Biological Assessment for Whitebark Pine

Gold Butterfly Project

Bitterroot National Forest

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Introduction

Threatened, endangered, and proposed species are managed under the authority of the Federal Endangered Species Act (PL 93-205, as amended) and the National Forest Management Act (PL-940588). Under provisions of the Endangered Species Act (ESA), federal agencies shall use their authorities to carry out programs for the conservation of listed species, and shall ensure that any action authorized, funded, or implemented by a federal agency is not likely to (1) adversely affect listed species or designated critical habitat, (2) jeopardize the continued existence of a proposed species, or (3) adversely modify proposed critical habitat (16 USC 1536).

The purpose of this biological assessment (BA) is to analyze the potential impacts of implementing the proposed *Gold Butterfly Project* for the Bitterroot National Forest (BNF) in sufficient detail to determine the extent to which implementation of the project may affect whitebark pine (*Pinus albicaulis*), a species recently proposed as threatened (Federal Register pp. 77407-77424). This BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act ((ESA); 16 U.S.C. 1536 (c)), and follows the standards established in the Forest Service's National Environmental Policy Act (NEPA) and ESA guidance. The federally designated terrestrial species have been analyzed in separate documents.

Federally Designated Species

In accordance with section 7(c) of the Endangered Species Act (ESA), the U.S. Fish and Wildlife Service (USFWS) has determined that the following federally designated species is present on the Bitterroot National Forest as of 2 December 2020:

Table 1. Federally designated plant species on the Bitterroot National Forest

Common Name	Scientific Name	Status	Distribution in Planning Area
Whitebark pine	*Pinus albicaulis*	Proposed	Throughout the Bitterroot NF. Forested areas in western/central Montana, in high-elevation, upper montane habitat near treeline.

Consultation Requirements

In accordance with the ESA and its implementing regulations and FSM 2671.4, the Bitterroot National Forest is required to request written concurrence with the U.S. Fish and Wildlife Service (USFWS) with respect to the determination of potential effects on listed or proposed species.

The USFWS Wyoming Field Office (lead office) published consultation recommendations for federal projects that may affect whitebark pine (USDI Fish and Wildlife Service 2020). The recommendations include exceptions under Section 4(d) of the Endangered Species Act to allow for forest activities that can advance whitebark pine conservation. This project and assessment comply with these recommendations and guidance.

The findings of this assessment are based on the best data and scientific information available at the time of preparation. A revised assessment must be prepared if: 1) new information reveals effects that may impact threatened, endangered, or proposed species or their habitats in a manner or to an extent not considered in this assessment; 2) the proposed action is subsequently modified in a manner that causes an effect that was not considered in this assessment; or 3) a new species is listed or habitat identified that may be affected by the action.

Description of Proposed Action

The Bitterroot National Forest is proposing a vegetation management and fuels reduction project in the Sapphire Mountains east of Corvallis between St. Clair and Burnt Fork Creeks.

This project is proposed under Healthy Forests Restoration Act (HFRA; 16 USC §6591) authority. The project area lies within Designated Areas that were requested by the Governor of Montana and designated by the Secretary of Agriculture.

The HFRA has several titles that apply to the project:

- Title I provides for hazardous fuels reduction on Federal land.
- Title IV provides for systematic information gathering and research on applied silvicultural treatments to address the effects of insects, disease, and their interactions on forests.
- Title VI provides for the designation of insect and disease treatment areas to increase forest resilience to insect or disease infestations.

HFRA Section 603 requires the Forest Service to facilitate collaboration among State and local governments, Indian Tribes, and interested persons to encourage meaningful public participation during the preparation of the project. For this project, collaboration with the Bitterroot Restoration Committee, Ravalli County Collaborative, and involvement of Indian Tribes, agencies, and other interested parties has occurred and is continuing.

Analysis and documentation has been carried out in accordance with Section 602(d) of HFRA. Projects within the Designated Areas must "reduce the risk of, or increase the resilience to, insect or disease infestation" (602(d)(1)).

Commercial Treatments

In order to meet project objectives, it is often necessary to remove trees across a range of diameters. For example, an overstocked mature yet otherwise healthy Douglas-fir stand may need a reduction in tree density in order to free up growing space for the remaining trees, making them less susceptible to future bark beetle attacks. Another goal is to reduce the presence of severe Douglas-fir dwarf mistletoe infestations; proposed units targeting mistletoe often have trees in a range of diameter classes infected. Also, timber harvest reduces fuels by decreasing canopy density and often increasing the height to live crown and promoting fire-resistant species and individual trees. Removing commercial-sized trees for such reasons also contributes to the goal of supplying forest products to the public.

Generally, any tree over seven inches in diameter at breast height (DBH) has potential as a commercial product such as sawtimber, firewood, or pulp. If a silvicultural prescription requires the removal of trees with commercial potential, there is a financial incentive to make them available for sale. First, because a contractor is paying to remove the trees, there is no direct cost to the government for their removal. Second, the revenue generated may cover some or all of the costs associated with implementing other project activities which do not generate revenue, such as prescribed burning or road improvements. Thus, commercial timber harvest is one tool that may be used to achieve a wide range of objectives.

