# Travel Management Rule

## Botany Specialist's Report

**for:**

## Travel Management Rule

## Coconino National Forest

**Prepared by:**
Debra L. Crisp

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September 17, 2008
Botanist
Coconino National Forest
**Reviewed by:**

Barbara G. Phillips

_____
September 17, 2008
Zone Botanist, Coconino, Kaibab and Prescott National Forests

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# Introduction

This specialists report covers issues related to noxious or invasive weeds and threatened, endangered, and sensitive plant species (TES) that occur or have potential habitat on the Coconino National Forest. The purpose of this report is to disclose and discuss the effects of alternatives 3 and 4 for *Managing Motorized Travel on the Coconino National Forest* and the No Action Alternative as required by law. This analysis is part of a larger effort on the Coconino National Forest to implement Executive Order (EO) 11644 and EO 11989 regarding off-road use of motor vehicles on Federal lands.

## Regulatory Direction

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.

- Travel Management Rule (Part 212, subpart B of part 251, subpart A of part 261of the Code of Federal Regulations (CFR)).
- Executive Order (EO) 11644 and EO 11989
- 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.
- 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 noxious or invasive weeds 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 (2005)
- Amendment 20 of the Coconino National Forest Land and Resource Management Plan (2005)

# Methodology for Analysis

Sources for this analysis include various survey records and data on file at the Coconino National Forest. These include:

- Various TES plant survey documents on file at Coconino National Forest (paper copies)

- TES plant data filed in
  fsfiles/ref/library/gis/projects/forest_wide/wildlife/sens_plants/plant_point
  fsfiles/ref/library/gis/projects/forest_wide/wildlife/sens_plant/plant_poly
  fsfiles/ref/library/gis/projects/forest_wide/wildlife/sens_plants/plant_line

- 2006 sensitive plant data collected by the Flagstaff Center wildlife crew.
- Noxious or invasive weed data housed in the GIS coverage Southwest Exotics Plant Mapping Program 2003 filed in fsfiles/ref/library/gis/coconino/nox_weed/swemp 2003. This coverage includes surveys conducted by various surveyors between 1997 and 2003.
- 2005, 2006 noxious or invasive weed data collected by the Flagstaff Center wildlife crew.
- 2004 and 2005 noxious or invasive weed data collected by the Mogollon Ranger District wildlife crews.
- 2006 survey data collected by D. Crisp
- Biological control agent releases for 2005 filed in fsfiles/ref/library/gis/forest_wide/weed/knapweed.shp
- Biological control agent releases for 2006 filed in fsfiles/ref/library/gis/forest_wide/biocontrol_points.shp
- Biological control agent releases for 2007 –GPS locations (draft, not filed in GIS filing as of 8/29/07)
- NRIS-TESP/INPA database.

# Affected Environment and Environmental Consequences

This section details the affected environment and environmental consequences 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 and consequences for noxious or invasive weeds and the threatened, endangered or Region 3 sensitive plants (TES 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).

# Noxious or invasive weeds

## Affected Environment

This discussion applies to Alternatives 3 and 4 as described in the Summary of Alternatives. This discussion applies to the noxious or invasive weeds that are known to occur on the Coconino National Forest as well as to potential introductions of additional species. The species included in table 1 were analyzed in the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds* (2005). The species are ranked on the perceived difficulty of control for each species as well the projected success of meeting the management objective of prevent, eradicate, contain or control. Factors considered in difficulty for control include the lifecycle of the plant (perennial vs. annual), mode(s) of reproduction, and population size. Projected success of control considers these factors and history of success locally and elsewhere.

**Table 1.** Noxious or invasive weeds with occurrences on the Coconino National Forest.

| Common Name | Species | Species Rank | Objective |
|---|---|---|---|
| Leafy spurge | *Euphorbia esula* | 1 | Eradicate |
| Yellow starthistle | *Centaurea solstitialis* | 2 | Eradicate |
| Malta starthistle | *Centaurea melitensis* | 3 | Eradicate |
| Camelthorn | *Alhaghi pseudoalhagi* | 4 | Contain/Control |
| Russian knapweed | *Acroptilon repens* | 5 | Contain/Control |
| Whitetop | *Cardaria draba* | 6 | Eradicate |
| Mediterranean sage | *Salvia aethiopis* | 7 | Eradicate |
| Musk thistle | *Carduus nutans* | 8 | Eradicate |
| Diffuse knapweed | *Centaurea diffusa* | 9 | Contain/Control |

| Common Name | Species | Species Rank | Objective |
|---|---|---|---|
| Spotted knapweed | *Centaurea maculosa* | 10 | Eradicate |
| Scotch thistle | *Onopordum acanthium* | 11 | Eradicate/Control |
| Russian olive | *Elaeagnus angustifolia* | 12 | Contain/Control |
| Tamarisk | *Tamarix* spp. | 13 | Contain/Control |
| Himalayan blackberry | *Rubus procerus* | 14 | Contain/Control |
| Houndstongue | *Cynoglossum officinale* | 15 | Eradicate |
| Giant reed | *Arundo donax* | 16 | Contain/Control |
| Sulfur cinquefoil | *Potentilla recta* | 17 | Prevent/Eradicate |
| Dalmatian toadflax | *Linaria dalmatica* | 18 | Contain/Control |
| Tree of Heaven | *Ailanthus altissima* | 19 | Contain/Control |
| Bull thistle | *Cirsium vulgare* | 20 | Contain/Control |
| Siberian elm | *Ulmus pumila* | 21 | Contain/Control |
| Cheatgrass | *Bromus tectorum* | 22 | Contain/Control specific populations |
| Wild oats | *Avena fatua* | 23 | Contain/Control |
| Common teasel | *Dipsacus fullonum* | 24 | Eradicate |
| Oxeye daisy | *Chrysanthemum leucanthemum* | Unassigned | Prevent/Eradicate |

### Leafy spurge (*Euphorbia esula*)

Leafy spurge is a destructive perennial weed, reproducing from adventitious root buds and seeds. Roots of this species form extensive underground systems that can extend 30 feet into the soil, and laterally as well. The plant forcefully expels seeds which are able to travel up to 15 feet from the original plant. Humans may vector the species by dispersing seeds or plant fragments by various activities including by vehicle travel through infested areas, contaminated feed products and domestic animals. Birds and animals may disperse leafy spurge seeds in fecal matter or in their fur. These factors make the species very difficult to control making this species a priority species for control. The main infestation of leafy spurge on the Coconino National Forest occurs in Brolliar Park. Several satellite populations exist in areas surrounding the main infestation.

### Yellow starthistle (*Centaurea solstitialis*)

Yellow starthistle is an annual plant, 2 to 3 feet tall that reproduces solely from seed. In certain areas of the country yellow starthistle decreases the value of recreational experiences such as hiking by creating a thorny, impenetrable barrier that discourages use by human and/or animals. There are several populations of yellow starthistle in the Verde Valley area. Scattered populations have been detected in various areas around Flagstaff.

### Malta starthistle (*Centaurea melitensis*)

Malta starthistle is a close relative of yellow starthistle. It is similar to yellow starthistle in appearance and growth habit. Impacts to recreational experiences would be similar. Malta starthistle generally tends to grow at lower elevations than yellow starthistle. Scattered populations have been detected in various areas in the Verde Valley.

### Camelthorn (*Alhaghi pseudoalhagi*)

Camelthorn is a perennial spiny shrub that reproduces from seeds and by underground rhizomes. It grows in disturbed soil where it can form monocultures if not controlled. There are scattered populations of camelthorn along Leupp Highway, Sunset Crater Road and near Wupatki National Monument.

### Russian knapweed (*Acroptilon repens*)

Russian knapweed is a deep-rooted perennial that reproduces from seed and vegetation root buds. These buds develop into adventitious roots enabling the species to colonize large areas quickly. Russian knapweed produces compounds that suppress growth in native plants, which allows it to form dense monoculture over time.

### Whitetop (*Cardaria draba*)

Whitetop is a deep rooted perennial that reproduces from seed and root fragments. One reported location on Forest Highway 3 was apparently controlled by the reporting party and has not been relocated. A small population of whitetop was detected on forest land in 2009, adjacent to a road right-of way. There are several scattered populations of whitetop within the city of Flagstaff.

### Mediterranean sage (*Salvia aethiopis*)

Mediterranean sage is biennial plant that reproduces solely from seed. During the first season of growth it produces a rosette of large, grayish hairy leaves. The rosettes over-winter, bolt and produce seed forming stalks in the second year. There are numerous scattered populations of Mediterranean sage along Lake Mary Road (Forest Highway 3).

### Musk thistle (*Carduus nutans*)

Musk thistle is a biennial that can reach heights of 6 feet. Like most thistles, it grows in disturbed soils growing on roadsides, pastures, and forestlands. It can quickly form a monoculture if not promptly controlled. It has been reported from various locations in and around Flagstaff including populations along Fort Valley Road and near Kachina Peaks Wilderness.

### Diffuse knapweed (*Centaurea diffusa*)

Diffuse knapweed is an annual to short-lived perennial, growing one to two feet tall. Diffuse knapweed invades disturbed areas and can become an aggressive competitor, eliminating desirable vegetation (Whitson and others, 1991). There are numerous populations of this species in and around the Flagstaff area including many on Forest lands. Past control efforts for this species on the Forest include manual, herbicide and biological control agents.

### Spotted knapweed (*Centaurea maculosa*)

Spotted knapweed is a biennial or short-lived perennial from Eurasia, growing 1-3 feet tall. If allowed to spread, it forms a monoculture and reduces desirable plant populations. This species is allelopathic and has a taproot (Whitson and others, 1991). Known infestations in northern Arizona include areas along Highway 89A and Highway 179 in Sedona, Northern Arizona University Campus, on A-1 Mountain, and along the Forest Highway 3 at Diversion Park.

### Scotch thistle (*Onopordum acanthium*)

Scotch thistle is a large biennial thistle, native to Europe and eastern Asia. Characteristics of this species include broad, spiny stems with vertical ribs, large, spiny leaves with dense hairs and violet to reddish flower heads. Scotch thistle grows in disturbed habitats, along roadsides and in

waste areas and occurs in many locations on the Coconino National Forest. The seeds of this thistle are long-lived, persisting in the soil for many years. There are numerous infestations of Scotch thistle scattered throughout the forest.

