

Four Forest Restoration Initiative, Rim Country EIS

Botany and Weeds Report

Prepared by:

Debra L. Crisp

Coconino NF Forest Botanist and Rim Country Botany Lead

for:

4FRI Rim Country EIS

Date

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Purpose and Need

The purpose and need for the Rim Country Project is fully described in the June 2016 Scoping Document. See that document for a complete summary.

The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation, thus moving the project area toward the desired conditions. The outcome of improving structure and function is increased ecosystem resiliency. Resiliency increases the ability of an ecosystem to survive natural disturbances such as fire, insects and disease, and climate change (FSM 2020.5) without changing its inherent function (SER 2004). This project is needed to:

- Increase forest resiliency and sustainability
- Reduce risk of undesirable fire effects
- Improve terrestrial and aquatic species habitat
- Improve the condition and function of streams and springs
- Restore woody riparian vegetation
- Preserve cultural resources
- Support sustainable forest products industries

Forest Resiliency and Sustainability

- There is a need to restore the frequent low-severity fire regimes in which the forest in the Rim Country project area evolved. The Rim Country Project is expected to move over 1,000,000 acres toward comprehensive, landscape-scale restoration.
- There is a need to move tree group pattern, interspaces, and stand density toward the natural range of variation. There is a need to manage forest density, structure, and composition to increase forest health and reduce adverse effects from epidemic levels of bark beetles and dwarf mistletoe, while also providing a diversity of habitat types and features. In the oak woodland and shrubland cover types, there is a need to stimulate new growth, maintain vigor in large-diameter trees, encourage faster growth in young smaller oaks, and provide for a variety of shapes and sizes of trees across the forest cover types.
- Where aspen is found in the frequent fire forest cover types, there is a need to stimulate growth, reduce conifer encroachment, and increase individual tree recruitment.
- In grassland cover types, there is a need to reduce or remove trees and other woody species that have encroached, which has decreased the size and function of these systems that were historically grasslands and functionally connected montane meadows.
- There is a need to improve the condition of native plant communities and the **resiliency of rare species**. There is also a need to improve the abundance, diversity, distribution, and vigor of native understory vegetation to provide food and cover for wildlife where it is absent under dense forest stands where fire has been excluded.
- The Rim Country Project includes extensive areas where the ponderosa pine and mixed conifer cover types interface with the pinyon-juniper and oak woodland types. Because of this close association, some facilitative operations may be needed in these other, non-target cover types (such as pinyon-juniper) to support, increase the safety and effectiveness of, and minimize

surface disturbance of treatments to restore the frequent-fire forest structure in the target cover types (ponderosa pine types). Facilitative operations would support the safe and effective use of prescribed fire in the cover types targeted for restoration treatments. Where prescribed fire alone would not be safe or effective in a non-target cover type, limited mechanical operations may be needed to create conditions safe for personnel and to ensure prescribed fire meets objectives when entering the target cover types. The expectation is that the majority of the area available for facilitative operations would be for prescribed fire only, with mechanical treatments being the exception. The effects of facilitative operations on the non-target cover types is expected to be maintenance of current conditions or movement toward desired conditions per the applicable forest plan.

Undesirable Fire Effects

- There is a need to reduce the risk of undesirable fire behavior and effects, which currently pose a threat to ecosystem function and services, and human safety, lives, and values. Restoring fire regimes in forests and grasslands will decrease the risks of post-fire flooding and debris flows that cause loss of soil productivity, water quality, and watershed function. Reducing the potential for undesirable fire effects and reducing excessive fuel loadings will protect terrestrial and aquatic species habitat as they increase resiliency to fires, including areas within and adjacent to Mexican spotted owl habitat. Protected activity centers (PACs) currently contain high fuel loadings because of past management and a century of wildfire suppression efforts.

Terrestrial and Aquatic Species Habitat.

- There is a need to move the Rim Country project area toward desired conditions for snags, coarse woody debris, forest structural stages, and stream habitat complexity.
- There is a need to maintain or improve aquatic habitats to meet needs for fish, frogs, and garter snakes, while recognizing the ecological and socio-political importance of these streams and associated riparian areas.

Streams and Springs.

- There is a need to improve the condition and function of riparian areas, wet meadows, streams, and springs in the Rim Country project area in order to sustain these features for terrestrial and aquatic habitat, as well as for human use. Reducing road density and improving road and stream crossings would maintain natural flow regimes, provide connectivity for aquatic species and habitats, and reduce sediment delivery to streams and other water bodies.

Woody Riparian Vegetation.

- Restoring native riparian vegetation, including large conifers and willows in some cover types, would reduce sedimentation to stream habitat, provide stream shading, maintain cool-water conditions, and provide large wood recruitment to streams to improve habitat complexity. This may include maintaining and promoting existing vegetation, reducing conifer tree encroachment and noxious weeds, planting desirable species such as willows where they have been extirpated, and returning fire to riparian areas. Re-establishment of woody riparian vegetation will also benefit aquatic and terrestrial fish and wildlife species.

Roads.

- There is a need to have adequate access for project implementation, but then decommission temporary roads after use to restore these areas once project activities are completed. In addition, there is a need to decommission unneeded routes identified during the forest Travel Management Rule review processes as part of the restoration of the landscape in the project area.

Cultural Resources.

- There is a need to reduce threats to cultural resources caused by overly dense vegetation and soil erosion. Though most archaeological sites can tolerate low-severity fire, all are very vulnerable to the effects of high severity fire in unnaturally high fuel loads and to the soil loss that occurs in post-fire flooding. In particular, there is a need to reduce fuels accumulation around cultural resources to reduce threats to these non-renewable resources.

Forest Products Industries.

- As a primary tool to conduct accelerated forest restoration, there is a need to support appropriately-scaled, sustainable, forest products industries that strengthen local economies, while conserving natural resources and aesthetic values. Appropriately-scaled businesses would play a key role in achieving the goals of 4FRI by harvesting, processing, and selling wood products, thereby reducing treatment costs and providing economic opportunities. Engaging industry would offer the opportunity to cover all, or nearly all, of the cost of removal of forest restoration byproducts by the value of the products removed. Restoration that proceeds with enough predictability and social support would allow significant, long-term investment by industry partners.

Alternatives

Alternative 1 (No Action)

The Council on Environmental Quality (CEQ) regulations (40 CFR 1502. 14d) requires that a "No Action" alternative be analyzed. This alternative represents the existing condition against which the other alternatives are compared.

The no action alternative would not address the Purpose and Need or move toward the desired conditions identified for the project.

Specifically

- Threats to forest resiliency and sustainability would not be reduced and ecosystems in the analysis area would remain at risk from loss to uncharacteristic fire. Stand density and structure would remain departed and would not move toward the desired conditions identified in the forest plans resulting in increased risk of disease and mortality to tree species and degradation of ecosystem processes.
- The risk of uncharacteristic fire effects would not be reduced
- Wildlife and aquatic species habitats would not be improved.
- The condition and function of streams and springs would not be improved

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- Woody riparian vegetation would not be restored.
 - Cultural resources that would be protected from uncharacteristic disturbance and there would be no need to protect cultural resources during the management actions proposed in this analysis.

Alternative 2 (Modified Proposed Action)

This is the Proposed Action as presented for scoping, with additional detail, clarifications, corrections, and modifications in response to public comments received.

The even-aged shelterwood treatments originally proposed have been replaced with regular restoration treatments focused on dwarf mistletoe. Design features will focus mechanical thinning treatments on addressing dwarf mistletoe infections. Alternative 2, as modified, responds to the Dwarf Mistletoe Mitigation issue.

Alternative 2 has also been modified to propose treatments with a broader range of openness in some stands. These extended duration treatments are expected to achieve desired conditions faster and maintain them longer in these stands. These treatment areas will be monitored and will help facilitate adaptive management.

The restoration activities listed for Alternative 2 include vegetation treatments (mechanical thinning and burning) as well as comprehensive restoration treatments (other restoration treatments) for grassland, aquatics, wildlife habitat, and rare species restoration.

- Mechanically thin trees and/or implement prescribed fire on approximately 899,340 acres.
 - Implement mechanical thinning and prescribed fire on up to 522,310 acres including –
 - Up to 151,400 acres of intermediate thinning
 - Up to 72,830 acres of stand improvement
 - Up to 14,320 acres of single tree selection
 - Up to 283,760 acres of uneven-aged group selection
 - Implement prescribed fire alone on approximately 49,930 acres.
 - Mechanically thin and/or implement prescribed fire on up to 78,910 acres of Mexican spotted owl (MSO) protected activity centers (PACs) including --
 - Up to 22,310 acres of mechanical thinning and/or prescribed fire
 - Up to 49,930 acres of prescribed fire only
 - Up to 6,970 acres of facilitative operations
 - Mechanically thin and/or implement prescribed fire on approximately 25,960 acres of MSO replacement nest/roost recovery habitat.
 - Conduct facilitative operations in non-target cover types to support treatments in target cover types, including –
 - Up to 131,380 acres of facilitative thinning and prescribed fire
 - Up to 6,670 acres of facilitative prescribed fire only in PACs
 - Up to 300 acres of facilitative thinning and prescribed fire in PACs
 - Restore aspen on approximately 1,230 acres, including up to 30 acres in PACs.
 - Restore approximately 125,890 acres that have experienced severe disturbance, including up to 3,610 acres in PACs.
 - Restore approximately 17,590 acres of savanna.
- Restore approximately 36,340 acres of grassland, including –
 - Maintaining or restoring montane meadow connectivity in pronghorn corridors.

-
- Restore hydrologic function and vegetation on approximately 6,760 acres of meadows.
 - Restore approximately 184 springs.
 - Restore function and habitat in up to 777 miles of streams, including stream reaches with habitat for threatened, endangered, and sensitive aquatic species.
 - Restore up to 14,730 acres of riparian areas for aquatic stream habitat.
 - Decommission approximately 230 miles of existing system and unauthorized roads on the Coconino and Apache-Sitgreaves NFs.
 - Decommission approximately 20 miles of unauthorized roads on the Tonto NF.
 - Improve approximately 150 miles of existing non-system roads and construct approximately 350 miles of temporary roads for haul access; decommission all temporary roads when treatments are completed.
 - Relocate and reconstruct existing open roads adversely affecting water quality and natural resources, or of concern to human safety.
 - Construct up to 200 miles of protective barriers around springs, aspen, native willows, and big-tooth maples, as needed for restoration.

Alternative 3 (Focused Alternative)

This alternative is designed to focus restoration treatments in areas that are the most highly departed from the natural range of variation (NRV) of ecological conditions, and/or that put communities at risk from undesirable fire behavior and effects. High value assets will be better protected and burn boundaries will be designed to create conditions safe for personnel and to ensure fire can meet objectives. Treatment areas would be chosen to optimize ecological restoration, those areas that are most important to treat and can be moved the furthest toward desired conditions. Focusing on the higher priority ecological restoration will result in fewer acres being treated.

The restoration treatments proposed in Alternative 3 will be used to address moderate and high levels of mistletoe infection, but to a lesser extent on the fewer acres proposed for mechanical treatment and fire. The presence of dwarf mistletoe will not be used to prioritize areas for treatment, but it will be addressed where it exists, using the same types of treatments as Alternative 2. Design features will be developed to focus activity on addressing dwarf mistletoe infestations during implementation of mechanical treatments. Alternative 3 responds to the Smoke/Air Quality, Economics, Roads, and Dwarf Mistletoe Mitigation issues.

- Mechanically thin trees and/or implement prescribed fire on approximately 474,930 acres.
 - Implement mechanical thinning and prescribed fire on up to 315,770 acres including –
 - Up to 112,790 acres of intermediate thinning
 - Up to 38,880 acres of stand improvement
 - Up to 7,250 acres of single tree selection
 - Up to 157,660 acres of uneven-aged group selection
 - Implement prescribed fire alone on approximately 37,000 acres.
 - Mechanically thin and/or implement prescribed fire on up to 58,255 acres of Mexican spotted owl (MSO) protected activity centers (PACs) including --
 - Up to 18,410 acres of mechanical thinning and/or prescribed fire
 - Up to 37,000 acres of prescribed fire only
 - Up to 3,140 acres of facilitative operations
 - Mechanically thin and/or implement prescribed fire on approximately 20,140 acres of MSO replacement nest/roost recovery habitat.
 - Conduct facilitative operations in non-target cover types to support treatments in target cover types, including –
 - Up to 50,630 acres of facilitative thinning and prescribed fire
 - Up to 2,840 acres of facilitative prescribed fire only in PACs
 - Up to 300 acres of facilitative thinning and prescribed fire in PACs
 - Restore aspen on approximately 1,010 acres, including up to 30 acres in PACs.
 - Restore approximately 27,660 acres that have experienced severe disturbance, including up to 1,410 acres in PACs.
 - Restore approximately 2,400 acres of savanna.

- Restore approximately 36,340 acres of grassland, including –
 - Maintaining or restoring montane meadow connectivity in pronghorn corridors.
- Restore hydrologic function and vegetation on approximately 6,760 acres of meadows.
- Restore approximately 184 springs.
- Restore function and habitat in up to 777 miles of streams, including stream reaches with habitat for threatened, endangered, and sensitive aquatic species.
- Restore up to 14,730 acres of riparian areas for aquatic stream habitat.
- Decommission approximately 230 miles of existing system and unauthorized roads on the Coconino and Apache-Sitgreaves NFs.
- Decommission approximately 20 miles of unauthorized roads on the Tonto NF.
- Improve approximately 150 miles of existing non-system roads and construct approximately 350 miles of temporary roads for haul access; decommission all temporary roads when treatments are completed.
- Relocate and reconstruct existing open roads adversely affecting water quality and natural resources, or of concern to human safety.
- Construct up to 200 miles of protective barriers around springs, aspen, native willows, and big-tooth maples, as needed for restoration.

Comparison of Action Alternatives

Table 1 provides a detailed comparison of the action alternatives. Alternative 1 was not included because no treatments would occur except those analyzed in other decisions.

Table 1. Detailed Mechanical and Fire Treatments by Alternative

Proposed Treatment	Acres Alt 2 (MPA)	Acres Alt 3 (FA)
Areas assigned treatments using the decision matrices	522,310	316,580
Intermediate Thin	151,400	112,790
IT 10% - 25%	26,940	21,060
IT 10% - 40%	6,370	5,980
IT 25% - 40%	51,920	32,860
IT 40% - 55%	63,930	52,070
IT 55% - 70%	2,240	820
Single Tree Selection	14,320	7,250
ST	14,320	7,250
Stand Improvement	72,830	38,880
SI 10% - 25%	10,960	6,370
SI 10% - 40%	4,510	2,620
SI 25% - 40%	33,790	16,140
SI 40% - 55%	23,110	13,750
SI 55% - 70%	460	0
Uneven Age	283,760	157,660
UEA 10% - 25%	77,490	47,890
UEA 10% - 40%	11,650	9,500
UEA 25% - 40%	116,530	60,800
UEA 40% - 55%	50,930	18,780

UEA 55% - 70%	27,160	20,690
Areas not assigned treatments using the decision matrices	377,020	158,350
Aspen Restoration	1,230	1,010
Aspen Restoration	1,200	980
PAC - Aspen Restoration	30	30
Facilitative Operations Mechanical	131,380	50,630
Facilitative Operations Mechanical	131,080	50,330
PAC - Facilitative Operations Mechanical	300	300
Facilitative Operations Prescribed Fire Only	6,670	2,840
PAC - Facilitative Operations Prescribed Fire Only	6,670	2,840
MSO Recovery - Replacement Nest/Roost	25,960	20,140
MSO Recovery - Replacement Nest/Roost	25,960	20,140
PAC - Mechanical	18,370	16,670
PAC - Mechanical	18,370	16,670
PAC - Prescribed Fire Only	49,930	37,000
PAC - Prescribed Fire Only	49,930	37,000
Savanna	17,590	2,400
Savanna	17,590	2,400
Severe Disturbance Area Treatment	125,890	27,660
PAC - Severe Disturbance Area Treatment	3,610	1,410
Severe Disturbance Area Treatment	122,280	26,250
Total	899,330	474,930

Design Features, Best Management Practices, Mitigation and Conservation Measures

The following design features, best management practices, mitigation and conservation measures were selected from those in Appendix C which encompasses all resources. These features are presented here because they directly apply to botanical resources. Other measures may apply.

Table 2. Design features, best management practices, mitigation and conservation measures directly applicable to botanical resources. .

Feature	Intent
AQ021	Biologists will be consulted during pre-planning for all treatments that will occur in springs, streams, and riparian areas, as well as fens or bogs where histic soils are present, to determine presence of federally listed or sensitives species (plants or animals), as well as mitigations needed for rare or sensitive species in/near the work areas.

Feature	Intent
BT001	During layout, protect Southwestern Region sensitive or analysis plant groups where practical by including the plants within tree groups and using areas not occupied by the plants as interspaces.
BT002	Survey springs and channels for Bebb's willow before implementation and identify locations. Inform the forest botanist or district wildlife biologist if new locations are found and mitigate effects to plants and populations. Mitigations include avoiding plants, altering designs, or including plants in enclosures. Identify opportunities to enhance Bebb's willow where plants are decadent or dying. Manual grubbing of grasses may be used to increase the likelihood of planting success.
BT003	Prescribed fires are conducted under conditions that promote native plant communities, hinder weed species germination, aid with controlling existing weed infestations, and prevent the spread of existing weeds.
BT004	Review various sites such as spring restoration for opportunities to introduce and restore Bebb's willow to supplement existing locations on the forest and introduce young plants into areas where plants are decadent and dying. Bebb's willow stands would be enhanced by using cuttings, planting locally cultivated plants, and using barriers as needed to protect existing or newly planted willows from browsing. Manual grubbing of grasses may be used to increase the likelihood of planting success. Where needed, fire lines would be placed around Bebb's willows and/or fuels would be removed from the vicinity of willow clumps to ensure there is only low to very low burn severity (fire effects to soil) and low to very low severity (fire effects to vegetation) in and around willow clumps.

Feature	Intent
BT005	<p>When planning for implementation, identify species of concern (such as Southwestern Region sensitive plants), and determine potential habitat based on past occurrences and the known ranges of the species. If there are no documented surveys, the appropriate specialist (e.g., forest botanist, wildlife biologist) should be consulted to determine the need for, and extent of, new surveys. If the appropriate specialist is unavailable, the area to be treated should be surveyed prior to implementation and implementation plans should be adjusted if/as needed, based on survey results. Surveys should focus on areas most likely to contain plants or potential habitat for the targeted species, based on conditions such as soil or vegetation type, rather than covering the entire area. Habitat modeling, or the use of habitat descriptions of species from past documentation, etc. will be used to help define survey areas. Narrow endemics should receive more attention than more widespread species because the loss of individuals would have greater impact on the overall population of the species than in more widely distributed species.</p>
BT006	<p>Monitor the effects of treatment on Southwestern Region sensitive plants after treatments are completed.</p>
BT007	<p>Mitigate loss of individuals and groups of Southwestern Region sensitive plants during management activities by avoiding plants as much as possible while achieving management objectives. Preserve plants and habitat during implementation of management activities, while realizing there may be some short-term losses of individuals or groups and short-term effects to habitat while moving toward desired conditions.</p>
BT009	<p>Prohibit temporary road construction and reconstruction, tracked vehicles, and pits within populations of Southwestern Region sensitive plants.</p>
BT010	<p>Sensitive plant populations would be avoided when constructing temporary roads.</p>

Feature	Intent
NW001	<p>Survey for noxious or invasive weeds in treatment areas prior to treatment and follow appropriate guidance based on location:</p> <p>Apache-Sitgreaves NFs: Follow the guidance in Appendix A of the Environmental Assessment for the ASNFs Integrated Forest-Wide Noxious Or Invasive Weed Management Program</p> <p>Coconino NF: Follow the guidance in appendix B of the “Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott NFs within Coconino, Gila, Mojave, and Yavapai Counties, Arizona”</p> <p>Tonto NF: Follow the guidance in Appendix C of the Tonto NF Weed Treatment EA when operating on the Tonto NF.</p>
NW002	<p>Prevent spread of potential and existing noxious or invasive weeds by vehicles and equipment used in management activities by washing vehicles and equipment to remove seeds, soil, vegetative matter, and other debris that could contain or hold seeds prior to entering the project area and when moving from one treatment unit to another. For example, see timber sale contract provision WO-C/CT 6.36.</p>
NW003	<p>If contractor desires to clean off-road equipment on national forest land, such as at the end of a project or prior to moving to, or through an area that is free of invasive species of concern, contractor shall obtain prior approval from contracting officer or timber sale administrator as to the location for such cleaning and measures, if any, for controlling impacts.</p>
NW004	<p>If noxious or invasive weeds are identified during or post-implementation, treat the weeds and monitor for a minimum of three growing seasons.</p>

Feature	Intent
NW005	Timing of prescribed fire and herbicide application in areas with leafy spurge will be determined on a site-specific basis by the District Fuels Specialist and District Weeds Coordinator at the time of implementation. Herbicide treatments in the fall are most effective, though spring herbicide treatments following fall burns may be necessary to facilitate control.
NW006	Before ground disturbing activities begin, inspect material sources on site annually (or before disturbance for new sites) to ensure they are weed-free before use and transport. Treat weed-infested sources for eradication, and strip, stockpile, and treat contaminated materials before using pit materials.
NW007	If weed treatments are not successful or not possible, operators would be informed of locations of noxious or invasive weed populations and ground disturbance associated with rock pit sites would be located away from noxious or invasive weed populations.
NW008	Equipment (other than for hauling, unless coming from sites with known invasive weed populations) would be inspected and cleaned before entering rock pit areas to prevent introduction of invasive weeds.
NW009	Monitor and treat noxious or invasive weed populations following project implementation annually for at least three years to ensure that any weeds transported to the site are detected and controlled.
NW010	Prevent any new noxious or invasive weed species from becoming established, contain or control the spread of known weed species, and eradicate species that are the most invasive and pose the greatest threat to the biological diversity and watershed condition. Maintain stockpiled, uninfested material in a weed-free condition.

Feature	Intent
SI008	Exclosure fencing to prevent utilization of plantings by deer, elk, and livestock is permitted.
SI028	Tree and shrub species, willow cuttings, as well as sedge and rush mats to be used as transplant material shall come from outside the bankfull width, typically in terraces (abandoned floodplains), or where such plants are abundant.
SW001	Establish staging areas for storage of vehicles, equipment, and fuels to minimize erosion into or contamination of streams, wetlands, and floodplains
SW072	Wet Meadows, springs, seeps or other wet features where the presence of water is indicated will be designated as “protected areas” to be excluded from the use of mechanized equipment. These “protected areas” will be clearly labeled on contract maps. Any features discovered during the layout phase of a project sale will also be included on task order or sale contract maps. These areas will be clearly marked on the ground.
SW107	Prior to construction/ site preparation, critical riparian vegetation areas, wetlands, and other sensitive sites will be clearly delineated to minimize ground disturbance, erosion, and sedimentation to aquatic habitats.
TR017	While in operation, appropriate dust abatement measures will be taken on roads and pit areas where trucks are operating if necessary

Relevant Law, Regulation, and Policy

- National Forest Management Act (1982)
- Invasive Species, EO 13112 of February 3, 1999
- Environmental Justice, EO 12898 of February 11, 1994
- Multiple-Use Sustained-Yield Act of 1960. This act designates multiple uses with equal standing in the National Forests. These include recreation, range, timber, watershed, wildlife and fish. It introduces the principles of multiple use and sustained yield on the National Forests.
- National Environmental Policy Act, 1969. This act requires all federal agencies to analyze the effects of management actions and prepare Environmental Assessments or Environmental Impact Statements to address these impacts (depending on the complexity of the project).
- Resource Planning Act (RPA), 1974 (as amended). This act directs the National Forest Service to inventory, protect and address the effects to natural resources.
- National Forest Management Act, 1976 (as amended); 36 CFR 219. The NFMA Act originated as an amendment to the Resources Planning Act (1974) to address legal challenges. It provided direction requiring an interdisciplinary and systematic approach to resource management and provided for public input on preparing and revising forest plans.
- Forest Service Manual, FSM 2370 (Special Recreation Designations), Part 2672 (Areas Designated Administratively) (RNAs and Botanical Areas) and Forest Service Manual, FSM 2372, 2372. 01, 2372. 02 and 2372. 05. These manuals provide Forest Service direction for designating, preserving and managing special areas such as Botanical Areas on National Forests. They were considered when addressing Research Natural Areas and Botanical Areas in the analysis area.
- Forest Service Manual, FSM 2620, 2630, 2670, 2672. These manual directives address the management of Region 3 sensitive species.
- Executive Order 13112 of 1999, regarding noxious or invasive weed control. This executive order is one of the founding directives of the noxious or invasive weed control on National Forest system lands.
- Forest Service Manuals 2900 and 2150 and Regional Supplement No. 2100-98-1, regarding noxious weed control.
- Forest Service Manuals 2080 and 2150 and Regional Supplement No. 2100-98-1 establish policy and implement programs for noxious weed management.

State and Local Law:

Arizona Administrative Codes R3-4-244, R3-4-245 (Arizona Department of Agriculture 1999) regulate certain invasive species in the state

Noxious Weed Coordination and Plant Protection Act 2000 (Public Law 106-224)

Arizona Administrative Codes (Arizona Department of Agriculture) Article 11, consisting of Sections R3-3-1101 through R3-3-1111 and Appendix A, recodified from 3 A.A.C. 4, Article 6 at 10 A.A.R. 726, effective February 6, 2004 (Supp. 04-1) provides protection for certain native plants in Arizona.

Other Guidance

- Stemming the Invasive Tide: Forest Service Strategy for Noxious and Nonnative Invasive Plant Management. (U.S. Forest Service, 1998).

- Noxious Weeds Strategic Plan Working Guidelines– Coconino, Kaibab, and Prescott National Forests (1998). These working guidelines were developed by the three forests to manage noxious or invasive weeds. Noxious weed invasions were recognized as an emerging issue and growing problem.
- Final Environmental Impact Statement for the Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab and Prescott National Forests within Coconino, Gila, Mojave and Yavapai Counties, Arizona (USDA Forest Service, 2005).
- Environmental Assessment For The A-SNFs Integrated Forest-Wide Noxious Or Invasive Weed Management Program USDA Forest Service Apache-Sitgreaves National Forests, Apache, Coconino, Greenlee and Navajo Counties, Arizona ((USDA Forest Service, 2008).
- Environmental Assessment for Integrated Treatment of Noxious or Invasive Plants Tonto National Forest Gila, Maricopa, Pinal, and Yavapai Counties, Arizona (USDA Forest Service, 2012).
- Forest Service Manual 2070 (Amendment 2000-2008-1) Native Plant Policy

Forest Plan Direction

The Rim Country EIS includes three forests so plan direction for each forest will be considered for this analysis. Each National Forest Plan provides management direction for the rare plants and non-native invasive plants on each forest as follows.

Apache-Sitgreaves National Forest Plan

Forestwide Desired Conditions

Overall Ecosystem Health

- Ecological components (e.g., soil, vegetation, water) are resilient to disturbances including human activities and natural ecological disturbances (e.g., fire, drought, wind, insects, disease, and pathogens) (Landscape scale 10,000 acres or greater)
- Natural ecological cycles (i.e., hydrologic, energy, nutrient) facilitate shifting of plant communities, structure, and ages across the landscape. Ecotone shifts are influenced at both the landscape and watershed scale by ecological processes. The mosaic of plant communities and the variety within the communities are resilient to disturbances.
- Ecological conditions for habitat quality, distribution, and abundance contribute to self-sustaining populations of native and desirable nonnative plants and animals that are healthy, well distributed, connected, and genetically diverse. Conditions provide for the life history, distribution, and natural population fluctuations of the species within the capability of the landscape.

Desired Conditions for Soil

Mid-Scale Desired Conditions (100 to 1,000 acres)

- Soils are stable within their natural capability. Vegetation and litter limit accelerated erosion (e.g., rills, gullies, root exposure, topsoil loss) and contribute to soil deposition and development.
- Soils provide for diverse native plant species. Vegetative ground cover (herbaceous vegetation and litter) is distributed evenly across the soil surface to promote nutrient cycling, water infiltration, and maintain natural fire regimes

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- Biological soil crusts (e.g., mosses, lichens, algae, liverworts) are present and reestablished if potential exists.

Guidelines for Soil

- Severely disturbed sites should be revegetated with native plant species when loss of long term soil productivity is predicted.
- Locally collected seed should be used where available and cost effective. Seeds should be tested to ensure they are free from noxious weeds and invasive nonnative plants at a State certified seed testing laboratory before acceptance and mixing.

