Oregon Department of Agriculture
Weed Risk Assessment for Taurian thistle
Onopordum tauricum Willd. January 2008

Taurian thistle (*Onopordum tauricum* Willd.) aka. Bull cotton thistle
Family: Asteraceae

Findings of this review and assessment:
Taurean thistle, *Onopordium tauricum*, was evaluated and determined to be a category "_A_" rated noxious weed, as defined by the Oregon Department of Agriculture (ODA) Noxious Weed Policy and Classification System. This determination was based on a literature review and analysis using two ODA evaluation forms. Using the Noxious Qualitative Weed Risk Assessment v. 3.6, taurean thistle scored _65_ indicating a Risk Category of _A_; and a score of _19_ with the Noxious Weed Rating System v. 3.1, indicating a "_A_" rating.

Introduction: Taurian thistle was first found in Oregon in 2007, near Klamath Falls. It is the only known site in the state. Because of its growth habits and appearance it is considered a sister plant to Scotch thistle *Onopordum acanthium*. Rangeland and openings in ponderosa pine forests are commonly invaded habitats. Competition from this plant can reduce forage availability and quality especially in drought years. Dense infestations in riparian areas interfere with livestock and wildlife and can impact recreational activities in these areas. California has reported several infestations of Taurian thistle from Modoc and Siskiyou counties and has classified it as an "A" rated noxious weed. These counties are just south of Klamath County, Oregon.

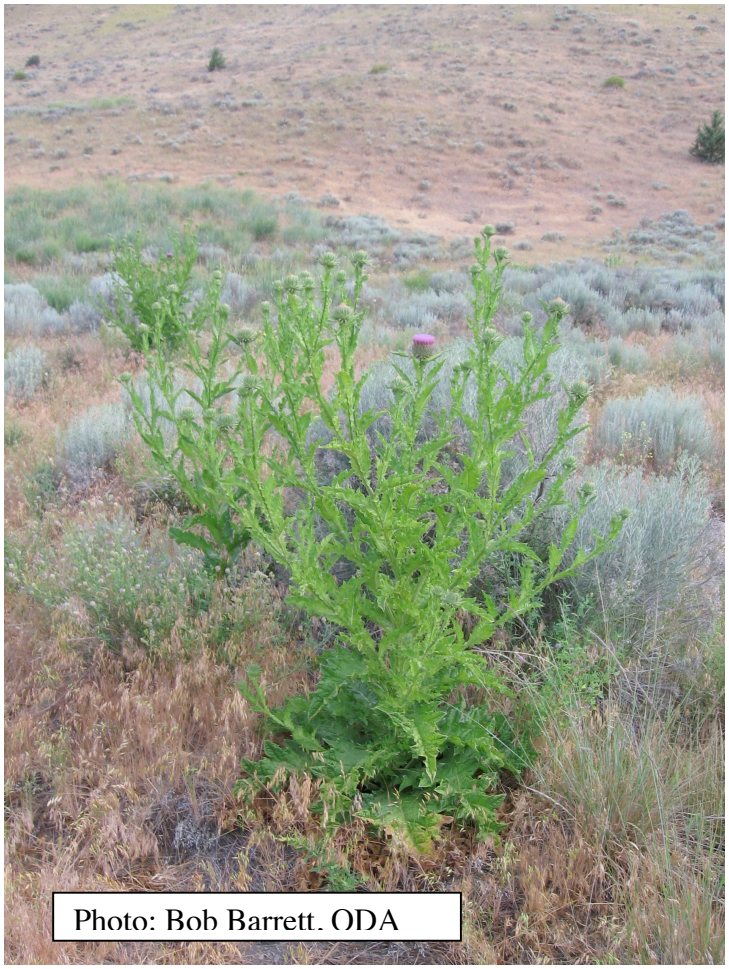
Photo: Bob Barrett, ODA

Description: Taurian thistle is a vigorous biennial, or short-lived perennial with course, spiny leaves and conspicuous spiny-winged stems. Taurian thistle plants

are a nearly florescent lime green color with large, mostly singular flower heads at the terminals of the main and side stems. The bright purple flower heads are 3 to 4 inches in diameter.