### Russian olive (*Elaeagnus angustifolia*)

Russian olive is a fast-growing tree that reaches heights from 10 to 25 feet. The tree produces copious numbers of fruits with papery outer coverings, which are relished by wildlife and birds. Russian olive has been widely planted as an ornamental, windbreak and in some cases as sources of food and protection for wildlife. However, Russian olive can become as serious weed in wildland areas, especially in wetland and riparian areas. There are scattered occurrences of this species on the Forest.

### Tamarisk (*Tamarix* spp.)

Tamarisk is a woody species that forms large woody shrubs to small trees. This highly invasive species was introduced for windbreaks and soil stabilization but has since become a serious threat to riparian systems throughout the western U.S. where it often replaces native woody species such as willows and cottonwoods and affects hydrological function especially along river corridors. There are scattered infestations of this species on the Coconino National Forest, especially in the Verde River System.

### Himalayan blackberry (*Rubus procerus*)

Himalayan blackberry is a non-native species that was planted in several locations on the Coconino National Forest, mainly around old homesteads. It is faster growing and more aggressive than its native relatives are and is well suited to a variety of habitats. The Himalayan blackberry can spread by seeds and by underground runners. Animals and humans relish the fruits and this may contribute to dispersal of populations into new areas. There are scattered populations of Himalayan blackberry in several locations on the Coconino National Forest including populations in the West Fork of Oak Creek and Fossil Springs area.

### Houndstongue (*Cynoglossum officinale*)

Houndstongue is a biennial herb introduced from Europe. The common name of this plant alludes to the large “hound tongue” shaped leaves. The plant reproduces only by seeds that form in clustered of four nutlets. The nutlets break apart at maturity and have spiny attachments that are transported on clothing, animal fur or vehicles. Houndstongue produces compounds that can cause liver failure in cattle and horses when eaten. There are documented locations of houndstongue near the Arizona Snowbowl parking lot and near Kachina Peaks trailhead.

### Giant reed (*Arundo donax*)

Giant reed is an invasive graminoid that grows in wet areas and riparian areas. In riparian areas, it can compete with native plants and carry fire through its volatility into riparian ecosystems not adapted to fire. There are scattered occurrences of giant reed in various areas of the Coconino National Forest, especially in the Fossil Creek and Verde River.

### Sulfur cinquefoil (*Potentilla recta*)

Sulfur cinquefoil is an invasive perennial herbaceous weed. This non-native plant is related to several desirable locally occurring native plants. Sulfur cinquefoil is unpalatable to animals and can form large colonies in certain areas. It has been reported locally in areas in the Rio de Flag drainage and along Lake Mary Road (Forest Highway 3).

### Dalmatian toadflax (*Linaria dalmatica*)

Dalmatian toadflax is an introduced perennial weed that can grow up to 3 feet tall and reproduces from both seed and underground rootstalks. The species is native to the Mediterranean region and was introduced to the United States as an ornamental. It forms dense stands eliminating native species by out-competing them for water. Often stands of Dalmatian toadflax will disappear for several years, only to re-establish through the seed bank or possibly vegetative root buds. Dalmatian toadflax is widely dispersed throughout the ponderosa pine type on the forest and is spreading along roadsides into pinyon-juniper and lower elevation ecosystems.

### Tree of Heaven (*Ailanthus altissima*)

The tree of heaven is a deciduous tree. It has a broad, spreading crown, pinnately compound leaflets, and gray bark. The leaflets resemble sumac leaves that have from one to four glands on the undersides of each leaflet, and have 11 to 25 leaflets per leaf. The leaves are large, from one to four feet in length. Regeneration can occur from seeds or root sprouts. The tree of heaven was planted as an ornamental in certain parts of Northern Arizona including the Sedona area and West Fork of Oak Creek. In certain wildland areas such as West Fork, the sites of former human occupation are now abandoned and the cultivated plants including the tree of heaven remain on the sites. The trees have formed numerous root sprouts and now cover several acres that originated from a few mature trees. Recently, the Forest treated infestations in the West Fork of Oak Creek.

### Bull thistle (*Cirsium vulgare*)

Bull thistle is a stout biennial or short lived perennial thistle that regenerates solely from seeds. During the first year of life, bull thistle forms seedlings and then rosettes with taproots. Under ideal conditions, rosettes over-winter, resume growth during spring of the next year, then bolt, flower, and die. 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. Additionally, several recent wildfires on the forest are infested with bull thistle.

### Siberian elm (*Ulmus pumila*)

Siberian elm is a large tree native to Asia which has been widely planted in certain parts of northern Arizona as an ornamental and for windbreaks. It has escaped into wildland areas near habitation in some areas. There are scattered Siberian elm trees along some of the major roadways and near some communities.

### Cheatgrass (*Bromus tectorum*)

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. Cheatgrass can emerge early in the spring and can sometimes form several generations of plants in one season. Cheatgrass increases the risk and frequency of fire in some ecosystems by providing fine fuel and by forming a flammable link between disturbed areas and surrounding forested vegetation.

### Wild oats (*Avena fatua*)

Wild oats is an annual grass that can occur on roadsides, pastures and disturbed areas. It is related to but taxonomically distinct from cultivated oats, which is sometimes used in mulching material in various projects. Wild oats reproduces from seed which are long-lived and can remain in the soil for several years after introduction.

### Common teasel (*Dipsacus fullonum*)

Common teasel is a biennial herbaceous species that reproduces solely from seed. Teasel is commonly used in dried flower arrangements. In some areas of the country, common teasel has formed dense monocultures that can exclude all other vegetation. There are scattered infestations of teasel in the City of Flagstaff. Teasel has been detected in a few locations on the Coconino National Forest.

### Oxeye daisy (*Chrysanthemum leucanthemum*)

Oxeye daisy is an erect rhizomatous perennial species. This ornamental and has escaped cultivation in some areas where it can be found in meadows, roadsides and in disturbed areas.

# Environmental Consequences

## No Action

### Direct and Indirect Effects

If the no action alternative is selected none of the elements identified in the need for change table above would be addressed. **Specifically:**

- Road densities would remain the same or continue to increase in the Coconino National Forest. The objective of reducing road densities would not be reached. Therefore, the risk of noxious or invasive weed dispersal would remain the same or increase as road densities continue to increase. The risk of dispersing noxious or invasive weeds into uninfested areas by motor vehicles will not be reduced.

- There would be no restriction on cross country motorized travel on the Coconino National Forest. Cross country travel would be permitted and allowed across most areas of the forest. As a result vehicles traveling across country would continue to contribute to the spread of noxious or invasive weeds. The risk of dispersing noxious or invasive weeds into uninfested areas by motor vehicles will not be reduced.

- With no restriction on cross-country travel or reduction in the number of roadways, the risk of introducing noxious or invasive weed species not currently known to exist within the forest will not be reduced.

- If the no action alternative is selected, there will be no restriction on motorized dispersed camping throughout the forest except in those areas already restricted through the Forest Plan, official closures or existing NEPA decisions. Motorized dispersed camping may still occur in some areas where there are resource conflicts such as infestations of certain noxious or invasive weeds or in potential habitat or existing populations of TES plants.

## Alternatives 3 and 4

This discussion applies to Alternatives 3 and 4 discussed in the Summary of Alternatives. The effects to noxious or invasive weeds are similar for both alternatives. The specific management actions that differ between the Alternatives include motorized big game retrieval and the inclusion of a specific set of motorized trails in Alternative 4. Overall, these differences are not significant enough to require separate analyses for each Alternative. Therefore, this effects

analysis applies to both alternatives. The effects discussion below applies to all noxious or invasive weed species mentioned above.

## Direct and Indirect Effects

Under Alternatives 3 and 4, road densities would be reduced. This reduction in road densities would help reduce the risk of present and future dispersal of noxious or invasive weeds along roadways. The reduction in risk would move toward the desired condition of reducing noxious or invasive weed dispersal along roadways and would be complementary to the management goals identified in the *Final Environmental Impact Statement for Noxious or Invasive Weeds Coconino, Kaibab and Prescott National Forests* (2005) and Amendment 20 of the Coconino National Forest Plan (2005). The density of noxious or invasive weeds tends to be greater along roadways than in interior areas with fewer disturbances (Fowler et al, 2008). Roads aid in dispersing noxious or invasive weeds in several ways such as altering habitat, stressing or reducing native vegetation, by providing avenues for conduction of weed infestations (Trombulak and Frissell, 2000), by compaction of native vegetation (Gelbard and Belnap, 2003), by dispersing seed carried in the mud on vehicles (Schmidt, 1989), and by channeling or creating disturbance (Parendes and Jones, 2000). Roads can be the entry points for many human influences that can affect the invasion process (Gelbard and Harrison, 2003) and can provide avenues for long distance dispersal of seeds contributing to disjunct "founder populations" of noxious or invasive weeds along roadways (Von der Lippe and Kowarik, 2007). Roads can contribute to forest fragmentation increasing the ratio of non-forested areas to forest and increasing the ratio of forest edge to interior habitats. These changes provide entry points for noxious or invasive weeds which are generally adapted to open, disturbed environments (Brothers and Spingarn, 1992). Disturbances from such activities as road maintenance, construction and traffic may help overcome the biological barriers to invasion in healthy native plant communities (Parendes and Jones, 2000; Gelbard and Belnap, 2003). Disturbance along roadways is severe and episodic and can provide habitat for noxious or invasive weeds (Larson, 2003). Reducing the density of roads in the Coconino National Forest would help reduce these risk factors and therefore reduce the risk of spreading noxious or invasive weed invasions on forest lands.

**Reduction of mileage and/or density of roads on the Coconino National Forest would be a beneficial effect to noxious or invasive weed management and control on the Coconino National Forest.**

An **indirect effect** of Alternative 3 or 4 would be increased disturbance from use and road maintenance on the remaining roads. By reducing the numbers of roads within the forest, use would more concentrated on remaining roads and would require more maintenance of existing roads. Gelbard and Belnap (2003) noted that increased levels of construction and maintenance increased the numbers of noxious or invasive weed species present along roadways as well as the density of weeds. These increases were attributed to increased disturbance from road maintenance and construction and tendency to introduce deeper layers of soil along roadways as road fill. Additionally, the levels of disturbance increased due to higher levels of use. Therefore, **a potential negative effect** of reducing the density of roads is concentrated use and maintenance along remaining roads. This would lead to higher levels of disturbance and more opportunities for dispersal of noxious or invasive weed propagules along remaining roads. These effects **could be mitigated** by focusing control efforts along roadways to control existing and introduced infestations along the remaining open road system.

