



John Wayne Pioneer Trail Noxious Weed Treatment and Vegetation Management Report

Pursuant to 2016 Proviso ESHB2376 Section 303 for operating budget subsection (4)

December 20, 2016

Introduction, Purpose and Scope of Report

The 2016 Washington State Legislature directed Washington State Parks to spend no less than \$100,000 of its 2015-17 operating budget and prepare an interim report back to the Legislature pursuant to the following budget proviso:

***Proviso - ESHB2376 Section 303 (4)...**\$100,000 of the parks renewal and stewardship account—state appropriation is provided solely for conducting noxious weed treatment and vegetation management on the John Wayne pioneer trail to protect adjacent land owners from noxious weeds with priority in areas where there is adjacent agricultural use. Control of noxious weeds must follow an integrated pest management approach including the use of biological, chemical, and mechanical control prescriptions in accordance with chapter 17.15 RCW and consistent with state and county weed board requirements. The commission must report on its progress in meeting this requirement to the appropriate committees of the legislature by September 30, 2016.*

This report is in compliance with that budget proviso requirement.

While not stated explicitly in the proviso, State Parks assumed that the legislature intended for the agency to focus its efforts exclusively on the portion of the John Wayne Pioneer Trail (JWPT – aka Iron Horse State Park Trail) east of the Columbia River that has been under agency management since 2006. That is an approximately 105-mile corridor along the old Milwaukee Road roadbed between the town of Lind and the Idaho Border. A map of State Parks rail-trails in Eastern Washington, which contains the segment discussed in this report, is shown in Appendix A.

Work Accomplished Through September 30, 2016

State Parks has taken the following actions consistent with the terms of the proviso:

- Hired a trail technician for this trail segment whose functions include inventorying locations of noxious weed infestations, communicating with adjacent property owners, and overseeing weed management and abatement efforts. Initially a 5-month position, the Director has funded the position until September 2017 at which time the local park area management will determine whether the position stays as a trail technician or is converted to a park ranger position focused on trail management.
- Provided equipment, materials and supplies to the trail technician to support his efforts.

- Carried out an initial noxious weed survey of the entire trail segment, identifying key locations of infestations and associated priority areas for control efforts.
- Developed an Integrated Weed Management Plan for the segment (see attached Appendix B).
- Contracted for sterilant application with a local contractor for 20 miles of the trail. Work started at milepost 1904 (Ewan) through milepost 1924 (Benge-Ritzville Road). Milepost markers used are the original railroad designations derived from miles to Milwaukie, WI. This work was done in April before vegetation emerged.
- Engaged the services of a 6-member Washington Conservation Corps (WCC) crew to carry out weed control efforts. Most of this work occurred on the same stretch as the sterilant application (milepost 1904 to 1924) as well as treatments around Malden and Pine City. This work consisted mostly of using backpack sprayers to individually spray plants in the early growth stages prior to flowering in May and June.

As a result of these efforts, State Parks has a clear idea of the magnitude of the weed problem, has identified priority areas that need attention, and is preparing for a concentrated weed control effort in the spring of 2017 when the growing season begins.

Below is an approximate breakdown of money spent through September.

Trail Technician - Surveying for weeds and overseeing spraying and mechanical weed removal	\$8,900
Technician Vehicle and Equipment	\$6,600
Sterilant Application - Spraying by contractor to prevent weeds growing on trail surface	\$9,900
Washington Conservation Corp (WCC) - backpack sprayers and weed trimmers	\$23,300
Herbicide and Equipment for WCC crew	\$5,400
TOTAL	\$54,100

Work after September 30: Underway and Planned

In October and November vegetation mowing took place on the trail to prepare for the 2017 sterilant application – this work occurred in the vicinity of Pine City and Rosalia. Old vegetation was cut to allow sterilant sprays to settle on the surface. In January, a Request For Proposals will be issued to solicit bids for sterilant work in 2017 with the goal of the remainder of the proviso-directed money put into staff and staff support, sterilant purchase and application, and WCC crew work between March and June.

Depending on the bidding environment, State Parks expects to spend between \$30,000 and \$40,000 on a contract to spray weeds along the 105-mile corridor in 2017. Other expenses will be incurred for staff time, equipment, supplies and WCC work. Staff will continue to solicit input from adjacent ranchers in addressing weed issues. Combined, our sterilant application and other spray work cost approximately \$300 - \$400 per mile of trail this last year. But there are variables that could increase or decrease that figure in future years. Development (improved surfacing), increased trail use and consistent programmatic annual maintenance may reduce this per mile weed control cost over time. On the other hand, the types and intensity of infestation could increase costs. Finally, the relationship between

neighbors could increase or decrease public expenses, depending on the type of infestation and the agreed upon responsibilities for treatment by the parties.

State Parks will carry out noxious weed control within the prism of the trail as well as weeds off to the side of the trail surface but within the state-owned right of way. There is a short growing season in this part of the state, so it was difficult to both identify and manage weeds in the first year's effort. The agency is prepared now to build on that knowledge base it has gained. This work will be more targeted and efficient this coming year. The full investment in proviso-related expenditures is projected to be in excess of \$100K.

When deciding priorities for directing resources for weed control, State Parks has used a combination of weed class, county designation and impact to adjacent agricultural and natural resources. The first priority is to address weeds where the agency is legally required to do so (Class A and county designated Class B). State Parks has also taken into account complaints and potential impacts to neighboring properties. Many weeds that are listed as Class C (not legally required for control) may have the ability to spread to or from neighboring properties and Parks has included some of these in assessments and treatments depending on the needs of the sites.

To better understand the classification system for noxious weeds, the information below is provided and taken directly from The Washington State Noxious Weed Control Board website:

Class A Weeds

Class A weeds are mostly newcomers to Washington, and are generally rare. The goal is to completely eradicate them before they gain a foothold. Landowners are required to completely eradicate Class A weeds. (Eradicating weeds means getting rid of the plants altogether, including plant roots.)

