

# Santa Fe National Forest Travel Management Planning Non-Native Invasive Plant Specialist Report DRAFT

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## Summary

All the action alternatives reduce the risk of introduction and spread of invasive species when compared to the existing condition (No Action Alternative). This analysis is based upon the assumption, supported by literature, that motorized vehicles and the pathways they use are principle conduits to weed introduction and transport. **Alternative 3** reduces this risk the most of all the alternatives because the fewest miles of roads and trails are open to motorized use and no areas are designated for cross country travel by motorized vehicles. **Alternative 1 (No Action)** represents the greatest risk for weed introduction and spread. This is because it results in the most miles of roads and trails open to motorized vehicle use and the largest component of cross country area, which is open year-round for motor vehicle use. **Alternative 4** has fewer miles of roads and trails open to motorized vehicle use and a slightly smaller component of cross country area open for this use than Alternative 1. However, the area open for cross country travel has timing limitations on when it's open, which may reduce the risk of weed introduction and establishment more than when compared with Alternative 1. **Alternatives 2 and 5** reduce the risk of future introduction and spread of weeds more than Alternatives 1 and 4, and increase the level of risk when compared to Alternative 3. The miles of open roads and trails and areas open to cross country travel by motor vehicle use is less for these alternatives than Alternative 1. However, the acres open for cross country motorized use are much less in Alternative 2 than Alternative 5, which reduces the potential risk of non-native invasive plants being transported and introduced into areas not previously infested with this alternative.

Alternative 3 represents the greatest change from the existing condition by reducing the risk of weed transport and introduction the most. Alternatives 2, 4, and 5 represent varying levels of change from the existing condition. All three alternatives leave more risk on the landscape for weed transport and introduction than Alternative 3, but the risk is reduced from the existing condition. Regardless of which alternative is selected, non-native invasive plants would continue to infest the area in the Santa Fe National Forest.

## Introduction

Non-native plants are defined as species that are of foreign origin, are new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation or

navigation, or the fish or wildlife resources of the United States, or the public health (USDA Forest Service, 2005). While thousands of plants have been introduced into the United States that are productively used for agricultural and horticultural purposes without problems, other non-native plants have become invasive. These plants severely threaten biodiversity, habitat quality, and ecosystem functions (National Strategy for Invasive Plant Management, 1999).

The Forest Service has identified the spread of invasive species as one of the four major threats to the nation's forests (<http://www.fs.fed.us/projects/four-threats/>). An "invasive" is defined as "a species that is nonnative (or alien) to the ecosystem" where found and whose "introduction is likely to cause economic or environmental harm or harms to human health" (Executive Order 13112, 1999).

Two things generally characterize non-native invasive species: 1) they were not historically (i.e., pre-European settlement) present in a region's ecosystems, and 2) they have the ecological ability to invade and persist in native plant and animal communities, and often displacing native plants and becoming the dominant species within the community.

Roads and trails provide pathways along which invasive, non-native plant species can move from one area to another, crossing barriers that would normally stop or slow their spread. Most non-native species prefer highly disturbed sites such as areas along rivers and streams, trails, trailheads, roadsides, building sites, wildlife bedding grounds, overgrazed areas, and campgrounds (Sheley and Petroff 1999). Species commonly found along roadsides within the Santa Fe National Forest include, Russian and spotted knapweed, non-native thistles, hoary cress, and yellow starthistle, among others. The purpose of this report is to describe the predicted effects on the spread of invasive plant species for each of the alternatives proposed in the Santa Fe National Forest Travel Management plan DEIS. This report uses the terms "non-native invasive species," "invasive plants," "weeds," and "invasive species" interchangeably.

## **Background**

In September 2005, the Santa Fe and Carson National Forests jointly published a Record of Decision and Final Environmental Impact Statement for the Invasive Plant Control Project. The purpose of the project, to control or eradicate weed infestations, was "to maintain or improve the diversity, function, and sustainability of desired native plant communities on the Forests" (USDA Forest Service 2005, p. 13).

The decision was appealed, and the appeal review team sent the environmental impact statement back to the Forests for more analysis. The Forests are still working on the additional analysis, and have not issued a new decision. As a result, the Santa Fe National Forest is primarily limited to the tools listed in the Forest's Land and Resource Management Plan (Forest Plan) to treat invasive species. The Jemez Ranger District,

with the implementation of the Jemez Riparian Enhancement Project in 1999, has been successfully using herbicides to control saltcedar, Russian olive, and Siberian elm.

### **Analysis Methods**

The public expressed the following concern about non-native invasive species:

*“Continued public motorized use of routes and areas described in the proposed action will adversely affect forest resources. These effects include the spread of invasive plant species.”*

Three measures form the basis for comparing the effects between alternatives to the spread of invasive plant species. These measures are depicted in Table 1:

*Measure 1:* Miles of routes and fixed distance corridors traversing known populations of invasive species.

*Reason for measure:* Vehicles are more likely to transport seeds where they encounter existing populations. This measure shows the relative opportunity of weed spread from vehicles crossing existing invasive plant populations.