By eliminating most cross-country travel, the risk of spreading noxious or invasive weeds from existing infestations will be reduced. Motorized vehicles can disperse noxious or invasive weeds

into new areas by transporting propagules on various parts of the vehicle (Schmidt, 1989; Von der Lippe and Kowarik, 2007). Additionally, reducing or eliminating cross-country travel would decrease the current levels of soil disturbance currently caused by vehicle travel. Disturbed areas tend to be more at risk for invasion by noxious or invasive weeds (Trombulak and Frissell, 2000; Parendes and Jones, 2000; Gelbard and Belnap, 2003). Elimination of cross-country travel would reduce this risk in most parts of the forest. Exceptions include the Cinder Hills OHV Area (Management Area 13). Cross-country travel would still occur in this area. This area contains infestations of noxious or invasive weeds including diffuse knapweed (*Centaurea diffusa*). Under Alternative 3 or 4, there would be no change in the current management in this area which focuses on off-highway vehicle recreation opportunities. Therefore, the risk of noxious or invasive weed dispersal by motorized vehicles in this area will remain the same or increase over time as use in the area increases.

As part of Alternatives 3 and 4, motorized dispersed camping sites will be restricted to designated corridors in certain areas and will be eliminated in other areas. This measure will help control impacts to several resources including noxious or invasive weed infestations by allowing Forest Service personnel to eliminate motorized dispersed camping sites from areas where infestations or noxious or invasive weeds are problematic. An example of this is leafy spurge (*Euphorbia esula*). A closure order for certain areas known to contain this species already exists (Coconino National Forest, Order # 04-00-146). However, additional populations have been detected in areas outside of the closure where cross-country travel and motorized dispersed camping are currently still allowed. Risks of dispersal of this species by motorized vehicles would be reduced by eliminating cross-country travel and motorized dispersed camping in these areas.

## Cumulative Effects

The boundary for this cumulative effects analysis is the Coconino National Forest. This discussion includes management actions related to noxious or invasive weeds since 1995. Prior to 1995, occurrences and distribution of noxious or invasive weeds on the forest were largely unknown. Beginning in 1995, the Coconino National Forest began surveying and documenting noxious or invasive weed occurrences on the Coconino National Forest. These actions were largely due to an increasing awareness of noxious or invasive weeds and their potential effects on native ecosystems. Location data were submitted to the Southwestern Exotic Plant Mapping Program (SWEMP), a cooperative effort hosted by the USGS Colorado Field Station. SWEMP compiled data from numerous cooperating agencies including the US Forest Service and Arizona Department of Transportation. The surveys by these agencies as well as other cooperators helped document the occurrences and areal extent of noxious or invasive weeds on the Coconino National Forest. Noxious or invasive weed data from the forest were submitted to SWEMP from 1995 through 2003 when the forest replaced the SWEMP system with its own Natural Resource Information System (NRIS) Threatened, Endangered and Sensitive Plants (TESP)-Invasive Species (TESP/INPA) database..

The Forest developed the *Noxious Weeds Strategic Plan Working Guidelines Coconino, Kaibab and Prescott National Forests* in 1998 to help address and mitigate effects to noxious or invasive weeds by management actions on the forests. Forest Supervisors for the three forests accepted and signed the guidelines which designated a series of best management practices to be incorporated into project planning and implementation on the forests. In 2002, the Peaks and Mormon Lake Ranger Districts completed the Flagstaff/Lake Mary Ecosystem Analysis (FLEA)**,** a major landscape analysis. Among other issues, it addressed noxious or invasive weeds in certain management areas with the FLEA analysis area, incorporating the guidance provided by the Strategic Plan. In 2003, Region 3 of the U.S. Forest Service completed the *Environmental*

*Assessment for Management of Noxious Weeds and Hazardous Vegetation on Public Roads on National Forest System Lands in* Arizona which allows treatment of noxious or invasive weeds along highway rights of ways in Region 3, including the Coconino National Forest. In 2005, the Forest completed the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona (FEIS)*. This document represented a major change in management of noxious or invasive weed control on the forests by allowing the use of herbicides on forest lands, therefore providing a management tool not previously available to forest managers. The document and its provisions were incorporated into the Coconino National Forest Plan by Amendment 20 of the Plan.

All of the above actions were beneficial management actions that supported management control objectives for noxious or invasive weeds on the forest. These management decisions are past cumulative actions complementary to Travel Management and the direct and indirect effects discussed above, all of which will reinforce the management goals for controlling noxious or invasive weeds on the Coconino National Forest.

Management activities and disturbances prior to 1998 have contributed to the establishment and distribution of noxious or invasive weeds on the Forest. 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. However, without information on known distribution of noxious or invasive weed species, the past effects of management actions are unclear. Sources of introduction for noxious or invasive weeds are often unknown or difficult to verify.

Numerous management actions that could have affected the occurrence, distribution and areal extent of noxious or invasive weeds have occurred in the past. Since 1997 noxious or invasive weed surveys were generally conducted on forest projects that would have management actions associated with soil disturbance. However, until the adoption of the FEIS management actions for noxious or invasive weeds were generally limited to incorporation of best management practices or to manual control of certain weed populations.

Recently, the Forest has released numerous biological control insects on Dalmatian toadflax, diffuse knapweed and leafy spurge in certain areas of the forest. The success of these treatments is not fully known at this time. However, the objective is to decrease the density, areal extent and reproductive capacity of the targeted weeds within the forest. These biological control agents will not completely eliminate the targeted noxious or invasive weed species from the Forest but will contribute to the management objectives established in the FEIS. Sheep grazing, a form of cultural control was used on leafy spurge at Brolliar Park in the past but has since been discontinued.

Since the finalization of the FEIS the Forest has treated certain infestations with herbicide, including some noxious or invasive weed infestations in wilderness areas, recent wildfires and leafy spurge infestations on the forest. Additionally, the Arizona Department of Transportation and Coconino County have used herbicide to treat noxious or invasive weeds along roadways under their jurisdiction. Other entities have treated some infestations within the City of Flagstaff. Collectively, these treatments have reduced infestations in some areas and reduced the risk of noxious weeds spreading into new areas.

Certain areas of the Forest are closed to vehicle travel. These include wilderness areas and roadless areas. Additionally, the forest has a series of closure areas for various purposes. These

are available at http://www.fs.fed.us/r3/coconino/nepa/forest-orders/. Many of these closures restrict motorized vehicle travel in specific areas. Although these closures were done for various reasons, some are complementary to noxious or invasive weed control. The closures motorized vehicle travel in certain areas and therefore reduce the risk of noxious or invasive weed dispersal in certain areas. One specific closure, order number 04-00-146, exhibit K, is specifically related to noxious or invasive weed control, restricting vehicle travel in an area containing leafy spurge.

Numerous projects have been initiated, analyzed, or implemented since 1995. Recent projects can be referenced on the Coconino National Forest NEPA website at http://www.fs.fed.us/r3/coconino/nepa/index.shtml. Projects analyzed since 2005 require consideration of the provisions of the *Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona (FEIS),* specifically project survey and incorporation of best management practices. Collectively, the incorporation of these provisions and planned noxious or invasive weed treatments associated will provide noxious or invasive weed management and control within these project areas.

# Threatened or Endangered Plants

## Affected Environment

The Coconino National Forest contains suitable habitat and/or populations for the following threatened or endangered plant species. The Endangered Species Act (1973) provides guidance for management and conservation of threatened or endangered species. Management actions adversely affecting these species require consultation and coordination with the U.S. Fish and Wildlife Service. The Forest provides habitat for two of these species, Arizona cliffrose (*Purshia subintegra*), an endangered species and San Francisco Peaks groundsel (*Senecio franciscanus*), a threatened species.

### Arizona cliffrose (*Purshia subintegra*)

The Arizona cliffrose is a long-lived shrub, endemic to white Tertiary (Miocene and Pliocene) limestone lakebed deposits that are high in lithium, nitrates, and magnesium (Anderson 1986;, Arizona Game and Fish Department 2001). A Recovery Plan has been prepared but no critical habitat was designated (US Fish and Wildlife Service, 1995).

Arizona cliffrose occurs in four disjunct populations spread across an area of approximately 200 miles in central Arizona. Population areas include Burro Creek in Mohave and Yavapai counties, Cottonwood in Yavapai County, Horseshoe Lake in Maricopa and Yavapai counties and near Bylas in Graham County (U.S. Fish and Wildlife Service, 1995). The Cottonwood population occurs mostly on the Coconino National Forest. Jenkins (1991), Lutz (1994,1995), Hannemann (1995), and Baker and Wright (1996) conducted surveys in the vicinity of Cottonwood in the Verde Valley and elsewhere and confirmed the distribution of the previously known population, but did not extend the known range (Phillips et al., 1996). Some potential habitat for Arizona cliffrose remains unsurveyed.

Mature plants are capable of producing numerous seeds per year, begin blooming in late March, and continue through early May. Normally, hundreds of flowers are produced on each mature plant. Native bees and introduced honeybees are the main pollinators. The flowers are primarily cross-pollinated, but are partially self-compatible. Cross-pollinated flowers produce significantly

more seeds than self-pollinated flowers. Most seeds develop during April (U.S. Fish and Wildlife Service, 1995) and disperse from July through August with seed germination occurring the following spring (Baggs and Maschinski, 2001b). Seed production can be highly variable from year-to-year and is at least partly dependent on winter precipitation. Baggs and Maschinski (2001b) collected seeds and determined that about 40% of collected seeds appeared viable. In dry years, plants may not produce any viable seeds (Baggs and Maschinski, 2001b).

A viable population should have plants of differing ages and sizes. The recruitment rates appear to vary among populations. There are areas in the Cottonwood population that support a relatively large number of established seedlings. In contrast, the other three Arizona cliffrose populations appear to have insufficient recruitment (U.S. Fish and Wildlife Service, 1995).

