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Veronica Leah Farber

Humboldt State University, vlf86@humboldt.edu

Marina Chow

Humboldt State University, mlc35@humboldt.edu

Claudia Rodriguez

Humboldt State University, cjr619@humboldt.edu

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Trinidad State Beach Habitat Restoration Plan

Marina Chow, Veronica Farber, Claudia Rodriguez



Trinidad State Beach looking northwest (V. Farber, March 2020)

Applied Ecological Restoration Capstone (ESM 455)
Department of Environmental Science & Management
Humboldt State University

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1 Introduction

1.1 Project Summary

California State Parks (CSP) is proposing to restore approximately 81 hectares (200 acres) of habitat at Trinidad State Beach (TSB). Over time, invasive non-native plants have established throughout TSB and are encroaching onto sensitive habitats. This project aims to restore coastal shrub communities and native forest understory by the removal of invasive non-native plant species currently inhabiting the area. The purpose of this project is to restore and protect these sensitive habitats while also preventing future degradation of these areas. The project will involve an integrated approach to invasive non-native plant control with treatment methods that will be determined by the target species and specific site conditions.

1.2 Project Location

Trinidad State Beach, North Coast Redwoods District, is located in Trinidad, California (41.0654° N, 124.1503° W) in Humboldt County and is part of the California Coastal National Monument, which protects unique coastal habitat for marine-dependent wildlife and vegetation on rocks, islands, exposed reefs and pinnacles along the California coastline (BLM, 2019) (Figure 1). The state beach is 30.5 km (19 miles) north of Eureka, CA just off Highway 101. It can be accessed via Stagecoach Road and Ewing Street (Figure 2). The south end of TSB begins adjacent to the Humboldt State University Telonicher Marine Laboratory (HSU Marine Lab) and continues northwards to Megwil Point. The project site is approximately 81 hectares (200 acres).

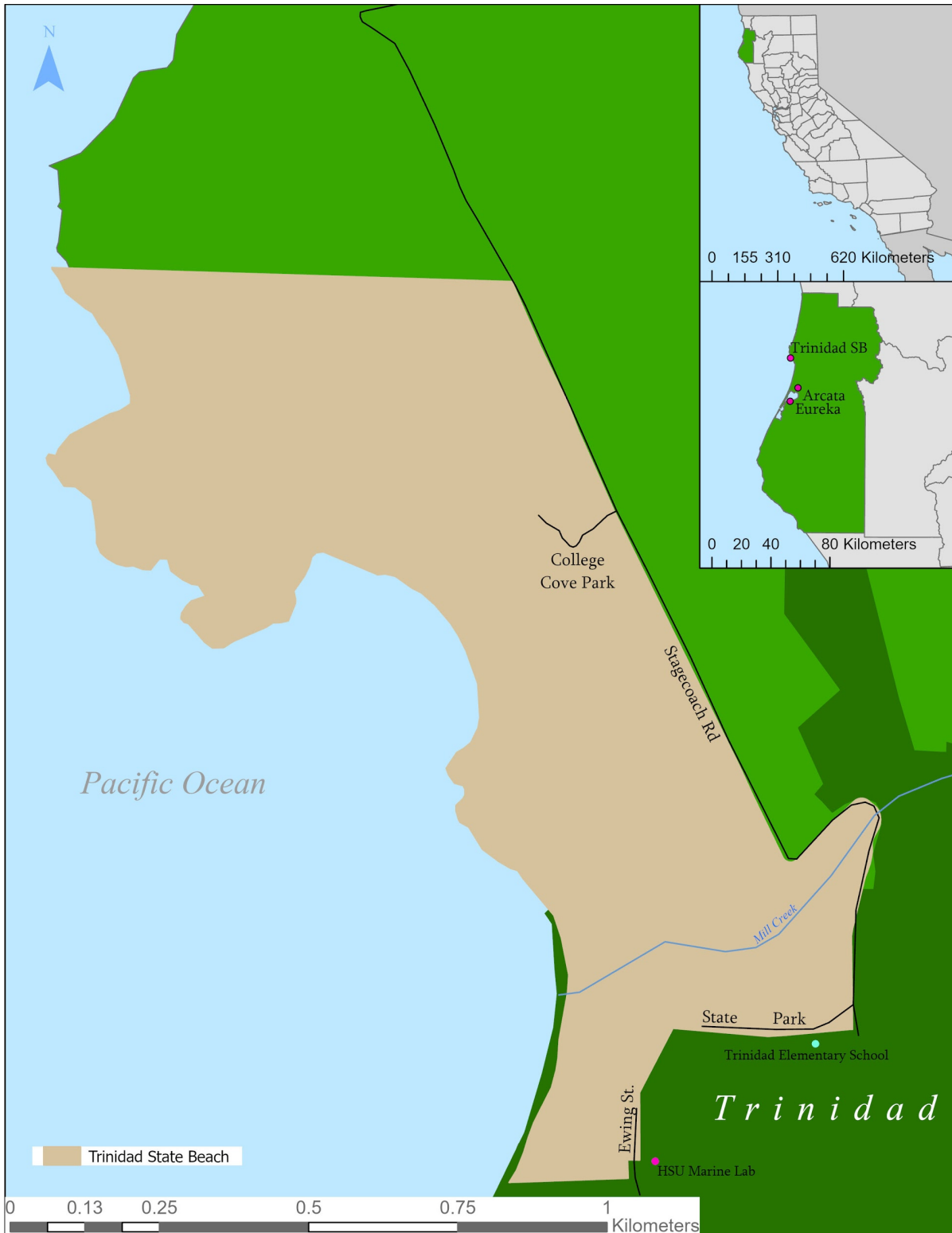


Figure 1. Location of Humboldt County in California (upper right inset), the town of Trinidad within Humboldt County (lower inset) and Trinidad State Beach in Trinidad, CA. Map made by Marina Chow using ArcGIS Pro version 2.5.

1.3 Need for Project

Trinidad State Beach does not have any formal planning documentation regarding vegetation management. Invasive non-native plants documented within TSB include English ivy (*Hedera helix*), English holly (*Ilex aquifolium*), Cotoneaster (*Cotoneaster* spp.), pampas grass (*Cortaderia jubata*), mattress vine (*Muehlenbeckia complexa*), and European beachgrass (*Ammophila arenaria*) among a list of others (Table 1) (Barrett 2010). Some of the above listed species such as English ivy, *Cotoneaster*, mattress vine, and European beach grass have turned sites within TSB into dense monocultures, choking out native vegetation. These invasive non-native species also spread much faster than native species, successfully reproducing and outcompeting native species for resources, efficiently decreasing the biodiversity within TSB (Bennett et al. 2011). This variety and degree of plant invasion into Trinidad State Beach threatens sensitive habitats within this Park.

Sensitive native plant habitats that occur within Trinidad State Beach include Herbaceous Alliance, specifically Pacific reed grass (*Calamagrostis nutkaensis*), and Shrubland Alliance (native *Rubus*). Presence of invasive non-native species within these sensitive habitats deplete resources for native species and reduce vitality of native plant habitats. This habitat restoration plan is needed to facilitate the restoration of sensitive native plant habitats and remove invasive non-native species within TSB.

It is within the California State Park mission statement to “preserve the state’s biological diversity, protect natural resources, and create opportunity for high-quality outdoor recreation” (CSP *About Us*, 2020). Trinidad State Beach faces the threat of invasive species crowding out sensitive and rare plants, and if a vegetation management plan is not developed, it is within reason that these rare and sensitive plants may disappear from TSB. Therefore if this project is not completed, the California State Parks will not be able to fulfill their mission.

1.4 Goals and Objectives

This section identifies the management goals and objectives for the Trinidad State Beach Habitat Restoration Plan. The goal of this plan is to restore the various habitats in the project area by treating invasive non-native plant species while protecting sensitive species. Specific actions to complete the following goals are provided in subsequent chapters.

Goals

1. Restore coastal scrub communities within Trinidad State Beach.
2. Restore and maintain native forest understory.

Objectives

1. Treat invasive non-native plant species at least once a year until eradicated or at a maintenance level.
2. Map all treated invasive plant species infestations to document treatment success.
3. Photo document selected invasive plant infestations to document treatment success.

2 Existing Environment

This section covers the current ecological, environmental, cultural, and recreational settings of TSB. A substantial classification of the vegetation types and invasive non-native species observed in 2020 at TSB are included as well.

2.1 Natural Resources

The project area is highly variable in character. It includes Sitka spruce (*Picea sitchensis*) forest, Red alder (*Alnus rubra*) forest, coastal scrub, grasslands, and beach strand. The natural resources in the project area are discussed below.

2.1.1 PHYSICAL ENVIRONMENT

Topography

Trinidad State Beach occurs along 2.41 km (1.50 miles) of the Pacific Ocean and has an elevation range of sea level to 54.9 meters (180 feet) above mean sea level (USGS, 2020). The beach has highly variable slopes, ranging from nearly flat to over 50 percent (HCCDS, 2002). The beach strand of Trinidad State Beach is surrounded by steep coastal bluffs.

Hydrology

Trinidad State Beach is within the designated California Coastal Zone and as such is also subject to protection and regulation under the California Coastal Act. The major coastal stream in TSB is Mill Creek, with a watershed area of 404 ha (1.56 mi²). The Mill Creek watershed is located in the northeast portion of TSB. The upper watershed is mostly timberlands with various logging roads throughout, while the lower watershed is residential and parkland (Madrone and Stubblefield, 2009). The Mill Creek watershed has an elongated shape, which contributes to high drainage densities and variable flow rates both seasonally and in response to individual storms (Madrone and Stubblefield, 2009) (Camper, 2009). Little information is available regarding average stream flow rates of Mill Creek.

Geology/Soils

Trinidad State Beach is underlain by a geologic unit commonly referred to as the Franciscan Formation, or Franciscan Complex. Franciscan rocks have their origins in the deep sea, where they were formed by turbidity currents that deposited sand, mud, gravel, and silica from the shells of marine creatures. These substances accumulated over tens of millions of years and hardened to form sandstone, shale, conglomerate, greenstone, and chert. Geologists refer to this formation as a *mélange* because of its mixture of different rock types. Over time, these rocks have been uplifted by seismic activity to their present location above sea level. Seismic activity has also caused breakage and deformation of these rocks. As a result, the Franciscan Formation consists of blocks of resistant sedimentary and metamorphic rock within a matrix of sheared, deformed, and highly erodible rock (Camper, 2009).

Local topography is characterized by beach strands and coastal terraces. These gently sloping surfaces were formed in the geologic past by wave erosion and deposition, and have moved above sea level due to periodic sea-level changes and uplift of the coastline. Most of the ground surface has a slope of 15 percent or less, but steeper slopes are found at sea cliffs, stream banks, and the boundaries between coastal terraces. Alluvial deposits have accumulated on the terraces over time; they are typically composed of sand, silt, and gravel. These deposits range in thickness from a few inches to more than 30.5 meters (100 feet).

Trinidad State Beach contains three different soils series within its boundary. The first soil series is called Halfbluff-Tepona-Urban Land. This soil has slopes that range from 2 to 9 percent and is found on marine terraces. The soil texture ranges from fine sand to a loam that creates moderate drainage for precipitation. This soil type can create an ecological site consisting of Sitka spruce-redwood (*Sequoia sempervirens*) forests, salal (*Gaultheria shallon*), and western bracken fern (*Pteridium aquilinum*). The second soil series is called the Oxyaquic Udipsamments-Samoa complex. This soil has slopes that range from 0 to 50 percent and is found in beaches or dunes. The soil texture ranges from fine sand to sand which allows for moderate and excessive drainage to occur. This soil type does not have the capability to create an ecological site. The last soil series within Trinidad State Beach is called Candymountain. This soil has slopes that range from 30 to 75 percent and is located on bluffs or marine terraces. The soil texture ranges from fine sandy loam to loamy fine sand, which allows the soil to be well drained. This soil type can create an ecological site that consists of Redwood-Sitka spruce forests, salal, California huckleberry (*Vaccinium ovatum*), western swordfern (*Polystichum munitum*), marine terraces, and marine deposits (Web Soil Survey, 2020).

Climate

The coastal climate of the Park means moderate temperatures year round. The average annual temperature in Trinidad, California is 52.4°F (World Media Group, 2020). The rainy season is from October to April, while the dry season (May through September) retains fog conditions and maintains the high humidity throughout the year. The average annual precipitation in Trinidad, California is 96.77 cm (38.10 inches) (Camper, 2009). Additionally, the average wind speed of Trinidad, California is 21.95 km/hr (13.64 mph) (World Media Group, 2020).

2.1.2 BIOLOGICAL RESOURCES

Habitat Types and Associated Vegetation

The project area is comprised of multiple habitat types that can be broadly classified as Sitka spruce forest, Red alder forest, coastal scrub, beach strand, and non-native grass lawn (Table 1). Within these broad habitats, there are two sensitive habitats found (Figure 2): *Rubus* Shrubland Alliance (coastal brambles) (G4 S3) and *Calamagrostis nutkaensis* Herbaceous Alliance (Pacific reed grass meadows) (G4 S2).

Some habitat and plant communities within the project area are recognized as sensitive by resource agencies. Under Section 30107.5 of the Coastal Act, the California Coastal Commission defines “Environmentally Sensitive Habitat Area,” or ESHA as, “any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and

developments” (CCC 1994). In addition, California Department of Fish and Wildlife (CDFW) recognizes “sensitive natural community” types that are rare and worthy of consideration due to highly limited distribution, regardless of presence or absence of rare, threatened, or endangered status species (CDFG 2000). A total of 4 occurrences of sensitive habitat communities were mapped in the project area (Figure 2). These occurrences were mapped only if they met the minimum habitat requirements in reference to the NCRD guidelines (NCRD, 2019).

Habitat requirements are as follows: wetlands were only considered if they were at least 50 m² (538.2 ft²), general herbaceous alliances had to be at least 100 m² (1076.4 ft²), shrub alliances and riparian woodlands had to be at least 200 m² (2152.8 ft²), and upland forests were considered when they were at least 400 m² (4305.5 ft²). Points were taken where it was uncertain if the sensitive habitat requirements were met or were in areas that were not accessible to map.

- One occurrence of Pacific reed grass meadows (G4 S2) in Red alder forest.
- Five occurrences of *Rubus* Habitat (G4 S3), with three in the Sitka spruce forest and the other two in the red alder forest.

Table 1: Summary of native plant species that occur in associated habitats present in Trinidad State Beach (CSP, 2010).

Habitat type	Associated Vegetation	
Sitka spruce forest	<i>Picea sitchensis</i> <i>Polystichum munitum</i> <i>Trillium ovatum</i> <i>Pseudotsuga menziesii</i> <i>Vaccinium ovatum</i>	
Red alder forest	<i>Alnus rubra</i> <i>Asarum sp.</i> <i>Rhododendron sp.</i> <i>Polystichum munitum</i> <i>Frangula purshiana</i> <i>Rubus parviflorus</i> <i>Rubus spectabilis</i>	<i>Rubus ursinus</i> <i>Ribes bracteosum</i> <i>Blechnum spicant</i> <i>Athyrium filix-femina</i> <i>Dryopteris expansa</i> <i>Equisetum telmateia ssp.</i> <i>Braunii</i>
Coastal scrub	<i>Baccharis pilularis</i> <i>Fragaria chiloensis</i> <i>Gaultheria shallon</i> <i>Garrya elliptica</i> <i>Heracleum maximum</i> <i>Lonicera involucrata</i>	<i>Morella californica</i> <i>Myrica californica</i> <i>Scrophularia californica</i> <i>Lupinus latifolius</i> <i>Rubus ursinus</i> <i>Calamagrostis nutkaensis</i>
Coastal bluff scrub	<i>Solidago spathulata</i> <i>Erigeron glaucus</i> <i>Poa macrantha</i> <i>Armeria maritima</i> <i>Eriogonum latifolium</i> <i>Arctostaphylos uva-ursi</i> <i>Gentiana affinis var. ovata</i>	<i>Eriophyllum lanatum</i> <i>Calochortus tolmiei</i> <i>Tanacetum camphoratum</i> <i>Sedum spathulifolium</i> <i>Dudleya sp.</i> <i>Plantago subnuda</i> <i>Mimulus aurantiacus</i>
Beach strand	<i>Solidago spathulata</i> <i>Romanzoffia tracyi</i> <i>Fragaria chiloensis</i> <i>Lupinus latifolius</i> <i>Armeria maritima ssp. californica.</i>	
Non-native grass lawn	<i>Lolium sp.</i> <i>Plantago lanceolata</i> <i>Rumex sp.</i>	

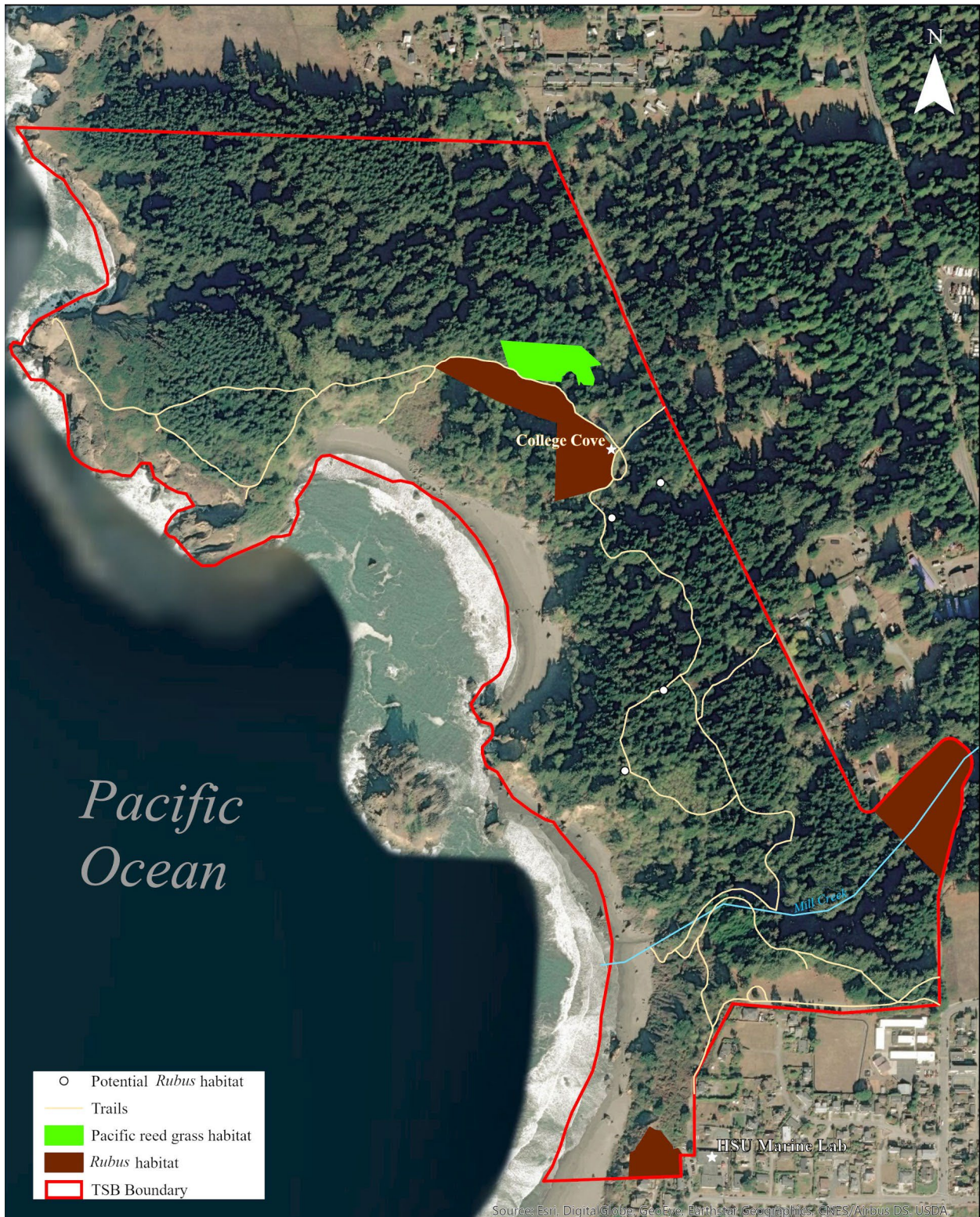


Figure 2. Sensitive habitats within Trinidad State Beach. Confirmed sensitive habitats are represented by polygons and potentially sensitive habitats are represented by points. Map made by Marina Chow using ArcGIS Pro version 2.5.

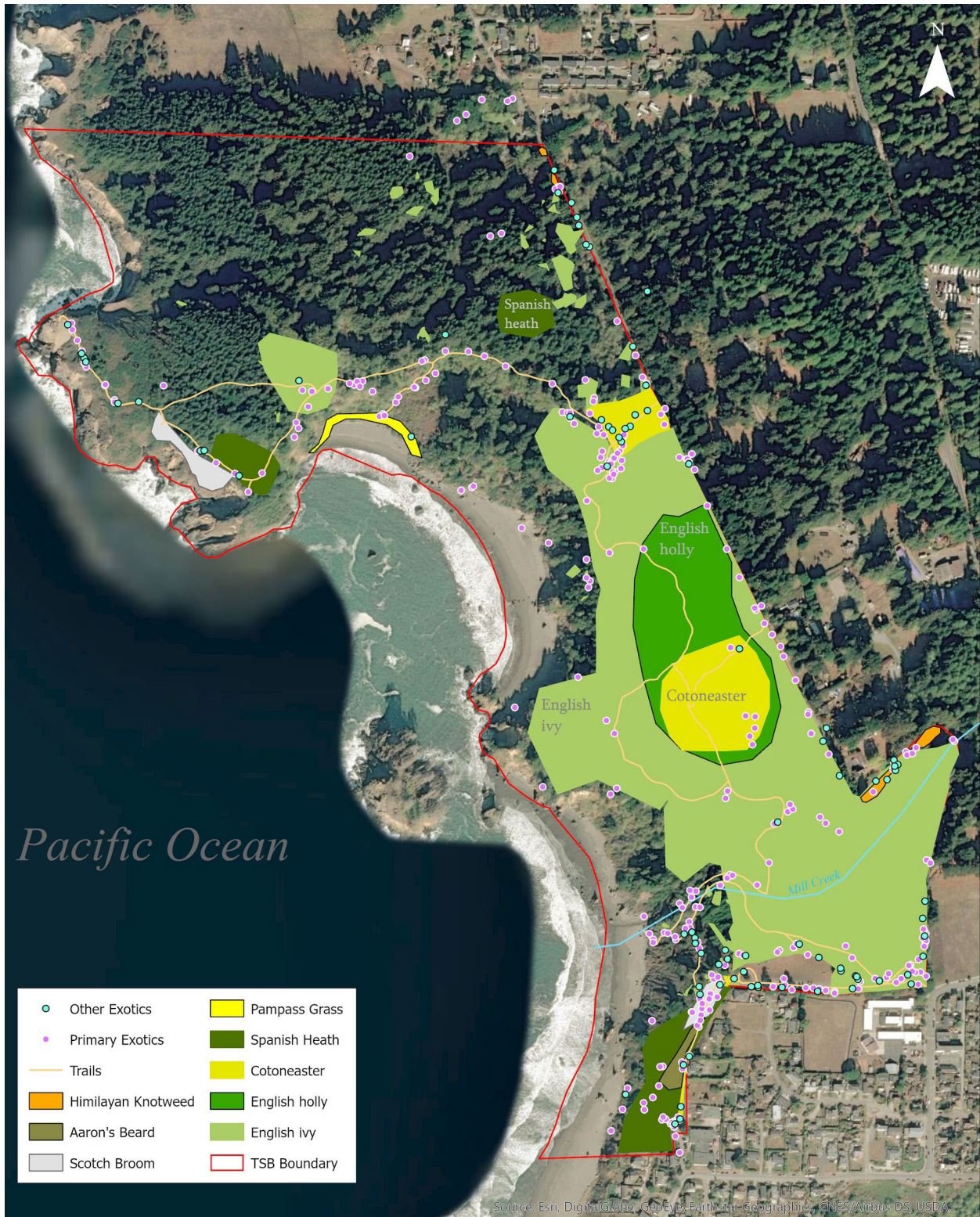


Figure 3. Areas where specific invasive non-native species are widespread, and point locations of target (primary) invasive species within Trinidad State Beach. Map made by Marina Chow using ArcGIS Pro version 2.5.



Figure 4. Locations of target invasive non-native species identified during March 2020 in Trinidad State Beach. Map made by Marina Chow using ArcGIS Pro version 2.5.

Sensitive Plant Species

Sensitive plants present within the site include Oregon coast paintbrush (*Castilleja affinis ssp. litoralis*), mountain crowberry (*Empetrum nigrum ssp. hermaphroditum*), coast silk tassel (*Garrya elliptica*) and California wax myrtle (*Morella californica*) (CSP, 2010).

Invasive Non-native Plant Species

Multiple invasive non-native species have become established within the project area (Figures 3 and 4). Many of which are ranked as High and Moderate Invasiveness by the California Invasive Plant Council (Cal-IPC 2020) (Appendix A). The primary target species (Figure 4) include pampas grass (*Cortaderia jubata*), Scotch broom (*Cytisus scoparius*), English holly (*Ilex aquifolium*), periwinkle (*Vinca major*), butterfly bush (*Buddleja davidii*), montbretia (*Crocsmia x crocosmiiflora*), Spanish heath (*Erica lusitanica*), Aaron's beard (*Hypericum calycinum*), Victorian box (*Pittosporum undulatum*), Himalayan blackberry (*Rubus armeniacus*), three-cornered leek (*Allium triquetrum*), wild radish (*Raphanus sativus*), European beachgrass (*Ammophila arenaria*), English ivy (*Hedera helix*), Cotoneaster (*Cotoneaster spp.*) and mattress vine (*Muehlenbeckia complexa*) (Appendix A). Multiple other invasive plants occur in the project area but are not as widespread, as shown in Figure 3 and described in Appendix A.

Wildlife

The project area is located in the Pacific Coastal Wildlife Region and along the Pacific Flyway. Many migrating and resident shorebirds as well as raptors and songbirds (Table 2) utilize multiple habitats in and adjacent to the project area (Cornell Lab of Ornithology, 2020). Mammalian species such as the California sea lion (*Zalophus californianus*), opossums (*Didelphis spp.*), voles (*Microtus spp.*) banana slugs (*Ariolimax spp.*) and raccoons (*Procyon lotor*) can also be found in the project area (Trinidad Coastal Land Trust, 2019).

Table 2: Resident shorebirds, raptors, and songbirds observed in Trinidad State Beach (Cornell Lab of Ornithology, 2020).

Common name	Scientific name
American Crow	<i>Corvus brachyrhynchos</i>
American Robin	<i>Turdus migratorius</i>
House Sparrow	<i>Passer domesticus</i>
Cackling geese	<i>Branta hutchinsii</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Barn Swallow	<i>Hirundo rustica</i>
Common Raven	<i>Corvus corax</i>
California Quail	<i>Callipepla californica</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Red Crossbill	<i>Loxia curvirostra</i>
Wilson's Warbler	<i>Cardellina pusilla</i>
Wrentit	<i>Chamaea fasciata</i>
Townsend's Warbler	<i>Setophaga townsendi</i>
Pacific Wren	<i>Troglodytes pacificus</i>
Band-tailed Pigeon	<i>Patagioenas fasciata</i>
Chestnut-backed Chickadee	<i>Poecile rufescens</i>
Anna's Hummingbird	<i>Calypte anna</i>
Turkey Vulture	<i>Cathartes aura</i>

2.2 Cultural Resources

Yurok Tribe

Trinidad State Beach lies within the Yurok Tribe's ancestral territory that spans 1,148 square miles along the coast of Humboldt County. Yurok, a term derived from Karuk, refers to people who are downstream from the Karuk tribe. The Yurok population was once estimated to range from 2,500 to 3,100 and they occupied at least 70 villages situated along the Klamath River and along the Pacific Coast (Del Norte County Historical Society, n.d). Historically, European colonists' greed for land and resources led to acts of violence against the Yurok people. This left the Yurok Tribe's population devastated. The Yurok Tribe currently has 5,000 members (Yurok Tribe, 2020).

The Trinidad area was historically used by the Yurok Tribe. The Yurok were people that primarily subsisted on salmon, clams, mussels and other ocean fish, as well as deer, elk and smaller game animals (Trinidad Rancheria, 2020). TSB is also in the domain of Tsurai, the southernmost village of the Yurok, which is embedded with deep cultural, historical, and spiritual significance (BLM, 2016).

