



# Hollister Hills SVRA

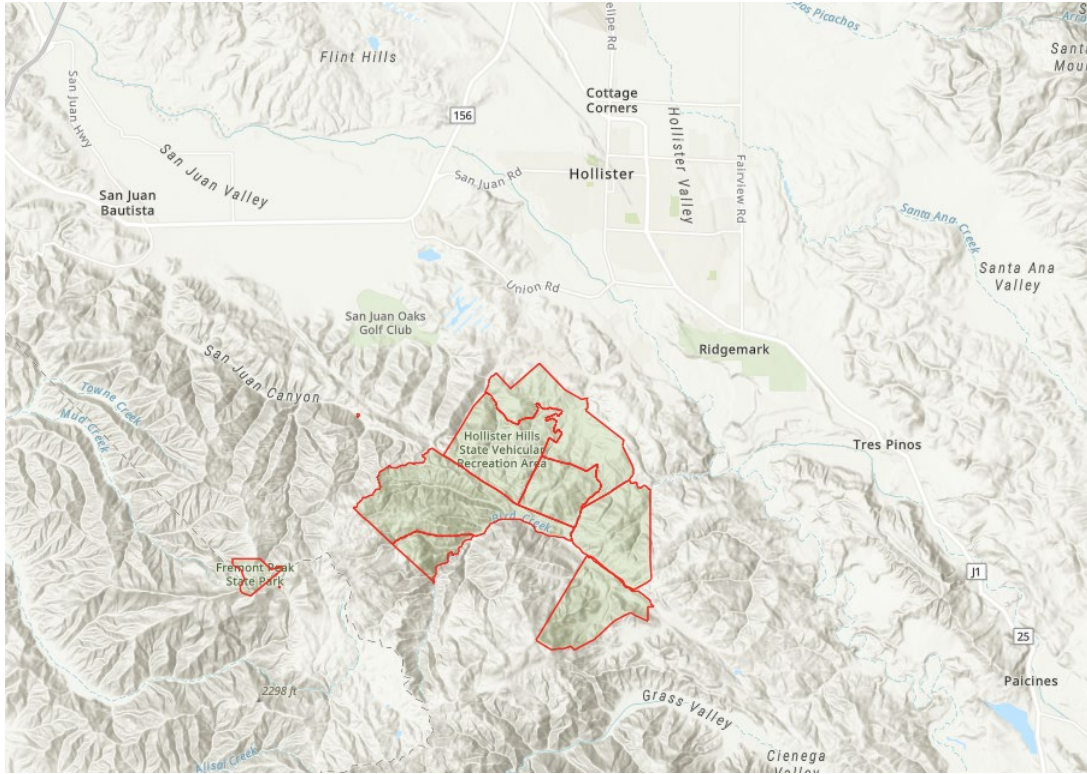
## Weed Management Program Overview



Nicolas Somilleda & Elijah Aldridge

Environmental Scientists





What is Hollister Hills SVRA?





What is Hollister Hills SVRA?





What is Hollister Hills SVRA?



