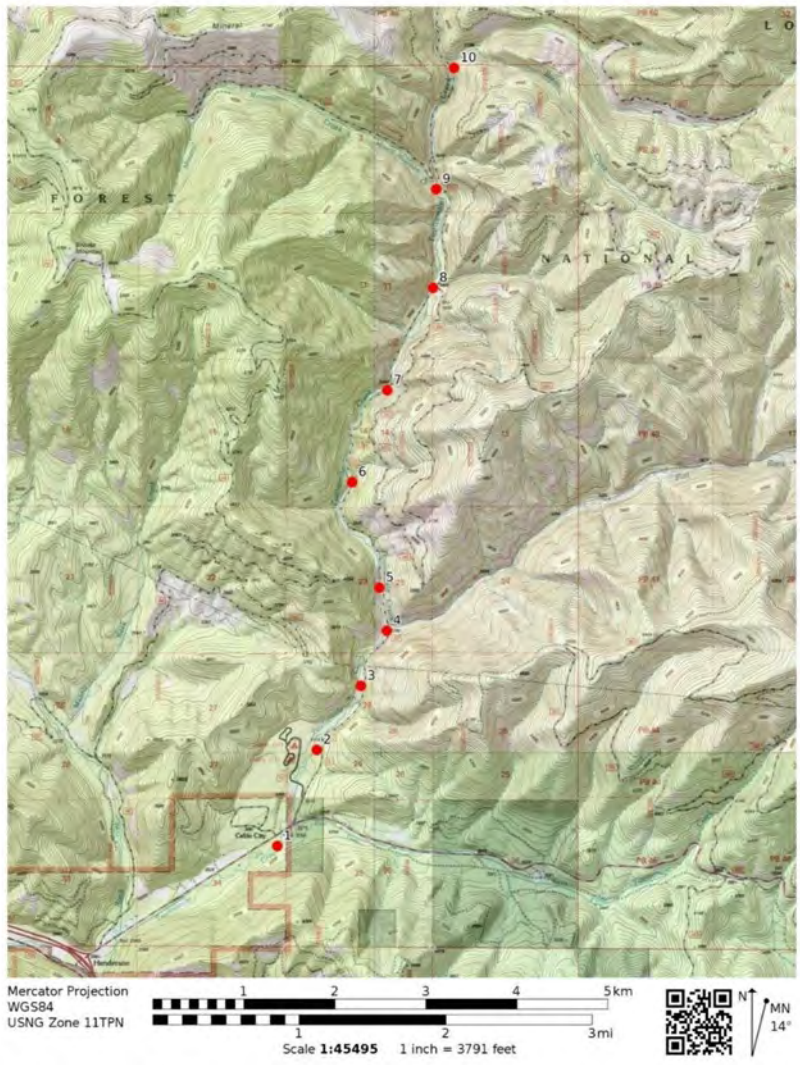

Figure 7. MON-FISH-01: Twelvemile Creek eDNA sampling sites.

In terms of overall native fish status (bull trout and all other species), the Lolo National Forest's fisheries stewardship goal and management ability is to maintain quality aquatic habitat conditions that provide for all native fisheries and to conduct management activities that also assists towards the recovery of threatened and endangered species such as bull trout (as related to habitat conditions within forest jurisdiction). Although the focus of the monitoring data presented herein is on bull trout, many of the findings can be extrapolated to issues and trends related to other native fish assemblages. When updated FWP fisheries data is compiled and available, we expect the data to reinforce the results of these monitoring efforts.

Concisely summarizing the data presented herein for bull trout, taken in context with other related monitoring items that directly affect fisheries habitat (MON-STRM-01,02,03), it is reasonable to assume that the population status of native fish varies within and between watersheds and is dependent on both local habitat factors and many factors outside of USFS jurisdiction. It is also reasonable to assume that

depending on the species and dependence on migratory ranges beyond USFS headwater habitats, that native fish populations are generally maintaining or declining. Data also indicates that species numbers can increase in some circumstances, as it appears from flow augmentation in the East Fork of Rock Creek. In future monitoring reports, we hope to display more data from FWP to account for more species such as westslope cutthroat and other population trends such as those associated with the Blackfoot Challenge private-public collaboration efforts (which have monitored favorable westslope cutthroat population response to restoration efforts at a watershed scale).

Our findings also suggest that greater efforts are needed to highlight and address limiting factors influencing native fish viability beyond Lolo National Forest jurisdiction to reverse the trend of declining populations most substantively and expeditiously. Despite generally high-quality habitat conditions on the Lolo National Forest, and several million dollars spent on restoration and road remediation projects to improve impaired habitat (see MON-STRM-01,02,03), with a few local exceptions our fisheries monitoring results are not indicating fisheries population improvements where declines exist at a watershed and greater scales. As such, two issues surface here, more monitoring needs to occur and fisheries data from FWP needs compiled and updated, and causal impacts to declining populations outside of national forest management need greater focus.

Evaluation of Results for Adaptive Management Finding

The following findings and recommendations resulted from the evaluation of monitoring results.

Recommended data needs for future monitoring:

- Updated, more consistently compiled and available native fish population data from Montana Fish, Wildlife, and Parks
- Compile data collected by BLM fish crew and provide annual field reports of snorkel and/or electro-shocking surveys
- Compile bull trout eDNA data from RMRS eDNA data base on Lolo National Forest watersheds
- Twelvemile Creek eDNA monitoring results should be consolidated and an updated status report created
- Focused fish population trend monitoring for westslope cutthroat and other species such as mountain whitefish or sculpin need to occur in Lolo National Forest watersheds to evaluate pre-restoration and post-restoration population densities where fish population data is available.
- More monitoring focus of fish population densities and trends needs to occur for native species other than bull trout (including non-salmonid/non-game species such as mountain whitefish, sculpin, and sucker)
- More information, context, integration, and prioritization are needed between multi-agency monitoring efforts to more holistically and effectively monitor, understand, and expeditiously target impacts affecting bull trout species, and perhaps other, population declines

Table 34. Summary of findings for MON-FISH-01

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-FISH-01: What is the status of native fish including, but not limited to west slope cutthroat trout and bull trout?	2021	(C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).	No, however as noted above, expand data analysis efforts along with coordination with partners.	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-STRM-01

Plan Component(s) being assessed by this monitoring item

Objectives – "This Forest Plan improves the environmental quality of the Forest…that emphasizes…enhancement of wildlife and fish habitats…" (p. II-2). "The Lolo Forest Plan provides habitat for viable populations of the diverse wildlife and fish species on the Forest…" (p. II-2).

Desired Future Condition (DFC) – "Fisheries on the Forest will have improved slightly…" (p. II-7). "Fisheries on the Forest will have improved. Fish habitat improvements accomplished during the first decade will have had a maintenance program that protected the improvements" (p. II-8).

Standard 28 – "Land management practices shall be designed to have a minimum impact on the aquatic ecosystem, free from permanent or long-term unnatural imposed stress" (p. II-14). "Project level assessments will address the potential impacts of management activities on off-Forest aquatic resources by considering and evaluating downstream data wherever available" (p. II-14).

Management Areas (MA) – See MA 13 (p. III-56 to III-63).

Forest Plan Amendment 21A - Inland Native Fish Strategy (INFISH) – "The goals establish an expectation of the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. Since the quality of water and fish habitat in aquatic systems is inseparably related to the integrity of upland and riparian areas within the waters, [t]he strategy identifies several goals for watershed, riparian, and stream channel conditions" (see Riparian Goals 1-8) (INFISH p. A-1 to A-2). Also see INFISH Objectives, Standards and Guidelines, and Monitoring (INFISH p. A-2 to A-15).

Table 35. MON-STRM-01: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-STRM-01: What activities have been conducted to improve or maintain riparian habitat conservation areas (RHCAs), and aquatic habitat?	Activities that improve condition of riparian habitat conservation areas (RHCAs) and habitat for aquatic species including but not limited to native fish and amphibians: Miles of stream habitat enhanced. (N) Acres of wetland improved. (N) Acres of streamside planted. (N) Acres of floodplain restored. (N) Number of stream crossings or barriers removed. (N) Number of stream crossings (road or trail) improved. (N) Number of stream diversions (irrigation) improved. (N) Acres instream water rights applied for and/or secured. (N) Miles of road decommissioned within 150/300 feet of streams. (N) Number of Best Management Practices (Best Management Practices) implemented. (N) Stream restoration activities accomplished (by 6th HUC or TMDL Watershed). (N) Number of watersheds with condition class improved. (N) Number of beavers re-introduced, or analogs installed. (N) Project RHCA variances approved. (N) Miles of riparian fencing constructed or maintained. (N)	2 Years	Natural Resource Information System (NRIS) Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) INFRA Database Watershed Improvements Tracking (WIT) PacFish InFish Biological Opinion (PIBO) Metrics (macroinvertebrates, bank angle, wood frequency, percent fines, residual pool depth, percent pools, median substrate size (D50), overall habitat indicators) improved. Project RHCA condition surveys. National Best Management Practices Monitoring Database	Traci Sylte, Soil, Water, and Fisheries Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 36. MON-STRM-01: Monitoring Collection Summary

Item	Year
Data was last collected or compiled in:	2019 & 2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	NA
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Table 35 displays a summary of the monitoring framework for MON-STRM-01 as revised during the Planning Rule Transition effort accompanied by indicator(s) that can assist with addressing the question, Forest Plan Components monitored, potential data sources, and a point of contact. Table 36 displays the general monitoring collection schedule. The management indicators represent a range of activities that can improve or maintain riparian habitat conservation areas (RHCAs) and aquatic habitat. Of the suite of indicators, this monitoring effort reports on the following indicators because at this time they are most relevant (relatively accurate and avoiding redundancy), and information is available.

- Indicator 1: Miles of stream habitat enhanced.
- Indicator 2: Acres of streamside planted.
- Indicator 4: Number of road-stream crossings improved.
- Indicator 5: Acres instream water rights applied for and/or secured.
- Indicator 6: Miles of road decommissioned within 150/300 feet of streams.
- Indicator 7: Number of Best Management Practices (Best Management Practices) implemented.
- Indicator 9: Number of watersheds with condition class improved.

Methods

The methodology in this section and results herein present data derived from individual project tracking (acres of streamside planted, instream water rights, and culvert replacements) and efforts fulfilling regional and national direction and guidance that are supported by several databases (Watershed Improvement Tracking System/Database (WIT); Watershed Classification and Assessment Tracking Tool (WCATT); and Trails, Recreation Sites, Roads, Buildings (INFRA), and national Best Management Practices. The methodology provided below pertains to general measures taken to adhere and support the guidance for the various programs. The information provided is the most currently compiled data at the time of reporting. As resources are available, we actively work to update and improve.

Indicator 1 – Miles of Stream Habitat Enhanced: Since 2014, the Watershed Improvement Tracking System/Database (WIT) has been the official database of record for fish and aquatic ecology program accomplishments in the Forest Service. The previous Wildlife, Fisheries and Rare Plant database (2007-2013) has been integrated with WIT with the intent of providing better spatial storage and display of information. Information collected in WIT is automatically sent to the geo-enabled Performance Accountability System which the agency uses to report accomplishments. See also Indicator 4.

Indicator 2 – Acres of streamside planted: Riparian planting is common for a variety of restoration projects and varies annually. The numbers reported are merely the numbers and acreage planted.

Indicator 4 - Number of road-stream crossings improved: This work is tracked by the fisheries program in addition to the USFS national Watershed Improvement Tracking (WIT) Database, an official application and database of record. Projects are recorded annually by forest water program staff. See also Indicator 1.

Indicator 6 - Miles of road decommissioned within 150/300 feet of streams: The Forest Service INFRA Data base manages information such as buildings, trails, roads, wilderness areas, and water systems. The database allows forests and districts to enter, manage, and report all aspects of the land, from permits to surveys, maintenance, and leases. On a national level, reports can be generated in a variety of business areas, such as deferred maintenance, real property inventory, and range and special use permit statistics. Road decommissioning is tracked and GIS efforts further refined the data to determine quantities within 150/300 feet of streams in bull trout watersheds (the distances equate to InFish RHCA buffers and whether streams are intermittent or perennial).

Indicator 5 - Acres instream water rights applied for and/or secured: A compact between the State of Montana and Region 1 of the USFS allows National Forests in Montana to apply for quantifiable instream-flow water rights using the "Wetted Perimeter" method adopted by Montana Fish, Wildlife and Parks. The wetted perimeter methodology applies a basic survey protocol to model aquatic habitat by relating discharge with the area of submerged channel. The wetted perimeter model enables managers to apply for water rights citing minimal flows necessary to support biologic productivity at locations that have a documented species-of-concern population. Post-compact wetted perimeter data collection for Lolo National Forest began in 2008. The Lolo National Forest also received 12 water rights from the compact. Detailed information of this methodology is not included herein for brevity purposes.

Indicator 7 - Number of Best Management Practices implemented: In 2012, the Forest Service established its National Core Best Management Practice framework. This initiative was an effort to standardize Best Management Practice evaluation processes across the National Forest System to better understand management activity shortcomings, improve accountability, and systematically evaluate trends in Best Management Practice implementation and effectiveness at varying scales (for example, between forests, between regions, etc.) within the agency. Per national direction, the Lolo National Forest has conducted Best Management Practice reviews using the nationwide Best Management Practice protocols since 2014. Methodology for Best Management Practice (BMP) monitoring adheres to the Forest Service's National Core Best Management Practice protocols: National Best Management Practices for Water Quality Management on National Forest System Lands (usda.gov).

Indicator 9 - Number of watersheds with condition class improved: A fundamental goal of watershed conditions and stewardship in the Lolo Forest Plan is to protect National Forest System watersheds by implementing practices and projects designed to maintain or improve watershed condition. The Watershed Condition Framework (WCF), a national framework established in 2011, is one tool through which these efforts are being coordinated. The WCF directed forests to identify the condition of forest watersheds, prioritizes treatments on watersheds, provides a methodology for tracking watershed recovery, and sets regional targets expecting forests to conduct necessary restoration work to improve watershed condition classification scores. The WCF classification and prioritization process occurs at what is referred to as the 6th-level or 6th-code HUC (Hydrologic Unit Code) scale, which translates to watersheds roughly 10,000 to 40,000 acres in area. Based upon a suite of 12 indicators representing aquatic physical, aquatic biological, terrestrial physical, and terrestrial biological watershed attributes, all subwatersheds were classified as Class 1-Functioning Properly, Class 2-Functioning at Risk, or Class 3-Impaired function. The map located at https://apps.fs.usda.gov/wcatt/ identifies the ranking for each watershed on the Lolo National Forest. More detail can be found at the following link: https://www.fs.fed.us/sites/default/files/legacy_files/media/types/publication/field_pdf/watershed_classification_guide2011FS978_0.pdf

Results and Discussion

Indicator 1: Miles of Stream Habitat Enhanced

Table 37 summarizes the stream miles of habitat enhanced by aquatic restoration related activities for watersheds designated as core to bull trout population recovery, which is representative of activities supporting native fisheries and RHCA improvements. Stream miles enhanced is a target accomplishment that is derived from various activities such as road decommissioning, road-stream crossing improvements, stream restoration, among other. Additional activities have occurred in other watersheds for water quality and other native fish; however, deviations exist between the WIT and INFRA databases. Ongoing efforts are working to synchronize and update these databases to improve the totals and accuracy as resources are available.

Table 37. MON-STRM-01: Stream Miles Enhanced from Watershed Improvement Tracking Accomplishments in FWS Local Bull Trout Populations – 2008 to Present

Stream Miles and Watershed Improvement Activities	Miles
Blackfoot River	13.82
Cottonwood Creek – channel reconstruction	0.58
Gold Creek – instream flow secured	13.24
Clearwater River & Lakes	0.83
Morrell Creek – channel reconstruction	0.83
Lake Pend Oreille/Lower Clark Fork	15.12
Fishtrap Creek – road reroute/riparian planting	0.97
Graves Creek – Large Wood reintroduction	0.12
Prospect Creek – instream flow, riparian improvement, channel reconstruction	14.02
Middle Clark Fork River	34.07
Cedar Creek – road reroute, increase large wood, instream flow secured	13.32
Fish Creek – instream flow secured	6.68
Ninemile Creek – channel rehabilitation, instream flow secured, mine reclamation	11.51
Twelvemile Creek – increase large wood, stream rehabilitation	2.56
Rock Creek	13.77
Brewster Creek – instream flow secured	8.40
Gilbert Creek – instream flow secured	5.36
Grand Total	77.61

Indicator 2: Acres of Streamside Planted

Acres of streamside planted annually greatly varies because quantities depend on the amount and type of projects occurring in a given year. The following displays results from 2020. Other years are not available because tracking of this activity began in 2020 as a request by the forest botanist.

- **Seed Application:** ~93 acres (7 project sites and majority native seed mixes)
- **Willow Cuttings Installed**: ~53,400 (3 project sites)
- **Transplants installed**: ~35 acres (3 project sites)

Indicator 4: Number of stream crossings improved

Table 38 summarizes the number of road-stream crossings where fish passage has been restored typically through culvert removal or replacement (i.e., undersized culverts often block fish passage because of depth, perch, blockage, and/or velocity barriers). Removals occur with road decommissioning efforts; replacements involve new culverts, bottomless arches, or bridges that meet national policy requirements of “stream simulation” (i.e., the stream channel inside a culvert, or under a bridge, simulates the dimensions, character, and processes of the adjacent natural channel and presents no more of an obstacle to movement of organisms than the natural channel. Structures also must accommodate a 100-year flood

magnitude within the structure opening without backwater effects (headwater/depth ratios less than one) and adequate freeboard for bridges).

The data in Table 38 represents activities that have occurred since 2008 within bull trout core watersheds from WIT data. Ongoing efforts are updating the database to include additional watersheds and capture previous efforts. In addition, general knowledge of forest operations and comparisons with the INFRA data base leads to a determination that this data is grossing underrepresenting the barriers removed because a typical road decommissioning project removes dozens of barriers. Additionally, the Lolo National Forest road-stream crossing replacement total is slightly greater than 100 crossings from records extending to the late 1990s - the Table 38 total from WIT data is 59, indicating significant shortages. Discrepancies in road-stream crossing improvements will be addressed in subsequent reporting.

Table 38. MON-STRM-01: 2008 - Present – Restored Fish Passage at Road-Stream Crossings

Barriers Removed/Crossings Improved by watershed	Count
Bitterroot River	
Lolo Creek – Culvert Removal/Replacement	1/1
Blackfoot River	
Cottonwood Creek – Culvert Removal/Replacement	4/5
Clearwater River & Lakes	
East Fork Clearwater River – Culvert Replacement	1
Morrell Creek – Culvert Removal/Replacement	6/3
Placid Creek – Culvert Removal/Replacement	6/4
West Fork Clearwater River – Culvert Removal	1
Lake Pend Oreille	
Fishtrap Creek – Culvert Replacement	2
Prospect Creek – Culvert Replacement	1
Middle Clark Fork River	
Cedar Creek – Culvert Replacement	4
Fish Creek – Culvert Removal/Bridge Removal/Culvert Replacement	6/1/1
Petty Creek – Culvert Replacement	5
South Fork Little Joe Creek – Culvert Replacement	1
Trout Creek – Culvert Replacement	1
Blackfoot River	
Johnson Gulch – Culvert Removal	3
Middle Clark Fork River	
Ninemile Creek – Culvert Removal	2
Grand Total	59

Indicator 5: Acres Instream Water Rights Applied For and/or Secured

Table 39 presents the current status of instream water rights secured through the Lolo's Instream Flow Water Rights Program.

Table 39. MON-STRM-01: March 2021 Status of Instream Flow Water Rights Secured on the Lolo National Forest (in addition to those granted within the Montana Compact).

Stream	BASIN	collected	Status	Priority Date	Issued Date	Water Right #	CFS
Ranch Creek	76E	2009	Issued	07/30/12	03/21/19	30063721	10
Boles Creek	76F	2007	Issued	01/26/09	06/29/09	30044937	5
Clearwater River	76F	2010	Issued	07/30/12	08/13/13	30063738	12
Cottonwood Creek	76F	2010	Issued	07/30/12	08/13/13	30063735	7
Deer Creek	76F	2008	Issued	12/17/09	05/11/10	30047720	4
North Fork Cottonwood Creek	76F	2010	Issued	01/25/13	01/06/14	30065388	8
Placid Creek	76F	2007	Issued	08/06/09	03/16/18	30046652	6
Trail Creek	76F	2013	Issued	11/30/17	02/11/19	30114890	5.7
W.Fk. Clearwater	76F	2007	Issued	08/06/09	05/11/10	30046651	11
Tyler Creek	76G	2012	Issued	09/25/14	01/16/18	30070889	2
Lolo Creek	76H	No date	Issued	09/25/14	06/08/16	30070887	23.5
Grave Creek	76HB	2008	Issued	10/9/2010? 11/9/10	06/15/11	30049905	4
Howard Creek	76HB	2008	Issued	12/17/09	05/11/10	30047723	4.5
Lolo at Fort Fizzle	76HB	2012	Issued	12/07/15	08/01/16	30104694	62
Obrien Creek	76HB	2010	Issued	01/25/13	01/06/14	30065387	4.2
Albert Creek	76M	2011	Issued	09/25/14	03/11/16	30070864	7.5
Big Creek	76M	2008	Issued	07/30/12	03/16/18	30063719	13.5
Butler Creek	76M	2010	Issued	07/30/12	03/16/18	30063712	2.5
Cedar Creek	76M	2012	Issued	12/07/15		30104693	52
Fish Creek	76M	2010	Issued	07/30/12	08/13/13	30063726	95
Mill Creek	76M	2012	Issued	12/07/15	08/01/16	30104698	6.6
Petty at bndry	76M	2008	Issued	11/09/10	06/15/11	30049907	30
Petty Creek below Forks	76M	2008	Issued	01/15/16		30105068?	26
Savenac Creek	76M	2010	Issued	01/25/13	02/24/14	30065381	13
Sixmile Creek	76M	2011	Issued	09/25/14	03/11/16	30070859	2.8
South Fork Fish Creek	76M	2010	Issued	01/25/13	01/06/14	30065386	44
Tamarack Creek	76M	2010	Issued	01/25/13	03/16/18	30065394	5
Trout Creek	76M	2010	Issued	01/25/13	08/03/16	30065390	28

Stream	BASIN	collected	Status	Priority Date	Issued Date	Water Right #	CFS
West Fork Fish Creek	76M	2010	Issued	01/25/13	01/29/14	30065389	45
Upper Rock Creek	76E	2011	Issued	09/25/14	12/01/20	populate	populate
Lower Blackfoot River	76F	2018	Issued	11/19/19	12/01/20		650

Indicator 6. Miles of Roads Decommissioned Within 150/300 feet of streams

Table 40 summarizes the total roads (transportation system and non-system (typically jammer roads)) that have been physically decommissioned or stored in a “hydrologically neutral” state in core bull trout watersheds on the Lolo. Hydrologically neutral means that the road is left in a condition that does not pose a significant risk to water resources (i.e., road-stream crossings have structures removed and the road surface is either recontoured fully, partially, or scarified to address drainage and stability needs).

This data originates from the INFRA database, which more accurately accounts for these efforts at this time. Ongoing efforts are addressing accuracy and discrepancies between WIT and INFRA databases and expanding to include all watersheds.

Table 40. MON-STRM-01: Road Decommissioning in Bull Trout Core Watersheds (all years)

Core Area, Local Population, Road System, Road Status	Miles
Bitterroot River	12.41
Lolo Creek	4.98
O'Brien Creek	7.43
Blackfoot River	32.07
Cottonwood Creek	6.24
Monture Creek	25.83
Clearwater River & Lakes	26.72
Clearwater River	5.55
Deer Creek	4.28
Morrell Creek	7.68
Placid Creek	7.17
West Fork Clearwater River	2.03
Lower Clark Fork River	17.59
Dry Creek	0.87
Fishtrap Creek	13.58
Prospect Creek	3.15
Middle Clark Fork River	78.07
Cedar Creek	8.03
Fish Creek	51.19
Ninemile Creek	15.27
Petty Creek	2.48
Trout Creek	1.10
Rock Creek	5.14
Butte Cabin Creek	0.69
Gilbert Creek	4.45
Grand Total	172.00

Indicator 7: Number of Best Management Practices Implemented

Thirteen Best Management Practice reviews were conducted during 2017 and 2019 including culvert replacement, chemical application (herbicide and dust abatement), fire suppression repair, vegetation management, and grazing management. Table 41 displays the activities monitored.

Table 41. MON-STRM-02: Number and type of National Core Best Management Practice review types conducted during 2017 and 2019.

Category	Number
Chemical Uses	2
Facilities	1
Fire	1
Range	1
Recreation	2
Road Maintenance, Reconstruction, Culvert Replacement	2
Vegetation Management	2
Water Use	2
TOTAL	13

Chemical Uses (Chem A and C) Categories:

Implementation and Effectiveness was monitored from two chemical sources (i.e., dust abatement and herbicides) for two waterbodies, Thompson River and Weeksville Creek. Review of the dust abatement results indicates an implementation rating of “Marginal” and an effectiveness rating of “Effective”. No rational was provided for the determinations. Review of the results for herbicide treatment monitoring showed that implementation received a “Marginal” rating with an effectiveness rating as “Effective”. Rational for the marginal rating stated that the contract did not contain all the provisions outlined during NEPA planning efforts. In both cases, it was determined that Best Management Practices adequately protected the two stream courses.

Vegetation Management (Veg A) Category:

Two Implementation/Effectiveness reviews were conducted on the vegetation management activities of ground-based skidding during each year of 2017 and 2019. One review showed Best Management Practices to be “Fully Implemented”, and the other, “Mostly Implemented”. In the latter, the stream protection zone was not marked on the Sale Area Map. Activities were deemed “Effective” at protecting water resources because resource protection measures required ground-based skidding to occur during winter conditions, and despite the buffer not being marked on the sale area map, the appropriate INFISH buffer widths were maintained at correct distance on the ground.

Range Category:

One Implementation/Effectiveness review was conducted for Grazing Management in 2017 on the Tyler Creek allotment. It was determined that desired conditions were achieved for both implementation and effectiveness criteria. Rational supporting the determinations was adequate fencing, timing, and salt blocks that kept livestock away from riparian areas.

Roads Category:

Implementation/Effectiveness reviews were conducted on Road Operation and Maintenance activities in 2017 and Active Road or Waterbody Reconstruction activities in 2019. The Best Management Practices for culvert replacement on Cottonwood Creek were rated “Fully Implemented” and they were "Mostly

Effective". No rational was provided, but the records show that most, but not all, water was controlled though the construction site. Operations (Road Activity C) Best Management Practices were rated poorly implemented yet had an "Effective" Effectiveness rating. The cause of this situation in not known.

Water Uses (Water Use C and D) Categories:

Implementation/Effectiveness reviews were conducted on Reconstruction/Repair, Operation and Maintenance of Water Sources (Drafting; Water Uses C) activities in 2017 and Construction of Water Diversion activities (Water Uses D) in 2019. Drafting Best Management Practices were rated "Mostly Implemented" and "Fully Effective". Diversion construction Best Management Practices were rated poorly implemented yet had an "Effective" Effectiveness rating.

Wildfire Management Actions (Fire A) Category:

One Implementation review was conducted for the Beeskove Fire in 2019. Best Management Practices such as communication of resource concerns to the incident management team, inclusion of soil and water protection in the incident action plan and in the formation of wildfire management objectives, were "Fully Implemented". Although Effectiveness was not thoroughly reviewed, the evaluation described the effectiveness of one of the implemented Best Management Practices, i.e., water bars on steep excavator lines, in trapping dislodged surface particles on disturbed soil on the steep slope following rain.

Indicator 9: Number of Watersheds with Condition Class Improved

Table 42 displays the hydrologic units that have been or are currently identified as priority watersheds where essential projects are identified in a WRAP (Watershed Restoration Action Plan). Each WRAP has a number of essential projects identified for implementation that are designed to change the watershed condition classification to a more improved rating, or where the rating is already fully functional to implement all remaining feasible restoration actions. Currently, as Table 42 displays, the Lolo National Forest has successfully completed two WRAPs (Cache and West Fork Fish Creek) and a third (Cottonwood Creek) is in progress. WRAP completion signifies that all activities necessary to significantly improve watershed conditions have been identified and remedies and/or restoration completed.

Table 42. MON-STRM-02: WFC Priority Watersheds Status

Watershed Name	Cache Creek	West Fork Fishtrap Creek	Cottonwood Creek
Hydrologic Unit Code	170102040503	170102130403	170102030909
Year Need Identified	2011	2011	2014
Completion Date	9/20/2020	9/21/2015	Estimated 2025
Acres	28,100	11,588	35,928
Ownership	100% National Forest	99% National Forest	51% National Forest
Initial Watershed Condition Class	Class 1-Functioning Properly	Class 2-Functioning at Risk	Class 2-Functioning at Risk
Current Watershed Condition Class	Class 1-Functioning Properly	Class 1-Functioning Properly	Improvements partially complete (estimated completion date 9/30/2019)
Essential Projects (see WRAP for specific listing)	Road decommissioning, culvert removal/fish passage restoration	Road decommissioning, culvert removal/fish passage restoration; AOP infrastructure improvements	Road decommissioning, culvert removal/fish passage restoration; AOP infrastructure improvements
Community Partners	Trout Unlimited	none	Big Blackfoot Chapter Trout Unlimited, Trout Unlimited
Restoration Funding Estimate (+/- 20%)	$375,000	$225,000	$660,000+
Resource Concerns	Aquatic passage connectivity, aquatic/riparian habitat, water quality	Aquatic passage connectivity, aquatic/riparian habitat, water quality	Aquatic passage connectivity, aquatic/riparian habitat, water quality

Evaluation of Results for Adaptive Management Finding

This effort has highlighted that many activities known to have occurred are either not accounted, or errors exist in the data entry such that queries are not extracting the data. Although the results from the WIT and INFRA databases have consistency, each have errors that are significantly underreporting restoration activities. As such, adequate resources need to be applied to correct errors and account for all known restoration projects. Assuring that projects are established spatially with GIS efforts is necessary to most effectively verify and display known project work.

Table 43 displays the findings and recommendations pertaining to the monitoring results and discussion.

Table 43. MON-STRM-01 – Summary of Findings

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-STRM-01: What activities have been conducted to improve or maintain riparian habitat conservation areas (RHCAs), and aquatic habitat?	2021	(E) Yes. Based on the substantial management activities implemented that result in improved riparian and aquatic habitat.	Yes, recommend the following: Increase monitoring assessment and resources in order to improve data quality. Assure that projects include a geospatial data component to most effectively verify and display known project work.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-STRM-02

Plan Component(s) being assessed by this monitoring item:

Objectives – "This Forest Plan improves the environmental quality of the Forest…that emphasizes…enhancement of wildlife and fish habitats…" (p. II-2). "The Lolo Forest Plan provides habitat for viable populations of the diverse wildlife and fish species on the Forest…" (p. II-2).

Desired Future Condition (DFC) – "Fisheries on the Forest will have improved slightly…" (p. II-7). "Fisheries on the Forest will have improved. Fish habitat improvements accomplished during the first decade will have had a maintenance program that protected the improvements" (p. II-8).

Standard 28 – "Land management practices shall be designed to have a minimum impact on the aquatic ecosystem, free from permanent or long-term unnatural imposed stress." (p. II-14). "Project level assessments will address the potential impacts of management activities on off-Forest aquatic resources by considering and evaluating downstream data wherever available" (p. II-14).

Management Areas (MA) – See MA 13 (p. III-56 to III-63).

Forest Plan Amendment 21A - Inland Native Fish Strategy (INFISH) – "The goals establish an expectation of the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. Since the quality of water and fish habitat in aquatic systems is inseparably related to the integrity of upland and riparian areas within the waters, [t]he strategy identifies several goals for

watershed, riparian, and stream channel conditions" (see Riparian Goals 1-8) (INFISH p. A-1 to A-2). Also see INFISH Objectives, Standards and Guidelines, and Monitoring (INFISH p. A-2 to A-15).

Table 44. MON-STRM-02: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-STRM-02: What is the condition of instream native fish habitat?	Pacfish Infish Biological Opinion (PIBO) Metrics (N) Macroinvertebrates (U) Bank Angle (U) Wood Frequency (U) Percent Fines (U) Residual Pool Depth (U) Percent Pools (U) Median Substrate Size (D50) (U) Overall Habitat Indicators Improved (U)	Annual	Natural Resource Information System (NRIS) Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) INFRA Database Watershed Improvements Tracking (WIT) Pacfish Infish Biological Opinion (PIBO) Metrics (macroinvertebrates). Biological Opinion Stream Function Rating Matrix (FUR to FAR to FA trend data) Project-level stream condition surveys. Project RHCA Condition Surveys	Traci Sylte, Lolo Soil, Water, and Fisheries Program Manager

Table 45. MON-STRM-02: Monitoring Collection Summary

Item	Year
Data was last collected or compiled in:	2017-2019
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	NA
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Table 45 displays a summary of the monitoring question for MON-STRM-02 as revised during the Planning Rule Transition effort accompanied by indicator(s) that may be used to assist with addressing the question, Forest Plan Components monitored, potential data sources, and a point of contact. Table 46 displays the general monitoring collection schedule. The management indicators listed represent potential methods to evaluate the condition of instream native fish habitat (i.e., stream habitat condition). This monitoring report displays data from two of the indicators (PACFISH INFISH Biological Opinion Effectiveness Monitoring (PIBO) and Lolo National Forest Stream Temperature Monitoring Program data) because this information is very relevant in understanding stream habitat status on the Lolo National Forest, represents some of the best available science, and was readily available. Other indicators may be used in the future to compliment these results but are not necessary to address the monitoring question.

PIBO data:

The PacFish/InFish Biological Opinion (PIBO) Monitoring Program (USDA, 2010) is a large, robust stream survey and monitoring effort conducted annually. Although local reach and some stream conditions may differ from PIBO data results and trends, stream health on the Lolo National Forest is well represented by PIBO results. Deviations from these data results can occur where local impacts dominate effects on specific stream segments. Field visits or local knowledge are essential to assess possible reasons for poor habitat conditions and the nature of on-the-ground impacts to a specific site. In addition, data is limited for 5th order and greater streams because of stream size and data collection challenges coupled with little to no reference data availability because larger streams exist either in developed valley bottoms dominated by private land impacts or are in remote wilderness areas.

The primary objective of the PIBO stream monitoring data program is to answer the question: "Are key biological and physical components of aquatic and riparian communities being improved, degraded, or restored within the range of steelhead (Oncorhynchus mykiss) and bull trout (Salvelinus confluentus)? The data addresses this question for portions of the upper Columbia River Basin on USDA Forest Service lands (21 National Forests), and on BLM lands within PACFISH (7 BLM Districts) or containing bull trout. The Lolo National Forest is one of the 21 national forests.

Lolo National Forest Stream Temperature Data:

The Lolo National Forest stream temperature monitoring program is managed by the Clark Fork Coalition and aims to collect sufficient stream temperature data to understand how climate change may be directly affecting stream temperatures on the Lolo National Forest and related management issues such as water quality and fish population questions over time. Because stream temperature is a critical component in suitable fisheries habitat, it is a very important indicator to address. The Lolo National Forest temperature monitoring network has a goal to collect continuous, annual stream temperatures in representative stream systems across the forest to develop an overall forest-wide assessment of stream temperature patterns over the next 25 years. Data strictly adheres to methodology of the collaborative effort led by the Rocky Mountain Research Station in Boise and their regional stream temperature database, temperature model, and climate vulnerability assessments for sensitive fish and aquatic biota within the Great Northern Landscape Conservation Cooperative. In addition, a critical role of the temperature modeling is to validate the associated Norwest Climate Shield stream temperature modeling projections, which we've found measured data to deviate significantly in some streams (relative to bull trout threshold temperatures).

The Lolo National Forest's stream temperature monitoring network is designed to:

- Assess current and long-term temperature patterns in all Water Quality Limited (303d listed) streams listed for temperature on the Lolo National Forest.
- Assess current and long-term temperature patterns in at least half of Bull Trout Critical Habitat streams across the forest.
- Assess current and long-term stream temperature patterns in bull trout spawning locations in the Fish Creek, Fishtrap Creek, Rattlesnake Creek, Monture, and West Fork Clearwater River drainages.
- Assess current and long-term temperature changes in a representative set of larger stream systems (such as Rock Creek, Thompson River, Fish Creek) to allow for comparisons in water quality and fish species composition changes over time.

- Monitor longitudinal stream temperature patterns in representative stream systems across the forest where feasible and strategic with other objectives and expand the distribution and knowledge of longitudinal relationships by combining with other agency datasets.

Methods

The PIBO Program implements a 5-year, rotating panel design and conducts stream surveys representing the U.S. Geological Survey, Hydrologic Unit - 6th field sub-watershed scale. Sub-watersheds were originally combined geographically into ecoregions then randomly assigned and distributed both spatially and temporally. Ultimately, a subset of groups, generally one-fifth of the sample area, are sampled each year. A sub-watershed must meet two criteria to be sampled. First, it must contain an "integrator" site with a channel gradient less than 3 percent, which displays the greatest response to upstream impacts from management activities. Secondly, the watershed upstream of the sample site must have greater than 50 percent Forest Service or BLM ownership. Subwatersheds that meet these two criteria are then categorized as either "managed" or "reference." Sub-watersheds are categorized as "reference" if: 1) they have a history of minimal timber harvest, 2) they have not been grazed by livestock within the last 30 years, 3) watershed road densities are less than 0.5km/km2, 4) riparian road densities are less than 0.25km/km2, and 5) no historic dredge or hard rock mining has occurred in riparian areas. For detailed information on PIBO methods visit: https://www.fs.fed.us/biology/resources/pubs/feu/pibo/pibo-2011-EM_Stream_Sampling_Protocol.pdf

The Lolo Stream Temperature Monitoring Program was initiated in 2011 and has a developed Sampling and Analysis Plan, SAP, that describes network development, installation, and data collection protocols. The SAP was developed in close contact with, and adhering to, the Rocky Mountain Research Station's stream monitoring network supporting the NorWeST Climate Shield data (https://www.fs.fed.us/rm/boise/AWAE/projects/ClimateShield.html. We installed temperature sensors at 72 designated locations in August and September of 2011 and added replicates at four of these stations for a total of 76 sensors. Since 2011, we've download data every year and provided annual reports.

Instrumentation involves TidbiT v2 temperature loggers from Onset Computer Corp. These are chosen for their small size, durability, waterproof housing, 5-year battery life, accuracy of 0.2°C, over 0°, to 50°C, resolution of 0.02°C at 25°C, stability (drift) of +/- 0.1°C per year, 64 Kbytes of memory, and the ability to use a submersible data shuttle for downloading. The start time and sampling interval may be selected by the user. These sensors are recommended by Forest Service researchers including Dan Isaak of the Rocky Mountain Research Station, Boise and Eric Archer, previous leader of the PIBO program (pers. communication). Data from the sensors are downloaded in the field once per year using an Onset HOBO waterproof shuttle, and the sensors remain in place for approximately five years, or as long as battery life and sensor condition allows. Much greater detail on sampling methodology and mapping is located in the Sampling and Analysis Plan, SAP, 2011.

Results and Discussion

The following information generally summarizes current stream habitat status on the Lolo National Forest - greater detail is available in the annual Lolo PIBO report. Figure 8 displays "habitat index scores", which are an aggregate of habitat metrics indicating overall stream health as represented by the extensive PIBO Program. Summarizing Figure 8 (i.e., typical box plot where data ranges are depicted by the "whiskers", the boxes represent 1 standard deviation around the average; averages are denoted by the black horizontal line; outliers are shown as small circles):

- "Managed Area" watersheds have average values that are well within "Reference All" and "Reference Local" conditions (i.e., managed streams are exhibiting habitat characteristics that are the same as reference conditions, which exist in watersheds with little to no human activity).

- "Special Interest" streams (i.e., stream PIBO data collected in addition to the normal PIBO network, funded by the Lolo National Forest to increase the data set) are also within reference/non-developed conditions.

At least three other important observations can be made with Figure 8:

- The range of "Reference All" conditions (i.e., the composite of all streams in the PIBO network that exist in watersheds of little to no development) is much greater than ranges of developed watersheds (range extents area are represented by the box plot whiskers). This outcome is most likely indicative of greater natural disturbance and watershed responses in non-developed watersheds as compared to developed/managed watersheds which tend to control natural disturbance and grossly simply streams (i.e., more wildfire, flooding, sediment fluxes, beaver, among other, are "allowed" in non-developed watersheds (i.e. disturbances are not managed in suppression scenarios); whereas, disturbance in developed watersheds are often extensively eliminated (i.e. wildfire is generally not allowed to burn; streams can be controlled with riprap and have little to no side channels or multiple thread systems in floodplains; beaver are heavily controlled/eradicated even by agencies promoting/responsible for watershed health, etc.)).
- The range of "Reference Local" conditions for our Lolo National Forest local streams is less than the "Reference All" range, which is likely a result of sample size (i.e., larger data sets capture a much greater range of climatic and disturbance factors over time and space, which increases the range variance).
- "Managed Area" streams (excluding "Special Interest") on the Lolo have average index scores that are slightly less or degraded as compared to reference conditions (i.e., some managed streams have influences that affect metrics (e.g., pool depth), which appears to be slightly lowering the overall index scores; this finding is also supported by the metrics in the following figures as well.