The term commercial timber harvest refers to the removal of a product in exchange for payment. This is typically done with a timber sale contract or a stewardship contract. The Gold Butterfly project is expected to yield several commercial contracts, both traditional timber sale and stewardship.

Clearcut with Reserve Trees

This type of regeneration harvest removes most of the overstory, but some reserve trees remain for snags or forest structure. Some or all slash would be left in the units to facilitate prescribed burning, and the units would be planted following burning.

Clearcutting is proposed in stands that can no longer be managed or maintained in a healthy state through other silvicultural treatments. For example, Douglas-fir stands with heavy dwarf mistletoe infestations that cannot be carried into the future in a healthy state are proposed for a clearcut with reserve tree treatment. In these stands, ponderosa pine and mistletoe-free Douglas-fir will be retained as reserve trees. Another example is over mature, dead, and dying lodgepole pine stands; reserve trees would include mistletoe-free Douglas-fir. A third example is in mixed conifer stands where the treatment objective is designed to promote whitebark pine regeneration, such as units 76, 82, and 93; reserve trees would include mature whitebark pine.

Seed Tree Cut

With this type of regeneration harvest much, but not all, of the overstory is removed. Well-distributed, healthy, seed-producing reserve trees would be left to provide a seed source for the establishment of a new age class. Some or all slash would be left in the units to facilitate prescribed burning. These areas may need to be planted if a sufficient natural seed source cannot be ensured.

This treatment is proposed in mixed conifer units that are experiencing insect and disease activity, most commonly dwarf mistletoe infestations and western spruce budworm defoliation, and have an objective to feature a new age-class of a desired species. Reserve trees would include remnant ponderosa pine and healthy mistletoe free Douglas-fir, and mature whitebark pine. The objective of this treatment is similar to a clearcut, but these stands generally have a larger presence of ponderosa pine aiding in natural regeneration in stands infected with dwarf mistletoe.

Shelterwood Cut

This is another type of regeneration harvest in which more of the overstory is retained than in the treatments discussed above. The goal is to create a new age class via natural regeneration. Overstory reserve trees are retained in a variety of densities, to provide a cooler microclimate to facilitate regeneration. Due to the current condition of the stands found in the project area, the shelterwood cut treatment units will vary in residual tree density. The residual stand may be an irregular in nature with a combination of variable density thinning and small openings determined tree health and resilience to insects, disease and fire. Some areas may need to be planted if a sufficient natural seed source cannot be ensured. Slash would be yarded out attached to trees (whole-tree), and prescribed burning would occur following harvest.

This treatment is proposed in overstocked stands of pure Douglas-fir, or Douglas-fir mixed with other species such as lodgepole and subalpine fir.

Group Selection

This type of harvest would create openings for regeneration in mostly even-aged, mature Douglas-fir stands. Openings would vary in size and create a mosaic of age and size classes across the treated area; areas between openings would not be treated. Slash would be whole-tree yarded, and prescribed burning would occur following harvest.

Openings Greater than 40 Acres

In some cases the regeneration harvest, described above, will form forest openings greater than 40 acres. These may be individual treatment units or separate treatment units that are contiguous. Table 2.2-2 displays the number and size of openings greater than 40 acres by alternative.

The long-term goal of creating openings over 40 acres in size is a landscape with greater heterogeneity in forest stand cover type and size class distribution, increasing resiliency and biological diversity. Units with widespread disease problems need to be treated on a larger scale to be effective at the landscape level because mistletoe is so widely distributed. Another long-term goal is to create a mix of opening sizes exhibiting a variety of fuel models and fuel loads in mixed fire regimes across the landscape.

Table 2: Summary of Openings Greater than 40 Acres, by Alternative

	Alternative 2	Alternative 3
Number of openings >40 acres	14	10
Minimum size (acres)	46	40
Maximum size (acres)	262	87
Average size (acres)	111	54
Total acreage	1552	544
Number of treatment units contributing	36	18

Intermediate Harvest

Intermediate treatments proposed include commercial thinning, improvement cutting, and sanitation. The goal is generally to free up growing space and retain the healthiest trees, without freeing up enough growing space for regeneration to occur.

Commercial Thin

In the project area, commercial thinning focuses on reducing density in plantations with trees that have reached commercial size. A variable spacing is used to reduce stocking and redistribute growing space to the best trees in the unit. Slash would be whole-tree yarded, and prescribed burning would not occur.

Sanitation

Sanitation focuses on removal of overstory Douglas-fir that is infected with dwarf mistletoe. The stands proposed for sanitation have an understory of ponderosa pine and Douglas-fir that would also be thinned commercially. Slash would be whole-tree yarded, and prescribed burning would not occur so as not to damage the understory.

