United States
Department of
Agriculture

Forest
Service

June 2007

Botany Specialist's Report

Jack Smith/Schultz Project

Peaks Ranger District, Coconino National Forest
Coconino County, AZ

Date: 6/29/2007

Amended: 1/29/2008

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INTRODUCTION

The 11,827 acre Jack Smith/Schultz Project area is located northeast of Flagstaff and is made up of two planning areas on the Peaks Ranger District. While these planning areas are now incorporated into the larger Jack Smith/Schultz project area, they are listed here to provide geographic reference points since the Jack Smith/Schultz project area is relatively large. Table 1 lists ownership within the project area:

Table 1. Project Area Ownership

Ownership	**Acres**	**Percentage of Total Area**
Forest Service	11,727	99%
Private	100	01%
Total	11,827	

The Jack Smith area is located east and west between the Kachina Peaks Wilderness on the San Francisco Peaks and Hwy 89 N, and between Forest Road 556 and Forest Road 418 north and south. The Schultz project joins the Jack Smith project at Forest Road 420 near Schultz Tank and stretches west along Forest Road 420 from Schultz Tank to the City of Flagstaff near Highway 180. For additional information and map location refer to the Proposed Action (5/22/2007)

Purpose and Need

The purpose of this project is to implement management direction of the Coconino Forest Plan and address resource needs identified in the Jack Smith/Schultz Project Need for Change Report (located in the Project Record). Specifically, this project is aimed at restoring fire-adapted ecosystems and reducing the threat of severe wildfires in and around the project area.

Proposed Action

Approximately 7,078[1] acres will be treated using an uneven-aged management system. Approximately 3,096 acres are treated using this system with a fuel hazard reduction objective and an emphasis on WUI, which includes protection to communities and critical infrastructure. Approximately **3,982** acres are treated using this system where due to differing values at risk, fuel hazard reduction is still a primary objective, but resource protection is the emphasis. Treatments will use pre-settlement evidences to guide

[1] These acreages do not account for any deferrals due to layout, inoperability, financial efficiency, wildlife cover, etc. Actual number of acres would be lower after review from implementation staff and layout.

retention tree levels when possible. Retention tree levels will vary to meet specific objectives, such as higher retention in some clumps and groups for wildlife habitat desired conditions, visual quality, and diversity. Treatments will reduce expected flame lengths, lower fire hazard ratings, and increase crown base heights by removing some ladder fuels. The resulting uneven-age stands provide a heterogeneous forest structure; more age and size class diversity; wildlife habitat and hiding and thermal cover for wildlife species; and resiliency to environmental stress factors such as insect and disease outbreaks.

Approximately 1,100 acres have been identified for thinning from below for fuel reduction with a diameter limit of 12 inches diameter breast height (dbh). These treatments have been identified for stands where access by mechanical logging equipment or haul trucks is not possible, but could benefit from thinning to reduce fuel and fire hazard to resources and improve forest health. Attaining a clumpy/groupy arrangement is desirable in these treatments, but limited due to the diameter cutting limitations.

Approximately 305 acres within Mexican spotted owl PACs will be thinned from below for fuel reduction where recovery plan requirements limit tree cutting to 9” dbh. These treatments have been identified for stands within PACs that would benefit from a limited thinning to reduce fuel and fire hazard and improve over all forest health. The emphasis in these stands is to maintain higher canopy cover at the stand level.

Approximately 445 acres classified as restricted habitat and 158 acres restricted habitat classified as Mexican spotted owl target/threshold habitat for Mexican spotted owl will be thinned using uneven-aged treatments with a resource emphasis for the Mexican spotted owl. An objective in these stands is to maintain or retain canopy cover of 40% at the stand level.

Approximately 151 acres have been identified for treatments for developing or recruitment old-growth. These stands have been selected as those that could reach an existing old-growth condition as soon as possible.

To restore meadows and grasslands back to historic vegetation and function mechanical and hand thinning treatments will be used to remove most ponderosa pine trees that have invaded mountain meadows/grasslands on 27 acres. However, no yellow pine trees would be removed.

Approximately 150 acres on 35 sites have been identified for aspen restoration. To restore, protect, and regenerate aspen clones, invading ponderosa pine will be removed from within the clones and up to 66 ft. surrounding the clone. Treated sites may be fenced to protect aspen suckers from ungulate browsing.

All areas proposed for vegetation treatment would be burned after thinning to remove activity-created slash, duff, and needle cast. After this initial burn, maintenance burning would be conducted periodically (every 4-15 years) to mimic the historic fire interval patterns in southwestern ponderosa pine forests. Maintenance burns aid in reducing fuels loads, raising crown base heights of live trees, and promoting understory growth.

Burning would occur when weather and environmental factors such as wind, fuel moistures, and humidity are suitable for burning.

In addition to areas mechanically and hand treated, approximately 700 acres would receive a burn-only treatment. The areas that are deferred from mechanical entry include inoperable slopes and forested lands that already meet or are close to meeting objectives for forest structure. When thinning acreage is included a total of approximately 9,220 acres would receive prescribed burn treatment.

Additionally, the project would close approximately 27.9 miles and obliterate approximately 38 miles of roads in excess or otherwise undesirable due to resource concerns to achieve the desired open road system of less than 2 miles/section as outlined in the Forest Plan.

A Forest Plan Amendment would be necessary if the Deciding Official accepts the Proposed Action.

Alternative 2

Alternative 2 is similar to the Proposed Action but differs in its compliance with Forest Plan Standards and Guidelines for Northern Goshawk. Generally, forest canopy closure will be assessed on a stand basis as per Plan Guidance instead of at the clump/group level as in the Proposed Action, which could result in a higher canopy closure as compared to the Proposed Action. Alternative 2 adds 144 acres of prescribed burning. Specifically, Stands 3, 15 and 16 in Compartment 246 would be added to the acreage in the Proposed Action. No Forest Plan Amendment would be needed to implement this alternative.

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. Under the No Action alternative current management activities will continue. Management actions proposed in the proposed alternative will not occur. There will be no restoration of fire to fire-adapted ecosystems and the threat of severe wildfire in and around the project area will not be reduced.

Laws and Regulations

Shown below is a partial list of federal and state laws, executive orders, and Forest direction pertaining to project-specific planning and environmental analysis for this project as they relate to TECS pants and noxious or invasive weeds.

- Coconino National Forest Land and Resource Management Plan, 1987 (as amended)
- Endangered Species Act, 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act (RPA), 1974 (as amended)
- Forest Service Manual, FSM 2620, 2630, 2670, 2672
- Multiple-Use Sustained-Yield Act of 1960
- National Environmental Policy Act, 1969
- National Forest Management Act, 1976 (as amended); 36 CFR 219
- Executive Order 13112 of 1999, regarding noxious weed control.
- Forest Service Manuals 2080 and 2150 and Regional Supplement No. 2100-98-1, regarding noxious weed control.
- Southwestern Region's Strategy for the Protection and Restoration of Native Plant Communities (USDA Forest Service, Regional Office 1999a).
- Noxious Weeds Strategic Plan Working Guidelines– Coconino, Kaibab, and Prescott National Forests (1998)
- Arizona State regulations R3-4-244, R3-4-245 require that the landowner must have an active management program to prevent further spread of these species and reduce numbers of existing populations.
- 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.

Units of Measure

- A unit of measure for the Region 3 Sensitive Species, **Rusby milkvetch** is to **maintain or increase** the populations within the project area. Additionally, potential habitat for The Region 3 Sensitive Species, Rusby milkvetch and Sunset Crater beardtongue should be **maintained or enhanced**. Manual direction (FSM 2670.5(19)) emphasizes that management actions should avoid or minimize impacts to sensitive species. Mitigating measures should be incorporated into project design and implementation as necessary to minimize impacts to sensitive plants and their habitats.
- The management actions untaken in this project are **complementary and enhance the control objectives** for each noxious or invasive weed species as identified in the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds for Coconino, Kaibab and Prescott National Forests.*
- Noxious or invasive weed infestations **do not increase** because of management actions.
- Appropriate treatments to **mitigate** the effects of management actions on noxious or invasive weeds **are incorporated** into the project design and implementation.
- Appropriate **Best Management Practices** as outlined in Appendix D of this document are incorporated into the project design and implementation

- **Conflicts** between noxious or invasive weeds and the Region 3 Sensitive Plant are mitigated through management actions.

Mitigation Measures

Table 2. Mitigation measures required for all action alternatives.

#	Mitigation	Why
1	Mitigate loss of individuals and groups of Rusby milkvetch during management activities by avoiding known locations. See Table 3.	Mitigates effects to TES Plants
2	Prohibit slash pile construction within populations of Rusby milkvetch.	Mitigates effects of high intensity burning to Rusby milkvetch.
3	Construct slash piles at least 10 to 20 feet away from populations of Rusby milkvetch	Mitigates effects of burning to Rusby milkvetch.
4	Prohibit temporary road construction or reconstruction within populations of Rusby milkvetch.	Mitigates effects of disturbance and burning to Rusby milkvetch
9	Place slash piles on previously used locations such as old piling sites, old log deck sites, or other disturbed sites to avoid severe disturbance to additional locations where possible.	Reduces loss of native seed bank, limits extent of severe disturbances and reduces severely disturbed sites that are more prone to invasion by noxious or invasive weeds.
10	Treat weed infestations within stands before implementing treatments. See Appendix D of this report.	Forest Plan Direction
11	Monitor slash pile sites after burning and control noxious or invasive weeds.	Controls weeds, reduces risk of invasion and reduces risk to native species by reducing weed competition.
12	Prevent spread of potential and existing noxious or invasive weeds by vehicles used in management activities by washing vehicles and equipment prior to entering the project area and when moving from one area to another.	Mitigates effects of management actions on existing and potential noxious or invasive weed infestations Forest Plan Direction CT Clause WO-C/CT 6.36
13	Incorporate the Best Management Practices for noxious or invasive weeds as listed in Appendix D of this report.	Required by the Forest Plan (Amendment 20).
14	Manage prescribed fires as an aid to control of existing weed infestations and to prevent the spread of existing weeds.	Mitigates effects of management actions on existing and potential noxious or invasive weed infestations Forest Plan Direction

#	Mitigation	Why
15	Survey roads to be closed or obliterated before the closure/obliteration work begins and avoid Region 3 Sensitive plants if necessary. Avoid existing noxious or invasive weeds during soil disturbing activities associated with obliteration.	Mitigates effects to Region 3 Sensitive plants and noxious or invasive weeds during road closure/obliteration.
16	Incorporate weed prevention and control into project layout, design, alternative evaluation and project decisions.	Addresses noxious or invasive weeds during project planning and implementation Required by the Forest Plan (Amendment20)

Coconino National Forest Land Management Plan Direction _

TES Plant Species noted in the Forest Plan

The Forest Plan specifically mentions the following plant species. The standards and guidelines require the conservation and/or protection of these species and their habitat.

- Arizona bugbane (*Cimicifuga arizonica*)
- Arizona leatherflower (*Clematis hirsutissima* var. *arizonica*) (Removed from Region 3 Sensitive Species List in 1999 but addressed in Goshawk Guidelines).
- Flagstaff pennyroyal (*Hedeoma diffusum*)
- Arizona cliffrose (*Purshia subintegra*)
- San Francisco Peaks groundsel (*Senecio franciscanus*)

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section details the affected environment and environmental consequences for Threatened, Endangered and Sensitive Plants within the analysis 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 the Threatened, Endangered and Sensitive Plants in the project 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).

