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## TERR 2 INVASIVE/EXOTIC PLANT SPECIES

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### 1.0 EXECUTIVE SUMMARY

The occurrence and abundance of invasive/exotic plant populations near Project facilities and recreational facilities in the study area surveyed in 2003 were determined by reviewing existing information, conducting agency consultation, and completing surveys during spring and summer 2003. An exotic plant species is any species growing outside of its native range. Invasive plants are defined as those exotic species, which are not native to a region, persist without human intervention, and have serious impacts on their new environment (Simberloff et al. 1997; Davis and Thompson 2000). Noxious weed is a term used by government agencies to apply to invasive plants that have been defined as pests by law or regulation (California Department of Food and Agriculture (CDFA) 2000). The term invasive/exotic as used in this report, applies to those exotic plant species that have been defined as invasive or noxious weed species by the agencies concerned.

Seven invasive/exotic plant species in 28 populations were identified in the 2003 study area. This includes two California Exotic Pest Plant Council (CalEPPC) 'List A-1' invasive species (Himalayan blackberry (*Rubus discolor*) and cheatgrass (*Bromus tectorum*)) and five CalEPPC 'List B' invasive species (bull thistle (*Cirsium vulgare*), English ivy (*Hedera helix*), Spanish broom (*Spartium junceum*), woolly mullein (*Verbascum thapsus*), and periwinkle (*Vinca major*)). None of these species are rated by the CDFA.

Three populations of Himalayan blackberry were identified in the 2003 study area. One is located along the Musick Distribution Line, one is along the Jumbo Distribution Line, and one is along the floodplain of Stevenson Creek between river mile (RM) 2.7 and 3.2. All three of these populations are moderate in abundance. Cheatgrass occurs sporadically throughout the study area but infestations are low in abundance. Fourteen populations of cheatgrass were reported. One population of bull thistle was identified along the Tunnel 5 access road near Adit 1. This population is low in abundance, consisting of approximately 50 plants. One population of English ivy was identified along the Jumbo Distribution Line near the Eastwood School site. This population is low in abundance and occupies approximately 150-sq. ft. One population of Spanish broom was identified along the East Incline Distribution Line near Big Creek Powerhouse No. 1. This population is low in abundance, consisting of approximately 20 individuals in a 500-sq. ft. area. Three populations of woolly mullein were detected in 2003 including one population along the Musick Distribution Line and two populations at the Camp 62 Storage Yard and Tailings Pile. All three populations are low in abundance. Two populations of periwinkle were identified in 2003. One population occupies approximately 500-sq. ft. along the Musick Distribution Line and the other occupies approximately 200-sq. ft. along the East Incline Distribution Line. Both populations of periwinkle are low in abundance.

## **2.0 STUDY OBJECTIVES**

- Document the occurrence and abundance of invasive/exotic plant populations adjacent to Project facilities, including Project-related recreational facilities that were not surveyed during the spring and summer of 2002.
- Document the occurrence and abundance of invasive/exotic plant populations along selected flow-augmented and bypass stream reaches as part of the CAWG 11, Riparian Study.

## **3.0 STUDY IMPLEMENTATION**

### **3.1 STUDY ELEMENTS COMPLETED**

- Completed invasive/exotic plant surveys at Project facilities during spring and summer 2003.
- Completed invasive/exotic plant surveys along selected flow-augmented and bypass stream reaches as part of the CAWG 11, Riparian Study.

### **3.2 OUTSTANDING STUDY ELEMENTS**

- Complete surveys for invasive/exotic plant species at additional Project facilities identified in 2004. Refer to Appendix A of the 2003 TERR 1, Vegetation Communities Technical Study Report (TSR) for a list of these facilities (SCE 2004). Refer to Appendix C of the 2003 TERR 1, Vegetation Communities TSR for a list of facilities that have not been surveyed because they are either entirely underground or not within the Project area, and without SCE maintenance activities (SCE 2004).

## **4.0 STUDY METHODOLOGY**

### **4.1 REVIEW OF EXISTING INFORMATION**

Information on invasive/exotic plant species in the 2003 study area, was compiled, reviewed, and analyzed. This included a review of: (1) *SNF Noxious Weed and Invasive Plants List* (USDA-FS 1999); (2) the California Department of Food and Agriculture's *Noxious Weed List* (CDFA 2000); (3) California Exotic Pest Plant Council's *List of Exotic Pest Plants of Greatest Ecological Concern in California* (CalEPPC 1999); and (4) the *SNF Plan Amendment* (USDA-FS 2001). A description of each invasive/exotic plant species potentially occurring in the entire study area was developed and included in the 2002 TERR-2, Invasive/Exotic Plant Species TSR (SCE 2003).

