

Lake County All Lands Restoration Initiative

Noxious Weed Management Plan

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Back cover: Purple Loosestrife Flower. Photo by Wilson Herbicide Spraying LLC.

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Scotch Thistle Infestation. Photo by Wilson Herbicide Spraying LLC.

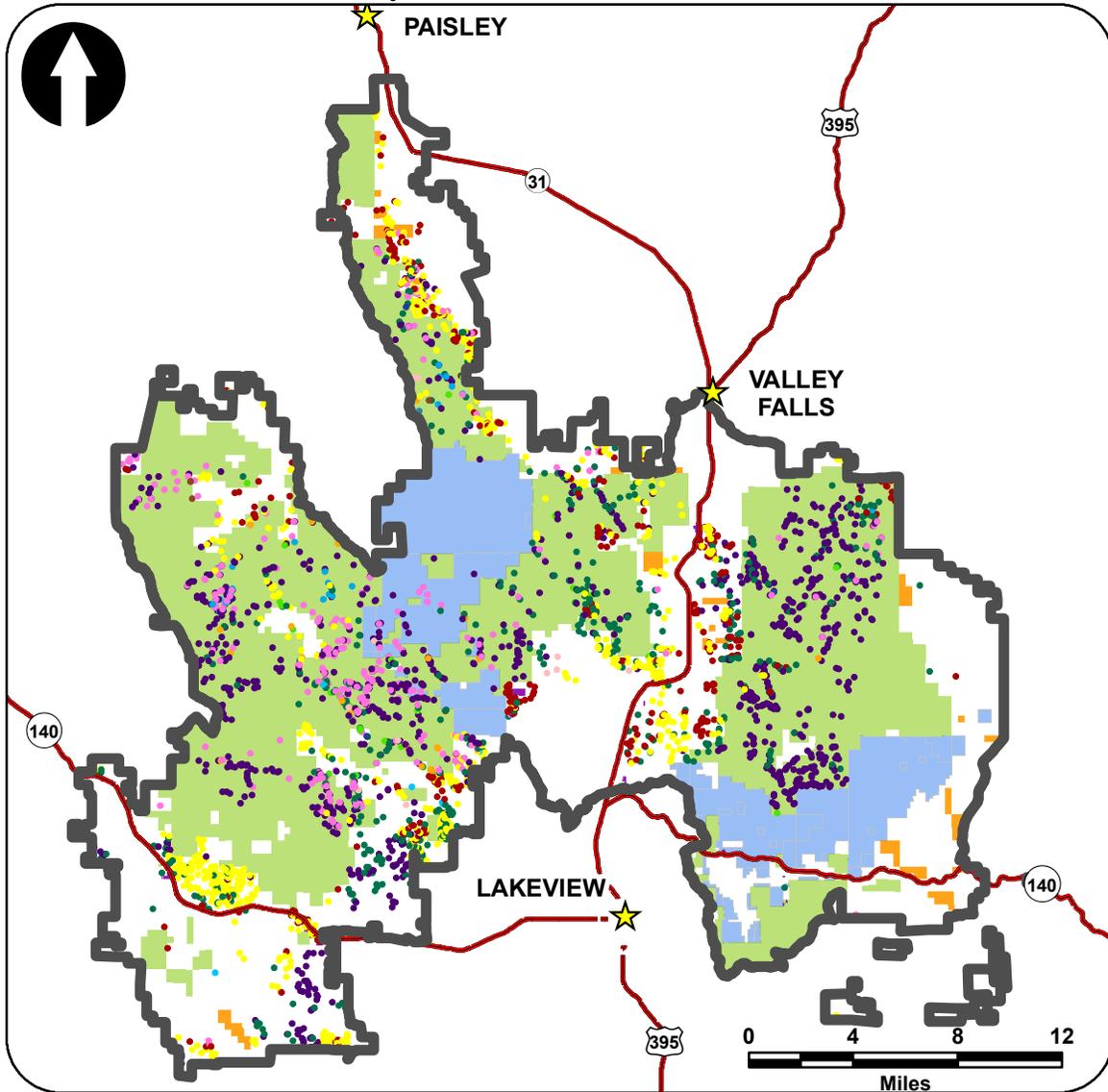
INTRODUCTION

The Lake County Umbrella Watershed Council (LCUWC) and the Klamath Lake Forest Health Partnership (KLFHP) envisions creating a healthy, resilient, and functional forest landscape maintained with fire as an ecological process, while mitigating the threat of high severity wildfire to dry forests, fish and wildlife habitat, water quality, and the surrounding human communities. This healthy and resilient landscape has abundant, productive, and diverse populations of native fish and wildlife species and contributes to the social, cultural, and economic well-being of the communities that live, work, and recreate within its boundaries.

Noxious weeds are being found in ever-increasing numbers throughout Lake County. The spread of noxious weeds signals the decline of entire native plant communities. Noxious weeds severely impact the plant diversity of occupied environments and cause widespread economic impacts. Invasive weeds are considered one of the most serious natural resource and economic issues facing Lake County. Without a major increase in management efforts, noxious weeds will continue to spread across the county and project landscape, facilitating further degradation of productive lands that are critical to Lake County's livelihood.

With the increase in ground disturbance from mechanical treatments, increased road travel during the various stages of these forest health treatment projects, and the prescribed burning proposed by the KLFHP, a strong noxious weed management plan is needed to adequately and proactively address the potential for further noxious weed dispersal across private and public lands. Knowing that noxious weed population growth can be both local (at the current site) and distal (spreading to new sites), this Noxious Weed Management Plan (NWMP) will attempt to address the potential causes for noxious weed proliferation and growth.

Lake County All Lands Restoration Initiative
 Map 10: Noxious Weed Sites



Noxious Weed Sites (USFS/Private Lands)

LCALRI

Birds Foot Trefoil (26/0)	Medusahead (38/342)
Canada Thistle (887/191)	Musk Thistle (242/64)
Common Tansy (1/0)	Scotch Thistle (14/8)
Dalmatian Toadflax (5/0)	Spotted Knapweed (31/1)
Diffuse Knapweed (2/0)	St. Johnswort (32/3)
Dyer's Woad (1/0)	Ventenata (76/651)
Field Bindweed (8/0)	White Top (0/1)
Mediterranean Sage (252/271)	Yellow Starthistle (1/5)

GOALS

The purpose of the Lake County All Lands Restoration Initiative (LCALRI) NWMP is to provide a written strategy that will guide weed management activities now and into the future across the LCALRI landscape coordinated across private and public lands. To achieve this strategy the following actions will be taken throughout the lifespan of the LCALRI:

1. Effectively control and reduce the spread of invasive noxious weeds within the project area following the USFS Fremont Winema Prevention Practices document (Table 1).
2. Limited to funding, identify the priority of noxious weed species to be treated.
3. Reduce economic and environmental losses to LCALRI project landowners and managers caused by noxious weeds.
4. Implement a Weed Policy and Classification System.
5. Recommend noxious weed management strategies and plans for each priority species as it relates to forest management treatments.
6. Provide public awareness and education of the ecologic and economic implications of noxious weed establishment and persistence through stakeholder engagement.
7. Encourage and facilitate cooperation and coordination between jurisdictions, agencies, land managers, and private landowners.
8. Be compliant with federal, state, and local laws, regulations, and policies regarding noxious weed control.

MANAGEMENT PLAN FOR CURRENT AND FUTURE INFESTATIONS

The LCALRI NWMP will build upon the following Objectives:

OBJECTIVE #1: PREVENTION AND EARLY DETECTION

Prevention, early detection, and eradication of early detected noxious weed species is the most practical means of weed management. Prevention is best accomplished by ensuring that new weed species' seed or vegetative reproductive plant parts are not introduced into an area. Specific prevention methods for the LCALRI are listed under Prevention Strategies below (Table 1).

