Appendix A.

Noxious Weed Assessment

Appendix A. Noxious Weed Risk Assessment for Angeles National Forest Lands

A.1 Introduction

The USDA Forest Service Strategic Plan for Fiscal Years 2007 through 2012 identifies the introduction and spread of invasive species as one of the four primary threats to the nation's forests and grasslands (USDA 2007). One of the identified objectives under the Strategic Plan's primary goal to "restore, sustain, and enhance the nation's forests and grasslands" is to "reduce adverse impacts from invasive and native species, pests, and diseases" (USDA 2007). Several federal laws and regulations require the Forest Service to manage and control noxious weeds on Forest Service lands. Among these are the Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 et seq.), and the National Environmental Policy Act (NEPA) (42 U.S.C. 4321-4346) and implementing regulations found at 40 CFR Parts 1500-1508 (FSM 1950; FSH 1909.15). Forest Service Manual 2080 (FSM 2080), which governs the management of noxious weed on Forest Service lands, describes these laws and additional regulations in Section 1 (USDA 1995). In addition, the land management plan for each national forest or forest region, such as the Final Environmental Impact Statement, Volume 1, Land Management Plans (USDA 2005), contains policies and guidelines for the prevention and control of invasive species. One of the requirements contained in FSM 2080 is for a determination of "the risk of noxious weed introduction or spread as part of the NEPA process for proposed actions, especially for ground disturbing and site altering activities" (USDA 1995). In compliance with the requirements of FSM 2080, this report 1) analyzes the risk of noxious weed introduction or spread associated with the Tehachapi Renewable Transmission Project (TRTP) within the Angeles National Forest (ANF); 2) identifies appropriate methodology, impact reduction strategies, and Best Management Practices (BMPs) to reduce these risks; and 3) identifies the recommended management actions required by the project proponent to further reduce project-induced weed related impacts below a significant level under the California Environmental Quality Act (CEQA) and NEPA.

A.1.1 Definition and Selection of Noxious Weeds

The term "noxious weeds" includes all plants formally designated by the Secretary of Agriculture or other responsible State official as such, and these species usually possess one or more of the following characteristics: "aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being non-native or new to or not common to the United States or parts thereof" (USDA 1995). Several noxious weeds, as defined by the California Invasive Plant Council (Cal-IPC) or the Forest Service, already exist within or near the proposed Project in well-established populations, often clearly associated with a source of disturbance. Additionally, the native species rubber rabbitbrush (*Chrysothamnus nauseosus*), while not designated by any California State or federal agency as a noxious weed, is discussed here because the species is an opportunistic invader of disturbed chaparral and Mojavean scrub habitats, dominating areas and rendering them difficult or impossible to restore to the original suite of species (Mohan 1972, Cooley 2000). However, rubber rabbitbrush is not likely to behave as an invasive, within ANF boundaries, only in lower elevation Mojavean habitats in the northern portion of the alignment. All other weed species considered are exotic to the western U.S. and have been formally rated or considered for rating by Cal-IPC. Weed species observed across the project area are discussed, as are other noxious weeds threatening ANF habitats (USDA 2005). The primary objective of this Report is to identify threat and infestation levels

within the ANF specifically, but some weed species not observed within ANF boundaries were nevertheless observed within the project alignment in the Southern or Northern Regions. We included such species in this Report due to the small but potential risk for their spread into the ANF by project vehicles used in other portions of the alignment, or the larger risk of non-project actions spreading them into the ANF.

Noxious weeds present a severe threat to natural habitats. When noxious weeds become established in an area, they can cause a permanent or long-lasting change in the environment by increasing vegetative cover, thereby creating a dense layer that prevents native vegetation from germinating, and essentially halting normal successional processes that would typically allow an area to recover from disturbance. Weed populations can also alter edaphic and hydrological conditions and structure through nitrogen fixation (as in Spanish broom, *Spartium junceum*) or draining of the water table (as in giant reed, *Arundo donax*). Monocultures of noxious weeds create such an unfavorable environment for wildlife that associate, mutualistic species necessary for native plant life cycles, such as seed dispersers, fossorial mammals, or pollinators, can be lost from the area, and heavy infestations can also significantly reduce the recreational or aesthetic value of open space. This being said, weed control efforts are costly, labor intensive, often require several years of follow-up monitoring and a combination of control methods to completely eradicate populations, and in many cases pose significant risk to native plants that may occur within the weed control area. Even still, the ecological costs and risks associated with not managing noxious weed populations are so great that these exceed risks posed by most control methods (DiTomaso, 1997).

A.2 Proposed Project (Alternative 2) Description

The proposed Project includes a series of new and upgraded high-voltage electric transmission and substations to deliver electricity from wind farms in Eastern Kern County, California to the Los Angeles Basin. The duration of the proposed construction for this project is 55 months, and is estimated to begin in April 2009 and end in November 2013. The purpose of the proposed TRTP would be to provide the electrical facilities necessary to integrate levels of new wind generation in excess of 700 megawatts (MW) and up to approximately 4,500 MW in the Tehachapi Wind Resource Area (TWRA). The major components of the proposed Project/Action have been separated into eight distinct segments. Two of these segments, Segment 6 and Segment 11, are proposed to pass through the ANF and would constitute new and replacement transmission lines, staging areas, pulling stations, and tower locations. A summary of the proposed actions within each of the two segments is provided below (Table A-1). Additional project detail is provided in Section 1 of the Biological Specialist Report.

Table A-1. Summary of Alternative 2 (SCE's Proposed Project) Components

Segment 11: New Vincent – Mesa (via Gould) 500/220-kV T/L

• Initiates at the existing Vincent Substation and ends at the existing Mesa Substation
• Remove approximately 4 miles of the existing Vincent – Pardee No. 1 220-kV T/L
• Remove approximately 15 miles of the existing Pardee – Eagle Rock 220-kV T/L
• Construct new approximately 19-mile 500-kV single-circuit T/L between Vincent and Gould Substations (initially energized at 220 kV)
• String approximately 18 miles of new 220-kV conductor on the vacant side of the existing double-circuit structures of the Eagle Rock-Mesa 220-kV T/L
• Most construction within existing ROW, except for approximately 3 miles north of Gould Substation where existing ROW would be expanded on the west side to maintain a ROW width of 250 feet (currently the ROW width varies)
• Erect approximately 76 new transmission structures, including:
  • 2 single-circuit 220-kV poles (120 ft tall)
  • 7 single-circuit 220-kV LSTs (120-160 ft tall)
  • 67 single-circuit 500-kV LSTs (100-220 ft tall)
• Would require approximately 12 new pulling locations, 15 tensioner locations, and 5 new splicing locations
• Of the 76 new transmission structures, approximately 16 would be constructed by helicopter due to terrain, which requires:
  • 7 4-acre helicopter staging and support areas ("fly-yards"), only 4 located on ANF lands

Table A-1. Summary of Alternative 2 (SCE's Proposed Project) Components
• Up to 4 5-acre primary marshalling yards sited in pre-disturbed areas if possible • Approximately 2-3 secondary marshalling yards, 1-3 acres each sited in disturbed areas if possible • Construction and vegetation clearing of 16 helicopter landing pads (40 X 40 ft), or 25 X 25 ft portable landing pads on struts for extreme terrain • Up to 14 helicopter support yards at a minimum of 100 X 100 ft • A portion of this segment (S11 MP 1.5 to 18.7) would be located within the ANF (USDA Forest Service land) • On NFS lands approved herbicides will be utilized within the Project area on select invasive plant species. Invasive plant surveys/control will continue for the life of Project
Segment 6: Section of New Replacement Vincent – Rio Hondo No. 2 500-kV T/L (initially energized at 220 kV) and Section of New Vincent – Mira Loma 500-kV T/L
• Initiates at the existing Vincent Substation and ends at the southern boundary of the ANF • Remove approximately 5 miles of the existing Vincent – Rio Hondo No. 2 220-kV T/L between Vincent Substation and the "crossover" span (S6 MP 5.0) • Construct new approximately 5-mile single-circuit Vincent – Mira Loma 500-kV T/L from the Vincent Substation to the "crossover" span (S6 MP 5.0) • Remove approximately 27 miles of the existing Antelope – Mesa 220 kV T/L from Vincent Substation to the southern boundary of the ANF • Construct new approximately 27-mile single-circuit Vincent – Rio Hondo No. 2 500-kV T/L (initially energized at 220 kV) • Eliminate the existing crossing of the Vincent – Rio Hondo No. 2 220-kV T/L over the Antelope – Mesa 220-kV T/L • All construction within existing ROW (~32 miles) • Erect approximately 140 new transmission structures, including: • 2 single-circuit 220-kV LSTs (90-120 ft tall) • 30 single-circuit 500-kV tubular steel poles (TSPs) (75-200 ft tall) • 103 single-circuit 500-kV LSTs (85-193 ft tall) • 4 3-pole dead-end 500-kV structures (75-80 ft tall) • Would require approximately 16 new pulling locations, 16 tensioner locations, and 16 new splicing locations • Of the 140 new transmission structures, approximately 17 would be constructed by helicopter due to terrain, which requires: • 5 4-acre helicopter staging and support areas ("fly-yards"), only 4 located on ANF lands • An unknown number of 5-acre primary marshalling yards sited in pre-disturbed areas if possible • Approximately 3-4 secondary marshalling yards, 1-3 acres each sited in disturbed areas if possible • Construction and vegetation clearing of 17 helicopter landing pads (40 X 40 ft), or 25 X 25 ft portable landing pads on struts for extreme terrain • Up to 10 helicopter support yards at a minimum of 100 X 100 ft • On NFS lands approved herbicides will be utilized within the Project area on select invasive plant species. Invasive plant surveys/control will continue for the life of Project • The majority of this segment (S6 MP 1.45 to 26.9) would be located within the ANF (USDA Forest Service land)

A.3 Alternative 6 (Maximum Helicopter) Description

Alternative 6, also known as the maximum helicopter alternative, includes a series of new and upgraded high-voltage electric transmission and substations to deliver electricity from wind farms in Eastern Kern County, California to the Los Angeles Basin. This alternative was requested by the Forest Service to reduce ground disturbance within the ANF by minimizing new road construction through the use of helicopter construction. Therefore, the proposed T/L alignment for this alternative and all impacts in the northern and southern sections of the project remain identical to Alternative 2. As under Alternative 2, the proposed construction for this alternative is estimated to begin in July 2009. However, for areas within the ANF, the need for substantial helicopter construction may result in a longer construction schedule due to the limited availability of specialized helicopters. The schedule for helicopter construction would be finalized as part of final engineering. Again, the purpose of the proposed Alternative 6 to TRTP would be to provide the electrical facilities necessary to integrate levels of new wind generation in excess of 700 megawatts (MW) and up to approximately 4,500 MW in the Tehachapi Wind Resource Area (TWRA). A summary of the proposed

actions within each of the two segments under Alternative 6 is provided below (Table A-2). Additional project detail is provided in Section 1 of the Biological Specialist Report.

Table A-2. Summary of Alternative 6 (SCE's Maximum Helicopter Alternative) Components

Segment 11: New Vincent – Mesa (via Gould) 500/220-kV T/L

- Initiates at the existing Vincent Substation and ends at the existing Mesa Substation
- Remove approximately 4 miles of the existing Vincent – Pardee No. 1 220-kV T/L
- Remove approximately 15 miles of the existing Pardee – Eagle Rock 220-kV T/L
- Construct new approximately 19-mile 500-kV single-circuit T/L between Vincent and Gould Substations (initially energized at 220 kV)
- String approximately 18 miles of new 220-kV conductor on the vacant side of the existing double-circuit structures of the Eagle Rock-Mesa 220-kV T/L
- Most construction within existing ROW, except for approximately 3 miles north of Gould Substation where existing ROW would be expanded on the west side to maintain a ROW width of 250 ft (currently the ROW width varies)
- Erect approximately 76 new transmission structures, including:
  - 2 single-circuit 220-kV poles (120 ft tall)
  - 7 single-circuit 220-kV LSTs (120-160 ft tall)
  - 67 single-circuit 500-kV LSTs (100-220 ft tall)
- Would require approximately 12 new pulling locations, 15 tensioner locations, and 5 new splicing locations
- Of the 76 new transmission structures, approximately 56 would be constructed by helicopter, which requires:
  - Up to 4 5-acre primary marshalling yards to be sited in pre-disturbed areas if possible
  - Approximately 2-3 secondary marshalling yards, 1-3 acres each and to be sited in disturbed areas if possible
  - Construction of 56 helicopter landing pads (40 X 40 ft vegetation clearing or 25 X 25 ft portable landing pad on struts for extreme terrain
  - Up to 8 helicopter support yards at a minimum of 100 X 100 ft
  - On NFS lands approved herbicides will be utilized within the Project area on select invasive plant species. Invasive plant surveys/control will continue for the life of Project
  - A portion of this segment (S11 MP 1.5 to 18.7) would be located within the ANF (USDA Forest Service land)

Segment 6: Section of New Replacement Vincent – Rio Hondo No. 2 500-kV T/L (initially energized at 220 kV) and Section of New Vincent – Mira Loma 500-kV T/L

- Initiates at the existing Vincent Substation and ends at the southern boundary of the ANF
- Remove approximately 5 miles of the existing Vincent – Rio Hondo No. 2 220-kV T/L between Vincent Substation and the "crossover" span (S6 MP 5.0)
- Construct new approximately 5-mile single-circuit Vincent – Mira Loma 500-kV T/L from the Vincent Substation to the "crossover" span (S6 MP 5.0)
- Remove approximately 27 miles of the existing Antelope – Mesa 220 kV T/L from Vincent Substation to the southern boundary of the ANF
- Construct new approximately 27-mile single-circuit Vincent – Rio Hondo No. 2 500-kV T/L (initially energized at 220 kV)
- Eliminate the existing crossing of the Vincent – Rio Hondo No. 2 220-kV T/L over the Antelope – Mesa 220-kV T/L
- All construction within existing ROW (~32 miles)
- Erect approximately 140 new transmission structures, including:
  - 2 single-circuit 220-kV LSTs (90-120 ft tall)
  - 30 single-circuit 500-kV tubular steel poles (TSPs) (75-200 ft tall)
  - 103 single-circuit 500-kV LSTs (85-193 ft tall)
  - 4 3-pole dead-end 500-kV structures (75-80 ft tall)
- Would require approximately 16 new pulling locations, 16 tensioner locations, and 16 new splicing locations
- Of the 140 new transmission structures, approximately 87 would be constructed by helicopter due to terrain, which requires:
  - At least 7 4-acre helicopter staging and support areas ("fly-yards"), allocated on ANF lands. Additional helicopter staging and support areas located outside the ANF
  - An unknown number of 5-acre primary marshalling yards sited in pre-disturbed areas if possible
  - Approximately 3-4 secondary marshalling yards, 1-3 acres each sited in disturbed areas if possible
  - Construction and vegetation clearing of 87 helicopter landing pads (40 X 40 ft), or 25 X 25 ft portable landing pads on struts for extreme terrain
  - Up to 14 helicopter support yards at a minimum of 100 X 100 ft
  - On NFS lands approved herbicides will be utilized within the Project area on select invasive plant species. Invasive plant surveys/control will continue for the life of Project
- The majority of this segment (S6 MP 1.45 to 26.9) would be located within the ANF (USDA Forest Service land)

A.4 Vegetation Types Within the Project Area

The majority of the proposed Project within the ANF consists of mixed chaparral vegetation (Table A-3). Canyon oak forest and bigcone Douglas fir-canyon oak forest are the second and third most common vegetation types, respectively. The next most abundant vegetation type is chamise chaparral, followed by two vegetation types that were recently burned (deerweed/chia herbaceous field, recently burned and Mojavean pinyon and juniper woodland, recently burned). Vegetation types restricted to the southern portion of the ANF include southern coast live oak riparian forest and coastal sage scrub. In the drier northern portion of the ANF, desert vegetation is more common, including Mojave pinyon woodland, Mojave juniper woodland and scrub, desert wash, and big sagebrush scrub. Several riparian vegetation types are located in deeper canyons along rivers or creeks and include southern willow scrub, southern sycamore alder riparian woodland, southern cottonwood willow riparian forest, and southern arroyo willow riparian forest. Non-native plants dominate three relatively uncommon vegetation types: non-native woodland, California annual grassland, and barren/developed. Vegetation maps of a 500-foot buffer surrounding the existing transmission lines composing Segments 6 and 11 are presented in Appendix G of the Biological Specialist Report. Descriptions of the mapped vegetation types are presented in Appendix H, while the methods used to define and map the vegetation are described in Section 2.2.

Table A-3. Vegetation Types Occurring Within the Angeles National Forest

Habitat Type	Segment 11		Segment 6		ANF Project Total	
	Acreage	Percentage of total acreage	Acreage	Percentage of total acreage	Acreage	Percentage of total acreage
Mixed Chaparral	1,508.14	54.26%	1,456.82	47.29%	2,964.97	50.59%
Canyon Oak Forest	76.83	2.76%	438.79	14.24%	515.62	8.80%
Bigcone Douglas Fir-Canyon Oak Forest	225.61	8.12%	268.88	8.73%	494.49	8.44%
Chamise Chaparral	169.79	6.11%	187.08	6.07%	356.87	6.09%
Deerweed/Chia Herbaceous Field, Recently Burned	255.78	9.20%	15.57	0.51%	271.35	4.63%
Mojavean Pinyon and Juniper Woodland, Recently Burned	49.86	1.79%	162.05	5.26%	211.91	3.62%
Barren/Developed	85.66	3.08%	124.91	4.05%	210.57	3.59%
Scrub Oak Chaparral	98.53	3.54%	84.07	2.73%	182.60	3.12%
Interior Live Oak Scrub	6.47	0.23%	99.73	3.24%	106.20	1.81%
Coulter Pine Forest	30.25	1.09%	74.37	2.41%	104.62	1.79%
Coast Live Oak Woodland	89.11	3.21%	7.83	0.25%	96.94	1.65%
Mojave Pinyon Woodland	12.91	0.46%	47.92	1.56%	60.82	1.04%
Coastal Sage Scrub	37.68	1.36%	14.68	0.48%	52.35	0.89%
Southern Sycamore Alder Riparian Woodland	32.38	1.16%	14.74	0.48%	47.12	0.80%
Southern Coast Live Oak Riparian Forest	43.23	1.56%	0.00	0.00%	43.23	0.74%
Mojave Juniper Woodland and Scrub	4.74	0.17%	27.18	0.88%	31.92	0.54%
Southern Willow Scrub	12.49	0.45%	15.34	0.50%	27.83	0.47%
Non-native Woodland	17.54	0.63%	0.00	0.00%	17.54	0.30%
California Annual Grassland	9.19	0.33%	3.46	0.11%	12.65	0.22%
Southern Cottonwood Willow Riparian Forest	8.42	0.30%	2.20	0.07%	10.62	0.18%
California Bay Forest	0.00	0.00%	9.74	0.32%	9.74	0.17%
Big Sagebrush Scrub	0.00	0.00%	9.74	0.32%	9.74	0.17%

Table A-3. Vegetation Types Occurring Within the Angeles National Forest						
Habitat Type	Segment 11		Segment 6		ANF Project Total	
	Acreage	Percentage of total acreage	Acreage	Percentage of total acreage	Acreage	Percentage of total acreage
Desert Wash	0.00	0.00%	8.79	0.29%	8.79	0.15%
Southern Arroyo Willow Riparian Forest	0.00	0.00%	5.39	0.18%	5.39	0.09%
Sparsely Vegetated Streambed	1.99	0.07%	0.96	0.03%	2.95	0.05%
Water	1.78	0.06%	0.58	0.02%	2.36	0.04%
Ruderal Grassland	0.72	0.03%	0.00	0.00%	0.72	0.01%
Mule Fat Scrub	0.58	0.02%	0.00	0.00%	0.58	0.01%
Total	2,779.67	100.00%	3,080.80	100.00%	5,860.47	100.00%

A.5 Species Accounts of Weeds Known or With the Potential to Occur Within the Project Area and Appropriate Control Methods

Weed species are ordered by three threat levels as per Cal-IPC. A summary of the spring 2008 survey data is included for each species observed within the alignment. Additionally, we considered species to be present if they were reported as occurring within the ANF (USDA 2005). Some species are not known to occur within the ANF but were observed elsewhere in the alignment and present a high enough risk to be covered here. See Table A-7 at the end of this document for specific location information for weed species observed within the ANF

A.5.1 High Risk Invasive Plant Species[1]

A.5.1.1 Giant Reed

Cal-IPC Pest Rating: High.

Present in Alignment: Yes, observed within ANF at two sites in Segment 11

Description:

Giant reed is a robust perennial grass native to Mediterranean Europe and tropical Asia. In California, the plant has invaded the southern and central parts of the state, and portions of the North Coast region (Bossard et al. 2000). Growing up to 30-ft tall and typically found in dense stands within riparian habitats, stands of giant reed displace native vegetation by monopolizing soil moisture and shading. Stands significantly decrease water levels in aquifers because of their high evapotranspiration rate, estimated to be three times higher than native Californian riparian vegetation (DiTomaso and Healy 2007). It also reduces wildlife forage and nesting habitats for many species including the federally listed least Bell's vireo (*Vireo bellii pusillus*) and southwest willow flycatcher (*Empidonax traillii extimus*, Bell 1998), and noxious alkaloids and sequestered silica in the foliage discourage animals from feeding. Giant reed may increase flooding and siltation due to a change in vegetation structure along banks. Soil preferences are generally broad for this species, as it occurs on coarse sands, gravelly soils, heavy clays, and river sediments. Reproduction and population expansion occurs exclusively and aggressively through vegetative means (by rhizomes), as it is not known to produce viable seeds.

[1] Cal-IPC High and/or CalEPPC A-1/A-2

Control:

- Prevention: The best preventative measure is the early removal of small infestations. As no reproduction takes place by seed, all rhizome fragments must be removed from the site to ensure eradication.
- Mechanical: Smaller plants (less than 6-ft tall) can be pulled by hand when the soil is moist. Care should be taken to remove all rhizome (underground horizontal stems that produce roots below and shoots above) fragments. With larger plants, the aboveground canes can be cut with a chainsaw or brushcutter. Then, the rhizomes must be removed as completely as possible by using shovels, pickaxes, or in very large infestations, excavators. If it is not possible or feasible to remove all underground rhizomes, stems can be cut in May and then covered with a heavy (so that the re-sprouts do not tear through) tarp for the remainder of the season to shade out re-sprouts; or as described below, a herbicidal treatment may be used to help kill rhizomes.
- Fire Management: Prescribed burns remove the aboveground canes, but may encourage regrowth. Large infestations of giant reed can produce tall, hot-burning fire ladders that increase the intensity and impact of fires, and also allow flames to spread to the canopy in riparian areas.
- Herbicide: Herbicide treatment works best to kill any remaining rhizomes after cutting, although some practitioners have used a systemic (sprayed onto intact plants) foliar spray application after the plant has flowered but before summer dormancy (Holloran et al. 2004). Stronger solutions of herbicides can be directly applied to cuts; for a foliar spray a weaker solution is applied. In either case, only herbicides specifically approved for use in wetland environments should be used.

A.5.1.2 Annual *Bromus* Grasses

Cheatgrass

Cal-IPC Pest Rating: High.

Present in Alignment: Yes, observed within ANF at 45 sites in Segment 11 and 100 sites in Segment 6

Red Brome

Cal-IPC Pest Rating: High.

Present in Alignment: Yes, observed within ANF at 66 sites in Segment 11 and 85 sites in Segment 6

Ripgut Brome

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, observed within ANF at 43 sites in Segment 11 and at 52 sites in Segment 6

Description:

Cheatgrass (*Bromus tectorum*), red brome (*Bromus madritensis* ssp. *rubens*), and ripgut brome (*Bromus diandrus*) are exotic, cool-season annual grasses originating from Europe. These species, among other exotic Bromus species and Eurasian annual grasses, have collectively replaced much of the perennial grasses that originally formed California grasslands. All three species contribute to type conversion of native desert woodland, scrub, and coastal scrub communities into annual grasslands due to increased fire frequency and intensity associated with invaded communities (DiTomaso and Healy 2007). Their maturing and drying in early summer creates a flammable layer instead of the bare ground, sparse perennial herbs, and perennial bunchgrasses that would normally form the herbaceous layer in arid woodland and scrub habitats. Additionally, all three species tend to form a relatively uniform, continuous carpet of grass (or, later in the season, standing dead biomass) that can prohibit establishment of native trees, shrubs, and herbs. While annual Bromus grasses can provide good livestock forage when young, they provide little caloric or nutritive

value once dried, and therefore the effective grazing period is often shortened on Bromus-invaded grasslands and scrublands compared to areas dominated by perennial grasses. All species reproduce by seeds, which are dispersed short distances by wind or are moved by rodents and cached underground.

Cheatgrass is especially prevalent in the Great Basin floristic province, although it invades areas under 7,218 ft in elevation throughout California. It is responsible for large areas of type conversion in sagebrush, chaparral, pinyon-juniper woodlands, and other Great Basin desert scrub habitats. Ripgut brome is more widespread throughout the state, although it is especially prevalent in central and southern California grasslands. Red brome, which is the only species discussed here that does not provide good livestock forage at any life stage, is mostly concentrated within the southern half of the state (DiTomaso and Healy 2007). Red brome is implicated in facilitating type conversion of scrublands both within the Great Basin areas of the state and in sensitive coastal scrub habitats.

Control:

- Prevention: Proper stocking levels and the protection of soil resources are the best known land management practices preventing the establishment and spread of cool-season annual grasses in California. However, preventing the spread or eradicating these grasses is difficult. The majority of grasslands within the state are now dominated by these and other exotic annual grasses.
- Mechanical: Few mechanical methods are suitable or effective in annual *Bromus* control. Precisely-timed mowing, after the grass has begun to flower but before it has produced mature seeds (a period of about a week), can help reduce the amount of seed produced each year. In agricultural areas, intensive or deep tilling can help eradicate infestations.
- Fire Management: Burning tends to promote the establishment, growth, and spread of these grass species. Late season burns can significantly increase *Bromus* densities in subsequent years (DiTomaso and Healy 2007). Some practitioners have advocated burning sites after seed is set but before the plants shatter, which reduces the amount of viable seed. However, like other burn control methods, this appears to increase the site's susceptibility to subsequent invasions (DiTomaso and Healy 2007), and therefore is not recommended.
- Herbicide: No herbicidal methods are currently a good option for annual *Bromus* grass control, due to the extensive nature of many infestations. As the grasses become dominant species in the habitats they invade, targeting specific areas for eradication and not affecting other co-occurring native species is difficult.

A.5.1.3 High-risk *Centaurea* Species

Spotted Knapweed

Cal-IPC Pest Rating: High.

Present in Alignment: Not specifically observed within the alignment, but previous surveys reported in the 2005 Land Management Plan have observed this species within the ANF.

Yellow Star-thistle

Cal-IPC Pest Rating: High.

Present in Alignment: Not specifically observed within the alignment, but previous surveys reported in the 2005 Land Management Plan have observed this species within the ANF.

