INVASIVE PLANT MANAGEMENT
2013-2014 ANNUAL REPORT

USDA Forest Service, Lake Tahoe Basin Management Unit

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May 11, 2015

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1 EXECUTIVE SUMMARY

This report summarizes 2013 and 2014 activities related to the management of priority invasive plants on the Lake Tahoe Basin Management Unit (LTBMU), particularly inventory and treatment. This report also provides updates on the status and change of each priority invasive plant species on LTBMU. Lastly, it includes guidance for the 2015 field season for the preferred treatment methods for species known on LTBMU and early detection rapid response (EDRR) procedures for species not known on LTBMU.

As of 2014, there are 402 active invasive plant infestations totaling 577 acres on LTBMU compared to 368 active infestations and 554 acres in 2013; active infestations are those where invasive plants are known to occur within the last three years. In 2014, a total of 156 invasive plant infestations totaling 44 acres were inventoried and treated. In 2013, a total of 276 invasive plant infestations totaling 128 acres were inventoried and treated. There were 32 new invasive plant infestations in 2014 and 37 new invasive plant infestations discovered in 2013.

2 INTRODUCTION & PROGRAM OVERVIEW

In 2003, the United States Forest Service identified invasive species as one of four critical threats to the nation's ecosystems (Bosworth 2003). Invasive plants pose a significant threat to ecological function due to their ability to displace native species, alter nutrient and fire cycles, decrease the availability of forage for wildlife, and degrade soil structure (Bossard et al. 2000). Infestations can also reduce the recreational or aesthetic value of native habitats.

The LTMBU Land and Resource Plan includes guidance to protect and enhance threatened or sensitive plant habitat(USDA Forest Service 1988). The plan is amended by the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) to address invasive plant management. The SNFPA establishes goals, standards, and guidelines for invasive plant (noxious weed) management for the Sierra Nevada forests. It emphasizes prevention and integrated weed management. It establishes the following invasive plant management prioritization: 1) prevent the introduction of new invaders; 2) conduct early treatment of new infestations; 3) contain and control established infestations. It also requires forests to conduct an invasive plant risk assessment to determine risks for weed spread (high, moderate, or low) associated with different types of proposed management activities and develop mitigation measures for high and moderate risk activities with reference to the weed prevention practices in the Regional Noxious Weed Management Strategy(USDA Forest Service 2004).

In 2003, LTBMU, in cooperation with the Lake Tahoe Basin Weed Coordinating Group (LTBWCG), began invasive plant surveys, inventories and treatments. As of 2014, LTBMU's invasive plant program consists of six major components: 1) materials inspection; 2) public outreach and interagency collaboration; 3) survey and inventory; 4) treatment; 5) monitoring. Updates for each component are provided below.

2.1 MATERIALS INSPECTION (GRAVEL PITS)

The use of imported materials (e.g. gravel, fill, seed, erosion control materials) is considered a substantial vector for the introduction and spread of invasive plants (Nevada Department of Agriculture 2013; USDA Forest Service 2001, 2004, 2011). The primary goal of the materials inspection program is to prevent the introduction of weed seeds or reproductive plant parts into the Lake Tahoe basin via imported materials. For aggregate materials, annual inspections of source infestations (i.e. gravel pits) are performed by an LTBMU botanist or an inspector from the Nevada Department of Agriculture. For

seed, proposed species lists are assessed for invasive plant risk, including species composition and seed purity.

In 2014, 11 gravel pits were inspected and found to be suitable sources of materials for the LTBMU. The findings from the materials inspections are discussed in a separate report. In 2013, 14 gravel pits were inspected and 13 were found to be suitable sources of material. In 2013-2014, seed lists were assessed for invasive plant risks for twelve revegetation projects.

2.2 Public Outreach and Interagency collaboration

In 2013 and 2014, LTBMU continued to participate in the Lake Tahoe Basin Weed Coordination Group, including hosting three meetings and the LTBWCG's June weed identification seminar. LTBMU provided survey, inventory and treatment data to LTBWCG for both 2013 and 2014. These data are utilized by both LTBMU and other agencies to plan for and fund future invasive plant management.

In 2013, LTMBU partnered with Nevada Department of Agriculture (NDA) to conduct invasive plant inspections of gravel pits (major component of the LTBMU's materials inspection program). NDA inspectors now survey for those species on the LTBMU invasive plant list and provide inspection results that can be used for approval of materials for use on LTBMU. This has allowed for several additional pit inspections.

In 2014, LTBMU biology staff developed templates and direction for contractors and permittees conducting invasive plant surveys, inventory, and treatment on LTBMU, in order to standardize invasive plant management across its many operators. This package is now available upon request and is provided to all contractors and permittees as needed. In 2014, eight contractors and permittees were provided invasive plant management direction.

2.3 Survey and Inventory

Survey and inventory efforts in 2013-2014 are summarized in Section 3.

2.4 Treatment

Treatment efforts in 2013-2014 are summarized in Section 3.

2.5 Monitoring

In 2013 and 2014, 19 projects (140 acres) were inspected for invasive plants as part of the post-implementation inspection program. A five year assessment report of this program summarizes the data collected from 2008-2012 (Uzes et al. 2014). Data collected in 2013 and 2014 is not summarized in this report but will be used in future analysis.

3 Survey, Inventory and Treatment

3.1 Methods

3.1.1 Survey

During project planning, project areas are surveyed for invasive plant infestations, so that risks can be assessed and mitigated, as necessary.

3.1.2 Inventory

Data collected at each invasive plant infestation includes species present, infestation size, percent canopy cover, GPS location and extent, number of plants, phenology, life form, distance to water, and distribution. APPENDIX B for links to FS Field Guides containing protocols for data collection and entry.

3.1.2.1 Urban Lots

Prior to 2014, invasive plant infestations on NFS lands designated as Urban Lots—of which there are approximately 200—were managed separately, by LTBMU's Urban Forest staff. In 2014, all invasive plant infestation data was transferred over LTBMU's Ecosystem Conservation department to be managed by the biology staff. In general, 2013-2014 data does not include infestations on urban lots. Until these data can be verified on the ground and in NRIS, the datasets will be maintained separately. However, 2013-2014, Forest Activity Tracking (FACTS) reporting of invasive plant treatments does include Urban Lot treatments.

3.1.2.2 Reassessment of LTBMU Management Priorities

In 2015 an updated ranking criteria was used to assess 29 priority invasive plant species on LTBMU; an update to the ranking assessment completed in 2011 (Gross and Olin 2011). New criteria were used in 2015 to better assess the current management capacity of LTBMU. The reassessment resulted in the removal of mullein (*Verbascum thapsus*) from the invasive plant list, changing the priority of 13 species, and 5 species were newly ranked for priority. The new priority for each species is included in Table 1.

Table 1. Revised Management Priorities and Species List

Scientific Name	Common Name	2011 LTBMU Priority	2015 LTBMU Priority
Acroptilon repens	Russian knapweed	Medium	Medium
Ailanthus altissima	tree of heaven	**N/A**	High
Bromus tectorum	cheat grass	Low	Low
Cardaria draba	heart-podded hoary cress; whitetop	Medium	Medium
Cardaria pubescens	globe-podded hoary cress; hairy whitetop	Medium	Medium
Carduus nutans	musk thistle	High	High
Centaurea calcitrapa	purple starthistle; red starthistle	N/A	Medium
Centaurea diffusa	diffuse knapweed	Medium	High
Centaurea maculosa	spotted knapweed	Medium	High
Centaurea solstitialis	yellow starthistle	Medium	Medium
Centaurea virgata ssp. squarrosa	squarrose knapweed	Medium	High
Chondrilla juncea	rush skeletonweed	High	High
Cirsium arvense	Canada thistle	Medium	High
Cirsium vulgare	bull thistle	High	Low
Conium maculatum	poison hemlock	Medium	Low
Cytisus scoparius	Scotch broom	Medium	Medium
Dipsacus fullonum	teasel; Fuller's teasel	N/A	Low
Dittrichia graveolens	stinkwort	N/A	Low
Elytrigia repense	quackgrass	N/A	High
Hydrilla verticillata	hydrilla; waterthyme	N/A	Low
Hypericum perforatum	St. Johnswort; Klamathweed	Medium	N/A
Isatis tinctoria	Dyer's woad	Medium	Medium

Scientific Name	Common Name	2011 LTBMU Priority	2015 LTBMU Priority
Lepidium latifolium	tall whitetop; perennial pepperweed	**Medium**	High
Leucanthemum vulgare	oxeye daisy	Medium	High
Linaria genistifolia spp. dalmatica	Dalmatian toadflax	High	Low
Linaria vulgaris	yellow toadflax; butter & eggs	Medium	High
Lythrum salicaria	purple loosestrife	Medium	High
Myriophyllum spicatum	Eurasian watermilfoil	N/A	High
Onorpordum acanthium ssp. acanthium	Scotch thistle	High	N/A
Potamogeton crispus	curlyleaf pondweed	N/A	High
Potentilla recta	sulfur cinquefoil	Low	N/A
Rubus armeniacus	Himalaya blackberry	Low	Medium
Elymus caput-medusae	medusahead	High	Medium
Tamarix chinensis, T. ramosissima, & T. parvifolia	tamarisk; saltcedar	High	High

LTBMU: High—Species that have a large ecological impact or invasive potential; species that are easily controlled. Medium—Species that have a moderate ecological impact or invasive potential; species that may be difficult to control. Low—Species that have a low ecological impact or invasive potential; species that require substantial effort to control. N/A—species not evaluated.

3.1.3 Treatment

Invasive plant species and infestations are prioritized for treatment, in order to focus limited staff time and funds on those infestations that a) present the greatest risk of spread or the greatest risk of ecological damage and b) for which eradiation is a feasible goal. For example, cheatgrass presents a high ecological risk but is so widespread that eradication is not considered feasible and cheatgrass is not generally prioritized for treatment, except near ground-disturbing activities.

In 2011, LTBMU assessed and ranked priorities for all known invasive plant species(Gross and Olin 2011). This information was used to develop treatment goals for each priority level. In several cases the 2013-2014 treatment priority level was different from the 2011 assessment (TABLE 2). The 2011 assessment provided a management priority for all species on the LTBMU invasive plant list—even those that are not known on LTBMU. In addition, the 2011 assessment did not account for the ability to herbicides to control some species, per the 2010 Terrestrial Invasive Plant Species Treatment project. Approval of this project made eradication feasible for certain species (e.g. Canada thistle, perennial pepperweed) which could not be controlled effectively through manual methods.

Table 2. Preferred Treatment Methods and Priority for 2013-2014.