Arizona cliffrose occurs on the Coconino National Forest in Management Areas (MAs) 11 and 17. Management Area 11 includes the Verde Valley and covers 169,529 acres. Arizona cliffrose occupies only a small portion of Management Area 11. Management Area 17 comprises areas of special emphasis including geological areas, botanical areas and research natural areas. The Verde Valley Botanical Area, which was created to manage Arizona cliffrose and several other sensitive and rare plants, is included in this designation. Emphasis for Management Area 17 is to maintain as nearly as possible existing conditions and natural processes for public enjoyment, demonstration, and study. Forest Plan Guidance for Management Area 17 applicable to Arizona cliffrose for travel management includes prohibition of off-road travel. Research Natural Areas and Botanical Areas are managed to protect and maintain their uniqueness and ecological condition. The plan also states, "Do not allow special use authorizations that would or could adversely affect or change the character of the areas. Manage roads adjacent to botanical areas to prevent vehicular intrusion. Block and obliterate existing roads entering the areas in the first decade."

The management emphasis for Management Area 11 is watershed condition, rangeland management, wildlife habitat for upland game birds, and dispersed recreation (Coconino National Forest Plan, 1987). The Plan states "Verde Valley is managed for dispersed recreation along the upper Verde River outside the Wild and Scenic section and along lower Oak Creek". However, it does not differentiate between motorized and non-motorized uses. The plan also calls for coordination with Dead Horse Ranch State Park for connecting trails and access roads adjacent to the park.

The Coconino Forest Plan (USDA Forest Service, 1987) has several Forest-wide Standards and Guidelines for endangered species management. Habitat management for federally listed species takes precedence over unlisted species. The Forest Plan directs managers to inventory, evaluate, and prepare recovery schedules for threatened or endangered species, monitor implementation of approved schedules, reproductive success, and effects of management activities at occupied threatened or endangered species sites, prepare Biological Assessments to evaluate project impacts on threatened or endangered species and conduct appropriate Fish and Wildlife Service consultation when necessary and to provide appropriate protection or enhancement.

# Environmental Consequences

## No Action

### Direct and Indirect Effects

If the no action Alternative were selected none of the elements identified in the need for change table above would be addressed. Specifically:

- If the Deciding Official selects the no-action Alternative, options for managing the Verde Valley Botanical Area which provides habitat for the Arizona cliffrose (*Purshia subintegra*) would remain the same and will not be enhanced by additional management tools provided by incorporation of Executive Orders 11644 and 11989.
- A limited number of roads in Management Area 11 will remain listed as open roads on the Forest map. These roads are adjacent to the Verde Valley Botanical Area. The estimated total mileage of these roads is 7 miles.

## Alternatives Three and Four

### Direct and Indirect Effects

Under Alternative 3 or 4, protective measures for such areas as the Verde Valley Botanical Area, which provides habitat for the Arizona cliffrose, would be enhanced by strengthening restrictions for off-road travel in these areas through the incorporation of Executive Orders 11644 and 11989. Motor vehicle travel is currently prohibited in the Botanical Area, but there are still occasional incursions in the area. Provisions that would be part of Alternative 3 or 4 would strengthen existing closures in this area and similar areas that are currently protected through prior management decisions or legislative actions. Implementation of Travel Management would provide beneficial effects to Arizona cliffrose. Similarly, reductions in road density and restriction of cross-country travel in Management Area 11 would benefit Arizona cliffrose by reducing potential impacts to existing Arizona cliffrose populations such as crushing of plants, soil compaction and erosion and would reduce impacts to suitable habitat for Arizona cliffrose by reducing soil erosion and compaction in potential habitat on forest lands.

### Cumulative Effects

The boundary for this discussion includes the known range of Arizona cliffrose, focusing on portions of the range controlled by the Coconino National Forest. No timeline was set for this discussion.

Range-wide, multiple agencies have management responsibility for Arizona cliffrose. The Burro Creek population is on Federal lands managed by the Bureau of Land Management, Kingman Resource Area. The Cottonwood population is on Federal, Arizona State, Yavapai County and private lands. The Federal lands are part of Coconino National Forest and the State lands are managed as Dead Horse Ranch State Park. The Horseshoe Lake population is on Federal land with management of lake operations under the Bureau of Reclamation and surface management under Tonto National Forest. The Bylas population is on the San Carlos Apache Indian Reservation (U.S. Fish and Wildlife Service, 1995).

Major impacts to Arizona cliffrose include urbanization, recreation, road and utility line construction and maintenance, minerals exploration and mining, and livestock and wildlife

browsing. The Cottonwood population is in a developing urban/suburban area. The most serious impacts are from land development, road construction, and motorized and non-motorized recreation. The soils supporting Arizona cliffrose populations contain high quality bentonite, a type of clay with numerous commercial uses. Most mining and exploration has been in the Burro Creek and Horseshoe Lake populations. Livestock and/or wildlife browse all Arizona cliffrose populations. The greatest use occurs when both livestock and wildlife are present and when livestock are grazed yearlong (U.S. Fish and Wildlife Service, 1995).

The Coconino Forest Plan (USDA Forest Service, 1987) designated the Verde Valley Botanical Area (1,140 acres) for the protection of the unique plant community, which includes Arizona cliffrose. The Forest Service has considered Arizona cliffrose and its habitat, including the botanical area, in its actions since 1987 and has implemented many favorable actions.

In 1991, areas known to contain an important part of the Cottonwood population were withdrawn from the Bar-T-Bar land exchange. Surveys documented the presence of Arizona cliffrose and several Forest Service sensitive species in the land exchange area (Jenkins, 1991). The Coconino National Forest has indicated that no lands containing endangered species will be exchanged out of Federal ownership (U.S. Fish and Wildlife Service, 1995). Yavapai County obtained a square mile section of suitable habitat for Arizona cliffrose from Arizona State Lands Department. This action brought an area of suitable habitat into public ownership and removed the potential for future development.

The Coconino National Forest revised the Windmill Allotment Management Plan in 1992 to accommodate Arizona cliffrose recovery needs, excluding livestock from some pastures and monitoring use in others. The current allotment management plan requires monitoring for threatened and endangered species within the allotment (USDA Forest Service, 2008). Managing livestock in the Windmill Allotment using Forest Plan Standards and Guidelines is providing increased protection for plants and habitat through use of fences, monitoring, and grazing regimes**.**

Red Rock Ranger District initiated several actions since 1996 including trail re-routing and rock placement to protect Arizona cliffrose along several trails in the area of Dead Horse Ranch State Park, photo monitoring along trails, and maintenance of fences to exclude cattle and off-road vehicles from the Verde Valley Botanical Area. Other beneficial actions included maintenance and enhancement of vehicle closures along Rocking Chair Road. The District initiated emergency consultation on illegally placed signs, then coordinated placement of the signs to eliminate damage to Arizona cliffrose. The Forest Service closed and rehabilitated an unofficial target shooting range.

Numerous meetings have been held since June 1995, regarding the impacts from existing and proposed trails, types of recreation uses, and proposed development near Dead Horse Ranch State Park. These meetings have included the participation of personnel from the Forest Service, Arizona State Parks, Fish and Wildlife Service, and others. Surveys have been conducted for Arizona cliffrose, other sensitive plant species, and archeological and historical resources. There has been on-going informal consultation with Fish and Wildlife Service on this issue.

The Forest Service is working with State and local planners and other entities such as Dead Horse Ranch State Park, Arizona Department of Transportation, and private landowners to develop more comprehensive and ecosystem-based plans for the Verde Valley. A draft management plan for the Verde Valley Botanical Area has been prepared for the Forest Service (The Arboretum at Flagstaff, 2002), but this plan has not been finalized. Modifications to the development plans of

Dead Horse Ranch State Park Phase 3 Roadway Improvements resulted in increased protection for Arizona cliffrose and its habitat, both within the botanical area and adjacent to it (Phillips, 1993).

In 1996 a 5-year research program on Arizona cliffrose was funded by Arizona Department of Transportation as mitigation for the Mingus Avenue Bypass project in the Verde Valley was begun and the Arboretum at Flagstaff research facility conducted research on that project. As mitigation for these road expansions, The Arboretum at Flagstaff cultivated Arizona cliffrose plants for return to sites along the roadway. However, several sites were unsuitable due to steep road cuts. The Arboretum at Flagstaff and Coconino National Forest found suitable locations for some of these plants on Forest lands adjacent to Dead Horse State Park in Cottonwood. In April 2003 personnel from the Arboretum, Forest Service and numerous volunteers planted Arizona cliffrose plants and some associated Region 3 sensitive plant species on a Forest Service parcel as well as adjacent County land. The Arboretum, U.S. Forest Service, Dead Horse Ranch State Park, and volunteers cared for and irrigated these plants.

The Arboretum at Flagstaff established 30 demographic plots at four sites in the Verde Valley in 1996 and monitored them yearly. Results of these plots and other studies on *Purshia subintegra* can be found in the yearly reports prepared by the Arboretum that are on file at the Coconino National Forest (Baggs 1996, 1997, 1998, 2000, Baggs and Maschinski 2000, 2001). Some of these studies include genetics, cultivation requirements, and perceived threats. The research has resulted in several scientific articles. Baggs and Maschinski (2001b) discuss ex-situ requirements for cultivation of Arizona cliffrose, which may be necessary in the future if the species is to survive. The ex-situ study was initiated as part of mitigation for the Hwy. 89A expansion project. They found that Arizona cliffrose more readily regenerated from seed as compared to cuttings. Baggs and Maschinski (2001c) discuss the increasing threat of habitat fragmentation and hybridization with the more common relative *Purshia stansburiana*. Introgressions (hybrid forms) were typically found in drainages in the past and were created when the two species came in close contact. Road construction and associated disturbance may create corridors, bringing the introgressed forms spatially closer to "pure" forms of Arizona cliffrose, resulting in disruption of population dynamics for Arizona cliffrose (Baggs and Maschinski, 2001c). Maschinski, et al. (2004) explored human - assisted expansion of the geographic range for Arizona cliffrose. They found that seedling survival was significantly influenced by habitat and survival was greatest in currently occupied habitats, declining in "novel" soil types nearby. Arizona cliffrose has high site fidelity to Verde Formation limestone soil, which is generally found mid-slope. The "novel" soil types included in the study were alluvial soil in drainage bottoms and sites on ridge tops above the Verde Formation. Soil moisture and the proportion of fine and very fine sands appeared to be contributing factors in survival. Survival was lower in alluvial soils in drainage bottoms and on ridge tops as compared to seedlings planted or naturally occurring in the Verde Formation soil. Maschinski, et al (2004) determined that introduction into these "novel" habitats would not be good sites for re-introduction. Therefore, the preservation of the Verde Formation habitat is critical to the survival of Arizona cliffrose. Maschinski, et al. (2006) prepared a publication based on data from the demography study. Through creation of a mathematical model, they determined that Arizona cliffrose faces increasing risks of extinction from increasingly arid climates and may eventually go extinct without human intervention. These risks would be even higher if the fragmentation of existing habitat increases from additional roads, trails and other forms of human disturbance.