Euro-American Colonization

In the early 1700s, Spanish settlers landed in Trinidad and laid claim on the land by mounting a cross on Trinidad Head. In the early 1800s, the first American ship visited Trinidad and Big Lagoon and initially traded with the coastal people for sea otter pelts (Del Norte County Historical Society, n/a). In the 1850s, a trail was opened from Trinidad north along the coast to Klamath to get goods, supplies, and men into the gold mines (Rocha and Sloan, 2007). Soon after, the miners left, leaving the settlers to start logging and created a partnership with the Yurok tribe for salmon fishing (Rocha and Sloan, 2007).

2.3 Recreational Resources

Trinidad State Beach regulations help to provide recreational opportunities while also incorporating resource protection and restoration. TSB offers low impact recreational activities like fishing, surfing, bird watching, and hiking. The Beach has approximately 6.09 km (3.78 miles) of trails, extending along the coastal terrace from the HSU Telonicher Marine Lab to Elk's Head, with multiple spur trails that allow access to the beach. Trinidad State Beach is open for day use only and does not allow camping. There are three parking lots at this location. Two paved parking lots at the south end of TSB near the marine lab (5 parking spots) and adjacent to Trinidad Elementary School (50 parking spots). The third parking lot is gravel and is located in the northern portion of TSB (30 parking spots). Other facilities that are provided are restrooms and a picnic area with tables and stoves adjacent to the Trinidad Elementary School (Figure 5).



Figure 5: Recreational areas in Trinidad State Beach. Map made by Marina Chow using ArcGIS Pro version 2.5.

3 Implementation Plan

3.1 Project Implementation

3.1.1 PROPOSED PROJECT

The proposed project is a combination of herbicide application, flaming, solarizing, and manual removal to remove invasive non-native plant species and restore native habitat. Based on an analysis of the potential treatment methods (Appendix C), their impacts to sensitive resources, past successes, and treatment costs, it has been determined that no reasonable alternatives to the proposed activity would better protect the existing resources and reduce or eliminate the detrimental effects to the habitat. Proposed treatments vary for each target species and are based on a number of factors including the type and degree of invasion, attributes of each species, site accessibility, and proximity to sensitive resources.

Many of the target plant species can be easily removed with shovels and weed wrenches; however, with some species such as pampas grass, manual removal by hand can be very labor intensive and require use of multiple treatment methods such as manual removal and herbicide application (Table 2).

3.1.2 METHODS

All invasive non-native species have their own set of criteria on which treatments can occur, such as topography, their size, and presence of sensitive species, and/or cultural resources (CSP, 2020). As a result of this criteria, a combination of treatments will be applied in the project area. Each type of treatment method is described below.

Manual Removal Technique

Manual removal techniques will be performed using hand tools such as shovels, weed wrenches, and Pulaski's, to dig up the invasive plant species. The invasive plant species will be dug to a depth necessary to remove all below ground material, usually no greater than 0.6 m (2 ft) deep. Care will be taken not to disturb any sensitive resources. Above ground vegetation may be removed using power tools, such as chainsaws and brush cutters. Manual removal will be conducted by the National Council of Research and Development (NCRD) staff, contractors such as the California Conservation Corps (CCC) and California Department of Forestry and Fire Protection (Cal Fire) crews and volunteers. NCRD Natural Resource staff will supervise all manual removal operations (CPS, 2020).

Mechanical Removal Technique

Weed eaters, brush cutters, and mowers will be used to remove above ground vegetation of the target species. Plants will be cut at ground level. Roots of species that can regenerate from underground parts will be removed after mechanical removal to ensure complete removal of the target plant. NCRD Natural Resource staff will supervise all manual removal operations (CPS, 2020).

Flaming Technique

Flaming is a removal technique that can effectively control a variety of plant species, without disturbing the ground. Two types of flaming are commonly used: green and black. Green flaming sometimes called wilting or blanching utilizes a small torch that is applied just long enough to wilt the plant. Although the plants do not brown and look dead until the next day, this is enough heat to actually kill many species of plants. Black flaming utilizes the same equipment, but the torch is left on the plant long enough to actually cause it to incinerate. Flaming involves the use of a small propane torch to either wilt or incinerate target plants. This technique will target individual plants so that impacts to sensitive resources will be avoided or minimized. Flaming will be conducted by NCRD staff or contractors under the supervision of NCRD Natural Resource staff. Each project will be evaluated for the risk of the fire spreading beyond the target plants. If fuel and weather conditions are such that adjacent fuels have the potential to burn then a Prescribed Fire Complexity Rating analysis will be completed (Appendix F). If the complexity rating score is 60 or more, then a prescribed burn plan must be completed and approved by a State Park-qualified Burn Boss (CPS, 2020).

Solarizing

This technique utilizes material to cover the target species to prevent photosynthesis. First the above ground vegetation is mowed or weed whacked to the ground and then weed cloth and or black 6 mm plastic tarps will be placed over the infestation and secured with sand bags. If sterile mulch (free of non-native plants and seeds) can be obtained, they will be placed over the tarping to help keep it in place and reduce the aesthetic impact. Weed cloth and or plastic tarps will be left in place for at least one year, will be checked regularly and added to if necessary. Depending on the species and successfulness of solarizing the infestation the cover material may be left in place for many years (CPS, 2020).

Chemical

Herbicide will be applied directly to target species using either a low-volume sprayer with a wick/sponge or a hand held spot sprayer or by using the stump cut method (Table 1). A 4-gallon backpack sprayer with a single nozzle applicator will be used for foliar spot spraying and when using a wick/sponge applicator. Stump cut treatment involves first cutting the target species to the ground. Then wiping the freshly cut stump with herbicide. This method is used on woody shrubs and trees. The wick/sponge applicator and the stump cut method reduces the potential for herbicide drift and injury to adjacent native plants and sensitive areas and create a situation where a non-selective herbicide can be used selectively (DiTomaso et al. 2013).

Depending on the target species, Mark Hansen, Pest Control Advisor, has recommended the use of four types of herbicide (aminopyralid, triclopyr, imazapyr, glyphosate) and a mentholated seed oil as an adjuvant (Appendix E). This project proposes application of these herbicides at differing concentrations (1.5% to 2% for foliar application) with a spray adjuvant at a concentration of no more than 1.5% to enable the herbicide to more effectively bind to and penetrate the target plants (Appendix G). Only aquatic safe versions of imazapyr and glyphosate will be used near water. Aminopyralid and triclopyr will not be used in or near water. A non-toxic dye may be used to indicate where spray has been applied, helping to avoid over-applying

to a given area and should disappear within a few days of the first rainfall following application. For cut stump treatment concentrations will be no more than 20% (Appendix E). For more information about the herbicides, adjuvants, and colorant proposed for use see Appendix G (CSP, 2020).

Aminopyralid application will not exceed 7 fluid ounces per acre per year for the invasive non-native species found in rangelands, grass pastures, and non-cropland areas (Dow AgroSciences, 2005). Triclopyr application will not exceed 8 pounds per acre per year on grazable areas and forestry sites (EPA, 2008). Imazapyr application will not exceed 1.5 pounds per acre per year for forest and aquatic sites (EPA, 2011). Glyphosate application will not exceed 10.6 quarts per acre per year in a combination of all the treatments of invasive non-native species that are trees, vines, or shrubs (EPA, 2016).

Risk of spray drift outside of the project area will be minimized to the maximum extent practicable. Wind conditions during application will not exceed 10 mph. Applications will not occur if there is a greater than 30% chance of rain within 72 hours of the workday. Spray shields will be used whenever a sensitive plant is within 2 m (6.6 ft) of a target plant. Spray application will not occur if spray drift is found to exceed buffer distances for wetlands or sensitive plants. Discharge of herbicide into water or onto non-target areas will not occur (CSP, 2020).

All applications will be in accordance with the manufacturer's labels (Appendix G). NCRD staff holding a Qualified Applicator Certificate from the Department of Pesticide Regulation will oversee the use of herbicides for this project to ensure safe handling (including storage, mixing and application) of herbicides and adjuvants. NCRD staff or a contracted spray crew will apply the herbicide. If a contracted crew conducts work, a NCRD staff member will be onsite during application. Best management practices for herbicide use is available in Appendix H (CSP, 2020).

Retreatment Methods

Timely retreatment of invasive non-native plants is essential for their control and eradication. Many non-native species will re-establish rather aggressively if not retreated within a few months of the initial removal effort (Bossard et. al. 2000, DiTomaso et al. 2013). Using the methods described above, infestations will be retreated on a regular basis (at least once a year or as funding allows), until the invasive non-native plants are controlled and or eradicated (CSP, 2020).

Disposal Methods

During manual retreatment efforts, removed vegetation will either be piled, left to dry, and burned at a later date or transported to an appropriate dumping area to be composted or burned. Pile burning will occur outside of the wildfire season for coastal Humboldt County and all appropriate permits will be obtained (CSP, 2020).

Revegetation

Given that a majority of the project area is not yet highly infested with monocultures of invasive non-native plants, there are still multiple native plant species present in and surrounding the

infestations. It is anticipated that most treatment areas will be recolonized naturally by native species in the project area. However, in areas where project operations result in exposing large amounts of bare soil, mulching using native duff from within the project area and or revegetation will occur. When revegetation is needed, seeding and or transplanting with native species will be conducted. The CSP NCRD genetic integrity policy will be followed (Appendix I) (CSP, 2020).

Table 1. Integrated pest management plan – treatment strategy for the project area.

Scientific Name	Common Name	Manual Treatment	Mechanical Treatment	Chemical Treatment	Cultural Control	Biological Control	Fire
<i>Allium triquetrum</i>	three cornered leek	Yes	No	No	Solarizing	None	No
<i>Buddleja davidii</i>	butterfly bush	Yes	brushcutter/ chainsaw	Stump cut treatment with a 20% solution of Habitat or Rodeo	Solarizing	None	No
<i>Cirsium arvense</i>	Canada thistle	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 1% (1.5 oz.) solution of Milestone + 1.5 oz. MSO	None	None	No
<i>Cirsium vulgare</i>	bull thistle	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 1% (1.5 oz.) solution of Milestone + 1.5 oz. MSO	None	None	No
<i>Conium maculatum</i>	poison hemlock	Yes	brushcutter/ chainsaw	Foliar spot spraying using a 4-gallon backpack with a 1.5% (2 oz.) solution of Rodeo or Habitat + 1/2 oz. MSO	None	None	No
<i>Cortaderia jubata</i>	jubata grass	Yes	brushcutter/ chainsaw	Foliar spot spraying using a 4-gallon backpack with a 2% (2.6 oz.) solution of Rodeo + 1% (1.3 oz.) solution of Habitat + 1/2 oz. MSO	None	None	Flaming seedlings
<i>Crococsmia X crocosmiiflora</i>	montbretia	Yes	No	No	Solarizing	None	No

Scientific Name	Common Name	Manual Treatment	Mechanical Treatment	Chemical Treatment	Cultural Control	Biological Control	Fire
<i>Cytisus scoparius</i>	Scotch broom	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 2% (2.6 oz.) solution of Rodeo + 1/2 oz. MSO	None	None	Flaming seedlings
<i>Delairea odorata</i>	Cape ivy	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 1% (1.3 oz.) solution of Milestone + 1.5% (2 oz.) solution of Garlon 3A + 1/2 oz. MSO	None	None	No
<i>Erica lusitanica</i>	Spanish heath	Yes	brushcutter/ chainsaw	Foliar spot spraying using a 4-gallon backpack with a 2% (2.6 oz.) solution Garlon 3A + 1/2 oz. MSO or 2% (2.6 oz.) solution of Rodeo + 1/2 oz. MSO	None	None	No
<i>Foeniculum vulgare</i>	fennel	Yes	brushcutter/ chainsaw	No	None	None	No
<i>Geranium lucidum, G. robertianum</i>	shining geranium and stinky Bob	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 1.5% (2 oz.) solution of Rodeo or Habitat + 1/2 oz. MSO	None	None	No
<i>Lathyrus latifolius</i>	everlasting peavine	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 2% (2.6 oz.) solution of Rodeo + 1% + 1/4 oz. Spreader 90	None	None	No

Scientific Name	Common Name	Manual Treatment	Mechanical Treatment	Chemical Treatment	Cultural Control	Biological Control	Fire
<i>Raphanus sativus</i>	wild radish	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 1.5% (2 oz.) solution Garlon 3A + 1/2 oz. MSO	None	None	No
<i>Rubus armeniacus</i>	Himalayan blackberry	Yes	brushcutter/ chainsaw	Foliar spot spraying using a 4-gallon backpack with a 1.5% (2 oz.) solution Garlon 3A + 1/2 oz. MSO or 1.5% (2 oz.) solution of Rodeo + 1/2 oz. MSO	None	None	No
<i>Senecio jacobaea</i>	tansy ragwort	Yes	No	Foliar spot spraying using a 4-gallon backpack with a 1.5% (2 oz.) solution of Milestone + 1/2 oz. MSO or 1.5% (2 oz.) solution of Rodeo + 1/2 oz. MSO	None	Yes	No

3.1.3 DISCUSSION OF TREATMENT METHODS

The following treatment methods were considered during planning of the proposed project (Appendix C).

1. *No action*

Failure to address invasive non-native plant species infestations is not preferred as it will allow further decline of the sensitive plants, animals, and habitats in Trinidad State Beach. Non-native plant species will continue to invade infested sensitive plant populations and their habitats and if no actions are taken to reverse the current trend it will continue to degrade.

2. *Biological Control*

No insects or fungi have been approved by the California Department of Food and Agriculture for control of the target species. Grazing is not effective at removing most of the target species and in some cases could encourage further spread (Appendix C). Some target species are toxic to livestock and others are avoided by grazing animals (Appendix B). Neither biological method will completely remove an infestation, which is needed for full restoration of the habitats. Therefore, neither biological method is preferred.

3. *Manual Control*

Manual control can be effective on small infestations of certain non-native species, but it is not always feasible in some locations no matter the size of the occurrence (Appendix E). Manual control methods may not be suitable on steep slopes, such as coastal bluffs, and in areas with sensitive cultural resources if digging with shovels is required. Manual removal can also encourage further spread of some non-native plants. Due to limits on the use of shovels around sensitive cultural resources the potential to spread non-native plants and cause erosion as well as the intensive labor costs. This method will be primarily used to treat infestations in sensitive plant buffers and where infestations are still small.

4. *Flaming/Prescribed Fire*

Flaming and prescribed fire is effective on some species, such as Scotch broom seedlings and some grass species (Appendix C). Due to the variable terrain and the presence of a major highway, prescribed fire is not a preferred method at this time. Flaming will only be an alternative control method for species that do not readily germinate after fire.

5. *Mechanical Control*

Mechanical methods can be preferred over manual methods for treatment of some species due to the higher cost-efficiency. Mechanical control is not suitable in areas where there are sensitive resources, both natural and cultural. The majority of topography in the project area does not allow for mowing and in some areas cause erosion if heavy equipment were to be used. This method is not preferred in most areas due to the presence of sensitive resources and topography;

however, it may be used on infestations that have become a monoculture or on woody shrubs (Appendix C).

6. Solarization

Solarization is effective on a few of the target species, but depending on the specific site characteristics, this method may not be feasible (Appendix C). Materials involved with this method are not cost efficient. This method is not preferred for most species due to site characteristics, such as steep slopes or sensitive habitats and its inability to successfully eradicate certain species. This method may be used on certain species in areas that are relatively flat.

7. Chemical Treatment

Chemical treatment is effective on most invasive non-native plant species and requires the least number of retreatments if applied properly during initial treatment (Appendix C). This is the preferred method of treatment for some target species (Appendix C). As to reduce unintended effects from herbicides, chemicals will only be applied directly to individual target species via a cut-stump method. Some herbicides are non-selective or cannot be used near or in water. Therefore, only aquatically registered herbicide will be used near water and none will be used on the water.

3.1.4 AVOIDANCE MEASURES FOR SENSITIVE RESOURCES

The project is designed to minimize impacts that will adversely affect sensitive resources and species that may be present within or adjacent to the project area. The following avoidance measures will be implemented along with CSP project requirements (Appendix J) to avoid or minimize potential adverse impacts to sensitive resources.

Avoidance Measures for Sensitive Plants

1. Floristically appropriate surveys in conformance with CDFW guidelines will be conducted prior to project implementation.
2. Prior to beginning restoration work in an area, sensitive plants will be flagged. Flags will be removed upon completion of work.
3. All people engaged in restoration activities with potential to negatively impact sensitive plants will be instructed by a NCRD botanist in the identification of sensitive species in the project area.
4. All personnel applying herbicides must be able to distinguish between target non-native plants and sensitive plants.
5. No herbicide use (storage, mixing, loading or application) within a 3 m (9.8 ft) buffer around sensitive plants.
6. During hand pulling care will be given to ensure that root systems of sensitive plants are not dislodged.

Sensitive Habitats and Wetlands

1. No wetlands will be actively filled.
2. Herbicide will not be stored, mixed, or applied within a 5 m (16.4 ft) buffer around wetlands or surface waters.

3.1.5 SAFETY PROTOCOLS AND SITE LOGISTICS

Every workday will begin with the lead person discussing the work plan and safety concerns and ensure all workers have the required personal protective equipment (PPE). All workers will be advised of high-risk areas and situations and be provided safety guidelines.

Project Handbook

A project handbook will be kept on-site during work hours for the duration of the project. The handbook will contain all safety measures and plans for the project area, important contact information pertaining to possible emergencies and general project contacts, permits, and monitoring forms. The following documents will be included in the handbook:

- Copy of California Environmental Quality Act (CEQA) clearance
- Copy of required permit and conditions
- List of Emergency Contacts
- Location of nearest hospital or medical facility
- Hazardous Material Spill Contingency Plan
- List of sensitive species and their identification characteristics
- Copies of labels for any chemicals being applied

The lead person for the day will ensure a fully stocked first aid kit including eyewash materials is available on site at all times. At the end of the work day, the lead person will ensure all areas treated are mapped, any monitoring forms completed, and all equipment has been cleaned and stored safely.

Personal Protective Equipment (PPE)

Workers involved in mixing, loading, and or applying herbicide must have the minimum required Personal Protective Equipment (PPE) per the product label(s). The minimum required PPE for the herbicides proposed for use are eye protection (safety glasses or goggles), chemical resistant gloves, long sleeve shirt and long pants, shoes and socks. Different PPE is required when using weed eaters, brush cutters or chainsaws. All require the use of ear protection (ear plugs or muffs), eye protection, long pants, socks and shoes. Chaps are required when operating a brush cutter or chainsaw and a helmet and gloves are also required to operate a chainsaw.

Tool Safety

Hand tools and mechanized equipment will be used during project implementation. Workers tasked with operating any tools will be instructed in the safe operation of those tools. Safety precautions include wearing the appropriate PPE, maintaining a safe distance from others, and using proper lifting and carrying techniques. Two people must be present to operate a chainsaw and a trauma kit should be on site.

Fire Safety

A fire safety plan will be in place prior to work involving flaming or pile burning. All required burn permits will be obtained and work will be conducted outside the coastal Humboldt County wildfire season.

Weather, Earthquakes and Tsunami

Workers should avoid being on beach sites during storm events that pose risk from high surf, wind, and flooding. In the event of high winds, workers should avoid working in forested areas. A National Oceanic and Atmospheric Administration (NOAA) weather radio should be on site to alert workers of tsunami risks. If a notable earthquake is felt while working on site, all workers will leave the project site immediately to seek high ground if in a tsunami zone. Then wait for guidance from the NOAA weather radio.

Hazardous Materials

Risk of hazardous material spills will be minimized to the extent possible. No fueling or maintenance of mechanical equipment will be allowed within 30 m (100 ft) of a stream, the ocean, or a wetland. All equipment will be inspected each morning for leaks and repaired off site. All herbicide mixing, loading, and application equipment will be kept in good condition and routinely cleaned and calibrated to avoid over or under application.

In the unlikely event of a hazardous substance (herbicide, oil, gasoline) being released, a hazardous material plan will be available to ensure adequate and safe cleanup. In the event of any spill in or adjacent to the project area, work will be halted or moved to a nearby location, and the site supervisor will notify the appropriate CSP staff (e.g., project manager or supervisor). Appropriate agencies will be notified if the spillage is greater than 1/2 gallon. However, in the event of any herbicide spill, the County Agricultural Commissioner will be notified. Hazardous materials, if present, will be contained and removed from the site prior to resumption of work.

Mixing and loading of herbicides will be conducted at the project site or as close to the project site as possible. Used liquid herbicide containers will be triple rinsed and the rinse water will be applied at the work site. Backpack sprayers will not be overfilled and workers will be instructed on how to avoid spilling and proper application. A Qualified Pesticide Applicator will oversee herbicide use during implementation to ensure safety precautions are followed. Emergency information and first aid procedures for decontaminating a worker can be found under the statement of practical treatment on the herbicide label.

The public will be notified prior to the use of herbicides during the implementation of this project. Notification will be in accordance with County and State laws and include posted notices at trailheads and treatment areas. Posted notices will include the name of the herbicide being applied, the dates of application and phone number for more information.

3.2 Project Monitoring, Reporting and Adaptive Management

This section will discuss the monitoring and reporting methods that are designed to meet the goals and objectives discussed earlier in the document. Additionally, this section will discuss the adaptive management approach set in place by the plan and how monitoring will be necessary for responding to unforeseen restoration outcomes. Reports will be produced addressing the restoration work completed, monitoring results, and the overall status of the implementation of the plan.

3.2.1 ADAPTIVE MANAGEMENT APPROACH

The Adaptive management approach will be used during the implementation of this plan where appropriate and necessary. This management approach will be used to attain the highest level of habitat restoration possible. The key concept in an adaptive management approach is the willingness to let new information drive adaptations in the plan based on changing conditions and information. The plan must have the ability to adapt and respond to new information on a regular basis to be successful. Pre and post monitoring results will be analyzed as components of the plan are completed. Based on these results, actions can be adjusted to best meet the plan's overall goal.

3.2.2 PROJECT MONITORING AND REPORTING

Effectiveness monitoring will provide information describing the success of restoration activities. This monitoring will be conducted at most areas where restoration activities are implemented. Monitoring objectives are:

- Protect natural and cultural resources present in the project area
- Track locations and numbers of sensitive plant species
- Detect changes in habitat quality (plant community composition and species cover) over time
- Document success of restoration activities
- Provide feedback for adaptive management to help with determining what management actions are necessary

Vegetation

Vegetation monitoring will consist of rare plant monitoring. A rare plant survey will be conducted prior to restoration activities to document any special status species that may occur within the current years' restoration area. The surveys will be conducted in compliance with approved state protocol (CDFG 2000). Should a special status plant be located within 2 m (6.6 ft.) of a target plant, then hand removal techniques will be used, unless the target plant is located on a slope greater than 10 percent. Spray shields will be used if this situation is encountered.

Cultural

If in the process unknown cultural artifacts are discovered at any of the management sites, the project manager will suspend and modify any needed work in the specific site and surrounding areas. Historically, Native American tribes such as the Yurok and Wiyot tribes resided along the

coast prior to European settlement (NCIDC, 2020). A qualified archeologist will document and examine any artifacts found within the vicinity. The project manager will take appropriate steps and will implement any preservation, recovery and/or avoidance measures if applicable.

Meander Surveys

Meander surveys will be conducted in treated areas at least once each year (until five years following the last restoration treatment) to assess treatment success and the overall site conditions. The meander surveys will involve walking random routes throughout the restoration areas to identify successes and or problems such as significant invasive non-native plant mortality, new occurrence of invasive non-native species or sensitive species, native plant recolonization, etc.

Photo Documentation

Photo documentation will take place every year in the treated areas (until five years following the last restoration treatment). Photographs will be taken from established Global Positioning Unit (GPS) points throughout the project area to document changes in the landscape. Photo documentation will evaluate the success of the project by documenting evidence of plant death, vegetation growth, and re-establishment of native plant species as well as exotic invasive plant regrowth in treated areas.

Project Reporting

Project reporting will be important to observe the overall success of the project and to help assess adaptive management goals. Summary reports will be produced to document project tasks completed, methods used, and the outcome of the associated monitoring activities. The reports will be produced and authored by the project manager(s).

4 Project Considerations and Compliance

4.1 Conformance with existing management plans

The restoration activities proposed in this plan are consistent with the Department’s mission “To provide for the health, inspiration and education of the people of California by helping to preserve the state’s extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high quality outdoor recreation.” This project is in conformance with the California State Park’s Natural Resource directives.

4.2 Regulatory Conformance and Permitting

A mitigated negative declaration (MND) will be prepared to meet environmental compliance requirements under the California Environmental Quality Act (CEQA). The City of Trinidad has a local coastal plan and permitting jurisdiction for activities in the project area. A Coastal Development Permit will be obtained from the City of Trinidad to meet California Coastal Act requirements.

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5.2 Personal Communications

Hansen, Mark. 2017. Pesticide Recommendations for the treatment of invasives at Trinidad State Beach

6 Appendices

APPENDIX A. INVASIVE NON-NATIVE PLANTS SPECIES FOUND WITHIN THE PROJECT AREA.

Scientific Name	Common Name	Cal-IPC Rating ¹	CalEPPC Rating ²	CDFR Rating ³	Oregon Rating ⁴
<i>Allium triquetrum</i>	three-cornered leek				
<i>Ammophila arenaria</i>	European beachgrass	High		NL	
<i>Buddleja davidii</i>	butterfly bush	Watch/Hot			B
<i>Cirsium arvense</i>	Canada thistle	Moderate	B	B	B
<i>Cirsium vulgare</i>	bull thistle	Moderate	B	NL	B
<i>Conium maculatum</i>	poison hemlock	Moderate	B	NL	B
<i>Cortaderia jubata</i>	jubata grass	High	A-1	NL	B
<i>Crocsmia X crocosmiiflora</i>	montbretia	Limited			
<i>Cotoneaster</i> spp.	Cotoneaster	Moderate	A-1	NL	
<i>Cytisus scoparius</i>	Scotch broom	High	A-1	C	B
<i>Delairea odorata</i>	Cape ivy	High	A-1	C	A
<i>Erica lusitanica</i>	Spanish heath	Limited		B	B
<i>Foeniculum vulgare</i>	fennel	High	A-1	NL	
<i>Geranium lucidum</i>	shining geranium	Red Alert		A	B
<i>Geranium robertianum</i>	stinky Bob				
<i>Hedera helix</i>	English ivy	High	A-1	NL	B
<i>Hypericum calycinum</i>	Aaron's beard				
<i>Ilex aquifolium</i>	English holly	Limited	B		
<i>Lathyrus latifolius</i>	Perennial peavine				B
<i>Muehlenbeckia complexa</i>	Mattress vine				

Scientific Name	Common Name	Cal-IPC Rating ¹	CalEPPC Rating ²	CDFR Rating ³	Oregon Rating ⁴
<i>Raphanus sativus</i>	wild radish	Limited			
<i>Rubus armeniacus</i>	Himalayan blackberry	High	A-1	NL	B
<i>Phalaris arundinacea</i>	reed canarygrass				
<i>Pittosporum undulatum</i>	Victorian box	Watch			
<i>Senecio jacobaea</i>	tansy ragwort	Limited	B	B	B
<i>Vinca major</i>	Periwinkle	Moderate	B	NL	

1 Cal-IPC - California Invasive Plant Council; 2 CalEPPC - California Exotic Pest Plant Council; 3 California Department of Food and Agriculture, 4 Although this listing has no standing in California, it shows that these plants are considered invasive in an adjacent state that is part of a larger bioregion.

APPENDIX B. DESCRIPTION OF TARGET INVASIVE PLANT SPECIES

For each invasive non-native target plant, their life history, damage and threats posed by them, and a description of the infestations are described below.

English ivy (*Hedera helix*) is the most dominant and aggressive plant in the project area that covers 41.5 hectares (102.4 acres) of Trinidad State Beach. This plant is typically found in open forests and in urban areas near forests; it will also invade riparian areas. English ivy grows as a woody vine or it can be an evergreen shrub, which both contain deep green, glossy, leathery leaves. It can form a dense cover that prevents growth and establishment of other plant species. The viney form of English ivy does not produce flowers or fruits, but when it grows as a shrub it does produce flowers and fruits. Its white or yellow flowers bloom in the fall and produce fruit from April to May. Each seed is covered in a hard coat that is removed through animal digestion before germination. Its leaf litter adds nitrogen to the soil, which becomes a disadvantage to native species that compete best under lower nutrient levels (Bossard et al, 2000). This plant resprouts quickly if not disposed of correctly. The Cal-IPC ranks English ivy as High Invasiveness (Cal-IPC 2020). A majority of the plants occur within the Sitka spruce and the Red alder forests.