Species	Common Name	LTBMU Treatment Priority[1]	Preferred Treatment Method[2]			
			Herbicide—Glyphosate	Herbicide—Aminopyralid	Herbicide—Chlor-sulfuron	Manual
Acroptilon repens	Russian knapweed	High		Preferred		X
Bromus tectorum	cheatgrass	Low				Preferred
Cardaria draba	heart-podded hoary cress	High			Preferred	X
Cardaria pubescens	globe-podded hoary cress	High			Preferred	X
Carduus nutans	musk thistle	High		X		Preferred
Centaurea diffusa	diffuse knapweed	High				Preferred
Centaurea maculosa	spotted knapweed	High				Preferred
Chondrilla juncea	rush skeletonweed	High				Preferred
Cirsium arvense	Canada thistle	High		Preferred		X
Cirsium vulgare	bull thistle	Low				Preferred

Species	Common Name	LTBMU Treatment Priority[1]	Preferred Treatment Method[2]			
Conium maculatum	poison hemlock	High				Preferred
Cytisus scoparius	Scotch broom	High				Preferred
Hypericum perforatum	St. Johnswort	Medium		X		Preferred
Isatis tinctoria	Dyer's woad	High				Preferred
Lepidium latifolium	perennial pepperweed	High	X		Preferred	X
Leucanthemum vulgare	oxeye daisy	Medium		X		Preferred
Linaria dalmatica	Dalmatian toadflax	High	X		Preferred	X
Linaria vulgaris	yellow toadflax	High	X		Preferred	X
Onopordum acanthium	Scotch thistle	High		X		Preferred
Potentilla recta	sulfur cinquefoil	Medium				Preferred
Rubus armeniacus	Himalayan blackberry	High				Preferred

[1]High—Treat all known infestations twice during a field season. Treat any new infestation prior to project implementation. Medium—Monitor or treat once during field season. Assess for future herbicide treatment (e.g. distance from water, other resource concerns) or hand treat if infestation is very small. Low—Monitor or treat infestations as time allows or when adjacent to high priority infestations.
[2]An 'X' indicates an acceptable alternative effective treatment option

In 2010, the Terrestrial Invasive Plant Species Treatment project authorized the use of manual, mechanical, thermal and chemical (herbicide) treatments. As a result of this analysis, three chemicals were authorized for use on LTBMU; aminopyralid, chlorsulfuron, and glyphosate (APPENDIX D). Since 2011, the LTBMU treatment program has included the use of herbicide for selective treatment. Herbicide use on LTBMU requires a project-specific Pesticide Use Proposal (PUP) (FS-2100-2) and safety plan (FS-6700-7). Herbicides are applied and monitored in accordance with: a) product label directions; b) Best Management Practices for water quality (USDA Forest Service 2000), c) Forest Service Manual (FSM 2080, 2150 and 2200) and Handbook (FSH 2109.14) direction; and d) design features contained within the 2010 Terrestrial Invasive Plant Species (TIPS) Treatment Environmental Assessment (APPENDIX C, APPENDIX D). In 2013-2014, the following species were prioritized and approved for chemical treatment (TABLE 3).

Table 3. Invasive Plants Approved for Chemical Treatment in 2013-2014

Species	Common Name	Glyphosate[1]	Aminopyralid	Chlorsulfuron
Acroptilon repens	Russian knapweed		Preferred	
Cardaria draba	heart-podded hoary cress	X		Preferred
Cardaria pubescens	globe-podded hoary cress	X		Preferred
Cirsium arvense	Canada thistle		Preferred	
Hypericum perforatum	St. Johnswort	X	Preferred	
Lepidium latifolium	perennial pepperweed	X		Preferred[2]
Linaria dalmatica	Dalmatian toadflax	X		Preferred[3]
Linaria vulgaris	yellow toadflax	X		Preferred[3]

[1] An 'X' indicates an acceptable alternative effective treatment option
[2]These species occur primarily near water on LTBMU where the use of chlorsulfuron is restricted by the resource protection measures in the 2010 EA.

3.2 RESULTS

3.2.1 Survey

In 2013, 1010 acres of proposed projects were surveyed for invasive plants. In 2014, 543 acres of proposed projects were surveyed for invasive plants.

3.2.2 Inventory

3.2.2.1 Summary of active infestations on LTBMU

Of the approximately 154,000 acres of NFS lands comprising the LTBMU, only a very small percentage is infested with invasive plants. As of 2014, a total of 577 infested acres were mapped, representing approximately 0.45 % of the total acreage of LTBMU (TABLE 4). However, this is likely a substantial underestimate, as three species—cheatgrass, Eurasian milfoil, and wooly mullein—are not mapped and several others are likely under-mapped. The vast majority of mapped infestations—74%--are bull thistle.

Table 4. Summary of active infestations on LTBMU 2013-2014

Scientific Name	Common Name	Number of Infestations 2013	Acres 2013	Percent of total acres 2013	Number of Infestations 2014	Acres 2014	Percent of total acres 2014
Acroptilon repens	Russian knapweed	1	0.04	<0.1%	1	0.04	<0.1%
Cardaria draba	heart-podded hoary cress	1	0.03	<0.1%	1	0.03	<0.1%
Cardaria pubescens	globe-podded hoary cress	1	0.37	<0.1%	1	0.4	<0.1%
Carduus nutans	musk thistle	2	0.01	<0.1%	1	1.00	0.2%
Centaurea diffusa	diffuse knapweed	2	0.12	<0.1%	2	0.12	<0.1%
Centaurea maculosa	spotted knapweed	3	0.07	<0.1%	4	0.14	<0.1%
Chondrilla juncea	rush skeletonweed	1	0.06	<0.1%	0	0.00	0.0%
Cirsium arvense	Canada thistle	23	2.74	0.5%	26	7.10	1.2%
Cirsium vulgare	bull thistle	233	409.43	73.9%	248	422.00	73.2%
Conium maculatum	poison hemlock	1	1.48	0.3%	1	1.48	0.3%
Cytisus scoparius	Scotch broom	2	0.04	<0.1%	2	0.18	<0.1%
Hypericum perforatum	St. Johnswort	35	73.37	13.2%	44	76.90	13.3%
Isatis tinctoria	Dyer's woad	1	0.38	<0.1%	1	0.40	<0.1%
Lepidium latifolium	perennial pepperweed	16	2.66	0.5%	18	2.9	0.5%
Leucanthemum vulgare	oxeye daisy	32	48.63	8.8%	36	49	8.4%
Linaria dalmatica	Dalmatian toadflax	1	9.70	1.8%	2	9.7	1.7%
Linaria vulgaris	yellow toadflax	11	0.45	<0.1%	12	0.57	1.0%
Onopordum acanthium	Scotch thistle	1	0.33	<0.1%	1	0.33	<0.1%
Potentilla recta	sulfur cinquefoil	1	4.8	0.9%	2	4.8	0.8%
Rubus armeniacus	Himalayan blackberry	1	0.0001	<0.1%	1	0.003	<0.1%
Grand Total		368	554	100.0%	406	577	100.0%

Derived from NRIS TESP-IP data (USDA Forest Service 2014). Cheatgrass is not comprehensively mapped on LTBMU. Data does not include invasive plant infestations on NFS lands designated as urban lots.

3.2.2.2 New and expanding infestations

In 2014, there were 32 new invasive plant infestations inventoried on NFS lands administered by the LTBMU in 2014 (TABLE 5). Of these, 24 were found during project surveys, none during post-project inspections, and 8 were discovered secondarily while conducting other botany work. The most notable expansion was a 4.2-acre increase in Canada thistle along Burke Creek, which nearly doubled the total area across LTBMU that is infested with Canada thistle; this new infestation is a high priority for future treatment.

In 2013, there were 37 new invasive plant infestations inventoried on NFS lands administered by the LTBMU in 2013 (TABLE 5). Of these, 26 were found during project surveys, none during post-project inspections, and 11 were discovered secondarily while conducting other botany work.

Table 5. Quantity and area of new infestations inventoried in 2014

Scientific Name	Common Name	Number of new infestations in 2013	New acres 2013	Number of new Infestations in 2014	New acres 2014
Centaurea maculosa	spotted knapweed	1	0.03	1	0.07
Cirsium arvense	Canada thistle	3	0.89	3	4.21
Cirsium vulgare	bull thistle	26	12.23	11	4.25
Hypericum perforatum	common St. Johnswort	3	0.65	9	3.47
Lepidium latifolium	perennial pepperweed	1	0.01	1	0.05
Leucanthemum vulgare	oxeye daisy	2	0.01	3	0.35
Linaria vulgaris	yellow toadflax	1	0.01	3	0.08
Rubus armeniacus	Himalayan blackberry			1	0.01
	Total	**37**	**13.84**	**32**	**12.50**

Derived from NRIS TESP-IP data (USDA Forest Service 2014). Data does not include invasive plant infestations on NFS lands designated as urban lots.

3.2.3 Treatment

In 2014, there were 156 invasive plant treatments conducted at 128 infestations; many infestations were treated more than once (TABLE 6). Of these treated infestations, 5.7% (9 infestations) received one follow-up visit including monitoring and 0% received additional follow-up visits. Staffing issues severely limited opportunities for treatment in 2014.

In 2013, there were 276 invasive plant treatments conducted at 201 infestations in 2013; many infestations were treated more than once (TABLE 6). Data was actually recorded for 273 occurrences because there were 3 occurrences that were combined; data for these infestations are now included in the infestation with which they were combined. Of these treated infestations, 11% (30 infestations) received one follow-up visit and 2.5% (7 infestations) received additional follow-up visits.

Table 6. Treatment 2013-2014

Scientific Name	Common Name	Total number of Active Infestations 2013	Number of Infestations Treated 2013	Total Acres treated 2013	Total number of Active Infestations 2014	Number of Infestations Treated 2014	Total Acres Treated 2014
	High Priority						
Acroptilon repens	Russian knapweed	1	1	0.04	0	1	0.04

Cardaria draba/pubescens	hoary cress/hairy hoary cress	2	1	0.37	2	2	0.439
Carduus nutans	musk thistle	0	0	0	1	1	0.99
Centaurea diffusa	diffuse knapweed	2	2	0.12	2	2	0.12
Centaurea maculosa	spotted knapweed	3	3	0.07	2	4	0.14
Chondrilla juncea	rush skeletonweed	1	1	0.06	1	1	0.06
Cirsium arvense	Canada thistle	23	21	2.5	26	25	3.02
Conium maculatum	poison hemlock	1	0	0	1	0	0
Cytisus scoparius	Scotch broom	3	2	0.08	2	2	0.18
Isatis tinctoria	Dyer's woad[1]	1	1	0.38	1	0[1]	0[1]
Lepidium latifolium	perennial pepperweed	24	21	2.66	24	16	1.8
Linaria dalmatica	Dalmatian toadflax	3	3	9.93	9	1	0.01
Linaria vulgaris	yellow toadflax	11	11	8.4	11	11	0.62
Onopordum acanthium	Scotch thistle	1	1	0.33	1	1	0.33
Potentilla recta	sulfur cinquefoil	2	1	4.73	2	1	4.73
Rubus armeniacus	Himalayan blackberry	1	1	0.0023	2	2	0.01
	Medium Priority						
Hypericum perforatum	St. Johnswort	35	8	15.91	44	19	3.75
Leucanthemum vulgare	Oxeye daisy						
	Low Priority						
Cirsium vulgare	Bull thistle	233	123	79.91	247	38	22.9
	Total	**368**	**201**	**128**	**402**	**128**	**44**

Derived from NRIS TESP-IP data (USDA Forest Service 2014). Data does not include invasive plant infestations on NFS lands designated as urban lots.

[1]Dyers woad was chemically treated by Placer County in 2013-2014.

As a result of continued treatment and monitoring efforts, over 70 infestations have been eradicated since 2004 (two in 2013 and 2014) (TABLE 7). An infestation is considered eradicated if it is monitored for 3 consecutive years and no plants are found.

Table 7. Infestations considered eradicated, 2004-2014

Scientific Name	Common Name	Number of infestations considered eradicated as of 2014	Number of acres considered eradicated as of 2014
Carduus nutans	musk thistle	1	0.035
Centaurea maculosa	spotted knapweed	2	0.04
Chondrilla juncea	rush skeletonweed	1	0.04
Cirsium arvense	Canada thistle	7	0.127
Cirsium vulgare	bull thistle	41	1.9
Cytisus scoparius	Scotch broom	3	0.0015
Hypericum perforatum	common St. Johnswort	3	0.0022
Lepidium latifolium	perennial pepperweed	3	0.07
Leucanthemum vulgare	oxeye daisy	3	0.18

Linaria dalmatica	Dalmatian toadflax	2	0.0008
Linaria vulgaris	yellow toadflax	4	0.11
Potentilla recta	sulphur cinquefoil	1	0.0004
Rubus armeniacus	Himalayan blackberry	1	0.0023
	Total	71	2.5

Derived from NRIS TESP-IP data (USDA Forest Service 2014). Data includes invasive plant infestations on NFS lands designated as urban lots.