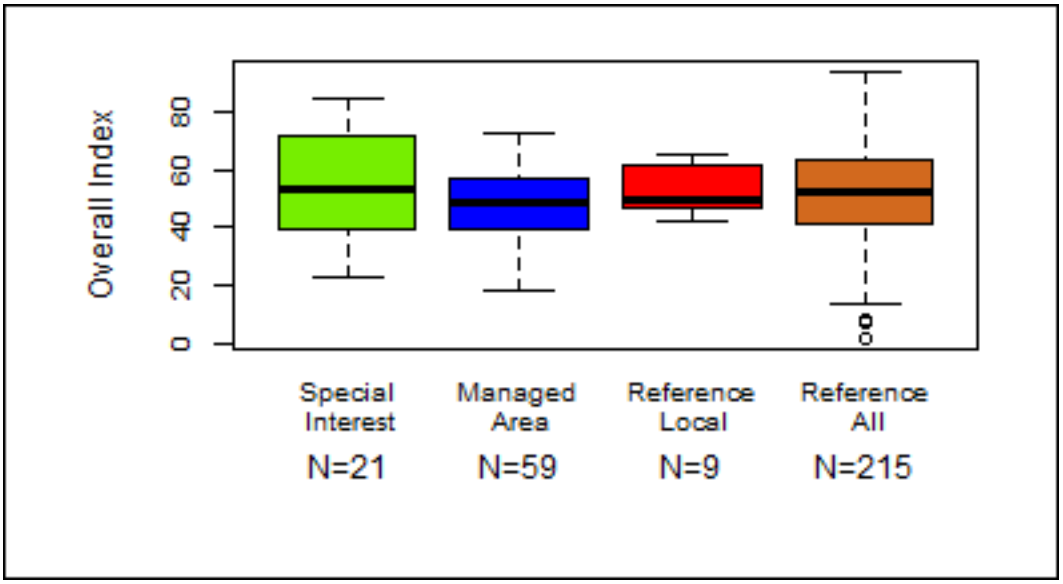

Figure 8. MON-STRM-02: Overall Index values across the Lolo National Forest. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

Figure 9 displays the same habitat index data as Figure 8 with a different chart presentation. The two charts correlate - most surveyed streams in managed watersheds (i.e., blue bars) have stream metrics (i.e., native fish habitat values) that are within reference conditions (orange line); however, the index value for managed streams are skewed to the left, indicating slightly worse or unfavorable habitat conditions.

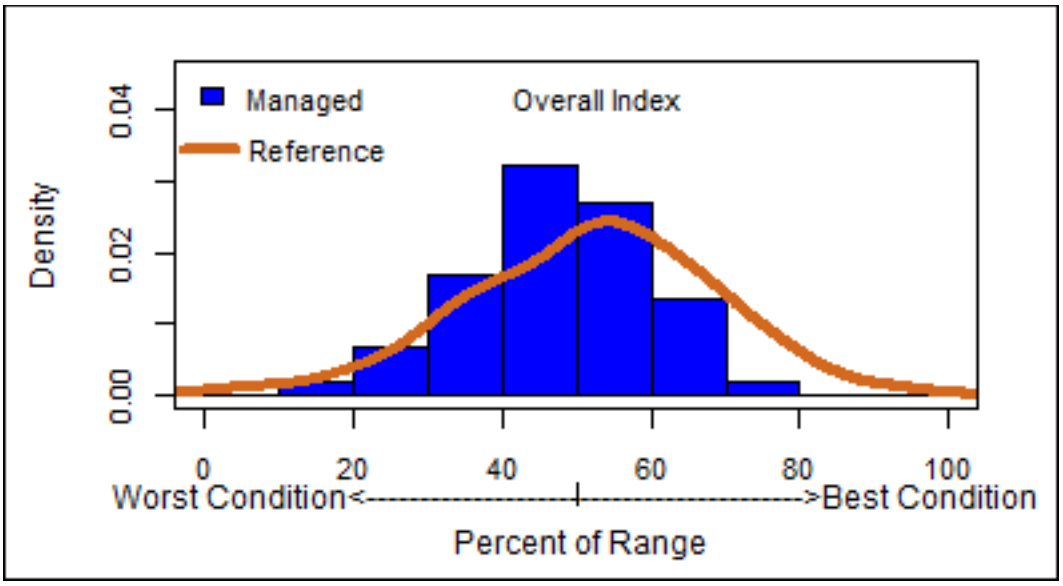

Figure 9. MON-STRM-02: Overall Index values across the Lolo National Forest. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Figure 10 displays residual pool depths indexes. Much could be evaluated with pool depth data. Focusing on a two observations, and similar to the overall index values, the "Reference All" streams have a wider range than "Managed Area" streams. Average pool depths in managed streams are notedly less than reference streams, but with deviation and ranges that are within reference conditions.

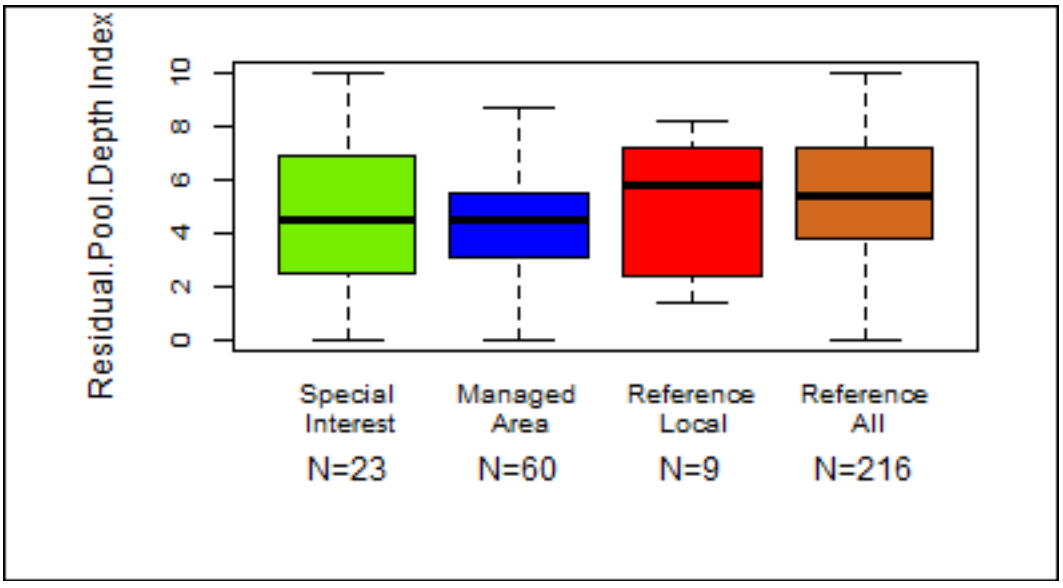

Figure 10. MON-STRM-02: Residual Pool Depth Index values across the Lolo National Forest. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

Figure 11 presents that same data as Figure 10 with a different chart presentation. As with habitat index values, the majority of streams in managed watershed (blue bars) are within reference conditions;

however, there is marked shift to the left and worse conditions (i.e., some managed streams have pool depths that are significantly less than reference conditions, although most streams are within reference conditions).

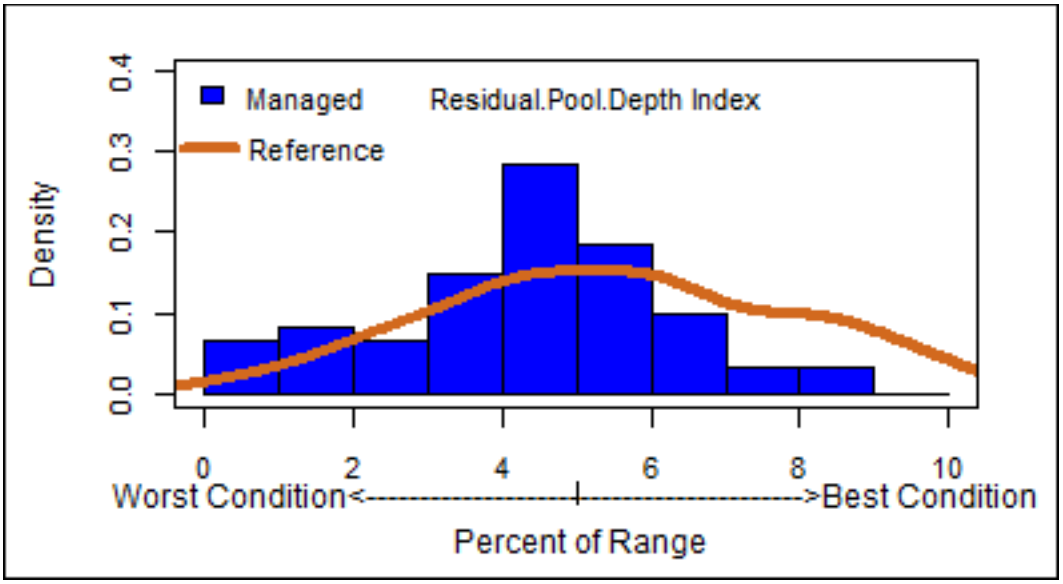

Figure 11. MON-STRM-02: Residual Pool Depth Index values across the Lolo National Forest. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Figure 12 displays the percentage of pools within the stream reach surveyed. Streams in managed/developed watersheds appear to have the same number of pools per unit length than reference conditions. Interestingly, the "Special Interest" streams have a higher frequency of pools for which more data collection and assessment of individual sites is necessary to understand further. Some of the special interest streams are in higher order systems, which typically have more pool habitat than higher order streams, although there could be additional reasons as well.

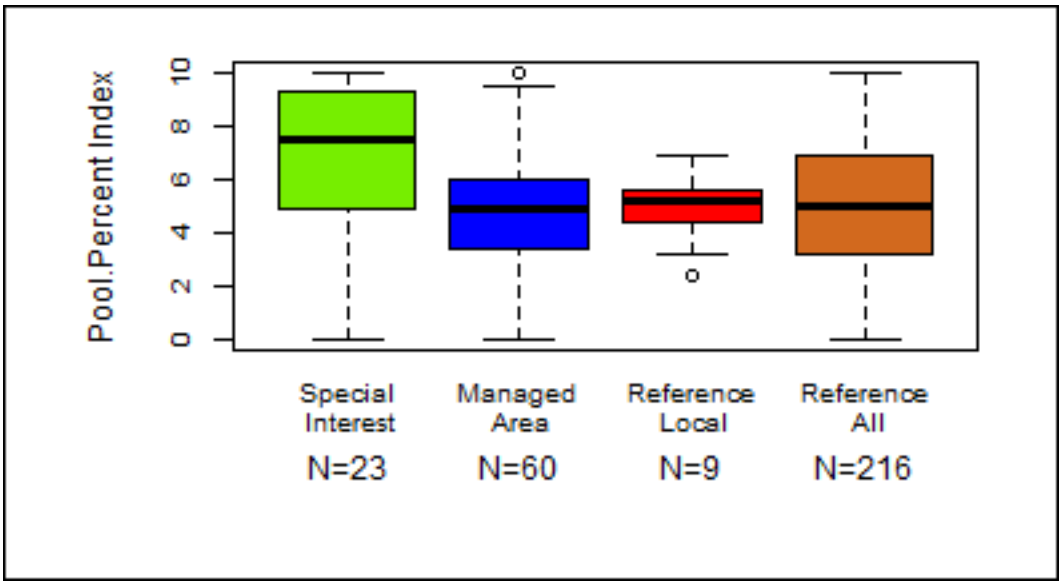

Figure 12. MON-STRM-02: Pool Percent Index values across the Lolo National Forest. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

Figure 13 displays the same data as Figure 12, but with a histogram display (similar to the others). Once again, pool frequencies in managed/developed watersheds are within reference conditions with a few streams with lower amounts, which skews the data to the left or having worse conditions.

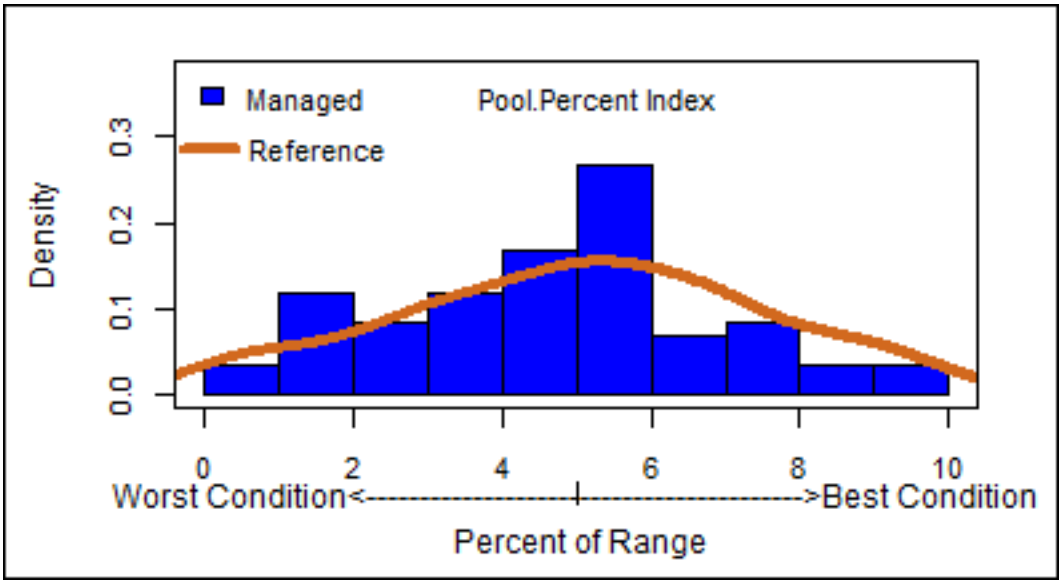

Figure 13. MON-STRM-02: Pool Percent Index values across the Lolo. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Medium substrate indexes for streams in managed/developed and undeveloped watersheds are all within the same standard of deviation with similar averages as displayed in Figure 14.

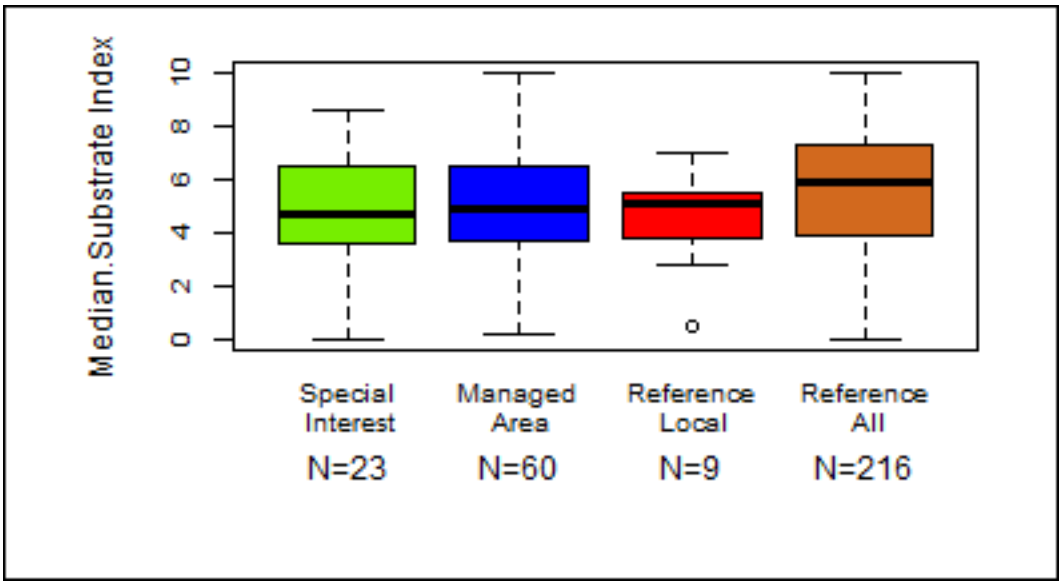

Figure 14. MON-STRM-02: Median substrate Index values across the Lolo National Forest. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

In Figure 15, stream substrates in non-developed watersheds appear largely within reference conditions; however, data results show the same shift towards worse conditions for managed watersheds, similar to other metrics displayed herein.

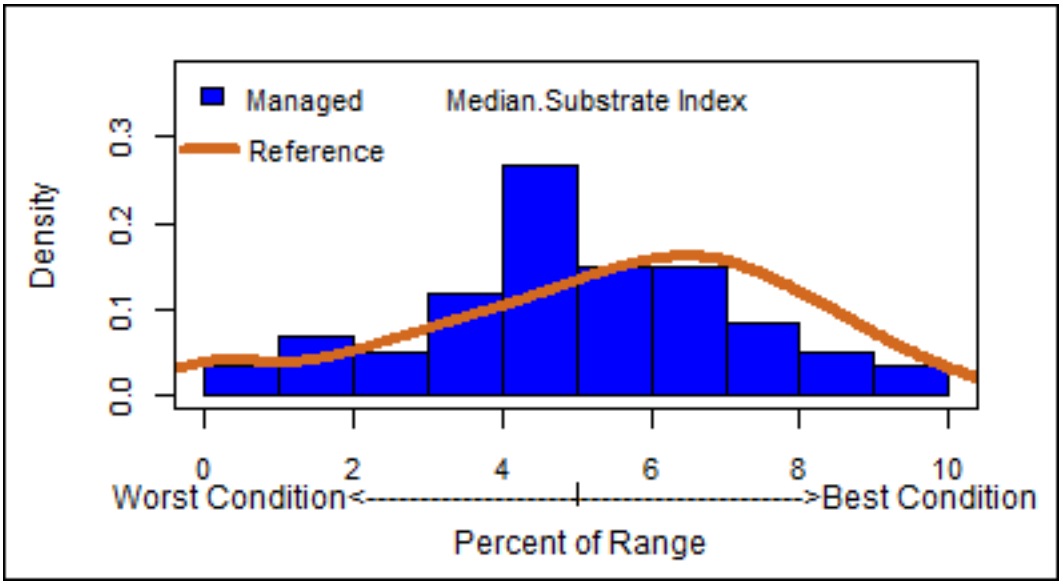

Figure 15. MON-STRM-02: Median substrate Index values across the Lolo. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Pool fines appear to be similar in developed and non-developed watersheds with similar deviations. Of interest, the deviation and range for local reference streams is much less than either overall reference conditions or streams in developed watersheds; however, again the sample size is much less than other data sets.

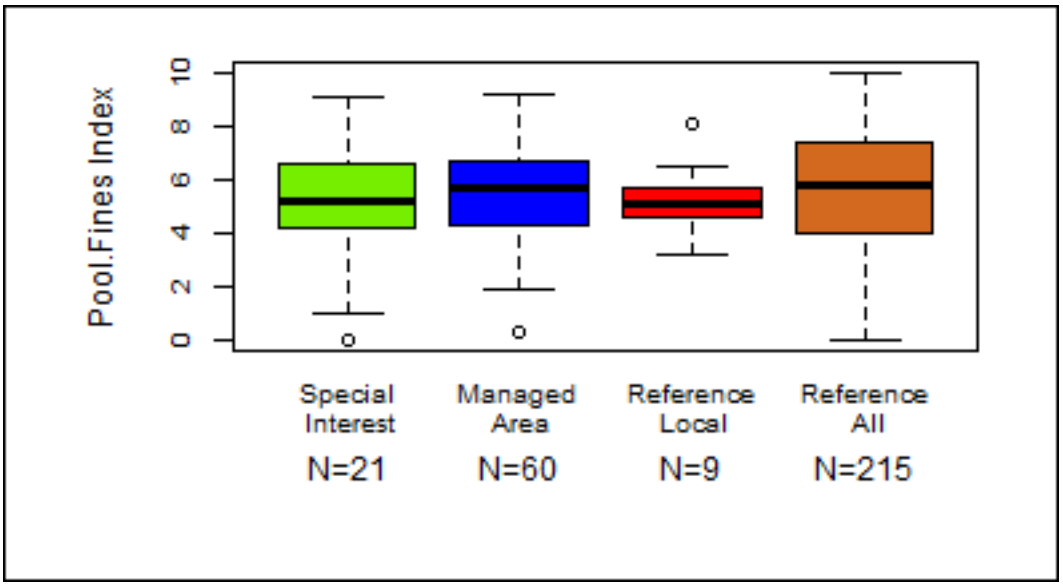

Figure 16. MON-STRM-02: Pool Fines < 6 mm Index values across the Lolo. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

In Figure 17, pool fines in developed watersheds are primarily within reference conditions with some streams in developed watersheds appearing to have a slightly higher level of fines than streams non-developed watersheds (and typically higher fines equates to worse habitat conditions).

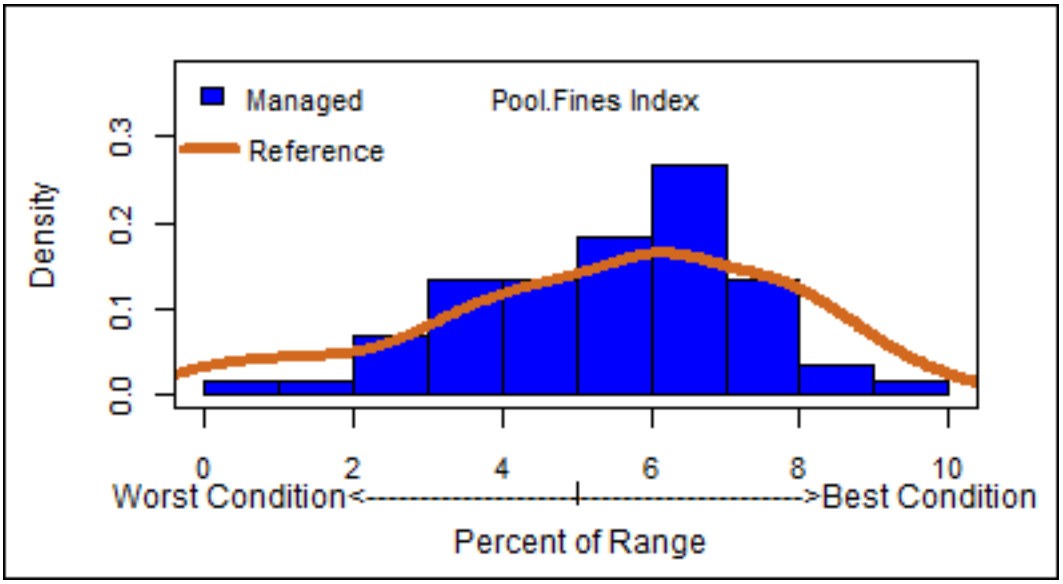

Figure 17. MON-STRM-02: Pool Fines < 6 mm Index values across the Lolo. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Wood frequency is displayed in Figure 18. On average, stream wood frequencies are higher in reference/non-developed watersheds than developed watersheds. The standard deviations for both managed and special interest streams are lower than the standard deviations for reference conditions. And once again, the overall reference conditions are showing wider ranges of variance.

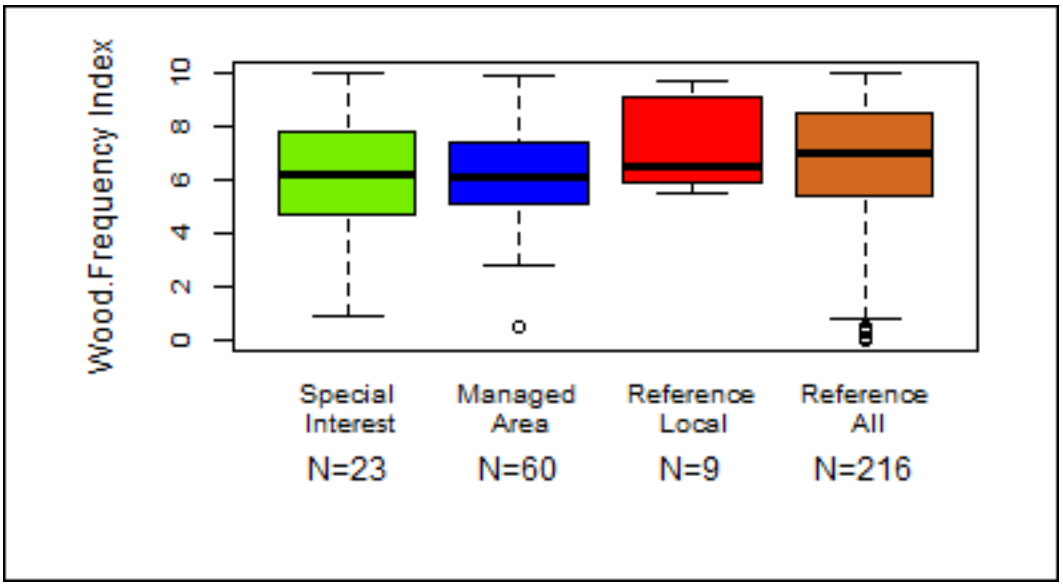

Figure 18. MON-STRM-02: Wood Frequency Index values across the Lolo. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

In Figure 19, there appears to be a greater shift to the left, or worse conditions, relative to wood amounts in developed watersheds as compared other metrics and reference conditions.

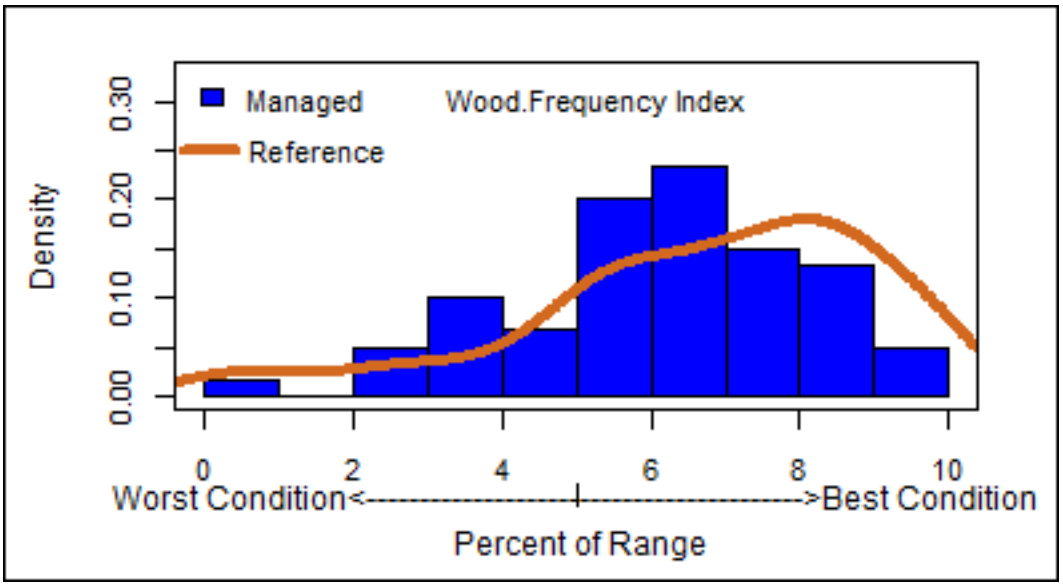

Figure 19. MON-STRM-02: Wood Frequency Index values across the Lolo. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Bank angles generally are all with the same standard deviation and ranges (Figure 20). Average values are indicating higher values in developed watersheds than overall reference (i.e., banks are more "layed back" or sloping, as opposed to vertical or overhanging).

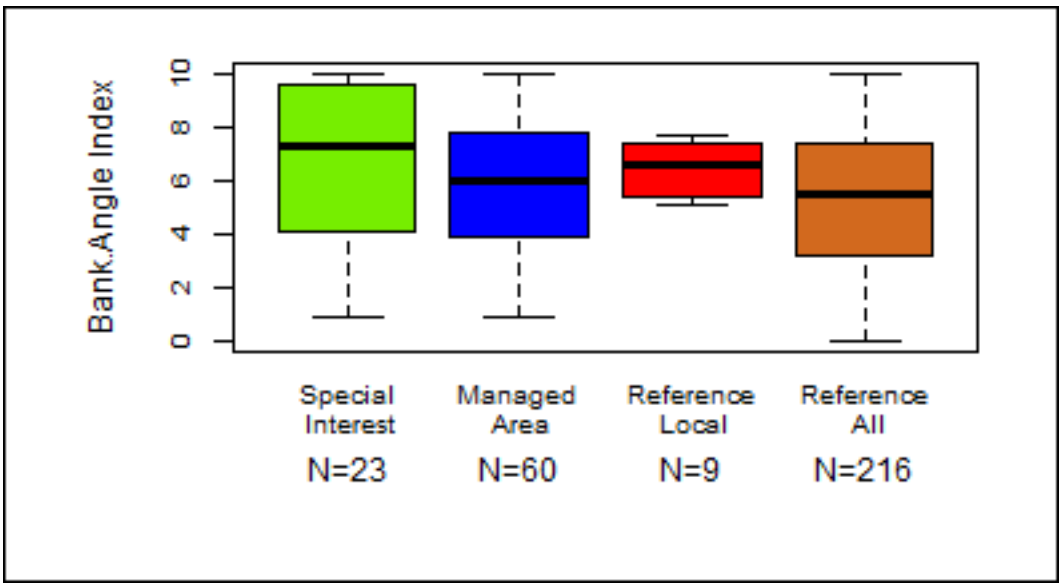

Figure 20. MON-STRM-02: Bank Angle Index values across the Lolo. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

Figure 21 helps substantiate what is shown in Figure 20, bank slopes are similar in developed and non-developed watersheds with indications that developed watersheds are skewed to the right (i.e., some streams have higher bank slopes, which likely is a result of greater bank erosion; more refined assessment is needed to be more conclusive).

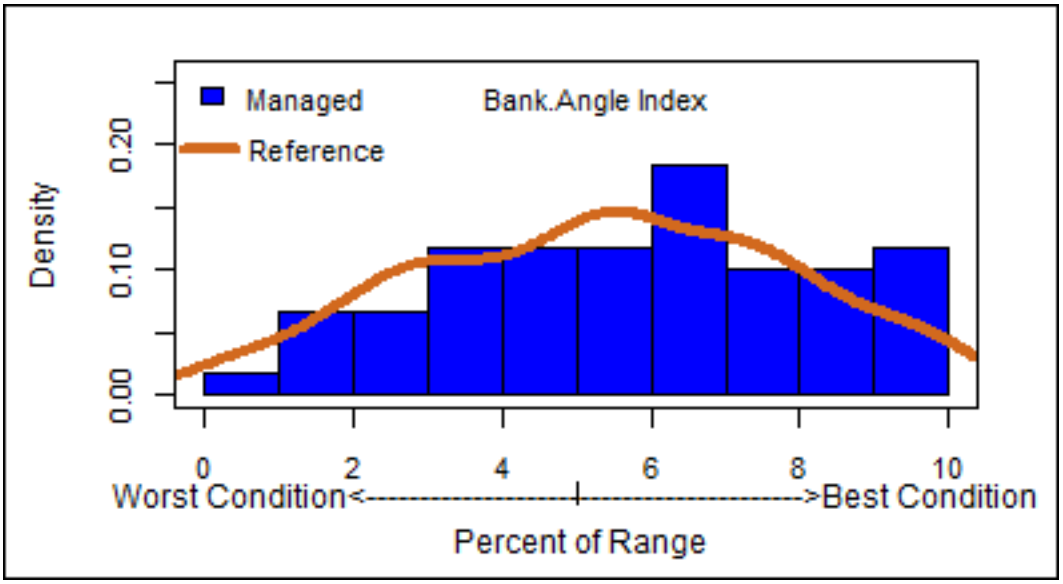

Figure 21. MON-STRM-02: Bank Angle Index values across the Lolo. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Macroinvertebrate indexes appear similar between all watersheds - managed streams have slightly lower average values and slightly higher range (Figure 22 and Figure 23).

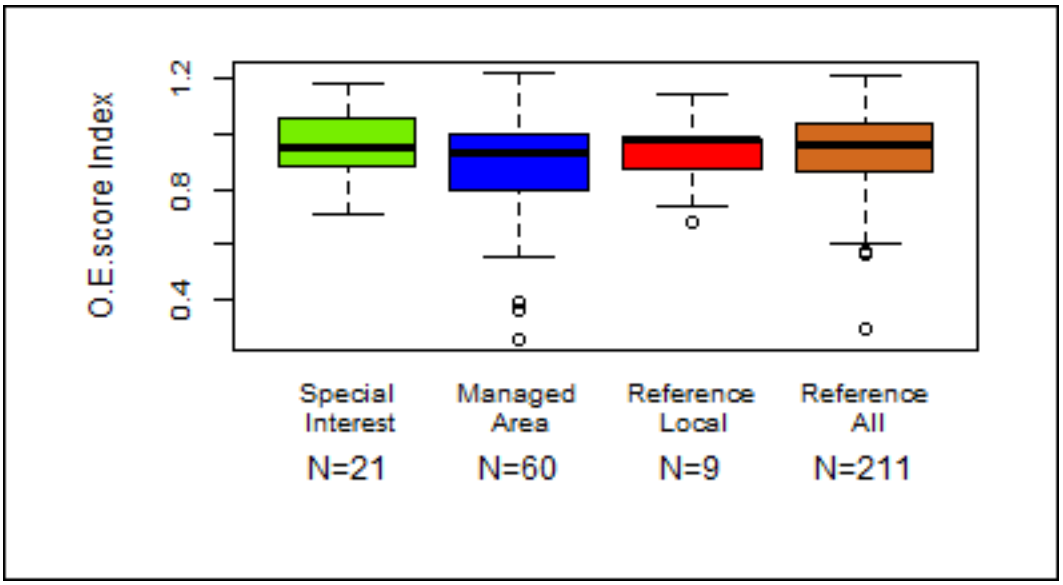

Figure 22. MON-STRM-02: O/E Macroinvertebrate score Index values across the Lolo. Median and range of index values for special interest (contracted) sites, managed sites, reference sites within the area of evaluation, and reference sites for the entire PIBO study area.

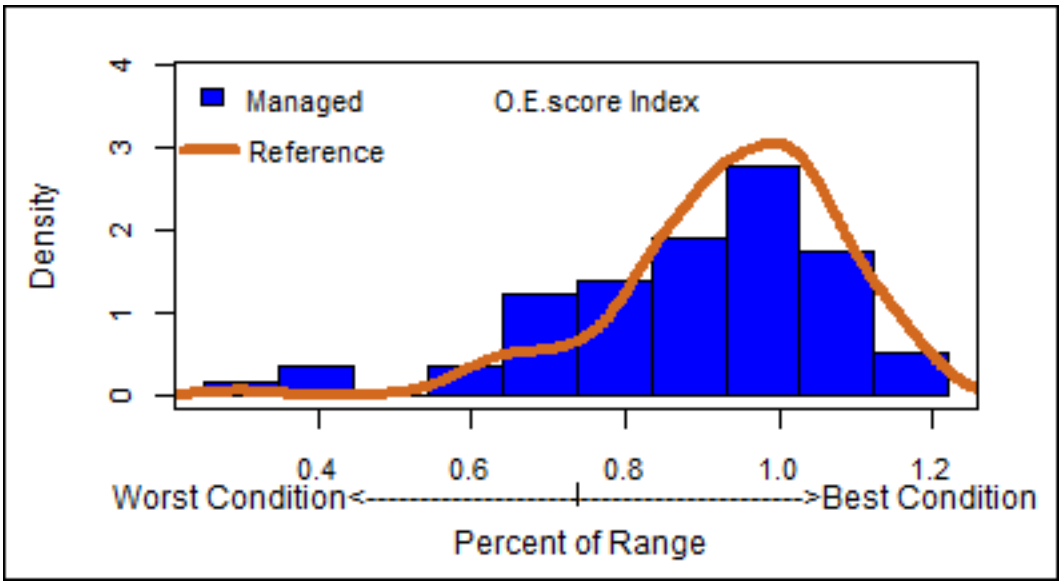

Figure 23. MON-STRM-02: O/E Macroinvertebrate score Index values across the Lolo. Distribution of index values for managed reaches (histogram) compared to expected values at reference reaches (the line graph). Close matches between histogram height and line indicate conditions are similar at managed and reference reaches.

Results of 2011 to 2020 stream monitoring data are most comprehensively provided by a story map here: http://bit.ly/Lolo National Forest-Stream-Temps-2020

In addition, we compare the measured current year's values with NorWeST modeled (http://www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html) average august mean temperatures at our sampling stations. Findings are summarized as follows:

- Significant differences exist between measured August mean temperatures and Norwest projections for several streams on the Lolo National Forest.
- Several priority streams for native fisheries have temperatures that likely compromise or impair population dynamics.
- The Lolo's data sites combined with other agency data provides a substantive network of stream data that enables a longitudinal profile of stream temperature dynamics in several streams, and highlights where interagency coordination could greatly improve and expand the comprehensive network to address key/critical issues.

Evaluation of Results for Adaptive Management Finding

The following findings and recommendations resulted from the evaluation of monitoring results.

- Future monitoring efforts should reduce the list of indictors associated with MON-STRM-02 because the question can be adequately addressed with fewer indicators.
- Although the majority of streams on the Lolo are within PIBO reference conditions, as described herein, local conditions and some specific watersheds have worse habitat conditions than reference streams. With additional funding, future monitoring efforts could increase PIBO stations in specific watersheds of concern to refine data and track trends.
- It would be advantageous to utilize the Lolo National Forest's Watershed Climate Change Vulnerability Assessment, WCCVA, findings for bull trout in combination with the PIBO data presented herein. The WCCVA highlights which streams have conditions that are most vulnerable and favorable to bull trout (and thus other native fish species) under realistic climate change scenarios. PIBO data would help inform specific stream conditions (which have different climate change vulnerabilities) for which existing management protections or improvements could be refined and prioritized. Additional PIBO surveys could be funded where data gaps exist. Further, this data could be combined with recent bull trout minimal "patch-size"/metapopulation data for relatively robust approach for management to "protect the best" and prioritize "restoring the rest" of streams for optimal native fish viability.

Table 46. MON-STRM-02: Summary of findings

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-STRM-02: What is the condition of instream native fish habitat?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired. Management is resulting in high quality conditions throughout the majority of streams on the Lolo National Forest.	Yes, recommend the following: Reduce the list of indictors associated with MON-STRM-02. Update data sources to include the Lolo National Forest's Watershed Climate Change Vulnerability Assessment (WCCVA).	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-STRM-03

Plan Component(s) being assessed by this monitoring item:

Objectives – "This Forest Plan improves the environmental quality of the Forest…that emphasizes…enhancement of wildlife and fish habitats…" (p. II-2). "The Lolo Forest Plan provides habitat for viable populations of the diverse wildlife and fish species on the Forest…" (p. II-2).

Desired Future Condition (DFC) – "Fisheries on the Forest will have improved slightly…" (p. II-7). "Fisheries on the Forest will have improved. Fish habitat improvements accomplished during the first decade will have had a maintenance program that protected the improvements" (p. II-8). "Fisheries on the Forest will have improved slightly…" (p. II-7). "Fisheries on the Forest will have improved. Fish habitat improvements accomplished during the first decade will have had a maintenance program that protected the improvements" (p. II-8).

Standard 28 – "Land management practices shall be designed to have a minimum impact on the aquatic ecosystem, free from permanent or long-term unnatural imposed stress" (p. II-14). "Project level assessments will address the potential impacts of management activities on off-Forest aquatic resources by considering and evaluating downstream data wherever available" (p. II-14).

Management Areas (MA) – See MA 13 (p. III-56 to III-63).

Forest Plan Amendment 21A - Inland Native Fish Strategy (INFISH) – "The goals establish an expectation of the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. Since the quality of water and fish habitat in aquatic systems is inseparably related to the integrity of upland and riparian areas within the waters, [t]he strategy identifies several goals for

watershed, riparian, and stream channel conditions" (see Riparian Goals 1-8) (INFISH p. A-1 to A-2). Also see INFISH Objectives, Standards and Guidelines, and Monitoring (INFISH p. A-2 to A-15).

Table 47. MON-STRM-03: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-STRM-03: What is the condition of riparian habitat conservation areas including wetlands?	Acres of Riparian Habitat Conservation Areas (150/300 feet from stream or wetland) with intact native plant species and seral climax species assemblages. (U) Miles of road within 150/300 feet of stream (in RHCAs). (N) Miles of trail within 150/300 feet of stream (in RHCAs). (N) Miles of open/restricted (travel mgmt.) within 150/300 feet of stream (in RHCAs). (N)	Biennially or for specific project purposes	Natural Resource Information System (NRIS) Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) INFRA Database Watershed Improvements Tracking (WIT) PacFish InFish Biological Opinion (PIBO) Metrics (macroinvertebrates, bank angle, wood frequency, percent fines, residual pool depth, percent pools, median substrate size (D50), overall habitat indicators) improved. Project RHCA condition surveys. VMAP vegetation mapping	Traci Sylte, Lolo Forest Soil, Water, and Fisheries Programs Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 48. MON-STRM-03: Monitoring Collection Summary

MON-STRM-03	Year
Data was last collected or compiled in:	2019
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	NA
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Table 50 displays a summary of the monitoring question for MON-STRM-03 as revised during the Planning Rule Transition effort accompanied by indicator(s) that may be used to assist with addressing the question, Forest Plan Components monitored, potential data sources, and a point of contact. Table 51 displays the general monitoring collection schedule.

Monitoring findings for this item are presented for the first indicator, Acres of Riparian Habitat Conservation Areas, RHCAs, with intact native plant species and late seral plant assemblages, because this indicator is most relevant in directly addressing management protections of RHCA condition (which includes wetlands). The other indicators provide data on existing conditions, but don't address RHCAs as well as monitoring RHCA's directly. Further, if RHCAs are protected, it is assumed that riparian

vegetation will remain intact and trending naturally towards late climax stages (excluding climate change effects on riparian vegetation, which are currently unknown).

Based on Forest Plan Amendment 21A, Inland Native Fish Strategy (INFISH), Lolo National Forest management activities should avoid RHCAs unless actions improve riparian management objectives. In 2019 and 2020, two monitoring efforts addressed RHCA protections: annual National Best Management Practices, BMP, monitoring (Timber harvest activity), and timber salvage monitoring to address Fish and Wildlife Service bull trout consultation needs (Liberty Insect and Disease Salvage Sale).

Methods

To improve efficiency and accountability in management of water quality and aquatic resources, the Forest Service developed a National Best Management Practice Monitoring Program in 2013. National Forests are required to monitor a variety of management activities annually and report results on a two-year schedule. Fourteen activity types such as timber harvest, road management, recreation, water uses, among others are assigned to forests to monitor. Sites are determined either randomly or intentionally to address land management plans or other monitoring needs. As part of assessments, resources specialists address whether activities were implemented as intended (implementation monitoring) and effective in meeting water quality objectives (effectiveness monitoring). Results from Best Management Practice monitoring are entered into the National Best Management Practice Monitoring Database. Data available from these reports are used to summarize the findings and inform management of corrective action needs and adaptive manage strategies. More detail on methodologies, visit the National Best Management Practice Program Internet site at http://www.fs.fed.us/biology/watershed/BMP.html.