Desired Conditions for All PNVTs (ERUs)

Landscape Scale Desired Conditions (10,000 acres or greater)

Each PNVT contains a mosaic of vegetative conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds. The distribution of physical and biological conditions is appropriate to the natural disturbance regimes affecting the area

- Native plant communities dominate the landscape.
- Species genetic diversity remains within native vegetation and animal populations, thus enabling species to adapt to changing environmental and climatic conditions.
- Diverse vegetation structure, species composition, densities, and seral states provide quality habitat for native and desirable nonnative plant and animal species throughout their life cycle and at multiple spatial scales. Landscapes provide for the full range of ecosystem diversity at multiple scales, including habitats for those species associated with late seral states and old growth.
- Disjunct populations of Chihuahuan pine (*Pinus leiophylla*), Arizona cypress (*Cupressus arizonica*), and Rocky Mountain maple (*Acer grandidentatum*) are present with the ability to reproduce on capable sites.
- Ecosystem services are available as forests, woodlands, grasslands, and riparian communities successfully adapt to a changing and variable climate.

Mid-Scale Desired Conditions (100 to 1,000 acres)

- Vegetation conditions provide hiding and thermal cover in contiguous blocks for wildlife. Native plant species are present in all age classes and are healthy, reproducing, and persisting.
- Vegetative ground cover (herbaceous vegetation and litter) is optimized to protect and enrich soils and promote water infiltration. There is a diverse mix of cool and warm season grasses and desirable forbs species.

Fine Scale Desired Conditions (less than 10 acres)

- Rare or unique plant communities (e.g., agaves, Chihuahuan pine) are intact and persisting.

Standards for All PNVTs

- Vegetation treatments shall include measures to reduce the potential for introduction of **invasive plants** and animals and damage from nonnative insects and diseases.

Desired Conditions for Riparian Areas

Landscape Scale Desired Conditions (10,000 acres or greater)

- Natural ecological disturbances (e.g., flooding, scouring) promote a diverse plant structure consisting of herbaceous, shrub, and tree species of all ages and size classes necessary for the recruitment of riparian-dependent species
- Riparian-wetland conditions maintain water-related processes (e.g., hydrologic, hydraulic, geomorphic). They also maintain the physical and biological community characteristics, functions, and processes

Mid-Scale Desired Conditions (100 to 1,000 acres)

- Willows (e.g., Bebb's, Geyer, Arizona, Goodding's) are reproducing with all age classes present, where the potential exists.
- Riparian vegetation consists mostly of native species that support a wide range of vertebrate and invertebrate species and are free of invasive plant and animal species.

Desired Conditions for Forests: Ponderosa Pine

Landscape Scale Desired Conditions (10,000 acres or greater)

- Grasses, forbs, shrubs, needles, leaves, and small trees support the natural fire regime. The larger proportion (60 percent or greater) of soil cover is composed of **grasses and forbs** as opposed to needles and leaves.

Fine Scale Desired Conditions (less than 10 acres)

- Interspaces surrounding tree groups are variably shaped and composed of a grass, forb, and shrub mix. Some may contain individual trees or snags.

Guidelines for Forests: Ponderosa Pine

- Where Gambel oak or other native hardwood trees and shrubs are desirable to retain for diversity, treatments should improve vigor and growth of these species
- Where consistent with project or activity objectives, canopy cover should be retained on the south and southwest sides of small, existing forest openings that are naturally cooler and moister. These small (generally one-tenth to one-quarter acre) shaded openings provide habitat conditions needed by small mammals, plants, and insects (e.g., Merriam's shrew, **Mogollon clover**, four-spotted skipperling butterfly). Where these openings naturally occur across a project area, these conditions should be maintained on an average of 2 or more such openings per 100 acres.

Desired Conditions for Forests: Dry Mixed Conifer

Landscape Scale Desired Conditions (10,000 acres or greater)

- Grasses, forbs, shrubs, needles, leaves, and small trees support the natural fire regime. The larger proportion (60 percent or greater) of soil cover is composed of **grasses and forbs** as opposed to needles and leaves.

Fine Scale Desired Conditions (less than 10 acres)

- Interspaces surrounding tree groups are composed of a grass, forb, and shrub mix. Some may contain individual trees or snags.

Guidelines for Forests: Dry Mixed Conifer

- Where Gambel oak or other native hardwood trees and shrubs are desirable to retain for diversity, treatments should improve vigor and growth of these species
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Desired Conditions for Wildlife and Rare Plants

Landscape Scale Desired Conditions (10,000 acres or greater)

- Habitat is well distributed and connected

Fine Scale Desired Conditions (less than 10 acres)

- Collection of animals and plants does not negatively impact species abundance.
- Localized rare plant and animal communities are intact and functioning.

Guidelines for Wildlife and Rare Plants

- Management and activities should not contribute to a trend toward the Federal listing of a species.
- Activities occurring within federally listed species habitat should apply habitat management objectives and species protection measures from recovery plans.
- Modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs, consistent with project or activity objectives.
- Cool and/or dense vegetation cover should be provided for species needing these habitat components (e.g., Gooding's onion, black bear, White Mountains chipmunk, western yellow-billed cuckoo).
- Rare and unique features (e.g., talus slopes, cliffs, canyon slopes, caves, fens, bogs, sinkholes) should be protected from damage or loss in order to retain their distinctive ecological functions and maintain viability of associated species.
- The needs of localized species (e.g., New Mexico meadow jumping mouse, Bebb's willow, White Mountains paintbrush) should be considered and provided for during project activities to ensure their limited or specialized habitats are not lost or degraded.

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- Constructed features should be maintained to support the purpose(s) for which they were built. Constructed features should be removed when no longer needed.

Desired Conditions for Invasive Species

Landscape Scale Desired Condition (10,000 acres or greater)

- Invasive species (both plant and animal) are nonexistent or in low occurrence to avoid negative impacts to ecosystems.

Mid-Scale Desired Conditions (100 to 1,000 acres)

- Undesirable nonnative species are absent or present only to the extent that they do not adversely affect ecosystem composition, structure, or function, including native species populations or the natural fire regime.
- Introduction of additional invasive species rarely occurs and is detected at an early stage.

Objectives for Invasive Species

- Annually, contain, control, or eradicate invasive species (e.g., musk thistle, Dalmatian toadflax) on 500 to 3,500 acres.
- Annually, control or eradicate invasive species (e.g., tamarisk, bullfrogs) on at least 2 stream miles.

Standards for Invasive Species

- Projects and authorized activities shall be designed to reduce the potential for introduction of new species or spread of existing invasive or undesirable aquatic or terrestrial nonnative populations

Guidelines for Invasive Species

- Projects and activities should not transfer water between drainages or between unconnected water bodies within the same drainage to avoid spreading disease and aquatic invasive species.
- Project areas should be monitored to ensure there is no introduction or spread of invasive species.
- Treatment of invasive species should be designed to effectively control or eliminate them; multiple treatments may be needed.
- Pesticide use should minimize impacts on non-target plants and animals.

Standards for Special Uses

- Noxious plants and nonnative invasive species monitoring and control shall be included in contracts, permits, and agreements.
- Special use authorizations for the collection of live species with limited distribution (e.g., some invertebrates, plants) shall include permit provisions to ensure the species persist onsite.

Landscape Scale Disturbance Events

The forest included a section on landscape scale disturbances, recognizing that these areas represent departure from reference conditions and may lead to succession away from the desired conditions. This shift can be complicated by the increased risk of invasion by non-native species and by climate change.

Landscape Scale Desired Conditions (10,000 acres or greater)

- The Apache-Sitgreaves NFs landscapes retain the resiliency to survive landscape scale disturbance events.

Guidelines for Landscape Scale Disturbance Events

- Erosion control mitigation features should be implemented to protect significant resource values and infrastructure such as stream channels, roads, structures, threatened and endangered species, and cultural resources.
- Management should emphasize long term reestablishment of native deciduous trees, shrubs, and herbaceous vegetation to maintain ecosystem diversity.

Management areas

Management areas are areas that have similar management intent and a common management strategy. This direction does not substitute for, or repeat, forestwide direction

There are twelve management areas on the forest. All are represented in the analysis area and include Primitive Area, General Forest, Community-Forest intermix, Energy Corridor, High Use Developed Recreation Area, Natural Landscape, Recommended Research Natural Area, Research Natural Area, Wild Horse Territory, Wildlife Quiet Area and Wilderness.

General Forest

The General Forest Management Area encompasses the majority of the Apache-Sitgreaves NFs. All PNVTs occur in this management area.

There is no additional guidance for this management area for the resources discussed in this report that are not represented by the guidance in the PNVTs.

Community-Forest IntermixThe Community-Forest Intermix Management Area consists of National Forest System (NFS) lands that are within one-half mile of communities-at-risk. The Community-Forest Intermix Management Area makes up a portion of the wildland-urban interface (WUI).

Desired Conditions for Community-Forest Intermix

- The Community-Forest Intermix Management Area is composed of smaller groups of trees that are more widely spaced than other forested areas. These conditions result in fires that burn primarily on the forest floor and rarely spread as crown fire
- As a result of forest management, most wildfires are low to mixed severity surface fires resulting in limited loss of structures or ecosystem function.
- Native grasses, forbs, shrubs, and litter (i.e., fine fuels) are abundant enough to maintain and support natural fire regimes, protect soils, and support water infiltration.
- Grasslands have less than 10 percent woody canopy cover.

High Use Developed Recreation Area

The High Use Developed Recreation Area Management Area includes places with relatively high levels of visitor use that are managed to provide a wide variety of opportunities to a broad spectrum of visitors.

Guidelines for High Use Developed Recreation Area

- Management should focus on operation and maintenance, safety, aesthetics, and control of noxious weeds and nonnative invasive species.

Energy Corridor

The Energy Corridor Management Area includes the three existing high voltage energy corridors located on the Apache-Sitgreaves NFs.

Guidelines for Energy Corridor

Invasive plant species should be aggressively controlled within energy corridors to prevent or minimize spread.

Natural Landscape

These are generally undeveloped areas that are natural appearing and provide primitive and semi primitive recreation opportunities. Management activities are allowed but are primarily focused on ecosystem restoration.

There is no additional guidance for this management area for the resources discussed in this report that are not represented by the guidance in the PNVTs.

Wild Horse Territory

Desired Conditions for Wild Horse Territory

Grazing is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed established use levels).

Wildlife Quiet Area

Wildlife quiet areas provide relatively undisturbed habitat where big game and other wildlife could reside without disturbance from motorized vehicle use

Guidelines for Wildlife Quiet Areas

Fences surrounding and within WQAs should be inspected and improved to allow wildlife movement within and outside of the areas. Fences should be removed if no longer needed.

Coconino National Forest Revised Forest Plan (2018)

Forest-wide direction

All Ecosystems

General Description and Background for All Ecosystems

These desired conditions apply to all ecosystems.

Desired Conditions for All Ecosystems

FW-Eco-DC

- 1 Within their type and capability, ecosystems are functioning properly, provide habitat for native species, and are resilient to natural disturbances (such as flooding, fire, and periodic drought) and climate change. Ecosystem processes and contributions (for example, nutrient cycling, water

infiltration, and wildlife habitat) are sustained, as vegetation on the Forest adapts to a changing climate.

- 2 The composition, structure, function, and arrangement of vegetation conditions reduce the threat of uncharacteristic disturbances.

Management Approaches for All Ecosystems

Coordinate with neighboring jurisdictions, permit holders (including utilities and livestock permittees), and other interested parties when undertaking activities in permitted areas or easements.

Soil

Soils are variable on the forest and range from hot, dry desert soils at the lowest elevations to cold, moist soils found in the alpine tundra at the highest elevations. Soils are inventoried and classified in the terrestrial ecological unit inventory (TEUI) called the Terrestrial Ecosystem Survey of the Coconino NF. The plan refers to Mollisol soil in several locations. Soils classified as Mollisols are those with relatively thick organic surfaces. They are typical of and develop under grassland conditions.

Desired Conditions for Soil

FW-Soil-DC

- 1 Soils function properly to distribute water and cycle nutrients to a variety of vegetation including lichens, mosses, grasses, **forbs**, shrubs, and trees.
- 2 Soil productivity and functions are sustained and functioning properly within the capability of the site, so the soil has the ability to resist erosion, infiltrate water and recycle nutrients. Coarse woody debris, including downed logs, provides for long-term soil productivity. Soil productivity and functions contribute to the **resiliency** and **adaptability** of terrestrial and riparian ecosystems to climate change.
- 3 **Vegetative ground cover** is maintained at levels that contribute to suitable hydrologic function, soil stability, and nutrient cycling. Soils are protected by adequate vegetative ground cover on the soil surface to prevent erosion from exceeding natural rates of soil formation (soil tolerance), within their inherent capability. Soils are permeable and capable of infiltrating water to reduce instances of overland flows during precipitation events. The composition of grass and forb species and presence of plant litter and grass, forb, shrub, and tree basal area surface cover reduce occurrences of compaction and erosion.
- 4 Biological soil crusts stabilize soil and improve nutrient cycling.

Guidelines for Soil

FW-Soil-G

- 2 Projects should be designed to avoid disturbance that would result in long-term impacts to soil function and productivity. Where disturbance cannot be avoided, project-specific soil and water conservation practices should be developed
- 3 Project-specific design features should be used when projects occur on slopes with a grade of about 40 percent or greater, on soils with moderate or severe erosion hazard, or on soils that are sensitive to degradation when disturbed, such as calcareous soils, to minimize or avoid soil impacts.

Biophysical Features

Geological Features

General Description and Background for Geological Features

Geological features include caves, karst, cliffs, and talus slopes.

Cliffs are vertical or near vertical rock faces. They range in size from a few feet to hundreds of feet tall and are inherently dynamic, subject to rock fall, ice, and wind and water erosion. Cliff resources include any naturally occurring material or substances such as plant and animal life, paleontological deposits, and minerals.

Desired Conditions for Geological Features

FW-BioPhys-Geo-DC

- 1 Geological features are generally undisturbed by human activities. The cultural, archaeological, geological, hydrological, paleontological, biological, and aesthetic resources associated with caves, karst, talus slopes, and **cliffs** are maintained.
- 6 Cliffs provide specialized habitats for a variety of species including nesting and feeding habitats for birds of prey and roosting habitat for bats. They provide escape, bedding, and lambing cover for bighorn sheep. They provide habitat for rare plants such as **rock fleabane** and Senator Mine alumroot.

Guidelines for Geological Features

FW-BioPhys-Geo-G

- 1 Projects should be designed and uses should be managed to maintain the integrity and function of caves, karst, cliffs, and talus slopes. Where alteration of these resources cannot be avoided, they should be mitigated to mimic pre-disturbance conditions and function.

Watersheds and Water

Watersheds within the **C.C. Cragin Watersheds**, Inner Basin Watershed, and Lake Mary Watersheds Management Areas contribute water to public water systems.

Desired Conditions for Watersheds and Water

FW-Water-DC

- 3 Vegetation and soil conditions in watersheds support important ecosystem services such as clean water, base flow, riparian communities, and long-term soil productivity. These conditions also help moderate climate variability and change. Soil and vegetation function to facilitate precipitation infiltration and groundwater recharge.

Guidelines for Watersheds and Water

FW-Water-G

- 1 Watersheds should have enough vegetative ground cover to recover rapidly from natural and human disturbances and to maintain long-term soil productivity.

Management Approaches for Watersheds and Water

Consider prioritizing and accelerating watershed treatments such as vegetation thinning, prescribed burning, and channel stabilization in C.C. Cragin Watersheds MA, Lake Mary Watersheds MA, and Inner Basin Watershed MA to help reduce the threat of crown fires, flood volumes, sedimentation impacts, and risk of future wildfires.

Riparian Areas

Desired Conditions for All Riparian Areas

FW-Rip-All-DC

- 1 Within their type and capability, riparian ecosystems and corridors promote the natural role of water, sediment, woody debris, and root masses, and maintain water tables. This includes perennial and intermittent riparian streamcourses. The associated water table supports riparian vegetation.

Guidelines for All Riparian Areas

FW-Rip-All-G

- 1 Management activities such as vegetation treatments or other restoration actions should be designed to maintain or move toward desired conditions for other uses and resources.
- 2 Riparian areas should be managed to promote natural movement of water and sediment, to maintain ecological functions, and to maintain habitat and corridors for species.

Desired Conditions for Riparian Forest Types

FW-Rip-RipType-DC

- 1 Riparian forests are in proper functioning condition. Periodic flooding and scouring are the primary natural disturbances and promote a diverse plant structure consisting of herbaceous, shrub, and tree species of all ages and size classes necessary for the recruitment and succession of riparian-dependent species. Age and size classes include seedling, sapling, mature, and over mature vegetation. Fire is infrequent.
- 2 Riparian forests provide the composition and structure to filter sediments, ash, and contaminants; build and stabilize banks; reduce the effects of flooding; store and release water; and recharge aquifers. Riparian forests provide habitat and help maintain temperatures necessary for maintaining populations of native aquatic and riparian-dependent species and for their dispersal. At the landscape scale, overall plant composition is similar to site potential (greater than 66 percent). Plant composition can vary considerably at the fine- and mid-scales, depending on site potential (as determined by TEUI or other appropriate ecological classification system) and climate, elevation, geomorphology, topography, soils, and smaller scale disturbances.

Wetlands

Desired Conditions for Wetlands

FW-Rip-Wtlns-DC

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- 1 Wetlands provide functional soil and water resources on most acres, consistent with their flood regime and flood potential, and provide diverse habitats for native species. Wetlands are in or trending toward proper functioning condition.
 - 2 Consistent with the natural hydrologic cycle, wetland vegetation has a variety of age classes ranging from young to old and a composition of native species that reflects the individual wetland types. Plant composition can vary considerably at the fine- and mid-scales depending on site potential (as determined by TEUI or other appropriate ecological classification system) and geomorphology, elevation, climate, topography, soils, and smaller scale disturbances. Wetlands include vegetation that indicates maintenance of riparian soil moisture characteristics.

Desired Conditions for Springs

FW-Rip-Spr-DC

- 1 Springs have functional soil, water, and vegetative resources consistent with natural water flow patterns, recharge rates, and geochemistry appropriate for the site.
- 2 Spring vegetation has young, mid, and late seral stages and a composition of native aquatic and riparian species consistent with spring type, slope, aspect, natural disturbances, and natural solar energy budget (amount of radiation during different times of the year).
- 3 Spring riparian zones are capable of filtering sediment, capturing and/or transporting bedload, improving or maintaining water quality, providing groundwater recharge and supporting perched water-bearing zones within their natural potential, consistent with the spring type.

All Terrestrial ERUs

FW-TerrERU-All-DC

- 1 Each ERU contains a mosaic of vegetation conditions, densities, and structures. This mosaic occurs at a variety of scales across landscapes and watersheds, and reflects the natural disturbance regimes affecting the area.
- 2 Within their type and capability, terrestrial ERUs are functioning properly and are resilient to the frequency, extent, intensity, and severity of disturbances, such as fire in fire-adapted systems, and adapt to climate variability. Natural and human disturbances provide desired overall plant density, species composition (mix of species), structure, coarse woody debris, and nutrient cycling. Desired disturbance regimes, including fire, are restored where practical.
- 3 Vegetation and stream ecosystems are connected based on natural patterns that are consistent with landforms and topography and provide for upland and aquatic species movements and genetic exchange.
- 4 Vegetation conditions allow for inclusions and variability within the landscape as well as for transition zones or ecotones between riparian areas, forests, woodlands, shrublands, and grasslands. Transition zones shift in time and space due to factors affecting site conditions (such as fire or climate). Stringers persist where they naturally occur. For example, pine stringers are noncontiguous narrow communities of pine (often large old trees) that extend into lower elevation vegetation.
- 5 Vegetation provides ecologically sustainable amounts of products, such as wood fiber or forage.

Guidelines for All Terrestrial ERUs

FW-TerrERU-All-G

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- 1 Management activities such as vegetation treatments or other restoration actions should be designed to maintain or move toward desired conditions, to minimize impacts to other uses and resources, and to maintain biodiversity created by inclusions, landscape variability, and transition zones.
 - 3 If needed to support restoration activities, seeding with native species appropriate for the ecological unit (or similar in elevation, soil type, and ecosystem) should be used to restore the desired native species composition of the area. Use of desirable, non-native plant materials may be allowed where native plant materials are unavailable, cost-prohibitive, insufficient to address site-specific problems, and the non-native plant materials do not impede re-establishment of native species.

Grassland ERUs

General Description and Background for Grassland ERUs

The Coconino NF has three different grassland ERUs: Semi-desert Grassland, Great Basin Grassland (also known as Colorado Plateau/Great Basin Grassland), and Montane/Subalpine Grassland. One of the defining characteristics of grasslands is the amount of canopy cover, generally less than 10 percent. Many of these grasslands within the Forest boundary are at least partially in private ownership.

There are two grassland ERUs within analysis boundary. These are montane/subalpine and Great Basin grasslands.

Montane/Subalpine Grasslands

The higher elevation Montane/Subalpine Grassland ERU covers approximately 23,656 acres within lands managed by the Coconino NF. Typical locations of the montane portion include Kendrick Park, Antelope Park, and Bargaman Park whereas the subalpine portion is located on the San Francisco Peaks, on deeper soils with warmer, drier aspects than adjacent mixed conifer or spruce-fir vegetation. This ERU is more productive than Great Basin, and Semi-desert Grassland ERUs.

Great Basin Grasslands

Great Basin Grassland ERU are more arid than Montane/Subalpine Grassland ERU. They consist mostly of grasses with smaller amounts of forbs and shrubs. Trees can be present in trace amounts depending on the soil; however, tree canopy is increasing in some areas. Species include, but are not limited to, western wheatgrass, black grama, blue grama, galleta grass, hairy grama, spike muhly, and needle and thread grass. Trees may include sparse one-seed juniper, alligator juniper, red berry juniper, Utah juniper, and Colorado pinyon pine. Natural disturbances are weather, low-intensity/high-severity fire (from adjacent ERUs), and natural soil movement (such as natural shrink-swell and seasonal surface cracking).

Desired Conditions for Grassland ERUs

FW-TerrERU-Grass-DC

Landscape Scale (1,000 to 10,000+ acres)

- 1 Grasslands occur on soils classified as Mollisol or those with relatively thick organic surfaces. Canopy cover of trees and shrubs on grasslands is less than 10 percent. Grassland vegetation is dominated by native grasses, forbs and annuals of varying seral stages where they naturally occur. Early seral stages will typically contain more forbs, and as stages get older, they are dominated by more grasses and fewer forbs. Native plant species are present in natural patterns of abundance and density, and regenerate successfully in most years depending on seasonal climatic conditions. At the landscape scale, overall plant composition is similar to site potential (greater than 66 percent). Plant

composition can vary considerably at the fine- and mid-scales depending on site potential (as determined by TEUI or other appropriate ecological classification system) and climate, topography, soils, and smaller scale disturbances. Succulents are present on more arid sites.

- 3 Grasslands are connected based on the distribution of soils classified as Mollisol or those with relatively thick organic surfaces and are not fragmented.

Mid-Scale (10 to 999 acres)

- 6 In Montane Grasslands, soil surface structure is granular or well aggregated, which promotes water infiltration at natural rates and reduces runoff. Natural surface drainages and subsurface flow patterns maintain water flow into connected waterbodies or streams.

Guidelines for Grassland ERUs

FW-TerrERU-Grass-G

- 2 Grassland composition, structure, and productivity and soil function should be protected and enhanced using methods such as fencing, aerating soil (decompacting soils), improved grazing strategies, or strategic location of constructed waters or of roads.

Pinyon Juniper ERUs

General Description and Background for Pinyon Juniper ERUs

There are three pinyon juniper ERUs on the Coconino NF: Pinyon Juniper with Grass (includes Juniper with Grass), Pinyon Juniper Evergreen Shrub, and Pinyon Juniper Woodland (also called Pinyon Juniper (persistent)). All three occur in the analysis boundary. Where?

Desired Conditions for Pinyon Juniper ERUs

FW-TerrERU-PJ-DC

- 3 In Pinyon Juniper with Grass, fires typically occur every 1 to 35 years with low severity and patches of mixed severity (Fire Regime I) favoring regrowth and germination of native grasses and forbs.
- 4 In Pinyon Juniper with Grass, scattered shrubs and a dense herbaceous understory including native grasses, forbs, and annuals, are present to support frequent surface fires. Shrubs average less than 30 percent canopy cover. At the landscape scale, overall plant composition is similar to site potential (greater than 66 percent), but can vary considerably at the fine- and mid- scales owing to a diversity of seral conditions. The seral state proportions contained in appendix E apply at the landscape scale, where low overall departure from reference proportions is a positive indicator of ecosystem condition.
- 9 In Pinyon Juniper Evergreen Shrub, the understory is dominated by low to moderate density of shrubs, depending on seral stage. The shrub component consists of one or a mix of evergreen shrub, oak, manzanita, mountain mahogany, sumac, skunk bush, Fremont barberry, and other shrub species, which are well distributed. A variety of low- to high-growing native perennial and annual grasses and forbs are present in the interspaces. Shrubs average greater than 30 percent canopy cover. At the landscape scale, overall plant composition is similar to site potential (greater than 66 percent), but can vary considerably at fine- and mid-scales owing to a diversity of seral conditions. The seral state proportions contained in appendix E apply at the landscape scale, where low overall departure from reference proportions is a positive indicator of ecosystem condition.

Guidelines for Pinyon Juniper ERUs

FW-TerrERU-PJ-G

- 1 In all pinyon juniper ERUs, soils classified as Mollisols should be managed toward grassland desired conditions.
- 2 In areas where there is little understory and treatments are proposed, slash treatments (such as lop and scatter and mastication) should be used that improve herbaceous vegetation growth, watershed condition, and soil productivity. The intent is to encourage response in herbaceous vegetation and allow smaller debris to decompose in place on the ground.

Aspen and Maple

General Description and Background for Aspen and Maple

Aspen is an early seral shade-intolerant species that occurs as groups or clones. Its distribution can vary in space and time and is influenced by soil type, soil moisture, low temperatures, and disturbances (primarily wildfires, but occasionally flooding) that stimulate root sprouting and colonization. Aspen sites may or may not have a significant conifer component depending on successional status. Aspen primarily occurs in the Mixed Conifer with Infrequent Fire and Spruce-Fir ERUs, but may also be found in cool moist locations in the Mixed Conifer with Frequent Fire and Ponderosa Pine ERUs.

Maple is a shade-tolerant later seral species generally found in wetter and cooler sites, canyons, and draws. It is currently more abundant in the bottom than in the top of snow-melt drainages on the Mogollon Rim. Bigtooth maple is a deciduous tree or shrub and its form is dependent on the moisture regime. It is generally fire-tolerant, sprouting from root crowns after low to moderate severity burns. The white fir/bigtooth maple community represents a unique vegetation type found in Arizona at only a few locations along the Mogollon Rim. It is important wildlife habitat especially for birds and black bears.

Desired Conditions for Aspen and Maple

FW-TerrERU-AspMpl-DC

- 1 Where they naturally occur, all age classes of aspen and maple are present in groups or patches and are regenerating and vigorous, providing habitat for a variety of species. Natural and human disturbances are sufficient to maintain desired overall tree density, structure, species composition, coarse woody debris, and nutrient cycling. The size and number of patches depend on the scale and type of disturbance as well as microsite conditions such as elevation, soil type, aspect, and site productivity. A diverse understory consisting of native graminoids, forbs, and/or shrubs is present and has a variety of seral stages and age classes.

Guidelines for Aspen and Maple

FW-TerrERU-AspMpl-G

- 1 Where needed, aspen and maple should be protected from excessive herbivory using methods such as fencing that protect regeneration and recruitment. Fences should be removed when no longer needed to allow wildlife and human access.

Management Approaches for Aspen and Maple

Regularly inspect and maintain fences used to protect aspen and maple to ensure recovery

Ponderosa Pine

Mid-Scale (10 to 999 acres)

FW-TerrERU-PP-DC

- 10 Diversity of understory species (such as grasses, forbs, and shrubs) is within the capability of the site and provides for water infiltration and soil stability. The understory has a variety of heights of cool and warm season vegetation and produces seed heads and all age classes of vegetation food and cover for wildlife and forage for livestock. A mosaic of dense cover, high amounts of litter, and bare ground provide habitat for a variety of species.