4 Species Updates—Species of Management Concern

This section provides updates on the status of each priority invasive plant species on LTBMU as well as guidance for the 2015 field season for the preferred treatment methods for species known on LTBMU and early detection rapid response (EDRR) procedures for species not known on LTBMU. This information can be utilized in the project-level analysis of invasive plant risk as well as to develop infestation-specific invasive plant management plans.

4.1 Species known on LTMBU

4.1.1 Russian knapweed (*Acroptilon repens*)

4.1.1.1 Species Account

This perennial aster spreads primarily by creeping rhizomes. It exhibits allelopathic effects and is aggressively competitive, facilitating rapid colonization and development of dense stands (Beck 2008; California Department of Food and Agriculture 2013). Infestations can be extremely long-lived due to extensive root and rhizome systems (California Department of Food and Agriculture 2013). Russian knapweed can cause chewing disease in horses (California Department of Food and Agriculture 2013). Hand pulling of this species reportedly has limited effectiveness and repeated pulling may not eradicate the infestation due to its proficiency at reproducing by rhizomes (Carpenter and Murray 1998a).

Russian knapweed is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in both California and Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.1.2 Status on LTBMU

The priority assigned to Russian thistle by LTBMU is medium. On LTBMU, there is one known Russian knapweed infestation—totaling less than 0.1 acres—roadside on Highway 50 in Nevada, approximately 1.5 miles east of Shakespeare Point. In 2013, 67 plants were treated but in 2014, 0 plants were found. The infestation will continue to be monitored in 2015.

4.1.1.3 Preferred Treatment on LTBMU

This tap-rooted biennial can be controlled manually, if enough root is removed and no seed is produced. Preferred treatment is manual. Chemical treatment of large infestations can be assessed in consultation with the Forest Botanist; for chemical treatment, aminopyralid is preferred.

4.1.2 Cheatgrass (*Bromus tectorum)*

4.1.2.1 Species Account

Cheatgrass is an annual graminoid which generally emerges in early spring (Bossard et al. 2000). The conversion of Great Basin rangeland from native perennial grasses to cheatgrass is one of the most severe ecological degradations in the United States(D'Antonio and Vitousek 1992; Mack 1981). Cheatgrass invasion shortens fire return interval and alters nutrient cycling, resulting in increased fire hazard and the displacement of native plant communities, particularly those dominated by sagebrush (*Artemisia* spp.) (Brooks et al. 2004; Evans et al. 2001). Most available treatment methods have proven ineffective for control of cheatgrass on a large scale (Bossard et al. 2000). Therefore, prevention is considered critical in cheatgrass management.

Cheatgrass is considered highly invasive by Cal-IPC and is not ranked by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is not a Category weed in California or Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.2.2 Status on LTBMU

The priority assigned to cheatgrass by LTBMU is low due to a dearth of treatment options. Nonetheless, cheatgrass represents the greatest threat to ecosystem function and native species habitat on LTBMU. Though not mapped in NRIS, it is known to occur in every USGS quad within LTBMU and has spread exponentially since 2009 (B. Engelhardt personal communication, 2013). It is found in disturbed roadside habitats, such as cut banks and road medians along the entire length of US 50 through the Basin (Bibbo 2010). Management on LTBMU is currently limited to prevention during project and management activities (e.g. screening materials, avoiding known infestations, cleaning equipment).

In 2014, 4.2 acres of cheatgrass were mapped in project areas; these infestations were recommended for either avoidance or treatment, based on a project-specific assessment of feasibility.

4.1.2.3 Preferred Treatment on LTBMU

Management outside of project areas focuses on avoidance and prevention. When this species intersects proposed project activities, it is mapped and managed (avoided or treated); recommended management will be project and site-specific. Manual treatment is preferred for small infestations. Pull plants prior to seed set. Plants without flowers can be left on site. Plants with flowers should be bagged and disposed properly. Repeat as new plants appear. Manual treatment may not be feasible for large infestations.

Mechanical and cultural methods are also approved, but not preferred. Chemical treatment of cheatgrass is not approved. Mechanical treatment would involve disking/tilling live plants in spring (prior to seed set), repeating as new plants appear, and revegetating with native species. Do not mow; mowed plants can still produce seed. Mechanical treatment may not be feasible for large infestations. Cultural treatment would involve flaming in late spring-early summer may be considered in consultation with the Forest Botanist and Forest Fuels Officer (requires an approved burn plan). Cultural treatment may not feasible for large infestations.

In general, large infestations are manage to avoid spread (rather than treated), using a combination of the following techniques: 1) flag and completely avoid infestations; 2) lay down barriers over infestations during staging and construction; 3) work in infested areas first, then wash equipment before moving to uninfested areas; and/or 4) use manual or mechanical techniques (above) in staging or construction areas. Hoary cress, heart-podded (*Cardaria draba*) & globe-podded (*Cardaria pubescens*)

4.1.2.4 Species Account

Both hoary cress species are perennial mustards with extensive rhizome production. These two species can be difficult to differentiate in the field and are managed similarly. Seedlings quickly develop lateral roots, shoot buds, and tap roots, some of which reach a depth of 25 centimeters in less than one month (California Department of Food and Agriculture 2013). The mature root system of hairy whitetop can reach depths of three feet or more and can account for 75 percent of plant biomass (California Department of Food and Agriculture 2013). An extensive root system enables plants to survive cold winter climates and periods of drought. Hoary cress is difficult to control because the majority of the plant's biomass is located below ground; therefore successful control may require the integration of a number of different treatment measures (USDA Forest Service 2005).

Hoary cress species are considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). They are a Category B weed in California and only globe-podded hoary cress is a Category C weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.2.5 Status on LTBMU

The priority assigned to hoary cress by LTBMU is medium. The two species of hoary cresses are believed to be relatively new introductions to LTBMU. First detection of globe-podded hoary cress was in 2008 along rock rip-rap southeast of the culvert crossing for Glenbrook Creek under Highway 50 in Nevada; no plants have been found in subsequent yearly visits. Currently, there is one heart podded and one globe-podded infestation on LTBMU, both on Spooner summit. In 2014, 200 plants were treated at the heart podded infestation (431C), and zero plants were found at the globe-podded infestation (776B).

4.1.2.6 Preferred Treatment on LTBMU

Both hoary cress species are rhizomatous and difficult to control by manual methods. Chemical treatment with chlorsulfuron is preferred. However, manual treatment should be attempted on newly discovered and very small infestations. For manual treatment, pull and dig up as much root as possible, getting both lateral and vertical roots. Bag any flowers, buds and any roots and dispose properly.

4.1.3 Musk thistle *(Carduus nutans*)

4.1.3.1 Species Account

Musk thistle is a pink flowered biennial or sometimes a winter, or summer annual, that can grow up to six feet tall and that prefers moist, bottomland soil, but can be found on drier uplands. The taproot is long, thick and fleshy, occasionally branched, and is capable of penetrating the soil to depths of a foot and a half or more. The plant reproduces by seed with each flower head capable of producing 1,500 or more seeds. Seed is dispersed by wind, water, birds, small mammals and less often by human activities (California Invasive Plant Council 2010).

Musk thistle is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category A weed in California and a Category B weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.3.2 Status on LTBMU

The priority assigned to musk thistle by LTBMU is high. There is one active infestation on LTBMU—totaling less than 1 acre, and two eradicated infestations. The active infestation (436A) is actively treated; there were 40 plants treated in 2014.

4.1.3.3 Preferred Treatment on LTBMU

This tap-rooted biennial can be controlled manually, if enough root is removed and no seed is produced. Preferred treatment is manual. Chemical treatment of large infestations can be assessed in consultation with the Forest Botanist; for chemical treatment, aminopyralid is preferred.

4.1.4 Diffuse knapweed (*Centaurea diffusa*)

4.1.4.1 Species Account

Diffuse knapweed is a diffusely branched biennial, or annual to short-lived perennial that can have both pink and white flowers, reaching one to three feet tall. It reproduces and spreads by seed, with each plant producing an average of 1000 seeds (California Invasive Plant Council 2010; Zouhar 2001a). The seeds germinate in spring or fall particularly following disturbance (such as manual control), if adequate soil moisture is present. Like other knapweeds, it readily establishes in disturbed soil in a variety of habitats and can displace native plant species via production of allelopathic chemicals (California Department of Food and Agriculture 2013). This species is spread by vehicles, people and contaminated hay, and once established can spread very quickly (California Invasive Plant Council 2010).

Diffuse knapweed is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category A weed in California and a Category B weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.4.2 Status on LTBMU

The priority assigned to diffuse knapweed by LTBMU is high. There are two active infestations (Nevada Beach, Griff Creek) on LTBMU—totaling less than 0.04 acres. Both infestations were treated in 2014 – zero plants were found at Griff Creek (352A), and five plants were treated at Nevada Beach (595B) in 2014.

4.1.4.3 Preferred Treatment Method

Diffuse knapweed can be controlled by repeated pulling or digging and are currently known only from small infestations. Preferred treatment is manual.

4.1.5 Spotted knapweed (*Centaurea maculosa)*

4.1.5.1 Species Account

Spotted knapweed is a biennial or short-lived perennial with a stout taproot. Like other knapweeds, it readily establishes in disturbed soil, and can produce allelopathic chemicals, excluding native plant species (California Department of Food and Agriculture 2013). This species reproduces by seed only and each plant produces an average of 1,000 seeds per plant. This species requires diligent monitoring as seeds can remain viable in the soil for up to seven years. Seeds are easily moved by vehicles, people and heavy machinery (California Invasive Plant Council 2010).

Spotted knapweed is considered highly invasive by Cal-IPC and a Class 2 weed—manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category A weed in both California and Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.5.2 Status on LTBMU

The priority assigned to spotted knapweed by LTBMU is high. There are four infestations on LTBMU—totaling less than 0.14 acres; two are near Nevada Beach (129, 885), one is located along Grass Lake Creek in Big Meadow (821), and one eradicated infestation is near the Supervisor's Office (547C). In 2014, all four infestations were inventoried and treated; 129, 821 and 547C had zero plants, and 885 had 250 plants.

4.1.5.3 Preferred Treatment on LTBMU

Spotted knapweed can be controlled by repeated pulling or digging and are currently known only from small infestations. Preferred treatment is manual. Small infestations can be effectively treated manually and there are several chemicals available to control larger infestations (Bossard et al. 2000).

4.1.6 Rush skeletonweed (*Chondrilla juncea)*

4.1.6.1 Species Account

This herbaceous, relatively long-lived yellow flowered perennial can flourish in very dry to very wet environments. It has the ability to form dense monocultures, displacing native species. This species can reproduce both by seed and adventitious buds on the roots (Jacobs et al. 2009). Diligent hand-pulling or grubbing can provide effective control of very small infestations. As with oxeye daisy, this species is difficult to control, even with herbicides (California Department of Food and Agriculture 2013).

4.1.6.2 Status on LTBMU

The priority assigned to rush skeletonweed by LTBMU is high. There is one eradicated infestation (Old Meyers Grade, site 738) on LTBMU—totaling less than 0.04 acres. No plants were observed in 2012, 2013 or 2014. Currently, this species is considered eradicated from LTBMU.