*Measure 2:* Miles of routes proposed open for any kind of motor vehicle use.

*Reason for measure:* Comparing the total miles of routes proposed between alternatives provides a comparison of potential pathways. Currently the vast majority of non-native invasive plants occur along roads and trails since this habitat is most conducive to their establishment, due to the level of disturbance and the potential for vehicles to carry and distribute invasive weeds, seeds, or propagules (plant parts capable of reproducing plants (eg. roots)) from off-site sources. This measure includes all kinds of motor vehicle use since all vehicles are capable of spreading invasive plants, seeds, or propagules. For example, unauthorized roads proposed open to cars and trucks, but closed to ATVs, are still counted because car or truck use could also spread weeds. Routes not proposed open to motor vehicle use are not counted in this measure because they will no longer provide pathways for invasive species once cross country travel is prohibited.

*Measure 3:* Acres of areas open to motorized cross country travel within the Forest.

*Reason for measure:* Motorized vehicles of all types provide the primary means for invasive plant movement and potential establishment. This measure provides a comparison between alternatives of the areas open to vehicular travel.

**Table 1. Measures for Invasive Species Analysis**

<b>Measure</b>	<b>Alt. 1</b>	<b>Alt. 2</b>	<b>Alt. 3</b>	<b>Alt. 4</b>	<b>Alt. 5</b>
<i>Miles of existing roads and trails traversing an existing invasive species population</i>	79	57	49	58	54
<i>Total miles of routes proposed to be open for all types of motor vehicle use</i>	5457	2552	1882	3010	2536
<i>Acres of areas open to motorized vehicle travel within the Forest.</i>	1,266,910/ 1	16,380/ 2	0/3	1,065,539/ 4	377,748/ 5

/1 All acres outside wilderness areas. This number corresponds to the calculation of downed big game animals on the forest. Forest staff have no data on where big game is retrieved with a vehicle.

/2 These acres are a combination of the open designation (40 acres) and motorized dispersed camping and big game retrieval (16,340 acres) areas. The latter two directly overlap each other.

/3 No acres designated open for cross country motorized travel.

/4 Acres determined by subtracting motorized dispersed camping acres from motorized big game retrieval acres.

/5 Acres determined through GIS analysis and include dispersed camping corridors, big game retrieval corridors, and open designated areas with no double counting.

Non-native invasive plants can be moved through the environment in many ways, including wind, water, livestock, wildlife, and humans. (Center for Invasive Plant Management, 2003) On the Santa Fe National Forest, many of the known invasive plant populations are associated with existing roads and trails, with new infestations being inventoried each year. Awareness of the association between invasive species and roads lead to the selection and use of the above-listed measures to analyze the alternatives to Travel Management decision-making. It is recognized there is some level of risk for invasive plant transport and introduction not associated with motorized use, but locally this is one of the dominant mechanisms for weed dispersal.

## **Assumptions**

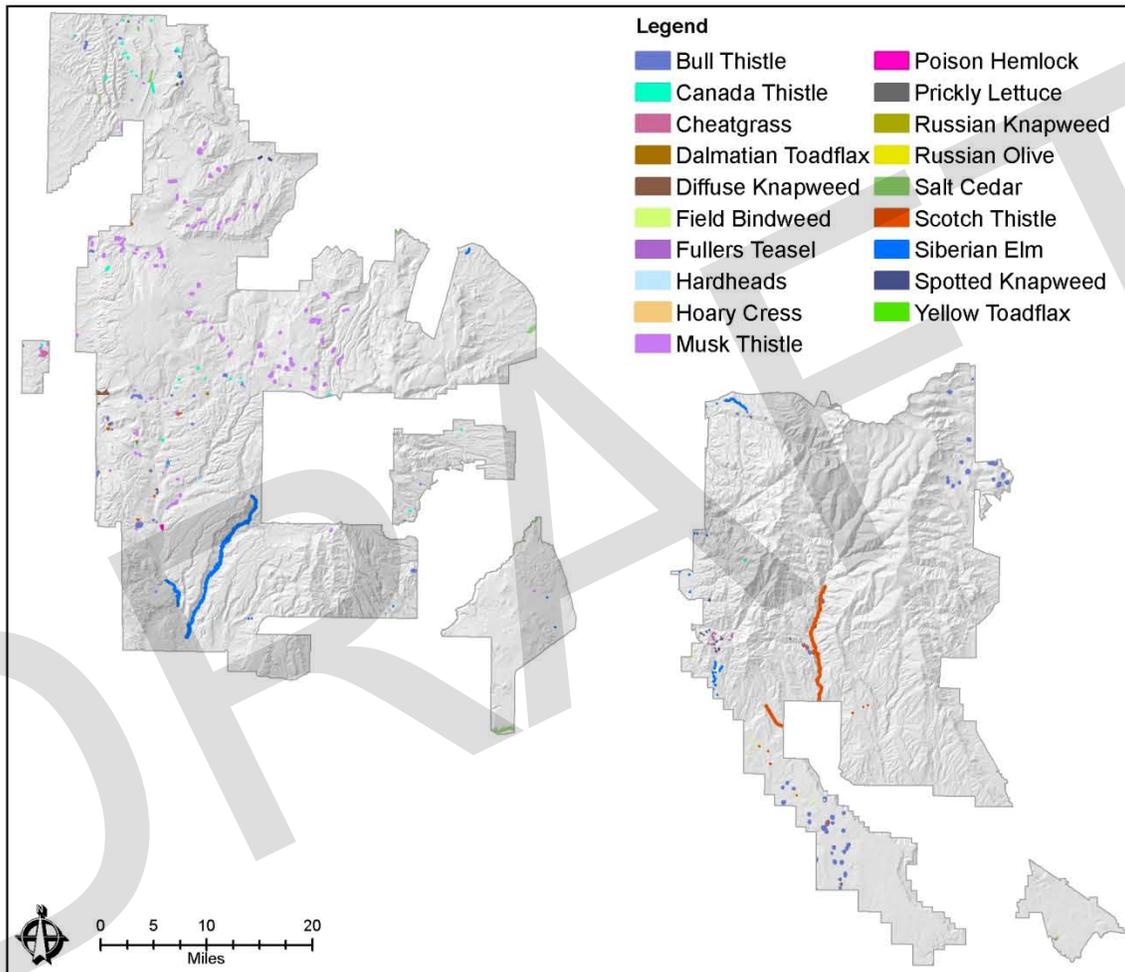
The Interdisciplinary Team developed a list of assumptions to utilize when documenting the effects analysis. From this list, the following assumptions were applicable for consideration for the non-native invasive plant species effects analysis.