All Mixed Conifer ERUs

Desired Conditions for Mixed Conifer ERUs

FW-TerrERU-MC-All-DC

- 2 Native herbaceous and shrub species occur in natural patterns of abundance and density with varying seral stages ranging from young to old and are regenerating successfully. The amount of shrub cover depends on the TEUI unit. At the landscape scale, overall plant composition is similar to site potential (greater than 66 percent), but can vary considerably at fine- and mid- scales owing to a diversity of seral conditions. The seral state proportions contained in appendix E apply at the landscape scale, where low overall departure from reference proportions is a positive indicator of ecosystem condition.

Mixed Conifer with Frequent Fire

Landscape Scale (1,000 to 10,000+ acres)

FW-TerrERU-MC-MCFF-DC

- 4 The composition, structure, and function of vegetation conditions are resilient to the frequency, extent, intensity, and severity of disturbances and to climate variability. The landscape is a functioning ecosystem that contains all its components, processes, and conditions that result from natural levels of disturbances (such as insects, diseases, fire, dwarf mistletoe, drought, and wind) including: snags, downed logs, and old trees which allows for the establishment and sustainability of the desired forest structure over time. Graminoids, forbs, shrubs, needle cast (fine fuels), and small trees maintain the natural fire regime. Vegetative ground cover provides protection from accelerated soil erosion, promotes water infiltration, and contributes to soil nutrient cycling, plant and animal diversity, and to ecosystem function.
- 8 Ground cover consists primarily of perennial grasses and forbs capable of carrying surface fire, with basal vegetation values ranging between about 5 and 20 percent, depending on the TEUI (soil) unit. Fires burn primarily on the forest floor and do not spread between tree groups as crown fire, but may result in torching of single trees or tree groups.

Fine Scale (less than 10 acres)

FW-TerrERU-MC-MCFF-DC

- 10 Trees typically occur in irregularly shaped groups and are variably spaced with some tight clumps. Crowns of trees within the mid-aged to old groups are interlocking or nearly interlocking. Old-growth groups are trees having similar characteristics and conditions. Such groups may include

fairly similar tree ages and sizes or combinations of ages and sizes, limited amounts of dead and downed material, and dead trees and spike tops, but they are readily distinguished from adjacent groups having different characteristics. In local areas, trees are randomly distributed. Interspaces surrounding tree groups and patches are variably shaped and composed of a mix of graminoids, forbs, and shrubs. Some natural openings contain individual trees or snags.

Mixed Conifer with Infrequent Fire ERU

Mixed Conifer with Infrequent Fire is also known as Wet Mixed Conifer. It covers approximately 37,143 acres within lands managed by the Coconino NF, and is generally on moister sites than Mixed Conifer with Frequent Fire such as higher elevations on the San Francisco Peaks or **along the Mogollon Rim**. It may also occur in canyons and north-facing slopes such as on Hutch Mountain and Mormon Mountain. Tree species composition varies depending on seral stage, elevation, and moisture availability. This ERU can be composed of dominant and codominant species such as: Douglas-fir, New Mexico locust, southwestern white pine and limber pine, and late seral species such as maple, and white fir. Ponderosa pine may be present in minor proportions. The absence of significant proportions of Engelmann spruce and/or corkbark fir distinguishes Mixed Conifer with Infrequent Fire from the Spruce-Fir ERU.

Fine Scale (less than 10 acres)

- 10 Small openings are present as a result of disturbances. Some openings may support grasses, forbs, and shrubs and provide habitat for species such as Colorado blue columbine, Rusby milkvetch, Oregon willow herb, and timberland blue-eye grass.

Forest Products

General Description for Forest Products

Forest products generally include botanical products, such as boughs, cones, fruits, seeds and plants and are provided using special use permits. Small amounts of these product are generally provided without permit for personal use..

Desired Conditions for Forest Products

FW-FProd-DC

- 1 The Coconino NF provides a sustainable supply of forest products consistent with other resource desired conditions and applicable laws and regulations. This supply contributes to the stability and social, **economic**, and **cultural** aspects of the communities in central and northern Arizona.
- 3 Traditional and ceremonial tribal uses for forest products, such as the collection of medicinal plants, wild plant foods, basketry materials, kiva beams, and firewood, are available under conditions and procedures that minimize restrictions and are consistent with laws, regulations, and agreements with **tribes**.

Wildlife, Fish, and Plants

General Description and Background for Wildlife, Fish, and Plants

Species are primarily dependent on the condition of their habitats. The plan addresses species needs by providing guidance to maintain and/or enhance habitat elements that are important for species found on the forest, in addition to addressing threats specific to habitat and providing guidance for species-specific threats. Guidance to manage species is found in this section on Wildlife, Fish, and Plants, as well as in the sections of this plan that relate to their habitats and specific resources like recreation.

Desired Conditions for Wildlife, Fish, and Plants

FW-WFP-DC

- 1 Properly functioning ecosystems and ecologically responsible forest activities support sustainable populations of native plant and animal species distributed throughout their potential natural range. Properly functioning ecosystems reflect the diversity, quantity, quality, and site potential of natural habitats on the Forest. Habitat is available at the appropriate spatial, temporal, compositional, and structural levels for a wide variety of species.
- 3 Terrestrial ERUs and riparian areas provide the necessary physical and biological habitat components for carrying out growth, reproduction, survival, dispersal, and other key life cycle needs of associated native species.
- 5 The composition, structure and function of ERUs and associated physical elements (such as canyons, cliffs, caves, karst, talus slopes, rock piles, specific soil types, springs, wet areas, and other special features) provide functioning habitat and refugia to support populations of federally listed, Southwestern Region sensitive species, narrowly endemic species, and species with restricted distributions.

Guidelines for Wildlife, Fish, and Plants

FW-WFP-G

- 10 Projects and management activities should be designed and implemented to maintain refugia and primary life cycle needs of Southwestern Region sensitive species and to protect and provide for narrowly endemic species and species with restricted distributions where they are likely to occur.

Desired Conditions for Established and Proposed Research Natural Areas and Designated Botanical and Geological Areas

The 339-acre Mogollon Rim Botanical Area preserves a representative portion of a white fir/bigtooth maple community. This community represents a unique vegetation community in Arizona and is found only at a few locations along the Mogollon Rim.

The Mogollon Rim Botanical Area is part of a larger area along the Mogollon Rim known as the “snow-melt draws”. This area is generally characterized by steep slopes or canyon bottoms and provides habitat for a diverse community of organisms including a wide variety of songbirds. The botanical area was impacted by the Packrat Fire (2002) which has resulted in the loss of the white fir overstory in some areas.

SA-RNABotGeo-DC

5 The unique characteristics of botanical and geological areas are protected and maintained. The inherent physical and biological processes of botanical areas and geological areas are sustained, and not negatively impacted from human activities or permitted uses. Natural processes continue to shape and define the unique features, characteristics, and formations of these areas.

6 Botanical areas and geological areas provide opportunities for study, monitoring, and interpretation.

Guidelines for Established and Proposed Research Natural Areas and Designated Botanical and Geological Areas

SA-RNABotGeo-G

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- 1 To support the area's purpose, human activities, permitted uses, and types and levels of access should be managed to protect the uniqueness and/or ecological condition of these special areas, and the values for which they were designated, established, or proposed.
 - 2 In established and proposed research natural areas, fire management activities should be designed and implemented to mimic natural fire processes and should be compatible with ongoing research.
 - 3 Fire should be managed using minimal impact suppression tactics or other appropriate suppression tactics to protect the resources for which research natural areas, botanical areas, and geological areas were designated, established, or proposed.
 - 4 Allotment management plans should have provisions to protect the uniqueness and/or ecological condition of these designated, established, or proposed special areas that occur within an active grazing allotment.

Invasive Species

General Description and Background for Invasive Species

Executive Order 13112 defines an invasive species as any species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species generally possess one or more of the following characteristics: aggressive and difficult to manage; poisonous; toxic; parasitic; a carrier or host of serious insect or pathogen; and being non-native, new, or not common to the United States or parts thereof. Invasive species pose an increasing threat to the integrity of ecosystems by decreasing native plant and animal diversity, increasing soil erosion and sedimentation, and interfering with natural fires regimes. Reducing the threat of aquatic and terrestrial invasive species will allow the Coconino NF to better manage resilient landscapes and species populations that have a greater capacity to survive natural disturbances and uncertain future environmental conditions such as those driven by climate change and increasing human uses.

Invasive species include aquatic and terrestrial vertebrates, invertebrates, plants, and pathogens. Priority infestations or populations have the greatest threats to native species populations, watershed condition, ecosystem health, and biological diversity.

Desired Conditions for Invasive Species

FW-Invas-DC

- 1 Invasive species are absent or exist at levels where they do not disrupt ecological composition, structure, and function; do not disrupt the natural fire regime; or do not affect the sustainability of native and desirable non-native species.
- 2 Infestations of invasive species are detected at an early stage.

Guidelines for Invasive Species

FW-Invas-G

- 1 Measures should be incorporated into authorized activities, project planning, and implementation to prevent, control, contain, and eradicate priority infestations or populations of invasive species to ensure the integrity of native species populations and their habitats is maintained.

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- 2 Integrated pest management approaches and other treatments to control invasive species should be used to improve watershed condition and maintain ecosystem function while minimizing project impacts on native species.¹
 - 3 Weed-free plant material should be selected for all seeding and mulching projects to restore natural species composition and ecosystem function to the disturbed area. Plant or seed materials should be used that are appropriate to the site, capable of becoming established, and are not invasive.

Management Approaches for Invasive Species

Maintain a current inventory of invasive species on forest lands. For plant inventories, prioritize areas of unique and rare habitats first, areas of high use and disturbance second (such as material pits, trailheads, campgrounds, corrals, roads, boat ramps, and bridges), and areas where invasive species are just getting established.

Prioritize areas such as wilderness, research natural areas, botanical areas, wild and scenic areas, and riparian areas for control of invasive species to maintain and restore the integrity of native species and ecosystems. Promote early detection of new populations of invasive species and rapid management response as an effective approach to minimize spread.

Coordinate with stakeholders and the public to reduce, minimize, or eliminate the potential introduction, establishment, spread, and impact of non-native invasive species and to monitor the effectiveness of project design features.

Encourage the prevention of accidental introduction and spread of invasive species carried by contaminated vehicles, equipment, personnel, or materials (including plants, wood, plant/wood products, water, soil, rock, sand, gravel, mulch, seeds, grain, hay, straw, animal feeds, or other materials).

This guidance supplements the plan direction for non-native invasive plants

Guidelines for All Recreation

FW-Rec-All-G

- 6 Forest visitors with recreational stock should carry hay, cubed, pelleted, or rolled feed that is certified weed-free to prevent the spread of invasive plants.

Desired Conditions for Developed Recreation

FW-Rec-Dev-DC

- 9 In and around developed sites, **invasive weeds** and invasive aquatic organisms are not established or transported.

Desired Conditions for C.C. Cragin Watersheds Management Area

MA-CCCrg-DC

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1. There is low risk of substantial damage from uncharacteristic fire and recreation to water supply, infrastructure, water quality, visual quality, and cultural integrity (such as tribes and local communities).

Guidelines for C.C. Cragin Watersheds Management Area

MA-CCCRg-G

- 1 The C.C. Cragin Watersheds MA should be managed to reduce the threat of uncharacteristic wildfires, flooding, and sedimentation, and to maintain water quality and quantity.
- 2 Roads and trails within the C.C. Cragin Watersheds MA should be maintained to prevent erosion and sedimentation and to protect existing infrastructure.

Tonto National Forest Plan (1985)

Common to all areas

Standards and Guidelines

Replacement page 40-1

- Identify, survey, map, and analyze habitat for all Federally-listed species. Identify management conflicts and enhancement opportunities. Correct any management conflicts or problems.
- Identify, survey, map, and analyze habitat for all state species as listed in Threatened Native Wildlife in Arizona. Correct any management conflicts or problems.
- Continue to clear all projects for threatened, endangered, proposed, and candidate plant and animal species. Clearances will be done by a Wildlife Biologist and reviewed by the Forest Biologist.
- New additions of listed, proposed, or candidate species by the US Fish and Wildlife Service will be protected.
- Where appropriate and feasible, culture and stock candidate plants such as Chiricahua Dock (*Rumex orthoneurus*) into suitable habitats to eliminate the need for formal listing by the US Fish and Wildlife Service
- Maintain a minimum of 30% effective ground cover for watershed protection and forage production, especially in primary wildlife forage producing areas. Where less than 30% exists, it will be the management goal to obtain a minimum of 30% effective ground cover.
- Habitat requirements for endangered species will have precedence over threatened species. Habitat requirements for threatened, endangered, and **sensitive species** will take precedence over requirements for other species and habitat requirements for **sensitive species** will take precedence over non-sensitive species.

Wildland Fire will receive an appropriate management response and be managed consistent with Wilderness resource objectives. Naturally occurring fires may be used to play as nearly as possible their natural ecological role and to reduce unnatural fuel hazards as identified in the Forest Service Manual and approved Wilderness Implementation Plan.

All reported wildland fires will receive a strategic fire size-up. Wildland fires meeting locally developed operating guidelines listed below may be managed for resource benefit.

1. Fire cause is from a natural ignition.

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2. Fire does not threaten life, property, public and firefighter safety.
 3. Fire does not threaten fire sensitive cultural resources.
 4. ADEQ, Air Quality Division procedures and guidelines for consultation and management of smoke will be implemented.
 5. Wildland Fire managed for resource benefit must meet Tonto, Regional, and National fire situation parameters.
 6. No site specific resource objective is threatened.

For each wildland fire located in an FMU approved for wildland fire use and naturally ignited, a decision criteria checklist will be prepared to determine whether or not it should be declared a Wildland Fire use candidate. If approved, a Wildland Fire Implementation Plan (WFIP) will be prepared that identifies specific resource concerns.

Designated Wildland Fires managed for resource benefit will be monitored according to established guidelines.

Wildland Fire suppression actions using accepted fire management tactics will be taken if any of the above parameters are not met. Suppression of fires, or portions thereof, will be undertaken where they adversely affect forest resources, endanger public safety and/or have potential to damage private lands.

Management Area 4D Payson Ranger District – Mogollon Rim Area

Description: This management area includes the ponderosa pine forested area below the Mogollon Rim. The area includes 13 developed and public service sites totaling 169 acres. Most of the area is ponderosa pine forest with the exception of 610 acres of riparian. 81 percent of the ponderosa pine forest occurs on slopes less than 40 percent.

Management Emphasis: Manage for a variety of renewable resource outputs with primary emphasis on intensive, sustained yield timber management, timber resource protection, creation of wildlife habitat diversity, increased populations of emphasis harvest species, and recreation opportunity. Timber harvesting methods and timing will include improvement of wildlife habitat quality and watershed condition, and will consider impacts on intensive range and recreation management. Mining activities are authorized in conformance with existing laws and regulations. Visual quality protection will be emphasized in the area (Analysis Area 5542) of the Highline Trail, a National Recreation Trail. Wildland Fires will be managed consistent with resource objectives. Wildland Fires will be managed with an appropriate suppression response. Fire management objectives for this area include: providing a mosaic of age classes within the total type which will provide for a mix of successional stages, and to allow fire to resume its natural ecological role within ecosystems. Wildland Fires or portions thereof, will be suppressed when they adversely affect forest resources, endanger public safety, or have a potential to damage significant capital investments.

Standards and Guidelines

- Aspen stands should be periodically harvested to achieve wildlife benefits. A 20 year rotation retaining some old growth has been proposed. The oak component of the conifer types and the encinal oak type will be maintained. Oak may be cut to improve spacing and sprouting. Thickets can be cut to thin but retain at least 40% of the stand. When thinning stands, retain large trees contributing the bulk of the mast crop. Manage oak to enhance band-tailed pigeon and whitetail deer habitat, especially within 1/2 mile of water.

- Retain alligator-juniper as a component where it occurs in commercial forest land. Replacement page 130.
- Habitat requirements for threatened, endangered and sensitive species will take precedence over requirements for other species Replacement page 131
- Exclude cable logging on the face of the Mogollon Rim replacement page 132.
- Manage noncommercial species within the pine type to maintain their representation in the vegetative diversity.
- Manage the oak component to maximize an optimum mix of mast and browse to accomplish wildlife objectives. Replacement page 133
- Ensure the silvicultural prescriptions and logging practices provide adequate protection of the Chihuahua pine stand and other biological benchmarks. Page 134.
- If necessary, maintain animal control fencing on reforestation plots until the regenerated stands are fully established. Page 134.
- Use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Replacement Page 136-1.

Management Area 4F Payson Ranger District – General Management Area

Description: This management area is comprised of several vegetation types, including ponderosa pine. 89 percent of the ponderosa pine forest occurs on slopes less than 40 percent, but the ponderosa pine vegetation type represents only about 3.5 percent of the management area.

Management Emphasis: Wildland Fires will be managed consistent with resource objectives. Wildland Fire not meeting management objectives will receive an appropriate suppression response. Fire management objectives for this area include: providing a mosaic of age classes within the total type which will provide for a mix of successional stages, and to allow fire to resume its natural ecological role within ecosystems. Wildland Fires or portions thereof will be suppressed when they adversely affect forest resources, endanger public safety, or have a potential to damage significant capital investments.

Sonoran Desert and Riparian vegetative types will be protected from fire except where separate burn plans have identified an ecological need.

Standards and Guidelines

- Continue periodic inspection and maintenance of existing wildlife exclosures and restoration projects. Develop report as needed to describe results of studies. Improve the level of protection and maintenance at these sites to ensure their continued informational value for wildlife management. Replacement Page - 140
- Integrate habitat needs through prescribed fire within fire suppression objectives. Replacement Page - 140
- Use prescribed fire as necessary to enhance natural regeneration. Replacement Page - 142
- All except Riparian Areas - Use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Replacement Page 143-1

Management Area 5A Pleasant Valley Ranger District – Sierra Ancha Wilderness

Management Emphasis: Manage for wilderness values, wildlife habitats and natural ecological processes while allowing livestock grazing and recreation opportunities that are compatible with maintaining these values and processes. Replacement Page 144. Wilderness areas are not scheduled for treatment in this analysis.

Management Area 5D Pleasant Valley Ranger District – Mogollon Rim-Sierra Ancha Area

Management Emphasis: Manage for a variety of renewable resource outputs with primary emphasis on intensive, sustained yield timber management, timber resource protection, creation of wildlife habitat diversity, increased populations of emphasis harvest species, and recreation opportunity. Timber harvesting methods and timing will include improvement of wildlife habitat quality and watershed condition, and will consider impacts on intensive range and recreation management. Replacement page 151.

The dominant vegetation type in this management area is ponderosa pine (99%). 72 percent of the ponderosa pine in the management area occurs on slopes that are 40 percent or less. However, a large portion of the ponderosa pine forest is unsuitable for timber operations (USDA Forest Service 1985).

Standards and Guidelines

- Aspen stands should be periodically harvested to achieve wildlife benefits. A 20 year rotation retaining some old growth has been proposed. Page 154.
- The oak component of the conifer types and the encinal oak type will be maintained. Oak may be cut to improve spacing and sprouting. Thickets can be cut to thin but retain at least 40% of the stand. When thinning stands retain large trees contributing the bulk of the mast crop. Manage oak to enhance band-tailed pigeon and whitetail deer habitat, especially within 1/2 mile of water. Page 154.
- Retain alligator-juniper as a component where it occurs in commercial forest land. Page 154.
- Continue monitoring wildlife exclosures and restoration projects. Develop reports as needed to describe results of studies. Improve the level of protection and maintenance at these sites to ensure their continued informational value for wildlife management. Page 154.
- Habitat requirements for threatened, endangered, and sensitive species will take precedence over requirements for other species. Replacement Page 155.
- Exclude cable logging along the face of the Mogollon Rim. Replacement Page 156.
- Manage noncommercial species within the pine type to maintain their representation in the vegetative diversity. Replacement Page - 157
- Manage the oak component to maximize an optimum mix of mast and browse to accomplish wildlife objectives. Replacement Page - 157
- If necessary, maintain animal control fencing on reforestation plots until the regenerated stands are fully established. Replacement Page - 157

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- Use prescribed fire for seedbed preparation to enhance natural regeneration and control of competing species such as juniper. Replacement Page – 157

Management Area 5E Pleasant Valley Ranger District – Sierra Ancha Experimental Forest

Management Emphasis: The Experimental Forest was established and is managed for purposes of research on vegetative treatments for increasing water yield. The Experimental Forest is operated by the Rocky Mountain Research Station, Flagstaff, Arizona, often cooperatively with Arizona State University and the University of Arizona. Replacement Page 161. The Sierra Ancha Experimental Forest will not be treated under this analysis. It contains occurrences of the Region 3 sensitive plant, Arizona bugbane.

Management Area 5G Pleasant Valley Ranger District – General Management Area

Management Emphasis: Manage for a variety of renewable natural resources with primary emphasis on wildlife habitat improvement, livestock forage production, and dispersed recreation. Watersheds will be managed so as to improve them to a satisfactory or better condition. Improve and manage the included riparian areas (as defined by FSM 2526) to benefit riparian dependent resources. Replacement Page – 164

This management area contains riparian, chaparral/pinyon-juniper and ponderosa pine vegetation types. The ponderosa pine vegetation type forms about 28 percent of the management area. 77 percent of the ponderosa pine forest is on slopes of less than 40 percent.

Standards and Guidelines

- Continue periodic inspection and maintenance of existing wildlife enclosures and restoration projects. Develop report as needed to describe results of studies. Page 166.
- Integrate habitat needs through prescribed fire within fire suppression objectives. Page 166.
- Manage the chaparral type on a 30-year prescribed fire rotation on those sites managed intensively for forage production and water yield. Page 166.
- All except Riparian Areas. Use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Replacement Page 168-1.

Management Area 6J Tonto Basin Ranger District – General Management Area

Management Emphasis: Manage for a variety of renewable natural resources with primary emphasis on wildlife habitat improvement, livestock forage production, and dispersed recreation. Watersheds will be managed so as to improve them to a satisfactory or better condition. Improve and manage the included riparian areas (as defined by FSM 2526) to benefit riparian dependent resources. Replacement Page 193.

Ponderosa pine forms only a small portion (about 2%) of this Management Area and is unsuitable for timber operations.

Sonoran Desert and Riparian vegetative types will be protected from fire except where separate burn plans have identified an ecological need. Replacement page 193.

Standards and Guidelines

- Continue periodic inspections and maintenance of existing wildlife enclosures and restoration projects. Develop report as needed to describe results of studies. Improve the level of protection

and maintenance at these sites to ensure their continued informational value for wildlife management. Page 195.

- Integrate habitat needs through prescribed fires within fire suppression objectives. Page 195.
- Manage the chaparral type on a 30 year prescribed fire rotation on those sites managed intensively for increased forage production and water yield. Page 195.
- All except Riparian-Use prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Replacement Page 198

Noxious or Invasive Weed NEPA Guidance

Each of the three forests in the project area has completed NEPA analyses to address noxious or invasive weed management within their forest boundary. In addition to guidance provided by individual Forest Plans, Forest Service Manual and Handbook, Executive Order, and state laws, guidance for noxious or invasive weed management will be dependent on the appropriate NEPA document. Each of these documents contains analyses for the weed species of concern, analyses of effects, control methods. Best management practices and mitigations by forest. Each is incorporated into the respective forest plan buy amendment (Tonto NF) or through incorporation into the recently revised Forest Plans.

Weed management for the Coconino National Forest is addressed in the Final Environmental Impact Statement for *Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests* (USDA Forest Service 2005)

Weed management for the Apache-Sitgreaves National Forest is addressed in the *Environmental Assessment for the A-SNFs Integrated Forest-Wide Noxious or Invasive Weed Management Program* (USDA Forest Service 2008)

Weed management for the Tonto National Forest is addressed in the *Environmental Assessment for Integrated Treatment of Noxious or Invasive Plants* (2012)

Units of Measure

The following are analysis questions and the indicators used to evaluate environmental consequences specific to Region 3 Forest Service sensitive plant species and noxious and invasive weeds. These analysis questions will be tracked throughout the effects analysis in order to address whether, or to what degree, the project meets the purpose and need and complies with law, regulation, policy and the forest plan direction. Specific analysis questions also respond to public concerns and issues brought up during scoping. A quantitative and/or qualitative indicator has been developed for each analysis question.

Analysis questions to be answered

- How would proposed treatments affect Region 3 Forest Service sensitive plant species?. The indicators used to evaluate environmental consequences are: (1) a qualitative evaluation of whether populations are maintained or increased per FSM 2760. 5(19), (2) a qualitative evaluation of whether potential habitat is maintained or enhanced, (3) an evaluation of whether impacts to sensitive plants and their habitats are effectively minimized, and, (4) an evaluation on habitat and species resiliency to natural disturbances including fire and climate change.

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- A unit of measure for Region 3 Sensitive Species is to maintain or increase the populations within the project area. Additionally, potential habitat for these Region 3 Sensitive Species should be maintained or enhanced.
 - How would project activities affect interactions between noxious or invasive weeds and Southwestern Region sensitive plants?
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 - How would project activities affect the presence of noxious or invasive weeds? (1) qualitative evaluation of compliance with the Forest Plans and direction of existing noxious or invasive weed treatment documents or each forest (2) qualitative evaluation on whether noxious weeds and non-native invasive would have the potential to increase with mitigation, best management practices, and design features applied, (3) qualitative evaluation of the conflict between noxious or invasive weeds and the Region 3 Sensitive Plants,
 - The management actions undertaken in this project are complementary and enhance the control objectives for each noxious or invasive weed species as identified in each Forest's EIS/EA for weed management
 - Appropriate treatments to mitigate the effects of management actions on noxious or invasive weeds are incorporated into the project design and implementation.

There are no measures for Threatened and Endangered plants, because none occurs within the analysis boundary.

Affected Environment and Environmental Consequences

This section details the affected environment and environmental consequences for the threatened, endangered and Region 3 sensitive plants and noxious or invasive weeds within the project area. It establishes the baseline against which the decision maker and the public can compare the effects of all action alternatives.

This section also describes the direct, indirect, and cumulative effects of implementing each alternative on threatened, endangered and Region 3 Sensitive plants and noxious or invasive weeds in the analysis area. It presents the scientific and analytical basis for the comparison of the alternatives presented in Alternatives section. NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502. 16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Assumptions

The environmental effects disclosed in this document are based on the following assumptions:

- All relevant laws, regulations, manual guidance and Forest Service policy relating to management of the resources discussed within are followed during analysis and implementation.
- Management will follow the guidance of the Forest Plans.

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- Silviculture and prescribed burning treatments will be implemented as written and addressed in the Silviculture and Fire Specialist's Reports and not substantially modified without review of the effects of such actions.
 - Management actions for activities related to roads and transportation as well as spring and channel restoration will be implemented as addressed in their respective reports and not substantially modified without review of the effects of such actions.
 - Prescribed fires will be of lower severity and intensity in any given area compared to large-scale wildfires in the same area so the amount of disturbance from prescribed burning is less than compared to wildfires.
 - Fire effects to individual species vary depending on several factors including life cycle, time of burning and several biotic and abiotic factors (see Pyke et al, 2010). As a result, the responses of the plant species discussed in this report may vary in any given area or time. The effects of fire on these species will be mitigated through the burning prescription.
 - Areas to be treated will be surveyed for Region 3 sensitive plants before and after treatments are implemented. These factors should be considered when identifying survey needs
 - Target special features and microhabitat needed by the species of interest. This is generally only a small portion of the area, and is estimated to be 5% or less of any given area.
 - Survey and mitigation will be based on the likelihood of any of the species addressed in this document occurring within the treatment area. Not all areas contain suitable habitat for a given species.
 - The amount of disturbance predicted to occur during treatment. For example, surveys may not be needed in areas scheduled for prescribed burning if the treatments are scheduled to be of low intensity.
 - Areas to be treated will be surveyed for noxious or invasive weeds before and after treatments are implemented. These factors should be considered when identifying survey needs
 - Likelihood of any of the species addressed in this document occurring within the treatment area
 - Amount of disturbance. For example, surveys may not be needed in areas scheduled for prescribed burning if the treatments are scheduled to be of low intensity.
 - The mitigations and Best Management Practices addressed in this document are included in analysis and project implementation.
 - The acreage of potential disturbance in this project is much larger than generally analyzed in similar projects, necessitating more noxious or invasive weed treatments to control invasive species. This will lead to increases in personnel and budget to accomplish this need.

Federally Listed Threatened or Endangered Plants

The project area **does not include** any locations or potential habitat for Threatened or Endangered plant species.