4.1.6.3 Preferred Treatment on LTBMU

This plant can be controlled by repeated manual treatment and is currently known only from small infestations. Preferred treatment is manual.

4.1.7 Canada thistle (*Cirsium arvense)*

4.1.7.1 Species Account

Canada thistle is a pink flowered perennial, reaching one to four feet tall with a rhizomatous root system that can outcompete native vegetation to form dense stands. This species can grow in a variety of habitats and soil types (Bossard et al. 2000). A single plant can produce thousands of seeds that can remain viable for 20 years (Zouhar 2001b). Canada thistle primarily spreads by horizontal creeping roots. It is difficult to treat through manual methods because the plant regenerates unless all root fragments are removed (Bond and Turner 2004).

Canada thistle is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in California and a Category C weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.7.2 Status on LTBMU

The priority assigned to Canada thistle by LTBMU is high. As of 2014, there are 26 infestations on LTBMU—totaling 7.10 acres. Since 2008, there has been a rapid increase in both the quantity and size of infestations (Olin 2011). Chemical treatment of Canada thistle infestations began in 2011 and

continued at all 23 known infestations in 2013. In 2014, a new 4-acre infestation—by far the largest to-date—was discovered in Rabe Meadows. In 2014, 26 infestations were inventoried and 25 were treated manually. Chemical treatment is planned for 2015.

4.1.7.3 Preferred Treatment on LTBMU

This plant is rhizomatous and is difficult to control by manual methods. Chemical treatment using aminopyralid is preferred. However, manual treatment should be attempted on newly discovered and small infestations. Clipping, mowing, and prescribed burning alone are not recommended as they can stimulate regrowth (Zouhar 2001b).

4.1.8 Bull thistle (*Cirsium vulgare*)

4.1.8.1 Species Account

Bull thistle is a pink flowered rosette forming biennial, two to six feet tall. Plants usually bolt, or grow a flowering stem the second year. This species only reproduces by seed and generally lacks an extensive root system. A single plant can produce up to 10,000 wind dispersed seeds. Bull thistle is widespread in North America and can invade a variety of both disturbed and intact habitat types including mesic forest, roads, ditches, grasslands and meadows (Bossard et al. 2000).

Bull thistle is considered moderately invasive by Cal-IPC and a Class 2 weed—manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category C weed in California and is not a Category weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.8.2 Status on LTBMU

The priority assigned to bull thistle by LTBMU is low. Bull thistle is the most common invasive plant species mapped on LTBMU, though cheatgrass (which is not mapped) may be more extensive. There are over 240 mapped infestations—totally over 422 acres; this represents 73% of the infestations managed by LTBMU. Due to the high number of infestations, only high priority infestations—particularly those that intersect proposed project areas—are treated. In 2013, 129 infestations were treated. In 2014, 42 infestations were treated.

4.1.8.3 Preferred Treatment on LTMBU

This tap-rooted biennial can be controlled manually, if enough root is removed and no seed is produced. Preferred treatment is manual. Chemical treatment is not authorized for existing infestations; new infestations must be evaluated for chemical treatment by an interdisciplinary team. Manual control is highly effective for small infestations (Bossard et al. 2000).

4.1.9 Poison hemlock (*Conium maculatum)*

4.1.9.1 Species Account

This white flowered biennial plant can reach up to 10 feet tall and establishes in disturbed roadsides, meadows, riparian forests and flood plains where soils are moist. Hemlock reproduces predominately from seed, which is dispersed by water, mud, wind, animal fur, human clothing, boots, and machinery. This species is highly toxic to livestock, wildlife and humans. Manual control is highly effective for small infestations (Bossard et al. 2000).

Poison hemlock is considered moderately invasive by Cal-IPC and is not ranked by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is not a

Category weed in California but is a Category C weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.9.2 Status on LTBMU

The priority assigned to poison hemlock by LTBMU is low. The only documented infestation of poison hemlock on LTBMU is along the Truckee River, approximately 1,000 ft. inside the LTBMU's north boundary. The infestation was last treated in 2012; there were only 15 plants across 1.4 acres; this is a substantial decrease from the 250 plants initially documented in 2008. The infestation was not treated in 2013 or 2014.

4.1.9.3 Preferred Treatment on LTBMU

This plant can be controlled by repeated manual treatment and is currently known only from small infestations, so preferred treatment is manual. Poison hemlock is poisonous and can cause an allergic reaction; wear gloves during treatment.

4.1.10 Scotch broom (*Cytisus scoparius)*

4.1.10.1 Species Account

Scotch broom is a large yellow-flowered perennial shrub reaching a height of two to three feet tall. It spreads aggressively by seed with each plant producing up to 12,000 seeds per year. It is difficult to control due to a persistent seed bank and its ability to establish from stem sprouts, even when cuts are made close to the ground. Scotch broom can form dense, monotypic stands that outcompete native vegetation(Bossard et al. 2000).

Scotch broom is considered highly invasive by Cal-IPC and a Class 2 weed—manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category C weed in California and is not a Category weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.10.2 Status on LTBMU

The priority assigned to scotch broom by LTBMU is medium. There have been five infestations of scotch broom documented on LTBMU. As of 2013, only three infestations were active (Fallen Leaf Lake, and Tallac Historic Estates). After inventory in 2014, only two infestations are considered active—both near Fallen Leaf Lake—and the infestation at Tallac Historic Estates is considered eradicated (748—Tallac Historic Estates). At the two active infestations, no plants were found at sites 707B or 748A, and 25 were found and pulled at 106.

4.1.10.3 Preferred Treatment on LTBMU

This shrub is currently only known from small infestations; manual and small tool mechanical treatment is preferred. Broom has a high re-sprout potential; therefore, clipping, mowing, and blade-type mechanical treatments are not recommended. Manual removal is typically effective only when plants are young, and can be removed in entirely (Bossard et al. 2000; LeBlanc 2001).

4.1.11 St. Johnswort (*Hypericum perforatum)*

4.1.11.1 Species Account

St Johnswort is a perennial, with stout taproots and many branched, lateral roots up to five feet deep. Rhizomes develop just below the soil surface from the crown and can extend outwards over two feet.

New shoots grow from the crown and rhizomes in early spring. It reproduces from both seed and rhizomes. Fragmented rhizomes can develop new plants (California Department of Food and Agriculture 2013). By 1940, more than one million hectares of California were infested by St. Johnswort, but biological control agents have eliminated most populations below 4900 feet elevation (Bossard et al. 2000).

St. Johnswort is considered moderately invasive by Cal-IPC and a Class 2 weed—manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category C weed in California and a Category A weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.11.2 Status on LTBMU

The priority assigned to St. Johnswort by LTBMU is medium. As for 2014, there are at least 44 documented infestations on LTBMU—totally 76.9 acres. The species is spreading rapidly along stream corridors in Ward and Blackwood Canyons on the west shore (C. Rowe personal communication, 2014). In 2014, 20 infestations were treated manually; however plants continue to persist at 16 infestations.

4.1.11.3 Preferred Treatment on LTMBU

This species is rhizomatous and is difficult to control by manual methods. Chemical treatment using aminopyralid is preferred; near water, glyphosate may also be used. However, manual treatment should be attempted on newly discovered and small infestations. Clipping, mowing, and prescribed burning alone are not recommended as they can stimulate regrowth.

4.1.12 Dyer's woad (*Isatis tinctoria)*

4.1.12.1 Species Account

Dyer's woad is a perennial mustard that invades both disturbed and undisturbed areas, but is most common in dry, rocky areas. The first documentation of Dyer's woad in the U.S. was in Siskiyou County and it been rapidly spreading across northeastern California, with very high levels of infestation in Modoc county (California Invasive Plant Council 2011).

Dyer's woad is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in California and a Category A weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.12.2 Status on LTBMU

The priority assigned to Dyer's woad by LTBMU is high. Dyer's woad is believed to be relatively new introductions to LTBMU. There is only one documented infestation on LTBMU—along Highway 267 immediately south of Brockway Summit. The infestation is actively treated by Placer County and monitored by LTBMU.

4.1.12.3 Preferred Treatment on LTBMU

This plant can be controlled by repeated manual treatment and is currently known only from small infestations, so preferred treatment is manual.

4.1.13 Tall whitetop (*Lepidium latifolium)*

4.1.13.1 Species Account

This white flowered perennial forb grows from three to eight feet tall, and spreads vigorously to form dense colonies from roots and deep-seated rhizomes. This species spreads by both rhizomes and each plant can produce thousands of seeds with high germination rates (Bossard et al. 2000). It can grow at altitudes of 4,000 to 8,000 feet and is an aggressive invader of moist to wet ecosystems, even invading ecologically healthy areas. Due to its propensity to overtake wetland areas, its ecological impact is considered high in both California and Nevada (California Invasive Plant Council 2010, 2011; Ryan 1998). Manual and mechanical removal has been shown to be ineffective for controlling tall whitetop because plants form clonal stands and continue to sprout from extremely deep roots, and from root fragments (Howald 2000; Ryan 1998).

Tall whitetop is considered highly invasive by Cal-IPC and a Class 2 weed—manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in California and a class C weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.13.2 Status on LTBMU

The priority assigned to tall whitetop by LTBMU is high. There are 18 active infestations on LTBMU—mostly around South Lake Tahoe, with an isolated infestation at Brockway Summit. All 18 infestations are actively treated or monitored; chemical treatment commenced at seven infestations in 2013, though only the Brockway Summit infestation (754A) could be chemically treated in 2014. As for 2014, plants were only present at four infestations (169, 296, 754A, 890).

4.1.13.3 Preferred Treatment on LTBMU

This plant is rhizomatous and is difficult to control by manual methods. Chemical treatment with chlorsulfuron is preferred; secondary preference is for glyphosate. However, manual treatment should be attempted on newly discovered and small infestations. For large infestations, mowing or cutting weeks before chemical treatment to stimulate greater leaf area to absorb herbicide products is recommended. Clipping, mowing, and prescribed burning alone are not recommended as they can stimulate regrowth.

4.1.14 Oxeye daisy (*Leucanthemum vulgare*)

4.1.14.1 Species Account

This white flowered perennial forb grows from one to three feet tall that invades both disturbed areas and wildland habitats including wet meadows, riparian forests and open canopy forests. This species is a prolific seed producer and seeds can remain viable in the soil for up to 20 years (Bossard et al. 2000). The creeping rhizomes enable it to outcompete and displace native vegetation, making it difficult to control large infestations (Mangold et al. 2009).

Oxeye daisy is considered moderately invasive by Cal-IPC and a Class 2 weed—manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is not a Category weed in California or Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.14.2 Status on LTBMU

The priority assigned to oxeye daisy by LTBMU is low. The oxeye daisy infestation at Slaughterhouse Meadows represents the single largest known invasive plant infestation on LTBMU—spanning over 39 acres. This infestation appears to be rapidly expanding, as it was only estimated at 5 acres in 2003-2007, representing an 8-fold increase in five years (Olin 2009). As of 2014, there are 36 documented

infestations on LTBMU—totally 49 acres. Several new infestations were discovered after the Angora fire in 2007 (Olin 2009). Manual treatment has been relatively ineffective on LTBMU; despite repeated years of treatment. In 2014, 15 infestations treated manually and plants remained at 10 infestations.

4.1.14.3 Preferred Treatment on LTBMU

Preferred treatment method depends on infestation size. Manual treatment is preferred for small infestations. Large infestations require consultation with the Forest Botanist to develop a treatment plan. If chemical methods are selected, aminopyralid is preferred. For large infestations, mowing or cutting weeks before chemical treatment to stimulate greater leaf area to absorb herbicide products is recommended.