OBJECTIVE #2: FUNDING AND PROGRAM JUSTIFICATION

To increase funding and justify our LCALRI NWMP, the KLFHP needs to:

1. Demonstrate the impacts that noxious weeds are causing in Lake County, and more specifically the LCALRI project area.
2. Identify noxious weed species priority and treatment recommendations.
3. Establish an operating budget for the entire program.
4. Designate who performs which parts of the program.

OBJECTIVE #3: INVENTORY (ZONING AND WEED MAPPING)

Mapping known and future noxious weed sites, is an exceptionally useful part of this noxious weed management plan. We must “know what is out there” if we expect to manage the land successfully. A good inventory and mapping system does the following:

1. Defines the problem spatially and temporally;
2. Brings awareness to the problem (visual products associated with this plan);
3. Helps monitor program effectiveness;
4. Helps develop prevention and integrated weed management action plans across public and private lands;
5. Represents and visualizes the problem of noxious weeds at the landscape scale;
6. Provides a historical weed infestation record;
7. Provides data to evaluate weed management options.

OBJECTIVE #4: PRIORITY, PLANNING, AND IMPLEMENTATION

1. Priority

There are various factors that influence priority as it pertains to noxious weed treatment

- i. Funding constraints
- ii. Site relationship to sensitive habitat
- iii. Site located in high traffic area
- iv. Plant phenology
- v. Treatment window
- vi. Available herbicide applicators

2. Planning

Once treatment prioritization is agreed upon by participants, planning of the treatments will take place. This can include chemical selection, site selection, applicator selection, and considerations of sites with sensitive areas nearby.

3. Implementation

During the implementation phase, one will need to monitor the application, obtain pesticide applicator records (PAR's), and collect pre and post application photos. This will allow subsequent applications to be adjusted to better suit site conditions.

When taking inventory of noxious weed sites, survey crews will use the Lake County All Lands Restoration Initiative Noxious Weed Assessment Tool (Appendix A). This tool will collect pertinent site information as well as serve as a methodology to prioritize weed treatment sites as needed.

OBJECTIVE #5: RECORD SYSTEM

A record system will help identify factors that influence success such as noxious weed species identification, growth stage of weeds, treatment justification, and ranking prioritization, herbicide selection and application rates, treatment dates, and monitoring results. Records can make the difference between success and failure, as well as be an effective cost saving tool.

Keeping accurate records of the details of each treatment in prioritized units ensures that planning is accurately translated into action. Records for the treatment of noxious weeds will include keeping accurate pesticide application records (PAR's), taking GPS locations of treatment areas, and sharing those treatments with applicable parties using the LCALRI Noxious Weed Assessment Tool (Appendix A). Additionally, before and after monitoring photographs will be taken and shared to visually demonstrate a timeline of progress or failure. All information recorded on the LCALRI Noxious Weed Assessment Tool data sheet will be entered into an electronic database that will be shared between applicable partners to track and report findings, treatments, and monitoring status.

OBJECTIVE #6: MONITORING AND EVALUATION

Monitoring means repeated, systematic observation. Monitoring is “determining the truth” or observing the results of implementation and analyzing the NWMP effectiveness. To build awareness, continue education, implement training, acquire program funding, and retain the ability to apply adaptive management within this plan, the LCALRI partnership must know what goals and objectives relate to this NWMP; evaluation is relating information obtained from monitoring relative to a goal. The purpose of evaluation is to answer the questions:

- A. Does the weed management plan accomplish the goals effectively with the resources at hand?
- B. Are the initial goals still desirable and realistic?

OBJECTIVE #7: AWARENESS, EDUCATION, AND TRAINING

Awareness is when people responsible for supporting, implementing, or taking part in a weed management program realize there is a weed problem. When people can recognize noxious weeds and other undesirable plants as problems, they have weed awareness.

Educating participants on the impacts that noxious weeds have on natural resources, wildlife, and the economy occurs after people are made aware of weeds.

Training takes place after people become aware and realize that noxious weeds are detrimental to the livelihood of Lake County, but need assistance in how to manage the weeds effectively.



Perennial Pepperweed Flowering Stage. Photo by Wilson Herbicide Spraying LLC.

PREVENTION STRATEGIES

In the case of a landscape-scale project such as this, prevention of the spread of noxious weeds will have both time and cost saving effects, as well as protecting the natural habitat. These management practices shall serve as a guide and are designed to minimize the introduction of invasive species, minimize conditions that favor the spread of invasive species, and minimize conditions that favor the establishment of invasive species. Most weeds on the LCALRI landscape are associated with wildfires, roadsides, timber sale areas, and shrub-steppe ecosystems. Care should be given to prevention measures that limit spread into and from these types of areas.

*Note: While the following actions are considered best management practices for public lands and will be implemented thusly, not all management objectives are relevant or translatable to the private land component of the Lake County All Lands Restoration Initiative. Where applicable and appropriate, private lands should implement the following management objectives.

Table 1

Management Objectives

(U.S. Forest Service, 2005. Fremont-Winema National Forest Invasive Species Prevention Practices)

**Practices in italics are Forest Plan Standards contained in the Pacific Northwest Region Invasive Plant Program Preventing and Managing Invasive Plants Record of Decision (2005). Page numbers in the ROD are indicated see link for more details: <https://www.fs.usda.gov/detailfull/fremont-wine-ma/landmanagement/planning/>*

MANAGEMENT OBJECTIVE	PREVENTION PRACTICES
<p>EDUCATION: Increase employee and public knowledge of invasive species to help reduce both the spread of existing weeds and the risk of infestation by new weeds.</p>	<ol style="list-style-type: none"> 1. Educate employees regarding the identification and impact of invasive species, and appropriate reporting methods. 2. Designate an invasive species coordinator for each of the four zones on the Fremont-Winema who is knowledgeable about weeds in their area and can provide input to project planning. 3. Increase public awareness of invasive species and their negative impact on the environment. Post prevention practices at trailheads and developed recreation facilities, provide information to user groups, and have education material available at Forest offices and on the website. 4. Coordinate weed prevention efforts with other agencies. Continue work with the Bureau of Land Management, State, County, and other interested partners to develop additional educational materials. 5. Discuss weed prevention practices at permittee and cooperator meetings, and at contractor pre-work sessions, where applicable.

MANAGEMENT OBJECTIVE	PREVENTION PRACTICES
<p>PLANNING: Consider and evaluate the risks of invasive species introduction and spread for activities implemented or permitted by the Forests, and in planning documents and land management assessments.</p>	<ol style="list-style-type: none"> 1. Evaluate the need for ground disturbing activities, including prescribed fire and special use permitted actions, prior to initiating project planning. Consider invasive species management when weighing the costs and benefits of an activity. 2. If current information is not already available, conduct inventory in the project area, along access routes, and in areas adjacent to the project area, to identify existing infestations and the susceptibility of the project area to spread and invasion. 3. Consider invasive species prevention and risk in the development and evaluation of alternatives. Where weeds are an issue, consider the use of alternative locations or alternative implementation methods. 4. Use mitigations to prevent weed introduction and spread. 5. <i>*Prevention of invasive plant introduction, establishment, and spread will be addressed in watershed analysis; roads analysis; fire and fuels management plans; Burned Area Emergency Recovery Plans; emergency wildland fire situation analysis; wildland fire implementation plans; grazing allotment management plans; recreation management plans; vegetation management plans; and other land management assessments (pg 10).</i> 6. <i>*Use available administrative mechanisms to incorporate invasive plant prevention practices into rangeland management. Examples of administrative mechanisms include, but are not limited to, revising permits and grazing allotment management plans, providing annual operating instructions, and adaptive management. Plan and implement practices in cooperation with the grazing permit holder (pg 16).</i>