Threatened and Endangered Species

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

Sensitive Plant Species

One Region 3 Sensitive plant species currently known to occur within the project area is Rusbyi milkvetch (*Astragalus rusbyi*). Potential habitat for Sunset Crater beardtongue (*Penstemon clutei*) may exist but no locations for this species have been recorded within the project area.

Rusby milkvetch

Rusby milkvetch is an upright perennial herb with pinnately compound leaves of oval leaflets. No tendrils are present on the stem. The stem can be reddish in color with dark spots along the stem. A distinguishing character is the presence of trigonus pods (triangular in cross section). Each seedpod also has a stipe, which is a narrow area at the base of the pod where it connects the plant. The flowers are white to cream color and pea-like and the plants bloom from May to September. This species is similar to the more common *Astragalus recurvus* and can be confused with it during identification. Habitats for this plant include aspen groves, mixed conifer, ponderosa pine/Arizona fescue, and ponderosa pine/gambel oak sites in dry or temporarily moist basaltic soils.

The Peaks Wildlife Crew reported over 50 locations of Rusby milkvetch during their surveys in 2004 and 2005. Some of these locations were outside of the project boundary but within the ½ mile buffer around the project area that is surveyed during Northern Goshawk surveys, but others are within the project boundary. The crew documented 22 locations of Rusby milkvetch within the units scheduled for treatment in the proposed action dated February 2007. Twenty were within Compartment 267, two sites were found in Compartment 286. These populations are subject to damage or destruction if not protected during project implementation (Table 3).

Table 3. Locations of Rusby milkvetch in treatment areas on the project. Locations not in treatment units were not included in this table.

Date	Number of plants	Compartment	Stand	Prescription	Treatment method
07/29/2004	20+	267	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	12+	267	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	15+	267	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	20+	267	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	12+	267	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	15+	267	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	8+	267	8	Fuel Reduction - < "12	Hand thinning
07/29/2004	8+	267	8	Fuel Reduction - < "12	Hand thinning
07/29/2004	5+	267	23	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	5+	267	23	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	2	267	26	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	2	267	26	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	3+	267	29	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	5+	267	29	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	3+	267	29	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	5+	267	29	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	5+	267	32	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	5+	267	32	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
07/29/2004	10+	267	36	Prescribe Burn	Burn only
07/29/2004	10+	267	36	Prescribe Burn	Burn only
08/04/2004	6	286	3	Fuel Reduction - < "12	Hand thinning
08/04/2004	6	286	3	Fuel Reduction - < "12	Hand thinning

The effects of the management actions for the Proposed Action and Alternative 2 are similar and will therefore be discussed together. The differences in the effects to Region 3 Sensitive plants are minor and insignificant.

Direct and indirect effects common to the Proposed Action (Alternative 1) and Alternative 2

Direct effects of the proposed action would include deaths of individual plants or population groups through management actions. Factors contributing to these effects would include disturbance from management activities including mechanical activities such as vegetation management, fuel reduction activities and prescribed burning. Generally, these effects can be **mitigated to non significant levels** during mechanical activities by avoiding known populations during activities. Some individuals may be killed during prescribed burning, especially in areas where only isolated individuals may occur or in areas where plants were not detected during previous surveys. However, prescribed burning may also have beneficial indirect effects. These effects are discussed below.

Prescribed burning may have beneficial **direct and indirect effects** on all understory vegetation including Rusby milkvetch depending on fire severity. Burning is a disturbance that can release nutrients, reduce plant competition, and increase the amount of available sunlight light. Observations by Judy Springer (2004), a local botanist from the Ecological Restoration Institute, Northern Arizona University suggest that Rusby milkvetch responds favorable to disturbance. These observations were made on restoration plots at Ft. Valley Experimental Forest. The effects of burning may initially be negative by reducing the numbers of individuals but will beneficial in the long term by reducing competition, increasing the amount of available sunlight and by increasing available nutrients. It is expected that most broadcast and prescribed burning for this project will be of low severity.

In some cases, fire severity may be higher in limited areas depending on variables such as management goals, weather, fuel conditions and topography. In these cases moderate to high fire severity may occur. In these areas, there could be **limited negative direct effects** through deaths scattered individuals or groups of Rusby milkvetch if they occur at that particular location. Limited deaths of small groups of plants in these cases would not significantly contribute to the overall decline of populations of this species within the project area or over the ranges of this species. The **indirect effects** of higher fire severity in these areas would be similar to those for slash pile burning.

One of the associated activities with several treatments includes piling of slash from management activities. Slash piles may have negative **direct and indirect effects** on all understory vegetation including Rusby milkvetch. Slash pile construction could be a possible **direct negative effect** if the pile is placed in or near existing populations of Rusby milkvetch. These effects can be mitigated by avoiding placing slash piles directly on existing plants and by constructing piles at least 10 to 20 feet away from existing populations. Pile burning will create locally **severely burned** areas at pile sites, which is a negative **indirect effect**. Consequences include, but are not limited to, the reduction or loss of the seed bank on these sites (Korb, 2001; Crisp, 2004); death or reduction of soil

organisms on the pile sites (Raison, 1979; Ballard, 2000; Korb et al., 2004) and development of hydrophobic soil (Ballard, 2000). Slash pile sites are more prone to invasion from noxious or invasive weeds than surrounding areas and may contribute to the persistence and spread of noxious or invasive weeds in treated areas. Noxious or invasive weeds may have adverse effects on all native plants including Rusby milkvetch by competing with native species for resources and altering habitat. Mitigation for these effects is to use previously disturbed areas including old pile sites or previously used decking areas where available instead of creating new sites within the forest. Additionally, pile sites should be **monitored** after burning occurs to identify and treat infestations.

An i**ndirect** effect of management actions within the potential habitat of Rusby milkvetch includes an increased risk of invasion from noxious or invasive weeds. These effects can be mitigated by incorporating the noxious or invasive weed treatments described in Appendix B and by incorporating the Best Management Practices described in Appendix D. Incorporation of the Best Management Practices will mitigate the effects of increased disturbance from management activities, and help to control the spread and introduction of weeds within the habitat of Rusby milkvetch.

Direct and indirect effects of road closure or obliteration include destruction of individual plants, localized disturbance of suitable habitat and the potential introduction of noxious or invasive weeds. These effects can generally be mitigated by surveying the sections of road where closure or obliteration will occur as well as nearby areas that may be disturbed and avoiding existing plant populations. Additionally, the incorporation of Best Management Practices for noxious or invasive weeds as outlined in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds (2005).

Cumulative effects

No specific time limit was established for past actions for this **cumulative effects** discussion. **The boundary for this discussion includes the range of Rusby milkvetch within the Coconino National Forest.**

Rusby milkvetch is a native species and has survived in the area as a component of the native vegetation but was not added to the Region 3 Sensitive Species list until 1999**.** **Cumulative effects** Rusby milkvetch may include past and ongoing management actions by the U.S. Forest Service such as grazing, timber sales and prescribed burning within the project area and throughout its range but the effects of these actions are unknown. Many were initiated before the species were added to the Sensitive Species list.

Fire suppression and past alteration of the fire regime through suppression have affected all vegetation including Rusby milkvetch through changes in tree density and understory species composition. Elimination of fire in the project area and throughout most of the range of Rusby milkvetch has allowed tree canopy and stand density to increase in some areas, reducing the abundance or eliminating of most understory species including Rusby milkvetch. The elimination of fire has also resulted in the increase in litter in some areas which has negatively affected understory plant species by eliminating plants and by

contributing to the increase in fire spread, length of residence time of fire and fire severity.

The project area contains all or portions of several large wildfires. These include the Arnold Cabin Fire (1946), Hostettor Fire (1950), Burnt Fire (1973), Radio Fire (1977), Weatherford Fire (1980), Bear Jaw Fire (1995), Doyle Fire (1996), Smith Fire (1998), Mid Fire (2000) and Wedding Fire (2005). Not all of these are near the known occurrences of Rusby milkvetch and some may not contain suitable habitat. The Peaks Wildlife crew documented at least one occurrence of Rusby milkvetch within the Radio Fire perimeter but outside of the project area. According to Barb Phillips (Zone Botanist, Coconino, Kaibab and Prescott National Forests) the species is adapted to fire. However, severe wildfires often result in deaths of all plants including TES plant species, loss of seed banks (Korb et al., 2004) and volatilization or removal of nutrients (Ballard, 2000; Choromanska and DeLuca, 2002). These effects generally have long term effects on the plant community. Plants eliminated due to large, hot-burning wildfires may take years re-establish and long-term alteration of habitat occurs.

One other fuels reduction project has occurred in the habitat of Rusby milkvetch, the Fort Valley Ecosystem Restoration Project (2000). Crews found several populations of Rusby milkvetch within the project during implementation and monitoring. The effects of the project were, “may affect individuals but not likely to adversely affect” the species as a whole.

Grazing within the project area includes grazing by domestic ungulates and wild grazers. The cumulative effects of grazing include past and present loss of individual plants to grazing animals and alteration of habitat through animal impacts such as trampling and compaction. According to Springer (2004), deer and elk may preferentially select legumes when they find them. Small animals such as rodents may also eat Rusby milkvetch.

Rusby milkvetch has been observed along the Schultz Trail, which is adjacent to the project area. Several of the locations detected by survey crews are along the trail. Trail users may impact individual plants at these locations through trampling and compaction of soil.

In 2000, the Forest withdrew the San Francisco Mountain and Mount Elden areas from mineral exploration. This withdrawal could have indirect long-term beneficial effects on species such as Rusby milkvetch by preserving habitat that might otherwise be altered through mineral exploration.

A mining operation, the White Vulcan Mine is within the project boundary. The permitted mine area contains the same soil series (series 551) as is found in some of the areas where Rusby milkvetch is found within the project. Therefore, past and on-going mine operations could have altered potential habitat for Rusby milkvetch in that localized area.

The Coconino National Forest is in the process of NEPA analysis to implement the Travel Management Rule (2005). The cumulative effects to this and other projects forest

wide will be the reduction in the numbers of motorized routes and the elimination of cross country travel. Negative affects from motorized such as crushing of plants; damage to potential habitat such damage to soils, fragmentation of habitat and introduction of noxious or invasive weeds into the habitats and/or populations will be reduced. These reductions will be from the elimination of most cross-country travel and through the reduction of road density. This would aid in reducing pressures from vehicle travel in sensitive areas where plants and potential habitat occur.

The management actions proposed for this project will have no significant negative effects on the overall distribution and abundance within the project area or within the total range of Rusby milkvetch, provided the mitigations recommended in this document are incorporated into the project design and implementation. The management actions will not significantly contribute to the cumulative effects discussed above, provided they are mitigated as recommended. The project will have beneficial direct and indirect effects on Rusby milkvetch by reducing fire risk and therefore the threat of severe wildfire within the potential habitat of Rusby milkvetch within the project area. Additionally, all understory plants including Rusby milkvetch will benefit from the reduction of tree density and canopy in certain areas of the project by reducing competition for nutrients, light and growing space.

No Action

Direct and indirect effects

There will be no **direct effects** from management actions to existing suitable habitat for Rusby milkvetch, or to populations or individuals of this species since none of the management actions in the proposed action would occur.

Indirect Effects of the no action alternative include the persistence and increase of high fire hazard potential. Forest fuels will continue to increase, resulting in increased risk of landscape or crown fire. Crown-base heights will continue to remain low, contributing to the risk of crown fire initiation, which could result in a landscape scale stand replacing wildfire. In this scenario, the risk of death by fire to individuals and groups of Rusby milkvetch will increase. If a large stand replacing wildfire occurred, the plant community would be impacted and sensitive plant populations would be lost due to large expanses of the forest burning at one time. Severe wildfires often result in deaths of all plants including TES plant species, loss of seed banks (Korb et al., 2004) and volatilization or removal of nutrients (Ballard, 2000; Choromanska and DeLuca, 2002). These are generally long term effects on the plant community. Plants eliminated due to large, hot-burning wildfires may take years re-establish and long-term alteration of habitat will occur.