The heads consist of numerous spiny-tipped bracts resembling an artichoke before the bud opens. The leaves are typically covered with short, sticky-glandular hairs, 10-25 cm. long, acutely triangular, with 6 to 8 pairs of spiny-toothed lobes.
Taurian thistle seedlings typically appear after the first fall rains and develop into large rosettes the next growing season. From this rosette and taproot an 8 foot tall plant develops. Dead stems can persist into the next season with spines attached.

Photo by Bob Barrett, ODA
Bud

Photo by Bob Barrett, ODA
Flower

Reproduction and dispersal: Taurian thistle reproduces only by seed. Most seeds rapidly germinate with the fall rains and establish a deep taproot, though they can germinate throughout the summer when moisture is available. The taproot enables the thistle to pull moisture from deeper in the soil profile enabling it to grow throughout the dry season. Thick stands often form excluding all other vegetation insuring the thistle will have full access to water. Buried seed can remain viable in the soil seed for at least 7 years and possibly 20 years or more. Wind, water, animals, and vehicles can disperse seeds. Human agricultural activities are a prime mover of thistle seed.
Taurean thistle is uneffected by herbivory with no insect or livestock grazing noted. The thistles are only limited by the availability of light, water and nutrients.

Habitat availability: Taurean thistle occupies the same habitat as scotch thistle. Millions of acres of pine forests, arid and sem-arid rangelands are available for invasion in Oregon and the western states. Right of ways, irrigation ditches, livestock corrals and waste areas all provide excellent disturbed habitat for Taurean thistle.

Hardiness zones: Taurean thistle thrives in 3-4 hardiness zones

Probability of detection: Taurean thistle resembles scotch thistle in all aspects except plant color. Scotch thistle is greyish-green, Taurean thistle is significantly greener. This color difference may not be significant enough for most people to take notice. Couple this subtle difference to the vastness of the territory to search in, some populations may escape detection due to oversight and a lack of survey and detection resources.

Economic impact: Taurian thistle has the ability to form dense thickets similar to it's sister species, scotch thistle. Riparian areas and pastures are especially susceptible as dense stands form, crowding out native vegetation, making these areas impenetrable for medium to large animals. Significant resources are expended each year treating and removing scotch thistle from ranches and right of ways. Studies in Australia have concluded that Taurian thistle has reduced the economic return of infested land by at least 5 percent. Thistle material can also be a contaminant in alfalfa and grass hay and a troublesome sight-distance issue for automobiles on right-of-ways.

Environmental impacts: Taurian thistle does not normally form a closed canopy but when it forms dense thickets, grasses and other desirable species are displaced. Often, after occupying a site for a few years, even taurian thistle cannot germinate there for some time, leaving bare ground.

Native range: Taurian thistle is native to the Middle East. Taurian thistle from Greece has spread across Europe into France where there is concern that it is hybridizing with illyrian thistle *Onopordum illyricum*, another sister plant similar to scotch thistle.

North American range: Taurian thistle has only been reported in California and in Colorado. In California it infestes areas in the Modoc Plateau (north east Siskiyou County), northern coastal ranges (central Monterey County), and the Sierra Nevada foothills, (south central Yuba County, north east Nevada County, and Central Madera County). Colorado has reported taurian thistle in two counties in the Pueblo Mountains but there appears to be confusion as to whether it is actually taurian or scotch thistle.