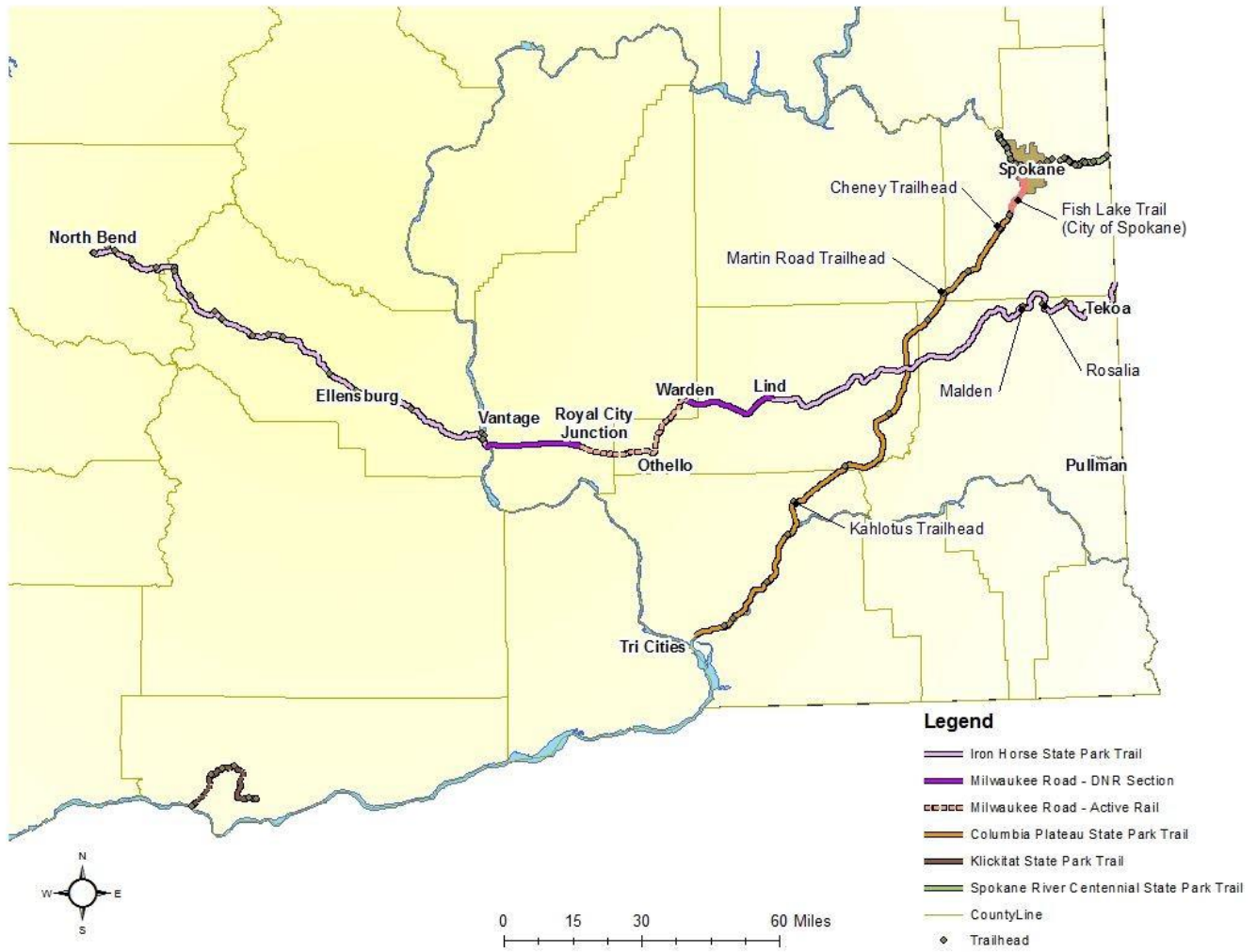
Class B Weeds

Class B weeds are those that are widespread in some parts of the state, but limited or absent in other parts of the state. The goal with Class B weeds is to prevent them from spreading into new areas, and to contain or reduce their population in already infested areas. The State Weed Board designates Class B noxious weeds for control in those parts of the state where they are limited or absent. Additionally, a County Weed Board may select a Class B non-designate for control if it is considered a local priority.

Class C Weeds

Class C weeds are often widespread, or are of special interest to the agricultural industry. The State Weed Board does not require control of Class C noxious weeds. The State and many County Weed Boards provide information on identification and best management practices for these species. A County Weed Board may require landowners to control a Class C weed if it poses a threat to agriculture or natural resources.

Appendix A: State Parks Rail-Trails in Eastern Washington



2016 Proviso ESHB2376 Section 303

Appendix B:

INTEGRATED WEED MANAGEMENT PLAN

John Wayne Pioneer Trail (JWPT) (aka) Iron Horse State Park Trail

Lind to Idaho Border Section

2016



PREPARED BY
Andrew Fielding
State Parks Environmental Planner

I. INTRODUCTION

Noxious weeds threaten Washington's irreplaceable resources. These non-native, invasive species threaten our parks, wildlife, property values, public health and safety, waterways, rangelands, and general ecological health and diversity of our native ecosystems. While the economic efforts of noxious weeds on agriculture are enormous, their effects on the natural resources and ecological diversity of the state compound those losses. Noxious weed infestations are the second leading cause of losses in biological diversity. These resources, once destroyed, are irreplaceable.

In recognition of the negative impacts of noxious weeds, Washington State has a long history of noxious weed law. Chapter 17.10 RCW, the current weed control statute, requires private and public landowners to control noxious weeds on their property. Washington's noxious weed list is adopted annually and is found in WAC 16-750. Some species are mandated for control at the state level, while others are mandated for control by individual counties. This plan provides a framework to control those plant species listed as "noxious" within the subject area.

Property Description

John Wayne Pioneer Trail (JWPT), also known as Iron Horse State Park Trail, is located along roadbed of the old *Milwaukee Road* rail corridor from Rattlesnake Lake in King County to the Idaho border. This plan covers only the eastern portion of the JWPT managed by Washington State Parks since 2006, from near the town of Lind to the Idaho border, including portions of Grant, Adam, Whitman and Spokane Counties. The climate is mostly arid and dry and the vegetation is a mix of shrub step, agricultural and pine.