English holly (*Ilex aquifolium*) is the second most dominant or widespread invasive plant within the project area and occurs in the greatest densities within the open areas of the Sitka spruce forest and along the trails. Within the project area, there are 43 occurrences consisting of approximately 68 individuals that covers approximately 6.07 hectares (15 acres). This plant is typically found in cool, wooded areas. English holly can grow as a shrub or as a tree and can reach a height of 20 m (65.6 ft). Their sharply edged leaves can cause injury to humans. Its dull white flowers appear from May to June and occur in clusters towards the ends of the branches. The fruit is red and smooth so that it attracts the attention of birds for them to disperse the seeds (UC Berkeley, 2020). The Cal-IPC ranks English holly as Limited Invasiveness (Cal-IPC 2020).

Jubata grass (*Cortaderia jubata*) is the third most dominant and aggressive invasive plant within the project area and occurs in the greatest densities in open, disturbed areas such as along roads, trails, and coastal bluffs. It is a large perennial grass with basal leaves that are sharply serrated. Their tall inflorescences are plume-like and produce up to 100,000 light, highly dispersive seeds (DiTomaso et al., 2013). Designated as High Invasiveness by the California Invasive Plant Council (Cal-IPC), jubata grass can have “severe ecological impacts on physical processes, plant and animal communities, and vegetation structure” (Cal-IPC, 2020). It is known to create a fire hazard and to complicate fire management activities due to an excessive production and build-up of dry leaves and flowering stalks that can persist in the environment for extended periods of time (DiTomaso and Healy, 2007). This plant can also block vehicle and human access and the sharply serrated leaves can cause injury to humans (Cal-IPC, 2014). Within the project area, there are 30 occurrences consisting of approximately 80 individuals. A majority of the plants occur along the coastal bluffs and within the coastal scrub habitat.

Scotch broom (*Cytisus scoparius*) is most commonly found in disturbed places, such as river banks, road cuts, and forest clearcuts, but can colonize undisturbed grassland, shrubland, and open canopy forest (Bossard et. al, 2000). This is a deciduous shrub with yellow, pea shaped flowers growing as singles or pairs in leaf axils along erect branches. Up to 9 seeds are contained

within a seedpod and once ejected, can remain viable in the soil for up to 60 years (DiTomaso and Healy, 2007). Designated as High Invasiveness by the Cal-IPC, Scotch broom can have “severe ecological impacts on physical processes, plant and animal communities, and vegetation structure” (Cal-IPC, 2020). It is a fast grower, producing dense stands that are impenetrable and inedible to most wildlife. This plant can limit regeneration of most other plant species and create a dangerous fire hazard. With its ability to fix nitrogen, Scotch broom can give a competitive advantage to other invasive plant species by increasing soil fertility. Within the project area there are 4 occurrences of Scotch broom consisting of approximately 40 individuals. A majority of the plants occur along or near the trails of TSB.

There are a few scattered patches of **three-cornered leek** (*Allium triquetrum*) that can be found in the project area, primarily along the roads. Three-cornered leek is a perennial bulb with umbels of white flowers that droop to one side on three-sided flower stems that grow up to 2 ft tall (DiTomaso and Healy, 2007). The leaves of three corner leeks are basal, glabrous and grass-like. Reproduction is vegetative by underground bulblets and by seed (DiTomaso, 2013). Three-cornered leek has been evaluated but not listed due to inadequate information by the Cal-IPC (Cal-IPC, 2020). Foliage and bulbs from the plant have a strong onion or garlic odor and flavor and can cause problems to humans and animals if ingested in large quantities.

Wild radish (*Raphanus sativus*) is primarily located in the southern half of TSB before Mill Creek and along the trails. Radish is a winter or summer annual, though sometimes a biennial with white, yellow, pink or purple four petal flowers growing from an erect flower stem growing up to 2 ft tall (DiTomaso and Healy, 2007). Leaves are alternate and vary in shape and size but typically have a covering of stiff, flat hairs (DiTomaso and Healy, 2007). Reproduction occurs only by seed that develop in pods. Though seeds do not disperse but fall directly below parent plants, they remain viable in the soil for several years. Radish, designated as Limited Invasiveness by the Cal-IPC, has a fast establishment and growth rate, and is highly competitive (Cal-IPC, 2020). Additionally, radish can be harmful to animals if ingested in large quantities (DiTomaso and Healy, 2007).

Himalayan blackberry (*Rubus armeniacus*) is an evergreen erect shrub that grows up to 10 ft tall (DiTomaso et al. 2013, DiTomaso and Healy 2007). The roots are typically found in the first 2 ft of soil, but can grow up to 7 ft in loose soil (DiTomaso et al. 2013, DiTomaso and Healy 2007). New plants can emerge from root buds and occasionally from root fragments in good conditions (DiTomaso et al. 2013, DiTomaso and Healy 2007). The white to pinkish flowers are self-pollinating (DiTomaso et al. 2013, DiTomaso and Healy 2007). Seeds only survive on the soil for a few years (DiTomaso et al. 2013, DiTomaso and Healy 2007). The Cal-IPC ranks Himalayan blackberry as High Invasiveness (Cal-IPC 2020, DiTomaso et al. 2013, DiTomaso and Healy 2007). There are multiple patches of Himalayan blackberry in the project area and are primarily located along the trails or roads of Trinidad State Beach.

There are a few scattered patches of **montbretia** (*Crocsmia x crocosmiiflora*) in the project area. Montbretia is a perennial herbaceous herb with an inflorescence of 4-20 red to orange subopposite flowers that are sessile on a flexuosa-arched spike on a horizontally branched stem. The leaves are basal, alternate and lanceolate with entire margins. Montbretia can reproduce through seeds or through division of the corms (DiTomaso and Healy, 2007). Designated as

Limited Invasiveness by the Cal-IPC, montbretia is known to spread rapidly, form dense patches and displace native vegetation as it outcompetes natives for water, light and nutrients (Cal-IPC, 2020).

There are only a few infestations of **Butterfly bush (*Buddleja davidii*)** and primarily located along Stagecoach Road in the midsection of TSB. This woody shrub has opposite, velvety lanced-shaped leaves (UG, 2018). Flowering occurs from May to August, when dense clusters of purple, white or pink tubular flowers develop (UG, 2018). Their seeds develop in small upright oval pods and when ready opened at the tip releasing seeds (dust-like particles) which can easily be distributed by the wind (UG, 2018). The flowers produce high quantities of nectar that attract butterflies who will use it; however, butterfly larvae cannot survive on the nectar (UG 2018). Butterfly bush readily invades disturbed sites and riparian areas and easily escapes gardens (UG 2018). By replacing native plants that provide food for the larvae, butterfly bush can have a negative impact on wildlife and invertebrates (UG, 2018). The Cal-IPC ranks Butterfly bush as Watch and Hot Invasiveness (Cal-IPC, 2020).

Spanish heath (*Erica lusitanica*) is primarily found in the south end of the project area near the HSU Marine Lab. This infestation is still small and could be eradicated if treated properly and in a timely manner. This shrub is typically found along roadsides and disturbed areas; it also invades native vegetation types including wet forest, dry forest, grassland and riparian areas (DiTomaso and Healy 2007). It can form dense monoculture stands where there is little canopy cover. Spanish heath is a woody evergreen perennial shrub that grows to a height of 7 ft. with brittle stems and tiny pointed leaves clustered densely on the stem (DiTomaso and Healy 2007). Its white or pinkish flowers appear from late autumn to early spring and occur in loose groups towards the end of the stems (DiTomaso and Healy 2007). Each flower can produce hundreds of tiny, dust-like seeds that are dispersed by wind and water, and carried off in soil and on animals (DiTomaso and Healy 2007). This plant resprouts quickly after being cut to the ground or burned. The Cal-IPC ranks Spanish heath as Limited Invasiveness (Cal-IPC 2020).

Periwinkle (*Vinca major*) is primarily located along Stagecoach Road and near the HSU Marine Lab. This infestation is still small and could be eradicated if treated properly and in a timely manner. This plant is typically found along tree-covered drainages and creeks in coastal areas as well as in moist roadside locations. It can form a dense cover that prevents growth and establishment of other plant species. Periwinkle is a perennial vine with glabrous, dark green stems that contain a milky latex. Its purplish-blue flowers appear from March to July, but the seeds rarely mature. The plants instead reproduce vegetatively to sprawl across the ground. This plant resprouts quickly after being cut to the ground (Bossard et al, 2000). The Cal-IPC ranks Periwinkle as Moderate Invasiveness (Cal-IPC 2020).

Aaron's beard (*Hypericum calycinum*) is primarily located near the HSU Marine Lab along the trails. This infestation is still small and could be eradicated if treated properly and in a timely manner. This plant is typically found in shaded wildland-urban interfaces. It can form a dense cover that prevents growth and establishment of other plant species. Aaron's beard is a perennial herb that grows to a height ranging from 20 to 60 cm (7.9 to 23.6 inches) with creeping stems. Its yellow flowers bloom from June to November and occur in clusters of 3 per stem, which are then wind pollinated (UC Berkeley, 2020). Each flower can produce many tiny seeds inside of fruits

which are then dispersed by wind and carried off in soil and on animals. This plant resprouts quickly after being cut to the ground. Aaron's beard has been evaluated but not listed due to inadequate information by the Cal-IPC (Cal-IPC, 2020).

Victorian box (*Pittosporum undulatum*) is primarily located near the Trinidad Elementary School next to the trails in the project area. This infestation is still small and could be eradicated if treated properly and in a timely manner. This plant can be found in disturbed areas and coastal scrub habitats. A Victorian box is a tree that can grow to a height of 15 m (49 feet). Its white flowers bloom from November to June and occur in loose groups towards the end of the stems (UC Berkeley, 2020). The flowers produce a fruit to contain the seeds, which are then dispersed by wind and carried off in soil and on animals. The Cal-IPC ranks Victorian box as Watch Invasiveness (Cal-IPC 2020). Within the project area there are 11 occurrences of Scotch broom consisting of approximately 20 individuals.

There are only two patches of **mattress vine (*Muehlenbeckia complexa*)** that are located in the southern portion of TSB near the HSU Marine Lab as well as near the Trinidad Elementary School. This plant is typically found among disturbed areas, coastal bluffs, as well as sandy and rocky places. It can form a dense cover that prevents growth and establishment of other plant species. Mattress vine grows as a shrub that has spreading branches that form dense tangles. Its yellow-green or green flowers appear from July to September that grow in clusters along the branches (UC Berkeley, 2020). The flowers produce fruits that are then dispersed by birds. The mattress vine has been evaluated but not listed due to inadequate information by the Cal-IPC (Cal-IPC, 2020).

Cotoneaster (*Cotoneaster* spp.) is primarily located within the Sitka spruce forest and covers approximately 3.52 hectares (8.71 acres) of the project area. This shrub can be found in forests, shrublands, and grasslands; they can also invade moist woodlands and open areas with thin, rocky soils. Cotoneaster is an evergreen shrub that grows to a height of 10 ft with branches in a complex zig-zag, interweaving pattern. Its white to pink flowers appear in the summer and produces abundant fruits in the autumn. The fruits self-sow into the ground to germinate. Another way that the shrub reproduces is through asexual reproduction from the stems or roots. This plant resprouts quickly after being cut to the ground or burned if not managed correctly (Bossard et al, 2000). The Cal-IPC ranks Cotoneaster as Moderate Invasiveness (Cal-IPC 2020).

APPENDIX C. EVALUATION OF POTENTIAL TREATMENT METHODS FOR EACH TARGET SPECIES

Table 1. Evaluation of potential treatment methods for jubata grass (*Cortaderia jubata*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for jubata grass (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Burning does not provide long-term control because the growing points of jubata grass are protected by surrounding leaves and can rapidly resprout following a burn (DiTomaso et al. 2013, Bossard et al. 2000).	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Hand grubbing using a pulaski or shovel is effective on jubata grass seedlings (DiTomaso et al. 2013). For larger plants a chainsaw or brush cutter can be used to expose the base of the plant to allow better access to the root crown. The entire crown and roots must be removed to prevent resprouting and can be very labor intensive (DiTomaso et al. 2013). Some of the plants are located on slopes where soil disturbance could cause erosion. Removed plants left lying on the soil surface may take root and reestablish under moist soil conditions (DiTomaso et al. 2013, Bossard et al. 2000). All plant material will need to be hauled off site, which is labor intensive and expensive. Cutting and removing the inflorescence is important to prevent seed dispersal during (DiTomaso et al. 2013).	Yes, on small plants, but not on slopes

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Jubata grass can be easily remove using an excavator or bull dozer (DiTomaso et al. 2013). However, this method is labor and cost intensive and most infestations are on coastal bluffs making it not feasible in most of the project area. Jubata grass rapidly resprouts after being cut to the ground. Therefore, mowing is not an effective means of eradication without employing other treatments, such as herbicide (DiTomaso et al. 2013). Livestock do not graze on jubata grass.	Yes, mowing in conjunction with herbicide treatment
Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	On individual plants, on flat ground	Covering jubata grass with heavy duty geo-textile fabric or black plastic works well in controlling isolated individual plants, in open flat terrain (DiTomaso et al. 2013). This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Control of jubata grass can be achieved by spot spraying the plants with a post-emergence application (DiTomaso et al. 2013). It has been recommended to use 1.5-2% solution of Glyphosate or Imazapyr plus ½ oz. of Mentholated Soil Oil solution (Hansen 2017, DiTomaso et al. 2013). In one study, over 90 percent control was obtained during the first season, but continued spot applications were necessary to prevent reestablishment (Bossard et al. 2000). Fall applications result in better control because photosynthetic assimilates are translocating downward at a faster rate late in the season (DiTomaso et al. 2013, Bossard et al. 2000).	Yes

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Herbicide - <i>Wick Wipe</i>	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	Yes, in conjunction with cutting
Herbicide - <i>Stem Injection</i>	This method involves injecting herbicide into the plant.	No	This plant is a grass and does not have hollow stems to inject herbicide into.	No

Table 2. Evaluation of potential treatment methods for Scotch broom (*Cytisus scoparius*). .

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for broom species (<i>Cytisus</i> spp. <i>Genista</i> spp.) (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	Partial	Prescribed fire can kill all broom species, given the intensity level, but it also stimulates seed germination. The broom infestations are surrounded by native plants and trees and located in areas that are unsafe to conduct a prescribed fire. Flaming is effective in killing broom seedlings.	Yes, flaming seedlings
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Hand removal using a weed wrench is effective in removing mature plants (DiTomaso et al. 2013). For very large plants a chainsaw can be used to cut the plant down. However, to prevent resprouting the entire tap root must be removed (DiTomaso et al. 2013). Small plants and seedlings can be hand pulled when soil is moist. However, manual removal that involves soil disturbance can stimulate broom seeds to germinate.	Yes
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Mowing is effective at reducing above-ground biomass, but broom species resprout after being cut to the ground and is not an effective means of eradication (DiTomaso et al. 2013). The flowers and seeds are toxic to humans and livestock, with the exceptions of goats and grazing animals can damage native species. Both the use of heavy equipment or animals can spread seed.	No

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	No	This method is not feasible for where this species is growing in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - <i>Foliar</i>	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Broom species can be easily controlled and eradicated with the use of herbicides (DiTomaso et al. 2013). It has been recommended to use 1.5-2% solution of Glyphosate or Imazapyr plus 1% of Mentholated Soil Oil solution (Hansen 2017, DiTomaso et al. 2013).	Yes
Herbicide - <i>Wick Wipe</i>	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of these species, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - <i>Cut Stump</i>	This method involves applying herbicide to plant stumps or stems after being cut to the ground.	Yes	This application method can greatly reduce drift but needs to be paired with cutting the plants to the ground first. After cutting the plant to ground herbicide is wiped onto the freshly cut stem. It is recommended to us 33% to 55% solution of Glyphosate. This method is more labor intensive than foliar application.	Yes
Herbicide - <i>Stem Injection</i>	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 3. Evaluation of potential treatment methods for tansy ragwort (*Senecio jacobaea*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	Three insects, the cinnabar moth (<i>Tyria jacobaeae</i>), tansy ragwort seed fly (<i>Botanophila seneciella</i>) and the tansy ragwort flea beetle (<i>Longitarsus jacobaeae</i>) were released in the 1960's as a bio-control for tansy ragwort. However, this is not an effective eradication method (DiTomaso et al. 2013).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	Yes, on seedlings	With sufficient fuel fire will kill seedlings, but mature plants will resprout (DiTomaso et al. 2013). This is not an eradication method.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes, on small infestations	Manual removal can control tansy ragwort, but must be repeated 2 to 3 times a year prior to flowering (DiTomaso et al. 2013). Tansy ragwort flowers can still produce seed, if removed from the ground and left to decompose. Therefore, if flowers are present during removal, the pants must be taken off site and disposed of properly. This method is labor intensive and costly.	Yes, on small infestations
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Grazing and mowing only remove the above-ground biomass and tansy ragwort will resprout if roots are not removed (DiTomaso et al. 2013). In addition, tansy ragwort is toxic to grazers, except sheep (DiTomaso et al. 2013).	No

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases, mulch could be used. The covering material may need to be left in place for many years.	Yes, on small infestations	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Tansy ragwort can be easily controlled and eradicated with the use of herbicides. It has been recommended to use 1.5% solution of Glyphosate or Aminopyralid plus ½ oz. of Mentholated Soil Oil per gallon of water (Hansen 2017, DiTomaso et al. 2013). It is recommended to apply herbicide in the late summer to early fall (DiTomaso et al. 2013).	Yes, on small infestations
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 4. Evaluation of potential treatment methods for thistle species (*Cirsium arvense*, *C. vulgare*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	Canada thistle and milkthistle: No biological control agents available (DiTomaso et al. 2013, Bossard et al. 2000). Bull thistle: Two USDA approved insects, <i>Urophora stylata</i> and <i>Rhinocyllus conicus</i> have been released for bull thistle control in California (DiTomaso et al. 2013, Bossard et al. 2000). However, neither species has been successful in controlling populations in California (Bossard et al. 2000). <i>Trichosirocalus horridus</i> , a weevil, was introduced in 1974 with varying results (DiTomaso et al. 2013). This is not an eradication method.	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed fire has not shown to be effective in eliminating these species (DiTomaso et al. 2013). Burning can cause the seedbanks to flush and encourage establishment (DiTomaso and Healy 2007). Prescribed fire can help to expose rosettes making it easier to apply herbicide or manually dig out plants (DiTomaso and Healy 2007).	No

<p>Manual/ Cultivating</p>	<p>This method involves physically removing the plants and roots from the ground using hand tools.</p>	<p>Yes for some species</p>	<p>Bull thistle can be controlled by cutting the plants shortly before plants flower (DiTomaso and Healy 2007). If cut too early in the season, plants will resprout and flower before the first frost (DiTomaso and Healy 2007). The uneven flowering times may make more than one treatment necessary. Some plants that have been removed only days after flowering still produced seeds when left lying on the ground (Cal-IPC 2013). Therefore, it is important to remove cut flower heads from the area. This method is time consuming and labor intensive. Canada thistle: Digging the plants out can actually increase the population of Canada thistle, because it readily grows from root fragments that can stay viable for 100 days without nutrients from photosynthesis (DiTomaso and Healy 2007). Digging of plants must be repeated at 21 day intervals throughout the growing season (DiTomaso and Healy 2007). Milkthistle: Manual removal can be effective on seedlings (DiTomaso and Healy 2007). This method is time consuming and labor intensive. This is not an eradication method.</p>	<p>No</p>
<p>Mechanical/ Grazing</p>	<p>This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.</p>	<p>No</p>	<p>Milkthistle can be controlled by mowing or cutting the plants to the ground (DiTomaso and Healy 2007). Cutting should occur shortly before flowering. First year rosettes of bull and Canada thistles would not be damaged by mowing and will be able to flower the following year (DiTomaso et al. 2013). Mowing is not an effective means of eradication (DiTomaso et al. 2013). The spiny leaves of thistle species can injure livestock and other grazing wildlife.</p>	<p>No</p>
<p>Solarizing/ Mulching</p>	<p>This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The</p>	<p>No</p>	<p>Some infestations are on steep slopes and other infestations are intermixed with native species. This method is not appropriate for these species within the project area. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.</p>	<p>No</p>

	covering material may need to be left in place for many years.			
Herbicide - <i>Foliar</i>	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	All of these species can be relatively easy to control and eradicated with the use of herbicides. The main goal of this project is to restore the grasslands in the project area. Therefore, a broad leaf selective herbicide is more desirable. It has been recommended to use 1% Aminopyralid plus ½ oz. of Mentholated Soil Oil per gallon of water (Hansen 2017, DiTomaso et al. 2013). It is recommended to apply herbicide in the fall prior to seeding for mature plants and in the spring for rosettes (DiTomaso et al. 2013).	Yes
Herbicide - <i>Wick Wipe</i>	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of thistles, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - <i>Stem Injection</i>	This method involves injecting herbicide into the plant.	No	Milkthistle, bull thistle and Canada thistle do not have hollow stems to inject herbicide into.	No

Table 5. Evaluation of potential treatment methods for poison hemlock (*Conium maculatum*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for poison hemlock (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed fire is only effective in removing above ground vegetation. Poison hemlock can resprout following a burn and toxins in the plants are released into the air when burned (DiTomaso et al. 2013). Roots must be removed to eradicate this species.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Hand grubbing using a pulaski or shovel is effective on poison hemlock seedlings (DiTomaso et al. 2013). All roots must be removed to prevent resprouting and can be very labor intensive (DiTomaso et al. 2013). Some of the plants are located on slopes where soil disturbance could cause erosion. In addition all plant parts are poisonous and safety precautions must be taken when handling this plant.	Yes, on small infestations, but all plant parts are toxic
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Poison hemlock resprouts after being cut to the ground (DiTomaso et al. 2013). Mowing is not an effective means of eradication. This method requires other methods to be employed, that are more effective and efficient alone. The use of heavy equipment is not practical based on the location of the infestations. All plant parts are toxic and will kill livestock.	No

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	No	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Poison hemlock can be easily controlled and eradicated with the use of herbicides (DiTomaso et al. 2013). It has been recommended to use 2% solution of Glyphosate plus ½ oz. of Mentholated Soil Oil solution (Hansen 2017, DiTomaso et al. 2013).	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	No	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of poison hemlock, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 6. Evaluation of potential treatment methods for geranium species (*Geranium lucidum*, *G. robertianum*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are currently no biological control agents available for <i>Geranium</i> spp. (Hooghkirk 2015, TCNWC 2011).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed burning and flaming will not control or remove <i>Geranium</i> spp. (Hooghkirk 2015). Infestations are found in wet areas where fire does not get hot enough to carry into the root system even though the vegetative portions may be destroyed. In addition, some infestations are found along a major highway where a prescribed fire may not be feasible.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	No	Small populations can be hand-weeded if the soil is loose and allows roots to be removed easily. However, disturbing the soil through manual or mechanical control may cause a flush of seedlings (TCNWC 2011). Resprouting is possible from root remnants. Multiple treatments are required each year making this method labor intensive. Manual removal may not be the best method of control where steep slopes exist, due to increasing chances of erosion. Removal should be conducted prior to flowering and will need to be conducted multiple times a year for many years (Kings County 2018). Best time to pull is right when the plants go to flower (Hooghkirk 2015).	Partially
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and	No	Mowing and grazing is not an effective means of eradication and both can accelerate the spread of <i>Geranium</i> spp. infestations especially along roadways (Kings County 2018). <i>Geranium</i> spp. can fling their seeds up to 20 feet away from the mother plant and are easily picked up by tires, shoes, and animals. This short growing herbaceous plant is usually spared due to the mower height (Hooghkirk 2015). In addition,	No

	below ground with heavy equipment.		there is no physical way to mow most infestations due to the topography.	
Solarizing/ Mulching	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	Maybe	Covering <i>Geranium</i> spp. with heavy duty geo-textile fabric or black plastic may work in controlling isolated, small patches in open flat terrain. This method requires constant monitoring of the plants around the perimeter and plants that grow through the cover material. Since the <i>Geranium</i> sp. infestation is growing along steep slopes and uneven terrain there is no effective way to hold down the cover material. The material is expensive and sand bags would have to be transported to the site. The site would have to be checked on a regularly making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Control of <i>Geranium</i> sp. can be achieved by spot spraying the plants with a post-emergence application (Hooghkirk 2015). It is recommended to use a glyphosate based herbicide at a 1.5% solution plus ¼ oz. of Spreader 90 per gallon of water to treat <i>Geranium</i> spp. (Hansen 2017). Herbicide can be applied throughout the year but best if applied in the fall when plants first emerge after sufficient rains or in the early spring before native annuals and perennials emerge (TCNWC 2011).	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	No	This application method can greatly reduce drift. However, the plant is very small and it is hard to get the chemical on the leaf surfaces, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	<i>Geranium</i> spp. are herbs and does not have hollow stems to inject herbicide into.	No

Table 7. Evaluation of potential treatment methods for Cape ivy (*Delairea odorata*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	Since 1998, California Department of Food and Agriculture has been researching multiple species as a control agents for Cape ivy, but none have been approved for use in California (DiTomaso et al. 2013).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed burning and flaming will not control or remove Cape ivy (DiTomaso et al. 2013). Infestations are found in wet areas where fire does not get hot enough to carry into the root system even though the vegetative portions may be destroyed. Burnt stumps have been observed to resprouting 2 months after burning (Bongio 2015, Hooghkirk 2015, Miller et al. 2010). In addition, it is found along a major highway where a prescribed fire may not be feasible.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Small populations can be hand-weeded. Care must be taken while transporting removed Cape ivy as all plant parts can resprout, allowing it to easily become established. Multiple treatments are required each year making this method labor intensive. Manual removal may not be the best method of control where steep slopes exist, due to increasing chances of erosion.	No
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Effective at reducing above-ground biomass. Cape ivy will resprout after being cut to the ground. Mowing and grazing is not an effective means of eradication and can accelerate the spread of Cape ivy. There is no physical way to mow most of the infestation as they are mainly on steep slopes or uneven ground. Cape ivy leaves and stems are toxic to livestock.	No

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Yes	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through. The material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Cape ivy can be easily controlled and eradicated with the use of herbicides. It has been recommended to use 1.5% solution of Triclopyr or Aminopyralid plus ½ oz. of Mentholated Soil Oil per gallon of water (Hansen 2017, DiTomaso et al. 2013).	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	No	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of this vine, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants. It is recommended to us 33% to 55% solution of Glyphosate (DiTomaso et al. 2013).	No
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 8. Evaluation of potential treatment methods for three cornered leek (*Allium triquetrum*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for this species (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed fire can kill the above ground vegetation. However, wild onion will regrow from underground bulbs. Fire will not kill the bulbs. Therefore, this is not an effective treatment method (DiTomaso et al. 2013).	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Manual removal can effectively wild onion but all bulbs must be removed from the soil (DiTomaso et al. 2013). Multiple treatments are needed throughout the growing season making this method labor intensive and costly (DiTomaso et al. 2013).	Yes, on small infestations
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Mowing and grazing can remove the above ground vegetation. However, wild onion will readily regrow from underground bulbs. Therefore, this is not an effective treatment method (DiTomaso et al. 2013).	No

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Maybe	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	Maybe, on small infestations, on flat terrain
Herbicide - <i>Foliar</i>	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Herbicide can successfully reduce the spread of wild onion and should be done in spring before flowering (IWS 2020). Multiple applications may be required due to the persistence of bulbs and seed bank (IWS 2020). It is recommended to use Glyphosate (IWS 2020).	Yes
Herbicide - <i>Wick Wipe</i>	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - <i>Stem Injection</i>	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 9. Evaluation of potential treatment methods for radish (*Raphanus* spp.).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	Red-legged earth mite, cabbage moth, Rutherglen bug, thrips, and Italian snails attack wild radish, but also native plant species (DiTomaso et al. 2013). This is not an eradication method (DiTomaso et al. 2013).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed fire is only effective in removing above ground vegetation. Radish can resprout following a burn (DiTomaso et al. 2013). Roots must be removed to eradicate this species. The majority if the wild radish is located in areas where a prescribed burn is not feasible.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Manual removal prior to seed set can help control wild radish (DiTomaso et al. 2013). All root fragments need to be removed and multiple treatments are needed throughout the growing season (DiTomaso et al. 2013).	Yes, on small infestations
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Mowing can be effective at reducing above-ground biomass, but wild radish will grow back after being cut (DiTomaso et al. 2013). This is not an effective eradication method (DiTomaso et al. 2013). Similar to mowing, grazing does not provide effective control and seeds can be easily carried away on animals.	No