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# Park Usage



# Trail Riding





**Park Usage**

Off-roading







**Park Usage**

**Camping**

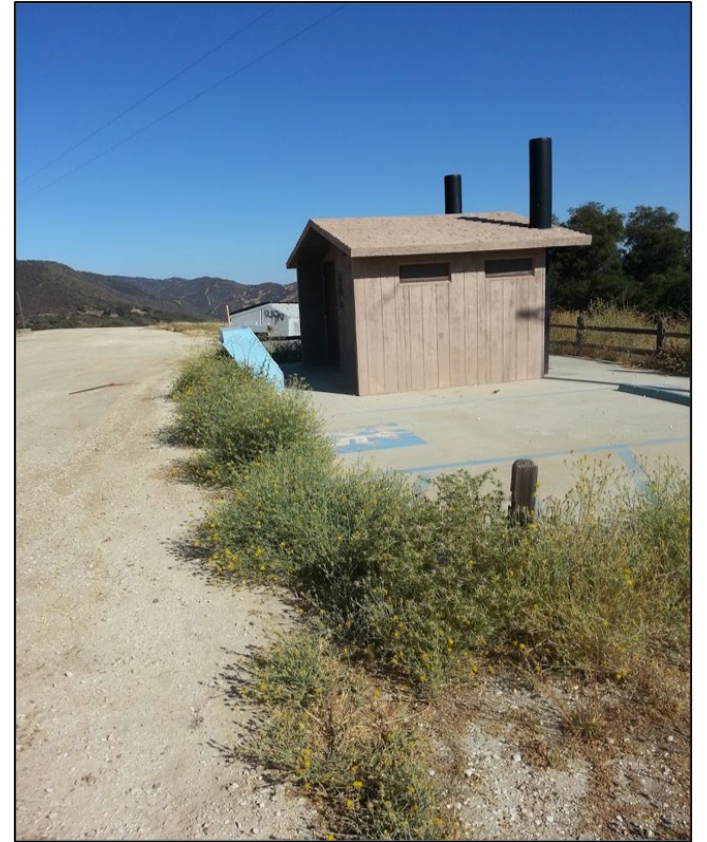


# Park Usage

# Special Events







## PRESENCE OF INVASIVE PLANTS

IMPACTS OF INVASIVE PLANT INFESTATIONS  
CAN BE SEEN THROUGHOUT THE ENTIRE PARK



# Weed Infestations on Trails





# Weed Infestations on Trails





# Weed Infestations in Campgrounds





# Weed Infestations at Tracks





# Added Pressures



## STAGING AREAS





# Added Pressures



QUARRY MATERIALS





Added Pressures

OFF-TRAIL RIDING



# Added Pressures



WILD BOAR



A photograph showing a flooded area with muddy, brown water. In the background, there are trees, some bare and some with green leaves, and a building with a corrugated metal roof. The water is turbulent and appears to be flowing through a narrow channel or a cleared area. The sky is overcast and grey. The overall scene suggests a severe weather event, likely a winter storm, causing flooding.

Extreme Winter  
Storms





Extreme Winter  
Storms





## Extreme Winter Storms

- Sink Holes
- Wash Outs
- Impassible Conditions
- Weed Explosions



Extreme Winter  
Storms

Weed Explosions



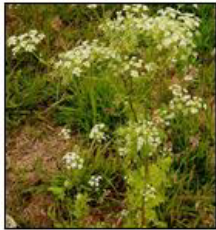


# Wildlife Habitat Protection





**Common Name: Poison Hemlock**  
**Botanical Name: *Conium maculatum***  
**Family: Apiaceae**



Poison Hemlock



Flower



Plant Stem

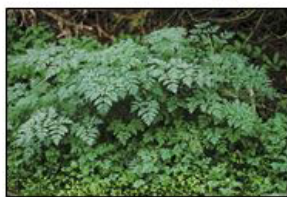
Poison hemlock is a dicot and is a perennial herb that is NOT native to California; it was introduced elsewhere and naturalized in the wild. Poison hemlock is a weed that inhabits disturbed places and wetland-riparian communities. Occurs anywhere between 0 to 5000 feet in elevation. Cal-IPC classifies the statewide impact of poison hemlock as moderate.

This plant is **TOXIC!** Do **NOT** ingest!

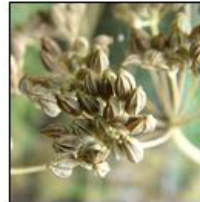
**Blooms:** April through July

**Description:** Erect biennial to 3 m tall, with large triangular, dissected compound leaves and usually with purple-spotted or purple-streaked stems. Crushed foliage has a musty odor that is often described as similar to mouse excrement. Poison hemlock contains piperidine alkaloids, and all plant parts are highly toxic to humans and animals when ingested. Symptoms of poisoning appear soon after ingestion and include nervousness, trembling, knuckling at the fetlock joints, uncoordinated gait, dilated pupil, coldness of the limbs or body, weak and slow heartbeat, coma, and death from respiratory paralysis.

**Location within Hollister Hills:** Common along roadsides, pastures, fields, ditches, riparian areas, cultivated fields, waste places, and other disturbed, other moist sites. Found all throughout Hollister Hills.



Immature Plant



Seed Pod

**Common Name: Black Mustard**  
**Botanical Name: *Brassica nigra***  
**Family: Brassicaceae**



Black Mustard



Flower



Plant

Black mustard is a dicot and is an annual herb that is NOT native to California; it was introduced elsewhere and naturalized in the wild. Occurs anywhere between 0 to 4921 feet in elevation. Cal-IPC classifies the statewide impact of this plant as moderate.

**Blooms:** April through August

**Description:** Erect winter annuals, with bright yellow 4-petaled flowers and linear seedpods (3/4 in) that are erect or spreading. Stems coarse-haired. Can grow up to 2-8 feet tall with basal leaves mostly have 1-2 pairs of distinct lateral lobes at the base, terminal lobe much larger than the lateral lobes. Upper stem leaves oblong linear, base tapered, margins entire to toothed or weakly lobed. Black mustard has adapted to periodic fire.