Improvement

The overall goal of improvement harvest is to reduce density, open the canopy, and favor the development of the healthiest and largest trees to increase resistance and resilience to fire, insects and disease. This method would be applied to Douglas-fir and ponderosa pine stands that are overstocked but not necessarily experiencing widespread insect and disease issues at present. These units would be whole-tree yarded and underburned.

Non-Commercial Treatments

Most non-commercial vegetation treatments will be accomplished through service contracts in which the Forest Service pays a private business to accomplish work. In some cases forest service personnel, such as fire crews, may be used to accomplish work such as thinning, piling, and burning.

Non-Commercial Thinning Following Commercial Harvest

Commercial harvest units will be assessed following completion of logging to determine additional non-commercial treatment needs prior to burning (if applicable); these may include, but are not limited to, slash-pull back from leave trees, thinning, or slashing of smaller diameter conifers.

Plantation Thinning

Plantations containing smaller diameter trees would be thinned by hand to reduce density and increase growing space for the healthiest, dominant trees. Slash would be lopped and scattered, unless a fuel hazard would result, in which case slash would be hand-piled within the unit and burned.

Mechanical Thinning / Fuels Reduction

This treatment is being applied to plantations (many of them terraced) that cannot be accessed with modern logging systems. These slopes are generally steeper than 40% and not accessible by ground-based or skyline equipment. They would be treated with a steep-slope feller-buncher with a masticating head, or similar equipment. Trees to be thinned would be ground into chips and chunks and left on-site.

Tree Planting

Tree planting is planned in regeneration harvest units (clearcut, seed-tree, shelterwood, and group selection), if sufficient natural regeneration cannot be ensured. These units will be examined two years following harvest to determine natural seedling density and species composition. If natural means is insufficient, then the site would be planted with species determined by aspect and elevation. Seedlings to be planted will be grown from local stock.

Meadow Restoration

These units are grasslands infested with knapweed and cheat grass and, in some areas, encroached on with conifers. Generally, the treatment is herbicide and biocontrol agents applied to reduce invasive plant populations. Once invasive plant treatments have been determined effective, encroaching conifers will be felled, lopped, and scattered and the units may be underburned. The process may take several years to complete for each unit.

Prescribed Fire Following Commercial Harvest

Many stands proposed for treatment would experience significant mortality if they were subjected to fire without some pre-work. Most commercial and non-commercial treatments will reduce the amount and arrangement of fuels to allow for a low intensity fire to burn through a stand, under desirable conditions, with an acceptable level of mortality. Some combination of timber harvest and non-commercial treatments, prior to prescribed fire, will reduce ladder fuels, decrease canopy density, and promote fire-resistant species and individual trees. Prescribed fire, the final component of the treatment, would reduce surface fuels left behind.

Maintenance Burn

Maintenance burns are low intensity burns designed to mimic historically more frequent low intensity wildfire to maintain fire on the landscape, reduce fuels, and enhance native vegetation such as fire adapted grasses, forbs and shrubs. This would occur without pre-fire treatments, such as timber harvest or non-commercial thinning. These are currently open forest stands or grasslands that would benefit from underburning without pre-work.

Whitebark Pine Daylighting

These units include various natural stands and plantations with a component of whitebark pine that will be daylighted; this involves removing competing conifer trees from within a certain radius of whitebark pine trees.

Units 86, 119, and 120 will feature a research project that will assess the effectiveness of daylighting on whitebark pine. These units will receive some combination of burning and daylighting, as well as have a control established.

The remaining (non-research) whitebark pine daylighting units will not be underburned following treatment. Excessive slash will be hand piled and burned.

Regeneration Harvest

Regeneration harvest removes enough of the overstory of an existing stand to free up sunlight and other resources, allowing for the regeneration of new trees in the understory. Regeneration harvest types in Gold Butterfly includes clearcut, seed tree, shelterwood, and group selection. Alternative 2 has 2,138 acres and Alternative 3 has 987 acres of regeneration harvest.

The objectives of regeneration harvest (clearcut with reserves, seed tree and shelterwood) with leave trees are:

- Restoration of whitebark pine by removing competing species and planting with rust resistant whitebark pine
- Create ecosystem resilience into the future under climate change by reducing competition in whitebark pine units
- Increase ponderosa pine –dominated old growth stands by reducing susceptibility to mortality caused by intense competition for moisture thereby decreasing susceptibility to insects and disease; old growth stands composed mainly of Douglas-fir are severely impacted by mistletoe or Douglas-fir bark beetles and are not sustainable old growth for the long term.

Regeneration harvest-type of treatments are proposed in units that need to be “reset” based on the health of the stand, stand composition and current lack of resiliency to insects and disease. Many units are predominately Douglas-fir have 90% or greater infection of mistletoe and have stand ages ranging from 80 -200 years old that are proposed for treatment. Other units proposed are in alignment for whitebark pine restoration and reducing effects from mountain pine beetle.

Units dominated by lodgepole pine that are classed late seral are at high risk to mountain pine beetle and ages range from 100-120 years old. Many of the trees that are characterized as late seral are currently not sustainable or long-lived, because of their decline due to insect and disease effects.