Other management agencies have also considered Arizona cliffrose in their projects and implemented positive actions as well. These included future planned projects for non-motorized trails in suitable habitat of Arizona cliffrose and mitigations for utility line reconstruction and

improvement within the habitat of Arizona cliffrose. The proposed trails would consolidate non-motorized trail routes to a given area and reduce random "wandering" by users such as hikers and horseback riders. The Forest Service worked with Arizona Public Service on the Phase II Maintenance in Utility Corridors on Arizona National Forests to assure that maintenance and improvements to utility lines within Arizona cliffrose habitat are mitigated, and existing plants are avoided (Phillips, 2008). Additionally, the Red Rock Ranger District continues to monitor and reinforce closures where needed.

The positive results anticipated from implementation of alternative 3 or 4 will be additive to the positive actions the forest has taken to date for Arizona cliffrose. Cumulatively, when other reasonably foreseeable actions are considered, implementation of the Travel Management Rule on Coconino National Forest will benefit Arizona cliffrose.

I conclude that the implementation of the Travel Management Rule **May Affect but is Not Likely to Adversely Affect Arizona cliffrose or its Habitat. The effects will generally be beneficial by reducing the risks of negative impacts from motorized vehicles and strengthening existing closures within and near the Verde Valley Botanical area and nearby habitat.**

### San Francisco Peaks groundsel (*Senecio franciscanus*)

The San Francisco Peaks groundsel is a dwarf herbaceous perennial alpine plant. Plants develop as small clones that propagate vegetatively from intricately branched rhizomes. The San Francisco Peaks groundsel is endemic to the alpine tundra of San Francisco Peaks in Coconino County, Arizona north of Flagstaff. Plants occur on Humphreys, Agassiz, Fremont, and Doyle peaks and along the north rim extending northeast from Humphreys Peak. San Francisco Peaks groundsel inhabits the alpine talus cracks and crevices of fine to medium grained soils and is generally found on all exposures with less than 20% slope.

There is a Recovery Plan (US Fish and Wildlife Service, 1987) for San Francisco Peaks groundsel. Critical habitat includes the summits of Agassiz and Humphrey's peaks and the surrounding slopes and alpine areas. "The primary constituent elements [of critical habitat] are the loose cinder talus slopes of the San Francisco Peaks alpine tundra system. Management of this area to reduce disturbance of the talus slopes is necessary to protect the species" (US Fish and Wildlife Service, 1983).

# Environmental Consequences

## No Action

### Direct and Indirect Effects

If the no action Alternative were selected none of the elements identified in the need for change table above would be addressed. Specifically:

- The effects of no action on the Threatened plant San Francisco Peaks groundsel (*Senecio fransciscanus*) will be the same as those as Alternative 3 or 4 because this species will not be affected by the Travel Management Rule. This species is limited to areas that are inaccessible by motor vehicles. All known locations and designated critical habitat for this species are within the Kachina Peaks Wilderness Area where motor vehicle travel is

currently prohibited. There restrictions will not change regardless of the decisions made for implementation of the Travel Management Rule.

## Alternatives Three and Four

### Direct and Indirect Effects

There will be no effect to San Francisco Peaks groundsel (*Senecio franciscanus*) from alternatives 3 or 4 because the known populations and habitat for this species are limited to the tundra area of the San Francisco Peaks which is within the Kachina Peaks Wilderness area and the area is closed to motorized travel.

I conclude that the implementation of the Travel Management Rule **will not affect San Francisco Peaks Groundsel or its habitat. The entire range of this species is limited to a Wilderness area that is closed to vehicle travel. This management will not change with the implementation of the Travel Management Rule.**

# Region 3 Sensitive Plants

Sensitive species are defined as "those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: a) significant current or predicted downward trends in population numbers or density, or b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5(19))". It is the policy of the Forest Service regarding sensitive species to:

- Assist states in achieving their goals for conservation of endemic species
- As part of the National Environmental Policy Act process, review programs and activities through a biological evaluation, to determine their potential effect on sensitive species
- Avoid or minimize impacts to species whose viability has been identified as a concern
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole (the Line Officer, with project approval authority, makes the decision to allow or disallow impacts, but the decision must not result in loss of species viability or create significant trends toward federal listing)
- Establish management objectives in cooperation with the state when projects on National Forest system lands may have a significant effect on sensitive species population numbers or distributions
- Establish objectives for federal candidate species, in cooperation with the U.S. Fish and Wildlife Service and Arizona State (FSM 2670.32).

**Usually arrangement of species in this section would be arranged alphabetically or according to habitat. However, there are several species on the Coconino National Forest that will not be affected by the implementation of the Travel Management Rule. Therefore, these species have been placed at the beginning of this discussion. The next portion of the discussion will focus on species that may benefit from the implementation of the Travel Management Rule. Finally, species that will not benefit from the implementation will be discussed.**

# Affected Environment

## Region 3 Sensitive plants not affected by implementation of the Travel Management Rule

### Crenulate moonwort (*Botrychium crenulatum*)

The known distribution of crenulate moonwort includes central and southern California to central Arizona and Montana. A single specimen was collected on Agassiz Peak at 11,000 feet elevation in 1884 by J.G. Lemmon. There will be no effect to crenulate moonwort from alternative 3 or 4 because the documented occurrence of this species on the Coconino National Forest is limited to the tundra area of the San Francisco Peaks which is within the Kachina Peaks Wilderness area and the area is closed to motorized travel.

### Cochise sedge (*Carex ultra*)

This large sedge looks similar to bulrush but is actually a large sedge with round, stout, erect, culms 3.3-6.6 ft. tall (Arizona Game and Fish Heritage Database Abstract, 2000). The documented range of this species is southeastern Arizona and southwestern New Mexico. However, it has been reported from the Fossil Creek area on the Coconino National Forest. The habitat of this species is moist soil near perennially wet springs and streams in rocky-gravelly terrain (Arizona Game and Fish Heritage Database Abstract, 2000).

### Arizona bugbane (*Cimicifuga arizonica*)

Arizona bugbane occurs only in northern and central Arizona. It is a perennial plant that grows along canyon bottoms and lower canyon slopes in association with Douglas fir, white fir, big tooth maple, Rocky Mountain maple, and sometimes aspen. Some populations occur on mountains at seeps and springs, in drainages and on shaded north slopes, growing in moist, loamy soil of the ecotone between the coniferous forest and riparian habitat. Arizona bugbane requires deep shade from forest or riparian overstory at elevations from 4800 to 8600 feet.

### Mogollon thistle (*Cirsium parryi* ssp. *mogollonicum*)

Mogollon thistle occurs only in its type location at Dane Spring and a few nearby springs on the Coconino National Forest. Characteristics that distinguish it from related species include white corollas, nearly entire leaf margins in the mature leaves and poorly developed spines. Mogollon thistle grows in moist soils with riparian under story plants associated with a perennial stream in mixed conifer and ponderosa pine forest. The limited distribution of this species makes it particularly susceptible to loss or extirpation.

### Metcalf's tick trefoil (*Desmodium metcalfei*)

Metcalf's tick trefoil is a perennial herb that occurs in New Mexico (Grant and Sierra counties) in Arizona in Cochise, Gila, Pinal, and Santa Cruz counties; and probably adjacent Mexico. The habitat is rocky slopes, canyons, and ditches in grasslands and oak/pinyon-juniper woodlands; at 4,000-6,500 ft (New Mexico Rare Plant Guide, 1999). Documented locations of Metcalf's tick trefoil on the Coconino National Forest include the Huckaby Trail area (Licher, 2001) and Fossil Creek (Rink, 2005).

### Cliff fleabane (*Erigeron saxatilis*)

Cliff fleabane occurs only in northern and central Arizona where inhabits sheer canyon walls, moist north-facing slopes, steep solid rock and bedrock outcrops from 5,000 to 8,350 ft. Known locations include Barbershop Canyon, East Clear Creek, Mt. Elden., Oak Creek Canyon, Tule Canyon, Walnut Canyon, West Fork of Oak Creek Canyon and Sycamore Canyon (Arizona Game and Fish Heritage Database Abstract, 2003). There will be no effect to cliff fleabane from alternative 3 or 4 because the known populations and habitat for this species are limited to canyons and slopes that are generally inaccessible to motorized vehicle travel and dispersed camping.

### Eastwood Alum root (*Heuchera eastwoodiae*)

Eastwood alum root is endemic to central Arizona where it occurs on the Mogollon Rim near Telephone Ride, in Oak Creek Canyon, and West Fork of Oak Creek Canyon (Arizona Game and Fish Heritage Database Abstract, 2005). Habitat for Eastwood alum root includes moist slopes in ponderosa pine forests and canyons where it typically grows on slopes or cliffs. There will be no effect to Eastwood Alum root from alternative 3 or 4 because the known populations and habitat for this species are limited to canyons and slopes that are generally inaccessible to motorized vehicle travel dispersed camping.

### Lyngholm's brakefern (*Pellaea lyngholmii*)

Lyngholm's brakefern occurs only in a few isolated canyons near Sedona. There will be no effect to Lyngholm's brakefern (*Pellaea lyngholmii*) from alternative 3 or 4 because the known populations are limited to canyons and slopes that are generally inaccessible to motorized vehicle travel and motorized camping.

### Alcove bog orchid (*Platanthera zothecina*)

Alcove bog orchid is a regional endemic of the Colorado and Green rivers and their tributaries in eastern Utah, northwest Colorado and northern Arizona (Arizona Game and Fish Heritage Database Abstract, 2004). Known occurrences of this species include the West Fork of Oak Creek. There will be no effect to Alcove bog orchid from alternative 3 or 4 because the known populations of this species on the forest are limited to areas that are generally inaccessible to motorized vehicle travel and motorized camping.

# Environmental Consequences

## No Action

### Direct and Indirect Effects

- There will be no effect to crenulate moonwort, Cochise sedge, Arizona bugbane, Mogollon thistle, Metcalf's tick trefoil, cliff fleabane, Eastwood alum root, Lyngholm's brakefern, alcove bog orchid and Blumer's dock because these species occur in areas that are currently inaccessible to motorized travel.