**Location within Hollister Hills:** Common along roadsides, pastures, fields, ditches, riparian areas, cultivated fields, waste places, and other disturbed sites. Found all throughout Hollister Hills.



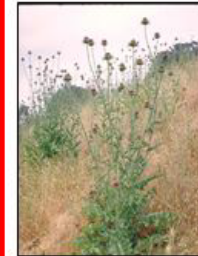
Immature Plant



Seed Pod

# Winter Weeds

**Common Name: Milk Thistle**  
**Botanical Name: *Silybum marianum***  
**Family: Asteraceae**



Milk Thistle



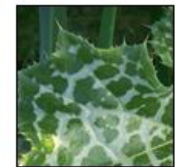
Thicket



Flower



Seedling



Leaf



Seeds

Milk thistle is a dicot and an annual or perennial herb that is NOT native to California; it was introduced elsewhere and naturalized in the wild. Occurs anywhere between 0 to 1640 feet in elevation. Cal-IPC classifies the statewide impact of this plant as limited.

**Blooms:** April-July

**Description:** Erect winter/summer annual or biennial generally 1-2 m tall, with white-variegated prickly leaves. Often occurs in dense competitive stands. Seedlings are cotyledons broadly obovate, about 1-1.5 cm long, thick, glabrous. First leaf pair alternate, elliptic-obovate, mostly 1-2 cm long, margin prickly-toothed, nearly glabrous. The mature plants have stems that are branched, thick, hollow, ribbed, lack wings or spines, and are sparsely hairy. Leaves coarsely pinnately lobed, prickly-toothed, ruffled, nearly glabrous. Upper surfaces shiny green and conspicuously variegated with white. Basal leaves 15-7 cm long. Stem leaves reduced, sessile, and clasping the stem at the base, often curved downward. Flower heads consist of numerous pink to purple disk flowers, base 2-6 cm in diameter; on long stalks. Seeds are mostly lanceolate, 6-8 mm long, slightly flattened, mottled black and brown, with a yellowish ring at the apex. Pappus bristles numerous, minutely barbed, flat, mostly 15-20 mm long, fused at the base to form a ring, detach as a unit.

**Location within Hollister Hills:** Disturbed sites, roadsides, pastures, fields, agronomic crops, waste places, orchards, and tree margins in chaparral and woodlands. Grows best in fertile soils. Found all throughout Hollister Hills SVRA.



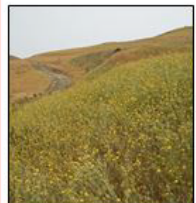
Common Name: **Yellow Star Thistle**

Botanical Name: ***Centaurea solstitialis***

Family: **Asteraceae**



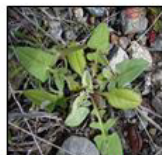
Yellow star thistle



Thicket



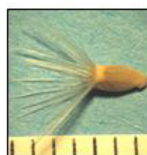
Flowers



Immature Plant



Stem



Seed

Yellow star thistle is a dicot and an annual herb that is NOT native to California; it was introduced elsewhere and naturalized in the wild. Occur anywhere between 0 to 4265 feet in elevation. Cal-IPC classifies the statewide impact of this plant as high. The California Department of Food and Agriculture classifies Italian thistle as a Noxious Weed List C: Control required in nurseries, not required elsewhere.

**Blooms:** June through December

**Description:** Simple to bushy winter annuals with spiny yellow-flowered heads and wiry stems that can grow to 2 m tall. Plants are highly competitive and typically develop dense, impenetrable stands that displace desirable vegetation. Foliage grayish to bluish green, densely covered with fine white cottony hairs that hide most of the stiff thick hairs and minute glandular dots. Seedlings are cotyledons 6-9 mm long, 3-5 mm wide. Later, rosette leaves typically deeply lobed near to the mid-vein, often appear ruffled, lobes most acute, with toothed to wavy margins. Terminal lobe nearly triangular to lanceolate. Both upper and lower surfaces usually densely covered with fine cottony hairs and stiff thick hairs. Flower heads are round to ovoid, spiny, solitary to stem tips, consist of numerous yellow disk flowers. Central spike of main phyllaries 10-25 mm long, stout, yellowish to straw-colored throughout. Lateral spines typically in 2-3 pairs at the base of the central spine. Mature plants can produce nearly 75,000 seeds. Produces 2 types of seeds, both glabrous, mostly 2-3 mm long, base broad. Outer ring of seed dull dark brown, often speckled with tan, lack pappus bristles, often remain heads. Inner seeds glossy, gray to tan to mottled cream-colored and tan, with slender white pappus bristles 2-5 mm long.