Table 3. Summary of vegetation treatment acres by alternative.

Activity	Alt 2	Modified Alt 2 (Selected Alternative)	Alt 3
TOTAL COMMERCIAL HARVEST	5621	5461	3342
Clearcut with Leave Trees	747	531	333
Shelterwood	768	653	388
Seed Tree	270	172	111
Group Selection	296	296	156
Commercial thin	765	765	635
Sanitation	517	517	431
Improvement	2258	2527	1289
TOTAL NON-COMMERCIAL	7130	7238	3228
Plantation Thinning	427	427	360
Mechanical Thinning / Fuel Reduction	64	64	64
Planting	2198	2198	1048
Non-commercial thinning associated with timber harvest units	3580	3580	938
Meadow Restoration	84	84	57
Whitebark pine Daylighting	777	885	761
TOTAL PRESCRIBED FIRE	4854	4854	2581
Prescribed fire associated with commercial harvest	4440	4440	2276
Maintenance Burn	414	414	305
TOTAL AREA TREATED[1]	**7376**	**7376**	**4888**

[1]Total Area Treated is not the sum of total commercial harvest, total non-commercial thinning, and total prescribed fire because treatments overlap between these categories. In other words, several types of treatment occur in the same units.

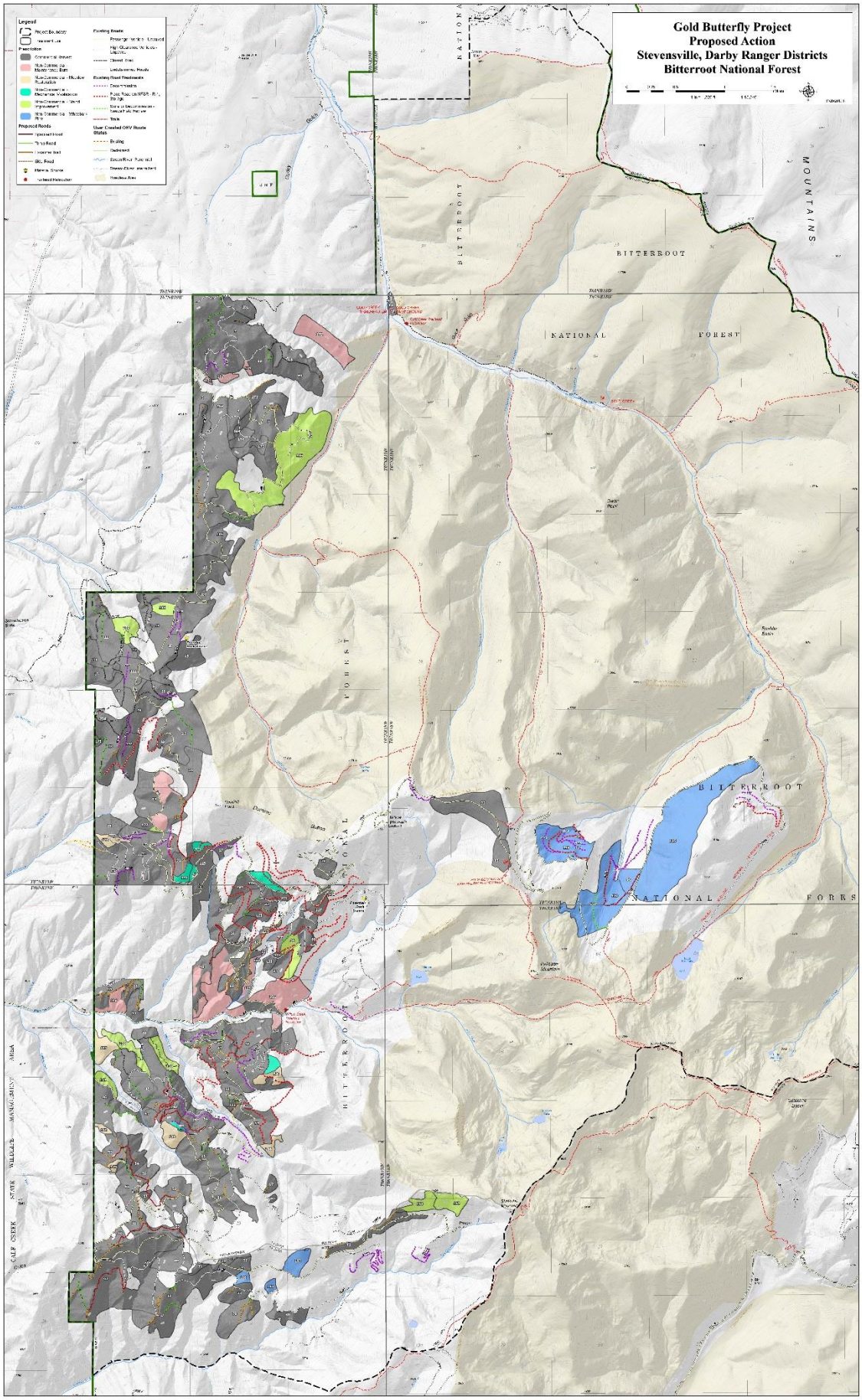
Project Description

The Gold Butterfly project area includes 55,147 acres of National Forest System (NFS) lands and is located within Ravalli County east of Corvallis, Montana in the Sapphire Mountains on the Bitterroot National Forest. There are 780 acres of private land within the project area boundary. The project area includes a portion of the Stony Mountain Roadless Area, however, no treatment activities will occur within specially designated areas (e.g., Research Natural Areas, Inventoried Roadless Areas, or Wilderness) or other ownerships.