Under the no action alternative, no tree removal will occur and tree density and canopy closure will continue to increase, reducing the availability of resources such as light and water to understory plants including Rusby milkvetch, resulting in the reduction or elimination of understory plants including Rusby milkvetch.

Cumulative effects

The cumulative effects of no action are related to the indirect effects discussed above. If none of the management actions proposed for this project is undertaken, high fire risk will exist and continue to increase and forest fuels will continue to increase, resulting in increased risk of landscape or crown fire. Additionally, there will be no reduction of tree density and canopy within the project area. Therefore, there will be increased competition among all plant species, including Rusby milkvetch for resources such as light and water. These indirect effects have minor but notable effects on the potential habitat of Rusby milkvetch range wide by allowing the continuing increases to factors such as fire risk and plant competition within potential habitat.

Sunset Crater beardtongue

Sunset Crater beardtongue is a perennial herb 12 to 30 inches tall with bright pink flowers. The leaves are sharply toothed with lower leaves joining to surround the stem, forming a disk around the stem (amplexicaul). The soil in which Sunset Crater beardtongue grows is typically a layer of cinders 2 to 5 inches deep with a layer of silty soil below, important for water retention at the root level of this species. The range of this species is limited to the Sunset Crater volcanic field near Flagstaff, including the Coconino National Forest and Sunset Crater National Monument. The habitat of Sunset Crater beardtongue is flat or gently sloping sites in open ponderosa pine forest between 6500 to 8500 feet**. No locations** of this species have been **reported in the project area**. However, potential habitat may exist within the project area.

Direct and indirect effects common to the Proposed Action (Alternative 1) and Alternative 2

There are **no direct effects** to Sunset Crater beardtongue from management actions, since there are no known occurrences within the project area. **Indirect effects** to the potential habitat of Sunset Crater beardtongue would be similar to those discussed above for Rusby milkvetch. However, there would be no expected loss of individuals to management actions since no locations of Sunset Crater beardtongue occur in the project area.

Cumulative Effects

No specific time limit was established for past actions for this **cumulative effects** discussion. **The boundary for this discussion includes the range of Sunset Crater beardtongue within the Coconino National Forest.**
This discussion includes past management activities that have occurred in potential habitat of the Sunset Crater beardtongue**,** which is an endemic and occurs only in the Sunset Crater volcanic field of the Coconino National Forest and Sunset Crater National Monument. This discussion contains several activities but may not be inclusive of all activities within the potential habitat of Sunset Crater beardtongue.

Fire suppression and alteration of the fire regime has affected all vegetation including Sunset Crater beardtongue. The effects of fire exclusion on Sunset Crater beardtongue are perhaps less severe than for other species since it grows in the relatively open environments that are characteristic of the Sunset Crater volcanic field. However, fire

exclusion could have contributed to changes in tree density and understory species composition as it has in other areas of the forest. The elimination of fire has also resulted in the increase in litter in some areas contributing to the increase in fire spread, length of residence time of fire and fire severity.

Historically, there have been several large wildfires in the habitat of Sunset Crater beardtongue including the Burnt Fire in 1973. A portion of this fire is within the project area. After the fire, Goodwin (1979) stated that Sunset Crater beardtongue was a pioneering species in the fire. However, Fule et al. (2000) conducted a burning experiment and found that Sunset Crater beardtongue numbers were lower on experimental plots three years after treatment when compared to pre-treatment numbers. Therefore, burning may initially reduce the numbers of Sunset Crater beardtongue on localized areas.

In 1992, a tornado occurred in the area near Sunset Crater National Monument and O'Leary Peak, within the habitat of the Sunset Crater beardtongue. The storm damaged large numbers of trees on Forest land and within Sunset Crater National Monument. The Forest Service conducted a salvage sale and removed storm damaged trees from its land. Monitoring of the effects of the salvage sale on Sunset Crater beardtongue was mitigation for the project. The monitoring conducted by the Peaks District (Crisp, 1995) found no adverse effects from the storm or the salvage sale.

The cinder hills area that contains most of the habitat for Sunset Crater beardtongue is heavily used for recreation, especially in the Cinder Hills OHV Area, an area identified for off-highway vehicle use. Impacts from off-highway vehicles, which are legally permitted in the area, may include loss of plants from crushing and compaction and introduction on noxious or invasive weeds into the potential habitat of Sunset Crater beardtongue.

Several utility corridors are present in the potential habitat of Sunset Crater beardtongue. Construction, expansion and maintenance of these corridors could result in loss of individuals along the corridor routes. The presence of these corridors provides corridors for dispersal of noxious or invasive weeds along the utility corridor and in adjacent forested areas.

The presence and expansion of the Flagstaff City Landfill has affected the potential habitat of Sunset Crater beardtongue by altering habitat and possibly by loss of some individuals. Additionally, it is a source for potential noxious or invasive weed invasions.

Other activities that have occurred in the habitat include fuel wood removal and grazing. However, these have limited effects on the overall viability of Sunset Crater beardtongue.

Non-forest actions include a rapidly growing population in the Doney Park, Timberline and similar neighborhoods that are within the range of Sunset Crater beardtongue. Effects of this increasing human population include increases of human impacts to surrounding Forest lands and possibly a decrease in the amount of suitable habitat available on non-forest lands.

Sunset Crater has been collected as an ornamental on a limited basis but this practice is strongly discouraged. This limited collection has not affected the viability of the species.

The Coconino National Forest is in the process of NEPA analysis to implement the Travel Management Rule (2005). The cumulative effects to this and other projects forest wide will be the reduction in the numbers of motorized routes and the elimination of cross country travel. Negative affects from motorized such as crushing of plants; damage to potential habitat such damage to soils, fragmentation of habitat and introduction of noxious or invasive weeds into the habitats and/or populations will be reduced. These reductions will be from the elimination of most cross-country travel and through the reduction of road density. This would aid in reducing pressures from vehicle travel in sensitive areas where plants and potential habitat occur.

No Action

Direct and indirect effects

There will be no direct effects from management actions to existing suitable habitat for Sunset Crater beardtongue, or to populations or individuals of this species since none of the management actions in the proposed action would occur.

The **indirect Effects** of the no action alternative include persistence and continued increase in fire hazard potential. Forest fuels will continue to increase, resulting in increased risk of landscape or crown fire. Crown-base heights will continue to remain low, contributing to the risk of crown fire initiation, which could result in a landscape scale stand replacing wildfire. If a large stand replacing wildfire occurred, the plant community would be impacted and sensitive plant habitats could be altered due to large expanses of the forest burning at one time. Severe wildfires often result in deaths of all plants including TES plant species, loss of seed banks (Korb et al., 2004) and volatilization or removal of nutrients (Ballard, 2000; Choromanska and DeLuca, 2002). These are generally long term effects on the plant community. Plants eliminated due to large, hot-burning wildfires may take years re-establish and long-term alteration of habitat will occur.

Cumulative effects

The cumulative effects of no action are related to the indirect effects discussed above. If none of the management actions proposed for this project is undertaken, high fire potential will exist and continue to increase and forest fuels will continue to increase, resulting in increased risk of landscape or crown fire. Additionally, there will be no reduction of tree density and canopy within the project area. These indirect effects have minor but notable effects on the potential habitat of Sunset Crater beardtongue range wide by allowing the continuing increases to factors such as fire risk.

Noxious or invasive Weeds

Noxious or invasive weeds are receiving increasing emphasis in management decisions. Recently, the Chief of the Forest Service identified invasions by exotic species as one of the four major threats. Noxious or invasive weeds can affect composition, structure and function of native ecosystems and can affect factors such as fire interval, species composition within communities, and successional pathways.

Surveys within the project area

Various surveyors have detected several of noxious or invasive weed species in the Analysis Area. Infestations range from a few scattered plants to localized but severe infestations. In 2003, 2004 and 2005, the Peaks Wildlife Crew conducted noxious or invasive weed surveys in portions of the project area in conjunction with Northern Goshawk survey transects. They detected locations for bull thistle (*Cirsium vulgare*), Dalmatian toadflax (*Linaria dalmatica*), cheatgrass (*Bromus tectorum)* and common mullein (*Verbascum thapsus*). I conducted surveys in the Jack Smith portion of the project in 2005 and detected infestations of diffuse knapweed (*Centaurea diffusa*), Dalmatian toadflax and cheatgrass. Additional locations for noxious or invasive weeds are documented in the SWEMP 2003 coverage currently available in the GIS files. The layer shows locations for Dalmatian toadflax, camelthorn (*Alhagi pseudoalhagi*); and diffuse knapweed within the project area. Several surveyors collected location information for this layer including past Forest Service surveyors, Coconino County and state roads crews and various others. Noxious or invasive weed locations within the project boundary are documented in Appendix B of this document. The surveyors estimated many of the infestations within the project area to be 1/10 acre or less at the time of reporting. However, the infestations within each stand may be much larger, depending on several factors including multiple occurrences within stands and growth of each reported infestation since its initial report. Additionally, some of the small infestations may have been successfully removed at the time of detection or may have failed to persist. Many noxious or invasive weed locations in the SWEMP layer are concentrated along roadways and utility corridors. These areas are potential dispersal corridors for weed infestations where propagules are dispersed by human activities. Additionally, these areas tend to have high levels of disturbance and are therefore more susceptible to invasion.

Each noxious or invasive weed species within the project area is rated by the perceived severity and risk to Forest resources. This rating follows the rating in the *Final Environmental Impact Statement for the Integrated Treatment of Noxious or invasive Weeds, Coconino, Kaibab and Prescott National Forests*. This rating is based on invasiveness and the predicted success of control measures of each species (Table 4). The objectives below are taken from the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds* and are the rankings are for Coconino, Kaibab and Prescott National Forests as a whole. Rankings may be changed based on local conditions and management concerns.

Table 4. Noxious or invasive weed species and treatment priorities within the project

area.

Common Name	Species*	Species Rank	Objective
Camelthorn	*Alhaghi pseudoalhagi*	4	Contain/Control
Diffuse knapweed	*Centaurea diffusa*	9	Contain/Control
Dalmatian toadflax	*Linaria dalmatica*	18	Contain/Control
Bull thistle	*Cirsium vulgare*	20	Contain/control
Cheatgrass	*Bromus tectorum*	22	Contain/Control specific populations
Common mullien	*Verbascum thapsus*	Not ranked	No control objective defined.

Camelthorn

Camelthorn is a native of the Mediterranean area and Asia and was accidentally introduced into the United States around 1915. Camelthorn is a member of the pea family, Fabaceae. It is a perennial shrub with deep roots and extensive rhizomes. The plant is from 1 ½ to 4 feet high and is covered with spines. The spines are yellow tipped. The leaves are small, wedge shaped, and undersides of the leaves are covered with small hairs. Camelthorn has small pea- like pink flowers. The seedpods are maroon to brown in color and are constricted between each seed, forming a distinct outline around each seed. Reproduction can occur from seeds or from the extensive underground rhizomes, making control of infestations difficult.