Description:

Spotted knapweed (*Centaurea maculosa*) is a biennial plant native to Europe that belongs to the sunflower family (Asteraceae). Closely related to yellow star-thistle (*Centaurea solstitialis*) and tocalote (*Centaurea melitensis*), scattered populations of this purple flower have been reported throughout California. It can be

found in disturbed open sites, grasslands, heavily-grazed rangelands, roadsides, and logged areas. Reproduction is mainly by seeds, and dispersal over great distances is generally accomplished through human activities, vehicles, heavy machinery, water, soil movement, and by clinging to shoes, clothing, tires, and feet, fur, or feathers of animals. Up to 40,000 seeds per plant may be produced in a single year, and these are propelled a short distance by an explosive force created by drying phyllaries; fortunately unlike other knapweed species, this plant does not usually break off at the base to form a tumbleweed. However, unlike yellow star-thistle or tocalote, spotted knapweed may also show significant vegetative reproduction by producing new rosettes from lateral roots, which may require diligent follow-up treatment after initial control efforts. Another distinction between spotted knapweed and the 2 yellow-headed pest *Centaurea* species is that knapweed requires more soil moisture and is often found in areas with light, well-drained soils that receive at least some amount of summer rainfall (DiTomaso and Healy 2007).

Yellow star-thistle is an annual (rarely biennial), spiny herb in the Asteraceae family. Native to southern Europe and western Eurasia, it is typically found on dry exposed soils within grassland and woodland habitats below 7,500 ft throughout most of California. Like tocalote and spotted knapweed, dense infestations of yellow star-thistle displace native vegetation and associated wildlife species. Forage quality of rangelands and access to recreational areas are also reduced. Because yellow star-thistle has evapotranspiration rates approximately 2 times higher than native grassland species or annual grasses, areas densely infested with star-thistle may exhibit altered hydrological cycles and a reduction in soil moisture that can stress or preclude establishment and growth of other species (DiTomaso et al. 2006). Reproduction is accomplished by seed with flowering generally beginning later than seen in tocalote, starting in late May and continuing until September. Large plants can produce nearly 75,000 seeds, and average-sized plants regularly produce 1,000 seeds, many of which survive as long as ten years. The movement of contaminated hay and uncertified seed are important long distance transportation mechanisms. Seeds are also transported to new areas by road maintenance equipment and on the undercarriage of vehicles (Bossard et al. 2000).

Control:

- Prevention: Fertilizer application, dry-season irrigation, or ill-timed mowing may increase infestation occurrence and severity. Much like tocalote, intense infestations may be avoided through responsible range management, including the appropriate stocking of susceptible rangelands.
- Mechanical: See mechanical control methods for tocalote above, but time appropriately for these later-blooming plants, which will usually have 2 to 5 percent seed head production in June. Mow immediately after the earliest 2 to 5 percent of plants have begun to produce flower heads (May/June). Additionally, hand-pulling may be used as a follow-up treatment for re-sprouting spotted knapweed rosettes produced by root fragments remaining in the soil.
- Biocontrol: Responsible rangeland management, where lands are grazed by sheep, goats, or cattle to a moderate degree, can help prevent establishment and/or spread of populations in grasslands. Infested areas can be treated by high-intensity grazing between the period when the plant bolts (May through June) to just before the plant produces spiny seed heads in July and August. Yellow star-thistle is toxic to horses and causes permanent brain damage leading to nigropallidal encephalomalacia, commonly known as chewing disease (DiTomaso and Healy 2007). Several biocontrol insects have been used in attempts to control infestations. Perhaps the most promising insect biocontrol agent is the yellow star-thistle hairy weevil (*Eustenopus villosus*), which causes damage to the seed heads (reducing reproduction) in both the larval and adult stages (Environmental Laboratories 2007). While this and several other biocontrol insects have been established in sites around California, it has yet to substantially reduce infestation throughout the state. In very dense infestations, however, local release may allow the temporary formation of a large, active, biocontrol population in that area. Some of the same insects established for biocontrol of yellow star-thistle may affect spotted knapweed, but these species favor and will preferentially attack yellow star-thistle. Other

insect species have been released in California to control knapweeds, but it is too early to gauge the treatment efficacy (DiTomaso and Healy 2007).

- Fire Management: Do not burn areas infested with spotted knapweed, as this may increase seed germination. In contrast, prescribed burning of yellow star-thistle can reduce populations if timed correctly, similar to mowing-based treatments. Burning should occur after other annual plants have dried but before yellow star-thistle seeds are produced.
- Herbicide: Herbicide treatments by foliar spray or wick application are generally used to control or reduce spot infestations, or as follow-up to more intensive mechanical, grazing, or fire management-based treatments.

A.5.1.4 Fennel

Cal-IPC Rating: High.

Present in Alignment: Invades annual grasslands in the southern Project segments, not yet observed within the ANF.

Description:

Fennel (*Foeniculum vulgare*) is an erect perennial herb belonging to the carrot family (Apiaceae). It generally stands 4 to 10 ft tall, and has finely dissected leaves characterized by a highly aromatic licorice or anise scent. Fennel is most common throughout low elevation areas of the California floristic province. It is generally found in disturbed, mesic sites located next to brackish or fresh waters,although it is also found in pastures, along roadsides, and in abandoned lots. Common habitats in which it may occur include grasslands, coastal scrub, chaparral, savannahs, and the banks of creeks, estuaries, and bays. This species reproduces by seeds and may also reproduce vegetatively from roots or stem fragmentation. After removal of aboveground vegetation, these perennials can re-sprout quickly from reserves stored in the large taproots.

Control:

- Prevention: Fennel colonizes sites with disturbed soils, so activities that cause soil disturbance should be re-vegetated with native species as soon as possible, particularly in chaparral habitats (Holloran et al. 2004). Managing areas to minimize soil disturbance can help prevent the establishment, or control the spread, of this species.
- Mechanical: Mechanical removal of this species is most successful when the plants are young and have not developed a large taproot.. Small seedlings or individual plants in small infestations can be removed when the soil is moist, using soil knives or trowels for seedlings and shovels or hand picks for larger plants with established taproots. For larger or denser infestations, frequent, repeated mowing every 3 months for approximately 4 years is often sufficient to reduce or eradicate fennel (Holloran et al. 2004). Infestations should not be mown during seed set, as this facilitates spread by seed. Burning followed by herbicide treatments for 2 years can also control or eradicate fennel infestations.
- Biocontrol: No known biocontrol agents provide safe or effective treatment of fennel infestations. Cattle will graze younger leaves but avoid the plant as the foliage matures later in the season.
- Fire Management: Fall burning followed by herbicide treatments for 2 years can also control or eradicate fennel (DiTomaso and Healy 2007).
- Herbicide: A 2% glyphosate solution can be applied as a foliar spray in grassland environments after seedlings germinate and/or older plants re-sprout from the rootstock in spring. However, this method may affect other native vegetation that co-occurs with the infestation and should be used with care. Herbicidal treatments are often used in concert with mechanical or burn methods, and some experts recommend mowing, waiting for seedlings and re-sprouts to emerge, and following with a foliar spray (Holloran et al. 2004). For infestations near wetlands or aquatic habitats, only herbicides specifically approved for use in these sensitive habitats should be applied.

A.5.1.5 English Ivy

Cal-IPC Pest Rating: High.

Present in Alignment: Yes, observed within ANF at one site in Segment 11.

Description:

English ivy (*Hedera helix*) is a common perennial landscaping vine in the ivy family (Araliaceae). Originating from Europe, it escaped cultivation and invades many riparian corridors or other mesic forest sites in California, particularly in coastal areas. English ivy has two growth forms, one producing vine-like, climbing stems (which are considered juvenile); and the other producing upright, shrubby stems (considered adult) that produce flowers and fruit. Reproduction is by seed or vegetatively through spread from stolons and vine-like stems. Plant tissues tend to be strongly totipotent in this species, meaning that any fragment of stem material left in contact with the soil surface can regenerate into a completely new plant (DiTomaso and Healy 2007). English ivy produces several undesirable effects in invaded systems, such as a loss of understory plant diversity. The species is such a strong competitor for water and light that invaded areas are often called "ivy deserts". Additionally, because it can grow over other plants, even large trees and shrubs can be injured through added leaf weight and contribute to storm damage or treefall.

Control:

- Prevention: Removal of small or initial infestations can prevent the development of large, difficult-to-eradicate colonies.
- Mechanical: Hand-removal of all above- and below-ground tissues using clippers and weed wrenches can successfully control infestations (Bossard et al. 2000, DiTomaso and Healy 2007). The best method is to work from the perimeter of the infestation inwards, and return to the site repeatedly in subsequent seasons or years to remove additional plants and re-sprouts.
- Biocontrol: No biocontrol-based methods exist for this species, and none will likely be developed due to English ivy's popularity as an attractive landscaping plant.
- Herbicide: English ivy produces a very thick, waxy cuticle that inhibits herbicide infiltration into tissues. Herbicide treatment can be effective on young or re-sprouting tissues, before the waxy cuticle has built up, and is best preceded by manual control efforts. A 5% solution of glyphosate can be applied by foliar spray to young tissues. Spot treatments can be accomplished by wick application. However, infestations are often in sensitive riparian areas, risking herbicidal contamination of native vegetation and watercourses. Only herbicides specifically approved for use in aquatic and wetland habitats should be employed in control efforts for this species in riparian habitats, and care should be taken to minimize damage to native aquatic and emergent vegetation through careful application.

A.5.1.6 Perennial Pepperweed

Cal-IPC Rating: High.

Present in Alignment: Not specifically observed within the alignment, but previous surveys reported in the 2005 Land Management Plan have observed this species within the ANF.

Description:

Perennial pepperweed (*Lepidium latifolium)* is an erect multi-stemmed herb in the mustard family (Brassicaceae). Though it is herbaceous, it can grow to be three to eight feet tall. It is highly competitive, forming dense colonies that displace native vegetation. It typically grows on moist or seasonally wet sites and thrives on soils that are slightly saline or alkaline. Habitats include wetlands, riparian areas, meadows, vernal

pools, salt marshes, flood plains, sand dunes, roadsides, and irrigation ditches. Propagation occurs through seed and vegetatively through root suckering and fragmentation. This species does not have a taproot or massive underground storage structure like many perennials; instead, it produces a filamentous root system that is very difficult to remove from the soil. A major impact related to dense, perennial pepperweed infestations is increased erosion on riverbanks following flood events because the fibrous roots of this species do not hold soil in place as effectively as the native riparian and streamside vegetation it replaces (Holloran et al. 2004).

Control:

- Prevention: Prevention of perennial pepperweed infestations is best accomplished through application of appropriate BMPs designed to reduce the spread of propagules, either seeds or root fragments, from infested areas. Any construction equipment used in an area supporting perennial pepperweed should be well cleaned before being used in another area; similarly, hay, crops, and fill soils should not be harvested or exported from an area infested by this species.
- Mechanical: Unless dealing with a small infestation, plants should not be pulled by hand. Repeated mowing, grazing, or even burning without concurrent implementation of other measures is also often ineffective (DiTomaso and Healy 2007). To prevent re-sprouting from roots, mowing treatments can be followed by covering the root system with cardboard or landscape cloth. Alternatively, mowing can be used if timed correctly and followed with herbicides as described below. First, plants should be mowed as close to the ground as possible as soon as flowers appear in spring, then mow again when re-sprouts produce more flowers (before seed has been set in both cases). Herbicide application is subsequently required (Holloran et al. 2004, DiTomaso and Healy 2007).
- Biocontrol: No known biocontrol agents provide safe or effective treatment of pepperweed infestations. Sheep and goats will graze this species if other food is not available, but this is not an effective method of control due to clonal reproduction and re-sprouting from the root system.
- Flooding: One promising treatment for this wetland invader, when feasible, is long-term flooding of infested areas. Perennial pepperweed is adapted to seasonal hydrology and does not tolerate soils saturated for a long duration. However, if native plants are still present on-site, these may also be adapted to seasonal hydrology and could be negatively affected.
- Herbicide: Mowing is most effective when followed by herbicide treatment, but do not apply herbicide to non-mowed plants because perennial pepperweed leaves produce a thick waxy coating that prevents foliar uptake. Instead, herbicide should be applied directly after the second mowing as described above. When working in or near wetlands, only herbicides specifically approved for use in these sensitive habitats should be used.

A.5.1.7 Himalayan Blackberry

Cal-IPC Pest Rating: High.

Present in Alignment: Yes, observed within ANF at one site in Segment 11.

Description:

Himalayan blackberry (*Rubus discolor*) is a fast-growing, spiny shrub in the rose family (Rosaceae) with a semi-erect, mounded, or trailing habit. Despite the species' common name, it is native to Armenia (DiTomaso and Healy 2007). Blackberries produce two main types of shoots, often with differently shaped leaves on each type: primocanes, which emerge during the first year and extend rapidly in length; and floricanes, which emerge from the root crown during the second year and bear flowers and fruits. Reproduction may occur by either clonal or sexual means. Blackberry fruits are edible and highly prized by birds; thus animal-facilitated seed dispersal is very effective and may transport propagules over large distances from infested areas. Additionally, Himalayan blackberries can reproduce vegetatively by re-sprouting from central root crowns, re-

sprouting from lateral or disconnected root fragments, or by producing roots at the tips of primocanes, allowing for the stolon-like lateral aboveground spread of infestations or even the re-rooting and establishment of plants from piles of cut and discarded stems. Himalayan blackberry tends to grow mostly in riparian corridors, but can also invade moist pastures and forest plantations. A highly aggressive competitor, it can replace native vegetation including native species of blackberries, raspberries, and thimbleberries. Creating a dense canopy, it may completely shade out all other vegetation, and may form large, spiny monocultures that can restrict wildlife and livestock access to water resources. Additionally, when infestations develop near structures or along fencelines, the brambles can significantly increase fire hazards and fuel loads (Bossard et al. 2000).

Control:

- Prevention: There are no known land management practices that would discourage establishment of Himalayan blackberry and not also discourage the establishment of favorable native bramble species. However, removal of small, initial infestations is the best method to prevent the development of large monocultural stands that are typically difficult to eradicate.
- Mechanical: Cutting stems can be an effective mode of removal, but as this species has several methods of vegetative reproduction, purely mechanical means can be problematic in several ways. Stems should be cut with a chainsaw, scythe, or tractor-mounted mower followed by the removal of as much underground tissue as possible. This can be prohibitively labor intensive in large infestations. While cutting does not stimulate lateral root sprouting, stems will re-grow from root crowns. Large, older root crowns are often difficult or impossible to remove completely. As plants can reproduce from cut primocanes, slash piles should be burned. As with most mechanical control methods, success is often achieved only after several sequential cuts that exhaust the plants' resources. Optimal timing for cutting is just after the commencement of flowering.
- Fire Management: Burning can be an effective means to control large thickets, but as fires do not kill underground tissues, re-sprouts require follow-up mechanical or herbicidal control. Slash burning as described above will prevent the establishment of new infestations from re-rooted primocanes.
- Biocontrol: The USDA has not supported research on insect biocontrol agents for this species due to the large number of commercially important *Rubus*-based crop berries (Bossard et al. 2000). However, a fungal rust (*Phragmidium violaceum*) was discovered in Oregon in 2005 that may eventually provide effective bioagent based control in California (DiTomaso and Healy 2007). Additionally, although the spiny plants are usually avoided by large livestock, the foliage provides year-round, palatable forage, and goat and sheep herds have been successfully used to control re-sprouting following other control methods, to manage the spread of large infestations, and reclaim or prevent further spread into pastures (Bossard et al. 2000).
- Herbicide: Mechanical control methods such as cutting are most effective if immediately followed by herbicide application. Some researchers report that herbicidal methods are the most effective means of control (DiTomaso and Healy 2007), but caution should be used due to the species' tendency to infest riparian areas. Only herbicides specifically approved for use in aquatic and wetland habitats should be employed in control efforts for this species in riparian habitats, and care should be taken to minimize damage to native aquatic and emergent vegetation through careful application.

A.5.1.8 Cape Ivy

Cal-IPC Rating: High.

Present in Alignment: Not specifically observed within the alignment, but previous surveys reported in the 2005 Land Management Plan have observed this species within the ANF.

Description:

Cape ivy (*Delairea odorata,* formerly *Senecio mikanioides*) is a perennial vine belonging to the sunflower family (Asteraceae). Generally found in moist habitats along the California Coast from Del Norte County in the north to San Diego County in the south, it prefers shady sites with year round moisture such as stream banks or soils with a high water table. However, populations have recently been reported in communities such as grasslands, open oak forests, coastal scrublands, Monterey pine forest, and coastal bluff communities. In habitats that lack year round moisture, cape ivy dies back during the dry season. Reproduction is generally vegetative, either through stolons or fragmentation, although select Californian climatic regimes allow some successful reproduction by seed. Clonal vines can become so thick and heavy that they can choke, shade out, or otherwise damage both canopy and understory vegetation, thus inducing changes in structure and species diversity in affected habitats. The foliage contains pyrrolizidine alkaloids that are intensely poisonous to animals when ingested; when cape ivy is in contact with aquatic habitats enough alkaloids can be leached into the water to kill fish (DiTomaso and Healy 2007).

Control:

- Prevention: No proven prevention methods are known to avert initial colonization and establishment of cape ivy, but once established, following correct control measures is key to prevent or reduce re-infestation. These may include a combination of treatments as described below. Finally, waste vegetation produced in control efforts should be handled by bagging and off-site disposal, or in another manner (i.e. pile turning, herbicide treatment) precluding stolons from producing more roots that can infiltrate the soil.
- Mechanical: Due to cape ivy's ability to re-sprout from very small stolon fragments, manual removal is difficult. Focus, particularly in large patches, should be on removing all vegetative matter from the perimeter of the infestation inwards, as opposed to attempting all-out removal during initial efforts. A containment line should be cut around the patch as if constructing a fire break (although this may cause impacts to native vegetation). All vegetation should be removed from this approximately 3-foot wide swath, as the species does not colonize bare soil easily and additional sprouts may be easily identified. Vines can be cut with loppers and left to rot in the tree as long as no connection to the roots remain, and the remaining vine is high enough that no adventitious roots can infiltrate at ground level. Ground-rooted stolons can be removed with hand mattocks or similar weed wrenching tools, following the stolons inward from the containment swath to their terminus (Holloran et al. 2004). In subsequent years or visits, removal of re-sprouts is essential.
- Biocontrol: No insect species are known to be good biocontrol agents for this species. Additionally, one experiment conducted by the Audubon Canyon Ranch showed that while goats can graze the foliage without toxicity issues, they only consume the foliage, leaving the stolons intact (Holloran et al. 2004).
- Herbicide: Combining mechanical and herbicidal treatments often aids control efforts, but as cape ivy grows in sensitive riparian habitats, care should be taken to protect native vegetation from careless application or herbicides that flash back through the roots of the affected plant. After cutting, a glyphosate solution can be applied to the cut stems using a paintbrush. Also, piles of cast-off cape ivy can be sprayed with a dilute glyphosate solution to prevent stolon re-sprouting.

A.5.1.9 Perennial Broom Shrubs

Spanish Broom

Cal-IPC Rating: High.

Present in Alignment: Yes, observed within ANF at 14 sites in Segment 11 and 8 sites in Segment 6. Also present along many ANF access roads (see Figures A-2 to A-4).

Scotch Broom

Cal-IPC Rating: High.

Present in Alignment: ~~Not specifically observed within the alignment, but previous surveys reported in the 2005 Land Management Plan have observed this species within the ANF~~Yes, observed within ANF at approximately 4 sites along access roads associated with Segment 6.

Description:

Spanish broom (*Spartium junceum*) is a perennial, early-deciduous shrub in the pea family (Fabaceae) that grows four to seven feet tall. It quickly colonizes habitats after a disturbance, developing a dense shrub community that out-competes native vegetation. Additionally, because this species is a nitrogen fixer, colonies can increase nutrient availability, altering soil chemistry even after the infestation is eradicated. This could potentially allow colonization by other non-native plants that previously would have been out-competed by natives adapted to low soil nitrogen content. Alteration of fire regimes may also occur in densely invaded areas, as the shrubs produce a significant lateral, fuel load allowing fire to jump into canopies normally unburned in ground fires. Seed production is abundant, with a single plant capable of producing 7,000 to 10,000 seeds in a single season, each of which is propelled some distance away from the plant by the explosive, corkscrew-like opening of its legumes. Seeds remain viable for at least five years, allowing for build-up of a significant seed bank where these stands are present (Bossard et al. 2000). Not only do the shrubs produce a large, long-lived seed bank, they also produce a taproot storage structure (from which mowed or cut plants can re-sprout) that can be as much as six feet long (Holloran et al. 2004). Habitats for the species include open disturbed sites, such as roadsides and pastures; relatively undisturbed grasslands; coastal scrub; oak woodlands; riparian corridors; and open forests.

Scotch broom (*Cytisus scoparius*) is a very similar species to Spanish broom, with similar ecological tolerances and adverse effects. Scotch broom is also early deciduous with photosynthetic stems, but these are winged or star-shaped in cross section. Scotch broom also has impressive reproductive capabilities, with a single mature shrub being able to produce 2,000 to 3,500 seeds in a non-drought season. These seeds may be even longer lived, as they can remain viable for 30 years under field conditions and about 50 percent of seeds produced in any given year remain dormant, thus producing an even longer-lived seed bank than Spanish broom (DiTomaso and Healy 2007). While seeds are initially dispersed with a similar explosive drying seed pod, Scotch broom seeds produce eliasomes and are thus highly prized by ants, which help disperse seeds even farther from the parent plant. While no populations of Scotch broom were specifically observed by H. T. Harvey & Associates biologists during field surveys, this species is very easy to mistake for Spanish broom from a distance, and the weed is known to exist within the ANF. However, control methods for the two species are essentially identical and populations of either invasive broom should be considered serious threats to habitats in the ANF.

Control:

- Prevention: Minimization of soil disturbance, followed by immediate re-vegetation of any areas that must be disturbed through temporary impacts, is the best way to prevent infestation by Spanish or Scotch broom. Areas where temporary grading impacts have occurred should be monitored until successfully re-vegetated to catch initial colonizers, which should be manually removed as described below. Once a large population is established, eradication is very difficult due to the large, long-lived seed bank that develops (DiTomaso and Healy 2007). However, careful removal of initial colonizers as described below can help prevent the formation of a colony.
- Mechanical: Remove individual plants in late winter-spring when the soil is moist and plants are most easily removed from the soil, using a weed wrench or similar tool to get as much taproot as possible. This is most efficient when removing the initial colonizers of an area to prevent a large infestation, but once a large infestation is present, spring hand pulling of successive generations is still thought to be the most effective

method of control (Holloran et al. 2004). Alternatively, shrubs can be cut or mown during the dry season, which minimizes soil disturbance related to removal efforts and causes extra physiological stress to the more drought-intolerant Scotch broom. Untreated cut stems will re-sprout, and will require repeated cutting unless treated, although in medium to large shrubs, re-sprouting can be reduced by removing all of the bark from the cut stump down to ground level. Wherever mature plants are removed by pulling or cutting, seedlings will have to be treated for at least the following 5 to 8 years to prevent a recurrence of the infestation. Seedlings should be raked with a Hula Hoe soon after germination or flamed with a propane torch.

- Biocontrol: Three species of biocontrol insects have been released to control Scotch broom, but these have so far been ineffective in achieving control of infestations (DiTomaso and Healy 2007). Grazing is not typically an effective means to control Spanish broom, although if goats are confined to a small enough area following a cutting treatment, they can remove re-sprout growth as it occurs (DiTomaso and Healy 2007).
- Fire Management: Burn-based control methods are not recommended for either of these species, due to the danger of fire spreading to tree canopies. Additionally, fires appear to increase the germination rate of Scotch broom seeds.
- Herbicide: Applying herbicide to fresh wounds following cutting can reduce the degree of re-sprouting, but will not prevent new generations of seedlings from germinating each year.

A.5.1.10 Tamarisk

Cal-IPC Pest Rating: High.

Present in Alignment: Not specifically observed within the alignment, but previous surveys reported in the 2005 Land Management Plan have observed this species within the ANF.

Description:

Tamarisk (*Tamarix* sp.) is a type of woody shrub or small tree in the tamarisk family (Tamaricaceae) that invades desert washes and arid riparian areas throughout the western U.S. The Tehachapi Mountains are known to support at least four related Eurasian species with the common names Chinese tamarisk (*Tamarix chinensi*), French tamarisk (*Tamarix gallica*), smallflower tamarisk (*Tamarix parviflora*), and saltcedar (*Tamarix ramosissima*). Tamarisk reproduces by seed and by root sprouting or even disconnected stem fragments. Seedlings have very low survivorship because the deep root system that would protect them from desiccation or being washed away in floods is undeveloped (DiTomaso and Healy 2007). Once this root system forms, however, tamarisk trees are associated with several negative effects, including draining of the water table, loss of diversity, and reduced habitat quality for many bird and wildlife species. Seed germination is not inhibited in saline soils, and the plants can tolerate saline conditions quite well. The plants can extract groundwater efficiently from deep in the soil profile and sequester the resulting salts in their leaf tissues. When these tissues decompose on the soil surface, they increase soil salinity, making the site less suitable for native species. Once established, tamarisk can spread quickly through vegetative means.

Control:

- Prevention: Sites with intact native riparian vegetation are resistant to tamarisk invasion because the seedlings are such poor competitors. Minimizing impacts in riparian and desert wash habitats and restoring any necessary impacts with native vegetation will thus reduce the potential for tamarisk invasion into new areas.
- Mechanical: Trees cut from the soil surface re-sprout from the root system, so aboveground tree removal should be followed with herbicidal methods as outlined below. Otherwise, the root system will need to be manually removed, which may cause more soil disturbance than necessary and leave the site open to new invasions.
- Biocontrol: In 2002, the saltcedar beetle (*Diorhabda elongata*) was released in efforts to control tamarisk, but it is not yet known how effective the species will be in control of these species (DiTomaso and Healy 2007).
- Fire Management: Burning is not recommended because plants re-sprout readily following fire.

- Herbicide: Cut stumps should be painted with an herbicide preparation specifically approved for use in aquatic and wetland ecosystems in California. Care should be taken to use a strong enough application to kill the root crown bud. Repeat applications are required the following year when seedlings germinate in the spring. Young plants are easily scraped with a Hula Hoe or pulled by hand.

A.5.2 Moderate Risk Invasive Plant Species[2]

A.5.2.1 Thoroughwort

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, observed within ANF at two sites in Segment 11 and at one site along an access road for Segment 6.

Description:

Thoroughwort (*Ageratina adenophora*) is a perennial or subshrub in the Sunflower family (Asteraceae) that grows 3- to 5-ft tall. The species is an escaped cultivar originally native to southern and central Mexico (DiTomaso and Healy 2007). Escaped or invasive populations are typically found in disturbed places, coastal canyons, riparian areas, scrub, and on slopes below 984 ft from the San Francisco Bay region, Central Coast, western South Coast ranges, South Coast, central and eastern Transverse Ranges, and south to the Mexican border (DiTomaso and Healy 2007, Holloran 2004). This species can form dense stands, especially after disturbance, displacing native vegetation and associated wildlife. The plant is unpalatable to cattle and causes a fatal respiratory disease in horses (DiTomaso and Healy 2007, Holloran et al. 2004). Thoroughwort grows rapidly and reproduces primarily by seed, each plant producing 7,000 to 10,000 which may remain viable for 2-3 years. This species can also re-sprout from roots and stems contacting soil. These seeds are easily dispersed by wind, water, animals, and machinery (Holloran et al., 2004).