4.1.15 Dalmatian toadflax (*Linaria dalmatica)*

4.1.15.1 Species Account

This yellow flowered perennial forb grows up to three feet tall and can invade a variety of habitats, soils and climates. This species reproduces aggressively both by seeds and by vegetative propagation and the extensive deep root system and waxy leaves make it very difficult to control (California Department of Food and Agriculture 2013; Carpenter and Murray 1998b). Dalmatian toadflax has only recently been detected in the northern Sierra, with infestations believed to limited to the Truckee River drainage and the Tahoe Basin (California Invasive Plant Council 2011).

Dalmatian toadflax is considered moderately invasive by Cal-IPC and a Class 2 weed— manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category A weed in both California and Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.15.2 Status on LTBMU

The priority assigned to yellow toadflax by LTBMU is high. There are at least 16 infestations on LTBMU, totally 10.6 acres; most are found on Urban Lots around South Lake Tahoe with two located on general forest areas along the Lower Truckee River near Tahoe City (217D, 261). All infestations have been actively treated via manual removal; however, at four infestations, repeated annual treatment since 2005 has failed to reduce infestation size or plant quantity. In 2013, chemical treatment was initiated at the two Tahoe City infestations. In 2014, there were no plants at either infestation. Chemical treatment is planned for 2015.

4.1.15.3 Preferred Treatment on LTBMU

There are very few effective treatment methods for toadflax species; both manual and chemical control methods yield erratic results. Clipping, mowing, and prescribed burning alone are not recommended as they can stimulate regrowth. If chemical treatment is selected, chlorsulfuron is preferred. Secondary preference is for glyphosate as an early summer application (plants ~3”). Flaming (cultural method) can be considered for small infestations, but is not feasible for large infestations. Conduct in early summer. Flaming requires consultation with the Forest Botanist and Forest Fuels Officer (requires an approved burn plan).

For manual treatment, dig, bag, and dispose properly. Remove lateral roots completely; they can tear and underground portions can survive to grow new plants. Revisit infestation several times per season. Schedule 5-10 years of follow-up treatment. Revegetation with natives is highly recommended.

4.1.16 Yellow toadflax (*Linaria vulgaris)*

4.1.16.1 Species Account

This yellow flowered perennial forb grows up to three feet tall and can invade a variety of habitats, soils and climates. Yellow toadflax is difficult to control due to its large and extensive root system and the ability for a single plant to produce up to 500,000 seeds that can remain viable in the soil for up to ten years (Kadrmas 2002b).

Yellow toadflax is considered moderately invasive by Cal-IPC and a Class 2 weed—manage infestations with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is not a Category weed in California but is a Category A weed in Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.16.2 Status on LTBMU

The priority assigned to yellow toadflax by LTBMU is high. As for 2014, there are at least 12 infestations on LTBMU—totaling 0.6 acres. Most infestations are found along the Lower Truckee River near Tahoe City and there are three infestations at Tallac Historic Estates. All active infestations have been actively treated via manual removal; however, clipping and hand-pulling have not proven to be effective methods as the plants quickly resprout and set seed at short heights. In 2013, two infestations along the Lower Truckee were treated with glyphosate. In 2014, these infestations were treated manually. Three new infestations were discovered in 2014—one at 64 Acres had over 1,000 plants. Additional surveys of the Lower Truckee River are needed to determine the full extent of infestation. Chemical treatment is planned for 2015.

4.1.16.3 Preferred Treatment on LTBMU

There are very few effective treatment methods for toadflax species; both manual and chemical control methods yield erratic results. Clipping, mowing, and prescribed burning alone are not recommended as they can stimulate regrowth. If chemical treatment is selected, chlorsulfuron is preferred. Secondary preference is for glyphosate as an early summer application (plants ~3”). Flaming (cultural method) can be considered for small infestations, but is not feasible for large infestations. Conduct in early summer. Flaming requires consultation with the Forest Botanist and Forest Fuels Officer (requires an approved burn plan).

For manual treatment, dig, bag, and dispose properly. Remove lateral roots completely; they can tear and underground portions can survive to grow new plants. Revisit infestation several times per season. Schedule 5-10 years of follow-up treatment. Revegetation with natives is highly recommended.

4.1.17 Scotch thistle (*Onopordum acanthium)*

4.1.17.1 Species Account

Scotch thistle is as an annual or a short-lived perennial that can grow up to 12 feet tall with rosettes reaching 12 or more inches. Scotch thistle is a prolific seed producer—producing from 70,000-300,000 seeds per plant. This species reproduces only by seed; seed can be dispersed by wind, water, wildlife, livestock and human activities. Scotch thistle typically invades disturbed, wet areas including rangeland, pastures and roadsides (Kadrmas 2002a).

Scotch thistle is considered highly invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category A weed in both California and a Category B weed in Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.17.2 Status on LTBMU

The priority assigned to scotch thistle by LTBMU is high. In the Tahoe Basin, it is known from only a few locations. On LTBMU, there is only one known infestation—near Taylor Creek and Highway 89. In 2013, two plants were found and treated and in 2014 no plants were found. This infestation will continue to be treated and monitored.

4.1.17.3 Preferred Treatment on LTBMU

This tap-rooted biennial can be controlled manually, if enough root is removed and no seed is produced. Preferred treatment is manual. Chemical treatment of large infestations can be assessed in consultation with the Forest Botanist. If chemical treatment is selected, aminopyralid is preferred.

4.1.18 Sulphur cinquefoil (*Potentilla recta)*

4.1.18.1 Species Account

This perennial herb has a single, woody taproot that can grow one to two feet in height. Key features that distinguish the species from several native *Potentilla* spp. include: pointed hairs that protrude outward at right angles from the stem and leafstalk; leaves that are green abaxially, rather than silver(Baldwin et al. 2012). This species reproduces by seed; a single plant can produce up to 1,650 seeds per year and seeds may remain viable in the soil for three to four years (Zouhar 2003).

Sulphur cinquefoil is not categorized by Cal-IPC but is a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category A weed in both California and Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.18.2 Status on LTBMU

The priority assigned to sulphur cinquefoil by LTBMU is medium. As for 2014, there are at least two active infestations on LTBMU, with one infestation—along Burke Creek in Lam Watah Meadow—accounting for 3.8 acres of the total 4.0 acres known for the species. Known infestations have been treated manually since 2007 with successful eradiation at small infestations and little to no effect on infestation size and plant quantity for the single large infestation (along Burke Creek). As of 2014, there were still at least 2,000 plants documented at this large infestation. The infestation is not currently being treated until more effective treatment methods can be researched and piloted.

4.1.18.3 Preferred Treatment on LTBMU

This species is often confused with the native *Potentilla* spp. that have similar habitat requirements as sulphur cinquefoil. Confirm identification with trained botanist prior to treatment. Preferred treatment method depends on infestation size. Manual treatment is preferred for small infestations; pull or dig, bag and dispose properly. Large infestations require consultation with the Forest Botanist to develop a treatment plan. Sulfur cinquefoil is not sensitive to aminopyralid; glyphosate is preferred.

4.1.19 Himalayan blackberry (*Rubus armeniacus)*

4.1.19.1 Species Account

This robust shrub effectively and rapidly displaces native species by forming impenetrable thickets along disturbed roadsides, right-of-way corridors, and riparian areas. It can grow in a wide variety of conditions and on a number of different soil types, including barren and infertile soils(Hoshovsky 2000). It spreads both vegetatively and through the production of large quantities of seed, which are readily

dispersed by mammals, birds, and via rivers and streams. Seeds remain viable for several years, with germination increasing after the first year(2005). The most effective treatment methods for Himalayan blackberry are mechanical removal, burning, and, in some cases, herbicide application(Hoshovsky 2000).

Himalayan blackberry is considered highly invasive by Cal-IPC and has not been ranked by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is not a Category weed in California or Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.1.19.2 Status on LTBMU

The priority assigned to Himalayan blackberry by LTBMU is medium. As of 2014, there is one active infestation on LTBMU and one eradicated infestation (Supervisor's Office). At the Supervisor's Office, there was one plant discovered in 2009; it was treated manually and has not been seen since 2009. In 2014, 20 plants were discovered near Tahoe City in the 64-Acre parcel. The infestation was manually treated and the infestation will be monitored in 2015 and treated, as necessary.

4.1.19.3 Preferred Treatment on LTBMU

Plants can be controlled by repeated manual treatment and are currently known only from small infestations, so preferred treatment is manual. Treatment of large infestations will require consultation with the Forest Botanist; if chemical treatment is selected, glyphosate is preferred. For large infestations, mowing or cutting weeks before chemical treatment to stimulate greater leaf area to absorb herbicide products is recommended.

4.2 SUMMARY OF CURRENT TREATMENT ON LTBMU

The majority of mapped active infestations on LTBMU were treated in 2013, but not in 2014. In 2013, there were 368 active invasive plant infestations mapped, of which 266 were treated (TABLE 4, TABLE 8). In 2014, there were 406 active invasive plant infestations mapped, of which 162 were treated (TABLE 4, TABLE 8). There were no chemical treatments in 2014 due to staffing issues. The majority of active cheatgrass, St. Johnswort, oxeye daisy, and bull thistle infestations are not treated. Despite the implementation of a chemical treatment program in 2011, the primary treatment method remains manual removal (Table 8).

Table 8. Summary of invasive plant treatments on LTBMU, 2005-2014

Year	Manual	Chemical	Total
2005	45	0	45
2006	185	0	185
2007	294	0	294
2008	406	2	408
2009	518	2	520
2010	477	0	477
2011	421	9	430
2012	314	12	326
2013	224	42	266
2014	162	0	162
Derived from NRIS TESP-IS & FACTS data			

4.3 SPECIES LISTED BUT NOT KNOWN TO OCCUR ON LTBMU

Only 21 of the 35 species on the LTBMU invasive plant list have been found on NFS lands in the Basin. The other species are included because they have been found elsewhere in the Basin or are suspected to be within 25 miles of the LTBMU administrative boundary. Proximity of these species increases the likelihood of introduction on LTBMU. If any of the following species are found, the Forest Botanist should be notified and detailed geospatial (GPS) and infestation information should be collected. The following summary and treatment information is provided as rudimentary Early Detection and Rapid Response (EDDR) treatment options. Treatment of large infestations will require consultation with the Forest Botanist.

4.3.1 Tree of heaven (*Ailanthus altissima*)

Tree of Heaven is a fast growing deciduous tree with pinnately compound leaves. It tends to invade disturbed and riparian areas and spreads easily from root sprouts and wind dispersed seeds. This species can form dense stands that displace native vegetation (Bossard et al. 2000). This species is currently documented in the Lake Tahoe Basin, but not on LTBMU NFS lands. The known infestation in the Basin consists of only a few individuals.

Tree of heaven is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in both California and Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.1.1 Preferred EDDR Treatment

Dig up young plants getting as much root as possible, any root or plant part left behind can re-sprout. Infestations must be monitored and treated multiple times within the year.

4.3.2 Purple starthistle (*Centaurea calcitrapa*)

Purple starthistle is a rosette forming annual to short-lived perennial reaching one to four feet tall. Flowers are surrounded by long, stout, pointed spines, which persist even on dead plants. Reproduction is by seed only and is primarily dispersed by wind and contaminated material (Bossard et al. 2000). Currently, there are no known occurrences within the Basin, although it is found at lower elevations in Eldorado and Placer counties. A single historic CalFlora report exists for McKinney-Rubicon Springs Road. This area will be surveyed in 2015 if time allows.

Purple starthistle is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in California and a Category A weed in Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.2.1 Preferred EDDR Treatment

Grub and dig up as much root as possible getting at least 2” below surface, cut and bag flower heads. Revisit infestations at least 3 times per growing seasons. Follow-up treatments should be scheduled for 2-4 years.