Region 3 Sensitive Plants

Desired future conditions for Region 3 Sensitive plants with habitat or locations within the planning area include:

- **Maintain or increase** the populations within the planning area. Additionally, suitable habitat for sensitive plant species should be **maintained or enhanced**.
- **Follow Forest Plans and Manual Direction** as applicable to Region 3 sensitive plant species.

The indicators used to evaluate environmental consequences are:

-
- A qualitative evaluation of whether populations are maintained or increased per FSM 2670. 5(19)
 - A qualitative evaluation of whether potential habitat is maintained or enhanced
 - An evaluation of whether impacts to sensitive plants and their habitats are effectively minimized
 - An evaluation on habitat and species resiliency to natural disturbances including fire and climate change.

DRAFT

Table 3. Region 3 Sensitive species occurring within the analysis boundary.

Common name	Scientific Name	Forest	ERU/Habitat	Data source	Notes
Greene Milkweed	<i>Asclepias uncialis ssp. uncialis</i>	Apache Sitgreaves	Madrean/Pine-Oak woodland Great Basin Grassland	Apache Sitgreaves LMRP Wildlife Report (2016)	No documented occurrences and distribution is poorly known.
Villous groundcover milkvetch	<i>Astragalus humistratus var. crispulus</i>	Apache Sitgreaves	Narrow-leaf cottonwood/shrub. These occurrences are in the Rodeo-Chediski Fire (2002) and are in severely disturbed sites.	HDMS Data (Arizona Game and Fish Department 2006), SEINet	The Forest did not include this species as forest planning species in 2012. The species has limited distribution on the Forest and is considered a disturbance species. There were not enough data to determine a finding of effect at the forest planning scale. It is still addressed in site specific NEPA (USDA Forest Service 2014)
Arizona Bugbane	<i>Actaea (Cimicifuga) arizonica</i>	Coconino, Tonto	Ponderosa pine, Mixed Conifer with Aspen	HDMS, (Arizona Game and Fish Department 2012)SEINet and	Arizona bugbane occurs mostly in deep canyons.

Common name	Scientific Name	Forest	ERU/Habitat	Data source	Notes
				Forest Service files.	
Dane Thistle	<i>Cirsium parryi ssp. mogollonicum</i>	Coconino	Springs	Goodwin (2005)	Field notes prepared by Goodwin (2005) provide the most accurate location and condition description for this species.
Hairy Clematis (Arizona leatherflower)	<i>Clematis hirsutissima var. hirsutissima</i>	Coconino		FS files – at Hoe tank	Generally on limestone soils,
Mogollon Fleabane	<i>Erigeron anchana</i>	Tonto	Ponderosa pine/willow, ponderosa pine/evergreen oak, mixed conifer frequent fire.	SEINet, HDMS (Arizona Game and Fish Department 2003)	Rock crevices or ledges on boulders and vertical rock faces, usually in canyons, usually on granite (HDMS 2003)
Rock Fleabane	<i>Erigeron saxatilis</i>	Coconino	Ponderosa pine, Mixed Conifer Frequent Fire, narrow-leaf cottonwood/shrub, willow/alder, Mixed Conifer with Aspen	SEINet, HDMS, (Arizona Game and Fish Department 2003) NRM/TESP	Cliffs or vertical rock faces, usually on Coconino sandstone
Arizona Sneezeweed	<i>Helenium arizonicum</i>	Coconino, Apache Sitgreaves	Ponderosa pine Forest (wet meadows) Apache Sitgreaves NF.	SEINet, FS files and local knowledge, NRM/TESP	

Common name	Scientific Name	Forest	ERU/Habitat	Data source	Notes
			Ponderosa Pine Forest, Montane-subalpine grasslands. Coconino NF		
Eastwood (Senator Mine) Alumroot	<i>Heuchera eastwoodiae</i>	All	Ponderosa Pine Evergreen Oak,(TNF) Mixed Conifer Frequent Fire (TNF) Mixed Conifer with Aspen (TNF, A-S) Cottonwood Shrub (TNF), Ponderosa Pine/Willow (TNF, A-S) and Ponderosa Pine (A-S)	SEINet and HDMS (Arizona Game and Fish Department 2005)	Specimens for this species on the Coconino NF have been reclassified to another species (Folk and Alexander 2015)
Flagstaff beardtongue	<i>Penstemon nudiflorus</i>	Coconino	Ponderosa pine/Gambel oak	HDMS NRM/TEBP	
Blumer's Dock	<i>Rumex orthoneurus</i>	All	Fremont cottonwood/shrub, herbaceous, Mixed conifer frequent fire, mixed conifer with aspen, narrow leaf cottonwood/shrub, ponderosa pine/evergreen oak, ponderosa pine/willow and ponderosa pine forest.	SEINet and HDMS	
Bebb's Willow	<i>Salix bebbiana</i>	Coconino, Apache Sitgreaves	Montane willow riparian forest for hart prairie	SEINet	

Alternative 1 No Action

This discussion addresses the no action alternative for Greene milkweed, villous groundcover milkvetch, Arizona bugbane, Dane thistle, hairy clematis, Mogollon fleabane, Rock fleabane, Arizona sneezeweed, Eastwood alumroot, Flagstaff beardtongue, Blumer's dock and Bebb's willow. This discussion groups all of these species together because the effects of no action are the same. All of these species differ in location and habitat needs from each other. These topics are discussed below in each species section

Direct and Indirect Effects common to these species

Alternative 1 is the no action alternative. Under this alternative, none of the management actions including tree removal, burning, spring restoration, channel restoration, aspen restoration or actions related to road reconstruction, or decommissioning would occur. There would be no direct effects from management actions to these Region 3 sensitive species.

If the no action alternative were selected, none of the management actions would occur. There would be no tree cutting and no prescribed burning. As a result, tree density and canopy would not be reduced and stands would remain overstocked). Conditions associated with dense ponderosa pine stands result in physiologically stressful environments for understory plants (Laughlin, Moore and Fule 2011). Stressors include increased shading, deep litter horizons, low soil moisture, low nutrient availability and contribute to a decline in species richness within the plant community. These factors affect all understory species including Region 3 sensitive plants. There would continue to be a reduction or loss of understory vegetation and therefore, a loss of understory services.

With no treatment, fire hazard would continue to increase therefore increasing the risk of severe wildfire in many parts of the project area (see Vegetation and Fire Reports for more information). Factors that contribute to fire hazard ratings that would be reduced through management actions such as canopy cover, trees per acre and dead and down fuel loading would not be reduced. The risk of wildfire transitioning to crown fires would increase in many areas of the project area resulting in the increased risk of severe wildfire and degradation of potential habitat. Severe wildfires often result in short and long-term effects (Pyke, Brooks and D'Antonio 2010) which include removal of tree canopy, loss of the understory plant community and alteration of soil structure and nutrients. Fire affects plant communities in several ways including, removal of vegetation and litter, alteration of soil characteristics and redistribution or modification of nutrients (Raison 1979). Severe wildfires often result in deaths of all plants including Region 3 sensitive plants, loss of seed banks (Korb, Johnson and Covington 2004) and volatilization, alteration or removal of nutrients (Kaye and Hart 1998); (Ballard 2000) (Choromanska and DeLuca 2002). These changes could adversely affect the habitat and populations of Region 3 sensitive plants by damaging soil, killing existing plants and by reducing or destroying the seed bank. Fire size may also increase, leading to largescale crown fires, which in turn may cause a permanent loss in understory diversity (Covington 2000) Primary fire effects such as deaths of individual plants or groups may recover in a matter of a few years. However, secondary effects such as permanent changes in biotic and abiotic factors can result in permanent changes in the post fire plant community (Pyke, Brooks and D'Antonio 2010)

With no action, dead and down fuels would continue to increase, which in turn could negatively affect the vigor of Region 3 sensitive plants by increasing the amount of shade and litter (see Vegetation Report).

Noxious or invasive weeds such as Dalmatian toadflax (Crawford, et al. 2001) (Collins, Moghaddas and Stevens 2007) (Dodge, Fule and Hull Sieg 2008) and cheatgrass (McGlone, Springer and Wallace 2009) (Pyke, Brooks and D'Antonio 2010) more easily invade areas of severe wildfires than unburned areas. Therefore, if a severe wildfire occurred in the habitat of Region 3 sensitive plants, noxious or invasive

weeds would also increase and contribute to the degradation of the habitat and loss of individuals and groups of Region 3 sensitive plants.

In the no action alternative, there would be no road reconstruction or decommissioning so there would be no direct or indirect risks such as deaths of individual plants and no risk of introduction of noxious or invasive weeds from management activities associated with road activities.

No spring or channel restoration would occur. There would be no improvements to upland watershed conditions in areas near Arizona bugbane habitat. Opportunities to improve habitat for such species as Arizona sneezeweed, Bebb's willow and Blumer's dock would not occur and areas that might have historically provided habitat for these species and would remain degraded and unsuitable for these and other plant species that require mesic conditions for their survival.

With no action, there would be no restoration of structure and function in the treatment areas, resulting in continued departure from the desired conditions for all resources in this project, including Region 3 sensitive plant species.

Cumulative Effects

The boundary of this analysis is the project area. The time limit is from the year 2000 to present.

Past management actions within the project area have defined the existing conditions and set the stage for the current departure from reference condition and need for change. Past activities such as fire exclusion and heavy grazing have resulted in a shift in environmental conditions. Conditions in many western forests, including the ponderosa pine forests in northern Arizona have changed from an ecosystem regulated by frequent, low intensity ground fire to a system with fire exclusion and stand-replacing fire regimes. These changes have resulted in decreased understory vegetation and alteration of the hydrological systems (see *Silviculture and Watershed Reports*). Other changes include shifts to more frequent occurrences of fire intolerant species, increases in litter, (Abella, et al. 2007), declines in species density and shrub cover (Bakker and Moore 2007) changes in species composition and functional groups including shifts toward more shade tolerant understory species under denser tree canopies (Laughlin, Moore and Fule 2011).

If the "no action" alternative is selected management actions such as fuels reduction projects, prescribed fire, spring and channel restoration will be limited to those analyzed and implemented by the individual projects analyzed in other NEPA on each forest (see cumulative effects section of EIS). The effects of the no action would be continued survey, analysis and mitigation for Region 3 sensitive plant species on the Apache-Sitgreaves, Coconino and Tonto NFs based on project level analyses. Opportunities for cooperation with external partners for such items as survey and monitoring would not occur.

Greene Milkweed (*Asclepias uncialis*)

Greene milkweed is a Region 3 sensitive species for Apache Sitgreaves.

The distribution of this small milkweed is poorly understood. Greene milkweed is known from scattered locations in Arizona, Colorado, New Mexico, Nevada, western Oklahoma and Utah (Sundell 1994). Typical habitat for this species is level to gently sloping terrain on a variety of soil types except for pure sand. It is typically found in juniper woodland and savannas but within the grassland components of those systems (NatureServe 2017). Green milkweed occurs in small scattered clusters and tends to bloom earlier in the spring than many plants so may be overlooked during typical plant surveys (Decker 2006).

Existing Condition

Green milkweed was included in the Great Basin Grasslands and Madrean/Pine Oak Woodland ERUs during forest plan revision (USDA Forest Service 2014). There is one historical location from the White Mountains near Springerville in 1915 (Decker 2006). There are no documented for Greene milkweed in the analysis area.

Environmental Consequences

Effects Common to All Alternatives

There is no effect to Greene milkweed from management actions since none are known to occur in the analysis area.

It is my determination that

Management actions proposed in the Rim Country EIS will not impact individuals of Greene milkweed (*Asclepias uncialis*) and are not likely to result in a trend toward federal listing or loss of viability.

Villous groundcover milkvetch (*Astragalus humistratus* var. *crispulus*)

Villous groundcover milkvetch is a Region 3 sensitive species for Apache Sitgreaves.

Villous groundcover milkvetch is a perennial species with prostrate, forking stems. Its distribution is limited to southeastern Apache County in Arizona and in neighboring Catron County in New Mexico where it grows on sandy soils of volcanic origin in dry pine forests (Spellenberg 2007). The occurrences on the forest are in narrow-leaf cottonwood/shrub ERUs.

Existing Condition

The locations below were recorded by Glenn Rink and G. Clifton on July 23, 2014 for Bear Spring and July 24, 2014 for Black Canyon Lake. (SEINet - Arizona Chapter 2017). Figures 1 through 4 show the collection sites. Both sites within the Rodeo-Chediski Fire (2002). This landscape scale event was a major driving force in defining the existing conditions on these sites which is now outside the historic range variation (HRV).

Table 4. . Locations and proposed treatments for villous groundcover milkvetch. Data are from SEINet.

Collector/Observer	Date	Location	Proposed treatment	Comments
G. Rink and G. Clifton	7/23/2014	Along the Mogollon Rim at Bear Spring, 34.31849 - 110.45950	Facilitative Operations (ponderosa pine) /Stream Channel Restoration (Bear spring channel)	Within the Rodeo-Chediski Burn. Near edge of ponderosa pine forest. The estimated distance from the channel is less than 0.1 mile.

Collector/Observer	Date	Location	Proposed treatment	Comments
G. Rink and G. Clifton	7/24/2014	Spillway of Black Canyon Lake, southwest of Heber, 34.33100 - 110.69794	Prescribed Fire Only/Stream Channel Restoration (west fork of Black Canyon)	Mogollon Rim, spillway of Black Canyon Lake, southwest of Heber Within the Rodeo-Chediski Burn. The estimated distance from the channel is less than 0.1 mile.

Figure 1. Location of villous groundcover milkvetch near Bear Spring

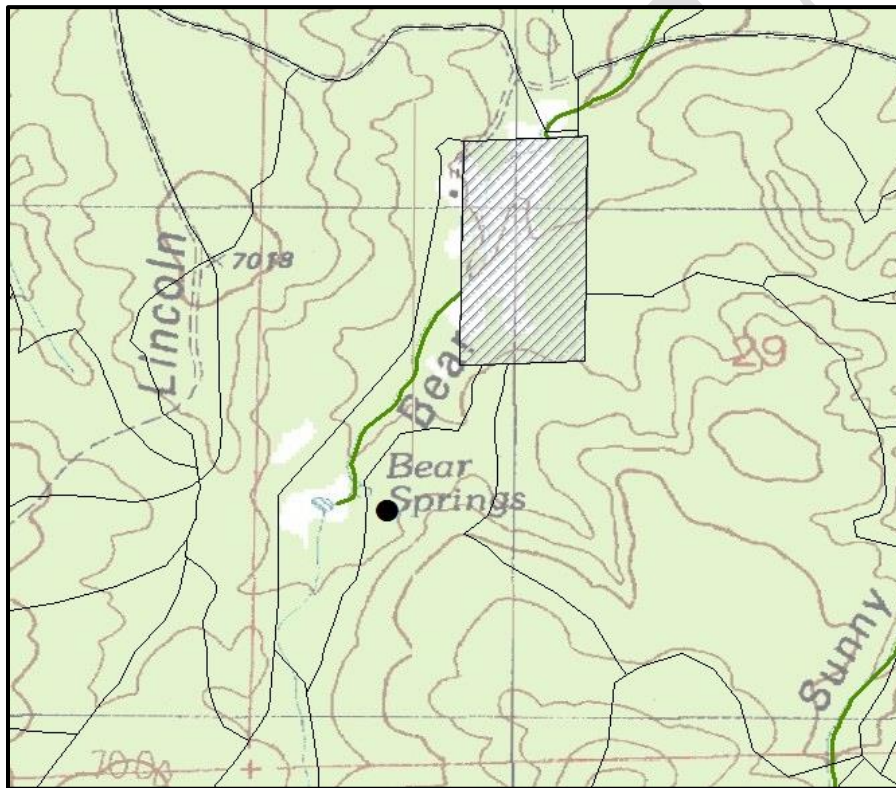


Figure 2. Google Earth image of Bear Springs area.



Figure 3. Location of villous groundcover milkvetch near Black Canyon Lake



Figure 4. Google Earth image of Black Canyon Lake and occurrence of villous groundcover milkvetch.



Environmental Consequences

Alternative 1 No Action

There are no direct effects to villous groundcover milkvetch from management actions since none will occur.

The no action alternative would not move these areas toward the [Desired Conditions for Forest-wide Ecosystem Health](#) or [Desired Conditions for Riparian](#), Fine Scale Desired Conditions or Guidelines for Wildlife and Rare Plants or Desired Conditions and Guidelines for Landscape Scale disturbance. It will not meet the Purpose and Need of this project. Management actions that would improve the habitat for terrestrial and aquatic species would not occur and there would be no actions to improve the condition and function of these stream channels.

Effects Common to All Action Alternatives

Table 4 shows the locations of known occurrences of villous ground cover milkvetch and the proposed treatments for the areas. These locations are in areas proposed for stream channel restoration. These actions would help move the treated areas toward the desired conditions as described in the Apache-Sitgreaves LRMP (USDA Forest Service 2016) including mitigating the landscape scale disturbance that occurred as a result of the Rodeo-Chediski Fire in 2002.

Management actions related to stream restoration could result in the damage or loss of individual plants or groups of plants at the two locations in table 4. This can be mitigated by following the guideline for [Wildlife and Rare Plants](#) stating that modifications, mitigations, or other measures should be incorporated to reduce negative impacts to plants, animals, and their habitats and to help provide for species needs,

consistent with project or activity objectives. Mitigations and design features AQ021 and BT 007 in Appendix C will help to mitigate impacts to villous groundcover vetch.

The management activities needed to restore the stream channels will be guided by the Aquatic Toolbox which will also mitigate the loss of plants. It is anticipated that the tools for improving the form and function of stream channels and floodplains (figure 2) and the tools for improving spring outflows (figure 4) will be used at these sites.

The plant locations were documented in 2014 so are present despite the disturbance from the fire. No scientific data or publications were found that document the effects of fire on the plant. Villous groundcover milkvetch has been observed growing in roadbeds so is assumed to tolerate disturbance (Spellenberg 2007) so will likely tolerate the burning treatments proposed for these areas.

Cumulative effects

The area of consideration for this analysis includes project boundary

The timeframe for this analysis is from 2002 when the Rodeo-Chediski Fire burned through the area to 20 years in the future.

The Rodeo Chediski Fire (2002) was a major disturbance that defined the existing conditions in the areas containing villous groundcover milkvetch. Figures 2 and 4 above show the loss of overstory vegetation in these areas. The LRMP addresses future landscape scale events stating actions to be taken by the forest. The guidance is mentioned here because it provides important insight into the long-lasting effects of landscape scale disturbance stating “These can lead to ecological succession away from desired conditions, which can be complicated by other factors like climate change and invasive species. When uncharacteristic outcomes occur, the landscape can take hundreds of years or more to recover to some level of stability. Where outcomes are uncharacteristic and there are needs to accelerate recovery, additional direction is provided to protect existing resources and facilitate recovery of soil and vegetation components and improve ecosystem health.” (USDA Forest Service 2016). The degraded channels in the area may be attributed at least in part to the effects of the Rodeo-Chediski Fire in the areas around the occurrences of villous groundcover milkvetch as well as in the watersheds above and attributed to the need for action to restore these channels.

The effects of recreation on the plants at Black Canyon Lake are not known but may attribute to the impacts to the villous groundcover milkvetch in the area.

Both of the documented occurrences of villous groundcover milkvetch are within the Heber [Wild Horse Territory](#), a special area designated in the LRMP. Desired conditions for this area include grazing that is in balance with the available forage. It is not known if horses or other grazers in the area utilize villous groundcover milkvetch as forage.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of villous groundcover milkvetch (*Astragalus humistratus* var. *crispulus*) but is not likely to result in a trend toward federal listing or loss of viability.

Arizona Bugbane (*Cimicifuga arizonica*)

Arizona bugbane is endemic to northern Arizona, occurring on Coconino, Kaibab and Tonto National Forests where it occurs in mesic habitats, typically along the bottoms and lower slopes of steep, narrow canyons. The overstory often includes a combination of coniferous and deciduous tree species. Important

overstory species include Douglas fir (*Psuedotsuga menziesii*), white fir (*Abies concolor*), big tooth maple (*Acer saccharum* ssp. *grandidentatum*), Arizona alder (*Alnus oblongifolia*) and red osier dogwood (*Cornus stolonifera*).

Arizona bugbane is a Region 3 sensitive species for Kaibab, Coconino and Tonto National Forests. Almost all of the known occurrences are in wilderness areas including those known from West Clear Creek drainage (Arizona Game and Fish Department 2012).

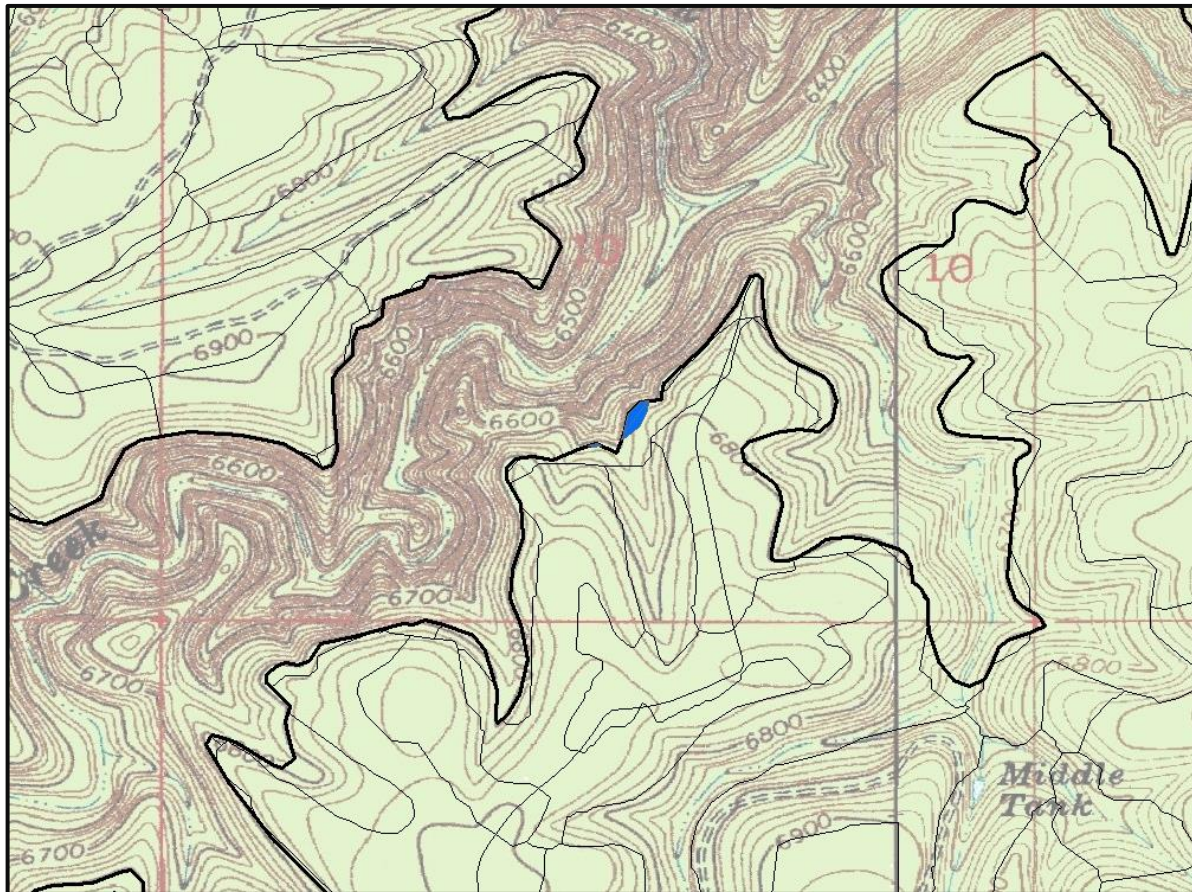
Existing Condition

In this analysis occurrences of Arizona bugbane are limited to the Coconino National Forest. The location in figure 3 below is in Tom’s Creek drainage, which is a tributary of West Clear Creek. The data are from Arizona Game and Fish Heritage Database (2017). This location is also documented in Forest Service files (USDA Forest Service 1998) and in the NRM TESP/IS database. The area is in the Tom’s Creek Mexican Spotted Owl PAC and the treatment is listed as a potential PAC treatment. Because occupied PACs can already be considered successful nesting habitat, mechanical activity within PACs should be designed to protect the habitat characteristics that make each PAC effective at providing habitat. Consideration should be given to treating areas near PACs in order to improve resiliency within the PACs themselves. PACs should be treated with consideration of the larger landscape and not just separate entities. As a result, treatments within PACs will be determined separately and in consultation with appropriate FWS personnel (Mechanical Flexible Toolbox 2018)

Table 5. Locations of Arizona bugbane in vegetation treatment units.

Collector/Observer	Date	Location	Alternative 2	Alternative 3	Comments
USDA Forest Service - J. Keller and R. Popowski	08/11/1998	Tom’s Creek	Potential MSO	PAC- Prescribed Fire Only.	Within Tom’s Creek MSO PAC. Treatments for individual PACs will be negotiated with FWS and not treated using treatment matrix in Mechanical Toolbox.

Figure 5. Arizona bugbane in Tom's Creek drainage, shown by blue polygon



Environmental Consequences

Alternative 1 No Action

There are no direct effects to Arizona bugbane from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions as defined in the Coconino LRMP (2018). The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation. Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area the Arizona bugbane by reducing the risk of loss to disturbances such as uncharacteristic wildfire. The Desired Conditions and Guidelines that apply to the Arizona bugbane in this area include Desired Conditions [All Ecosystems](#), [Soil, Terrestrial Ecosystems](#), or [Wildlife, Fish and Plants](#). As a result, there would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and Arizona bugbane plants in the project area would remain at a higher risk of loss from loss from undesirable fire effects if a wildfire were to occur within or near the Arizona bugbane population.

Alternative 2

The proposed management actions would help move the treated areas toward the desired conditions as described in the LRMP. The most significant effect to Arizona bugbane from management actions is direct losses of individuals from management actions but these would be mitigated by incorporating the components in Appendix C – Design Features, Best Management Practices, Mitigation and Conservation Measures (BT001, BT005 BT007).

This occurrence of Arizona bugbane is within the Tom’s Creek Mexican Spotted Owl (MSO) PAC and will be treated using the PAC Mechanical, a treatment designed to reduce the risk of uncharacteristic wildfire in MSO PACs. Refer to the Silviculture Report for a complete description of the treatment.

Mexican Spotted Owl habitat will be treated according to the direction provided in the revised MSO Recovery Plan (USDI U.S. Fish and Wildlife Service 2012). The treatment of this area will be negotiated with the US Fish and Wildlife Service and not by using the treatment matrix in the mechanical toolbox. Trees removed from areas in this treatment are generally smaller in diameter than those removed in other treatments. Canopy cover after treatment is generally higher as compared to those prescribed using the mechanical toolbox for areas outside MSO habitat. Shade for Arizona bugbane plants in this area may be affected but it will not be extensive. This could result in the loss of a few individuals but will not affect the entire population at this site.

Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include the loss of shade, increased risk of noxious or invasive weeds and an increased risk of erosion. This will be mitigated by burning at intensities in all entries low enough to limit mortality to trees (see design features BT003 and FE003). The current knowledge of fire effects on Arizona bugbane are based largely on observations on a local wildfire, the Fry Fire in 2003. No published data for fire effects to Arizona bugbane were found. A related species red baneberry (*Actaea rubra*) has been studied in the Northwestern U. S (Crane 1990). In that species, the tops of plants are removed by fire and then plants regenerate from thick underground caudices, but seedlings did not appear for several years post-fire. Another related species (*Cimicifuga elata*) grows in various habitats t habitats in the northwestern U.S. where it demonstrates fire tolerance. The lack of fire has been implicated as a factor in limiting population size and distribution in the northwestern U.S. (Klinkenberg and Klinkenberg 2003).

Activities associated with roads and transportation in this project would be limited those needed to accomplish the management actions that will occur in the area. No hauling is proposed in the immediate area of Arizona bugbane populations. Indirect effects from road use would be limited to dust from road maintenance but these will be minimal and insignificant.

An indirect effect of management actions within the potential habitat of Arizona bugbane includes an increased risk of invasion from noxious or invasive weeds Incorporation of the Best Management Practices would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of Arizona bugbane See design features BT007, NW001, NW004 and NW009.

No locations of Arizona bugbane occur within sites for spring or channel restoration were found, so there are no effects to the species.

There are no rock pits or in-woods processing areas near this occurrence of Arizona bugbane so no effects will occur.

Alternative 3

No mechanical treatment will occur in this area, so the effects of mechanical treatment described in alternative 2 above do not apply. The effects of all other management actions are similar.