### **4.2 FIELD SURVEYS**

The presence and absence of invasive/exotic plant species near Project facilities was recorded during field surveys conducted in the spring and summer of 2003 in conjunction with the special-status plant surveys. A list of facilities surveyed is included

in the 2003 TERR-1, Vegetation Communities TSR (SCE 2004). Levels of infestation were reported as required under Section 2083 of the *Forest Service Manual, Information and Reporting Guidelines for Noxious Weeds* (USDA-FS 1995). Refer to the 2002 TERR-3 Special-status Plant Populations TSR for detailed survey methodology (SCE 2003). Refer to Appendix B of the 2003 TERR-1, Vegetation Communities TSR for a list of facilities surveyed in 2003 (SCE 2004).

Focused surveys for invasive/exotic plant species were also conducted along selected flow-augmented and bypass stream reaches as part of the CAWG 11, Riparian Study. The locations of these surveys correspond to sample/reference sites selected for the quantitative riparian study. A list of the bypass stream reaches and flow-augmented streams surveyed is provided in Appendix B of the TERR-1, Vegetation Communities TSR (SCE 2004).

Invasive/exotic plant surveys were conducted in conjunction with special-status plant surveys during the spring and summer of 2003. The lower elevation surveys were conducted during the weeks of May 5-11 and July 7-13. The middle elevation surveys were conducted during the weeks of May 9-15, May 19-25, and July 14-20. The high elevation surveys were conducted during the weeks of June 16-22, August 4-10, and August 11-15. The surveys were floristic and taxonomy was based on *The Jepson Manual of Higher Plants of California* (Hickman 1993).

Focused surveys for invasive/exotic plant species were conducted within sampling sites along selected flow-augmented and bypass stream reaches as part of the CAWG 11, Riparian Study in the summer and fall of 2003 during the weeks of July 21-25, July 28-31, August 11-15, August 18-22, September 1-5, September 15-19, September 29-October 3, and October 6-10.

## 5.0 STUDY RESULTS AND ANALYSIS

### 5.1 REVIEW OF EXISTING INFORMATION

A list of invasive/exotic plant species that have the potential to occur in the study area was compiled in 2002 and provided as part of the 2002 TERR-2, Invasive/Exotic Plant Species TSR (SCE 2003). Two invasive/exotic plant species that were not detected during surveys in 2002 were detected at facilities studied in 2003. A description of the life history characteristics of these two species follows. These descriptions are based on Bossard et al. (2000).

**English ivy (*Hedera helix*; CalEPPC List B).** This species is an evergreen woody vine or shrub. Vines can reach up to 100 ft. in length and root at the nodes, providing anchorage for climbing buildings and other plants. Both shrubby and vining forms have dark green, leathery leaves; however, the leaves of vining plants are lobed while the leaves of shrubby plants are not lobed. Vining forms of this species have not reached reproductive maturity and, thus, do not flower. The sexually immature phase can last for many years but plants reproduce vegetatively by adventitious roots during this phase. The shrub form of the species reproduces sexually by flowering. The white

flowers are produced in clusters in the fall. Birds disperse the seeds in their droppings. English ivy is native to England, Ireland, the Mediterranean, and northern Europe and was introduced as an ornamental foliage plant with the first European settlers to North America. English ivy inhibits regeneration of native species in the forest understory and can even kill overstory trees by climbing their trunks and shading them out. The leaves and berries of English ivy can be toxic to wildlife.

**Periwinkle (*Vinca major*; CalEPPC List B).** This species is a perennial, spreading vine with stems up to three feet long. Flowering stems are erect while non-flowering stems are prostrate. The dark green, waxy leaves are arranged oppositely on the stems. The large, violet flowers are produced from March to July but do not produce seeds. In California, reproduction is exclusively vegetative by nodal root sprouts. Periwinkle is native to southern Europe and northern Africa and was introduced in the United States for ornamental and medicinal uses. This species commonly spreads from old home sites and disposed clippings. Periwinkle can inhibit growth and regeneration of native plant species through its dense cover, particularly in riparian areas.

## 5.2 INVASIVE/ EXOTIC PLANT SURVEY RESULTS

Seven invasive/exotic plant species were identified in the study area during surveys completed in 2003 (Appendix A; Appendix B). This included two CalEPPC 'List A-1' invasive species (Himalayan blackberry and cheatgrass) and five CalEPPC 'List B' invasive species (bull thistle, English ivy, Spanish broom, woolly mullein, and periwinkle). Two of the invasive/exotic species (English ivy and periwinkle) that were detected in the 2003 study area were not detected in the study area in 2002.