Diffuse knapweed

Diffuse knapweed is an introduced biennial or short-lived perennial with erect, diffusely branched stems growing from ½ to 3 feet tall. Most plants of this species live to be 2 to 6 years old and are capable of spreading only by seed. In the fall, diffuse knapweed plants break off at ground level and tumble along the ground dispersing seeds. Seeds are also spread as the spiny bracts attach to animal fur, clothing, and vehicles and can be spread in contaminated products such as hay. Diffuse knapweed was first detected in the Flagstaff area in the late 1970's and has spread from a few scattered plants to infestations on thousands of acres in the urban interface around east Flagstaff. These populations continue to expand and new infestations are created after mature plants break at the base and are dispersed by the wind or by being dragged along by vehicles. This species poses serious threat to restoration efforts because of its high rates of expansion and ability to outcompete native vegetation.

Dalmatian toadflax

Dalmatian toadflax is an introduced perennial plant that reproduces both by seed and vegetative root buds. The two methods of reproduction give this plant a competitive advantage under a wide range of environmental conditions. Often stands of Dalmatian toadflax will disappear for several years, only to re-establish through the seed bank or possibly vegetative root buds.

Bull thistle

Bull thistle is a stout biennial thistle with purple flowers. Regeneration is solely from short-lived seed. Bull thistle grows in numerous areas of the Coconino National Forest, mostly in the ponderosa pine forests, where it invades disturbed sites such as slash piles, old log decks, and roadsides.

Cheatgrass

Cheatgrass is an erect winter and spring annual grass from Europe that can grow to a height of two feet. The plant is a prolific seed producer and the density of this species has more to do with available sites (bare soil) for germination than the number of seeds produced. The presence of cheatgrass has increased the fire frequency in grassland and sagebrush ecosystems (Zouhar, 2003). Shorter periods between fires in these ecosystems will eventually cause the loss of native plants not adapted to frequent fire and the replacement of these by non-native annual grasses. Cheatgrass is also common in ponderosa pine forests throughout the western United States. Cheatgrass can provide a flammable link between open areas and forested areas, allowing fires to move from one habitat type into another. Live cheatgrass plants can be killed by fire, but seeds survive relatively severe fires and colonize recently burned areas. Additionally, offsite colonization into recently burned areas often occurs.

Common mullein

Common mullein is native to Europe and Asia, and is found in many areas the United States. First year mullein plants are low-growing rosettes that have bluish, gray-green leaves and a felt-like texture. As the plant ages, the hairs on the leaves are mechanically worn away. Leaves range from 4-12 inches in length and 1-5 inches in width in the rosette stage. Mature flowering plants are produced the second year, and can grow from five to ten feet in height, including the conspicuous flowering stalk. Mullein seeds remain viable for an extremely long time, having a life expectancy that ranges from 35 years to more than 100 years, and will remain dormant when buried in the soil. If a viable seed reaches the surface of the soil, it will be able to germinate and form a new plant, possibly several years after the previous infestation has ended.

Although common mullein is an invasive weed, no treatments are currently proposed for this species on the Forest. Common mullein infestations can cover several acres but tend to be episodic and disappear over time as the source of disturbance passes. Management activities on the project area may lead to temporary increases in common mullein but these infestations will decrease as the disturbance passes and the species is eliminated from the plant community by more competitive species. No further discussion of this species will be included in the effects analysis.

Direct and indirect effects common to the Proposed Action (Alternative 1) and Alternative 2

Direct effects of management activities to noxious or invasive weeds include ground disturbing activities that have the potential to increase the acreage and/or density of the existing noxious or invasive weed infestations within the project area. Disturbance is a

natural process in our landscape but it can contribute to the spread of noxious or invasive weeds by creating potential sites for invasion. Disturbance may contribute to the spread of weeds by eliminating competition from existing vegetation and creating bare ground that can be more easily invaded than in undisturbed areas. **The level of disturbance is important**. **Severe disturbance** removes competitive vegetation, alters nutrient composition, creates bare soil and can severely reduce or eliminate shade, 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 construction and decommissioning , road closure/obliteration** and use by machinery during **mechanical thinning**. Other management activities associated with the project will be sources of disturbance but the level of disturbance will not be as severe such as broadcast burning and hand thinning.

A direct effect of management actions includes increased risk of introduction of noxious or invasive weeds to uninfested areas within the project area. This could be expansion of weed species known to exist in the project area or additional species not yet existing in the area. These effects can be mitigated by following the Best Management Practices as identified in Appendix D. An example of a Best Management Practice common to all actions is cleaning equipment before entering the project area.

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 will affect all understory plants, including noxious or invasive weeds by allowing more sunlight, increasing available nutrients and temporarily decreasing interspecies competition as well as intra species (between tree) 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 mitigations, best management practices and noxious or invasive weed treatments for the project.

Many stands in the project are scheduled for **mechanical thinning**. Effects associated with this activity include high levels of disturbance, loss or reduction of existing understory vegetation and creation of bare soil. Additionally, machinery can be sources of noxious or invasive weed introductions. These activities can be mitigated by incorporating the Best Management Practices outlined in Appendix D.

Hand thinning is a less severe form of disturbance as compared to mechanical thinning. The effects are similar to prescribed fire and include reduction tree canopy, release of nutrients, reduction plant competition, increase in the amount of available sunlight and creation of bare soil. These factors benefit all understory plants including noxious or invasive weeds. However, these factors are less severe and would be of less concern than pile burning or machine piling on deck sites.

Burning is a disturbance that can release nutrients, reduce plant competition, increase the amount of available sunlight and increase bare soil. Management actions proposed for various areas of the project include broadcast or pile burning. The effects of prescribed

burning are similar to those of tree removal and may contribute to expansion of existing noxious weed populations. Prescribed burning may have **direct and indirect effects** to on all understory vegetation depending on fire severity, including existing noxious or invasive weed populations within the project area. It is expected that most broadcast and prescribed burning will be of low severity. Under these conditions, the effects would be similar to those caused by reducing tree canopy. However, fire severity may be higher in limited areas depending on variables such as management goals, weather, fuel conditions and topography. In these cases moderate to high severity may occur. The effects in these areas would be more severe and would be similar to slash pile burning discussed below.

The implementation of prescribed fire within the project area will benefit the understory vegetation and may eventually lead to a more resilient, weed resistant plant community within the project area and on an area-wide basis, which would be a beneficial **indirect** effect. However, fire will be a source of disturbance that could contribute to the increase in noxious or invasive weeds. .Prescribed fire will reduce the risk of uncontrolled wildfire, which is a more severe disturbance than prescribed fire especially when wildfires become landscape in scale. Under the conditions of severe landscape scale wildfire, the risk and likelihood of noxious or invasive weed invasions are higher than under the less severe conditions of prescribed fire. Examples of severe, large fires with noxious or invasive weed infestations include the Hochderffer and Horseshoe Fires in 1996 and the Pumpkin Fire in 2000. The prescribed fire treatments that are part of the management actions of this project will help reduce the threat of similar severe wildfire within the project area as well as helping to reduce the risk of uncontrolled wildfire in surrounding areas from a wildfire that might otherwise originate within the project area. This in turn will help to control the potential spread of noxious or invasive weeds that might occur from future wildfires originating within the within the project area and in surrounding areas at risk.

Slash **pile burning** will create localized severely burned areas. Consequences include but are not limited to the reduction or loss of the seed bank on these sites (Korb, 2001); death or reduction of soil organisms on the pile sites (Raison, 1979; Ballard, 2000; Korb et al., 2004) and development of hydrophobic soil (Ballard, 2000). Slash pile sites are more prone to invasion from noxious or invasive weeds than surrounding areas and may contribute to the persistence and spread of noxious or invasive weeds in treated areas. A possible mitigation for these effects is to use previously disturbed areas including old pile sites or previously used decking areas where available instead of creating new sites within the forest. Additionally, pile sites **should be monitored** after burning occurs to identify and treat infestations. As stated above, management actions can be mitigated by following the Best Management Practices in Appendix D.

Manual removal of noxious or invasive weeds may be used for several species and populations in the project area. Several techniques may be used for this control including hand pulling and removal of weeds with hand tools**.** District Archeologists should be consulted before using hand tools in areas where conflicts may occur. The effects of manual treatments would be to reduce or eliminate the noxious weed infestations, populations and acreages in the project area.

Biological control agents include approved insects and pathogens that undergo a rigorous testing procedure prior to being available for release. Initial testing occurs in quarantined laboratories abroad and in the United States. The agents are tested for their effectiveness in controlling the target organism and for their host specificity. Testing includes potential effects on economic crops, rare plants, and similar species found in North America. An agent can be released only after is has been determined that it is unlikely that the agent will feed or cause injury to any native or agronomic species. Prior to the release of a new agent an environmental analysis is prepared by APHIS (Agricultural Plant Health Inspection Service). The only action the Forest Service is taking by releasing an agent is changing the location and influencing the rate of spread of the agent. Under the proposed action, there could be releases of biological control insects on diffuse knapweed and Dalmatian toadflax. The **indirect** effect of these releases is a decrease in the density and area of coverage of targeted weed species. Biological control agents will not completely eliminate noxious or invasive weeds in the project area or elsewhere on the forest.

Herbicide treatment

Under the proposed action, herbicide would be used on a limited basis to control a small infestation of camelthorn in Compartment 231, stand 6. The effect of this treatment would be to eradicate or control Camelthorn from its only known location in the project area. Herbicide treatment has been addressed in the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds on the Coconino, Kaibab and Prescott National Forest within Coconino, Gila, Mojave and Yavapai Counties, Arizona* (2005) (FEIS). Refer to that document for a complete discussion of the effects of herbicide treatment. Direct and indirect effects of herbicide treatments are discussed comprehensively in the FEIS.

Cumulative Effects

The Forest began documenting noxious or invasive weed occurrences forest-wide in 1997. Noxious or invasive weeds may have occurred before then but these occurrences are not well documented. Management activities and disturbances prior to 1997 have contributed to the establishment and distribution of noxious or invasive weeds in the project area. Past forest activities, such as grazing, vegetation treatments, recreation uses, road maintenance and travel along roadways, including paved roads and highways probably affected the abundance and distribution of noxious or invasive weeds in the project area. However, without information on known distribution of noxious or invasive weed species, the past effects of management actions would be unclear. Sources of introduction for noxious or invasive weeds are often unclear and difficult to verify.

Historically**, fire suppression** and **past alteration of the fire regime** through fire suppression have affected all understory vegetation through changes in density, abundance and species composition and through changes to hydrologic function. Elimination of fire in the project area and forest-wide has allowed tree canopy and stand density to increase in some areas, severely reducing or eliminating most understory species. As a result, the healthy, resilient plant community that would be present in many areas is absent and there are few desirable understory species present to provide competition that would help reduce the potential of invasion from noxious or invasive

weeds. Past fire suppression has increased the risk and severity of wildfires when they occur. The effects of the resulting severe fires include high levels of disturbance, loss of the plant community and possible alteration of habitat.

One of the objectives of the **prescribed fire** program within the project area and forest-wide is to restore fire to areas where it has been absent for long periods. The beneficial effects of restored fire include reversal of those factors mentioned above, including restoration of understory species, and reduction of fire risk and severity. There have been prescribed burns within the project area before implementation of the noxious or invasive weed FEIS, so noxious or invasive weed control was not considered in the decisions. However, there are no data to suggest that these actions introduced, increased or decreased noxious or invasive weeds in the project area. The effects of these actions were likely similar to the direct and indirect effects discussed above, except no noxious or invasive weed treatments or mitigations were included or required.