II. INTEGRATED WEED MANAGEMENT APPROACH

A. General Management Philosophy

Weed control is part of property management. This plan is based on the desired plant species and communities, rather than on simply eliminating weeds. Preventive programs will be implemented to keep the park free of species that are not yet established there but which are known to be pests elsewhere in the area. Priorities are set to reduce or eradicate weeds that have already established on the property, according to their actual and potential impacts on the land management goals for the property, and according to the ability to control them now versus later. Actions will be taken only when careful consideration indicates leaving the weed unchecked would result in more damage than controlling it with best available methods.

The plan follows the adaptive management approach. First, weed species are identified through inventory of the property and by gathering information from other sources. Second, land management goals and weed management objectives are established and recorded for the property. Third, priorities are assigned to the weed species and weed patches based on legal requirements, distribution, severity of their impacts, and ability to control them. Fourth, methods are considered for controlling them or otherwise diminishing their impacts. Fifth, Integrated Weed Management (IWM) plans are developed based on this information. Sixth, the IWM plans are implemented. Seventh, the results of the management actions are monitored and evaluated in light of weed management objectives for the park. Finally, this information is used to modify and improve weed management objectives, control priorities, and IWM plans, thereby starting the cycle again. The premise behind this weed management plan is that a structured, logical approach to weed management, based on the best available information, is cheaper and more effective than an ad-hoc approach where one deals with weed problems as they arise.

B. Inventory of Weed Species

Several state-listed noxious weeds are known to occur on the JWPT (Table 1). This list will be updated as more details are gathered. It is not a comprehensive list, as some Class C weeds are not considered critical for treatment.

Table 1. Noxious Weeds for JWPT

Common Name	Scientific Name	Status*
Spotted knapweed	<i>Centaurea maculosa</i>	B
Diffuse knapweed	<i>Centaurea diffusa</i>	B
Kochia	<i>Kochia Scoparia</i>	B
Bull thistle	<i>Cirsium vulgare</i>	C
Canada Thistle	<i>Cirsium arvense</i>	C/
Russian Thistle	<i>Salsola iberica Sennen</i>	N/A
Dalmation toadflax	<i>Linaria dalmatica</i>	B
Russian knapweed	<i>Centaurea repens</i>	B
Perennial pepperweed	<i>Lepidium latifolium</i>	B
Puncturevine	<i>Tribulus terrestris</i>	B
Yellow starthistle	<i>Centaurea solstitialis</i>	B
Scotch thistle	<i>Onopordum acanthium</i>	B
Hoary cress	<i>Cardaria draba</i>	C
Common tansy	<i>Tanacetum vulgare</i>	C

*State Class of Noxious Weed

C. Priorities for Weed Management

Priorities are set with the goals of complying with state law, protecting resources, and minimizing the total, long-term workload. Therefore, highest priority is given to preventing new infestations and controlling existing infestations that are the most limited in size, fastest growing, most disruptive, and most likely to affect the most highly valued area(s) of the park. Additional considerations include difficulty of control, giving higher priority to infestations that are most controllable with available technology and resources.

Prevention

The most important weed management action is to prevent weeds from becoming established. Prevention activities can take several forms. Identifying and minimizing pathways for new weed introductions is critical. For example, the use of certified seed can minimize the risk of introducing weeds during a restoration project. Regular surveys to identify new infestations before they have a chance to spread are also crucial. As part of this plan, park staff and volunteers will be trained to identify noxious weeds that are likely to occur at the park. In addition, efforts will be made to establish desirable, native vegetation whenever possible. In the absence of bare ground and disturbance, undesirable weeds are less likely to establish.

Weed Species Priorities

In this plan, several criteria were used to set weed management priorities.

- ◆ *State requirements.* Species that are Class A or Class B-designates, or are county-selected for control are given the highest priority. Sometimes a weed will be designated for control by a Washington State Parks official and will be thereby listed as “agency.”
- ◆ *Distribution.* Higher priority is given to species that have very limited distribution in the park. In these instances, there is an opportunity to eradicate a species before it becomes a widespread problem.
- ◆ *Potential impact to priority resources.* The classification and management plan for Lincoln Rock identified two priority species and habitats. Priority is given to managing noxious weeds that directly threaten these resources.
- ◆ *Potential to impact adjacent agricultural lands.* Staff will work to identify areas where weeds could impact agricultural uses adjacent to the trail corridor.
- ◆ *Likelihood of control with existing technology and resources.* Higher priority is given to species that can realistically be controlled with existing techniques, funding, and staff levels.

Staff will use a range of options on the trail including;

- ◆ Mowing and sterilant treatments of the trail surface
- ◆ Backpack spraying utilizing Washington Conservation Crews
- ◆ Contract spraying services
- ◆ Park staff
- ◆ Washington Conservation Corps Crew work
- ◆ Biological control in cooperation with APHIS USDA (Spokane)
- ◆ Use of soil bacteria *P. fluorescens* ACK55 for treatment of Cheat Grass

The following pages include specific control plans for priority weed species. Control of other noxious weeds at the park will occur where they can impact adjacent lands or the opportunity exists to stop smaller infestations before spreading.

Control methods are a combination of common industry standards, regulatory use of herbicides, and recommendations from the Pacific Northwest Weed Management Handbook developed by agricultural experiment stations and extension services of Oregon, Idaho, and Washington.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Centaurea diffusa Lam. Common name: Diffuse knapweed