From USDS Plants Database

Photo by Bob Barrett, ODA
Taurian thistle site near Klamath Falls, Oregon, 2007

Control: Improper tillage can actually increase weed density through seed scarification and dispersal. Mowing may reduce seed production if repeated several times a season but it cannot be expected to eliminate a population. Herbicides are the most effective tools to control the plant. Phenoxy based herbicides are effective if applied to the seedling to rosette stage. Cutting off the taproot several

inches under the soil can control individual plants or small infestations. All treatments need to be checked at least twice during the growing season

Noxious Weed Qualitative Risk Assessment
Oregon Department of Agriculture

Common name: Taurean thistle
Family: Asteraceae
Scientific name: Onopordum tauricum

For use with plant species that occur or may occur in Oregon to determine their potential to become serious noxious weeds. For each of the following categories, select the number that best applies. Numerical values are weighted to increase the value of important factors over less important ones. Choose the best number that applies, intermediate scores can be used.

Total Score: 65 Risk Category: **A**

GEOGRAPHICAL INFORMATION

1. 6 **Invasive in other areas**

0 Low- not known to be invasive elsewhere
2 Known to be invasive in climates dissimilar to Oregon's current climates.
6 Known to be invasive in geographically similar areas.

Comments: Known to be invasive in similar habitats.

2. 6 **Habitat availability:** Are there susceptible habitats for this species and how common or widespread are they in Oregon?

1 *Low* – Habitat is very limited, usually restricted to a small watershed or part of a watershed (e.g., tree fern in southern Curry County).
3 *Medium* – Habitat encompasses 1/4 or less of Oregon (e.g., oak woodlands, coastal dunes, eastern Oregon wetlands, Columbia Gorge).
6 *High* – Habitat covers large regions or multiple counties, or is limited to a few locations of high economic or ecological value (e.g., threatened and endangered species habitat).

Comments: Habitat includes much of Eastern Oregon.

3. 0 **Proximity to Oregon**: What is the current distribution of the species?

0 *Present* – Occurs within Oregon.
1 *Distant* – Occurs only in distant US regions or foreign countries.
3 *Regional* – Occurs in Western regions of US but not adjacent to Oregon border.
6 *Adjacent* – Weedy populations occur adjacent (<50 miles) to Oregon border.

Comments: Occurs in one location in Oregon.

4. 10 **Current distribution**: What is the current distribution of escaped populations in Oregon?

0 *Not present* – Not known to occur in Oregon.
1 *Widespread* – Throughout much of Oregon (e.g., cheatgrass).
5 *Regional* – Abundant (i.e., occurs in eastern, western, central, coastal, areas of Oregon) (e.g., gorse, tansy ragwort).
10 *Limited* – Limited to one or a few infestations in state (e.g., kudzu).

Comments: Limited to one population in Klamath County.

BIOLOGICAL INFORMATION

5. 4 **Environmental factors**: Do abiotic (non-living) factors in the environment effect establishment and spread of the species? (e.g., precipitation, drought, temperature, nutrient availability, soil type, slope, aspect, soil moisture, standing or moving water).

1 *Low* – Severely confined by abiotic factors.
2 *Medium* – Moderately confined by environmental factors
4 *High* – Highly adapted to a variety of environmental conditions (e.g., tansy ragwort, Scotch broom).

Comments: Highly adapted to a variety of environmental conditions

6. 5 **Reproductive traits:** How does this species reproduce? Traits that may allow rapid population increase both on and off site.

0 *Negligible* – Not self-fertile, or is dioecious and opposite sex not present.
1 *Low* – Reproduction is only by seed, produces few seeds, or seed viability and longevity are low.
3 *Medium* – Reproduction is vegetative (e.g., by root fragments, rhizomes, bulbs, stolons).
3 *Medium* – Produces many seeds, and/or seeds of short longevity (< 5 years).
5 *High* – Produces many seeds and/or seeds of moderate longevity (5-10 years) (e.g., tansy ragwort).
6 *Very high* – Has two or more reproductive traits (e.g., seeds are long-lived >10 years and spreads by rhizomes).

Comments: Produces many seeds of moderate longevity.