Timber sales have occurred in some portions of project area in the past. Examples include the Jack Smith Timber sale harvested in 1990 and 1991. The effects on noxious or invasive weeds from these activities are uncertain because weed data were not recorded until 1997. Therefore, introductions or increases in noxious or invasive weeds for these activities is unknown and the cumulative effects of the reduction in tree canopy and stand density on noxious or invasive weeds within the project area are also unknown. Mitigations such as incorporation of best management practices and noxious or invasive weed control will help reduce the negative effects on noxious or invasive weeds to non-significant levels.

Grazing within the project area includes grazing by domestic ungulates and wild grazers. The cumulative effects of grazing on noxious or invasive weeds include disturbance, trampling, consumption of desirable plants that could provide competition for noxious or invasive weeds, and possible introduction of propagules through feces or contaminated feed. Many of these effects can be mitigated by following the Best Management Practices as identified in Appendix B the *Final Environmental Impact Statement for the Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab and Prescott National Forests* (2005) (FEIS) and through prudent management of grazing allotments.

A **mining** operation, the White Vulcan Mine is within the project area. The mine site has a high level of disturbance. Additionally, there is heavy vehicle traffic associated with hauling materials from the mine. This location could be a source of infestation. However, portions of the mine have been recently rehabilitated and there is currently no evidence of higher levels of noxious or invasive weed infestations as compared to the surrounding forest. Another mining operation which extracts sand is on the north east corner of the project area. Diffuse knapweed has been observed in that location but is currently untreated. This infestation could potentially spread onto forest land.

Road re-alignment activities associated with the expansion of Highway 89N may have contributed to noxious or invasive weed infestations in the project area and along roadways. These activities were initiated and completed before completion of the *Final Environmental Impact Statement for the Integrated Treatment of Noxious or Invasive*

Weeds, Coconino, Kaibab and Prescott National Forests (2005). No mitigations or Best Management Practices for noxious or invasive weeds were incorporated.

Other cumulative effects include past and on-going efforts to control noxious or invasive weeds. The Forest has been manually controlling weeds on a limited basis since about 1995. The cumulative effects of these treatments include localized decreases or elimination of noxious or invasive weeds in the targeted areas. The success of these treatments has not been assessed. Recently, biological control insects for Dalmatian toadflax (June 2007) and diffuse knapweed (July 2007) were released within or near the boundaries of the project area. These releases were separate actions that were part of the forest-wide noxious weed program. These treatments are intended to reduce the density and acreage of the targeted noxious or invasive weeds but will not completely eliminate them from the targeted areas and project area in general.

Table 5. Releases of biological control insects in the Project area.

Targeted noxious or invasive weed	Date of release	Area of release	Treatment in proposed action
Dalmatian toadflax	June 2007	Compartment 258 stand 1	Uneven-aged – resource emphasis
Dalmatian toadflax	June 2007	Compartment 269 stand 7	Fuel reduction < 9inches DBH
Dalmatian toadflax	June 2007	Near Schultz Tank (Multiple releases)	Adjacent to project boundary
Dalmatian toadflax	June 2007	Near Little Bear Trail	Adjacent to project boundary
Dalmatian toadflax	June 2007	Near Lenoux Tank	Adjacent to project boundary
Diffuse Knapweed	July 2007	Transwestern Pipeline (multiple releases)	Adjacent to project boundary
Diffuse Knapweed	July 2007	Sandpit area near Sugarloaf Peak (multiple releases, insects releases on Forest Service Property)	Adjacent to project boundary

The effects of the management actions proposed in this project and currently under consideration may have synergistic cumulative effects while reversing some of the same effects. For example, disturbance from management actions, especially in areas of

existing noxious or invasive weed infestations may contribute to additional growth of the infestations. However, noxious or invasive weed control as part of the management actions will help to control noxious weed invasions within the project as well as within the surrounding area. Neither the disturbance nor noxious or invasive weed control actions associated with the proposed action would occur if the proposed action is not selected by the deciding official.

The Coconino National Forest is in the process of NEPA analysis to implement the Travel Management Rule (2005). The cumulative effects to this and other projects forest wide will be the reduction in the numbers of motorized routes and the elimination of cross country travel. Negative affects from motorized such as crushing of plants; damage to potential habitat such damage to soils, fragmentation of habitat and introduction of noxious or invasive weeds into the habitats and/or populations will be reduced. These reductions will be from the elimination of most cross-country travel and through the reduction of road density. This would aid in reducing pressures from vehicle travel in sensitive areas where plants and potential habitat occur.

Cumulative effects from human activities such as dispersed recreation travel on roadways, hunting and fishing, and fire-wood gathering have occurred in the project area. Effects of these activities include disturbance and possible dispersal of noxious or invasive weeds into or within the project area. The extent and overall past and future effects of these activities are unknown. Many of these activities have occurred in the past and will continue to occur in the future. However, the Forest Service has little or no control over these activities.

No Action

Direct and indirect effects

There would be no direct effects from management actions because none of the management actions identified in the proposed action would occur. No tree thinning would occur and there would be no prescribed burning. Under the no action alternative, no noxious or invasive weed treatments would occur in the project area except those accomplished by other projects such as limited manual control by Forest Service Crews or control efforts by other entities such as treatment of right-of-ways by Arizona Department of Transportation, and release of biological control agents provided by APHIS.

With no treatment, the risk of severe wildfire will continue to increase in many areas of the project area. Those factors that contribute to fire hazard ratings that would be reduced through management actions such as high canopy cover, high numbers of trees per acre and dead and down fuel loading will not be reduced. The risk of wildfire transitioning to crown fires will continue to increase in many areas of the project area. Severe wildfires often result in complete removal of tree canopy, complete loss of ground cover and understory plant community and alteration of soil structure and nutrients. These conditions provide potential sites for noxious or invasive weed invasion through creation of bare soil, increased light and absence of competition from desirable plant species. Therefore, increases in fire hazard and severity that will occur with no action will also increase the risk of or invasive weed invasions in the project area.

Under the no action alternative, noxious or invasive weed treatments or mitigations that would help prevent the spread of noxious or invasive weeds will not occur as part of the management actions currently under consideration. Noxious or invasive weed populations will remain untreated and continue to expand. Mitigation measures and Best Management Practices that would help control the spread of noxious or invasive weeds will not be implemented.

Monitoring Requirements

Species	Timing	Purpose
Rusby milkvetch	Post treatment	Monitor effects of treatments on Rusby milkvetch
Noxious or invasive weeds	Post treatment	Monitor need for treatments, especially biocontrol insects
Noxious or invasive weeds	Post treatment	Select suitable sites for biocontrol insects
Noxious or invasive weeds	Post treatment	Monitor noxious or invasive weed treatments for effectiveness.

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Appendix A

Threatened, Endangered and Sensitive Species Plants on the Mormon Lake and Peaks Ranger Districts, Coconino National Forest and their Status within the Jack Smith-Schultz Project Area.

This list was prepared from the Region 3 Sensitive Species List (September 2007)

Species Name	Species Status			No Suitable Habitat	Suitable Habitat Present	Suitable Habitat Occupied
	Federal	State	Forest Service			
San Francisco Peaks Groundsel, *Senecio franciscanus* (*Packera franciscana*)	T			X		
Mt. Dellenbaugh Sandwort, *Arenaria aberrans*	--	SNR	Sen	X		
Rusby's Milkvetch, *Astragalus rusbyi*	--	S3	Sen		X	Yes
Crenulate Moonwort, *Botrychium crenulatum*		SH	Sen	X		
Disturbed Rabbitbrush, *Chrysothamnus molestus*		S3	Sen	X		
Arizona Bugbane, *Cimicifuga arizonica*	--	S2	Sen	X		
Arizona leatherflower, *Clematis hirsutissima* var. *hirsutissima*		S2	Sen	X		
Rock Fleabane, *Erigeron saxatilis*	--	S3	Sen	X		
Flagstaff Pennyroyal, *Hedeoma diffusum*	--	S3	Sen	X		
Arizona sneezeweed, *Helenium arizonicum*		S3	Sen	X		
Arizona sunflower, *Helianthus arizonensis*		SNR	Sen	X		
Sunset Crater beardtongue, *Penstemon clutei*		S2	Sen		X	No
Flagstaff beardtongue, *Penstemon nudiflorus*		S2S3	Sen	X		
Blumers' Dock, *Rumex orthoneurus*		S3	Sen	X		
Bebb's Willow, *Salix bebbiana*		SNR	Sen	X		

KEY

Federal = Federal status under the authority of the Endangered Species Act. (Refer: Endangered and Threatened Wildlife and Plants (50 CFR 17.11 & 17.12, July 15, 1991); Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered orThreatened Species; Proposed Rule (50 CFR Part 17, November 15, 1994))

1. ENDANGERED - any species that is in danger of extinction throughout all or a significant portion of its range as determined by the Secretary of the Interior.
2. THREATENED - any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range as determined by the Secretary of the Interior.
3. PROPOSED - any species that has been proposed in the Federal Register to be listed under the Endangered Species Act. Candidate 1 - those species for which the Fish and Wildlife Service has sufficient information on hand to support their being listed as threatened or endangered. These species are likely to be proposed for listing in the foreseeable future.

Appendix B

Locations of Noxious or invasive Weeds within the Project area

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
D.Crisp	Diffuse knapweed	0.1	230	3	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Cheatgrass	0.1	230	17		None
T. Klein	Dalmatian toadflax	0.1	230	17		None
Murphy	Diffuse knapweed	5	230	18		None
D.Crisp	Dalmatian toadflax	0.1	230	22	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Diffuse knapweed	0.1	230	22	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Cheatgrass	0.1	231	1	Prescribe Burn	Burn
D.Crisp	Cheatgrass	0.1	231	2	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Cheatgrass	0.1	231	2	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Cheatgrass	1	231	2	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Cheatgrass	0.1	231	4	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	231	4	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	231	4	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	231	4	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	231	4	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	231	5	Uneven-aged - Resource Emphasis	Mechanical restoration
CPFS	Camelthorn	1	231	6	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Cheatgrass	0.1	231	6	Uneven-aged - Resource Emphasis	Mechanical restoration
CPFS	Dalmatian toadflax	1	231	6	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	231	6	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Cheatgrass	20	231	9	Uneven-aged - Resource Emphasis	Mechanical restoration

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
D.Crisp	Dalmatian toadflax	0.1	231	9	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	231	9	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	231	9	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Diffuse knapweed	0.1	231	9	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	231	10	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Cheatgrass	0.1	231	13	Uneven-aged - Resource Emphasis	Mechanical restoration
K. Beiler	Dalmatian toadflax	0.1	231	13	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	231	13	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	237	18	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	0.1	237	105	Fuel Reduction - < "9	Hand thin
D.Crisp	Dalmatian toadflax	0.1	238	1	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	238	1	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	238	1	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	238	7	Uneven-aged - Resource Emphasis	Mechanical restoration
D. Crisp	Dalmatian toadflax	0.1	238	18	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	238	21	Uneven-aged - Resource Emphasis	Mechanical restoration
K. Beiler	Cheatgrass	0.1	238	25		Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	238	25		Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	238	25	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	238	29	Uneven-aged - Resource Emphasis	Mechanical restoration
K. Beiler	Cheatgrass	0.1	238	31		None
T. Klein	Dalmatian toadflax	0.1	238	31		None
D.Crisp	Cheatgrass	0.1	245	2	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	245	2	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Cheatgrass	0.1	245	16		None
D.Crisp	Dalmatian toadflax	1	245	17	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	245	17	Uneven-aged - Resource Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	245	17	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	245	19	Uneven-aged - Resource Emphasis	Mechanical restoration