The results of the surveys conducted in 2003, including descriptions of the locations of invasive/exotic species identified in the study area, follow, with species arranged by CalEPPC listing status in descending order. Figure TERR-2-1a, b, c and d shows the location of invasive/exotic plant populations observed in the study area.

**Himalayan blackberry.** Three populations of Himalayan blackberry were identified in the study area including a population comprising approximately 30% of the canopy cover in a 1,000-sq. ft. area along the Musick Distribution Line. Another population of Himalayan blackberry was found along the Jumbo Distribution Line at the Eastwood School Site. This population comprised approximately 20% of the canopy cover over approximately 1 acre. The final population occurs along the floodplain of Stevenson Creek between RM 2.7 and 3.2 and comprises 6-25% of the canopy cover over a 300-sq. ft. area.

**Cheatgrass or downy brome.** This species is by far the most commonly encountered invasive species in the study area. Populations of this species, however, tend to be low in abundance and sparsely scattered. Fifteen populations of cheatgrass were recorded in the 2003 study area and all comprised <6% of the canopy cover in the area they occupied. One population is located at the Mammoth Pool Reservoir Cabin/Maintenance Building and comprises <1% of the canopy cover over 0.5 acres. Cheatgrass is sparsely scattered in the understory and in openings over approximately

1 acre at the Logan Meadow Trailhead. One population occupying approximately 100-sq. ft. was detected along the Musick Distribution Line and a population occupying approximately 500-sq. ft. was detected along the Jumbo Distribution Line at the Eastwood School Site. Three populations of cheatgrass were recorded along the trail to Scott Lake Diversion. These populations produce scattered individuals along the length of the trail. Two populations occur along the East Incline Distribution Line. One is adjacent to the surfaced road that leads to Big Creek Powerhouse No. 1 and occupies approximately 200-sq. ft. and the other is at the substation, uphill and to the north of Big Creek Powerhouse No. 1 and is scattered over approximately 0.25 acres. One population was detected in the northwest corner of the Portal Forebay Tunnel Muck Site and was scattered over approximately 300-sq. ft. A population of approximately 100 plants scattered over 0.5 acres was found at the Bear Diversion Tunnel Muck Site. A population of approximately 100 individuals in a 20-sq. ft. area and another population of approximately 200 individuals in a 50-sq. ft. area were found along the Bear Tunnel. Cheatgrass is scattered throughout the Trailhead-Bear Creek parking area (covering approximately 1.5 acres) in any spot that has enough soil to support growth. The final population is sparsely scattered over approximately 3 acres at the Eastwood Power Station Tunnel Muck Site.

**Bull thistle.** A single population of bull thistle was detected in the 2003 study area. This population consists of approximately 50 individuals in a 200-sq. ft. area (<6% canopy cover) near Tunnel 5, Adit 1.

**English ivy.** One population of English ivy was identified along the Jumbo Distribution Line near the Eastwood School Site. This population represents <6% of the canopy cover at the site and covers approximately 150-sq. ft. This species was not previously reported for Fresno County and this population is located above the species' typical elevation range.

**Spanish broom.** One population of Spanish broom was identified in the 2003 study area along the East Incline Distribution Line near Big Creek Powerhouse No. 1. This population occupies approximately 500-sq. ft. and comprises <6% of the canopy cover.

**Woolly mullein or common mullein.** Three populations of woolly mullein were found in the 2003 study area. A population of 10 plants in a 100-sq. ft. area is located along the East Incline Distribution Line approximately 500 ft. northwest of Big Creek Powerhouse No. 1. This population comprises <6% of the canopy cover. The other two populations of woolly mullein are located at the Camp 62 Storage Yard and Tailings Pile. One population consists of approximately 500 individuals scattered over approximately 3 acres and the other consists of 30 individuals in a 2,000-sq. ft. area adjacent to Kaiser Pass on the south end of the storage yard. Each of the Camp 62 populations comprise <6% of the canopy cover in their respective areas.

**Periwinkle.** Two populations of periwinkle were identified in the 2003 study area. One population covering approximately 500-sq. ft. was detected under the Musick Distribution Line beside the Big Creek 3-8 Patrol Road south of Big Creek Powerhouse No. 2A. Another population covering approximately 200-sq. ft. was detected along the

East Incline Distribution Line north of Big Creek Powerhouse No. 1 at what appears to be an old home site. Both populations constitute <6% of the canopy cover where they occur.