7. 4 **Biological factors:** Do biotic (living) factors restrict or aid establishment and spread of the species? (What is the interaction of plant competition, natural enemies, native herbivores, pollinators, and pathogens with species?)

0 *Negligible* – Host plant not present for parasitic species.
1 *Low* – Biotic factors highly suppress reproduction or heavily damage plant for an extended period (e.g., biocontrol agent on tansy ragwort).
2 *Medium* – Biotic factors partially restrict or moderately impact growth and reproduction, impacts sporadic or short-lived.

4 *High* – Few biotic interactions restrict growth and reproduction. Species expresses full growth and reproductive potential.

Comments: Plant expresses full biological potential.

8. 4 **Reproductive potential and spread after establishment - Non-human factors:** How well can the species spread by natural means?

0 *Negligible* – No potential for natural spread in Oregon (e.g., ornamental plants outside of climate zone).

1 *Low* – Low potential for local spread within a year, has moderate reproductive potential or some mobility of propagules (e.g., propagules transported locally by animals, water movement in lakes or ponds, not wind blown).

3 *Medium* - Moderate potential for natural spread with either high reproductive potential or highly mobile propagules (e.g., propagules spread by moving water, or dispersed over longer distances by animals) (e.g., perennial pepperweed)

5 *High* – Potential for rapid natural spread throughout the susceptible range, high reproductive capacity and highly mobile propagules. Seeds are wind dispersed over large areas (e.g., rush skeletonweed)

Comments: Potential for rapid natural dispersal due to wind, water, and anumals.

9. 5 **Potential of species to be spread by humans**. What human activities contribute to spread of species? Examples include: interstate or international commerce; contaminated commodities; packing materials or products; vehicles, boats, or equipment movement; logging or farming; road maintenance; intentional introductions of ornamental and horticultural species, or biofuel production.

1 *Low* – Potential for introduction or movement minimal (e.g., species not traded or sold, or species not found in agricultural commodities, gravel or other commercial products).

3 *Medium* – Potential for introduction or off-site movement moderate (e.g., not widely propagated, not highly popular, with limited market potential; may be a localized contaminant of gravel, landscape products, or other commercial products) (e.g., lesser celandine, Canada thistle).

5 *High* – Potential to be introduced or moved within state high (e.g., species widely propagated and sold; propagules common contaminant of agricultural commodities or commercial products; high potential for movement by contaminated vehicles and equipment, or by recreational activities) (e.g., butterfly bush, spotted knapweed, Eurasian watermilfoil).

Comments: High potential for spread due to agricultural activities and commerce.

IMPACT INFORMATION

10. 7 **Economic impact**: What impact does/can the species have on Oregon's agriculture and economy?

0 *Negligible* – Causes few, if any, economic impacts.

1 *Low* - Potential to, or causes low economic impact to agriculture; may impact urban areas (e.g., puncture vine, pokeweed).
5 *Medium* – Potential to, or causes moderate impacts to urban areas, right-of-way maintenance, property values, recreational activities, reduces rangeland productivity (e.g., English ivy, Himalayan blackberry, cheatgrass).
10 *High* – Potential to, or causes high impacts in agricultural, livestock, fisheries, or timber production by reducing yield, commodity value, or increasing production costs (e.g., gorse, rush skeleton weed, leafy spurge).

Comments: Potential to cause significant impacts to forage and livestock production.

11. 4 **Environmental Impact**: What risks or harm to the environment does this species pose? Plant may cause negative impacts on ecosystem function, structure, and biodiversity of plant or fish and wildlife habitat; may put desired species at risk.

0 *Negligible* – None of the above impacts probable.
1 *Low* – Can or does cause few or minor environmental impacts, or impacts occur in degraded or highly disturbed habitats.
4 *Medium* – Species can or does cause moderate impacts in less critical habitats (e.g., urban areas, sagebrush/ juniper stands).
6 *High* – Species can or does cause significant impacts in several of the above categories. Plant causes severe impacts to limited or priority habitats (e.g., aquatic, riparian zones, salt marsh; or T&E species sites).