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Yes, on small infestations	This method is not feasible for where this species is found in the project area. Although most infestations are on flat ground, they are large that would require multiple acres of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.		Tansy ragwort can be easily controlled and eradicated with the use of herbicides. It has been recommended to use 1.5% solution Triclopyr plus ½ oz. of Mentholated Soil Oil per gallon of water (Hansen 2017). It is recommended to apply herbicide in the late summer to early fall (Hansen 2017).	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.		This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	Yes
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 10. Evaluation of potential treatment methods for Himalayan blackberry (*Rubus armeniacus*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	<i>Phragmidium violaceum</i> , blackberry leaf rust, partially defoliates Himalayan blackberry and also reduces tip rooting (DiTomaso et al. 2013). It has not proven to show sustained control of Himalayan blackberry and it is not an eradication method (DiTomaso et al. 2013).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	Yes, in conjunction with herbicide or manual treatment	Prescribed fire is only effective in removing above ground vegetation. Himalayan blackberry can rapidly resprout following a burn (DiTomaso et al. 2013). Roots must be removed to eradicate this species. The majority if the Himalayan blackberry is located near HWY 101, making it challenging to conduct a prescribed burn.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Hand grubbing using a pulaski or shovel can be effective on small plants but is labor intensive (DiTomaso et al. 2013). For larger plants a chainsaw or brush cutter can be used to expose the base of the plant to allow better access to the roots.	Yes, on small infestations
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	Yes, in conjunction with herbicide or manual treatment	Mowing and grazing only remove the above ground vegetation. Mowing is not an effective means of eradication because all roots must be removed to completely remove the plants (DiTomaso et al. 2013). Goats have been used to remove the above ground vegetation of Himalayan blackberry but these animals will also eat the surrounding native vegetation (DiTomaso et al. 2013).	No

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Yes	Some infestations are on steep slopes and other infestations are intermixed with native species. Infestations would first have to be mowed. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. Himalayan blackberry has been documented growing through most cover materials. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Himalayan blackberry can be easily controlled and eradicated with the use of herbicides. It has been recommended to use 1.5% solution of Glyphosate or Triclopyr plus ½ oz. of Mentholated Soil Oil per gallon of water (Hansen 2017, DiTomaso et al. 2013). It is recommended to apply herbicide in the late summer to early fall (DiTomaso et al. 2013).	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of this plant, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	Himalayan blackberry does not have hollow stems to inject herbicide into.	No

Table 11. Evaluation of potential treatment methods for montbretia (*Crocasmia X crocosmiiflora*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for this species (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed fire can kill the above ground vegetation. However, montbretia will regrow from underground corms. Fire will not kill the corms. Therefore, this is not an effective treatment method (DiTomaso et al. 2013).	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Manual removal can effectively montbretia but all corms must be rmeoved from the soil (DiTomaso et al. 2013). Multiple treatments are needed throughout the growing season making this method labor intensive and costly (DiTomaso et al. 2013).	Yes, on small infestations
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Mowing and grazing can remove the above ground vegetation. However, montbretia will regrow from underground corms. Therefore, this is not an effective treatment method (DiTomaso et al. 2013).	No

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Maybe	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	Maybe, on small infestations, on flat terrain
Herbicide - <i>Foliar</i>	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Herbicide can effectively eradicate fennel. It is recommended to use 0.5-1% solution of Glyphosate (DiTomaso et al. 2013).	Yes
Herbicide - <i>Wick Wipe</i>	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - <i>Stem Injection</i>	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 12. Evaluation of potential treatment methods for butterfly bush (*Buddleja davidii*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for this species (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	Yes, in conjunction with herbicide or manual treatment	Prescribed fire can kill the above ground vegetation but Spanish heath will resprout unless all roots are removed. The Spanish heath infestations are small, surrounded by native plants and trees and located in areas that are unsafe to conducted a prescribed fire.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Hand grubbing using a pulaski or shovel can be effective on small plants but is labor intensive (DiTomaso et al. 2013). For larger plants a chainsaw or brush cutter can be used to expose the base of the plant to allow better access to the roots. Some of the plants are located on slopes where soil disturbance could cause erosion.	Yes, on small infestations
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	Yes, in conjunction with herbicide or manual treatment	Effective at reducing above-ground biomass, but butterfly bush resprouts after being cut to the ground. Mowing is not an effective means of eradication (DiTomaso et al. 2013). Animals do not graze on butterfly bush.	No

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Yes, in conjunction with cutting	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	Yes, on individual plants
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Butterfly bush can be controlled and eradicated with the use of herbicides (DiTomaso et al. 2013). It has been recommended to use 1.5-2% solution of Glyphosate or Imazapyr plus 1% of Mentholated Soil Oil solution (DiTomaso et al. 2013). However, the stump cut treatment method is more effective and reduces fire hazards by removing above ground vegetation.	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of these species, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - Cut Stump	This method involves applying herbicide to plant stumps or stems after being cut to the ground.	Yes	This application method can greatly reduce drift but needs to be paired with cutting the plants to the ground first. After cutting the plant to ground herbicide is wiped onto the freshly cut stem. It is recommended to us 33% to 55% solution of Glyphosate. This method is more labor intensive than foliar application (Hansen 2017).	Yes
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 13. Evaluation of potential treatment methods for fennel (*Foeniculum vulgare*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for this species (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Fire does not kill mature plants and can stimulates seed germination (DiTomaso et al. 2013).	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Manual removal can effectively control fennel, and should occur prior to seed set (DiTomaso et al. 2013). All root fragments need to be removed and multiple treatments are needed throughout the growing season (DiTomaso et al. 2013).	Yes, on small infestations
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	Yes	Grazing does not provide effective control and can increase the spread as seeds can be easily carried away on animals (DiTomaso et al. 2013). Mowing or hand cutting at flowering can kill fennel. However, multiple treatments may be necessary (DiTomaso et al. 2013).	Yes, on small infestations

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	No	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	Yes, on small infestations
Herbicide - <i>Foliar</i>	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Herbicide can effectively eradicate fennel. It is recommend to use 0.5-1% solution of Triclopyr (DiTomaso et al. 2013).	Yes
Herbicide - <i>Wick Wipe</i>	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - <i>Stem Injection</i>	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 14. Evaluation of potential treatment methods for Spanish heath (*Erica lusitanica*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for this species (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed fire can kill the above ground vegetation but Spanish heath will resprout unless all roots are removed. The Spanish heath infestations are small, surrounded by native plants and trees and located in areas that are unsafe to conducted a prescribed fire.	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Hand grubbing using a pulaski or shovel can be effective on small plants but is labor intensive (DiTomaso et al. 2013). For larger plants a chainsaw or brush cutter can be used to expose the base of the plant to allow better access to the roots. Some of the plants are located on slopes where soil disturbance could cause erosion.	Yes
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Mowing and grazing only remove the above ground vegetation. Mowing is not an effective means of eradication because all roots must be removed to completely remove the plants (DiTomaso et al. 2013). Grazing animals will also eat the surrounding native vegetation (DiTomaso et al. 2013).	No

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	No	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	No
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Spanish heath can be easily controlled and eradicated with the use of herbicides. It has been recommended to use 2% solution Triclopyr plus ½ oz. of Mentholated Soil Oil per gallon of water (DiTomaso et al. 2013). It is recommended to apply herbicide in the late summer to early fall (DiTomaso et al. 2013).	Yes
Herbicide - Stump Cut	This method involves applying herbicide to plant stumps or stems after being cut to the ground.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants. It is recommended to use Glyphosate at a 1:5 ratio in water (TSA 2020).	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of these species, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 15. Evaluation of potential treatment methods for sweetpea (*Lathyrus latifolius*).

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for this species (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	No	Prescribed fire can kill the above ground vegetation. However, sweatpea will regrow from underground roots. Therefore, this is not an effective treatment method (DiTomaso et al. 2013).	No
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Manual removal can effectively control sweatpea (DiTomaso et al. 2013). However, all root fragments need to be removed and multiple treatments are needed throughout the growing season making this method labor intensive and costly (DiTomaso et al. 2013).	Yes
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Mowing and grazing can remove the above ground vegetation. However, sweatpea will regrow from underground roots. In addition, sweatpea is toxic to livestock (DiTomaso et al. 2013). Therefore, this is not an effective treatment method (DiTomaso et al. 2013).	No

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Yes, on small infestations, on flat terrain	This method is not feasible for where this species is found in the project area. Some infestations are on steep slopes and other infestations would require large areas of both native and non-native species to be completely covered. This method requires constant monitoring of the site to ensure the cover material does not move or the plants do not grow through the cover material. The cover material is expensive and sand bags would have to be transported to the site making this method costly, labor intensive and time consuming.	Yes, on small infestations, on flat terrain
Herbicide - <i>Foliar</i>	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Herbicide can effectively eradicate fennel. It is recommend to use 0.5-1% solution of Triclopyr (DiTomaso et al. 2013).	Yes
Herbicide - <i>Wick Wipe</i>	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	Yes	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and or contact to non-target plants.	No
Herbicide - <i>Stem Injection</i>	This method involves injecting herbicide into the plant.	No	This plant does not have hollow stems to inject herbicide into.	No

Table 16. Evaluation of potential treatment methods for reed canarygrass.

Weed Treatment Method	Methodology Explanation	Is Method Effective?	Rationale for Method Implementation Decision	Objectives/ Goals Achieved?
Bio-control	The use of insects or fungal agents to damage or kill plants.	No	There are no biological control agents available for reed canarygrass (DiTomaso et al. 2013, Bossard et al. 2000).	No
Burning/ Flaming	The use of prescribed fire to remove vegetation from the landscape. Flaming: technique of passing a torch over the green tissue of a plant to destroy cell walls and prevent photosynthesis.	Yes	Fire can suppress reed canarygrass (DiTomaso et al. 2013, Bossard et al. 2000). Annual burning in later spring or early fall for up to 6 years may be required. However, most infestations are growing in moist conditions that may not allow for a hot enough burn to kill reed canarygrass. Flaming can be used to treat resprouts and seedlings after herbicide application. Infestations are found in wet areas where fire does not get hot enough to carry into the root system even though the vegetative portions may be destroyed.	Yes, flaming
Manual/ Cultivating	This method involves physically removing the plants and roots from the ground using hand tools.	Yes	Hand grubbing using a pulaski or shovel is only practical on small infestations (DiTomaso et al. 2013). All roots must be removed to prevent resprouting and can be very labor intensive (DiTomaso et al. 2013). All plant material would need to be hauled off site, which would be labor intensive and expensive.	Yes, on small infestations, but not on slopes
Mechanical/ Grazing	This method involves physically removing plant material from above the ground using a mower or brush cutter or grazing animals and below ground with heavy equipment.	No	Mowing or grazing is not an effective means of eradication, as it only removes the above ground vegetation. Therefore, other methods must be employed to achieve eradication (DiTomaso et al. 2013). In addition, other methods alone are more effective and efficient. This method is not practical in the project area because of the high density of native vegetation and varying topography where the reed canarygrass infestations are located. This is not an eradication method.	No

Solarizing/ Mulching	This method involves covering the plants with geo-textile fabric or heavy duty black plastic to prevent photosynthesis. In some cases mulch could be used. The covering material may need to be left in place for many years.	Maybe	Covering reed canarygrass with heavy duty geo-textile fabric or black plastic may work in controlling small isolated patches, in open flat terrain. Reed canarygrass favors moist soils and wetlands. Using this method can be problematic in and near wet areas. This method requires constant monitoring of the plants to ensure the cover does not move or the plants do not grow through the cover. The cover material is expensive and sand bags would have to be transported to the site. The site would have to be checked on a regularly making this method costly, labor intensive and time consuming.	Maybe
Herbicide - Foliar	This method involves applying herbicide to the plants using a low volume backpack sprayer.	Yes	Control of reed canarygrass can be achieved by spot spraying the plants with a post-emergence application (DiTomaso et al. 2013). It is recommended to use Imazapyr at a 1-2% solution plus ½ oz. of Mentholated Soil Oil per gallon of water (Hansen 2017, DiTomaso et al. 2013). Early spring applications on newly sprouting reed canarygrass (DiTomaso et al. 2013).	Yes
Herbicide - Wick Wipe	This method involves applying herbicide to the plants using an applicator wand with a rope wick or sponge on the end of a reservoir.	No	This application method can greatly reduce drift. However, it is hard to get the chemical on the leaf surfaces of grasses, increasing the amount of herbicide used and the chance of personal contact with the herbicide and contact to non-target plants.	No
Herbicide - Stem Injection	This method involves injecting herbicide into the plant.	No	This plant is a grass and does not have hollow stems to inject herbicide into.	No

**APPENDIX D. EXAMPLE OF A FIRE ANALYSIS FOR FLAMING TREATMENT
METHOD AND PILE BURNING**

PRESCRIBED FIRE COMPLEXITY RATING

PARK UNIT NAME Humboldt Lagoons SP	BURN UNIT Sample Flaming Plan
PREPARED BY Lathrop Leonard	DATE 27-Jan-20

COMPLEXITY RATING
*Rate each criteria for significance.
 For Value use: 1 (Low), 3 (Moderate), or 5 (High).
 Use values 2 or 4 when criteria do not clearly meet the Low, Moderate or High levels.*

<u>*Criteria</u>	<u>Value</u>	<u>Rating</u>	<u>Comments</u>
BURN DURATION (3)	1	3	
FIRE BEHAVIOR OUTSIDE PLOT (3)	1	3	
IGNITION (3)	1	3	
LOGISTICS (3)	1	3	
OPERATIONS (3)	1	3	
ESCAPE POTENTIAL (2)	1	2	
TREATMENT OBJECTIVES (2)	1	2	
SAFETY (2)	3	6	
SMOKE MANAGEMENT (2)	1	2	
OWNERSHIP BOUNDARY THREAT (2)	1	2	
THREAT TO FACILITIES (2)	1	2	
SENSITIVE SPECIES CONCERNS (2)	1	2	
CULTURAL SITES CONCERNS (2)	1	2	
INTERAGENCY COORDINATION (1)	1	1	
PUBLIC/POLITICAL INTEREST (1)	1	1	
RATING TOTAL		37	

*** Weighting Factor (given in parenthesis):**


- 1 = Criteria that affect the visitors, neighbors, general public, and other agencies.
- 2 = Criteria that determine pre-burn techniques or during burn procedures necessary to implement project.
- 3 = Criteria critical to determining number and qualifications of personnel, number and types of equipment or amount of supplies needed to implement project.

Copy to Natural Resources Division

APPENDIX E. PEST CONTROL ADVISOR'S RECOMMENDATIONS

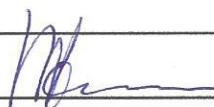
CPS Timberland

PEST CONTROL RECOMMENDATION

Operator of the Property California Dept. of Parks and Recreation		Recommendation Expiration Date 12/31/2017	
Address P.O. Box 2006		City Eureka, CA 95502	
Location to be Treated Humbolt Lagoons State Park and (HMSRA) cont.		County	
Weeds to be treated: Poison hemlock(Conium maculatum), Scotch broom(Cytisus scoparius), Spanish heath(Erica lusitancia)			
Weeds to be treated:		Acres or Units to be Treated Spot treatments	
Method of Application:		Pest(s) to be Controlled Noxious Weeds	
<input type="checkbox"/> Air <input checked="" type="checkbox"/> Ground <input type="checkbox"/> Fumigation <input type="checkbox"/> Other			
Herbicide: Rodeo 1.5% + MSO (Poison Hemlock)		Rate/Gal 2oz + MSO 1/2 oz	Dilution Rate
			Volume/acre: Variable
Herbicide: Rodeo 2% + MSO or Habitat (Scotch Broom)		Rate/Gal 2.6 oz + MSO 1/2 oz or Habitat 20%	Habitat for cut stump treatment
Herbicide: Garlon 3A 2% + MSO or Rodeo 2% +MSO (Spanish heath)		Rate/Gal 2.6oz +MSO 1/2oz or Rodeo 2.6oz +MSO 1/2oz	
<p>Do not apply during irrigation or when run-off is likely to occur.</p> <p>Do not allow drift from treatment area. Keep out of Lakes, streams and ponds. Do not apply when foliage is wet (dew, rain, etc) Re-Entry: Do not enter until spray has dried.</p>		Spray with the least amount of wind - under 10 mph	
		Wear appropriate PPE as specified on Label.	
		<p>Read label carefully----Avoid drift----Calibrate equipment---- Use directed spray</p>	
<p>I certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.</p>		<p>Comments</p> <p>Applications will be made with 4 gallon Backpack Sprayers. Habitat label says not to use for controlling Poison hemlock in California. Surfactants: MSO or Spreader 90 depending on species</p>	
Adviser Signature 	Date: 5/25/2017	Drift Reduction: Liberate	
Adviser	Phone# 503-703-6315	Cut Stump treatment: Make sure you have complete herbicide coverage of the stumps your treating.	
Mark P. Hansen	License Number	Garlon 3A could also be used for controlling Scotch broom at the rate of 2oz/gallon plus MSO at 1.5oz/gal.	
Employer CPS Timberland	PCA License# 72985		
4175 Salem Industrial Drive Salem, OR 97307			
Employer's Address	Phone# 800-452-8324		


CPS Timberland

PEST CONTROL RECOMMENDATION

Operator of the Property California Dept. of Parks and Recreation		Recommendation Expiration Date 12/31/2017	
Address P.O. Box 2006		City Eureka, CA 95502	
Location to be Treated Humbolt Lagoons State Park and (HMSRA) cont.		County Humbolt	
Weeds to be treated: Butterfly bush(Buddleja davidii), Tansy ragwort(Senecio jacobaea) Himalayan blackberry(Rubus armeniacus)			
Weeds to be treated:		Acres or Units to be Treated Spot treatments	
Method of Application:		Pest(s) to be Controlled Noxious Weeds	
<input type="checkbox"/> Air <input checked="" type="checkbox"/> Ground <input type="checkbox"/> Fumigation <input type="checkbox"/> Other			
Herbicide: 20% solution of Habitat or Rodeo (Butterfly Bush)		Rate/gal	Dilution Rate 20%
			Cut Stump
Herbicide: Milestone foliar treatment (Tansy ragwort)		Rate/gal 1.5oz in 4gal Backpack 1/4oz/gl S 90	Volume/acre: Variable
Herbicide: Garlon 3A 1.5% Spring or Rodeo 1.5% + MSO (B Berry)		Rate/gal 2oz Garlon 3A.2ozRodeo + MSO 1/2oz/gal	Rodeo Fall application
<p>Do not apply during irrigation or when run-off is likely to occur.</p> <p>Do not allow drift from treatment area. Keep out of Lakes, streams and ponds. Do not apply when foliage is wet (dew, rain, etc) Re-Entry: Do not enter until spray has dried.</p>		Spray with the least amount of wind - under 10 mph	
		Wear appropriate PPE as specified on Label.	
		<p>Read label carefully----Avoid drift----Calibrate equipment----</p> <p>Use directed spray</p>	
<p>I certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.</p>		Comments	
		Applications will be made with 4 gallon Backpack Sprayers.	
		Surfactants: MSO or Spreader 90 depending on species	
		Drift Reduction: Liberate	
		Cut stump treatment: Make sure you have complete herbicide coverage of the stumps your treating.	
Adviser Signature 	Date: 5/25/2017		
	Phone# 503-703-6315		
Adviser	License Number		
Mark P. Hansen	PCA License# 72985		
Employer CPS Timberland			
4175 Salem Industrial Drive Salem, OR 97307			
Employer's Address	Phone# 800-452-8324		

CPS Timberland

PEST CONTROL RECOMMENDATION

Operator of the Property California Dept. of Parks and Recreation		Recommendation Expiration Date 12/31/2017	
Address P.O. Box 2006		City Eureka, CA 95502	
Location to be Treated Humbolt Lagoons State Park and (HMSRA)		County Humbolt	
Weeds to be treated: Cape Ivy(Delairea odrata), Wild radish(Raphanus Raphanistrum), Jubata grass(cortaderia jubata) and related species.			
Weeds to be treated:		Acres or Units to be Treated Spot treatments	
Method of Application:		Pest(s) to be Controlled Noxious Weeds	
<input type="checkbox"/> Air <input checked="" type="checkbox"/> Ground <input type="checkbox"/> Fumigation <input type="checkbox"/> Other			
Herbicide: Milestone + Garlon 3A 1.5% +MSO (Cape Ivy)		1.5oz in 4gal + Garlon 3A 2oz/gal + MSO 1/2oz gl	Dilution Rate
			Volume/acre: Variable
Herbicide: Garlon 3A 1.5% + MSO (Wild radish)		Rate/Gal 2oz + MSO 1/2 oz	
Herbicide: Rodeo 2% + Habitat 1% + MSO (Jubata grass)		Rate/Gal 2.6oz + 11/3oz + MSO 1/2oz	
<p>Do not apply during irrigation or when run-off is likely to occur.</p> <p>Do not allow drift from treatment area. Keep out of Lakes, streams and ponds. Do not apply when foliage is wet (dew, rain, etc) Re-Entry: Do not enter until spray has dried.</p>		Spray with the least amount of wind - under 10 mph	
		Wear appropriate PPE as specified on Label.	
		<p>Read label carefully----Avoid drift----Calibrate equipment----</p> <p>Use directed spray</p>	
<p>I certify that alternatives and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.</p>		<p>Comments</p> <p>Applications will be made with 4 gallon Backpack Sprayers.</p> <p>Surfactants: MSO or Spreader 90 depending on species</p> <p>Drift Reduction: Liberate</p>	
<p>Adviser Signature  Date: 5/25/2017</p>			
<p>Adviser Mark P. Hansen Phone# 503-703-6315</p>			
<p>Employer CPS Timberland License Number PCA License# 72985</p>			
<p>4175 Salem Industrial Drive Salem, OR 97307</p>			
<p>Employer's Address Phone# 800-452-8324</p>			

APPENDIX F. INFORMATION ABOUT HERBICIDE PROPOSED FOR USE

Aminopyralid

Aminopyralid or Milestone is a pyridine carboxylic acid herbicide intended for use in rangeland, permanent grass pastures, non-cropland areas, natural areas, and grazed areas in and around these sites. It helps control a number of key noxious and invasive annual, biennial and perennial weed species. It also provides residual weed control activity, controlling re-infestations and reducing the need for re-treatment depending on the rate applied and the target species that it is used on. The total amount of herbicide applied as a re-treatment or as spot treatment cannot exceed 7 fl. oz. per acre per year in rangeland, permanent grass pastures and non-cropland areas. In addition, the total amount of herbicide that is used on wheat cannot exceed 0.57 fl oz per acre per growing season (EPA, 2005).

Triclopyr

Triclopyr 4 is an herbicide used to control unwanted woody plants and annual and perennial broadleaf weeds in forests, on permanent grass pastures, rangelands, and conservation reserve program (CRP) acres, on non-crop areas, on rights-of-way, on fence rows, on non-irrigation ditch banks, around farm buildings, and on perennial bluegrass, perennial ryegrass, and tall fescue ornamental turf (EPA, 2008). Triclopyr acid was found to be slightly toxic when ingested orally and when absorbed via the dermal route. The total amount of Triclopyr application in areas that are not forest and grazing lands shall not exceed 8 pounds per acre per year (EPA, 2008). The total amount of Triclopyr application in areas that are not forest and grazing lands shall not exceed 2 pounds per acre per year on grazable areas (EPA, 2008). The total amount of Triclopyr application in areas that are not forest and grazing lands shall not exceed 8 pounds per acre per year on forestry sites (EPA, 2008).

Imazapyr

Imazapyr is an aqueous solution intended to be mixed with water and surfactant(s) for application to non-cropland areas, such as railroads, utility, pipeline and highway rights-of-way, utility plant sites, petroleum tank farms, pumping installations, fence rows, storage areas, and non-irrigation ditch banks. The chemical may also be used on grass pastures and rangelands. Imazapyr helps control most annual and perennial grasses and broadleaf weeds as well as many brush and vine species. The herbicide also provides residual control of labeled weeds that have germinated in the treated areas. The total amount of Imazapyr application shall not exceed 1.5 pounds per acre per year for non-food/food croplands and aquatic sites (EPA, 2011).

Glyphosate

Glyphosate is a non-selective postemergent, systemic herbicide that has no soil residual activity. It gives a broad-spectrum control of many annual weeds, perennial weeds, woody brush and trees. It causes moderate eye irritation when absorbed as well as temporary gastrointestinal irritation when ingested in large amounts. The total amount of Glyphosate application shall not exceed 10.6 quarts per acre per year for trees, vines, or shrubs (EPA, 2016). The combined total of all treatments must not exceed 8 quarts of this product per acre per year (EPA 2016).

**APPENDIX G. HERBICIDE, ADJUANTS, AND COLORANT LABELS AND
MATERIAL SAFETY DATA SHEETS**

MATERIAL SAFETY DATA SHEET

Glyphosate 5.4

Alligare, LLC

Emergency Phone: Chemtrec 800-424-9300

Effective Date: April 6, 2007

EPA Reg. No. 81927-8

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Glyphosate 5.4

Active Ingredient: Glyphosate (in the form of its isopropylamine salt)

Chemical Name: N-(phosphonomethyl)glycine

Chemical Formula: $C_6H_{17}N_2O_5P$

COMPANY IDENTIFICATION:

Alligare, LLC

13 North 8th Street

Opelika, KS 36801

2. COMPOSITION / INFORMATION ON INGREDIENTS

Glyphosate Isopropylamine Salt	CAS No. 38641-94-0	53.8%
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3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Harmful if inhaled. Avoid breathing vapor or spray mist. Avoid contact with eyes, skin or clothing. Remove and wash contaminated clothing before reuse.

POTENTIAL HEALTH HAZARDS:

EYE – Slight eye irritant. Undiluted product may cause pain, redness and tearing.

SKIN - May be slightly irritating to the skin.

INGESTION - No more than slightly toxic and no significant adverse health effects are expected to develop if a small amount (less than a mouthful) is swallowed.

POTENTIAL PHYSICAL HAZARDS:

May react with metals such as galvanized or mild steel to produce hydrogen gas, potentially forming a highly combustible gas mixture.

4. FIRST AID

IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration (preferably by mouth-to-mouth) if possible.

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or a doctor.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-424-9300 for emergency medical treatment information..

5. FIRE-FIGHTING MEASURES

Flash point: Not applicable

Flammable Limits (LFL-UFL): N/A

Means of Extinction: Use water spray, foam or dry chemical.

Fire Fighting Instructions: Evacuate area and fight fire from a safe distance. Approach from upwind to avoid hazardous vapors and decomposition products. A foam or dry chemical fire extinguishing system is preferred to prevent environmental damage from excessive water run off. If water is used, avoid heavy hose streams. If possible, dike and collect water used to fight fire to prevent/minimize run off.

Firefighting Equipment: Self-contained breathing apparatus with full face piece. Wear full firefighting turn-out gear (Bunker gear).

Hazardous Combustion Products: Carbon monoxide, nitrogen oxides, phosphorous oxides.

6. ACCIDENTAL RELEASE MEASURES

Clean up spills immediately. Isolate and post spill area. Wear protective clothing and personal protective equipment as prescribed in Section 8 "Exposure Controls/Personal Protection". Keep unprotected persons and animals out of area.

SMALL SPILL: Absorb spill with inert material such as dry sand, vermiculite or fuller's earth, then place in a chemical waste container.

LARGE SPILL: Dike large spills using absorbent or impervious material such as clay or sand. Recover and contain as much free liquid as possible for reuse. Allow absorbed material to solidify and scrape up for disposal. After removal, scrub the area with detergent and water and neutralize with dilute alkaline solutions of soda ash or lime.

7. HANDLING AND STORAGE

Keep out of reach of children and animals. Do not contaminate other pesticides, fertilizers, water, food or feed by storage or disposal. Wash thoroughly after handling this product.

Store above 10°F (-12°C) to keep product from crystallizing.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: To keep exposure to airborne contaminants below exposure limits, proper ventilation is required when handling or using this product. Local mechanical exhaust ventilation may be required. Facilities storing or using this material should be equipped with an eyewash facility and a safety shower.

Eyewear: Safety goggles are recommended when mixing, loading or cleaning equipment.

Clothing: Wear long-sleeved shirt and long pants and shoes plus socks.

Gloves: Waterproof gloves are recommended when mixing, loading or cleaning equipment.

NOTE: Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Pale yellow, clear viscous liquid

Odor: Slight amine odor

pH: 4.6

Flashpoint (PMA-4): N/A

Specific Gravity: 1.2016 g/ml

Solubility in Water: Soluble

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Avoid temperatures above 115°F (46°C) and below 25°F (-5°C)

CHEMICAL STABILITY: Product is normally stable. However, product may decompose if heated.