Monitoring associated with USFS projects under consultation with the FWS is tied directly to the Endangered Species Act requirements. On the Liberty Fire Salvage Project monitoring of RHCAs was required to determine if the following FWS terms and conditions were adhered. Methods involved a forest biologist assessing the following provisions relative to RHCA health and protections:

- No timber harvest is allowed in RHCAs within the project area.
- If trees must be removed within RHCAs because of safety hazards, they must be removed by hand and left remaining within the RHCA.
- All log decks will be located outside of the RHCAs.
- Mechanical equipment will not be maintained or stored within RHCAs.

Results and Discussion

Lolo National Forest RHCA monitoring results from the National Best Management Practice monitoring program and FWS terms and conditions monitoring on the Liberty Fire Salvage Project are as follows:

- National Best Management Practice monitoring:
    - Implementation: RHCAs were protected throughout the corridor length within the timber harvest unit and actions were determined “fully implemented”; however, the final result was designated “mostly implemented” because the RHCA was not marked on the Sale Area Map.
    - Effectiveness: Activities were deemed “Effective” because the required no-activity buffers (RHCA) between activity and stream/wetland were maintained.
- Liberty Insect and Disease Salvage Sale:

- Monitoring of buffer effectiveness on Liberty Fire Salvage indicated they were entirely effective at protecting RMOs where full buffer distances were observed around salvage units.
- Multiple log decks were monitored and one (Figure 24) was mistakenly located within the RHCA buffer of an intermittent stream. At the time that the deck was created, snow cover and a relatively undefined, dry channel made it difficult for winter operations to discern the channel and associated buffer. The RHCA condition and sediment indicators were somewhat affected because the stream becomes sub-surface prior to entering Boles Creek and there was no surface water connection. Adaptive management actions were noted, and it was determined that the biologist would accompany timber specialists with future efforts and assure that RHCAs were marked sufficiently.

Figure 24. MON-STRM-03: Log deck inadvertently placed within RHCA buffer (green line sketch) of intermittent stream during Liberty Fire Salvage 2018.

These monitoring results indicate that RHCAs were delineated, and protections applied within two timber harvest projects, and management activities were primarily adhering to required protections. Monitoring exposed one minor departure where impacts occurred within the RHCA (Figure 24); however, it is important to note that these findings were within the larger context of multiple harvest units where no departures were observed. These findings are promising indicators of active forest plan compliance with required RHCA protections. More monitoring is needed to determine if compliance is occurring on a greater forest-wide effort and scale.

Evaluation of Results for Adaptive Management Finding

The following findings and recommendations resulted from the evaluation of monitoring results.

Recommendation for change in monitoring program: A greater number of forest management activities need to be monitored such as multiple projects across the forest over the past 2 or so years. Were roads/trails removed or added in RHCAs, were travel restrictions applied, was there an increase or decline in acres of RHCA with intact species.

Table 49. MON-STRM-03: Summary of findings

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-STRM-03: What is the condition of riparian habitat conservation areas including wetlands?	2021	(B) Uncertain. More time/data are needed to understand status or progress of the item.	Yes, it is recommended to expand use of indicators for this monitoring item.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Timber

MON-VEG-01

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1).

Objectives – The timber program approximates the annual average volume offered for the past ten years; it is designed to accommodate fluctuations in the market and meet the needs of local mills within the decade's allowable sale quantity" (p. II-1). "Overall, Lolo Forest Plan provides for the maintenance of a diverse mosaic of vegetational development, well distributed across the Forest to ensure ecological integrity" (p. II-2).

Desired Future Condition (DFC) – "Timber harvests may have taken place on 171,000 acres at an average annual level of 107 million board feet of regulated harvest" (p. II-6). Reforestation will have been accomplished on 88,460 acres…" (p. II-6). There will have been a change in the Forest-wide distribution of mature age classes…" (p. II-7).

Standards 10-13 – "Regional standards will be followed for tree utilization, management intensity, measurement…" (p. II-11). "The guideline in Appendix G will be used for selecting timber harvest systems…" (p. II-11). "Increase the use of the available wood fiber consistent with management objectives and economic principles" (p. II-11).

Management Areas (MAs) – see timber practices under each MA allocation to determine timber practices for other resource objectives (p. III-1 to III-149).

Table 50. MON-VEG-01: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-VEG-01: What vegetation management activities have been conducted to maintain or restore forest resiliency?	Acres regeneration and removal harvests. (N) Acres artificial and natural regeneration from prior regeneration harvests. (U) Acres intermediate harvest to reduce forest density. (N) Acres stand improvement activities. (N) Acres mechanical fuels treatments not related to timber harvest. (N) Acres of prescribed burning. (N) Acres of artificial and natural regeneration following wildfire. (Y) Acres treated to decrease conifer encroachments or improve native grassland/shrubland communities (through weed treatments or prescribed fire). (N) Acres treated to restore forest pattern (harvest and prescribed burn larger than 40 acres, natural fire, and group selection harvest where patches emulate natural patch size). (N)	2 years	Natural Resource Information System (NRIS) Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) Unit Silviculture Prescriptions Unit Marking Guides Unit Burn Plans Project level analysis and NEPA documentation. Timber Sale Unit maps and contracts. Region 1 Restoration & Resiliency reports.	Kurt Wetzstein, Lolo Forest Vegetation Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 51. MON-VEG-01: Monitoring Collection Summary

Collection Summary	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2010
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

Methods

The Forest Service Activity Tracking System database, also known as FACTS was the primary database of record to summarize the information presented below, which allows tracking of activities related to fire/fuels, silviculture, and invasive species as well as monitor NEPA decisions and create and manage K-V trust fund plans at the timber sale level. The application tracks on-the-ground activities from NEPA to accomplishment tabularly and spatially.

Additionally, the Natural Resource Manager (NRM) FACTS Table 27 Reforestation/TSI produced the accomplishments related to reforestation activities.

The Region 1 Restoration & Resiliency reports (USDA Forest Service, 2019, Restoration and Resiliency Treatment Accomplishments Leading to a More Resilient Forest and Grassland Condition) supplied the data pertaining to improving native grassland/shrubland communities (through weed treatments or prescribed fire). The Restoration and Resiliency Report documents the treatments each year that trend vegetation towards resilient desired conditions. The intent of the report is to show where Forests are managing for a range of forest and non-forest vegetation desired conditions, including the improvement or maintenance of resilient, native wildlife habitat (such as persistent hard snags from ponderosa pine (PP) and western larch (WL)) where such types have decreased in extent throughout the Forest and Region.

Results

Accomplishments for the period of 2018-2020 are summarized below using the indicators identified above; the data source is listed for each group of activities.

Table 52. MON-VEG-01: Vegetation treatment summary, 2018-2020.

Activity	2018 Acres Accomplished	2019 Acres Accomplished	2020 Acres Accomplished	Data Source
Acres regeneration and removal harvests.	5,023	3,061	3,828	FACTS ACTV160 Query
Acres artificial and natural regeneration from prior regeneration harvests.	Planting: 126 Natural Regen: 9	Planting: 37 Natural Regen: 124	Planting: 167 Natural Regen: 111	NRM REF/TSI Report App. Table 27
Acres intermediate harvest to reduce forest density.	264	918	3,593	FACTS ACTV160 Query
Acres stand improvement activities.	1,763	403	1,366	FACTS ACTV160 Query
Acres mechanical fuels treatments not related to timber harvest.	9,295	3,610	5,035	FACTS ACTV160 Query
Acres of prescribed burning.	9,674	7,727	1,909	FACTS ACTV160 Query
Acres of artificial and natural regeneration following wildfire.	Planting: 977 Natural Regen: 4,215	Planting: 1,244 Natural Regen: 3,635	Planting: 2,427 Natural Regen: 6,569	NRM REF/TSI Report App. Table 27
Acres treated to decrease conifer encroachments or improve native grassland/shrubland communities (through weed treatments or prescribed fire).	Weed treatment acres: 7,258	Weed treatment acres: 3,058	Data not available at time of report	R1 Restoration Resiliency Guide

Acres treated to restore forest pattern (harvest and prescribed burn larger than 40 acres, natural fire, and group selection harvest where patches emulate natural patch size) is depicted in the following tables, with data summarized from the FACTS database.

Table 53. MON-VEG-01: Acres of prescribed burning activities and natural ignition wildfire for patches larger than 40 acres in size.

Year Accomplished	Acres of Broadcast Burning - Covers a majority of the unit	Acres of Underburn - Low Intensity (Majority of Unit)	Acres of Burning of Piled Material	Acres of Wildlife Habitat Prescribed fire	Acres of Wildfire - Natural Ignition	Acres - Grand Total
2018	n/a	5,386	282	558	228,168	234,394
2019	n/a	3,700	495	n/a	n/a	4,195
2020	511	398	399	n/a	n/a	1,308
Grand Total	511	9,484	1,176	558	228,168*	239,897

*Wildfires are reported in FACTS once they are contained. The fires that occurred in 2017 were not determined to be contained until after October 1, which is Fiscal Year 2018. These reports are on a Fiscal Year basis.

Table 54. MON-VEG-01: Acres of intermediate harvest activities for patches larger than 40 acres in size.

Year Accomplished	Acres of Wildlife Habitat Intermediate cut	Acres of Commercial Thin	Acres of Improvement Cut	Acres of Liberation Cut	Acres of Sanitation Cut	Acres of Harvest Without Restocking	Acres - Grand Total
2018	411	n/a	165	n/a	41	n/a	617
2019	126	192	n/a	n/a		177	495
2020	n/a	767	1,876	43	57	n/a	2,743
Grand Total	537	959	2,041	43	98	177*	3,678

*177 acres of harvest without restocking shown above is not a common practice; in this instance additional ski runs were created at Montana Snowbowl. Harvest without restocking is not an intermediate harvest method but is presented here for ease of viewing.

Table 55 and Table 56 below in combination summarize the various regeneration harvest methods conducted between 2018 and 2020. They are split into two tables to accommodate formatting.

Table 55. MON-VEG-01: Acres of regeneration harvest activities for patches larger than 40 acres in size.

Year Accomplished	Acres of Seed-tree Seed Cut (with and without leave trees)	Acres of Shelterwood Establishment Cut (with or without leave trees)	Acres of Shelterwood Preparatory Cut	Acres of Single-tree Selection Cut	Acres of Stand Clearcut
2018	96	40	n/a	n/a	243
2019	45	n/a	n/a	98	n/a
2020	n/a	46	117	199	n/a
Grand Total	141	86	117	297	243

Table 56. MON-VEG-01: Acres of regeneration harvest activities for patches larger than 40 acres in size, including the grand total by year for all regeneration harvest activities.

Year Accomplished	Acres of Stand Clearcut (w/ leave trees)	Acres of Two-aged Seed-tree Seed and Removal Cut (w/reserves)	Acres of Two-aged Shelterwood Establishment and Removal Cut (w/ res)	Acres of Two-aged Shelterwood Establishment Cut (w/res)	Acres - Grand Total
2018	705	210	100	n/a	1,394
2019	190	492	170	290	1,285
2020	250	724	507	n/a	1,843
Grand Total	1,145	1,426	777	290	4,522

Per the FACTS business rules, activities are accomplished when a contract (timber sale contract, tree planting contract, etc.) is awarded to a contractor, so the year accomplished presented above is the year those activities were awarded; this is often not the same as the year the work gets completed on the ground. For example, for many of the fire salvage timber sale contracts that were awarded (accomplished) in 2018, work was completed on the ground in 2018, 2019 and 2020, with several contracts closing near the end of fiscal year 2019.

Following the substantial fire year on the Lolo National Forest in 2017, the timber program focused on fire salvage harvest activities in 2018. This is reflected by the relative increase in acres above in 2018 for regeneration harvest relative to 2019 and 2020. Following that effort, the timber program of work returned focus on green sales in 2019 and 2020.

Discussion:

Very little information from prior monitoring efforts can be used on a comparative basis to current data, as the methods used previously did not quantify accomplishments in a similar fashion (acres accomplished), with a few exceptions.

The 2000-2001 Forest Plan Monitoring Report included information regarding harvest greater than 40 acres in size: “No even-aged harvest units exceeded 40 acres during fiscal years 2000 and 2001. . . but Twenty even-aged harvest units have exceeded 40 acres during the 15-year period (fiscal years 1987 through 2001).”

It also included the table below depicting harvest activities that occurred from 1987-2001.

Table 57. MON-VEG-01: 2000-2001 Lolo Forest Monitoring Report – Table 3-12A. Outputs – Actual vs. Projected Silvicultural Activities, 1987-2001

Activity	Forest Plan Projected Annual Average (acres)	Actual Annual Average to Date (acres)	Percent of Projected
Silvicultural Exams	62,000	42,000	68%
Clearcut Harvested	NA	941	NA
Seed Tree Harvested	NA	930	NA
CC & ST Harvested	3,700	1,876	51%
Shelterwood Harvested	10,320	726	7%
Overstory Removal Harvested	NA	319	NA
Selection Harvested	1,670	215	13%
Sanitation/Salvage Harvested	NA	887	NA
Commercial Thinning	200	434	198%
Timber Stand Improvement (appropriated)	773	861	111%

Drawing a comparison to that reporting period, 6,328 acres of regeneration and intermediate harvest occurred, or an average of 422 acres per year. The annual average using current data (Table 52 above, 2018-2020) shows an average of 5,562 acres of intermediate and regeneration harvest accomplished per year, or an increase of roughly twelve-fold.

Vegetation management practices during this reporting period have helped support the economic structure of local communities as well as providing for regional and national needs by supplying wood to meet lumber demands and provided for the maintenance of a diverse mosaic of vegetational development distributed across the Forest to ensure ecological integrity, thereby maintaining, and restoring forest resilience.

Evaluation of Results for Adaptive Management Findings

Table 58. MON-VEG-01: Summary of Findings

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-VEG-01: What vegetation management activities have been conducted to maintain or restore forest resiliency?	2021	(E) Yes. Vegetation management activities are providing a sustained yield of forest products and provide for the maintenance of a diverse mosaic of vegetational development.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-VEG-02

Plan Component(s) being assessed by this monitoring item:

Objectives – "Roads will be kept to the minimum number and size needed to support resource management; most roads will be closed when projects are completed to protect resource values (p. II-2).

Standards 48, 49, and 52 – "Motorized vehicles will be limited to system roads and trails which are designated open in the Lolo Forest Travel Plan" (p. II-17). "Lolo National Forest roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user, and resource needs" (p. II-17). "Manage Forest roads to provide for resource protection, wildlife needs, commodity removal, and a wide range of recreation opportunities. In most areas on the Forest, this will involve leaving some roads open, closing some roads seasonally, and closing other road on a permanent basis" (p. II-18).

Management Areas (MA) – see specific road practices by MA (p. III-2 to III-149).

Table 59. MON-VEG-02: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-VEG-02: Is vegetation established on temporary roads within 10 years of closure?	Miles of temporary road constructed to contract standard; cleared and grubbed with retention of topsoil, grasses, and forbs (inoculates), coarse woody debris, and other materials set aside so they may be placed back on road surface when closed. Miles of temporary road surface decommissioned; prepared for vegetation establishment with scarification, ripping, recontouring or other closure technique, coarse woody debris placement, and seeded with forest vegetation including native forbs and grasses, or brush or trees.	2-yr collection interval.	Timber sale contracts. Timber sale inspection reports. Soil monitoring surveys. Road surveys. Weed surveys.	Tony Saba, Forest Timber Management Officer

(*Influenced by climate change? Y, N, Uncertain)

Table 60.MON-VEG-02: Monitoring Collection Summary

MON-VEG-02	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2022
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	N/A
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	N/A

This question not only pertains to sufficient establishment of vegetation on closed temporary roads after timber harvest/haul, but alludes to limiting motorized recreation and use by the public. Existing timber contracts ensure sufficient closure methods to limit the ability of vehicles to pass on closed temporary roads, along with reseeding to facilitate accelerated vegetative establishment.

Excerpt 52 on page II-18 in the Lolo Forest Plan covers a wide range of resource management concerns that revolve around temporary road construction. Generally, roads are to be managed for resource protection, wildlife needs, commodity removal, and a wide range of recreational opportunities. Temporary roads constructed for timber haul are closed on a permanent basis to provide for wildlife benefits, economics, and a variety of other resource benefits.

Results and Discussion

Methods

- Contract provision review of past timber contracts with temporary road construction and closure provisions. Verbal communication with timber sale administration team.

- A brief analysis on our existing program of work and entry into areas of prior management activity via closed temporary roads from ~20-30 years ago show that the Lolo National Forest has to make large investments for vegetation clearing when trying to access for timber sale prep work.

Results

Sale administration documentation of temporary road closures and acceptance of those closure methods, including seeding for revegetation of temporary roads.

The Lolo National Forest budgets ~ $50,000 annually to cut/remove vegetation on old temporary roads for timber sale preparation access related to the existing POW. Vegetation on these roads includes hardwood and conifer saplings anywhere up to 20 years of age, which gives the inference of tree seedling establishment and growth within 10 years after sale closures from 30 years ago.

Discussion

Timber sale administration reports document purchasers closing roads to the contract standard from past and existing timber sale contracts. This information does not provide details into desirable vegetative establishment within 10 years after post-harvest but does give insight as to closure effectiveness related to recreation user access. Contract specifications were developed to ensure that temporary roads receive the proper decommissioning methods that, when done properly, make it virtually impossible for motorized access. Proper erosion control features being constructed, along with vegetative seeding is also incorporated into the contract provisions, though the temporal scale of vegetative establishment comes later after all post-harvest operations have been completed.

Along with timber sale contract provisions, existing efforts into accessing old timber sale contract areas via closed temporary roads can be taken into account. The Forest is generally on 30-yr entry (cutting cycles) with designated forested stands throughout the Forest and access is needed for current efforts via old temporary roads. These roads, that were closed from 20-30 years ago, are grown in with grass, shrub and tree vegetation to where the Lolo National Forest makes investments of up to $50,000 annually to cut/remove and clear this vegetation for timber sale preparation crews access. Trees that are being cut and removed in these current efforts age up to 20 years, which gives the inference that these old temporary roads are not only establishing with herbaceous vegetation post-closure within 10 years, but also with natural tree establishment.

Evaluation of Results for Adaptive Management

Table 61. MON-VEG-02: Summary of findings

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-VEG-02: Is vegetation established on temporary roads within 10 years of closure?	2021	(E) Yes. Based on large annual budgets to cut and clear vegetation for timber sale preparations indicating that old temporary routes need the be cleared, because they have revegetated from previous actions.	Yes, Recommend the following: Update indicators used for this monitoring item with addition metrics that focus on post-sale activities.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-VEG-03

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1).

Objectives – The timber program approximates the annual average volume offered for the past ten years; it is designed to accommodate fluctuations in the market and meet the needs of local mills within the decade's allowable sale quantity" (p. II-1). "Overall, Lolo Forest Plan provides for the maintenance of a diverse mosaic of vegetational development, well distributed across the Forest to ensure ecological integrity" (p. II-2).

Desired Future Condition (DFC) – "Timber harvests may have taken place on 171,000 acres at an average annual level of 107 million board feet of regulated harvest…" (p. II-6). Reforestation will have been accomplished on 88,460 acres…" (p. II-6). There will have been a change in the Forest-wide distribution of mature age classes…" (p. II-7).

Standards 10-13 – "Regional standards will be followed for tree utilization, management intensity, measurement…" (p. II-11). "The guideline in Appendix G will be used for selecting timber harvest systems…" (p. II-11). "Increase the use of the available wood fiber consistent with management objectives and economic principles" (p. II-11).

Table 62. MON-VEG-03: Monitoring Item Summary

Monitoring Question	Indicators*	Data collection interval	Data Source/Partner	Point of Contact
MON-VEG-03: Is the volume of timber sold within the 10-year allowable sale quantity?	Timber volume sold (N) Firewood volume sold (N)	2-yr collection interval.	Timber Information Management (TIM) Reports	Tony Saba, Lolo Forest Timber Management Officer

(*Influenced by climate change? Y, N, Uncertain)

Table 63. MON-VEG-03: Monitoring Collection Summary

MON-VEG-03	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2022
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	1999
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2021

Results and Discussion

Methods

The data for insight regarding the amount of timber harvest off of the Forest vs. the amount allowed in Lolo Forest Plan was pulled from the agency Corporate Data Warehouse from the TIM program. A report called the PTSAR report allows us to obtain information on volumes eligible to be counted towards the Forest ASQ.

Results

As in previous years, timber sales in 2020 did not exceed the average annual ASQ. Regulated volume sold in 2020 was 57.2 MMBF, 53 percent of the 107 MMBF average annual ASQ. Table 3-10B displays the ASQ, sell target, and volumes offered and sold in FY 2020.Only sawtimber size material harvested from timber-suitable management areas is counted towards the ASQ and the "regulated" timber program. "Unregulated" volume is material smaller than sawtimber. Examples include firewood; certain cull, dead or noncommercial species or products; and all timber harvested from areas that are not in the commercial timber (suitable) base. This would include fire-killed timber salvaged from a timber-unsuitable management area or timber cut to improve wildlife habitat in a non-suitable area. Unregulated volume is not "charged" to the ASQ.

Table 64. MON-VEG-03: Timber Sale Program for FY 2020

Program	MMBF
Sell Target	63 MMBF
Offered	52.4 MMBF
Sold	62.8 MMBF
Sold Chargeable to ASQ	57.2 MMBF
Sold Non-Chargeable	5.6 MMBF

There is a high level of confidence in this data in that it came through our timber sale tracking system. Additional volume on top of what was offered in the 'sold' field comes from activities that are taking place in existing projects known as ad vol and the gap in salvage sales that were offered from burned timber.

Discussion

Data was analyzed annually over a 10-yr period. In FY 2020, the Lolo National Forest sold over 65 MMBF of timber harvest which was the most volume the Forest sold in nearly 15 years. That metric still fell way short of the 107 MMBF amount of volume projected by Lolo Forest Plan. Over the 10-yr period that was analyzed, average harvest was at a volume that was only about 30 percent of the allowable sale quantity assigned by Lolo Forest Plan. Volume analyzed was comprised of both sawlog and non-sawlog volumes offered in timber sale contracts and from permitted fuelwood purchased by the public.

Evaluation of Results for Adaptive Management Findings

Table 65. MON-VEG-03: Summary of findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-VEG-03: Is the Forest volume harvested exceeding the Plan ASQ?	2021	(E) Yes. Based on 10-yr period that was analyzed, average harvest was at a volume that was only about 30% of the allowable sale quantity assigned by Lolo Forest Plan	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-VEG-04

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1).

Objectives – The timber program approximates the annual average volume offered for the past ten years; it is designed to accommodate fluctuations in the market and meet the needs of local mills within the decade's allowable sale quantity" (p. II-1). "Overall, Lolo Forest Plan provides for the maintenance of a diverse mosaic of vegetational development, well distributed across the Forest to ensure ecological integrity" (p. II-2).

Desired Future Condition (DFC) – "Timber harvests may have taken place on 171,000 acres at an average annual level of 107 million board feet of regulated harvest …" (p. II-6). Reforestation will have been accomplished on 88,460 acres…" (p. II-6). There will have been a change in the Forest-wide distribution of mature age classes…" (p. II-7).

Standards 10-13 – "Regional standards will be followed for tree utilization, management intensity, measurement…" (p. II-11). "The guideline in Appendix G will be used for selecting timber harvest systems…" (p. II-11). "Increase the use of the available wood fiber consistent with management objectives and economic principles" (p. II-11).

Management Areas (MAs) – see timber practices under each MA allocation to determine timber practices for other resource objectives (p. III-1 to III-149).

Table 66. MON-VEG-04: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-VEG-04: Are harvested/burned stands in the suitable base restocked within 5 years?	Acres planted. Acres naturally regenerated. Acres certified regenerated.	2 years	Timber Sale Contracts and Maps (harvest units). FIRESTAT Wildfire Burned Area Emergency Response (BAER) Maps Regeneration surveys. Regeneration certifications. Natural Resource Information System (NRIS) Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) Silvicultural Prescriptions	Kurt Wetzstein, Lolo Forest Vegetation Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 67. MON-VEG-04: Monitoring Collection Summary.

MON-VEG-04	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2010
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

The National Forest Management Act of 1976, Section 6 (g) (3) (E) (ii) ensures that timber will be harvested from National Forest System lands only where there is assurance that such lands can be adequately restocked within five years after harvest.

Results and Discussion

Methods

The Forest Service Activity Tracking System database, also known as FACTS was the primary database of record to summarize the information presented below; it is the activity tracking application for all levels of the Forest Service. FACTS is the current database of record for the Forest Service to track certain activities. The application allows tracking of activities related to fire/fuels, silviculture, and invasive species as well as monitor NEPA decisions and create and manage K-V trust fund plans at the timber sale level. The application tracks activities from NEPA to on-the-ground accomplishment.

Additionally, the Reforestation Timeframe report displays the time from harvest until satisfactory stocking and certification based on data reported in the FACTS database. Regeneration harvests since 1976 are included. The report provides the basis for assuring restocking when planning regeneration harvest, as required by NFMA. The detailed report displays the activity units which met the criteria for each restocking category allowing silviculturists to determine trends or causes of successful or delayed regeneration. The report is run through the R1 Depot User Interface.

Results

Summarized data for 2018-2020 derived from FACTS for tree planting, certification as stocked, and naturally regenerated are below:

Table 68. MON-VEG-04: Accomplishment summary table (acres) for 2018-2020.

Activity	2018	2019	2020	Grand Total
Certification of Natural Regeneration with Site Prep	791	572	29	1,392
Certification of Natural Regeneration without Site Prep	5,329	3,635	6,644	15,608
Certification-Planted	290	486	89	865
Fill-in or Replant Trees		29	9	38
Plant Trees	1,123	1,252	2,585	4,960
Grand Total	7,533	5,974	9,356	22,863

As mentioned previously, NFMA requires that regeneration harvest must be re-stocked within five years. The R1 Depot Reforestation Timeframe report, summarized below provides an annual measure of progress; data is shown for the ten-year period, leading up to 2015. Units harvested 2016 and later are still within the five-year timeframe as of the time of this report, so that data is omitted here. The full dataset dating back to 1976 is available as an appendix.

Table 69. MON-VEG-04: Reforestation Timeframe report for the most recent ten-year period for all Districts of the Lolo, segregated by status, acres, and percentages.

Forest	Harvest Year	Units	Activity Acres	Progressing or Certified Now				Not Stocked, Certified or Progressing now			
				Activity Units		Activity Acres		Activity Units		Activity Acres	
				#	%	#	%	#	%	#	%
Lolo	2006	29	457	26	90%	404	88%	3	10%	53	12%
Lolo	2007	9	86	9	100%	86	100%	0	0%	0	0%
Lolo	2008	7	232	7	100%	232	100%	0	0%	0	0%
Lolo	2009	70	1528	70	100%	1528	100%	0	0%	0	0%
Lolo	2010	29	929	28	97%	804	87%	1	3%	125	13%
Lolo	2011	14	1005	14	100%	1005	100%	0	0%	0	0%
Lolo	2012	9	126	9	100%	126	100%	0	0%	0	0%
Lolo	2013	19	329	14	74%	299	91%	5	26%	30	9%
Lolo	2014	27	657	17	63%	323	49%	10	37%	334	51%
Lolo	2015	18	363	12	67%	150	41%	6	33%	213	59%
Total		231	5712	206	89%	4957	86%	25	11%	755	14%

At the Forest level, we are generally achieving the reforestation timeframe in accordance with policy, though in 2014 & 2015 there are roughly 550 acres that have not yet been certified.

Tables 70-74 below reflect the same ten-year period as above, for each of the Districts on the Forest. Gaps for individual years indicate years with no regeneration harvests completed.

Table 70. MON-VEG-04: Reforestation Timeframe report for the most recent ten-year period for the Missoula District (D3).

District	Harvest Year	Units	Activity Acres	Progressing or Certified Now				Not Stocked, Certified or Progressing now			
				Activity Units		Activity Acres		Activity Units		Activity Acres	
				#	%	#	%	#	%	#	%
D3	2006	9	157	8	89%	135	86%	1	11%	22	14%
D3	2013	5	30	0	0%	0	0%	5	100%	30	100%
Total		14	187	8	45%	135	43%	6	56%	52	57%

Table 71. MON-VEG-04: Reforestation Timeframe report for the most recent ten-year period for the Ninemile District (D4).

District	Harvest Year	Units	Activity Acres	Progressing or Certified Now				Not Stocked, Certified or Progressing now			
				Activity Units		Activity Acres		Activity Units		Activity Acres	
				#	%	#	%	#	%	#	%
D4	2006	15	141	13	87%	110	78%	2	13%	31	22%
D4	2008	1	156	1	100%	156	100%	0	0%	0	0%
D4	2009	9	539	9	100%	539	100%	0	0%	0	0%
D4	2010	1	125	0	0%	0	0%	1	100%	125	100%
D4	2011	6	845	6	100%	845	100%	0	0%	0	0%
D4	2014	19	585	9	47%	251	43%	10	53%	334	57%
D4	2015	6	237	1	17%	52	22%	5	83%	185	78%
Total		57	2628	39	64%	1953	63%	18	36%	675	37%

Table 72. MON-VEG-04: Reforestation Timeframe report for the most recent ten-year period for the Plains-Thompson Falls District (D5).

District	Harvest Year	Units	Activity Acres	Progressing or Certified Now				Not Stocked, Certified or Progressing now			
				Activity Units		Activity Acres		Activity Units		Activity Acres	
				#	%	#	%	#	%	#	%
D5	2008	2	10	2	100%	10	100%	0	0%	0	0%
D5	2010	17	475	17	100%	475	100%	0	0%	0	0%
D5	2011	7	132	7	100%	132	100%	0	0%	0	0%
D5	2012	9	123	9	100%	126	100%	0	0%	0	0%
D5	2013	11	258	11	100%	258	100%	0	0%	0	0%
D5	2014	8	72	8	100%	72	100%	0	0%	0	0%
D5	2015	5	103	4	80%	75	73%	1	20%	28	27%
Total		59	1173	58	97%	1148	96%	1	3%	28	4%

Table 73. MON-VEG-04: Reforestation Timeframe report for the most recent ten-year period for the Seeley Lake District (D6).

District	Harvest Year	Units	Activity Acres	Progressing or Certified Now				Not Stocked, Certified or Progressing now			
				Activity Units		Activity Acres		Activity Units		Activity Acres	
				#	%	#	%	#	%	#	%
D6	2007	7	25	7	100%	25	100%	0	0%	0	0%
D6	2008	1	12	1	100%	12	100%	0	0%	0	0%
D6	2009	41	730	41	100%	730	100%	0	0%	0	0%
D6	2010	4	208	4	100%	208	100%	0	0%	0	0%
Total		53	975	53	100%	975	100%	0	0%	0	0%

Table 74. MON-VEG-04: Reforestation Timeframe report for the most recent ten-year period for the Superior District (D7).

District	Harvest Year	Units	Activity Acres	Progressing or Certified Now				Not Stocked, Certified or Progressing now			
				Activity Units		Activity Acres		Activity Units		Activity Acres	
				#	%	#	%	#	%	#	%
D7	2006	5	159	5	100%	159	100%	0	0%	0	0%
D7	2007	2	61	2	100%	61	100%	0	0%	0	0%
D7	2008	3	54	3	100%	54	100%	0	0%	0	0%
D7	2009	20	259	20	100%	259	100%	0	0%	0	0%
D7	2010	7	121	7	100%	121	100%	0	0%	0	0%
D7	2011	1	28	1	100%	28	100%	0	0%	0	0%
D7	2013	3	41	3	100%	41	100%	0	0%	0	0%
D7	2015	7	23	7	100%	23	100%	0	0%	0	0%
Total		48	746	48	100%	746	100%	0	0%	0	0%

Discussion

The Seeley Lake and Superior Districts do not currently have any harvest units outside of the five-year reforestation timeframe. Plains-Thompson Falls has one unit outside the timeframe, while the Missoula and Ninemile Districts have several units not achieving the required timeframe. On the Missoula District, the 5 units harvested in 2013 shown above are group selection harvests in the Butte Lookout TS and are scheduled for certification of natural regen in FY21. On the Ninemile District, the bulk of the acres not stocked are from single tree and group selection harvests in the Frenchtown Face project, that have not been prescribed burned yet for a variety of reasons; principally not having the right conditions for successful prescribed burning.

Regeneration harvest information is available dating back to 1976. The amount of regeneration harvest over that time period is presented below:

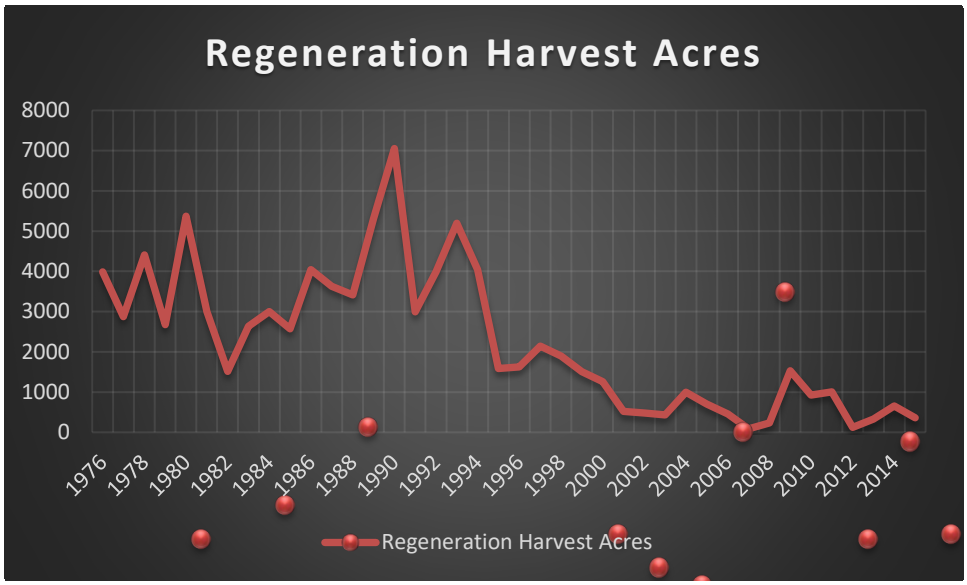

Figure 25. MON-VEG-04: Amount of regeneration harvest 1976-2015.

Reforesting areas of regeneration harvest within 5 years has overall been very good. The figure below shows the number of acres from 1976 to present that are not stocked or progressing toward being stocked now:

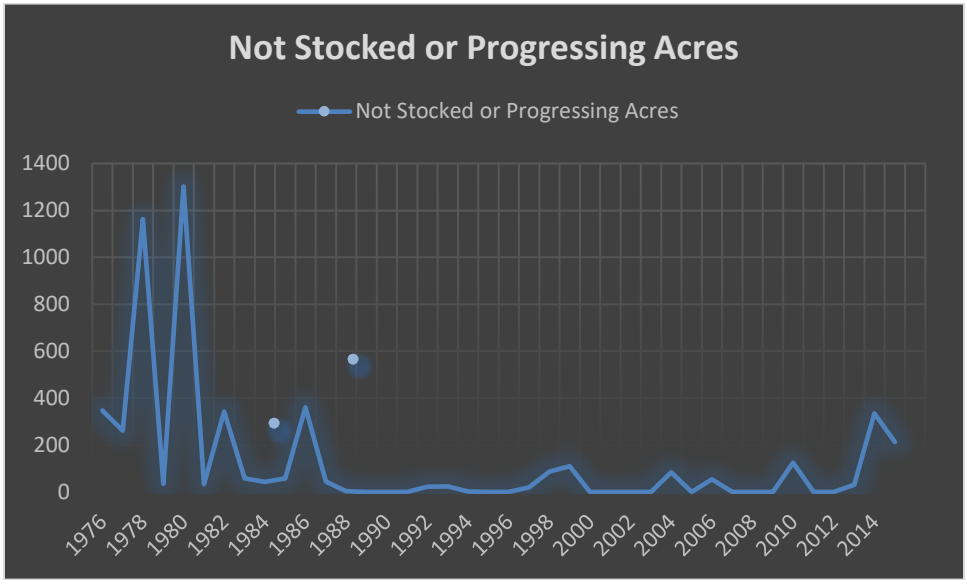

Figure 26. MON-VEG-04: Number of acres from 1976 to present not stocked or progressing towards being stocked currently.

Evaluation of Results for Adaptive Management Findings

Table 75. MON-VEG-04: Summary of findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-VEG-04: Are harvested/burned stands in the suitable base restocked within 5 years?	2021	(E)Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired. The vast majority of stands across the Forest are restocked within 5 years.	Yes, changes may be warranted where we are not trending towards the five-year timeframe. Management activities should place increased emphasis on moving toward the required timeframes.	Management Activities

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Soil

MON-SOIL-01

Plan Component(s) being assessed by this monitoring item:

Objectives – "This Forest Plan improves the environmental quality of the Forest…that emphasizes protection of water quality and soils…" (p. II-2).

DFCs – "Forest soil productivity will have been maintained" (p. II-7).

Standards 16 and 18 – "Developmental projects in areas with steep slopes, granitic soils, wet glacial tills, and lake sediments will not be scheduled until they have been analyzed for environmental effect and economic feasibility" (p. II-12). "All management practices will be designed or modified as necessary to maintain land productivity" (p. II-12).

Table 76. MON-SOIL-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-SOIL-01: Are forest management activities maintaining soil productivity?	Percent Detrimental Soil Disturbance (DSD) (measured in activity units as determined by Region 1 Soil Criteria). (N) Percent linear foot stream-bank compaction and/or hoof shear. Percent compaction as measured across grazing allotment and high use areas. (N) Percent ground surface occupied by noxious weeds/native plant species. (N)	1-2 years	Soil Specialist Reports and associated Resource Protection Measures FSM 2550 Watershed and Air Management, Chapter 2550 Soil Management (2010) FSM 2500 R1 Supplement 2500-99-1, Chapter 2550 Soil Management (2014)	Traci Sylte, Lolo Soil, Water, and Fisheries Programs Manager and Ann Hadlow, Lolo Soil Scientist

(*Influenced by climate change? Y, N, Uncertain)

Table 77. MON-SOIL-01: Monitoring Collection Summary.

MON-SOIL-01:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2020
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2021

Lolo National Forest detrimental soil disturbance monitoring shows that Forest management activities are achieving the standards of the Lolo Forest Plan, National Forest Management Act, and Region 1 Soil Quality Standards. Since 2006, the Lolo has had an active soil monitoring program that is strongly tied to forest activities and NEPA soil resource analyses. Forest activities are monitored in order to answer one critical question: are forest management activities maintaining soil productivity? Our primary objectives in monitoring are:

1. To review the Lolo Soil Program's record of work from 2019 and 2020 and assess if Region 1 Soil Quality Standards, Lolo Forest Plan standards, and soil direction in the National Forest Management Act are being met.
2. Address forest implementation strategies to maintain soil productivity.
3. Validate the assumptions of project soil disturbance used for NEPA analysis by comparing these assumptions to existing post-activity monitoring data.
4. Further develop the Lolo's soil monitoring framework for use in future monitoring and Forest Plan Revision efforts.

Methods

In Region 1, soil productivity is determined using soil quality standards which include six measurable soil attributes that negatively impact soil function, which may indicate conditions that are detrimental to long term soil productivity. These six attributes (compaction, rutting, displacement, severely burned soils, surface erosion, soil mass movement, and loss of organic matter), address the primary monitoring indicator, Detrimental Soil Disturbance, DSD (Table 76), and are proxy indicators to negative impacts to soil productivity based on biologic and hydrologic function. DSD is calculated by combining the existing (i.e., pre-activity) DSD measured averages (if legacy impacts are present) with conservative predictions of post-assessment increases, currently assigned as a 10 percent increase in DSD for non-fire salvage and 13 percent DSD increase for fire salvage units. Treatment activities can only occur if the combination of these factors do not exceed the 15 percent regional DSD standard.

Indicators of soil quality are designed to be representative of overall ecosystem processes, integrate soil function groups, and be sensitive to management objectives (Doran and Parkin 1996). In Region 1, the six above indicators were established in order to accurately portray how land management activities impact soil processes, and in the long-term (50-100+ years), how detrimental changes to these soil processes impact soil productivity. *For example*, soil compaction, a measurable soil physical feature results in increased soil bulk density, which negatively impacts soil root development (biologic function) and decreases soil porosity and water infiltration capacity (hydrologic function). Therefore, when these functions are effected, it has potential to negatively impact long term soil productivity.

Soil surveys are completed by forest soil scientist and trained field technicians using 30-point surface disturbance transects (Dumroese et al. 2009) as identified in FSM 2550 (2010). In addition to full, 30 point transects, a shortened, walk-through assessment was also developed for field use, collecting information on unit disturbance, site characteristics, and soil pit observations.

Table 76 also presents soil productivity indicators of percent linear foot stream-bank compaction and/or hoof shear and percent ground surface occupied by noxious weeds/native plant species. At this time grazing impacts and invasive plants/weeds are assessed by other program monitoring efforts and consequently are not included in MON-SOIL-01 monitoring item.

Results

Utilizing representative unit surveys within each project area, monitoring site location is based on physical location, environmental site conditions, planned harvest system, and known previous forest activities within that project area. Additionally, soil monitoring emphasizes areas with higher impacts, focusing more data collection on ground-based logging systems. Assessments occur within proposed NEPA management projects, which include pre-project environmental assessments (pre-NEPA) and required post-implementation (post-NEPA) monitoring in a subset of units in order to assess if forest management actions are causing disturbance (USDA, 2000). Post-implementation surveys begin two years after implementation to allow for natural forest recovery between the disturbance and assessments, which makes it possible to distinguish permanent impairment from temporary, short-term disturbance.

Table 78 displays activity units surveyed during the 2019 and 2020 field seasons: 104 ground-based units, 68 skyline units, 10 excaline, 10 tethered units, and 5 “Other” harvest systems were surveyed.