A total of 17 invasive/exotic plant species were discovered in the study area during the 2002 and 2003 surveys. Eleven of these species (Himalayan blackberry, cheatgrass, Scotch broom, tree-of-heaven, bull thistle, Klamath weed, black mustard, tocalote, black locust, Spanish broom, and woolly mullein) were already known to occur in the Sierra National Forest. Four of these species (French broom, perennial pepperweed, ox-eye daisy, and common tansy) were previously unknown in the Sierra National Forest. Two of these species (English ivy and periwinkle) were known by Sierra National Forest botanists to occur but were not shown on the Sierra National Forest weed list and are not known as occurring in Fresno County.

## 6.0 LITERATURE CITED

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## FIGURES



## **Placeholder for Figures**

### **Non-Internet Public Information**

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## **APPENDIX A**

### **Location of Invasive/Exotic Plant Species in the Big Creek ALP 2003 Study Area**

## Appendix A. Location of Invasive/Exotic Plant Species Detected in the Big Creek ALP 2003 Study Area

Scientific Name/ Common Name	Location	Level of Infestation	Map Label	CalEPPC List	CDFA List	USFS List
<i>Rubus discolor</i> Himalayan blackberry	Musick Distribution Line beside transmission tower MST4, on the B.C. 3-8 Patrol Road	Moderate (25% coverage in 1,000 sq. ft.)	1-1	A-1	NA	P
<i>Rubus discolor</i> Himalayan blackberry	Jumbo Distribution Line; approximately 30 ft. east of Eastwood School Site on the northeast side of Canyon Rd. extending up the hillside	Moderate (20% cover in 1 acre)	1-2	A-1	NA	P
<i>Rubus discolor</i> Himalayan blackberry	Stevenson Creek floodplain between river mile 2.7 and 3.2	moderate (6-25% cover in 300sq. Ft.)	1-3	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Mammoth Pool Reservoir Cabin/Maintenance Building	Low (<1% coverage in 0.5 acre)	2-1	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Logan Meadow Trailhead	Low (sparsely scattered over 1 acre)	2-2	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Musick Distribution Line beneath pole 4456873E, on the B.C. 3-8 Patrol Road near Powerhouse No. 2	Low (<1% coverage in a 100 sq. ft. area)	2-3	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Jumbo Distribution Line at the Eastwood School Site; approximately 50 ft. off the Canyon Rd. on the northeast side	Low (500 sq. ft)	2-4	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Scot Lake Domestic Water Diversion	Low , scattered along trail	2-5	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Scot Lake Domestic Water Diversion	Low, scattered along trail	2-6	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Scot Lake Domestic Water Diversion	Low, scattered along trail	2-7	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	East Incline Distribution Line along surfaced road to Powerhouse No. 1	Low (200 sq. ft)	2-8	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	East Incline Distribution Line at the substation	Low (0.25 acres)	2-9	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Portal Forebay Tunnel Muck Site; northwest corner	Low (300 sq. ft. area)	2-10	A-1	NA	P

## Appendix A. Location of Invasive/Exotic Plant Species Detected in the Big Creek ALP 2003 Study Area

Scientific Name/ Common Name	Location	Level of Infestation	Map Label	CalEPPC List	CDFA List	USFS List
<i>Bromus tectorum</i> cheatgrass	Bear Diversion Tunnel Muck Site	Low (100 individuals over 0.5 acres)	2-11	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Bear Tunnel	Low (100 individuals in 20 sq. ft. area)	2-12	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Bear Tunnel from the Bear Forebay Rd. to top of flowline	Low (50 sq. ft)	2-13	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Trailhead-Bear Creek, scattered throughout the trailhead parking area anywhere that has enough soil to support growth	Low (sparsely scattered over approximately 1.5 acres)	2-14	A-1	NA	P
<i>Bromus tectorum</i> cheatgrass	Eastwood Power Station Tunnel Muck Site	Low (sparsely scattered over approximately three acres)	2-15	A-1	NA	P
<i>Cirsium vulgare</i> bull thistle	Tunnel 5, Adit 1 where the tunnel access road intersects with road 9S22	Low (approximately 50 individuals in 200 sq. ft. area)	3-1	B	NA	P
<i>Hedera helix</i> English ivy	Jumbo Distribution Line; near Eastwood School Site on the southwest side of Canyon Rd.	Low (150 sq. ft)	5-1	B	NA	NA
<i>Spartium junceum</i> Spanish broom	East Incline Distribution Line approximately 500 ft. northwest of, and along the road to, Powerhouse No. 1	Low (20 individuals in 500 sq. ft.)	8-1	B	NA	P
<i>Verbascum thapsus</i> woolly mullein	East Incline Distribution Line approximately 500 ft. northwest of Powerhouse No. 1	Low (10 plants in 100 sq. ft)	6-1	B	NA	P
<i>Verbascum thapsus</i> woolly mullein	Camp 62 Tunnel Muck Site	Low (1,000+ individuals over 1 acre)	6-2	B	NA	P
<i>Verbascum thapsus</i> woolly mullein	Camp 62 Storage Yard; adjacent to Kaiser Pass on south side of yard	Low (30 individuals over 2,000 sq. ft.)	6-3	B	NA	P
<i>Vinca major</i> periwinkle	Musick Distribution Line beneath pole 4456873E, on the B.C. 3-8 Patrol Road near Powerhouse No. 2.	Low (500 sq. ft)	7-1	B	NA	P