Cumulative effects

The boundary of this discussion is the project boundary. The timeline for this analysis begins in 1998, when the first report of Arizona bugbane in Tom's Creek was reported to twenty years in the future

The following past actions have affected the abundance and Arizona bugbane and have established baseline current condition for Arizona bugbane. Some impacts observed include grazing, recreation, wildfire and natural disturbances such as flooding, drought, tornados and mortality in overstory trees. Grazing impacts were addressed in the Conservation Assessment and Strategy, Coconino and Kaibab National Forests (USDA Forest Service 1995) and include fencing and monitoring in certain populations. This has led to a reduction in these conflicts.

The Tram Fire burned in 2002 along the south side of West Clear Creek in an area above the Tram Trail a known large group of Arizona bugbane. There were no direct effects to the plants. The Fry Fire in 2003 burned into Fry Canyon and into some populations of Arizona bugbane but did not appear to severely impact the Arizona bugbane populations in the canyon. The source of the fire was a lightning strike on August 9, 2003 near the south edge of Fry Canyon. The fire burned approximately 180 acres of ponderosa pine and mixed conifer forest in upland areas and canyons slopes. Activities during the suppression effort included but were not limited to fire line construction and felling of trees in the canyon. Additionally, some backfires were set in the upland areas to reduce fire spread and intensity. On subsequent visits after the fire, Arizona bugbane was observed growing along the fire line.

Arizona bugbane occurs on the Tonto National Forest but there are no data that support its occurrence in the treatment areas for Rim Country. Arizona bugbane was previously managed using a Conservation Assessment (USDA Forest Service 1993a). Most occurrences of Arizona bugbane are within the Sierra Anchas Experimental Forest. Others are in the Sierra Anchas Wilderness. The most recent survey of the area was by Glenn Rink where he recorded three areas including Workman Creek, Pueblo Canyon and Cold Springs Canyon. He surveyed other canyons in the general area and reported finding no additional occurrences. The Juniper Fire (2016) burned in the Experimental Forest and in the Wilderness. The Coon Fire (2000) burned within the Experimental Forest. The effects to Arizona bugbane and its habitat from these fires is unknown.

Ongoing and future foreseeable actions

These management actions are ongoing within the habitat of Arizona bugbane.

In addition to the management actions in this analysis, the most likely foreseeable actions in area include recreation such as hiking, rock climbing and canyoneering. Wildfires will continue to burn in the area. Grazing by cattle and wildlife will continue. Vegetation treatments and prescribed fire analyzed in this analysis will occur. Wildfires may also occur in the area. Singly none of these actions will extirpate the Arizona bugbane at the site.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Arizona bugbane (*Cimicifuga arizonica*) but are not likely to result in a trend toward federal listing or loss of viability.

Dane (Mogollon) thistle (*Cirsium parryi* subsp. *mogollicum*)

Dane thistle is a Region 3 sensitive species for Coconino National Forest. It is endemic to a few canyons on the Mogollon Rim Ranger District.

Dane thistle was first “discovered” in 1987 and its description was published in 1990 (Schaack and Goodwin 1990). Dane thistle is distinguished from the more common Parry thistle by its white corollas and nearly entire leaves (Arizona Game and Fish Department 2005)

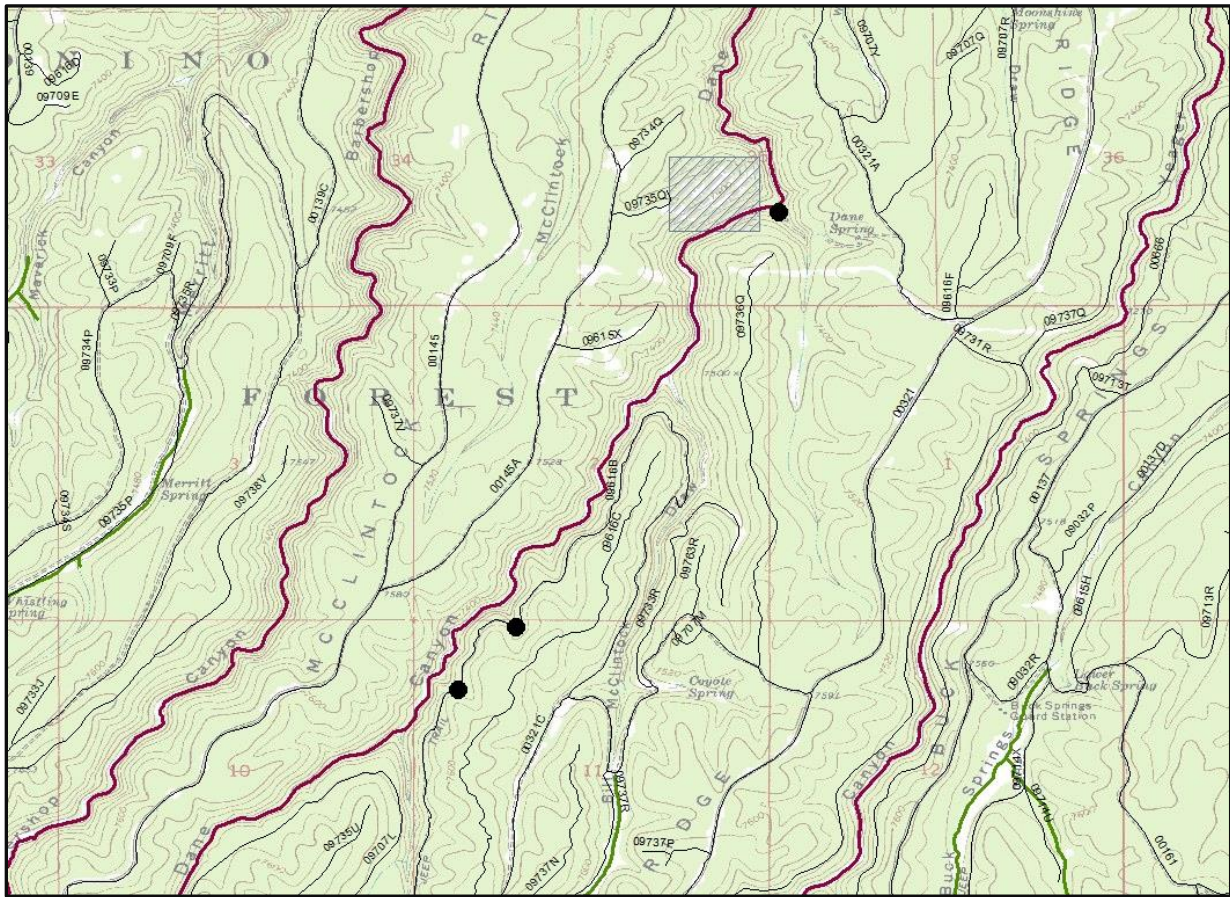
Existing Condition

This rare thistle is known from only four locations on the Mogollon Rim Ranger District, Coconino National Forest where it is associated with springs or canyons including Dane, Dane Spring, and Yeager Canyons (Goodwin 2005). The data provided by Goodwin show the locations for the plants in Dane Canyon and Dane Spring Canyon but no accurate description for the occurrence in Yeager Canyon was found. These areas are proposed for aquatic habitat restoration. Non-native invasive species such as bull thistle (*Cirsium vulgare*) are threats to rare species such as Dane thistle for resources such as water and light. Mitigation to prevent infestations in these areas is especially important.

The occurrence in the upper right corner of Figure 6 is in a drainage below Dane Spring and is in MSO recovery habitat. Mechanical and prescribed fire are proposed for this area. The other two occurrences are within the Coyote Springs MSO PAC and will receive PAC treatment. Treatment at the first location may be guided by the mechanical toolbox but treatment in MSO PACS will be negotiated separately with USFWS.

All of the occurrences are near stream channels which will receive aquatic habitat restoration. Treatments for aquatic habitat restoration will be guided by the Aquatic Toolbox. Mitigations and design features will also be applied.

Figure 6. Dane thistle in analysis area. .



Alternative 1 No Action

There are no direct effects to Dane thistle from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions as defined in the Coconino LRMP (2018). The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation. Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area containing Dane thistle by reducing the risk of loss to disturbances such as uncharacteristic wildfire. The Desired Conditions and Guidelines that apply to Dane thistle include Desired Conditions [All Ecosystems](#), [Soil](#), [Terrestrial Ecosystems](#), or Watershed and Water, Springs or [Wildlife, Fish and Plants](#). As a result, there would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and Dane thistle plants in the project area would remain at a higher risk of loss from loss from undesirable fire effects if a wildfire were to occur within or near Dane thistle.

Effects Common to All Action Alternatives

Two occurrences of Dane thistle are within the Coyote Springs Mexican Spotted Owl (MSO) PAC and will be treated using the PAC Mechanical, a treatment designed to reduce the risk of uncharacteristic wildfire in MSO PACs. Refer to the Silviculture Report for a complete description of the treatment.

Mexican Spotted Owl habitat will be treated according to the direction provided in the revised MSO Recovery Plan (USDI U.S. Fish and Wildlife Service 2012). The treatment of this area will be negotiated with the US Fish and Wildlife Service and not by using the treatment matrix in the mechanical toolbox. Trees removed from areas in this treatment are generally smaller in diameter than those removed in other treatments. Canopy cover after treatment is generally higher as compared to those prescribed using the mechanical toolbox for areas outside MSO habitat. The third occurrence in figure 6 is within MSO recovery habitat. Vegetation treatment for this area will be developed using the Mechanical Toolbox and will follow guidance in the MSO Recovery Plan (2012). The most significant effect to Dane thistle from this treatment is direct losses of individuals from management actions but these can be mitigated by using design features and mitigations (BT001, BT005 BT007).

Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include the loss of shade, increased risk of noxious or invasive weeds and an increased risk of erosion. This will be mitigated by burning at intensities in all entries low enough to limit mortality to trees (BT003 and FE003)

The management actions would help move the treated areas toward the desired conditions as described in the Coconino NF LRMP. The effects of disturbance from vegetation treatments and prescribed fire include loss of individual plants. Disturbance may also increase the risk of invasion of noxious or invasive weeds. Invasion of non-native thistles such as bull thistle (*Cirsium vulgare*) are of particular concern due to the potential of hybridization. Therefore, mitigating the threat of noxious or invasive weeds in this area is needed (BT007, NW001, NW004 and NW009).

Aquatic restoration may include site disturbing activities that would affect the occurrences of Dane thistle, especially the northernmost mapped occurrence in figure 6 which is less than 1/10th mile from the proposed restoration site. Ground disturbing activities such as moving soil would increase the risk of disturbance to individual plants and their habitat. These effects can be mitigated through design features and mitigations specifically BT007 to mitigate loss of sensitive plants by avoiding them as much as possible. Design feature AQ021 also applies, stating that all federally listed or sensitive species will be identified during pre-planning on a site specific basis and mitigations for those species will be determined.

There are no rock pits or in-woods processing areas near this occurrence of Dane thistle so no effects will occur.

The locations of Dane thistle are not near any roads so there are no effects from management actions along roads.

Cumulative effects

The area of this cumulative effects analysis includes the known range of Dane thistle, which includes the area described in the desired condition above. The timeframe begins when Dane thistle was first described (Schaack and Goodwin 1990) to twenty years in the future. The known range of Dane thistle is a small subset of the overall project area. At least one occurrence of Dane thistle was protected with a small wire structure in the past but this area has not been revisited in several years so the fates of the plants and structure are unknown.

There have been a variety of management activities in the uplands surrounding the known Dane thistle occurrences but few activities have occurred in the steep canyon areas. Grazing by cattle has occurred in the past but the allotment containing Dane thistle is not currently being used. Grazing by wildlife still occurs. A limited amount of recreational activities such as hiking may occur in the areas but there are no established trails in the canyon areas.

There is a large dispersed camping area in the uplands above one occurrence. A fence restricts vehicle travel and camping near the canyon edge. Hikers from the camping area may occasionally venture into the area. At the same site, there is an historical cabin and spring diversion upslope. There are plans to rehabilitate the spring, allowing it to be free-flowing but management actions from this action are not anticipated to have any effect on Dane thistle.

Ongoing and future foreseeable actions Mogollon fleabane

In addition to the management actions in this analysis, grazing by wildlife and recreation will continue in this area

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Dane thistle (*Cirsium parryi* subsp. *mogollicum*) but is not likely to result in a trend toward federal listing or loss of viability.

Hairy Clematis (Arizona leatherflower) (*Clematis hirsutissima* var. *hirsutissima*) (syn. var. *Arizonica*)

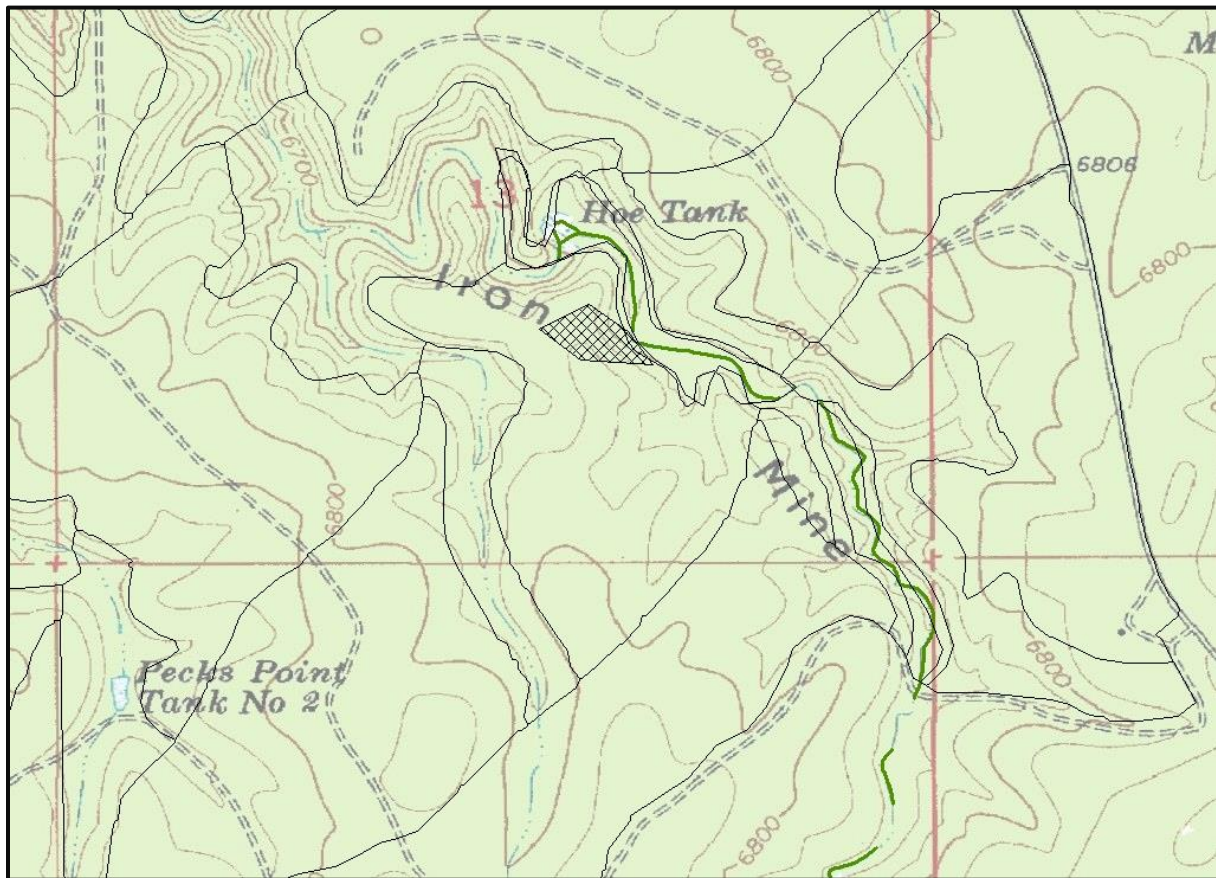
Hairy clematis is a Region 3 sensitive species for Coconino National Forest.

A balance of shade and sun is important habitat components of hairy clematis. Intermediate amounts (approximately 50%) of light and shade provided the most beneficial conditions. Higher levels of light increased photosynthesis in adult plants, but resulted in lower reproductive success, and increased risk of desiccation. Low levels of light resulted in decreased photosynthesis, fewer stems per plant and lower seed production (Maschinski, et al. 1997). Juvenile plants benefit from the presence leaf litter. The litter provides a source of humidity around seedlings. However, heavy accumulation of litter can be detrimental to seedling survival and vegetative reproduction in adults.

Existing Condition

There is one location of hairy clematis near the proposed Iron Mine Draw Stream Channel Restoration in the area near Hoe Tank.

Figure 7. Hairy clematis near Hoe Tank.



Alternative 1 No Action

There are no direct effects to hairy clematis from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions as defined in the Coconino LRMP (2018). The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation. Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area containing hairy clematis by reducing the risk of loss to disturbances such as uncharacteristic wildfire. The Desired Conditions and Guidelines that apply to hairy clematis include Desired Conditions [All Ecosystems](#), [Soil](#), [Terrestrial Ecosystems](#), or [Wildlife, Fish and Plants](#). As a result, there would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and hairy clematis plants in the project area would remain at a higher risk of loss from loss from undesirable fire effects if a wildfire were to occur within or near hairy clematis.

Alternative 2

The area containing hairy clematis is slated for mechanical treatment (goshawk foraging). The treatment will be developed using the mechanical treatment toolbox. The treatment will encompass considerations for the habitat of northern goshawk. The effects of mechanical treatment include loss of individual plants

or groups of plants. These effects can be mitigated by using the design features in Appendix C, specifically BT001, BT005, BT007.

Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include the loss of shade, increased risk of noxious or invasive weeds and an increased risk of erosion. This will be mitigated by burning at intensities in all entries low enough to limit mortality to trees (see design features BT003 and FE003).

Activities associated with roads and transportation in this project would be limited those needed to accomplish the management actions that will occur in the area. The effects of road construction, maintenance, reconstruction and decommissioning can be mitigated by using the design features in Appendix C, specifically BT009 and BT010. The effects of dust on plants from transportation can be mitigated by design feature TR017

An indirect effect of management actions within the potential habitat of hairy clematis includes an increased risk of invasion from noxious or invasive weeds. Incorporation of the Design Features, best management practices, mitigation and conservation measures in Appendix C would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of hairy clematis. See design features BT007, NW001, NW002, NW003, NW004 and NW009.

This occurrence of hairy clematis is near the proposed Iron Mine Draw Stream Channel Restoration. Actions needed to restore the channel will be guided by the Aquatic Toolbox. The risk to hairy clematis from these actions include loss or damage of plants or loss of habitat. These can be mitigated through using the design features AQ021, BT001, BT005, BT007 and SW001.

There are no rock pits or in-woods processing areas near this occurrence of hairy clematis so no effects will occur.

Alternative 3

No mechanical and fire treatments are proposed for this area in alternative 3 so the effects of those actions are similar to alternative 1, the no action alternative. The effects of transportation and channel restoration are the same as for alternative 2, including the threats of noxious or invasive weeds.

Cumulative effects

The area of this analysis is the project boundary. The time frame is from 2005 to 20 years in the future which is considered the length of the decision to be made by this analysis.

This occurrence was detected in 2005 during a survey for the Bald Mesa Fuels Reduction Project in 2005. Since then there has been at least one entry of prescribed fire in this area. The effects were mitigated by locating and constructing hand line around the plants.

Other activities include grazing and dispersed recreation in the uplands.

Ongoing and future foreseeable actions

In addition to the management actions in this analysis these management actions are ongoing within the habitat of hairy clematis.

The most likely foreseeable actions in area include recreation such as hiking and dispersed camping. Wildfires will continue to burn in the area. Grazing by cattle and wildlife will continue. Vegetation

treatments and prescribed fire analyzed in this analysis will occur. Singly none of these actions will extirpate the hairy clematis at the site.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of hairy clematis (*Clematis hirsutissima* var. *hirsutissima*) (syn. var. *Arizonica*) but is not likely to result in a trend toward federal listing or loss of viability.

Mogollon fleabane (*Erigeron anchana*)

Mogollon fleabane is a Region 3 sensitive species for Tonto National Forest

Mogollon fleabane is one of four species identified by Nesom in 1990 (Nesom 1990) in a revision of *Erigeron pringlei*. Prior to then, all were considered one species. All of the four species occur in various areas of northern Arizona where they are endemic. Mogollon fleabane is the only one of the four that occurs in the “sub-Mogollon” portion (below the Mogollon Rim) of the state with most occurrences in the Sierra Ancha Mountain range. Occurrences tend to be on rock cliffs (Arizona Game and Fish Department 2003) where it occurs in cliff crevices, ledges, soil pockets among boulders (Nesom 2006).

Existing Condition

There is one confirmed location of Mogollon fleabane in the analysis area. It is near Bear Flat Campground on the Tonto NF. . The area where the plants are located is scheduled for mechanical and prescribed fire treatment (goshawk foraging; meadow restoration and is near a stream channel proposed for aquatic restoration

This occurrence of Mogollon fleabane is in the Mogollon Rim Area (4D) Management Area (MA) of the Tonto NF LMRP (USDA Forest Service 1985). The management emphasis is for a variety of renewable resource outputs with primary emphasis on intensive, sustained yield timber management, timber resource protection, creation of wildlife habitat diversity, increased populations of emphasis harvest species, and recreation opportunity. Fire management objectives for this area include: providing a mosaic of age classes within the total type which will provide for a mix of successional stages, and to allow fire to resume its natural ecological role within ecosystems. A standard and guideline for the area states that habitat requirements for TES species will take precedence over other species.

Alternative 1 No Action

There are no direct effects to Mogollon fleabane from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) or the direction of the current Tonto NF LMRP (1985) for the area. The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation. Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area surrounding Mogollon fleabane by reducing the risk of loss to disturbances such as uncharacteristic wildfire.

Alternative 1 would not achieve the management emphasis for MA 4D. Specifically, there would be no management actions that would help protect timber resources by reducing the risk of uncharacteristic

Effects Common to All Action Alternatives

Treatments in the area shown in figure 8 include mechanical and prescribed fire treatment (goshawk foraging; meadow restoration) and is near a stream channel proposed for aquatic restoration.

The vegetation and prescribed fire treatments would support the management emphasis for MA 4D. The vegetation treatments would protect timber resources by reducing the risk of uncharacteristic disturbances and would improve watershed condition. The mechanical treatment emphasizes habitat for northern goshawk so would fulfill the emphasis for wildlife habitat. Prescribed fire would reduce the risk of uncharacteristic fire in the area surrounding this occurrence Mogollon fleabane and move toward allowing fire to resume its natural ecological role. The most significant risk to Mogollon fleabane is loss of individual plants or the group of plants at this location.

Aquatic restoration may include site disturbing activities that would affect this occurrence of Mogollon thistle. Ground disturbing activities such as moving soil would increase the risk of disturbance to individual plants and their habitat. These effects can be mitigated through design features and mitigations specifically BT007 to mitigate loss of sensitive plants by avoiding them as much as possible. Design feature AQ021 also applies, stating that all federally listed or sensitive species will be identified during pre-planning on a site specific basis and mitigations for those species will be determined.

This occurrence of Mogollon fleabane appears to be near the roadway so may be affected if construction, maintenance or reconstruction of the road occurs, especially if the rocky areas favored by the species is affected. This can be mitigated by locating and avoiding the plants before activities occur.

There are no rock pits or in-woods processing areas near this occurrence of Mogollon fleabane so no effects will occur.

Cumulative effects

The timeframe of this discussion is from 1990 to 20 years in the future. The area of this analysis is the project boundary. Many of the documented collections of Mogollon fleabane are in wilderness or remote areas and would not be affected by management actions such as those proposed in this analysis.

This occurrence is near the Bear Flat Campground so past and future impacts from recreational activities have occurred and will continue to occur near the site. Recreational activities such as rock climbing could affect plants by crushing individuals and altering habitat.

Factors contributing to the degradation of Tonto Creek that led to the decision to include it in this analysis may have also affected the habitat of Mogollon fleabane. Aquatic habitat restoration, depending on the actions taken could preserve or improve the habitat of Mogollon fleabane in this area, depending on the actions taken.

The past actions such as construction and maintenance of roads in the area could have contributed to the effects on habitat in this area, especially if rock formations were altered during construction and maintenance.

Ongoing and future foreseeable actions Mogollon fleabane

In addition to the management actions in this analysis the foreseeable actions in area include recreation and occupancy of nearby land. Grazing by cattle and wildlife may occur in the area. Vegetation treatments, prescribed fire and aquatic restoration analyzed in this analysis will occur. Wildfire may also

occur in the area. These may affect the habitat or plants occurring at this location but are not likely to affect the entire species.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Mogollon fleabane (*Erigeron anchana*) but is not likely to result in a trend toward federal listing or loss of viability.

Rock (cliff) fleabane (*Erigeron saxatilis*)

Rock fleabane is a Region 3 sensitive species for Coconino National Forest.

Rock fleabane is a small daisy-like plant that tends to grow in erosion pockets on vertical cliff faces, most commonly Coconino sandstone. Generally, risks from management actions are confined to activities that would affect the cliff habitat on which it depends. Rock fleabane is an endemic species that occurs only in northern and central Arizona where it inhabits sheer canyon walls, moist north-facing slopes, steep solid rock and bedrock outcrops from 5,000 to 8,350 ft. It is closely related to Mogollon fleabane and is one of the four species identified by Nesom in his 1990 revision of *Erigeron pringlei*.

Existing Condition

Figure 9 shows the locations of rock fleabane in the project area. All known occurrences are limited to the Coconino NF.

Figure 9. Locations of Rock fleabane in analysis area.

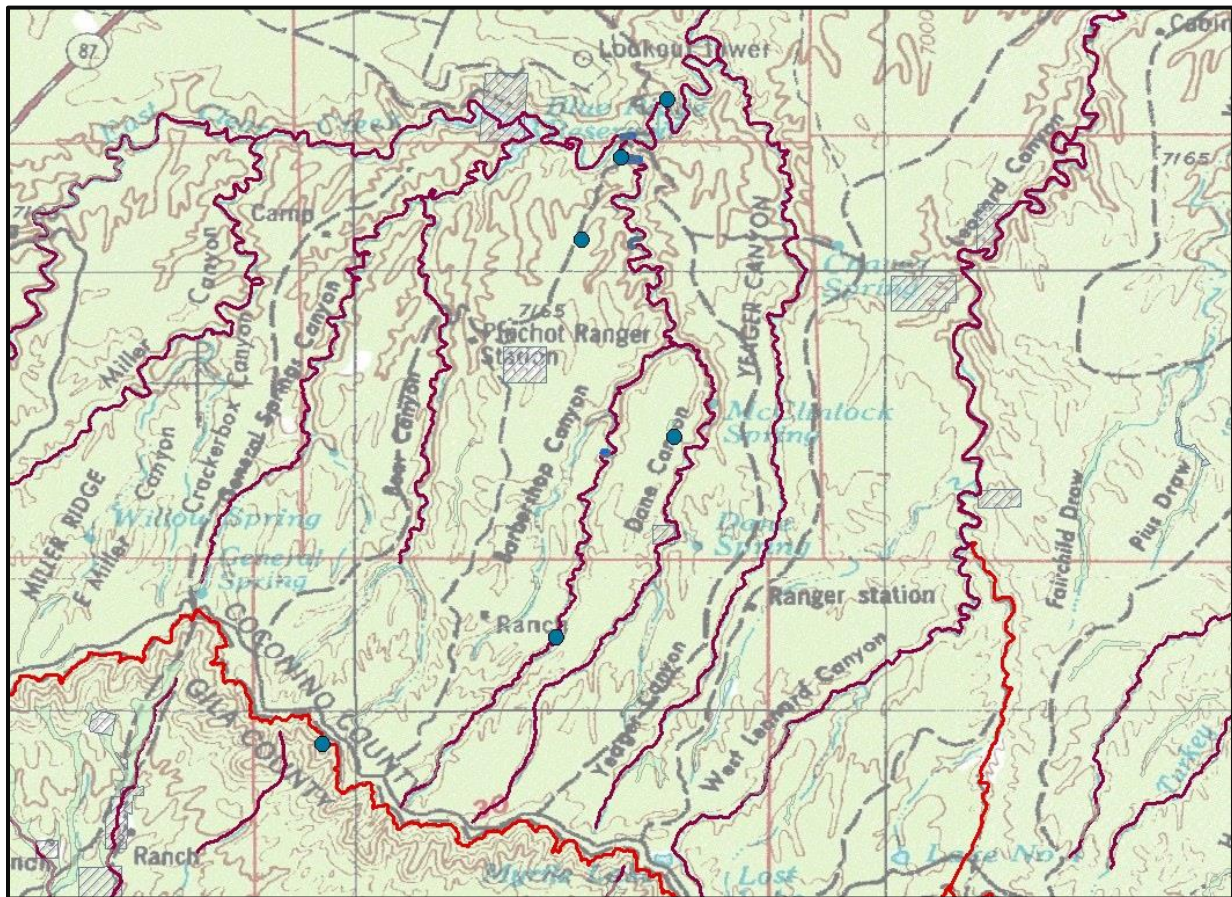


Table 6 below contains the locations and proposed treatments for areas containing rock fleabane.