- A. PRIORITY:** *Diffuse knapweed is on the CLASS B noxious weed list.*
- B. DESCRIPTION:** Diffuse knapweed is a diffusely branched annual or short-lived perennial plant that spreads by seed. It is 1-2 feet tall. Stems are rough to the touch. In Washington, Diffuse knapweed grows in pastures, on rangelands and along roadsides. The plant flowers from July to September.
- C. CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. DAMAGE AND THREATS:** Diffuse knapweed is an aggressive plant that can replace desirable native vegetation, posing a threat to biodiversity. Because of its low palatability, it is also a threat to forage production in pastures and dry land grass hay. It makes recreational areas less functional.
- E. GOALS:** The goal is to prevent the spread of Diffuse knapweed and to attempt to eradicate the weed.
- F. MANAGEMENT OPTIONS:** Pulling is quite effective on bolting and mature plants. Mowing is possibly not a practical option because of the suppressive effects it would probably have on native and desirable species and because of the rough areas of infestation. Where grass cover is adequate, Diffuse knapweed may be controlled using herbicides and fertilizer. Fertilizing in November or spring will encourage native and appropriate species enough to make the habitat less desirable for Diffuse knapweed. Redeem may be used over the whole area and be safe to trees when the weeds are at rosette or bolting stage. Using Tordon in core areas well away from trees will produce desirable effects. Spraying will not be done when temperature is over 85 degrees F. because of vaporization and drift possibilities. In fall or spring, seeding with vegetation such as Sherman bluegrass, Idaho fescue, and blue bunch wheatgrass is always an option if the desirable species get too thin to be competitive. Evaluation in fall for follow-up treatments is necessary.
- G. ACTIONS PLANNED:** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. COST ESTIMATES:** The average costs per year for control of weeds at JWPT Trail is being established.
- I. RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Cirsium arvense Common name: **Canada thistle**

- A. PRIORITY:** *Canada thistle is on the CLASS C noxious weed list for the state.*
- B. DESCRIPTION:** Canada thistle is an erect, perennial, rhizomatous thistle distinguished from all other thistles by 1) creeping horizontal lateral roots; 2) dense clonal growth; and 3) small dioecious (male and female flowers on separate plants) flower heads. It is common on roadsides, in old fields, croplands, and pastures. Canada thistle is shade intolerant. While it grows along the edges of woods (both deciduous and coniferous), it is rarely found within forests. The plant grows on all but waterlogged, poorly aerated soils, including clay, clay loam, silt loam, sandy loam, sandy clay, sand dunes, gravel, limestone, and chalk, but not peat. Although Canada thistle flowers June-August and produces some seed, it spreads primarily by vegetative growth of its roots. The root system can be extensive, growing horizontally over 20 feet in one season.
- C. CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. DAMAGE AND THREATS:** Canada thistle threatens natural communities by directly competing with and displacing native vegetation, decreasing species diversity, and changing the structure and composition of some habitats. Canada thistle presents an economic threat to farmers and ranchers. Infestations reduce crop yield through competition for water, nutrients and minerals and interfere with harvest. In addition to reducing forage and pasture production, Canada thistle may scratch grazing animals, resulting in small infections. It is also quite undesirable in park areas, making public lands less usable.
- E. GOALS:** The goal is to prevent the spread of Canada thistle.
- F. MANAGEMENT OPTIONS:** Mechanical control methods are generally ineffective because of Canada thistle's extensive root system. Mowing does not kill Canada thistle unless done repeatedly for several years. Mowing two to three times a year can prevent seed set, but mowing once a year is ineffective. In order to prevent production of viable seeds, stems must be mown before the flowers open or when they have been open for only a few days, or viable seed will be produced. Tilling can reduce or eliminate *Cirsium arvense*, if conducted repeatedly for several years. Grazing is the least effective control method for Canada thistle. Cattle and horses avoid the plant and browse on competing vegetation, which results in gradual dominance by Canada thistle. Canada thistle's deep, well-developed root systems make it resilient to most control methods, including herbicides. Several herbicides are labeled for use on Canada thistle. Clopyralid (Stinger) is a relatively selective post-emergence herbicide that is especially effective against members of the sunflower, buckwheat and pea families. It should be applied to actively growing Canada thistle plants after the basal leaves emerge but before bud stage. Clopyralid may have limited soil residual and is most effective on short (young) thistle shoots. Spot spraying with glyphosate (Roundup, Rodeo), a non-selective systemic herbicide that kills all vegetation green at the time of application. It has little or no soil residual. Glyphosate should be applied to actively growing plants that are past the bud stage. Fall is the best season for applying glyphosate. Treating thistles immediately before the first frost should be avoided. Chlorsulfuron (Telar) is a post-emergent herbicide that primarily suppresses re-growth of Canada thistle, and secondarily reduces the number of root buds and plant weight. Dicamba, 2,4-D, and triclopyr + clopyralid can also be used on Canada thistle. For all herbicides, repeated treatments may be required. Consult the Chelan County weed board. At least seven insect species have been intentionally or unintentionally released for Canada thistle control in North America; a few of them cause conspicuous damage. However, biocontrol currently provides little or no control of Canada thistle populations. In Washington, four insects are established on Canada thistle. Larvae of the weevil *Ceutorhynchus litura* feed on stems. The stem-galling fly *Urophora cardui* attacks thistle shoots but has little impact. The seed weevil *Rhinocyllus conicus* was introduced to control musk thistle (*Carduus nutans*) and other related *Carduus* and *Cirsium* thistles and lays eggs in Canada thistle flowerheads. The weevil *Larinus planus* is a seed head feeder but it has had little impact on Canada thistle. A combination of biocontrol agents, or of biocontrol agents and herbicides, may provide better control of Canada thistle than any single agent.

- G. ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. COST ESTIMATES:** The average costs per year for control of weeds at JWPT Trail is being established.
- I. RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Salsola iberica Sennen Common name: **Russian thistle**