Control:

- Prevention: It may be difficult to prevent initial colonization by seed, so minimization of disturbed habitat should be a priority. The best preventative measure is immediate removal of small infestations.
- Mechanical: For small infestations, plants can be pulled or dug out when in flower but before going to seed. The root must be removed, or the plant will re-sprout. Piles should be made away from wet areas, where they can be left to decompose on-site. A rotary, slash brush-cutter can be used on dry, steep slopes, followed by digging out the roots or an herbicide application to the stems. Return 2 to 3 times at 6-month intervals to kill new seedlings with a McLeod or Hula Hoe. Mulching with landscape fabric or 1 to 2 inches of straw can reduce germination (DiTomaso and Healy, 2007).
- Biocontrol: The USDA has not approved any insect of fungi for use a biological control agents against throroughwort (Bossard, 2000).
- Fire Management: Burning, and other disturbances that result in bare soil, can favor germination and establishment of thoroughwort (DiTomaso and Healy, 2007).

Herbicide: A weak solution of glyphosate can be sprayed on the tops and undersides of the leaves just before or after budding. This treatment is best used away from water on dry slopes (Holloran et al. 2004, DiTomaso and Healy 2007). Alternatively, when the plant is actively growing in late summer or autumn, a large quantity of full strength glyphosate, or dicamba + MCPA, or triclopyr should be applied, focusing on the base and thoroughly wetting the plants (Bossard, 2000).

[2] Cal-IPC Moderate and/or CalEPPC B

A.5.2.2 Tree-of-Heaven

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, observed within ANF at one site in Segment 11 and in several locations along access roads to Segment 6.

Description:

Tree-of-heaven (*Ailanthus altissima*) is a deciduous tree in the Quassia family (Simaroubaceae) reaching 30 to 65 feet high. The species is native to eastern China, but due to its ability to tolerate heavy air pollution, tree-of-heaven has been intentionally planted in urban areas throughout the U.S. Escaped or invasive populations are typically found in riparian, grassland, and oak woodland habitats below 6,600 ft throughout the California floristic province. This species can form dense stands, displacing native vegetation and associated wildlife. The bark and leaves are known to produce allelopathic chemicals (natural herbicides) that affect native vegetation and facilitate the establishment of monocultures, and unlike much of the native vegetation it replaces, the foliage is unpalatable and unsuitable for browsing wildlife (Holloran et al. 2004). Tree-of-heaven is a fast-growing tree that reaches sexual maturity in as little as 10 to 20 years. Reproduction is by seed and also vegetatively by root sprouts from a large taproot. Tree-of-heaven is a prolific seed producer with an individual tree capable of producing 325,000 seeds per year. These seeds are easily wind-dispersed (Hoshovsky 1988), but are only viable for a single year (Holloran et al. 2004). However, seedling establishment of this species is infrequent in California (Bossard et al. 2000), and most infestations intensify and persist through vegetative root suckering. Plants are dioecious, meaning that each individual tree typically only produces male or female flowers, although occasional bisexual flowers have been observed.

Control:

- Prevention: While it is difficult to prevent initial colonization by seeds, which may enter an area through wind dispersal, the main method of reproduction in California is by vegetative reproduction. Slash piles created after cutting tree-of-heaven to control infestations should be burned or periodically rechecked to pull new saplings that can establish from cut stem fragments.
- Mechanical: Stems should be cut to remove all vegetative tissue in late spring to cause the most stress to plants, which will re-sprout from the cut stem as well as produce new individuals through root suckering. Young saplings can be hand-pulled when the soil is moist in an attempt to remove the taproot, but this will not work in older, larger individuals. Cut stems will require repeated treatments over a period of at least 2 years to completely exhaust the resources needed to re-sprout or produce suckers. Do not girdle trees as this encourages extensive suckering from the root system. Immediate treatment of cut stumps as described below is most effective in prevention of re-sprouts.
- Biocontrol: Tree-of-heaven is generally resistant to insect damage, and is even cultivated for use in silk production. Grazing is ineffective, and wildlife do not typically browse new shoots.
- Herbicide: Immediately following the late spring stem cut, apply a 50% solution of glyphosate to the cut wounds using a paintbrush, taking care to protect native vegetation from the herbicide. Application in the late spring coincides with the most effective time to cut, and has the added benefit of being readily translocated to the root system at this time of year (Holloran et al. 2004, DiTomaso and Healy 2007).

A.5.2.3 Tocalote

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, observed at 18 sites in Segment 11, ~~and~~ 6 sites in Segment 6, and along multiple locations along access and spur roads for Segments 6 and 11.

Description:

Tocalote (*Centaurea melitensis*), also known as Maltese star-thistle, is an annual plant in the sunflower family (Asteraceae) that is native to southern Europe. It is widely distributed throughout California, with larger, more problematic populations being found in central-western and southwestern regions of the state within grassland and oak woodland communities. Dense infestations of tocalote threaten natural ecosystems by displacing native plants and animals. This species has an earlier phenology (annual timing of life stages) than the closely related, more widespread yellow star-thistle (*Centaurea solstitialis*), and generally flowers from April to June (Bossard et al. 2000). Tocalote also is similar in appearance to yellow star-thistle. As it flowers and senesces earlier in the year than yellow star-thistle, control treatments should be timed appropriately. Otherwise, mechanical and herbicidal control techniques developed and used for yellow star-thistle are also effective for tocalote infestations (DiTomaso and Healy 2007).

Control:

- Prevention: When working in areas infested with tocalote, equipment (including undercarriages) should be carefully cleaned before moving to a non-infested area. The collection and export of fill soils, pasture hay, and crops from infested areas should be avoided or minimized to the maximum extent practicable.
- Mechanical: Mowing can provide effective treatment of infested areas if mowed at the correct time, which is immediately after the earliest 2 to 5% of plants have begun to produce flower heads, usually in April or early May (DiTomaso and Healy 2007). Mowing too early may cause plants to become bushier and produce more flower heads. Treatments should continue for at least 2 to 3 years, after which spot eradication may be required indefinitely.
- Biocontrol: Responsible rangeland management, where range is grazed by sheep, goats, or cattle to a moderate degree can help prevent establishment or spread of populations in grasslands. Infested areas can be treated by high-intensity grazing between the period when the plant bolts (April) to just before the plant produces spiny seed heads in May-June. Biocontrol insects used to control yellow star-thistle may also feed on tocalote flower heads, but are more attracted to, and better at damaging yellow star-thistle.
- Fire Management: Prescribed burning of tocalote can reduce populations if timed correctly, but to avoid heavy damage to native vegetation, burns should be timed to occur after other annual plants have dried but before tocalote seeds are produced. Due to its late spring-early summer flowering period, burning may be difficult to implement for tocalote.
- Herbicide: Herbicide treatments by foliar spray or wick application are generally used to control or reduce spot infestations, or as follow-up to more intensive mechanical, grazing, or fire management-based treatments.

A.5.2.4 Rush Skeletonweed

Cal-IPC Pest Rating: Moderate

Present in Alignment: Yes, in northern region of Project but not within ANF.

Description:

Rush skeletonweed (*Chondrilla juncea*) is a fast growing herbaceous perennial or biennial species in the sunflower family (Asteraceae). Originally native to southern Europe, this species has invaded a wide range of open sites with sandy or gravelly soils in the western U.S. and Australia, and is a state-listed noxious weed in Arizona, Colorado, Idaho, Montana, Nevada, Oregon, and Washington. This species is triploid and cannot reproduce sexually. However, plants can reproduce both by regeneration from buried stem or taproot fragments as well as by self-produced (asexual) seed. A single plant can produce 15,000 to 20,000 seeds per season with as much as 90% germination in the first year (DiTomaso and Healy 2007). However, viability

falls rapidly and by two years after dispersal, only about two percent of the seeds germinate. Rush skeletonweed is an aggressive competitor for soil water and nutrients, and can displace native vegetation. Within the project alignment, botanists only observed infestations of rush skeletonweed at sites that had been recently burned, which suggests that the species may be fire-adapted.

Control:

- Prevention: Rush skeletonweed is an early colonizing species that readily inhabits disturbed soils. Additionally, prolonged high-intensity grazing may favor skeletonweed invasion, as accidental burial in moist soils through hoof action appears to promote seed germination (DiTomaso and Healy 2007). Ground disturbance shouldbe minimized to reduce the risk of establishing or spreading populations of this species.
- Mechanical: Activities that do not remove all underground tissue, such as mowing or tillage, will fail to control rush skeletonweed due to its ability to regenerate from small root fragments (see herbicides, below).
- Biocontrol: Several biocontrol agents, including insect pests and a fungal rust, have been released in California in attempts to control populations of this species. To date, the rush skeletonweed rust (*Puccinia chondrillina*) has provided the best results in California trials. While prolonged high-intensity grazing can increase the potential for skeletonweed invasions, appropriate stocking rates and timing can help control infestations as livestock readily browse the plant before the stems mature and become lignified (hard), and this can potentially reduce seed production.
- Fire Management: As the species apparently readily colonizes burned areas, controlled burns are not recommended when developing a treatment plan for this species.
- Herbicide: Freshly cut stems should be treated by glyphosate or a dicot-targeted herbicide such as 2,4-D as a spray or wick application to kill all underground tissues. The species is resistant to herbicidal control and individual plants may require multiple applications or a mix of herbicides to achieve lasting control.

A.5.2.5 Bull Thistle

Cal-IPC Pest Rating: Moderate

Present in Alignment: Yes, observed within ANF at seven sites in Segment 11, six sites in Segment 6, and at multiple locations along access and spur roads for Segments 6 and 11. ~~and 6 sites in Segment 6~~

Description:

Bull thistle (*Cirsium vulgare*) is a 2 to 6 ft tall course biennial in the Sunflower (Asteraceae) family (DiTomaso and Healy 2007). The species is native to Europe, western Asia, and North Africa, and is now naturalized throughout the U.S. after reaching the country as a crop seed contaminant during the colonial period (Bossard 2000, Holloran et al. 2004). In California, bull thistle is absent from desert habitats, less common on arid hillsides in southern California, and common elsewhere (Bossard 2000). Bull thistle invades a variety of habitats, including open disturbed sites, roadsides, crop fields, pastures, hillsides, rangelands, and forest openings below 7546 ft, where it competes with, and displaces, native species including forage species (Bossard et al. 2000). While most plants remain in the rosette stage for the first year, producing flowering stems the second, some may flower the first year. Reproduction occurs only by seed (Bossard et al. 2000, DiTomaso and Healy 2007). The flower heads are unisexual, and the number per plant is variable; from 1 to over 400. The number of seeds per flowering head averages 200 but ranges from fewer than 100 to over 400. Seeds usually fall within 3 ft of the plant, although approximately 1% may travel over 90 ft. More seeds are produced in grazed fields than ungrazed fields, perhaps due to reduced competition. Seed survival is reported as 3 years if buried (DiTomaso and Healy 2007), to more than 10 years (Holloran et al. 2004). Bare soil created by grazing or other disturbance favors seedling establishment and survival (DiTomaso and Healy 2007).

Control:

- Prevention: The best preventative measure is removal of small infestations as soon as possible after they are located.
- Mechanical: Bull thistle can be hand pulled prior to flowering, by bending the stem and pulling. Use a pick to loosen hard soil and pull the taproot. Bull thistle can also be cut or mowed shortly before flowering. Cut the stem a minimum of 1-2 inches below the ground with a shovel. If mowing, cut close to the ground just before flowering. A follow up mowing one month later is often needed (Holloran et al. 2004). Stems can be left to decompose onsite, although flower heads should be removed. Cut flower heads should be bagged, as they may still produce viable seed (Bossard et al. 2000, DiTomaso and Healy 2007, Holloran et al. 2004).
- Biocontrol: The USDA has approved two insect species for bull thistle control in California, although neither has been successful. *Rhinocyllus conicus* is a weevil that attacks *Cirsirm*, *Carduus*, and *Silybum* species, however it has been known to attack native *Cirsium* species. *Urophora stylata* is a gall-forming fruit fly that may be useful in coastal sites (Bossard et al. 2000).
- Herbicide: Autumn or spring application of 2,4-D at 0.5 kg/ha is recommended to control rosettes (Bossard et al. 2000).

A.5.2.6 Annual Yellow-flowered Mustards

Shortpod Mustard

Cal-IPC Pest Rating: Moderate.

Present in alignment: Yes, observed within ANF at 14 sites in Segment 11, ~~and~~ 12 sites in Segment 6, and at multiple locations along access and spur roads for Segments 6 and 11.

Black Mustard

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, observed within ANF at 13 sites in Segment 11.

Description:

Shortpod mustard (*Hirschfeldia incana*) is an annual or short-lived perennial forb in the mustard family (Brassicaceae) that is native to Eurasia. It matures quickly in the spring and produces a large amount of biomass in infested areas, potentially outcompeting native species through shading or an early reduction in soil moisture. Reproduction occurs by seeds, which are sticky when wet and are thus easily transferred by equipment, vehicles, or people working or traveling through infested areas when moisture is present (Brooks 2004). Similar to other invasive mustard species, shortpod mustard can build up a large, long-lived seed bank at infestation sites. This species often invades areas dominated by exotic annual grasses and can contribute to type conversion of woodlands and scrublands into annual grasslands by adding to the early season fuel load of an area, as this can increase the amount of fuel available for fires. Fire frequency and intensity can increase such that shrub and tree species can no longer establish or survive. While the species is generally considered a successional plant, and thus might be expected to decrease in density or extent with increasing time since disturbance, the typically large seed bank in combination with repeated disturbance in riparian areas or associated with heavy grazing can favor the establishment of long-term infestations (Brooks 2004).

Black mustard (*Brassica nigra*) is very similar in appearance to shortpod mustard, and the two species are often difficult to tell apart in the field. The ecological effects of black mustard invasion are virtually identical to shortpod mustard in how it impacts ecosystems, but black mustard tends to be taller, may regularly produce sdenser infestations than shortpod mustard, and may be more widespread. It can readily invade chaparral and

sensitive coastal sage scrub habitats, contributing to increased fire frequency and intensity leading to type conversion of these habitats into annual grasslands. Deeply buried black mustard seeds may remain viable for as much as 50 years under field conditions (DiTomaso and Healy 2007).

Control:

- Prevention: Disturbance and fire favor establishment of these mustard species. Additionally, shortpod mustard may be more likely to invade areas already dominated by annual grasses (Brooks 2004). Therefore, protection and sound management of remaining bunchgrass grasslands and quick eradication of initial infestations in scrub- or woodlands is recommended.
- Mechanical: Black and shortpod mustard are best controlled mechanically by hand-pulling of plants each year after they have bolted but before they produce seed. The plants have a fairly weak root system, and as annuals, do not re-sprout from root fragments left in the soil. Over time, this can deplete the seed banks and allow native or grassy vegetation to dominate previously infested areas. Mowing, particularly when timing is poor, can produce plants that branch heavily from the base, and could produce even more seed than undisturbed plants.
- Fire Management: Burning is not recommended for shortpod mustard control as it can damage co-occurring native vegetation due to heavy fuel loads, as well as the fact that shortpod and other exotic mustard species appear to be somewhat fire-adapted and can increase in density following fires.
- Herbicide: Because early season mustards such as these emerge early in the growing season, often before native vegetation has broken dormancy, it is thought that early post-emergence herbicidal treatments may be effective for members of this group (Bossard et al. 2000), but more research is needed to develop a standardized, optimized methodology for control of these species.

A.5.2.7 Dalmatian Toadflax

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Not specifically observed within the alignment, but previous surveys reported in the 2005 Land Management Plan have observed this species within the ANF.

Description:

Dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*) is an herbaceous perennial in the snapdragon family (Scrophulariaceae). It is native to the Mediterranean region and is widely distributed in California, except in the Great Basin and Desert regions. It occurs in habitats below 3,300 ft and prefers disturbed open sites, fields, pastures, degraded rangelands, and roadsides. Infestations often form dense colonies, displacing native vegetation. The plants are strong competitors for soil moisture, adversely affecting winter annuals and shallow-rooted perennials (DiTomaso and Healy 2007) such as those occuring in Californian annual grasslands. Dalmatian toadflax is intolerant of acidic or strongly alkaline soils, and is commonly found on coarse, neutral, or slightly alkaline substrates. The foliage produces quinazoline alkaloids that are toxic to livestock if ingested in sufficient quantities, but as livestock typically avoid grazing Dalmatian toadflax, infestations more commonly reduce stocking capacity in rangelands. Large plants can produce up to 500,000 seeds in a single growing season if pollinators are present, and seeds remain viable for up to ten years. Additionally, this plant can reproduce by root suckering or from larger broken root fragments.

Control:

- Prevention: Minimization of soil disturbance and established vegetation removal, and managing rangelands responsibly through proper grazing management can prevent the establishment of new seedlings and colonies. Equipment used in an area infested with Dalmatian toadflax should be cleaned before use in another area. Soil compaction also seems to enhance seedling germination. If temporary grading impacts are necessary, revegetate as quickly as possible to help preclude establishment of this species.

- Mechanical: Mowing is recommended before flowers mature (or before blooming begins if herbicidal follow-up is to be used) to remove aboveground tissue and stop seed production, but this will have to be repeated several times (for up to 10 years) as mowing does not affect the large, long-lived seed bank or prevent resprouting. Intense cultivation (every 7 to 10 days for a year and 4 to 5 times the following year, DiTomaso and Healy 2007) can control large infestations, but as this method would obviously increase soil disturbance, it is not recommended for any habitats except agricultural fields.
- Biocontrol: One natural insect pest of both Dalmatian toadflax and its close relative yellow toadflax (*Linaria vulgaris)* has been released in the U.S. since the mid-1960s. The toadflax moth (*Calophasia lunula*) has shown high host specificity thus far, even to the degree that populations derived from collections made on yellow toadflax plants only have been observed to attack yellow toadflax, even when it co-occurs with Dalmatian toadflax. Populations were collected in the 1980s from Yugoslavia on Dalmatian toadflax (which is native there), and released populations derived from these collections have established and controlled Dalmatian toadflax, especially in Montana. Recent releases have occurred in Washington, Oregon, Idaho, Wyoming, and Colorado, but to this date, not in California (Environmental Laboratories 2007).
- Herbicide: Herbicidal treatment is most effective when applied at the time the starch reserves are lowest, which is in spring after the plants have begun resprouting but before blooming has begun. Herbicidal treatment is probably best used as a follow-up to mechanical control or for control of small patches, but in any case, will likely require several applications to completely kill plants or eradicate populations. A 4 to 6 pounds acid equivalent per acre preparation of Dicamba (a herbicide that severely affects broad-leaf plants; use care near trees or other native perennials) is recommended (Peachy et al. 2007).

A.5.2.8 Tree Tobacco

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, observed within ANF at 10 sites in Segment 11, ~~and~~ 6 sites in Segment 6, and at multiple locations along access and spur roads to Segments 6 and 11.~~.~~

Description:

Tree tobacco (*Nicotiana glauca*) is a shrub or tree in the nightshade family (Solanaceae), native to South America. Leaves and other structures of this species contain the highly toxic alkaloid anabasine, which can cause fetal deformities or even death in livestock that graze the plants. Tree tobacco occurs on sandy or gravelly soils, usually near streams, lakes, or ditches, although the plants are extremely drought tolerant and can withstand long periods of hot, dry weather (Guertin and Halvorson 2003). Tree tobacco plants are short-lived and the species does not appear to produce dense infestations in California (Cal-IPC 2006), although the species is spreading throughout lower elevations of Arizona and California. While toxic to livestock, the plant is beneficial for native species such as hummingbirds and hawkmoths. Little is known about specifics of reproduction in this species, and optimal control methods are still being developed.

Control:

- Prevention: In Australia, it has been observed that stem densities are significantly reduced in non-grazed plots, possibly due to the competition from native wetland vegetation (Florentine and Westbrooke 2005). As wetland areas are often grazed heavily by livestock in arid areas, protection of native emergent wetland vegetation by excluding livestock from sensitive areas may prevent seedling establishment or spread of existing infestations.
- Mechanical: No mechanical methods of control other than hand-pulling are known, although cutting before herbicide application is an accepted control method for many weedy, woody species.
- Herbicide: Optimal methods for control are still being developed, but glyphosate applied as foliar spray, drizzle, or as a treatment to cut-stumps all showed high levels of initial success when applied in fall (Oneto et

al. 2004), although later regrowth was not assessed and other timing regimes were not compared in the 2004 publication.

A.5.2.9 Fountaingrass

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, but not within the ANF. Present in Southern Region.

Description:

Fountaingrass (*Pennisetum setaceum*), sometimes known as crimson or tender fountaingrass, is a densely clumped perennial grass that is native to Africa and the Middle East. In California, it is found along the coast from the San Francisco Bay Area to the South Coast. It also occurs in inland communities from the Central Valley to the interior areas of the South Coast and Imperial Valley. It is generally found in grasslands, deserts, canyons, and disturbed areas along roadsides, especially near urban centers, but can also occur in undisturbed coastal dunes and coastal sage scrub. Fountaingrass is a fire-adapted plant and can regenerate rapidly following fires. It can significantly augment the fuel load of a community, increasing the intensity and frequency of fires such that native plants not adapted to such extreme fire regimes can be significantly impacted. This alteration of fire regimes can have major effects on community composition, causing native desert shrublands to convert to grasslands (DiTomaso and Healy 2007). Fountaingrass is intolerant of saline soil conditions. Reproduction is both sexual and asexual, as the species is apomictic (capable of producing seeds that are unfertilized, Bossard et al. 2000). Seeds remain viable in the seed bank for as much as six years, and individual plants can survive for 20 years or more, producing a crop of seeds each year.

Control:

- Prevention: Removal of small bunches when first detected can help prevent more extensive colonies from forming. Due to the long life of the grass, as well as its ability to produce a large, long-lived seed bank, larger, well-established colonies are extremely difficult to eradicate.
- Mechanical: Control of fountaingrass is best achieved by starting removal efforts around the perimeter of infestations and working inward to decrease the patch size. Mechanical removal is achieved by first cutting culms down with a weed whacker or similar tool, followed by digging up individual tufts. For larger plants, with a basal diameter of 6 inches or more, heavy equipment such as pick axes or mattocks may be required to uproot the tuft. Follow-up surveys and control are required due to the large seed banks associated with fountaingrass infestations.
- Biocontrol: No suitable or safe biocontrol agents exist for this species, and grazing is not recommended as a control method.
- Fire Management: Crimson fountaingrass is fire-adapted and will likely increase in density following a burn, so prescribed burns should not be used in control attempts for this species.
- Herbicide: Mechanical control as described above works best when followed by systemic or, in areas with high rates of seed germination, pre-emergent herbicide treatment (by pouring an aqueous herbicide into the soil to kill germinating seeds), although this obviously can be damaging to any co-occurring native vegetation and should be used with caution. Hexazinone in a less than 5 kilograms active ingredient per hectare preparation can be used as both a systemic and pre-emergent treatment for densely infested areas (Tunison et al. 2004), although this should never be used in close proximity to aquatic habitats, wetlands, or forested areas, as it will adversely affect these habitats. Glyphosate is a relatively ineffective herbicide choice for this species, and should be used only if other options are infeasible.

A.5.2.10 Periwinkle

Cal-IPC Pest Rating: Moderate.

Present in Alignment: Yes, observed within ANF at two sites in Segment 11.

Description:

Periwinkle (*Vinca major*) is a perennial understory herb in the dogwood family (Apocynaceae) that is native to southern Europe and northern Africa. Often planted as an ornamental groundcover, it has naturalized in shady, moist microclimates, in lower elevation riparian corridors throughout the state. While not drought- or frost-tolerant, the plants are resilient and re-sprout quickly from stem fragments when favorable conditions return. Periwinkle reproduces almost entirely by vegetative means in California, where it is not observed to produce viable seed (Bossard et al. 2000). However, it can spread much like a seed-producing species in riparian areas because stem fragments can travel downstream and root to form new colonies. Periwinkle creates uniform carpets that preclude establishment and growth of native vegetation, decreasing species diversity. At one site in Arizona, a major infestation also appeared to alter normal erosional and hydrological process in the invaded stream channel, causing downcutting and increased scouring of the creek bed (Bossard et al. 2000).

Control:

- Prevention: Removal of small or initial infestations is important in preventing the development of large, established colonies.
- Mechanical: Hand-removal of all above- and below-ground tissues using clippers and weed wrenches can successfully control infestations (Bossard et al. 2000, DiTomaso and Healy 2007). The best method is to work from the perimeter of the infestation inwards, and return to the site repeatedly in subsequent seasons or years to remove more of the colony and remove any re-sprouts.
- Fire Management: Burn-based control methods are not recommended for this species, which often occurs in sensitive riparian corridors. It is not expected to invade newly burned areas as these are often unshaded.
- Herbicide: Periwinkle produces a thick, waxy cuticle that inhibits herbicide infiltration into tissues. Herbicide treatment can be effective if the colony is heavily injured by weed-whacker and a 5% solution of glyphosate is applied by foliar spray. Spot treatments can be accomplished by wick application. However, infestations are often in sensitive riparian areas, and herbicidal contamination of native vegetation and watercourses, as well as a possibility of spreading many small stem fragments (see above) make this method problematic for many sites. Only herbicides specifically approved for use in aquatic and wetland habitats should be employed in control efforts for this species in riparian habitats, and care should be taken to minimize damage to native aquatic and emergent vegetation through careful application.

A.5.3 Lower Risk, Poorly Known, or Native Invasive Species[3]

A.5.3.1 Rock Rose

Cal-IPC Pest Rating: None.

Present in Alignment: Yes, observed within ANF at 10 sites in Segment 11, ~~and~~ one site in Segment 6, and at multiple locations along access and spur roads for Segments 6 and 11.

[3] Cal-IPC Rating Limited and/or CalEPPC Rating Need More Info; or considered but not officially listed by either agency.

Description:

Rock rose (*Cistus creticus* and *C. ladanifer*) is a shrub or sub-shrub in the Rock Rose family (Cistaceae). The species is an uncommon escaped ornamental native to southern Europe (DiTomaso and Healy 2007). Rock rose spreads by seed, which fall near the parent or are dispersed by ants (Skourou and Arianoutsou 2004). Soil seed banks are typically long-lasting. The species keeps the fruit on the plant for over one year, increasing the dispersal period and creating a canopy seed bank. The species invades disturbed areas in the north and south Central Coast and San Gabriel Mountains (DiTomaso and Healy 2007).

Control:

No specific information is available on methods of control for rock rose. However, the following general information would apply to the species.

- Prevention: The best preventative measure is removal of small infestations as soon as possible after they are located and before they set seed. Repeat site visits will be required to assure exhaustion of the seed bank.
- Mechanical: Removal of plants through tillage will likely cause more soil disturbance than is necessary and this method is therefore not recommended. Weed wrenches can be utilized to pull out roots after removing above vegetation by cutting.
- Biocontrol: No biocontrol-based methods exist for this species, and none will likely be developed due to rock rose's popularity as an attractive landscaping plant.
- Herbicide: No developed methods for control of rock rose are available, but glyphosate applied as foliar spray, drizzle, or as a treatment to cut-stumps should be somewhat effective. This species often occurs within riparian areas in the ANF (where it does occur), risking herbicidal contamination of native vegetation and watercourses. Only herbicides specifically approved for use in aquatic and wetland habitats should be employed in control efforts for this species in riparian habitats, and care should be taken to minimize damage to native aquatic and emergent vegetation through careful application.