Table 6. Locations of rock fleabane with vegetation and fire treatments. Plant locations are from SEINet.

Collector/Observer	Date	Comp/Stand	Alternative 2	Alternative. 3	Notes
Ronald L. Hartman, James F. Fowler 83951		788/30	Mechanical & Prescribed Fire (MSO Recovery)	IT10-25%	Within Dude Fire (1990) and Rim Fire (2009) Severe infestation of weeping lovegrass below in Dude Fire (TNF)

G. Rink 7127		777/2	Potential Treatment (MSO PAC) (Barbershop MSO)	None	Aquatic habitat restoration
Max Licher 2122		780/14	Mechanical & Prescribed Fire (Goshawk Foraging)	Mechanical & Prescribed Fire (Goshawk Foraging)	In grassland restoration treatment and near stream channel scheduled for treatment (McClintock Draw)
P. Boucher 654		772/1	Mechanical & Prescribed Fire (Goshawk Foraging)	Mechanical & Prescribed Fire (Goshawk Foraging)	Near road 95R
Wendy C. Hodgson 11705 and 11720		772/7	Mechanical & Prescribed Fire (MSO Recovery)	Uneven age 25-40%	Near roads 95 and 96
D.M. Benham 1058		748/6	Potential Treatment (MSO PAC) (Lockwood Spring)	PAC – Prescribed Fire only	Aquatic habitat restoration

Alternative 1 No Action

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions as defined in the Coconino LRMP (2018). The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation. Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area containing rock fleabane by reducing the risk of loss to disturbances such as uncharacteristic wildfire. The Desired Conditions and Guidelines that apply to rock fleabane include [All Ecosystems](#), [Soil](#), [Terrestrial Ecosystems](#), Geologic Features,

Watershed and Water, and [Wildlife, Fish and Plants](#). As a result, there would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved.

If Alternative 1 is selected, there would be no activities associated with roads and transportation in this project so there would be no effects to rock fleabane.

There are no rock pits or in-woods processing areas near the occurrences of rock fleabane so no effects will occur.

Effects Common to All Action Alternatives

Two areas containing rock fleabane are slated for mechanical treatment (goshawk foraging). The treatments will be developed using the mechanical treatment toolbox. The treatment will encompass considerations for the habitat of northern goshawk. The effects of mechanical treatment include loss of individual plants or groups of plants. These effects can be mitigated by using the design features in Appendix C, specifically BT001, BT005, BT007.

Prescribed fire will occur throughout the project area but rock fleabane tends to occur in rocky areas that are sheltered from most fire activities so effects to the species from burning are anticipated to be minimal. Management activities such as fireline construction are not likely to occur in these areas. Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include, increased risk of noxious or invasive weeds and an increased risk of erosion.

There are two occurrences of rock fleabane in aquatic restoration areas. Management actions to accomplish this work will be guided by the Aquatic Toolbox. The risk to rock fleabane from these actions include loss or damage of plants or loss of habitat. These can be mitigated through using the design features AQ021, BT001BT005, BT007 and SW001. Ground disturbing activities such as moving soil would increase the risk of disturbance to individual plants and their habitat. These effects can be mitigated through design features and mitigations specifically BT007 to mitigate loss of sensitive plants by avoiding them as much as possible. Design feature AQ021 also applies, stating that all federally listed or sensitive species will be identified during pre-planning on a site specific basis. Mitigations for those species will be determined.

An indirect effect of management actions within the potential habitat of rock fleabane includes an increased risk of invasion from noxious or invasive weeds. Incorporation of the Design Features, best management practices, mitigation and conservation measures in Appendix C would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of rock fleabane. See design features BT007, NW001, NW002, NW003, NW004 and NW009.

Two occurrences of rock fleabane appears to be near roadways so may be affected if construction, maintenance or reconstruction of the road occurs, especially if the rocky areas favored by the species is affected. This can be mitigated by locating and avoiding the plants before activities occur (BT001, TR001, and TR017).

Factors contributing to the degradation of aquatic habitats that led to the decision to include the areas in this analysis may have also affected the habitat of Mogollon fleabane. Aquatic habitat restoration, depending on the actions taken could preserve or improve the habitat of rock fleabane in this area, depending on the actions taken by restoring the general area and reducing effects such as erosion in the long term.

There are no rock pits or in-woods processing areas near this occurrence of rock fleabane so no effects will occur.

Alternative 2

Four occurrences are in Mexican Spotted Owl habitat and will be treated according to the direction provided in the revised MSO Recovery Plan (USDI U.S. Fish and Wildlife Service 2012).. The treatment of these areas will be negotiated with the US Fish and Wildlife Service and not by using the treatment matrix in the mechanical toolbox. Trees removed from areas using this treatment are generally smaller in diameter than those removed in other treatments. Canopy cover after treatment is generally higher as compared to those prescribed using the mechanical toolbox for areas outside MSO habitat. The most significant effect to rock from this treatment is direct losses of individuals from management actions but these can be mitigated by using design features and mitigations (BT001, BT005 BT007).

Alternative 3

One occurrence of rock fleabane (in the Barbershop MSO PAC) will not receive treatment mechanical and prescribed fire treatments in this alternative and would not move as quickly toward desired condition as compared to the potential MSO PAC treatment in Alternative 2. Two occurrences that would be treated as MSO habitat in Alternative 2 will receive different mechanical treatments in this alternative. One area will receive an individual tree removal and the other will be treated using an uneven age treatment. Both will receive some form of prescribed burning. The effects of these treatments may result in different overstory composition and structure but the effects to rock fleabane and its habitat are expected to be similar.

Cumulative effects

The timeframe of this discussion is from 1990 to 20 years in the future. The area of this analysis is the project boundary.

Factors contributing to the degradation of areas scheduled for aquatic restoration that led to the decision to include it in this analysis may have also affected the habitat of rock fleabane. Aquatic habitat restoration, depending on the actions taken could preserve or improve the habitat of rock fleabane in this area, depending on the actions taken.

The past actions such as construction and maintenance of roads in the area could have contributed to the effects on habitat in this area, especially if rock formations were altered during construction and maintenance.

Ongoing and future foreseeable actions rock fleabane

In addition to the management actions in this analysis, grazing by cattle and wildlife may occur in the area. Vegetation treatments, prescribed fire and aquatic restoration analyzed in this analysis will occur. Wildfire may also occur in the area. These may affect the habitat or plants occurring at this location but are not likely to affect the entire species.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of rock fleabane (*Erigeron saxatilis*) but are not likely to result in a trend toward federal listing or loss of viability.

Arizona sneezeweed (*Helenium arizonicum*)

Arizona sneezeweed is a Region 3 sensitive species for Coconino and Apache Sitgreaves National Forests. Arizona sneezeweed is a perennial herb that grows up to 4 feet tall with several stems. Flower heads consist of yellow to orange 3-lobed ray flowers and purplish-brown globular disk flowers and bloom July through September. Hundreds of individuals may exist in a single population. This endemic species ranges from the Mormon Lake area southeastward to the White Mountains area where it grows in drainages, near springs, ponds and other wet areas. (Arizona Game and Fish Department 2005).

DRAFT

Existing Condition

Table 7. Locations of Arizona Sneezeweed from Apache Sitgreaves files

Collector/Observer	Date	Location.	Comp.	Stand	Alternative 2	Alternative 3	Notes
Jon Ricketson and Luther Raechal	9/3/1988	Horseshoe Lake	4107	36	Facilitative Operations	Facilitative Operations Mechanical	
Herbarium of Desert Botanical Garden. Notes: Forest Service.	8/16/1975	Fivemile Lake	4049	19	Facilitative Operations	Facilitative Operations	Road #300, 10.6 mile. W of Rt 260. Abundant along wet gully and in moist low wet areas.
No information	10/4/2006	Aspen Lake	5550	19	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 25%-40%	100+ plants; nearing the end (dying). In Elk enclosure.

Table8. Arizona sneezeweed occurrences as documented in TESP/IS (Coconino National Forest)

Collector/Observer	Date	Comp/ Stand	Alternative 2	Alternative 3
AZCC, Plant Crew	6/24/2014		Grassland Restoration	N/A
AZCC, Plant Crew	6/24/2014		Grassland Restoration	N/A
AZCC, Plant Crew	9/26/2015		Grassland Restoration	N/A
K. Sullivan	8/2/2004	551/0001	Facilitative Operations	N/A
Wildlife Crew	8/25/2011	551/0022	Facilitative Operations	N/A
Wildlife Crew	8/25/2011	551/0034	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
Wildlife Crew	8/25/2011	551/0035	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A

Collector/Observer	Date	Comp/ Stand	Alternative 2	Alternative 3
Wildlife Crew	9/2/2014	559/0015	Mechanical & Prescribed Fire (Goshawk Foraging)	Facilitative operations mechanical
Wildlife Crew	9/2/2014	559/0016	Facilitative Operations	Facilitative operations mechanical
Wildlife Crew	7/13/2011	562/0015	Facilitative Operations	N/A
Wildlife Crew	8/27/2014	571/0010	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
Wildlife Crew	8/25/2011	571/0024	Facilitative Operations	UEA 55%-70%
Wildlife Crew	7/13/2011	572/0001	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
Wildlife Crew	7/15/2011	572/0001	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
Wildlife Crew	7/13/2011	573/0001	Potential Treatment (MSO PAC)	N/A
Wildlife Crew	7/13/2011	573/0001	Potential Treatment (MSO PAC)	N/A
Wildlife Crew	9/9/2014	610/0018	Facilitative Operations	N/A
Wildlife Crew	9/9/2014	611/0001	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
Wildlife Crew	9/9/2014	611/0007	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A

Table 9. Locations of Arizona sneezeweed in treatment areas using data from SEINet.

Collector/collector's number	Date	Location	Comp/.Stand	Alternative 2	Alternative 3
J.M. Rominger 3576	9/3/1986	Woods Canyon at Rocky Park Exit			
W. S. Phillips; T. K. Phillips, T. H. Kearney 3459	8/14/1950	4.5 mi E of Alder Lake	4002/0038	Potential Treatment (MSO PAC)	PAC - Prescribed Fire Only

J. Ricketson 4451	9/3/1988	R12E T12N Sec. 34 & 35. Horseshoe Lake, 2.6 miles east of the Coconino- Sitgreaves National Forest boundary, along U.S.F.S. Road 300 (Rim Road	4109/0015	Mechanical & Prescribed Fire (MSO Recovery)	Severe Disturbance Area Treatment
M. Licher 4636	8/14/2014	Navajo County, Along Hwy. 260, west of Forest Lakes, Mogollon Rim country	5099/0003	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 25% - 40%
Ronald L. Hartman 84707	9/21/2006	Near Forest Lakes Estates, on Forest Road 237 at dual 500 KV transmission lines	5113/0025	Energy corridor	Energy corridor
P. Boucher 764	7/9/1987	Barbershop Canyon	782/0009	Mechanical & Prescribed Fire (Goshawk Foraging)	UEA 55% - 70%
R. A. Darrow 3275	9/10/1975	Myrtle Lake, on Mogollon Rim Rd	789/0006	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 25% - 40%

W. S. Phillips 3588	8/24/1953	Myrtle Lake, Mogollon Rim	789/0006	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 25% - 40%
J. Ricketson 1686	7/24/1984	Myrtle Lake	789/0006	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 25% - 40%
J. Ricketson 1698	7/24/1984	Lost Lake, 19.2 miles E of the junction of AZ-87, along U.S.F.S. Road 300	790/0012	Mechanical & Prescribed Fire (MSO Recovery)	IT 40% - 55%
Rose E. Collom 630	9/1/1936	Buck Springs Ranger Station	797/0003	Prescribed Fire Only	UEA 40% - 55%
S. P. McLaughlin; J. E. Bowers 3812	8/23/1986	Jct of hwy 260 and Rim Road	11/0003	Potential Treatment (MSO PAC)	PAC - Prescribed Fire Only
Elinor Lehto 2003	7/14/1963	Payson-Heber Hwy; 5 miles east of Woods Canyon Lake turnoff	13/0011	Mechanical & Prescribed Fire (Goshawk Foraging)	UEA 55% - 70%
Paul A. Newman 1971-09-14	9/14/1971	Rt. 260 between road to Woods Canyon Lake and Heber	5041/0036	Reforestation Need	N/A

J. Springer 5579	8/23/2007	FR135 turnoff from Lake Mary Road, in wet meadow	551/0001	Facilitative Operations	N/A
J.N. Mann 174	8/15/1967	Beaver Creek Watershed 1 mi SW Lake Mary Rd, 4 mi NW Happy Jack	559/0001	Facilitative Operations/Grassland restoration	N/A
W. Hodgson H-828	7/8/1980	In meadow adjacent to lower Canyon Creek, ca. 2 mi. from campground	10201/0006	Facilitative Operations/Meadow restoration	N/A

There are no data for Arizona sneezeweed in the Arizona Game and Fish Heritage Database.

Alternative 1 No Action

There are no direct effects to Arizona sneezeweed from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions, standards and guidelines, or management emphasis as defined in the Apache-Sitgreaves (2016), Coconino (2018) or Tonto (1985) LMRPs. . The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation.

Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area the Arizona sneezeweed by reducing the risk of loss to disturbances such as uncharacteristic wildfire.

Alternative 1 would not be consistent with the LMRPs for the forests. As a result, there would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and Arizona sneezeweed plants in the project area would remain at a higher risk of loss from loss from undesirable fire effects if a wildfire were to occur within or near an occurrence of Arizona sneezeweed.

Specifically:

For the Apache-Sitgreaves NF, the forest wide desired conditions for overall forest health and the desired conditions and guidelines for soil, desired conditions for All PNVTs Landscape Scale and Mid-scale Desired Conditions would not be met. Guidelines for wildlife and rare plants, specifically the guideline that protect unique habitat features to retain their distinctive ecological functions and maintain viability of associated species and the guideline that considers and provides for the needs of localized species during project activities to ensure their limited or specialized habitats so they are not lost or degraded would not be followed

For the Coconino NF, the Desired Conditions and Guidelines that apply to Arizona sneezeweed include Desired Conditions [All Ecosystems](#), [Soil](#), [Terrestrial Ecosystems](#), or Watershed and Water, Springs or [Wildlife, Fish and Plants](#).

Alternative 1 would not comply with the Forest wide standards and guidelines for the Tonto NF that provide for consideration of the habitat requirements of sensitive species.

There are four documented occurrences of Arizona sneezeweed on the Tonto NF, two in MA 4D and two in MA 4F.

The management emphasis in MA 4D (Mogollon Rim) is for timber production, wildlife habitat improvement and recreation. The fire management objectives in the area include providing a mosaic of age classes with a mix of successional stages while allowing fire to resume its natural ecological role within ecosystems. This emphasis is complementary to the purpose and need of the project would not be met in Alternative 1.

The management emphasis in MA 4F is on Watershed protection, livestock grazing, non-wilderness dispersed recreation, fuelwood production and wildlife habitat improvement. Fire management objectives for this area include: providing a mosaic of age classes within the total type which will provide for a mix of successional stages, and to allow fire to resume its natural ecological role within ecosystems. These

objectives are complementary to the purpose and need of this project but would not be met in Alternative 1.

Effects Common to All Action Alternatives

The action alternatives would better meet the purpose and need of the project and would better fulfill the direction of the forest LMRPs as compared to Alternative 1.

Arizona sneezeweed occurs on all three forests included in this analysis and within several treatments (see existing condition). Vegetation treatments except those in MSO habitat will be developed using the flexible toolbox. Treatments within MSO habitat will be developed in cooperation with U.S. Fish and Wildlife Service. These effects can be mitigated by using the design features in Appendix C, specifically BT001, BT005, BT007.

Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include the loss or damage of plants, increased risk of noxious or invasive weeds and an increased risk of erosion. These effects can be mitigated through the use of design features and mitigations (see design features BT003 and FE003).

An indirect effect of management actions within the potential habitat of Arizona sneezeweed includes an increased risk of invasion from noxious or invasive weeds. Incorporation of the Design Features, best management practices, mitigation and conservation measures in Appendix C would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of roc fleabane. See design features BT007, NW001, NW002, NW003, NW004 and NW009.

Arizona sneezeweed is known to occur in the following aquatic restoration units; Woods Canyon Creek, Chevelon Lake and Canyon Creek but may be in additional sites as well. Aquatic restoration may include site disturbing activities that would affect this occurrence of Arizona sneezeweed. Ground disturbing activities such as moving soil would increase the risk of disturbance to individual plants and their habitat. These effects can be mitigated through design features and mitigations specifically BT007 to mitigate loss of mitigate loss of sensitive plants by avoiding them as much as possible. Design feature AQ021 also applies, stating that all federally listed or sensitive species will be identified during pre-planning on a site specific basis and mitigations for those species will be determined.

Arizona sneezeweed near roadways may be affected if construction, maintenance or reconstruction of the road occurs, especially if the rocky areas favored by the species is affected. This can be mitigated by locating and avoiding the plants before activities occur (BT001, TR001, and TR017).

Factors contributing to the degradation of aquatic habitats that led to the decision to include the areas in this analysis may have also affected the habitat of Arizona sneezeweed. Aquatic habitat restoration, depending on the actions taken could preserve or improve the habitat of Arizona sneezeweed in this area, depending on the actions taken by restoring the general area and reducing effects such as erosion in the long term.

There are no rock pits or in-woods processing areas near this occurrence of Arizona sneezeweed so no effects will occur.

Arizona sneezeweed may occur near roadways so may be affected if construction, maintenance or reconstruction of the road occurs and can be mitigated by locating and avoiding the plants before activities occur (BT001, TR001, TR017).

Alternative 2

The effects of Alternative 2 are the same as in the section above for all action alternatives.

Alternative 3.

Fewer areas containing Arizona sneezeweed will be treated as compared to Alternative 2 (see existing condition). As a result, it would not fulfill the purpose and need of the project as well as Alternative 2 and there would be less progress toward the desired conditions and guidelines of the forest LMRPs including those that apply to Region 3 sensitive plants such as Arizona sneezeweed.

Cumulative Effects

The timeframe of this discussion is from 1999 when Arizona sneezeweed was added to the sensitive species list to 20 years in the future. The area of this analysis is the project boundary.

On the Coconino NF, Arizona sneezeweed has been addressed in Upper Beaver Creek, Clint's and Cragin Watershed Protection Project where effects were mitigated through design features and mitigations similar to those in this project. On the Upper Beaver Creek Project the species tended to grow in drainages and open meadows and not in forested areas. Mitigations for watershed and fuels such as limiting the amount of disturbance in drainages during activities such as fireline construction.

Arizona sneezeweed tends to grow in drainages and open areas. These areas are also favored by dispersed recreationists who may crush plants and alter habitat during activities.

Activities such as grazing and fuelwood gathering have occurred and will continue in these areas.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Arizona sneezeweed (*Helenium arizonicum*) but are not likely to result in a trend toward federal listing or loss of viability.

Eastwood (Senator Mine) Alumroot (*Heuchera eastwoodiae*)

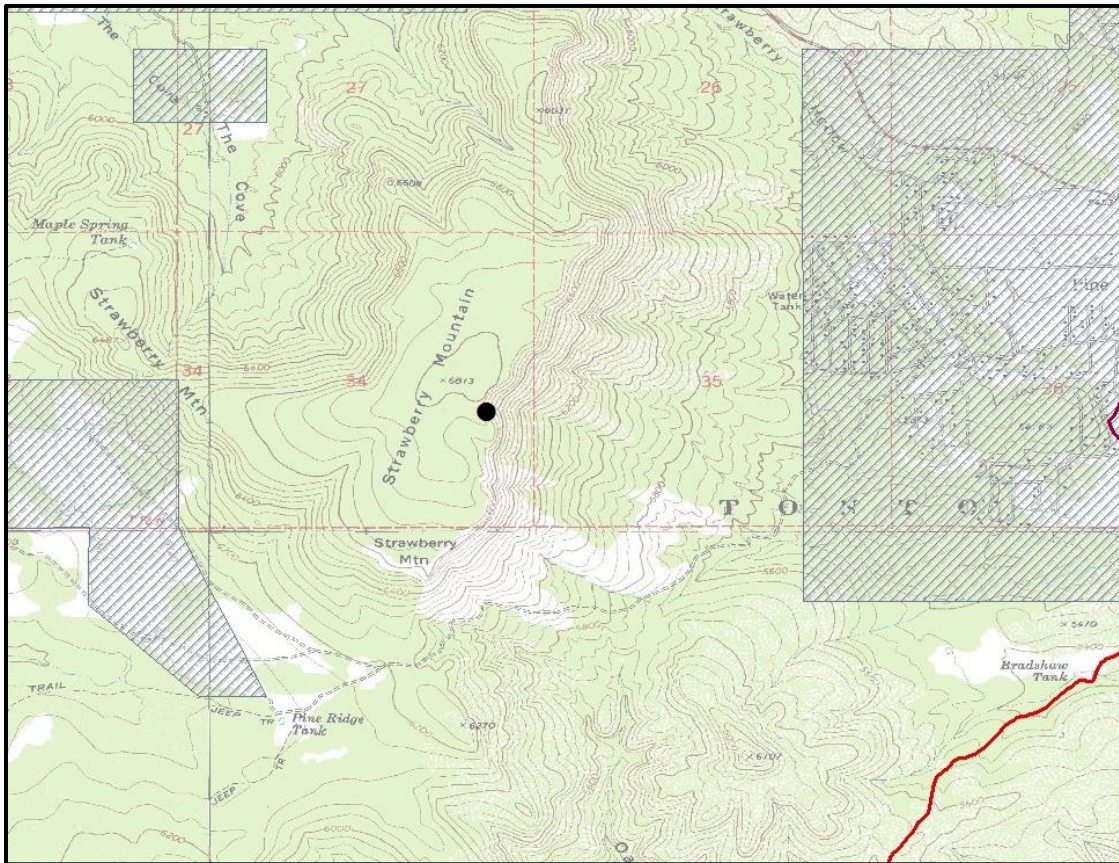
Eastwood Alumroot is a Region 3 sensitive species for all three forests

Eastwood alumroot is endemic to central Arizona where it grows on moist shaded slopes in ponderosa pine forests and canyons. The typical substrate is crevices in basalt soil or basalt soil (Arizona Game and Fish Department 2005). Many of the previous occurrences of this species have been reclassified and are no longer included in this taxa (Folk and Alexander 2015). This has reduced the number of known occurrences of Eastwood alumroot on the forests and possibly within the project area.

Existing Condition

There are three occurrences of Eastwood alumroot within the analysis area documented in SEINet. Hendricks collected the species in 1930 from "Strawberry Hill". The location falls with ponderosa pine/evergreen oak habitat.

Figure 10. Map showing Hendricks collection location of Eastwood alumroot.



Eastwood alumroot was collected three times in 1966 in the Christopher Creek drainage (SEINet - Arizona Chapter 2017). Lehto collected the species on April 30, 1966 at Christopher Creek Campground and on October 1, 1966 on a mountainside near Christopher Creek (34.3152 -111.016). David Keil collected it near the mountainside location on April 30, 1966. These locations are on private land. However, the species may occur on nearby Forest Service lands.

In addition to these areas, there are documented occurrences of Eastwood alumroot in the Hunter Creek, Christopher Creek drainages and in Chevelon Canyon (Arizona Game and Fish 2017). However, the location information is generalized so exact locations cannot be determined.

For the purposes of this analysis, only the collection by Hendricks will be discussed since it is the only collection that can be verified as occurring on forest lands. The vegetation treatment for the location containing the occurrence is proposed to be IT 10% - IT 25% for alternatives 2 and 3. This location is on the Tonto NF but Eastwood alumroot may also be present on the other forests as well.

Alternative 1 No Action

There are no direct effects to Eastwood alumroot from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions, standards and guidelines, or management emphasis as defined in the Apache-Sitgreaves (2016), Coconino (2018) or Tonto (1985) LMRPs. Alternative 1 would not increase

forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area the Eastwood alumroot by reducing the risk of loss to disturbances such as uncharacteristic wildfire.

Effects common to all action alternatives

The occurrence of Eastwood alumroot is in an area that will be treated using the IT 10%-IT 25% prescription in both action alternatives. The treatment will be developed using the mechanical treatment toolbox. The effects of mechanical treatment include loss of individual plants or groups of plants. These effects can be mitigated by using the design features in Appendix C, specifically BT001, BT005, BT007.

Prescribed fire will occur in the project area. Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include, increased risk of noxious or invasive weeds and an increased risk of erosion.

There are no occurrences of Eastwood alumroot in aquatic restoration areas but if any are found in areas such as Christopher Creek, management actions to accomplish this work will be guided by the Aquatic Toolbox. The risk to Eastwood alumroot from these actions include loss or damage of plants or loss of habitat. These can be mitigated through using the design features AQ021, BT001BT005, BT007 and SW001. Ground disturbing activities such as moving soil would increase the risk of disturbance to individual plants and their habitat. These effects can be mitigated through design features and mitigations specifically BT007 to mitigate loss of sensitive plants by avoiding them as much as possible. Design feature AQ021 also applies, stating that all federally listed or sensitive species will be identified during pre-planning on a site specific basis and mitigations for those species will be determined.

An indirect effect of management actions within the potential habitat of Eastwood alumroot includes an increased risk of invasion from noxious or invasive weeds. Incorporation of the Design Features, best management practices, mitigation and conservation measures in Appendix C would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of roc fleabane. See design features BT007, NW001, NW002, NW003, NW004 and NW009.

There are no rock pits or in-woods processing areas near this occurrence of Eastwood alumroot so no effects will occur.

Eastwood alumroot may occur near roadways so may be affected if construction, maintenance or reconstruction of the road occurs and can be mitigated by locating and avoiding the plants before activities occur (BT001, TR001, TR017).

Cumulative effects

work on later

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Eastwood alumroot (*Heuchera eastwoodiae*) but are not likely to result in a trend toward federal listing or loss of viability.

Flagstaff beardtongue (*Penstemon nudiflorus*)

Flagstaff beardtongue is a Region 3 sensitive species for Coconino NF. Flagstaff beardtongue grows in dry pine forests, pine/oak, pine/oak/ juniper and pinyon juniper forests. It occurs on dry slopes, in openings and along edges of openings and in forested areas. Documented locations for Flagstaff beardtongue include Anderson Mesa, near Lake Mary, Luke Mountain, Mormon Lake, Stoneman Lake, along the Schnebly Hill Road, along Oak Creek. In recent years, numerous locations have been found in proposed fuels reduction projects such as Upper Beaver Creek Watershed Fuels Reduction Project (2010) and in the Rocky Park Fuels Reduction Project (2001).

Flagstaff beardtongue is endemic to northern and central Arizona where grows in dry pine forests (Arizona Game and Fish Department 2003). It tends to occur at elevations from 5100 to 7000 ft. in stony basaltic soil (Crosswhite 1967).

Existing Condition

Tables 8 and 9 show the occurrences of Flagstaff beardtongue as recorded in TESP/IS and Arizona Game and Fish Heritage Database (2017)

Alternative 1 No Action

There are no direct effects to Flagstaff beardtongue from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions as defined in the Coconino LRMP (2018). The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation. Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area containing hairy clematis by reducing the risk of loss to disturbances such as uncharacteristic wildfire. The Desired Conditions and Guidelines that apply to Flagstaff beardtongue include Desired Conditions [All Ecosystems](#), [Soil](#), [Terrestrial Ecosystems](#), or [Wildlife, Fish and Plants](#). As a result, there would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and Flagstaff beardtongue plants in the project area would remain at a higher risk of loss from loss from undesirable fire effects if a wildfire were to occur within or near Flagstaff beardtongue.

Alternative 2

Most of the areas containing Flagstaff beardtongue receiving vegetation treatments areas are scheduled for mechanical treatment (goshawk foraging). The treatments will be developed using the mechanical treatment toolbox. The treatment will encompass considerations for the habitat of northern goshawk. The effects of mechanical treatment include loss of individual plants or groups of plants. These effects can be mitigated by using the design features in Appendix C, specifically BT001, BT005, BT007.