Table 78. MON-SOIL-01: Activity units surveyed by project area from 2019 and 2020.

Project Name	Survey Year		
	2019	2020	Number of Units Surveyed
Post-Harvest Monitoring			
Antimony	2	No data	2
Debaugan	1	No data	1
Copper King Salvage	2	No data	2
South Fork Fish	2	No data	2
Pre-Harvest Monitoring			
A-BLT	6	No data	6
Cedar South Tethered	No data	10	10
Cruzane	25	No data	25
Henry Deemer	No data	9	9
Liberty 2	2	No data	2
Lower Blackfoot Corridor	2	1	3
Salty Borax	No data	1	1
Sawmill Petty	47	No data	47
Stark Creek Fuels	No data	2	2
Superior North	No data	25	25
Swamp Eddy	17	No data	17
WAM – Hayes Creek Focal Treatment Area	1	14	15
WestSide Bypass	No data	28	28
Total	107	90	197

Ground-Based Harvest Unit Results

In 2019 and 2020 pre-activity surveys of suitable ground-based units found average DSD at approximately 3.3 percent (comparatively the 2018 estimate for pre-harvest DSD in ground-based units was 3.7 percent). In 2019, post-activity surveys on ground-based harvest occurred on the Antimony, Copper King Fire Salvage, Debaugen, and South Fork Fish projects. All ground based DSD averaged 13.5 percent, which includes average post-harvest values of +25.5 percent collected from fire salvage harvest on the Copper King Fire in high burn severity areas. Excluding the Copper King data, post-activity surveys collected from traditional ground-based harvest activities averaged 7.5 percent DSD, which is slightly less than previous monitoring reports (e.g., 6-14 percent DSD in post-activity monitoring in the 2018 Lolo National Forest Soil Monitoring report).

Skyline Harvest Unit Results

The average pre-activity existing condition of soil disturbance in skyline harvest systems was 2 percent DSD, linked predominantly to existing jammer road systems and surface soil layers missing or impaired

from localized topsoil displacement and erosion. Legacy jammer road systems were the most common form of observed soil disturbance; DSD in these road prisms was related to increased bulk density and J-rooting of trees and shrubs, and increased soil instability along the cut and fill slopes.

One skyline unit was surveyed for post-harvest monitoring in the 2019 field season on the South Fork Fish project; the post-harvest DSD of this skyline unit was +3 percent, DSD was associated with a fully decommissioned temporary road prism that was not yet showing signs of recovery.

In 2019 and 2020, 197 units associated with 15 NEPA projects had been surveyed using the R1 detrimental soil disturbance protocol (Dumroese et al. 2009). In 2020, post-harvest monitoring was not prioritized because of limited resources and restrictions from the COVID-19 global pandemic.

Consequently, on average across the Lolo National Forest, DSD effects from all logging systems are currently below the 15 percent DSD threshold for Region 1 Soil Quality Standards and are therefore achieving the requirements of the Lolo Forest Plan standards for soil quality. and the National Forest Management Act.

Additional Monitoring Efforts

The following topics summarize additional monitoring efforts conducted as specialist time is available to improve our understanding of soil health and productivity, increase assessment efficiencies, and help validate methodologies and predictions.

Soil Recovery Trend of Rehabilitated Sites

DSD and soil recovery monitoring is conducted on sites that have been rehabilitated, assessing soil recovery and resiliency as they link closely to biologic and physical soil features. The success of soil rehabilitation goals is measured by a variety of methods and is best parametrized by realistic expectations of potential, given the degree of disturbance and departure from the pre-disturbed state. Because it may not be possible to return a site to a pre-disturbance state, soil recovery goals aim to rehabilitate soil productivity to a pre-disturbance trajectory that will improve with time. Assessing soil health and soil productivity as measured by distribution of desired vegetation type and amount of ground cover is proving to be the most successful method to assess project goals and Forest Plan achievement.

Monitoring on previous sites will be completed in 2022 and will be analyzed with past rehabilitation data. The current strategy is to resurvey every 5 years with sites identified using existing DSD data (randomly generate a sub-sample of maybe 20 units). As such, developing trend lines of soil recovery over a range of habitat types and logging systems would greatly increase our understanding of the rate and magnitude of soil health recovery.

Steep Slope Monitoring

In recent years, various approaches from the timber industry have asked for variance in the Lolo Forest Plan guidance (which limits ground-based operations to slopes under 35 percent) under the premise that operations can still achieve necessary standards. In 2020, the Lolo Soils program responded by proposing an adaptive management approach to the Forest Leadership Team for which proposed variances may be allowed with appropriate monitoring. Since then, monitoring has been implemented in several project areas. The analysis process calls for a field review of proposed treatment units and limits steep slope opportunities from occurring on sensitive soil conditions such as geologic instability, low soil resiliency, and high existing DSD. All units that are approved for steep slope trials have been added to the long-term soil monitoring program for further review beginning 2 years after implementation.

Fire Salvage and Validation Monitoring

In 2016 and 2017, large wildfires burned approximately 314,000 acres of Lolo National Forest lands. Most salvage logging activities were completed in 2018-2019, with some activities still on-going. Information on post-harvest conditions in burned areas is limited and very site specific. As such, post-harvest unit monitoring is occurring on these burned landscapes as soil specialist capacity is available.

Monitoring on both moderate and high burn severity soils are planned in the next two years for salvage activities associated with the 2017 fire season, in addition to follow-up surveys on the Copper King Fire Salvage Project (monitoring previously occurred on Copper King as part of a small study to assess impacts of ground-based harvest on high soil burn severity areas in summer vs. winter harvest conditions). For current and future context, monitoring summer ground-based harvest activities on high burn severity soils on the Copper King Salvage units showed DSD as high as +37 percent increase from pre-harvest conditions (resultant of deep soil rutting, top-soil displacement, and changes in soil structure that were noted from high traffic skid trails and areas where equipment had turned). Comparatively, winter harvest conditions resulted in less disturbance, +14 percent DSD, with soil disturbance noted on primary skid trails. Recovery trend monitoring will continue on the Copper King Salvage activity units to build upon the limited data set. Preliminary findings strongly suggest that ground-based harvest activities should not occur on high burn severity soils and winter operating conditions may not be sufficient in high burn severity areas to protect soils and for consistency with the objectives of R1 Soil Quality Standards.

These efforts offer potential validation that the perceived conservative assumptions of post-activity DSD (10 percent and 13 percent for ground-based non-salvage and salvage operations, respectively) may in fact not be too high/conservative, especially in high burn severity units harvested during summer operating conditions. However, this data is considered preliminary only because the sample size was small (only 5 non-fire salvage units). Consequently, at this time it is recommended to maintain the current estimates until additional monitoring occurs in subsequent years. It is also recommended that additional monitoring of fire salvage units is conducted in areas that represent a variety of soil burn severity conditions.

Fuels Monitoring

Fuel treatments, including ecosystem maintenance burns (EMB) and project burning (unit underburning, pile, and jackpot) are typically a low risk to the soil resource. To improve our understanding and provide quantitative data, we are considering using Burned Area Reflectance Classification data (available from remote sensing datasets) to compare large-scale wildfires to large scale EMB burns to show differences in burn severity. We hope to utilize this methodology in a future monitoring effort if resources are available.

Geospatial Data and Assessment Updates

Our Soils Program is exploring tools that could be standardized and useable on the Lolo National Forest and throughout the Region. Specifically, connecting geospatial data to model systems that assess which soil attributes are correlated to soil resilience and/or vulnerable to soil disturbance. This effort would provide a data supported method to extrapolate results from field soil surveys and increase assessment efficiencies.

In the winter of 2018/2019, our soils scientists worked closely with GIS analysts from the Forest Service Geospatial Training Applications Center (GTAC) to develop a geospatial model that identifies and classifies soil vulnerability, using the Lolo's existing monitoring database and a variety of remotely sensed and corporate data (Simpson et al., 2020). The resulting model (Soil Vulnerability Model, SVM) and data from this project, was used to validate assumptions used in soil monitoring protocols and

identify key field data collection needs. The SVM will be included in planning for the Wildfire Adapted Missoula (WAM) project analysis in spring 2021.

Workload Efficiencies and Data Rigor Strategies

To assist with future monitoring efforts, data collection strategies and personnel time/effort have been recently evaluated. Line officers are often comfortable with soil specialists completing field monitoring on 30-60 percent of units (as necessary for representative sample) in a project area when determining if a project meets soil policies. With increasing pace and scale demands, soil specialists need to increase monitoring units from an average of 60 to 100 units across the forest each field season. This will require line officer support for more field time by forest soil scientists or additional field crew (GS-5/7 seasonal soils support) resources each year. Remote sensing technologies (Soil Variability Modeling, SVM) and other geospatial products can likely assist with efficiencies by highlighting areas with greater soil impacts which need field verification. Using these methods with the 2019 and 2020 demands, we were able to continue conducting surveys of 30-60 percent of project activity units for proposed NEPA activities.

Evaluation of Results for Adaptive Management Findings

It is recommended the following be added to this monitoring item:

- Ground-Based Harvest - Maintain the +10% and 13% post-activity DSD estimates for normal and fire-salvage units and validate assumption with additional further monitoring.
- Skyline- Base Harvest – small sample size. Need to increase monitoring.
- Soil Rehabilitation – Need more data to develop trend lines of soil recovery over a range of habitat types and logging systems to increase understanding. Units should be identified using existing DSD data (randomly generate a sub-sample of ~ 20 units) and surveyed every 5 years.
- Soil Vulnerability Model – Continue Use and Refinement
- Workload efficiencies/data rigor – Continue utilizing Soil Vulnerability to assist with field data collection efficiencies.
- Continue monitoring and developing data sets on steep slope logging proposals and treatments through adaptive management process as presented to the Forest Leadership Team (June 2020).
- Validate assumptions of low soil risk associated with fuel treatments (EMB, unit underburning, pile, and jackpot) by comparison with wildfire scenarios utilizing Burned Area Reflectance Classification data to determine how controlled burning systems differ from wildfire scenarios, where high soil burn severity can often result.

Table 79. MON-SOIL-01: Summary of findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-SOIL-01: Are forest management activities maintaining soil productivity?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired. DSD results on both ground-based and skyline harvest units are currently below the 15% DSD threshold for Region 1 Soil Quality Standards.	Yes, it is recommended that some monitoring indicator assumptions be validated, and sample size of some indicators be increased to provide a more robust dataset for this monitoring item. Please see above narrative for additional details to these recommendations.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Recreation

MON-REC-01

Plan Component(s) being assessed by this monitoring item:

Standard 48 - (p. II-17): Motorized vehicles will be limited to system roads and trails which are designated open in the Lolo Forest Travel Plan. Temporary exceptions are authorized for any Federal, State, or local officer, or member of an organized rescue or firefighting force in the performance of an official duty; any vehicle whose use is expressly authorized by the Forest Service under a permit, license, or contract; off-road travel by snowmobiles in areas designated as open in the Travel Plan, and occasional off-road trips for administrative use.

1986 Forest Plan, Standard - 52. (p. II-20): Off-road vehicle use will be limited to those areas designated in the Forest Travel Plan.

Table 80. MON-REC-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-REC-01: Are motorized vehicle travel restrictions effective in limiting off-road vehicle damage?	Number of 36 CFR 261.15(h), Motorized Vehicle Violation Notice/Citations. (N) Incident Reports. (N) Warnings. (N) Number of Closure Orders (36 CFR 261, Subpart B) issued to address resource damage caused by off-road motorized vehicle use. (N)	FY2016 thru FY2020	Data was pulled from USFS Law Enforcement's LEIMARS database. Years 2016 through 2020 were pulled individually from the Offense Statistics Report within in LEIMARS. Lolo National Forest Civil Engineer manages all Closure Orders for the unit. Per her review, there was only one Closure Order in the five years between FY2016 and FY2020, in 2016 that makes reference to resource damage caused by off-road motorized vehicle us.	Danelle Highfill, Lolo Forest Recreation Staff Officer

(*Influenced by climate change? Y, N, Uncertain)

Table 81. MON-REC-01: Monitoring Item Collection Summary.

MON-REC-01	Year
Data was last collected or compiled in:	2016
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2021

Results and Discussion

Methods

Three data sources were utilized for this monitoring item:

1. USFS Law Enforcement's LEIMARS database. Years 2016 through 2020 were pulled individually from the Offense Statistics Report within in LEIMARS for the Lolo National Forest.
2. Closure Order(s) in the five years between FY2016 and FY2020 for the Lolo National Forest. Forest Civil Engineer keeps an up-to-date yearly file on all Closure Orders for the unit.
3. Direct Management Team Involvement by informal discussions with each ranger districts recreation specialist point-of-contact. Heather Berman (Superior/Plains-Thompson Falls), Laura Johnson Boudreaux (Nine Mile), Josh Lattin (Missoula), and Matt Walter (Seeley Lake).

Data analysis was a simple count by fiscal year between 2016 and 2021 of the total number of recorded vehicle citations, incident reports and warnings, in addition to the number (and associated narrative) of closure orders issued to address resource damage caused by off-road motorized vehicle use. And district specialists were interviewed to discuss issues on district relevant to the monitoring question -

Results

USFS Law Enforcement LEIMARS Database

Table 82. MON-REC-01: Warning notices, incident reports, and violation notices issued on the Lolo National Forest 2016-2020 for 36 CFR 261.15(h).

YEAR	WN's (warnings)	IR's (incidents)	VN's (violations)
2016	0	5	0
2017	0	1	0
2018	0	0	0
2019	0	1	1
2020	0	0	1

36 CFR 261.15(h): It is prohibited to operate any vehicle off National Forest System, State or County roads: In a manner which damages or unreasonably disturbs the land, wildlife, or vegetative resources.

WNs = warning notices. The notice is handwritten and therefore usually has an associated name of the individual given the warning. This is a notice, not a ticket … no payment of funds required.

IRs = incident reports. In this case the resource manager and law enforcement are not sure who was driving off-road and causing resource damage. Appropriate documentation tied to physical impacts and disturbance are documented.

VNs = violation notices. This is a ticket just like you would receive if caught speeding on the highway. A payment of funds is required.

Table 83. MON-REC-01: Warning notices, incident reports, and violation notices issued on the Lolo National Forest 2016-2020 for 36 CFR 261.13

YEAR	WN's (warnings)	IR's (incidents)	VN's (violations)
2016	10	37	32
2017	19	32	25
2018	13	39	10
2019	16	42	16
2020	20	90	40

36 CFR 261.13: After National Forest System roads, National Forest System trails, and areas on National Forest System lands have been designated pursuant to 36 CFR 212.51 on an administrative unit or a Ranger District of the National Forest System, and these designations have been identified on a motor vehicle use map, it is prohibited to possess or operate a motor vehicle on National Forest System lands in that administrative unit or Ranger District other than in accordance with those designations, provided that the following vehicles and uses are exempted from this prohibition:

> (a). Aircraft;(b). Watercraft; (c). Over-snow vehicles; (d). Limited administrative use by the Forest Service; (e). Use of any fire, military, emergency, or law enforcement vehicle for emergency purposes; (f). Authorized use of any combat or combat support vehicle for national defense purposes; (g). Law enforcement response to violations of law, including pursuit; (h). Motor vehicle use that is specifically authorized under a written authorization issued under Federal law or regulations; and (i). Use of a road or trail that is authorized by a legally documented right-of-way held by a State, county, or other local public road authority.
>
> WNs = warning notices. The notice is handwritten and therefore usually has an associated name of the individual given the warning. This is a notice, not a ticket … no payment of funds required.
>
> IRs = incident reports. In this case the resource manager and law enforcement are not sure who was driving off-road and causing resource damage. Appropriate documentation tied to physical impacts and disturbance are documented.
>
> VNs = violation notices. This is a ticket just like you would receive if caught speeding on the highway. A payment of funds is required.

Closure Orders

Between 2016 and 2021, only one order was found that addresses off-highway vehicle use (issued in 2016). The Lolo National Forest issued special restrictions for the Rattlesnake National Recreation Area

and Wilderness and the South Zone on the Missoula Ranger District. District Recreation Resource Specialists have observed a general increase in resource damage and trail tracks created by Off-Road Vehicles between 2016 and 2020. These observations indicate an increase in the number of ORVs using the Lolo National Forest.

Discussion

Motorized off-road vehicle (ORV) use on public lands administered by the US Forest Service is increasing. Many factors contribute to the growing popularity of motorized off-road recreational activities and the resulting impacts to public land resources. Some factors are, a) greater public interest in unconfined outdoor recreational opportunities, b) rising disposable income to advance recreational pursuits, c) advances in vehicle technology that enable ORV users to reach previously inaccessible areas, d) rapid expansion in the West that brings the public closer to once-remote public lands, and e) a population with an increasing median age with changing outdoor recreational interests.

In the effort to ensure consistent and positive management of environmentally responsible motorized off-road vehicle use on public lands, the Lolo National Forest provides free copies of Motor Vehicle Use Maps (MVUM) at each district or through a mobile device download. Maps designate roads and trails for summer, or snow-free travel. MVUMs do not apply to snowmobile trails, they are shown on the forest Visitor Maps and where available, on Over Snow Vehicle Use Maps.

The 1986 Lolo Forest Plan identified the need to understand if vehicle travel restrictions are effective in limiting off-road vehicle damage. Plan components to attain that provision are stated above. The indicators and measurements reviewed identify outcomes that are advancing the standards identified (48 and 52). The Lolo National Forest is experiencing an increase in ORV use. To protect public land resources, promote safety for all public land users, and minimize conflicts among various uses of the public lands, law enforcement patrols and delivers monitoring and compliance with Incidents Reports, Warning Notices and Violation Notices associated with 36 CFR 261.13 (motor vehicle use maps).

There is limited use of Closure Orders to address resource damage when off-road vehicle use conflicts with management goals of the area. Regardless, once impacts caused by unauthorized motorized use are identified, District recreation staff perform corrective actions that include rehabilitating damage caused by the illegal use and installing barriers to prevent future use of the unauthorized route. Unauthorized motorized routes and associated impacts are typically identified by reports provided by the public, during routine forest patrols by district staff, and during field reconnaissance for project level analysis.

LEIMARS data is helpful in understanding violations taking place on the Lolo National Forest between 2016 and 2020. Violations are a good indicator of individuals being caught in the act of violating travel restrictions to limit off-road vehicle damage on public lands. In addition, incident reports and warning notices issued to members of the public visiting the national forest and behaving poorly are also valued. In general, the years leading up to 2020 demonstrated a steady and consistent application of 36 CFR 261.15 (h) and 36 CFR 261.13, with the latter being the CFR applied by Law Enforcement with most regularity since the passing of the Travel Management Rule (TMR) in 2005 and the production and use of Motor Vehicle Use Maps (MVUMs) in 2007/2008. Trends in violation notices remained stable until 2020 where a spike in issuances were recorded, possibly due to COVID-19 and associated increases in visitation and new users who lack travel restriction awareness and knowledge of the areas they are visiting. As recommended below, monitoring violations is warranted in the future Biennial Monitoring Evaluation Report efforts to determine whether the reported “spike” continues to increase of it is an anomaly associated with recreation habitats attributed to COVID-19.

The Lolo National Forest has not documented a significant degree of off-road vehicle damage to land, wildlife or vegetative resources as indicated by only issuing a single Closure Order in 2016 on the Missoula Ranger District, which identified:

36 CFR 261.56 – Use of Vehicles Off National Forest System Roads

The following is prohibited:

1. Possessing or using a vehicle or bicycle for cross-country travel off National Forest System roads (36 CFR 261.56), except for use of snowmobiles in the Shoofly Meadow/Mineral Peak area.

Snowmobile use is heavy on the Seeley Lake Ranger District. Monitoring from the air in the past has determined that some unauthorized snowmobile use in Management Area (MA) 11 has occurred. Most unauthorized use in MA 11 land occurs in the Lake Elsina and Pyramid Pass areas. Law enforcement patrols these areas, but working with the local snowmobile clubs has proven to be more effective.

Recommendations to discuss:

1. Continue to monitor Off-Road Vehicle use across the Forest on an annual basis and document Off-Road Vehicle caused resource damage and user conflicts.

Evaluation of Results for Adaptive Management Findings

Table 84. MON-REC-01: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
Mon-Rec-01: Are motorized vehicle travel restrictions effective in limiting off-road vehicle damage?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-REC-02

Plan Component(s) being assessed by this monitoring item:

Goals (p. II-1) - "provide for a broad spectrum of dispersed recreation involving sufficient acreage to maintain a low user density compatible with public expectations."

Objectives (p. II-2) - "the rich variety of recreation experiences available on the Forest will continue."

Desired Future Conditions (p. II-7) - "recreation will have been provided that allowed for all types in the Recreation Opportunity Spectrum. The demand for developed recreation will have reached the capacity of the developed sites."

Desired Future Conditions (p. II-7) - "capacity for dispersed recreation will exceed the projected use for primitive/semi-primitive recreation and roaded natural recreation."

Standards 6,7,8, and 9 - "the Lolo National Forest will provide for a wide spectrum of Forest-related dispersed recreation activities and range of skill levels available to Forest visitors including elderly and handicapped. The program will provide for use of the Forest on a year-round basis in areas that will minimize conflicts between user groups and other Forest resources" (p. II-9). The Forest Service will not significantly expand the capacity of developed recreation sites on the Lolo National Forest during the next 10-year period" (p. II-10).

Management Areas (MAs) – see 7,8,9,10,11, and 12 (p. III-21 to III-55).

Table 85. MON-REC-02: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-REC-02: Is a wide spectrum of recreation opportunities provided?	Miles of trail maintained. (N) Miles of road maintained. (N) Number of campgrounds maintained. (N) Number of ski areas permitted. (N) Number of developed recreation sites maintained. (N) NVUM user survey responses. (N) Number of guide permits issued and service days. (N) Challenge cost share agreements and partnership agreements. (N) Number of recreation user events. (N) Number of cabin rental agreements issued. (N)	2 Year – (Biennial)	Infra Trails – inventory results and data status by region and forest geo-enabled Performance Accountability System Reports (geospatially enabled Performance Accounting System) Infra User Views and Reports Recreation Sites Inventory and Maintenance Management Reporting Recreation.gov Reports National Visitor Use Management (NVUM) Forest Master Reports USFS Enterprise Data Warehouse (EDW) – Outfitter and Guides and Recreation Events data. The EDW is a collection of databases that centralizes information from multiple sources and applications to make the data available for use across the USFS.	Danelle Highfill, Lolo Forest Recreation Staff Officer

(*Influenced by climate change? Y, N, Uncertain)

Table 86. MON-REC-02: Monitoring Collection Summary.

MON-REC-02	Year
Data was last collected or compiled in:	2016
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2021

Results and Discussion

Methods

Data collected for evaluating this monitoring item include the following:

- The status of visitor use,
- visitor satisfaction, and
- progress towards recreation objectives.

National Visitor Use Management (NVUM)

The NVUM program has two concurrent goals. First, to produce estimates of the volume of recreation visitation to National Forests and Grasslands. Second, to produce descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit.

Analysis and reports on visitation and visitor characteristics are available through the NVUM program, with fieldwork starting in 2005. The Lolo National Forest currently has three years of estimates in 2006, 2011 and 2016. Once every five years, each National Forest and Grassland has a year of field data collection.

The National Visitor Use Monitoring (NVUM) program provides science-based estimates of the volume and characteristics of recreation visitation to the National Forest System, as well as the benefits recreation brings to the American public. Information about the quantity and quality of recreation visits is required for the National Forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda. The NVUM program ensures that all visitor statistics for National Forests and grasslands produced by the Forest Service use a standardized measure. These standards were established by the Forest Service in the 1970s; however, their application is now stricter than in the past. For example, visitors must be physically recreating on Forest Service managed lands for a visit to count. They cannot be passing through, viewing from a non-Forest Service managed road, or just using restroom facilities.

In essence, visitation is estimated through a combination of traffic counts and surveys of exiting visitors. Both are obtained on a random sample of locations and days distributed over an entire forest for a year. All of the surveyed recreation visitors are asked about their visit duration, activities, demographics, travel distance, and annual usage. About one-third are also asked a series of questions about satisfaction. Another one-third are asked to provide information about their income, spending while on their trip, and the next best substitute for the visit.

Note that the results of the NVUM activity analysis DO NOT identify the types of activities visitors would like to have offered on the national forests. It also does not tell us about displaced forest visitors, those who no longer visit the forest because the activities they desire are not offered.

Results

2006 NVUM Report

Visit Description: In 2006 visit durations to the Lolo National Forest were typically short, where the median duration was only two hours. People who visited frequently were quite common: almost 35 percent of all visits were made by people who report visiting over 50 times each year. For about 91 percent of all visits, the visitor goes to only one location on the forest for recreation. And approximately 90 percent of visitors were from Missoula County.

Demographic results show that women accounted for over 40 percent of visits to the Lolo. There were very few visits that are made by racial or ethnic minorities on this forest. Over 1/3 of visits were made by people in their twenties or thirties; children under the age of 16 made up just under fourteen percent of visits. The Lolo appears to have served a very local customer base. About 2/3 of visits were made from people living within 25 miles of the forest; another 14 percent lived between 24 and 75 miles away.

Activities: By far, the most common main activity on the Lolo is hiking/walking (45 percent). Visitors participate in this activity on nearly 2/3 of visits. The next most common main activities are relaxing (7 percent) and hunting (6 percent). Viewing activities are frequently something that people do while visiting the forest, even though they are not often the primary/main recreation activity.

Use of constructed facilities and special designated areas: About one-third of recreation visitors interviewed were asked about whether they made use of a targeted set of facilities and special designated areas during their visit. Responses indicate the top five special facilities or areas provided by the Lolo National Forest were (in order, highest to lowest): developed swimming site, motorized dual track trails, interpretive areas, designated off-road vehicle areas and forest roads.

Activity participation

The wide-ranging offerings or activities identified by national forest visitors included: hiking/walking, viewing natural features, viewing wildlife, relaxing, driving for pleasure, other non-motorized, picnicking, developed camping, hunting, fishing, snowmobiling, nature study, bicycling, motorized water activities, downhill skiing, gathering of forest products, visiting historic sites, nature center activities, non-motorized water, resort use, motorized trail activity, cross-country skiing, horseback riding, OHV use, primitive camping, backpacking and other motorized activities.

Where did they stay during their time on the Lolo National Forest?

In terms of lodging, 43.4 percent of visitors spent nights on the national forest in USFS campgrounds (31.5 percent), USFS cabins/lookouts (8.0 percent), and in undeveloped camping sites (3.9 percent). When not staying on the national forest overnight, visitors mostly stayed at a vacation rental (20.3 percent) or at the home of friends and family (25.0 percent).

Crowding

Percent of Site Visits by Crowding Rating and Site Type on the Lolo National Forest in 2006. Visitors rated their perception of how crowded the recreation site or area felt to them. This information is useful when looking at the type of site the visitor was using since someone visiting a designated Wilderness may

think 5 people is too many while someone visiting a developed campground may think 200 people is about right. The table below shows the distribution of responses for each site type. Crowding was reported on a scale of 1 to 10 where 1 demotes hardly anyone was there, and a 10 indicates the area was perceived as overcrowded.

Table 87. MON-REC-02: Percent of Site Visits by Crowding Rating and Site Type on the Lolo Forest in 2006.

Crowding Rating	Day Use Developed Sites	Overnight Use Developed Sites	Undeveloped Areas (GFA)	Designated Wilderness
10 Overcrowding	1.2	0	0	1.2
9	6	0.5	0	2.5
8	6.4	6.2	3.8	3.7
7	6.4	7	7.6	3.7
6	20.3	26.3	9.6	2.5
5	12	14.3	2.1	0
4	15.6	14.4	30.7	27.2
3	12	7.7	23	27.2
2	19.5	19.2	19.3	32.1
1 – Hardly anyone there	0.5	4.3	3.9	0
Average Rating	4.8	4.6	3.9	3.6

Providing barrier-free facilities for recreation visitors with disabilities is an important part of facility and service planning. Visitor use surveys asked if the facilities at given sites visited were accessible for forest visitors with disabilities. Results were very supportive of facilities at sites visited to be accessible.

Table 88. MON-REC-02: Accessibility of National Forest Facilities by Persons with Disabilities.

Item	Percent
% of Visits that include a group member with a disability	7.8%
Of this group, percent who said facilities at the site visited were accessible.	100%

Were visitors to the Lolo National Forest satisfied?

An important element of outdoor recreation program delivery is understanding customer satisfaction with the recreation setting, facilities, and services provided. Visitors were asked to rate the specific site or area at which they were interviewed. Visitors rated their satisfaction on a Likert scale from 1 to 5, with an Importance-Performance Analysis (IPA) calculated. Results suggest overall satisfaction ratings were very high for the Lolo National Forest. About 77 percent of people visiting gave a rating of very satisfied with their overall recreation experience and 18 percent were somewhat satisfied.

2011 NVUM Report

Visit Description: In 2011 visit patterns were consistent with what we saw in 2006. The Lolo National Forest was serving primarily a local market. The median duration for visits showed that about half of all visits lasted around 2.5 hours, up 30 minutes from 2006. For about 95 percent of all visits, the visitor goes to only one location on the forest for recreation. People who visited frequently was down a bit from 2006, where almost 31 percent of all visits were made by people who report visiting over 50 times each year. And approximately 90 percent of visitors were from Missoula County.

Demographic results show a little less than 30 percent of the visits to the Lolo were made by females. Native Americans and Asians each accounted for about 1.5 percent of visits, and Hispanic/Latino visitors for just over 1 percent. Only about 12 percent of visits were by children under the age of 16; 16 percent that are 60 or older. Most visits were from people who live nearby: almost 69 percent of visits were from people who live within 25 miles of the forest. Another 12 percent of visits were from people living 25 to 50 miles away.

Activities: Four main activities accounted for over 55 percent of the visits to the Lolo National Forest. These included hiking/walking (15.5 percent), cross-country skiing (15 percent), hunting (15 percent), and other non-motorized (12 percent) activities. Hiking was something that over 30 percent of people visiting participate in; viewing activities were almost as popular at 30 percent.

Use of constructed facilities and special designated areas: About one-third of recreation visitors interviewed were asked about whether they made use of a targeted set of facilities and special designated areas during their visit. Responses indicate the top five special facilities or areas provided by the Lolo National Forest were (in order, highest to lowest): Forest roads, developed fishing sites, developed swimming sites, information sites, and interpretive areas.

Activity participation

The wide-ranging offerings or activities identified by national forest visitors included: hiking/walking, viewing wildlife, viewing natural features, relaxing, hunting, cross-country skiing, driving for pleasure, snowmobiling, fishing, downhill skiing, developed camping, picnicking, gathering forest products, OHV use, motorized trail activity, motorized water activities, non-motorized water, primitive camping, nature study, resort use, visiting historic sites, bicycling, nature center activities, other motorized activity, horseback riding and backpacking.

Where did they stay during their time on the Lolo National Forest?

In terms of lodging, 49.2 percent of visitors spent nights on the national forest in USFS campgrounds (23.1 percent), USFS cabins/lookouts (12.9 percent), and in undeveloped camping sites (13.2 percent). When not staying on the national forest overnight, visitors mostly stayed at a vacation rental (23.5 percent) or at the home of friends and family (30.8 percent).

Crowding

Percent of Site Visits by Crowding Rating and Site Type on the Lolo National Forest in 2011. Visitors rated their perception of how crowded the recreation site or area felt to them. This information is useful when looking at the type of site the visitor was using since someone visiting a designated Wilderness may think 5 people is too many while someone visiting a developed campground may think 200 people is about right. The table below shows the distribution of responses for each site type. Crowding was reported on a scale of 1 to 10 where 1 demotes hardly anyone was there, and a 10 indicates the area was perceived as overcrowded.

Table 89. MON-REC-02: Percent of Site Visits by Crowding Rating and Site Type on the Lolo National Forest in 2011.

Crowding Rating	Day Use Developed Sites	Overnight Use Developed Sites	Undeveloped Areas (GFA)	Designated Wilderness
10 – Overcrowding	0.3	14.2	0	0
9	2.8	6.3	0.1	0
8	3.9	7.6	3.4	6.3
7	3.4	2.6	10	0
6	7.2	14	13.7	7.2
5	9.4	2.7	17	7.2
4	20.5	18.9	14.7	6.3
3	14.6	14.3	13.8	27
2	38	19.5	27.4	45.9
1 – Hardly anyone there	0	0	0	0
Average Rating	3.7	5.3	4.2	3.3

Providing barrier-free facilities for recreation visitors is an important part of facility and service planning and development. Visitors were asked if anyone in their group had a disability. If so, the visitor was then asked if the facilities at the sites they visited were accessible for this person.

Table 90. MON-REC-02: Accessibility of National Forest Facilities by Persons with Disabilities.

Item	Percent
% of Visits that include a group member with a disability	9.7%
Of this group, percent who said facilities at the site visited were accessible	96.1%

Were visitors to the Lolo National Forest satisfied?

An important element of outdoor recreation program delivery is understanding customer satisfaction with the recreation setting, facilities, and services provided. Visitors were asked to rate the specific site or area at which they were interviewed. Visitors rated their satisfaction on a Likert scale from 1 to 5, with an Importance-Performance Analysis (IPA) calculated. Results suggest overall satisfaction ratings were quite good for the Lolo National Forest. About 70 percent of people visiting gave a rating of very satisfied with their overall recreation experience and 21 percent were somewhat satisfied.

2016 NVUM Report

Visit Description: In 2016 visit durations saw an uptick to 3 hours per visit for more than half of the visitors. That said, the average duration is about 7 hours because of longer stays of those using overnight use sites and Wilderness areas. The median length of visits to overnight sites is about 39 hours, indicating a two-night stay. Under 30 percent of visits come from people who visit at most 10 times per year. Very frequent visitors are quite common: over 35 percent of visits are made by people who visit more than 50 times per year. And approximately 84 percent of visitors were from Missoula County.

Demographic results show that slightly less than 35 percent of visits to the Lolo National Forest were made by females. Among racial and ethnic minorities, the most commonly encountered are Hispanic/Latinos at 1.6 percent. The age distribution shows that less than 15 percent of visits were children under age 16. People over the age of 60 accounted for about 19 percent of visits. Over 60 percent of visits were from those living within 25 miles of the forest and another 10 percent come from people who lived between 25 and 50 miles away. About 12 percent of visits were from those living more than 200 miles away.

Activities: The most frequently reported main activities were hiking/walking (22 percent), followed by fishing (13 percent) and hunting (12 percent).

Use of constructed facilities and special designated areas: About one-third of recreation visitors interviewed were asked about whether they made use of a targeted set of facilities and special designated areas during their visit. Responses indicated the top five special facilities or areas provided by the Lolo National Forest were (in order, highest to lowest): forest roads, motorized single track trails, scenic byways, interpretive areas and developed fishing sites.

Activity participation

The wide-ranging offerings or activities identified by national forest visitors included: hiking/walking, viewing wildlife, viewing natural features, relaxing, driving for pleasure, fishing, hunting, other non-motorized, nature study, downhill skiing, bicycling, developed camping, gathering forest products, picnicking, nature center activities, visiting historic sites, motorized water activities, snowmobiling, cross-country skiing, resort use, non-motorized water, primitive camping, motorized trail activity, OHV use, backpacking, horseback riding, and other motorized activity.

Where did they stay during their time on the Lolo National Forest?

In terms of lodging, 33.4 percent of visitors spent nights on the national forest in USFS campgrounds (20.7 percent), USFS cabins/lookouts (6.9 percent), and in undeveloped camping sites (5.8 percent). When not staying on the national forest overnight, visitors mostly stayed at a vacation rental (25.1 percent) or at the home of friends and family (19.2 percent).

Crowding

Percent of Site Visits by Crowding Rating and Site Type on the Lolo National Forest in 2016. Visitors rated their perception of how crowded the recreation site or area felt to them. This information is useful when looking at the type of site the visitor was using since someone visiting a designated Wilderness may think 5 people is too many while someone visiting a developed campground may think 200 people is about right. The table below shows the distribution of responses for each site type. Crowding was reported on a scale of 1 to 10 where 1 demotes hardly anyone was there, and a 10 indicates the area was perceived as overcrowded.

Table 91. MON-REC-02: Percent of Site Visits by Crowding Rating and Site Type on the Lolo National Forest in 2016.

Crowding Rating	Day Use Developed Sites	Overnight Use Developed Sites	Undeveloped Areas (GFA)	Designated Wilderness
10 – Overcrowding	0	0	3.4	0
9	0	0	0	0
8	0.9	5.4	4.1	10
7	2.8	22.9	7.4	10
6	6.7	0	2.9	0
5	12.3	37.7	17.2	22
4	10.3	8.2	9.7	10
3	21.5	8.1	10.8	14
2	21.4	1	13.7	5
1 – Hardly anyone there	24.1	16.6	30.8	29
Average Rating	3	4.7	13.5	3.8

Providing barrier-free facilities for recreation visitors is an important part of facility and service planning and development. Visitors were asked if anyone in their group had a disability. If so, the visitor was then asked if the facilities at the sites they visited were accessible for this person.

Table 92. MON-REC-02: Accessibility of National Forest Facilities by Persons with Disabilities.

Item	Percent
% of Visits that include a group member with a disability	9.2%
Of this group, percent who said facilities at the site visited were accessible.	99%

Were visitors to the Lolo National Forest satisfied?

An important element of outdoor recreation program delivery is understanding customer satisfaction with the recreation setting, facilities, and services provided. Visitors were asked to rate the specific site or area at which they were interviewed. Visitors rated their satisfaction on a Likert scale from 1 to 5, with an Importance-Performance Analysis (IPA) calculated. Results suggest overall satisfaction ratings were quite good for the Lolo National Forest. About 75 percent of people visiting gave a rating of very satisfied with their overall recreation experience and 18 percent were somewhat satisfied.

Lolo National Forest Map

Eight of the nine counties overlapping the national forest's boundaries are non-metro containing less than 50,000 residents. As noted in the 2016 Lolo NVUM report - under 30 percent of visits come from people who visit at most 10 times per year. Very frequent visitors are quite common, where over 35 percent of visits are made by people who visit more than 50 times per year. And approximately 94 percent of visitors were from Missoula County.

Figure 27. MON-REC-02: Map of Lolo National Forest and associated counties.

Access Benefits

Locals and visitors benefit from access to the forest and its resources. There are approximately 2,444 miles of trails and 6,379 miles of roads on the Lolo National Forest. Both roads and trails provide access for recreation, subsistence and other resource uses to the general forest in addition to wilderness and proposed wilderness areas. The latter provide intangible and spiritual values to society that the Wilderness Act describes as the benefits of an enduring resource. Seven percent of the forest is wilderness, which is a benefit for people that value preservation, untrammeled areas, wildlife habitat and solitude.

Trails

The Forest Service's trails program aims to ensure recreation opportunities, public safety, and backcountry access through operation maintenance, rehabilitation, and improvement of forest trails. Forest Service trails are categorized by trail type, trail class, and the managed use of each trail. Trail type reflects predominant trail surface and general mode of travel for each trail. The three trail types are standard (or "terra") trails, which have a surface consisting predominantly of earth; snow trails, which

have a surface consisting predominantly of snow or ice; and water trails, which have a surface consisting predominantly of water (but may include portage routes over land). The majority of Forest Service trails on the Lolo National Forest are terra trails, and in some cases, a trail may be classified as a terra trail in the summer and a snow trail in the winter. All Forest Service trails must also be categorized by trail class, which are general categories reflecting the prescribed scale of development for each trail.

Maintenance to keep trails in good condition may include, among other tasks, clearing encroaching vegetation and fallen trees, as well as repair; preventive maintenance; and replacement of trail signs, water drainage features, trail bridges, and other trail structures. For reporting purposes, the agency divides trail maintenance activities into three categories: (1) miles maintained, (2) miles achieving standard, and (3) miles improved. The Forest Service defines these categories as follows:

- Miles maintained: includes miles of trail on which at least one maintenance task was performed to quality standards during a given year, indicating that one or more—but not necessarily all—needed maintenance tasks were completed.
- Miles improved: includes all trail miles where any improvements were made during a given year through activities such as widening the trail and adding or improving trail bridges or trail components, such as barriers, trail surfacing, kiosks, and wildlife viewing platforms.

Miles achieving standard: includes all trail miles that are achieving quality standards and have been maintained in accordance with a specific maintenance cycle associated with each trail's management objective. Maintenance cycles vary by trail; some trails, for example, may be on annual maintenance cycles, and others may be on 3- or 5-year cycles. Thus, a trail can achieve the Forest Service's standards even if it was not maintained in a given year.

Table 93. MON-REC-02: Lolo Trail Target Accomplishments: 2016-2020.

Target Accomplishments	2016	2017	2018	2019	2020
Maintained	908	1,083	1,290	1,497	1344
Improved	13	11	32	32	22
Achieving Standard	746	726	686	761	650

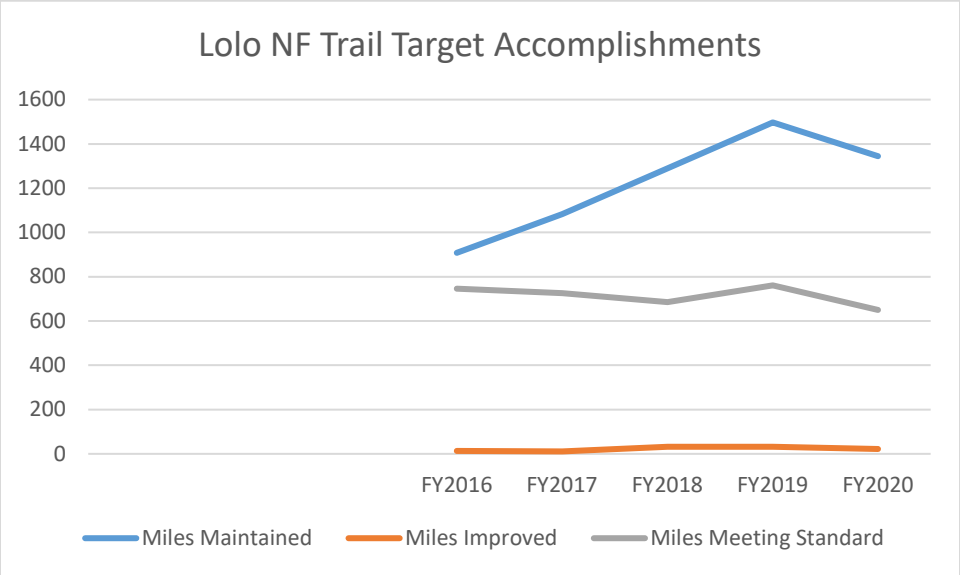

Figure 28. MON-REC-02: Lolo Trail Target Accomplishments.