4.3.3 Yellow starthistle (*Centaurea solstitialis*)

Yellow starthistle is a winter annual, or sometimes a biennial that is highly competitive, and can develop dense, impenetrable stands. Taproots grow vigorously early in the season to depths of 3 feet or more,

giving plants access to deep soil moisture. One plant can produce 75,000 seeds, and nearly all seeds are able to germinate within one week of dispersal. This species can be dispersed by vehicles, animals, people, contaminated hay and unverified seed (Bossard et al. 2000). Yellow starthistle has not been found on NFS lands, but small occurrences are known near the Tahoe Basin(California Invasive Plant Council 2010).

Yellow starthistle is considered highly invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category C weed in California and a Category A weed in Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.3.1 Preferred EDDR Treatment

For small infestations digging and pulling can be effective, if at least 2" of the root is dug below the soil surface. Since this species is a prolific seed producer, flower heads should be cut and bagged. Revisit infestations at least 3 times per growing seasons. Follow-up treatment should be scheduled for 2-4 years.

4.3.4 Squarrose knapweed (*Centaurea virgata ssp. squarrosa*)

Squarrose knapweed is a long-lived perennial with a stout taproot that can grow to three feet tall. It is a highly competitive plant that can displace native species(Graham and Johnson 2004). Like other knapweeds, is it readily established in disturbed soil, and can produce allopathic chemicals, excluding native plant species (California Department of Food and Agriculture 2013). It has not been reported in the Tahoe Basin.

Squarrose knapweed is considered moderately invasive by Cal-IPC and has not been ranked by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category A weed in both California and Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.4.1 Preferred EDDR Treatment

CDFA reports that hand pulling spotted knapweed has limited effectiveness, since vegetative reproduction from short lateral roots can occur for several years.

4.3.5 Teasel (*Dipsacus fullonum*)

Teasel is a tap-rooted rosette forming biennial with prickly leaves native to Europe. This species can reach seven to ten feet in height, can invade a variety of habitats and spreads primarily by seed (Gucker 2009). Teasel has been found close to the LTBMU near the Angora burn area and is known on the Lower Truckee River on the Tahoe National Forest.

Teasel is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is not a Category weed in California or Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.5.1 Preferred EDDR Treatment

Teasel is a biennial making cutting, pulling or digging effective. Buds and flowers should be bagged but leaves, stems and roots can be left to dry to save landfill space. Seeds are viable for 2-4 years, so treatment should be repeated for several years.

4.3.6 Stinkwort (*Dittrichia graveolens*)

Stinkwort is a strongly aromatic annual native to the Mediterranean region. It reproduces large amounts of seed that are dispersed by wind, water, machinery, vehicles, and animals. The wind can carry seeds great distances. This species can cause allergic reactions in humans, and enteritis in animals. It can be difficult to control with herbicides due to its oily leaves, which reduce penetration by most chemicals. Isolated plants can be controlled by hand (DiTomaso 2013). Stinkwort has recently been found in Eldorado County west of the Tahoe Basin(California Invasive Plant Council 2010).

Stinkwort is considered moderately invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is not designated as a Category weed in California or Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.6.1 Preferred EDDR Treatment

Stinkwort has a shallow root system; hoeing or pulling easily removes the plant. Wear protective gloves during treatment, as plant oils are irritating. Plants without flowers can be left on infestation. Plants with flowers should be bagged and disposed properly.

4.3.7 Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife is a purple flowered, long lived perennial that can reach one to five feet tall and invades wetlands and other moist areas. This species spreads primarily by seed, but can also spread by root fragments-the primary vectors for seed dispersal are wind and water. This species invades disturbed wetlands, roadsides, ditches, ponds, river banks, meadows, pastures and bogs (Bossard et al. 2000). Purple loosestrife is known along Highway 50 west of the Tahoe Basin. It has been planted as an ornamental for road work on the South Shore of Lake Tahoe.

Purple loosestrife is considered highly invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in California and a Category A weed in Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.7.1 Preferred EDDR Treatment

Hand pull only as seedlings. Do not mow or graze.

4.3.8 Medusahead (*Elymus caput-medusae*)

This annual grass is highly competitive, forming monocultures in a wide range of habitats (Bossard et al. 2000). Once established, this species forms a dense layer of silica rich litter which inhibits germination and establishment of native species. Medusahead is easily spread by wind, water animals, vehicles and clothing due to its long-awned seeds(Bossard et al. 2000). There are no known infestations of medusahead on LTBMU.

Medusahead is considered highly invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category C weed in California and a Category B weed in Nevada (California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.8.1 Preferred EDDR Treatment

This species is often confused with the native perennial squirreltail grasses (*Elymus sp*.) that are found throughout the basin. Confirm identification with trained botanist prior to treatment. Small infestations can be treated manually via pulling or clipping; bag any seeds and dispose properly.

4.3.9 Saltcedar (*Tamarix spp*.)

This highly branched shrub or tree is not found in the Tahoe Basin, but is in adjacent communities in wet and riparian areas(Bossard et al. 2000). Salt cedar, originally brought to the U.S. as an ornamental and soil stabilizer, has taken over many of Nevada's stream banks and lake margins (Stevenson 1996). Salt cedar uses large amounts of ground water that causes water tables to fall and springs and small streams to dry up(DiTomaso 1996).

Saltcedar is considered highly invasive by Cal-IPC and a Class 1 weed—with the goal of eradiation—by the LTBWCG (California Invasive Plant Council 2010; Lake Tahoe Basin Weed Coordination Group 2011). It is a Category B weed in California and a Category C weed in Nevada(California Department of Food and Agriculture 2009; Nevada Department of Agriculture 2012).

4.3.9.1 Preferred EDDR Treatment

When cut or disturbed, salt cedar sprouts aggressively from the root crown. If the plants have grown beyond small shrub size salt cedar is difficult to eradicate without the use of an herbicide (Bossard et al. 2000; Tesky 1992). If found as a young plant, pull or dig up the plant getting as much root as possible.

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Appendix A. Invasive Plants of Management Concern on LTBMU

Scientific Name	Common Name	LTBMU Priority	NDA	CDFA	Cal-IPC	LTB WCG
Acroptilon repens	Russian knapweed	Medium	B	B	Moderate	Group 1
Ailanthus altissima	tree of heaven	High		C	Moderate	Group 1
Bromus tectorum	cheat grass	Low			High	
Cardaria draba	heart-podded hoary cress; whitetop	Medium	C	B	Moderate	Group 1
Cardaria pubescens	globe-podded hoary cress; hairy whitetop	Medium		B	Limited	Group 1
Carduus nutans	musk thistle	High	B	A	Moderate	Group 1
Centaurea calcitrapa	purple starthistle; red starthistle	Medium	A	B	Moderate	Group 1
Centaurea diffusa	diffuse knapweed	High	B	A	Moderate	Group 1
Centaurea maculosa	spotted knapweed	High	A	A	High	Group 2
Centaurea solstitialis	yellow starthistle	Medium	A	C	High	Group 1
Centaurea virgata ssp. *squarrosa*	squarrose knapweed	High	A	A	Moderate	
Chondrilla juncea	rush skeletonweed	High	A	A	Moderate	Group 1
Cirsium arvense	Canada thistle	High	C	B	Moderate	Group 1
Cirsium vulgare	bull thistle	Low		C	Moderate	Group 2
Conium maculatum	poison hemlock	Low	C		Moderate	
Cytisus scoparius	Scotch broom	Medium		C	High	Group 2
Dipsacus fullonum	teasel; Fuller's teasel	Low			Moderate	Group 1
Dittrichia graveolens	stinkwort	Low			Moderate	Group 1
Elymus caput-medusae	medusahead	High	B	C	High	Group 1
Elymus repense	quackgrass	Low		B		
Hydrilla verticillata	hydrilla; waterthyme	N/A	A	A	High; Alert	
Hypericum perforatum	St. Johnswort; Klamathweed	Medium	A	C	Moderate	Group 2
Isatis tinctoria	Dyer's woad	High	A	B	Moderate	Group 1
Lepidium latifolium	tall whitetop; perennial pepperweed	High	C	B	High	Group 2
Leucanthemum vulgare	oxeye daisy	Low			Moderate	Group 2
Linaria genistifolia spp. *dalmatica*	Dalmatian toadflax	High	A	A	Moderate	Group 2
Linaria vulgaris	yellow toadflax; butter & eggs	High	A		Moderate	Group 2
Lythrum salicaria	purple loosestrife	High	A	B	High	Group 1
Myriophyllum spicatum	Eurasian watermilfoil	N/A	A		High	
Onorpordum acanthium ssp. *acanthium*	Scotch thistle	High	B	A	High	Group 1
Potamogeton crispus	curlyleaf pondweed	N/A			Moderate	
Potentilla recta	sulfur cinquefoil	Medium	A	A		Group 1
Rubus armeniacus	Himalaya blackberry	Medium			High	
Tamarix chinensis, T. ramosissima, & T. parvifolia	tamarisk; saltcedar	High	C	B	High	Group 1

LTBMU: High—Species that have a large ecological impact or invasive potential; species that are easily controlled. Medium—Species that have a moderate ecological impact or invasive potential; species that may be difficult to control. Low—Species that have a low ecological impact or invasive potential; species that require substantial effort to control. N/A—species not evaluated.
NDA: Nevada Department of Agriculture Noxious Weed List (http://agri.nv.gov/nwac/PLANT_NoxWeedList.htm) Category A—Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations. Category B—Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur. Category C—Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer.
CDFA: California Department of Food and Agriculture Noxious Weed List (http://www.cdfa.ca.gov/phpps/ipc/). A--Eradication or containment is required at the state or county level. B—Eradication or containment is at the discretion of the County Agricultural Commissioner. C--Require eradication or containment only when found in a nursery or at the discretion of the County Agricultural Commissioner. Q—Require temporary "A" action pending determination of a permanent rating.
Cal-IPC: California Invasive Plant Council Online Invasive Plant Inventory (2006) (http://www.cal-ipc.org/ip/inventory/weedlist.php). High—Species having severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Moderate—Species having substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Limited—Species that are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Alert—Species with significant potential for invading new ecosystems.
LTBWCG: Lake Tahoe Basin Weed Coordinating Group Weed Priority List (2010). Group 1--Watch for, report, and eradicate immediately. Group 2--Manage infestations with the goal of eradication.