- For the purposes of this analysis, the amount of motorized travel on roads and motorized trails is held constant among alternatives;
- Publishing a system of motorized routes on a map may cause an increase in motorized use on the Forest;
- The effects of motorized trails are the same as the effects of roads;
- All motorized vehicles, such as motorcycles, ATVs, trucks, and cars, cause similar resource impacts;
- Not every acre of corridors designated for motorized dispersed camping and motorized big game retrieval will be driven on;
- The estimated number of motorized trips to retrieve a downed big game animal will not change between alternatives, except for Alternative 3, which does not allow it;
- With a restriction on public use, use on roads needed for administrative purposes will be less than the existing use;
- An increase or decrease in visitation to the Forest as a result of population change is not included in this analysis;
- Motorized big game retrieval in designated corridors will not result in the creation of new routes;
- The amount of administrative motorized use of forest system roads is not expected to change among alternatives.

## **Limitations**

The Forest's GIS layer depicting the locations of current invasive plant populations is the best available data. Forest Service personnel regularly inventory and map existing invasive plant populations (See Figure 1). Inventory data is managed in the Natural Resource Information System (NRIS). Management activities associated with invasive species are tracked in the Forest Service Activity Tracking System (FACTS). The availability of that data depends on whether personnel were on the route and recorded data on invasive species.

**Figure 1 – Locations of known invasive plant sites in the Santa Fe National Forest.**



Although it is recognized that invasive plants may not have been inventoried on all access pathways (eg. roads and trails), for the purposes of this analysis having perfect information at the forest scale is not necessary. Most forest visitation occurs through use of the Maintenance Level 3 and 4 road system, so describing the spread of invasive species from these access routes is appropriate. The mechanisms and conditions for the spread of weeds apply to the Maintenance Level 2 roads as well. The predicted effects will show the relative likelihood of weed spread between alternatives; it is not necessary to have perfect information to make a decision.

## **Methods**

Using GIS, Forest staff overlaid the invasive species layer with the alternatives, and calculated the miles of routes where a road, trail, or fixed distance corridor contains or crosses an existing invasive weed population for each alternative (see Table 1). In addition, the acres of areas proposed to remain open for vehicular travel (eg. dispersed camping areas, big game retrieval) were determined for each alternative using GIS.

## **Analysis Area**

The lands within the proclaimed Forest boundary and administered by the Santa Fe National Forest comprise the analysis area for the direct and indirect effects because this is where the Forest has jurisdiction to designate routes and areas for motorized use. Which routes are designated, in turn, cause the direct and indirect effects from public motorized use. The time period for analyzing the direct and indirect effects is 10 years from the time the motor vehicle use map is published since weed establishment can occur rapidly (ie. within the 10 year window). A decade provides sufficient time to establish ecological trends.

All lands within the proclaimed Forest boundary comprise the area for the cumulative effects analysis because lands controlled by other entities share physical and ecological characteristics with adjacent National Forest System lands. These characteristics influence the distribution of invasive species throughout the Forest. Though roads leading to and from the Forest could also be a pathway for weed seeds and subsequent spread (e.g., vehicles from out-of-state), collecting information on the source of all weed seeds entering the forest would be an impossible task.

As of 2005, there were many weed treatment activities being conducted on adjoining lands by private landowners, county, State, and other Federal agencies near the Santa Fe National Forest (USDA Forest Service, 2005). There may be more treatment activities currently occurring that we are not aware of.