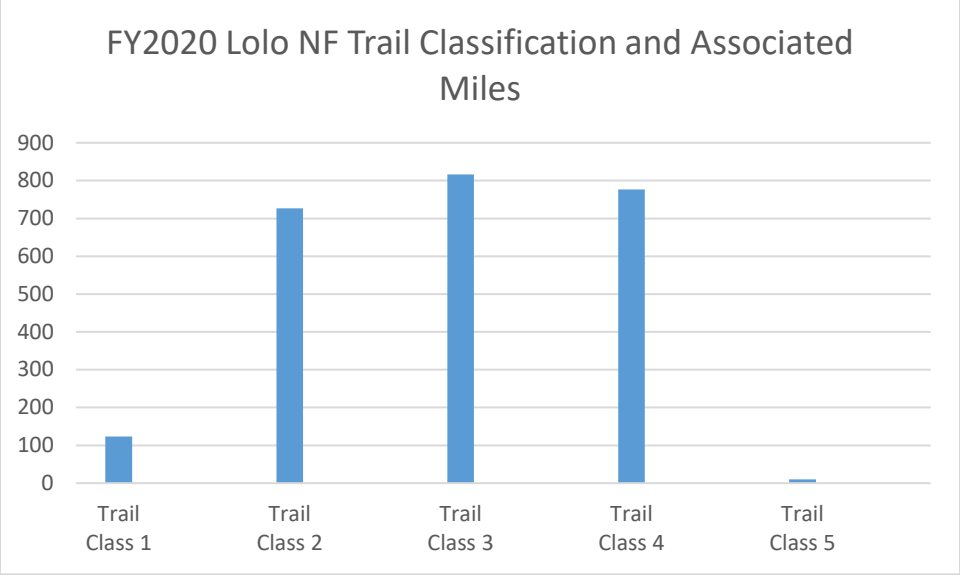

Figure 29. MON-REC-02: USFS Trail Classifications and associated miles for the Lolo National Forest in 2020.

FY2020: **Trail Class 1** (Minimally Developed) – 123 miles, **Trail Class 2** (Moderately Developed) – 727 miles, **Trail Class 3** (Developed) – 816 miles, **Trail Class 4** (Highly Developed) – 777 miles, **Trail Class 5** (Fully Developed) – 1 mile

A Snapshot of Lolo National Forest Assets Providing a portion of Recreation Opportunities

The following information on percent occupancy by site type is an indicator across the forest on recreation assets available to the public and the amount of use they receive. Data covers fiscal years 2019 and 2020 and is pulled from the USFS corporate reservation system, Recreation 1 Stop… also referred to as Recreation.gov. The information provided by Recreation.gov is "real-time" and a very good estimate of those assets provided through the reservation service given it is based on actual reservations/commitments to utilize significant elements of the Lolo National Forest's outdoor recreation program. Although this snapshot is not the complete picture of occupancy, it is a reliable source of up-to-date data information.

Table 94. MON-REC-02: Lolo National Forest Rental % Occupancy Data, Fiscal Year 2019.

Asset Name	Site Type	# of Available Nights	# of Reserved Nights	%Occupancy
Bend Guard Station	Lookout/Cabin	324	212	65%
Cougar Peak Lookout	Lookout/Cabin	77	77	100%
Double Arrow Lookout	Lookout/Cabin	171	164	96%
Hogback Homestead	Lookout/Cabin	243	177	73%
Monture Guard Station Cabin	Lookout/Cabin	131	85	65%
Morgan-Case Homestead	Lookout/Cabin	365	248	68%
Savenac Bunkhouse	Lookout/Cabin	147	50	34%
Savenac Cookhouse	Lookout/Cabin	346	64	18%

Asset Name	Site Type	# of Available Nights	# of Reserved Nights	%Occupancy
Savenac West Cottage	Lookout/Cabin	352	139	39%
Thompson Peak Lookout Tower	Lookout/Cabin	134	130	97%
Up Up Lookout	Lookout/Cabin	106	106	100%
West Fork Butte Lookout	Lookout/Cabin	356	247	69%
Big Larch Campground	Campground	204	118	58%
Lake Inez Point 6 Group Site	Campground	102	100	98%
Lakeside Group Site	Campground	607	85	14%
Pattee Canyon Picnic Area	Picnic Area	189	16	8%
Grand Total		3854	2021	52%

Table 95. MON-REC-02: Lolo National Forest Rental % Occupancy Data for Fiscal Year 2020.

Asset Name	Site Type	# of Available Nights	# of Reserved Nights	% Occupancy
Bend Guard Station	Lookout/Cabin	235	168	71%
Cougar Peak Lookout	Lookout/Cabin	79	78	99%
Double Arrow Lookout	Lookout/Cabin	112	104	93%
Hogback Homestead	Lookout/Cabin	149	136	91%
Monture Guard Station Cabin	Lookout/Cabin	92	70	76%
Morgan-Case Homestead	Lookout/Cabin	237	180	76%
Savenac Bunkhouse	Lookout/Cabin	92	38	41%
Savenac Cookhouse	Lookout/Cabin	228	52	23%
Savenac West Cottage	Lookout/Cabin	239	150	63%
Thompson Peak Lookout Tower	Lookout/Cabin	92	89	97%
Up Up Lookout	Lookout/Cabin	81	80	99%
West Fork Butte Lookout	Lookout/Cabin	238	199	84%
Big Larch Campground	Campground	78	71	91%
Lake Inez Point 6 Group Site	Campground	39	38	97%
Lakeside Group Site	Campground	39	38	97%
Pattee Canyon Picnic Area	Picnic Area	26	2	8%
Grand Total		3854	2021	73%

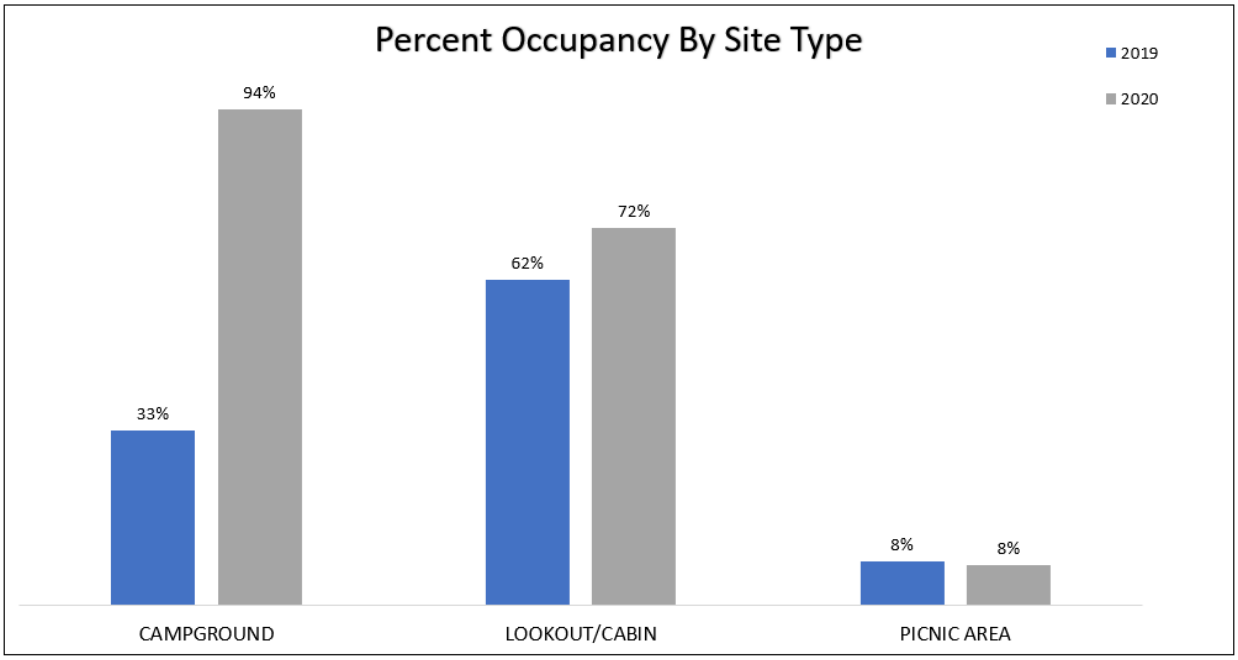

Figure 30. MON-REC-02: Bar Graph Display of % Occupancy by Site Type - FY19 vs. FY20 (data provided by Recreation.gov).

On an average year the Lolo National Forest can see approximately 1,000,000 + visitors, where top activities are hiking, walking, fishing, hunting and other non-motorized pursuits. Recreationists, outfitters and guides benefit directly from National Forest System land while local businesses benefit from spending by forest visitors. Total spending by visitors to the Lolo National Forest estimated in 2018 was about $47.5 million annually. Visits to the Lolo National Forest related to wildlife (hunting, fishing and wildlife viewing) was approximately 29 percent of total visits. Landscapes and features of the Forest provide scenic resources appreciated by local residents, recreationists, artists, people seeking inspiration and other visitors. In addition, scenery on the Forest contributes to community identity, a sense of place, quality of life, the tourism industry and supports property values. The Lolo National Forest provides a wide spectrum of recreation opportunities from campgrounds (individual and group) to day-use areas, to fishing sites, to lookouts and cabins, as well as snow play areas, alpine ski areas, interpretive sites and observation sites.

Discussion

As noted in the 2016 national report Federal Outdoor Recreation Trends: Effects on Economic Opportunities (White et al. 2016), choices across the spectrum for outdoor recreation today are different from choices made by previous generations of Americans, both in the mix of activities and relative popularity. The report looked at 17 recreation activities. Between 1999 and 2009 nature-based outdoor recreation generally increased, where activities oriented toward viewing and photographing nature were among the fastest growing activities. Day hiking has seen increased numbers of participants. Off-highway vehicle driving saw a 34 percent increase in participants; however, there were some decreases observed in traditional winter recreation activities. Past and recent outdoor recreation trends are important indicators of what might happen in the future.

Variety of recreation opportunities are being provided.

To understand if the Lolo National Forest is providing a wide spectrum of recreation opportunities, we looked at a number of data sources suggested by previous indicators and measurements. An assessment of the reliability of the data was performed and plan components were evaluated relative to moving towards or attaining the provisions stated. The 1986 Lolo Forest Plan is on target. At present, the Forest is attaining the goal of providing a broad spectrum of dispersed recreation involving sufficient acreage to maintain a low user density compatible with public expectations. Utilizing analysis and reports on public visitation and visitor characteristics through the NVUM program, the Lolo has estimates for 2006, 2011, and 2016. Based on a review of visitor perception of how crowded the recreation site or area visited felt to them, across the 4 site types measured, the average was relatively low. The average "crowding rating" for Day Use Developed Sites across the three years was 3.8 on a 1 to 10 scale, with 10 being "overcrowded". The crowding rating for Overnight Use Developed Sites across the survey interval was 4.9, for Undeveloped Areas (GFAs) was 3.9 and for Designated Wilderness was 3.6. The forest is meeting public expectations identified in the 1986 Plan.

An objective of the 1986 Plan was to continue providing the rich variety of recreation experiences available on the Lolo National Forest into the future. Activity participation self-assessed by the visiting public across the visitor use survey interval from 2006 to 2016 has been consistent and demonstrates the rich variety of recreation experiences desired. The wide-ranging offerings or activities identified by national forest visitors consistently included: hiking/walking, viewing wildlife, viewing natural features, relaxing, driving for pleasure, fishing, hunting, other non-motorized, nature study, downhill skiing, bicycling, developed camping, gathering forest products, picnicking, nature center activities, visiting historic sites, motorized water activities, snowmobiling, cross-country skiing, resort use, non-motorized water, primitive camping, motorized trail activity, OHV use, backpacking, horseback riding, and other motorized activity. Hiking and walking on the Lolo National Forest were the most frequently reported activities by visitors across the NVUM survey interval from 2006 to 2016. Recognizing the importance of access for hiking and walking in addition to the other identified activities, the trails program plays a key role. It aims to ensure recreation opportunities, public safety, and backcountry access through operation maintenance, rehabilitation, and improvement of forest trails. Forest Service trails are categorized by trail type, trail class, and the managed use of each trail. The Lolo National Forest has approximately 2,444 miles of trail and 6,379 miles of roads. The trails program has demonstrated a consistent commitment to maintaining and working towards each trails management objective. The majority of trails in Fiscal Year 2020 were Class 2 (TC2), Class 3 (TC3) and Class 4 (TC4), where 65 percent of the trails are developed (TC3) or highly developed (TC4). A developed trail is defined by tread continuous and obvious and the Recreation Opportunity Spectrum (ROS) management intent is typically primitive to roaded natural. A highly developed trail is defined by tread wide and relatively smooth with few irregularities and the ROS management intent is typically semi-primitive to rural roaded natural to a rural setting.

Desired future conditions set forth in the 1986 Plan stated recreation will be provided, allowing for all types in the Recreation Opportunity Spectrum and where the capacity for dispersed recreation will exceed the projected use for primitive/semi-primitive recreation and roaded natural recreation. The Recreation Opportunity Spectrum (ROS) is a system for classifying and managing recreation opportunities based on the physical setting, social setting, and managerial setting. The combination of the three criteria results in six different ROS classes: 1) primitive, 2) semi-primitive non-motorized, 3) semi-primitive motorized, 4) roaded natural, 5) rural, and 6) urban. An important element of outdoor recreation program delivery is understanding customer satisfaction with the recreation setting, facilities, and services provided. Across the visitor use survey interval from 2006 to 2016, 74 percent of the visiting public gave a rating of very satisfied with their overall recreation experience and 19 percent were somewhat satisfied. These results suggest overall satisfaction ratings were quite good at the specific site or area at which they were

interviewed. Satisfaction information is generalized to the forest as a whole from developed sites to designated wilderness. When combined with "crowding" analysis previously discussed, the information suggests the Forest continues to allow for all types of recreation opportunities across the spectrum, visitors are satisfied with setting and therefore suggesting capacity for dispersed recreation across the forest as a whole continues to exceed the use for primitive/semi-primitive recreation and roaded natural recreation.

Standards established by the 1986 Plan identified the Lolo National Forest will provide for a wide spectrum of Forest-related dispersed recreation activities and range of skill levels available to Forest visitors including elderly and handicapped (note, the American Disability Act uses the word "disability" in replacement of "handicap"). Providing barrier-free facilities for recreation visitors is an important part of facility and service planning and development on the Lolo National Forest. Across the visitor use survey interval from 2006 to 2016, visitors were asked if anyone in their group had a disability. If so, the visitors were then asked if the facilities at the site they visited were accessible for this person. Results across all three survey years were very supportive of facilities at sites visited to be accessible: 2006 (100 percent), 2011 (96 percent) and 2016 (99 percent). As well, the 1986 Plan identified the Forest would not significantly expand the capacity of developed recreation sites during the first 10-year period. This approach continued through the 2000s up until today.

The Great American Outdoors Act (GAOA – PL No. 116-152) has brought a new funding source to the Agency and will be available for five consecutive years starting in 2021. Funding emphasis is on reduction in deferred maintenance for existing developed recreation sites. This may provide some capacity expansion at existing sites. Open spaces are being heavily utilized by a sequestered population. In some locations across the forest, every weekday is like the weekend. The question is, will this trend continue post Covid-19? Occupancy data pulled from Recreation.gov for the Lolo National Forests, as a proxy comparison between public reservations in fiscal year 2019 compared to fiscal year 2020, demonstrates an increase in use for those assets hosted by the reservation service. In FY2019 across all Recreation.gov hosted developed recreation sites on the Lolo National Forest, there was a 52 percent occupancy for all available nights reservable. In FY2020 that number for the same assets rose to 73 percent occupancy.

Evaluation of Results for Adaptive Management Findings

Recommendations

1. Continue to direct appropriated, Capital Investment Program (CIP), and Recreation Fee (FLREA) funding to: a) perform heavy maintenance and repair/replacement of recreation facilities (deferred maintenance); b) correct resource damage and poor health and safety conditions of facilities; c) improve universal accessibility of our recreation sites; and d) operate and maintain interpretive sites, congressionally designated areas, Scenic Byways, and Wild and Scenic River corridors.
2. Have new programs and site facilities consider reasonable estimates of the overall patterns of future recreation participation on federal lands, especially in a post Covid-19 environment – "the great outdoors has become the great escape."
3. Continue implementation of the Lolo National Forest Accessibility Transition Plan for developed recreation sites.
4. Continue to assemble, update, and validate meaningful data for all recreation uses on the Lolo National Forest.
5. Continue to monitor the effects and benefits of the Recreation Fee Program and the Great American Outdoors Act, established for developed recreation sites and national forest system trails.

6. Close attention should take place relative to the present and post impacts on Outdoor Recreation associated with the global pandemic – Covid-19. The great outdoors has become the great escape. Hiking trails, parks and other open spaces were heavily utilized in 2020 with a sequestered population searching for fresh air during the coronavirus pandemic. Locked down, shut in or just fearful of crowds, people took up hiking, biking, cross-country skiing, snowshoeing, camping (dispersed and developed) - in significant numbers as observed and documented through reservations and management personnel. The Outdoor Industry Association is putting out national 2020 impact numbers as follows: 8.1 million more Americans went hiking in 2020 compared to 2019, 7.9 million more went camping last year and 3.4 million more participated in freshwater fishing. In some locations every weekday was like a weekend. The question is, will this trend continue post Covid-19?

Evaluation of Results for Adaptive Management Findings

Table 96. MON-REC-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
Mon-Rec-02: Is a wide spectrum of recreation opportunities provided?	2021	(E) Yes. Based on results of the National Visitor Use Monitoring surveys and 74% of the visiting public gave a rating of very satisfied with their overall recreation experience.	Yes, it is recommended that in the next monitoring report, consider analyzing data relative to the impacts on outdoor recreation associated with the Covid 19 global pandemic.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired .

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-REC-03

Plan Component(s) being assessed by this monitoring item:

Objectives – "Approximately 25 percent of the Forest will remain in a roadless condition, managed as designated Wilderness or for its roadless values" (p. II-1). "At the present time, approximately 80 percent of the Forest has a relatively natural appearance" (p. II-2).

DFCs – "At the end of the first decade, there will have been minimal change in the overall appearance of the Forest" (p. II-6). "Approximately 223,600 acres of the roadless resource will have been proposed for wilderness, with an additional 181,000 acres to remain roadless" (p. II-7). "By the end of the fifth decade, many changes will be apparent in the overall condition of the Forest" (p. II-7). "Essentially all of the 371,590 acres of the roadless area available for development will have been developed; the roadless areas remaining will be the 363,308 acres of wilderness and the 181,000 acres managed for roadless" (p. II-8).

Management Areas (MA) – See MAs10, 11 and 12 (p. III-30 to III-55). 36 CFR Part 294 – Special Areas: Roadless Area Conservation; Final Rule – The final rule established prohibitions on road construction and road reconstruction in inventoried roadless areas except in certain circumstances. Road maintenance of classified roads is permitted (36 CFR 294.12). The final rule also established prohibitions on timber cutting, sale, or removal in inventoried roadless areas except in certain circumstances (36 CFR 294.13).

Table 97. MON-REC-03: Monitoring Item Summary.

Monitoring Question	Indicators*	Data collection interval	Data Source/Partner	Point of Contact
MON-REC-03: What activities are occurring in roadless lands and what amount and distribution of roadless lands remain on the Forest?	Acres of Wilderness (U) Acres of proposed wilderness (U) Acres of Inventoried Roadless Areas (U) Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13 (U) Acres of Inventoried Roadless Areas substantially altered (36 CFR 294.13(b) (4)). (N) Acres of Inventoried Roadless Area not substantially altered. (N) Miles of National Forest System Road (NFSR) within Inventoried Roadless Areas. (N) Miles of Unauthorized (non-system) road within Inventoried Roadless Areas. (N) Miles of Temporary road constructed within Inventoried Roadless Areas. (N)	1 Year – (Annually or by Project)	Natural Resource Information System (NRIS) Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) Enterprise Data Center (EDC) Forest GIS Layer Forest Transportation Atlas (INFRA Database) Watershed Improvements Tracking (WIT) Database Timber Sale Contracts Timber Sale Inspect Reports	Allen Byrd, Lolo Forest Environmental Coordinator

(*Influenced by climate change? Y, N, Uncertain)

Table 98. MON-REC-03: Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2001
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussions

Methods

Acres of Wilderness; Acres of proposed wilderness; Acres of Inventoried Roadless Areas

These indicators are used to show baseline distribution of each land designation across the Forest. A table showing the distribution of acres for each land designation is provided in the results section below. These indicators will be used to compare and track changes in acres of each land designation in future biennial monitoring and evaluation efforts.

Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13

This indicator tracks activities that have occurred within inventoried roadless areas across the Lolo National Forest as they relate to:

- 36 CFR 294.12, Prohibition on road construction and road reconstruction in inventoried roadless areas and,
- 36 CFR 294.13, Prohibition on timber cutting, sale, or removal in inventoried roadless areas.

The 2001 Roadless Rule provides exemptions to these prohibitions in certain situations. Use of these exemptions have been recorded by the Northern Region's Roadless Coordinator since 2008 and are displayed in Appendix E to this monitoring evaluation report.

Acres of Inventoried Roadless Areas substantially altered (36 CFR 294.13(b) (4)) and Acres of Inventoried Roadless Area not substantially altered.

One of the exemptions in the 2001 Roadless Rule that allows timber to be cut, sold, or removed in inventoried roadless areas *is 36 CFR 294.13294.13(b)(4):*

> *Roadless characteristics have been substantially altered in a portion of an inventoried roadless area due to the construction of a classified road and subsequent timber harvest. Both the road construction and subsequent timber harvest must have occurred after the area was designated an inventoried roadless area and prior to January 12, 2001. Timber may be cut, sold, or removed only in the substantially altered portion of the inventoried roadless area.*

This exception recognizes that past road construction and timber harvesting in inventoried roadless areas may have altered the roadless characteristics to the extent that the purpose of protecting those characteristics cannot be achieved (66 Fed. Reg. 3258). Timber harvest under this exemption should not expand the area already substantially altered by past management. Since 2001, the Lolo National Forest has not expanded areas already substantially altered by past management. The number of times this exemption has been authorized on the Lolo National Forest and associated acres treated within existing

substantially altered area is provided in the above indicator, *Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13.*

Miles of National Forest System Road (NFSR) within Inventoried Roadless Areas; Miles of Unauthorized (non-system) road within Inventoried Roadless Areas; Miles of Temporary road constructed within Inventoried Roadless Areas.

All known NFSR roads and unauthorized roads within inventoried roadless areas on the Lolo National Forest were identified in GIS using the Forest Service Infrastructure (INFRA) database and roads atlas overlayed with the 2001 Roadless Area boundaries spatial layer. This year's Biennial Monitoring Evaluation Report will serve as a starting point to which subsequent reports for this monitoring item can track and compare changes in roads over time within IRAs.

The INFRA database tracks general road information including route status, length, jurisdiction, design standard, travel condition, and maintenance level. Route status in INFRA denotes whether a road is a NFSR or an unauthorized road, both are defined below:

National Forest System road. (36 CFR 212.1; 2010). A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority.

Unauthorized road and trail. (36 CFR 212.1; 2010). A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas.

- Unauthorized roads are categorized into two types and recorded in the SYSTEM linear event in the INFRA Travel Routes database. The two types are:
    - Undetermined (UND). Roads where long-term purpose and need has yet to be determined.
    - Not Needed (NOT). Roads not needed for long-term management of national forest resources as determined through an appropriate planning process.

Temporary road or trail. (36 CFR 212.1; 2010). A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas.

Since the inception of the 2001 Roadless Area Conservation Rule, no authorizations have been granted allowing temporary road constructed in inventoried roadless areas on the Lolo National Forest. Therefore, this year's Biennial Monitoring Evaluation Report records zero mile of temporary roads constructed within inventoried roadless areas and will serve as a baseline for future Biennial Monitoring Evaluation Reports to track and compare overtime temporary road construction.

Results

Acres of Wilderness; Acres of proposed wilderness; Acres of Inventoried Roadless Areas

Table 99. MON-REC-03: Distribution of acres for each land designation across the Lolo National Forest, as of 2021.

Land Designation	Acres (2021)
Acres of Wilderness	147,893
Acres of Proposed Wilderness	223,994
Acres of Inventoried Roadless Areas	757,927

Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13

Please see Appendix E below for results to this indicator.

Acres of Inventoried Roadless Areas substantially altered (36 CFR 294.13(b) (4)) and Acres of Inventoried Roadless Area not substantially altered.

The number of times this exemption has been authorized on the Lolo National Forest and associated acres treated within existing substantially altered areas is provided in the above indicator, Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13.

Table 100. MON-REC-03: Miles of National Forest System Road (NFSR) within Inventoried Roadless Areas; Miles of Unauthorized (non-system) road within Inventoried Roadless Areas; Miles of Temporary road constructed within Inventoried Roadless Areas

Road classification	Miles
Miles of National Forest System Road (NFSR) within Inventoried Roadless Areas	255.75
Miles of unauthorized (non-system) road within Inventoried Roadless Areas	57.5
Miles of temporary road constructed within Inventoried Roadless Areas	0

Discussion

Initial monitoring of inventoried roadless areas on the Lolo National Forest occurred between 1991 and 2001. During this timeframe monitoring tracked changes in acres and distribution of roadless lands over time and compared these changes with the amount of development in inventoried roadless areas projected in the 1986 Lolo Forest Plan. Development in this case consisted of road construction for timber harvest. The 1986 Lolo Forest Plan projected that 142,864 acres of inventoried roadless lands for development by the end of the first decade and essentially all of the 371,590 acres of the roadless area available for development will have been developed by the 5th decade. By 2001, the amount of development reached 43,445 acres according to the initial monitoring reports.

In 2016, the Lolo National Forest modified its Forest Plan's monitoring program to transition to the requirements of the 2012 Planning Rule (36 CFR 219.12). The transition resulted in modifying monitoring item 5-3 to reflect changes to management of inventoried roadless areas under the 2001 Special Areas; Roadless Area Conservation; Final Rule (36 CFR 294). This item now monitors activities within roadless areas as described under the provisions of the 2001 Roadless Rule.

For the most part the results of each monitoring indicator speak for themselves since they simply report out on existing acres of land designations, number of authorizations granted to cut, sale, or remove timber in inventoried roadless areas as well associated number of acres treated under each authorization, and the number of roads currently located within inventoried roadless areas. These indicators include:

- Acres of Wilderness
- Acres of proposed wilderness
- Acres of Inventoried Roadless Areas
- Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13.
- Miles of National Forest System Road (NFSR) within Inventoried Roadless Areas
- Miles of Unauthorized (non-system) road within Inventoried Roadless Areas.

The following three indicators, however, are recommended be dropped from future monitoring and evaluations.

- Acres of Inventoried Roadless Areas substantially altered (36 CFR 294.13(b) (4)).
- Acres of Inventoried Roadless Area not substantially altered.
- Miles of Temporary road constructed within Inventoried Roadless Areas.

It is recommended that the indicators acres of inventoried roadless areas substantially altered, not substantially altered, and miles of temporary road construction be dropped from future evaluation and monitoring because no change in acres of substantially altered areas or miles of temporary roads has occurred since the inception of the 2001 Roadless Area Conservation Rule. Treatments in inventoried roadless areas authorized under exemption 36 CFR 294.13(b)(4) occurred within previous developed areas. Also, since the rule states, timber harvest under this exemption should not expand the area already substantially altered by past management, it is unlikely a change in the distribution of these areas would occur in future. Likewise, the rule prohibits construction of temporary roads and therefore, it is unlikely a change in miles would occur in the future. These indicators provide little value to inform future management decision on the Lolo National Forest and should be dropped.

Evaluation of Results for Adaptive Management

Table 101. MON-REC-03: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-REC-03: What activities are occurring in roadless lands and what amount and distribution of roadless lands remain on the Forest?	2021	(E) Yes. Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired	Yes, the following is recommended: The following three indicators, should be dropped from future monitoring and evaluations because no change in acres of substantially altered areas or miles of temporary roads has occurred since the inception of the 2001 Roadless Area Conservation Rule (see above for additional information): Acres of Inventoried Roadless Areas substantially altered (36 CFR 294.13(b) (4)). Acres of Inventoried Roadless Area not substantially altered. Miles of temporary road constructed within Inventoried Roadless Areas.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Range

MON-RNG-01

Plan Component(s) being assessed by this monitoring item:

Goals – Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1). "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1).

DFCs – "The current grazing program will have been maintained and the opportunity to increase animal numbers provided as a result of increases in the transitory range created through timber harvest" (p. II-7 and II-8).

Standards 4 and 5 – "Conflict between livestock and big game will be resolved so big game are allocated the forage required to meet their needs. Domestic livestock will be allowed to utilize any forage surplus not conflicting with the planned expansion of big-game populations. Reduction in livestock numbers will be avoided, if possible, but will be acceptable to meet management goals" (p. II-9). "Allotments with no AUM's shown for the Proposed Action in Appendix B will be phased out unless the permittee is willing to make necessary investments in livestock management and structural improvement to maintain range condition at an acceptable level" (p. II-9).

Management Areas (MA) – See Mas 14 and 15 (p. III-64 to III-69).

Table 102. MON-RNG-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-RNG-01: Is livestock use managed within the carrying capacity of grazing allotments?	Adherence to Term Grazing Permits, Annual Operating Instructions and On-Off Dates (N) Range Conditions (Y)	1 year – (Annually by Active Allotment)	Natural Resource Information System (NRIS) and Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) Range surveys Range Allotment Management Plans Grazing permits District permit administrators	Tony Saba, Forest Timber Management Officer

(*Influenced by climate change? Y, N, Uncertain)

Table 103. MON-RNG-01: Monitoring Collection Summary.

MON-RNG-01:	**Year**
Data was last collected or compiled in:	2019
Next scheduled data collection/compilation:	2022
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	1999
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2022

Results and Discussion

Methods

The data utilized for this monitoring item was pulled from the agency Corporate Data Warehouse from the FACTS program within the Natural Resource Management Information System. Reports were run on authorized use relative to the number of Animal Unit Months (AUM) permitted and actual numbers grazed.

There was also communication with District Range permit administrators for information such as existing permit use, non-use requests, and current analyses that may be underway for any existing allotment management plans.

Results

The reports show that there are zero excess AUMs, meaning that livestock use is being managed with the carrying capacity of the existing allotments. The Lolo National Forest has been successful with managing and updating the existing permits and achieving Forest Plan direction. Annual field monitoring of those active allotments in use have shown that the Forest is compliant with Forest Plan direction.

Evaluation of Results and Findings

Table 104. MON-RNG-01: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-RNG-01: Is livestock use managed within the carrying capacity of grazing allotments?	2021	(E) Yes. Due to all existing active permits being administered to allotment management standard, allotments are being managed within carrying capacity for livestock.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-RNG-02

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1).

DFCs – "The current grazing program will have been maintained and the opportunity to increase animal numbers provided as a result of increases in the transitory range created through timber harvest" (p. II-7 and II-8).

Standards 4 and 5 – "Conflicts between livestock and big game will be resolved so big game are allocated the forage required to meet their needs. Domestic livestock will be allowed to utilize any forage surplus not conflicting with the planned expansion of big-game populations. Reduction in livestock numbers will be avoided, if possible, but will be acceptable to meet management goals" (p. II-9). "Allotments with no AUM's shown for the Proposed Action in Appendix B will be phased out unless the permittee is willing to make necessary investments in livestock management and structural improvement to maintain range condition at an acceptable level" (p. II-9).

Table 105. MON-RNG-02: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-RNG-02: Is the establishment and spread of invasive aquatic and terrestrial plant weed species being controlled (prevented or reduced) through use of integrated weed treatment practices?	Acres of invasive plant species treated (mechanically). (N) Acres of invasive plant species treated (biologically). (N) Acres of invasive plant species treated (chemically). (N) Acres of other prevention and control methods. (N) Acres of new invasive plant species treated. (N) Terrestrial Invasive Plant Treatment Efficacy Rating, (N)	2 years	Natural Resource Information System (NRIS) Natural Resource Management (NRM) TESP-IS Invasive Plant Control Code Forest Service Activity Tracking System (FACTS) Project noxious weed inventories. Project noxious weed analysis and NEPA documentation.	Kurt Wetzstein, Lolo Forest Vegetation Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 106. MON-RNG-02: Monitoring Collection Summary.

MON-RNG-02	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2022
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2010
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

Methods

- All invasive species treatment and inventory records are stored in the Forest Service Activity Tracking System database, also known as FACTS. This is the primary database of record to summarize the information presented below. The Invasives Performance Reports utility in FACTS provide the accomplishment summary and treatment efficacy information below.
- The Geospatial Interface (GI) utility in ARCGIS was used for individual species treatment data reported in the FACTS database.
- TESP-IS (Threatened, Endangered, Sensitive-Invasive Species) invasive plant species inventory data was queried in February 2021 for the data presented below.

Results

Treatment activities accomplished between 2018-2020 are summarized below:

Table 107. MON-RNG-02: Treatment Activities accomplished between 2018-2020.

Treatment Activity	2018	2019	2020	Total
Acres of invasive plant species treated (mechanically)	34	32	0	66
Acres of invasive plant species treated (biologically)	155	175	155	485
Acres of invasive plant species treated (chemically)	7071	3729	5966	16,766
Total	7,260	3,936	6,121	17,317

Invasive plant treatment efficacy rating is the percent of the targeted invasive species population (infestation) that was killed by the treatment/activity. Summarized below are the efficacy ratings for treatments conducted 2018-2020, when treatment efficacy was recorded.

Table 108. MON-RNG-02: Invasive plant treatment efficacy rating, 2018-2020.

Accomplishment Year	District	Activity	Individual Treatment Activities	Acres Accomplished	Treatment Efficacy
2018	Missoula	Biocontrol	30	150	85%
2018	Missoula	Pesticide Application	85	2,576	72%
2018	Ninemile	Pesticide Application	27	583	93%
2018	Plains-Thompson Falls	Pesticide Application	79	1,405	95%
2018	Seeley Lake	Pesticide Application	80	1,794	76%
2018	Superior	Pesticide Application	137	714	82%
2019	Plains-Thompson Falls	Pesticide Application	96	929	92%
2019	Seeley Lake	Pesticide Application	31	560	64%
2019	Superior	Pesticide Application	87	244	94%
2020	Missoula	Pesticide Application	89	3,914	62%
2020	Ninemile	Pesticide Application	36	947	95%
2020	Plains-Thompson Falls	Pesticide Application	24	259	79%

Summarizing the table above, average treatment efficacy for 2018 is 84 percent effective, 2019 is 83 percent, and 2020 is 79 percent.

Average efficacy by Districts for treatments accomplished during this three-year period is summarized below:

Table 109. MON-RNG-02: Average invasive treatment efficacy by district.

District	Average treatment efficacy
Missoula	73%
Ninemile	94%
Plains-T Falls	89%
Seeley Lake	70%
Superior	88%

Invasive species infestation in acres during this three-year period, with the associated amounts in descending order depicted below (TESP-IS):

Table 110. MON-RNG-02: Invasive species infestation in acres, 2018-2020.

Invasive Species	2018	2019	2020	Total Acres
Spotted knapweed	11,143	3,544	3,364	18,052
Common mullein	804	578	1,493	2,875
Oxeye daisy	514	411	1,074	2,000
Common St. Johnswort	900	528	65	1,493
Cheatgrass	1,461	3		1,463
Gypsyflower	467	299	524	1,290
Nodding plumeless thistle	58	220	736	1,014
Common tansy	194	4	431	628
Sulphur cinquefoil	83	204	230	517
Leafy spurge	50	28	408	486
Common viper's bugloss	427			427
Dalmatian toadflax	180	2	102	283
Canada thistle	182	53	44	279
Orange hawkweed	3	0	171	174
Meadow hawkweed	21	0	103	124
Butter and eggs	48	5	19	72
Tall tumblemustard	72			72
Whitetop	40			40
Bull thistle	8	1		10
Tall buttercup	7			7
Diffuse knapweed	7			7
Yellow salsify	6			6
Total	16,673	5,882	8,765	31,319

Figures above may not match prior reporting efforts, as numbers represented here sometimes have multiple weeds on a single acre. For example, the actual number of acres treated without duplicates in 2020 is 6,121, as reflected above.

New invaders are beginning to take hold on the Forest. These include blueweed, orange hawkweed, rush skeleton weed, and ventenata. Currently the Forest does not emphasize conducting inventory of new invaders, so it is likely that small populations such as Ventenata will continue to grow.

Nearly all of the treatment work that has been accomplished is being done with grant funding, and typically does not involve any inventory and monitoring, only treatment of invasive species.

All of the treatment methods conducted on the Forest were either mechanical/physical (such as pulling by hand), chemical, or biocontrol.

Discussion

Since standalone inventories are rarely conducted due to lack of staffing and funding, it is common that inventory records are created only because a treatment was accomplished. While the Forest has been successful in getting work done on the ground via grant funding, the lack of inventory and monitoring leads to an increased potential for increased occurrence and severity of existing infestations as well as presence of new invaders.

As far as trends go, the number of acres treated has increased substantially since previous Forest Plan monitoring efforts. The 2000-2001 monitoring effort showed 2,063 acres of weed treatments in 2000 and 3,654 acres in 2001. On an annual average basis, the current three-year average for the last three years is 5,772 acres, compared to the 2000-2001 annual average of 2,859 acres, or an increase of roughly 102 percent.

Evaluation of Results for Adaptive Management Findings

Table 111. MON-RNG-02: Summary of findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-RNG-02: Is the establishment and spread of invasive aquatic and terrestrial plant weed species being controlled (prevented or reduced) through use of integrated weed treatment practices?	2021	(E) Yes. Monitoring results indicate that establishment and spread is being controlled with weed treatment practices.	Yes, the following is recommended: Increase data collection with an emphasis on new invasive species.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-RNG-03

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1).

DFCs – "The current grazing program will have been maintained and the opportunity to increase animal numbers provided as a result of increases in the transitory range created through timber harvest" (p. II-7 and II-8).

Standards 4 and 5 – "Conflicts between livestock and big game will be resolved so big game are allocated the forage required to meet their needs. Domestic livestock will be allowed to utilize any forage surplus not conflicting with the planned expansion of big-game populations. Reduction in livestock numbers will be avoided if possible, but will be acceptable to meet management goals" (p. II-9). "Allotments with no AUM's shown for the Proposed Action in Appendix B will be phased out unless the permittee is willing to make necessary investments in livestock management and structural improvement to maintain range condition at an acceptable level" (p. II-9).

Table 112. MON-RNG-03: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-RNG-03: Is weed spread increasing/decreasing and are new invasive plant species occurring?	Acres of invasive plants inventoried, (N) New invasive plant species found (U)	2 years	Natural Resource Information System (NRIS) Natural Resource Management (NRM) Forest Service Activity Tracking System (FACTS) Project noxious weed inventories. Project noxious weed analysis and NEPA documentation.	Kurt Wetzstein, Lolo Forest Vegetation Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 113. MON-RNG-03: Monitoring Collection Summary.

MON-RNG-03	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2010
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

Methods

- All invasive species treatment and inventory records are stored in the Forest Service Activity Tracking System database, also known as FACTS. This is the primary database of record to summarize the information presented below.
- The Geospatial Interface (GI) utility in ARCGIS was used for individual species infestation data.

Results

Invasive species inventory is accomplished when treatments occur. As such, infestation data collected during weed treatments for the period 2018-2020 is summarized below:

Table 114. MON-RNG-03. Infestation data collected during weed treatments for the period 2018-2020

Invasive Species	2018	2019	2020	Total Acres
Spotted knapweed	11,143	3,544	3,364	18,052
Common mullein	804	578	1,493	2,875
Oxeye daisy	514	411	1,074	2,000
Common St. Johnswort	900	528	65	1,493
Cheatgrass	1,461	3	No data	1,463
Gypsyflower	467	299	524	1,290
Nodding plumeless thistle	58	220	736	1,014
Common tansy	194	4	431	628
Sulphur cinquefoil	83	204	230	517
Leafy spurge	50	28	408	486
Common viper's bugloss	427	No data	No data	427
Dalmatian toadflax	180	2	102	283
Canada thistle	182	53	44	279
Orange hawkweed	3	0	171	174
Meadow hawkweed	21	0	103	124
Butter and eggs	48	5	19	72
Tall tumblemustard	72	No data	No data	72
Whitetop	40	No data	No data	40
Bull thistle	8	1	No data	10
Tall buttercup	7	No data	No data	7
Diffuse knapweed	7	No data	No data	7
Yellow salsify	6	No data	No data	6
Total	16,673	5,882	8,765	31,319

Discussion

It is not well documented if new species are occurring, other than anecdotal evidence, as a comprehensive inventory and monitoring program is absent on the Forest. New invaders such as Ventenata, blueweed, orange hawkweed, and rush skeleton weed are beginning to take hold in some areas.

If monitoring for new invaders is not conducted in the coming years, species like Yellow star thistle and other highly undesirable species are likely to become established, with potentially devastating ecological impacts.

Evaluation of Results for Adaptive Management Findings

Table 115. MON-RNG-03: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-RNG-03: Is weed spread increasing/decreasing and are new invasive plant species occurring?	2021	(B) Uncertain. It is largely unknown if new species are occurring due to lack of comprehensive monitoring efforts.	Yes, the following is recommended: Management activities should include a more comprehensive inventory and monitoring program. Monitoring Plan: Develop more appropriate Plan Components to tie to this monitoring item.	Management Activities and Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-RNG-04

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for regional and national needs" (p. II-1).