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
Peaks WL Crew	Dalmatian toadflax	0.2	245	19	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	245	21	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	246	9	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	246	9	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	246	11	Prescribe burn	Burn
T. Klein	Cheatgrass	0.1	246	12	Prescribe burn	Burn
T. Klein	Dalmatian toadflax	0.1	246	12	Prescribe burn	Burn
T. Klein	Dalmatian toadflax	0.1	246	12	Prescribe burn	Burn
T. Klein	Dalmatian toadflax	0.1	246	12	Prescribe burn	Burn
CPFS	Dalmatian toadflax	0.4	246	15		None
Peaks WL Crew	Dalmatian toadflax	0.1	246	15		None
T. Klein	Dalmatian toadflax	0.1	246	17	Uneven-aged - Resource Emphasis	Mechanical restoration
D. Crisp	Dalmatian toadflax	0.1	246	21	Prescribe burn	Burn
Peaks WL Crew	Cheatgrass	5	258	1	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.2	258	1	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	258	2	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	258	3	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	258	8	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	259	7		None
T. Klein	Dalmatian toadflax	0.1	259	7		None
T. Klein	Dalmatian toadflax	0.1	259	12	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	259	14	Fuel Reduction - <12"	Hand thin
T. Klein	Dalmatian toadflax	0.1	259	14	Fuel Reduction - <12"	Hand thin
T. Klein	Dalmatian toadflax	0.1	259	17		None
Peaks WL Crew	Cheatgrass	0.4	260	5	Prescribe Burn	Burn
Peaks WL Crew	Dalmatian toadflax	0.4	260	5	Prescribe Burn	Burn
Peaks WL Crew	Bull thistle	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Cheatgrass	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Cheatgrass	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
Peaks WL Crew	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	260	6	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.2	260	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	2	260	8	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	8	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	8	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Cheatgrass	0.1	260	10	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	11	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	260	11	Uneven-aged - Resource Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	260	11	Uneven-aged - Resource Emphasis	Mechanical restoration
P.Parks	Dalmatian toadflax	0.1	267	4		None
P.Parks	Dalmatian toadflax	0.1	267	4		None
K. Beiler	Dalmatian toadflax	0.1	267	7	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Murphy	Dalmatian toadflax	2.5	267	8	Fuel Reduction - < "12	Hand thin
Murphy	Dalmatian toadflax	2.5	267	8	Fuel Reduction - < "12	Hand thin
S. Meares	Dalmatian toadflax	0.1	267	8	Fuel Reduction - < "12	Hand thin
Murphy	Diffuse knapweed	0.4	267	8	Fuel Reduction - < "12	Hand thin
S. Meares	Dalmatian toadflax	0.1	267	9	Fuel Reduction - < "9	Hand thin
S. Meares	Dalmatian toadflax	0.1	267	13	Prescribe Burn	Burn
S. Meares	Dalmatian toadflax	0.1	267	15	Prescribe Burn	Burn
K. Beiler	Dalmatian toadflax	0.1	267	27	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
K. Beiler	Dalmatian toadflax	0.1	267	29	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
K. Beiler	Dalmatian toadflax	0.1	267	29	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
K. Beiler	Dalmatian toadflax	0.1	267	33	Prescribe Burn	Burn
Peaks WL Crew	Dalmatian toadflax	0.1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	3	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D. Crisp	Dalmatian toadflax	1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D. Crisp	Dalmatian toadflax	1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D. Crisp	Dalmatian toadflax	1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D. Crisp	Dalmatian toadflax	0.1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D. Crisp	Dalmatian toadflax	0.1	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D. Crisp	Diffuse knapweed	10	269	3	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Cheatgrass	0.1	269	5	Fuel Reduction - < "12	Hand thin
T. Klein	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
T. Klein	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	1	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	10	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	5	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	5	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	5	269	5	Fuel Reduction - < "12	Hand thin

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
D. Crisp	Dalmatian toadflax	5	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	10	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	1	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Dalmatian toadflax	0.1	269	5	Fuel Reduction - < "12	Hand thin
D.Crisp	Diffuse knapweed	0.1	269	5	Fuel Reduction - < "12	Hand thin
D. Crisp	Diffuse knapweed	0.1	269	5	Fuel Reduction - < "12	Hand thin
K. Beiler	Dalmatian toadflax	0.1	269	7	Fuel Reduction - < "9	Hand thin
D.Crisp	Dalmatian toadflax	5	269	7	Fuel Reduction - < "9	Hand thin
D.Crisp	Dalmatian toadflax	1	269	7	Fuel Reduction - < "9	Hand thin
D.Crisp	Diffuse knapweed	0.1	269	7	Fuel Reduction - < "9	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	8	Fuel Reduction - < "9	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	8	Fuel Reduction - < "9	Hand thin
D.Crisp	Dalmatian toadflax	0.1	269	9		None
D.Crisp	Dalmatian toadflax	0.1	269	9		None
D.Crisp	Dalmatian toadflax	0.1	269	9		None
D.Crisp	Dalmatian toadflax	0.1	269	9		None
D.Crisp	Diffuse knapweed	0.1	269	9		None
D.Crisp	Diffuse knapweed	0.1	269	9		None
D.Crisp	Diffuse knapweed	0.1	269	9		None
T. Klein	Dalmatian toadflax	0.1	269	11		None
Peaks WL Crew	Dalmatian toadflax	0.1	270	7	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	270	7	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	270	7	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	270	8	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	1	270	8	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
Peaks WL Crew	Dalmatian toadflax	0.1	278	1	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	1	278	1	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	20	278	1	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Dalmatian toadflax	0.1	278	1	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
D.Crisp	Diffuse knapweed	0.1	278	1	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	20	278	3		None
Peaks WL Crew	Dalmatian toadflax	20	278	3		None
T. Klein	Dalmatian toadflax	0.1	278	3		None
T. Klein	Dalmatian toadflax	0.1	278	3		None
D.Crisp	Dalmatian toadflax	0.1	278	3		None
D.Crisp	Dalmatian toadflax	0.1	278	3		None
D.Crisp	Dalmatian toadflax	0.1	278	3		None
D.Crisp	Dalmatian toadflax	0.1	278	3		None
Peaks WL Crew	Diffuse knapweed	20	278	3		None
D.Crisp	Diffuse knapweed	0.1	278	3		None
D.Crisp	Diffuse knapweed	0.1	278	3		None
D.Crisp	Diffuse knapweed	0.1	278	3		None
D.Crisp	Diffuse knapweed	5	278	3		None
D.Crisp	Diffuse knapweed	5	278	3		None
Peaks WL Crew	Cheatgrass	6	278	12	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Cheatgrass	20	278	12	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Cheatgrass	1	278	12	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	6	278	12	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.5	278	12	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	278	12	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	1	278	12	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.2	278	14	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.2	278	14	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	278	14	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	278	14	Uneven-aged - Resource Emphasis	Mechanical restoration

Collector	Species	Infested Acres	Location	Site	Emphasis	Proposed Treatment
T. Klein	Dalmatian toadflax	0.1	278	14	Uneven-aged - Resource Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	278	15	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	278	15	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.5	278	15	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	278	15	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	0.1	278	15	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	1	278	15	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	278	15	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	278	16	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	278	16	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Cheatgrass	12	278	17		None
Peaks WL Crew	Cheatgrass	20	278	17		None
Peaks WL Crew	Dalmatian toadflax	12	278	17		None
Peaks WL Crew	Cheatgrass	3	278	19	Prescribe Burn	Burn
Peaks WL Crew	Dalmatian toadflax	3	278	19	Prescribe Burn	Burn
Peaks WL Crew	Dalmatian toadflax	1	278	24	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
Peaks WL Crew	Dalmatian toadflax	1	278	24	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration
T. Klein	Dalmatian toadflax	0.1	278	24	Uneven-aged - Fuels Reduction Emphasis	Mechanical restoration

Treatment Priorities for Noxious or invasive Weeds within the Project area

All treatments should follow the Best Management Practices for the appropriate activity as listed below. A certified individual must oversee all herbicide treatment. Currently, Laura Moser and Jerry Gonzales are the only individuals certified for the Coconino National Forest. Other treatments could be supervised or applied by other individuals. All assumptions are based on the treatments as outlined in the proposed action. The priority rankings are based on species ranking within the Weed EIS and treatments in proposed action. The priority of treatments may change during project implementation based on implementation schedule.

Species/objective	Date Observed	Infestation size (acres)	Compartment / Stand	Proposed Treatment	Treatment method	Treatment Cost	Notes
Camelthorn (Contain/control)	07/07/1999	1	231/6	Uneven-aged - Fuels Reduction Emphasis / Mechanical restoration	Herbicide	$350.00	Does not include cost of herbicide
Diffuse knapweed (Contain/control)	09/23/2005	10	269/3	Uneven-aged - Fuels Reduction Emphasis / Mechanical restoration	Biocontrol insects	$550.00	
Diffuse knapweed (Contain/control)	09/23/2005	0.1	278/1	Uneven-aged - Fuels Reduction Emphasis / Mechanical restoration	Biocontrol insects	$ 200.00	
Diffuse knapweed (Contain/control)	08/29/2005	0.1	230/3	Uneven-aged - Fuels Reduction Emphasis / Mechanical restoration	Biocontrol insects	$ 200.00	
Diffuse knapweed (Contain/control)	08/29/2005	0.1	230/22	Uneven-aged - Fuels Reduction Emphasis / Mechanical restoration	Biocontrol insects	$200.00	
Diffuse knapweed (Contain/control)	08/29/2005	0.1	231/9	Uneven-aged - Fuels Reduction Emphasis / Mechanical restoration	Biocontrol insects	$200.00	
Diffuse knapweed (Contain/control)	08/17/2000	0.4	267/8	Fuel Reduction - < "12 / Hand thin	Biocontrol insects	$200.00	
Diffuse knapweed (Contain/control)	08/30/2005	0.2	269/5	Fuel Reduction - < "12 / Hand thin	Biocontrol insects	$400.00	Two reported sites within stand

Species/objective	Date Observed	Infestation size (acres)	Compartment / Stand	Proposed Treatment	Treatment method	Treatment Cost	Notes
Dalmatian toadflax (Contain/control)				All treatments	Biocontrol insects	$2,000.00	Select release sites within project area from location table. Cost includes ten release sites within project
Bull thistle (Contain/control)	08/26/2003	0.1	260/6	Uneven-aged - Fuels Reduction Emphasis / Mechanical restoration	Manual Control	$ 200.00	Locate and hand pull or grub plants
Cheatgrass				All treatments	Mitigation		Mitigate effects through use of BMPs

Appendix C

Risk Assessment from Three Forest Noxious Weed Strategic Plan (1997)

A risk assessment is conducted as part of the NEPA process to determine if an action may introduce or spread invasive weeds within a proposed project area. It is also used to prescribe follow-up treatments and project actions necessary to reduce or prevent the spread of invasive weeds where the risk of invasive weed establishment is moderate or high. The primary focus of risk assessment is on ground-disturbing or site altering projects conducted on National Forest System land.

Region 3 Invasive Weed Classification System

The Region 3 invasive weed classification system provides a systematic approach for assigning management emphasis priorities.

1. Class A - Those invasive weeds that are non-native (exotic) to the state and are of limited distribution or are unrecorded in the State and pose a serious threat to agricultural crop, rangelands, plants listed an endangered, threatened or sensitive, and other natural and economic resources in the ecosystem. Class A plants receive highest priority. Management emphasis is complete eradication.

2. Class B - Those invasive weeds that are non-native (exotic) species that are of limited distribution or are unrecorded in a region of the state but are common in other regions of the state. Class B plants receive second highest priority. Management emphasis is to contain the spread, decrease population size, and eventually eliminate the infestation when cost effective technology is available.

