Appendix E. Examples of Species Treatment Prescriptions

Examples of species treatment prescriptions: This is presented to give the reader an example of what would be proposed for major species of concern. A prescription for each invasive species will be developed for the analysis.

Taprooted Biennials or Perennials				
Spotted knapweed (CEBI2) **Diffuse knapweed** (CEDI) **Meadow knapweed** (CEDE5) Tap rooted Biennials or Perennials	*Centaurea biebersteinii* *C. diffusa* *C. jacea x nigra* *(C. jacea;* *C. nigra*	-Hand pull or dig small, easily accessible populations. Multiple entries per year are required. Pull bolting plants prior to seed set. Bag flowering plants and dispose of properly. Success will depend on consistent labor for each growing season until plants are eradicated. - Mowing is possible, but timing is critical. - These treatments may take up to ten years due to long term seed viability. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate with desirable species at high priority sites when possible.	**Upland**: 1 - Clopyralid 2 - Picloram **Riparian/High Water Table/Porous Soils**: Aquatic labeled Glyphosate (will require the most repeated treatments)	***Drier upland sites (Road, Quarries & Upland Forest/Rangeland):*** Boom broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. ***Roads, Recreation Sites, Special Management Areas, TES plant & wildlife sites, & any sites where more selective treatment is desired:*** Spot spray to target individual plants. ***Wet Meadows, Riparian:*** Wick applications with appropriate chemicals to target specific plants. ***Timing:*** Preferred treatment is spring before bud stage or early summer so use less herbicide. ***Notes:*** Yearly revisits will be necessary; the number of which is dependent on the chemical used and the seedbank.

Rhizomatous Perennials				
Dalmation toadflax (LIGEDA) **Butter 'n' eggs** (LIVU) Rhizomatous Perennials	*Linaria genistifolia ssp.dalmatica* *Linaria vulgaris*	-Hand pull or dig small, easily accessible populations. Multiple entries per year are required. Plants can be left on site, but may reduce germination of desirable species due to mulching effect. Success will depend on consistent labor for each growing season until plants are eradicated. -Cutting stands in spring or early summer will eliminate plant reproduction, but not the infestation. - These treatments may take up to ten years due to long term seed viability. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate with desirable species at high priority sites when possible. Plant communities in good condition may recover without replanting.	**Upland:** 1. Picloram 2. Chlorosulfuron 3. Imazapic (Use in native grass stands; fall application only) **Riparian/High Water Table/Porous Soils:** Aquatic labeled Glyphosate	***Drier upland sites (Road, Quarries & Upland Forest/ Rangeland):*** Boom broadcast spray in dense cover, where dominant plant community is non-native. However, this species tends to be scattered, so spot spraying (backpack or on OHV) is usually more appropriate. ***Timing:*** Apply during active growth in spring before bloom or in late summer or fall during re-growth. ***Notes:*** Revisits will be necessary; the number of which is dependent on the chemical used and the seedbank. This control could vary by site. Even after three years of consecutive treatments, control may range widely.

Rhizomatous Perennials				
Leafy spurge (EUES) Rhizomatous perennial	*Euphorbia esula*	-Requires combination of techniques for successful control. Multiple entries per year are required. - Repeated mowing or hand cutting can control seed production but must be used with herbicides for adequate control of the site. - Repeated mowing could reduce competitive ability of desirable species. - Some success has been found with using biological control (flea beetle) with fall herbicide treatments. - Grazing when managed carefully (timing, livestock species, etc.) may help control leafy spurge (***see Common Control Measures***).	**Upland:** 1. Picloram 2. Glyphosate 3. Imazapic **Riparian/High Water Table/Porous Soils:** Aquatic labeled Glyphosate	***Drier upland sites (Road, Quarries & Upland Forest/Rangeland):*** Spot spray whenever possible, Boom broadcast spray in dense cover, where dominant plant community is non-native and leafy spurge population is large.. ***Moist to Wet Meadows (high water table) and, Riparian:*** Wick applications with appropriate chemicals to target specific plants. ***Timing:*** ***Notes:***

Rhizomatous Perennials			
Russian knapweed (ACRE3) Perennial with adventitious shoots	*Acroptilon repens*	- Hand-pulling Russian knapweed is very difficult, but can be effective for small infestations during the establishment year only. Pull plants when soil is wet and before seeds have formed. Remove all plant parts from site. - Cutting or mowing reduces the current year growth and will eliminate seed production, but will not kill the roots of this species. Cut/mow several times annually to control existing top growth; re-emerging plants will be smaller in size and lower in vigor. Must be frequently repeated (at least 3 times/year – spring, summer, and fall). - Discing or plowing produces broken root fragments that spread quickly and resprout. - Russian knapweed is poisonous to horses. Livestock will graze, but it is usually avoided. Grazing provides only a negligible effect on vigor and viability of root system. - In most situations, Russian knapweed cannot be effectively managed by herbicides alone. - Lasting control requires an integration of techniques (mechanical, manual, chemical, and possibly biological control), proper land management, and revegetation to out compete the thistle (The Nature Conservancy 1998). - Competitive plantings are usually necessary.	**Upland:** 1. Chlorosulfuron 2. Clopyralid 3. Clopyralid + Triclopyr (Redeem) 4. Glyphosate, Imazapic, or Metsulfuron **Riparian/High Water Table/Porous Soils:** Aquatic labeled Glyphosate ***Drier upland sites (Road, Quarries & Upland Forest/Rangeland):*** Boom broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. ***Sensitive Sites or Special Management Areas where more selective treatment is desired:*** Spot spray to target individual plants. ***Moist to Wet meadows (high water table) and wetlands/riparian***: Wick application with manual follow-up treatments. ***Timing***:

Annuasl				
Yellow starthistle (CESO3) Annual	*Centaurea solstitialis*	- Hand-pull small patches or maintenance programs where plants are sporadically located. Remove all above ground material (leaving even a two inch piece of stem can result in recovery if leaves and buds are still attached at base of plant. Pull after bolted but before it produces viable seed. On relatively large populations of < 40 acres, start removing plants at outward edge of population and work toward interior (Bradley Method). - Mowing can be useful but timing is critical (before viable seed production, but too early can result in rapid regrowth), - In areas with many non-target species, early summer tillage will control yellow starthistle provided roots are detached from the shoots; repeated cultivation will be necessary in same season when rainfall stimulates germination. - Mazzu (2005) discusses biological control, prescribed burning, and grazing. Timing and intensity of grazing and type of grazing animal needs to be considered. Prescribed burning may be best used after herbicide treatment. Two biological control insects have reduced seed production by up to 76% in California. - Revegetate high priority sites if needed with desirable species if possible.	**Upland**: 1 - Clopyralid 2 - Picloram 3 - Glyphosate **Riparian/High Water Table/Porous Soils**:	***Drier upland sites (Road, Quarries & Upland Forest/Rangeland):*** Boom broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. ***Sensitive Sites (e.g., adjacent to moist meadows or riparian areas) or Special Management Areas where more selective treatment is desired:*** Spot spray or wick application to target individual plants. ***Timing***: ***Notes***: Yearly revisits will be necessary; the number of which is dependent on the chemical used and the seedbank.