DFCs – "The current grazing program will have been maintained and the opportunity to increase animal numbers provided as a result of increases in the transitory range created through timber harvest" (p. II-7 and II-8).

Standards 4 and 5 – "Conflicts between livestock and big game will be resolved so big game are allocated the forage required to meet their needs. Domestic livestock will be allowed to utilize any forage surplus not conflicting with the planned expansion of big-game populations. Reduction in livestock numbers will be avoided if possible, but will be acceptable to meet management goals" (p. II-9). "Allotments with no AUM's shown for the Proposed Action in Appendix B will be phased out unless the permittee is willing to make necessary investments in livestock management and structural improvement to maintain range condition at an acceptable level" (p. II-9).

Table 116. MON-RNG-04: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-RNG-04: Are weed prevention being applied during project implementation?	Observed implementation of weed prevention and mitigation measures, (N) Presence of weed prevention and mitigation measures in contracts, (N) Presence of weed prevention and mitigation measures in NEPA documents (N)	1 year	Project noxious weed analysis and NEPA documentation (design criteria and mitigation measures). Timber Sale Contracts Timber Sale Inspection Reports Forest Plan Monitoring Project Field Review	Kurt Wetzstein, Lolo Forest Vegetation Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 117. MON-RNG-04: Monitoring Collection Summary.

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2010
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

Methods

- NEPA decision documents (Environmental Assessments, Decision Notices) were reviewed for consistency with the indicators listed above.
- Standard timber sale contract language was also reviewed to determine compliance.

Results

Virtually all Timber Sale contracts awarded on the Forest utilize the BT6.35 Equipment Cleaning provision, which requires that all equipment used in harvesting operations adhere to strict cleaning procedures prior to operating on the sale, and before moving to another area within the sale boundary. Equipment is considered clean when a visual inspection does not reveal seeds, soil, vegetative matter, and other debris that could contain or hold seeds.

A review of recent NEPA decisions showed that all decision notices include weed treatment and mitigation activities as a part of the Resource Protection Measures (RPMs). It is common practice to spray haul routes with herbicide prior to any log hauling, as well as log landings sites, as they are the primary vectors for weed spread.

As an example, the recent Soldier Butler Decision Notice (2020) included the following excerpt in the RPMs:

Table 118. MON-RNG-04: Example of Project Level Noxious Weed Resource Protection Measures.

RPM	Resource Objective	Description of Resource Protection Measure	Units Locations	Sale, Service, Others
NW-1	To reduce or eliminate the introduction or spread of noxious weeds	Prior to project implementation and following completion conduct ground-based noxious weed herbicide treatments along planned NFS haul roads.	Haul Routes	Sale
NW-2	To reduce or eliminate the introduction or spread of noxious weeds	Include in all contracts the standard Contract Provisions: C/CT6.351 (or equivalent) – Washing Equipment: This clause requires the purchaser to clean all off-road equipment before moving into project area so that weed seeds are not spread.	Project Area	Sale
NW-3	To reduce or eliminate the introduction or spread of noxious weeds and impacts of herbicide treatment and to prevent inadvertent contamination of aquatic ecosystems	Weed treatments will tier to Lolo National Forest Integrated Weed Management Plan (USDA Forest Service 2007), including approved herbicides, treatment strategies, and mitigation measures. Implement mitigation measures 1 through 48 (starting on page 28 of Lolo National Forest Integrated Weed Management Environmental Impact Statement [2007]). See Project File or 2007 IWM Environmental Impact Statement for a complete list of mitigation measures.	Project Area	Sale, Service, Other
NW-4	To reduce or eliminate the introduction or spread of noxious weeds	To the extent practical, noxious weed herbicide treatments will occur on landings.	Landings	Other, Service

Another recent example from the Sunrise Fire Salvage Decision Notice (2018) is below, similar in content but a different format:

Example of Project Level Noxious Weed Resource Protection Measures include:

- Off-road equipment will be cleaned (power or high-pressure cleaning) of mud, dirt, and plant parts before moving into the area
- Roads will be treated with herbicide prior to road reconstruction, maintenance, and haul use unless existing road conditions (i.e., vegetation on road, road barriers, etc.) prohibit reasonable access for spraying equipment. Reasonable access will be determined by the District Weed Coordinator. If existing road conditions prohibit access, then treatment will be deferred until the road activities clear the obstruction. The determination of which roads to be treated will be made by the District Weed Coordinator based on weed inventories and treatment schedules.
- If gravel or other material is hauled for road surfacing, it will be from a site (pit) that has been previously treated for weeds and is currently weed free, where possible.
- Disturbed sites will be seeded with native seed as specified in Lolo seed mixes.
- Straw used for road stabilization and erosion control will be certified weed-free or weed seed-free.

- Where possible, before and during sale preparation, landings will be identified and sprayed for weeds as needed. Where possible, skid trails, skyline corridors and landings will be located where there are no obvious weed infestations.
- Temporary roads will be treated with herbicide prior to decommissioning unless waived by written agreement.
- At the discretion of the Contracting Officer, all vehicles and trailers used for planting purposes will be cleaned of dirt, plant parts, and material that may carry noxious weeds prior to entry into the project area.

These are common examples included in NEPA decisions for weed prevention and mitigation.

Discussion

Sale administration personnel are responsible for inspecting equipment to be free of weeds and other vegetative material including seeds prior to operating on NFS lands. These inspections are documented in the sale inspection reports for each sale and are reviewed for Forest personnel on a regular basis, indicating that equipment operating on the Forest is in compliance with Forest Plan direction. They also ensure that weed treatments along haul routes and at log landing sites occurs as specified in the contracts.

Evaluation of Results for Adaptive Management Findings

Table 119. MON-RNG-04: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-RNG-04: Are weed prevention being applied during project implementation?	2021	(E) Yes. Based on the observed implementation of weed prevention and mitigation measures in contracts and NEPA documents.	Yes. Recommend dropping this monitoring item.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Roads

MON-RDS-01

Plan Component(s) being assessed by this monitoring item:

Objectives - "Roads will be kept to the minimum number and size needed to support resource management; most roads will be closed when projects are completed to protect resource values" (p. II-2).

Standards 48, 49, and 52 - "Motorized vehicles will be limited to system roads and trails which are designated open in the Lolo Forest Travel Plan" (p. II-17). "Lolo National Forest roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user, and resource needs" (p. II-17). "Manage Forest roads to provide for resource protection, wildlife needs, commodity removal, and a wide range of recreation opportunities. In most areas on the Forest, this will involve leaving some roads open, closing some roads seasonally, and closing other road on a permanent basis" (p. II-18).

Management Areas (MA) - see specific road practices by MA. (p. III-2 to III-149).

Table 120. MON-RDS-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
Do the number of roads assist moving toward resource and other management needs and objectives, reflect long-term funding, and minimize environmental impacts?	Forest Plan Management Area direction, number of roads, road density, road location, and motorized vehicle use travel management designation as determined by the Transportation Analysis Process.	1 year – (by project) 2 year – Grizzly Bear Biennial)	Forest transportation analysis. Project and/or representative (sample) project analysis and NEPA documentation. OMRD and TMRD Biennial (Grizzly bear monitoring reporting) Transportation Analysis Process Travel Management Atlas Forest Transportation Atlas (INFRA Database) WIT, culvert inventory Motorized Vehicle Use Map (MVUM)	Catina McLean, Assistant Forest Engineer

(*Influenced by climate change? Y, N, Uncertain)

Table 121. MON-RDS-01: Monitoring Collection Summary.

MON-RDS-01	Year
Data was last collected or compiled in:	2021
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Several plan components address roads and the transportation system. The objectives of the Plan state that; *"Roads will be kept to the minimum number and size needed to support resource management; most roads will be closed when projects are completed to protect resource values"* (p. II-2). Several standards address where motorized vehicles may travel and how the road system will be managed to protect other resources; *"Motorized vehicles will be limited to system roads and trails which are designated open in the Lolo Forest Travel Plan" (p. II-17). "Lolo National Forest roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user, and resource needs" (p. II-17). "Manage Forest roads to provide for resource protection, wildlife needs, commodity removal, and a wide range of recreation opportunities. In most areas on the Forest, this will involve leaving some roads open, closing some roads seasonally, and closing other road on a permanent basis" (p. II-18).*

Results and Discussion

Methods

The number of transportation analyses completed were collected from the transportation planners and Zone NEPA Coordinators.

Miles of roads maintained, constructed, reconstructed, and Road Miles Maintained were pulled from geo-enabled Performance Accountability System (gPAS) Reports and were from October 1 – September 30 each year. Miles of Road Maintained were broken out by High Clearance (Maintenance Level 1 & 2) and Passenger (Maintenance Level 3, 4, &5) because that is how it is reported, it is not broken out by Maintenance Level 1, 2, 3, 4, or 5.

Total Road Miles, Open Road Miles, Stored Road Miles, Decommissioned Road Miles, Road Miles Open to Motorized Travel, Road Miles Restricted to Year Long Motorized Travel, and Road Miles Restricted to Seasonal Motorized Travel were pulled from the INFRA database in February 2021 and were from that point in time. Data from INFRA is continually changing and so data from past years is unavailable.

Results

Transportation Plans

Fiscal Year 2019: Three transportation plans (Soldier Butler, Sawmill Petty, and Swamp Eddy) were completed. Specific information on each of the transportation plans is available in the project files located at the responsible Ranger District Office.

Fiscal Year 2020: Five transportation plans (Centerhorse Post Fire TAP, A-BLT, Redd Bull, BMU 22 Compliance, and Cruzane Mountain) were completed. Specific information on each of the transportation plans is available in the project files located at the responsible Ranger District Office.

Miles Constructed/Reconstructed

Fiscal Year 2019: In fiscal year 2019, 4.13 miles of road were constructed and 84.13 miles of System (National Forest System) roads were reconstructed. This represents 33.6 percent of Lolo Forest Plan projected annual average road construction and reconstruction of 263 miles.

Fiscal Year 2020: In fiscal year 2020, 1.74 miles of road were constructed, and 76 miles of System roads were reconstructed. This represents 29.6 percent of Lolo Forest Plan projected annual average road construction and reconstruction of 263 miles.

Roads information for elk, specific to population status and habitat, was included in MON-WLF-01.

See Data Tables in MON-WLF-04 for Open Motorized Road Densities and Total Motorized Road Densities data related to grizzly bears.

Data

Table 122. MON-RDS-01: General Road Information by Year

Year	**Miles Road Maintained** High Clearance	**Miles Road Maintained** Passenger Car	**Miles Road Maintained**	**Miles Road Constructed (Permanent)**	**Miles Road Reconstructed**
2019	166.27	364.94	531.21	4.13	84.13
2020	122.81	337.65	460.46	1.74	76.00

Table 123. MON-RDS-01: Motorized Travel Road Data from INFRA

Date of Data Query	Total Road Miles	**Open Road** Miles	**Stored Road** Miles	Decommissioned Road Miles
2/11/2021	6509.88	3345.10	314.11	376.51

Table 124. MON-RDS-01: Motorized Travel Road Data from INFRA

Date of Data Query	Road Miles Open to Motorized Travel	**Road Miles Restricted to Year Long** Motorized Travel	Road Miles Restricted to Seasonal Motorized Travel
2/11/2021	3345.10	3164.78	924.52

Note: The data is based off Forest Service System Roads except for the Decommissioned Road Miles which are the total miles of road in the INFRA database that have been decommissioned.

Discussion

The data for miles of road maintained, reconstructed, and constructed are for 2019 and 2020 only. Looking at this data, it shows a downward trend in the number of roads maintained, reconstructed, and constructed. There is not enough data to prove a downward trend. This will have to be confirmed with more data in the next report.

See the Discussion/Conclusion sections of MON-WLF-01 and MON-WLF-04 for road indicators related to elk and grizzly bear habitat respectively.

Evaluation of Results for Adaptive Management Finding

The following findings and recommendations resulted from the evaluation of monitoring results.

Table 125. MON-RDS-01: Summary of Findings

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-RDS-01: Do the number of roads assist moving toward resource and other management needs and objectives, reflect long-term funding, and minimize environmental impacts?	2021	(B) Uncertain. More time/data are needed to understand status or progress of the Plan Component(s).	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-RDS-02

Plan Component(s) being assessed by this monitoring item:

Objectives - "Roads will be kept to the minimum number and size needed to support resource management; most roads will be closed when projects are completed to protect resource values (p. II-2).

Standards 49, 50, and 51 - "Lolo National Forest roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user, and resource needs" (p. II-17). "All designs will be review for compliance with Lolo Forest Plan, project plan, and transportation plan" (p. II-18). "Road building slash treatment will be the most cost effective that will meet the management prescription in Lolo Forest Plan and project environmental analysis" (p. II-18).

Table 126. MON-RDS-02: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-RDS-02: Are roads designed and constructed to standard and meet State or Forest Best Management Practices (Best Management Practices)?	Number of road designs approved. (N) Miles of road constructed, reconstructed or maintained to standard - design vehicle, surface width, grade, turnout spacing, number of lanes, surface type, construction tolerance, location, maintenance level, service level, cut and fill ratio, clearing width, drainage size and spacing, travel management. (N) Number of road contracts administered and approved. (N) Number of Montana Best Management Practice review violations received. (N)	2 Years	Road Design and Construction Contract, Contract Specifications, ER/COR Inspection Daily Diary, Final Engineering Inspection Report, Timber Sale Inspection Report, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (FP-03), Lolo Forest Plan Appendix D - Best Management Practices, Water Quality Best Management Practices for Montana Forests, Montana State Best Management Practice Reviews and National Best Management Practice Audits.	Catina McLean, Assistant Forest Engineer

(*Influenced by climate change? Y, N, Uncertain)

Table 127. MON-RDS-02: Monitoring Collection Summary.

MON-RDS-02	Year
Data was last collected or compiled in:	2021
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Several plan components address roads and the transportation system. The objectives of the Plan state that; *"Lolo National Forest roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user, and resource needs" (p. II-17). "All designs will be review for*

compliance with Lolo Forest Plan, project plan, and transportation plan" (p. II-18). Several standards address design and construction practices.

Monitoring Items 7-2 and 7-3 from Lolo Forest Plan have been combined because they are considered duplicative into MON-RDS-02 (as updated in 2016 in the transition of the monitoring plan for consistency with the 2012 planning rule). Road design, construction, and Best Management Practice reviews will assess for compliance with design standards and monitor whether resource protections are appropriately provided.

Results and Discussion

Methods

Data for the Number of road designs approved, and the Number of road contracts administered and approved was collected from the Project Engineers and the Program of Work for each year.

Miles of roads maintained, constructed, reconstructed, and Road Miles Maintained were pulled from geo-enabled Performance Accountability System (gPAS) Reports and were from October 1 – September 30 each year. Designs beyond the limits of standards are documented or uncovered through the design variance process, project reviews, construction administration, and annual Forest Plan monitoring trips.

Results

Fiscal Year 2019: No designs beyond the limits of standards were observed. No Best Management Practice audits on odd years.

Fiscal Year 2020: No designs beyond the limits of standards were observed. No Best Management Practice audits were conducted in fiscal year 2020 because of COVID 19 restrictions.

Data

Table 128. MON-RDS-02: General Road Information by Year.

Year	Number of road designs approved	Miles of road constructed, reconstructed, or maintained to standard	Number of road contracts administered and approved	Number of Best Management Practice review violations received
2019	21	619.47	20	NA*
2020	19	538.20	21	NA*

* Best Management Practice audits are done on even years. No audit in 2020 because of COVID 19 restrictions.

The data for miles of road constructed, reconstructed, or maintained to standard is based off Forest Service System Roads.

Discussion

Designs beyond the limits of standards are documented or uncovered through the design variance process, project reviews, construction administration, and annual Forest Plan monitoring trips. No designs beyond the limits of standards were observed.

Evaluation of Results for Adaptive Management Finding

Plan Component(s) being assessed by this monitoring item:

Objectives - "Roads will be kept to the minimum number and size needed to support resource management; most roads will be closed when projects are completed to protect resource values" (p. II-2).

Standards 49, 50, and 51 - "Lolo National Forest roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user, and resource needs" (p. II-17). "All designs will be review for compliance with Lolo Forest Plan, project plan, and transportation plan" (p. II-18). "Road building slash treatment will be the most cost effective that will meet the management prescription in Lolo Forest Plan and project environmental analysis" (p. II-18).

The following findings and recommendations resulted from the evaluation of monitoring results.

Table 129. MON-RDS-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-RDS-02: Are roads designed and constructed to standard and meet State or Forest Best Management Practices (Best Management Practices)?	2021	(A) Uncertain. Pending the next State Best Management Practice audit results to confirm assumptions.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Minerals

MON-MIN-01

Plan Component(s) being assessed by this monitoring item:

Goals - Provide a sustained yield of timber and other outputs at a level that will help support the economic structure (p. II-1, A. 1.).

Standards - Areas currently withdrawn from mineral entry will be evaluated…Congressionally designated wilderness areas…The right to prospect, develop, and mine…When applicable, claimants/operators must have an approved… Activities proposed in mining…The Lolo National Forest will preserve corners...Common variety mineral…Requests for geophysical exploration…Before oil and gas lease…The Lolo National Forest will cooperate (p. II-15, and 33-42 on p. II-16).

Table 130. MON-MIN-01: Monitoring Item Summary

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-MIN-01: What effect are: forest management activities having on mineral activities/mineral activities having on forest management resources?	Acres open and accessible for mineral development and leasing. (U) Number of reclamation plans approved and reclamation activities completed to standard. (N)	Biennial	2 Years Project level transportation minerals analysis and NEPA documentation. Mineral Permits and Plan of Operations Natural Resource Information System (NRIS) Natural Resource Management (NRM)	Scott Gerwe, Lolo Forest Minerals Program Manager

(*Influenced by climate change? Y, N, Uncertain)

Table 131. MON-MIN-01: Monitoring Collection Summary.

MON-MIN-01	Year
Data was last collected or compiled in:	2018
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2019
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2021

Results and Discussion

Methods

Land status was determined by using GIS data. Number of active Plans of Operation were determined by using NRM data.

Results

Table 132. MON-MIN-01: Acres open and accessible for mineral development and leasing in 2019.

Mineral	Acres	% of Total USFS Acres
Open to Mineral Entry and Leasing	1,871,312	83.30%
Open to Leasing Only	24,574	1.09%
Open to Mineral Entry Only	3,169	0.14%

Table 133. MON-MIN-01: Acres open and accessible for mineral development and leasing in 2020.

Mineral	Acres	% of Total USFS Acres
Open to Mineral Entry and Leasing	1,871,312	82.69%
Open to Leasing Only	24,574	1.09%
Open to Mineral Entry Only	3,169	0.14%

*About 16,490 acres of USFS land were added to the Lolo National Forest in FY2020 as part of the Placid-Gold Phase I purchase. The mineral estate (locatable and leasable) of these lands was not acquired by the USFS and are not open to new mineral development.

There were four approved and active Plans of Operation (Plans) on the Lolo in 2019. There were three approved and active Plans in 2020 as one of the 2019 Plans completed final reclamation and closed out. All of these Plans were small, less than ½ acre of surface disturbance. One of the Plans extracts quartz crystals, but all the other Plans extract placer gold. There was no leasing activity during this monitoring period.

Discussion

There were three new Plans for hard rock silver exploration pending approval in early FY 2021. The locatable and leasable minerals programs are reactionary to external demands. Locatable minerals operations are not discretionary. There are no internally driven or planned number of desired Plans of Operation for locatable mineral operations. There was little change in land status regarding lands open to mineral entry and leasing (Pedde 2021).

Evaluation of Results for Adaptive Management Finding

Table 134. MON-MIN-01: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-MIN-01: What effect are forest management activities having on mineral activities/mineral activities having on forest management resources?	2021	(E) Yes. Based on the rate planned operations approved is consistent with demand.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Visual Quality

MON-VIS-01

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a pleasing and healthy environment..." (p. II-1).

Objectives – "This Forest Plan improves the environmental quality of the Forest over current direction through strong Forest goals…and the integration of visual quality objectives" (p. II-2). "Resource management activities are significantly constrained by visual quality objectives in areas adjacent to or readily visible from major highways, roads, trails, campgrounds, and other recreational developments. Other parts of the Forest where visual quality objectives constrain resource management activities are identified; Lolo Forest Plan continues management that ensures those natural-appearing landscapes" (p. II-2).

Standard 53 – "Visual rehabilitation of past management activities will be evaluated where needed during preparation and implementation of the timber sale program." (p. II-20).

Management Areas (MA) – See visual quality practices for MAs 22, 23, 24, and 25 (p. III-107 to III-134).

Table 135. MON-VIS-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-VIS-01: Do projects and activities comply with visual quality objectives?	Visual Quality Objectives as determined by Visual Resource Analysis or Scenery Specialist Report Preservation Retention Partial Retention Modification Maximum Modification Enhancement	1 Year – (by Project)	Visual Resource Analysis or Scenery Specialist Report Lolo Forest Scene Area Analysis Visual Management System (USDA Forest Service, 1974) Scenery Management System (USDA Forest Service, 1995) Forest Service Manual 2380 USDA Agricultural Handbooks 462, 483, 559, and 608 available at http://fsweb.r1.fs.fed.us/rmlhw/scenery_mgmt/scenery.htm	Allen Byrd, Lolo Environmental Coordinator

(*Influenced by climate change? Y, N, Uncertain)

Table 136. MON-VIS-01: Monitoring Collection Summary.

MON-VIS-01	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Several plan components address visual quality and the scenic value of the Forest. The goals of the Plan state; "provide a pleasing and healthy environment, including clear air, clean water, and diverse ecosystems" (p. II-1). "This Forest Plan improves the environmental quality of the Forest over current direction through strong Forest goals…and the integration of visual quality objectives" (p. II-2). "Resource management activities are significantly constrained by visual quality objectives in areas adjacent to or readily visible from major highways, roads, trails, campgrounds, and other recreational developments. Other parts of the Forest where visual quality objectives constrain resource management activities are identified; Lolo Forest Plan continues management that ensures those natural-appearing landscapes" (p. II-2). Specific management area allocations (see MAs 22, 23, 24 and 25) are assigned to portions of the Forest where visual quality is of concern for preservation, retention or partial retention of the naturally appearing landscape. In addition, Lolo Forest Plan provides for visual enhancement of areas previously degraded by past land management activities. "Visual rehabilitation of past management activities will be evaluated where needed during preparation and implementation of the timber sale program" (p. II-20).

Results and Discussion

Methods

Of several NEPA projects initiated over the past three years, two were selected that represent how the Forest addressed concerns raised by the public regarding scenery resources. The two projects selected are: Plains Ranger District, A-BLT project and the Ninemile Ranger District, Sawmill Petty project. These two projects are representative of how the Forest typically ensures VQOs are met at the project level. A review of the project's response to public comment as well as resource protection measures related to scenery resources was conducted to demonstrate how projects and activities are designed to integrate visual quality objectives.

Results

While the Lolo Forest doesn't typically receive an abundant number of public comments related to scenery resources, the A-BLT project received one that expressed concern about the project's ability to ensure visual quality objectives would be met:

> *"The EA contends VQOs will be met by leaving clumps of trees. Though proposedly vague leaving enough clumps of trees to meet VQOs on skyline cable yarded units is unlikely to be implementable based on my 30+ years of experience. Furthermore, follow-up prescribed burning for site preparation will most likely kill reserved trees and reserved trees in an otherwise clearcut are extremely susceptible to windthrow. Specifically, how will VQOs be ensured?"*

Forest Service's response:

"A qualified landscape architect assessed all vegetation treatment units located within Forest Plan management areas that have visual sensitivity. He concluded that the project and individual treatment units are consistent with Forest Plan direction for visual quality.

No harvest units are located within Forest Plan management areas that have a visual quality objective (VQO) of "retention". However, some units are located within Forest Plan management areas that have a VQO of "partial retention", which means that human activities may be evident, but must remain subordinate to the characteristic of the landscape. After a site visit, the landscape architect determined that only one of these units (T01) is clearly visible from the Prospect Creek highway. Commercial thinning is prescribed for this unit which will retain a mature tree canopy. Some of the skyline corridors may be visible for a few years following harvest, particularly when there is snow on the ground, until they regenerate with shrubs and small trees.

The other harvest units located within Forest Plan management areas that have a VQO of partial retention are screened from view of the Prospect Creek highway by topography and/or vegetation. Even after the proposed non-commercial thinning along the highway is completed, these units would not be easily viewed from the road. Units T09, T10, and T11 are obscured by topography and vegetation. The proposed treatment would retain variable spacing of the leave trees, including some clumps. These units would then be burned along with LB03 to blend their boundaries.

Units T02 and T07 are also obscured by topography and vegetation. The proposed treatment would also retain variable spacing of the leave trees. The boundary of unit T02 would be blended by prescribed burning through LSB02. Unit B01 is obscured by vegetation and is viewed at a greater distance. The proposed treatment would retain variable spacing of residual leave trees."

Through refinement of project design an application of resource protection measures (RPM), the A-BLT project was able to demonstrate consistency with Forest Plan standards (VQOs) for scenery resources. The following lists of typical resource protection measures incorporated into most projects and activities on the Forest. This list comes from the Sawmill Petty project on the Ninemile District. Additional project specific resource measures can also be applied on a case-by-case bases.

Table 137. MON-VIS-01: Example of typical resource protection measures for projects on the Forest related to scenery resources.

Visual Quality RPM	Goal of RPM	Resource Protection Measure
VQ-1	To blend units into the surrounding landscape and avoid creating unnatural appearing lines, shapes and forms.	Created openings and treatment units should not be symmetrical in shape. Blend units including fuel breaks with natural landscape features such as natural openings, rock outcrops, and topography where possible. Harvest units should be shaped to mimic natural patterns found in the landscape where possible. Avoid straight lines and right angles (an exception would be along the boundary with private property). Align treatments with natural topographic breaks, and changes in vegetation.

Visual Quality RPM	Goal of RPM	Resource Protection Measure
		Where practical, shape or feather edges treatment edges to avoid a shadowing effect in the cut unit. Where the unit is adjacent to denser forest, progressively reduce the percent of thinning within the transition zone toward the outside edge of the unit. Vary transition zone width. Where the unit is adjacent to less-dense forest, progressively increase the percent of thinning within the transition zone toward the outside edge of the unit until it is similar to the adjacent area. Vary transition zone width. Extend treatment boundaries up and over ridgelines to avoid the “Mohawk” look. This is especially important along ridgelines silhouetted against the sky. Leave single trees and groups to visually connect with unit edges. Interlock individual openings to prevent a “floating” appearance.
VQ-2	To minimize the visual effects of additional linear openings.	Where feasible, align new access roads and skid trails to intersect at a right angles to existing primary roads and trails, and curve after the junction to minimize the length seen from the primary travel route. Where feasible, locate and orient roads to minimize cut and fill. Where feasible, retain screening trees one tree-height below roads and landings when viewed from below, and one-tree height above when viewed from above. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing. Slope cut and fill banks to accommodate natural revegetation and revegetate (seed) with native species where possible. Minimize the number and width of skyline corridors.
VQ-3	To minimize visual effects caused by stumps, slash and other debris.	Flush cut or low-cut stumps as low to the ground as possible (target height 6”) within immediate foreground (300 feet) of open roads, trails, dispersed recreation sites and private property. This RPM lists all known affected units. Should additional units from the unit list for VQ-1 and VQ-2 be found to be within the immediate foreground of open roads, trails, dispersed recreation sites, or private property, consult with Forest Scenery Specialist to determine appropriate RPMs.
VQ-4	To minimize visual effects caused by stumps, slash, and other debris.	Stumps should be cut at a height of no greater than 12 inches.
VQ-5	To minimize visual effects caused by stumps, slash, and other debris.	Within the immediate foreground (300’) of open roads, trails, developed recreation sites, and private property: minimize the size and number of machine piles visible; treat slash within 2 years, when feasible; scatter the remainder of piles not consumed to achieve maximum slash height of six inches. This RPM lists all known affected units. Should additional units from the unit list for VQ-1 and VQ-2 be found to be within the

Visual Quality RPM	Goal of RPM	Resource Protection Measure
		immediate foreground of open roads, trails, dispersed recreation sites, or private property, consult with Forest Scenery Specialist to determine appropriate RPMs.
VQ-6	To minimize visual effects caused by marking.	Minimize marking to the maximum extent possible within the immediate foreground (300') of open roads, trails, recreation sites, and private property, maximize the use of species designation where appropriate, and use water-based paint. This RPM lists all known affected units. Should additional units from the unit list for VQ-1 and VQ-2 be found to be within the immediate foreground of open roads, trails, dispersed recreation sites, or private property, consult with Forest Scenery Specialist to determine appropriate RPMs.

Discussion

Through project design and application of resource protection measures, the Lolo Forest has been able to demonstrate consistency with Forest Plan direction for scenery resources.

Evaluation of Results for Adaptive Management Finding

Table 138. MON-VIS-01: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-VIS-01: Do projects and activities comply with visual quality objectives?	2021	(E) Yes. Based on the sampled projects demonstrating adequate project design to move towards visual quality objectives.	Yes, it is recommended to modify the monitoring question to change the phrase "comply with" to "integrate" for consistency with current land management plan language.	Monitoring Plan

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Fire

MON-FIRE-01

Plan Component(s) being assessed by this monitoring item:

Goals - "Provide a pleasing and healthy environment, including clean air, clean water, and diverse ecosystems" (p.II-1).

Standard 43 - "Air quality will be maintained at a level that is adequate for the protection and use of National Forest System Lands and that meets or exceeds Federal and State standards. Prescribed fire objectives for smoke management will be met within the constraints established by Montana State Airshed Groups Memorandum of Understanding" (p.II-17).

Table 139. MON-FIRE-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-FIRE-01: Is air quality maintained during prescribed fire implementation?	#1: Number of Notice of Violations received from DEQ. (N) #2: Number of days smoke monitors within the area of the National Forest activities exceed National Ambient Air Quality Standards (NAAQS) during prescribed fire activities. (N) #3: Number of public complaints received and documented regarding smoke during prescribed fire activity. (N) #4: Number of burn permits from all regulatory agencies updated annually and adhered too. (All burn plans have current applicable burn permits during implementation.) (N)	2018-2020	Montana DEQ Air Monitoring Stations: Thompson Falls, Frenchtown, Missoula, and Seeley Lake 2.5 PM Monitors Missoula County Health Department Approved Burn Plans	Jeffrey Hayes. Lolo Forest Assistant Fire Management Officer-Fire Planner

(*Influenced by climate change? Y, N, Uncertain)

Table 140. MON-FIRE-01: Monitoring Collection Summary.

MON-FIRE-01	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	N/A
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

This monitoring item, MON-FIRE-01, exists to evaluate how the Lolo National Forest is achieving air quality guidelines and standards identified in the 1986 Lolo Forest Plan (p. II-17). This report also evaluates for compliance with the 2010 Montana-Idaho Airshed Group Operating Guide and air quality guidance set forth by Montana DEQ and the Missoula County Health Department. The importance of monitoring this element is to document and track any potential air quality concerns, issues, and trends associated with the Lolo National Forest prescribed burning program which may be brought forward from the Montana DEQ, Missoula County Health Department, and members of the public.

Results and Discussion

Methods

The Lolo National Forest Fire Management Program compiles and enters a list annually of all prescribed burn units to the Montana-Idaho Airshed Group which the Montana DEQ generates reports from and administers annual permits. Some of the burns on this list include prescribed burns within Missoula County which are submitted to the Missoula City-County Health Department for a Major Source Outdoor Burning Permit.

Notice of Violations are based upon a NAAQS exceedance of 2.5 particulate matter (pm) above 35 µg/m3 for a 24-hour average, midnight to midnight. This is measured using air monitoring stations located in the Thompson Falls, Frenchtown, Missoula, and Seeley Lake communities. Data collection methods for any Notice of Violations from the DEQ were collected through conversations and emails with the Forest Service Regional Smoke Coordinator, Seth Morphis, and the Missoula City-County Health Department Air Quality Specialist, Sarah Coefield.

The Montana DEQ did not have any recorded days when smoke monitors exceeded NAAQS standards. Data was collected evaluating the Montana DEQ Airshed monitors located in Thompson Falls, Frenchtown, Missoula, and Seeley Lake.

The number of public complaints regarding smoke pollutants and air quality in relation to Lolo National Forest prescribed burning activities were gathered through email conversation with the Missoula City-County Health Department Air Quality Specialist, Sarah Coefield, who referenced her database which documents and files public complaints. Sanders and Mineral County were also contacted regarding any potential complaints. No complaints were filed in their office. The Montana DEQ communicates any complaints of record to the Forest Service Regional Smoke Coordinator for tracking purposes and documentation.

There are two annual prescribed burn permits issued to the Lolo National Forest: Montana DEQ and Missoula County Major Source Outdoor Burning Permits.

Results

Table 141. MON-FIRE-01: Indicator #1.

Indicator #1	Number of Violations	Analysis Timeframe	Trend
Number of Notice of Violations received from Montana DEQ.	0	2018-2020	2016: 0 2017: 0 2018: 0 2019: 0 2020: 0

Table 142. MON-FIRE-01: Indicator #2.

Indicator #2	Number Days of Violations	Analysis Timeframe	Trend
Number of days smoke monitors, within the area of the National Forest activities, exceed National Ambient Air Quality Standards (NAAQS) during prescribed fire activities.	0	2018-2020	2016: 0 017: 0 2018: 0 2019: 0 2020: 0

Table 143. MON-FIRE-01: Indicator #3.

Indicator #3	**Number of** Public Complaints	Analysis Timeframe	Trend on Complaints
Number of public complaints received regarding prescribed burning activity.	6	2018-2020	2016: 1 Complaint 2017: 0 Complaints 2018: 4 Complaints 2019: 1 Complaint 2020: 1 Complaint

Table 144. MON-FIRE-01: Indicator #4.

Indicator #4	Number of Burn Permits	Analysis Timeframe	Trend
Number of burn permits from all regulatory agencies updated annually and adhered too.	2 Total Permits: 1 Montana DEQ and 1 Missoula City-County Health Department	2018-2020	2016: 2 Permits 2017: 2 Permits 2018: 2 Permits 2019: 2 Permits 2020: 2 Permits

Discussion

The findings for Monitoring Item #1 and #2 show, from 2018-2020, the Lolo National Forest accomplished all prescribed burning in compliance with the Montanan DEQ and Missoula City-County Health Department annual permits and within the approval guidelines set forth in the 2010 Montana-Idaho Airshed Group. No Notice of Violations or NAAQS exceedances were submitted to the Forest from the Montana DEQ. Trends show this being consistent back to the year 2016.

The Missoula City-County Health Department did receive more public complaints, during this analysis timeframe, associated with the Lolo National Forest prescribed burning program; however, during this time interval the number of complaints were minimal and lessened towards the end of the year 2020. Trends showed previous years to have fewer public complaints. Sanders and Mineral Counties had no public complaints on record. Public complaints in 2018 may be attributed to the level of wildfire smoke the public dealt with during the summer of 2017. In the years 2019 and 2020, public complaints trended back to normal. No other public complaints were provided from the Montana DEQ for Missoula, Mineral, and Sanders Counties regarding prescribed burning activities.

The Lolo National Forest has consistently operated under two annual burn permits, Missoula County Major Source Outdoor Burning and Montana DEQ Permits, over the course of the years evaluated in this report and trending back to the year 2016.

Evaluation of Results for Adaptive Management

Table 145. MON-FIRE-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-FIRE-01: Is air quality maintained during prescribed fire implementation?	2021	(E) Yes. based on prescribed burning being consistent with Montanan DEQ and Missoula City-County Health Department annual permits and within the approval guidelines	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-FIRE-02

Plan Component(s) being assessed by this monitoring item:

Objective - Table II.1 (in the Lolo Forest Plan) displays projected outputs and activities by time period including fuels management for timber management site preparation (target item T44) and fuels management for forest protection (target item T23) (p.II-3).

Standard 47 - "A balanced Fire Management Action Plan will be implemented annually that is cost effective and commensurate with threats to life and property, public safety, values, risks, and specific resource management goals and objectives. The average annual acreage burned at the most efficient fire management program level is expected to be 2,907 acres for wildfires and 9,280 acres for prescribed fire" (p. II-17).

Table 146. MON-FIRE-02: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-FIRE-02: Have fuel treatment targets been accomplished?	#1: Acres treated in the Wildland Urban Interface (wild urban interface). *(Final mitigated fuels entries should equal approximately 70%).* (N) #2: Acres treated in the Non-wild urban interface. (Final mitigated fuels entries should equal approximately 30%). (N) #3: Total acres treated annually, and annual percentage of Forest target achieved. (N)	2018-2020	Annual reporting in the Forest Service Activity Tracking System (FACTS)	Jeffrey Hayes. Lolo Forest Assistant Fire Management Officer-Fire Planner

(*Influenced by climate change? Y, N, Uncertain)

Table 147. MON-FIRE-02: Monitoring Collection Summary.

MON-FIRE-02	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	N/A
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

This monitoring item, MON-FIRE-02, exists to evaluate how the Lolo National Forest fuels management program is moving towards the standards set forth in the Lolo Forest Plan (p.II-3) (p. II-17) and track acres accomplished and treated on an annual basis. The importance of monitoring this element is to document and track trends of treatments in the wild urban interface and Non-wild urban interface and how we are emphasizing treatment areas identified in our Community Wildfire Protection Plans (CWPP). The importance of this monitoring item is to continue to evaluate acres accomplished and track the trends of the Lolo National Forest progress toward Regionally directed forest target acreage.

Methods

Fuels treatment accomplishments are reported annually in the Forest Service Activity Tracking System (FACTS). Accomplished acres are inputted into the database prior to the close of the fiscal year for reporting purposes. Fire management personnel query the database to report acres toward annual forest target developed by the Regional Office. These reports can be compared with Lolo Forest Plan projections and estimated decadal averages found in Table II-1 on page II-3 of the Lolo Forest Plan. The Regional Office queried FACTS reports which provided the data in the tables of this report.

Some acres burned during wildfire incidents, met vegetative management goals in the years 2016 and 2017, and were reported as forest target acres. Beginning in 2018, reporting of wildfires acres was not included in forest target acre accounting. As a result, starting in 2018 there is a decrease in the percentage of forest target achieved, as seen in Table 4.

Results

Table 148. MON-FIRE-02: Indicator #1.

Indicator #1	Acres Treated	Analysis Timeframe	Trend of Annual Acres
Acres treated in the Wildland Urban Interface (wild urban interface). *(Final* mitigated fuels entries should equal approximately 70%).	27,410.3 Acres	2018-2020	2016: 11,484 Acres 2017: 8,357 Acres 2018: 10,854.1 Acres 2019: 8,622 Acres 2020: 7,934.2 Acres

Table 149. MON-FIRE-02: Indicator #2.

Indicator #2	**Acres Treated in Non-** wild urban interface	Analysis Timeframe	Trend of Annual Acres
Acres treated in the non-wild urban interface. (Final mitigated fuels entries Should equal approximately 30%).	14,173 Acres	2018-2020	2016: 3,266.5 Acres 2017: 4,823 Acres 2018: 6,449 Acres 2019: 3,842 Acres 2020: 3,882 Acres

Table 150. MON-FIRE-02: Indicator #3.

Indicator #3	**Annual Trends of Forest Target Acres versus Actual** Accomplished & Reported Acres	**Trend of Annual Percentage of** Forest Target Achieved
Total acres treated annually and annual percentage of Forest target achieved.	2016: 11,008 Acres/14,750 Acres 2017: 10,909 Acres/13,180 Acres 2018: 15,877 Acres/17,303 Acres 2019: 10,800 Acres/12,464 Acres 2020: 11,548 Acres/11,816 Acres 2016-2020 Fuels Treatment Acres 20,883 Broadcast Burn Acres 2,101 Machine Pile Burn Acres 18,186 Biomass Removal Acres 18 Chipping Acres 3,857 Lop and Scatter Acres 3,473 Machine Pile Acres 11,202 Thinning Acres	2016: 134% 2017: 121% 2018: 109% 2019: 115% 2020: 102%

Discussion

The findings for Monitoring Item #2 show, from 2018-2020, the Lolo National Forest accomplished both wild urban interface and Non-wild urban interface acres towards vegetative treatments consistent with the Lolo Forest Plan. The wild urban interface acres reported accounted for 65 percent of the Forest target, while the Non-wild urban interface acres accounted for 35 percent. A slight decrease from the projected 70 percent/30 percent split for wild urban interface/Non-wild urban interface and this can be attributed to managing ecosystems at a larger scale where some landscape scale vegetative treatments occurred. Both wild urban interface and Non-wild urban interface treated acres have seen a downward trend in treated acres since 2018; however, the forest target percentage achieved of treated acres remains above 100 percent. wild urban interface continues to be a focus of fuels treatments on the Forest as the Lolo emphasizes the need to protect life, property, and highly valued resources and assets. Findings show the trend and percentage of target acres achieved since 2016 on the Lolo National Forest. As mentioned before the slight decrease in percentages of target met is due to policy no longer including wildfire acres as forest target acres to report.

Evaluation of Results for Adaptive Management

Table 151. MON-FIRE-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-FIRE-02: Have fuel treatment targets been accomplished?	2021	(E) Yes. Based on the accomplished annual acres of fuels treatments.	No.	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-FIRE-03

Plan Component(s) being assessed by this monitoring item:

Standard 44: "A fire management plan complete with prescriptions for unplanned ignition prescribed fires, as appropriate, will be maintained to accomplish management direction and allocation contained in Lolo Forest Plan" (p. II-17).

Standard 45: "An Escaped Fire Situation Analysis will be made for all escaped fires to determine appropriate control measures." All unplanned fire ignitions will be evaluated to determine appropriate response measures, based on values at risk, cost effectiveness, and existence of site-specific fire management prescriptions" (p. II-17).