The project is entirely within Ravalli County, Montana and the legal description of the areas proposed for treatment is:

- Township 6 North, Range 18 West, Sections 4, 17-20;
- Township 6 North, Range 19 West, Sections 1, 2, 10-15, 22-28;
- Township 7 North, Range 18 West, Sections 6, 26, 27, 29-34;
- Township 7 North, Range 19 West, Sections 1, 2, 11, 12, 14, 22, 23, 26, 27, 34-36;
- Township 8 North, Range 18 West, Section 31

The project is on the east slope of the Sapphire Mountains, which drain into the Bitterroot River, a tributary to the Clark Fork River. The primary drainages, tributary to the Bitterroot River, in the project area include the Burnt Fork of the Bitterroot, Willow Creek, and St. Clair Creek.


Gold Butterfly Project
Proposed Action
Stevensville, Darby Ranger Districts
Bitterroot National Forest
BITTERROOT
NATIONAL
FOREST
MOUNTAINS

Project Design Features:

Rare Plants

- If whitebark pine is found in any treatment units, trees 3" diameter at breast height or greater, would be avoided to the extent possible. All healthy and reproducing populations (cone-bearing or mature trees) of whitebark pine are to be avoided during vegetation management activities; unless it is to specifically benefit the species and discussed with a Forest Service Botanist. Mature cone bearing and trees showing rust resistance should be preserved. Whitebark pine (Pinus albicaulis) will be maintained and/or promoted in all stands where it occurs. Damage to existing whitebark pine individuals will be minimized to the extent possible.

Methodology

Spatial & Temporal Scale

The spatial context for the analysis of direct and indirect effects includes Forest Service lands within the project area with a focus on treatment units and associated activities because impacts to rare plants are more likely to occur where project treatments are planned. The cumulative effects analysis spatial bounds are the same as for direct/indirect effects.

The temporal context immediately follows treatment until recovery of disturbances caused by project activities, up to 10 years post treatment. The comparison of effects is based on the existing condition, which reflects the culmination of effects from past management. The recovery of individual plants and populations after disturbance is species-specific and may depend on the disturbance type and its effects to the microsite, the tolerance of the species to disturbance, and the species rooting characteristics (i.e. rhizomes, taproots, bulbs, and corms). Following project implementation, vegetation conditions may be suitable for some rare plant species to become established or expand their populations, while other species may take between 50 and 100 years before the tree and shrub canopy cover conditions that provide suitable habitat.

Sources, Methods, and Assumptions

Montana Natural Heritage Program database, aerial photographs, spatial information, and Bitterroot National Forest records were reviewed to identify known rare plant populations in or near the proposed project area. The project area was also surveyed for habitat that might be suitable for rare plant species. This document was based on this data and a table was compiled showing rare plant species and habitat that were known to occur within the project area or had the potential to occur in the area.

This document was prepared based on presently available information. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact rare plants in a manner or to an extent not previously considered, a new or revised Biological Evaluation may be required.

Species Assessment

As of December 2, 2020, the U.S. Fish and Wildlife Service (Service) has proposed to list the whitebark pine (*Pinus albicaulis*) as a threatened species under the Endangered Species Act (ESA) and opened a 60-day public comment period to help inform future conservation of the species (Federal Register pp. 77407-77424). The proposed listing is based on the results of a rigorous Species Status Assessment involving review of the best available science (USDI, 2018). White pine blister rust, a non-native fungal disease, is harming native whitebark pine trees across the American West. Mountain pine beetles, altered wildfire patterns, and climate change are also negatively affecting the species' health. These factors led scientists to conclude that after decades of decline, an estimated 51% of all standing whitebark pine trees were dead as of 2016. The Service

determined it is not prudent to designate critical habitat for whitebark pine because neither habitat loss nor range restriction are a threat to this species' continued survival.

This proposal includes a "4(d) rule" authorized under section 4 of the ESA, which allows the Service to tailor the protections and prohibitions pertinent to the specific conservation needs of a threatened species.

The proposed 4(d) rule would provide the following protections for whitebark pine:

- Prohibit removing, cutting, digging up, damaging, or destroying whitebark pine on Federal lands.
- Prohibit whitebark pine import, export, and activities related to interstate and foreign commerce.