Prescribed fire will occur across the project area. Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include the loss of shade, increased risk of noxious or invasive weeds and an increased risk of erosion. This will be mitigated by burning at intensities in all entries low enough to limit mortality to trees (see design features BT003 and FE003).

An indirect effect of management actions within the potential habitat of Flagstaff beardtongue includes an increased risk of invasion from noxious or invasive weeds. Incorporation of the Design Features, best management practices, mitigation and conservation measures in Appendix C would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of hairy clematis. See design features BT007, NW001, NW002, NW003, NW004 and NW009.

Activities associated with roads and transportation in this project would be limited those needed to accomplish the management actions that will occur in the area. The effects of road construction, maintenance, reconstruction and decommissioning can be mitigated by using the design features in Appendix C, specifically BT009 and BT010. The effects of dust on plants from transportation can be mitigated by design feature TR017.

There are no rock pits or in-woods processing areas near the occurrences of Flagstaff beardtongue so no effects will occur.

Alternative 3

Under alternative 3 fewer acres containing Flagstaff beardtongue would receive vegetation treatments (see tables 8 and 9). Alternative 3 would not address the purpose and need as well as Alternative 2 and there would be less progress toward the desired conditions that affect Flagstaff beardtongue. Forest resiliency and sustainability would be attained on fewer acres and the risk of undesirable fire effects would be reduced in fewer areas. Flagstaff beardtongue plants and habitat in these areas would remain at higher risk of loss or damage from undesirable fire.

Table 8. Locations of Flagstaff Beardtongue in vegetation treatments.

Examiner/ Observer	Date	Comp/ Stand	Alternative 2	Alternative 3
MRRD WL Crew	8/1/2013	573/6	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/1/2013	573/7	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/8/2005	606/22	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/1/2013	609/9	Mechanical & Prescribed Fire (MSO Recovery)	UEA 25% -40%
MRRD WL Crew	8/1/2013	609/15	Mechanical & Prescribed Fire (Goshawk Foraging)	SI 40% - 55%
K Sullivan	8/31/2004	609/41	Mechanical & Prescribed Fire (Goshawk Foraging)	UEA 10% -40%
MRRD WL Crew	8/1/2013	610/25	Mechanical & Prescribed Fire (Goshawk Foraging)	SI 10%-40%
MRRD WL Crew	8/1/2013	611/6	Mechanical & Prescribed Fire (Goshawk Foraging)	UEA 10% - 40%
K Sullivan	8/2/2005	618/24	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
K Sullivan	8/2/2005	618/25	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
K Sullivan	9/5/2004	619/1	Mechanical & Prescribed Fire (Goshawk Foraging)	UEA 40% -55%
K Sullivan	9/5/2004	619/2	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 40% - 55%
MRRD WL Crew	8/1/2013	619/3	Mechanical & Prescribed Fire (Goshawk Foraging)	UEA 25% - 40%
MRRD WL Crew	8/1/2013	619/24	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 40% - 55%
MRRD WL Crew	8/1/2013	619/26	Mechanical & Prescribed Fire (Goshawk Foraging)	SI 25% - 40%
MRRD WL Crew	8/3/2005	621/1	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/3/2005	621/7	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/3/2005	925/6	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	925/14	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	925/15	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	925/16	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	925/17	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	925/18	Mechanical & Prescribed Fire (Goshawk Foraging)/ Grassland Restoration	N/A
MRRD WL Crew	8/2/2005	925/21	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	925/27	Mechanical & Prescribed Fire (Goshawk Foraging)/ Grassland Restoration	N/A

Examiner/ Observer	Date	Comp/ Stand	Alternative 2	Alternative 3
MRRD WL Crew	8/2/2005	925/28	Mechanical & Prescribed Fire (Goshawk Foraging)/ Grassland Restoration	N/A
MRRD WL Crew	8/2/2005	925/29	Mechanical & Prescribed Fire (Goshawk Foraging)/ Grassland Restoration	N/A
MRRD WL Crew	8/2/2005	925/30	Mechanical & Prescribed Fire (Goshawk Foraging)/ Grassland Restoration	N/A
MRRD WL Crew	8/2/2005	944/5	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	944/6	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/2/2005	944/7	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A
MRRD WL Crew	8/15/2005	954/2	Facilitative Operations	Grassland Restoration
MRRD WL Crew	8/9/2004		Grassland Restoration	N/A
MRRD WL Crew	8/11/2004		Grassland Restoration	N/A
MRRD WL Crew	8/11/2004		Grassland Restoration	N/A
MRRD WL Crew	8/13/2004		Grassland Restoration	N/A
MRRD WL Crew	7/31/2014		Grassland Restoration	N/A

Table 9. Locations for Flagstaff beardtongue occurring in treatment units from Arizona Game and Fish Heritage Database

Date	Location	Comp/Stand	Alternative 2	Alternative 3
6/25/1988	Mogollon Rim: N of Strawberry	682/5	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 25%-40%
6/25/1988	Mogollon Rim: N of Strawberry	684/5	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 40% -55%
6/25/1988	Mogollon Rim: N of Strawberry	684/12	Mechanical & Prescribed Fire (MSO Recovery)	N/A
8/15/1973	Jacks Canyon: Moqui Draw	728/10	Mechanical & Prescribed Fire (MSO Recovery)	N/A
7/5/1974	W of Stoneman Lake		Grassland Restoration	N/A

Cumulative effects

The area of consideration for this discussion includes the Coconino NF within the analysis area boundary. The timeframe includes 20 years past and future.

Surveys have been conducted for Flagstaff beardtongue on several of past projects that addressed vegetation and prescribed fire treatments. These include Upper Beaver Creek Watershed Fuels Reduction Project (2010), Clint's Well Forest Restoration (2013), Mahan, Marshall Fuels Reduction and Forest Restoration Project (2011) and the Four-Forest Restoration Initiative (2014). Effects to Flagstaff beardtongue were mitigated with similar measures as are being used in Rim Country EIS.

Management activities such as grazing have occurred and will continue to occur in the area of consideration.

Other activities such as utility corridors have impacted individual plants or groups but has not contributed to a decline in the species.

Activities such as dispersed recreation and fuel wood cutting occur in the area of consideration.

Flagstaff beardtongue is showy and is cultivated and offered for sale by local and regional wildflower vendors but the effects of these activities on wild populations is not known.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Flagstaff beardtongue (*Penstemon nudiflorus*) but are not likely to result in a trend toward federal listing or loss of viability.

Blumer's Dock (*Rumex orthoneurus*)

Blumer's dock is a Region 3 sensitive species for all three forests

Blumer's dock is a large, long-lived herbaceous perennial plant endemic to New Mexico and Arizona. Its range is from east-central to southeastern Arizona (depending on taxonomic interpretation). Habitat for Blumer's dock includes mid- to high-elevation wetlands with moist, organic soil adjacent to perennial springs or streams in canyons or meadows (Arizona Game and Fish Department 2002). The species was proposed for federal listing in 1998 (US Fish and Wildlife Service 1998) but the petition was rescinded in 1999 (U.S. Fish and Wildlife Service 1999).

Existing Condition

There are numerous occurrences of Blumer's dock on the Apache-Sitgreaves NF. The Wildlife Specialist Report for Plan Revision on Apache-Sitgreaves NF identified the habitat for Blumer's dock as All Riparian PVNTs. Healthy riparian condition and clean water are identified as the habitat elements (fine filter components) addressed in analyses for plan revision (USDA Forest Service, Apache-Sitgreaves National Forest. 2015). .

Historically, there were both naturally occurring and introduced populations of Blumer's dock on Tonto NF (USDA Forest Service 1985). The introductions occurred in the 1980's. The introduced plants were cultivated from seeds collected from naturally occurring populations on the forest. The four naturally occurring populations include Reynolds Creek, Workman Creek, Rose Creek and Cold Springs Canyon. There are seventeen additional introduced populations including Canyon Creek, Haigler Creek, Pueblo Canyon, Bray Creek, Chase Creek, See Canyon, Nappa Spring, Dude Creek, East Verde River, Horton

Springs, Pine Creek, Tonto Creek, Tonto Spring, Washington Park, Webber Creek, Ellison Creek, Christopher Creek, See Canyon and Horton Spring (USDA Forest Service 1993).

The Tonto NF prepared a Conservation Strategy for Blumer's dock in 1993. Directions in the Conservation Strategy included a series of mitigations including maintaining or improving suitable riparian condition and actions to reduce the effects of roads. These are

- Locate new roads away from populations
- Minimize road maintenance and reconstruction of existing roads adjacent to populations
- Seek opportunities to obliterate and/or close roads adjacent to or impacting the population.

The documented locations within the project area on the Coconino NF are in the East Clear Creek and Barbershop Canyon areas.

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Table 10. Locations of Blumer's dock on Apache-Sitgreaves and Tonto NFs (source Apache Sitgreaves files).

Forest	District	Date	Location_	Comments
Apache-Sitgreaves	Black Mesa	7/2/1997	Double Cabin	1000-3000 plants, very vigorous, within a 6-acre enclosure along creek. 6/26/98: Upstream of enclosure, within 100 meters of enclosure,
Apache-Sitgreaves	Black Mesa	6/26/1998	Gentry Canyon	Very few individuals observed; two clumps prostrate 11 plants upstream 80-100 meters from FR40; one clump prostrate plants d
Apache-Sitgreaves	Black Mesa	6/26/1998	Upper Fairchild Draw	Rhizomes documented. Probably 1000 plants in wet meadow, but all prostrate and very small. No evidence of old or new flower stalks.
Apache-Sitgreaves	Black Mesa	7/28/1998	Pius Draw	Common in cienega.
Apache-Sitgreaves	Black Mesa	7/29/1998	Willow Creek, Wiggins Crossing	Infrequent from 1 km above mouth of Hart Canyon to 1 km below Wiggins Crossing.
Apache-Sitgreaves	Black Mesa	7/29/1998	Long Tom Canyon	Common from FR 172 crossing down to near center of Sec 27 in deeply incised stream in ponderosa pine forest.
Apache-Sitgreaves	Black Mesa	10/14/2007	Willow Creek, Mule Crossing	Plant found just north of Mule Crossing. Plants found in Willow Creek from Mule Crossing to approximately 1.5 miles north of Wiggins Crossing. Rhizomes verified at this location.
Apache-Sitgreaves	Black Mesa	10/14/2007	Willow Creek at Gentry Creek Junction	Plant found at junction of Willow Creek and Gentry Creek. Plants found in Willow Creek from Mule Crossing to approximately 1.5 miles north of Wiggins Crossing.
Apache-Sitgreaves	Black Mesa	10/14/2007	Willow Creek	Plant found approximately 0.5 miles north of Wiggins Crossing. Plants found in Willow Creek from Mule Crossing to approximately 1.5 miles north of Wiggins Crossing.
Tonto	Payson	1984	Napa Spring	Introduced population; 1984: 10 plants introduced. 1985: 5 plants observed. 1986: No plants observed. 1991: No plants observed.
Tonto	Payson	1985	Tonto Spring	Introduced population. Tonto Spring (site T12): 1985: 20 plants introduced. 1986: 12 plants observed. 1989. 10 plants observed, area being grazed. 1990: No plants observed, area scoured by flooding following the Dude Fire. 1990-11: plants found res
Tonto	Payson	1985	Tonto Creek	Introduced population. Tonto Creek Site (site T13): 1985-08: Four plants introduced T11, R12 Sec 4. 1987-07: 80 plants introduced. 1988-07: 132 plants introduced. 1989-10: No plants observed. 1990: No plants observed, area scoured following Dude Fire
Tonto	Payson	1986	Christopher Creek	Introduced population. 1989-09: 180 plants introduced. Much caterpillar use noted. 1990: 18 plants observed, area grazed. 1991-08: 9 plants observed.

Tonto	Payson	May-85	Horton Springs	Introduced population. 1985-05: 40 plants introduced. 1986-07: 12 plants observed. 1987: Area fenced. 1989: Fire in fenced area. 1990-08: 95 plants observed. Area being grazed. Most small with no flowers. 1991-08: 164 plants observed, appear healthy.
Tonto	Payson	Aug-85	See Spring	Introduced population: 1985-08: 75 plants introduced. 1986-10: 23 plants, reproduction. Evident. 1987-08: 50 plants introduced. 1989: 180 plants introduced below spring 1990: 130 plants observed.
Tonto	Pleasant Valley	1987	Lower Canyon Creek	Introduced population: 1987: Approximately 100 (?) plants introduced downstream from FR 33. 1988-09; 1988-1989: More plants introduced. 1990-08:
Tonto	Pleasant Valley	Aug-85	Canyon Creek Spring and Canyon Creek	Introduced population. USFWS site T2A at Canyon Creek Spring. 1985: Introduced 30 plants. 1986: Reproduction evident. 1987-09: 31 plants, 100 more introduced. 1989-09: Over 216 plants, reprod. Evident. Last observation 1998. USFWS site T2B.

Table 11 below includes specimens or observations from various herbaria and documented in SEINet (on-line database).

Table 11. Collections of Blumer's dock within the analysis boundary as documented in SEINet

Collector/Observer	Date	Location
G. J Harrison; T. H. Kearney & H. J. Fulton	June 23,1929	Rose Creek, Sierra Ancha
Gregory J. Imdorf	July 9,1993	Along Reynolds Creek, east of Reynolds Falls at trailhead for Trail 150
Wendy C. Hodgson	June 25, 1999	Tributary running N-S into East Clear Creek, just below junction of FSR 95 and FSR 96, parallel (and below) FSR 96,
Barbara Phillips	September 20, 1998	Barbershop Canyon, 34.55028 -111.16194

Arizona Game and Fish Heritage Database documented occurrences of Blumer's dock in the following areas Barbershop Canyon, Fairchild Draw, Gentry Canyon, Pius Draw, Willow Draw, Bray Creek, Canyon Creek, Christopher Creek, Dude Creek, Buck Springs Canyon, Pieper Hatchery Spring., Ellison Creek, Horton Spring, Haigler Creek, Pine Canyon, Reynolds Creek, Rose Creek, Tonto Creek, Webber Creek and Workman Creek (Arizona Game and Fish 2017).

Table 12. Aquatic restoration areas and/or stream channel restoration containing Blumer's dock. Plant locations are from AZGFD HDMS data.

Stream	Location of plants	Date last observed
Barbershop Canyon	Barbershop Canyon	September 1998
Canyon Creek	Canyon Creek	1998
Chase Creek	Chase Creek	1998
Christopher Creek	Christopher Creek	August 1991
Christopher Creek	Christopher Creek/ Nappa Spring	1985
Dude Creek	Dude Creek	1997
East Verde River	East Verde River/Pieper Hatchery Spring	1998
Ellison Creek	Ellison Creek	September 1989

Gentry Canyon	Gentry Canyon	July 26, 1998
Haigler Creek	Naegelin Rim/ Haigler Creek	1998
Pine Creek	Pine Canyon	1998
Reynolds Creek	Reynolds Creek	August 1998
Christopher Creek	See Canyon	1998
Upper Tonto Creek	Tonto Creek	1998
Webber Creek	Webber Creek	1997
Willow Creek	Willow Creek	July 29, 1998
Workman Creek	Workman Creek.	September 8, 2011

The streams in table 13 are being analyzed for channel restoration, which is a subset of the aquatic restoration treatments.

Table 13. Stream channel restoration areas containing Blumer's dock

Date observed	Stream
1998-06-26	Gentry Canyon
1998-06-26	Fairchild Draw
1987-08	Bray Creek
1998	East Verde River
1989-09	Ellison Creek
1998	Valentine Canyon
1998	Mule Creek
1998	Canyon Creek
1998-08	Reynolds Creek
2011-09-08	Workman Creek
1998-08	Rose Creek
1997	Weber Creek
1999-08-18	Buck Springs Canyon

Alternative 1 No Action

There are no direct effects to Blumer's dock from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions, standards and guidelines, or management emphasis as defined in the Apache-Sitgreaves (2016), Coconino (2018) or Tonto (1985) LMRPs. The portion of the purpose and need that addresses the need to improve terrestrial and aquatic habitats and the need to improve the condition of streams and springs. Alternative 1 would not improve terrestrial or aquatic habitats or improve the condition of streams and springs.

There would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and the habitats that support Blumer's dock would not be restored or improved. There would be no improvement in aquatic habitats and there would be no opportunities to improve the conditions of stream channels and springs.

Specifically:

For the Apache-Sitgreaves NF, the forest wide desired conditions for overall forest health and the desired conditions and guidelines for soil, desired conditions for All PNVTs landscape scale and mid-scale desired conditions would not be met. The landscape scale and midscale desired conditions for All Riparian Areas would not be addressed. Guidelines for wildlife and rare plants, particularly the guideline that protect unique habitat features to retain their distinctive ecological functions and maintain viability of associated species and the guideline that considers and provides for the needs of localized species during project activities to ensure their limited or specialized habitats so they are not lost or degraded would not be followed.

For the Coconino NF, the desired conditions and guidelines for [All Ecosystems, soil](#), all riparian, riparian forests, wetlands, springs or [wildlife, fish and plants](#) would not be addressed and there would be no progress toward achieving the desired conditions.

Alternative 1 would not comply with the forest wide standards and guidelines for the Tonto NF addressing the habitat requirements of sensitive species. Blumer's dock occurs in MAs 4D and 5D where plan direction related to riparian systems is limited to the establishment of buffer strips for protection of aquatic and riparian resources. This guidance would be applied only in areas identified by the ID team during planning and implementation.

Effects Common to All Action Alternatives

Management actions in aquatic and riparian areas will be guided by the Aquatic Toolbox. These treatments will be prioritized based on the criteria in toolbox. Mechanical and fire treatments may occur in the uplands adjacent to these areas and will be guided by the Mechanical Toolbox.

The risk to Blumer's dock from management actions to restore aquatic habitats and stream channels include loss or damage of plants or loss of habitat. These can be mitigated through using the design features AQ021, BT001BT005, BT007, FE007 and SW001. Ground disturbing activities such as moving soil would increase the risk of disturbance to individual plants and their habitat. These effects can be mitigated through design features and mitigations specifically BT007 to mitigate loss sensitive plants by avoiding them as much as possible. Design feature AQ021 also applies, stating that all federally listed or sensitive species will be identified during pre-planning on a site specific basis and mitigations for those species will be determined.

An indirect effect of management actions within the potential habitat of Blumer's dock includes an increased risk of invasion from noxious or invasive weeds. Incorporation of the Design Features, best management practices, mitigation and conservation measures in Appendix C would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of Blumer's dock. See design features BT007, NW001, NW002, NW003, NW004 and NW009.

Prescribed fire will occur in the project area. Short-term effects of prescribed fire include deaths of individual plants but these can be mitigated by using design features BT003, FE004

There are no rock pits or in-woods processing areas near the occurrences of Blumer's dock so no effects will occur.

Blumer's dock may occur near roadways so may be affected if construction, maintenance or reconstruction of the road occurs and can be mitigated by locating and avoiding the plants before activities occur (BT001, TR001, TR017). The action alternatives would better address the purpose and need for aquatic and riparian habitats for the Apache Sitgreaves and Coconino NFs and would address the desired conditions and guidelines in the LMRPs. On the Tonto NF, the design features, mitigations and Aquatic Toolbox would provide better protection for riparian areas and stream courses as compared to the protections in Tonto NF LMRP (1985). Management actions would be guided by a comprehensive set of mitigations. The Aquatic Toolbox contains decision matrices and tools to address a series of conditions that affect the ecosystem health in aquatic systems. Examples include addressing the effects of erosion, noxious weeds, and soil disturbance or compaction that degrade all habitats including those occupied by Blumer's dock.

Cumulative effects

The area of consideration for this discussion includes the portion of the project area containing Blumer's dock plants and habitat, especially the drainages in the area. The timeframe is from 1993 to 20 years in the future. The 1993 timeframe was chosen so we can discuss the introductions of Blumer's dock on the Apache Sitgreaves and Tonto NFs as documented in the Conservation Strategy (USDA Forest Service 1993). These introductions were implemented to supplement the numbers of plants and populations of this rare species. The fates of some of these introductions are unknown and are thought to have not persisted. This would affect the distribution of Blumer's dock in the project area and could affect the mitigations and management actions for restoring these areas.

There are a series of exclosures on the Apache Sitgreaves NF. Some of them contain or were designed to protect Blumer's dock. The status of these are unknown. Some likely need repair.

Several large fires have occurred in the project area. The largest of these is the Rodeo-Chediski (2002). It and other large fires have affected the terrestrial and aquatic habitats in the area containing Blumer's dock by destroying or altering vegetation communities, creating landscape scale disturbance, contributing to the risk of invasion of noxious or invasive weeds and contribution to erosion. The extent of effects on Blumer's dock is not known.

Grazing by livestock and wildlife has occurred and will continue to occur in the area. Blumer's dock is palatable to animals and small populations may be completely eaten in a single year.

Activities such as dispersed recreation and firewood gathering have occurred and will continue to occur in the area.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Blumer’s dock (*Rumex orthoneurus*) but are not likely to result in a trend toward federal listing or loss of viability.

Bebb’s Willow (*Salix bebbiana*)

Bebb’s willow is a Region 3 sensitive species for Coconino and Apache Sitgreaves National Forests.

Bebb's willow (*Salix bebbiana*) is a large native shrub or a small bushy tree fifteen to twenty-five feet tall that ranges from Alaska south to British Columbia to east Newfoundland and in northeast United States and upper mid-western United States. Bebb’s willow plants can regenerate from root and basal stem sprouting. Stem and root fragments root naturally if buried in moist soil. Plants are dioecious: male and female flowers are borne on separate plants. Large quantities of seed may be produced but remain viable for only a few days. Bebb’s willow is drought and shade intolerant. Changes in water regime such as channel changes reduce successful germination from seed (Tesky 1992).

Existing Condition

Table 14. Bebb’s willow locations with vegetation treatments (Apache-Sitgreaves NF)

Date	Number of plants	Location	Comments	Comp/Stand	Alternative 2	Alternative 3	Aquatic treatments
9/11/2000	29	Gentry Meadow	11 Sept 2000: 29 live, 86 skeletons. 09 May 2003: 7 live, 9 skeletons. Site fenced Sept 2004: 100 <i>S. bebbiana</i> seedlings planted. 18 Aug 2005: 35 seedlings observed. Existing enclosure, In meadow	34/0014	Mechanical & Prescribed Fire (MSO Recovery)	N/A	
9/11/2000	30	Baca Meadow	11 Sept 2000: 30 live, 48 skeletons. 09 May 2003: 3 live, 9 skeletons. Site fenced Oct 2004 Existing enclosure, In meadow	350/008	Mechanical & Prescribed Fire (Goshawk Foraging)	N/A	

2002	Unknown	South Willow Creek	Several large willows caged with heavy 4' hog wire. Not in enclosure layer		Meadow Restoration	N/A	Stream Channel Restoration (Willow Creek.)
2006	1	Willow Creek N. of Rancho Alegre	One large willow on bank north of Private Land No information to show willow is fenced		Meadow Restoration	N/A	Stream Channel Restoration (Willow Creek.)
5/9/2000	4	Gentry Spring	Site caged. Protected by "cage"	1090011	Facilitative Operations	N/A	Stream Channel Restoration (Gentry Creek)
5/9/2000	6	Open Draw	Site fenced in 1996 and seedlings planted. Existing enclosure	1130009	Facilitative Operations		Stream Channel Restoration (Open Draw)
10/17/2005	1	Side drainage of Hart	Willow not doing well. Hammered by elk. No information in files indicating protective fencing is present.	970021	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 25% -40%	Stream Channel Restoration (Hart Canyon)
5/9/2000	7	Double Cabin	Site fenced and seedlings planted. Existing enclosure	1120006	Facilitative Operations	Facilitative Operations Mechanical	Stream Channel Restoration
5/9/2000	32	Fairchild Draw	Site fenced in 2001 and seedlings planted. Existing enclosure	1110003	Mechanical & Prescribed Fire (Goshawk Foraging)	IT 10% - 25%	Stream Channel Restoration Fairchild Draw

Table 15. Bebb's willow from SEINet

Name	Date		Forest	Comments	Comp	Stand	Alternative 2	Alternative 3	Aquatic
G. Rink	7/6/2015	McCormick Spring	Apache Sitgreaves		7012	10	Facilitative Operations	N/A	N/A
Granfelt	7/3/2008	McCormick Spring. Bebb's tree tag #11. T9N R24E S27 SWNW.	Apache Sitgreaves		7011	10	Mechanical & Prescribed Fire (MSO Recovery)	N/A	N/A
G.W. Argus	5/28/1985	Kehl Springs	Coconino	Vegetation treatment addressed in the Cragin Project			.		Steam Channel Restoration Kehl Canyon
G. Rink	7/17/2016	Pat Knoll Spring	Apache Sitgreaves		787	109	Mechanical & Prescribed Fire (MSO Recovery)		
Vera Markgraf	8/9/2012	Middle Kehl Spring	Coconino	Vegetation treatment addressed in the Cragin Project					Steam Channel Restoration Middle Kehl Canyon
G.W. Argus	5/24/1985	Merritt Draw	Coconino		777	3	Mechanical & Prescribed Fire (MSO Recovery)	IT 10%-25%	Steam Channel Restoration Merritt Draw

Name	Date		Forest	Comments	Comp	Stand	Alternative 2	Alternative 3	Aquatic
Barb Phillips	6/29/2008	Moonshine Spring	Coconino		785	47	IT 10%-25%	IT 10%-25%	N/A
Jessa Fisher	6/29/2008	Moonshine Spring	Coconino		785	47	IT 10%-25%	IT 10%-25%	N/A
Vera Markgraf	7/26/2013	Moonshine Spring	Coconino		785	47	IT 10%-25%	IT 10%-25%	N/A
L.E Stevens	9/19/2009	Moonshine Springs	Coconino		785	47	IT 10%-25%	IT 10%-25%	N/A

There is no information for Bebb's willow in the TESP/IS or Arizona Game and Fish Heritage Database.

Alternative 1 No Action

There are no direct effects to Bebb's willow from management actions since none will occur.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions, standards and guidelines, or management emphasis as defined in the Apache-Sitgreaves (2016) or Coconino (2018) LMRPs. Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no treatments to restore the structure and function of the area to reduce the risk of loss to disturbances such as uncharacteristic wildfire.

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions, standards and guidelines, or management emphasis as defined in the Apache-Sitgreaves (2016) or Coconino (2018) LMRPs. . The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation.

Alternative 1 would not be consistent with the LMRPs for the forests. As a result, there would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and Bebb's willow in the project area would remain at a higher risk of loss from loss from undesirable fire effects if a wildfire were to occur within or near an occurrence of Bebb's willow.

The portion of the purpose and need that addresses the need to improve terrestrial and aquatic habitats and the need to improve the condition of streams and springs. Alternative 1 would not improve terrestrial or aquatic habitats or improve the condition of streams and springs.

There would be no improvement of forest health, change in vegetation composition and diversity, resiliency would not be improved and the habitats that support Bebb's willow would not be restored or improved. There would be no improvement in aquatic habitats and there would be no opportunities to improve the conditions of stream channels and springs.

Short-term effects of prescribed fire include deaths of individual plants. The potential long-term effects include the loss of shade, increased risk of noxious or invasive weeds and an increased risk of erosion. This will be mitigated by burning at intensities in all entries low enough to limit mortality to trees (see design features BT003 and FE003).

Opportunities to plant Bebb's willow in existing locations or other suitable locations not currently occupied would not occur and the opportunities to construct protective barriers around Bebb's willow would not occur.

Specifically:

For the Apache-Sitgreaves NF, the forest wide desired conditions for overall forest health and the desired conditions and guidelines for soil, desired conditions for All PNVTs landscape scale and mid-scale desired conditions would not be met. The landscape scale and midscale desired conditions for All Riparian Areas would not be addressed. Guidelines for wildlife and rare plants, particularly the guideline that protect unique habitat features to retain their distinctive ecological functions and maintain viability of associated species and the guideline that considers and provides for the needs of localized species during project activities to ensure their limited or specialized habitats so they are not lost or degraded would not be followed.

For the Coconino NF, the desired conditions and guidelines for [All Ecosystems, soil](#), all riparian, riparian forests, wetlands, springs or [wildlife, fish and plants](#) would not be addressed and there would be no progress toward achieving the desired conditions.