- A. PRIORITY:** *Russian thistle is not on the state or county noxious weed list.*
- B. DESCRIPTION:** Russian thistle is a rounded, bushy, much branched annual, ½ to 3 feet tall, reproducing by seed. Stems are usually red or purple striped. Leaves are alternate; the first are long, string-like and soft, with later leaves short, scale-like and tipped with stiff spine. Inconspicuous green flowers are borne in axils of upper leaves, each flower accompanied by a pair of spiny bracts. Seeds are spread as mature plants break off at ground level and are scattered by the wind as tumbleweeds. Rapid germination and seedling establishment occur after only brief and limited amounts of precipitation. It flourishes in drier regions and is well adapted to cultivated dry-land agriculture and disturbed wastelands and overgrazed rangeland.
- C. CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT Trail. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. DAMAGE AND THREATS:** Russian thistle is an aggressive plant that can replace desirable native vegetation, posing a threat to biodiversity. Because of its low palatability, it is also a threat to forage production in pastures and dry land grass hay. It makes recreational areas less functional.
- E. GOALS:** The goal is to prevent the spread of Russian thistle.
- F. MANAGEMENT OPTIONS:** Pulling is quite effective on young to middle age plants. Mowing is possibly not a practical option in this location because of the suppressive effects it would probably have on native and desirable species. Where grass cover is adequate, Russian thistle may be controlled using herbicides and fertilizer. Fertilizing in November or spring will encourage native and appropriate species enough to make the habitat less desirable for Russian thistle. In early spring or late fall, Diuron may be applied in likely areas as road, park lot shoulders, and other disturbed soils as a pre-emergent application. In early summer when plants are 2-3 inches tall, they may be sprayed using 1 quart of Vengence per acre and ½ ounce of Escort per acre with Syltac will get desirable results. Spraying will not be done when temperature is over 85 degrees F. because of vaporization and drift possibilities. In fall or spring, seeding with native vegetation such as Sherman bluegrass, Idaho fescue, and blue bunch wheatgrass is always an option if the desirable species get too thin to be competitive. Evaluation of fall follow-up treatments is necessary.
- G. ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. COST ESTIMATES:** The average costs per year for control of weeds at JWPT Trail is being established.
- I. RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Linaria dalmatica ssp. Dalmatica Common name: **Dalmatian toadflax**

- A. **PRIORITY:** *Dalmatian toadflax is on the CLASS B noxious weed list for the state.*
- B. **DESCRIPTION:** Dalmatian Toadflax is a perennial that is becoming increasingly common in any open area of Washington. The weeds are about three feet tall with dense, waxy leaves, and yellow flowers. Reproduction is seed and underground rootstalks. The plant can re-sprout from root and stem fragments. Habitat includes rangelands, roadsides, and other open areas.
- C. **CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT Trail. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. **DAMAGE AND THREATS:** The species is so aggressive that just a few or even single plants are seldom seen that way very long. The weeds are frequently in sizeable colonies. This weed is expected to surpass knapweed in population and nuisance.
- E. **GOALS:** The goal is to prevent the spread of Dalmatian toadflax and to attempt to eradicate the weed.
- F. **MANAGEMENT OPTIONS:** The plants are extremely difficult to dig up due to their high rhizome densities. Care must be taken with any mechanical removal methods, since improper disposal of plant material can spread the species further. While it *may* be possible to dig out a newly established plant, removal by digging is not recommended. Repeated mowing's may set back toadflax populations. However, stem fragments can potentially root, so this method has limited applicability. Foliar applications should be made when the plants are actively growing and most have reached the flowering stage of growth. Serial mowing can be effective and it may be particularly helpful if dealing with other noxious weeds in the same locale. Since previously infested sites are more susceptible to re-invasion by noxious weeds, bare areas should be replanted with a rapidly growing, relatively aggressive ground cover (but a species mix that will eventually yield to colonization by native plants). A mix of native grasses with Sherman bluegrass, Idaho fescue, and blue bunch wheatgrass is a recommended mix.
- G. **ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT Trail State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. **COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. **RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Kochia scoparia (L.) Schrad. Common name: Kochia

- A. **PRIORITY:** *Kochia is on the CLASS B noxious weed list for the state.*
- B. **DESCRIPTION:** Kochia is a many-branched erect annual 1-6 feet tall that is tap-rooted. Stems are round and covered with soft hair and are often red-tinged. Leaves are ½ -2 inches long and are alternate with narrow lance shapes. Inconspicuous flowers form dense spikes in leaf axils and are usually surrounded by clusters of long hairs. Flowering and seed production runs from July through October with SEVERAL FLUSHES OF SEEDLINGS PER SEASON. Kochia is common in cultivated fields, gardens, roadsides, ditchbanks and waste areas. Livestock and other animals graze on it and can feed on it up to 40%. Kochia can be made into silage. The plant is rich in protein and carbohydrates, but can contain too many nitrates—even to the toxic level. This plant is drought resistant, but it does well under irrigation. Old plants spread seeds while tumbling. This weed is going to be common everywhere.
- C. **CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT Trail. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. **DAMAGE AND THREATS:** Kochia is an extremely aggressive plant that can replace desirable native vegetation, posing a threat to biodiversity. Because of its moderate palatability, it is also forage. It makes recreational areas less functional.
- E. **GOALS:** The goal is to prevent the spread of Kochia and to attempt to eradicate the weed.
- F. **MANAGEMENT OPTION:** Pulling is quite effective on bolting and mature plants before viable seed is set. Mowing and grazing will not stop seed production or kill the plant, which will resprout from the stem. Cultivation or hoeing will kill Kochia. Shallow tillage helps force seeds to sprout or decay. Seed is viable up to 2 years. There are no known biological controls. Chemicals as Pursuit and Butyrac 200 are effective on the kill. It is wise to rotate herbicides with different modes of action to help prevent resistance from developing. Where grass cover is adequate, Kochia may be controlled using herbicides and fertilizer. Fertilizing in November or spring will encourage native and appropriate species enough to make the habitat less desirable for Kochia. Spraying will not be done when temperature is over 85 degrees F. because of vaporization and drift possibilities. In fall or spring, seeding with native vegetation is always an option if the desirable species get too thin to be competitive. Evaluation in fall for follow-up treatments is necessary. Consult the county weed board. Read and follow labels.
- G. **ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. **COST ESTIMATES** The average costs per year for control of weeds at JWPT is being established.
- I. **RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Centaurea maculosa Lam. Common name: Spotted knapweed