Table 1 Continued

Management Objectives

MANAGEMENT OBJECTIVE	PREVENTION PRACTICES
<p>MINIMIZE TRANSPORTATION OF INVASIVE SPECIES SEED: Reduce the spread of existing weeds and the risk of introducing new weed species to project sites and other areas of the Forests.</p>	<ol style="list-style-type: none"> 1. Avoid infested sites when parking vehicles and operating off-road equipment, including ATV's, fire equipment, and timber sale equipment. 2. Encourage employees working in infested areas to inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment prior to leaving a project site. 3. Give priority to treating infestations in high traffic areas, including administrative sites, developed recreation areas, and along main roads. 4. Give priority to treating existing infestations in and adjacent to areas proposed for ground disturbing activity, including prescribed fire, and along project area access routes. 5. Give priority to treating sites in areas recently burned by wildfire. Evaluate invasive species status and risks in Burned Area Emergency Rehabilitation plans. 6. <i>*Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dumptrucks, etc.) prior to entering National Forest System Lands. This does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time (pg 11).</i> 7. Consider weed risk and spread in travel plan decisions. Consider road closures in areas that are weed free, or at high risk to weed invasion, as well as in areas that are heavily infested and likely to be a major source of spread. 8. <i>*Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists, incorporate invasive plant prevention practices as appropriate (pg 18).</i> 9. <i>*Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists (pg 17).</i> 10. When possible, establish fire camps and vehicle and crew staging areas in areas inspected and verified as weed-free. Maintain helibases, helispots, airstrips and a network of potential camp and staging areas in a weed free condition. 11. Incident Management Team Resource Advisors will obtain invasive species information and consult with zone weed coordinators, as needed. 12. <i>*Use weed-free straw and mulch for all projects conducted or authorized by the Forest Service on National Forest System Lands. If State certified straw and/or mulch is not available, individual Forests should require sources certified to be weed free using the North American Weed Free Forage Program standards, or a similar certification process (pg 12).</i> 13. Encourage motorized trail users to inspect and clean their vehicles prior to using NFS lands. 14. Work with state and other agencies, special use permittees, and recreationists to prevent introduction of aquatic weeds to lakes and reservoirs within Forest boundaries 15. <i>*Use only pelletized or certified weed-free feed on all National Forest System lands. If State certified weed free feed is not available, individual Forests should require feed certified to be weed free using North American Weed Free Forage Program standards or a similar certification process. Choose weed-free project staging areas, livestock and packhorse corrals, and trailheads. Closure orders requiring pelletized or weed-free feed for all Wilderness Areas and Wilderness trailheads in the Region will be in place as of January 1, 2007. Closure orders for remaining National Forest System lands in the Region will be filed on a Forest-by-Forest basis as certified weed-free feed becomes available (pg 12-15).</i> 16. Develop designated unloading areas for livestock being transported to the Forests from potentially infested areas. 17. Consider scheduling use by livestock in areas with infestations of invasive species susceptible to being spread by livestock (e.g. bur-like fruits) to occur prior to seed maturation. For houndstongue, avoid grazing infested areas after mid-late July.

Table 1 Continued

Management Objectives

MANAGEMENT OBJECTIVE	PREVENTION PRACTICES
<p>AVOID CONDITIONS THAT PROMOTE INVASIVE SPECIES ESTABLISHMENT: Minimize soil disturbance, maintain native vegetation, and revegetate disturbed areas.</p>	<ol style="list-style-type: none"> 1. Manage the timing, intensity, duration, and frequency of livestock activities to maintain the vigor of desirable plant species and retain live plant cover and litter. 2. Maintain desirable roadside vegetation. 3. During timber sale, fuels treatments, and other projects, minimize soil disturbance by applying existing soil protection BMP's. 4. Avoid prescribed fire in or near infested areas, unless burning is used as part of a treatment strategy. Minimize fireline construction. Incorporate mitigations developed during project planning in burn plans. 5. Consider stockpiling topsoil for replacement during construction projects. 6. Where needed, develop site-specific prescriptions for revegetation in compliance with the Forest Native Species Plan. 7. <i>*Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality, and to help prevent the establishment of invasive species); 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants; 3) if native plant materials are not available; or 4) in permanently altered plant communities. Under no circumstances will non-native invasive plant species be used for revegetation (pg 21).</i>

MANAGEMENT OBJECTIVE	PREVENTION PRACTICES
<p>MONITORING: Revisit project areas, high use areas, wildfires, and revegetation sites to determine the effectiveness of prevention measures, and to detect new infestations before they spread.</p>	<ol style="list-style-type: none"> 1. Monitor project areas after ground disturbing activities are implemented for 1-3 years. 2. Monitor livestock unloading areas and areas of concentrated livestock use. 3. Monitor administrative sites, main roadways, and developed recreation areas. 4. Monitor gravel pits and stockpiles of fill, sand, or gravel. 5. Monitor areas burned by wildfire. Burned areas may be susceptible to weed infestation for 5-10 years or more. 6. Use methods described in the Native Species Plan for the Fremont- Winema National Forests to monitor revegetation sites. 7. Evaluate the effectiveness of prevention measures contained in this document, and use the monitoring results to update this document every 5 years.

BEST MANAGEMENT PRACTICES MITIGATION STANDARDS

The mitigations below will help reduce the spread of the existing infestations if they exist. The project has the potential to introduce new invasive plants and increase spread of existing invasive plants in the project area due to ground disturbance. If the mitigation measures are followed, the potential for introduction and spread in the project area would be minimal.

1. **Cleaning of equipment:** The Project Manager will require and inspect the cleaning of all equipment and vehicles prior to entering Project Area/National Forest System land for all projects, and before leaving the project site when operating in areas where invasive plant seed or vegetative propagules (root fragments) are likely a concern.
2. **Material:** Use only gravel, fill, sand, and rock that is judged to be weed free by weed specialists. If fill material is being brought in from an outside source for this project, the source must be identified and inspected before use by Weed Specialist.
3. Prior to any ground disturbing work, the Project Manager will be notified so invasive plant surveys can occur.
4. If invasive plant infestations are discovered, the sites will be flagged for avoidance if feasible. If infestation is too large to be logistically avoided, equipment operating within the known invasive plant infestation must be washed before leaving the site.
5. For sites that are found to be a monoculture of noxious weeds or have an infestation with a greatly reduced level of native plant component, such sites will be assessed for reseeding efforts. Reseeding efforts will be planned in conjunction with the appropriate land manager to ensure that reseeding efforts meet management objectives pertinent to said area.

LCALRI WEED POLICY AND CLASSIFICATION SYSTEM

THE PURPOSE OF THE CLASSIFICATION SYSTEM IS TO:

1. Act as the Lake County All Lands Restoration Initiative official guideline for implementing noxious weed control programs.

NOXIOUS WEED CONTROL RATING SYSTEM

Noxious weeds, for the purpose of this system, shall be designated “A” and “B”.

1. “A” designated weed: a weed of known economic importance which occurs in small enough infestations to make eradication/containment possible; or not known to occur, but its presence in adjacent areas makes future occurrence highly likely.

RECOMMENDED ACTION: Infestations are subject to intensive control when found by Lake County All Lands Restoration Initiative partner.

2. “B” designated weed: a weed of known economic importance, which is locally abundant, but of limited distribution in other counties or areas.

RECOMMENDED ACTION: Moderate to intensive control at the local level.

LICALRI NOXIOUS WEED LIST

Below is a list of “A” and “B” weeds. Under each category, the species are listed in order of priority for treatment within the LICALRI project area. It is recognized that funding is limited and not all known weed sites can be treated, the lists below will provide guidance on the priority for treatment. All classifications treatments will be treated within available funding. If funding is lacking, species will be prioritized for treatment determined on a site-by-site basis, informed by the LICALRI Noxious Weed Assessment Tool (**Appendix A**).