# Alternatives Three and Four

### Direct and Indirect Effects

### Determination of Effects

Occurrences of the Region 3 Sensitive plants mentioned above occur in areas currently not accessible to vehicle traffic. Based on the above information it is my determination that:

> **Implementation of the Travel Management Rule on the Coconino National Forest will have no impact on crenulate moonwort, Cochise sedge, Arizona bugbane, Mogollon thistle, Metcalf's tick trefoil, cliff fleabane, Eastwood Alum root, Lyngholm's brakefern or alcove bog orchid.**

# Affected Environment

### Region 3 Sensitive plants affected by implementation of the Travel Management Rule

### Tonto Basin Agave (*Agave delamateri*)

Tonto Basin Agave frequently occurs in association with archaeological sites in several areas of the state and represents feral domesticated crops that have persisted without human care for hundreds of years. It usually occurs on the tops of benches, edges of slopes, and on gentle slopes overlooking major drainages and perennial streams in certain areas of the Verde Valley.

### Phillips' Agave (*Agave phillipsiana*)

Phillips' Agave was previously thought to occur only in the Grand Canyon (Hodgson in Flora of North America, 2001). However, Hodgson found populations of this species in the Verde Valley area on the Coconino National Forest in 2005. Like the Tonto Basin Agave, it grows in association with archaeological sites. Existing populations are remnants of feral domesticated crops that have persisted without human care.

### Mt. Dellenbaugh sandwort (*Arenaria aberrans*)

Mt. Dellenbaugh sandwort is endemic to northern and north-central Arizona. The type specimen is from Mount Dellenbaugh north of Grand Canyon. It is a perennial plant with a somewhat woody caudex from 2 to 5 inches tall. The leaves are mostly basal and linear in form but there may be one or more pairs of leaves on the stem. The inflorescence is a cyme, with most flowers occurring near the top of the stem. The habitat for this species is meadows within oak and pine forests at elevations between 5500 - 9000 feet.

### Rusby's milkvetch (*Astragalus rusbyi*)

This species is known only from northern and central Arizona on the Coconino and Kaibab National Forests. It is a perennial herb with upright form and pinnately compound leaves with rounded leaflets. No tendrils are present on the stem. The stem can be reddish in color. A distinguishing character is trigonus pods (triangular in cross section) which also have small black hairs, seen best with hand lens or under scope. The flowers are white to cream color. The species occurs at elevations from 6,500 to 9000 feet and blooms from May to September. Habitats where

this plant is likely to be found include aspen groves; mixed conifer, ponderosa pine/ Arizona fescue and ponderosa pine/Gambel oak sites in dry or temporarily moist basaltic soils.

### Disturbed rabbitbrush (*Chrysothamnus molestus*)

The range of disturbed rabbitbrush is north central Arizona in Coconino County, and northeastern Arizona in Apache and Navajo counties (Arizona Game and Fish Heritage Database Abstract, 2005). This perennial sub-shrub is associated with the pinyon-juniper woodlands and grasslands. It occurs on slopes and flats, infrequently on steep slopes and grows exclusively on calcareous soils including soil whose parent material was alluvium derived from Kaibab limestone and soil whose parent material was predominantly basalt.

### Arizona leatherflower (*Clematis hirsutissima* var. *hirsutissima*)

Arizona leatherflower is a perennial herb with pinnately compound leaves with finely divided, pubescent leaflets. The leaves have petioles and join the stems at right angles. The flowers are solitary, purple and bell shaped. Habitat includes rocky hillsides with slopes. This plant generally grows on limestone soil. However, a few groups occur on basalt soils in the Fort Valley area and near Woods Canyon. Many populations of this plant occur near Lower Lake Mary, in Skunk Canyon and in Fay Canyon. Other scattered populations occur on Harold Ranch Road in east Flagstaff (private land), in Mountainaire (private land), in Fort Valley and in Long Valley Draw.

### Heathleaf Wild Buckwheat (*Eriogonum ericifolium* var. *ericifolium*)

Heathleaf wild buckwheat is endemic to northern and central Arizona. The plant is restricted to a limestone substrate described as white or chalky gray and powdery formed from old lakebed deposits. Heath-leaf wild buckwheat grows on low arid hillsides associated with a unique white outcrop, which appears to be a shallow gravelly loam that develops over white Tertiary limestone lakebed deposits high in lithium and magnesium. Associated species include *Salvia dorrii* ssp. *mearnsii*, *Eriogonum ripleyi*, *Polygala rusbyi* and *Purshia subintegra.*

### Ripley wild buckwheat (*Eriogonum ripleyi*)

Ripley wild buckwheat is endemic to northern and central Arizona in the creosote community of the Sonoran desert shrub and pinyon-juniper woodland of Great Basin conifer woodland at elevations from 2,000 to 6,000 feet. It grows on low arid hillsides associated with a unique white outcrop, which appears to be a shallow gravelly loam that develops over white Tertiary limestone lakebed deposits high in lithium and magnesium. Associated species include *Salvia dorrii* ssp. *mearnsii*, *Eriogonum ericifolium* var. *ericifolium*, *Polygala rusbyi* and *Purshia subintegra.*

### Flagstaff Pennyroyal (*Hedeoma diffusum*)

Flagstaff pennyroyal is a small perennial, mat-like herb that grows on dolomitic limestone outcrops or soils in ponderosa pine forests. It has square, wiry stems and small oval opposite leaves. The flowers are blue and occur in clusters of one to three at the nodes. There are two major population areas for this species on the Coconino National Forest; the first extends roughly from Flagstaff, east to Marshall Lake and Fisher point, then south to the vicinity of Mountainaire, then to Lower Lake Mary. A second population area is near the rim of Oak Creek Canyon and its tributaries (Boucher, 1984; Phillips, 1984). Flagstaff pennyroyal occurs in three distinctive habitats in the ponderosa pine forest, rock pavement, cliffs and limestone. Forest canopy cover ranged from zero to 86%, averaging 26.5% (Phillips, 1984).

The Management Plan for *Hedeoma diffusum* Greene Elden, Flagstaff, Mormon Lake, and Sedona Ranger Districts (Boucher, 1984) was prepared in response to a proposal to list Flagstaff pennyroyal as a threatened species. This plan was recognized in the Forest Plan and is still a valid management document. Management direction outlined in the document should be followed when management activities occur in populations or suitable habitat for Flagstaff pennyroyal. Guidelines for Flagstaff pennyroyal that may apply to Travel Management include guidelines for construction and maintenance of forest roads within or near the potential habitat for Flagstaff pennyroyal.

### Arizona sunflower (*Helianthus arizonensis*)

Arizona sunflower is an herbaceous perennial with long creeping roots that function like rhizomes. The known distribution of Arizona sunflower includes New Mexico (Catron County, west of Quemado) and Arizona in Coconino and Navajo counties. The distribution and habitat requirements of this species are poorly understood, but documented occurrences are in dry, sandy soil at elevations of 4,000 to 7000 ft (New Mexico Rare Plant Guide, 1999). There is only one documented location on Coconino National Forest from the eastside of Soldier Lake on Anderson Mesa (Frost, 1945) but there may be other undetected locations.

### Arizona sneezeweed (*Helenium arizonicum*)

Arizona sneezeweed is a perennial herb that grows up to 4 feet tall with several stems. Flower heads consist of yellow to orange 3-lobed ray flowers and purplish-brown globular disk flowers and bloom July through September. Arizona sneezeweed grows at elevations from 7000 to 9000 feet. Hundreds of individuals may exist in a single population. This endemic species ranges from the Mormon Lake area southeastward to the White Mountains area where it grows in drainages, near springs, ponds and other wet areas and is found in several locations on the Coconino National Forest including Mormon Lake, Bear Park, Buck Springs, Alder Lake, Myrtle Lake, Fulton Spring, Stoneman Lake area, Bar M Canyon and several tanks.

Areas near water tend to be used more heavily by grazing animals. This usage often results in heavier grazing, compaction and trampling than comparable upland areas. Humans also tend to favor these areas for recreational use and contribute to trampling and compaction.

### Flagstaff beardtongue (*Penstemon nudiflorus*)

Flagstaff beardtongue grows in dry pine forests, pine/oak, pine/oak/ juniper and pinyon juniper forests. It occurs on dry slopes, in openings and along edges of openings and in forested areas. Forest-wide, documented locations for Flagstaff beardtongue included Anderson Mesa, near Lake Mary, Luke Mountain, Mormon Lake, Stoneman Lake, along the Schnebly Hill Road, along Oak Creek. In recent years, numerous locations have been found in proposed fuels reduction projects such as Upper Beaver Creek Project (Mogollon Rim Ranger District) and in the Rocky Park Project (Mormon Lake Ranger District).

### Hualapai milkwort (*Polygala rusbyi*)

Hualapai milkwort is a perennial sub-shrub, endemic to northern and central Arizona at elevations of 3500 to 5000 feet. The total range of the species is from the Peach Springs area, southeastward to the Verde Valley area. In some areas of its range this plant occurs on the same formation as *Salvia dorrii* ssp. *mearnsii, Eriogonum ericifolium* var. *ericifolium, Eriogonum ripleyi* and *Purshia subintegra*.

### Blumer's dock (*Rumex orthoneurus*)

Blumer's dock is a large, long-lived herbaceous perennial plant endemic to New Mexico and Arizona. Habitat for the species is mid- to high-elevation wetlands with moist, organic soil adjacent to perennial springs or streams in canyons or meadows (Arizona Game and Fish Heritage Database Abstract, 2004). There are isolated populations of this species in the Fern Mountain area and Mogollon Rim on the Coconino National Forest.

### Bebb's willow (*Salix bebbiana*)

Bebb willow (*Salix bebbiana*) is a large native shrub or a small bushy tree fifteen to twenty-five feet that ranges from Alaska south to British Columbia to east Newfoundland and in northeast United States and upper mid-western United States. Bebb's willow plants are dioecious and some populations on the forest contain plants of only one sex. Bebb's willow was added to the Region 3 Sensitive Species list for the Coconino National Forest in 2007. There are several documented locations of this species in various areas on the forest.