**Location within Hollister Hills:** Common along open disturbed sites open hillsides, grassland, rangeland, open woodlands, fields, pastures, roadsides, and waste places. Found all throughout Hollister Hills SVRA.

Weed Alert!  
Stinkwort



Stinkwort  
(*Dittrichia graveolens*)



Mature Size Waist



Description

- Annual plant to 3 ft. tall
- Branched from base of plant with a "Christmas tree" growth form when young
- Small, 1/3-2/3 in. wide, daisy-like flowers with yellow outer petals and yellow to reddish interiors
- Narrow grey-green leaves are 1-4 in long with serrated edges
- Leaves partially clasp the stalk
- Sticky with a strong camphor aroma; plant can cause skin irritation
- Reproduces by seed
- Spread by roads and construction materials
- Native to western Europe, the Mediterranean region, and southwest Asia



Bloom Period Sep - Dec

Habitat Roadsides, pastures, riparian



2-Minute Removal Pull

Image credits: Front top: ©2006 Tom Cochran, Front bottom Regents of the University of California, Back top: ©2006 Tom Hyland  
These cards were adapted from a design by National Park Service

# Summer Weeds





## INTEGRATED WEED MANAGEMENT PROGRAM

- (Timing) Early Detection / Rapid Treatment
- (Timing) Planned & Coordinated Effort
- Repeat Treatments within the Same Season
- Manage High Visible Areas
- Anchor Points
- Weed Mapping: Web Maps – ArcGis Online
- Partnerships: Weed Management Area (WMA) MOU



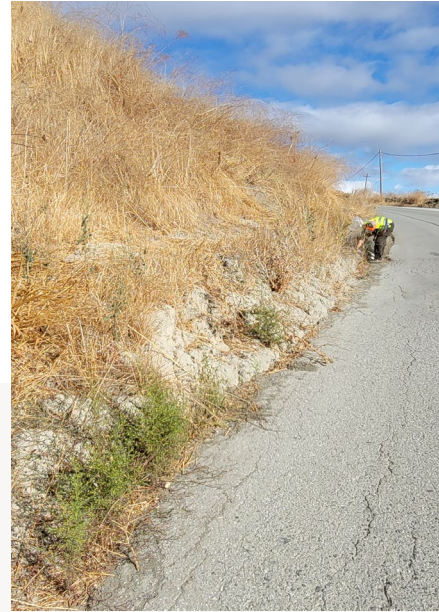
# INVASIVE PLANT CONTROL METHODS



EARLY  
DETECTION  
RAPID  
TREATMENT



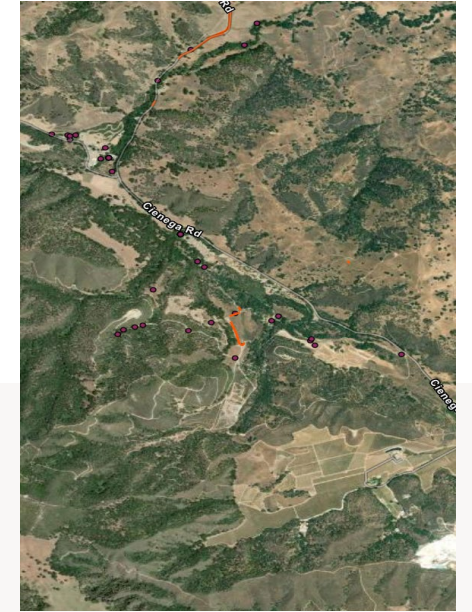
TIMELY  
BRUSHING



MANUAL  
REMOVAL



HERBICIDE  
TREATMENT



WEED  
MAPPING





**UNIVERSITY OF CALIFORNIA**

Division of Agriculture  
and Natural Resources

<http://anrcatalog.ucdavis.edu>

**PUBLICATION 8012**

## **Herbicide Resistance: Definition and Management Strategies**

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**JOSEPH M. DITOMASO**, Cooperative Extension Weed Specialist, UC Davis; and  
**JODIE S. HOLT**, Professor, Department of Botany and Plant Sciences, UC Riverside

**H**erbicide resistance is the inherited ability of a plant to survive and reproduce following exposure to a dose of herbicide that would normally be lethal to the wild type. In a plant, resistance may occur naturally due to selection or it may be induced through such techniques as genetic engineering. Resistance may occur in plants as the result of random and infrequent mutations; there has been no evidence to date that demonstrates herbicide-induced mutation. Through selection, where the herbicide is the selection pressure, susceptible plants are killed while herbicide-resistant plants survive to reproduce without competition from susceptible plants. If the herbicide is continually used, resistant plants successfully reproduce and become dominant in the population. The appearance of herbicide resistance in a population is an example of rapid weed evolution ([Figure 1](#)).