“A” DESIGNATED WEEDS (IN ORDER OF LICALRI PRIORITY)

1. Leafy Spurge	<i>Euphorbia esula</i>
2. Dyers Woad	<i>Isatis tinctoria</i> L.
3. Yellowstar Thistle	<i>Centaurea solstitialis</i>
4. Ventenata	<i>Ventenata dubia</i>
5. Medusahead	<i>Taeniatherum caput-medusae</i>
6. Spotted Knapweed	<i>Centaurea maculosa</i>
7. Diffuse Knapweed	<i>Centaurea diffusa</i>
8. Scotch Thistle	<i>Onopordum acanthium</i>
9. Musk Thistle	<i>Carduus nutans</i>
10. Russian Knapweed	<i>Centaurea repens</i>
11. Dalmatian Toadflax	<i>Linaria dalmatica</i>
12. Canadian Thistle	<i>Cirsium arvense</i>
13. Perennial pepperweed	<i>Lepidium latifolium</i>
14. Whitetop	<i>Cardaria draba</i>
15. St. Johnswort	<i>Hypericum perforatum</i>
16. Mediterranean Sage	<i>Salvia aethiopsis</i>

“B” DESIGNATED WEEDS (IN ORDER OF LICALRI PRIORITY)

1. Poison Hemlock	<i>Conium maculatum</i>
2. Water Hemlock	<i>Circuta maculata</i>
3. Halogeton	<i>Halogeton glomeratus</i>
4. Puncturevine	<i>Tribulus terrestris</i>

PLANT IDENTIFICATION AND TREATMENT STRATEGIES

Plant identification and treatment strategies go hand in hand. It is impossible to know how to control a plant species without a basic understanding of the plant's biology. The following section covers targeted species for the purposes of weed control for the Lake County All Lands Restoration Initiative. Plants listed below are identified using easy to understand nomenclature, if a species arises that cannot be identified, please contact the Lake County Extension office or the Lake County Cooperative Weed Management Area for help in identifying.

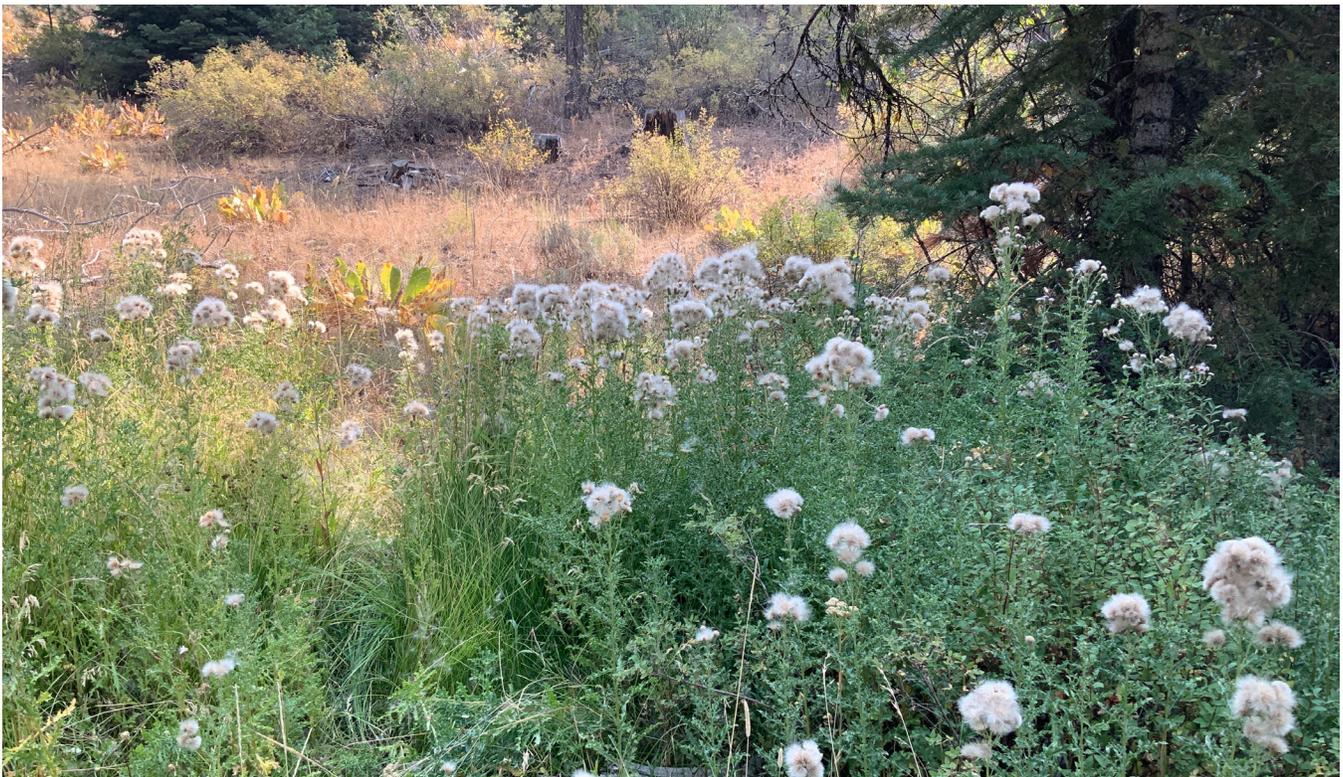
Once the plant is identified properly, please refer to the control section listed for each plant species. Understand that in each instance there may be unforeseen circumstances that will change the treatment strategy. These circumstances may include; large sites, sites in construction areas that may need pre and post treatment, sensitive areas/plants nearby, sites may be located next to streams, and species that have not been inventoried before. Please note that all control methods listed are not finite, in many cases there may be new options for control that are being developed and or tested.

Disclaimer

*All treatments recommended below should be verified annually to comply with local, state, federal, and private landowners' rules, and objectives. It is recommended to verify control methods with a qualified agronomist and/or the current version of the PNW Weed Management Weed Control Handbook. Please understand that treatment strategies and chemicals to treat weeds are continually being updated.

*Chemical weed control recommendations below are supplied with the understanding that no discrimination is intended and no endorsement is implied. Before using any chemical, ALWAYS read the label. Any person using the products listed in these guidelines assumes full responsibility for their use in accordance with current directions of the manufacturer and in accordance with Oregon law.

Below descriptions contain excerpts from the Nevada Noxious Weed Field Guide, 2010, University of Nevada Cooperative Extension SP-10-01, Earl Creech, Brad Schultz, Lisa Blecker 2010.



Canada Thistle. Photo by Autumn Muir, Lake County Umbrella Watershed Council.

“A” DESIGNATED WEEDS

1. LEAFY SPURGE - *EUPHORBIA ESULA*

Stem

- Up to 3 ft. tall; branched; base of plant often woody; entire plant contains milky white sap

Leaves

- Mostly alternate, strap-like (linear), 1-2 in. long, 0.2 in. wide and lack hair (glabrous); NO leaf stem (petiole); smooth edges (margins)

Flower

- Small, showy, green to yellow and clustered at tips of stems; bracts below flowers are heart- to kidney-shaped and have the appearance of flower petals

Root

- Creeping, deep root system; new shoots arise from pinkish buds

Other

- Grows well across a wide range of sites; often found in pastures, waste areas, rangelands, field borders and along waterways
- Perennial; reproduces by seed and roots; sap can irritate skin, eyes and the digestive tracts of humans and animals; sheep and goats are immune

Control

- Several biological control agents are available
- Mechanical control (mowing, burning, tillage and grazing) can reduce seed production but are often NOT effective due to new shoot growth from root buds
- Apply dicamba, 2,4-D or glyphosate to actively growing plants through early bloom; picloram throughout the growing season; imazapic in fall after a killing frost but before loss of milky sap



Leafy Spurge in Blossom. THRO NPS Photo.



Leafy Spurge in Blossom. Photo by USDA.



Leafy Spurge infestation. Photo by Norman Rees.