A.5.3.2 Rubber Rabbitbrush

Cal-IPC Pest Rating: None.

Present in Alignment: Yes but not at pest levels in ANF, degrades Mojavean habitats in northern section. Observed within ANF at 5 sites in Segment 11 and 24 sites in Segment 6.

Description:

Rubber rabbitbrush (*Chrysothamnus nauseosus*) (also known as gray rabbitbrush) is the most common of the 12 native species of rabbitbrush that occur in the western U.S. It is a perennial shrub in the sunflower family (Asteraceae) that is found in a variety of desert scrub and steppe habitats throughout the western U.S. While this species is native, soil disturbance, removal of other native shrubs, and overgrazing all favor establishment of dense, invasive colonies of rubber rabbitbrush (Mohan 1972, Cooley 2000) if soil conditions permit. Desert scrublands that have been converted to rabbitbrush stands are very difficult to restore to the previous vegetative composition because rubber rabbitbrush is such a strong competitor against other native shrub species in the initial establishment phases. Depending on the scale of disturbance, rabbitbrush can come to dominate vast tracks of land for long periods. In Oregon, approximately 65,000 acres of arid steppe were affected by dense rabbitbrush invasion following widespread abandonment of farms in the 1930s; 40 years later the rabbitbrush was still so dense it made "observation of ground cover difficult" (Mohan 1973). While it may be a successional brush species, the time frames for full succession in arid lands essentially result in type conversion to rabbitbrush-dominated areas for dozens if not hundreds of years. Rabbitbrush vigorously re-sprouts from the crown when aboveground tissue is burned (Johnson and Strang 1983), mowed, or cut. Rabbitbrush invasion following scrubland impacts is preferable to conversion to annual grasslands dominated

by cheatgrass (see Section A.5.1.2) because it provides a similar brushy vegetation structure which traps snow and seeds, prevents soil erosion, and may facilitate establishment of big sagebrush seedlings in some situations (Monsen 2000). However, in disturbed areas, such as in the Oregon study described above, as well as observed at previously disturbed sites along the northern section of the project alignment outside the ANF, rabbitbrush can respond to disturbance by creating extremely dense colonies that function more like monocultural infestations rather than comprising a subset of the shrub flora. When this occurs, the species can act as a permanent or near-permanent barrier to succession into more diverse scrublands or to the original community dominated by creosote bush or saltbush. Rabbitbrush provides minimal browsing forage for wildlife, mainly in the fall when several species browse on the flowers, but some animals will eat the foliage if other forage is limited (Wood et al. 1995).

Control:

- Prevention: While rabbitbrush is in many cases a native and desirable component of desert scrub flora, soil disturbance followed by rabbitbrush invasion can cause long-term successional changes or even the permanent type conversion of more diverse or sensitive scrub habitats (such as creosote bush scrub or Joshua tree woodlands and scrub) into rabbitbrush scrub. As this is to be avoided to the maximum extent feasible, all BMP-approved efforts at revegetation of impact sites must be enacted, and soil-disturbing impacts should be minimized. If a dense colony begins to form following ground impacts at a site, it may be worthwhile to thin out the initial colonizers while they still have weak root systems and then drill seed with other local shrub species in an attempt to allow the site to attain similar structure and species diversity. Again, it should be mentioned that rabbitbrush invasion is preferable to cheatgrass or red brome invasion.
- Mechanical: Removal of plants through tillage will likely cause more soil disturbance than is necessary and this method is therefore not recommended.
- Fire Management: Burning may kill a proportion of individual plants within an infestation (Robertson and Cords 1957), but will likely result in conditions favoring extensive resprouting from the crown and new seedling establishment (Johnson and Strang 1983), and thus should also be avoided in weed control efforts in all desert scrub habitats.
- Herbicide: Rabbitbrush has tomentose (densely hairy) foliage that prevents optimal herbicidal absorption from foliar spray. However, due to the typically large areas that become infested with rabbitbrush, most recommended control methods focus on herbicides.

A.5.3.3 Tree Spurge

Cal-IPC Rating: None

Present in Alignment: Not specifically observed within the alignment, but does occur along a travel route (2N65.1).

Description:

Tree spurge (*Euphorbia dendroides*) is an erect shrub in the Spurge family (Euphorbiaceae). The species is native to the Mediteranean, and in California is found on the southern Coast in the Santa Ynez Mountains, Santa Barbara, Ventura, and Los Angeles Counties (DiTomaso and Healy 2007). Tree spurge produces a milky latex and is known to cause a dermatitis reaction when in contact with skin (Filmer 2008). This species is known to be pollinated by lizards in tropical environments, but can also be successfully pollinated by generalist insect pollinators (Traveset and Saez 1997). This indicates that pollinator limitation will not hamper the future spread of this species. Thus far, this species has become a pest in Australia and is naturalized in California (USDA 2008).

Control:

- Prevention: The best preventative measure is removal of small infestations as soon as possible after they are located.
- Mechanical: Stems should be cut by machine or tools, as hand contact with the plant could cause a severe reaction in exposed individuals. Follow up visits to spot-spray with herbicide may be required to kill re-sprouts and plants from the seed bank.
- Biocontrol: A species of whitefly has been tested as a possible biocontrol agent for naturalized tree spurge, with very poor results (Calvitti and Remotti 1998). As with other Euphorbia species, intensive grazing with goats may show some promise as a potential biocontrol method.
- Herbicide: While there is little published research regarding the use of herbicides to control tree spurge, several herbicides are known to be effective against other members of Euphorbiaceae, such as leafy spurge (Euphorbia esula) (NRCS 2006). Imazapic, the active ingredient found in Plateau™, has been shown to cause plant mortality and remains active in the soil, suppressing seedling germination and regrowth. As tree spurge often exhibits woody characteristics, higher rates of herbicide application may be required for control or may be augmented with other herbicides effective on woody species (e.g., tebuthiuron [Spike™], hexazinone [Velpar™], etc.). Follow-up visits are recommended through the next growing season.

A.5.3.4 White Horehound

Cal-IPC Pest Rating: Limited.

Present in Alignment: Yes, observed within ANF at eight sites in Segment 11, ~~and~~ two sites in Segment 6, and at multiple locations along access and spur roads to Segments 6 and 11.

Description:

White horehound (*Marrubium vulgare*) is an aromatic, cool-season perennial in the Mint family (Lamiateae) that grows to two ft tall (DiTomaso and Healy 2007). The species is native to Eurasia, but is now distributed nearly worldwide. White horehound is found throughout California, except in deserts, to elevations of 1969 ft. It is typically found in dry, disturbed areas, including pastures, fields, roadsides, rangeland, disturbed natural areas, waste places, and ditches. White horehound reproduces by seed, and extensive seedbanks can develop. Fruits disperse by water and soil movement, or by clinging to animals or vehicles. Seeds are known to survive ingestions by horses.

Control:

- Prevention: The best preventative measure is removal of small infestations as soon as possible after they are located before they set seed.
- Mechanical: White horehound can be controlled through manual removal or cultivation; however, partially buried plants can survive.
- Fire Management: Burning can kill mature plants, but is known to stimulate seed germination for the following season.
- Biological Treatment: The governments of Australia and Tasmania are experimenting with the horehound plume moth (*Wheeleria spilodactylus*) as a control agent (DPIW 2008).
- Herbicide: In Australia and Tasmania, Dicamba, MCPA amine, trichlopyr and 2,4-D are used to treat white horehound for spot spratying, repeat treatments, and aerial applications (NRMB 2008). Herbicide treatments are applied while the plants are actively growing. A surfactant must be added to assure wetting of the leaf surface. This species can take between 6 and 20 weeks to show herbicide effects.

A.5.3.5 Smilograss

Cal-IPC Pest Rating: Limited.

Present in Alignment: Yes, observed within ANF at five sites in Segment 11, ~~and~~ eight sites in Segment 6, and at multiple locations along access and spur roads to Segments 6 and 11.

Description:

Smilograss (*Piptatherum miliaceum*) is a tufted perennial grass (Poaceae) that is native to Eurasia (DiTomaso and Healy 2007). The plant has escaped from cultivation, often as livestock forage, and has invaded riparian areas, roadside ditches, canyons, fields, and other disturbed sites. The species is found in the North Coast, Central Valley, Central Coast, and Central-western region, and South Coast to 984 ft. Smilograss reproduces by seed, which falls near the parent plant or may be dispersed by water, soil movement, animals, or vehicles.

Control:

- Prevention: The best preventative measure is removal of small infestations as soon as possible after they are located before they set seed.
- Mechanical: Soil disturbance associated with large-scale mechanical removal is not recommended, as this may encourage smilograss seedling germination or establishment of other weedy species.
- Fire Management: Prescribed burning may be used to control smilograss (Piptatherum miliaceum). Research has shown that perennial grasses are most susceptible to fire when the tillers are elongating (DiTomaso and Johnson 2006). The exact timing of prescribed burning would need to be determined on a site-specific basis to coincide with susceptibility. Individual torching of plants could be used in the early spring to reduce the fire hazard associated with burning later in the season, as well are reducing the impacts to native species. Revegetation with native species is recommended to prevent re-establishment of smilograss or other exotic species.
- Herbicide: No developed methods for control of smilograss are available, but glyphosate applied as foliar spray, drizzle, or as a treatment to cut-stumps should be somewhat effective. This species often occurs within riparian areas in the ANF risking herbicidal contamination of native vegetation and watercourses. Only herbicides specifically approved for use in aquatic and wetland habitats should be employed in control efforts for this species in riparian habitats, and care should be taken to minimize damage to native aquatic and emergent vegetation through careful application.

A.5.3.6 Castor Bean

Cal-IPC Pest Rating: Limited.

Present in Alignment: Yes, observed within ANF at three sites in Segment 11 and two sites in Segment 6

Description:

Castor bean (*Ricinus communis*) is a plant in the spurge family (Euphorbiaceae) that can present a wide variety of life duration strategies and habits including summer annual, perennial, shrub, or even small tree. It was introduced in the U.S. for castor oil production but has escaped cultivation and become an invasive weed in the Central and South Coast of California, commonly occurring along roadsides, in fields, riparian corridors, and disturbed, ruderal areas below 1,000 ft (Bossard et al. 2000, DiTomaso and Healy 2007). While drought tolerant, Castor bean grows best when available soil moisture is plentiful. Problematic invasions are likely restricted to southern or lower elevation areas of the state because the species is highly intolerant of frost, although its range may increase due to global climate change. The plant produces the powerful toxin ricin in high concentrations in both the foliage and the seeds. Castor bean reproduces by seeds, which are dispersed

through elastic drying of the fruits or carried longer distances by humans, equipment, or water. Secondary dispersal may be accomplished by ants, as the seeds produce large eliasomes (special structures at the tips of seeds that encourage ants to take the seed into their nests). Larger plants are capable of resprouting from the crown if cut. Castor bean affects natural habitats by displacing native vegetation, forming monocultures that out-compete diverse native stands. Its seeds germinate very quickly following fire or disturbance, allowing the species to gain a competitive foothold that prevents the normal successional development of native communities.

Control:

- Prevention: Preventing or minimizing soil disturbance and anthropogenic burns is the key to avoiding castor bean establishment. If soil disturbance is necessary, areas susceptible to castor bean invasion should be revegetated and monitored following impacts. The species does much better when ample soil moisture is available, so overwatering should be avoided.
- Mechanical: It is feasible to pull plants by hand when they are small or when the soil is moist and sandy (Bossard et al. 2000), but a weed wrench should be used to help remove as much of the taproot as possible. Larger plants must be cut near the crown with loppers or saws. Due to castor bean's resprouting abilities, removal of aboveground tissue is best followed by herbicidal treatment.
- Biocontrol: No biocontrol agents are known to be a safe and effective means for controlling this species. Additionally, due to the plant's high toxicity, grazing is not recommended as a form of control.
- Fire Management: Do not burn areas infested with castor beans, as this creates ideal conditions favoring complete habitat conversion (Bossard et al. 2000).
- Herbicide: Herbicide treatment using a 2% glyphosate foliar spray can be effective, but often affects non-target and native vegetation. A better option is to treat cut stumps with a painted glyphosate solution. When large plants are removed, this can increase seed germination underneath the former canopy area, so areas where large plants or dense infestations have been removed should be revisited to spray or hand pull seedlings later in the season or in January through March of the following year (Bossard et al. 2000, DiTomaso and Healy 2007).

A.5.3.7 Black Locust

Cal-IPC Pest Rating: Limited.

Present in Alignment: Not specifically observed within the alignment, but surveys have observed this species along access routes ~~for the project~~to both Segments 6 and 11.

Description:

Black locust (*Robinia pseudoacacia*) is a fast-growing tree in the pea family (Fabaceae) that is native to the eastern U.S. The tree is used extensively in landscaping due to its showy, fragrant flowers, strong, rot-resistant wood, fast growth, and nitrogen fixing abilities. Black locust has naturalized and is a problematic invader of non-desert habitats in the western U.S., particularly in riparian corridors. Reproduction is by seeds or by root suckering, which allows the species to colonize new areas and to create dense monocultural stands that displace native riparian vegetation. The extensive root suckering capabilities of this species also contribute to the difficulty of controlling existing infestations. Black locust stands may provide fewer resources for wildlife than native trees, as it is reported that wildlife use of both foliage and seeds is low (DiTomaso and Healy 2007). The bark, foliage, and seeds are reported to be toxic to both humans and livestock (Hickman 1993, Bossard et al. 2000, DiTomaso and Healy 2007). Finally, when this species replaces native riparian canopy trees that do not fix nitrogen, it can change soil chemistry and favor the invasion of exotic understory species that respond favorably to the increased nitrogen.

Control:

- Prevention: Sprout production of this species is enhanced in areas with full sun (Bossard et al. 2000), so minimizing removal of other canopy trees in shaded riparian settings may help prevent worsening or spreading existing infestations.
- Mechanical: In most cases, due to the extensive root suckering capabilities of this species, mechanical treatment alone is unlikely to be an effective control of black locust infestations. Cutting or girdling trunks, even if done close to the soil surface, appears to encourage production of root re-sprouts. Mowing of dense sprouts at an early stage also has been ineffective (Bossard et al. 2000). While mechanical methods are most effective when combined with herbicidal treatments (see below), repeated cutting (multiple times per year for multiple years) of all growing sprouts may eventually exhaust reserves of the tree and curb resprouting (DiTomaso and Healy 2007).
- Fire Management: Fire-based methods of control are not recommended for this species because it appears to be at least somewhat fire adapted. Burns can encourage greater rates of root suckering, enhance seed germination, and create conditions favoring the invasion and establishment of new clones.
- Herbicide: Mechanical control methods such as cutting or girdling are most effective if immediately followed by herbicide application. Herbicide treatments are most effective when applied immediately after leaf emergence in the spring, when the tree's reserves are at an annual low. The most effective strategy currently known is to cut larger trees close to the ground and apply a 100% solution of glyphosate directly to the cut stump, followed by treating re-sprouts with a direct foliar application of 4% glyphosate (Bossard et al. 2000). Should direct removal of large stems be undesireable, trunks can be girdled or frilled by removal of a ring of bark, and a 15-20% solution of triclopyr can be applied to the fresh bark wound. Triclopyr can be directly applied to young shoots and sprouts, as the thinner bark on these stems allows for direct uptake of the herbicide.

A.5.3.8 Rosemary

Cal-IPC Pest Rating: None.

Present in Alignment: Yes, observed within ANF at two sites in Segment 11 and at multiple locations along access and spur roads to Segment 6.

Description:

Rosemary (*Rosemarinus officinalis*) is a shrub in the Mint family (Lamiaceae) reaching up to 5 ft high (DiTomaso and Healy 2007). The ornamental species is native to the Mediterranean, and has escaped cultivation in several areas of California.

Control:

No specific information is available on methods of control for Rosemary. However, the following general information would apply to the species.

- Prevention: The best preventative measure is removal of small infestations as soon as possible after they are located before they set seed. Repeat site visits will be required to assure exhaustion of the seed bank.
- Mechanical: Removal of plants through tillage will likely cause more soil disturbance than is necessary and this method is therefore not recommended. Weed wrenches can be utilized to pull out roots after removing above vegetation by cutting.
- Biocontrol: No biocontrol-based methods exist for this species, and none will likely be developed due to Rosemary's popularity as an attractive landscaping plant.
- Herbicide: No developed methods for control of rosemary are available, but glyphosate applied as foliar spray, drizzle, or as a treatment to cut-stumps should be effective.

A.5.3.9 Russian Thistles

Cal-IPC Pest Rating: Limited.

Present in Alignment: Yes, observed within ANF at 10 sites in Segment 11 and 3 sites in Segment 6.

Description:

Russian thistle (*Salsola tragus, Salsola kali* ssp. *austroafricana*) is the common name applied to a congeneric group of tumbleweed-forming, spiny summer annuals in the goosefoot family (Chenopodiaceae) that are native to Eurasia. Phylogenetic relationships among the various species or types are very poorly understood, but it is known that *S. tragus*, which is tetraploid, can hybridize with *S. kali*, which is diploid, to create a new, hexaploid strain currently known as *Type C* (DiTomaso and Healy 2007). With at least two very similar but genetically distinct strains or species, as well as the potential for hybridization, positive identification of an individual plant to species can be difficult to impossible, and the wide range of genotypes means that this group can colonize diverse habitats throughout much of the state. In any case, the various *Salsola* species or strains with the common name Russian thistle all are similar in basic biology and ecosystem effects. Russian thistle readily colonizes disturbed areas where it can create large monocultural stands. Reproduction is by seed, which is dispersed when the plant dries and breaks off at the base to form tumbleweeds. These can build up in large "drifts" which clog drainages and roadways and can also contribute to increased fire frequency or intensity. Seeds are numerous but generally short-lived (approximately 2 years), so control measures can be successful at eradicating infestations if repeated long enough to fully exhaust the seed bank (DiTomaso and Healy 2007). While the very young seedlings are soft, nutritious, and edible for livestock, later stages of growth produce tough, spiny foliage that is often not utilized by grazing or browsing animals unless other forage species are not available. High concentrations of oxalates occur in mature foliage as well, which can lead to toxicity in livestock. Russian thistle also provides an alternate host for the beet leafhopper (*Circulifer tenellus*), an important pest of a diverse range of commercial crops including beets, tomatoes, and melons (DiTomaso and Healy 2007).

Control:

- Prevention: As Russian thistle readily colonizes soil disturbances in arid areas, minimization of ground disturbance followed by immediate re-vegetation can help to prevent or minimize new infestations.
- Mechanical: Effective control or even eradication can be achieved if new seedlings are pulled or removed by hula hoe (for smaller infestations) or mowed just above the cotyledons when these seed leaves are still attached but some juvenile stem leaves have been produced above, usually in early to midsummer. The seed bank is relatively short lived and sites typically only require treatment for 2 to 3 years, but several mowings or treatments within a year may be required to control multiple waves of germination.
- Fire Management: Burning may disturb soils and remove native vegetation, and while it can destroy the seeds, may create conditions favoring re-invasion or colonization by other noxious weeds and annual grasses.
- Biocontrol: Two biocontrol agents, the stem boring moth (*Coleophora parthenica*) and the leaf mining moth (*Coleophora klimeschiella*) were released in California in the 1970s, but neither species has provided effective control. As taxonomic relationships between cryptic strains within this group are poorly understood and possibly changing rapidly within the U.S. due to hybridization, new, host-specific biocontrol agents may be difficult to isolate. Intensive grazing of seedlings can kill young plants and aid in exhausting seed banks or controlling the extent of large infestations. The oxalic acids produced in mature foliage is very toxic to sheep and can lead to death when no other forage is available.
- Herbicide: As this species is controlled relatively easily (compared to perennial or long-lived seed bank weeds) by correctly timed mechanical methods, herbicidal treatment is not typically indicated, although it can be effective. As the plant germinates and matures in the summer when many other native species are active,

herbicidal applications should be carefully employed in order to minimize damage to favorable native forbs and shrub species.

A.5.3.10 Brazilian Peppertree

Cal-IPC Pest Rating: Limited.

Present in Alignment: Yes, observed within ANF at two sites in Segment 11.

Description:

Brazilian peppertree (*Schinus terebinthifolius*) is an aromatic, evergreen shrub or tree in the sumac family (Anacardiaceae). This species can be distinguished from its closely related, widespread congener Peruvian peppertree (*Schinus molle*) by the number of leaflets on its characteristic odd-pinnate leaves; Peruvian peppertrees have between 15 and 49 leaflets while Brazilian peppertrees have only seven or even fewer. Brazilian peppertrees are native to dry, upland grasslands of Brazil. Ironically, after both peppertree species naturalized within the U.S., the riparian Peruvian peppertree has been less invasive, though more widespread, and has to date, posed fewer problems in Californian riparian systems than Brazilian peppertree, which has proven to be a formidable riparian invader in southern California. While only having a "limited" pest rating by the Cal-IPC, Brazilian peppertree may present a significant threat to southern Californian riparian corridors if their influence within riparian areas follows a similar explosive trajectory to that observed in Florida ecosystems, where it has aggressively infested hundreds of thousands of acres since its introduction in 1891 (Bossard et al. 2000, DiTomaso and Healy 2007). High rates of colonization and expansion from initial infestations may be partially due to the seedlings' ability to tolerate shaded conditions and produce explosive growth if the canopy is opened through disturbance. Reproduction is by seeds, which do not remain viable for longer than one year under field conditions. The red, attractive peppercorn fruits are dispersed over long distances by birds, mammals, or water, but significant reproduction can also occur through crown resprouting or root suckering. In Southern California, Brazilian peppertree is found at elevations below about 660 ft in canyons and washes, and may be particularly suited to colonizing upper banks of riparian systems in arid climates, as it prefers well-drained soils (Bossard et al. 2000). Ecological effects include a severe reduction of plant diversity in infested sites due to stand density, highly competitive nature of seedlings combined with high rates of seed germination and seedling survivorship, and production of allelopathic chemicals. The foliage can be toxic to livestock and other mammals browsing the plant.

Control:

- Prevention: Brazilian peppertree readily colonizes disturbed soils near watercourses, so soil disturbance along riparian corridors, canyons, washes, and even roadsides near drainage canals should be avoided to the maximum extent feasible.
- Mechanical: Mature plants should be removed close to the soil surface and immediately treated with herbicide. Root sprouts and new seedlings will have to be controlled for three years or even longer following mature tree removal, as any seedling recruits and root sprouts will show explosive growth following removal of the mature peppertree canopy. Root sprouts should be cut and herbicide applied to the root crown, while seedlings, which should only germinate during the first year following removal of the mature trees, can be pulled by hand to remove the root system as well as the aboveground tissues. New growth and seedlings will need control until native riparian vegetation re-establishes.
- Fire Management: Burn-based control methods are not recommended for this species as fires appear to encourage root crown resprouting.
- Herbicide: Typical herbicides such as glyphosate and methods such as foliar spray show low success in controlling Brazillian peppertree infestations (Bossard et al. 2000). However, 100% triclopyr applied to cut

stumps following manual removal or by a frill-cut method can kill adult trees and prevent resprouting from root crowns. Bromacil and hexazinone can also be applied as basal spot treatments, and as both of these are selective herbicides and peppertrees provide a good sink for soil-applied herbicides, the risk to native vegetation in the area is low if treated trees are not shaded and are thus transpiring freely.

- re-sprouts

A.6 Risk Assessment

The removal of existing transmission line towers and the construction of replacement towers will require ground disturbance that will create conditions favoring the establishment and spread of noxious weeds. In many areas of the ANF, vehicles and equipment used in the construction of the proposed Project will access the existing tower locations by traveling existing access roads and newly created or reopened spur roads . The majority of these access roads are unimproved dirt roads bordered on both sides by native vegetation. The proposed Project calls for access roads to be widened from their average of 12 ft to 16 ft. The majority of spur roads are old two tracks put in 30-40 years ago to build the current transmission line. Most of these spur roads have slopes over 30 degrees, are re-vegetated, and contain mature shrubs and, in some cases, adolescent trees. In other areas of the proposed Project, no access or spur roads have ever existed; and helicopters will be used to transport construction crews, materials, and equipment to the tower locations.

In general, the overall level of ANF ground disturbance associated with the preferred project is higher than with Alternative 6 (maximum helicopter). This is due to several factors. Since most transmission structures will be constructed by helicopter under Alternative 6, this will require significantly less road use within the ANF compared to Alternative 2 (Tables A-1 and A-2 for details). There will be fewer new roads constructed and fewer existing unpaved roads used and/or upgraded (widened). Additionally, there will be fewer ground trips required under Alternative 6 because a larger percentage of equipment, personnel, and materials will be delivered to the various impact sites via helicopter. Finally, existing and new spur roads to each transmission structure will be permanent roads and must be considered to have permanent impacts under Alternative 2. However, under Alternative 6 these spur roads will only be temporary and will therefore be considered to have temporary impacts since they shall be restored with native vegetation.

The terrestrial travel routes into the construction areas of the proposed Project present a great risk for the establishment and spread of noxious weeds. The seeds of many species of noxious weeds are known to be transported along roadways, and many infestations of noxious weeds currently occur along the access routes into the proposed Project. While noxious weeds may be transported into project areas that will be accessed only by helicopter, the risk of project activities or equipment bringing weed propagules into impact areas in this manner is low compared to the risks of spread associated with surface travel, and measures that will reduce the risk of spreading weed seeds via helicopter are straightforward. Total ground disturbance related to helicopter staging areas within the ANF will be similar under the two alternatives. Additionally, it was assumed for the proposed Project that impact areas accessed only by helicopters will be (1) remote and isolated from disturbance, roads, or anthropogenically associated noxious weed populations; or (2) staging areas for helicopters will be relatively discrete and any existing weed infestations and possible contamination sources can be controlled prior to construction (see Section A.7., Nox-1c). All impact areas accessed only by helicopter are assumed to have an identically “low” risk assessment related to the relatively smaller amount of soil disturbance, the intact nature of these native backcountry communities or ability to control weeds in these areas before construction, and the lowered risk of weed importation (although see Section A.6.3). For impact areas that will be accessed partially by both means of travel, it is assumed that use of helicopters will not produce more risk of noxious weed invasion than if these areas were accessed by surface routes alone. Furthermore, the fact that fewer surface trips will be required for the areas constructed by a combination of

these methods lessens the chance of accidental propagule introduction. Therefore, the detailed risk assessment that follows concentrates on the evaluation of risk along the roads that will be used to access the proposed Project during construction.

A risk assessment for the establishment and spread of noxious weeds associated with soil disturbance was made for the construction sites occurring along the routes accessing Segments 6 and 11. Assessments of the risks associated with the spread of weeds along travel routes and of the overall risk were also made. The risk rating (Low, Moderate, or High) is based on the habitat conditions and prevalence of weeds in the vicinity of each access road as recorded during noxious weed inventories of the proposed alignments conducted during June, September, and October 2007, ~~and~~ spring 2008, and spring/summer 2009 (2009 inventories were only conducted along Segment 6). The risk assessment for the roads of Segment 6 is presented in Section A.6.1 and the risk assessment for the roads of Segment 11 is presented in Section A.6.2. Each section contains a table presenting the three risk ratings (Soil Disturbance, Travel Routes, and Overall Risk) for each road followed by a discussion of the ratings for each road or for groups of roads with similar risks. The overall risk rating for the travel routes along both segments for Alternative 2 is presented in Figure A-1 and in Figure A-2 for Alternative 6. Please note that all figures are at the end of this Appendix.