### Verde Valley sage (*Salvia dorrii* ssp. *mearnsii*)

Verde Valley sage is a shrub that grows on low arid hillsides associated with a unique white outcrop, which appears to be a shallow gravelly loam that develops over white Tertiary limestone lakebed deposits high in lithium and magnesium. The elevational range is approximately 3000 to 5000 ft (Arizona Game and Fish Heritage Database Abstract, 2002). Associated species include *Eriogonum ripleyi*, *Eriogonum ericifolium* var. *ericifolium, Polygala rusbyi* and *Purshia subintegra* as well as more common species such as crucifixion thorn, juniper, barberry and snakeweed. Habitat types include creosote bush shrub, Sonoran desert scrub and pinyon-juniper woodlands.

# Environmental Consequences

## No Action

### Direct and Indirect Effects

- If the no action Alternative is selected, negative impacts to these Region 3 Sensitive plants that would have been reduced or eliminated would remain the same or increase over time. Examples of these impacts include 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 of Region 3 Sensitive plant species.

- If the no action Alternative is selected, there will be no restriction on motorized dispersed camping throughout the forest except in those areas already restricted through the Forest Plan, official closures or existing NEPA decisions. Motorized dispersed camping may still occur in some areas where there are resource conflicts such as infestations of certain noxious or invasive weeds or in potential habitat or existing populations of Region 3 Sensitive plants.

# Alternatives Three and Four

## Direct and Indirect Effects

Direct effects from motorized vehicles to plant communities in general include soil compaction, erosion or loss of top soil, crushing of above ground portions, crushing of roots, up-rooting of plants (Wilshire et al, 1978), compaction of native vegetation (Gelbard and Belnap, 2003) and altering habitats, stressing or reducing native vegetation, by providing avenues for conduction of weed infestations (Trombulak and Frissell , 2000) and by channeling or creating disturbance (Parendes and Jones, 2000). Roads can contribute to forest fragmentation increasing the ratio of non-forested areas to forest and increasing the ratio of forest edge to interior habitats (Brothers and Spingarn, 1992; Fowler et al, 2008). These changes create open, disturbed environments, which in turn can provide habitat for noxious or invasive weeds (Brothers and Spingarn, 1992). Interior habitats can provide important refugia with fewer human generated disturbances for native plant species (Gelbard and Harrison, 2003).

If alternative 3 or 4 is accepted, negative impacts from motorized vehicles to the above Region 3 Sensitive plants 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. Effects to Region 3 sensitive plants from fragmentation would be similar to those for noxious or invasive weeds.

If alternative 3 or 4 is accepted, the numbers of Forest Roads and mileage open for public travel will be reduced. By reducing the mileage of open roads, Forest road crews will be better able to maintain the remaining roads. Impacts to Region 3 sensitive plants that would result from un-maintained or poorly maintained roads would be reduced. Forest Road crews would be more able to incorporate mitigations for sensitive plants while following Forest Service Manual direction and complying with Federal Highway Standards, especially for Level 3 Forest Roads. Crane (2006) discusses a summary of requirements for road Region 3 Sensitive plants. The publication contains examples of successful mitigations where roads were constructed or maintained in or near Region 3 Sensitive plant populations without significant impacts to the plants. With the current road system these mitigations are not possible because road crews are often unable to maintain specific sections of various roads for many years or construct structures due to limited financial resources and manpower that would mitigate effects to sensitive plant populations and habitats.

If alternative 3 or 4 is accepted dispersed motorized camping sites will be designated in certain areas and eliminated in other areas. This measure will help control impacts to several resources including Region 3 Sensitive plants by reducing potential adverse effects such as soil compaction and loss of individuals or populations in certain areas. Exceptions to this effect would be certain areas where dispersed camping is already restricted or prohibited such as in the area regulated by Amendment 12 of the Coconino National Forest Plan. The effects to Region 3 Sensitive plants in this area will not change. Another exception is in the Cinder Hill OHV Area (Management Area 13) where dispersed motorized camping will not be restricted.

Indirect effects common to the reduction in the density of roads and regulation of dispersed motorized camping is the potential reduction of the numbers of people conveyed into some sensitive areas. Currently people are able to drive to almost any point within the forest, where

they can then engage in other activities such as OHV use, camping, hiking, horseback riding and bicycling. These activities can extend into remote areas containing Region 3 sensitive plants and/or potential habitat that would otherwise be remote locations. For example, two remote monitoring points for Flagstaff pennyroyal were impacted by camping when users left an established road and set up campsites in areas away from roads (Crisp, 2005). Campers built fires directly on top of the monitoring plots and plant populations. Other examples include horseback riders hauling livestock into remote areas where they then unload the animals and ride into sensitive areas and conveyance of hikers to remote trailheads where they are able to hike into remote areas containing Region 3 Sensitive plants. Reduction in the numbers of roads and elimination of roads in certain sensitive areas may reduce these effects.

## Cumulative Effects

The boundary for this cumulative effects analysis is the Coconino National Forest. This discussion includes management actions related to the Region 3 sensitive plants mentioned above. No time limit was set for the discussion.

The forest has gathered location and abundance data and considered Region 3 Sensitive plants in project planning and implementation for numerous projects. Mitigations for these species have been incorporated into many projects. Forest Service Manual Direction (FSM 2670.5 (19) and (FSM 2670.32) guided many of these mitigations. The current Coconino National Forest Plan addresses conservation and mitigation of three Region 3 sensitive plants: Flagstaff pennyroyal, Arizona bugbane and Arizona leatherflower. Additional past management actions that are beneficial for Region 3 sensitive plants include preparation of Conservation Plans, Conservation Agreements and Management Plans for various species. The Coconino National Forest has a Conservation Agreement and Conservation Plan for Arizona bugbane. However, there are no cumulative effects from implementation of the Travel Management Rule to this species because there are no direct or indirect effects to it. The Forest Plan recognizes the Management Plan for *Hedeoma diffusum* Greene Elden, Flagstaff, Mormon Lake, and Sedona Ranger Districts (Boucher, 1984), a document that mainly addresses the effects of timber sale-related activities. The plan contains mitigations for road construction and maintenance in the habitat of Flagstaff pennyroyal including acceptable distances for roadways from established populations of the plant and the effects of dust. For these factors, the implementation of the Travel Management Rule would be a complementary and cumulative action by re-enforcing the provisions of the Management Plan.

Cumulative effects to Region 3 Sensitive plants may include past and ongoing management actions by the U.S. Forest Service such as grazing, timber sales, fuels reduction projects, prescribed burning, recreational activities (motorized and non-motorized), construction, reconstruction and decommissioning of roads and trails, various land use projects including communications facilities, utility corridors and special use areas. Most of these actions were or are currently mitigated if they were or are under Forest Service control. Forest Service manual direction and/or Forest Plan provide direction for mitigations. Numerous projects have been initiated, analyzed, or implemented. Recent projects can be referenced on the Coconino National Forest NEPA website at http://www.fs.fed.us/r3/coconino/nepa/index.shtml.

Fire suppression and past alteration of the fire regime through suppression have affected all vegetation including several of the Region 3 Sensitive plant species through changes in tree density and understory species composition and changes to hydrologic function. Elimination of fire in many areas of the Coconino National Forest has allowed tree canopy and stand density to increase in some areas, reducing the abundance or eliminating of most understory species.

Elimination of fire and subsequent increase in forest density have probably reduced the amount surface water and soil moisture in some areas, therefore negatively affecting the potential habitat of some species.

There have been many large wildfires in the potential habitat of several of these species. Severe wildfires can negatively alter the potential habitat for many species by destroying plants and significantly altering the habitat on a long-term basis. The extent of the alteration of potential habitat by past wildfires over the Coconino National Forest is unknown.

Certain areas of the Forest are closed to vehicle travel. These include wilderness areas and roadless areas. Additionally, the forest has a series of closure areas for various purposes. These are available at http://www.fs.fed.us/r3/coconino/nepa/forest-orders/. Many of these closures restrict motorized vehicle travel in specific areas. Although these closures were done for various reasons, some are complementary to conservation of native plants and their habitats including Region 3 sensitive plants by reducing motorized vehicle travel in certain areas. .These closures may help reduce impacts such as destruction of individual plants and populations and impacts to potential habitat such as soil compaction and erosion.

Cumulative effects not mitigated include non-Forest actions such as public travel, recreational visits by the public, wildfires and unmanaged grazing (wildlife and livestock). Activities on non-forest lands such as state and private lands have also contributed to cumulative effects on several species including timber harvest, fuels reduction projects, recreational uses and development. Land development on non-forest parcels has affected the amount of suitable habitat available on non-forest lands, reducing the amount of suitable habitat in these areas. Activities on non-Forest Service lands tend to have more adverse effects on populations and habitat because they are not subject to mitigation as similar actions on the Forest would be. The overall result is a possible reduction in the overall distribution and amount of suitable habitat for some species throughout their ranges. Therefore, mitigation measures on Forest Lands are particularly important.

## Determination of Effects

**Based on the above information it is my determination that:**

> **Implementation of the Travel Management Rule may impact individuals of Tonto Basin Agave, Phillips' Agave, Mt. Dellenbaugh sandwort, Rusby's milkvetch, Disturbed rabbitbrush, Arizona leatherflower, Heathleaf wild buckwheat, Ripley wild buckwheat, Flagstaff pennyroyal, Arizona sunflower, Arizona sneezeweed, Flagstaff beardtongue, Hualapai milkwort, Bebb's willow, Blumer's dock and Verde Valley sage. However, the overall effect of this implementation will be beneficial by reducing future direct and indirect impacts from motorized vehicle use on Coconino National Forest to Tonto Basin Agave, Phillips' Agave, Mt. Dellenbaugh sandwort, Rusby's milkvetch, Disturbed rabbitbrush .Arizona leatherflower, Heathleaf Wild Buckwheat ,Ripley wild buckwheat, Flagstaff Pennyroyal, Arizona sunflower, Arizona sneezeweed, Flagstaff beardtongue ,Hualapai milkwort , Blumer's dock, Bebb's willow and Verde Valley sage.**
>
> **It is my finding that implementation of the Travel Management Rule may impact individuals of these species but is not likely to result in a trend toward federal listing or loss of viability**

# Affected Environment

### Sunset Crater beardtongue (*Penstemon clutei*)

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). Sunset Crater beardtongue is an endemic species that occurs only in the volcanic fields north and east of Flagstaff. 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 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 (Phillips, et.al, 1992). The habitat of Sunset Crater beardtongue is flat or gently sloping sites in open ponderosa pine forest between 6500 to 8500 feet**.**

The known habitat for Sunset Crater beardtongue includes Management Area 13 of the Coconino National Forest Plan. The northern boundary of the Management Area is south of Sunset Crater National Monument and south of Forest Road 545. The eastern boundary adjoins the Doney Management Area, (east of Fernwood subdivision). The southern boundary is the Doney Management Area (underground pipeline) and the western boundary is the Craters Management Area (large KV electric line). This Management Area is a portion of the San Francisco volcanic field with a field of large cinder cones sparsely covered by ponderosa pine trees and shrubs and covered with a deep layer of loose cinders. Management Area 13 has been designated for off-road vehicle use. Coconino National Forest Plan provides guidance for accepted uses on pages 178 through 182 and in Appendix M. Management Area 13 consists of 13,711 acres (Coconino National Forest Plan as amended 2002). Most of the Management Area is suitable habitat for Sunset Crater beardtongue. The implementation of the Travel Management Rule will not affect this guidance. Therefore, off-road vehicle use in Management Area 13 will continue and may increase over time because of fewer areas available for use. Off-road vehicle use may also increase as the population of Arizona continues to expand.