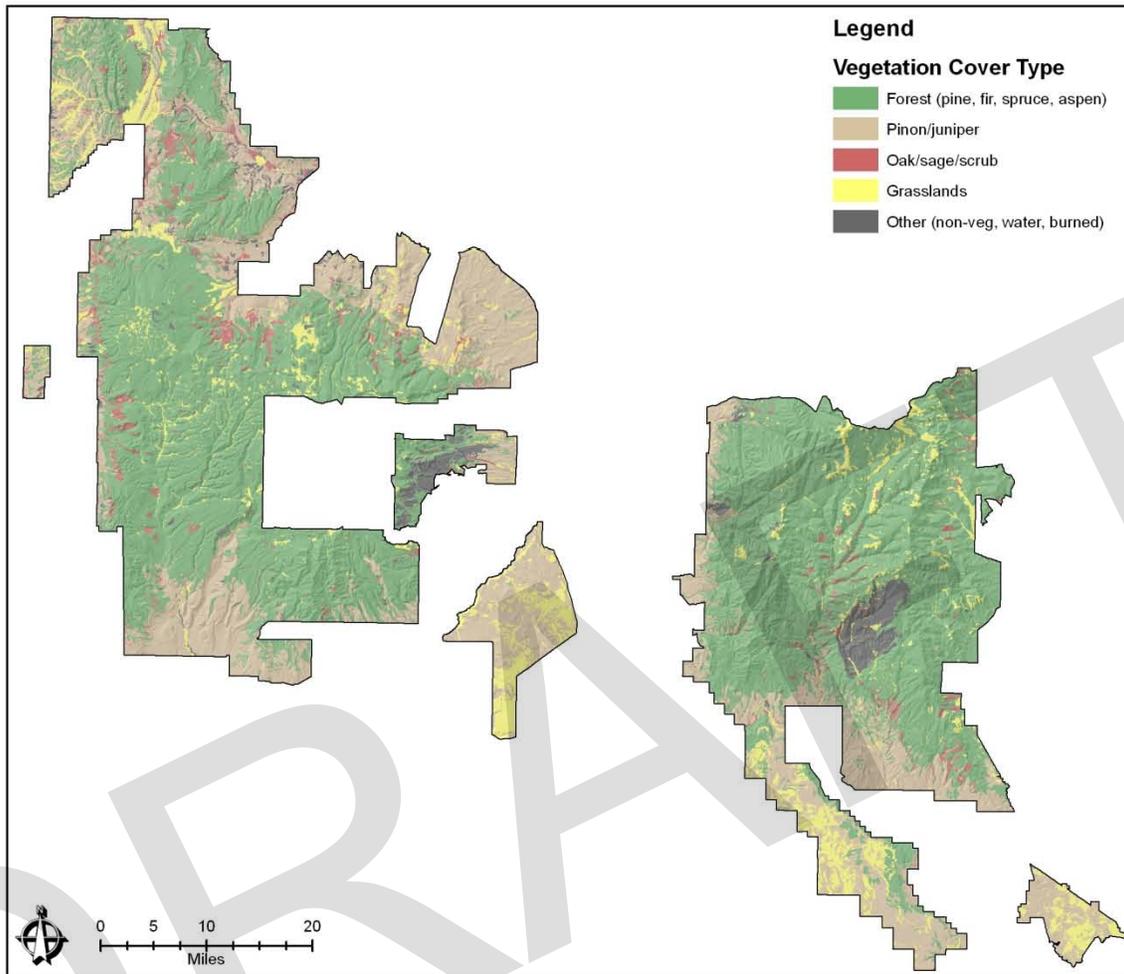
## **Affected Environment**

### *Vegetation and Invasive Species*

The Santa Fe National Forest lies within the Colorado Plateau Semi-Desert Province and Arizona-New Mexico-Mountains Semi-Desert-Open Woodland-Coniferous Forest-Alpine Meadow Province (Mountains Regime) of the Tropical/Subtropical Steppe Division; and the Great Plains-Palouse Dry Steppe Province and the Southern Rocky Mountains Steppe-Open Woodland-Coniferous Forest-Alpine Meadow Province (Mountains Regime) of the Temperate Steppe Division within the Dry Domain (McNab and Avers 1994).

Grasslands, sagebrush, shrublands, oak, piñon-juniper, ponderosa pine, mixed conifer, spruce-fir and subalpine fir are the Forest's dominant vegetation types, with riparian vegetation in valley bottoms and along streams and lakes.

**Figure 2 - Vegetative cover types in the Santa Fe National Forest.**



The presence of invasive species varies across the forest. The following paragraphs briefly describe each vegetation cover type and the weeds currently found in them.

#### *Forest*

This cover type is a consolidation of all timber types and includes Aspen, Blue Spruce, Douglas Fir, Engelmann Spruce, Subalpine Fir, Limber Pine, Ponderosa Pine, and White Fir. These species are widespread at middle and upper elevations (6,900-11,500 ft) and approximately 992,700 acres (59%) of the SFNF consist of this cover type. Most weed species known to exist on the Forest are found in the forested cover type. Approximately 5500 acres (39%) of non-native invasive species infest the forested cover types.