Observations of specific noxious weed occurrences along the roads accessing the segments and an assessment of the roadside Spanish broom infestation intensities along each route are presented in Figures A-3 through A-5. Additional occurrence details are presented in the text of the risk discussions and summarized in Table A-7 at the end of this Appendix. In Figures A-3 through A-5, we focused on Spanish broom infestation intensity along each road because this species was observed to be the most common, and possibly most detrimental, roadside weed within the ANF. "Light" infestations were typically widely scattered and consisted of approximately ten or fewer plants per colony. Roads indicated as supporting "moderate" infestations had less scattered Spanish broom occurrences, with large populations containing hundreds of individuals. Finally, roads indicated to have a "high" Spanish broom infestation intensity typically had poorly separated or even continuous populations of thousands or more individuals (Figures A-3 through A-5). While the text and mapped observations (Figures A-3 through A-5) generally focus on the noxious weed species that were observed in the vicinity of each of the access roads during surveys, the overall risk assessment rating considers the possibility that other species may be spread to impact sites and become established as a result of project activities.

A.6.1 Segment 6 Travel Route Risk Assessment

Table A-4. Noxious weed risk factor ratings for the roads used to access Segment 6 for Alt. 2 and 6.

Potential Impact Area - Segment 6	Soil disturbance		Travel Routes to Project Area		Overall Risk of New Infestations in the Project Area	
	Alt. 2	Alt. 6	Alt. 2	Alt. 6	Alt. 2	Alt. 6
Unnamed Access road at Structure 21, to ANF boundary	H	M	L	L	H	M
Highway 59 (Angeles Forest Highway)	None	None	M	M	L	L
Spurs to structures 22-28 off of Highway 59	H	M	L	L	H	M
Forest Road 4N27 (Aliso Canyon Road)	None	None	L	L	L	L
Forest Road 4N41	H	M	M	M	H	M
Forest Road 4N18.1	H	M	L	L	H	M
Forest Road 3N23	H	M	H	H	H	M
Forest Road 4N18.2 (Lynx Gulch Road.)	H	~~M~~None	L	~~L~~None	H	~~M~~None
Forest Road 3N19.2 (Big Tujunga Canyon Road)	None	None	M	M	L	L

Table A-4. Noxious weed risk factor ratings for the roads used to access Segment 6 for Alt. 2 and 6.

Potential Impact Area - Segment 6	Soil disturbance		Travel Routes to Project Area		Overall Risk of New Infestations in the Project Area	
	Alt. 2	Alt. 6	Alt. 2	Alt. 6	Alt. 2	Alt. 6
Forest Road 1N16 (Alder Road)	H	M	L	L	H	M
Forest Road 3N20 (Edison Loop Road)	H	M	M	M	H	M
Forest Road 3N19AO to Shortcut Station	H	M	H	H	H	M
Highway 2 (Angeles Crest Highway)	None	None	M	M	L	L
Forest Road 2N23	H	M	H	H	H	M
Forest Road 2N24.1 (Rincon Red Box Road)	H	M	H	H	H	M
Forest Road 2N25.2 (West Fork Red Box Road)	H	~~M~~None	H	~~H~~None	H	~~M~~None
Forest Road 2N30.1 (Sawpit Truck Trail)	H	M	H	H	H	M
Forest Road 1N36 (Van Tassel Truck Trail)	H	M	H	H	H	M

The following risk assessment assignments (High, Medium, and Low) are specific to Alternative 2. In all cases, the risk associated with Alternative 6 would be at least one degree lower, or in some cases where roads are not used under Alternative 6, non-existent. See Table A-4 and Figure A-2 for the Alternative 6 risk levels. The discussion of the risk factors along each travel route are a general assessment of physical conditions in each area and an explanation of how this relates to soil, travel, or overall risk levels.

A.6.1.1 Unnamed Access Road at Structure 21 to ANF Boundary and the Spur Roads to Structures 21 through 26 off of Highway 59

Soil Disturbance: High Risk. Ground-disturbing construction activities, such as road widening and grading, along these access routes (Figure A-3) have a high potential to create favorable conditions for the establishment and spread of cheatgrass and red brome, which are present throughout the desert-transitional areas of the ANF.

Travel Routes: Low Risk. There are patchy populations of cheatgrass and red brome scattered along these access roads leading to the northern portions of Segment 6.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of cheatgrass and red brome are well established in the vicinity and will provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.1.2 Highway 59 (Angeles Forest Highway) and Forest Road 4N27 (Aliso Canyon Road)

Soil Disturbance: No Risk. No soil disturbance is expected to take place along these roads (Figures A-3 and A-4) during project implementation.

Travel Routes: Moderate Risk. Populations of cheatgrass and red brome are common along these access roads leading to the northern portions of Segment 6.

Overall Risk: Low Risk. Trucks and heavy equipment may be transported along this access road from various geographical locations where noxious weeds may be well established. Weed seeds may be transported into the area in this manner; however, construction traffic along this road is expected to stay on paved surfaces, therefore providing for a relatively minor contribution to the establishment and spread of these species.

A.6.1.3 Forest Road 4N41

Soil Disturbance: High Risk. Ground-disturbing construction activities along this access route (Figure A-3) have a high potential to create favorable conditions for the establishment and spread of cheatgrass, red brome, and Spanish broom.

Travel Routes: Moderate Risk. Ceheatgrass and red brome are scattered along this road. A small population of target species, Spanish broom, occurs near the willow riparian habitat along the road (Figure A-3) and would likely serve as a seed source along this road.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of cheatgrass and red brome are well established in the vicinity and will provide a seed source for the spread of infestations into areas disturbed by project activities. The small population of Spanish broom may provide a seed source for the spread of infestations within the area.

A.6.1.4 Forest Road 4N18.1

Soil Disturbance: High Risk. Ground-disturbing construction activities along this access route (Figure A-3) have a high potential to create favorable conditions for the establishment and spread of cheatgrass, red brome, and other nearby weeds.

Travel Routes: Low Risk. There are patchy populations of cheatgrass, ripgut, shortpod mustard, and red brome scattered along the road.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of cheatgrass and red brome are well established in the vicinity and will provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.1.5 Forest Road 3N23 (only utilized under Alternative 2)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-3) have a high potential to create favorable conditions for the establishment and spread of giant reed, cheatgrass and red brome. Soil disturbance also favors the spread of Spanish broom, which is prevalent along the adjacent Highway 59.

Travel Routes: High Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. There are several patches of giant reed in the Monte Cristo Creek Drainage (Figure A-3). Forest Road 3N23 passes through the creek bed at several locations and road widening and construction traffic along the road pose a high risk of spreading giant reed to upstream habitats.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of giant reed, cheatgrass, and red brome are well established in the vicinity and will provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.1.6 Forest Road 4N18.2 (Lynx Gulch Road) and Forest Road 1N16 (Alder Road)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of these access routes (Figure A-3) have the potential to create favorable conditions for the establishment and spread of red brome, which is present along the roadsides throughout the ANF. Soil disturbance also favors the spread of Spanish broom, but no populations that may serve as a seed source were observed to occur in this area of the proposed Project.

Travel Routes: Low Risk. There are known populations of red brome along these roads. However, construction traffic and the movement of machinery are expected to provide a relatively minor contribution to the establishment and spread of this species. While Spanish broom infestations occur along Forest Road 3N19.2 (Upper Big Tujunga Road, Figure A-3), the primary access route for these roads, the road is paved and vehicle traffic has a low risk of transporting the seeds of this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome are well established in the vicinity and will provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.1.7 Forest Road 3N19.2 (Upper Big Tujunga Canyon Road)

Soil Disturbance: No Risk. No soil disturbance is expected to take place along this road during project implementation.

Travel Routes: Moderate Risk. There are infestations of red brome and Spanish broom along this access road (Figure A-3). However, the road is paved and construction traffic along this road is therefore expected to create a low risk for the establishment and spread of these species into areas of native vegetation that are currently free of weed infestations.

Overall Risk: Low Risk. Trucks and heavy equipment may be transported along this access road from various geographical locations where noxious weeds may be well established. Weed seeds may be transported into area in this manner.

A.6.1.8 Forest Road 3N20 (Edison Loop Road)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route have the potential to create favorable conditions for the establishment and spread of red brome, which is present along the roadsides throughout the ANF. Soil disturbance also favors the spread of Spanish broom, and several small populations that may serve as a seed source occur along this road (Figure A-4).

Travel Routes: Moderate Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic and the movement of machinery along these roads are expected to provide a relatively minor contribution to the establishment and spread of this species. Several patches of Spanish and Scotch broom occur along this access road (Figure A-4) and construction traffic and the movement of machinery along the road pose a moderate risk of spreading this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of Spanish broom and red brome are well established in

the vicinity and will provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.1.9 Forest Road 3N19AO to Shortcut Station

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route have the potential to create favorable conditions for the establishment and spread of Spanish broom and red brome. Red brome is present along the roadsides throughout the ANF, and several moderate to heavy infestations of Spanish broom occur along this access road (Figure A-5). The existing infestations will provide an abundant seed source for the establishment of noxious weeds in areas disturbed by project activities.

Travel Routes: High Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic and the movement of machinery along these roads are expected to provide a relatively minor contribution to the establishment and spread of this species. Several moderate to heavy infestations of Spanish broom consisting of thousands of individuals occur along this access road (Figure A-5). Construction traffic and the movement of machinery along the road pose a high risk of spreading this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome and heavy infestations of Spanish broom are well established in the vicinity and will provide an abundant seed source for the spread of infestations into areas disturbed by project activities.

A.6.1.10 Highway 2 (Angeles Crest Highway)

Soil Disturbance: No Risk. No soil disturbance is expected to take place along this road during project implementation.

Travel Routes: Moderate Risk. There are known populations of red brome and Spanish broom along this access road (Figure A-4, Figure A-5). However, the road is paved and construction traffic along this road is therefore expected to create a low risk for the establishment and spread of these species into areas of native vegetation that are currently free of weed infestations.

Overall Risk: Low Risk. Trucks and heavy equipment may be transported along this access road from various geographical locations where noxious weeds may be well established. Weed seeds may be transported into the area in this manner.

A.6.1.11 Forest Road 2N23, Forest Road 2N24.1 (Rincon Red Box Road), Forest Road 2N25.2 (West Fork Red Box Road; only utilized under Alternative 2), and Forest Road 2N30.1 (Sawpit Truck Trail)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of these access routes have the potential to create favorable conditions for the establishment and spread of Spanish broom and red brome. Red brome is present along the roadsides throughout the ANF, and many moderate to heavy infestations of Spanish broom occur along these access roads (Figure A-5). However, these infestations of Spanish broom are currently widely scattered and localized, and large sections of these roads are currently free of this noxious weed. Nevertheless, the existing infestations will provide an abundant seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: High Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic along these roads is expected to provide a relatively minor contribution to the establishment and spread of this species. Several moderate to heavy infestations of Spanish broom consisting of thousands of individuals are scattered along these access roads (Figure A-5). Construction traffic and the movement of machinery along these roads poses a high risk for spreading this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome and scattered heavy infestations of Spanish broom are well established along these roads and will provide an abundant seed source for the spread of infestations into areas disturbed by project activities.

A.6.1.12 Forest Road 1N36 (Van Tassel Truck Trail)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route have the potential to create favorable conditions for the establishment and spread of Spanish broom, red brome, and other invasive plant species. Red brome is present along the roadsides throughout the ANF. Many moderate to heavy infestations of Spanish broom occur to the north of this road along routes that may be used to access this portion of the proposed Project from the north during construction (Figure A-5). Additionally, several small infestations of Spanish broom, black locust, tree tobacco, and castor bean occur along Forest Road 1N36 (Figure A-5). The existing infestations will provide a seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: High Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic along these roads is expected to provide a relatively minor contribution to the establishment and spread of this species. The heavy infestations of Spanish broom occurring along the access roads to the north of 1N36 (Figure A-5) present a high risk for the transportation of seed into this portion of the proposed Project if the area is accessed from the north. However, Spanish broom is much less abundant along the roads to the south of 1N36, and construction traffic and the movement of machinery into this portion of the proposed Project from the south presents only a moderate risk for the transportation of seed into this portion of the proposed Project.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of Spanish broom, red brome, black locust, castor bean, and tree tobacco are established along these roads and may provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.2 Segment 11 Risk Assessment

Table A-5. Noxious weed risk factor ratings for the roads used to access Segment 11 for Alt. 2 and 6.

Potential Impact Area - Segment 11	Soil disturbance		Travel Routes to Project Area		Overall Risk of New Infestations in the Project Area	
	Alt. 2	Alt 6	Alt. 2	Alt. 6	Alt. 2	Alt. 6
Forest Road 4N24, north of Aliso Canyon Road	H	M	M	L	H	M
Forest Road 4N24, south of Aliso Canyon Road	H	M	M	L	H	M
Forest Road 3N17.5 (Mt. Gleason Road)	None	None	L	L	L	L
Forest Road 3N27	H	M	H	L	H	M
Forest Road 3N53 (Big Tujunga Canyon Road)	None	None	L	L	L	L
Highway 59 (Angeles Forest Highway)	None	None	L	L	L	L
Unnamed spur to structures 53 & 54	M	L	L	L	M	L
Unnamed spur to structure 55	M	L	L	L	M	L
Assembly yard in Maple Canyon	H	H	L	L	M	M
Forest Road 2N79.1 (Grizzly Flat Road)	H	M	M	L	H	M
Highway 2 (Angeles Crest Highway)	None	None	L	L	L	L
Forest Road 2N75 (CCC Ridge)	H	M	H	M	H	M
Forest Road 2N76 (Mount Lukens Road)	H	M	H	M	H	M
Forest Road 2N69 to Gould Substation & Gould Camp Ground	H	M	M	L	H	M
Forest Road 2N66	H	M	M	L	H	M
Forest Road 2N65.1	H	M	M	L	H	M
Forest Road 2N68.2	M	L	L	L	M	L
Forest Road 2N65.2	M	L	L	L	M	L
Forest Road 2N50.2 (Mt. Lowe Road)	H	M	M	L	H	M
Forest Road 2N45.3 (Mt. Wilson Road)	H	M	M	L	H	M

As in Section A.6.1, the following risk assessment assignments (High, Medium, and Low) are specific to Alternative 2. In all cases, the risk associated with Alternative 6 would be at least one degree lower, or in some cases where roads are not used under Alternative 6, non-existent. See Table A-5 and Figure A-2 for the Alternative 6 risk levels. The discussion of the risk factors along each travel route are a general assessment of physical conditions in each area and an explanation of how this relates to soil, travel, or overall risk levels.

A.6.2.1 Forest Road 4N24, North of Aliso Canyon Road

Soil Disturbance: High Risk. Ground-disturbing construction activities along and around the vicinity of this access route (Figure A-3) have a high potential to create favorable conditions for the establishment and spread of cheatgrass and red brome, which are present throughout the desert-transitional areas of the ANF.

Travel Routes: Moderate Risk. There are known populations of cheatgrass and red brome along this access road leading to the northern portions of Segment 11. However, construction traffic along the road is expected to provide a relatively minor contribution to the establishment and spread of these species.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of cheatgrass and red brome are well established in the vicinity and will provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.2.2 Forest Road 4N24, South of Aliso Canyon Road

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-3) have the potential to create favorable conditions for the establishment and spread of cheatgrass and red brome, which are present throughout the desert-transitional areas of this road. At higher elevations near Mt. Gleason there is a high risk of the spread of Spanish broom due to soil disturbance.

Travel Routes: Moderate Risk. There are known populations of cheatgrass and red brome along the desert-transitional portions of this access road. However, construction traffic along the road is expected to provide a relatively minor contribution to the establishment and spread of these species. At higher elevations along this road, construction traffic and the movement of machinery poses a moderate risk of the spread of Spanish broom, which is present in the area at low abundance (Figure A-3).

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of cheatgrass and red brome are well established at lower elevations, and Spanish broom is present at higher elevations. These existing weed infestations may provide a seed source for the spread of noxious weeds into areas disturbed by project activities.

A.6.2.3 Forest Road 3N17.5 (Mt. Gleason Road), Forest Road 3N53 (Big Tujunga Canyon Road), Highway 59 (Angeles Forest Highway), and Highway 2 (Angeles Crest Highway)

Soil Disturbance: No Risk. No soil disturbance is expected to take place along these roads during project implementation (Figures A-3 through A-5).

Travel Routes: Low Risk. There are known populations of red brome and moderate to heavy infestations of Spanish broom along these access roads leading to portions of Segment 11. However, the roads are paved and construction traffic is therefore expected to create a low risk for the establishment and spread of these species into areas of native vegetation that are currently free of weed infestations.

Overall Risk: Low Risk. Trucks and heavy equipment may be transported along these access roads from various geographical locations where noxious weeds may be well established. Weed seeds may be transported into the area in this manner.

A.6.2.4 Forest Road 3N27

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route have the potential to create favorable conditions for the establishment and spread of Spanish broom and red brome. Red brome is present along the roadsides throughout the ANF. Although much of road 3N27 is free of Spanish broom, several light to moderate infestations are widely scattered along this access road (Figure A-3). The existing infestations will provide a seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: High Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic along these roads is expected to provide a relatively minor contribution to the establishment and spread of this species. Several light to moderate infestations of Spanish broom are scattered along this access road (Figure A-3). Construction traffic and the movement of machinery along the road pose a ~~moderate~~ high risk of spreading this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome and scattered infestations of Spanish broom are established along this road and will likely provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.2.5 Unnamed Spur Roads to Structures 53, 54 & 55

Soil Disturbance: Moderate Risk. Ground-disturbing construction activities in the vicinity of this access route (Figures A-1 - A-3) have the potential to create favorable conditions for the establishment and spread of Spanish broom and annual bromes such as red brome and ripgut brome. Red brome is present along the roadsides throughout the ANF and ripgut brome is also abundant. Although these spur roads are currently free of Spanish broom, this species is abundant along Highway 59 and infestations there may provide a seed source for the spread of noxious weeds into areas disturbed by project activities along these spur roads.

Travel Routes: Low Risk. There are known populations of red brome and ripgut brome along the roads leading to this portion of the proposed Project. However, construction traffic along these roads is expected to provide a relatively minor contribution to the establishment and spread of this species. No infestations of Spanish broom currently occur along these access roads. Construction traffic and the movement of machinery along the road pose a low risk of spreading this species into areas that are currently not infested.

Overall Risk: Moderate Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome and ripgut brome are established along this road and infestations of Spanish broom are common along the major access routes to these spur roads. These populations may provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.2.6 Assembly Yard in Maple Canyon

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this assembly yard (Figure A-4) have the potential to create favorable conditions for the establishment and spread of annual brome grasses, shortpod mustard, tree tobacco, Russian thistle, and Spanish broom. Each of these species, with the exception of Spanish broom, currently occurs at this site. Spanish broom is abundant along Big Tujunga Canyon Road, the major access road to this site. These infestations may provide seed sources for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: Low Risk. There are heavy infestations of Spanish broom consisting of thousands of individuals along the major access roads leading to this assembly yard (Figure A-4). However, the roads are paved and construction traffic is therefore expected to create a low risk for the establishment and spread of these species into assembly yard areas that will be temporarily disturbed by project activities.

Overall Risk: Moderate Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of noxious weeds are established in this assembly yard and may provide a seed source for the establishment of new infestations as the electrical system components assembled here are transported across the project area to their final locations.

A.6.2.7 Forest Road 2N79.1 (Grizzly Flat Road)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish broom and red brome. Red brome is present along the roadsides throughout the ANF. Although much of road 2N79.1 is free of Spanish broom, one light infestation occurs along this access road. This infestation may provide a seed source for the spread of Spanish broom into areas disturbed by project activities.

Travel Routes: Moderate Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic along these roads is expected to provide a relatively minor contribution to the establishment and spread of this species. One light to moderate infestation of Spanish broom occurs along this access road (Figure A-4). Construction traffic and the movement of machinery along the road pose a moderate risk of spreading this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome and a light infestation of Spanish broom are established along this road and may provide a seed source for the spread of infestations into areas disturbed by project activities.

A.6.2.8 Forest Road 2N75 (CCC Ridge)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish broom, red brome, and shortpod mustard. Red brome is present along the roadsides throughout the ANF. A moderate infestation of Spanish broom consisting of hundreds of plants occurs along this access road, and the ridge top surrounding this road is heavily infested with shortpod mustard. These infestations will provide an abundant seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: High Risk. Construction traffic and the movement of machinery within the heavy infestation of shortpod mustard that occurs along this road poses a high risk for the spread of this species into areas of the proposed Project that are not currently infested. The moderate infestation of Spanish broom along this access road (Figure A-4) poses a similar, but less severe risk.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of shortpod mustard and Spanish broom are established along this road and will provide an abundant seed source for the spread of these species into areas disturbed by project activities.

A.6.2.9 Forest Road 2N76 (Mount Lukens Road)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish broom, red brome, and tree tobacco. Red brome is present along the roadsides throughout the ANF, and heavy infestations of Spanish broom consisting of thousands of plants occur along this access road. Tree tobacco is also present along the roadsides at low abundance. The existing infestations will provide an abundant seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: High Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic and the movement of machinery along these roads are expected to provide a relatively minor contribution to the establishment and spread of this species. Heavy infestations of Spanish broom consisting of thousands of individuals occur along this access road (Figure A-4). Construction traffic and the movement of machinery along the road pose a high risk of spreading this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome and heavy infestations of Spanish broom are well established in the vicinity and will provide an abundant seed source for the spread of infestations into areas disturbed by project activities.

A.6.2.10 Forest Road 2N69 to Gould Substation and Gould Mesa Campground

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish broom, red brome, and tocalote. Red brome is present along the roadsides throughout the ANF. A light-moderate infestation of Spanish broom consisting of 10 to 20 plants occurs along this access road, and the moderate infestations of tocalote occur along the roadsides (Figure A-4). These infestations will provide seed sources for the spread of infestations into areas disturbed by project activities. The riparian areas in the vicinity of Gould Mesa Campground are heavily infested with ivy, periwinkle, and several other invasive species, but no project-related soil disturbance will take place in this area.

Travel Routes: Moderate Risk. There are known populations of red brome along the roads leading to this portion of the proposed Project. However, construction traffic along these roads is expected to provide a relatively minor contribution to the establishment and spread of this species. One light to moderate infestation of Spanish broom occurs along this access road. Construction traffic and the movement of machinery along the road pose a moderate risk of spreading this species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of red brome and heavy infestations of Spanish broom are established in the vicinity and will likely provide a seed source for the spread of noxious weeds into areas disturbed by project activities.

A.6.2.11 Forest Road 2N66 and Forest Road 2N65.1

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of these access routes (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish broom, castor bean, tree tobacco, tree-of-heaven and other invasive plant species. Several moderate infestations of Spanish broom consisting of hundreds of plants occur along these roads as do several scattered infestations of the weed species listed above. A moderate infestation of tree spurge occurs along road 2N65.1. This species is not currently listed as a noxious weed by the State or Cal-IPC, and it is not covered in any California floras or in any recent California weed publications. Although very little information is available regarding the species' potential to invade wildlands, its presence within the ANF should be considered undesirable, and its potential spread due to project activities should be controlled. The existing infestations will provide a seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: Moderate Risk. There are known populations of several noxious weed species along these access roads (Figure A-4). Construction traffic and the movement of machinery along these roads poses a moderate risk of spreading these species into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of Spanish broom, castor bean, tree tobacco, tree-of-heaven and other invasive plant species are well established in the vicinity and will provide an abundant seed source for the spread of infestations into areas disturbed by project activities.

A.6.2.12 Forest Road 2N68.2 and Forest Road 2N65.2

Soil Disturbance: Moderate Risk. Ground-disturbing construction activities in the vicinity of these access routes (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish broom, fountaingrass, and other noxious weeds. Fountaingrass is present along the roadsides in this area, and moderate infestations of Spanish broom consisting of hundreds of plants occur along these access roads. The existing infestations may provide a seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: Low Risk. There are moderate infestations of Spanish broom and fountaingrass consisting of hundreds of individuals along these access roads. However, the roads are paved and construction traffic is therefore expected to create a low risk for the establishment and spread of these species into areas of native vegetation that are currently free of weed infestations.

Overall Risk: Moderate Risk. Trucks and heavy equipment may be transported along this access road from various geographical locations where noxious weeds may be well established. Weed seeds may be transported into the area in this manner.

A.6.2.13 Forest Road 2N50.2 (Mt. Lowe Road)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish broom and other noxious weeds. Large infestations of Spanish broom consisting of thousands of plants occur along this access road. The existing infestations will provide a seed source for the spread of noxious weeds into areas disturbed by project activities.

Travel Routes: Moderate Risk. There are heavy infestations of Spanish broom along this access road (Figure A-4). However, the road is paved and construction traffic is therefore expected to result in a moderate risk for the establishment and spread of this species into areas of native vegetation that are currently free of weed infestations.

Overall Risk: High Risk. Trucks and heavy equipment may be brought to this portion of the proposed Project from various geographical locations where noxious weeds may be well established, and weed seeds may be transported into the area in this manner. Populations of Spanish broom are established in the vicinity and will provide an abundant seed source for the spread of infestations into areas disturbed by project activities.

A.6.2.14 Forest Road 2N45.3 (Mt. Wilson Road)

Soil Disturbance: High Risk. Ground-disturbing construction activities in the vicinity of this access route (Figure A-4) have the potential to create favorable conditions for the establishment and spread of Spanish

broom and other noxious weeds. Infestations of Spanish broom are common in the vicinity of this access road. The existing infestations will provide a seed source for the spread of noxious weeds into areas disturbed by project activities. Although several clonal patches of giant reed occur in the Eaton Wash channel in the vicinity of this road, no project activities will take place in the wash.

Travel Routes: Moderate Risk. Mt. Wilson Road is currently impassable from the south due to a large landslide just above Eaton Wash. If the road is reopened, construction traffic and the movement of machinery along the road will pose a moderate risk of spreading noxious weeds such as Spanish broom, tocalote, and red brome into areas that are currently not infested.

Overall Risk: High Risk. Trucks and heavy equipment may be transported along this access road from various geographical locations where noxious weeds may be well established. Weed seeds may be transported into the area in this manner.

A.6.3 Habitat and Species-specific Risk Assessment

Project-related activities, such as soil or vegetation disturbance associated with new road construction, tower construction, pulling stations, and staging will create conditions favorable for the establishment of weed populations on newly disturbed sites. In addition, project activities have the potential to create new or increased weed infestations in sites that have experienced some level of disturbance in the past and may contain a greater percentage of weed species cover. Even if all BMPs are successful and no weed seed is transported onto impact sites with project equipment and personnel, most if not all sites, even those in remote native communities, may be expected to contain an existing weed seed bank. Seed banks are known to regularly contain a different suite of species than is represented by the standing vegetation due to succession, low reproduction by seed of some perennials, and other factors (Thompson 2000). While in most cases it is rare to find species in the seed bank that are not represented to any degree in the aboveground vegetation, the exception to this is seeds from invasive, aggressive, disturbance-adapted, early colonizing weeds (Thompson 2000). For example, large cheatgrass seed banks are commonly found throughout semi-deserts of western North America, often regardless of such factors as remoteness of the site, grazing history, or fire history. However, in intact desert and semi-desert communities these seeds are typically held in the aboveground vegetation or in crevices on cryptogamic crusts, so germination is prevented until disturbance allows the cheatgrass seeds to come into contact with broken soil surfaces (Boudell et al. 2002, Clements et al. 2007).