Comments: Species can be highly competative in natural environments.

12. 4 **Impact on Health:** What is the impact of this species on human, animal, and livestock health? (e.g., poisonous if ingested, contact dermatitis, acute and chronic toxicity to livestock, toxic sap, injurious spines or prickles, causes allergy symptoms

0 *Negligible* – Has no impact on human or animal health.
2 *Low* – May cause minor health problems of short duration, minor allergy symptoms (e.g., leafy spurge)
4 *Medium* – May cause severe allergy problems, death or severe health problems through chronic toxicity, spines or toxic sap may cause significant injury. (e.g., giant hogweed, tansy ragwort).
6 *High* – Causes death from ingestion of small amounts, acute toxicity (e.g. poison hemlock)

Comments: Can cause injury to wildlife and livestock due to its spiny nature.

CONTROL INFORMATION

13. 4 **Probability of detection at point of introduction**: How likely is detection of species after introduction and naturalization in Oregon?

1 *Low* – Grows where probability of early detection is high, showy and easily recognized by public; access to habitat not restricted (e.g., giant hogweed).

5 *Medium* – Easily identified by weed professionals, ranchers, botanists; some survey and detection infrastructure in place. General public may not recognize or report species (e.g., leafy spurge).

10 *High* – Probability of initial detection by weed professionals low. Plant shape and form obscure, not showy for much of growing season, introduction probable at remote locations with limited access (e.g., weedy grasses, hawkweeds, skeletonweed).

Comments: Plant tall and showy but easily confused with scotch thistle.

14. 2 **Control efficacy:** What level of control of this species can be expected with proper timing, herbicides, equipment, and biological control agents?

1 *Negligible* – Easily controlled by common non-chemical control measures (e.g., mowing, tillage, pulling, and cutting; biocontrol is very effective at reducing seed production and plant density) (e.g., tansy ragwort).

2 *Low* – Somewhat difficult to control, generally requires herbicide treatment (e.g., mechanical control measures effective at preventing flowering and but not reducing plant density; herbicide applications provide a high rate of control in a single application; biocontrol provides partial control).

4 *Medium* – Treatment options marginally effective or costly. Tillage and mowing increase plant density (e.g., causes tillering, rapid regrowth, spread from root fragments). Chemical control is marginally effective. Crop damage occurs or significant non-target impacts result from maximum control rates. Biocontrol agents ineffective.

6 *High* – No effective treatments known or control costs very expensive. Species may occur in large water bodies or river systems where containment and complete control are not achievable.

Comments: Control not difficult but requires multiple years of treatment for complete eradication.

Category Scores:
22 Geographic score (Add scores 1-4)
22 Biological Score (Add lines 5-8)
15 Impact Score (Add lines 9-11)
6 Control Score (Add Lines 12-13)

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65 **Total Score** (Add scores 1-14 and list on front of form)

Risk Category: 55-90 = **A** 24-54 = **B** < 24 = unlisted.

This Risk Assessment was modified by ODA from the USDA-APHIS Risk Assessment for the introduction of new plant species
Vers. 3.6 12/2/2010

Oregon Department of Agriculture
Noxious Weed Rating System

Taurian thistle — Common Name

Onopordum tauricum — Scientific Name

Points: 19 Category: A

1. 4 Detrimental Effects: Circle all that apply, enter number of circles

1. **Health: causes poisoning or injury to humans or animals**
2. **Competition: strongly competitive with crops, forage, or native flora**
3. **Host:** host of pathogens and/or pests of crops or forage
4. **Contamination: causes economic loss as a contaminate in seeds and/or feeds**
5. **Interference: interferes with recreation, transportation, harvest, land value, or wildlife and livestock movement**

2. 4 Reproduction & Capacity for Spread: Circle the number that best describes, enter number