Standard 47: "A balanced Fire Management Action Plan will be implemented annually that is cost effective and commensurate with threats to life and property, public safety, values, hazards, risks, and specific resource management goals and objectives. The average annual acreage burned at the most efficient fire management program level is expected to be 2,907 acres for wildfires and 9,280 acres for prescribed fire" (p. II-17).

Table 152. MON-FIRE-03: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-FIRE-03: Are unplanned ignitions (wildfire) being managed for resource benefits when appropriate?	Number of wildland fires that have all or portions of the perimeter managed for resources benefit as determined by number of wildfires and Wildland Fire Decision Support System (WFDSS) decisions. (N)	2018-2020	Annual reporting and documentation tracking within the Wildland Fire Decision Support System (WFDSS) and FIRESTAT.	Jeffrey Hayes. Lolo Forest Assistant Fire Management Officer-Fire Planner

(*Influenced by climate change? Y, N, Uncertain)

Table 153. MON-FIRE-03: Monitoring Item Collection Summary.

MON-FIRE-03	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	N/A
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

This monitoring item, MON-FIRE-03, exists to evaluate how the Lolo National Forest fire management program is progressing toward the standards identified in the Lolo Forest Plan (p.II-17), as well as utilizing wildfire as an ecosystem management tool and track reported wildfire acres that have met vegetative management goals.

Results and Discussion

Methods

Current Lolo Forest Plan direction does not allow for managing fire as resource benefit. As a result, you will not see any WFDSS decisions for wildfires on the Lolo National Forest using this language. Wildfire acres that achieved desired vegetation management conditions were reported for annual primary forest target acres in 2016 and 2017. Beginning in 2018, National direction no longer allowed counting wildfire acres towards primary target. They are however reported in FACTS to account for wildfire acres burned which assist to move toward vegetative management goals for Regional and National tracking.

Wildfire acre accomplishments are reported annually in the Forest Service Activity Tracking System (FACTS). Accomplished acres are inputted into the database prior to the close of the fiscal year for reporting purposes. Fire management personnel query the database to report acres toward annual forest

target developed by the Regional Office. The Regional Office queried FACTS reports which provided the wildfire data reported and displayed in the Table 154.

Results

Table 154. MON-FIRE-03: Indicator #1.

Indicator #1	Number of Wildland Fires	Analysis Timeframe	**Trend of** Fires and Acres Reported
Number of wildland fires that have all or portions of the perimeter managed for resource benefit as determined by the number of wildfires and Wildland Fire Decision Support System (WFDSS) decisions.	0	2018-2020	2016: 7 Fires and 8,194 Acres 2017: 1 Fire and 1,505 Acres 2018: 0 Fires and 0 Acres 2019: 0 Fires and 0 Acres 2020: 0 Fires and 0 Acres

Discussion

The findings for Monitoring Item #3 show, from 2018-2020, the Lolo National Forest did not account for any wildfire acres reported as resource benefit. The Lolo National Forest did report wildfire acres attaining objectives on the landscape during 2016-2017. Since then, reporting wildfire acres managed for vegetative and ecosystem objectives has trended down. Acres will continue to be inputted and tracked for Regional and National purposes as wildfire acres assist to move towards vegetative management goals. These acres will be inputted into FACTS for future query reports to track trends. No WFDSS decisions or FIRESTAT queries show any wildfires as a resource benefit incident.

Evaluation of Results for Adaptive Management

Recommendations:

During Assessment phase for plan revision, assess wildfire as a resource benefit.

Monitoring Program: Consider, changing Monitoring Question to address accounting for wildfire acres which assist in moving towards land management objectives, instead of wildfire acres managed strictly for resource benefit, as some wildfires may be managed under another strategy and still move towards land management objectives.

Table 155. MON-FIRE-03: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-FIRE-03: Are unplanned ignitions (wildfire) being managed for	2021	(E) Yes. Implementation of plan component to manage wildfire for resource benefit to achieve land management	Yes, the following is recommended:	Plan and Monitoring Plan

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e. maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
resource benefits when appropriate?		objectives is trending toward a desired result.	During Assessment phase for plan revision, assess wildfire as a resource benefit. Monitoring Program: Consider changing Monitoring Question to account for wildfire acres that assist in moving towards land management objectives, instead of wildfire acres managed strictly for resource benefit.	

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Adjacent Lands, Resources and Communities

MON-SOC-01

Plan Component(s) being assessed by this monitoring item:

Goals: "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for reginal and national needs." (p. II-1). "Provide for a broad spectrum of dispersed recreation…" (p. II-1). "Provide a pleasing and healthy environment, including clear air, clean water, and diverse ecosystems" (p. II-1).

Objectives: "…management under this Forest Plan does not create abrupt changes or sudden shifts from current direction" (p. II-1). "Resource management activities are significantly constrained by visual quality objectives in areas adjacent to or readily visible from major highways…" (p. II-2).

DFCs: "At the end of the first decade, there will have been minimal change in the overall appearance of the Forest" (p. II-6). "By the end of the fifth decade, many changes will be apparent in the overall condition of the Forest. (p. II-7). Fisheries on the Forest will have improved slightly…" (p. II-7). "Fisheries on the Forest will have improved. Fish habitat improvements accomplished during the first decade will have had a maintenance program that protected the improvements" (p. II-8).

Standard 11: "An economic analysis will be completed for a) timber sales larger than 1 mmbf… The project will be analyzed…considering the net public benefit and/or probable marketability…" (p. II-11).

Table 156. MON-SOC-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-SOC-01: What effects do forest management activities have on the local economy, recreation opportunities, downstream water uses, visual quality, and local air quality?	For effects on local economy consider: • Project Present Net Values (PNVs). • Project derived employment. • Federal payments received. • Revenue sharing with State & Local Governments received. • Local forest products processing capacities and needs. For recreation, downstream water uses, visual quality and local air quality see indicators provided under monitoring items: MON-REC-02, MON-STRM-01 (instream water rights), MON-VIS-01, and MON-MON-FIRE-01	2 Year – (Biennial or by Project)	Project level economic analysis (if prepared). • Project level employment analysis (if prepared). • Project recreation analysis (if prepared). • Project water quality analysis (if prepared) • Project visual quality analysis (if prepared). • Project air quality analysis (if prepared). • US Census http://www.census.gov/quickfacts/ • Montana Department of Commerce (http://ceic.mt.gov/) • UM Bureau of Business and Economic Research – Forest Industry Research Program (http://www.bber.umt.edu/FIR/default.asp) • Timber Information Management (TIM) Reports • Headwater Economics Tools (http://headwaterseconomics.org/tools/economic-profile-system/about) – (data compiled and evaluated every two years by Regional Office at region by forest/grassland scales) Also see data sources for resource monitoring items MON-REC-02, MON-STRM-01 (instream water rights), MON-VIS-01, and MON-MON-FIRE-01	NA

(*Influenced by climate change? Y, N, Uncertain)

Table 157. MON-SOC-01: Monitoring Collection Summary.

MON-SOC-01	Year
Data was last collected or compiled in:	2001
Next scheduled data collection/compilation:	2023
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

This monitoring item is designed to assess the overall impacts of forest management activities on local economies and the general setting of the Forest. This monitoring item relies upon a summary of other resource monitoring items (see indicators listed above in table 156). The Lolo Forest Plan retained this monitoring item for future evaluations. The last time this monitoring item was assessed was in 2001.

Project level analysis has regularly occurred over the years that assess the economic effects of forest management on communities. However, funds have not been allocated to conduct this monitoring item since 2001 that cumulatively looks at all project level analysis to determine whether forest management is trending toward meeting plan components this monitoring item is intended to address. Therefore, this item was not monitored for this biennial report.

Evaluation of Results for Adaptive Management

Table 158. MON-SOC-01: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-SOC-01: What effects do forest management activities have on the local economy, recreation opportunities, downstream water uses, visual quality, and local air quality?	NA	(B) Uncertain. Data was not compiled for this monitoring item.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-SOC-02

Plan Component(s) being assessed by this monitoring item:

Goals – "Provide a sustained yield of timber and other outputs at a level that will help support the economic structure of local communities and provide for reginal and national needs" (p. II-1). "Provide for a broad spectrum of dispersed recreation…" (p. II-1). "Provide a pleasing and healthy environment, including clear air, clean water, and diverse ecosystems" (p. II-1).

Objectives – "…management under this Forest Plan does not create abrupt changes or sudden shifts from current direction" (p. II-1). "Resource management activities are significantly constrained by visual quality objectives in areas adjacent to or readily visible from major highways…" (p. II-2).

DFCs – "At the end of the first decade, there will have been minimal change in the overall appearance of the Forest" (p. II-6). "By the end of the fifth decade, many changes will be apparent in the overall condition of the Forest" (p. II-7). Fisheries on the Forest will have improved slightly…" (p. II-7). "Fisheries on the Forest will have improved. Fish habitat improvements accomplished during the first decade will have had a maintenance program that protected the improvements" (p. II-8).

Standard 11 – "An economic analysis will be completed for a) timber sales larger than 1 mmbf…. The project will be analyzed… considering the net public benefit and/or probable marketability…" (p. II-11).

Table 159. MON-SOC-02: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-SOC-02: What effects do adjacent land uses and activities have on management of the Forest?	Number of subdivisions approved on adjacent private ownership. • Road and highway construction and reconstruction on adjacent State, Federal and private ownership. • Forest management activities on adjacent State, Federal and Private ownership (e.g., timber harvest, road construction). Conservation Easements and other deed restrictions. • Resource improvements implemented on State, Federal and private ownership (e.g., fish ladder, removal of dams, weed treatments, closure of roads). • Recreation development on adjacent State, Federal and private ownerships (e.g., ski areas, motorized use).	2 Year or by Project	• Subdivision requests reviewed and commented on. • Highway projects reviewed and commented on. • BLM and Montana DNRC forest management activities reviewed and commented on. • Partnership and cooperative agreements (e.g., AVISTA, CFC, RMEF). • National Conservation Easement Database (NCED) • County and local government cooperative information meetings.	NA

(*Influenced by climate change? Y, N, Uncertain)

Results and Discussion

This monitoring item is designed to assess the impacts of activities on other adjacent lands on the ability for the Forest to achieve its Forest Plan goals and objectives. The Lolo Forest Plan retained this monitoring item for future evaluations. The last time this monitoring item was assessed was in 2001.

Funds have not been allocated to conduct this monitoring item since 2001to determine whether forest management is trending toward meeting plan components this monitoring item is intended to address. Therefore, this item was not monitored for this biennial report.

This item was not monitored for this biennial report.

Evaluation of Results for Adaptive Management

Table 160. MON-SOC-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-SOC-02: What effects do adjacent land uses and activities have on management of the Forest?	NA	(B) Uncertain. Data was not compiled for this monitoring item.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Lands

MON-LAND-01

Plan Component(s) being assessed by this monitoring item:

Standard 31 – "Guidelines for development of a Forest land ownership adjustment program and the proposed program are in Appendix I. In addition, the Forest may accept donations of fee or partial interests in land within or adjacent to its boundaries when proposed donation will complement National Forest management" (p. II-15).

Appendix I – provides general guidelines for landownership adjustments, acquisition and disposal of Forest land (p. I-1 to I-2).

Table 161. MON-LAND-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-LAND-01: What adjustments have been made to land ownership within the Forest boundary?	• Acres of land acquired. • Acres of land exchanged. • Acres of land conveyed.	2 Year – (Biennially)	• Natural Resource Information System (NRIS) Natural Resource Management (NRM) • INFRA Database Enterprise Data Center (EDC) Forest GIS Land Ownership Layer and Metadata	Allen Byrd, Lolo Forest Environmental Coordinator

(*Influenced by climate change? Y, N, Uncertain)

Results and Discussion

This monitoring item is designed to evaluate progress in land adjustments (acquisitions, exchanges, and conveyances).

Method

Acres of land acquired, land exchanged, and land conveyed on the Lolo National Forest were generated using the Forest Service Land Areas Report database which is the official publication of NFS acreages, The acreages are derived from the Land Status Records System (LSRS). The LSRS is the USFS's official data base of landownership and boundaries. Acres reported for this biennial report are for the past ten years. Subsequent Biennial Monitoring Evaluation Report reports will track changes to land adjustments on the Lolo National Forest overtime.

Results

Table 162. MON-LAND-01: Lolo National Forest Land Adjustments 2011-2021

Calendar Year	Adjustment Type	Acres (GIS)
2011	Acquired	0
	Exchanged	0
	Conveyed	0
2012	Acquired	5,507
	Exchanged	0
	Conveyed	0
2013	Acquired	10,880
	Exchanged	0
	Conveyed	0
2014	Acquired	25,128
	Exchanged	0
	Conveyed	0

Calendar Year	Adjustment Type	Acres (GIS)
2015	Acquired	0
	Exchanged	0
	Conveyed	0
2016	Acquired	0
	Exchanged	0
	Conveyed	0
2017	Acquired	683
	Exchanged	0
	Conveyed	0
2018	Acquired	1,122
	Exchanged	0
	Conveyed	0
2019	Acquired	23,016
	Exchanged	0
	Conveyed	0
2020	Acquired	12,082
	Exchanged	0
	Conveyed	0
2021	Acquired	14,874
	Exchanged	0
	Conveyed	5
Totals	Acquired	93,292
	Exchanged	0
	Conveyed	5

Discussion

As shown in table 162 above, the Lolo National Forest has had an active lands acquisition program. These land acquisitions target private parcels within the forest boundary that have the potential to be developed, increasing the complexity of forest management on surrounding lands. In particular, the acquisition program has been focused on private timber lands. The success of the program maintains undeveloped areas that provide resource benefits and future uses consistent with historic use. Implementation of plan components associated with this monitoring item are trending as desired.

Evaluation of Results for Adaptive Management

Table 163. MON-SOC-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-LAND-01: What adjustments have been made to land ownership within the Forest boundary?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-LAND-02

Plan Component(s) being assessed by this monitoring item:

Standard 32 – "Power line and pipeline corridor locations will be responsive to socially defined resource values such as visual quality, recreation, economics, land uses, and the traditional impact of the landscape. Except as they cannot be mitigated, biological and physical impacts will be subordinate to consideration of social factors. The consideration of a corridor's influence on the maintenance of outputs will be subordinate to the above considerations. Locations will be in existing transportation and/or utility corridors when feasible" (p. II-15)

Management Areas (MA) – See MA 5 (p. III-14 to III-15).

Appendix J – provides guidelines for issuance and administration of special use permits (p. J-1 to J-3).

Table 164. MON-LAND-02: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-LAND-02 Have major utility and transportation systems and right-of-way grants been developed within identified corridors.	Mapped location of major utility and transportation systems as compared to mapped location of Management Area 5 – Utility Right-of-Ways	1 Year – (by Project)	• Special Uses Administration project level analysis and NEPA documentation. • Natural Resource Information System (NRIS)	NA

			• Natural Resource Management (NRM) • INFRA Database and Transportation Atlas • Enterprise Data Center (EDC) Forest GIS Utilities Layer • Enterprise Data Center (EDC) Forest GIS Management Area Layer	

(*Influenced by climate change? Y, N, Uncertain)

This monitoring item is used to assess whether right-of-way grants, utilities and transportation systems are developed within allocated corridors and whether siting of utilities and other transportation systems are in compliance with Management Area and other Forest Plan direction.

Funds have not been allocated to conduct this monitoring item since 2001 to determine whether forest management is trending toward meeting plan components this monitoring item is intended to address. Therefore, this item was not monitored for this biennial report.

Evaluation of Results for Adaptive Management

Table 165. MON-LAND-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-LAND-02: Have major utility and transportation systems and right-of-way grants been developed within identified corridors.	NA	(B) Uncertain. Data was not compiled for this monitoring item.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

Process

MON-PROC-01

Plan Component(s) being assessed by this monitoring item:

Goals – "Encourage a "Good Host" concept when dealing with the public" (p. II-1).

Objectives – "Lolo National Forest management under this Forest Plan does not create abrupt changes or sudden shifts from current direction" (p. II-1).

Standard 6 – "The program will provide for use of the Forest on a year-round basis in areas that will minimize conflicts between user groups and other Forest resources" (p. II-9).

Standard 55 – "The Forest will coordinate, on a yearly schedule, with representatives from the Confederated Salish and Kootenai Tribes to discuss the types and location of proposed Forest undertakings. Coordination with other Native American groups could occur if there was reason to believe traditional or contemporary religious areas, important to these groups, were present on the Forest" (p. II-20).

Implementation and Monitoring – "Project environmental analyses provide an essential source of information for Forest Plan monitoring. First, as project analyses are completed, new emerging public issues or management concerns may be identified. Second, the management direction designed to facilitate achievement of the management area goals is validated by the project analysis. Third, the site-specific data collected for project environmental analyses serve as a check on the correctness of the land allocation" (p. V-2). "The Forest Supervisor may amend Lolo Forest Plan" (p. V-5). "The Forest Supervisor shall review the conditions on the land covered by the Plan at least every 5 years to determine whether conditions or demands of the public have changed significantly" (p. V-5).

Table 166. MON-PROC-01: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-PROC-01: Are emerging issues or changing social values being tracked?	General public comments received. Collaborative group comments received. General public meetings. Project scoping period comments received. Project comment period comments received. Project appeals and objections received. Project litigation claims received Consultation responses from other Federal, State,	1 Year – (Annually or by Project)	Line Officer and staff public contact records. Public Information Officer public contact records. Meeting notes. Project planning (NEPA) public response to scoping, comment, and objection periods (administrative review process). Social Media Platforms (internet blogs, twitter, and Facebook). https://twitter.com/LoloNF and at	Allen Byrd, Lolo Environmental Coordinator

	local and tribal governments.		https://www.facebook.com/Lolo-National-Forest-409424909216306/?ref=hl Public newspaper articles and editorials.	

(*Influenced by climate change? Y, N, Uncertain)

Table 167. MON-PROC-01: Monitoring Collection Summary.

MON-PROC-01	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Results and Discussion

Methods

This monitoring element tracks new emerging issues that may surface through public engagement and provides the Forest an opportunity to communicate any nuances to the public.

The following data sources are used to identify new emerging issues. These sources are reviewed periodically Lolo Forest staff to determine how and if management should be adjusted to address new issues. In addition to the following data sources, the 2021 Forest Monitoring Interdisciplinary Team discussed as a group what they thought may be new emerging issues.

- Line Officer and staff public contact records.
- Public Information Officer public contact records.
- Meeting notes.
- Project planning (NEPA) public response to scoping, comment, and objection periods (administrative review process).
- Social Media Platforms (internet blogs, twitter, and Facebook). https://twitter.com/LoloNF and at https://www.facebook.com/Lolo-National-Forest-409424909216306/?ref=hl
- Public newspaper articles and editorials.

Results

Two emerging issues were identified via the data sources mentioned above and discussion amongst the Forest Monitoring interdisciplinary team. These include:

- Land acquisitions
- Climate change

Discussion

Land Acquisitions:

During the past fifteen, the Lolo National Forest has acquired about 250,000 acres of land mainly through the Montana Legacy Project. The Montana Legacy Project is a three-phase purchase of more than 310,000 acres (1,300 km2) of land owned by Plum Creek Timber in northwestern Montana for conservation protection. The land is within the counties of Missoula, Mineral, Lake and Powell. Lolo Forest Plan Management Areas and associated standards need to be applied to these newly acquired lands. This is accomplished through existing administrative processes, usually at a project level, that assign management areas to these lands.

Climate Change:

Public comments received on various vegetation projects on the Lolo have expressed concerns related to climate change. Comments generally request information/analysis on how climate change may impact the Forest's ability to move towards plan goals and objectives as well as the effects climate change may have on all forest resources. The current 1986 Lolo Forest Plan does not include components that address climate change. Public concerns related to climate change are mainly addressed via the NEPA process at the project level. Revision efforts or an amendment may want to adopt plan components that consider the effect forest management may have on climate change and climate change effects on forest resources.

Evaluation of Results for Adaptive Management

Table 168. MON-PROC-01: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-PROC-01: Are emerging issues or changing social values being tracked?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

MON-PROC-02

Plan Component(s) being assessed by this monitoring item:

Objectives – "Lolo National Forest management under this Forest Plan does not create abrupt changes or sudden shifts from current direction" (p. II-1). "This Forest Plan improves the environmental quality of the Forest over current direction through strong Forest goals, Forest-wide standards, Management Area standards and direction…" (p. II-2).

Management Area Direction – "The National Forest land within the Lolo National Forest has been divided into 28 management areas, with different management goals, resource potentials and limitations" (p. III-1). "The boundaries represent transitions from one set of opportunities and constraints to another with management direction established for each" (p. III-1).

Implementation and Monitoring – "Project environmental analyses provide an essential source of information for Forest Plan monitoring. First, as project analyses are completed, new emerging public issues or management concerns may be identified. Second, the management direction designed to facilitate achievement of the management area goals is validated by the project analysis. Third, the site-specific data collected for project environmental analyses serve as a check on the correctness of the land allocation" (p. V-2).

Table 169. MON-PROC-02: Monitoring Item Summary.

Monitoring Question	Indicators *	Data collection interval	Data Source/Partner	Point of Contact
MON-PROC-02 Have errors in original land allocations been evaluated and corrected?	Number of land management allocation changes made. Acres of land management allocation changes made. Type of land management allocation changes made. Changes in land suitability made. Land allocations made to newly acquired lands.	1 Year – (Annually or by Project)	Project specific Management Area allocation changes. Project level evaluation and NEPA documentation and decisions with Forest Plan Amendments that change Management Area allocations. Enterprise Data Center (EDC) Forest GIS Management Area Layer and Metadata	Allen Byrd, Lolo Forest Environmental Coordinator

(*Influenced by climate change? Y, N, Uncertain)

Table 170. MON-PROC-02: Monitoring Collection Summary.

MON-PROC-02	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last Biennial Monitoring Evaluation Report evaluation for this monitoring item:	2001
Next scheduled Biennial Monitoring Evaluation Report evaluation of this monitoring item:	2023

Discussion and Results

Methods

A review of previous NEPA decisions that include changes to management areas was conducted which tallied amendments made since 1986.

Results

The Lolo National Forest incorporated the approved Management Area (MA) corrections during 1987-2001 into Lolo Forest Plan through amendments #4, #5a, #6, #7, #8, #13, #15, #17, #20, #22, #23, #24, #25 and #26. Since 2001, ten additional amendments have been made that resulted in changes to MA

allocations on approximately 7,686 acres. The amendments included #28, #29, #33, #34, #35, #37, #42, #43, #45, and #46 (see table 171 below). These error and/or mis-allocation corrections are based on field verifications on topography, soils, habitat type, public use, and vegetation conditions.

Table 171. Summary of Management Area Changes to the Lolo Forest Plan

Amendment	Date	Forest Plan MA Change
28	01/24/2003	Amendment changes MA designations on the south side of Runt Mountain for the proposed expansion of the Lookout Ski Area on the Superior RD. Specifically, this amendment changes 65 acres from MA 9 to MA 8; and thus the Visual Quality Objective will also change for that area: from Retention to Modification.
29	07/14/03	Amendment changes MA 11 designations in snowmobile use areas on the Seeley Lake RD Specifically, this amendment changes 1,921 acres in the Elsina area from MA 11 to MA 10, and changes 749 acres in the Morrell area from MA 11 to MA 27
33	12/18/09	Changes 450 acres from MA 13 to MA 14 in the North Fork Brewster and Spring Creek based on past monitoring of conditions and maintenance of desired riparian vegetation conditions. This amendment is associated with the Tyler-Genoa and Bateman-Gillespie range allotment.
34	03/05/2010	Management Area Changes in the South Fork of Fish Creek, Ninemile Ranger District. Based on a mapping area of visual quality objectives, this amendment modifies 539 acres of MA 22 to MA 23; and 1187 acres of MA 24 to MA 25.
35	06/09/2010	Management Area Changes for the Muchwater Flat Dispersed Recreation Area, Clark Fork Cutoff, Plains/Thompson Falls Ranger District and Peninsula Dispersed Recreation Area, Clark Fork Cutoff, Superior Ranger District. Based on recreation use of both areas, this amendment modifies both areas to MA 9 as follows: Muchwater Flat MA 14 (32 Acres) to MA 9 MA 19 (26 Acres) to MA 9 Peninsula MA 13 (49 Acres) to MA 9 MA 14 (9 Acres) to MA 9 MA 19 (14 Acres) to MA 9 MA 24 (88 Acres) to MA 9
37	07/30/2012	Management Area Correction in Antimony Creek on Plains/Thompson Falls Ranger District (Antimony Decision Notice). 16-acre parcel no longer has active mining activities. Mine claims on this parcel were officially cancelled in 2000 by BLM. MA 4 (16 acres) to MA 24

Amendment	Date	Forest Plan MA Change
42	05/22/2017	Jam Cracker EA/DN – Management Area changes for two parcels of land (Flat Creek on the Superior RD and Bear Creek on the Ninemile RD) totaling approximately 1611 acres. Approximately 1326 acres located within Flat Creek on the Superior Ranger District is changed from MA 27 (land where timber management is not economically or environmentally feasible due to physical features of the parcels) to Management Area 18 (management emphasis is for big game winter range, forest health, and timber production). The affected area is located within portions of Sections 1, 2, 11, 12, 13, 14, 22, 23, 24, 26, and 27, T17N, R26W and Sections 18-19 17N, R25W, P.M.M. Approximately 285 acres located in Bear Creek on the Ninemile Ranger District are changed from Management Area 17 (steep terrain where management emphasis is for forest health and timber production) to Management Area 27. This area has been determined to be uneconomical for timber production considering forest productivity. The affected area is located within portions of Section 34, T16N, R24W and Sections 3-4, T15N, R24W, P.M.M.
43	05/12/2017	Lookout Pass Ski Area Expansion – This amendment changes the management area (MA) designation for the expanded footprint of the Lookout Pass Ski Area from MAs 9, 13, and 24 to MA 8 (ski areas) to provide for consistent management of the ski area. The affected area is immediately west of the existing ski area boundary located along the Montana-Idaho state line in the west end of the Superior Ranger District. MA 9 (148 acres) is reclassified to MA 8. MA 13 (5 acres) is reclassified to MA 8. MA 24 (78 acres) is reclassified to MA 8.
45	4/16/2020	Soldier-Butler EA/DN: Changes Management Area (MA) designation for about 76 acres in the Kennedy Creek drainage from MA 4 (active mineral extraction and processing operations) to MA 18 (winter range for deer, elk and bighorn sheep). Assign MA designations of 14 (riparian with grazing) and 18 (winter range) to approximately 96 acres that were not allocated an MA in the 1986 Lolo Forest Plan.
46	1/7/2020	Swamp Eddy EA/DN: This amendment changes the Management Area designation for two parcels of land totaling approximately 527 acres that were incorrectly mapped during the development of the 1986 Lolo Forest Plan. These parcels are located near Combest Peak on the Plains/Thompson Falls Ranger District Approximately 481 acres in the Miller Creek drainage is changed from Management Area 27 (land where timber management is not economically or environmentally feasible due to physical features of the parcels) to Management Area 25 (land with a medium degree of visual sensitivity and is available for varying degrees of timber management), which is the current allocation of adjacent lands. Approximately 46 acres in the East Fork Swamp Creek drainage is changed from Management Area 27 (land where timber management is not economically or environmentally feasible due to physical features of the parcels) to Management Area 16 (timber management), which the current allocation of adjacent lands.

Timber suitability changes were calculated by net transfers from suitable timber MAs to unsuitable MA, or visa/versa. The following table displays these changes in the Lolo National Forest's timber suitable lands since 2001.

Table 172. Timber suitability changes.

Amendment #	MA Change From	MA Change To	Acres	+/- change in suitable timber base
35	24	9	88	-
37	4	24	16	+
42	27	18	1,326	+
	17	27	285	-
43	24	8	78	-
45	4	18	76	+
	NA (originally unmapped NFS lands)	18	80	+
46	27	25	481	+
	27	16	46	+
Total Acres changed to suitable timber lands				2,025
Total Acres changed to unsuitable timber lands				451

Discussion

The 1986 Plan intent was for mapping errors for be addressed and/or corrected during project development. Since 2001, amendments have been incorporated at the project level in order to align with the goals of the Lolo Forest Plan. These amendments are made on an "on-need" basis. Thus, to track trends or changes is not meaningful. Therefore, no trend data is generated for this monitoring item.

As technology in remote sensing improves over time, more areas of the forest may be considered suitable for timber that were originally designated at unsuitable in the 1986 Forest Plan. This could lead to additional amendments in MA allocations.

Evaluation of Results for Adaptive Management

Table 173. MON-SOC-02: Summary of Findings.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed? [2]
MON-PROC-02: Have errors in original land allocations been evaluated and corrected?	2021	(E) Yes - Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired because errors in original land allocations are evaluated on a project-by-project basis and corrected as needed.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area.

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Appendix A. Summary of Findings to the 2021 Lolo National Forest Biennial Monitoring and Evaluation Report

Please note, numbers 1 and 2 as marked in the following tables indicate the following:

1. Plan Intent: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to answer monitoring question.(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

2. [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of Lolo Forest Plan area. see body of the report for more details regarding any specific recommendations/opportunities for change

Table 174. Summary of Findings to the 2021 Lolo National Forest Biennial Monitoring and Evaluation Report.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
Wildlife				
MON-WLF-01: What is the current population status of elk on National Forest System Lands?	2021	(E) Yes. Elk are not trending downward since Plan inception and based on the MTFWP data and habitat improvement, elk populations meet the intention of Lolo Forest Plan.	Yes, recommend updating indicators to include open road density as the measure and refining the spatial extent of this to management areas 18, 19, 22, 23, and 26 which have a focus on elk.	Monitoring Plan
MON-WLF-02: What is the quantity of old growth on the Forest?	2021	(B) Uncertain. More time/data are needed to understand status or progress of the Plan Component(s).	Yes, recommend the following: A more current estimate of the quantity of old growth on the Forest is warranted that considers newly acquired lands and recent disturbance regimes.	Monitoring Plan: a more current estimate of Old Growth present on the Lolo Forest is warranted. Management Activities: Update Lolo Forest Old Growth Strategy.

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
			Consider updating the Forest strategy for old growth at the Forest scale. Please see this section in the full report for additional detailed information related to recommendations. .	
MON-WLF-03: What is the quantity of large snags on the Forest?	2021	(E) Yes. Based on increases in snag size class proportion that are providing habitat for viable populations of wildlife and fish species.	Yes, recommend updating indicators by removing the height by size class metric for future monitoring, including the three size classes currently included in metrics. Please see this section inf the full report for additional information.	Monitoring Plan
MON-WLF-04: What progress has been made towards habitat improvement for Threatened and Endangered Species recovery through forest management activities?	2021	(E) Yes. Grizzly bears appear to have an increase in population and are expanding their range. (E) Yes. Lynx habitat is not limited on the Forest and management continues to follow practices to aid in the recovery of the lynx, however, lynx do not appear to be expanding their range on the Forest indicating more information is needed.	No	NA
Aquatic Environment and Fisheries				
MON-FISH-01: What is the status of native fish including, but not limited to west slope cutthroat trout and bull trout?	2021	(C) Uncertain. Methods inadequate to assess the status or progress toward achieving plan component(s).	No, however as noted in the full report for this monitoring item, expand data analysis efforts along with coordination with partners.	NA
MON-STRM-01: What activities have been conducted to improve or maintain	2021	(E) Yes. Based on the substantial management activities implemented that	Yes, recommend the following: Increase monitoring assessment and resources in order to improve data quality.	Monitoring Plan

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
riparian habitat conservation areas (RHCAs), and aquatic habitat?		result in improved riparian and aquatic habitat.	Assure that projects include a geospatial data component to most effectively verify and display known project work. Please see this section in the full monitoring report for additional information related to these recommendations.	
MON-STRM-02: What is the condition of instream native fish habitat?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired. Management is resulting in high quality conditions throughout the majority of streams on the Lolo National Forest.	Yes, recommend the following: Reduce the list of indictors associated with MON-STRM-02. Update data sources to include the Lolo National Forest's Watershed Climate Change Vulnerability Assessment (WCCVA). Please see this section in the full monitoring report for additional information related to these recommendations.	Monitoring Plan
MON-STRM-03: What is the condition of riparian habitat conservation areas including wetlands?	2021	(B) Uncertain. More time/data are needed to understand status or progress of the item.	Yes, it is recommended to expand use of indicators for this monitoring item. Please see this section in the full monitoring report for additional information related to these recommendations.	Monitoring Plan
Timber				
MON-VEG-01: What vegetation management activities have been conducted to	2021	(E) Yes. Vegetation management activities are providing a sustained yield of forest products and provide for the maintenance	No	NA

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
maintain or restore forest resiliency?		of a diverse mosaic of vegetational development.		
MON-VEG-02: Is vegetation established on temporary roads within 10 years of closure?	2021	(E) Yes. Based on large annual budgets to cut and clear vegetation for timber sale preparations indicating that old temporary routes need the be cleared, because they have revegetated from previous actions.	Yes, Recommend the following: Update indicators used for this monitoring item with addition metrics that focus on post-sale activities. Please see this section in the full monitoring report for additional information related to these recommendations.	Monitoring Plan
MON-VEG-03: Is the Forest volume harvested exceeding the Plan ASQ?	2021	(E) Yes. Based on 10-yr period that was analyzed, average harvest was at a volume that was only about 30% of the allowable sale quantity assigned by Lolo Forest Plan	No	NA
MON-VEG-04: Are harvested/burned stands in the suitable base restocked within 5 years?	2021	(E)Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired. The vast majority of stands across the Forest are restocked within 5 years.	Yes, changes may be warranted where we are not trending towards the five-year timeframe. Management activities should place increased emphasis on moving toward the required timeframes.	Management Activities
Soils				
MON-SOIL-01: Are forest management activities maintaining soil productivity?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired. DSD results on both ground-based and skyline harvest units are currently below the 15% DSD threshold for Region 1 Soil Quality Standards.	Yes, it is recommended that some monitoring indicator assumptions be validated, and sample size of some indicators be increased to provide a more robust dataset for this monitoring item. Please see this section in the full monitoring report for additional information related to these recommendations.	Monitoring Plan

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
Recreation				
Mon-Rec-01: Are motorized vehicle travel restrictions effective in limiting off-road vehicle damage?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired.	No	NA
Mon-Rec-02: Is a wide spectrum of recreation opportunities provided?	2021	(E) Yes. Based on results of the National Visitor Use Monitoring surveys and 74% of the visiting public gave a rating of very satisfied with their overall recreation experience.	Yes, it is recommended that in the next monitoring report, consider analyzing data relative to the impacts on outdoor recreation associated with the Covid 19 global pandemic.	Monitoring Plan
MON-REC-03: What activities are occurring in roadless lands and what amount and distribution of roadless lands remain on the Forest?	2021	(E) Yes. Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired	Yes, the following is recommended: The following three indicators, should be dropped from future monitoring and evaluations because no change in acres of substantially altered areas or miles of temporary roads has occurred since the inception of the 2001 Roadless Area Conservation Rule: • Acres of Inventoried Roadless Areas substantially altered (36 CFR 294.13(b)(4)). • Acres of Inventoried Roadless Area not substantially altered. • Miles of temporary road constructed within Inventoried Roadless Areas.	Monitoring Plan
Range				
MON-RNG-01:	2021	(E) Yes. Due to all existing active permits being	No	NA

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
Is livestock use managed within the carrying capacity of grazing allotments?		administered to allotment management standard, allotments are being managed within carrying capacity for livestock.		
MON-RNG-02: Is the establishment and spread of invasive aquatic and terrestrial plant weed species being controlled (prevented or reduced) through use of integrated weed treatment practices?	2021	(E) Yes. Monitoring results indicate that establishment and spread is being controlled with weed treatment practices.	Yes, the following is recommended: Increase data collection with an emphasis on new invasive species.	Monitoring Plan
MON-RNG-03: Is weed spread increasing/decreasing and are new invasive plant species occurring?	2021	(B) Uncertain. It is largely unknown if new species are occurring due to lack of comprehensive monitoring efforts.	Yes, the following is recommended: Management activities should include a more comprehensive inventory and monitoring program. Monitoring Plan: Develop more appropriate Plan Components to tie to this monitoring item.	Management Activities and Monitoring Plan
MON-RNG-04: Are weed prevention being applied during project implementation?	2021	(E) Yes. Based on the observed implementation of weed prevention and mitigation measures in contracts and NEPA documents.	Yes. Recommend dropping this monitoring item. Please see this section in the full monitoring report for additional information related to these recommendations.	Monitoring Plan
Roads				
MON-RDS-01: Do the number of roads assist moving toward resource and other management needs and objectives, reflect long-term funding, and minimize	2021	(B) Uncertain. More time/data are needed to understand status or progress of the Plan Component(s).	No	NA

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
environmental impacts?				
MON-RDS-02: Are roads designed and constructed to standard and meet State or Forest Best Management Practices (Best Management Practices)?	2021	(A) Uncertain. Pending the next State Best Management Practice audit results to confirm assumptions.	No	NA
Minerals				
MON-MIN-01: What effect are forest management activities having on mineral activities/mineral activities having on forest management resources?	2021	(E) Yes. Based on the rate planned operations approved is consistent with demand.	No	NA
Visual Quality				
MON-VIS-01: Do projects and activities comply with visual quality objectives?	2021	(E) Yes. Based on the sampled projects demonstrating adequate project design to move towards visual quality objectives.	Yes, it is recommended to modify the monitoring question to change the phrase “comply with” to “integrate” for consistency with current land management plan language.	Monitoring Plan
Fire				
MON-FIRE-01: Is air quality maintained during prescribed fire implementation?	2021	(E) Yes. based on prescribed burning being consistent with Montanan DEQ and Missoula City-County Health Department annual permits and within the approval guidelines	No	NA
MON-FIRE-02: Have fuel treatment targets been accomplished?	2021	(E) Yes. Based on the accomplished annual acres of fuels treatments.	No	NA

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
MON-FIRE-03: Are unplanned ignitions (wildfire) being managed for resource benefits when appropriate?	2021	(E) Yes. Implementation of plan component to manage wildfire for resource benefit to achieve land management objectives is trending toward a desired result.	Yes, the following is recommended: During Assessment phase for plan revision, assess wildfire as a resource benefit. Monitoring Program: Consider changing Monitoring Question to account for wildfire acres that assist in moving towards land management objectives, instead of wildfire acres managed strictly for resource benefit.	Plan and Monitoring Plan
Adjacent Lands, Resources and Communities				
MON-SOC-01: What effects do forest management activities have on the local economy, recreation opportunities, downstream water uses, visual quality, and local air quality?	NA	(B) Uncertain. Data was not compiled for this monitoring item.	No	NA
MON-SOC-02: What effects do adjacent land uses and activities have on management of the Forest?	NA	(B) Uncertain. Data was not compiled for this monitoring item.	No	NA
Lands				
MON-LAND-01: What adjustments have been made to land ownership within the Forest boundary?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired	No	NA
MON-LAND-02: Have major utility and transportation systems and right-of-	NA	(B) Uncertain. Data was not compiled for this monitoring item.	No	NA

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS [1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?[2]
way grants been developed within identified corridors?				
Process				
MON-PROC-01: Are emerging issues or changing social values being tracked?	2021	(E) Yes. Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired.	No	NA
MON-PROC-02: Have errors in original land allocations been evaluated and corrected?	2021	(E) Yes - Implementation of Plan Component(s) are trending, progressing, and/or conducted as desired because errors in original land allocations are evaluated on a project-by-project basis and corrected as needed.	No	NA

Appendix B. MON-WLF-01: Elk Habitat Improvement GIS Processes – FP Monitoring

Winter Range: MA 18, 19, 22, 23

Summer Range: area outside above MA's

FACTS Treatment Groups (summarize by Winter Range and Summer Range)

Date Range: 2014 – present

Treatment Acres Completed

RX Fire

- 1111- Broadcast Burning - Covers a majority of the unit
- 1112- Jackpot Burning - Scattered concentrations
- 1113- Underburn - Low Intensity (Majority of Unit)
- 6101- Wildlife Habitat Prescribed fire

Wildfire

- 1117- Wildfire - Natural Ignition
- 1118- Wildfire - Human Ignition

Weed Treatments

- 2510- Invasive - Pesticide Application
- 2530- Invasive - Mechanical/Physical
- 2540- Invasive - Cultural/Fire
- 2550- Invasive - Biocontrol, Classic

Wildlife Treatments

- 6000- Wildlife Habitat Activities
- 6050- Wildlife Habitat Improvement
- 6104- Wildlife Habitat Regeneration cut
- 6105- Wildlife Habitat Intermediate cut
- 6107- Wildlife Habitat Mechanical treatment
- 6130- Wildlife Habitat Create openings
- 6133- Wildlife Habitat Slash treatment

- 6160- Wildlife habitat non- structural maintenance

Process steps

1. Run GI Query: FACTS Any Activity by Any Year – RSW to pull above activities 2014 to present. Add *TreatmentGroup* field and attribute based on treatment classes above.

Note: Due to inconsistencies in activity reporting in the wildlife program (only west zone is reporting 6000-code activities) the data needs further manipulation. The difference in reporting results in overlapping treatments occurring in some areas (i.e on the same unit a wildlife veg treatment happened first then a Rx Fire treatment second). After consulting with the wildlife bio; the general view is – we did not improve the habitat unless we do the burn. In areas that overlapped the RX acres were counted and the wildlife veg treatment activity polygons were removed to avoid double counting acres.