A second factor favoring the establishment of new weed populations at disturbed sites is the propensity of disturbed soils to "catch" and hold seeds that were dispersed onto the site by wind, animals, or some other manner following the disturbance. This allows for a rapid build-up of weed seed banks even when these were not present prior to the disturbance. Soils in arid communities often have a high proportion of bare ground and can be compacted or very smooth-textured. When seeds are deposited onto a typical arid site, they tend to be blown away by wind or washed downstream by runoff unless they are trapped by some sort of microtopographical feature on the soil surface. Small cracks and fissures in the soil surface not only prevent seeds from being blown or washed away, but also increase infiltration and retention of water, creating a protected environment for seeds that is favorable for germination (Bainbridge 2007). Thus, when the typically hard, smooth, arid soil surface is texturized, bladed, disked, and denuded of protective vegetation, allelopathic agents, and cryptogamic crusts through ground disturbance, it creates a microtopography especially favorable for 1) catching and holding seeds and 2) absorbing and holding available moisture that enables weed seeds to germinate and establish. Through ground disturbance, the soil structure and biotic components such as mycorrhizae and soil fauna, to which native plants are adapted, and on which they depend are disrupted or

completely destroyed as the site is made more suitable for colonization of disturbance-loving invasive species by the destruction of natural barriers to weed establishment. It is this second effect that may explain why disturbed areas commonly show the largest transient, or recently accrued, seed banks, and these banks are typically dominated by weed species (Baskin and Baskin 2001).

For these reasons, there is a risk of establishing certain weed populations due to project-related disturbance regardless of the risks associated with spreading existing weed populations through travel routes or on project equipment, as discussed in Section A.5.1 and A.5.2 above. These risks are affected by factors including the following:

- Species-specific dispersal traits of weeds. Weed species with seeds dispersed by wind (tree-of-heaven), by tumbleweed (Russian thistle), water (saltcedar), or by animals (Brazilian peppertree) can potentially spread weed propagules miles from their original sources. Most seeds are not moved far from the parent plant, but a small proportion of seeds can be found large distances away. Even propagules with low innate dispersal abilities, such as stem fragments of giant reed or castor bean seeds that fall close to the plant, can be carried far after initial dispersal by streams or surface runoff. However, species without wind, water, or animal-mediated dispersal are less likely to disperse propagules far from the original source.
- Habitat being disturbed. While many weed species are generalists that can potentially colonize a fairly wide range of vegetation types, it is true that some habitats, particularly those with ample nutrients and soil moisture or those that have been recently disturbed, are more susceptible to invasion. Additionally, the suite of weed species that one would expect to colonize a site is dependant to some degree on the habitat where the disturbance occurred.
- Regional patterns in weed occurrence and propagule pressure. The ANF occurs in a transitional area with regards to climate, elevation, and vegetation communities. The southern portion has lower elevations and supports large areas of coastal sage scrub. The central portion contains the highest elevations and supports many types of forested communities. The northern portion supports several types of Mojavean scrub and woodland vegetation at moderate elevations. The most commonly observed weeds differed within these 3 regions, possibly due to species-specific habitat preferences.
- Type of ground disturbance. The type of disturbance creates conditions favoring release and establishment of different weed species. For example, removal of trees is expected to favor establishment of weed species that do best in full sun, such as black locust; burning is expected to favor establishment of fire-adapted weed species such as fountaingrass; and soil disturbance is expected to favor establishment of early-colonizing weed species, such as black mustard or tocalote, that respond favorably to disturbed, denuded soils.

We used these factors to consider the risks associated with the establishment of new weed infestations due to project activities. The results of this risk assessment, which focuses on risks associated with 1) release of pre-existing but currently dormant weed seed banks at disturbed sites, 2) rapid build-up of transient weed seed banks at disturbed sites, and/or 3) the creation of conditions favoring weed establishment at disturbed sites, are presented below.

A.6.3.1 Regional Risk Patterns

Due to regional differences in climate and dominant vegetation types, different weed species were observed to dominate disturbed sites in the southern, central, and northern areas of the ANF during project surveys. These species are clearly well suited to establish and spread within the region(s) in which they are found most frequently, and they can be expected to produce a large potential seed bank and infestation risk within a given region.

South Zone: In southern portions of the ANF, and just to the south of ANF boundaries, coastal sage scrub areas are commonly infested with castor bean, shortpod mustard, annual *Bromus* grasses, and Spanish broom. Disturbed areas within the southern portion of the ANF are expected to have a relatively high risk of establishment of new populations of these species.

Central Zone: In central areas of the ANF, roadsides were frequently observed to be infested with large colonies of Spanish broom (Figures A-3 through A-5). Disturbed areas within the central portion of the ANF are expected to have a relatively high risk of establishment of new populations of this species.

North Zone: In northern regions of the ANF, and just to the north of ANF boundaries, Mojavean scrub and woodlands represent the most common vegetation types. In this region, disturbed, overgrazed, or burned sites were observed to be heavily colonized by annual *Bromus* grasses such as cheatgrass and red brome and supported dense colonies of the native rubber rabbitbrush. Disturbed areas within the northern portion of the ANF are expected to have a relatively high risk of establishment of new populations of these species.

A.6.3.2 Riparian and Wetland Weed Risk

Road grading and stream crossing upgrades at Big Tujunga and the west fork of the San Gabriel River and many other riparian areas would result in direct loss of and impacts to wetlands, riparian corridors, streams, desert washes, unvegetated streambeds, and other sensitive aquatic resources. Riparian habitat would be impacted from the expansion of the existing access roads. Direct impacts could include removal of wetland/riparian vegetation and/or filling of jurisdictional areas to create stream crossings, particularly in the ANF. On NFS lands no activities can occur within designated Riparian Conservation Areas (RCAs) without approval from the Forest Service.

An RCA is defined as "an area delineated next to water features requiring special management practices to maintain and/or improve watershed and riparian-dependent resource conditions" (USDA, 2005a). Therefore, any riparian areas having important biological and/or hydrologic riparian characteristics within the project area were identified by the ANF as RCAs using the Five-Step Project Screening Process for Riparian Conservation Areas (a detailed description of the Five-Step Process and methods utilized to assess affects to RCAs is presented in Appendix M).

In general, RCAs include areas containing both aquatic and terrestrial components, and serve as the interface between land and water. Specifically, RCAs can include lands adjacent to perennial, intermittent, or ephemeral streams as well as in and around meadows, lakes, reservoirs, ponds, wetlands, vernal pools, seeps, springs, and other water bodies. These areas are especially important as they are where terrestrial and aquatic systems interact and slope and fluvial processes are tightly interconnected. In California, the expansion of existing populations or the colonization of weedy exotics is considered a major threat to riparian ecosystems.

Two hundred and sixty-seven RCAs were identified during field assessments for the proposed Project on NFS lands. These RCAs fall within the transmission line ROW or along access roads that would be used and upgraded during construction of the proposed Project. Approximately 96 RCAs occur where the transmission line crosses a substantial stream or drainage. One hundred and seventy-one occur where access or spur roads cross ephemeral, intermittent, or perennial drainages.

RCAs that could be impacted by the proposed Project include a wide range of riparian areas, from ephemeral drainages high in a watershed that contain chaparral or other xeric plant communities to perennial streams surrounded by mature riparian forest. The single largest impact to RCAs from the proposed Project would occur from the widening of the access roads to 16 ft and the construction of new spur roads. Widening of the access roads would in some cases remove riparian vegetation, including mature oak trees, alders and other riparian trees that occur in RCAs. In some areas only limited riparian vegetation would be removed where an RCA supports only ephemeral or intermittent flows such as portions of Mill or Alder Creeks. However, in

other areas including Monte Cristo Creek, Big Tujunga, Alder, and Lynch Gulch large areas of riparian habitat within designated RCAs would be removed to support vehicle traffic and heavy equipment.

Some weed species observed within the ANF by project botanists or determined to be a threat based on the Final Environmental Impact Statement, Volume 1, Land Management Plans (USDA 2005, see Section A.4 above) occur only or primarily within riparian or wetland habitats. Subsequently, project activities are expected to create a moderate to high risk of establishment of new populations of species occurring only or primarily within riparian or wetland habitats, including perennial pepperweed, thouroughwort, cape ivy, bull thistle, English ivy, giant reed, tree-of-heaven, black locust, Brazilian peppertree, periwinkle, saltcedar and other tamarisk species, and Himalayan blackberry.

A.6.3.3 Recently Burned Vegetation Types

Over eight percent of the project alignment within the ANF was mapped as recently burned (Table A-3). These habitats exhibited differing levels of burn severity, from having all pre-existing aboveground shrub and scrub vegetation burned to lower intensity areas that supported resprouting associate scrub species such as chamise. Areas burned in higher intensity fires are expected to be more disturbed, retain fewer woody survivors, and recover at slower rates compared to the lower intensity burned areas. Regardless, several weed species observed to occur in the ANF during project surveys or previously identified to be a threat to ANF habitats (USDA 2005) are strongly fire-adapted and preferentially colonize burned areas. Additional ground disturbance following a fire can increase invasion risk even further. Impact areas in vegetation types mapped as deerweed/chia herbaceous field, recently burned and Mojavean pinyon and juniper scrub, recently burned (see vegetation type mapping, Appendix G of the Biological Specialist Report) are expected to have a high to very high risk of establishment of some of the following fire-adapted weed species: cheatgrass, red brome, ripgut brome, smilo grass, rubber rabbitbrush, shortpod mustard, black mustard, fountaingrass, castor bean, Scotch broom, Spanish broom, and tocalote.

A.6.3.4 Species Likely to Establish at Impact Sites

The majority of impacts will occur in upland habitats. Impacts will generally remove or disturb existing vegetation by trampling or line pulling and/or disturb soils through staging activities, movement of heavy equipment, grading, road construction, and tower installation. Therefore, the weed species with the highest risk of establishing new populations at impact sites (due to a pre-existing or quickly developed weed seed bank and the creation of conditions favoring invasion) are those upland species that are disturbance-adapted early colonizers. Within this suite of species, those weeds with low dispersal ability are less likely to be found in a given impact area's seed bank prior to or shortly following disturbance, while those that are wind or animal dispersed are more likely to be present in a given area's seed bank. In general, assuming the BMPs prevent project-related spread of existing populations, impact sites have a moderate risk for establishment of new populations of the following habitat-appropriate, disturbance-adapted, low dispersal weeds: shortpod mustard, black mustard, Spanish broom, Scotch broom, castor bean, fennel, and Dalmatian toadflax. This is because these species all have a high risk resulting from their occurrence in the ANF (meaning there are more seed sources to produce propagules), but a low risk resulting from their dispersal biology. However, this low risk from dispersal method is only true if BMPs do prevent project-related weed seed spread on vehicles, equipment, and personnel, which is unlikely. Impact sites have a high to very high risk of establishment of new populations of the following habitat-appropriate, disturbance-adapted, wind, tumbleweed, or animal dispersed weeds: cheatgrass, red brome, ripgut brome, smilo grass, bull thistle, tree-of heaven, spotted knapweed, yellow star-thistle, tocalote, and Russian thistle. This is because these species, like the low-dispersal species, are also present within the alignment in the ANF. However, their seeds are much more

likely to disperse to impacted areas even if project BMPs are completely successful in preventing weed seed spread via equipment, vehicles, or personnel.

A.7 Recommended Management Actions

The ANF contains a wealth of particularly sensitive resources and rare remaining natural habitats, and provides unique recreational opportunities for residents of the LA Basin. Some plant communities are best represented, and many plant species are found, only within the ANF. Additionally, as the ANF comprises publicly owned U.S. Forest Service (USFS) lands, impacts that may substantially degrade habitat functions and values have the potential to affect a wide range of activities and uses within the ANF. Once established in an area, weed populations are generally self-reproducing and often create dense monocultures or otherwise alter the physical properties of a site so that normal successional stages of native plant growth and development, which might otherwise lead to native climax vegetation, is much slower or even completely prevented. Arid environments present extremely harsh circumstances for seed germination and seedling establishment. Competition from invasive species for scarce water resources and for suitable safe sites for seedling establishment in these environments can preclude the return of native species following disturbance. The spread of existing populations of invasive weeds or the establishment of new weed populations in previously native areas as a result of project activities are considered permanent in nature due to the length of time typically required to eradicate populations and will constitute significant degradation of native habitats within and surrounding the impact areas. Impacts related to the permanent loss of these habitats are addressed separately in Section 6 of the Biological Specialist Report. Therefore, recommended management actions for project-related increases in regional weed populations will focus not on loss of these habitats through conversion, but instead on controlling the establishment and spread of noxious weeds along travel routes, in assembly yards or staging areas, and at impact sites.

There are three major ways that project-related activities and impacts could contribute to an increase in noxious weeds within the ANF: (1) the creation of conditions that favor establishment of weed species through soil disturbance, removal of native vegetation, breakup of cryptogamic crusts, etc., (2) the subsequent release of pre-existing weed seed banks from dormancy or quick build-up of new weed seed banks on disturbed soils at the impact sites; and (3) spread of new and pre-existing weed infestations into newly disturbed areas via project equipment and personnel. Therefore, recommended management actions for these impacts are designed as a multi-part approach. First, implement USFS-recommended Best Management Practices (BMPs) to reduce the potential spread of noxious weed propagules from urban areas into remote, natural areas, or from roadsides into habitat interiors. Second, control weeds within main staging areas and assembly yards to reduce spread of weed seeds into installation areas via the transport of equipment and tower infrastructure. Third, enact specific and targeted control measures on all roadside weed populations along travel routes used for project construction. Once sites are impacted, areas will be restored or treated to minimize weed establishment, in accordance with recommendations outlined in site-specific feasibility analyses in the Habitat Restoration Plan. Finally, because no suite of BMPs will be 100 percent effective in preventing the spread of all invasive propagules or release of existing noxious weed seed banks from dormancy, further management actions will be required in the form of funding and implementing long-term noxious weed control efforts within the ANF along access routes and at impact sites.

SCE shall implement the following recommended management actions to reduce the spread of existing, and establishment of new weed infestations within the ANF:

B-3a **Prepare and implement a Weed Control Plan.** SCE shall prepare and implement a comprehensive, adaptive Weed Control Plan on NFS lands for pre-construction and construction invasive weed abatement. The long term Weed Control Plan, including monitoring and eradication, will be defined as part of the 50 year Operations and Maintenance Permit. On the ROW easement lands administered by the FS, the Weed Control Plan shall incorporate all appropriate and legal agency-stipulated regulations. The Weed Control Plan shall be submitted to the FS for final authorization of weed control methods, practices, and timing prior to implementation of the Weed Control Plan on public lands. ROW easements located on private lands shall include adaptive provisions for the implementation of the Weed Control Plan. The Weed Control Plan shall include the following:

- A pre-construction weed inventory shall be conducted by surveying all areas subject to ground-disturbing activity, including, but not limited to, tower pad preparation and construction areas, tower removal sites, pulling and tensioning sites, assembly yards, and areas subject to grading for new or improved access and spur roads. Weed populations that: (1) are rated High or Moderate for negative ecological impact in the California Invasive Plant Inventory Database (Cal-IPC, 2006); and (2) aid and promote the spread of wildfires (such as cheatgrass, Saharan mustard, and medusa head); and (3) are considered by the FS as species of priority (for NFS lands only) shall be mapped and described according to density and area covered. In areas subject to ground disturbance, weed infestations shall be treated prior to construction according to control methods and practices for invasive weed populations designed in consultation with the FS. The Weed Control Plan shall be updated and utilized for eradication and monitoring post construction.

- Weed control treatments shall include all legally permitted herbicide, manual, and mechanical methods applied with the authorization of the FS~~, and Fish and Wildlife Service~~ where appropriate. The application of herbicides shall be in compliance with all state and federal laws and regulations under the prescription of a Pest Control Advisor (PCA), where concurrence has been provided by the CPUC/FS, and implemented by a Licensed Qualified Applicator. ~~Herbicides shall not be applied in areas containing occupied Threatened, Endangered, Proposed, Candidate, and FS Sensitive/Watch List (TEPCSW) species without further analysis.~~ Herbicides shall not be applied during or within 72 hours of a scheduled rain event. Herbicides shall not be used within Riparian Conservation Areas (RCAs) on the ANF without approval of the FS~~ and if necessary, the FWS~~. In riparian areas only water-safe herbicides shall be used. Herbicides shall not be applied when wind velocities exceed 6 mph. Where manual and/or mechanical methods are used, disposal of the plant debris will follow the regulations set by the FS. The timing of the weed control treatment shall be determined for each plant species in consultation with the FS (on NFS lands~~), PCA, the county Agriculture Commissioners, and Cal IPC~~ with the goal of controlling populations before they start producing seeds.

For the preconstruction and construction of the Project, measures to control the introduction and spread of noxious weeds in the Project work area shall be taken as follows.

- On the ANF, from the time construction begins until ten years after construction is complete, surveying for new invasive weed populations and the monitoring of identified and treated populations shall be required at all sites impacted by construction (tower pads, staging areas, landing zones, etc.), including access/spur roads disturbed during the Project. Surveying and monitoring for weed infestations shall occur annually for years one to five and bi-annually for years six to ten. Treatment of all identified weed populations shall occur at a minimum of once annually. When no new seedlings or resprouts are observed at treated sites for three consecutive, normal rainfall years, the weed population can be considered eradicated and weed control efforts may cease for that impact site.

- During Project preconstruction and construction, all seeds and straw materials shall be weed-free rice straw, and all gravel and fill material shall be certified weed free by the county Agriculture Commissioners' Offices. Any deviation from this will be approved by a FS botanist. All plant materials used during restoration shall be native, certified weed-free, and approved by the CPUC and FS.

- During Project preconstruction and construction, vehicles and all equipment shall be washed (including wheels, undercarriages, helicopter landing gear, and bumpers) before and after entering FS identified areas. On non-federal lands vehicles and equipment shall be washed prior to commencing work in off road areas. Vehicles shall be cleaned at existing construction yards or legally operating car washes. SCE shall document that all vehicles have been washed prior to commencing project work. In addition, tools such as chainsaws, hand clippers, pruners, etc. shall be washed before and after entering all Project work areas. All washing shall take place where rinse water is collected and disposed of in either a sanitary sewer or landfill, unless otherwise approved by the FS. A written daily log shall be kept for all vehicle/equipment/tool washing that states the date, time, location, type of equipment washed, methods used, and staff present. The log shall include the signature of a responsible staff member. Logs shall be available to the CPUC and FS for inspection at any time and shall be submitted to the CPUC and FS on a monthly basis.

- During Project operation and maintenance activities, clear and dispose of weeds in assembly yards, helicopter landing areas, tower pads, spur roads, staging areas, and any other disturbance areas in a FS-approved method.

B-3b **Remove weed seed sources from construction routes.** Prior to construction, SCE shall initiate invasive species eradication identified in Table 2. These populations were identified as small and isolated but having the potential to spread aggressively during construction. Post construction, these isolated populations will be included and treated according to the restoration plan. Per the FSM 2080 BMP guideline, SCE shall also remove or reduce sources of weed seed along the travel routes identified in Figures A-2 through A-4 of Appendix A of the *Biological Specialist Report* (Aspen, 2008) by mowing or other control methods to substantially reduce seed production in these infestations during Project construction. Following Project approval and during the time of year when weed species can be observed and identified, SCE shall identify, using a qualified plant ecologist, any other weed seed sources that could contribute to Project-related weed spread on the ANF. The following weed populations, and any other target infestations identified by Project surveys, should be controlled prior to construction. SCE shall initiate eradication of the following weed populations and any other isolated, target infestations discovered during pre-construction surveys along construction routes.

Table A-6. Weed Populations Along Construction Routes*

ANF Road Location	Noxious Weeds Identified
4N41~~4N41~~	Isolated patch of Spanish broom~~Isolated patch of Spanish broom~~
3N20~~3N20~~	Isolated patches of Spanish broom, Scotch broom, and rockrose~~Isolated patches of Spanish broom~~
3N23~~3N23~~	Giant reed population in creek adjacent to road~~Giant reed population in creek adjacent to road~~
2N23~~2N23~~	Scattered Spanish broom infestations of a range of population sizes and densities. Some of the large populations along these routes observed during project surveys had been recently brushed for weed control by SCE contractors, but these populations should be rechecked and control efforts reapplied as necessary. Also isolated patches of tree tobacco, rockrose, horehound, and tocalote.~~Scattered Spanish broom infestations of a range of population sizes and densities. Some of the large populations along these routes observed during project surveys had been recently brushed for~~

Table A-6. Weed Populations Along Construction Routes*

ANF Road Location	Noxious Weeds Identified
	~~weed control by SCE contractors, but these populations should be rechecked and control efforts reapplied as necessary~~
2N24~~2N24~~	Scattered, isolated patches of Spanish broom and rockrose~~Scattered, isolated patches of Spanish broom~~
2N25.2~~2N25.2~~	Scattered, isolated patches of Spanish broom, rosemary, rockrose, and horehound~~Scattered, isolated patches of Spanish broom~~
2N30.1~~3N27 north of Big Tujunga Creek to Mt. Gleason Rd~~	One isolated patch of Spanish broom~~Scattered, isolated patches of Spanish broom~~
2N30.2~~2N45~~	Scattered Spanish broom, bull thistle, tree of heaven, black locust, tocalote, rockrose, eupatory, horehound, smilo grass, and tree tobacco infestations of a range of population sizes and densities.~~Moderate patch of giant reed and tree of heaven~~
3N27 north of Big Tujunga Creek to Mt. Gleason Rd~~2N65.1~~	Scattered, isolated patches of Spanish broom~~Moderate infestation of tree spurge~~
2N45~~2N65.2~~	Moderate patch of giant reed and tree of heaven~~Moderate infestation of Spanish broom and thoroughwort~~
2N65.1~~2N66~~	Moderate infestation of tree spurge~~Moderate patch of Spanish broom and tree of heaven~~
2N65.2~~2N75~~	Moderate infestation of Spanish broom and thoroughwort~~Moderate patch of Spanish broom~~
2N66~~2N79~~	Moderate patch of Spanish broom and tree of heaven~~Isolated patch of Spanish broom~~
2N75~~1N36~~	Moderate patch of Spanish broom~~Scattered Spanish broom, bull thistle, tree of heaven, black locust, tocalote, and tree tobacco infestations of a range of population sizes and densities.~~
2N79	Isolated patch of Spanish broom
1N36	Scattered Spanish broom, bull thistle, tree of heaven, black locust, tocalote, rockrose, Canadian thistle, hairy vetch, smilo grass, and tree tobacco infestations of a range of population sizes and densities.
Road west out of Shortcut Station	Isolated patches of Spanish broom

*Specific locations are found in Figures A-2 through A-4 of Appendix A of the Biological Specialist Report Noxious Weed Assessment. [Aspen, 2008]

B-3c **Remove weed seed sources from assembly yards, staging areas, tower pads, pull sites, landing zones, and spur roads.** Prior to construction and during each year of use at all assembly yards, staging areas, tower pads, pull sites, landing zones, and spur roads within the ANF, weed infested areas should be mowed and/or treated as appropriate for the individual weed species under the guidance of a qualified plant ecologist or restoration ecologist, where concurrence on the ecologist has been provided by the FS. Unless otherwise authorized by the FS, weed control efforts in these areas shall be timed annually to reduce shortpod mustard, tocalote, and other noxious weed seed production, by mowing or weed-whacking infestations when flowering has just started, but before seeds have been produced. All plant debris shall be disposed of at a FS/CPUC-approved location. Weed control efforts shall commence in early spring (February – March), as indicated annually by a qualified plant ecologist or restoration ecologist in coordination with a FS botanist or Forest Weed Specialist.

A.8 Forest Service Manual 2080 BMP Text

The BMPs as outlined in the management actions above are a project-specific modification of the more general FSM 2080 BMPs (FSM 2080, 2081.2, Prevention and Control Measures) listed below. All information and

recommendations pertinent to project-related weed impacts contained in these BMPs are discussed in Section A.6.

1. Roads.

Required Objectives and Associated Practices.

(1) Incorporate weed prevention into road layout, design, and alternative evaluation. Environmental analysis for road construction and reconstruction will include weed risk assessment.

(2) Remove the seed source that could be picked up by passing vehicles and limit seed transport in new and reconstruction areas.

(a) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.

(b) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.

(3) Re-establish vegetation on bare ground due to construction and reconstruction activity to minimize weed spread.

(a) Revegetate all disturbed soil, except the travel way on surfaced roads, in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site will prevent weed establishment. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. To avoid weed contaminated seed, each lot must be tested by a certified seed laboratory against the all State noxious weed lists and documentation of the seed inspection test provided.

(b) Use local seeding guidelines for detailed procedures and appropriate mixes. Use native material where appropriate and available. Revegetation may include planting, seeding, fertilization, and weed-free mulching as indicated by local prescriptions.

(c) Monitor and evaluate success of revegetation in relation to project plan. Repeat as indicated by local prescriptions.

(4) Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. The borrow pit will not be used if new invaders, defined by the Forest Weed Specialist, are found on site.

(5) Minimize sources of weed seed in areas not yet revegetated. If straw is used for road stabilization and erosion control, it must be certified weed-free or weed-seed free.

(6) Minimize roadside sources of weed seed that could be transported to other areas during maintenance.

(a) Look for priority weed species during road maintenance and report back to District Weed Specialist.

(b) Do not blade roads or pull ditches where new invaders are found.

(c) Maintain desirable roadside vegetation. If desirable vegetation is removed during blading or other ground disturbing activities, area must be revegetated according to section (3) (a), (b), (c) above.

(d) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(e) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders, as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.

(f) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

(7) Reduce weed establishment in road obliteration/reclamation projects. Revegetate according to section (3) (a), (b), (c) above.

Recommended Objectives and Associated Practices.

(1) Retain shade to suppress weeds. Consider minimizing the removal of trees and other roadside vegetation during construction, reconstruction, and maintenance, particularly on southerly aspects.

(2) Consider re-establishing vegetation on bare ground due to construction and reconstruction activity to minimize weed spread. Road maintenance programs should include scheduled fertilization to maintain vigor of competitive vegetation (3-year period suggested).

(3) Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. All gravel and borrow sources should be inspected and approved before use and transport. The source will not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they must be treated before transport and use.

(4) Minimize roadside sources of weed seed that could be transported to other areas. Weed infestations should be inventoried and scheduled for treatment.