There are additional populations and suitable habitat in the areas surrounding Management Area 13. Motorized travel is restricted in much of this area through the publication of the Off-Road Management Plan, 36 CFR 261.56 (1986) and by the Forest Order 04-00-146 (2000). However, much of this area is currently poorly signed, making enforcement difficult.

# No Action

### Direct and Indirect Effects

- If the no action Alternative is selected, current management and recreational use within the habitat will remain the same. Most of this species occurs in Management Area 13, which will remain open to cross-country vehicle travel. Some populations occur outside of MA 13 and use by motor vehicles will remain the same or increase over time.

- If the no action Alternative is selected, there will be no restriction on motorized dispersed camping throughout the forest except in those areas already restricted through the Forest Plan, official closures or existing NEPA decisions. Motorized dispersed camping will still occur in MA 13 and other areas occupied by Sunset crater beardtongue

# Alternatives Three and Four

## Direct and Indirect Effects

The direct, indirect and cumulative effects mentioned in the section above for Tonto Basin Agave, Phillips' Agave, Mt. Dellenbaugh sandwort, Rusby's milkvetch, Disturbed rabbitbrush, Arizona leatherflower, Heathleaf wild buckwheat, Ripley wild buckwheat, Flagstaff pennyroyal, Arizona sunflower, Arizona sneezeweed Flagstaff beardtongue, Hualapai milkwort, Bebb's willow, Blumer's dock and Verde Valley sage, apply to Sunset Crater beardtongue. Additional effects to the species are discussed below.

Exceptions to the anticipated positive effects for Region 3 sensitive plants include the Cinder Hills OHV area which is Management Area 13 as designated by the Coconino National Forest Plan. The Cinder Hills OHV area has been designated for off-highway vehicle use. Much of the known range of this species is in the Cinder Hills OHV area. Management Area 13 contains potential habitat and documented locations for Sunset Crater penstemon (*Penstemon clutei*) (see Map 1). Impacts to Sunset Crater beardtongue from motor vehicle travel in that area will not be significantly reduced. Impacts such as crushing and destruction of individual plants and degradation of habitat will continue in Management Area 13. The populations of Sunset Crater beardtongue that occur outside this area will benefit from the proposed management actions in alternatives 3 and 4.

## Cumulative Effects

Historically, there have been several large wildfires in the habitat of Sunset Crater beardtongue including the Burnt Fire in 1973. After the fire, Goodwin (1979) stated that Sunset Crater beardtongue was a pioneering species in the fire. However, Fule et al. (2000) found that Sunset Crater beardtongue numbers were lower on burned plots three years after treatment when compared to pre-treatment numbers. In 1992, a tornado occurred in the area near Sunset Crater, 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. A monitoring project conducted by the Peaks District (Crisp, 1996) 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. Other activities that have occurred in the habitat include fuel wood removal, utility corridors and grazing. 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. Past activities within the habitat include recreational uses, fuel wood removal, utility corridors and grazing. Some large fires such as the Burnt Fire (1979) and the Hochderffer Fire (1996) have occurred within the range of Sunset Crater beardtongue. Removal of material from the Tornado Salvage occurred in the range of the habitat. Cumulatively, these projects and activities have not affected the overall distribution 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 suitable habitat available on non-forest lands through alteration of habitat by human activities such as development.

## Determination of Effects

**Based on the above information it is my determination that:**

**Implementation of the Travel Management Rule may impact individuals of Sunset Crater beardtongue, but is not likely to result in a trend toward federal listing or loss of viability. Impacts to Sunset Crater beardtongue from motorized vehicles will remain the same or increase in Management Area 13 which is not affected by the action. Impacts may be reduced in other areas outside Management Area 13.**

**Map 1.** Management Area 13 with surrounding habitat for Sunset Crater beardtongue (*Penstemon clutei*). The boundaries for Closure Order 04-00-146 are not shown. Closure orders can be accessed at http://www.fs.fed.us/r3/coconino/nepa/forest-orders/index.shtml

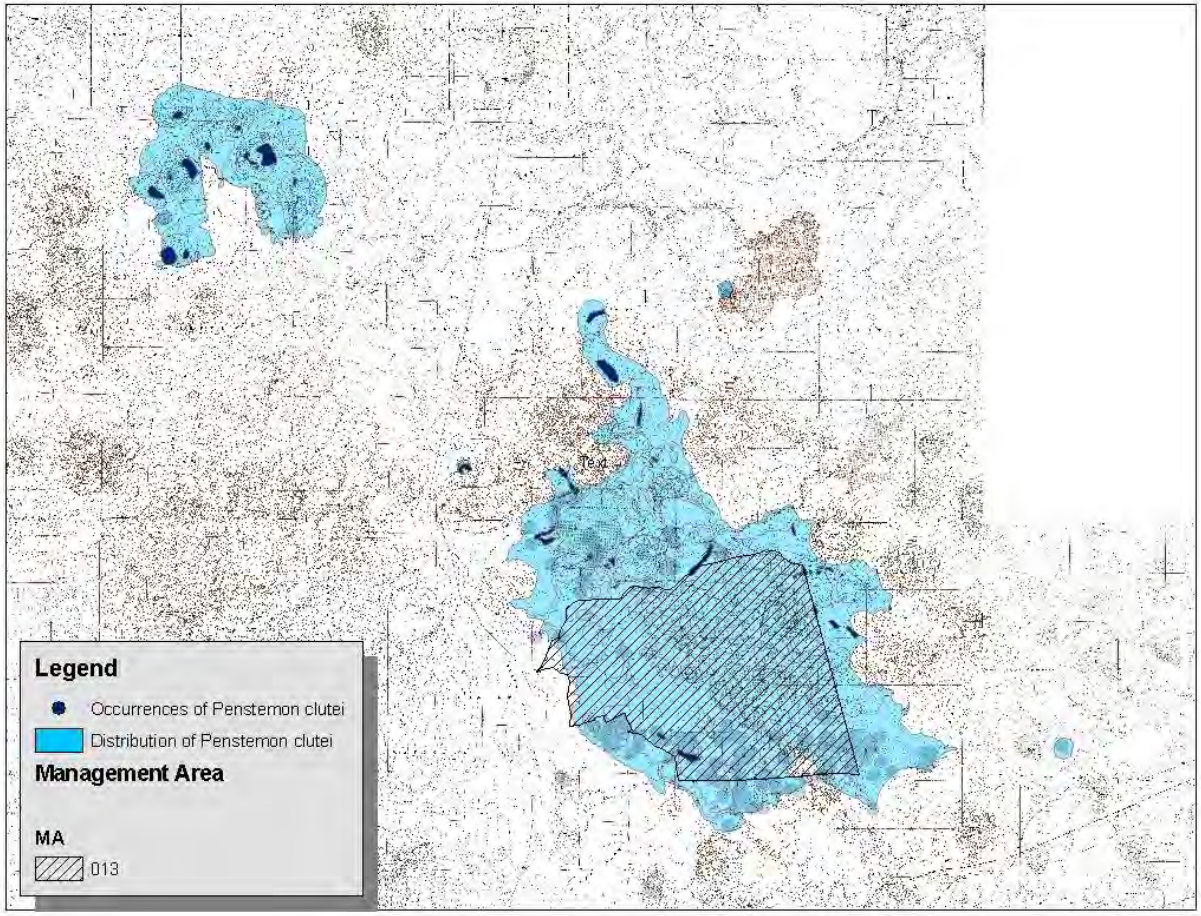

**Table 2.** Region 3 Sensitive Plant species occurring on the Coconino National Forest (as designated September 2007)

| Scientific Name | Common Name | Effects of Proposed Action |
|---|---|---|
| *Botrychium crenulatum, Carex ultra, Cimicifuga arizonica, Desmodium metcalfei, Cirsium parryi* ssp. *mogollonicum, Erigeron saxatilis, Heuchera eastwoodiae, Pellaea lyngholmii, Platanthera zothecina* | Crenulate milkwort, Cochise sedge, Arizona bugbane, Metcalf's tick trefoil, Mogollon thistle, Rock fleabane, Eastwood alum root, Lyngholm's brakefern, Alcove bog orchid | Implementation of the Travel Management Rule will have no direct effects on these species because they occur in areas where motor vehicle travel is not likely to occur. |
| *Agave delamateri, Agave phillipsiana, Arenaria aberrans, Astragalus rusbyi, Helianthus arizonensis, Penstemon nudiflorus, Polygala rusbyi, Rumex orthoneurus, Salix bebbiana, Salvia dorrii* ssp. *mearnsii* | Tonto Basin agave, Phillips' agave, Mt. Dellenbaugh sandwort, Rusby's milkvetch, Arizona sunflower, Flagstaff beardtongue, Hualapai milkwort, Blumer's dock, Bebb's willow, Verde Valley sage | Beneficial effects are anticipated for these species through reduction of disturbances, soil compaction, crushing of plants, alteration of habitats and by reducing avenues for conduction of weed infestations |
| *Penstemon clutei* | Sunset Crater beardtongue | Implementation of the Travel Management Rule will not benefit this species. It occurs in the Cinder Hills OHV area which is Management Area 13 as designated by the Coconino National Forest Plan which will not be affected by alternative 3 or 4 and will remain open to cross-country travel. Impacts to this species by motorized vehicles will continue to occur and may increase over time. |

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