- A. **PRIORITY:** *Spotted knapweed is on the CASS B noxious weed list for the state.*
- B. **DESCRIPTION:** Spotted knapweed is a 2 to 4 foot tall short-lived perennial that reproduces solely by seed. It also goes through the rosette stage. The plant bears alternate pale green leaves, which are 1 to 3 inches long. Leaf margins of the lower leaves are divided and smooth while the surface of the leaf is rough. Stems are erect and rough, with slender branches. Numerous flowers are produced from early July through August. Flowers are pink to light purple and borne on tips of terminal or axillary stems. Stiff, black-tipped bracts, giving the flower head a spotted appearance, surround flower petals.
- C. **CURRENT DISTRIBUTION ON THE SITE:** Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.
- D. **DAMAGE AND THREATS:** Spotted knapweed is a very aggressive species that can infest large areas quickly. The species has limited value as forage for cattle and seasonal value for sheep or big game. Knapweed infestations impair the quality of wildlife habitat, decrease plant diversity, increase soil erosion rates on valuable watershed areas and parks, decrease the visual quality and the appeal of recreational lands, and pose wildfire hazards.
- E. **GOALS:** The goal is to prevent the spread of Spotted knapweed and to attempt eradication.
- F. **MANAGEMENT OPTIONS:** Because Spotted knapweed and Diffuse knapweed are so similar in physical appearance, habitat, and probably degree of infestations, treating them together can save resources. Mechanical control methods are fairly effective on Spotted knapweed as it helps to greatly reduce seed. Hot wildfire or periodical prescribed burns may reduce established stands of knapweed. Prescribed fires managed and controlled by experienced crews at the right times will not significantly affect timber. Pulling Spotted knapweed may be the most effective if done in blocks or specific areas such as high recreational use areas first. Mowing is not a practical option of this location because of the suppressive effects it would probably have on native and other desirable species and because of the colossal vastness of the park. Where grass cover is adequate, Spotted knapweed can be controlled using herbicides and fertilizer. Fertilizing in November or spring will encourage native and appropriate species enough to make the habitat less desirable for Spotted knapweed. Redeem with Syltac may be used over the whole area and be safe to trees when weeds are at the rosette stage or bolting stage. Using Tordon in core areas well away from timber will produce desirable effects. Consult the county weed board. Read and follow labels.
- G. **ACTIONS PLANNED (Treatments and Monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. **COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. **RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Cirisium vulgare Common name: **Bull thistle**

- A. **PRIORITY:** *Bull thistle* is on the CLASS C noxious weed list for the state.
- B. **DESCRIPTION:** Bull thistle is a biennial with a short fleshy taproot. The stem grows 2-5 feet with many branches. The Leaves in the first year form a rosette, with a hairy, prickly topside and cottony underside. After the first year the plant is green or brownish with irregular spiny leaves. The flower is 1 1/2 to 2 inches wide and clusters at the end of the branches. Flowering can occur from July through September and the plant thrives in disturbed sites such as roadsides and pastures.
- C. **CURRENT DISTRIBUTION ON THE SITE:** Weed species are located throughout the JWPT Trail. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.
- D. **DAMAGE AND THREATS:** Pastures, roadsides and disturbed sites are potential habitats for this highly competitive weed.
- E. **GOALS:** The goal is to prevent the spread of Bull thistle.
- F. **MANAGEMENT OPTIONS:** Thistles are often troublesome weeds in lawns. The first step to proper thistle control is their identification. Bull thistles can be controlled by digging and cultivation. The most effective way to remove perennial thistles is through the use of herbicides. Broadleaf herbicides containing 2, 4-D and MCPP can control thistles in lawns. In ornamental areas it may be best to spot treat thistles with a non-selective herbicide containing glyphosate, such as Round-up. Herbicides must be applied when weeds are actively growing and air temperatures are roughly 60° to 85° F. The best times to control weeds are in the fall (September through mid-October) or spring (late April through mid-June). Always read and follow all pesticide label directions carefully.
- G. **ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads, shop compound area and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. **COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. **RESULT OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Cardaria draba (L.) Desv. Common name: Hoary cress

- A. **PRIORITY:** Hoary cress (Whitetop) is on the CLASS C noxious weed list for the state.
- B. **DESCRIPTION:** Hoary cress (white top) is a deep-rooted perennial plant that spreads by seed and root segments. Plants can be 2 feet tall with flowers of 4 petals each. Flowers have a flat-topped appearance. Leaves are blue-green in color and are lance-shaped. Plants emerge in very early spring and flower and have bloomed and set seed by mid-summer. It is common on alkaline and disturbed soils. It is highly competitive with other species when established.
- C. **CURRENT DISTRIBUTION ON THE SITE:** Weed species are located throughout the JWPT Trail. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.
- D. **DAMAGE AND THREATS:** Hoary cress is a very aggressive plant that can replace desirable native vegetation, posing a threat to biodiversity. Because of its low palatability, it is also a threat to forage production in pastures and grass hay. Hoary cress is not a desirable plant in recreational settings.
- E. **GOALS:** The goal is to prevent the spread of Hoary cress.
- F. **MANAGEMENT OPTIONS:** Mowing assists with control because mowed plants produce less seed until chemical or mechanical measures can be utilized. Where residual grass cover is adequate, Hoary cress may be controlled using herbicides and fertilizer. Fertilizing in November or spring will encourage native and appropriate species enough to make habitat less desirable for Hoary cress. Applying Weed and Feed in the spring should produce reasonable results. Using Vengence and Escort should yield excellent results. Evaluation of fall follow-up treatments is pending. Consult the county weed board. Read and follow labels.
- G. **ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads, shop compound area and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. **COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. **RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Onopordum acanthium L. Common name: Scotch thistle

- A. PRIORITY:** *Scotch thistle is on the CLASS B noxious weed list.*
- B. DESCRIPTION:** Scotch thistle is a biennial that grows up to 12 tall. Stems have broad, spiny wings. Leaves are large, shiny, and covered with fine dense hair, giving a grayish appearance. Upper leaves are alternate, coarsely lobed. Basal leaves may be up to 2 feet long and 1 foot wide. Flower heads are numerous, 1 to 2 inches in diameter and bracts are spine-tipped. Flowers are violet to reddish. Fruits are about 3/16 inch long and tipped with slender bristles. It is an aggressive plant and may form stands so dense that they are impenetrable to livestock. Scotch thistle is best controlled in the rosette stage. Rosettes can be 2 feet in diameter.
- C. CURRENT DISTRIBUTION ON THE SITE:** Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.
- D. DAMAGE AND THREATS:** Scotch thistle is an aggressive plant that can replace desirable native vegetation, posing a threat to biodiversity. Because of its zero palatability, it is also a threat to forage production in pastures and dry land grass hay. In parks they are very difficult to walk through. The species forms dense stands that crowd out mammals, all other vegetation, degrading native plant and animal habitat.
- E. GOALS:** The goal is to prevent the spread of Scotch thistle and to attempt to eradicate the weed.
- F. MANAGEMENT OPTIONS:** Dogmatic persistence on this tough weed is necessary for control or termination. Beware of using Tordon near trees and desirable shrubs. Use of 2, 4-D is acceptable near trees. When some control is gained, hopefully in 2003, native grasses are an option for fall seeding. Fall follow-ups are necessary for modifying strategies as necessary. Consult the county weed board. Read and follow labels.
- G. ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads, shop compound area and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. RESULTS OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Tribulus terrestris L. Common name: Puncturevine