Appendix B. Inventory and Treatment Field Form 2013

INFESTATION #_____ SPECIES _____SURVEYORS _____DATE_____
FundCode_____ NRIS Entry Date_____ FACTS Entry Date_____

County: _____ Quad Name: _____ Elevation: _____
Location: T _____ R _____ Sec _____ 1/4 _____ 1/16 _____ Slope: FLAT SLOPING STEEP
NAD 83 Zone:_____ UTM Easting:_____ Northing: _____
Additional UTMs:

Directions to infestation:

Habitat Description/Associated Species:

<u>INVENTORY #1</u>

 # plants: _____ COUNT ESTIMATE Distribution: EVEN CLUMPED LINEAR PATCHY

~Size of Infestation: _____ M^2 ACRES %Cover: _____

Phenology: ROSETTE BOLT BUD FLOWER FRUIT SENESCENT Seeding adults:_____ %

Horizontal Dist. to Water: _____ (ft) Vertical Dist. to Water: _____ (ft)

Boundary mapped? YES NO GPS Unit:_____ Polygon/Track ID: _____

Photos taken? YES NO Camera:_____ Photo ID(s): _____

Comments:

<u>TREATMENT #1</u>

Treatment type: PULL DIG CLIP HEADS HERBICIDE MONITOR NONE REQUIRED OTHER

 # plants treated: _____ COUNT ESTIMATE % Infestation treated: _____

Total time to conduct treatment: _____ MINUTES HOURS

Comments:

SURVEYORS _____ DATE_____

INVENTORY #2

 # plants: _____ COUNT ESTIMATE Distribution: EVEN CLUMPED LINEAR PATCHY

~Size of Infestation: _____ M^2 ACRES %Cover: _____

Phenology: ROSETTE BOLT BUD FLOWER FRUIT SENESCENT Seeding adults:_____ %

Horizontal Dist. to Water: _____ (ft) Vertical Dist. to Water: _____ (ft)

Boundary mapped? YES NO GPS Unit:_____ Polygon/Track ID: _____

Photos taken? YES NO Camera:_____ Photo ID(s): _____

Comments:

TREATMENT #2

Treatment type: PULL DIG CLIP HEADS HERBICIDE MONITOR NONE REQUIRED OTHER

 # plants treated: _____ COUNT ESTIMATE % Infestation treated: _____

Total time to conduct treatment: _____ MINUTES HOURS

Comments:

SURVEYORS _____ DATE_____

INVENTORY #3

 # plants: _____ COUNT ESTIMATE Distribution: EVEN CLUMPED LINEAR PATCHY

~Size of Infestation: _____ M^2 ACRES %Cover: _____

Phenology: ROSETTE BOLT BUD FLOWER FRUIT SENESCENT Seeding adults:_____ %

Horizontal Dist. to Water: _____ (ft) Vertical Dist. to Water: _____ (ft)

Boundary mapped? YES NO GPS Unit:_____ Polygon/Track ID: _____

Photos taken? YES NO Camera:_____ Photo ID(s): _____

Comments:

TREATMENT #3

Treatment type: PULL DIG CLIP HEADS HERBICIDE MONITOR NONE REQUIRED OTHER

 # plants treated: _____ COUNT ESTIMATE % Infestation treated: _____

Total time to conduct treatment: _____ MINUTES HOURS

Comments:

Appendix C: Resource Protection Measures for All Treatment Methods

From the 2010 Terrestrial Invasive Plant Species (TIPS) Treatment Project

Special Status (Threatened, Endangered, Candidate, Forest Sensitive, TRPA[1] Special Interest, Management Indicator, and Migratory Bird Species) Wildlife and Fisheries

1. Where possible, manual weed treatment methods will be utilized within 50 feet of perennial rivers, streams, lakes and other water bodies, including seasonally flooded Stream Environment Zones (SEZs)[2].
2. Chlorsulfuron and Triclopyr will not be applied within 50 feet of perennial rivers, streams, lakes, and other water bodies, including seasonally flooded SEZs.
3. Only dip & clip, wicking & wiping, or spot applications of Glyphosate or Amminopyralid will be used within a zone between 10 to 50 feet from perennial rivers, streams, lakes, seasonally flooded SEZs, and meadows, including adjacent to occupied Lahontan cutthroat trout and Sierra Nevada yellow-legged frog habitats (consistent with Sierra Nevada Forest Plan Amendment (SNFPA) Standard and Guideline #98).
4. Only dip & clip and wicking & wiping applications of Amminopyralid or the aquatic formulation of Glyphosate will be used within 10 feet of perennial rivers, streams, lakes, seasonally flooded SEZs, and meadows.

1. When applying aquatic formulations of herbicides within 50 feet of perennial rivers, streams, lakes and other water bodies, including seasonally flooded SEZs, a surfactant registered by the California Department of Pesticide Regulation for aquatic use will be utilized. Prior to application, the noxious weed coordinator will consult with an aquatic biologist to select a surfactant.
5. Herbicide applications will not take place within six hours of predicted rainfall that has a high probability of producing measurable runoff, or as requested by the Aquatics Biologist, and as found in the label directions. Daily spot weather forecasts will be made available to the applicator.
6. Streams or other surface waters must not be used for washing herbicide application equipment or personnel, unless required in an emergency situation. However, Pesticide Worker Safety Regulations require that water, soap and a towel be available within ¼ mile of field workers and at mixing sites (PRD L30).
7. Treatment crews will use system road or trail stream crossings when wearing contaminated clothing or carrying herbicide mix, within or upstream of LCT occupied habitat. Mixing of herbicides for application will take place more than 100 feet from perennial rivers, streams, lakes and other water bodies, and outside of SEZs.
8. The noxious weed coordinator will inform the project or staff biologists for fisheries and wildlife of new infestations before each treatment season, to verify that treatments would not disturb nesting or denning activity of any special status wildlife species. This information will be used to verify that treatments will not impact Lahontan cutthroat trout, yellow-legged frog, or other species habitat or populations. Limited operating periods for all special status wildlife species will be implemented as necessary, based on the most current wildlife data from pre-project field surveys, or habitat suitability as determined by the project biologist. Most vegetation management activities are prohibited during limited operating periods (LOP), unless surveys confirm that nests are uninhabited (SNFPA 2004).
9. Any incidental sightings of special status fish and wildlife species will be reported to the project or staff biologists. Active nests or dens will be protected according to management direction found in the LTBMU Forest Plan and Sierra Nevada Forest Plan Amendment. Species identification, known locations, and protection procedures will be discussed during a pre-treatment meeting.
10. TIPS occur within 0.25 mile of osprey nests designated as Fallen Leaf Lake 04 and South Lake Tahoe 06. Both nests were active in 2008. A limited operating period of March 1 through August 15 applies, unless surveys confirm that osprey are not nesting.

Hydrology/Water Quality/Soils

11. State and Regional Water Quality Control Board certified Best Management Practices will be implemented. BMPs applied to all Forest projects are outlined in the Water Quality Management for Forest System Lands in California, BMP handbook. See Appendix E for BMPs appropriate for this project and references to the associated design features outlined in section 3.2. Referenced design features provide additional information as to how these BMPs will be applied on this project. Weed infestation size and density criteria will be used to delineate degree of LRWQCB notification and involvement, as below (PRD I5).
    - Where infestations are less than one acre in size and rapid action is required to prevent impending seed production, notify LRWQCB with request for "return in 48-hour" response. The LRWQCB will notify the

[1] Tahoe Regional Planning Agency
[2] Unless otherwise noted, SEZs will be based on the riparian vegetation layer for the Forest, and field checked prior to implementation.

Forest within two days if anything more is needed prior to treatment. If the LRWQCB does not respond, it can be interpreted that the agency does not need anything additional (Bruce Warden, personal communication 3/18/2010).

- Where infestation areas are greater than one acre, or are within 25 feet of a water surface, or infestation areas are from ¼ to 1 acre and so do not require rapid consultation for seed production control, full consultation with LRWQCB is required prior to treatment.
- Additional specifications regarding buffer zones for herbicide applications adjacent to water are given in the preceding section (Design Features 1 through 8).

12. Rehabilitation of disturbed sites will be accomplished using local native plant species. Areas with greater than 0.1 acre of bare soil created by the treatment of TIPS would be evaluated for rehabilitation and revegetation. Temporary Best Management Practices, such as use of rice grass mulch, will be implemented as needed.

Heritage Resources

13. Weed treatments will be coordinated with the Forest Heritage Resource specialist to protect resources such as traditional plant gathering areas, rock art, and historic structures in both Nevada and California. In California, soil disturbance will be limited to one cubic meter per acre, without prior authorization from the heritage resources specialist. (R5 Programmatic Agreement for minimum disturbance activities with State Historic Preservation Officer)
14. Herbicides will not be used to treat TIPS in any Area of Concern or gathering site for the Washoe Tribe without consultation with the Tribe. If weeds become established in the future, the LTBMU will consult with the Tribe on suitable treatment methods.
15. Cultural surveys will be conducted as needed and evaluation will occur on a case by case basis. Existing properties will be considered with each treatment of weeds.

Forest Service Sensitive and Special Interest Plant Species

2. The project or staff botanist will be consulted prior to chemical treatment of new TIPS occurrences or expanding occurrences, to ensure that Threatened, Endangered, Proposed, Candidate, and Sensitive (TEPCS) plant species are not affected.
3. Only wicking & wiping, dip & clip, and non-chemical treatments may take place within 100 feet of Sensitive Plants.

Management Areas and Adjacent Non-Forest Areas

4. If TIPS are discovered in the Grass Lake RNA, approval for treatment will be coordinated with the Pacific Southwest Research Station Director. Refer to FSM 4060.
5. If herbicide use is proposed to control an infestation of TIPS in any Wilderness Area (Desolation, Granite Chief, Mt. Rose), Regional Forester approval will be sought. Refer to FSM 2320.
6. If National Forest property boundary is unclear, then Forest Service personnel will identify property boundary locations before treatment occurs.

Recreation, Special Uses and Recreation Residences

16. The Recreation Department will be consulted prior to treatment near public developed recreation sites, areas of concentrated public use such as trailheads, and publicly and privately operated water systems and facilities, to reduce conflicts with operational needs. Application of herbicides in recreation areas would ideally occur during the week, and on weekends before Memorial Day or after Labor Day.
17. For domestic water system sources, chemical applications shall be avoided within areas where movement into drinking water is possible. For surface water and groundwater sources, a buffer of 50 feet is required from the point of diversion.
18. Prior to herbicide applications within Special Use Permitted areas, LTBMU Special Uses will be contacted for any necessary coordination with permit holders.

Health and Safety

19. Chemicals will be stored in designated storage facilities according to the manufacturer's labels and consistent with SNFPA Standard and Guideline #99.
20. All Personal Protective Equipment (PPE) will be used in accordance with the Material Safety Data Sheet (MSDS) and product label for the specific type of chemical being applied during field operations.
21. Cautionary notice signs regarding herbicide use will be placed at access points to treatment areas prior to initiating treatment. These signs will identify the herbicide(s) to be used, the date of application and date of expiration of the cautionary notice (at least 48 hours after application), name and phone number of Forest contact, and phone number for the County Health Department. They will be removed as soon as possible after the expiration date of the cautionary notice.
22. Herbicides will only be applied by trained and/or certified applicators in accordance with label instructions and applicable Federal and state pesticide laws. Label instructions include constraints on application under certain wind, temperature, precipitation and other weather conditions to eliminate drift, volatilization, leaching, or runoff.

23. Any hazardous materials spills will be reported to the LTBMU Forest Spill Coordinator and treated in accordance with the LTBMU Hazardous Materials Response and Spill Safety Plan (PRD L10). If a spill is threatening or has occurred, and requires emergency containment, staff will call 911, and radio or call Camino Dispatch. Dispatch will notify the appropriate agencies according to the Lake Tahoe Geographic Response Plan (September 2007). If material is determined to be of the type that may be handled by local refuse companies (such as oil and gas), staff will call refuse companies first to see if they are capable of retrieving and disposing. If material is beyond the capability of local refuse companies, staff will call a hazardous waste contractor to arrange retrieval and disposal.
24. Unused herbicides will be disposed of in accordance with the manufacturer's label.
25. Bladder bag and hand tools such as shovel and Pulaski shall be on site when using an open flame to thermally treat TIPS. Although this method does not utilize burning per se, but rather heats to boiling the cells of plants (and not necessarily with an open flame), if any fires result from this treatment, they will be put dead-out before personnel leave the area. Fire-trained personnel will be on site as required.