#### *Pinyon-Juniper*

Pinyon-juniper woodlands are widespread at lower and middle elevations (5,700-8,400 ft) and approximately 443,900 acres (26%) of the SFNF consist of this cover type. Weed species known to be present include bull thistle, Canada thistle, dalmatian toadflax, diffuse knapweed, leafy spurge, musk thistle, Russian knapweed, Scotch thistle, Siberian

elm and spotted knapweed. Approximately 5960 acres (42%) of non-native invasive species infest the pinyon-juniper covertypes.

#### *Oak/Sagebrush/Shrublands*

This cover type is widespread at lower and middle elevations (6,200-9,000), typically as openings within forested lands, and approximately 53,000 acres (3%) of the SFNF consist of this covertype. The most common oak species present in these areas is Gambel oak. Weed species known to be present include black henbane, bull thistle, Canada thistle, dalmation toadflax, musk thistle, perennial pepperweed, Russian knapweed, Scotch thistle, and spotted knapweed. Approximately 360 acres (3%) of non-native invasive species infest the oak/sagebrush/shrublands covertypes.

#### *Grasslands*

Grasslands are widespread at all elevations, typically as openings within shrublands and forested lands, and approximately 143,400 acres (9%) of the Santa Fe NF consist of this covertype. All weed species known to exist on the Forest are found in the grassland covertype. Approximately 1920 acres (14%) of non-native invasive species infest the grasslands covertype.

#### *Other cover types*

Portions of the Forest do not fall within the above-listed covertypes and have been categorized as other cover types. These areas include badlands; recently burned areas; non-vegetated sites such as rock, talus, scree, gravel pits; and water and approximately 52,000 acres (3%) of the SFNF consist of these other covertypes. Weed species known to occur on these sites include bull thistle, Canada thistle, diffuse knapweed, scotch thistle, Siberian elm, Russian knapweed, musk thistle, Russian olive, and salt cedar. Approximately 370 acres (2%) of non-native invasive species infest the other covertypes.

#### *Spread of Invasive Species*

Depending on the ecology of the species, non-native invasive plants can be moved and spread in several ways, such as on vehicle wheels or bodies, livestock, wildlife, pets, wind, or human foot traffic. They typically establish themselves in disturbed areas having bare ground. Depending on factors such as shade tolerance, degree of invasiveness, dispersal mechanisms, and habitat availability, weeds may or may not spread into adjacent forested or non-forested ecosystems. Expansion rates vary between 5 and 30 percent annually, depending on the species and ecological conditions (Asher 1998). Like human populations, weeds typically increase exponentially beginning slowly, then doubling and redoubling (Kummerow, 1992). Typical sites in the Santa Fe National Forest having invasive species are roadsides, trails, gravel pits, parking areas, campsites, helispots, high-intensity wildfire areas, riparian areas, and administrative sites (see Figure 2).

Forested sites with shady understories tend to resist invasion by weed species fairly well because the native shrubs, forbs, and trees compete more effectively. A western Montana study determined site factors influenced weed establishment and spread on roadsides. Results showed that shading of the roadway by tree and shrub over story was a primary factor limiting spotted knapweed establishment on roadsides in forest habitats (USDA Forest Service, 2003). The invasive species on the Forest are generally shade

intolerant, and are less likely to become established in shady areas. Native plant communities typical of droughty, shallow-soiled sites are susceptible to invasion by weed species, especially when combined with ground disturbance.

### **Direct and Indirect Effects**

#### ***Effects common to all alternatives***

As stated above, the undesirable non-native plant species found on the Santa Fe National Forest generally are more invasive on sites that are warmer, drier, and typically exhibit some level of soil disturbance (USDA Forest Service, 2005). For all alternatives, the potential for new populations of invasive species to become established exists, but is expected to be greater at lower elevations and in areas with higher open road and trail densities.

The potential increase in invasive plant infestations would be a direct result of seeds being transported along roads, trails, and areas of cross-country travel by motorized vehicles. Once established, populations may increase through other kinds of transport. Along roads, wind, livestock, and vehicle transport would be likely; along trails, hiking or other non-motorized activities could also spread weeds into more ecologically sensitive areas.

Invasive species establishment is closely associated with areas of ground disturbance, commonly the more disturbed a site the greater the potential for establishment when a seed source is introduced. All alternatives that allow cross country motorized vehicle use would result in an increased potential for invasive species transport, introduction, and establishment. The areas utilized for dispersed camping have a higher likelihood to become infested with invasive species due to higher level of ground disturbance at these sites when compared with access routes used for big game retrieval. This is due to the retrieval routes being used one time in/out only, with minimal ground disturbance expected to occur as a result of this use.

For the action alternatives, it is difficult to estimate how many new populations of invasive species would be prevented as the result of the limitation on motorized cross-country travel, but some level of expansion is expected into new areas. The tracks made by OHVs can become regularly used routes, which provide the habitat that invasive species prefer, although the likelihood of this occurring is expected to be slight, particularly related to cross country travel for big game retrieval since it is limited to one time in/out, occurs infrequently across the Forest, and is seasonally limited.