1. Few seeds, not wind blown, spreads slowly
2. Many seeds, slow spread
3. Many seeds, spreads quickly by vehicles or animals
4. **Windblown seed, or spreading rhizomes, or water borne**
5. Many wind-blown seeds, high seed longevity, spreading rhizomes, perennials

3. 3 Difficulty to Control: Circle the number that best describes, enter number

1. Easily controlled with tillage or by competitive plants
2. Requires moderate control, tillage, competition or herbicides
3. **Herbicides generally required, or intensive management practices**
4. Intensive management generally gives marginal control
5. No management works well, spreading out of control

4. 6 Distribution: Circle the number that best describes, enter number

1. Widely distributed throughout the state in susceptible habitat
2. Regionally abundant in part of the state, 5 or more counties, more than 1/2 of a county
3. Abundant throughout 1- 4 counties, or 1/4 of a county, or several watersheds
4. Contained in only 1 watershed, or less than 5 square miles gross infestation
5. Isolated infestation less than 640 acres, more than 10 acres
6. **Occurs in less than 10 acres, or not present, but imminent from adjacent state**

5. 2 Ecological Impact: Circle the number that best describes, enter number

1. Occurs in most disturbed habitats with little competition
2. **Occurs in disturbed habitats with competition**
3. Invades undisturbed habitats and crowds out native species
4. Invades restricted habitats (i.e., riparian) and crowds out native species

TOTAL POINTS: 19

Note: Noxious weeds are those non-native plants with total scores of 11 points or higher. Any plants in 4.1, 4.2, and 4.3 should not be classified as "A" rated weeds. Ratings: 16+ = A, 15 – 11= B

References

Dickinson R , Royer F. 1999 Weeds of the Northern U.S. and Canada.
Lone Pine Publishing and University of Alberta Press. pp.54-55

PLANTS Profile for *Onopordum tauricum* (Taurian thistle) | USDA PLANTS
plants.usda.gov/java/profile?symbol=ONTA

Distribution of thistles of the genus Onopordum in Australia.
Briese, D.T,; Lane, D.; Hyde-Wyatt, B.H.; Crocker, J.; Diver. R.G.
Plant Protection Quarterly., Vol.5, No.1, pp 23-27, 1990.

California Dept. of Agriculture - Encycloweedia: Data Sheets
http://cdfa.ca.gov/phpps/ipc/weedinfo/onopordum.htm#anchor 611410

Impact Assessment - Taurian thistle
www.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/impact_taurian_thistle-31k-