3. Class -C - Consists of any other invasive weeds (exotic or native). This classification receives the lowest priority. Management emphasis is to contain spread to present population size or decrease population.

The invasive weed classes may be further subdivided to meet regional, National Forest, or local needs.

Risk Assessment Process

The invasive weed risk assessment process should be accomplished by, or closely supervised by, a person who has a good understanding of invasive weed ecology. It is an integral part of the NEPA scoping process. An overview flowchart of the Risk Assessment Process is shown in Exhibit 1 of this document.

Pre-field Review

The risk assessment process begins with a review of existing information for the subject area. Suggestions for completing this task are as follows:

1. Check local Forest Service, county/state weed board, and Natural Heritage records to determine if invasive weed species have been sighted in or adjacent to the area. Develop a list of species considered for possible occurrence.
2. Compare the habitat requirements of invasive weed species with habitat known to occur in the proposed project area to determine if potential habitat for invasive weed species exists.
3. Determine if a field reconnaissance is needed using the following:
    a. If no invasive weeds are likely to occur within the area, document the results and proceed with the project as planned.
    b. If the presence of invasive weed species or their habitats within or adjacent to the area is indicated by the pro-field review, conduct a field reconnaissance.
4. Summarize the results, including a list of species considered and any sources of area habitat information. File in the Risk Assessment Report and the appropriate NEPA document.

Field Reconnaissance

Use a reliable sample design in the field reconnaissance that will show that likely areas of invasive weed occurrence were searched at the proper time of year for identification of invasive weed species.

Field reconnaissance also includes inspection of potential off-site areas such as sawmills, gravel pits, equipment yards, or other areas for the presence of invasive weed species which could be transported onto NFS lands in conjunction with the proposed project.

Take the following weed management actions according to the class of invasive weed encountered:

a. Class A or B weeds are present:

(1) Develop and implement management measures to eliminate weeds.

(2) Monitor management measures for 5 years.

(3) Determine the risk of introducing invasive weeds.

b. Class C weeds are present:

(1) Develop and implement management measures to prevent spread or eliminate invasive weeds.

(2) Monitor management measures for 3 years.

(3) Determine the risk of introducing invasive weeds.

c. No weeds are present or likely to occur:

(1) Document the results.

(2) Proceed with the project as planned.

File in the Risk Assessment Report and the appropriate NEPA document. Include a list of species for which a reconnaissance was conducted, a description of the survey design, and a narrative of the habitat information developed in the pre-field review. Report all sightings of invasive weed species to the appropriate interested and affected parties, including County and/or State agencies, other Federal agencies, and monitoring and oversight groups (County and/or State weed board, State Natural Heritage organization, etc.).

Using the risk assessment factors shown in Exhibit 2 of this document, determine the risk rating of introducing invasive weeds in the area. Document the results, including positive management actions such as planned prevention, control, and monitoring measures that may reduce or eliminate the risk of invasive weed establishment in the project area. Include a list of species considered for possible occurrence and any sources of area habitat information, along with supporting material from the pre-field review and field reconnaissance. Summarize the results and file in the Risk Assessment Report and the appropriate NEPA document.

Exhibit 1: Flow Chart Integrating Invasive Weed Evaluation with NEPA Scoping Process

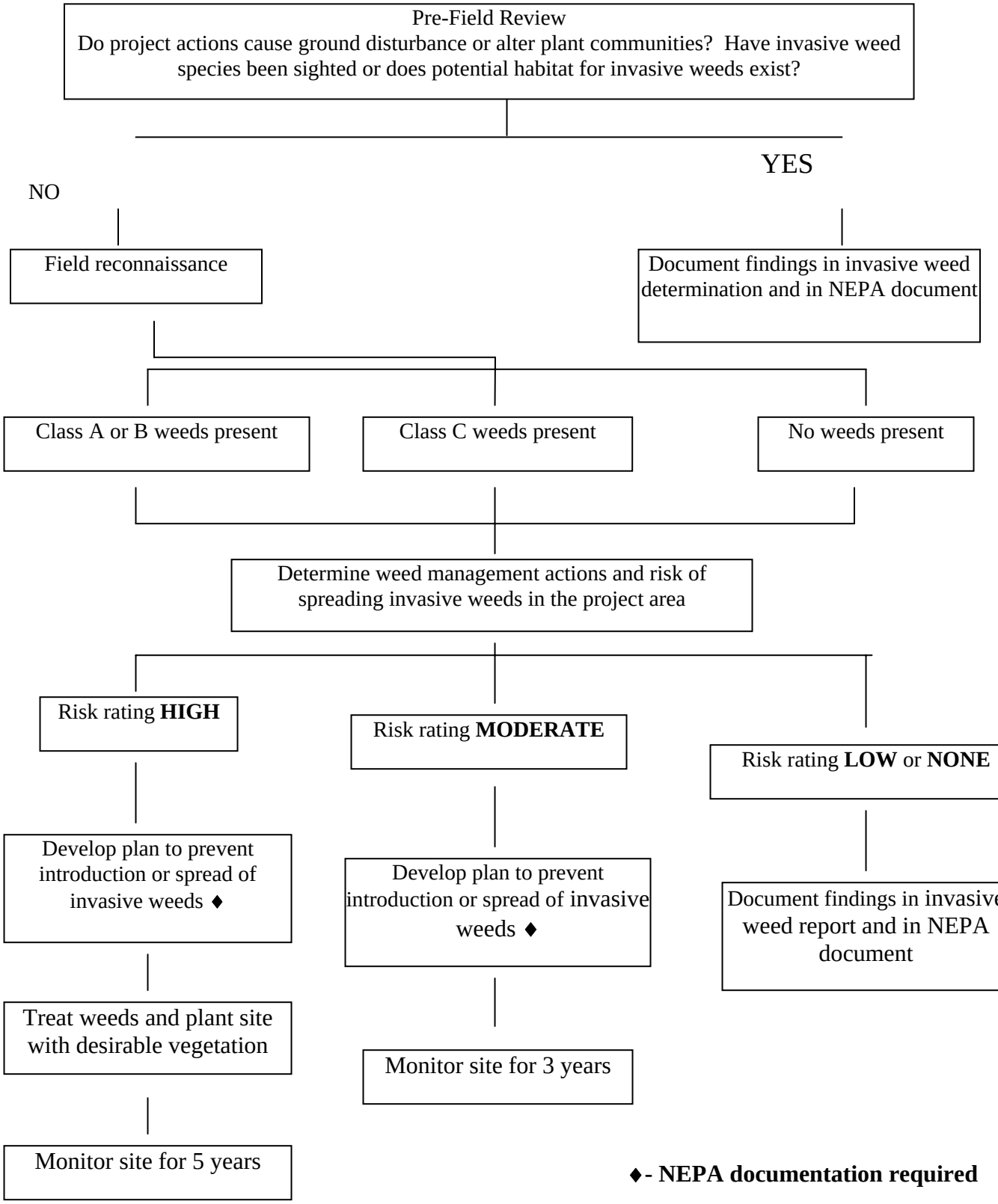

Exhibit 2

Risk Rating

A Risk Rating is used to describe the relative risk of the potential for invasive weed establishment in the project area and to serve to guide further action regarding project modification or implementation. Calculate the Risk Rating as follows:

Risk Rating = Likelihood x Consequence

Where: Likelihood = the likelihood that invasive weed species will become established in the project area.

Consequence = the consequence of invasive weed species becoming established in the project area.

Use the factors below in developing the Risk Rating. The factors are Factor 1: Likelihood of Invasive Weed species spreading to project area. Factor 2: Consequence of Invasive Weed establishment in project area. The risk or likelihood and consequences of invasive weeds range from a value of 0 (none) to 100 (high).

RISK ASSESSMENT FACTORS AND RATING

Factor I: Likelihood of Invasive Weed Species Spreading into Project Area:

NONE: (0) Invasive weed species not located within or immediately adjacent to the project area. Project activity is not likely to result in the establishment of invasive weed species in the project area.

LOW: (1) Invasive weed species present in areas adjacent but not within the project area. Project activities can be implemented and prevent the spread of invasive weeds into the project area.

MODERATE: (5) Invasive weed species located immediately adjacent to or within the project area. Project activities are likely to result in some areas becoming infested with invasive weed species even when preventative management actions are followed. Control measures are essential to prevent the spread of invasive weeds within the project area.

HIGH: (10) Heavy infestations of invasive weeds are located within or immediately adjacent to the project area. Project activities, even with preventative management actions, are likely to result in the establishment and spread of invasive weeds on disturbed sites throughout much of the project area.

Factor 2: Consequence of Invasive Weed Establishment in Project Area

NONE to LOW: (1) None. No cumulative effects expected.

MODERATE: (5) Possible adverse effects on site and possible expansion of infestation within project area. Cumulative effects on the economic or ecological communities (i.e. native plants) are likely, but limited.

HIGH: (10) Obvious adverse effects within the project area and probable expansion of invasive weed infestations to areas outside the project area. Adverse cumulative effects on the economic or ecological communities (i.e. native plants) are probable.

ASSIGNING A RISK RATING

Step 1 Identify level of likelihood and consequence of adverse of effects and assign values according to the following:

None = 0
Low = 1
Moderate = 5
High =10

LIKELIHOOD	X	CONSEQUENCE	=	RIS
5	X	5	=	**25**

This risk assessment applies only to the proposed action and to all noxious or invasive weed species discussed in this report and assumes that the control and mitigation measures are incorporated into the project. The risk rating may increase if no control measures or mitigation is incorporated into the project.

Step 2 Multiply level of likelihood times consequence.

Step 3 Use the value resulting in Step 2 to determine Risk Rating and Action follows:

VALUE	RISK RATING	ACTION
0	NONE	Proceed as planned.

1-10 LOW Proceed as planned. Initiate control treatments on invasive weed populations that are established in the nearby area.

25 MODERATE Develop preventative management measures for the proposed project following the Integrated Weed Best Management Practices to reduce the risk of introduction or spread of invasive weeds into the area. Preventative management measures should include modifying the project to promote first successional locally native species to occupy disturbed sites, monitor area for at least 3 consecutive years, and provide for control of newly established populations of invasive weeds and follow-up treatment for previously treated infestations.

50-100 HIGH Project must be modified following the Integrated Weed Best Management Practices to reduce risk level through preventative management measures, including promote first successional locally native species to occupy disturbed sites, and controlling existing infestations of invasive weeds in nearby areas prior to project activity. Project must provide at least 5 consecutive years of monitoring. Project must also provide for control of newly established populations of invasive weeds and follow-up treatment for previously treated infestations.

Appendix D

Best Management Practices and Recommended Activities for the Jack Smith Schultz Project

Noxious or Invasive Weeds

The Final Environmental Impact Statement (FEIS) for Treatment of noxious or invasive Weeds, Coconino, Kaibab and Prescott National Forests, and Coconino, Mohave and Yavapai Counties, Arizona (2005) amended the Coconino National Forest Plan. Appendix B of that document includes specific design features, best management practices, required protection measures and mitigation measures to manage noxious or invasive Weeds.

Preventing the introduction and spread of noxious or invasive weeds is one objective of integrated weed management programs on the Coconino National Forest. The following list of integrated best management practices for weeds, and recommended management activities was adapted from the FEIS and is designed to mitigate identified risks of weed introduction and spread in the Jack Smith Schultz project area... Only those measures applicable to this project are included in this list.