#### ***Alternative 1 – No Action***

The likelihood and potential extent of weed spread from motorized vehicles would be highest for Alternative 1 because of all the alternatives, it permits the most motorized use on the Santa Fe National Forest, including the number of miles of open motorized roads and trails and unrestricted cross country travel.

Measure 1 (miles of existing roads and trails traversing known populations of invasive species) is 79 miles, the highest for any alternative. The potential for weeds, seeds, or propagules to be moved by vehicles is greater due to the high number of open roads and trails in this alternative (Hansen and Clevenger, 2005). This measure depicts the relative opportunity of weed spread from vehicles crossing existing invasive plant populations.

Measure 2 (total miles of routes proposed to be open for all types of motorized use) is also the highest of the alternatives at 5457 miles. Continued motor vehicle use of roads and trails would likely lead to an increase in the number of weed populations and acreage along them; this effect has been well documented (Hansen and Clevenger 2005).

Measure 3 (acres of areas open to motorized vehicle travel within the Forest) is high for this alternative. This alternative would allow motorized cross-country travel on approximately 82% of the Forest, or 1,266,910 acres. However, the Forest estimates that OHV use off of designated routes is currently occurring on approximately 35% of these acres (443,848 acres) at present; this use would continue to occur and contribute to weed spread (Rooney, 2005). Additionally, there is no timing limitation on when motorized cross-country travel can occur with this alternative, which may increase the potential for invasives to be transported into previously “clean” areas. It is difficult to estimate how many new populations would be established as the result of motorized cross-country travel, but they would be likely to expand into new places. The tracks made by OHVs can become established routes after some level of re-use, which then provides habitat conducive to invasive species establishment. In Glacier National Park, exotic plant species showed a continuous distribution along road and trail corridors in the majority of study transects (Tyser and Worley, 1992). New user created routes increase the risk of transport, introduction, and establishment of new populations of invasive species.

#### ***Alternative 2 – Proposed Action***

The likelihood and potential extent of weed spread from motorized vehicles would be moderate for Alternative 2. The number of open road and trail travel route miles is reduced when compared to the No Action Alternative, and it continues to allow for cross country travel in some areas for dispersed camping and big game retrieval. However, cross country travel is limited in distance (150 ft or 300 ft from existing routes), intensity (one time in/out) and timing (big game retrieval is seasonally limited), which reduces the risk of transport and introduction of invasive species.

Measure 1 (miles of routes and fixed distance corridors traversing known populations of invasive species) is 57 miles, which is a 28% reduction from the No Action Alternative. The potential for weeds, seeds, or propagules to be moved by vehicles is moderate due to the number of open roads and trails in this alternative (Hansen and Clevenger, 2005).

Measure 2 (miles of routes proposed to be open for any motor vehicle use) is also moderate, at 2552 miles, a 53% reduction from the No Action Alternative. Continued motor vehicle use of roads and trails would likely lead to an increase in the number of weed populations and acreage along them; this effect has been well documented (Hansen and Clevenger 2005). However, this potential is expected to be less than the No Action Alternative.

Measure 3 (acres of areas open to motorized vehicle travel within the Forest) is low for this alternative, with a 99% reduction in acres open for motorized cross country travel from the No Action Alternative. However, based on the Forest estimate of the area currently being used for cross country travel (443,848 acres), the reduction in area

available for cross country travel is approximately 96%. This alternative would allow motorized cross-country travel for the purposes of dispersed camping and big game retrieval only on approximately 1% of the Forest, or 16,380 acres. This use is expected to continue to occur and contribute to weed spread (Rooney, 2005), however this alternative limits the area open to either 150 ft or 300 ft from select existing routes, the intensity to one time in/out from the identified route, and the time period (for big game retrieval) on which motorized cross-country travel can occur. The reduction in areas open to cross country travel is expected to reduce the potential for invasives to be transported into previously “clean” areas more than the No Action Alternative.

### ***Alternative 3***

The likelihood and potential extent of weed spread from motorized vehicles would be lowest for Alternative 3. The number of open road and trail travel route miles is reduced, and it does not designate any areas open for motorized cross country travel when compared to the No Action Alternative.

Measure 1 (miles of routes and fixed distance corridors traversing known populations of invasive species) is 49 miles, which is a 38% reduction from the No Action Alternative. The potential for weeds, seeds, or propagates to be moved by vehicles is low due to the number of open roads and trails in this alternative (Hansen and Clevenger, 2005).

Measure 2 (miles of routes proposed to be open for any motor vehicle use) is also low, at 1882 miles, a 66% reduction from the No Action Alternative. Continued motor vehicle use of roads and trails would likely lead to an increase in the number of weed populations and acreage along them; this effect has been well documented (Hansen and Clevenger 2005). However, this potential is expected to be less than the No Action Alternative due to fewer miles of roads and motorized trails open for use.