Research on early cases of herbicide resistance showed that resistant plants were found infrequently in weed populations before use of the herbicide. In some cases this was because the resistant plant was not as fit (i.e., as likely to survive and produce seed) as other plants in the population and therefore would not persist in large numbers. Recent research, however, has shown that in some cases resistance does

# **Herbicide Resistance**

Definition: Target plant survives and reproduces even after exposure to herbicide.

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## **Resistance Management Guidelines:**

- Let areas rest (Cycle years)
- A combination of different management techniques at the same site.
- No more than 1 entry per year with certain herbicides
- Use correct dosages





WR6J85

JOHN DEERE

705



High Pressure  
Weed Sprayer



Boom Sprayer





# Selective Herbicides

Kill Weeds NOT Grass or Forbs

- Pre-emergent
- Can mix with Roundup



**Capstone™ Specialty Herbicide Fact Sheet**

**The proven premix with targeted control**

Capstone™ specialty herbicide was developed by Dow AgroSciences to deliver enhanced performance on problem weeds — including noxious and invasive broadleaf weeds — as well as selective control of brush and vines. Featuring an excellent environmental profile, Capstone is available exclusively from Dow AgroSciences to meet the changing needs of professional vegetation managers. This innovative formulation combines fast knockdown power with long-lasting residual control of herbaceous broadleaf weeds and woody plants, including glyphosate-resistant broadleaf weeds.

Capstone is labeled for use on rights-of-way, including roadsides, electric utility and communications transmission lines, pipelines, railroads and nonirrigation ditch banks; forests; Conservation Reserve Program (CRP) sites; industrial sites; natural areas; and grazed areas in and around these areas, and can be applied up to the water's edge.

**Application techniques and timing**

Capstone is selective to most cool- and warm-season perennial grasses, which allows existing grasses to flourish, and is labeled for use in a variety of different ways beyond the proven broadleaf weed control. Research has shown its effectiveness in chemical side trim applications, which affect only the area of target trees that the herbicide solution is applied to, leaving the rest of the tree alive and healthy as long as only the lower and/or mid-canopy branches are treated. This is not true with all species, especially legume species (such as locust), so be sure to check the label, the supplemental label and the Use Around Tree Guidelines Fact Sheet for a full list of species with which caution must be used when applying as a side trim. Capstone also controls many key woody brush and vine species while being selective to desirable grasses in the treatment area.

In forestry settings, Capstone™ specialty herbicide in combination with Accord® XRT II specialty herbicide makes for an ideal site preparation treatment when targeting wilding pine, cedar and select waxy leaved species. For directed spray applications such as low-volume backpack, Capstone has proven effective as a spot treatment to control a multitude of woody plants and vines in areas such as along fencerows, nonirrigation ditch banks, utility poles, guy wires, and forest understory and edges. Capstone provides a unique level of flexibility to users because it is labeled not only for foliar treatments, but also can be used for cut surface applications such as tree injection (hack and squirt) and cut-stump treatments.

Cut-stump applications are made after tree removal with undiluted Capstone by spraying or painting the freshly cut surfaces immediately after cutting (at least within 30 minutes) for optimum effectiveness. The sooner treatments are made the better the control of the target species will be. The cambium area next to the bark is the most vital area to wet. Applications should cover all of the exposed cambium so that a continuous ring of product is applied around the cut surface.

Directions for foliar applications allow treatments to be performed using ground or aerial equipment. Capstone specialty herbicide should not be applied at more than 9 pints per acre per year unless used as a spot treatment (follow spot treatment directions on the label).