The 4(d) rule also includes exceptions to the proposed ESA protections to allow for optimal, flexible, and adaptive forest activities that can advance whitebark pine conservation now and in the future. Specifically, Federal forest management, restoration, and research related activities are excepted.

- As no forest management, restoration, or research-related activities are known to pose any threat to the whitebark pine in any form, we purposefully do not specify in detail what types of these activities are included in this exception, or how, when, or where they must be conducted, as long as they are conducted or authorized by the appropriate Federal agency.
- The exception is intended to allow Federal land management agencies to continue managing the forest ecosystems where the whitebark pine occurs and to continue conducting restoration and research activities that benefit the species.
- It is anticipated the proposed 4(d) rule would not limit grazing in any way.

Existing Condition

Whitebark pine is a long-lived species that is commonly found as a major seral species on upper alpine sites. The average lifespan is 400 years with the oldest tree recorded near 1300 years (Keane and Parsons 2010). At the highest forest elevations or alpine sites, whitebark persists as a climax species in a krummholz form (Keane and Parsons 2010, Arno 2001, Tomback et al. 2011). At its lower elevations, whitebark competes with lodgepole pine. The species generally occurs within a narrow elevation range (Tomback et al. 2011). Whitebark pine starts producing cones at age 30 to 60, but a quality cone crop is dependent upon good canopy volume which occurs between 125 and 250 years of age. Cone crop frequency is about every 3 to 5 years (Keane et al. 2012). Clark's nutcracker, the primary seed dispersal mechanism for whitebark, can transport and cache seeds 30 kilometers (Lorenz et al. 2011). Each bird can cache thousands of whitebark pine seeds per year. Nutcrackers select cache sites with distinctive landscape features, often patches of open or recently burned forest where the ground is readily visible. Uneaten seeds cached in favorable habitat can sprout and begin the next generation of whitebark pine trees.

Fire, ranging from small and isolated to large and stand-replacing, is the primary disturbance factor in this forest community that renews the species. Mixed-severity fire, occurring at 60 to 300-year intervals, is the most common whitebark pine fire regime that creates a diverse landscape pattern favorable for whitebark establishment. In the absence of fire, whitebark pine is eventually replaced by shade-tolerant species (Keane and Parsons 2010; Keane et al. 2012). Based on information provided to the U.S. Fish and Wildlife Service, the primary stressor driving the status of the whitebark pine is white pine blister rust, a fungal disease caused by the nonnative pathogen *Cronartium ribicola*. Whitebark pine is also impacted by the mountain pine beetle (*Dendroctonus ponderosae*), altered fire regimes, and the effects of climate change (Federal Register 2020). Along with the summarized information above, the Species Status Assessment represents a robust assemblage

of scientific data and is hereby incorporated by reference (USFWS 2018).

Roughly 98% of the range for whitebark pine occurs on public lands in the United States (Schwandt 2006). Region 1 of the US Forest Service is mapped as having over 5 million acres of whitebark pine (USDA Forest Service 2010a). Data gathered by FIA (Forest Inventory and Analysis) show a reduction in the extent of live whitebark pine within the region, as well as an increase in dead whitebark pine trees (USDA Forest Service 2010a). Whitebark pine was found in elevations from 5,500-8,040 ft.

The project area was partially surveyed in 2012, 2013, 2016, and 2017 for rare plant and invasive plant species by the Forest Botanist and Botany Technicians.

The surveys that were conducted confirmed the presence of whitebark pine in the project area. Whitebark pine habitat is scattered throughout the project area. Within the project area, whitebark pine was found in the northern, eastern, and southern portion of the project area. With the majority of the species found in the eastern and southern portion of the project area.

Varying age classes have been found so far. Cone bearing trees have been located in eastern and southern portions of the project area. Over a thousand trees have been found within the project area. Blister rust was documented in some populations. Many healthy trees were also noted and found within the project area.

Table 4. Resource indicators and measures for whitebark pine (WBP) management (specific details about the conditions of units and WBP populations for each unit are found, in the Botany BE, in the Project file).

Unit(s)	Current conditions	Current Whitebark Pine (WBP populations)	Proposed Management and affects	Whitebark Pine Protection Measures
5, 72	The unit is dense with conifer species. WBP is being encroached by other conifers.	Individual WBP were found were found in the units.	Commercial treatment would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate to high severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid any clumps of WBP within the unit.
6, 10, 55	Much of the units appear to be large areas of dense, regenerating conifer.	Very few young WBP were found in the units.	Elevation is too low for the range for this species so there would be no long-term benefit for WBP in this unit.	Avoid the few populations of WBP within the unit. Avoid hand piling in the unit.
7, 59, 90,103, 107	These units had dense conifer and areas in the units that have openings.	Very few WBP were found in the units. All WBP found in the units were under 9ft tall.	Elevation is too low for the range for this species so there would be no long-term benefit for WBP in this unit.	Avoid the few WBP within the unit.
63, 71	Dense lodgepole pine stands	Young and cone-bearing WBP were found in the units	Commercial treatment would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate to high severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid the mature WBP trees.