Measure 3 (acres of areas open to motorized vehicle travel within the Forest) is the lowest for this alternative, a 100% reduction in acres open for motorized cross country travel when compared to the No Action Alternative. This alternative does not allow any motorized cross-country travel on the Forest. Total elimination of this use is expected to reduce the number of new invasive plant infestations, by decreasing the potential for invasives to be transported or introduced into previously “clean” areas, when compared to the No Action Alternative.

### ***Alternative 4***

The likelihood and potential extent of weed spread from motorized vehicles would be higher for Alternative 4 than any of the other action alternatives. The number of open road and trail travel route miles are reduced the least when compared to the No Action Alternative, and it provides for continued cross country travel from any designated open route, limited to a one time in/out basis, for dispersed camping (300 ft) and big game retrieval (one mile). The cross country travel distance limitations may reduce the risk of transport and introduction of invasive species when compared to the No Action Alternative.

Measure 1 (miles of routes and fixed distance corridors traversing known populations of invasive species) is 58 miles, which is a 27% reduction from the No Action Alternative.

The potential for weeds, seeds, or propagates to be moved by vehicles is moderate due to the number of open roads and trails in this alternative (Hansen and Clevenger, 2005).

Measure 2 (miles of routes proposed to be open for any motor vehicle use) is also moderate, at 3010 miles, a 45% reduction from the No Action Alternative. Continued motor vehicle use of roads and trails would likely lead to an increase in the number of weed populations and acreage along them; this effect has been well documented (Hansen and Clevenger 2005). However, the risk of transport and introduction of new invasive species populations is expected to be less when compared to the No Action Alternative.

Measure 3 (acres of areas open to motorized vehicle travel within the Forest) is the highest of any of the action alternatives, a 16% reduction in acres open for motorized cross country travel when compared with the No Action Alternative. This alternative would allow motorized cross-country travel on approximately 69% of the Forest, or 1,065,539 acres open for dispersed camping and big game retrieval. However, motorized travel is not expected to occur within the whole of this area due to vegetation, slope, or other limiting factors. The motorized use that does occur is expected to contribute to weed spread at some level (Rooney, 2005), and because this alternative extends the width of the cross country corridors (camping - 300 ft, big game retrieval - one mile), the risk for weed transport and introduction is greater than all the other action alternatives, although still less than the No Action Alternative. The limitation on the width of the cross country travel corridor may reduce the potential for invasive species to be transported into previously “clean” areas when compared with the No Action Alternative.

#### ***Alternative 5***

The likelihood and potential extent of weed spread from motorized vehicles would be moderate to high for Alternative 5. The number of miles of open road and trail travel routes is less than the No Action Alternative, which may reduce the potential for transport and introduction of new invasive species populations. Alternative 5 provides for continued cross country travel from selected designated open routes, limited to a one time in/out basis, for dispersed camping (150 ft to 300 ft) and big game retrieval (one mile). The cross country travel distance limitations may reduce the risk of transport and introduction of invasive species when compared to the No Action Alternative.

Measure 1 (miles of routes and fixed distance corridors traversing known populations of invasive species) is 54 miles, which is a 32% reduction from the No Action Alternative. The potential for weeds, seeds, or propagates to be moved by vehicles is moderate due to the number of open roads and trails in this alternative (Hansen and Clevenger, 2005).

Measure 2 (miles of routes proposed to be open for any motor vehicle use) is also moderate, at 2536 miles, a 54% reduction from the No Action Alternative. Continued motor vehicle use of roads and trails would likely lead to an increase in the number of weed populations and acreage along them; this effect has been well documented (Hansen and Clevenger 2005). However, this potential is expected to be less than the No Action Alternative.

Measure 3 (acres of areas open to motorized vehicle travel within the Forest) is moderate to high for this alternative, a 70% reduction from the No Action Alternative. This alternative would allow motorized cross-country travel on approximately 24% of the

Forest, or 377,748 acres open for motorized cross country travel. However, motorized travel is not expected to occur within the whole of this area due to vegetation, slope, or other limiting factors. The motorized use that does occur is expected to contribute to weed spread at some level (Rooney, 2005). Because this alternative includes focused areas for cross country corridors (camping – 150 ft – 300 ft, big game retrieval - one mile), the risk for transport and introduction of invasive species is moderate to high, although still less than the No Action Alternative. The reduction in areas open to cross country travel is expected to reduce the potential for invasives to be transported into previously “clean” areas when compared with the No Action Alternative.

### **Cumulative Effects**

#### **Past Actions (1987-2009)**

There are a number of activities, actions, and developments that have occurred on the Santa Fe National Forest that may have cumulatively affected non-native invasive species. Those activities include: subdivision and development of private inholdings, road construction for timber sales, mining claims and development of mining, roads to access oil and gas developments and pipelines, acquisition of lands by the Santa Fe National Forest, and technological advances in OHVs (e.g. 3-wheelers, 4-wheelers, side-by-sides, tracked vehicles). All of these activities potentially introduced, transported, or spread non-native invasive species in the Forest. However, it is not possible to explicitly quantify the influence these activities have had cumulatively on non-native invasive species.