**Specimen Label**

AMINOPYRALID GROUP 4 HERBICIDE

**CORTEVA**  
agriscience

**Milestone®**

**HERBICIDE**

™&® Trademarks of Corteva Agriscience and its affiliated companies

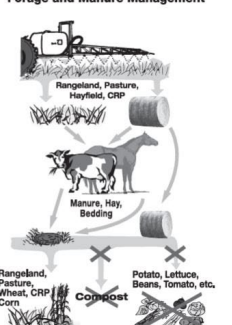
- For control of annual and perennial broadleaf weeds including invasive and noxious weeds, certain annual grasses, and certain woody plants and vines on:
  - rangeland, permanent grass pastures (including grasses grown for hay\*), Conservation Reserve Program (CRP);
  - non-crop areas for example, airports, barrow ditches, communication transmission lines, electric power and utility rights-of-way, fencerows, gravel pits, industrial sites, military sites, mining and drilling areas, oil and gas pads, non-irrigation ditch banks, parking lots, petroleum tank farms, pipelines, roadsides, railroads, storage areas, dry storm water retention areas, substations, unimproved rough turf grasses;
  - natural areas (open space) for example, campgrounds, parks, prairie management, trailheads and trails, recreation areas, wildlife openings, and wildlife habitat and management areas including seasonally dry flood plains, deltas, marshes, prairie potholes, or vernal pools;
  - including grazed areas in and around these sites.

\*Hay from grass treated with Milestone within the preceding 18 months can only be used on the farm or ranch where the product is applied unless allowed by supplemental labeling.

**IMPORTANT USE PRECAUTIONS AND RESTRICTIONS TO PREVENT INJURY TO DESIRABLE PLANTS in Hay or Manure Use.**

- Carefully read the section "Restrictions in Hay or Manure Use."
- It is mandatory to follow the "Use Precautions and Restrictions" section of this label.
- Manure and urine from animals consuming grass or hay treated with this product may contain enough aminopyralid to cause injury to sensitive broadleaf plants.
- Hay can only be used on the farm or ranch where product is applied unless allowed by supplemental labeling.
- Consult with a Corteva Agriscience representative if you do not understand the Use Precautions and Use Restrictions. Call 1-800-258-3033 Customer Information Group.

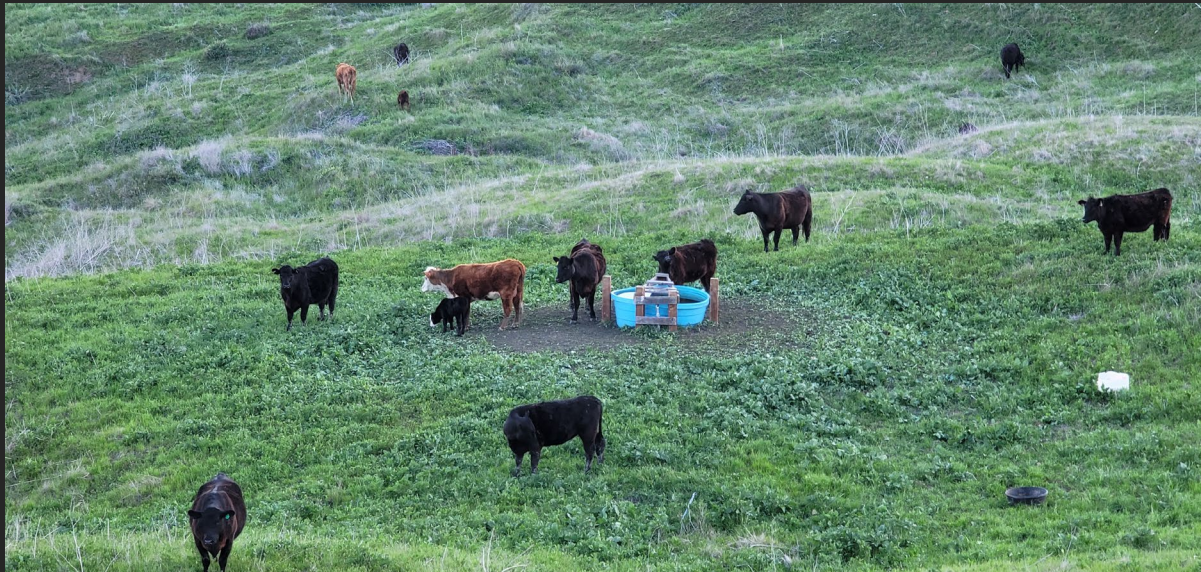
**Forage and Manure Management**



The diagram illustrates the management of forage and manure. It shows a field labeled 'Rangeland, Pasture, Hayfield, CRP' where a tractor is working. An arrow points to a cow and horse labeled 'Manure, Hay, Bedding'. Another arrow points to a pile of 'Compost'. A third arrow points to 'Potato, Lettuce, Beans, Tomato, etc.'. 'X' marks are placed over the arrows leading to 'Compost' and 'Potato, Lettuce, Beans, Tomato, etc.' to indicate that the product should not be used in these areas.