2. DYERS WOAD - *ISATIS TINCTORIA* L.

Stem

- Up to 4 ft. tall; branched at top; dry plants with attached seed pods remain standing into winter

Leaves

- Lance-shaped, 1-7 in. long, bluish-green and lack hair (glabrous) with a distinct whitish midvein; edges (margins) are wavy to smooth
- Stem leaves are alternate with lobed base that clasps the stem

Flower

- Yellow with 4 petals; occur in clusters that give plant a flat-topped appearance
- Mature seed pods dark brown to black, oblong, flattened and suspended from a small stalk; each contains a single seed

Root

- Deep taproot

Other

- Grows well on a broad range of sites; often infests waste areas, roadsides, rangeland, pastures, and crop fields
- Biennial, but sometimes annual or perennial; reproduces by seed
- Historically cultivated for use as a blue dye and as a medicine

Control

- Mow in early-flower to reduce seed production; spring tillage or digging individual plants prior to seed production can be effective
- Apply 2,4-D, metsulfuron, chlorsulfuron or imazapic to young, actively growing plant throughout the growing season; imazapic in fall after a killing frost but before loss of milky sap



Dyer's Woad Plant. Photo by Jennifer Andreas, WSU Extension.



Dyer's Woad Seed Head in different stages of development. Photo by Steve Dewey, Utah State University.



Dyer's Woad rosette. Photo by Steve Dewey, Utah State University.

3. YELLOW STAR THISTLE - *CENTAUREA SOLSTITIALIS*

Stem

- Stiff, wiry, 1-3 ft. tall and usually branched; wings (less than 0.2 in. wide) extend down stem

Leaves

- Blue- to gray-green, 1.5-6 in. long and densely covered with fine hairs
- Rosette leaves are oval to strap-like (linear) with deeply lobed edges (margins); stem leaves are alternate, strap-like to oblong with smooth to wavy edges

Flower

- Yellow, located singly at branch tips or axils; base of flower is vase-shaped, 0.5-0.75 in. diameter and covered with cotton-like hairs and stout, straw-colored spines 0.5- 1 in. long

Root

- Deep taproot

Other

- Often infests rangeland, pastures, cultivated fields, waste areas and roadsides
- Annual; reproduces by seed
- Causes “chewing disease” in horses by damaging the area of the brain that controls fine motor movements, particularly of the mouth, resulting in starvation or dehydration

Control

- Grazing, mowing, burning, pulling, digging and cultivation can be effective if done prior to seed production
- Several biological control agents are available
- Apply aminopyralid, 2,4-D, clopyralid, dicamba or picloram to actively growing plants before flowering.



Yellow Star Thistle in Flower. Photo by Carol W. Whitham.



Yellow Star Thistle in Flower. Photo by Stephany Dery, NPS.



Yellow Star Thistle flower head development. Photo by Ron Vanderhoff.

4. VENTENATA - *VENTENATA DUBIA*

Stem

- Ventenata is a basally branched, tufted winter annual grass that has rolled or folded leaves and membranous ligules. Openly branched panicles are pyramidal in overall shape and have spikelets comprised of typically 3 florets. The awns of some of the florets are bent and twisted. Nodes are reddish-black in late spring.

Leaves

- Ventenata dubia leaves mostly occur on the lower half of the stem and have open leaf sheaths. Leaves have glabrous, membranous ligules that are obtuse, usually lacerate (cut into narrow segments). The leaf blades are 1 to 3 mm wide and 2 to 7 cm (occasionally to 12 cm) long, usually glabrous (smooth and hairless) on the upper surface, scabrous on the lower surface, starting out flat and becoming rolled or folded.

Flower

- Ventenata dubia's inflorescence is an open panicle, pyramidal in shape, and up to 16" long. The panicle is light yellow in color and has a sheen. Panicle branches are spreading to drooping. Spikelets on pedicels contain on average 3 florets. Because of where the spikelets disarticulate, on mature specimens the straight-awned floret remains, while the bisexual florets with bent awns have broken away.

Root

- Fibrous

Other

- New infestations are easily overlooked.
- Prefers dry, open, and often disturbed habitats, tending to prefer sites that are inundated in early spring but dried out by late spring.
- Commonly found on south-facing hillsides with shallow, rocky clay or clay-loam soils though it can be found on other aspects and substrates

Control

- Seeds can survive in seedbank up to 3 years and require 3 or 4 years of intensive control to manage
- Soil disturbance may cause more seeds to germinate-minimize soil disturbance in infested areas
- Apply imazapic in the fall after emergence, after native plant senescence. If applied in the spring, perennial grasses may be injured.
- Apply sulfosulfuron in the fall after emergence, after native plant senescence. Native grasses may be sensitive to sulfosulfuron.



Mature Ventenata. Photo by Matt Lavin, Bozeman Montana.



Mature Ventenata. Photo by unknown.



Mature Ventenata seed head. Photo by unknown.

5. MEDUSAHEAD - *TAENIATHERUM CAPUT-MEDUSAE*

Stem

- 0.5-2 ft. tall; slender; round in cross-section

Leaves

- 4-12 in. long, less than 0.12 in. wide; sometimes covered with short hairs; collar region usually
- Has long hairs, auricles, and a membranous ligule

Flower

- Seed head is a spike, 0.5-2 in. long; awns are stiff, straight, or twisted, barbed and up to 3 in. long; spikes often remain intact on dry plants through winter

Root

- Fibrous

Other

- Grows best on clay soils; primarily infests rangeland
- Annual; reproduces by seed; matures 2-4 weeks later than other annual grasses
- Unpalatable to grazing animals due to high levels of silica in the foliage and long, stiff awns

Control

- Tillage, mowing or grazing prior to seed set can reduce stands
- Burning has had mixed results; most effective with a hot, slow fire prior to medusahead seed maturity but after other species have dried-down; burning can also be used to reduce the thatch layer, which can increase the performance of soil-applied herbicides
- Apply imazapic or sulfometuron before emergence or to small, actively growing plants; glyphosate to actively growing plant



Mature Medusahead seed head. Photo by Steve Dewey, Utah State.



Medusahead infestation can form a dense mat, preventing competition. Photo by John M. Randall, The Nature Conservancy.



Medusahead infestation intermingled in bunchgrass. Photo by Leslie J. Mehrhoff, University of Connecticut.

6. SPOTTED KNAPWEED - *CENTAUREA MACULOSA*

Stem

- Up to 4 ft. tall, rough-textured, branched and bushy; NO wings on upper stems

Leaves

- Alternate, gray-green, up to 8 in. long; most are pinnate-divided, dotted with resin and sometimes covered with small grayish hairs; upper leaves smaller and narrower with few to no lobes

Flower

- White to purple, each located at the tip of a branch; base of flower is vase-shaped, 0.5 in. long, 0.3-0.5 in. wide and covered with bracts with dark, comb-like tips that give the appearance of spots (after which the weed is named)

Root

- Deep, stout taproot

Other

- Grows best on dry, well-drained soils; often infests rangelands, waste areas and roadsides
- Biennial; reproduces by seed and lateral roots

Control

- Mowing plants in bud to flower stage can reduce seed production; repeated hand removal can be effective; DO NOT burn
- Several insect biological control agents are available
- Apply 2,4-D or dicamba in the rosette stage; apply clopyralid, picloram or aminopyralid between rosette and mid-bolt stages



Spotted knapweed buds and flower.
Photo by Rob Routledge, Sault College.



Spotted knapweed Rosette. Photo by
Rob Routledge, Sault College.



Spotted knapweed Infestation. Photo by Jason Jaeger, Lake County CWMA.