2. Perform Identity with MA and Activities, then run Frequency Statistic to summarize

Appendix C. MON-WLF-04: Habitat Improvement for Threatened and Endangered Species

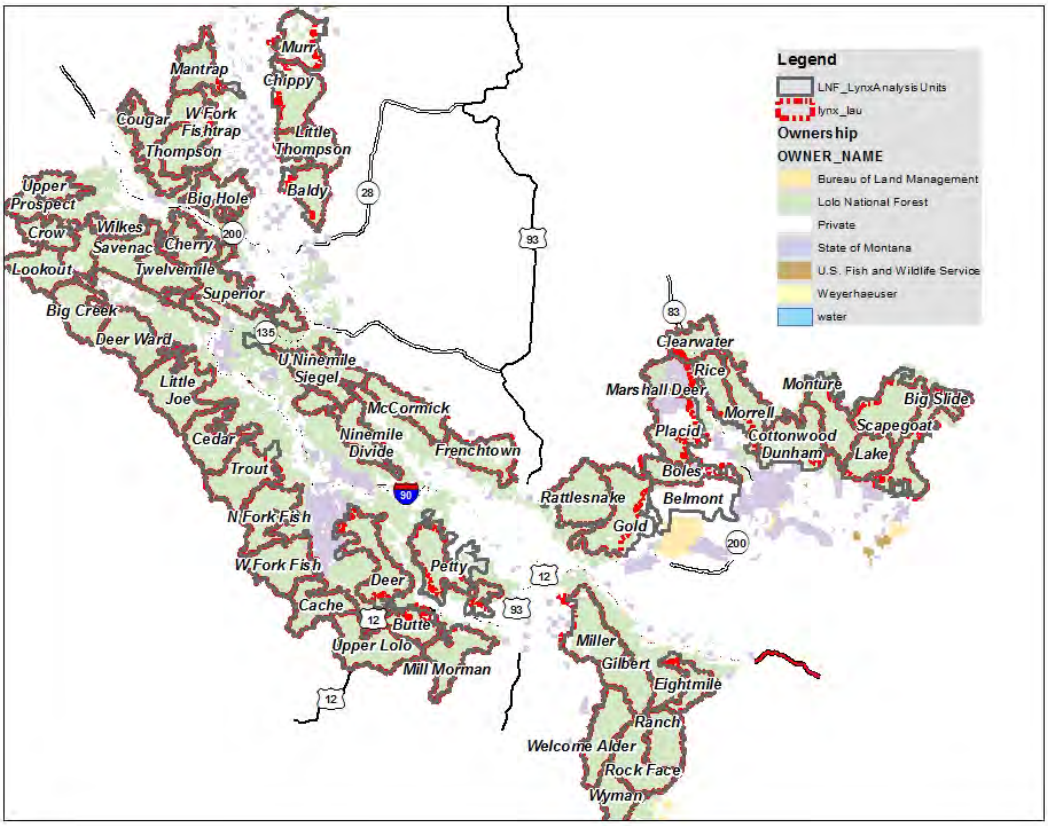

Figure 31. MON-WLF-04: Lolo National Forest lynx analysis units. Red lines indicate past lynx analysis units and gray lines are updated lynx analysis units – 2020 process.

Table 175. MON-WLF-04: Lynx analysis units, Lolo National Forest.

lynx analysis units Name	Previous lynx analysis units Acres	New lynx analysis units Acres	Percent Change	Potential Mapped Habitat	Acres	Potential Mapped Habitat Percent
Baldy	21,425	24,481	14	Lynx Habitat	16,946	69%
				Non-Lynx Habitat	7,535	31%
Belmont	0	40,566	100	Lynx Habitat	26,824	66%
				Non-Lynx Habitat	13,742	34%
Big Creek	30,467	30,450	0	Lynx Habitat	15,781	52%
				Non-Lynx Habitat	14,652	48%
Big Hole	24,977	24,952	0	Lynx Habitat	11,458	46%

lynx analysis units Name	Previous lynx analysis units Acres	New lynx analysis units Acres	Percent Change	Potential Mapped Habitat	Acres	Potential Mapped Habitat Percent
				Non-Lynx Habitat	13,494	54%
				Lynx Habitat	26,052	67%
Big Slide	35,056	39,103	12	Non-Lynx Habitat	13,023	33%
				Lynx Habitat	16,733	81%
Boles	20,838	20,708	-1	Non-Lynx Habitat	3,974	19%
				Lynx Habitat	15,655	69%
Butte	20,530	21,094	3	Non-Lynx Habitat	5,439	26%
				Lynx Habitat	12,687	44%
Cache	28,563	28,540	0	Non-Lynx Habitat	15,830	55%
				Lynx Habitat	22,604	67%
Cedar	33,539	33,517	0	Non-Lynx Habitat	10,902	33%
				Lynx Habitat	10,804	46%
Cherry	23,632	23,608	0	Non-Lynx Habitat	12,804	54%
				Lynx Habitat	28,445	80%
Chippy	31,821	35,708	12	Non-Lynx Habitat	7,263	20%
				Lynx Habitat	15,965	76%
Clearwater	19,794	20,988	6	Non-Lynx Habitat	4,995	24%
				Lynx Habitat	31,524	77%
Cottonwood Dunham	34,015	40,888	20	Non-Lynx Habitat	9,364	23%
				Lynx Habitat	22,279	67%
Cougar	33,471	33,445	0	Non-Lynx Habitat	11,152	33%
				Lynx Habitat	9,460	55%
Crow	17,310	17,344	0	Non-Lynx Habitat	7,873	45%
				Lynx Habitat	15,369	36%
Deer	36,133	42,195	17	Non-Lynx Habitat	26,826	64%
				Lynx Habitat	18,064	50%
Deer Ward	35,819	35,819	0	Non-Lynx Habitat	17,741	50%
				Lynx Habitat	6,666	34%
Eightmile	17,920	19,867	11	Non-Lynx Habitat	13,148	66%
				Lynx Habitat	20,939	76%
Frenchtown	27,751	27,487	-1	Non-Lynx Habitat	6,548	24%

lynx analysis units Name	Previous lynx analysis units Acres	New lynx analysis units Acres	Percent Change	Potential Mapped Habitat	Acres	Potential Mapped Habitat Percent
Gilbert	25,017	24,993	0	Lynx Habitat	13,092	52%
				Non-Lynx Habitat	11,901	48%
Gold	41,332	52,158	26	Lynx Habitat	41,026	79%
				Non-Lynx Habitat	11,132	21%
Lake	22,844	23,149	1	Lynx Habitat	14,729	64%
				Non-Lynx Habitat	8,420	36%
Little Joe	47,332	47,311	0	Lynx Habitat	28,122	59%
				Non-Lynx Habitat	19,169	41%
Little Thompson	25,413	25,385	0	Lynx Habitat	16,142	64%
				Non-Lynx Habitat	9,242	36%
Lookout	26,577	26,598	0	Lynx Habitat	13,746	52%
				Non-Lynx Habitat	12,822	48%
Mantrap	25,075	27,445	9	Lynx Habitat	8,626	31%
				Non-Lynx Habitat	18,803	69%
Marshall Deer	19,620	22,493	15	Lynx Habitat	19,504	87%
				Non-Lynx Habitat	2,976	13%
McCormick	28,197	28,164	0	Lynx Habitat	16,361	58%
				Non-Lynx Habitat	11,803	42%
Mill Morman	29,636	30,097	2	Lynx Habitat	19,754	66%
				Non-Lynx Habitat	10,329	34%
Miller	38,600	37,600	-3	Lynx Habitat	14,573	39%
				Non-Lynx Habitat	23,027	61%
Monture	27,652	31,887	15	Lynx Habitat	23,296	73%
				Non-Lynx Habitat	8,581	27%
Morrell	23,430	27,463	17	Lynx Habitat	23,340	85%
				Non-Lynx Habitat	4,123	15%
Murr	24,472	28,073	15	Lynx Habitat	21,427	76%
				Non-Lynx Habitat	6,634	24%
N Fork Fish	35,567	35,556	0	Lynx Habitat	16,642	47%
				Non-Lynx Habitat	18,901	53%
Ninemile Divide	34,768	34,732	0	Lynx Habitat	22,417	65%

lynx analysis units Name	Previous lynx analysis units Acres	New lynx analysis units Acres	Percent Change	Potential Mapped Habitat	Acres	Potential Mapped Habitat Percent
				Non-Lynx Habitat	12,315	35%
				Lynx Habitat	24,913	47%
Petty	32,799	53,560	63	Non-Lynx Habitat	28,648	53%
				Lynx Habitat	37,270	92%
Placid	35,752	40,600	14	Non-Lynx Habitat	3,330	8%
				Lynx Habitat	13,082	48%
Ranch	27,396	27,359	0	Non-Lynx Habitat	14,245	52%
				Lynx Habitat	28,158	72%
Rattlesnake	38,453	39,101	2	Non-Lynx Habitat	10,943	28%
				Lynx Habitat	17,259	83%
Rice	24,358	20,721	-15	Non-Lynx Habitat	3,462	17%
				Lynx Habitat	13,892	38%
Rock Face	36,647	36,616	0	Non-Lynx Habitat	22,719	62%
				Lynx Habitat	16,752	53%
Savenac	31,370	31,339	0	Non-Lynx Habitat	14,588	47%
				Lynx Habitat	31,631	74%
Scapegoat	38,354	42,502	11	Non-Lynx Habitat	10,864	26%
				Lynx Habitat	19,483	44%
Superior	44,694	44,650	0	Non-Lynx Habitat	25,167	56%
				Lynx Habitat	14,926	54%
Thompson	27,920	27,893	0	Non-Lynx Habitat	12,967	46%
				Lynx Habitat	24,010	59%
Trout	38,273	40,808	7	Non-Lynx Habitat	16,782	41%
				Lynx Habitat	11,010	40%
Twelvemile	27,518	27,491	0	Non-Lynx Habitat	16,480	60%
				Lynx Habitat	22,452	59%
U Ninemile Siegel	33,888	37,850	12	Non-Lynx Habitat	15,397	41%
				Lynx Habitat	35,163	83%
Upper Lolo	42,416	42,377	0	Non-Lynx Habitat	7,179	17%
				Lynx Habitat	14,436	52%
Upper Prospect	27,789	27,798	0	Non-Lynx Habitat	13,338	48%

lynx analysis units Name	Previous lynx analysis units Acres	New lynx analysis units Acres	Percent Change	Potential Mapped Habitat	Acres	Potential Mapped Habitat Percent
W Fork Fish	36,088	36,462	1	Lynx Habitat	24,283	67%
				Non-Lynx Habitat	12,160	33%
W Fork Fishtrap	20,511	20,585	0	Lynx Habitat	12,853	62%
				Non-Lynx Habitat	7,725	38%
Welcome Alder	36,198	36,184	0	Lynx Habitat	23,486	65%
				Non-Lynx Habitat	12,698	35%
Wilkes	22,360	22,337	0	Lynx Habitat	9,768	44%
				Non-Lynx Habitat	12,569	56%
Wyman	24,765	24,744	0	Lynx Habitat	9,835	40%
				Non-Lynx Habitat	14,900	60%
TOTAL lynx analysis units ACRES	1,616,138	1,744,838		No data		No data
Total Lynx Habitat	0	0	0	No data	1,061,715	No data
Total Non-habitat	0	0	0	No data	682,647	No data
Total??	0	0	0	No data	1,744,363	No data

Table 176. MON-WLF-04: Forest Structural Stages and Acres in lynx analysis units on the Lolo National Forest

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Baldy	16,946	Multi-Story	4,642	27%
Baldy	16,946	Other	3,282	19%
Baldy	16,946	Stand Initiation	1,365	8%
Baldy	16,946	Stem Exclusion	6,926	41%
Baldy	16,946	Temporarily Unsuitable-10	313	2%
Baldy	16,946	Temporarily Unsuitable-20	417	2%
Belmont	26,824	Multi-Story	8,534	32%
Belmont	26,824	Other	7,438	28%
Belmont	26,824	Stand Initiation	4,783	18%
Belmont	26,824	Stem Exclusion	2,330	9%
Belmont	26,824	Temporarily Unsuitable-10	1,562	6%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Belmont	26,824	Temporarily Unsuitable-20	2,178	8%
Big Creek	15,781	Multi-Story	11,878	75%
Big Creek	15,781	Other	1,467	9%
Big Creek	15,781	Stand Initiation	157	1%
Big Creek	15,781	Stem Exclusion	2,203	14%
Big Creek	15,781	Temporarily Unsuitable-20	76	0%
Big Hole	11,458	Multi-Story	2,362	21%
Big Hole	11,458	Other	377	3%
Big Hole	11,458	Stand Initiation	253	2%
Big Hole	11,458	Stem Exclusion	2,037	18%
Big Hole	11,458	Temporarily Unsuitable-10	5,948	52%
Big Hole	11,458	Temporarily Unsuitable-20	481	4%
Big Slide	26,052	Multi-Story	11,312	43%
Big Slide	26,052	Other	4,052	16%
Big Slide	26,052	Stand Initiation	2,891	11%
Big Slide	26,052	Stem Exclusion	3,854	15%
Big Slide	26,052	Temporarily Unsuitable-10	509	2%
Big Slide	26,052	Temporarily Unsuitable-20	3,434	13%
Boles	16,733	Multi-Story	4,618	28%
Boles	16,733	Other	2,545	15%
Boles	16,733	Stand Initiation	1,008	6%
Boles	16,733	Stem Exclusion	1,464	9%
Boles	16,733	Temporarily Unsuitable-10	1,909	11%
Boles	16,733	Temporarily Unsuitable-20	5,189	31%
Butte	15,655	Multi-Story	3,633	23%
Butte	15,655	Other	2,055	13%
Butte	15,655	Stand Initiation	393	3%
Butte	15,655	Stem Exclusion	8,424	54%
Butte	15,655	Temporarily Unsuitable-10	724	5%
Butte	15,655	Temporarily Unsuitable-20	426	3%
Cache	12,687	Multi-Story	3,072	24%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Cache	12,687	Other	4,163	33%
Cache	12,687	Stand Initiation	1,115	9%
Cache	12,687	Stem Exclusion	3,444	27%
Cache	12,687	Temporarily Unsuitable-10	484	4%
Cache	12,687	Temporarily Unsuitable-20	409	3%
Cedar	22,604	Multi-Story	12,971	57%
Cedar	22,604	Other	4,499	20%
Cedar	22,604	Stand Initiation	478	2%
Cedar	22,604	Stem Exclusion	3,951	17%
Cedar	22,604	Temporarily Unsuitable-10	369	2%
Cedar	22,604	Temporarily Unsuitable-20	337	1%
Cherry	10,804	Multi-Story	4,298	40%
Cherry	10,804	Other	1,602	15%
Cherry	10,804	Stand Initiation	216	2%
Cherry	10,804	Stem Exclusion	2,319	21%
Cherry	10,804	Temporarily Unsuitable-10	745	7%
Cherry	10,804	Temporarily Unsuitable-20	1,625	15%
Chippy	28,445	Multi-Story	873	3%
Chippy	28,445	Other	1,839	6%
Chippy	28,445	Stand Initiation	499	2%
Chippy	28,445	Stem Exclusion	2,280	8%
Chippy	28,445	Temporarily Unsuitable-10	372	1%
Chippy	28,445	Temporarily Unsuitable-20	22,582	79%
Clearwater	15,965	Multi-Story	6,373	40%
Clearwater	15,965	Other	3,873	24%
Clearwater	15,965	Stand Initiation	199	1%
Clearwater	15,965	Stem Exclusion	4,174	26%
Clearwater	15,965	Temporarily Unsuitable-10	408	3%
Clearwater	15,965	Temporarily Unsuitable-20	938	6%
Cottonwood Dunham	31,524	Multi-Story	11,985	38%
Cottonwood Dunham	31,524	Other	2,506	8%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Cottonwood Dunham	31,524	Stand Initiation	447	1%
Cottonwood Dunham	31,524	Stem Exclusion	729	2%
Cottonwood Dunham	31,524	Temporarily Unsuitable-10	14,345	46%
Cottonwood Dunham	31,524	Temporarily Unsuitable-20	1,513	5%
Cougar	22,279	Multi-Story	11,892	53%
Cougar	22,279	Other	5,136	23%
Cougar	22,279	Stand Initiation	744	3%
Cougar	22,279	Stem Exclusion	1,869	8%
Cougar	22,279	Temporarily Unsuitable-10	2,190	10%
Cougar	22,279	Temporarily Unsuitable-20	448	2%
Crow	9,460	Multi-Story	6,599	70%
Crow	9,460	Other	1,258	13%
Crow	9,460	Stand Initiation	86	1%
Crow	9,460	Stem Exclusion	910	10%
Crow	9,460	Temporarily Unsuitable-20	607	6%
Deer	15,369	Multi-Story	3,285	21%
Deer	15,369	Other	3,452	22%
Deer	15,369	Stand Initiation	737	5%
Deer	15,369	Stem Exclusion	2,407	16%
Deer	15,369	Temporarily Unsuitable-10	314	2%
Deer	15,369	Temporarily Unsuitable-20	5,174	34%
Deer Ward	18,064	Multi-Story	13,629	75%
Deer Ward	18,064	Other	1,838	10%
Deer Ward	18,064	Stand Initiation	203	1%
Deer Ward	18,064	Stem Exclusion	1,868	10%
Deer Ward	18,064	Temporarily Unsuitable-10	105	1%
Deer Ward	18,064	Temporarily Unsuitable-20	420	2%
Eightmile	6,666	Multi-Story	4,095	61%
Eightmile	6,666	Other	983	15%
Eightmile	6,666	Stand Initiation	86	1%
Eightmile	6,666	Stem Exclusion	1,193	18%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Eightmile	6,666	Temporarily Unsuitable-10	9	0%
Eightmile	6,666	Temporarily Unsuitable-20	302	5%
Frenchtown	20,939	Multi-Story	5,022	24%
Frenchtown	20,939	Other	7,128	34%
Frenchtown	20,939	Stand Initiation	2,891	14%
Frenchtown	20,939	Stem Exclusion	2,524	12%
Frenchtown	20,939	Temporarily Unsuitable-20	3,374	16%
Gilbert	13,092	Multi-Story	4,344	33%
Gilbert	13,092	Other	2,412	18%
Gilbert	13,092	Stand Initiation	377	3%
Gilbert	13,092	Stem Exclusion	1,719	13%
Gilbert	13,092	Temporarily Unsuitable-10	1	0%
Gilbert	13,092	Temporarily Unsuitable-20	4,239	32%
Gold	41,026	Multi-Story	12,071	29%
Gold	41,026	Other	7,226	18%
Gold	41,026	Stand Initiation	2,404	6%
Gold	41,026	Stem Exclusion	3,617	9%
Gold	41,026	Temporarily Unsuitable-10	5,429	13%
Gold	41,026	Temporarily Unsuitable-20	10,279	25%
Lake	14,729	Multi-Story	5,821	40%
Lake	14,729	Other	1,179	8%
Lake	14,729	Stand Initiation	1,082	7%
Lake	14,729	Stem Exclusion	560	4%
Lake	14,729	Temporarily Unsuitable-10	4,760	32%
Lake	14,729	Temporarily Unsuitable-20	1,327	9%
Little Joe	28,122	Multi-Story	21,713	77%
Little Joe	28,122	Other	3,084	11%
Little Joe	28,122	Stand Initiation	194	1%
Little Joe	28,122	Stem Exclusion	2,293	8%
Little Joe	28,122	Temporarily Unsuitable-10	310	1%
Little Joe	28,122	Temporarily Unsuitable-20	528	2%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Little Thompson	16,142	Multi-Story	1,298	8%
Little Thompson	16,142	Other	2,730	17%
Little Thompson	16,142	Stand Initiation	498	3%
Little Thompson	16,142	Stem Exclusion	3,079	19%
Little Thompson	16,142	Temporarily Unsuitable-10	184	1%
Little Thompson	16,142	Temporarily Unsuitable-20	8,353	52%
Lookout	13,746	Multi-Story	8,612	63%
Lookout	13,746	Other	2,484	18%
Lookout	13,746	Stand Initiation	403	3%
Lookout	13,746	Stem Exclusion	1,261	9%
Lookout	13,746	Temporarily Unsuitable-20	986	7%
Mantrap	8,626	Multi-Story	2,252	26%
Mantrap	8,626	Other	1,811	21%
Mantrap	8,626	Stand Initiation	486	6%
Mantrap	8,626	Stem Exclusion	3,336	39%
Mantrap	8,626	Temporarily Unsuitable-10	616	7%
Mantrap	8,626	Temporarily Unsuitable-20	125	1%
Marshall Deer	19,504	Multi-Story	8,788	45%
Marshall Deer	19,504	Other	8,594	44%
Marshall Deer	19,504	Stand Initiation	908	5%
Marshall Deer	19,504	Stem Exclusion	920	5%
Marshall Deer	19,504	Temporarily Unsuitable-20	294	2%
McCormick	16,361	Multi-Story	6,222	38%
McCormick	16,361	Other	5,315	32%
McCormick	16,361	Stand Initiation	480	3%
McCormick	16,361	Stem Exclusion	1,838	11%
McCormick	16,361	Temporarily Unsuitable-10	49	0%
McCormick	16,361	Temporarily Unsuitable-20	2,457	15%
Mill Morman	19,754	Multi-Story	3,012	15%
Mill Morman	19,754	Other	2,549	13%
Mill Morman	19,754	Stand Initiation	329	2%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Mill Morman	19,754	Stem Exclusion	2,502	13%
Mill Morman	19,754	Temporarily Unsuitable-10	11,016	56%
Mill Morman	19,754	Temporarily Unsuitable-20	346	2%
Miller	14,573	Multi-Story	5,304	36%
Miller	14,573	Other	2,501	17%
Miller	14,573	Stand Initiation	626	4%
Miller	14,573	Stem Exclusion	2,034	14%
Miller	14,573	Temporarily Unsuitable-10	199	1%
Miller	14,573	Temporarily Unsuitable-20	3,910	27%
Monture	23,296	Multi-Story	4,570	20%
Monture	23,296	Other	1,394	6%
Monture	23,296	Stand Initiation	323	1%
Monture	23,296	Stem Exclusion	131	1%
Monture	23,296	Temporarily Unsuitable-10	13,037	56%
Monture	23,296	Temporarily Unsuitable-20	3,840	16%
Morrell	23,340	Multi-Story	10,440	45%
Morrell	23,340	Other	1,797	8%
Morrell	23,340	Stand Initiation	147	1%
Morrell	23,340	Stem Exclusion	1,889	8%
Morrell	23,340	Temporarily Unsuitable-10	8,541	37%
Morrell	23,340	Temporarily Unsuitable-20	526	2%
Murr	21,427	Multi-Story	2,560	12%
Murr	21,427	Other	3,315	15%
Murr	21,427	Stand Initiation	3,854	18%
Murr	21,427	Stem Exclusion	8,205	38%
Murr	21,427	Temporarily Unsuitable-20	3,492	16%
N Fork Fish	16,642	Multi-Story	5,189	31%
N Fork Fish	16,642	Other	4,109	25%
N Fork Fish	16,642	Stand Initiation	359	2%
N Fork Fish	16,642	Stem Exclusion	5,183	31%
N Fork Fish	16,642	Temporarily Unsuitable-10	1,271	8%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
N Fork Fish	16,642	Temporarily Unsuitable-20	531	3%
Ninemile Divide	22,417	Multi-Story	8,383	37%
Ninemile Divide	22,417	Other	7,202	32%
Ninemile Divide	22,417	Stand Initiation	630	3%
Ninemile Divide	22,417	Stem Exclusion	4,322	19%
Ninemile Divide	22,417	Temporarily Unsuitable-10	156	1%
Ninemile Divide	22,417	Temporarily Unsuitable-20	1,725	8%
Petty	24,913	Multi-Story	7,063	28%
Petty	24,913	Other	5,318	21%
Petty	24,913	Stand Initiation	672	3%
Petty	24,913	Stem Exclusion	9,553	38%
Petty	24,913	Temporarily Unsuitable-10	959	4%
Petty	24,913	Temporarily Unsuitable-20	1,348	5%
Placid	37,270	Multi-Story	6,178	17%
Placid	37,270	Other	7,151	19%
Placid	37,270	Stand Initiation	1,095	3%
Placid	37,270	Stem Exclusion	2,477	7%
Placid	37,270	Temporarily Unsuitable-10	888	2%
Placid	37,270	Temporarily Unsuitable-20	19,481	52%
Ranch	13,082	Multi-Story	3,798	29%
Ranch	13,082	Other	2,912	22%
Ranch	13,082	Stand Initiation	83	1%
Ranch	13,082	Stem Exclusion	2,053	16%
Ranch	13,082	Temporarily Unsuitable-10	278	2%
Ranch	13,082	Temporarily Unsuitable-20	3,957	30%
Rattlesnake	28,158	Multi-Story	11,188	40%
Rattlesnake	28,158	Other	7,436	26%
Rattlesnake	28,158	Stand Initiation	539	2%
Rattlesnake	28,158	Stem Exclusion	5,785	21%
Rattlesnake	28,158	Temporarily Unsuitable-20	3,209	11%
Rice	17,259	Multi-Story	9,671	56%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Rice	17,259	Other	1,367	8%
Rice	17,259	Stand Initiation	107	1%
Rice	17,259	Stem Exclusion	3,095	18%
Rice	17,259	Temporarily Unsuitable-10	2,984	17%
Rice	17,259	Temporarily Unsuitable-20	35	0%
Rock Face	13,892	Multi-Story	3,925	28%
Rock Face	13,892	Other	1,437	10%
Rock Face	13,892	Stand Initiation	29	0%
Rock Face	13,892	Stem Exclusion	1,880	14%
Rock Face	13,892	Temporarily Unsuitable-10	2,200	16%
Rock Face	13,892	Temporarily Unsuitable-20	4,421	32%
Savenac	16,752	Multi-Story	7,360	44%
Savenac	16,752	Other	3,448	21%
Savenac	16,752	Stand Initiation	600	4%
Savenac	16,752	Stem Exclusion	4,934	29%
Savenac	16,752	Temporarily Unsuitable-10	92	1%
Savenac	16,752	Temporarily Unsuitable-20	318	2%
Scapegoat	31,631	Multi-Story	11,555	37%
Scapegoat	31,631	Other	2,701	9%
Scapegoat	31,631	Stand Initiation	1,395	4%
Scapegoat	31,631	Stem Exclusion	1,878	6%
Scapegoat	31,631	Temporarily Unsuitable-10	680	2%
Scapegoat	31,631	Temporarily Unsuitable-20	13,422	42%
Superior	19,483	Multi-Story	9,439	48%
Superior	19,483	Other	1,978	10%
Superior	19,483	Stand Initiation	634	3%
Superior	19,483	Stem Exclusion	3,055	16%
Superior	19,483	Temporarily Unsuitable-10	4,025	21%
Superior	19,483	Temporarily Unsuitable-20	352	2%
Thompson	14,926	Multi-Story	5,046	34%
Thompson	14,926	Other	2,721	18%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Thompson	14,926	Stand Initiation	740	5%
Thompson	14,926	Stem Exclusion	6,331	42%
Thompson	14,926	Temporarily Unsuitable-10	24	0%
Thompson	14,926	Temporarily Unsuitable-20	64	0%
Trout	24,010	Multi-Story	12,330	51%
Trout	24,010	Other	3,368	14%
Trout	24,010	Stand Initiation	239	1%
Trout	24,010	Stem Exclusion	2,702	11%
Trout	24,010	Temporarily Unsuitable-10	2,968	12%
Trout	24,010	Temporarily Unsuitable-20	2,403	10%
Twelvemile	11,010	Multi-Story	6,416	58%
Twelvemile	11,010	Other	1,544	14%
Twelvemile	11,010	Stand Initiation	195	2%
Twelvemile	11,010	Stem Exclusion	1,039	9%
Twelvemile	11,010	Temporarily Unsuitable-10	718	7%
Twelvemile	11,010	Temporarily Unsuitable-20	1,099	10%
U Ninemile Siegel	22,452	Multi-Story	11,227	50%
U Ninemile Siegel	22,452	Other	4,178	19%
U Ninemile Siegel	22,452	Stand Initiation	1,288	6%
U Ninemile Siegel	22,452	Stem Exclusion	2,318	10%
U Ninemile Siegel	22,452	Temporarily Unsuitable-20	3,441	15%
Upper Lolo	35,163	Multi-Story	11,810	34%
Upper Lolo	35,163	Other	9,049	26%
Upper Lolo	35,163	Stand Initiation	2,666	8%
Upper Lolo	35,163	Stem Exclusion	9,558	27%
Upper Lolo	35,163	Temporarily Unsuitable-10	191	1%
Upper Lolo	35,163	Temporarily Unsuitable-20	1,888	5%
Upper Prospect	14,436	Multi-Story	10,307	71%
Upper Prospect	14,436	Other	2,830	20%
Upper Prospect	14,436	Stand Initiation	84	1%
Upper Prospect	14,436	Stem Exclusion	1,092	8%

lynx analysis units NAME	Total Mapped Lynx Habitat (ac)	Structural Stage	Structural Stage Acres	Percent Structural Stage
Upper Prospect	14,436	Temporarily Unsuitable-20	123	1%
W Fork Fish	24,283	Multi-Story	6,210	26%
W Fork Fish	24,283	Other	3,984	16%
W Fork Fish	24,283	Stand Initiation	1,037	4%
W Fork Fish	24,283	Stem Exclusion	5,079	21%
W Fork Fish	24,283	Temporarily Unsuitable-10	2,851	12%
W Fork Fish	24,283	Temporarily Unsuitable-20	5,122	21%
W Fork Fishtrap	12,853	Multi-Story	3,140	24%
W Fork Fishtrap	12,853	Other	1,987	15%
W Fork Fishtrap	12,853	Stand Initiation	578	4%
W Fork Fishtrap	12,853	Stem Exclusion	6,343	49%
W Fork Fishtrap	12,853	Temporarily Unsuitable-10	692	5%
W Fork Fishtrap	12,853	Temporarily Unsuitable-20	113	1%
Welcome Alder	23,486	Multi-Story	5,988	25%
Welcome Alder	23,486	Other	3,338	14%
Welcome Alder	23,486	Stand Initiation	928	4%
Welcome Alder	23,486	Stem Exclusion	8,471	36%
Welcome Alder	23,486	Temporarily Unsuitable-10	2,377	10%
Welcome Alder	23,486	Temporarily Unsuitable-20	2,384	10%
Wilkes	9,768	Multi-Story	4,215	43%
Wilkes	9,768	Other	2,637	27%
Wilkes	9,768	Stand Initiation	494	5%
Wilkes	9,768	Stem Exclusion	2,126	22%
Wilkes	9,768	Temporarily Unsuitable-10	48	0%
Wilkes	9,768	Temporarily Unsuitable-20	248	3%
Wyman	9,835	Multi-Story	754	8%
Wyman	9,835	Other	1,107	11%
Wyman	9,835	Stand Initiation	88	1%
Wyman	9,835	Stem Exclusion	895	9%
Wyman	9,835	Temporarily Unsuitable-20	6,990	71%

Appendix D. MON-WLF-04: Grizzly Bear

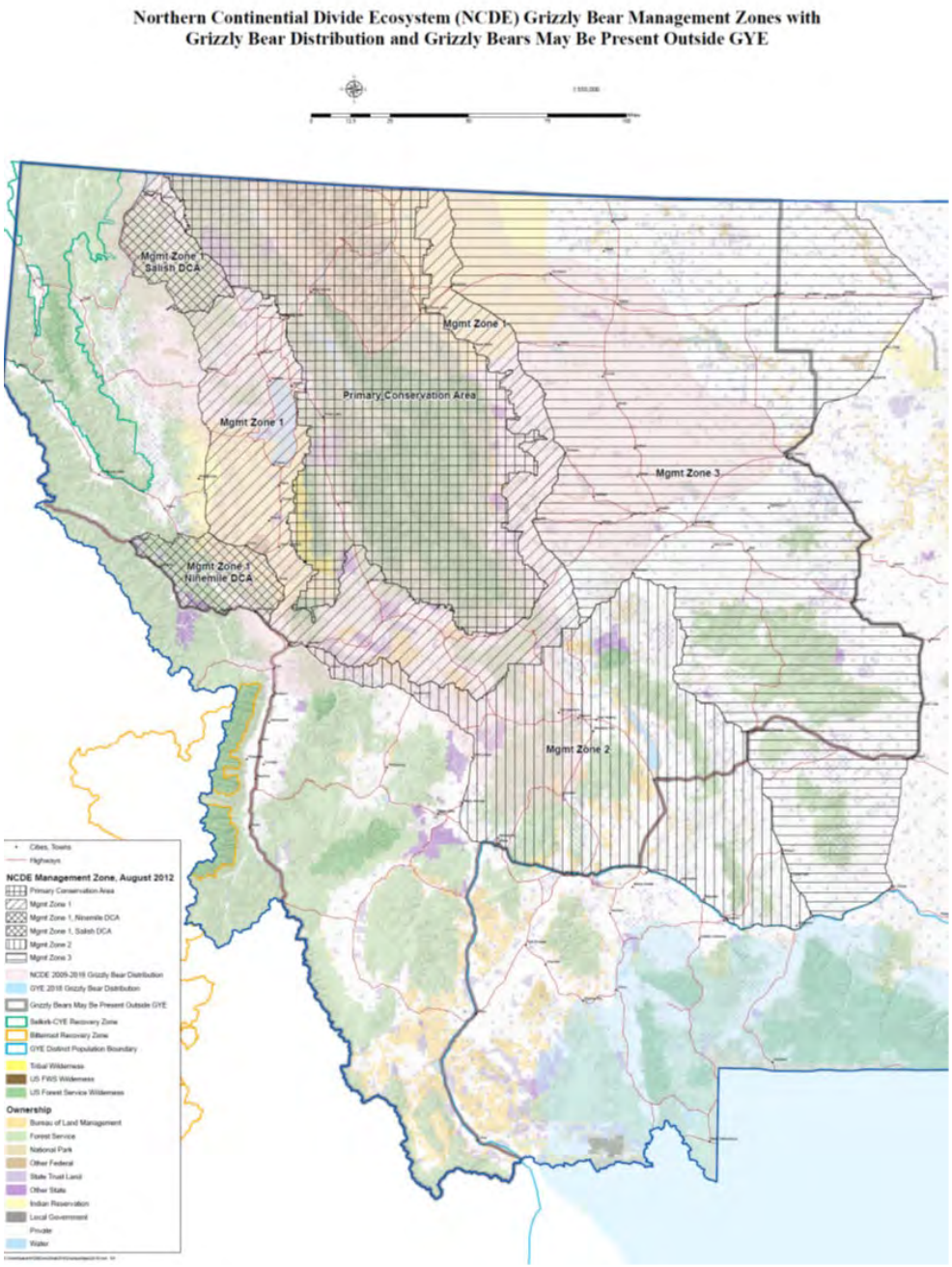

Figure 32. MON-WLF-04: NCDE Conservation Strategy Zones, Western Montana.

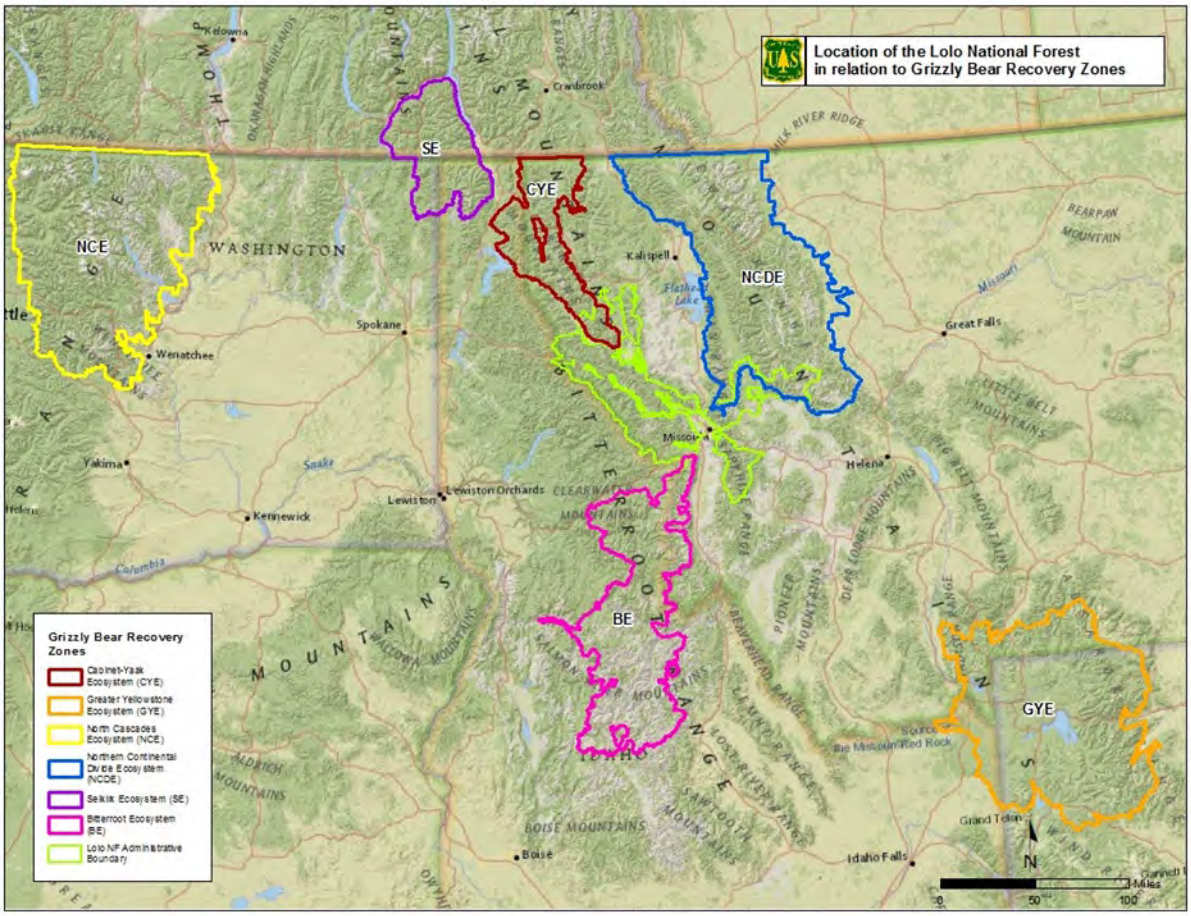

Figure 33. MON-WLD-04: Grizzly bear recovery areas and Lolo National Forest.

Appendix E. MON-REC-03: Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13 on the Lolo National Forest, 2008 to 2021.

Table 177. MON-REC-03: Activities in Inventoried Roadless Areas as provided for in 36 CFR 294.12 and 294.13 on the Lolo National Forest, 2008 to 2021. * Indicates more than one exception applied to the same acres of treatment in IRA. Acres are approximated.

Project Name	Roadless Area	Type of activity	Acres	Exception(s) Applied	NEPA Decision	Substantially altered" harvest acres: 294.13(b)(4)	Ecosystem comp and structure harvest acres: 294.13(b)(1)(ii)	Improve T&E, proposed, or sensitive species habitat: 294.13(b)(1)(i)	Incidental harvest acres: 294.13(b)(2)
Game Range	Cube Iron-Silcox Roadless Area (01784)	Rx burning and timber harvest	580	294.13(b)(1)(ii)	1/1/2008	0	580	0	0
Dry Cherry EMB	Cherry Peak (01791), Mount Bushnell (01790)	Rx burning and timber harvest	1327	294.13(b)(1)(ii) and 294.13(b)(2)	1/1/2010	0	927 of the total 1327	0	1327
South Fork Fish	Burdette (01803) and Hoodoo (01301)	Non-commercial veg. treatments and Rx burning	2030	294.13(b)(1)(ii)	3/5/2010	0	2030	0	0
Quartz Haugen PCT	Marble Point (01798), Stark Mountain (01800)	Thinning	119	294.13(b)(4)	1/17/2010	119	0	0	0

Project Name	Roadless Area	Type of activity	Acres	Exception(s) Applied	NEPA Decision	Substantially altered" harvest acres: 294.13(b)(4)	Ecosystem comp and structure harvest acres: 294.13(b)(1)(ii)	Improve T&E, proposed, or sensitive species habitat: 294.13(b)(1)(i)	Incidental harvest acres: 294.13(b)(2)
Clear Creek	Clear Creek (X1812)	Reroute 2000 feet of trail and Rx burning	96	294.13(b)(2)	09/02/2014	0	0	0	96
Antimony	Maple Peak (01141)	Slash small diameter conifers	*61	294.13(b)(1)(i), (ii), and 294.13(b)(2)	07/30/2012	0	61	61	61
Rennic Stark	Stark Mountain (01800)	Non-commercial veg treatment with incidental slashing for burning	2813	294.13(b)(1)(ii)	3/22/2013	0	2813	0	0
Cedar-Thom	Sheep Mountain-Stateline (01799), Meadow Ck-Upper North Fork (01302)	Commercial timber harvest on 1145 acres, Non-commercial treat. On 230 acres, and Rx burning on 6380 acre	1305	294.13(b)(1)(ii); 294.13(b)(4)	02/25/2015	All but 203 of 1145 acres of timber harvest.	1145	0	0
Cutoff	South Seigel-South Cutoff and Patrick's Knob Cutoff	Rx burning and pre-slashing	7077	294.13(b)(1)(ii) and (2)	06/09/2010	0	323	0	7077

Project Name	Roadless Area	Type of activity	Acres	Exception(s) Applied	NEPA Decision	Substantially altered" harvest acres: 294.13(b)(4)	Ecosystem comp and structure harvest acres: 294.13(b)(1)(ii)	Improve T&E, proposed, or sensitive species habitat: 294.13(b)(1)(i)	Incidental harvest acres: 294.13(b)(2)
Ninemile Divide EMB	Stark Mountain (01800)	Rx Burning and incidental cutting of trees	1200	294.13(b)(2)	05/31/2019	0	0	0	1200
Lost Creek Meadows Restoration	Sheep Mountain-Stateline (01799)	Slash small diameter conifers in historic meadow habitat	39	294.13(b)(1)(ii)	07/13/2007	0	39	0	0
Spruce Creek Daylighting	Cube Iron-Silcox (01784)	Slash small diameter conifers around whitebark and white pine.	48	294.13(b)(1)(i) and(ii) – both exemptions used concurrently on the total 48 acres of treatment	04/05/2017	0	48	48	0
Jam Cracker Ecosystem Management	Stark Mountain (01800)	Rx burning on 3200 acres and non-commercial mech. vegetation treatment (whitebark pine daylighting) on 73 acres	3273	294.13(b)(1)(ii) and 294.13(b)(2)	05/22/2017	0	73	0	3200