## Appendix A. Location of Invasive/Exotic Plant Species Detected in the Big Creek ALP 2003 Study Area

Scientific Name/ Common Name	Location	Level of Infestation	Map Label	CalEPPC List	CDFA List	USFS List
<i>Vinca major</i> periwinkle	East Incline Distribution Line, northwest of Huntington Lake Rd. in town of Big Creek	Low (200 sq. ft)	7-2	B	NA	NA

### CalEPPC List

List A-1: Most Invasive Wildland Pest Plants; Widespread

List A-2: Most Invasive Wildland Pest Plants; Regional

List B: Wildland Pest Plants of Lesser Invasiveness

Red alert: Species with potential to spread explosively; infestations currently restricted

### CDFA List

List A: Eradication, containment, rejection, or other holding action at the state-county level.

List B: Eradication, containment, control or other holding action at the discretion of the commissioner.

List C: State endorsed holding action and eradication only when found in a nursery.

### USFG List

P: Present on Sierra National Forest

N: Near Sierra National Forest, reasonable to expect within next 5 years

### % Cover Classes:

Low (<6% cover)

Moderate (6-25% cover)

High (>25% cover)

## **APPENDIX B**

### **Photograph of Invasive/Exotic Plant Species Detected in the Big Creek ALP 2003 Study Area**

**Appendix B. Photographs of Invasive/Exotic Plant Species in the 2003 Study Area**



Cheatgrass at the Eastwood School site.



Cheatgrass along the Musick Distribution Line.



Himalayan blackberry along the Musick Distribution Line.



Himalayan blackberry and cheatgrass at the Eastwood School site.



Himalayan blackberry at the Eastwood School site.



Periwinkle along the Musick Distribution Line.

**Appendix B. Photographs of Invasive/Exotic Plant Species in the 2003 Study Area**



Periwinkle along the East Incline Distribution Line.



Spanish broom and cheatgrass above Big Creek Powerhouse No. 1 near the East Incline Distribution Line.



Spanish broom along East Incline Distribution Line at the road to Big Creek Powerhouse No. 1.



Spanish broom above Big Creek Powerhouse No. 1 near the East Incline Distribution Line.



Woolly mullein along the East Incline Distribution Line.



Woolly mullein at Camp 62 storage yard.



**Appendix B. Photographs of Invasive/Exotic Plant Species in the 2003 Study Area**



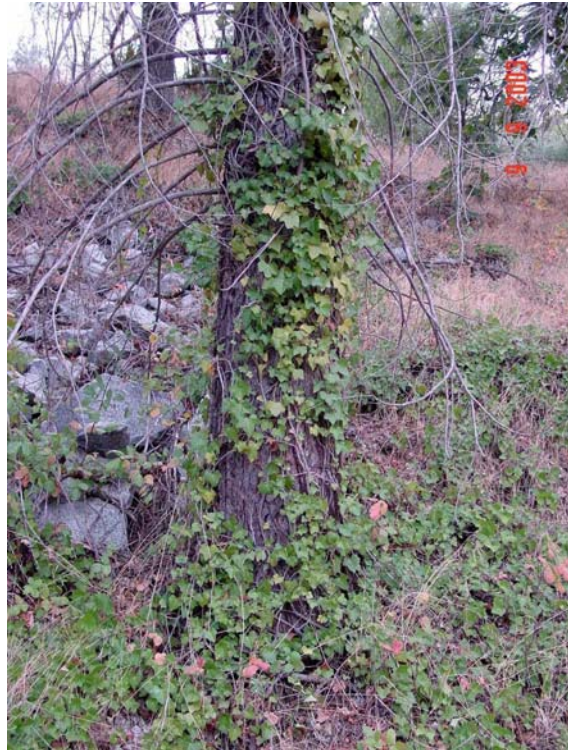
Bull thistle along Tunnel 5 near Adit 1.



English ivy at the Eastwood School site.



Bull thistle along Tunnel 5, Adit 1.



English ivy at Eastwood School site.