66	Dense stands mostly of doug fir infested with spruce budworm.	One young WBP was found in the unit.	This unit is dense and habitat for WBP is very limited. Commercial treatment would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate to high severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid the few WBP within the unit. Avoid hand piling.
58, 62, 75, 76	Dense canopy cover.	Few WBP	Commercial treatment would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid mature WBP in the unit. Avoid hand piling.
77	Dry forest with some openings.	Two cone-bearing WBP were found in the unit.	Commercial treatment would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate to high severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid mature WBP within the unit. Avoid hand piling.
79	Dense lodgepole stands.	This unit had several sites of a mixture of age classes of WBP.	Commercial treatment would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Low to moderate severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid WBP within the unit.
80	Dense conifer stands.	WBP was intermittent and found close to the road in openings. They were also found clumped on ridgelines and slopes.	Elevation is low and would be a good area for seed caches, but not likely to be habitat for individuals to reach maturity in the long term due to climate change. Thinning the unit or creating openings would help to produce caching areas and currently maintain the few cone bearing trees that currently exist.	Avoid WBP within the unit.
82, 86	A lot of subalpine fir in the unit. There is a thick overstory.	Several WBP of many age classes in the unit.	Commercial treatment would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate to high severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid mature WBP. Avoid young WBP when found in openings. Avoid hand piling.
93, 119, 120	There are some openings and dense pockets.	WB of all age classes. Many cone-bearing WBP in the unit.	Thinning the unit and introducing a light to moderate burn would help to keep the young WBP and remove the competition around the WBP population.	Avoid mature WBP. Avoid young WBP when found in openings. Avoid hand piling.
166, 167	The majority of this unit is a lodgeple plantation. This unit has a lot of openings in the plantation as well as around the plantation.	Few WBP were found in the unit. WBP were in larger openings in the unit and were often near the road.	Thinning would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate to high severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid the few WBP individuals in the units. Avoid hand piling in the unit.

183	Dense lodgepole stands with mid to high elevation grassland openings.	Mid to mature WBP were found in the unit. Seed caches found within the unit.	Thinning would help open the stand for future WBP and limit competition from other conifer species and encourage seed caching areas. Moderate to high severity burning would help encourage new seedling establishment and eliminate competition with WBP.	Avoid mature WBP and other individuals in the unit.
75, 76, 160, 161, 185		Surveys are needed in this unit. Mature WBP was seen from the road.		Avoid mature WBP in the unit. Avoid hand piling.

Environmental Consequences

Direct and Indirect Effects

No Action Alternative

Currently whitebark pine is being encroached upon and being outcompeted by conifers. Habitat for this species is limited and reduces as time passes. Current populations are limited in the resources that it needs to thrive to become mature cone bearing trees. This lowers potential seed sources to produce future individuals and populations of whitebark pine. This will continue to cause the species towards a downward trend in populations.

Alternative 2

Fuels Treatment

Whitebark pine habitat historically experienced periodic wildfire. In the moist, warmer parts of its range (including the project area) whitebark pine depends on an occasional fire to kill competing conifers that increase in the absence of fire and to create patches of exposed soil for nutcracker seed caching and seedling establishment (Arno 2001). Historic fires in whitebark pine habitat were commonly mixed-severity, leaving areas of fire-killed forest next to intact forest. This allowed whitebark pine seeds from surviving trees to be dispersed into burned areas and cached by nutcrackers, where the newly open conditions favored whitebark pine seedling establishment (Keane et al 2012). While individual whitebark pine stands might come and go depending on varying degrees of forest succession and wildfire burn patterns, the species persisted on the landscape and, on balance, benefitted from periodic fire. Both prescribed fires and wildfires are an important tool in restoring whitebark pine (Keane et al 2012).

Yet fire readily kills whitebark pine trees, especially in denser forests with abundant woody fuels which are seen in the project area. Prescribed burning under carefully controlled conditions reduces this risk but does not eliminate it (Keane et al 2012). Burning treatment units after logging could kill most of the whitebark pine seedlings there. Sapling of whitebark that are found in the project area may be more susceptible to fire mortality than larger trees because their thin bark is less able to shield the cambium from fire's heat and their branches are closer to the ground. Abundant standing dead and fallen conifer logs in these units also increase the risk that a prescribed burn would be too hot for whitebark pine survival. Consistent with Keane et al (2012), mixed-severity prescribed burns near existing cone-producing whitebark trees, will create patches of fire-killed

forest and bare ground near seed sources that are favorable for nutcracker seed caching and natural whitebark pine regeneration. To reduce large losses of whitebark pine within units, protection measures have been put in place (Table 3).

Commercial and Non-Commercial Treatment

Commercial and non-commercial treatments will likely damage or kill some of the whitebark pine within the treatment stands. For example, logged trees could be inadvertently dropped on the seedlings, or log skidders could drive over them. Whitebark seedlings appear to be somewhat resilient to logging disturbance. Thinning by non-commercial methods have shown to increase growth and health of whitebark pine trees (FS Fire Science Lab Research).