Integrated Weed Management Practices

Objective	Best Known Practice
Incorporate weed prevention and control into project layout, design, alternative evaluation, and project decisions.	Environmental analysis for projects and maintenance programs will need to assess weed risks, analyze potential treatment of high-risk sites for weed establishment and spread, and identify prevention practices This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into the Environmental Assessment. Determine prevention and maintenance needs, including the use of herbicides if needed, at the onset of project planning. This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment. Include weed surveys at the project planning stage as outlined in “General Weed Management Practices” This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment. For timber sale purchaser road maintenance and decommissioning, use standard timber sale contract clauses such as WO-C/CT 6.36 to ensure appropriate equipment

Objective	Best Known Practice
	cleaning. Incorporate during implementation. For new construction and reconstruction of roads (icluding temporary roads) conducted as part of public works (construction) contracts, the timber sale contract, and service contracts include contract language for equipment cleaning such as is in WO-C/CT 6.36. .Incorporate during implementation.
Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.	Before ground-disturbing activities begin, inventory and prioritize treatment of invasive weeds in project operating areas and along access routes, or within reasonably expected potential invasion vicinity. Surveys conducted by field crews prior to NEPA analysis. Do a risk assessment accordingly; control weeds as necessary. This practice was incorporated during NEPA Analysis in Botany Specialists Report and incorporated into Environmental Assessment. After completing the practice above, reduce the risk of spreading and creating weed infestations. Plan operating areas and access routes to avoid heavy infestation areas, plan closure of access routes at finish of project, and/or begin project operations in uninfested areas before operating in weed-infested areas. Locate and use weed-free project staging areas. Incorporate during implementation. Ensure that all outside (rental, other agency or unit) equipment is free of weed seed and propagules before it is accepted by the contracting officers representative. Wash vehicles and equipment before entering project area, focusing especially on areas such as undercarriages,tires and wheel wells that may harbor seeds and fragments of noxious or invasive weeds. Incorporate during implementation. Remove mud, dirt, and plant parts from project equipment before moving it into a project area. Determine the need for, and when appropriate, identify sites where equipment can be cleaned. Clean all equipment before entering National Forest System lands. This practice does not apply to service vehicles traveling frequently in and out of the project area that will remain on a clean roadway. Incorporate during implementation. If operating in areas infested with weeds, clean all equipment before leaving the project site. To minimize time spent cleaning equipment, schedule all work in infested areas last and concurrently. Designate a parking lot where project vehicles working in the infested area may be parked for the duration of the project. This area should be monitored in followup mitigation and should be near a “clean”

Objective	Best Known Practice
	vehicle/equipment lot. Identify sites where equipment and vehicles can be cleaned before leaving the site at the end of the project. Incorporate during implementation.
Retain native vegetation in and around project activity and minimize soil disturbance.	Minimize soil disturbance to no more than needed to meet vegetation management objectives. Incorporate during implementation. Minimize soil disturbance with appropriate logging techniques. The amount of disturbance from logging techniques varies with equipment and methods. Incorporate during implementation.
Where project disturbance creates bare ground, establish vegetation to minimize favorable conditions for weeds.	Treat disturbed soil (except surfacing projects) in a manner that optimizes native plant establishment for that specific site. Incorporate during implementation. Examples of revegetation techniques include but are not limited to topsoil replacement, native seedbank promotion, planting, seeding, fertilization, and/or weed seed-free mulching as necessary. Use local native material where appropriate and feasible (or specifically identify why not used). Use certified weed-free and weed seed-free hay or straw. Incorporate during implementation. Use local seeding guidelines to determine detailed procedures and appropriate mixes. To avoid weed contamination, a certified seed laboratory needs to test each lot against the Forest noxious or invasive weed list, and provide documentation of the seed inspection test. Seed lots labeled as certified weed seed-free at time of sale may still contain some weed seed contamination. Incorporate during implementation.

Objective	Best Known Practice
Manage fire as an aid in control of weeds to prevent new weed infestations and the spread of existing weeds.	Inventory project area and evaluate weeds present with regard to the effects on weed spread relative to the fire prescription. Surveys have been conducted by field crews prior to and concurrently with NEPA analysis. Survey results and analysis of effects from prescribed fire are included in the Botany Specialists Report and incorporated into Environmental Assessment. Burn noninfested areas first before entering weed infested sections of the burn. Clean all equipment when project is completed. Or treat and burn all infested areas first to remove seed source then clean equipment and proceed to uninfested areas. Incorporate during implementation. Time burns to promote native species and to hinder weed species germination. Incorporate during implementation. Mitigate the effects of pile burning by monitoring pile sites after burning and controlling noxious or invasive weeds on slash pile sites as necessary. These effects were addressed in the Botany Speialists Report.
Avoid or remove sources of weed seed and propagules to prevent new weed infestations and the spread of existing weeds.	Treat weeds on contracted projects, emphasizing treatment of weed infestations on existing landings, skid trails before activities commence. Incorporate during implementation. Use standard timber sale contract clauses such as WO-C/CT 6.36 to ensure appropriate equipment cleaning. Incorporate during implementation.
Retain native vegetation in and around project activity and minimize soil disturbance.	Minimize period from end of logging to site preparation, revegetation, and contract closure. Incorporate during implementation. Recognize the need for prompt growth of native vegetation, long-term restoration and weed suppression where forested vegetation management has created openings. Incorporate during implementation. Allow natural seedbank to provide vegetation if possible, next preference is for native seed grown from local collections. All seed must be certified weed seed-free for all species on the forest noxious or invasive weed list. The Forest will provide a current list to potential seed suppliers to facilitate the certification process. Incorporate during implementation.
Minimize roadside sources of weed seed that could be transported to other areas.	Avoid acquiring water for dust abatement from weed-infested areas. Incorporate during implementation. For road maintenance and decommissioning include contract language for equipment cleaning such as in WO-C/CT 6.36.

Objective	Best Known Practice
	Incorporate during implementation. Schedule and coordinate all earth-moving or soil-disturbing activities (such as pulling of noxious or invasive weed-infested roadsides or ditches) in consultation with the local weed specialist. Do not blade, pull or clean out roadsides and ditches that are infested with weeds unless doing so is required for public safety or protection of the roadway. If the ditch must be pulled, ensure the weeds remain onsite. Blade from least infested to most infested areas. When it is necessary to blade weed-infested roadsides or ditches, schedule the activity when seeds or propagules are least likely to be viable and spread. Minimize soil surface disturbance and contain bladed material on the infested site. Incorporate during implementation.
Road Closure/Obliteration	Clean equipment to be used on the project before entering the project. Focus on areas where soil and plant fragments may accumulate such as undercarriages and wheel wells. When working in weed infested areas, clean equipment before moving to another area.

Best Management Practices

Herbicide Treatments

These practices only apply to herbicide treatments. If herbicides are selected for use in the project, the following Best Management Practices will be incorporated in project implementation. These Best Management Practices have been developed for this project and are designed to minimize any potential water quality problems with approval of herbicide use in the project area. All Best Management Practices are considered standard procedure and do not constitute deviation from normal planning or implementation processes. These practices are also listed in the Soil and Water Conservation Handbook (2509.22) and comply with the requirements of the Federal Water Pollution Control Act.

- 21.11: Pesticide Application According to Label Directions and Applicable Legal Requirements — All approved herbicides will be applied according to label instructions to avoid water contamination. Directions found on the label of each herbicide are detailed and specific and include legal requirements for use. These constraints will be incorporated into individual project plans and contracts. Responsibility for in-service projects rests with the Forest Service's project supervisor who shall be a certified applicator. For contracted projects, it is the responsibility of the contracting officer or the contracting officer's representative to ensure that label instructions and other applicable legal requirements are followed.
- 21.12: Pesticide Application Monitoring and Evaluation — the objective of this BMP is to determine whether pesticides were applied safely, restricted to intended target areas,

and deposited at the right rates. It is also designed to evaluate if non-target species were impacted. Another component is also to provide early warning of possible hazardous conditions and determine the extent, severity, and duration of any potential hazard that might exist. Monitoring methods include spray cards, dye tracing, and direct measurements of herbicides on plants or near water. Monitoring of existing herbicide concentrations will be conducted prior to any treatments in riparian corridors where perennial water is found.

- 22.13: Pesticide Spill Contingency Plan — The objective of this BMP is to eliminate contamination of water or the soil resource that may occur from accidental spills.
- 24.14: Cleaning and Disposal of Herbicide Containers — This BMP is designed to prevent water contamination from cleaning or disposal of herbicide containers. The cleaning and disposal of these items will be done in accordance with Federal, State, and local laws. The forest or district pesticide use coordinator will approve proper rinsing procedures in accordance with State and local laws and regulations, and arrange disposal of containers when in service personnel apply the product. When a contractor applies the herbicide, the contractor is responsible for proper container disposal in accordance with label instructions.
- 21.16: Controlling Pesticide Drift during Spray Application — The objective of this BMP is to minimize risk of pesticides falling directly into water or non-target areas. The spray application of herbicides is accomplished according to a prescription which accounts for terrain and that specifies the following: spray exclusion areas, buffer zones, and factors such as formulation, equipment, droplet size, spray height, application pattern, flow rate, and the limiting factors of wind speed and direction, temperature, and relative humidity. On in service projects, the Forest Service project manager supervisor is responsible for ensuring the prescription is followed, whereas if contracted, the contracting officer is delegated the responsibility.

Additional Best Management Practices established by the FEIS for herbicide use include:

- Establish 1-mile limited spray zones adjacent to communities, private lands, recreation sites, trailheads, and scenic overlooks. Non-herbicidal treatment methods will be prioritized in these areas; only if these treatments are not successful will herbicides be used on deep-rooted perennial weeds.
- No mixing, loading, and equipment cleaning will be done within the limited spray zones, nor within 300 feet of the limited spray zones or private land.
- Application personnel will be trained by, and all application will be under direct supervision of, a Forest Service certified pesticide applicator (Region 3 Supplement 2100-98-1). All applicators must wear protective clothing as described on the label.
- All herbicide applications will follow EPA label requirements, USDA policy, and Forest Service direction (e.g., FSM 2150 Pesticide Use Management and Coordination; FSH 2109.11 Pesticide Project Handbook; FSH 2109.12 Pesticide Storage, Transportation, Spills, and Disposal Handbook; and FSH 2109.13 Pesticide Project Personnel Handbook).
- Herbicides will be transported daily to the project site under the following conditions: (a) transport only the quantity needed for that day's work, and (b) transport concentrate only in containers in a manner that will prevent tipping or spilling, and in a compartment that is isolated from food, clothing, and safety equipment.

- Mixing, loading, and equipment cleaning must be done onsite and at least 300 feet from the edge of a "Limited Spray Zone" or from private land (unless the owner is cooperating in the project), open water, known wellheads, or sensitive areas. Mixing and cleaning water must be transported to the site in labeled containers that are separate from water used for other purposes.
- Safety and spill plans will be written for each project.
- All herbicide containers will be disposed of in accordance with label, State, and Federal requirements.

Required Protection Measures
Herbicide Treatments in Identified Species Habitats

Appendix B of the Final Environmental Impact Statement (FEIS) for Treatment of Noxious or Invasive Weeds, Coconino, Kaibab and Prescott National Forests, and Coconino, Mohave and Yavapai Counties, Arizona (2005) includes required protection measures for threatened, endangered and sensitive species (TES) as well as for migratory birds, including management indicator species, partners in flight and Region 3 sensitive species. Herbicide treatment for the population of camelthorn is proposed in the project. The Required Protection Measures for Herbicide Treatments included in Appendix B of the Noxious or Invasive Weed FEIS should be reviewed with the assistance of the District Wildlife Biologist before herbicide treatments are implemented.