7. DIFFUSE KNAPWEED - *CENTAUREA DIFFUSA*

Stem

- Up to 2 ft. tall; rough-textured; highly branched; bushy; covered with short, stiff hairs; NO wings on upper stems

Leaves

- Alternate, lower leaves pinnate-divided, 4-8 in. long; sometimes covered with short grayish hairs; upper leaves strap-like (linear) with smooth edges (margins)

Flower

- White to sometimes purple, each located at the tip of a branch; base of flower is vase-shaped, 0.5 in. long, 0.12 in. wide and covered with yellow, comb-like bracts tipped with a narrow spine

Root

- Deep, stout taproot

Other

- Grows best in dry, well-drained soils; often infests rangelands, waste areas and roadsides
- Biennial, but sometimes annual or perennial; reproduces by seed; dry, mature plants often break off and tumble in the wind to spread seed

Control

- Mowing plants in bud to flower stage can reduce seed production; repeated hand removal can be effective; burning is NOT effective
- Several insect biological control agents are available
- Apply 2,4-D or dicamba in the rosette stage; apply clopyralid, picloram or aminopyralid between rosette and mid-bolt stages



Diffuse knapweed flower and bud. Photo by L.L. Berry.



Mature diffuse knapweed plant. Photo by K. George Beck and James Sebastian, Colorado State University.



Diffuse knapweed rosette. Photo by K. George Beck and James Sebastian, Colorado State University.

8. SCOTCH THISTLE - *ONOPORDUM ACANTHIUM*

Stem

- Up to 12 ft. tall and branched, with spiny wings along smooth stem; covered with wooly, gray hairs

Leaves

- Alternate; oblong, 4-20 in. long, covered with wooly, gray hairs giving plant a gray-green appearance; edges (margins) are lobed or toothed with stiff spines

Flower

- White to purple flowers, each located at the tip of a branch; base of flower is round (Resembles a squashed globe), 1-2 in. wide and covered with green, purple, or yellow bracts (Less than 0.2 in. long), each tipped with a spine; often covered with wooly, gray hairs

Root

- Fleshy taproot

Other

- Often infests pastures, rangeland, roadsides, and waste areas
- Biennial; reproduces by seed
- Forms dense stands that are difficult for humans and animals to penetrate

Control

- Hand-removal, digging or mowing prior to flowering can be effective
- Apply 2,4-D, dicamba, chlorsulfuron, metsulfuron or picloram to actively growing rosettes; 2,4-D + dicamba, aminopyralid, chlorsulfuron or clopyralid between rosette and late-bolt stage



Scotch Thistle Infestation. Photo by Chris Wilson, Wilson Herbicide Spraying LLC.



Scotch Thistle Infestation. Photo by Chris Wilson, Wilson Herbicide Spraying LLC.



Scotch thistle flower. Photo by Steve Dewey, Utah State University.

9. MUSK THISTLE - *CARDUUS NUTANS*

Stem

- 2-6 ft. tall and sometimes woolly and branched spiny wings caused by leaf bases that extend down the stem

Leaves

- Dark green with a light-green midvein, 4-15 in. long, alternate, and sometimes hairy; edges (margins) are deeply lobed and spiny

Flower

- Pink to purple (occasionally white), up to 3 in. wide, each located at the tip of a stem; head often nods or droops; stem below head usually spineless
- Base of flower is covered with green, purple- or straw-colored, spine-tipped bracts; bracts are 0.1-0.3 in. wide, lance-shaped, and sometimes hairy

Root

- Deep, fleshy taproot

Other

- Often infests roadsides, pastures, and waste areas
- Biennial; reproduces by seed
- Also known as nodding thistle

Control

- Mowing, tilling or hand removal after bolting but prior to flowering is effective; remove the top 2 in. of crown by digging before seed production
- Apply 2,4-D, dicamba, chlorsulfuron, metsulfuron or picloram to actively growing rosettes; aminopyralid or clopyralid between rosette and late-bolt stages



Musk Thistle rosette. Photo by Howard F. Schwartz, Colorado State University.



Musk Thistle Infestation. Photo by Chris Wilson, Wilson Herbicide Spraying LLC.



Musk Thistle flower. Photo by Chris Evans, University of Illinois.

10. RUSSIAN KNAPWEED - *CENTAUREA REPENS*

Stem

- Numerous; highly branched, stiff, 1-3 ft. tall and covered with wooly gray hair; NO wings

Leaves

- Alternate; mostly covered with wooly gray hair
- Lower leaves 2-4 in. long with lobed to wavy edges (margins); upper leaves strap-like (linear) or lance-shaped and less than 1.2 in. long with smooth or toothed edges

Flower

- Purple, pink or white, each located at the tip of a branch; base of flower is vase-shaped, 0.25-0.5 in. wide and covered with green bracts with papery or whitish edges

Root

- Creeping root system; upper roots often dark brown to black

Other

- Grows well on a broad range of sites; often found in rangeland, waste areas, roadsides and along waterways counties
- Perennial; reproduces by roots and seed
- Causes “chewing disease” in horses by damaging the area of the brain that controls fine motor movements, particularly of the mouth; results in starvation or dehydration

Control

- Mowing and tillage are NOT effective
- Apply glyphosate, chlorsulfuron or clopyralid from the bud to flower stage; aminopyralid or picloram from bud through dormancy; imazapic to dormant plants in fall



Russian Knapweed plant. Photo by Steve Dewey, Utah State University.



Russian Knapweed flower.
Photo by Eric Coombs,
Oregon State University.



Russian Knapweed infestation. Photo by Jason Jaeger, Lake County CWMA.

11. DALMATIAN TOADFLAX - *LINARIA DALMATICA*

Stem

- Up to 4 ft. tall, lacks hair (glabrous), waxy and branched near the top

Leaves

- Alternate and dense; lance-shaped to heart-shaped, 1-2.5 in. long, blue-green color, lack hair and waxy; bases clasp the stem; edges (margins) are smooth

Flower

- Snapdragon-like; 1.5-2 in. long; yellow with an orange-bearded throat and a long spur; clustered along upper part of stem
- Seed capsules round (less than 0.3 in. diameter) with two chambers, each containing many seeds

Root

- Creeping root system

Other

- Grows best in dry, well-drained soils; often infests rangelands, waste areas and roadsides
- Perennial; reproduces by seed and roots
- May be toxic to livestock if ingested in large quantities

Control

- Mechanical control (mowing, burning or tillage) is NOT effective
- Several biological control agents are available
- Apply chlorsulfuron, imazapic or picloram, through bloom or to fall rosettes; repeated applications of 2,4-D, dicamba or glyphosate to actively growing plants



Dalmation Toadflax Plant. Photo by Utah State University.



Dalmation Toadflax flower. Photo by Bob Nowierski, Montana State University.



Dalmation toadflax infestation. Photo by Jason Jaeger, Lake County CWMA.

12. CANADIAN THISTLE - *CIRSIUM ARVENSE*

Stem

- Up to 4 ft. tall, green to brown, branched at the top and usually lacks hair (glabrous)

Leaves

- Alternate, oblong, or lance-shaped, 2-8 in. long, shiny and lack hair; NO leaf stems (petioles); leaf edges (margins) are wavy, lobed, or toothed with spiny edges

Flower

- Pink, purple or white; occur in clusters at the ends of branches; base of flower is vase-shaped, 0.5-0.75 in. wide, lacks prickles and is covered with green to purple bracts with dark tips

Root

- Deep, extensive creeping root system

Other

- Grows best in moist areas; often found in pastures, hay fields, waste areas and along waterways
- Perennial; reproduces by both roots and seed; plants often appear in patches or colonies due to the spreading root system

Control

- Repeated mowing, tillage, cutting or hand removal prior to seed production can provide suppression
- Several biological control agents are available
- Apply picloram, aminopyralid or clopyralid to actively growing plants through flowering; repeated applications of 2,4-D, dicamba or glyphosate to actively growing plants



Canadian thistle infestation. Photo by Alec McClay, McClay Ecoscience.



Canadian thistle plants. Photo by Steve Dewey, Utah State University.