HAZARDOUS DECOMPOSITION PRODUCTS: Heat and fire may result in thermal decomposition and the release of nitrogen oxides, phosphorous oxides and carbon monoxide.

INCOMPATIBILITY WITH OTHER MATERIALS: Strong oxidizers and bases, unlined and galvanized steel.

POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE ORAL TOXICITY

Oral LD₅₀ (rat): > 5,000 mg/kg

ACUTE DERMAL TOXICITY

Dermal LD₅₀ (rat, male): > 5,000 mg/kg

ACUTE INHALATION TOXICITY

Inhalation LC₅₀ (rat): > 7.03 mg/L

EYE IRRITANT

None to Slight

SKIN IRRITATION

None to Slight

SENSITIZATION

Guinea pig – Non-Sensitizer

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None known.

CARCINOGENICITY:

ACGIH: Not listed

IARC: Not listed

NTP: Not listed

OSHA: Not listed

MUTAGENIC DATA: No evidence of mutagenic effects during *in vivo* and *in vitro* assays.

ADDITIONAL DATA: None.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

MAMMILIAN TOXICITY

This product is considered to be relatively nontoxic to dogs and other domestic animals; however, ingestion of this product or large amounts of freshly sprayed vegetation may result in temporary gastrointestinal irritation (vomiting, diarrhea, colic, etc.). If such symptoms are observed, provide the animal with plenty of fluids to prevent dehydration. Call a veterinarian if symptoms persist for more than 24 hours.

FISH TOXICITY

96 hour LC₅₀, Rainbow trout – 8.2 µg/L (technical)

96 hour LC₅₀, Bluegill – 5.8 µg/L (technical)

AVIAN TOXICITY

Oral LD₅₀, Bobwhite quail – > 3,800 mg/kg (technical)

BEE TOXICITY: Non-toxic.

13. DISPOSAL CONSIDERATIONS

PESTICIDE DISPOSAL: Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state or local procedures. Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned, or destroyed.

CONTAINER DISPOSAL: For plastic containers, triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

For refillable containers, do not reuse the container except for refill in accordance with a valid Alligare Repackaging or Toll Repackaging Agreement. If not refilled or returned to the authorized repackaging facility, triple rinse container, then puncture and dispose of in a sanitary landfill, or by incineration or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

For bulk containers, triple rinse (or equivalent) and wash with appropriate cleaners before reusing.

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: Not regulated by DOT.

DOT HAZARD CLASS OR DIVISION: N/A

DOT UN/NA NUMBER: N/A

DOT PACKING GROUP: N/A

REPORTABLE QUANTITY: None

MARINE POLLUTANT: Not Listed

DOT EMERGENCY RESPONSE GUIDE: N/A

15. REGULATORY INFORMATION

FIFRA –

All pesticides are governed under the Federal Insecticide, Fungicide, and Rodenticide Act. The regulatory information presented below is pertinent only when this product is handled outside of the normal use and application as a pesticide.

OSHA HAZARD COMMUNICATION STANDARD STATUS: Not Regulated

SARA Title III – Section 302 Extremely Hazardous Substances
Not listed

SARA Title III – Section 311/312 Hazard Categories
Immediate

SARA Title III – Section 312 Threshold Planning Quantity

The threshold planning quantity (TPQ) for this product treated as a mixture is 10,000 lbs. This product contains no ingredients with a TPQ of less than 10,000 lbs.

SARA Title III – Section 313 Reportable Ingredients
None

CERCLA –
None

CALIFORNIA PROP 65 STATUS –
Not listed

16. OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by CPR.

DISCLAIMER:

Alligare, LLC (the Company) warrants that this product conforms to the chemical description on the label in all material respects and is reasonably fit for the purpose referred to in the directions for use, subject to the exceptions noted below, which are beyond the Company's control. To the extent consistent with applicable law, the Company makes no other representation or warranty, express or implied, concerning the product, including no implied warranty of merchantability or fitness for a particular purpose. No such warranty shall be implied by law, and no agent or representative is authorized to make any such warranty on the Company's behalf.

To the extent consistent with applicable law, the exclusive remedy against the Company for any cause of action relating to the handling or use of this product is a claim for damages, and in no event shall damages or any other recovery of any kind exceed the price of the product which caused the alleged loss, damage, injury or other claim. To the extent consistent with applicable law, under no circumstances shall the Company be liable for any special, indirect, incidental or consequential damages of any kind, including loss of profits or income, and any such claims are hereby waived. Some states do not allow the exclusion or limitation of incidental or consequential damages.

[Sub Label A: Rangeland, Forests and Non-crop Areas, and Aquatic Sites]

(Base label):

Garlon[®] 3A**SPECIALTY HERBICIDE**

For the control of woody plants, broadleaf weeds in range and pasture, forests and non-crop areas, including manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides, railroads, fence rows, non-irrigation ditch banks, and around farm buildings; and applications to grazed areas, and establishment and maintenance of wildlife openings, and in Christmas tree plantations and aquatic sites.

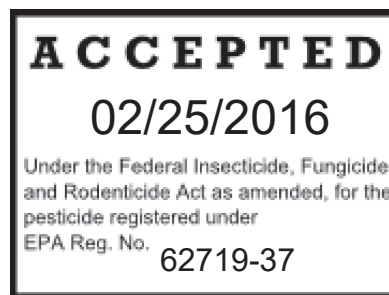
For use in New York State, comply with Section 24(c) Special Local Need labeling for Garlon 3A, SLN NY-110005.

GROUP	4	HERBICIDE
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Active Ingredient:

Triclopyr: 2-[(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid, triethylamine salt.....	44.4%
Other Ingredients	55.6%
Total	100.0%

Acid equivalent: triclopyr - 31.8% - 3 lb/gal

**Keep Out of Reach of Children****DANGER PELIGRO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements**Hazard to Humans and Domestic Animals**

Corrosive • Causes Irreversible Eye Damage • Harmful If Swallowed Or Absorbed Through Skin • Prolonged Or Frequently Repeated Skin Contact May Cause Allergic Reaction In Some Individuals

Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

Personal Protective Equipment (PPE)**Applicators and other handlers must wear:**

- Long-sleeved shirt and long pants
- Shoes plus socks
- Protective eyewear
- Chemical resistant gloves (≥14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240(d)(4-6)), the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Note to Applicator: Allergic skin reaction is not expected from exposure to spray mixtures of Garlon 3A herbicide when used as directed.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Under certain conditions, treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants, which may contribute to fish suffocation. This loss can cause fish suffocation. Therefore, to minimize this hazard, do not treat more than one-third to one-half of the water area in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State agency for fish and game before applying to public water to determine if a permit is needed.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Physical or Chemical Hazards

Combustible. Do not use or store the product near heat or open flame.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

(Storage and Disposal for rigid containers 5 gal or less)

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

(Storage and Disposal for refillable rigid containers larger than 5 gal)

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose.

Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

(Storage and Disposal for nonrefillable rigid containers larger than 5 gal)

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the

rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refer to label booklet for Directions for Use.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

EPA Reg. No. 62719-37

EPA Est. _____

®Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

**Produced for
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268**

NET CONTENTS _____

(cover/shipping container):

Garlon[®] 3A**SPECIALTY HERBICIDE**

For the control of woody plants, broadleaf weeds in range and pasture, forests and non-crop areas, including manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides, railroads, fence rows, non-irrigation ditch banks, and around farm buildings; and applications to grazed areas, and establishment and maintenance of wildlife openings, and in Christmas tree plantations and aquatic sites.

For use in New York State, comply with Section 24(c) Special Local Need labeling for Garlon 3A, SLN NY-110005.

GROUP	4	HERBICIDE
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Active Ingredient:

Triclopyr: 2-[(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid, triethylamine salt.....	44.4%
Other Ingredients	55.6%
Total	100.0%

Acid equivalent: triclopyr - 31.8% - 3 lb/gal

Keep Out of Reach of Children**DANGER PELIGRO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. Refer to label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

Refer to inside of label booklet for additional precautionary information including Directions for Use.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.**

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Produced for

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268

NET CONTENTS_____

(Page 1 through end):

Precautionary Statements

Hazard to Humans and Domestic Animals

DANGER

Corrosive • Causes Irreversible Eye Damage • Harmful If Swallowed Or Absorbed Through Skin • Prolonged Or Frequently Repeated Skin Contact May Cause Allergic Reaction In Some Individuals

Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Protective eyewear
- Chemical resistant gloves (≥ 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240(d)(4-6)), the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Note to Applicator: Allergic skin reaction is not expected from exposure to spray mixtures of Garlon 3A herbicide when used as directed.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Under certain conditions, treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants, which may contribute to fish suffocation. This loss can cause fish suffocation. Therefore, to minimize this hazard, do not treat more than one-third to one-half of the water area in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State agency for fish and game before applying to public water to determine if a permit is needed.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Physical or Chemical Hazards

Combustible. Do not use or store the product near heat or open flame.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Shoes plus socks
- Protective eyewear
- Chemical-resistant gloves (\geq 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Entry Restrictions for Non-WPS Uses: For applications to non-cropland areas, do not allow entry into areas until sprays have dried, unless applicator and other handler PPE is worn.

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal. Open dumping is prohibited.

Pesticide Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Nonrefillable containers 5 gallons or less:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers 5 gallons or larger:

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose.

Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

Nonrefillable containers 5 gallons or larger:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Product Information

Use Garlon® 3A specialty herbicide for the control of woody plants and broadleaf weeds in range and pasture, forests and non-crop areas including manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides, railroads, fence rows, non-irrigation ditch banks, and around farm buildings, and applications to grazed areas, and establishment and maintenance of wildlife openings, and in Christmas tree plantations and aquatic sites.

Obtain Required Permits: Consult with appropriate state or local water authorities before applying this product to public waters. State or local public agencies may require permits.

Use Precautions

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs), and transitional areas between upland and lowland sites.

When making applications to control unwanted plants on banks or shorelines of moving water sites, minimize overspray to open water.

Use Restrictions

For use in New York State, comply with Section 24(c) Special Local Need labeling for Garlon 3A, SLN NY-110005.

Chemigation: Do not apply this product through any type of irrigation system.

Do not apply Garlon 3A directly to, or otherwise permit it to come into direct contact with, grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants. Do not permit spray mists containing Garlon 3A to drift onto such plants.

Do not apply to salt water bays or estuaries.

Do not apply directly to un-impounded rivers or streams.

Do not apply on ditches or canals currently being used to transport irrigation water or that will be used for irrigation within 4 months following treatment. It is permissible to treat irrigation and non-irrigation ditch banks.

Do not apply where runoff water may flow onto agricultural land as injury to crops may result.

Do not apply with a mistblower.

Water treated with Garlon 3A may not be used for irrigation purposes for 120 days after application or until residue levels of Garlon 3A are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Seasonal Irrigation Waters: Garlon 3A may be applied during the off-season to surface waters that are used for irrigation on a seasonable basis provided that there is a minimum of 120 days between applying Garlon 3A and the first use of treated water for irrigation purposes, or until residue levels of Garlon 3A are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Irrigation Canals/Ditches: Do not apply Garlon 3A to irrigation canals/ditches unless the 120-day restriction on irrigation water usage can be observed or residue levels of Garlon 3A are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Maximum Use Rates

- Apply no more than 6 lb ae of triclopyr (2 gallons of Garlon 3A) per acre per year on aquatic sites.
- Apply no more than 2 lb ae of triclopyr (2/3 gallon of Garlon 3A) per acre per growing season on range and pasture sites, including rights-of-way, fence rows or any area where grazing or harvesting of hay is allowed.
- On forestry sites, Garlon 3A may be used at rates up to 6 lb ae of triclopyr (2 gallons of Garlon 3A) per acre per year.

- For all terrestrial use sites other than range, pasture, forestry sites, and grazed/hayed areas, the maximum application rate is 9 lb ae of triclopyr (3 gallons of Garlon 3A) per acre per year.

Precautions for Potable Water Intakes for Emerged Aquatic Weed Control

See chart below for specific setback distances near functioning potable water intakes. **Note:** Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

Area Treated (acres)	Garlon 3A Application Rate			
	2 qt/acre	4 qt/acre	6 qt/acre	8 qt/acre
4	0	200	400	500
>4 - 8	0	200	700	900
>8 - 16	0	200	700	1000
>16	0	200	900	1300

To apply Garlon 3A around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

Recreational Use of Water in Treatment Area: There are no restrictions on use of water in the treatment area for recreational purposes, including swimming and fishing.

Livestock Use of Water from Treatment Area: There are no restrictions on livestock consumption of water from the treatment area.

Grazing and Haying Restrictions

Grazing green forage:

- There are no grazing restrictions for livestock or dairy animals on treated areas.

Haying (harvesting of dried forage)

- Do not harvest hay for 14 days after application.

Slaughter Restrictions: During the season of application, withdraw livestock from grazing treated grass at least 3 days before slaughter.

Avoiding Injurious Spray Drift

Make applications only when there is little or no hazard from spray drift. Small quantities of spray, which may not be visible, may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants that are near enough to be injured. It is suggested that a continuous smoke column at or near the spray site or a smoke generator on the spray equipment be used to detect air movement, lapse conditions, or temperature inversions (stable air). If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

Aerial Application: For aerial application on rights-of-way or other areas near susceptible crops, apply through a Microfoil[†] or Thru-Valve boom[†], or use an agriculturally labeled drift control additive. Other drift reducing systems or thickened sprays prepared by using high viscosity inverting systems may be used if they are made as drift-free as mixtures containing agriculturally labeled thickening agents or applications made with the Microfoil or Thru-Valve boom. Keep spray pressures low enough to provide coarse spray droplets. Spray boom should be no longer than 3/4 of the rotor length. Do not use a thickening agent with the Microfoil or Thru-Valve booms, or other systems that cannot accommodate thick sprays. Spray only when the wind velocity is low (follow state regulations). Avoid application during air inversions. If a spray thickening agent is used, follow all use recommendations and precautions on the product label.

†Reference within this label to a particular piece of equipment produced by or available from other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by Dow AgroSciences is not intended as an endorsement of such equipment, shall not constitute a warranty (express or implied) of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than is advised in directions available from the equipment's manufacturer. The reader is responsible for exercising its own judgment and expertise, or consulting with sources other than Dow AgroSciences, in selecting and determining how to use its equipment.

Spray Drift Management

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outer most operating nozzles on the boom must not exceed 3/4 the length of the rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they must be observed.

The applicator should be familiar with and take into account the information covered in the following Aerial Drift Reduction Advisory. [This information is advisory in nature and does not supersede mandatory label requirements.]

Aerial Drift Reduction Advisory

Information on Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size:

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** - Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle Orientation** - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind: Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Applications should not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

Ground Equipment: To aid in reducing spray drift, Garlon 3A should be used in thickened (high viscosity) spray mixtures using an agriculturally labeled drift control additive, high viscosity invert system, or equivalent as directed by the manufacturer. With ground equipment, spray drift can be reduced by keeping the spray boom as low as possible; by applying 20 gallons or more of spray per acre; by keeping the operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used (low pressure nozzles are available from spray equipment manufacturers); and by spraying when wind velocity is low (follow state regulations). In hand-gun applications, select the minimum spray pressure that will provide adequate plant coverage (without forming a mist). Do not apply with nozzles that produce a fine-droplet spray.

High Volume Leaf-Stem Treatment: To minimize spray drift, do not use pressure exceeding 50 psi at the spray nozzle and keep sprays no higher than brush tops. An agriculturally labeled thickening agent may be used to reduce drift.

Weed Resistance Management:

Triclopyr, the active ingredient in this product, is a Group 4 herbicide based on the mode of action classification system of the Weed Science Society of America. Any weed population may contain or develop plants resistant to Group 4 herbicides. Resistant weeds may dominate the weed population if these herbicides are used repeatedly in the same field. Such resistant weed plants may not be effectively managed using Group 4 herbicides but may be effectively managed utilizing other herbicides alone or in mixtures from a different herbicide Groups that are labeled for control of these weeds and/or by using cultural or mechanical practices. However, a herbicide mode of action classification by itself may not adequately address specific weeds that are resistant to specific herbicides. Consult your local company

representative, state cooperative extension service, professional consultants or other qualified authorities to determine appropriate actions for treating specific resistant weeds.

Best Management Practices:

Proactively implementing diversified weed control strategies to minimize selection for weed populations resistant to one or more herbicides is recommended. A diversified weed management program may include the use of multiple herbicides with different modes of action and overlapping weed spectrum with or without tillage operations and/or other cultural practices. Research has demonstrated that using the labeled rate and directions for use is important to delay the selection for resistant weeds. Scouting after a herbicide application is important because it can facilitate the early identification of weed shifts and/or weed resistance and thus provide direction on future weed management practices. One of the best ways to contain resistant weed populations is to implement measures to avoid allowing weeds to reproduce by seed or to proliferate vegetatively. Cleaning equipment between sites and avoiding movement of plant material between sites will greatly aid in reducing the spread of resistant weed seed.

Plants Controlled

Woody Plant Species

alder	dogwood	salt cedar ²
arrowwood	elderberry	salmonberry
ash	elm	sassafras
aspen	gallberry	scotch broom
Australian pine	hazel	sumac
bear clover (bearmat)	hornbeam	sweetbay magnolia
beech	kudzu ¹	sweetgum
birch	locust	sycamore
blackberry	madrone	tanoak
blackgum	maples	thimbleberry
Brazilian pepper	mulberry	tulip poplar
casara	oaks	waxmyrtle
ceanothus	persimmon	western hemlock
cherry	pine	white titi
chinquapin	poison ivy	wild rose
choke cherry	poison oak	willow
cottonwood	poplar	winged elm
crataegus (hawthorn)	salt-bush (<i>Baccharis</i> spp.)	
Douglas fir		

¹For complete control, re-treatment may be necessary.

²Use cut surface treatments for best results.

Annual and Perennial Broadleaf Weeds

bindweed	lambquarter	Spanish needles/common beggarthicks
burdock	Mexican petunia	tansy ragwort
Canada thistle	plantain	tropical soda apple
chicory	purple loosestrife	vetch
curly dock	ragweed	wedelia
dandelion	smartweed	wild lettuce
field bindweed		

Purple Loosestrife (*Lythrum salicaria*)

Purple loosestrife can be controlled with foliar applications of Garlon 3A. For broadcast applications, use a minimum of 4 1/2 to 6 lb ae of triclopyr (6 to 8 quarts of Garlon 3A) per acre. Apply Garlon 3A when purple loosestrife is at the bud to mid-flowering stage of growth. Follow-up applications for control of regrowth should be made the following year in order to achieve increased control of this weed species. For all applications, a non-ionic surfactant should be added to the spray mixture. Follow all directions and use precautions on the label of the surfactant. Thorough wetting of the foliage and stems is necessary to achieve satisfactory control. A minimum spray volume of 50 gallons per acre is needed for ground broadcast applications.

If using a backpack sprayer, a spray mixture containing 1% to 1.5% Garlon 3A or 5 to 7.6 fl oz of Garlon 3A per 4 gallons of water should be used. All purple loosestrife plants should be thoroughly wetted.

Application Methods

Use Garlon 3A at rates of 3/4 to 9 lb ae of triclopyr (1/4 to 3 gallons of Garlon 3A) per acre to control broadleaf weeds and woody plants. In all cases, use the amount specified in enough water to give uniform and complete coverage of the plants to be controlled. Use only water suitable for spraying. Use an agriculturally labeled non-ionic surfactant for all foliar applications. When using surfactants, follow the use directions and precautions listed on the surfactant manufacturer's label. Use the higher concentrations of surfactant in the spray mixture when applying lower spray volumes per acre. The order of addition to the spray tank is water, spray thickening agent (if used), additional herbicide (if used), and Garlon 3A. Surfactant should be added to the spray tank last or as recommended on the product label. If combined with emulsifiable concentrate herbicides, moderate continuous adequate agitation is required.

Before using any recommended tank mixtures, read the directions and all use precautions on both labels. **Note:** If tank mixing with Rodeo[®] herbicide, mix the Garlon 3A with at least 75% of the total spray volume desired and ensure that Garlon 3A is well mixed before adding the Rodeo to avoid incompatibility.

For best results, apply when woody plants and weeds are actively growing. When hard to control species such as ash, blackgum, choke cherry, elm, maples, oaks, pines, or winged elm are prevalent and during applications made in late summer when the plants are mature and during drought conditions, use the higher rates of Garlon 3A alone or in combination with Tordon[®] 101 Mixture specialty herbicide. (Tordon 101 Mixture is a restricted use pesticide. See product label.) Tordon 101 Mixture is not registered for use in the states of California and Florida.

When using Garlon 3A in combination with 2,4-D 3.8 lb amine, like DMA 4 IVM, or low volatile ester herbicides, generally the higher rates should be used for satisfactory brush control.

Use the higher dosage rates when brush approaches an average of 15 feet in height or when the brush covers more than 60% of the area to be treated. If lower rates are used on hard to control species, resprouting may occur the year following treatment.

On sites where easy to control brush species dominate, rates less than those listed may be effective. Consult State or Local Extension personnel for such information.

Foliage Treatment With Ground Equipment

High Volume Foliage Treatment

For control of woody plants, use Garlon 3A at the rate of 3 to 9 lb ae of triclopyr (1 to 3 gallons of Garlon 3A) per 100 gallons of spray solution, or Garlon 3A at 3/4 to 3 lb ae of triclopyr (1 to 4 quarts of Garlon 3A) may be tank mixed with 2,4-D amine, like DMA 4 IVM, or low volatile ester or Tordon 101 Mixture and diluted to make 100 gallons of spray solution. Apply at a volume of 100 to 400 gallons of total spray per acre depending upon size and density of woody plants. Coverage should be thorough to wet all leaves, stems, and root collars. (See Use Precautions and Restrictions.) Do not exceed maximum allowable use rates per acre (see table below). Tordon 101 Mixture is not registered for use in the states of California and Florida.

Maximum Labeled Rate versus Spray Volume per Acre

Total Spray Volume (gal/acre)	Maximum Rate of Garlon 3A		
	Range and Pasture Sites ¹ (gal/100 gal of spray)	Forestry Sites ² (gal/100 gal of spray)	Other Non-Cropland Sites ³ (gal/100 gal of spray)
400	Do not use	0.5	0.75
300	Do not use	0.67	1
200	Do not use	1	1.5
100	0.67	2	3
50	1.33	4	6
40	1.67	5	7.5
30	2.33	6.65	10
20	3.33	10	15
10	6.67	20	30

¹Do not exceed the maximum use rate of 2 lb ae of triclopyr (2/3 gal of Garlon 3A)/acre/year.

²Do not exceed the maximum use rate of 6 lb ae of triclopyr (2 gal of Garlon 3A)/acre/year.

³Do not exceed the maximum use rate of 9 lb ae of triclopyr (3 gal of Garlon 3A)/acre/year on non-cropland use sites other than rangeland, pasture, forestry, and grazed/hayed areas.

Low Volume Foliage Treatment

To control susceptible woody plants, apply up to 15 lb ae of triclopyr (5 gallons of Garlon 3A) in 10 to 100 gallons of finished spray. The maximum volume of the finish spray applied to an acre is limited by the maximum use rate per site type (See Maximum Use Rates section - Range and Pasture, Grazing, Haying sites 2 lb ae, Forestry sites 6 lb ae, and all other sites 9 lb ae triclopyr). The spray concentration of Garlon 3A and total spray volume per acre should be adjusted according to the size and density of target woody plants and kind of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars (see General Use Precautions and Restrictions). For best results, a surfactant should be added to all spray mixtures. Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a truck mounted spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 psi may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush.

Tank Mixing: As a low volume foliar spray, up to 9 lb ae of triclopyr (3 gallons of Garlon 3A) may be applied in tank mix combination with Tordon K or Tordon 101 Mixture in 10 to 100 gallons of finished spray. The maximum volume of the finish spray applied to an acre is limited by the maximum use rate per site type (See Maximum Use Rates section - Range and Pasture, Grazing, Haying sites 2 lb ae, Forestry sites 6 lb ae, and all other sites 9 lb ae triclopyr). Tordon 101 Mixture and Tordon K are not registered for use in the states of California and Florida.

When applying this product in tank mix combination, follow all applicable use directions, precautions and limitations on each manufacturer's label. **Note:** If tank mixing with Rodeo[®] herbicide, mix the Garlon 3A with at least 75% of the total spray volume desired and ensure that Garlon 3A is well mixed before adding the Rodeo to avoid incompatibility.

Broadcast Applications With Ground Equipment

Apply using equipment that will assure uniform coverage of the spray volumes applied. To improve spray coverage, add an agriculturally labeled non-ionic surfactant as described later under Directions for Use. See Maximum Labeled Rate versus Spray Volume per Acre table above for relationship between mixing rate, spray volume and maximum application rate.

Woody Plant Control

Foliage Treatment: Use 6 to 9 lb ae of triclopyr (2 to 3 gallons of Garlon 3A) in enough water to make 20 to 100 gallons of total spray per acre or 1 1/2 to 3 lb ae of triclopyr (1/2 to 1 gallon of Garlon 3A) may be

combined with 2,4-D amine, like DMA 4 IVM, or low volatile esters or Tordon 101 Mixture in sufficient water to make 20 to 100 gallons of total spray per acre. Tordon 101 Mixture is not registered for use in the states of California and Florida.

Broadleaf Weed Control

Use Garlon 3A at rates of 1 to 4 1/2 lb ae of triclopyr (1/3 to 1 1/2 gallons of Garlon 3A) in a total volume of 20 to 100 gallons of water per acre. Apply any time during the growing season. Garlon 3A at 1 to 3 lb ae of triclopyr (1/3 to 1 gallon of Garlon 3A) may be tank mixed with Tordon K, Tordon 101 Mixture or 2,4-D amine, like DMA 4 IVM, or low volatile herbicides to improve the spectrum of activity. Tordon 101 Mixture and Tordon K are not registered for use in the states of California and Florida.

Aerial Application (Helicopter Only)

Aerial sprays should be applied using suitable drift control. (See Use Precautions and Restrictions.) Add an agriculturally labeled non-ionic surfactant as described under Directions for Use. See Maximum Labeled Rate versus Spray Volume per Acre table above for relationship between mixing rate, spray volume and maximum application rate.

Foliage Treatment (Non-Grazed Rights-of-Way)

Non-grazed areas: Use 6 to 9 lb ae of triclopyr (2 to 3 gallons of Garlon 3A) or 3 to 4 1/2 lb ae of triclopyr (1 to 1 1/2 gallons of Garlon 3A) in a tank mix combination with 2,4-D amine, like DMA 4 IVM, or low volatile esters or Tordon 101 Mixture, and apply in a total spray volume of 10 to 30 gallons per acre. Use the higher rates and volumes when plants are dense or under drought conditions. Tordon 101 Mixture is not registered for use in the states of California and Florida.

Interspersed areas in non-grazed rights-of-ways that may be subject to grazing may be spot treated if the treated area comprises no more than 10% of the total grazable area.

Cut Surface Treatments

Individual plant treatments such as basal bark and cut surface applications may be used on any use site listed on this label at a maximum use rate of 2.67 gallons of Garlon 3A (8 lb ae of triclopyr) per acre. These types of applications are made directly to ungrazed parts of plants and, therefore, are not restricted by the grazing maximum rate of 2/3 of a gallon of Garlon 3A (2 lb ae of triclopyr) per acre.

To control unwanted trees of hardwood species such as elm, maple, oak and conifers in labeled sites, apply Garlon 3A, either undiluted or diluted in a 1 to 1 ratio with water, as directed below.

With Tree Injector Method

Apply by injecting 1/2 milliliter of undiluted Garlon 3A or 1 milliliter of the diluted solution through the bark at intervals of 3 to 4 inches between centers of the injector wound. The injections should completely surround the tree at any convenient height. **Note: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is injected directly into plants.**

With Hack and Squirt Method

Make cuts around the tree trunk at a convenient height with a hatchet or similar equipment so that the cuts overlap slightly and make a continuous circle around the trunk. Spray 1/2 milliliter of undiluted Garlon 3A or 1 milliliter of the diluted solution into the pocket created between the bark and the inner stem/trunk by each cut.

With Frill or Girdle Method

Make a single girdle through the bark completely around the tree at a convenient height. The frill should allow for the herbicide to remain next to the inner stem and absorb into the plant. Wet the cut surface with undiluted or diluted solution.

Both of the above methods may be used successfully at any season except during periods of heavy sap flow of certain species - for example, maples.