Herbicides

7. All appropriate laws and regulations governing the use of pesticides, as required by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and Nevada Division of Environmental Protection, and Forest Service policy pertaining to pesticide use, will be followed.
8. Coordination with the appropriate County Agricultural Commissioners will occur, and all required licenses and permits will be obtained prior to any pesticide application.
9. All herbicide spray tanks will be equipped with a pressure gauge to ensure that herbicides are applied with low pressure.
10. For control of drift, all herbicide application will follow EPA approved label directions to control the drift of herbicides during spraying. These directions have specific wind speeds and air temperatures for application of each herbicide. In addition, applicators will utilize droplet size and spray pressure to ensure droplets do not travel outside of the targeted zone.

TIPS

11. Manual, mechanical, or thermal treatment will be utilized in lieu of chemical treatment where effective.
12. Any cut TIPS will be disposed of in a manner to preclude spread of propagative parts or contact with soils likely to encourage re-sprouting. Disposal will be as follows: If no flowers or seeds are present, pull the weed and place it on the ground to dry out if species is not rhizomatous or if there is no potential for re-sprouting. If flowers or seeds are present or there is resprouting potential, pull the weed carefully to prevent seeds from falling and to prevent roots from breaking and leaving segments in the ground, and place in an appropriate container for disposal; or separate the flowers and seed heads from the plant if vegetative reproduction is not a concern and dispose of separately as above.
13. The Forest will continue to inventory and monitor current TIPS populations and use this information to direct activities to reduce the spread and establishment of TIPS.
14. All off-road equipment used for weed control efforts will be washed before moving into the project area to ensure that the equipment is free of soil, seeds, vegetative material, or other debris that could contain or hold seeds of noxious weeds. "Off-road equipment" – in this case, potentially ATVs - does not include vehicles not intended for off-road use. Equipment will be considered clean when visual inspection does not reveal soil, seeds, plant material, or other such debris.
15. When working in known weed-infested areas, the equipment will be cleaned before leaving.
16. Use weed-free mulches and seed sources for revegetation efforts. All activities that require seeding or planting must utilize locally collected native seed sources when possible. Plant and seed material should be collected from or near the project area, from within the same watershed, and at a similar elevation when possible. Seed mixes must be approved by a LTBMU botanist, noxious weed coordinator, or ecologist.
17. Staging areas for equipment, materials, or crews will be prohibited within the actual area of TIPS infestations.

Appendix D. Summary of All Approved Treatment Methods

From the 2010 Terrestrial Invasive Plant Species (TIPS) Treatment Project

Treatment Method	Description
Manual Methods	
Hand Pulling	Pulling or uprooting plants can be effective against some shrubs, tree saplings, and herbaceous invasive plants. Annuals and tap-rooted plants are particularly susceptible to control by hand-pulling. It is not as effective against many perennial invasive plants with deep underground stems and roots that are often left behind to re-sprout. The advantages of pulling include its small ecological impact, minimal damage to neighboring plants, and low (or no) cost for equipment or supplies. The key to effective hand-pulling is to remove as much of the root as possible while minimizing soil disturbance. For many species, any root fragments left behind have the potential to re-sprout, and pulling is not effective on plants with deep and/or easily broken roots.
Pulling Using Tools	Most plant-pulling tools are designed to grip the plant stem and provide the leverage necessary to pull its roots out. Tools vary in their size, weight, and the size of the invasive plant they can extract. Some examples include The Root Talon, which is inexpensive and lightweight, and the Weed Wrench, which is available in a variety of sizes. Both tools can be cumbersome and difficult to carry to remote sites. Both work best on firm ground as opposed to soft, sandy, or muddy substrates.
Clipping	"Clipping" means to cut or remove seed heads and/or fruiting bodies to prevent germination. This method is labor-intensive and effective for small and spotty infestations.
Digging	Using hand tools such as shovels and sharp shooters (shovels with a narrow blade). This is the current method for TIPS treatment.
Mulching	Covering with certified "weed free and plastic free" mulch such as rice straw, grass clippings, wood chips, or newspaper.
Tarping	Placing tarps (visqueen, geocloth or similar material) to shade out weeds or solarize (to injure by long exposure to heat of the sun) them. Tarping is most effective when the soil is damp (Harris 2009).
Mechanical Methods	
Mowing, cutting, brushing, trimming	Mowing and cutting can reduce seed production and restrict invasive plant growth, especially in annuals cut before they flower and set seed. Some species, however, re-sprout vigorously when cut, replacing one or a few stems with many that can quickly flower and set seed. These treatments are used as primary treatments to remove above-ground vegetation in combination with herbicide treatments to prevent re-sprouting, or as follow-up treatments to treat target plants missed by initial herbicide use. Also, mowing and cutting can be used, in conjunction with herbicide treatments, to reduce vegetative materials and to promote vigorous growth in order to decrease the amount of herbicide application needed, and to increase herbicide effectiveness.
Herbicide Methods	
	Herbicides will be applied according to label directions. Herbicide treatments would include use of adjuvants such as surfactants and dyes. Adjuvants are materials that facilitate the activity of herbicides, such as the emulsifying, dispersing, spreading, wetting, or other surface modifying properties of liquids; and dyes assist the applicator in efficiently treating target TIPS and also avoiding contact with herbicide-treated plants by showing which plants have been treated already. Herbicide use must be timed to the growth stage and physiology of the target species.
Hand/ Selective	Treatment of individual plants using land-based equipment to avoid other non-target plants. There is a low likelihood of drift or delivery of herbicides away from treatment sites, because with these methods there should be no drift. These methods are used in sensitive areas, such as near water, to avoid getting any herbicide on the soil or in the water. Hand/Selective methods could be done under more variable conditions than spot spraying or broadcast spraying (Tu et al., 2001). Specific methods include: Dip & clip – similar to cut stump, where cutting tool is first dipped in concentrated herbicide, then used to cut target TIPS to be treated Hack & Squirt, Cut & Squirt, Cut stump – herbicide is applied to cut surfaces to eliminate or greatly reduce re-sprouts; this is an individual target TIPS treatment Wicking & wiping – herbicide is wiped onto the target TIPS with the wick of the applicator
Directed/ spot spray	Accomplished by land-based backpack sprayer with wand with regulated nozzle so that spray is concentrated at the target TIPS
Limited broadcast spray	Hand application with land-based backpack sprayer while wetting more than one target TIPS plant at a time; used for dense occurrences of target TIPS where individual plant application would not be effective.
Other Methods	
Thermal	Thermal methods are based on the systematic increase of plant temperature, reaching diverse thermal death points to eliminate the vegetation. Steaming, flaming, torching, infrared, microwave, and similar methods to be done only when weather conditions permit, such as in a wet season (spring). Equipment for these methods is produced by various companies and may include an open flame. However, flame/fire is not the prerequisite for this method, since temperatures to accomplish cell death are generally 50-70 degrees C (122-158˚ F), significantly below the temperatures attained by some propane burners (e.g. 1,900 C - 3452˚ F). Bladders and hand tools such as shovel and Pulaski are required when using this method (see Design Features). This method is especially useful for small plants, plants in the

Treatment Method	Description
	rosette stage, or seedlings. Larger weeds that are removed using other methods often release the seeds in the seed bank to germinate, which results in a flush of seedlings at that location. Thermal treatment would be a possible choice in treating these seedlings. Fuels burning is not part of this project. Thermal would not be used within wilderness.

Summary of herbicides approved for use on LTBMU

Herbicide Active Ingredient	Maximum Application Rate (pounds/acre)
Aminopyralid	0 .25 lbs (ae)
Chlorsulfuron	0.14 lbs/acre (ai)
Glyphosate	2.7 lbs/acre (ae)
Aminopyralid and Triclopyr premix	0.11 lbs (ae) Aminopyralid + 1.12 lbs (ae) Triclopyr acid

Appendix E. LTBMU Management Requirements for Invasive Plants

The following table outlines the management requirements for both invasive species known and not known to occur on LTBMU. If a new invasive occurrence is found on LTBMU the following table defines what reporting and treatment actions are required. Species of high and medium priority or species not previously documented on LTBMU should be reported by; a) collecting polygonal GPS and GIS data, b) filling out a site form and treatment form and, c) treating the occurrence if it is under 100 plants and time allows. Low priority species should only be mapped with polygonal GPS and GIS data, unless it occurs within a project area.

Scientific Name	Common Name	2015 LTBMU Priority	Known on LTBMU?	Map	Treat
Species actively reported, mapped and treated on LTBMU					
Acroptilon repens	Russian knapweed	Medium	Yes	X	X
Cardaria draba	heart-podded hoary cress; whitetop	Medium	Yes	X	X
Cardaria pubescens	globe-podded hoary cress; hairy whitetop	Medium	Yes	X	X
Carduus nutans	musk thistle	High	Yes	X	X
Centaurea diffusa	diffuse knapweed	High	Yes	X	X
Centaurea maculosa	spotted knapweed	High	Yes	X	X
Centaurea solstitialis	yellow starthistle	Medium	Yes	X	X
Centaurea virgata ssp. squarrosa	squarrose knapweed	High	Yes	X	X
Chondrilla juncea	rush skeletonweed	High	Yes	X	X
Cirsium arvense	Canada thistle	High	Yes	X	X
Conium maculatum	poison hemlock	Low	Yes	X	X
Cytisus scoparius	Scotch broom	Medium	Yes	X	X
Hypericum perforatum	St. Johnswort; Klamathweed	Medium	Yes	X	O
Isatis tinctoria	Dyer's woad	High	Yes	X	X
Lepidium latifolium	tall whitetop; perennial pepperweed	High	Yes	X	X
Leucanthemum vulgare	oxeye daisy	Low	Yes	X	O
Linaria genistifolia spp. dalmatica	Dalmatian toadflax	High	Yes	X	X
Linaria vulgaris	yellow toadflax; butter & eggs	High	Yes	X	X
Onorpordum acanthium ssp. acanthium	Scotch thistle	High	Yes	X	X
Potentilla recta	sulfur cinquefoil	Medium	Yes	X	X
Rubus armeniacus	Himalaya blackberry	Medium	Yes	X	X
Lower priority species managed on LTBMU but not always treated These are not actively reported, mapped or treated unless they occur within a project area.					
Cirsium vulgare	bull thistle	Low	Yes	O	O
Bromus tectorum	cheat grass	Low	Yes	O	O
Myriophyllum spicatum	Eurasian watermilfoil	N/A	Yes	O	O
Species Not Currently Known on LTBMU If any of the following species are found, immediately notify the Forest Botanist. Collect detailed geospatial (GIS) and infestation information					
Ailanthus altissima	tree of heaven	Medium	No	X	X
Centaurea calcitrapa	purple starthistle; red	Low	No	X	X

Scientific Name	Common Name	2015 LTBMU Priority	Known on LTBMU?	Map	Treat
Species actively reported, mapped and treated on LTBMU					
	starthistle				
Dittrichia graveolens	stinkwort	Low	No	X	X
Dipsacus fullonum	teasel; Fuller's teasel	Low	Yes	X	X
Elymus caput-medusae	medusahead	High	No	X	X
Elymus repense	quackgrass	N/A	No	X	X
Hydrilla verticillata	hydrilla; waterthyme	N/A	No	X	X
Lythrum salicaria	purple loosestrife	High	No	X	X
Potamogeton crispus	curlyleaf pondweed	N/A	No	X	X
Tamarix chinensis, T. ramosissima, & T. parvifolia	tamarisk; saltcedar	High	No	X	X

X=Required**, O**=Required in project areas and sensitive habitats
LTBMU: High—Species that have a large ecological impact or invasive potential; species that are easily controlled. Medium—Species that have a moderate ecological impact or invasive potential; species that may be difficult to control. Low—Species that have a low ecological impact or invasive potential; species that require substantial effort to control. N/A—species not evaluated.