Canadian thistle flower. Photo by Leslie J. Mehrhoff, University of Connecticut.

13. PERENNIAL PEPPERWEED - *LEPIDIDIUM LATIFOLIUM*

Stem

- Up to 6 ft. tall, semi-woody, waxy and lacks hair (glabrous); many stems can arise from each crown often branched near top; branches arise from leaf axils

Leaves

- Alternate, oval to lance-shaped, mostly 3-12 in. long, 1-3 in. wide, green to gray-green, lack hair and waxy; edges (margins) smooth to toothed and can also be curled; leaf bases DO NOT clasp stem; lower leaves larger than upper leaves

Flower

- Small and white with 4 petals; arranged in dense clusters at the tips of stems
- Seed pods are round, flattened, less than 0.1 in. diameter, usually covered with hairs; each has 2 chambers, each with 1 seed

Root

- Creeping root system

Other

- Grows best on moist sites; often found in floodplains, pastures, meadows, hay fields and along waterways
- Perennial; reproduces by roots and seed
- Also known as tall whitetop

Control

- Mowing, digging, tillage, burning and grazing established stands are NOT effective
- Apply metsulfuron, metsulfuron+aminopyralid, or chlorsulfuron to actively growing plants through early-bloom; imazapic from full-bloom until plants become necrotic; 2,4-D and glyphosate at bud to flower can be effective if repeated for several years



Perennial pepperweed infestation. Photo by Jason Jaeger, Lake County CWMA.



Perennial pepperweed flower, root, and leaves. Photo by Steve Dewey, Utah State University.



Perennial pepperweed infestation. Photo by Leslie J. Mehrhoff, University of Connecticut.

14. WHITETOP/HOARY CRESS - *CARDARIA DRABA*

Stem

- 0.5-2 ft. tall; branched near top; covered with short hairs

Leaves

- Alternate, 1-4 in. long, blue-green, oblong to lance-shaped and covered with short hairs; edges (margins) are toothed to smooth
- Lower leaves have short leaf stems (petioles); bases of upper leaves have lobes that clasp the stem

Flower

- White with 4 petals; occur in clusters that give plant a flat-topped appearance; occur from spring to early-summer
- Seed pods are oval to heart-shaped; each contain 2 seeds

Root

- Deep, spreading root system

Other

- Grows best in disturbed, alkaline soils; often found in pastures, fields, roadsides, rangelands, waste areas and along waterways
- Perennial; reproduces through roots and seeds
- Also known as whitetop; three species occur in Oregon: hoary cress (*C. draba*) is most common but lens-podded whitetop (*C. chalapensis*) and hairy whitetop (*C. pubescens*) also occur

Control

- Dig or pull individual plants for small infestations; remaining roots can produce new plants
- Frequent tillage or mowing for several years can reduce plant density
- Apply 2,4-D to actively growing plants prior to bud stage; chlorsulfuron or metsulfuron from bud to early bloom; imazapic from full bloom until necrosis



White Top (Hoary Cress) Flower.
Photo by Chris Evans, University of Illinois.



White Top (Hoary Cress) infestation. Photo by Chris Evans, University of Illinois.



White Top (Hoary Cress) plant, root, leaves. Photo by Chris Evans, University of Illinois.

15. ST. JOHNSWORT - *HYPERICUM PERFORATUM*

Stem

- Herb that can reach 4 ft. (1.2 m) in height

Leaves

- Leaves are opposite, sessile, elliptic, 0.4-1.2 in. (1-3 cm) long and dotted with many pellucid glands

Flower

- Flowering occurs from June to September, when bright yellow flowers develop at the tips of the stems. Flowers have five petals and many stamens. Petals typically have black glands along the margins.

Root

-

Other

- The fruits are three-chambered capsules with three persistent styles.
- *Hypericum perforatum* has been used to treat mild depression, but has been shown to cause hyper photosensitivity. Plants inhabit rangelands, pastures, roadsides, and forest clearings. St. Johnswort is native to Europe. *Hypericum perforatum* may be poisonous to cattle in large doses

Control

- Biological controls are available. Klamath beetles are preferred to control large infestations. Apply before any blossoms open, preferably on new seedlings after germination. Metsulfuron, apply after weeds emerge.



St. Johnswort flower. Photo by L.L. Berry.



St. Johnswort infestation. Photo by Norman E. Rees, USDA.



St. Johnswort plant. Photo by John Cardina.

16. MEDITERRANEAN SAGE - *SALVIA AETHIOPIS*

Stem

- 1-3 ft. tall, highly branched, and densely covered with hairs

Leaves

- Gray-green; densely covered with white hairs, particularly on new leaves and underside of older leaves; wider at base (triangle-shaped); 2-12 in. long; edges (margins) with rounded, irregular teeth; leaves have an aroma when crushed
- Lower leaves have leaf stems (petioles); upper leaves are smaller and lack leaf stems

Flower

- Yellow to white, arranged in clusters of 5-10, 0.5 in. long; 2 lips, the upper lip is arch- or hook shaped, the lower lip is smaller and has 3 lobes
- 4 nutlets produced per flower, 0.16 in. long

Root

- Stout, deep taproot

Other

- Often infests rangeland, roadsides, and waste areas
- Biennial; reproduces by seed; dried plants detach and “tumble,” which disperses seeds.
- Also known as African sage

Control

- Hand removal of individual plants (including the crown) can limit spread of small infestations
- An insect biological control agent is available
- Apply 2,4-D, clopyralid or picloram to actively growing plants prior to seed production



Mediterranean sage infestation. Photo by Vince Belleci.



Mediterranean sage plant. Photo by L.L. Berry.



Mediterranean sage rosette. Photo by Joseph M. DiTomaso.

“B” DESIGNATED WEEDS

1. POISON HEMLOCK - *CONIUM MACULATUM* L.

Stem

- Up to 10 ft. tall, green with purple spots, stout, hollow except at nodes and highly branched with lengthwise ridges

Leaves

- Triangular, 4-12 in. long, finely pinnate-divided (fern-like) and lack hair (glabrous); leaflets have toothed edges; foliage has a musty odor

Flower

- Small and white; arranged in umbrella-like clusters at end of a stalk

Root

- Thick, deep taproot

Other

- Grows best in moist sites; often infests crop fields, waterways, roadsides, and waste areas
- Biennial; reproduces by seed
- Highly toxic to animals and humans when consumed

Control

- Repeated mowing or tillage prior to seed production is effective; hand-removal by cutting the taproot below the crown can also eliminate plants (avoid contact with skin)
- An insect biological control agent is available
- Apply 2,4-D, MCPA, glyphosate, chlorsulfuron or metsulfuron to young actively growing plants



Poison Hemlock. Photo by Eric Coombs, Oregon Department of Agriculture.



Poison Hemlock. Photo by Joseph M. DiTomaso.



Poison Hemlock. Photo by Robert Videki.

2. WATER HEMLOCK - *CICUTA MACULATE*

Stem

- Up to 5 ft. tall, stout, lacks hair (glabrous) and hollow except at nodes; usually with purple streaks; often branched

Leaves

- Pinnate-compound; leaflets are lance-shaped, 1-4 in. long and lack hair; edges (margins) are toothed

Flower

- Small and white; arranged in umbrella-like clusters at end of a stalk

Root

- Swollen taproot at stem base that can be cut open to reveal multiple narrow, hollow, horizontal chambers; fluid released from cut stem bases is orange-yellow or brown, has the odor of parsnip and is highly toxic

Other

- Grows best in moist soils; often found in crop fields, roadsides, waste areas and along Waterways
- Perennial; reproduces by seed
- Highly toxic to animals and humans, even in small quantities

Control

- Repeated cultivation or hand-removal can be effective (avoid contact with skin)
- Apply 2,4-D or glyphosate to actively growing plants



Water hemlock flower. Photo by Steve Dewey, Utah State University.