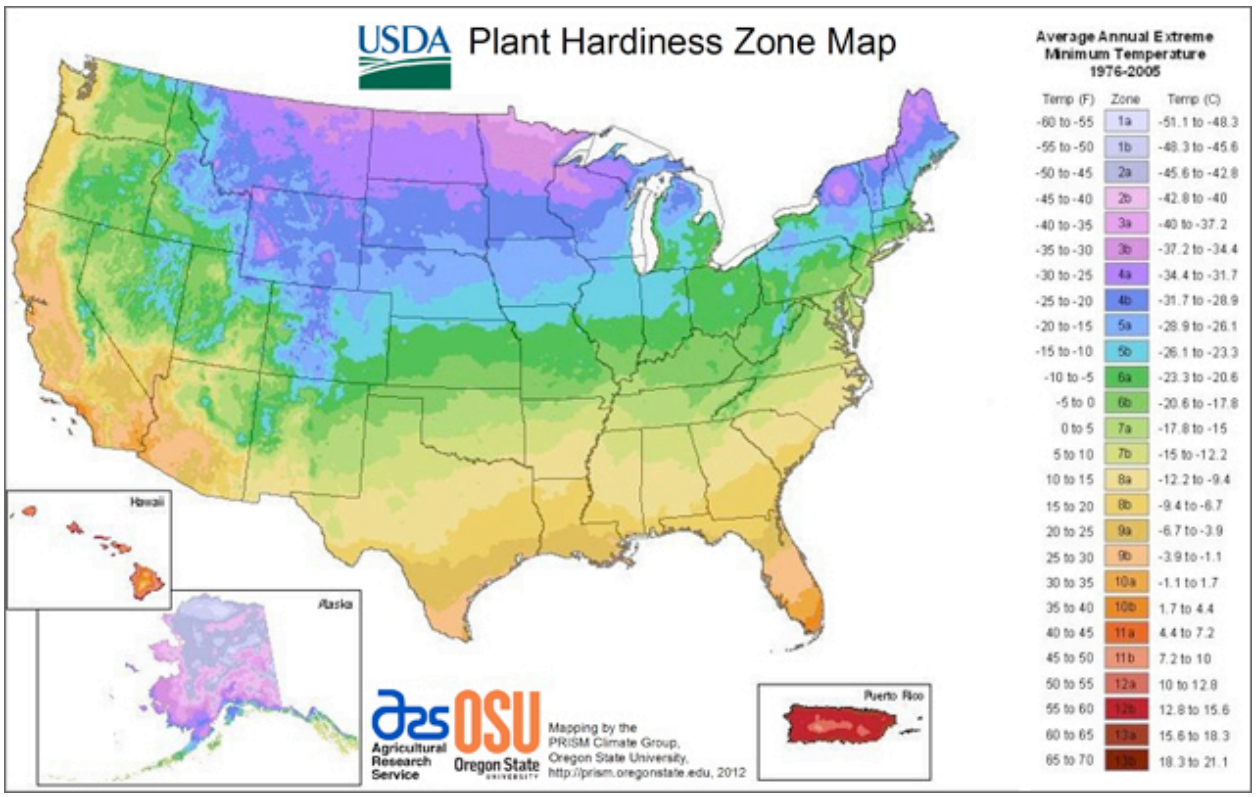
Invasive Assessment - Taurian thistle, *Onopordum tauricum*.
www.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/invasive_taurian_thistle-21k-

Taurian thistle is another of the State's "A" List
www.co.monterey.ca.us/ag/nox_weeds.htm -35K-

Natural Resource Projects Inventory (NRPI) catalog, Siskiyou County Taurian thistle control (0300)
http;//gis.ca.gov/Catalog/BrowseRecord.epl?id=24742

California State Noxious Weeds List
plants.usda.gov/java/noxious?rtpType=State&statefips=06

Attachment 1


USDA Plant Hardiness Zone Map
Average Annual Extreme Minimum Temperature 1976-2005
Temp (F) Zone Temp (C)
-60 to -55 1a -51.1 to -48.3
-55 to -50 1b -48.3 to -45.6
-50 to -45 2a -45.6 to -42.8
-45 to -40 2b -42.8 to -40
-40 to -35 3a -40 to -37.2
-35 to -30 3b -37.2 to -34.4
-30 to -25 4a -34.4 to -31.7
-25 to -20 4b -31.7 to -28.9
-20 to -15 5a -28.9 to -26.1
-15 to -10 5b -26.1 to -23.3
-10 to -5 6a -23.3 to -20.6
-5 to 0 6b -20.6 to -17.8
0 to 5 7a -17.8 to -15
5 to 10 7b -15 to -12.2
10 to 15 8a -12.2 to -9.4
15 to 20 8b -9.4 to -6.7
20 to 25 9a -6.7 to -3.9
25 to 30 9b -3.9 to -1.1
30 to 35 10a -1.1 to 1.7
35 to 40 10b 1.7 to 4.4
40 to 45 11a 4.4 to 7.2
45 to 50 11b 7.2 to 10
50 to 55 12a 10 to 12.8
55 to 60 12b 12.8 to 15.6
60 to 65 13a 15.6 to 18.3
65 to 70 13b 18.3 to 21.1
Hawaii
Alaska
Puerto Rico
Agricultural Research Service
Oregon State University
Mapping by the PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, 2012