- A. PRIORITY:** *Puncturevine is on the CLASS B noxious weed list for the state.*
- B. DESCRIPTION:** Puncturevine is annual, prostrate or somewhat ascending, mat forming, with trailing stems, each ½ to 5 feet long. Leaves opposite, hairy, divided into 4 to 8 pairs of leaflets, each about ¼ to ½ inch long and oval. Flowers are yellow and fruits consist of 5 sections which, at maturity, break into tack-like structures with sharp, sometimes curving spines, each section 2-to4-seeded. It grows in pastures, cultivated fields, waste areas, and along highways and roads. The hard spiny burs flatten bicycle tires and puncture peoples skin and cause bleeding. The seed will remain dormant in the soil for 4 to 5 years, which makes eradication difficult. Because of its sharp burs, puncturvine has been spread over a wide area by animals and vehicles and people. Flowering and seed production occur from July to October. Other common names are goathead, Mexican sandbur, and Texas sandbur.
- C. CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. DAMAGE AND THREATS:** The Puncturevine bur is the primary concern because of the damage that can be caused to people’s skin, some equipment, and to animals. The plants are quite prolific and the burs spread the seed that are stuck to shoes and tires of equipment. Eradication is slow and difficult, but a worthy goal. The plant thrives in drought conditions.
- E. GOALS:** The goal is to prevent the spread of puncturevine and to attempt to eradicate the weed.
- F. MANAGEMENT OPTIONS:** Manual methods of eradication are effective if care is used to not spread the seed. Manual methods should be done before the flowers have set the spiny fruit. Pre-emergent herbicides are effective, but also more toxic to soil in general. Treating road shoulders and trails periodically with Roundup has a sterilization effect but has a diminishing effect on the soil. Pre-washing the weeds the day before spraying to remove accumulated dust will cause the Roundup to be totally effective and avoid the dirt from binding with the Roundup on the leaves. If some puncturevine is found in lawn areas or in other desirable grass, 2, 4-D may be used for a reasonable kill. Consult the weed board. Read and follow labels.
- G. ACTIONS PLANNED (Treatments and Monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads, shop compound area and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. RESULT OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Tanacetum vulgare Common name: Common tansy

- A. **PRIORITY:** *Common tansy is on the CLASS C list for the state.*
- B. **DESCRIPTION:** Common tansy is an aromatic perennial with stems from 1 1/2 to 6 feet tall. The leaves are alternate and deeply divided into many narrow toothed segments. The flowers have yellow heads, 1/4 to 1/2 inch across, and occur in dense, flat topped clusters. Common tansy is typically found in stream banks, roadsides, waste areas and pastures. This plant is often mistaken for Tansy ragwort.
- C. **CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail.*
- D. **DAMAGE AND THREATS:** Tansy is a very effective invader and displaces native vegetation. The plant is very prolific, and often times is hard to control due to easy regeneration from root fragments.
- E. **GOALS:** The goal is to prevent the spread of Common tansy.
- F. **MANAGEMENT OPTIONS:** Pulling or mowing has little effect on tansy, except to reduce seed production. Most of the big roots are near the surface, so it may feel like you can pull up smaller plant roots and all, but it almost always comes back again and again. Tansy regenerates from root fragments, so cultivation could expand the size of an infestation. Tansy is relatively easy to control with common herbicides like 2,4-D, or a blend of 2,4-D and clopyralid (Curtail[®]), or picloram (Tordon[®] 22K), however the weed patches must be monitored and retreated to kill any tansy that regenerates from the roots. Herbicides are impractical in many cases where the weed is inter-mixed with other desirable plant species. Special care must be taken along ditch banks and creeks to avoid contaminating the water.
- G. **ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. **COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. **RESULT OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Lepidium latifolium L. Common name: Perennial pepperweed

- A. PRIORITY:** *Perennial pepperweed is on the CLASS B noxious weed list for the state.*
- B. DESCRIPTION:** This is a perennial plant that grows from 1 to 3 feet tall, with bright green to gray-green, entire toothed leaves that are larger near the base than the top. The flowers are very small, white, and found in dense clusters near the end of the branches. The plant grows in waste areas, wet areas, roadsides, ditches and croplands. The deep seated root stock make this an extremely difficult plant to control.
- C. CURRENT DISTRIBUTION ON THE SITE:** *Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. DAMAGE AND THREATS:** An aggressive plant, perennial pepperweed tends to establish and rapidly colonize pastures, riparian habitats, and waste places in wetter areas. The extremely competitive plant may also completely displace more desirable species, which poses a particular threat to natural areas.
- E. GOALS:** The goal is to prevent the spread of perennial pepperweed and to attempt to eradicate the weed.
- F. MANAGEMENT OPTIONS:** Herbicides may be useful for controlling infestations. However, great care must be used, since many infestations occur close to open water. The plants are most susceptible to herbicides at the initiation of flowering. 2,4-D amine, metsulfuron (Escort), and chlorsulfuron (Telar) all control perennial pepperweed. A surfactant is necessary with metsulfuron and chlorsulfuron, however, even with herbicide applications, stands may regenerate from creeping rhizomes.
- G. ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. COST ESTIMATES:** The average costs per year for control of weeds at JWPT is being established.
- I. RESULT OF EVALUATION:** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Centaurea repens Common name: Russian knapweed