Effects Common to All Action Alternatives

Some of the areas containing Bebb's willow will receive vegetation treatments. The treatments will be developed using the mechanical treatment toolbox. The effects of mechanical treatment include loss of individual plants or groups of plants. These effects can be mitigated by using the design features in Appendix C, specifically BT001, BT005, BT007.

Management actions in aquatic and riparian areas will be guided by the Aquatic Toolbox. These treatments will be prioritized based on the criteria in toolbox. Mechanical and fire treatments may occur in the uplands adjacent to these areas and will be guided by the Mechanical Toolbox.

The risk to Bebb's willow from management actions to restore aquatic habitats and stream channels include loss or damage of plants or loss of habitat. These can be mitigated through using the design features AQ021, BT001BT005, BT007, FE007 and SW001. Ground disturbing activities such as moving soil would increase the risk of disturbance to individual plants and their habitat. These effects can be mitigated through design features and mitigations specifically BT007 to mitigate loss sensitive plants by avoiding them as much as possible. Design feature AQ021

also applies, stating that all federally listed or sensitive species will be identified during pre-planning on a site specific basis and mitigations for those species will be determined.

Prescribed fire will occur in the project area. Short-term effects of prescribed fire include deaths of individual plants but these can be mitigated by using design features BT003, FE004

An indirect effect of management actions within the potential habitat of Bebb's willow includes an increased risk of invasion from noxious or invasive weeds. Incorporation of the Design Features, best management practices, mitigation and conservation measures in Appendix C would mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of Bebb's willow. See design features BT007, NW001, NW002, NW003, NW004 and NW009.

There are no rock pits or in-woods processing areas near the occurrences of Bebb's willow so no effects will occur.

Bebb's willow may occur near roadways so may be affected if construction, maintenance or reconstruction of the road occurs and can be mitigated by locating and avoiding the plants before activities occur (BT001, TR001, TR017). The action alternatives would better address the purpose and need for aquatic and riparian habitats for the Apache Sitgreaves and Coconino NFs and would address the desired conditions and guidelines in the LMRPs. The Aquatic Toolbox contains decision matrices and tools to address a series of conditions that affect the ecosystem health in aquatic systems. Examples include addressing the effects of erosion, noxious weeds, and soil disturbance or compaction that degrade all habitats including those occupied by Bebb's willow.

Alternative 2

The effects of Alternative 2 are the same as in the section above for all action alternatives.

Alternative 3

Fewer areas containing Bebb's willow will receive vegetation or prescribed fire treatments as compared to Alternative 2 (see existing condition). As a result, it would not fulfill the purpose and need of the project as well as Alternative 2 and there would be less progress toward the desired conditions and guidelines of the forest LMRPs including those that apply to Region 3 sensitive plants such as Bebb's willow.

Cumulative effects

The area of consideration for this discussion includes the portion of the project area containing Bebb's willow and its habitat, especially the drainages in the area. The timeframe is 20 years past and in the future.

There are a series of exclosures on the Apache Sitgreaves NF and Coconino NFs. Some of contain or were designed to protect Bebb's willows. The status of these are unknown. Some likely need repair.

Several large fires have occurred in the project area. The tops of Bebb's willow may be removed by fire but the species is able to regenerate through basal sprouting. However, regeneration is often targeted and eaten by domestic and wild grazers, leading to depletion of underground reserves ultimately leading to the death of individual plants.

Grazing by livestock and wildlife has occurred and will continue to occur in the area. Bebb's willow is palatable to animals and small populations may be completely eaten in a single year.

Activities such as dispersed recreation and firewood gathering have occurred and will continue to occur in the area.

It is my determination that

Management actions proposed in the Rim Country EIS may impact individuals of Bebb's willow (*Salix bebbiana*) but are not likely to result in a trend toward federal listing or loss of viability.

DRAFT

Alternative 1 No Action

Forest Planning Species (Apache-Sitgreaves NF) and “Other” Species (Coconino NF) are those species which were used to evaluate Plan components during the revision on the respective LMRPs. Standards and guidelines in the Apache-Sitgreaves (2016) and Coconino (2018) NF LRMPs would not be applied. There would be no progress toward the desired conditions and guidelines defined in the LRMPs.

Effects Common to All Action Alternatives

Forest Planning Species (Apache Sitgreaves NF) and “Other” Species (Coconino NF) are those species which were used to evaluate Plan components during the revision on the respective LMRPs. Assuming that all management actions comply with the plan components of the forest plans, then viability for these species will be appropriately addressed and no further consideration is needed.

There is no finding of effect for these species.

Noxious or Invasive Weeds

Each of the three forest has separate noxious or invasive weed treatment analyses. As a result, the targeted species and treatment methods may differ across forests. The Coconino NF was the first of the three forests to complete a noxious or invasive weed treatment analysis the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests*; (USDA Forest Service 2005), analyzing 29 species for treatment. The Apache-Sitgreaves NF completed the *Environmental Assessment for the A-SNFs Integrated Forest-Wide Noxious or Invasive Weed Management Program* (USDA Forest Service 2008). It analyzed 53 species and included a variety of treatments including chemical, cultural, mechanical/physical and biological control. The Tonto NF completed the *Environmental Assessment for Integrated Treatment of Noxious or Invasive Plants* in 2012 and addressed 68 species. It includes manual, mechanical, prescribed burning, cultural, use of biological control agents, and use of herbicides. The noxious or invasive weeds throughout the Region have been rated on the basis of their known distributions and threats to ecosystems (USDA Forest Service 2014). There are four levels defined by regional guidance.

- Class A species are newly established or have the potential to become established in the area. These may pose an unacceptable threat to rare species, watershed condition, wilderness or other natural and economic resources. These species should receive the highest priority prevention, eradication, containment, control, and/or restoration. Management emphasis is to prevent and eradicate whenever possible or else use containment as a last resort.
- Class B species have limited distribution on the forest, district, or else within a particular watershed but still pose a substantial threat to rare species, watershed condition, wilderness or other natural and economic resources. Weed species in this classification receive a lower priority for eradication, control, or restoration as compared to Class A species. Management emphasis is to eradicate on a local basis or else control established infestations by using an adaptive management approach.
- Class C species are widely distributed but do not pose additional threats to rare species, watershed condition, wilderness or other natural and economic resources. (e.g., widely scattered cheatgrass infestations that do not unduly impact native vegetation or contribute to periodic fire cycles).

Weed species in this classification generally receive the lowest priority for control or restoration as compared to species in other classes. Management emphasis is to use a control strategy with an adaptive management approach on a local basis only when necessary to achieve desired goals and/or objectives and to limit overall impacts.

- Class E species are widely distributed across the forest, district, or else within a particular watershed and pose overwhelming damage to natural resources.. These particular wide-ranging species must be controlled continuously to prevent overwhelming damage to natural. Management emphasis is to control on a broad-scale basis by using a control strategy with an adaptive management approach to achieve desired goals and/or objectives and limit overall impacts.

Assumptions

This analysis is based on the following **assumptions**.

- The mitigation measures and design features will be incorporated into project design and implementation
- Surveys will be conducted in treatment areas before implementation
- Areas to be treated will be surveyed noxious or invasive weeds before treatments are implemented.
- All management activities will occur as analyzed in the various specialists reports and described in the FEIS.
- These factors should be considered when identifying survey needs
 - Likelihood of any of the species addressed in this document occurring within the treatment area
 - Amount of disturbance. For example, surveys may not be needed in areas scheduled for prescribed burning if the treatments are scheduled to be of low intensity.
- The mitigations and Best Management Practices addressed in this document are included in analysis and project implementation. See table 4 above for these features.
- The acreage of potential disturbance in this project is much larger than generally analyzed in similar projects, necessitating invasive plant treatments to control invasive species. This will lead to increases in personnel and budget to accomplish this need.

Existing Condition

Noxious or invasive weeds are present within all three forests in the project area. The presence of noxious or invasive weed species have been documented by various surveyors including Forest employees. Disturbances such as wildfires, management activities, roadways and activities by the general public but not regulated by the Forest Service have contributed the introduction and spread of various species. Tables 15, 16 and 17 show the species present on each forest and the objectives by forest for each species.

Table 15. Noxious or invasive weeds on Apache Sitgreaves NF and within the project area boundary

Scientific name	Common name	Infested acres	Management goal/treatment objective	Regional Ranking	Comment
Acroptilon repens	Russian knapweed	0.1	Prevent/eradicate	E	Within project boundary but not in treatment units
Carduus nutans	musk thistle	0.1	Prevent/control/eradicate	A	
Centaurea solstitialis	yellow star-thistle	100	Prevent/eradicate	E	
Centaurea biebersteinii	spotted knapweed	3.0	Prevent/eradicate	E	
Cirsium vulgare	bull thistle	2.5	Prevent/control/eradicate	B	
Linaria vulgaris	butter and eggs	25.0	Prevent/eradicate	A	
Tamarix ramosissima	salt cedar	250.0	Prevent/control/eradicate	E	

Table 16. Noxious or invasive weeds on Coconino NF and within the analysis area boundary

Scientific name	Common name	Infested acres	Management goal /treatment objective	Regional Ranking	Comment
Acroptilon repens	Russian knapweed		Contain/Control	E	Most infestations are along or near highways
Alhagi maurorum	camelthorn	2.7	Contain/Control	E	All infestations are along highways except on FSR 316 which leads to private property

Scientific name	Common name	Infested acres	Management goal /treatment objective	Regional Ranking	Comment
<i>Bothriochloa ischaemum</i>	yellow bluestem		Not ranked*	B	All infestations are along Highway 260
<i>Bromus arvensis</i>	Japanese brome		Not ranked*	B	
<i>Bromus tectorum</i>	cheatgrass		Contain/control certain populations	B	
<i>Carduus nutans</i>	musk thistle		Eradicate	A	
<i>Centaurea biebersteinii</i>	spotted knapweed		Eradicate	E	Mostly along FH 3 and Highway 87
<i>Centaurea diffusa</i>	Diffuse knapweed		Contain/control	E	Mostly along roadways
<i>Cirsium vulgare</i>	Bull thistle		Contain/control	B	Most infestation are 1 acre or less and are on severely disturbed sites.
<i>Eleagnus angustifolia</i>	Russian olive		Contain/control	E	Single location along Highway 87
<i>Euphorbia esula</i>	Leafy spurge		Eradicate	E	
<i>Linaria dalmatica</i>	Dalmatian toadflax		Contain/control	B	Widespread weed in pine type on Coconino NF
<i>Linaria vulgaris</i>	butter and eggs		Not ranked*	A	One location near Happy Jack administrative site.

Scientific name	Common name	Infested acres	Management goal /treatment objective	Regional Ranking	Comment
Onopordum acanthium	Scotch thistle		Eradicate/control	E	
Tamarix ramosissima	Salt cedar		Contain/control	E	Along Rds. 316 and 625 from Hwy 87 to private land

Table 17. Noxious or invasive weeds on Tonto NF and within the analysis area boundary

Scientific name	Common name	Infested acres	Management goal /treatment objective	Regional Ranking	Comment
Acroptilon repens	Russian knapweed		A -Eradicate	E	
Alhagi maurorum	Camelthorn		A - Eradicate	E	
Arundo donax	Giant reed		B –Contain spread/reduce population	E	
Brassica tournefortii	Asian mustard		C – control outlying populations with long term goal of eradication	B	
Bromus japonicus	Japanese brome		C – Strategic treatment of certain populations.	B	
Bromus rubens	Red brome		C– Strategic treatment of certain populations	B	
Bromus tectorum	Downy brome		C– Strategic treatment of certain populations	B	
Carduus nutans	Musk thistle		A - Eradicate	A	
Centaurea diffusa	Diffuse knapweed		B – Contain/Eradicate	E	
Centaurea melitensis	Malta starthistle		C - Contain	A	
Centaurea solstitialis	Yellow starthistle		B – Contain existing populations, treat	E	

			new detections first.		
Cirsium vulgare	Bull thistle		C –Treat priority sites	B	
Convolvulus arvensis	Field bindweed		C – Low priority for treatment	C	
Eragrostis curvula.	Weeping lovegrass		C – Widespread distribution, prevent new introductions.	B	Severe infestation covers most of Dude Fire below the Mogollon Rim
Eragrostis Lehmanniana	Lehmann’s lovegrass		C – Widespread distribution, prevent new introductions.	B	
Erysimum repandum	Spreading wallflower		A -Eradicate	B	
Linaria dalmatica	Dalmatian toadflax		A Eradicate	E	
Onopordum acanthium	Scotch thistle		B - Contain/Eradicate	E	
Tamarix ramosissima	Saltcedar		C –Treat priority sites	E	
Ulmus pumila	Siberian elm		A – Treat new sites aggressively	B	

****Tonto Weed List: Class A weeds** are of limited distribution in Arizona, or unrecorded in the state. They pose a serious threat. Management goal is eradication. **Class B weeds** are of limited distribution in Arizona, common in some places in the state. Management goal is to contain their spread, decrease population size, then eliminate. **Class C weeds** have spread beyond our capability to eradicate them. Management goal is to contain spread to present size, then decrease the population, if possible.

Alternative 1 No Action

There are no effects to noxious or invasive weeds from management actions because none would occur

The no action alternative would not address the [purpose and need of the project](#) and would not move the area toward the desired conditions, standards and guidelines, or management emphasis as defined in the Apache-Sitgreaves (2016), Coconino (2018) or Tonto (1985) LMRPs. The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation.

Alternative 1 would not increase forest resiliency and sustainability or reduce the risk of undesirable fire effects. There would be no improvement in terrestrial habitat. There would be no survey or treatments of noxious or invasive weeds.

Alternative 1 would not be consistent with the LMRPs or the NEPA analyses for each of the forests. **No** survey or treatment of noxious or invasive weeds that would result as part of this project. Survey and treatment would continue in other projects, as part of the forests’ noxious weed program, and by other entities such as Arizona Department of Transportation.

For the Apache-Sitgreaves NF, the guidance of *Environmental Assessment for the A-SNFs Integrated Forest-Wide Noxious or Invasive Weed Management Program* would not be followed in this project. The guidelines for soil and high use developed recreation areas as they apply would not apply.

For the Coconino NF, the guidance of the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests*; (USDA Forest Service 2005). The guidelines for invasive species, guidelines for all recreation or desired conditions for developed recreation that apply to the management of noxious or invasive weeds would not apply,

For the Tonto NF, the guidance of the *Environmental Assessment for Integrated Treatment of Noxious or Invasive Plants* would not apply. (USDA Forest Service 2012)

Mitigation measures, treatments and surveys that would have been part of the Rim Country Project would not occur. As a result, weed infestations that would have been detected and treated would go unnoticed and continue to expand unless detected by other surveys or independent observations. Treatments that would have been part of the mitigating actions not be accomplished. As a result, treatment of weed infestations would not occur unless the locations are included in another project area or are treated by a cooperating agency. For example, treatments along highways or roadways in coordination other agencies would continue but would not expand outside of highway right of ways.

The following design features and mitigations would not be used BT009, FE004, NW001, NW002, NW003, NW004, NW005, NW006, NW007, NW008, NW009, NW010, SU018, SW005 and SW102. These design features provide an integrated approach to noxious or invasive weed management but would not be incorporated into management actions on the forests if the no action alternative is selected.

Effects Common to All Action Alternatives

The purpose of the Rim Country Project is to reestablish and restore forest structure and pattern, forest health, and vegetation composition and diversity in ponderosa pine ecosystems to conditions within the natural range of variation. Preventing, controlling and eradicating noxious or invasive weeds is complementary to the purpose and need and would improve native vegetation composition. Management of noxious or invasive weeds is consistent with the purpose and need because management of them will contribute to the vegetation composition and diversity of the native plant community in the project area.

The action alternatives would be consistent with the LMRPs and would move toward the desired conditions for native plant communities and noxious or invasive weed control. Noxious or invasive weed management would be guided by each forest's weed management NEPA. Surveys for noxious or invasive weeds would be conducted before management activities areas and needed treatments would follow the guidance of each forest's noxious or invasive weed assessment (NW001). Post implementation monitoring and treatment would occur (NW009).

To prevent the introduction and spread of noxious or invasive weeds by vehicles used in management activities, vehicles and equipment would be washed to remove soil, seeds and other debris from them before entering the area or when moving from one area to the other (NW002). Ideally, this would occur before the equipment comes onto the forest but it can also be facilitated with the approval of the contracting officer or timber sale administrator (NW003).

The direct effects of management activities noxious or invasive weeds include ground-disturbing activities that have the potential to increase the acreage and/or density of the existing infestations within the project area. Disturbance may contribute to the spread of weeds by eliminating competition from existing vegetation and creating bare ground that is more easily invaded than undisturbed areas. Severe disturbance removes competitive vegetation, alters nutrient composition, and creates bare soil making potential sites for the invasion or spread of noxious or invasive weeds. Examples of management activities that would create localized severe disturbance include burned areas from slash piles, creation of log decks, bare soil created through road reconstruction, decommissioning, temporary road construction, in woods processing areas and rock pits.

Tree removal indirectly affects noxious or invasive weeds by reducing tree canopy and stand density. Treatments that reduce the tree canopy and lower the stand density would affect all understory plants, including noxious or invasive weeds by allowing more sunlight, increasing available nutrients and temporarily decreasing competition. The increased availability of resources and decrease in competition can also provide favorable conditions for noxious or invasive weeds and could increase the size and density of existing populations, especially in areas where weed infestations already exist. These effects are reduced to a non-significant level by incorporating the mitigation measures and design features and by incorporating survey and treatment in the project (NW001, NW004 and NW009). Design features such as SW066 which limits the amount of soil disturbance permitted during timber sales and SW082 which regulates the depth of rutting by vehicles when soil conditions are wet, minimizing soil disturbance will help reduce the amount of disturbance during operations, reducing the amount of bare ground for noxious or invasive weed to occupy.

Burning can release nutrients, reduce plant competition, increase the amount of available sunlight and increase bare soil. Most prescribed burning would be of low severity with low soil heating, retention on most ground litter and little or no change in mineral soil (Fowler, et al. 2008) They concluded that low intensity fires in open ponderosa pine forest had minimal effects on the abundance of noxious or invasive weeds. McGlone and Egan (2009) found similar results in studies they reviewed. Prescribed or managed fires generally result in lower severity and result in lower levels of noxious or invasive weed invasion as compared to uncontrolled wildfire. In some situations, prescribed fire may result in moderate to higher severity (McGlone and Egan 2009). The effects in these areas would be more severe and would be similar to slash pile burning or wildfire. The action alternatives would incorporate a series of design features and mitigations that would focus on reducing the risk of actions that would increase existing weed populations or introduce new weeds. Design feature FE004 provides for collaboration between resources before the implementation of a prescribed fire. The purpose of this collaboration is to identify the appropriate mitigations and treatment of noxious or invasive weeds. Follow-up monitoring would be conducted in areas of heavy disturbance such as large slash piles. Design feature BT003 provides direction to conduct prescribed fires under conditions that promote native plant communities, hinder weed species germination, aid with controlling existing weed infestations, and prevent the spread of existing weeds.

Direct and indirect effects of temporary road construction, road reconstruction and maintenance or road decommissioning include disturbance and increased risks of dispersal of existing weed species and populations and introduction of new species. These will be mitigated by following the mitigation measures and design features in Appendix C. Roads that are decommissioned as part of the Rim Country Project would be complementary to the goals of Travel Management objectives for the forests. Design feature SW006 provides for the use of existing travel courses and stream crossings unless new construction would result in less disturbance. This would help to minimize disturbance from road construction and result in fewer disturbed areas where noxious or invasive weeds would be able to become established. .

Management activities associated with aquatic and channel restoration would increase disturbance in the treated areas. Actions such as digging, soil disturbance and related activities associated with spring restoration would be the sources of this disturbance. These effects will be mitigated by following the [mitigation measures and design features](#) in Appendix C. SW004 establishes designated staging areas outside of aquatic management zones (AMZs). This reduces the risk of the spread of noxious or invasive weeds into the AMZ while reducing the risk of aquatic diseases and petroleum contamination into aquatic systems and habitats.

A series of rock or gravel pits will be needed to provide materials for road maintenance in the project area. The activities associated with the operation of these are sources of disturbance. A series of mitigations are provided in the action alternatives to reduce the risks of introducing or spreading noxious or invasive weeds in the project area. NW006 provides for inspection of sites to assure they are weed-free before use or transport. Noxious or invasive weeds would be treated before use of the pits. If these treatments are not successful or possible then the operators would be informed of the weed locations and fill would be obtained from areas of the pit not near the weed infestation (NW007). Equipment used in the pit would be inspected and cleaned before entering the pit area (NW008). If pits are expanded soil and vegetation disturbance would be avoided to the extent possible and only the area needed would be cleared of vegetation (SW114). This would help minimize disturbance, reducing the amount of unoccupied sites that could then be invaded by noxious or invasive weeds. The risk of introducing noxious or invasive weeds from contaminated fill can be mitigated by maintaining stockpiled, weed-free material (NW010).

Processing areas are likely to be locations where invasive weeds are established during their operation. These areas will be managed under the timber sale or special use permit. To minimize the potential for invasive species spread and transport, these will be treated as part of the reclamation once operations are complete. Implementation of the design features will reduce introduction and spread of noxious and invasive weeds. Thus, while these areas will result in localized weed populations, the spread is expected to be limited. SU018 provides for rehabilitation of processing areas after they are no longer used including seeding of sites with native seed which will help re-establish native plant communities and reduce the risk of noxious or invasive weed infestations. Seed mixes of native species used for post-thinning erosion would be certified as weed-free in accordance with Region 3's guidance for weed-free materials (USDA 2018) with a minimum of five pounds of pure live seed per acre (USDA 2018). Potential vegetation for individual sites should utilize the Apache-Sitgreaves, Coconino, and Tonto NFs' Terrestrial Ecosystem Surveys (TES) to identify species to be utilized.

The action alternatives are expected to limit the establishment and spread of invasive species within and adjacent to the project area over the next several decades by decreasing the risk of high intensity wildfire. In the ponderosa and mixed conifer habitat types within the project area, nonnatives have been shown to increase with increasing fire intensity (McGlone and Egan 2009). By decreasing fire intensity, this alternative will result in increased understory abundance and diversity which would be more resistant to invasive species over the next 10-20 years.

Cumulative effects

The cumulative effects boundary for noxious or invasive weeds includes the project area plus surrounding major arteries of transportation and utility corridors that enter the project area. Major roads and utility corridors were included because of their roles in providing corridors for dispersal of noxious or invasive weeds. The timeframe for noxious or invasive weeds is twenty years prior and twenty years into the future.

The distribution of noxious or invasive weeds on the project has been shaped by past management actions and natural disturbances in the project.

Activities such as firewood cutting have occurred in the past and will continue into the future. Fuel wood cutters can introduce weeds into the area through their actions. These actions occur under permit but the forests have limited control over where these activities will occur.

Wildfires can be sources of high levels of disturbance depending on fire severity. Severely disturbed areas can be more easily invaded by noxious or invasive weeds than less severely disturbed or undisturbed areas. Numerous wildfires have occurred in the project area (see cumulative effects document). Some of these, such as the Rodeo-Chediski (2002), Juniper (2016) and Pot Fire (1996) have covered large acreages. These have resulted in large acreages of severe fire effects such as almost complete removal of the plant communities and soil erosion, leaving large areas of disturbance prone to noxious or invasive weed invasions. Some remedial actions for large fires have resulted in large acreages of non-native species that are now problematic and will be challenging to restore to native plant communities. An example of this is the large infestation of Lehmann's lovegrass that now infests the Dude Fire (1990) on the Tonto National Forest.

Fire exclusion has contributed to the risk of noxious or invasive weed invasion by promoting very dense forests with little or no resilient understory community. The lack of native vegetation to compete with noxious or invasive weeds increases the risk of weed invasion. Fire exclusion also increases the risk of severe stand replacing fires and its accompanying severe disturbance.

There are numerous grazing allotments in the project boundary. The past effects of grazing and the associated activities are not completely known but may include temporary reduction of the native plant community in certain areas (especially near water sources) which would allow for plants such as the noxious or invasive weeds discussed above to enter the plant community and introduction of weeds through feed or manure. Human actions associated with range management such as driving in the area, constructing livestock improvements, and transporting livestock have also been part of the past actions.

A wide variety of recreation activities occur within the boundary of the project area including hiking, camping, hunting and recreational driving. Users can introduce noxious or invasive weeds from other areas on vehicles and personal equipment. The effects of livestock such as horses or pack animals used in recreation are similar to those in grazing and include temporary reduction of the native plant community in localized areas where animals are allowed to graze and introduction of weeds through feed or manure. Trampling and compaction can also occur if the same campsites are used repeatedly.

In the past there were few restrictions on off-road motorized travel whether for recreational or other purposes. On the Coconino NF, most off-road motorized travel was prohibited with the implementation of the Travel Management Rule (TMR) in 2012. Implementation of the 2012 travel plan also reduced the number of roads open to public motorized travel, reducing the risk of dispersal of noxious or invasive weeds in some areas. The Tonto NF completed a similar analysis in 2016, restricting motor vehicle travel to roadways in some areas while allowing cross-country travel in other areas. The effects to noxious or invasive weeds were addressed in the analysis. The Apache-Sitgreaves NF is currently in the process of analyzing travel management. A final EIS for the project is expected in October 2019. The effects of this project to resources such as noxious or invasive weeds are unknown.

Major highways tend to be corridors for weed dispersal by providing a source to vector weeds into the area. Management activities associated with the highway can create disturbance and spread existing weeds. Examples include past activities such as blading of road ditches where equipment passed through existing weed infestations, spreading them along the road corridor. In 2003, the Southwestern Region of the Forest Service completed the Environmental Assessment for Management of Noxious Weeds and Hazardous Vegetation on Public Roads on National Forest System Lands in Arizona. The decision, which followed in 2004, allowing treatment of noxious or invasive weeds along state and federal highway

rights-of-way through all National Forests in Arizona. Some treatments have occurred along state and federal highways as a result but the extent of these treatments are not known.

The Apache-Sitgreaves NF has surveyed and treated numerous infestations of noxious or invasive weeds within the project area since 2004. All of the treatments prior to the approval of the *Environmental Assessment for the A-SNFs Integrated Forest-Wide Noxious or Invasive Weed Management Program* (USDA Forest Service 2008) were mechanical treatments accomplished using hand tools. Herbicide use on the forest began in 2009 after the approval of the document. Some of the major areas of past treatment include Bison East, Bison West, Buckskin Wash, Decker Wash, and Hart Canyon. These and other areas will need repeated monitoring and treatment. The Coconino NF began weed survey and treatments in about 1995 and like the Apache-Sitgreaves, they relied on non-herbicide methods to control isolated occurrences using mechanical control and alternatives such as grazing. Using sheep to control leafy spurge was utilized before the approval of the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests*; (USDA Forest Service 2005). The EIS allowed use of herbicide as well as biological control. Many of the treatments have been focused on particular species or areas of concern such as the leafy spurge, various species of knapweed and non-native thistles.

There are records of surveys along roadways on the Tonto NF beginning in 1999. These surveys were generally by Arizona Department of Transportation. The forest began surveying for weeds in 2003. Many of the treatment prior to the approval of the *Environmental Assessment for Integrated Treatment of Noxious or Invasive Plants* (2012) were done using hand tools.

The disturbance resulting from the management activities in this project will continue to be sources of disturbance that may contribute to the threat of noxious or invasive weed occurrences and will be additive to the activities discussed in this section of the report.

Numerous management activities and wildfires have occurred in the project area in the past (see cumulative effects document). These actions have contributed to the existing condition of this analysis. Ground disturbing activities such as timber sales and large wildfires may have contributed to the introduction, spread or persistence of some noxious or invasive weed invasions.

Other Agencies and Individuals Consulted

[Robert Madera, Forest Botanist Tonto National Forest](#)

[Shannon Houlette, Forest Wildlife Biologist Apache Sitgreaves National Forest](#)

[Suzanne DeRosier – ASNF](#)

[Sabra TonnHDMS](#)

[Andy Habgood ASNF](#)

[Kendall Hughes ASNF](#)

[Kathryn Kennedy Regional Botanist.](#)

[Mark Nigrelli](#)

[Mary Lata](#)

Acronyms

AZGFD Arizona Game and Fish Department

HDMS Heritage Database Management System

NRM/TESP

SEINet

EIS Environmental Impact Statement

EA Environmental Assessment.

List any acronyms you use in your report. We will use it to prepare a comprehensive list for the EIS.

Glossary

List words and their definitions here. We will use it to prepare a comprehensive list for the EIS.

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