#### **Present or Reasonably Foreseeable Actions (2009-2025)**

In addition to past actions, activities that are currently occurring, or expected to occur in the future in the Santa Fe National Forest that could cumulatively affect non-native invasive species include: economic recession, increase in state’s population, existence or creation of private or state OHV parks, and evolution of recreational preferences among the general public, e.g., mud-bogging, geocaching, hiking. Projects listed in the Santa Fe National Forest schedule of proposed actions include: 2008/2009 NM Motorcycle Trials Event, Recreation Residence Permit renewal (keeps existing motorized use in place), South Pit Pumice Mine Expansion, Cerro del Pino Pumice Mine, Gallinas Municipal Watershed WUI Project, Boone-Duran Pumice Mine EA, San Ignacio Joint Ventures Road Easement, County Line Forest Products, Rio Chama Wildlife Management Prescribed Fire Project, and Bear Paw Salvage. All of these activities could potentially introduce, transport, or spread non-native invasive species in the Forest. However, it is not possible to explicitly quantify the influence these activities may have cumulatively on non-native invasive species, except to say that increased use of the road system increases the potential for expansion of non-native invasive plant populations.

The majority of the activities occurring in the Santa Fe National Forest have the potential to affect the cumulative condition of non-native invasive plants in a negative manner (ie. more weeds). One past, present, and reasonably foreseeable action that can reduce or control weed populations or infestation levels is the direct treatment of the weeds. The methods of treatment currently available to the Forest are limited until a project-specific environmental analysis analyzing the use of herbicides is completed. Until such time, the

cumulative effect of this action is limited in scope in the Forest, but having positive effects in reducing or controlling non-native invasive weeds. Other agency and private individual efforts to reduce or control weeds may also be contributing in a positive manner to the cumulative condition for non-native invasive plant populations. Though these occur outside of the analysis area, fewer weeds entering the forest from adjacent properties would reduce the risk of spread cumulatively.

### **Irreversible or Irretrievable Effects**

Alternative 1 would result in continued threats to native plant communities, watershed health, and wildlife, and may be irreversible. Some weed species can invade relatively undisturbed native vegetation, affect runoff patterns or the amount of available soil moisture, degrade habitat for native wildlife, decrease economic land values, or change the way people use the land (Asher 1998). Some effects, such as loss of wildlife habitat, may also be potentially irretrievable if the weed populations expand beyond the Forests' capacity to manage them. The ability to manage noxious weeds is outside the scope of this project.

The Action alternatives are less likely to have irreversible or irretrievable effects due to an expected reduction in the transport and spread of weeds by motorized use, but the effects of these alternatives also depend upon the Forests' ability to manage weed infestations. Implementation of any action alternative may slow the establishment of new infestations of invasive species, but without a coincident invasive management program, irreversible or irretrievable effects may result. Once established, weed populations can be difficult to control, contain, or eradicate, so the change could be long-lasting.

### **Effects of Plan Amendments**

- 1) The change in Forest Plan definitions does not have any effect on the issue of non-native invasive species.
- 2) The effects to non-native invasive species of closing the entire Forest to motorized cross country travel has been documented previously in this specialists report (see Alternative 3, above).
- 3) For Figure 11 (in Alternatives 2,4,5) and Figure 29 & 30 (Alternative 4), the effect of allowing motorized use on previously non-motorized trails would increase the potential for weed introduction and spread.

### **Legal Consistency**

#### **The Federal Noxious Weed Act of 1974**

This Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health. The Act requires that each federal agency develop a management program to control undesirable plants on federal lands under the agency's jurisdiction; establish and adequately fund the program; implement cooperative agreements with state

agencies to coordinate management of undesirable plants on federal lands; and establish integrated management systems to control undesirable plants targeted under cooperative agreements. This travel management decision is not determining how to manage or control noxious weeds but instead describes the effects of the travel management decision to noxious weeds. The travel management analysis is compliant with the Act.

### **Executive Order 13112 (1999)**

This EO directs Federal agencies to use relevant programs and authorities to

- Prevent the introduction of invasive species;
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner;
- Monitor invasive species populations accurately and reliably;
- Provide for restoration of native species and habitat conditions in ecosystems that have been invaded;
- Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species;
- Promote public education on invasive species and the means to address them; and
- Not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.
- The EO 13112 further requires Federal agencies to pursue the duties set forth in this section in consultation with the “National Invasive Species Council, consistent with the National Invasive Species Management Plan and in cooperation with stakeholders, as appropriate, and, as approved by the Department of State when working with international organizations and foreign nations.”

All the action alternatives analyzed in this analysis are expected to result in reduced risk of transport and introduction of invasive species which meets the direction of, and therefore are compliant with, EO 13112.

### **Forest Plan Consistency**

The Santa Fe National Forest Land and Resource Management Plan (1987, as amended) contains no standards and guidelines specific to invasive species. Thus, all the alternatives are consistent with current Forest Plan direction on invasive species.

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