Most Flexible






# CATTLE GRAZING





# Non-Selective Herbicides

- Post-emergent
- Rain Ready
- With surfactant



## Roundup PROMAX® Herbicide Technical Fact Sheet

April 2010

**INTRODUCTION**

Roundup PROMAX® herbicide is widely used to control weeds and brush in professional vegetation management situations such as roadsides, railroad rights of way, turf management and landscaping. Roundup PROMAX is part of Monsanto's family of glyphosate herbicides, made up of dozens of brands used in agricultural, industrial and residential markets in more than 130 countries worldwide. Various wildlife habitat restoration groups use Roundup PROMAX or similar herbicides in the restoration and management of habitat and refuge areas.

The active ingredient in Roundup PROMAX, glyphosate, is absorbed into the green vegetation and is translocated throughout the plant, including the roots. Glyphosate works by inhibiting production of an enzyme that is essential to formation of essential amino acids in plants. Obvious signs of treatment may not be visible for one to four days in annual weeds and for up to seven days or more in perennials. Visible effects include gradual wilting or yellowing followed by complete browning and deterioration of plant tissue, and ultimate decomposition of the underground roots and rhizomes. Since Roundup PROMAX works only on plants that have emerged through the soil, it will not affect seeds in the soil that have not yet sprouted. When desirable vegetation is in close proximity to weeds, care must be exercised to keep Roundup PROMAX off of green plant tissues.

**INGREDIENTS**

Glyphosate, the active ingredient in Roundup PROMAX herbicide, is formulated as a potassium salt, which makes up 49 percent of the formulation. The non-herbicidally active or inert ingredients are water and a surfactant blend, which is added to aid penetration of the active ingredient through leaf surfaces. The concentrated formulation is diluted with water before application. Most vegetation management situations call for a spray solution of Roundup PROMAX herbicide that is more than 98 percent water.

**HEALTH AND SAFETY STUDIES**

Toxicological testing with laboratory animals serves as a model for evaluating the potential of a substance to cause adverse effects in humans. Roundup PROMAX herbicide has been evaluated in studies with laboratory animals and wildlife species, using levels far greater than the levels that might occur from normal use of the herbicide.

Glyphosate is widely considered by regulatory authorities, scientific bodies and independent scientists to have low acute toxicity, no potential to cause cancer, reproductive problems or birth defects and not bioaccumulate in mammals.<sup>1, 2, 3, 4</sup>

1 U.S. EPA (1993) Glyphosate Reregistration Eligibility Decision (RED). U.S. Environmental Protection Agency. EPA-738-R-93-014. Washington, DC.  
[http://www.epa.gov/oppstredl/RED/0606\\_reds/glyphosate.pdf](http://www.epa.gov/oppstredl/RED/0606_reds/glyphosate.pdf)

2 European Commission (2002) Report for the Active Substance Glyphosate, Directive 6511/V199, January 21.  
[http://ec.europa.eu/food/fs/afp/ph\\_ps/pro/eva/existing/list1\\_glyphosate\\_en.pdf](http://ec.europa.eu/food/fs/afp/ph_ps/pro/eva/existing/list1_glyphosate_en.pdf)

3 WHO/FAO (2004) Pesticides residues in food – 2004. Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Core Assessment Group on Pesticide Residues (JMPR). Rome, Italy, 20-29 September 2004. FAO Plant Production And Protection Paper 178. World Health Organization and Food and Agriculture Organization of the United Nations. Rome, Italy.  
[http://www.fao.org/ag/agn/agnp/pesticide/JMPR\\_DOWNLOAD/2004\\_jmpreport2004jmpr.pdf](http://www.fao.org/ag/agn/agnp/pesticide/JMPR_DOWNLOAD/2004_jmpreport2004jmpr.pdf)

4 Williams GM, Kross R, Munro IC. (2000) Safety evaluation and risk assessment of the herbicide Roundup and its active ingredient, glyphosate, for humans. Reg Toxicol Pharmacol 31(2): 117-165. doi:10.1006/rph.1999.1371