Water hemlock plant. Photo by Joseph M. DiTomaso, University of California.



Water hemlock leaf. Photo by John D. Byrd, Mississippi State University.

3. HALOGETON - *HALOGETON GLOMERATUS*

Stem

- Halogeton glomeratus is a 2-17.7 in. (5-45 cm) tall, annual herb. The stems are often curved at the base and tinged reddish or purple

Leaves

- Leaves are alternate, sessile, semi-succulent and 0.2-0.9 in. (4-22 mm) long

Flower

- Flowers appear in June to September. Two flower types are present; larger flowers that are 0.08-0.12 in. (2-3 mm) wide with 5 light yellow or greenish-yellow sepals, and smaller flowers with tooth-like sepals. Neither of these flower types have petals, but they both have 2-5 stamens and 2 stigmas

Root

- The root system consists of a slow growing taproot and lateral spreading roots. Halogeton builds its root system during the cool weather and begins rapid vegetative growth in May. It reproduces by seeds that are dispersed via wind, water, ants, animal ingestion, and road equipment

Other

- Halogeton glomeratus produces two types of seeds. Seed produced in the early summer are light tan and wingless; seeds produced in the late summer are dark brown and winged.
- Tissues of this plant accumulate salts from the soil. After a plant dies, these salts leach from the plant material and are deposited onto the topsoil, this favors Halogeton glomeratus seed germination and establishment. This plant is native to Eurasia and was introduced into the United States in the early 1930s. Preferred habitat includes roadsides, dry lakebeds, shrub lands and other arid and semi-arid regions

Control

- 2,4-D LV ester-apply in early spring when plants are actively growing before bloom stage
- Aminocyclopyrachlor+chlorsulfuron-apply to actively growing vegetation
- Imazapic-apply preemergence or early postemergence
- Metsulfuron-apply to actively growing plants



Halogeton plant. Photo by Clinton Shock, Oregon State University.



Halogeton foliage. Photo by Bonnie Million, Bureau of Land Management.



Halogeton flower. Photo by Clinton Shock, Oregon State University.

4. PUNCTUREVINE - *TRIBLUS TERRESTRIS*

Stem

- Prostrate; multiple stems that spread radially from crown; up to 3 ft. long (sometimes longer); highly branched, green to reddish-brown and often hairy

Leaves

- Opposite, usually hairy, pinnate-compound, 1-2 in. long, with 3-7 pairs of leaflets; leaflets oval and 0.2-0.6 in. long; edges (margins) are smooth

Flower

- Yellow, 0.2-0.6 in. diameter, with 5 petals; arise from leaf axils
- Fruit is a woody bur that breaks into 5 sections (nutlets) at maturity; each nutlet has 2 stouts, spines and contains 3-5 seeds

Root

- Slender, deep taproot; can associate with nitrogen-fixing bacteria

Other

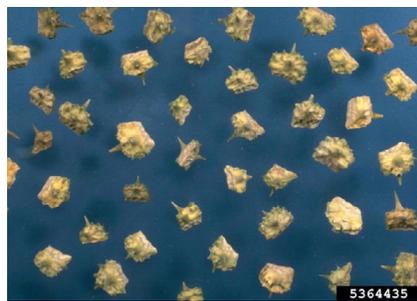
- Grows best in dry, sandy soils; often infests roadsides, crop fields and waste areas
- Annual; reproduces by seed
- Also known as goat head, Mexican sandbur, Texas sandbur and tack weed; spines on fruit can cause injury to livestock and humans and can also puncture tires; foliage can be toxic to livestock

Control

- Frequent hand-removal or tillage prior to seed production
- Two insect biological control agents are available
- Apply 2,4-D, glyphosate, dicamba, chlorsulfuron or imazapic to young, actively growing plants



Puncturevine plant. Photo by Howard F. Schwartz.



Puncturevine seeds. Photo by Howard F. Schwartz, Colorado State University



Puncturevine seeds. Photo by Steve Dewey, Utah State University

APPENDIX A

Lake County All Lands Restoration Initiative Noxious Weed Assessment Tool Field Template

Observer _____

Property Owner _____

Inspection Date _____

Forest Health Treatment Date _____

Are noxious weeds present? Yes No

Use Plant Identification and Treatment Strategies from LCALRI Noxious Weed Management Plan to fill in data below

Categories	GPS Waypoint (NAD 83, Lat/Long)	Subunit #	Species Name	Class	Plant Phenology: Grasses	Plant Phenology: Broadleaf	Infestation size	% weed cover
				(A) (B)	(Early germination) (Vegetative) (Seed Production) (Senescence)	(Rosette) (Bolt) (Bud/Flowering) (Mature/Seed heads) (Senescence)	(< 1 acre) (1/4 - 1 acre) (> 1 acre)	(<10%) (11-50%) (51-75%) (>75%)
Example	42.23250/-120.50412	1A	Medusahead	A	Seed Production		<1/4 acre	<10 %

Treatment Justification Criteria (*to be completed by the Project Manager) **Project Manager Name:** _____

What are the current funding restraints? _____ What is the available treatment window? _____

What is the site relationship to sensitive habitat? _____ Are there available herbicide applicators? _____

Is the site located in high traffic area? _____

Treatment Priority Ranking: Scale of 1-5 (with 1 equal to highest risk, requires immediate treatment and 5 being lower risk, can wait)

Subunit # (from above)	Priority Ranking	Recommended Treatment	Date Treated	Follow up Monitoring	Results
Example 1A	3	Apply herbicide	Spring 2021	Smaller patch still exists, retreat	Eliminated

Entered into Database: _____

APPENDIX B

Weed Calendar of Events for Lake County

*Note timeline is dependent upon weather & elevation

		January	February	March	April	May	June	July	August	September	October	November	December
Common Name	Scientific Name												
Leafy spurge	<i>Euphorbia esula</i>			Emerges	Flowers								
Dyer's woad	<i>Isatis tinctoria</i>		Rosette form	Flowers									
Yellow Star thistle	<i>Centaurea solistialis</i>		Rosette form & bolts in spring				Flowers						
Ventenata	<i>Ventenata dubia</i>		Germination	Growth Stage						Scenesance			
Medusahead	<i>Taeniatherum caput-medusae</i>		Germination	Growth Stage						Scenesance			
Spotted Knapweed	<i>Centaurea maculosa</i>		Rosette form & bolts in spring				Flowers						
Diffuse Knapweed	<i>Centaurea diffusa</i>		Rosette form & bolts in spring				Flowers						
Scotch Thistle	<i>Onopordum acanthium</i>		Rosette form & bolts in spring				Flowers						
Musk Thistle	<i>Carduus nutans</i>		Rosette form & bolts in spring				Flowers						
Russian Knapweed	<i>Centaurea repens</i>		Emerges				Flowers						
Dalmation Toadflax	<i>Linaria dalmatica</i>		Emerges	Flowers									
Canadian Thistle	<i>Cirsium arvense</i>		Rosette form & bolts in spring				Flowers						
Perennial Pepperweed	<i>Lepidium latifolium</i>		Rosette form & bolts in spring				Flowers						

Whitetop	<i>Lepidium draba</i>	Emerges	Flowers	
St John's wort	<i>Hypericum perforatum</i>	Emerges	Flowers	
Mediterranean Sage	<i>Salvia aethiopis</i>	Rosette form & bolts in spring	Flowers	
Poison Hemlock	<i>Conium maculatum</i>	Rosette form & bolts in spring	Flowers	
Water Hemlock	<i>Hypericum perforatum</i>	Rosette form & bolts in spring	Flowers	
Halogeton	<i>Halogeton glomeratus</i>	Rosette form & bolts in spring	Flowers	
Puncturevine	<i>Tribulus terrestris</i>	Rosette form & bolts in spring	Flowers	