Stump Treatment

Spray or paint the cut surfaces of freshly cut stumps and stubs with undiluted Garlon 3A. The cambium area next to the bark is the most vital area to wet.

Forest Management Applications

For best control from broadcast applications of Garlon 3A, use a spray volume which will provide thorough plant coverage. Recommended spray volumes are usually 10 to 25 gallons per acre by air or 10 to 100 gallons per acre by ground. To improve spray coverage of spray volumes less than 50 gallons per acre, add an agriculturally labeled non-ionic surfactant as described under Directions for Use. Application systems should be used to prevent hazardous drift to off-target sites. Nozzles or additives that produce larger droplets of spray may require higher spray volumes to maintain brush control.

Forest Site Preparation (Not for Conifer Release)

Use up to 6 lb ae of triclopyr (2 gallons of Garlon 3A) and apply in a total spray volume of 10 to 30 gallons per acre or Garlon 3A at 3 to 4 1/2 lb ae of triclopyr (1 to 1 1/2 gallons of Garlon 3A) may be used with Tordon 101 Mixture or 2,4-D low volatile ester in a tank mix combination in a total spray volume of 10 to 30 gallons per acre. Use a non-ionic agricultural surfactant for all foliar applications as described under Directions for Use. Tordon 101 Mixture is not registered for use in the states of California and Florida.

Note: Conifers planted sooner than one month after treatment with Garlon 3A at less than 4 lb ae of triclopyr (1 1/3 gallons of Garlon 3A) per acre or sooner than two months after treatment at 4 to 6 lb ae of triclopyr (1 1/3 to 2 gallons of Garlon 3A) per acre may be injured. When tank mixtures of herbicides are used for forest site preparation, labels for all products in the mixture must be consulted and the longest recommended waiting period before planting observed.

Directed Spray Applications for Conifer Release

To release conifers from competing hardwoods such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, hickory, alder, birch, aspen, and pin cherry, mix 3 to 6 lb ae of triclopyr (1 to 2 gallons of Garlon 3A) in enough water to make 100 gallons of spray mixture. To improve spray coverage, add an agriculturally labeled non-ionic surfactant as described under Directions for Use. The spray mixture should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after hardwoods have reached full leaf size, but before autumn coloration. The majority of treated hardwoods should be less than 6 feet in height to ensure adequate spray coverage. Care should be taken to direct spray away from contact with conifer foliage, particularly foliage of desirable pines.

Note: Spray may cause temporary damage and growth suppression where contact with conifers occurs; however, injured conifers should recover and grow normally. Over-the-top spray applications can kill pines.

Broadcast Applications for Conifer Release in the Northeastern United States

To release spruce, fir, red pine and white pine from competing hardwoods, such as red maple, sugar maple, striped maple, alder, birch (white, yellow or gray), aspen, ash, pin cherry and *Rubus* spp. and perennial and annual broadleaf weeds, use Garlon 3A at rates of 1 1/2 to 3 lb ae of triclopyr (2 to 4 quarts of Garlon 3A) per acre alone or with 2,4-D amine, like DMA 4 IVM, or 2,4-D ester to provide no more than 4 lb ae per acre from both products. Apply in late summer or early fall after conifers have formed their over wintering buds and hardwoods are in full leaf and prior to autumn coloration.

Broadcast Applications for Douglas-Fir Release in the Pacific Northwest and California

To release Douglas-fir from susceptible competing vegetation such as broadleaf weeds, alder, blackberry or Scotch broom, apply Garlon 3A at 1 to 1 1/2 lb ae of triclopyr (1 1/3 to 2 quarts of Garlon 3A) per acre alone or in combination with 4 lb per acre of atrazine. Mix all sprays in a water carrier with a non-ionic surfactant. Apply in early spring after hardwoods begin growth and before Douglas fir bud break ("early foliar" hardwood stage) or after Douglas fir seasonal growth has "hardened off" (set winter buds) in late summer, but while hardwoods are still actively growing. When treating after Douglas fir bud set, apply

prior to onset of autumn coloration in hardwood foliage. **Note:** Treatments applied during active Douglas fir shoot growth (after spring bud break and prior to bud set) may cause injury to Douglas fir trees.

Christmas Tree Plantations

Use Garlon 3A for the control of woody plants and annual and perennial broadleaf weeds in established Christmas tree plantations. For best results, apply when woody plants and weeds are actively growing. Garlon 3A does not control weeds which have not emerged at the time of application. If lower rates are used on hard to control woody species, resprouting may occur the year following treatment. Brush over 8 feet tall is difficult to treat efficiently using hand equipment such as backpack or knapsack sprayers. When treating large brush or trees or hard to control species such as ash, blackgum, choke cherry, elm, hazel, madrone, maples, oaks or sweetgum, and for applications made during drought conditions or in late summer when the leaves are mature, use the higher rates of Garlon 3A or use cut surface application methods. For foliar applications, apply in enough water to give uniform and complete coverage of the plants to be controlled. Applications made under drought conditions may provide less than desirable results.

Use Precautions:

- Newly seeded turf (alleyways, etc.) should be mowed two or three times before any treatment with Garlon 3A.

Use Restrictions:

- Do not use on newly seeded grass until well established as indicated by vigorous growth and development of secondary root system and tillering
- Do not reseed Christmas tree areas treated with Garlon 3A for a minimum of three weeks after application.
- Do not use Garlon 3A if legumes, such as clover, are present and injury cannot be tolerated.

Spray Preparation

The order of addition to the spray tank is water, drift control agent (if used), non-ionic agricultural surfactant and Garlon 3A. Continue moderate agitation while mixing and spraying. Use a non-ionic agricultural surfactant for all applications. When using surfactants, follow use directions and precautions listed on the manufacturer's label. Use the higher recommended concentrations of surfactant in the spray mixture when applying lower spray volumes per acre. **Note:** If tank mixing with Rodeo herbicide, mix the Garlon 3A with at least 75% of the total spray volume desired and ensure that Garlon 3A is well mixed before adding the Rodeo to avoid incompatibility.

Application

Apply in late summer or early autumn after terminal growth of Christmas trees has hardened of, but before leaf drop of, target weeds. Apply at a rate of 3/4 to 1 3/4 lb ae of triclopyr (2 to 5 pints of Garlon 3A) per acre as a foliar spray directed toward the base of Christmas trees. Use sufficient spray volume to provide uniform coverage of target plants (20 to 100 gallons per acre). **Do not apply with 2,4-D.** Application rates of Garlon 3A directed for Christmas trees will only suppress some well established woody plants that are greater than 2 to 3 years old (see table below). Broadcast sprays may also be applied in bands between the rows of planted trees. Use spray equipment that will assure uniform coverage of the desired spray volume.

Spray solution from Garlon 3A can cause needle and branch injury to Christmas trees. To minimize injury to Christmas trees, direct sprays so as to minimize contact with foliage. Blue spruce, white spruce, balsam fir and Frasier fir are less susceptible to injury than white pine and Douglas fir.

Restriction: Apply Garlon 3A only to established Christmas trees that were planted at least one full year prior to application.

Application Rates and Species Controlled:

Garlon 3A		
2 pints/acre (3/4 lb ae of triclopyr)	3 to 4 pints/acre (1 1/2 lb ae of triclopyr)	5 pints/acre (1 3/4 lb ae of triclopyr)
clover dandelion dock, curly lambsquarters lespedeza plantain, broadleaf plantain, buckhorn ragweed, common vetch	bindweed, field (TG) blackberry ¹ chicory (s) fireweed ivy, ground lettuce, wild oxalis poison ivy smartweed (TG) thistle, Canada (TG) violet, wild Virginia creeper ¹	arrowwood (SDL) aspens beech (SDL) birch (SDL) chinquapin cottonwood (SDL) elderberry grape, wild mulberry (SDL) poplar (SDL) sassafras (SDL) sumac (SDL) sycamore (SDL)

(TG) Top growth control, retreatment may be necessary

(S) Suppression

(SDL) Seedlings less than 2 to 3 years old

¹Use 4 pint per acre rate

Directed Applications

To control hardwoods such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, alder, birch, aspen, and pin cherry, mix 4 to 20 fl oz of Garlon 3A in enough water to make 3 gallons of spray mixture. For directed applications, do not exceed 6 lb ae of triclopyr (2 gallons of Garlon 3A) per acre per year. To improve coverage, add a non-ionic agricultural surfactant to the spray. This spray mixture should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after hardwoods have reached full leaf size, but before autumn coloration (when plants are actively growing). The majority of treated hardwoods should be less than 8 feet in height to ensure adequate spray coverage. **Note:** To prevent Christmas tree injury, care should be taken to direct spray away from contact with Christmas tree foliage.

Cut Surface Treatments

When treating large brush or trees or hard to control species such as ash, blackgum, choke cherry, elm, hazel, madrone, maples, oaks, salt cedar or sweetgum, and for applications made during drought conditions or in late summer when the leaves are mature, use cut surface treatments. (See directions for Cut Surface Treatments in preceding section of this label.)

Wetland Sites in Forests and Non-Crop Areas

Garlon 3A may be used within forests and non-crop sites to control target vegetation in and around standing water sites, such as marshes, wetlands, and the banks of ponds and lakes and transition areas between upland and lowland sites.

For control of woody plants and broadleaf weeds in these sites, follow use directions and application methods on this label for forestry and non-cropland sites.

Use Precautions:

Minimize overspray to open water when treating target vegetation in and around non-flowing, quiescent or transient water. When making applications to control unwanted plants on banks or shorelines of flowing water, minimize overspray to open water. **Note:** Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat such areas.

Terms and Conditions of Use

If terms of the following Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. To the extent permitted by law, otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitations of Remedies.

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. To the extent permitted by law, Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

Limitation of Remedies

To the extent permitted by law, the exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. To the extent permitted by law, in no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer, Inherent Risks of Use, and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

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05-04-2011

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U.S. ENVIRONMENTAL PROTECTION AGENCY

Office of Pesticide Programs
Registration Division (7505P)
Ariel Rios Building
1200 Pennsylvania Ave., NW
Washington, D.C. 20460

EPA Reg. Number:
84229-24

Date of Issuance:
MAY 4 2011

NOTICE OF PESTICIDE:

x Registration
Reregistration
(under FIFRA, as amended)

Term of Issuance: unconditional

Name of Pesticide Product:

Imazapyr 2SL

Name and Address of Registrant (include ZIP Code):

Tide International, USA, Inc.
c/o Pyxis Regulatory Consulting, Inc.
4110 136th St. NW
Gig Harbor, WA 98332

Note: Changes in labeling differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Registration Division prior to use of the label in commerce. In any correspondence on this product always refer to the above EPA registration number.

On the basis of information furnished by the registrant, the above named pesticide is hereby registered/reregistered under the Federal Insecticide, Fungicide and Rodenticide Act. Registration is in no way to be construed as an endorsement or recommendation of this product by the Agency. In order to protect health and the environment, the Administrator, on his motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.

The Basic and Alternate Confidential Statements of Formula (CSFs) dated 03/17/2011 are acceptable.

This product is registered in accordance with FIFRA section 3(c)(5) provided that you:

- 1. Submit and/or cite all data required for registration review/reregistration of your product when the Agency requires all registrants of similar products to submit data.
2. Make the following label revision:
a. Revise "EPA REG. NO. 84229-EU" to "EPA REG. NO. 84229-24." Assure that the establishment number and net contents are also added to the final printed label.
3. Submit one (1) copy of the revised final printed label for the record.

If these conditions are not complied with, the registration will be subject to cancellation in accordance with FIFRA sec. 6(e). Your release for shipment of the product constitutes acceptance of these conditions. A stamped copy of the label is enclosed for your records.

If you have any questions regarding this notice, please contact Maggie Rudick of my staff at 703-347-0257 or rudick.maggie@epa.gov.

Signature of Approving Official:

[Handwritten signature]

Kable Bo Davis
Project Manager 25
Herbicide Branch
Registration Division (7505P)

Date:

MAY 4 2011

Imazapyr 2SL

For the control of undesirable vegetation growing on forestry sites and within specified aquatic, industrial noncropland sites, and rights-of-way, non-agricultural fence rows, non-irrigation ditchbanks, establishment and maintenance of wildlife openings, for the release of unimproved Bermudagrass and Bahiagrass, for bareground weed control, and for use under certain paved surfaces.

ACTIVE INGREDIENT:

Isopropylamine salt of imazapyr: (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid)*..... 27.6%

OTHER INGREDIENTS:..... 72.4%

TOTAL:..... 100.0%

*Contains 2.59 lbs. of the active ingredient (a.i.), isopropylamine salt of imazapyr or 2.1 lbs. imazapyr acid equivalent per gallon.

KEEP OUT OF REACH OF CHILDREN CAUTION / PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID	
If on skin or clothing:	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If in eyes:	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If inhaled:	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-424-9300 for emergency medical treatment information.	

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION

Avoid contact with skin, eyes or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

ACCEPTED
with COMMENTS

EPA Reg. No. 84229-EU In EPA Letter Dated:

EPA Est. No.

Manufactured for:
Tide International, USA, Inc.
21 Hubble
Irvine, CA 92618

MAY 4 2011
Under the Federal Insecticide,
Fungicide, and Rodenticide Act,
as amended, for the pesticide
registered under EPA Reg. No.
84229-24

Net Contents:

PERSONAL PROTECTIVE EQUIPMENT (PPE):

Some materials that are chemically resistant to this product are listed below. If you want more options, follow the instructions for Category A on an EPA chemical-resistance category selection chart.

Mixers, Loaders, Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining personal PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

ENGINEERING CONTROLS STATEMENTS

Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)].

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands with plenty of soap and water before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This product is toxic to plants. Drift and runoff may be hazardous to plants in water adjacent to treated areas. Do not apply directly to bodies of water except as specified in this label. Treatment of aquatic weeds may result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss may cause the suffocation of some aquatic organisms. Do not treat more than 1/2 of the surface area of the water in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to move into untreated areas. Do not contaminate water when disposing of equipment washwaters or rinsate. See Directions for Use for additional precautions and requirements.

PHYSICAL OR CHEMICAL HAZARDS

Spray solutions of this product should be mixed, stored and applied only in stainless steel, fiberglass, plastic and plastic-lined steel containers. Do not mix, store or apply this product or spray solutions of this product in unlined steel (except stainless steel) containers or spray tanks.

Thoroughly clean application equipment, including landing gear, immediately after use of this product. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part. The maintenance of an organic coating (paint) may prevent corrosion.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Use this product only in accordance with the instructions contained within this label. Keep containers closed to avoid spills and contamination.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry intervals. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material
- Shoes plus socks
- Protective eyewear

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Do not enter or allow others to enter treated areas until sprays have dried.

PRODUCT USE PRECAUTIONS AND RESTRICTIONS

Applications may be made for the control of undesirable vegetation growing in forestry sites and within specified aquatic, industrial non-cropland sites, and railroad, utility and highway rights-of-way, and non-agricultural fence rows. Aquatic sites consist of standing and flowing water, wetland and riparian areas. Industrial non-cropland sites include utility plant sites, petroleum tank farms, pumping installations, non-agricultural fence rows, storage areas, and non-irrigation ditchbanks. **Imazapyr 2SL** may also be used for the establishment and maintenance of wildlife openings, for the release of unimproved Bermudagrass and Bahiagrass, for bareground weed control, and for use under certain paved surfaces.

- **DO NOT** use on food crops.
- **DO NOT** use on Christmas trees.
- **DO NOT** apply this product within 1/2 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water, such as a lake, pond or reservoir.
- **DO NOT** apply within drip-line of desirable trees or areas that will wash Imazapyr 2SL into roots of desirable trees and shrubs.
- Keep from contact with fertilizers, insecticides, fungicides and seeds.
- **DO NOT** drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the treated soil may be washed or moved into contact with their roots.
- **DO NOT** use on lawns, walks, driveways, tennis courts, or similar areas.
- **DO NOT** side trim desirable vegetation with this product unless severe injury and plant death can be tolerated. Prevent drift of spray to desirable plants.
- Clean application equipment after using this product by thoroughly flushing with water. Flush tank, pump, hoses, and boom with several changes of water after removing nozzle tips and screens (clean these parts separately).

Nonfood/feed-cropland Sites

- **DO NOT** apply more than 1.5 lbs acid equivalent (ae) imazapyr (equivalent to 96 ozs of **Imazapyr 2SL**) per acre per year.

Aquatic Sites

- **DO NOT** apply more than 1.5 lbs ae imazapyr (equivalent to 96 ozs of **Imazapyr 2SL**) per acre per year.
- **DO NOT** apply to marine or estuarine areas.
- **DO NOT** apply to bodies of water or portions of bodies of water where emergent and/or floating weeds do not exist. Imazapyr 2SL has no effect on submerged aquatic vegetation.
- **Public waters.** Application of **Imazapyr 2SL** to water can only be made by federal or state agencies such as Water Management District personnel, municipal officials, and the U.S. Army Corps of Engineers, or those applicators who are licensed or certified as aquatic pest control applicators and are authorized by a federal or state government entity. Treatment to other than non-native invasive species is limited to only those plants that have been determined to be a nuisance by a federal or state government entity.
- **Permitting.** Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.
- **Private waters.** Applications may be made to private waters that are still such as ponds, lakes and drainage ditches where there is minimal or no outflow to public waters.
- **Aerial application.** Aerial application to aquatic sites is restricted to helicopter only.
- **Irrigation water.** Application to water used for irrigation that results in **Imazapyr 2SL** residues > 1.0 ppb **MUST NOT** be used for irrigation purposes for 120 days after application or until **Imazapyr 2SL** residue levels are determined by laboratory analysis or other appropriate means of analysis to be 1.0 ppb or less.

Recreational use of water in treatment area. There are no restrictions on the use of water in the treatment area for recreational purposes, including swimming and fishing.

Livestock use of water in/from treatment area. There are no restrictions on livestock consumption of water from the treatment area.

Precautions for potable water intakes. **DO NOT** apply **Imazapyr 2SL** directly to water within ½ mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within ½ miles of an active potable water intake in a standing body of water such as a lake, pond or reservoir. To make aquatic applications around and within ½ mile of active potable water intakes, the intake **must** be turned off during application and for a minimum of 48 hours after the application. These aquatic applications may be made only in the cases where there are alternative water sources or holding ponds that would permit turning off of an active potable water intake for a minimum period of 48 hours after the applications.

NOTE: Existing potable water intakes that are no longer in use, such as those replaced by connections to wells or a municipal water system, are not considered to be active potable water intakes. This restriction does not apply to intermittent, inadvertent overspray or water in terrestrial use sites.

Quiescent or Slow-moving Waters. In lakes and reservoirs, **DO NOT** apply **Imazapyr 2SL** within one (1) mile of an active irrigation water intake during the irrigation season. Applications less than one (1) mile from an irrigation water intake may be made during the off-season, provided that the irrigation intake will remain inactive for a minimum of 120 days after application or until **Imazapyr 2SL** residue levels are determined by laboratory analysis or other appropriate means of analysis to be 1.0 ppb or less.

PRODUCT INFORMATION

Imazapyr 2SL is an aqueous solution to be mixed with water and a surfactant and applied as a spray solution to control undesirable vegetation growing within forestry sites and specified aquatic, industrial

non-cropland sites, and railroad, utility, and highway rights-of-way, and non-agricultural fence rows. Aquatic sites consist of standing and flowing water, wetland, and riparian areas. Industrial non-cropland sites include utility plant sites, petroleum tank farms, pumping installations, non-agricultural fence rows, storage areas, and non-irrigation ditchbanks. **Imazapyr 2SL** may also be used for the establishment and maintenance of wildlife openings, for the release of unimproved Bermudagrass and Bahiagrass, for bareground weed control, and for use under certain paved surfaces.

Imazapyr 2SL may be applied on forestry sites that contain areas of temporary surface water caused by the collection of water between planting beds, in equipment ruts, or in other depressions created by forest management activities, except in the states of California and New York. It is permissible to treat drainage ditches, intermittent drainage, intermittently flooded low lying sites, seasonally dry flood plains, and transitional areas between upland and lowland sites when no water is present except in the states of California and New York. Only the edge of drainage ditches can be treated for drainage ditches that contain water. It is also permissible to treat marshes, swamps, and bogs after water has receded, as well as seasonally dry flood deltas, except in the states of California and New York.

Herbicidal Activity. **Imazapyr 2SL** will control most annual and perennial grasses and broadleaf weeds in addition to many brush and vine species with some residual control of undesirable species that germinate above the waterline. **Imazapyr 2SL** is readily absorbed through emergent leaves and stems and is translocated rapidly throughout the plant with accumulation in the meristematic regions. For maximum activity, weeds should be growing vigorously at the time of application, and the spray solution should include a surfactant (see **ADJUVANTS** section for specific directions). Treated plants stop growing soon after spray application.

Chlorosis appears first in the newest leaves, and necrosis spreads from this point. In perennials, the herbicide is translocated into, and kills, underground or submerged storage organs, which prevents regrowth. Chlorosis and tissue necrosis may not be apparent in some plant species until 2 or more weeks after application. Complete kill of plants may not occur for several weeks. Applications of **Imazapyr 2SL** are rainfast one hour after treatment.

Application Methods. **Imazapyr 2SL** may be selectively applied by using low-volume directed application techniques or may be broadcast applied by using ground equipment, watercraft, or aircraft (aerial applications to aquatic sites must be made by helicopter). In addition, **Imazapyr 2SL** may also be applied using cut stump, cut stem, and frill and girdle treatment techniques within non-cropland, and aquatic sites (see **AERIAL APPLICATIONS** and **GROUND APPLICATIONS** sections for additional details).

PRECAUTIONS FOR AVOIDING INJURY TO NON-TARGET PLANTS

Untreated desirable plants can be affected by root uptake of **Imazapyr 2SL** from treated soil. Injury or loss of desirable plants may result if **Imazapyr 2SL** is applied on or near desirable plants, on areas where their roots extend, or in locations where the treated soil may be washed or moved into contact with their roots. When making applications along shorelines where desirable plants may be present, caution should be exercised to avoid spray contact with their foliage or spray application to the soil in which they are rooted. Shoreline plants that have roots which extend into the water in an area where **Imazapyr 2SL** has been applied generally will not be adversely affected by uptake of the herbicide from the water.

If treated vegetation is to be removed from the application site, **DO NOT** use the vegetative matter as mulch or compost on or around desirable species.

MANAGING OFF-TARGET MOVEMENT

Aerial Applications

- Applicators are required to use a coarse or coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle applicators are required to use a volume mean diameter (VMD) of 385 microns or greater for release heights below 10 feet. Applicators are required to use a very coarse or coarser droplet size or, if specifically using a spinning atomizer nozzle, applicators are required to use

a VMD of 475 microns or greater for release heights above 10 feet. Applicators must consider the effects of nozzle orientation and flight speed when determining droplet size.

- Applicators are required to use upwind swath displacement.
- The boom length must not exceed 60% of the wingspan or 90% of the rotor blade diameter to reduce spray drift.
- Applications with wind speeds less than 3 mph and with wind speeds greater than 10 mph are prohibited.
- Applications into temperature inversions are prohibited.

Ground Boom Applications

- Applicators are required to use a nozzle height below 4 feet above ground or plant canopy and coarse or coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle, applicators are required to use a volume mean diameter (VMD) of 385 microns or greater.
- Applications with wind speeds greater than 10mph are prohibited.
- Applications into temperature inversions are prohibited.

Wind Erosion

Avoid treating powdery, dry or light sandy soils when conditions are favorable for wind erosion. Under these conditions, the soil surface should first be settled by rainfall or irrigation.

ADJUVANTS

Postemergence applications of **Imazapyr 2SL** require the addition of a spray adjuvant. When making aquatic applications, only spray adjuvants that are approved or appropriate for aquatic use must be utilized.

Nonionic Surfactants. Use a nonionic surfactant (NIS) at the rate of 0.25% volume/volume (v/v) or higher (see manufacturer's label) of the spray solution (0.25% v/v is equivalent to 1 quart in 100 gallons). For best results, select a nonionic surfactant with an HLB (hydrophilic to lipophilic balance) ratio between 12 and 17 with at least 70% surfactant in the formulated product (alcohols, fatty acids, oils, ethylene glycol or diethylene glycol should not be considered as surfactants to meet the above requirements).

Methylated Seed Oils or Vegetable Oil Concentrates. Instead of a surfactant, a methylated seed oil (MSO) or vegetable-based seed oil concentrate may be used at the rate of 1.5 to 2 pints per acre. When using spray volumes greater than 30 gallons per acre, methylated seed oil or vegetable-based seed oil concentrates should be mixed at a rate of 1% of the total spray volume, or alternatively use a nonionic surfactant as described above. Research indicates that these oils may aid in **Imazapyr 2SL** deposition and uptake by plants under moisture or temperature stress.

Silicone-based Surfactants. See manufacturer's label for specific rate directions. Silicone-based surfactants may reduce the surface tension of the spray droplet allowing greater spreading on the leaf surface as compared to conventional nonionic surfactants. However, some silicone-based surfactants may dry too quickly, limiting herbicide uptake.

Fertilizer/Surfactant Blends: Nitrogen-based liquid fertilizers, such as 28%N, 32%N, 10-34-0 or ammonium sulfate, may be added at the rate of 2 to 3 pints per acre in combination with the labeled rate of nonionic surfactant, methylated seed oil or vegetable/seed oil concentrate. Do not use fertilizers in a tank mix without a nonionic surfactant, methylated seed oil or vegetable/seed oil concentrate.

Invert Emulsions. **Imazapyr 2SL** can be applied as an invert emulsion. The spray solution results in an invert (water-in-oil) spray emulsion designed to minimize spray drift and spray runoff, resulting in more herbicide on the target foliage. The spray emulsion may be formed in a single tank (batch mixing) or injected (in-line mixing). Consult the invert chemical label for proper mixing directions.

Other. An antifoaming agent, spray pattern indicator, or drift-reducing agent may be applied at the product labeled rate if necessary or desired.

TANK MIXES

Imazapyr 2SL may be tank mixed with other herbicides.

Consult manufacturer's labels for specific rate restrictions and weeds controlled. Always follow the more restrictive label restrictions and precautions for all products used when making an application involving tank mixes.

AERIAL APPLICATIONS

All precautions should be taken to minimize or eliminate spray drift. Also see "MANAGING OFF-TARGET MOVEMENT" on the label. Both fixed-wing aircraft and helicopters can be used to apply **Imazapyr 2SL** on non-cropland sites, but only helicopters can be used for aquatic applications. **DO NOT** make applications by fixed-wing aircraft or helicopter unless appropriate buffer zones can be maintained to prevent spray drift out of the target area, or when treating open tracts of land, spray drift as a result of fixed-wing aircraft application can be tolerated. Aerial equipment designed to minimize spray drift, such as helicopter equipped with a **Microfoil™ boom**, **Thru-Valve™ boom**, or raindrop nozzles, must be used and calibrated. Except when applying with a **Microfoil™ boom**, a drift control agent may be added at the specified label rate. Do not side trim with **Imazapyr 2SL** unless death of treated tree can be tolerated.

Uniformly apply the specified amount of **Imazapyr 2SL** in 2 to 30 gallons of water per acre. A foam-reducing agent may be added at the labeled rate, if needed.

IMPORTANT: Thoroughly clean application equipment, including landing gear, immediately after use of this product. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part. The maintenance of an organic coating (paint) may prevent corrosion.

GROUND APPLICATIONS

FOLIAR APPLICATIONS

Low-Volume Foliar Application

Use equipment calibrated to deliver 5 to 20 gallons of spray solution per acre. To prepare the spray solution, thoroughly mix in water 0.5% to 5% **Imazapyr 2SL** plus surfactant (see the **ADJUVANTS** section of this label for specific directions). A foam-reducing agent may be applied at the specified label rate, if needed. For control of difficult species (see **Aquatic Weeds Controlled** section and the **Terrestrial Weeds Controlled by Imazapyr 2SL** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes, but **DO NOT** apply more than 6 pints of **Imazapyr 2SL** per acre in aquatic and non-cropland sites. Do not excessively wet foliage. See **Spray Solution Mixing Guide for Low-Volume Foliar Applications** for specified volumes of **Imazapyr 2SL** and water.

For low-volume foliar application, select proper nozzles to avoid over-application. Proper application is critical to ensure desirable results. Best results are achieved when the spray covers the crown and approximately 70 percent of the plant. The use of an even, flat-fan tip with a spray angle of 40 degrees or less will aid in proper deposition.

Recommended tip sizes include 4004E or 1504E. For a straight-stream and cone pattern, adjustable cone nozzles, such as 5500 X3 or 5500 X4, may be used. Attaching a rollover valve onto a Spraying Systems Model 30 gunjet or other similar spray gun allows for the use of both flat-fan and cone tips on the same gun.