- A. PRIORITY:** Russian knapweed is on the CLASS B noxious weed list for the state.
- B. DESCRIPTION:** Russian thistle is perennial, forming dense colonies by adventitious shoots from widely spreading black roots. Stems are erect, openly branched, 18 to 36 inches tall. Lower leaves are deeply lobed, 2 to 4 inches long; upper heads are ¼ to ½ inch in diameter, solitary at the tip of leafy branchlets. Flowers are pink to lavender. Many pearly involucre bracts form with rounded to acute papery margins. This species forms colonies in cultivated fields, orchards, pastures and roadsides. Russian knapweed plants spread by black, deep growing roots which penetrate to a depth of over 8 feet. Flowering occurs from June to September.
- C. CURRENT DISTRIBUTION ON THE SITE.** *Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.*
- D. DAMAGE AND THREATS:** Russian knapweed is widely established in the western U.S. This species forms colonies in cultivated fields, orchards, pastures, and roadsides. Plants spread by black, deep growing roots that penetrate to a depth of over 8 feet.
- E. GOALS:** The goal is to prevent the spread of Russian knapweed and to attempt to eradicate the weed.

F. MANAGEMENT OPTIONS

Response to Herbicides: Russian knapweed is difficult to control with herbicides. Depending on the season and the developmental stage of the plant, chlorsulfuron, sodium chlorate, 2,4-D, and picloram are adequate. Read and follow current herbicide labels and recommendations for control.

Response to Cultural Methods: Productivity is likely to be maximized in a minimum amount of time if Russian knapweed populations can be treated with a suitable herbicide, farmed, and seeded to a competitive forage. Depending on the moisture regime, nitrogen fertilizer applied in conjunction with an herbicide significantly improves the competitiveness of residual grasses. In addition, improved grazing management will significantly influence the life span of Russian knapweed control efforts.

Biocontrol Potential Biocontrol Potential: The nematode *Subanguina picridis* forms galls on Russian knapweed that reduce plant vigor. However, its effectiveness in Washington is not yet known.

- G. ACTIONS PLANNED (Treatments and monitoring)** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.
- H. COST ESTIMATES.** The average costs per year for control of weeds at JWPT is being established.
- I. RESULT OF EVALUATION** Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.

SPECIFIC CONTROL PLANS FOR PRIORITY WEED SPECIES

Scientific name: Centaurea solstitialis Common name: Yellow starthistle

- A. **PRIORITY:** Yellow starthistle is on the CLASS B noxious weed list for the state.
- B. **DESCRIPTION:** Yellow starthistle is an annual, 2 to 3 feet tall, has rigid branching, winged stems covered with a cottony pubescence. Basal leaves are deeply lobed while upper leaves are entire and sharply pointed. Flower heads are yellow; thorns are up to ¾ inch long. Fruits from ray flowers are dark-colored without bristles, while fruits from disk flowers are lighter and have a tuft of white bristles. Yellow starthistle grows on various soil types and is usually introduced on roadsides and waste areas. Yellow flowers appear in this annual in mid-summer.
- C. **CURRENT DISTRIBUTION ON THE SITE** Weed species are located throughout the JWPT. There are no big infestations per definition as the park boundaries are anywhere from 15-200 feet from the center of the trail surface which do not provide for infestation areas on park property. Weed problems occur when the trail surface becomes covered with vegetation and weeds show up along the side of the trail surface. The trail has similar climate throughout most of the trail so weed species are located in all counties of the trail.
- D. **DAMAGE AND THREATS:** Yellow starthistle, introduced from Europe, grows on various soil types and is usually introduced on roadsides and waste areas. "Chewing disease" results when horses are forced to eat the Yellow starthistle.
- E. **GOALS:** The goal is to prevent the spread of Yellow starthistle and to attempt to eradicate the weed.
- F. **MANAGEMENT OPTIONS**

Response to Herbicides: Yellow starthistle in the rosette stage is not difficult to kill with herbicides such as 2-4-D. Plants in the flowering and seed production phase are resistant. Seeds are also resistant. Picloram not only kills the rosette stage but, due to residual action, is effective on seedlings developing in the next season. However, skipped or missed areas of herbicide application may occur. Seeds may survive beyond residual action of picloram. Resistance to picloram has been reported. Refer to Pacific Northwest Weed Control Handbook for detailed management.

Response to Cultural Methods: The primary site of yellow starthistle infestation is rangeland. Mechanical removal is economically unsound for dense infestations. However, initial infestations, such as occurred from contaminated seed mix in Okanogan County, have been lessened by hand pulling, flagging, and a herbicide pellet application. Proper grazing management, including rest and deferment to allow grasses to regain vigor, will both limit yellow starthistle invasions and improve the range's condition. In California, frequent cultivation slows or inhibits the plant, preventing it from fully exploiting cultivated grassland steppes.

Larson and McInnis (1989) report that a combination of "Tualatin" tall oatgrass or "Paiute" orchard grass with picloram application effectively controlled yellow starthistle and improved forage production.

Biocontrol Potential: Washington State initiated a yellow starthistle biological control program in 1985 with the release of a beetle *Bangosternus orientalis*. The beetles feed on small buds and lay eggs in medium sized buds. Larvae hatch and feed on developing seed destroying all of them within the head. Pupation occurs in the damaged heads and the emerged adults overwinter in the soil. This beetle has reduced yellow starthistle seed production by about 60 percent. Two other beetles which destroy yellow starthistle seed in affected heads are *Eustenopsis villosus* - released and successfully colonized at a site in Whitman County in 1990 - and *Larinus curtus*.

- G. **ACTIONS PLANNED (Treatments and monitoring):** Private applicators are contracted to control all weeds listed on the master weed plan for JWPT State Park. Park Staff also sprays trailheads and various spot applications throughout the trail. Park staff, with the assistance of contracted applicators, will monitor the effectiveness of herbicides applied.

H. COST ESTIMATES: The average costs per year for control of weeds at JWPT is being established.

I. RESULT OF EVALUATION: Weed control will be monitored starting the 2016 year to determine population controls and cost effectiveness.