(5) Ensure that weed prevention and related resource protection are considered in travel management. Consider weed risk and spread factors in travel plan (road closure) decisions.
(6) Reduce weed establishment in road obliteration/reclamation projects. Consider treating weeds in road obliteration and reclamation projects before roads are made undriveable. Monitor and retreat as indicated by local analysis and prescription.
(7) Evaluate and prioritize noxious weeds along existing Forest Service access roads leading to project area and treat as indicated by local analysis and prescriptions, before construction equipment moves into project area. New road construction must be revegetated as described in Weed Prevention measure, see Roads Required Objectives and Associated Practices section (3) (a), (b), (c) above.

2. Recreation, Wilderness, Roadless Areas.

Required Objectives and Associated Practices.

(1) Minimize transport and establishment of weeds on National Forest Service lands.
- (a) Include environmental analysis for recreation and trail projects in weed risk assessment.
- (b) Post and enforce statewide weed-free feed orders.
- (c) Seed only when necessary at backcountry sites to minimize introduction of non-native species and weeds. Reseed according to Roads (3) (a), (b), (c) above.

(2) Reduce weed establishment and spread from activities covered by Recreation Special Use Permits.
- (a) Include Clause R1-D4, (or subsequent approved direction), in all new and reissued recreation special use permits, authorizations, or other grants involving ground-disturbing activities. Include this provision in existing ground-disturbing authorizations, which are being amended for other reasons.
- (b) Revegetate bare soil resulting from special use activity according to Roads (3) (a), (b), (c) above.

(3) Prevent weed establishment resulting from land and float trail use, construction, reconstruction and maintenance activities.
- (a) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

Recommended Objectives and Associated Practices.

(1) Minimize transport and establishment of weeds on National Forest System (NFS) lands.
- (a) Encourage backcountry pack and saddle stock users to feed only weed-free feed for several days prior to traveling off roads in the Forest. Before entering NFS land, animals should be brushed to remove any weed seed.
- (b) Stock should be tied and/or held in the backcountry in such a way as to minimize soil disturbance and avoid loss of native/desirable vegetation.
- (c) Maintain trailheads, boat launches, outfitter and public camps, airstrips, roads leading to trailheads, and other areas of concentrated public use in a weed-free condition.
- (d) Motorized and/or mechanized (such as mountain bikes) trail users should inspect and clean their vehicles prior to using NFS lands.

(2) Consider reducing weed establishment and spread from activities covered by recreation, special use permits. Consider including Clause R1-D4, (or subsequent approved direction), by amending existing ground-disturbing authorizations as indicated by local prescriptions.
(3) Prevent weed establishment resulting from land and float trail use, construction, reconstruction, and maintenance activities.
- (a) All trail crews should inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.
- (b) Inspect and approve all gravel and borrow sources before use and transport. The source will not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they must be treated before transport and use.

3. Cultural Resources.

Required Objectives and Associated Practices.

(1) Reduce weed establishment and spread at archeological excavations. Revegetate bare soil resulting from cultural resource excavation activity according to the Roads (3) (a), (b), (c) section above.

4. Wildlife, Fisheries, and Botany.

Required Objectives and Associated Practices.

(1) Incorporate weed prevention into wildlife, fisheries, and botany project design.

a. Include weed risk assessment in environmental analysis for wildlife, fish and botany projects with ground disturbing actions.

b. Revegetate bare soil resulting from wildlife and fish project activity according to the Roads (3) (a), (b), (c) section above.

c. Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

d. Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

5. Range.

Required Objectives and Associated Practices.

(1) Ensure weed prevention and control are considered in management of all grazing allotments.

(a) Include weed risk assessment in environmental analysis for rangeland projects.

(b) When other plans do not already address noxious weeds, include practices and control measures in Annual Operating Plans.

(2) Minimize ground disturbance and bare soil.

(a) Revegetate, where applicable, bare soil from grazing activities according to the Roads (3) (a), (b), (c) section above.

(b) Check areas of concentrated livestock use for weed establishment and treat new infestations.

(3) Minimize transport of weed seed into and within allotments.

(a) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(b) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

(c) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

Recommended Objectives and Associated Practices.

(1) Transport of weed seed into and within allotments should be minimized.

(a) Avoid driving vehicles through off-road weed infestations.

(b) Feed certified weed-free feed to livestock for several days prior to moving them onto the allotment to reduce the introduction of new invaders and spread of existing weed species. Consider using transitional pastures when moving animals from weed infested areas to the National Forest. (Transitional pastures are designated fenced areas that can be logistically and economically maintained.)

(c) Consider excluding livestock from sites with new invaders or treat new invaders in these areas before entry by livestock.

(2) Maintain healthy desirable vegetation that is resistant to noxious weed establishment.

(a) Consider managing forage utilization to maintain the vigor of desirable plant species as described in the Allotment Management Plan.

(b) Minimize or exclude grazing on restoration areas until vegetation is well established.

6. Timber.

Required Objectives and Associated Practices.

(1) Ensure that weed prevention is considered in all pre-harvest timber projects.

(a) Include weed risk assessment in environmental analysis for timber harvest projects.

(b) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.) Reference Contract Provision C/CT6.26

(c) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as designated by the Forest Weed Specialist). Reference Contract Provision C/CT6.261

(2) Minimize the creation of sites suitable for weed establishment. Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above.

Recommended Objectives and Associated Practices.

(1) Ensure that weed prevention is considered in all timber projects.

(a) Consider treating weeds on roads used by timber sale purchasers. Reference Contract Provision C/CT6.26.

(b) Treat weeds on landings, skid trails and helibases that are weed infested before logging activities, where practical.

(2) Minimize the creation of sites suitable for weed establishment. Soil disturbance should be minimized to meet harvest project objectives.

(3) Consider monitoring for weeds after sale activity and treat weeds as indicated by local prescriptions.

(a) Consider trust, stewardship, or other funds to treat soil disturbance or weeds as needed after timber harvest and regeneration activities.

(b) Consider monitoring and treating weed infestations at landings and on skid trails after harvest.

7. Minerals.

Required Objectives and Associated Practices.

(1) Minimize weed establishment in mining, oil and gas operations, and reclamation.

(a) Include weed risk assessment in environmental analysis for minerals and oil and gas projects.

(b) Include weed prevention measures in operation and/or reclamation plans.

(c) Retain bonds until reclamation requirements are completed.

(d) Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above.

(2) Remove seed source and limit seed transport into new or existing mining and oil and gas operations. Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(3) Minimize weed spread caused by moving infested gravel and fill material.

(a) The borrow pit will not be used if new invaders (as defined by the Forest Weed Specialist) are found on the site.

(b) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(c) Do not establish new gravel and fill material sources in areas where new invaders are present on National Forest Service lands. Where widespread weeds occur at new pit sites strip at least the top 8" and stockpile contaminated material. Treat weeds at new pits where widespread weeds are present.

Recommended Objectives and Associated Practices.

(1) Consider removing seed source and limiting seed transport into new or existing mining and oil and gas operations. Where applicable, treat weeds on project access routes. Reference Contract Provision C/CT6.27.

(2) Minimize weed spread caused by moving infested gravel and fill material.

(a) Inspect and approve all gravel and borrow sources before use and transport. The source should not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they should be treated before transport and use.

(b) Consider maintaining stockpiled material in a weed-free condition.

(c) Check the area where pit material is used to ensure that no weed seeds are transported to the use site.

8. Soil and Water.

Required Objectives and Associated Practices.

(1) It is required that integrated weed prevention and management be used in all soil, watershed, and stream restoration projects.

(a) Include weed risk assessment in environmental analysis for soil, watershed, and stream restoration projects with ground disturbing actions.

(b) Revegetate bare soil resulting from excavation activity according to the Roads (3) (a), (b), (c) section above.

(c) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(d) Clean all equipment prior to leaving the project site, if operation in areas infested with new invaders (as designated by the Forest Weed Specialist).

(e) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

Recommended Objectives and Associated Practices.

(1) Integrate weed prevention and management in all soil, watershed, and stream restoration projects by considering treating weeds in road obliteration and reclamation projects before roads are made undriveable. Monitor and retreat as indicated by local prescriptions.

9. Lands and Special Uses.

Required Objectives and Associated Practices.

(1) Incorporate weed prevention provisons in all special use permits, road use permits, and easements.

(a) Include weed risk assessment in environmental analysis for land projects with ground disturbing actions.

(b) Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above, as a condition of the authorization.

(c) Include approved special use provision R1-D4, see FSH 2709.11, chapter 50, (or subsequent approved direction) in all new and reissued special use permits, authorizations, or other grants involving ground disturbing activities. Include this provision in existing ground disturbing authorizations, which are being amended for other reasons.

(d) Include noxious weed prevention and control measures as indicated by local prescriptions in new or reissued road permits or easements granted pursuant to FLPMA (P.L. 94579 0/2/76), FRTA (P.L. 88657 0/3/64) or subsequent authorities. This includes FLPMA Private and Forest Road Permits and Easements; FRTA Private and Forest Road Easements; Cost Share Easements; and Road Use (commercial haul) Permits (7730). (While the approved terms and conditions of certain permits or easements may not provide for modification, the necessary weed prevention and control provisions may be included in written plans, specifications, stipulations and /or operation and maintenance plans attached to and made a part of the authorization.)

(e) Clean all equipment prior to leaving the project site, if operating in areas infested with New Invaders (as designated by the Forest Weed Specialist).

(2) Minimize weed spread caused by moving infested gravel and fill material.

(a) Do not establish new gravel and fill material sources on National Forest Service lands in areas where new invaders are present. Where widespread weeds occur at new pit sites strip at least the top 8" and stockpile contaminated material. Treat weeds at new pits where widespread weeds are present.

(b) Remove all mud, dirt, and plant parts from all off-road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

Recommended Objectives and Associated Practices.

(1) Incorporate weed prevention provisions in all special use permits, road use permits and easements.

(a) Consider including special use provision R1-D4 by amending existing ground disturbing authorizations as indicated by local prescriptions.

(b) Consider including noxious weed prevention and control provisions by amending existing ground disturbing authorizations when determined to be necessary by the authorized officer. (While the approved terms and conditions of certain permits or easements may not provide for modification, the necessary weed prevention and control provisions may be included in written plans, specifications, stipulations and/or operation and maintenance plans attached to and made a part of the authorization.)

(2) Minimize weed spread caused by moving infested gravel and fill material. All gravel and borrow sources should be inspected and approved before use and transport. The source should not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they should be treated before transport and use.

10. Fire.

Required Objectives and Associated Practices.

(1) Increase weed awareness among all fire personnel. Include weed risk factors and weed prevention considerations in the Resource Advisor duties on all Incident Management Teams and Fire Rehabilitation Teams during pre-fire, pre-incident training.

(2) Mitigate and reduce weed spread during wild fire activities

(a) Initiate establishment of a network of helibases, camps and staging areas that will be maintained in a noxious weed-free condition.

(b) Minimize weed spread in camps by incorporating weed prevention and containment practices such as mowing, flagging or fencing weed patches, designating weed-free travel routes and washing equipment.

(c) Inspect all fire going vehicles regularly to assure that undercarriages and grill works are kept weed seed free. All vehicles sent off Forest for fire assistance will be cleaned before they leave or return to their home.

(3) Minimize weed spread during smoke jumper operations.

(a) Inspect, remove, and properly dispose of weed seed and plant parts found on clothing and equipment.

(b) Coordinate with Weed Specialist(s) to locate and/or treat practice jump areas.

(4) Mitigate and reduce weed spread in Air Operations.

(a) Initiate establishment of a network of helibases that will be maintained in a noxious weed-free condition.

(b) Minimize weed spread at helibases by incorporating weed prevention and containment practices such as mowing, flagging or fencing weed patches, designating weed-free travel routes.

(c) Provide weed prevention briefings for helibase staff.

(d) Inspect, and if necessary clean, contract fuel and support vehicles before and after each incident when travelling off road or through weed infestations.

(e) Inspect and remove weed seed and plant parts from all cargo nets.

(5) Mitigate and reduce weed spread from Logistics Operations activities.

(a) Look for weed-free camps, staging, drop points and parking areas.

(b) Regularly inspect and clean fire vehicles as necessary to assure that undercarriages and grill works are kept weed seed free.

(6) Integrate weed prevention and management in all prescribed burning. Mitigate and reduce weed spread during prescribed fire activities.

(a) Include weed risk assessment in environmental analysis for prescribed fire projects.

(b) Coordinate with local Noxious Weed Management Specialist to utilize helibases that are maintained in a weed-free condition, whenever possible.

(c) All crews should inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.

(d) Add weed awareness and prevention education to Fire Effects and Prescribed Fire training.

(7) Encourage desirable vegetation during rehabilitation activities.

(a) Revegetate only erosion susceptible and high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) as described in the Roads (3) (a), (b), (c) section above.

(b) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

Recommended Objectives and Associated Practices.

(1) Mitigate and reduce weed spread during fire activities.

(a) Initiate establishment of a network of helibases, camps, and staging areas on private land that will be maintained in a noxious weed-free condition.

(b) Consider checking and treating weeds that establish at cleaning sites after fire incidents, during rehabilitation.

(c) Emphasize Minimum Impact Suppression Tactics (M.I.S.T.) to reduce soil and vegetation disturbance.

(2) Minimize weed spread during smokejumper operations. Travel through weed infested areas should be avoided or minimized.

(3) Mitigate and reduced weed spread from Logistics Operations activities. Traffic should be routed through camps to avoid weed infested areas.

(4) Integrate weed prevention and management in all prescribed burning. Mitigate and reduce weed spread during prescribed fire activities.

(a) Consider treating high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) with weed infestations (such as roads, disturbed ground) before burning and check and retreat after burning if necessary.

(b) Consider avoiding ignition and burning in high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) that cannot be treated before or after prescribed fire.

(5) Encourage desirable vegetation during rehabilitation activities.

(a) Check and treat weeds at cleaning sites and all disturbed staging areas.

(b) Treat weeds within the burned area as part of rehabilitation plan to reduce weed spread.
(c) Check weed spread resulting from fire and fire suppression activities.
(d) Consider applying for restoration funding for treatment of weed infestations within the fire area.

11. Administration.
Required Objectives and Associated Practices.
(1) Ensure all Forest Service employees are aware of and knowledgeable about noxious weeds.
(a) Train Line Officers in noxious weed management principles and practices.
(b) Each unit will have access to Weed Specialist at the Ranger District or Supervisor's Office.
(2) Ensure all Forest workers are reducing the chance of spreading noxious weeds. All Forest workers will inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment including Forest Service vehicles.
Recommended Objectives and Associated Practices.
Consider a reward program for weed awareness, reporting, and beating new invaders.

A.8. Summary of Weed Occurrence Data from the Spring 2008 Surveys

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
Ageratina adenophora (Spreng.) King & H.E. Robins.	thouroughwort	SEG11-IA17
		SEG11-STR92
Ailanthus altissima (P. Mill.) Swingle	tree-of-heaven	SEG11-IA29
Arundo donax L.	giant reed	SEG11-IA16
		SEG11-IA29
Brassica nigra (L.) W.D.J. Koch	black mustard	SEG11-IA20
		SEG11-STR100
		SEG11-STR108
		SEG11-STR114
		SEG11-STR142
		SEG11-STR149
		SEG11-STR150
		SEG11-STR151
		SEG11-STR152
		SEG11-STR153
		SEG11-STR155
		SEG11-STR93
		SEG11-STR94
Bromus diandrus Roth	ripgut brome	SEG11-IA13
		SEG11-IA14
		SEG11-IA14
		SEG11-IA15
		SEG11-IA16
		SEG11-IA17
		SEG11-IA18
		SEG11-IA20
		SEG11-IA22
		SEG11-IA29
		SEG11-IA9
		SEG11-STR100
		SEG11-STR102
		SEG11-STR107

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG11-STR109
		SEG11-STR112
		SEG11-STR113
		SEG11-STR121
		SEG11-STR127
		SEG11-STR137
		SEG11-STR140
		SEG11-STR142
		SEG11-STR143
		SEG11-STR145
		SEG11-STR149
		SEG11-STR150
		SEG11-STR151
		SEG11-STR23
		SEG11-STR30
		SEG11-STR31
		SEG11-STR37
		SEG11-STR38
		SEG11-STR40
		SEG11-STR61
		SEG11-STR62
		SEG11-STR63
		SEG11-STR65
		SEG11-STR67
		SEG11-STR68
		SEG11-STR70
		SEG11-STR75
		SEG11-STR92
		SEG11-STR94
		SEG11-STR95
		SEG6-IA11
		SEG6-IA12
		SEG6-IA13
		SEG6-IA5
		SEG6-IA7
		SEG6-STR100
		SEG6-STR102
		SEG6-STR103
		SEG6-STR104
		SEG6-STR105
		SEG6-STR106
		SEG6-STR107
		SEG6-STR108
		SEG6-STR109
		SEG6-STR110
		SEG6-STR111
		SEG6-STR113
		SEG6-STR114
		SEG6-STR115
		SEG6-STR23
		SEG6-STR32
		SEG6-STR33

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG6-STR34
		SEG6-STR36
		SEG6-STR37
		SEG6-STR39
		SEG6-STR40
		SEG6-STR68
		SEG6-STR69
		SEG6-STR72
		SEG6-STR74
		SEG6-STR75
		SEG6-STR76
		SEG6-STR77
		SEG6-STR78B
		SEG6-STR79
		SEG6-STR80
		SEG6-STR81
		SEG6-STR82
		SEG6-STR83
		SEG6-STR84
		SEG6-STR85
		SEG6-STR86
		SEG6-STR87
		SEG6-STR88
		SEG6-STR90
		SEG6-STR91
		SEG6-STR92
		SEG6-STR94
		SEG6-STR95
		SEG6-STR96
		SEG6-STR97
		SEG6-STR99B
Bromus madritensis L.	red brome	SEG11-IA1
		SEG11-IA10
		SEG11-IA11
		SEG11-IA12
		SEG11-IA21
		SEG11-IA29
		SEG11-IA3
		SEG11-IA4
		SEG11-IA5
		SEG11-IA7
		SEG11-IA8
		SEG11-STR0-2
		SEG11-STR0-3
		SEG11-STR1
		SEG11-STR10
		SEG11-STR100
		SEG11-STR11
		SEG11-STR12
		SEG11-STR121
		SEG11-STR132

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area		
Species Name	Common Name	Location Observed
		SEG11-STR14
		SEG11-STR150
		SEG11-STR153
		SEG11-STR18
		SEG11-STR19
		SEG11-STR21
		SEG11-STR22
		SEG11-STR23
		SEG11-STR3
		SEG11-STR38
		SEG11-STR47
		SEG11-STR50
		SEG11-STR52
		SEG11-STR53
		SEG11-STR54
		SEG11-STR7
		SEG11-STR9
		SEG11-STR93
		SEG11-STR94
		SEG11-STR95
		SEG6-STR72
		SEG6-STR73
		SEG6-STR89
		SEG11-IA13
		SEG11-IA14

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG11-IA15
		SEG11-IA16
		SEG11-IA18
		SEG11-IA19
		SEG11-IA2
		SEG11-STR15
		SEG11-STR16
		SEG11-STR17
		SEG11-STR2
		SEG11-STR4
		SEG11-STR5
		SEG11-STR6
		SEG11-STR61
		SEG11-STR62
		SEG11-STR63
		SEG11-STR64
		SEG11-STR65
		SEG11-STR66
		SEG11-STR67
		SEG11-STR68
		SEG11-STR70
		SEG11-STR75
		SEG11-STR76
		SEG11-STR79
		SEG11-STR8
		SEG11-STR92
		SEG6-IA1
		SEG6-IA10
		SEG6-IA11
		SEG6-IA14
		SEG6-IA2
		SEG6-IA3
		SEG6-IA8
		SEG6-IA9
		SEG6-STR1
		SEG6-STR101
		SEG6-STR102
		SEG6-STR103
		SEG6-STR104
		SEG6-STR105
		SEG6-STR106
		SEG6-STR106
		SEG6-STR107
		SEG6-STR108
		SEG6-STR109
		SEG6-STR11
		SEG6-STR110
		SEG6-STR111
		SEG6-STR112
		SEG6-STR113
		SEG6-STR114

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area		
Species Name	Common Name	Location Observed
		SEG6-STR115
		SEG6-STR11B
		SEG6-STR11C
		SEG6-STR12
		SEG6-STR12B
		SEG6-STR14
		SEG6-STR14B
		SEG6-STR15
		SEG6-STR16East
		SEG6-STR17Northeast
		SEG6-STR18
		SEG6-STR19
		SEG6-STR2
		SEG6-STR20
		SEG6-STR21
		SEG6-STR22
		SEG6-STR23
		SEG6-STR24
		SEG6-STR25
		SEG6-STR28
		SEG6-STR3
		SEG6-STR4
		SEG6-STR43
		SEG6-STR5
		SEG6-STR52
		SEG6-STR54
		SEG6-STR55
		SEG6-STR56
		SEG6-STR6
		SEG6-STR60
		SEG6-STR62
		SEG6-STR64
		SEG6-STR65
		SEG6-STR66
		SEG6-STR67
		SEG6-STR68
		SEG6-STR7
		SEG6-STR74
		SEG6-STR75
		SEG6-STR76
		SEG6-STR77
		SEG6-STR78
		SEG6-STR78B
		SEG6-STR8
		SEG6-STR81
		SEG6-STR82
		SEG6-STR82
		SEG6-STR84
		SEG6-STR85
		SEG6-STR86
		SEG6-STR87
		SEG6-STR9

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG6-STR90
		SEG6-STR91
		SEG6-STR92
		SEG6-STR93
		SEG6-STR97
		SEG6-STR98
Bromus tectorum L.	cheatgrass	SEG11-IA1
		SEG11-IA12
		SEG11-IA13
		SEG11-IA2
		SEG11-IA6
		SEG11-IA7
		SEG11-IA8
		SEG11-IA9
		SEG11-STR0-2
		SEG11-STR14
		SEG11-STR152
		SEG11-STR153
		SEG11-STR16
		SEG11-STR17
		SEG11-STR18
		SEG11-STR19
		SEG11-STR2
		SEG11-STR21
		SEG11-STR22
		SEG11-STR23
		SEG11-STR24
		SEG11-STR25
		SEG11-STR27
		SEG11-STR28
		SEG11-STR3
		SEG11-STR30
		SEG11-STR31
		SEG11-STR32
		SEG11-STR33
		SEG11-STR35
		SEG11-STR37
		SEG11-STR39
		SEG11-STR4
		SEG11-STR40
		SEG11-STR44
		SEG11-STR50
		SEG11-STR53
		SEG11-STR54
		SEG11-STR55
		SEG11-STR60
		SEG11-STR66
		SEG11-STR66
		SEG11-STR7
		SEG11-STR8
		SEG11-STR92

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG11-STR95
		SEG6-IA1
		SEG6-IA10
		SEG6-IA10
		SEG6-IA11
		SEG6-IA12
		SEG6-IA13
		SEG6-IA4
		SEG6-IA5
		SEG6-IA6
		SEG6-IA7
		SEG6-IA8
		SEG6-IA9
		SEG6-STR1
		SEG6-STR10
		SEG6-STR100
		SEG6-STR101
		SEG6-STR102
		SEG6-STR102
		SEG6-STR107
		SEG6-STR108
		SEG6-STR11
		SEG6-STR110
		SEG6-STR11B
		SEG6-STR11C
		SEG6-STR12
		SEG6-STR12B
		SEG6-STR14
		SEG6-STR14B
		SEG6-STR15
		SEG6-STR16East
		SEG6-STR17Northeast
		SEG6-STR18
		SEG6-STR19
		SEG6-STR2
		SEG6-STR21
		SEG6-STR22
		SEG6-STR23
		SEG6-STR24
		SEG6-STR25
		SEG6-STR26
		SEG6-STR27
		SEG6-STR28
		SEG6-STR29
		SEG6-STR3
		SEG6-STR3
		SEG6-STR30
		SEG6-STR31
		SEG6-STR32
		SEG6-STR33
		SEG6-STR34
		SEG6-STR37

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG6-STR39
		SEG6-STR4
		SEG6-STR40
		SEG6-STR41
		SEG6-STR42
		SEG6-STR43
		SEG6-STR44
		SEG6-STR45
		SEG6-STR46
		SEG6-STR47
		SEG6-STR49
		SEG6-STR5
		SEG6-STR52
		SEG6-STR53
		SEG6-STR54
		SEG6-STR55
		SEG6-STR60
		SEG6-STR64
		SEG6-STR65
		SEG6-STR66
		SEG6-STR67
		SEG6-STR68
		SEG6-STR69
		SEG6-STR7
		SEG6-STR71
		SEG6-STR72
		SEG6-STR73
		SEG6-STR74
		SEG6-STR75
		SEG6-STR79
		SEG6-STR8
		SEG6-STR80
		SEG6-STR82
		SEG6-STR83
		SEG6-STR84
		SEG6-STR85
		SEG6-STR86
		SEG6-STR87
		SEG6-STR88
		SEG6-STR89
		SEG6-STR9
		SEG6-STR90
		SEG6-STR91
		SEG6-STR92
		SEG6-STR93
		SEG6-STR94
		SEG6-STR95
		SEG6-STR96
		SEG6-STR97
		SEG6-STR99B
Centaurea melitensis L.	tocalote	SEG11-IA14

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area		
Species Name	Common Name	Location Observed
		SEG11-IA15
		SEG11-IA16
		SEG11-IA17
		SEG11-IA18
		SEG11-IA19
		SEG11-IA20
		SEG11-STR102
		SEG11-STR149
		SEG11-STR150
		SEG11-STR151
		SEG11-STR152
		SEG11-STR153
		SEG11-STR66
		SEG11-STR67
		SEG11-STR68
		SEG11-STR70
		SEG11-STR75
		SEG11-STR92
		SEG6-STR104
		SEG6-STR108
		SEG6-STR109
		SEG6-STR113
		SEG6-STR114
		SEG6-STR115
Chrysothamnus nauseosus (Pall. ex Pursh) Britton	rubber rabbitbrush	SEG11-IA1
		SEG11-IA2
		SEG11-STR2
		SEG11-STR4
		SEG11-STR6
		SEG6-IA4
		SEG6-IA6
		SEG6-STR1
		SEG6-STR11B
		SEG6-STR11C
		SEG6-STR12
		SEG6-STR21
		SEG6-STR22
		SEG6-STR23
		SEG6-STR25
		SEG6-STR26
		SEG6-STR27
		SEG6-STR28
		SEG6-STR29
		SEG6-STR3
		SEG6-STR34
		SEG6-STR37
		SEG6-STR40
		SEG6-STR58
		SEG6-STR6
		SEG6-STR7
		SEG6-STR82
		SEG6-STR87

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG6-STR93
		SEG6-STR94
		SEG11-IA6
		SEG11-IA3
		SEG11-IA4
		SEG11-STR0-2
		SEG11-STR0-3
Cirsium vulgare (Savi) Ten.	bull thistle	SEG11-IA15
		SEG11-IA16
		SEG11-IA17
		SEG11-IA29
		SEG11-STR155
		SEG11-STR67
		SEG11-STR92
		SEG6-STR104
		SEG6-STR106
		SEG6-STR107
		SEG6-STR108
		SEG6-STR109
		SEG6-STR115
Cistus creticus L.	rock rose	SEG11-STR19
		SEG6-STR83
		SEG11-IA14
		SEG11-IA15
		SEG11-IA16
		SEG11-IA17
		SEG11-STR22
		SEG11-STR37
		SEG11-STR67
		SEG11-STR68
		SEG11-STR70
		SEG11-STR75
Hedera helix L.	English ivy	SEG11-STR112
Hirschfeldia incana (L.) Lagrèze-Fossat	shortpod mustard	SEG11-IA1
		SEG11-IA14
		SEG11-IA15
		SEG11-IA16
		SEG11-IA18
		SEG11-STR63
		SEG11-STR65
		SEG11-STR66
		SEG11-STR67
		SEG11-STR68
		SEG11-STR70
		SEG11-STR75
		SEG11-STR76
		SEG11-STR79
		SEG11-STR92
		SEG6-IA14
		SEG6-STR1