Rust resistant whitebark pine will be planted in units 160 and 161. Although there could be some negative short-term effects, there will be greater long-term benefits for this species.

Road Construction

Individuals would be lost due to road implementation. There are several populations of whitebark that are located on proposed road locations. However, if possible, the proposed roads could be moved so that individuals are not killed.

Cumulative Effects

There are a multitude of past, present and future actions across the Forest that could have limited negative impacts to localized populations of whitebark pine. Activities that will remove or damage individuals or groups of trees include timber harvest, vegetation management, road work, and fire suppression. These activities can result in a loss of individuals or group of trees in a localized area. These localized effects are somewhat small in size when compared to the Bitterroot National Forest at large which contains populations scattered across the forest.

As human populations and development increase in this region, available habitat for rare plants would decrease. Management and treatment activities would continue to occur on private lands where there are no laws or regulations to govern management of listed species, although plant species on federal lands would continue to be protected and conserved following policy and management guidelines. Populations on non-federal lands would most likely remain undetected and unprotected because there are no laws governing rare plants on non-federal lands.

The cumulative effects of the proposed action on rare plants are unknown. More suitable habitat for rare plants may have existed before fire suppression allowed tree density to increase. Invasive plants have also caused a decline in habitat quality. The proposed action alternatives would contribute to invasive plant spread in the project area by disturbing the soil and opening the forest canopy, in and near areas, where invasive plants are found. However, the long-term benefits of returning the forest to a more historical condition and reducing fuel loads may outweigh undesirable impacts from invasive plant spread (Harrod 2001). Thinning the forest and underburning could reduce the risk of an intense wildfire in the future, reducing the risk of widespread soil disturbance and greater spread of invasive plants.

Project implementation may hinder or eliminate the chances of any rare plant species establishing themselves within that habitat for several years in places such as skid trails, especially temp roads, hand piling areas, and landings. Hand piling, landings, and new road construction cause the most detrimental disturbances for rare plant species. Whitebark pine would be the only species to benefit from certain aspects of the proposed action

alternatives. Soil disturbance would occur between 1% and 14% within units that have rare plant populations and habitat. These numbers do not take into account hand piling that would occur in some of those units which would increase the percentage and make it much higher. This would in turn increase the spread of invasive species throughout units threatening rare plant populations and habitat and, in some instances, (handpiles and landings) leave the soil void of native plant vegetation for up to six years, possibly longer.

The Gold Butterfly project area incorporates project design features for the protection of rare botanical species and habitat from project activities. These protection measures are also utilized for other projects throughout the Bitterroot National Forest. Due to these protection measures, rare plant species and potential habitat are for the most part protected from impacts and project activities and will not trend towards extinction or extirpation at this time. However, it is important to look at the cumulative impacts not only on this Forest, but on surrounding Forests over time to ensure that slowly, those small cumulative impacts are not adding up into a downward trend for rare species that occur throughout the range of the species. If the action alternative is selected, the cumulative effects of these additional activities are likely to continue to increase invasive species and the spread of invasive species, which may adversely impact some rare plant habitat and rare plant populations.

USDI FWS Recommended Conservation Measures (2021 Conferencing Recommendations)

The USDI FWS provided possible conservation measures to include in agency proposed projects. Though these suggestions came out after the proposed action was completed and the bulk of analysis, several of the measures are inherent in the proposed action:

- Avoid removing or damaging plus trees.
- Avoid timber cutting or ground disturbance in stands with healthy reproductive populations.

Amendment

Under the Forest Plan and Green et.al, regarding old growth, there would be no effect to whitebark pine since stand exams show that there is no old growth within those whitebark pine stands within the project area. Tree ring dating showed that the oldest trees were 110 years of age. As stated for the protection measure, mature whitebark pine will still be protected. The determination is still: ***not likely to jeopardize.***

Determination of Effects

The implementation of the *Gold Butterfly Project* as proposed is ***not likely to jeopardize*** the continued existence of whitebark pine. This determination is based on the following rationale:

- Whitebark pine will be avoided to the extent possible, especially larger trees 3” dbh and greater would be avoided to the extent possible and reproducing populations (cone-bearing or mature trees) of whitebark pine are to be avoided during vegetation management activities (see project design features).

- Proposed activities would not increase any of the primary stressors of whitebark pine: white pine blister rust, mountain pine beetle, altered fire regimes, or the effect of climate change; but would decrease the likelihood of another landscape level mountain pine beetle epidemic and reduce the potential for catastrophic fire by introducing greater heterogeneity to the landscape.
- The proposed action may beneficially affect whitebark pine habitat conditions by reversing a negative trend of vegetation encroachment created by the absence of fire and reducing the risk of a stand-replacing fire in the units. Any impacts to limited individuals would be offset by the benefits of returning controlled fire to the project area and thus creating higher-quality habitat conditions for whitebark pine.

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