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Use Around Water





GOAT GRAZING

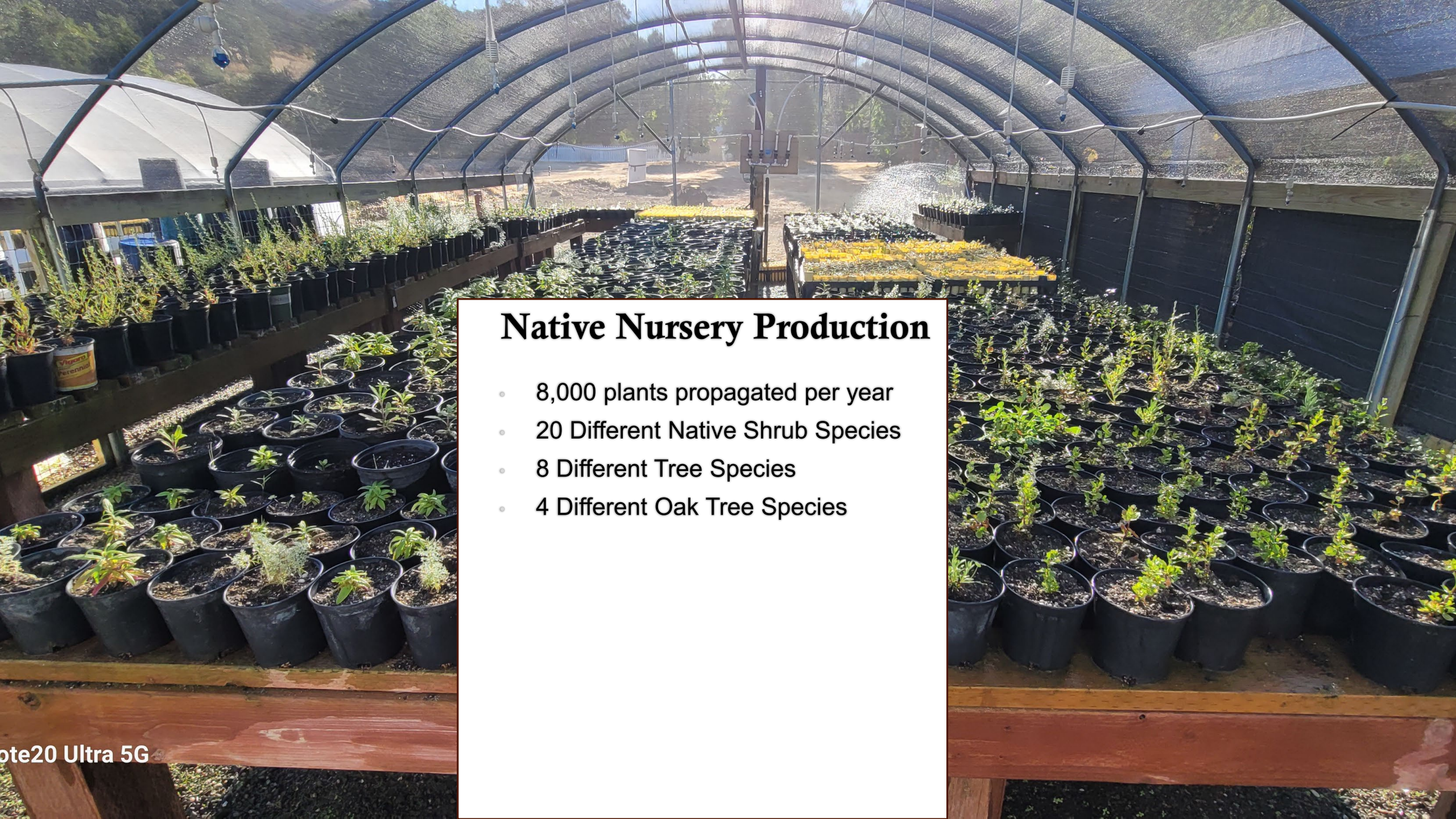




# Wildlife Habitat Restoration Program







## Native Nursery Production

- 8,000 plants propagated per year
- 20 Different Native Shrub Species
- 8 Different Tree Species
- 4 Different Oak Tree Species







# Weed Infestations

Manage weeds before  
native planting efforts





# Prescribed Fire Management Program

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- Period of Growth
- Building Capacity
- Improvement and Development
- CalFire Relationship/Local Operating Agreements
- Projects







SUCCESSFUL CONTROL of INVASIVES





**SUCCESSFUL CONTROL of INVASIVES**





**SUCCESSFUL CONTROL of INVASIVES**