Moisten, but **DO NOT** drench target vegetation causing spray solution to run off.

Low-volume Foliar Application with Backpacks

For low-growing species, spray down on the crown, covering crown, and penetrating approximately 70% of the plant.

For target species 4 to 8 feet tall, swipe the sides of target vegetation by directing spray to at least 2 sides of the plant in smooth vertical motions from the crown to the bottom. Make sure to cover the crown whenever possible.

For target species over 8 feet tall, lace sides of the target vegetation by directing spray to at least 2 sides of the target in smooth zigzag motions from crown to bottom.

Low-volume Foliar Application with Hydraulic Handgun Application Equipment

Use the same technique as described above for **Low-volume Foliar Application with Backpacks**.

For broadcast applications, simulate a gentle rain near the top of target vegetation allowing spray to contact the crown and penetrate the target foliage without falling to the understory. Herbicide spray solution that contacts the understory may result in severe injury or death of plants in the understory.

Spray Solution Mixing Guide for Low-Volume Foliar Applications

Spray Solution Prepared (gallons)	Desired Concentration (fluid volume)				
	0.5%	0.75%	1%	1.5%	5%
	(amount of Imazapyr 2SL to use)				
1	0.6 oz	0.9 oz	1.3 ozs	1.9 ozs	6.5 ozs
3	1.9 ozs	2.8 ozs	3.8 ozs	5.8 ozs	1.2 pints
4	2.5 ozs	3.8 ozs	5.1 ozs	7.7 ozs	1.6 pints
5	3.2 ozs	4.8 ozs	6.5 ozs	9.6 ozs	2 pints
50	2 pints	3 pints	4 pints	6 pints	10 quarts
100	4 pints	6 pints	8 pints	6 quarts	5 gallons

2 Tablespoons = 1 fluid ounce

High Volume Foliar Application

For optimum performance when spraying medium-density to high-density vegetation, use equipment calibrated to deliver up to 100 gallons of spray solution per acre (GPA). Spray solutions exceeding 100 GPA may result in excessive spray runoff, causing increased ground cover injury, and injury to desirable species. To prepare the spray solution, thoroughly mix **Imazapyr 2SL** in water and add a surfactant (see **ADJUVANTS** section for specific directions and rates of surfactants). A foam-reducing agent may be added at the labeled rate, if needed. For control of difficult species (see **Aquatic Weeds Controlled** chart and the **Terrestrial Weeds Controlled by Imazapyr 2SL** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes, but **DO NOT** apply more than 6 pints of **Imazapyr 2SL** per acre in aquatic and non-cropland sites. Uniformly cover the foliage of the vegetation to be controlled, but **DO NOT** apply to runoff. Do not excessively wet foliage.

Side Trimming

DO NOT side trim with **Imazapyr 2SL** unless severe injury or death of the treated tree can be tolerated. **Imazapyr 2SL** is readily translocated and can result in death of the entire tree.

CUT-SURFACE TREATMENTS

Imazapyr 2SL may be used to control undesirable woody vegetation by applying the **Imazapyr 2SL** solution to the cambium area of freshly cut stump surfaces or to fresh cuts on the stem of the target woody vegetation. Applications can be made at any time of the year except during periods of heavy sap flow in the spring. **DO NOT** overapply solution causing runoff from the cut surface.

Injury may occur to desirable woody plants if the shoots extend from the same root system or their root systems are grafted to those of the treated tree.

Cut-surface Applications With Dilute and Concentrate Solutions

Imazapyr 2SL may be mixed as either a concentrated or dilute solution. The dilute solution may be used for applications to the cut surface of the stump or to cuts on the stem of the target woody vegetation. Concentrated solutions may be used for applications to cuts on the stem. Use of the concentrated solution permits application to fewer cuts on the stem, especially for large-diameter trees. Follow the application instructions to determine proper application techniques for each type of solution.

- To prepare a dilute solution, mix 8 to 12 fluid ounces of **Imazapyr 2SL** with 1 gallon of water. The use of a surfactant or penetrating agent may improve uptake through partially callused cambiums.
- To prepare concentrated solution, mix 2 quarts of **Imazapyr 2SL** with no more than 1 quart of water.

Cut-Stump Treatments

- **Dilute Solutions.** Spray or brush the solution onto the cambium area of the freshly cut stump surface. Ensure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

Cut-Stem (injection, hack and squirt) Treatments

- **Dilute Solutions.** Using standard injection equipment, apply 1 milliliter of solution at each injection site around the tree with no more than 1-inch intervals between cut edges. Ensure that the injector completely penetrates the bark at each injection site.
- **Concentrate Solutions.** Using standard injection equipment, apply 1 milliliter of solution at each injection site. Make at least 1 injection cut for every 3 inches of Diameter at Breast Height (DBH) on the target tree. For example, a 3-inch DBH tree will receive 1 injection cut, and a 6-inch DBH tree will receive 2 injection cuts. On trees requiring more than 1 injection site, place the injection cuts at approximately equal intervals around the tree.

Frill or Girdle Treatments

- Using a hatchet, machete, or chainsaw, make cuts through the bark and completely around the tree to expose the cambium. The cut should angle downward extending into the cambium enough to expose at least 2 growth rings. Using a spray applicator or brush, apply a 25% to 100% solution of **Imazapyr 2SL** into each cut until thoroughly wet. Avoid applying so much herbicide that runoff to the ground or water occurs.

NON-CROPLAND USES

Applications may be made for the control of undesirable vegetation growing within industrial non-cropland sites. Industrial non-cropland sites include utility plant sites, petroleum tank farms, pumping installations, non-agricultural fence rows, storage areas, and non-irrigation ditchbanks. **Imazapyr 2SL** may also be used for the establishment and maintenance of wildlife openings, for the release of unimproved Bermudagrass and Bahiagrass, for bareground weed control, and for use under certain paved surfaces.

Applications to non-cropland areas that are not applicable to treatment of commercial timber or other plants being grown for sale or other commercial use, or for commercial seed production, or for research purposes.

Tank Mixes and Application Rates For Low-Volume Foliar Brush Control*

Target Vegetation	Imazapyr 2SL Rate	Tank Mix
Mixed hardwoods without elm, locust, or pine	1.0 to 1.5% by volume	Surfactant
Mixed hardwoods containing elm, locust, and pine	0.5 to 1.0% by volume	Accord ® at 2% to 3% by volume plus surfactant
Mixed hardwoods with locust and pine but no elm	0.5 to 1.0% by volume	Krenite ® at 2% to 5% by volume plus surfactant
Mixed hardwoods with locust and elm, but no pine	0.5 to 1.0% by volume	Escort ® at 2 ozs/A or 2.3 grams/gal plus surfactant

*Tank mixes with 2,4-D or products containing 2, 4-D have resulted in reduced efficacy of **Imazapyr 2SL**.

Mixing Chart

% Solution	Imazapyr 2SL per gallon of mix (ounces)	Imazapyr 2SL per 4-gallon backpack (ounces)
0.5%	0.6	2.6
1.0%	1.3	5.1
2.0%	2.6	10.2
3.0%	3.8	15.4
5.0%	6.4	25.6

Measuring Chart

128 ounces	=	1 gallon
16 ounces	=	1 pint
8 pints	=	1 gallon
4 quarts	=	1 gallon
2 pints	=	1 quart

FOR THE SELECTIVE CONTROL OF UNDESIRABLE WEEDS IN UNIMPROVED BERMUDAGRASS AND BAHIAGRASS

Imazapyr 2SL may be used on unimproved Bermudagrass and Bahiagrass turf such as roadsides, utility rights-of-way, and other non-cropland industrial sites. The application of **Imazapyr 2SL** on established common and coastal Bermudagrass and Bahiagrass provides control of labeled broadleaf and grass weeds. Competition from these weeds is eliminated, releasing the Bermudagrass and Bahiagrass. Treatment of Bermudagrass with **Imazapyr 2SL** results in a compacted growth habit and seed-head inhibition.

Uniformly apply with properly calibrated ground equipment using at least 10 gallons of water per acre.

IMPORTANT: Temporary yellowing of grass may occur when treatment is made after growth commences. **DO NOT** add surfactant in excess of the specified rate (1 oz per 25 gallons of spray solution). **DO NOT APPLY** to grass during its first growing season. **DO NOT APPLY** to grass that is under stress from drought, disease, insects, or other causes.

DOSAGE RATES AND TIMING

Bermudagrass. Apply **Imazapyr 2SL** at 6 to 12 ozs per acre when the Bermudagrass is dormant. Apply **Imazapyr 2SL** at 6 to 8 ozs per acre after Bermudagrass has reached full green-up. Applications made during green-up will delay green-up. Include a surfactant in the spray solution (see **IMPORTANT** note above).

For additional preemergence control of annual grasses and small-seeded broadleaf weeds, add **Pendulum® Aquacap™ herbicide** at the rate of 3.1 to 6.3 pints per acre. Consult the **Pendulum Aquacap** label for weeds controlled and for other use directions and precautions.

For control of Johnsongrass in Bermudagrass turf, apply **Imazapyr 2SL** at 8 ozs per acre, plus **Roundup® herbicide** at 12 ozs per acre, plus surfactant. For additional control of broadleaves and vines, **Garlon® 3A** may be added to the above mix at the rate of 1 to 2 pints per acre. Observe all precautions and restrictions on the **Garlon® 3A** and **Roundup®** labels.

Bahiagrass. Apply **Imazapyr 2SL** at 4 to 8 ozs per acre when the Bahiagrass is dormant or after the grass has initiated green-up but has not exceeded 25% green-up. Include a surfactant in the spray solution. (See **ADJUVANTS** section for specific directions on surfactants).

Weeds Controlled in Unimproved Bermudagrass and Bahiagrass:

Bedstraw (<i>Galium</i> spp.)
Bishopweed (<i>Ptilimnium capillaceum</i>)
Buttercup (<i>Ranunculus parviflorus</i>)
Carolina geranium (<i>Geranium carolinianum</i>)
Fescue (<i>Festuca</i> spp.)
Foxtail (<i>Setaria</i> spp.)
Little barley (<i>Hordeum pusillum</i>)
Seedling Johnsongrass (<i>Sorghum halepense</i>)
Wild Carrot (<i>Daucus carota</i>)
White clover (<i>Trifolium repens</i>)
Yellow woodsorrel (<i>Oxalis stricta</i>)

GRASS GROWTH AND SEED-HEAD SUPPRESSION

Imazapyr 2SL may be used to suppress growth and seed-head development of certain turfgrass in unimproved areas. When **Imazapyr 2SL** is applied to desirable turf, it may result in temporary turf damage and/or discoloration. Effects to the desirable turf may vary with environmental conditions. For optimum performance, application should be made prior to culm elongation. Applications may be made before or after mowing. If applied prior to mowing, allow at least 3 days of active growth before mowing. If applied following a mowing, allow sufficient time for the grasses to recover before applying this product or injury may be amplified.

DO NOT APPLY to turf under stress (drought, cold, insect damaged, etc.) or severe injury or death may occur.

Bermudagrass. Apply **Imazapyr 2SL** at 6 to 8 ozs per acre from early green-up to prior to seed-head initiation. **DO NOT** add a surfactant for this application.

Cool Season Unimproved Turf. Apply **Imazapyr 2SL** at 2 ozs per acre plus 0.25% nonionic surfactant. For increased suppression, **Imazapyr 2SL** may be tank mixed with such products as **Campaign®** (24 ozs per acre) or **Embark®** (8 ozs per acre). Tank mixes may increase injury to desired turf. Consult each

product label for specified turf species and other use directions and precautions. Tank mixes with 2, 4-D or products containing 2,4-D may decrease the effectiveness of **Imazapyr 2SL**.

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TOTAL VEGETATION CONTROL WHERE BARE GROUND IS DESIRED

Imazapyr 2SL is an effective herbicide for preemergence or postemergence control of many annual perennial broadleaf and grass weeds where bare ground is desired. **Imazapyr 2SL** is particularly effective on hard-to-control perennial grasses. **Imazapyr 2SL** herbicide at 1.5 to 6 pints per acre can be used alone or in a tank mix with herbicides approved for use in bare ground. The degree and duration of control are dependent on the rate of **Imazapyr 2SL** used, tank mix partner, the volume of carrier, soil texture, rainfall, and other conditions.

Consult manufacturer labels for specific rates and weeds controlled. Always follow the more restrictive label restrictions and precautions for all products used when making an application involving tank mixes.

Applications of **Imazapyr 2SL** may be made any time of the year. Use equipment calibrated to deliver desired gallons per acre spray volume and uniformly distribute the spray pattern over the treated area.

Postemergence Applications. Always use a spray adjuvant (see **ADJUVANTS** section of this label) when making a postemergence application. For optimum performance on tough-to-control annual grasses, applications should be made at a total volume of 100 gallons per acre or less. For quicker burndown or brown-out of target weeds, **Imazapyr 2SL** may be tank mixed with **Roundup** herbicide. Tank mixes with 2, 4-D, or products containing 2, 4-D, may reduce the performance of **Imazapyr 2SL**. Always follow the more restrictive label restrictions and precautions for all products used when tank mixing.

Spot Treatments. **Imazapyr 2SL** may be used as a follow-up treatment to control escapes or weed encroachment in a bareground situation. To prepare the spray solution, thoroughly mix in each gallon of water 0.5% to 5% **Imazapyr 2SL** plus an adjuvant. For increased burndown, include **Roundup** as a tank mixture. For added residual weed control, or to increase the weed spectrum, add **Pendulum Aquacap herbicide**, **Overdrive® herbicide** or diuron. Always follow the more restrictive label restrictions and precautions for all products when tank mixing.

FOR CONTROL OF UNDESIRABLE WEEDS UNDER PAVED SURFACES

Imazapyr 2SL can be used under asphalt, pond liners and other paved areas, **ONLY** in industrial sites or where the pavement has a suitable barrier along the perimeter that prevents encroachment of roots of undesirable plants.

Use **Imazapyr 2SL** only where the area to be treated has been prepared according to good construction practices. If rhizomes, stolons, tubers or other vegetative plant parts are present in the site, remove them by scalping with a grader blade to a depth sufficient to ensure their complete removal.

IMPORTANT: Follow **Imazapyr 2SL** applications with paving as soon as possible. **DO NOT** apply where the chemical may contact the roots of desirable trees or other plants.

Do not use this product under pavement on residential properties, such as driveways or parking lots, or for use in recreational areas, such as under bike or jogging paths, golf cart paths, or tennis courts, or where landscape plantings could be anticipated.

Injury or death of desirable plants may result if this product is applied where roots are present or where roots may extend into the treated area. Roots of trees and shrubs may extend a considerable distance beyond the branch extremities (drip line).

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Apply to the soil surface only when final grade is established. **DO NOT** move soil following **Imazapyr 2SL** application.

Apply **Imazapyr 2SL** in sufficient water (at least 100 gallons per acre) to ensure thorough and uniform wetting of the soil surface, including the shoulder areas. Add **Imazapyr 2SL** at a rate of 6 pints per acre (2.2 fluid ounces per 1000 square feet) to clean water in the spray tank during the filling operation. Agitate before spraying.

If the soil is not moist prior to treatment, incorporation of **Imazapyr 2SL** is needed for herbicide activation. Incorporate **Imazapyr 2SL** into the soil to a depth of 4 to 6 inches using a rototiller or disc. Rainfall or irrigation of 1 inch will also provide uniform incorporation. **DO NOT** allow treated soil to wash or move into untreated areas.

Spot Treatments and Crack and Crevice Treatments

Use **Imazapyr 2SL** as an initial or follow-up treatment control weed escapes or weed encroachment in a bareground situation, including cracks and crevices in paved surfaces such as roadways, runways, and parking areas.

AQUATIC WEED CONTROL

Imazapyr 2SL may be applied for the control of floating and emergent undesirable vegetation (see the **Aquatic Weeds Controlled** and the **Terrestrial Weeds Controlled by Imazapyr 2SL** section) in or near bodies of water that may be flowing, non-flowing, or transient. **Imazapyr 2SL** may be applied to aquatic sites that include lakes, rivers, streams, ponds, seeps, drainage ditches, canals, reservoirs, swamps, bogs, marshes, estuaries, bays, brackish water, transitional areas between terrestrial and aquatic sites, riparian sites, and seasonal wet areas. See **PRODUCT USE PRECAUTIONS AND RESTRICTIONS** section of this label for precautions, restrictions, and instructions on aquatic uses.

Read and observe the following directions if aquatic sites are present in non-crop areas and are part of the intended treatment area:

Imazapyr 2SL must be applied to the emergent foliage of the target vegetation and has little-to-no activity on submerged aquatic vegetation. **Imazapyr 2SL** concentrations resulting from direct application to water are not expected to be of sufficient concentration nor duration to provide control of target vegetation. Application should be made in such a way as to maximize spray interception by the target vegetation while minimizing the amount of overspray that enters water.

Imazapyr 2SL does not control plants that are completely submerged or have a majority of their foliage under water.

Imazapyr 2SL should be applied with surface or helicopter application equipment in a minimum of 2 gallons of water per acre. When applying by helicopter, follow directions under the **AERIAL APPLICATIONS** section of this label; otherwise, refer to the section on **GROUND APPLICATIONS** when using surface equipment.

Make applications to moving bodies of water while traveling upstream to prevent concentration of this herbicide in water. **DO NOT** apply to bodies of water of portions of bodies of water where emergent and/or floating weeds do not exist.

When application is to be made to target vegetation that covers a large percentage of the surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in the suffocation of some sensitive aquatic organisms. If oxygen depletion is a concern, treat no more than $\frac{1}{2}$ of the surface area of the water in a single operation and wait at least

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10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to move into untreated areas.

Avoid washoff of sprayed foliage by spray boat or recreational boat backwash for 1 hour after application.

Apply **Imazapyr 2SL** at 2 to 6 pints per acre depending on species present and weed density. **DO NOT** exceed the maximum label rate of 6 pints per acre (1.5 lbs ae/A) per year. Use the higher labeled rates for heavy weed pressure. Consult the **Aquatic Weeds Controlled** section and the **Terrestrial Weeds Controlled by Imazapyr 2SL** section of this label for specific rates.

Imazapyr 2SL may be applied as a draw-down treatment in areas described above. Apply **Imazapyr 2SL** to weeds after water has been drained and allow 14 days before reintroduction of water.

WEEDS CONTROLLED

Aquatic Weeds Controlled

Imazapyr 2SL will control the following target species as specified in the **Instructions** part of the table. Rates are expressed in terms of product volume for broadcast applications and as a % solution for directed applications including spot treatments. **For % solution applications, DO NOT apply more than the equivalent of 6 pints of Imazapyr 2SL per acre.**

Common Name	Scientific Name	Instructions
Floating		
*Floating Heart	<i>Nymphodes</i> spp.	2 to 4 pints/A (0.5 to 1.0%) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Frogbit	<i>Limnobium spongia</i>	1 to 2 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Spatterdock	<i>Nuphar luteum</i>	Apply a tank mix of 2 to 4 pints/A Imazapyr 2SL + 4 to 6 pints/A glyphosate (0.5% Imazapyr 2SL +1.5% glyphosate) in 100 GPA water for best control. Ensure 100% coverage of actively growing emergent foliage.
*Water hyacinth	<i>Eichhornia crassipes</i>	1 to 2 pints/A (0.5% solution) applied in 100 GPA water to actively growing foliage.
*Water lettuce	<i>Pistia stratiotes</i>	1 to 2 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
Emerged		
*Alligatorweed	<i>Alternanthera philoxeroides</i>	1 to 4 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Arrowhead, duck-potato	<i>Sagittaria</i> spp.	1 to 2 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Bacopa, lemon	<i>Bacopa</i> spp.	1 to 2 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.

*Parrot, feather	<i>Myriophyllum aquaticum</i>	Must be foliage above water for sufficient Imazapyr 2SL uptake. Apply 2 to 4 pints/A to actively growing emergent foliage.
*Pennywort	<i>Hydrocotyle</i> spp.	1 to 2 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Pickerelweed	<i>Pontederia cordata</i>	2 to 3 pints/A (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Taro, wild Dasheen Elephant's ear Coco yam	<i>Colocasia esculentum</i>	4 to 6 pints/A (1.5% solution) applied in 100 GPA with a high quality "sticker" adjuvant. Ensure good coverage of actively growing emergent foliage.
*Water lily	<i>Nymphaea odorata</i>	2 to 3 pints/A (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Water primrose	<i>Ludwigia uruguayensis</i>	4 to 6 pints/A (1.5% solution). Ensure 100% coverage of actively growing emergent foliage. Do not tank mix with glyphosate as this tank mixture may reduce water primrose control.
Terrestrial/Marginal		
*Soda apple, Aquatic nightshade	<i>Solanum tampicense</i>	2 pints/A applied to foliage.
*Bamboo, Japanese	<i>Phyllostachys</i> spp.	3 to 4 pints/A applied to the foliage when plant is actively growing; before setting seed head. More foliage will result in greater herbicide uptake, resulting in greater root kill.
Beach, vitex	<i>Vitex rotundifolia</i>	5% solution + 1% MSO foliar spray. 17% solution stem injection (hack and squirt)
Brazilian pepper Christmasberry	<i>Schinus terebinthifolius</i>	2 to 4 pints/A applied to foliage.
Cattail	<i>Typha</i> spp.	2 to 4 pints/A (1% solution) applied to actively growing green foliage after full leaf elongation. Lower rates will control cattail in the North; higher rates are needed in the South.
Chinese tallow tree	<i>Sapium sebiferum</i>	16 to 24 ozs/A applied to foliage.
Cogon grass	<i>Imperata cylindrica</i>	Burn foliage, till area; then fall-spray 2 quarts/A Imazapyr 2SL + MSO applied to new growth.
Cordgrass, prairie	<i>Spartina</i> spp.	4 to 6 pints/A applied to actively growing foliage
*Cutgrass	<i>Zizaniopsis miliacea</i>	4 to 6 pints/A applied to actively growing foliage
*Elephant grass Napier grass	<i>Pennisetum purpureum</i>	3 pints/A applied to actively growing foliage
*Flowering rush	<i>Butumu typla</i>	2 to 3 pints/A applied to actively growing foliage
Giant reed Wild cane	<i>Arundo donax</i>	4 to 6 pints/A applied in spring to actively growing foliage
*Golden bamboo	<i>Phyllostachys aurea</i>	3 to 4 pints/A applied to foliage when plant is actively growing; before setting seed

		head. More foliage will result in greater herbicide uptake, resulting in greater root kill.
Junglerice	<i>Echinochloa colonum</i>	3 to 4 pints/A applied to actively growing foliage.
Knapweeds	<i>Centaurea species</i>	Russian knapweed: 2 to 3 pints + 1 quart/A MSO fall-applied after senescence begins
Knotweed, Japanese (see <i>Fallopia japonica</i>)	<i>Polygonum cuspidatum</i>	3 to 4 pints/A applied postemergence to actively growing foliage
Melaleuca Paperbark tree	<i>Melaleuca quinquenervia</i>	For established stands, apply 6 pints/A Imazapyr 2SL + 6 pints/A glyphosate + spray adjuvant. For best results, use 4 quarts/A methylated seed oil as an adjuvant. For ground foliar application, uniformly apply to ensure 100% coverage. For broadcast foliar control, apply aerially in a minimum of 2 passes at 10 gallons/A applied cross treatment. For spot treatment, use a 25% Imazapyr 2SL + 25% solution of glyphosate + 1.25% MSO in water applied as a frill or stump treatment.
*Nutgrass Kili'p'opu	<i>Cyperus rotundus</i>	2 pints Imazapyr 2SL + 1 quart/A MSO applied early postemergence
*Nutsedge	<i>Cyperus spp.</i>	2 to 3 pints postemergence to foliage or preemergence incorporated, non-incorporated, preemergence applications will not provide control.
Phragmites Common reed	<i>Phragmites australis</i>	4 to 6 pints/A applied to actively growing green foliage after full leaf elongation. Ensure 100% coverage. If stand has a substantial amount of old stem tissue, mow or burn, allow to regrow to approximately 5 feet tall before treatment. Lower rates will control phragmites in the North; higher rates are needed in the South.
*Poison hemlock	<i>Corium maculatum</i>	2 pints Imazapyr 2SL herbicide + 1 quart/A MSO applied preemergence to early postemergence to rosette prior to flowering.
Purple loosestrife	<i>Lythrum salicaria</i>	1 pint/A applied to actively growing foliage
Reed Canarygrass	<i>Phalaris arundinacea</i>	3 to 4 pints/A applied to actively growing foliage
Rose, Swamp	<i>Rosa palustris</i>	2 to 3 pints/A applied to actively growing foliage
Russian olive	<i>Elaeagnus angustifolia</i>	2 to 4 pints/A or a 1% solution applied to foliage
Saltceder Tamarisk	<i>Tamarix spp.</i>	Aerial apply 2 quarts Imazapyr 2SL + 0.25% v/v NIS applied to actively growing foliage during flowering. For spot spraying, use 1% solution of Imazapyr 2SL + 0.25% v/v NIS and spray to wet foliage. After application, wait at least 2 years before disturbing treated saltcedar. Earlier disturbance can reduce overall control.

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Smartweed	<i>Polygonum</i> spp.	2 pints/A applied early postemergence
Sumac	<i>Rhus</i> spp.	2 to 3 pints/A applied to foliage
Swamp morningglory Water spinach Kangkong	<i>Ipomoea aquatic</i>	1 to 2 pints/A Imazapyr 2SL + 1 quart/A MSO applied early postemergence
Torpedo grass	<i>Panicum repens</i>	4 pints/A (1 to 1.5% solution); ensure good coverage to actively growing foliage
*White top Hoary cress	<i>Cardaria draba</i>	1 to 2 pints/A applied in spring to foliage during flowering
Willow	<i>Salix</i> spp.	2 to 3 pints/A Imazapyr 2SL applied to actively growing foliage. Ensure good coverage.

***Use not permitted in California unless otherwise directed by supplemental labeling.**

Terrestrial Weeds Controlled by Imazapyr 2SL herbicide

In terrestrial sites, **Imazapyr 2SL** will provide preemergence or postemergence control with residual control of the following target vegetation species at the rates listed. Residual control refers to control of newly germinating seedlings in both annuals and perennials. In general, annual weeds may be controlled by preemergence or postemergence applications of **Imazapyr 2SL**. **For established biennials and perennials, make postemergence applications of Imazapyr 2SL.**

The rates shown below pertain to broadcast applications and indicate the relative sensitivity of these weeds. The relative sensitivity should be referenced when preparing low-volume spray solutions (see **Low-volume Foliar Application** sections of **GROUND APPLICATIONS**); low-volume applications may provide control of the target species with less **Imazapyr 2SL** per acre than is shown for the broadcast treatments. Use **Imazapyr 2SL** only in accordance with the directions on this label.

The relative sensitivity of the species listed following can also be used to determine the relative risk of causing nontarget plant injury if any of the species listed following are considered to be desirable within the area to be treated.

Resistant Biotypes. Naturally occurring biotypes (a plant within a given species that has a slightly different by distinct genetic makeup from other plants of the same species) of some weeds listed on this label may not be effectively controlled. If naturally occurring, resistant biotypes are present in an area, **Imazapyr 2SL** should be tank mixed or applied sequentially with an appropriate registered herbicide having a different mode of action to ensure control.