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
		SEG6-STR104
		SEG6-STR105
		SEG6-STR106
		SEG6-STR107
		SEG6-STR108
		SEG6-STR109
		SEG6-STR110
		SEG6-STR111
		SEG6-STR113
		SEG6-STR115
		SEG6-STR72
Marrubium vulgare L.	white horehound	SEG11-IA14
		SEG11-IA15
		SEG11-IA16
		SEG11-IA17
		SEG11-STR66
		SEG11-STR67
		SEG11-STR70
		SEG11-STR75
		SEG11-STR95
		SEG6-STR106
		SEG6-STR72
Nicotiana glauca Graham	tree tobacco	SEG11-IA15
		SEG11-IA16
		SEG11-IA19
		SEG11-IA29
		SEG11-STR151
		SEG11-STR67
		SEG11-STR70
		SEG11-STR75
		SEG11-STR92
		SEG11-STR94
		SEG11-STR95
		SEG6-STR101
		SEG6-STR102
		SEG6-STR103
		SEG6-STR109
		SEG6-STR115
		SEG6-STR76
Piptatherum miliaceum (L.) Coss.	smilograss	SEG11-IA16
		SEG11-IA17
		SEG11-IA29
		SEG11-STR127
		SEG11-STR79
		SEG6-STR104
		SEG6-STR106
		SEG6-STR107
		SEG6-STR108
		SEG6-STR110
		SEG6-STR113
		SEG6-STR114
		SEG6-STR115

Table A-7: Site Data Summary for All Weeds Observed during the 2008 Surveys at a Tower Location, Spur Road, or Impact Area

Species Name	Common Name	Location Observed
Ricinus communis L.	castor bean	SEG11-STR113
		SEG11-STR92
		SEG6-STR113
		SEG6-STR115
		SEG11-IA19
Rosmarinus officinalis L.	rosemary	SEG11-STR19
		SEG11-STR22
Rubus discolor Weihe & Nees	Himalayan blackberry	SEG11-STR143
Salsola tragus L.	Russian thistle	SEG11-IA29
		SEG11-IA30
		SEG11-STR100
		SEG11-STR125
		SEG11-STR150
		SEG11-STR152
		SEG11-STR154
		SEG11-STR99
		SEG11-IA1
		SEG11-STR0-2
		SEG6-STR1
		SEG6-STR11
		SEG6-STR34
Schinus terebinthifolius L.	Brazilian pepper-tree	SEG11-IA29
		SEG11-STR142
Spartium junceum L.	Spanish broom	SEG11-IA14
		SEG11-IA15
		SEG11-IA16
		SEG11-IA17
		SEG11-STR23
		SEG11-STR41
		SEG11-STR43
		SEG11-STR44
		SEG11-STR45
		SEG11-STR66
		SEG11-STR67
		SEG11-STR68
		SEG11-STR70
		SEG11-STR75
		SEG6-IA10
		SEG6-IA13
		SEG6-STR115
		SEG6-STR68
		SEG6-STR72
		SEG6-STR73
		SEG6-STR83
		SEG6-STR99B
Vinca major L.	periwinkle	SEG11-IA17
		SEG11-IA22

Table A-8: Site Data Summary for All Weeds Observed during the 2009 Surveys at a Tower Location, Spur Road, or Impact Area (Segment 6 only)

Species Name	Common Name	Location Observed
Ailanthus altissima (P. Mill.) Swingle	tree-of-heaven	SEG6 – 1N36 between MP 24 & 25
Arundo donax L.	giant reed	SEG6 – 3N23 between MP 10 & 11
Carduus pycnocephalus	Italian thistle	SEG6 – 1N36 between MP 26 & 27
Centaurea melitensis L.	tocalote	SEG6-STR104
		SEG6 - STR108
		SEG6 – STR111
		SEG6 – 2N23 @ MP 17
		SEG6 – 2N30.2 between MP 24 & 25
		SEG6 – 1N36 between MP 25 & 26
		SEG6 – 1N36 between MP 26 & 27
		SEG6 – Access road between STR108 & STR109
		SEG6 – Access road between STR110 & STR111
Cirsium vulgare (Savi) Ten.	bull thistle	SEG6-STR108
		SEG6 – 1N36 between MP 25 & 26
		SEG6 – 1N36 between MP 26 & 27
		SEG6 – 1N36 @ STR107
Cistus creticus L.	rock rose	SEG6 - STR83
		SEG6 – STR107
		SEG6 - 2N24.2 between MP 19 & 20
		SEG6 – 2N30.2 between MP 24 & 25
		SEG6 – 1N36 between MP 25 & 26
Cistus ladanifer	gum rockrose	SEG6 – 3N20 @ MP 15
		SEG6 - 2N24.2 between MP 19 & 20
Cytisus scoparius	Scotch broom	SEG6 – STR67
		SEG6 – STR68
		SEG6 – 3N20 @ MP 15
Marrubium vulgare L.	white horehound	SEG6 – STR72
		SEG6 – STR108
		SEG6 – STR111
		SEG6 – 3N23 between MP 10 & 11
		SEG6 – 2N25.2 between MP 20 & 21
		SEG6 – 2N30.2 between MP 24 & 25
		SEG6 – 1N36 between MP 25 & 26
		SEG6 – Access road between STR110 & STR111

Table A-8: Site Data Summary for All Weeds Observed during the 2009 Surveys at a Tower Location, Spur Road, or Impact Area (Segment 6 only)

Species Name	Common Name	Location Observed
Nicotiana glauca Graham	tree tobacco	SEG6 - STR108
		SEG6 – 2N23 @ MP 18
		SEG6 – 2N30.2 between MP 24 & 25
		SEG6 – 1N36 between MP 26 & 27
Piptatherum miliaceum (L.) Coss.	smilograss	SEG6 – STR104
		SEG6 - STR107
		SEG6 – STR108
		SEG6 – STR109
		SEG6 – 1N36 between MP 25 & 26
		SEG6 – 2N30.2 between MP 24 & 25
		SEG6 – 1N36 between MP 26 & 27
		SEG6 – Access road between STR108 & STR109
Poa bulbosa	blue grass	SEG6 – 2N23 @ STR72
Robinia neomexicana	New Mexico locust	SEG6 – 3N23 between MP 10 & 11
Robinia pseudoacacia	black locust	SEG6 – 1N36 between MP 26 & 27
Rosmarinus officinalis L.	rosemary	SEG6 - 2N24.2 between MP 19 & 20
		SEG6 – 2N24.1 between MP 21 & 22
		SEG6 – Cogswell Road
Spartium junceum L.	Spanish broom	SEG6 - STR65
		SEG6 - STR68
		SEG6 – STR83
		SEG6 – STR94
		SEG6 – 3N20 between MP 14 & 15 near STR65
		SEG6 - Upper Big Tujunga Road between MP 15 & 16 near STR67
		SEG6 – 2N23 @ MP 17
		SEG6 – 2N23 @ STR72
		SEG6 - 2N23 between MP 18 & 19
		SEG6 - 2N24.2 between MP 19 & 20
		SEG6 – 2N25.2 between MP 20 & 21
		SEG6 – 2N24.1 between MP 21 & 22
		SEG6 – 2N24.2 between MP 22 & 23
		SEG6 – 2N24.3 between MP 23 & 24
		SEG6 – 2N30.1 between MP 23 & 24

Table A-8: Site Data Summary for All Weeds Observed during the 2009 Surveys at a Tower Location, Spur Road, or Impact Area (Segment 6 only)		
Species Name	Common Name	Location Observed
		SEG6 – 1N36 between MP 25 & 26
		SEG6 – Access road north of Shortcut Station
		SEG6 - Cogswell Road

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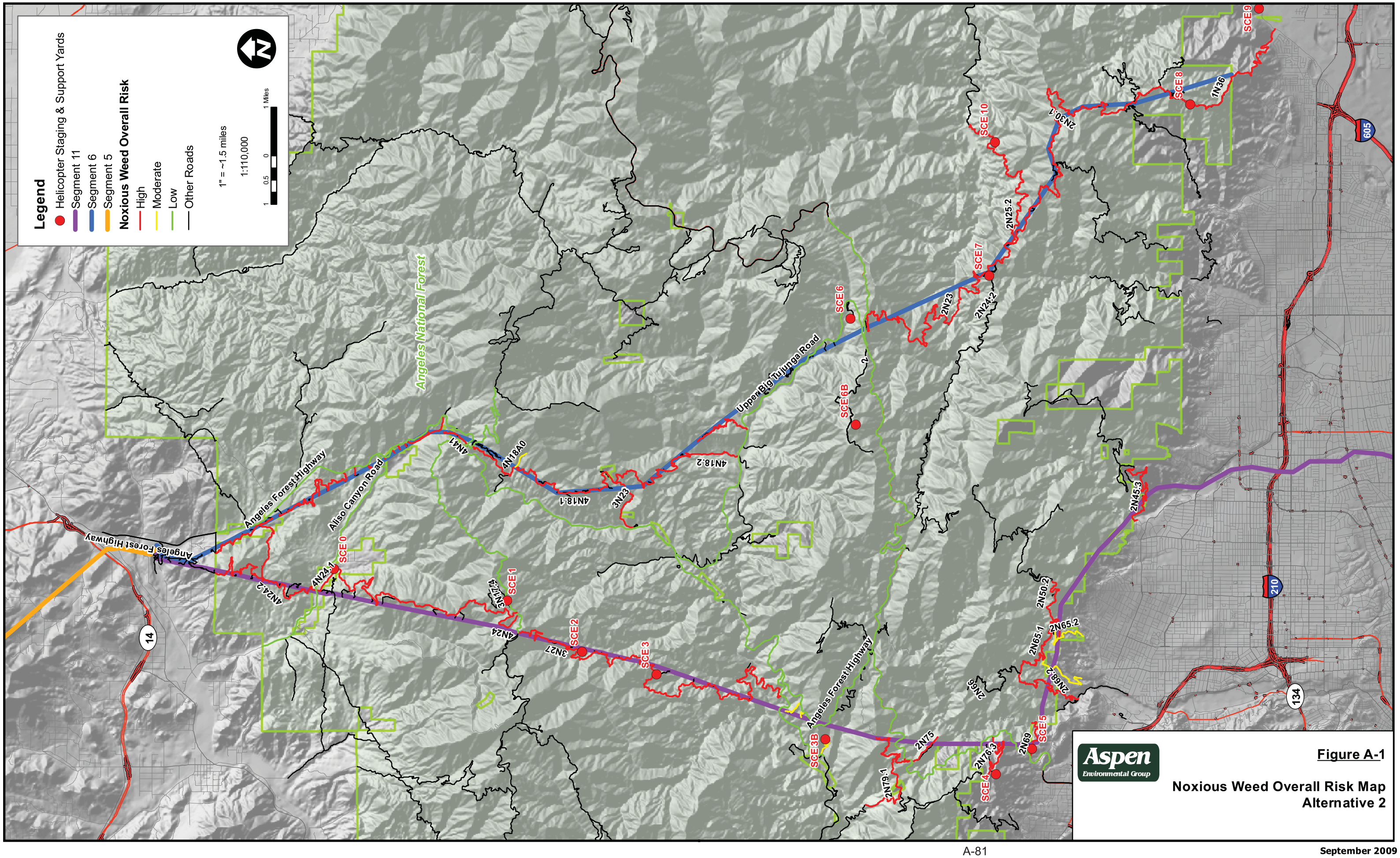

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Figure A-1

Noxious Weed Overall Risk Map
Alternative 2

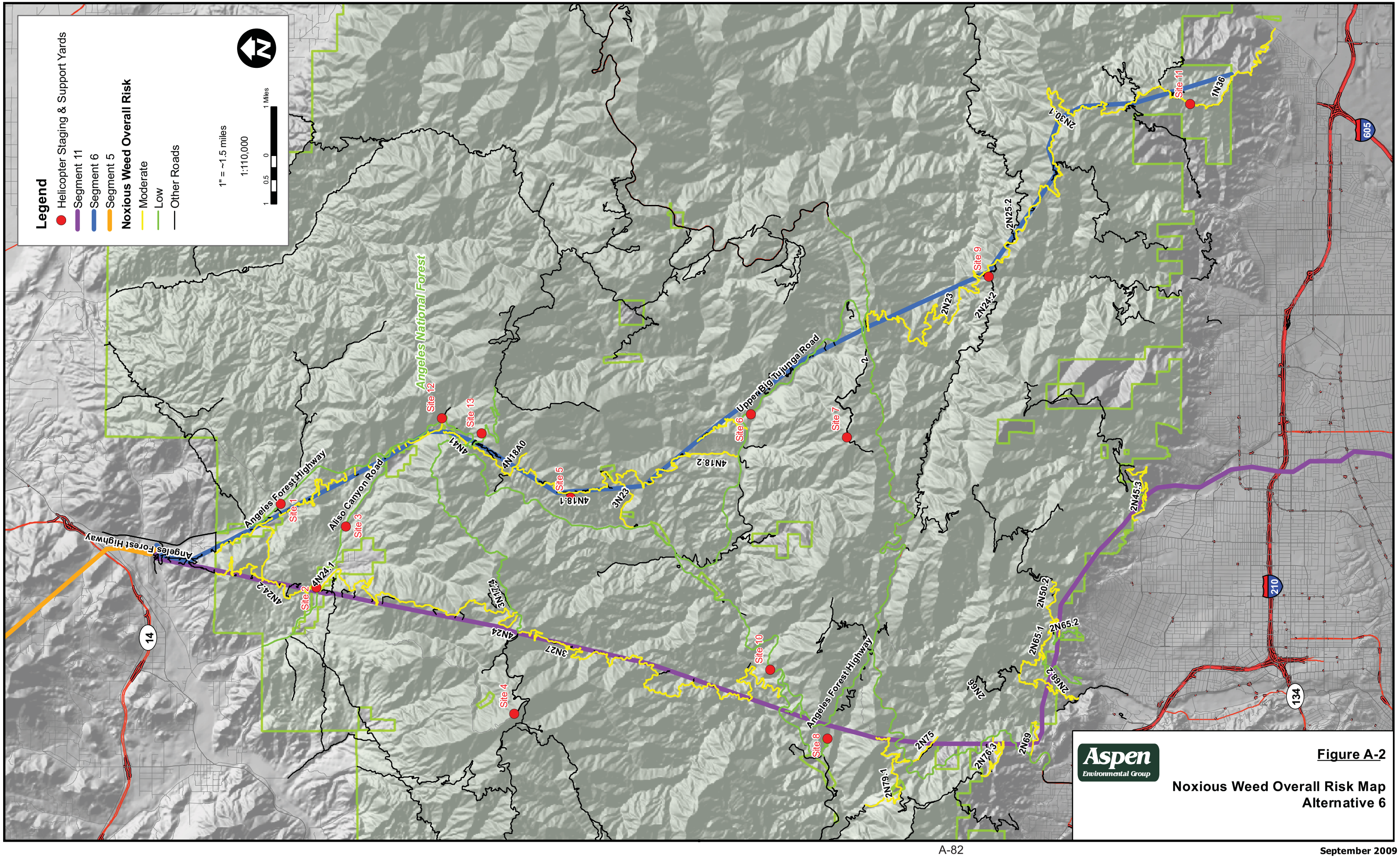

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Figure A-2

Noxious Weed Overall Risk Map
Alternative 6

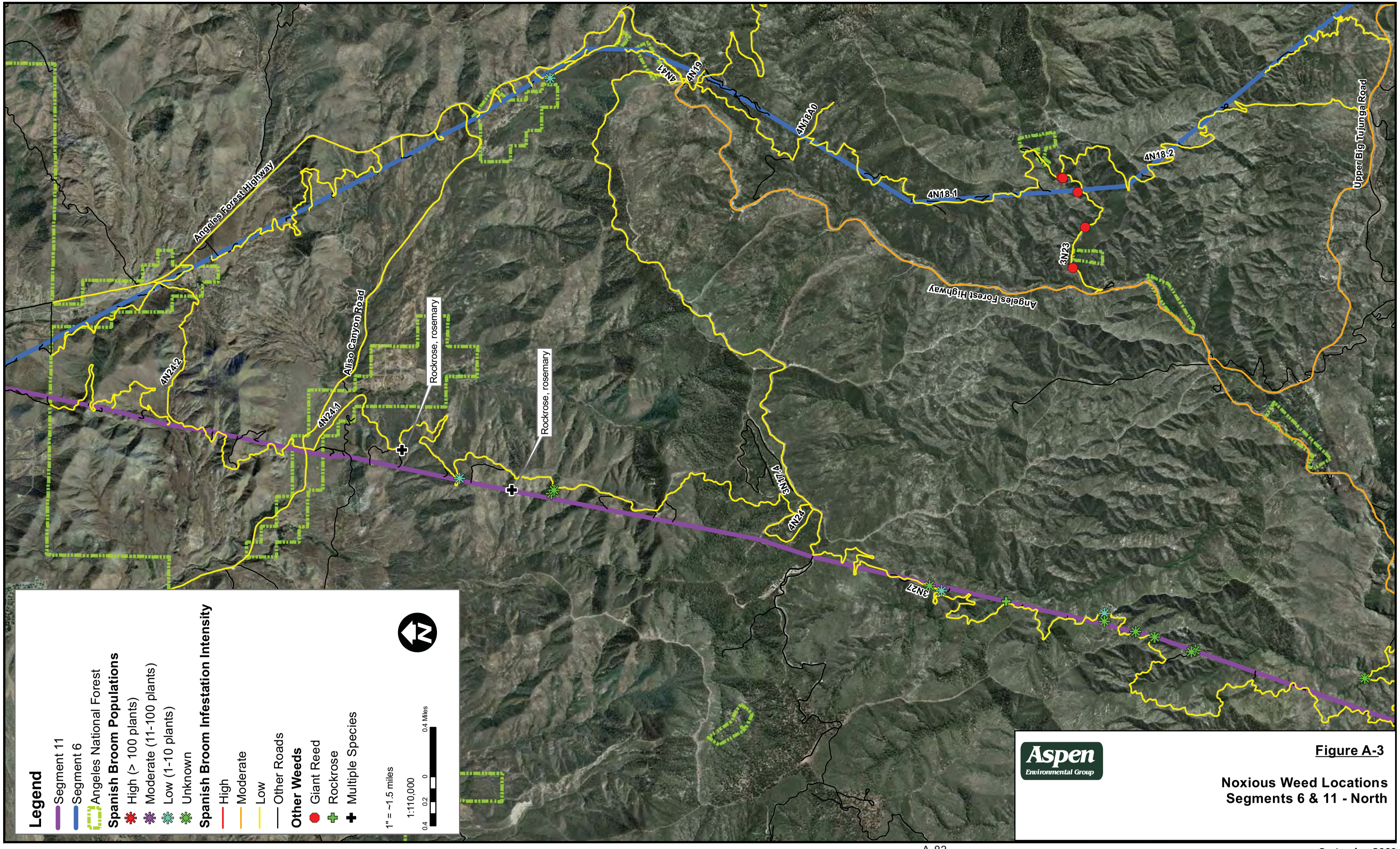

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Figure A-3

Noxious Weed Locations
Segments 6 & 11 - North

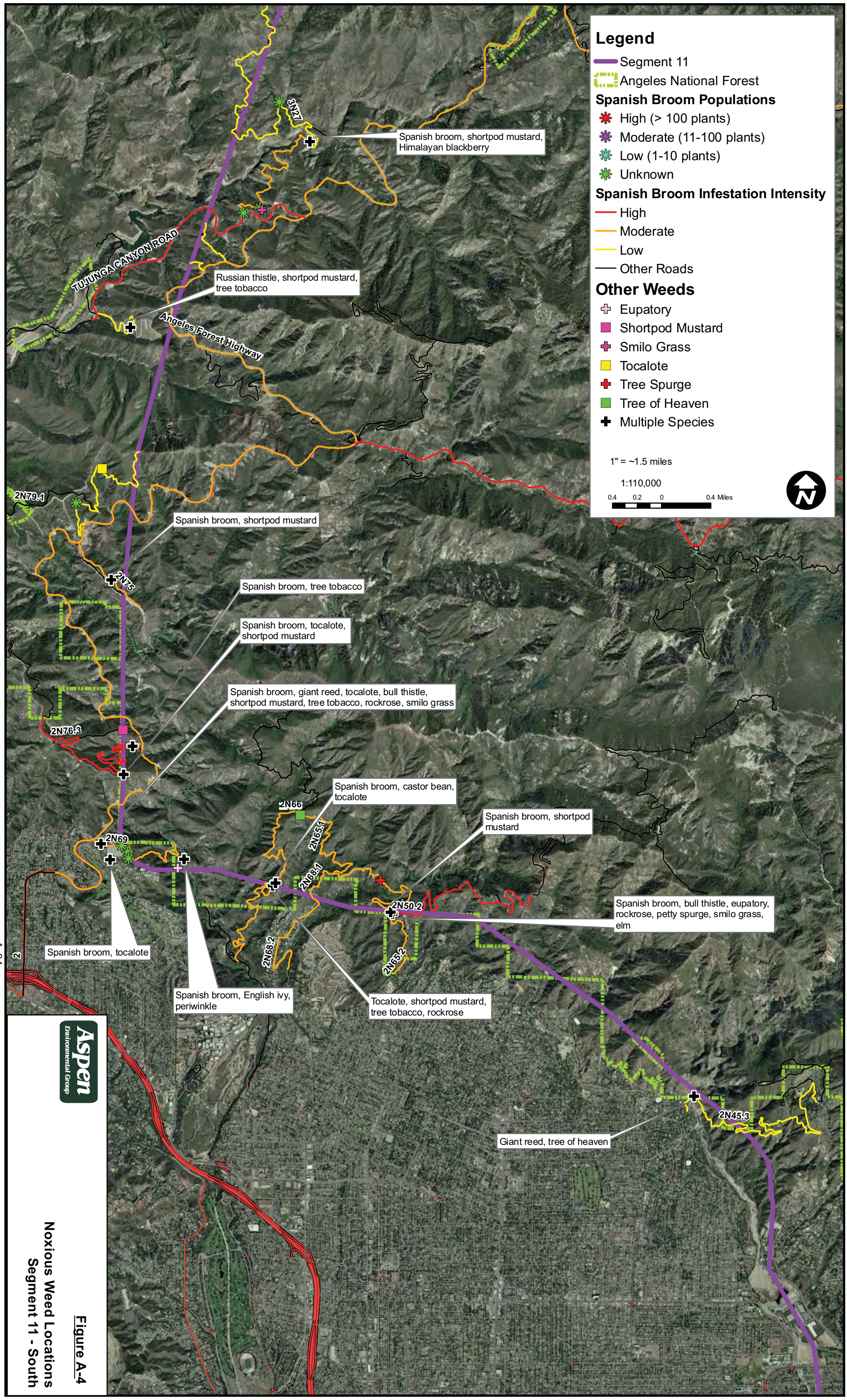

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Figure A-4

Noxious Weed Locations
Segment 11 - South

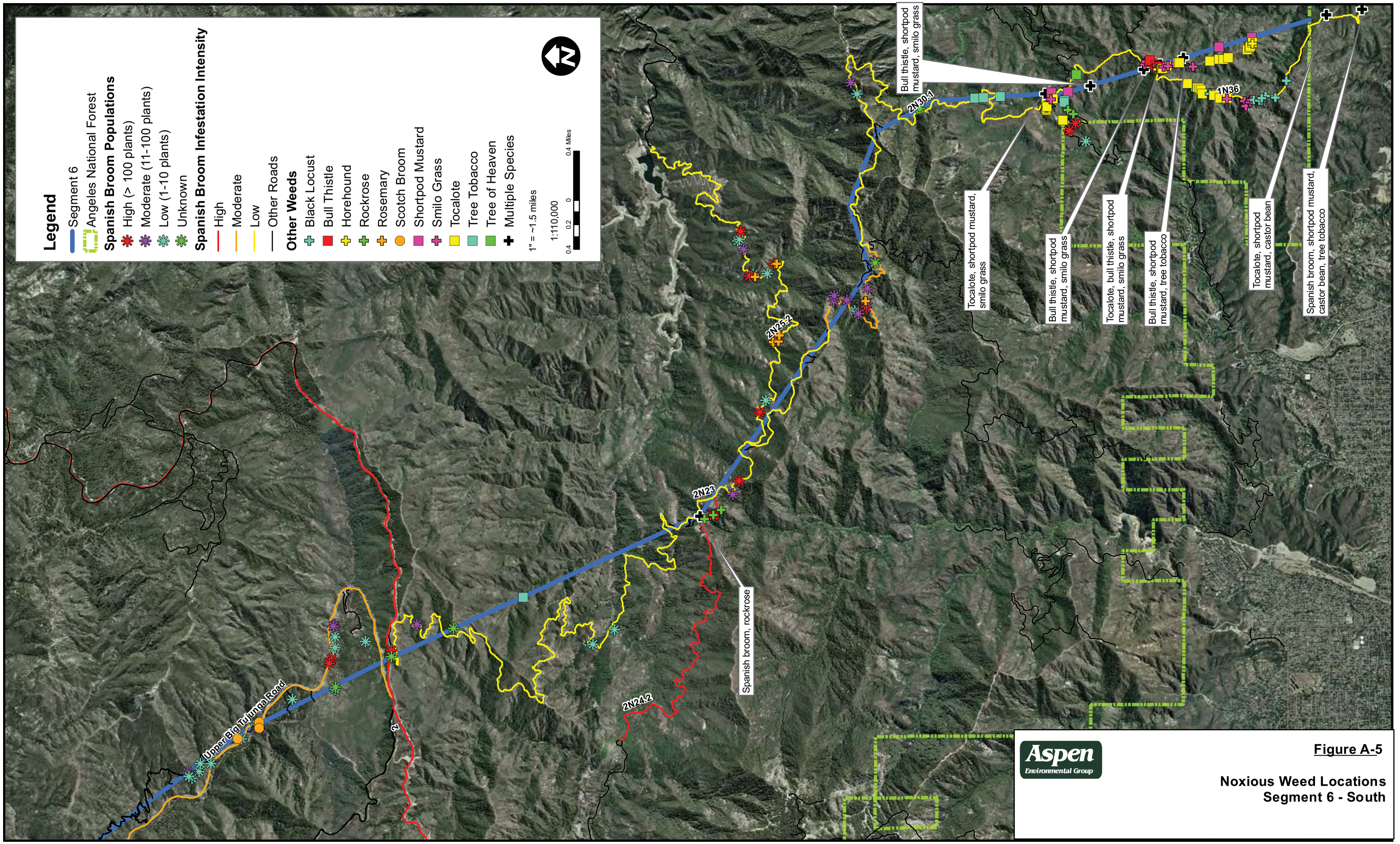

Figure A-5

Noxious Weed Locations
Segment 6 - South