GRASS WEEDS

COMMON NAME	SPECIES	GROWTH HABIT ²
Apply 2 to 3 pints per acre¹		
Annual bluegrass	<i>(Poa annua)</i>	A
Broadleaf Signalgrass	<i>(Brachiaria platyphylla)</i>	A
Canada bluegrass	<i>(Poa compressa)</i>	P
Downy brome	<i>(Bromus tectorum)</i>	A
Fescue	<i>(Festuca spp.)</i>	A/P
Foxtail	<i>(Setaria spp.)</i>	A
Italian ryegrass	<i>(Lolium multiflorum)</i>	A
Johnsongrass	<i>(Sorghum halepense)</i>	P
Kentucky bluegrass	<i>(Poa pratensis)</i>	P
Lovegrass	<i>(Eragrostis spp.)</i>	A/P
*Napier grass	<i>(Pennisetum purpureum)</i>	P
Orchardgrass	<i>(Dactylis glomerata)</i>	P

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Paragrass	(<i>Brachiaria mutica</i>)	P
Quackgrass	(<i>Agropyron repens</i>)	P
Sandbur	(<i>Cenchrus spp.</i>)	A
Sand dropseed	(<i>Sporobolus cryptandrus</i>)	P
Smooth brome	(<i>Bromus inermis</i>)	P
Vaseygrass	(<i>Paspalum urvillei</i>)	P
Wild oats	(<i>Avena fatua</i>)	A
Witchgrass	(<i>Panicum capillare</i>)	A

***Use not permitted in California unless otherwise directed by supplemental labeling.**

Apply to 3 to 4 pints per acre¹		
Barnyardgrass	(<i>Echinochloa crus-gali</i>)	A
Beardgrass	(<i>Andropogon spp.</i>)	P
Bluegrass, annual	(<i>Poa annua</i>)	A
*Bulrush	(<i>Scirpus validus</i>)	P
Cheat	(<i>Bromus secalinus</i>)	A
Crabgrass	(<i>Digitaria spp.</i>)	A
Crowfootgrass	(<i>Dactyloctenium aegyptium</i>)	A
Fall Panicum	(<i>Panicum dichotomiflorum</i>)	A
Goosegrass	(<i>Eleusine indica</i>)	A
Itchgrass	(<i>Rottboellia exaltata</i>)	A
Lovegrass	(<i>Eragrostis spp.</i>)	A
*Maidencane	(<i>Panicum hemitomon</i>)	A
Panicum, browntop	(<i>Panicum fasciculatum</i>)	A
Panicum, Texas	(<i>Panicum texanum</i>)	A
Prairie threeawn	(<i>Aristida oligantha</i>)	P
Sandbur, field	(<i>Cenchrus incertus</i>)	A
Signalgrass	(<i>Brachiaria platyphylla</i>)	A
Wild barley	(<i>Hordeum spp.</i>)	A
Wooly Cupgrass	(<i>Eriochloa villosa</i>)	A

***Use not permitted in California unless otherwise directed by supplemental labeling.**

Apply to 4 to 6 pints per acre¹		
Bahiagrass	(<i>Paspalum notatum</i>)	P
Bermudagrass ³	(<i>Cynodon dactylon</i>)	P
Big bluestem	(<i>Andropogon gerardii</i>)	P
Dallisgrass	(<i>Paspalum dilatatum</i>)	P
Feathertop	(<i>Pennisetum villosum</i>)	P
Guineagrass	(<i>Panicum maximum</i>)	P
Saltgrass ³	(<i>Distichlis stricta</i>)	P
Sand dropseed	(<i>Sporobolus cryptandrus</i>)	P
Sprangletop	(<i>Leptochloa spp.</i>)	A
Timothy	(<i>Phleum pretense</i>)	P
Wirestem Muhly	(<i>Muhlenbergia frondosa</i>)	P

BROADLEAF WEEDS

COMMON NAME	SPECIES	GROWTH HABIT²
Apply 2 to 3 pints per acre¹		
Burdock	(<i>Articum spp.</i>)	B
Carpetweed	(<i>Mollugo verticillata</i>)	A
Carolina geranium	(<i>Geranium carolinianum</i>)	A
Clover	(<i>Trifolium spp.</i>)	A/P
Common chickweed	(<i>Stellaria media</i>)	A

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Common ragweed	(<i>Ambrosia artemisiifolia</i>)	A
Dandelion	(<i>Taraxacum officinale</i>)	P
Dogfennel	(<i>Eupatorium capillifolium</i>)	A
Filaree	(<i>Erodium spp.</i>)	A
Fleabane	(<i>Erigeron spp.</i>)	A
Hoary vervain	(<i>Verbena stricta</i>)	P
Indian mustard	(<i>Brassica juncea</i>)	A
Kochia	(<i>Kochia scoparia</i>)	A
Lambsquarters	(<i>Chenopodium album</i>)	A
*Lespedeza	(<i>Lespedeza spp.</i>)	P
Miner's lettuce	(<i>Montia perfoliata</i>)	A
Mullein	(<i>Verbascum spp.</i>)	B
Nettleleaf goosefoot	(<i>Chenopodium murale</i>)	A
Oxeye daisy	(<i>Chrysanthemum leucanthemum</i>)	P
Pepperweed	(<i>Lepidium spp.</i>)	A
Pigweed	(<i>Amaranthus spp.</i>)	A
Puncturevine	(<i>Tribulus terrestris</i>)	A
Russian thistle	(<i>Salsola kali</i>)	A
Smartweed	(<i>Polygonum spp.</i>)	A/P
Sorrell	(<i>Rumex spp.</i>)	P
Sunflower	(<i>Helianthus spp.</i>)	A
Sweet clover	(<i>Melilotus spp.</i>)	A/B
Tansymustard	(<i>Descurainia pinnata</i>)	A
Western ragweed	(<i>Ambrosia psilostachya</i>)	P
Wild carrot	(<i>Daucus carota</i>)	B
Wild lettuce	(<i>Lactuca spp.</i>)	A/B
Wild parsnip	(<i>Pastinaca sativa</i>)	B
Wild turnip	(<i>Brassica campestris</i>)	B
Woollyleaf bursage	(<i>Franseria tomentosa</i>)	P
Yellow woodsorrel	(<i>Oxalis stricta</i>)	P

*Use not permitted in California unless otherwise directed by supplemental labeling.

Apply 3 to 4 pints per acre ¹		
Broom snakeweed ⁴	(<i>Gutierrezia sarothrae</i>)	P
Bull thistle	(<i>Cirsium vulgare</i>)	B
Burclover	(<i>Medicago spp.</i>)	A
Chickweed, mouseear	(<i>Cerastium vulgatum</i>)	A
Clover, hop	(<i>Trifolium procumbens</i>)	A
Cocklebur	(<i>Xanthium strumarium</i>)	A
Cudweed	(<i>Gnaphalium spp.</i>)	A
Desert camelthorn	(<i>Alhagi pseudahagi</i>)	P
Dock	(<i>Rumex spp.</i>)	P
Fiddleneck	(<i>Amsinckia intermedia</i>)	A
Goldenrod	(<i>Solidago spp.</i>)	P
Henbit	(<i>Lamium aplexicaule</i>)	A
Knotweed, prostrate	(<i>Polygonum aviculare</i>)	A/P
Pokeweed	(<i>Phytolacca americana</i>)	P
Purslane	(<i>Portulaca spp.</i>)	A
Pusley, Florida	(<i>Richardia scabra</i>)	A
Rocket, London	(<i>Sisymbrium irio</i>)	A
Rush skeletonweed ⁴	(<i>Chondrilla juncea</i>)	B
Saltbrush	(<i>Atriplex spp.</i>)	A

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Shepherdspurse	(<i>Capsella bursa-pastoris</i>)	A
Spurge, annual	(<i>Euphorbia</i> spp.)	A
Stinging nettle ⁴	(<i>Urtica dioica</i>)	P
Velvetleaf	(<i>Abutilon theophrasti</i>)	A
Yellow starthistle	(<i>Centaurea solstitialis</i>)	A

Apply to 4 to 6 pints per acre¹		
Arrowwood	(<i>Pluchea sericea</i>)	A
Canada thistle	(<i>Cirsium arvense</i>)	P
Giant ragweed	(<i>Ambrosia trifida</i>)	A
Grey rabbitbrush	(<i>Chrysothemnus nauseosus</i>)	P
Little mallow	(<i>Malva parviflora</i>)	B
Milkweed	(<i>Asclepias</i> spp.)	P
Primrose	(<i>Cenothera kunthiana</i>)	P
Silverleaf nightshade	(<i>Solanum elaeagnifolium</i>)	P
Sowthistle	(<i>Sonchus</i> spp.)	A
Texas thistle	(<i>Cirsium texanum</i>)	P

VINES AND BRAMBLES

COMMON NAME	SPECIES	GROWTH HABIT ²
Apply 1 pint per acre		
Field bindweed	(<i>Convolvulus arvensis</i>)	P
Hedge bindweed	(<i>Calystegia sepium</i>)	A

Apply 2 to 3 pints per acre¹		
Wild buckwheat	(<i>Polygonum convolvulus</i>)	P

Apply 3 to 4 pints per acre¹		
Greenbriar	(<i>Smilax</i> spp.)	P
Honeysuckle	(<i>Lonicera</i> spp.)	P
Morningglory	(<i>Ipomoea</i> spp.)	A/P
Poison ivy	(<i>Rhus radicans</i>)	P
Redvine	(<i>Brunnichia cirrhosa</i>)	P
Wild rose	(<i>Rosa</i> spp.)	P
Including:		
Multiflora rose	(<i>Rosa multiflora</i>)	P
Macartney rose	(<i>Rosa bracteata</i>)	P

Apply 4 to 6 pints per acre¹		
*Kudzu ³	(<i>Pueraria lobata</i>)	P
Trumpetcreeper	(<i>Campsis radicans</i>)	P
Virginia creeper	(<i>Parthenocissus quinquefolia</i>)	P
Wild grape	(<i>Vitis</i> spp.)	P

*Use not permitted in California unless otherwise directed by supplemental labeling.

BRUSH SPECIES

Apply 4 to 6 pints per acre¹		
Alder	(<i>Alnus</i> sp.)	P
American beech	(<i>Fagus grandfolia</i>)	P

Ash	(<i>Fraxinus</i> spp.)	P
Bald cypress	(<i>Taxodium distichum</i>)	P
Bigleaf maple	(<i>Acer macrophyllum</i>)	P
Black locust ⁵	(<i>Robinia pseudoacacia</i>)	P
Black gum	(<i>Nyssa sylvatica</i>)	P
Boxelder	(<i>Acer negundo</i>)	P
Cherry	(<i>Prunus</i> spp.)	P
Chinaberry	(<i>Prunus</i> spp.)	P
Dogwood	(<i>Cornus</i> spp.)	P
Elm ⁵	(<i>Ulmus</i> spp.)	P
Hawthorn	(<i>Crataegus</i> spp.)	P
Hickory	(<i>Carya</i> spp.)	P
Honeylocust ⁵	(<i>Gleditsia triacanthos</i>)	P
Maple	(<i>Acer</i> spp.)	P
Mulberry	(<i>Morus</i> spp.)	P
Oak	(<i>Quercus</i> spp.)	P
Persimmon	(<i>Diospyros virginiana</i>)	P
*Pine ⁵	(<i>Pinus</i> spp.)	P
Poplar	(<i>Populus</i> spp.)	P
Privet	(<i>Ligustrum vulgare</i>)	P
Red alder	(<i>Alnus rubra</i>)	P
Red maple	(<i>Acer rebrum</i>)	P
Russian olive	(<i>Elaeagnus angustifolia</i>)	P
Sassafras	(<i>Sassafras albidum</i>)	P
Sourwood	(<i>Oxydendrum arboreum</i>)	P
Sweetgum	(<i>Liquidambar styraciflua</i>)	P
*Water willow	(<i>Justica americana</i>)	P
Willow	(<i>Salix</i> spp.)	P
Yellow poplar	(<i>Liriodendron tulipifera</i>)	P

¹Use the higher rates where heavy or well-established infestations occur.

²Growth Habit: A = Annual, B = Biennial, P = Perennial

³Use a minimum of 75 GPA. Control of established stands may require repeat applications.

⁴For best results, early postemergence applications are required.

⁵Tank mix with glyphosate or triclopyr.

⁶Tank mix with glyphosate.

***Use not permitted in California unless otherwise directed by supplemental labeling.**

SITE PREPARATION TREATMENT

CONIFER SITE PREPARATION TREATMENTS

Imazapyr 2SL may be used to control labeled grasses, broadleaf weeds, vines and brambles, and woody brush and trees on forest sites in advance of regeneration for the following conifer crop species:

Crop Species	Rate (fl. oz./Acre)
Loblolly Pine (<i>Pinus taeda</i>)	48 – 80
Loblolly X Pitch Hybrid	48 – 80
Longleaf Pine (<i>Pinus palustris</i>)	48 – 80
Shortleaf Pine (<i>Pinus echinata</i>)	48 – 80
Virginia Pine (<i>Pinus virginianae</i>)	48 – 80
Slash Pine (<i>Pinus elliottii</i>)	40 – 64
Douglas Fir (<i>Pseudotsuga menziesii</i>)	24 – 48
Incense Cedar (<i>Libocedrus decurrens</i>)	24 - 48
Larch (<i>Larix</i> spp.)	24 – 48
Western Hemlock (<i>Tsuga heterophylla</i>)	24 - 48

Western Red Cedar (<i>Thuja plicata</i>)	24 – 48
Coast Redwood (<i>Sequoia sempervirens</i>)	24 – 48
California Red Fir (<i>Abies magnifica</i>)	24 – 40
California White Fir (<i>Abies concolor</i>)	24 - 40
Jack Pine (<i>Pinus banksiana</i>)	24 – 32
Lodgepole Pine (<i>Pinus contorta</i>)	24 – 32
Pitch Pine (<i>Pinus rigida</i>)	24 – 32
Ponderosa Pine (<i>Pinus ponderosa</i>)	24 – 32
Red Pine (<i>Pinus resinosa</i>) ²	24 – 32
Sugar Pine (<i>Pinus lamertiana</i>)	24 - 32
White Pine (<i>Pinus strobes</i>)	24 – 32
Black Spruce (<i>Picea mariana</i>) ¹	24 – 32
Red Spruce (<i>Picea rubens</i>)	24 – 32
White Spruce (<i>Picea glauca</i>) ¹	24 - 32

¹ **DO NOT** plant seedlings of black spruce (*Picea mariana*) or white spruce (*Picea glauca*) on sites that have been site prepared with a broadcast application of **Imazapyr 2SL** or into the treated zone of spot or banded site preparation applications for three months following treatment or injury may occur.

² **DO NOT** plant seedlings of Red Pine (*Pinus resinosa*) on sites that have been site prepared with a broadcast application of **Imazapyr 2SL** or into the treated zone of spot or banded site preparation applications for six months following treatment or injury may occur.

Use the specified rate of **Imazapyr 2SL** per acre applied as a broadcast foliar spray for long-term control of labeled woody plants and residual control of herbaceous weeds. Within 4 to 6 weeks of treatment, grasses and other herbaceous weeds will be controlled and may provide fuel to facilitate a site preparation burn, if desired, to control conifers or other species tolerant to the herbicide.

For tracts to be planted with loblolly, loblolly x pitch hybrid, longleaf pine, shortleaf pine, Virginia pine and slash pine, **Imazapyr 2SL** may be applied at a rate of 64 oz per acre on areas that have little to no resprouting vegetation because of recent management activities such as harvesting, mechanical shearing, burning piling or bedding. Applications must be made after September 1.

MIXING and APPLICATION INSTRUCTIONS for SITE PREPARATION:

Apply the specified rate of **Imazapyr 2SL** per acre in 5 to 20 gallons of total spray carrier for helicopter applications or 5 to 40 gallons total spray carrier for mechanical or backpack ground spray applications. Enhanced brownout for burning and improved control of brush and grasses may be obtained by application of **Imazapyr 2SL** in 12 to 50% oil:water (volume:volume) emulsion carrier. Use methylated or ethylated seed oils containing at least 50% esterified seed oil by volume. Mix **Imazapyr 2SL** into the water portion of the carrier thoroughly, then add the oil and mix thoroughly again to obtain a uniform emulsion. Use the higher label rates of **Imazapyr 2SL** and higher spray volumes when controlling particularly dense or multi-layered canopies or hardwood stands, or difficult to control species. Make applications during the growing season; beginning in the spring after full leaf expansion of the target weed or brush has occurred and complete applications before leaf drop in the fall.

Tank mixes may be necessary for chemical control of conifers and other species tolerant to **Imazapyr 2SL** in certain cases. Observe all precautions and restrictions on the product labels. Always follow the most restrictive label. Combinations with other products labeled for forest site preparation may kill certain plants such as legumes and blackberry, which are desirable for wildlife habitat.

DO NOT plant seedlings of black spruce (*Picea mariana*) or white spruce (*Picea glauca*) on sites that have been site prepared with a broadcast application of **Imazapyr 2SL** or into the treated zone of spot or banded site preparation applications for three months following treatment or injury may occur.

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HELICOPTER SPRAY EQUIPMENT

All precautions should be taken should be taken to minimize or eliminate spray drift. Applications should not be made under gusty conditions. The use of controlled droplet booms and nozzle configurations is recommended.

IMPORTANT: DO NOT make applications by fixed wing aircraft. Maintain adequate buffer zones. Thoroughly clean application and mixing equipment, including landing gear, immediately after use. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part.

HARDWOOD SITE PREPARATION TREATMENTS

For site preparation prior to planting hardwood species in the southeast and gulf coast states (Virginia to Texas), use **Imazapyr 2SL** at a rate of 48 oz per acre and spray before the end of July. Apply in an emulsion carrier with a minimum of 12% oil. **DO NOT** plant hardwood seedlings before January of the year following site preparation or injury may occur.

DIRECTED FOLIAR APPLICATIONS FOR CONIFER RELEASE

Imazapyr 2SL may be applied as a directed spray using water or oil emulsion carrier for control and suppression of labeled brush and weed species. Directed spray applications may be made using low carrier volumes (generally 10 gallons total spray per acre or less) in labeled conifer stands of all ages by targeting the unwanted vegetation and avoiding direct application to the conifer. Ensure that the maximum labeled rates per acre listed for the conifer species are not exceeded.

Use directed foliar applications of Imazapyr 2SL for release of the following conifers from hardwood competition:

Crop Species	Rate (fl. oz./Acre)
Loblolly Pine (<i>Pinus taeda</i>)	24 - 40
Loblolly X Pitch Hybrid	24 - 40
Virginia Pine (<i>Pinus virginianae</i>)	24 - 40
Longleaf Pine (<i>Pinus palustris</i>)	24 - 32
Pitch Pine (<i>Pinus rigida</i>)	24 - 32
Shortleaf Pine (<i>Pinus echinata</i>)	24 - 32
Slash Pine (<i>Pinus elliotii</i>)	24 - 32
Coast Redwood (<i>Sequoia sempervirens</i>)	16 - 32
Incense Cedar (<i>Libocedrus decurrens</i>)	16 - 32
Western Red Cedar (<i>Thuja plicata</i>)	16 - 32
White Pine (<i>Pinus strobes</i>)	16 - 32
Douglas Fir (<i>Pseudotsuga menziesii</i>)	16 - 24
Lodgepole Pine (<i>Pinus contorta</i>)	16 - 24
Black Spruce (<i>Picea mariana</i>)	12 - 24
Jack Pine (<i>Pinus banksiana</i>)	12 - 24
Red Spruce (<i>Picea rubens</i>)	12 - 24
White Spruce (<i>Picea glauca</i>)	12 - 24

For applications directed to the foliage of undesirable brush mix 2 to 10% **Imazapyr 2SL** in water. For brush species with thick leaf cuticles or difficult to control species use oil emulsion carrier containing 12 to 50%, by volume, specified oil diluents. Apply the spray solution or emulsion to at least 2/3 of each hardwood crown using backpack sprayers or hand-held equipment. **DO NOT** spray to the point of runoff and avoid spraying the conifers for best results. For low volume foliar applications to control big leaf maple, use a 5% by volume **Imazapyr 2SL** solution or emulsion.

Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer height growth inhibition, release treatments may be made late in the growing season after formation of final conifer resting buds. To prevent possibility of

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conifer injury, **DO NOT** apply **Imazapyr 2SL** when conifers are under stress from drought, diseases, animal or winter injury, or other stresses reducing conifer vigor.

Injury may occur to non-target or desirable hardwoods if they extend from the same root system as treated stems, or their root systems are grafted to those of the treated tree, or if their roots extend into the soil near treated trees.

BAG AND BROADCAST APPLICATIONS FOR CONIFER RELEASE

In Douglas-fir and Ponderosa pine stands, broadcast applications of **Imazapyr 2SL** up to 32 oz per acre are permissible when the trees are covered by bags prior to the application. The bags must prevent the spray mix from contacting the conifer foliage. For improved control of brush species, particularly evergreens, add a suitable seed oil at 5 to 12% by volume. On sites with coarse textured soils (e.g. decomposed granite, pumice, sandy or rocky sites) or low levels of soil organic matter (generally 5% or less) significant conifer growth inhibition and mortality is possible. **DO NOT** use this treatment on these types of sites if conifer growth inhibition and mortality cannot be tolerated.

LATE ROTATION VEGETATION CONTROL IN WESTERN CONIFERS

In California, the Pacific Northwest and Inland Northwest, broadcast aerial applications of **Imazapyr 2SL** up to 48 oz per acre are permissible in conifer stands that are targeted for harvesting the year following treatment. Use a minimum spray volume of 15 gallons per acre. For improved control of brush species, particularly evergreens, add a suitable seed oil at 5 to 12% by volume. Significant conifer injury or mortality must be expected. **DO NOT** use this treatment if conifer injury or mortality cannot be tolerated.

UNDERSTORY BROADCAST APPLICATIONS FOR MID-ROTATION RELEASE

Imazapyr 2SL may be applied as a broadcast application below the conifer canopy to control understory brush and suppress trees for labeled species. Ground spray machinery or hand held equipment may be used to broadcast **Imazapyr 2SL** in water or oil emulsion carrier below the crop tree canopy in a manner as to minimize spray contact by the live crown of crop trees.

Ensure that maximum labeled rates per acre listed for crop species below are not exceeded.

Crop Species	Rate (fl. oz./Acre)
Loblolly Pine (<i>Pinus taeda</i>)	64
Loblolly X Pitch Hybrid	64
Virginia Pine (<i>Pinus virginiana</i>)	64
Longleaf Pine (<i>Pinus palustris</i>)	32
Pitch Pine (<i>Pinus rigida</i>)	32
Shortleaf Pine (<i>Pinus echinata</i>)	32
Slash Pine (<i>Pinus elliottii</i>)	32

CUT STUMP TREATMENTS

Mix 8.0 to 16.0 fluid ounces of **Imazapyr 2SL** in one gallon of water*, spring oil or food/feed seed oil. **Imazapyr 2SL** may be tank mixed with **Garlon® 3A**, **Garlon® 4**, **Tordon® K**, **Escort®** or **Roundup®** to control labeled species. Spray or brush the **Imazapyr 2SL** solution onto the cambium area of the freshly cut stump surface. Ensure that the **Imazapyr 2SL** solution thoroughly wets the cambium area (the wood next to the bark) of the stump. The use of a surfactant or penetrating agent may improve uptake through partially callused cambiums. Applications can be made anytime during the year except during periods of heavy sap flow in the spring. **DO NOT** over apply causing puddling.

***Note:** Use water as a diluent only when temperatures are sufficient to prevent freezing or add the antifreeze (ethylene glycol) according to label directions to prevent freezing.

TREE INJECTION TREATMENTS

No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is directly injected into agricultural plants.

Mix 8.0 to 12.0 fluid ounces of **Imazapyr 2SL** in 1 gallon of water*. Using standard injection equipment, apply 1 ml. of **Imazapyr 2SL** solution at each injection site around the tree with no more than 1 inch intervals between cut edges. Ensure that the injector completely penetrates the bark at each site.

***Note:** Use water as a diluent only when temperatures are sufficient to prevent freezing or add antifreeze (ethylene glycol) according to label directions to prevent freezing.

FRILL OR GIRDLE TREATMENTS

Mix 8.0 to 12.0 fluid ounces of **Imazapyr 2SL** in 1 gallon of water*, spring oil or food/feed seed oil.

Using a hatchet, machete, or similar tool, make cuts through the bark and completely around the tree with no more than 2 inch intervals between cut edges. Spray or brush the **Imazapyr 2SL** solution into each cut until thoroughly wet.

***Note:** Use water as a diluent only when temperatures are sufficient to prevent freezing or add antifreeze (ethylene glycol) according to label directions to prevent freezing.

THINLINE BASAL AND STEM APPLICATIONS

Imazapyr 2SL may be applied as a thinline basal or arcing application to the stems of susceptible species such as big leaf maple (*Acer macrophyllum*), willow (*Salix* spp.) and Eucalyptus (*Eucalyptus* spp.) with a stem ground line diameter of 3 inches or less. Mix 24 to 48 ounces of **Imazapyr 2SL** in one gallon of diesel oil or penetrating oil. Maintain uniform mixtures with frequent agitation. Direct a thin line of the spray solution to the stems beginning a few feet from the ground and descending toward the base of the tree making a zig-zag motion. **DO NOT** over apply causing puddling.

LOW VOLUME BASAL BARK TREATMENTS

Mix 8.0 to 12.0 fluid ounces of **Imazapyr 2SL** in one gallon of spring oil or food/feed seed oil. To control mixed brush species with up to 4 inch stem diameter at breast height, spray to wet the lower 12 to 18 inches of the stem with the **Imazapyr 2SL** oil mixture (include the root collar area). **DO NOT** over apply causing dripping or puddling. Maintain uniform mixtures with frequent agitation.

LOW VOLUME FOLIAR APPLICATIONS

Imazapyr 2SL may be applied as a low volume foliar application. Mix 3 to 5% **Imazapyr 2SL** in water and adjuvant or in a penetrating oil. For small brush, spray down on the crown to cover approximately 70% of the plant foliage. For larger brush ensure coverage on as much of the crown as possible and spray at least two sides of the plant. **Imazapyr 2SL** may be tank mixed with other labeled herbicides. Use a tank mix of 3 to 5% **Imazapyr 2SL** plus 15 to 20% Garlon 4 in basal oil to control black locust, honey locust, hackberry, elms and other species listed on the manufacturer's labels. Use the higher rate of **Imazapyr 2SL** (5%) in areas containing sassafras, oak, hickory, cherry, and maples or in the southern 2/3 of the U.S. A tank mix of 3% **Imazapyr 2SL + Garlon® 4** or **Imazapyr 2SL** is effective in the Northeastern U.S.

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SPRAY SOLUTION MIXING GUIDE FOR LOW VOLUME FOLIAR APPLICATIONS

AMOUNT OF SPRAY SOLUTION BEING PREPARED	DESIRED CONCENTRATION (fluid volume)			
	Imazapyr 2SL		Garlon 4	
	3%	5%	15%	20%
1 gallon	3.8 oz	6.4 oz	19.2 oz	25.6 oz
3 gallons	11.5 oz	19.2 oz	57.6 oz	76.8 oz
4 gallons	15.4 oz	25.6 oz	76.8 oz	102.4 oz
5 gallons	19.2 oz	32.0 oz	96.0 oz	1.0 gallon
50 gallons	1.5 gallons	2.5 gallons	7.5 gallons	10.0 gallons
100 gallons	3.0 gallons	5.0 gallons	15.0 gallons	20.0 gallons

INVERT EMULSIONS

Imazapyr 2SL can be applied as an invert emulsion carrier. The carrier is a thick invert water-in-oil spray emulsion designed to minimize spray drift and spray run-off, resulting in more herbicide on the target foliage. The spray emulsion may be formed in a single tank (batch mixing) or injected (in-line mixing). Consult the invert chemical label for proper mixing directions. **DO NOT** exceed 3 quarts/Acre of **Imazapyr 2SL**.

WEEDS CONTROLLED

Imazapyr 2SL will provide postemergence control and some residual control of the following target vegetation species. Degree of control is both species and rate dependent.

GRASSES

The species of annual and perennial grasses controlled by **Imazapyr 2SL** include the following:

Annual bluegrass (<i>Poa annua</i>)	Junglerice (<i>Echinochloa colonum</i>)
Bahiagrass (<i>Paspalum notatum</i>)	Kentucky bluegrass (<i>Poa pratensis</i>)
Barnyardgrass (<i>Echinochloa crus-galli</i>)	Lovegrass (<i>Eragrostis</i> spp.)
Beardgrass (<i>Andropogon</i> spp.)	Orchardgrass (<i>Dactylis glomerata</i>)
Bermudagrass (<i>Cynodon dactylon</i>)	<i>Panicum</i> spp.
Big bluestem (<i>Andropogon gerardii</i>)	Paragrass (<i>Brachiaria mutica</i>)
Broadleaf Signalgrass (<i>Brachiaria platyphylla</i>)	Phragmites (<i>Phragmites australis</i>)
Canada bluegrass (<i>Poa compressa</i>)	*Pinegrass (<i>Calamagrostis rubescens</i>)
Cattail (<i>Typha</i> spp.)	Prairie cordgrass (<i>Spartina pectinata</i>)
Cheat (<i>Bromus secalinus</i>)	Prairie threeawn (<i>Aristida oligantha</i>)
Cogongrass (<i>Imperata cylindrical</i>) ¹	Quackgrass (<i>Agropyron repens</i>)
Crabgrass (<i>Digitaria</i> spp.)	Reed canary grass (<i>Phalaris arundinacea</i>)
Crowfootgrass (<i>Dactyloctenium aegyptium</i>)	Saltgrass (<i>Distichlis stricta</i>)
Dallisgrass (<i>Paspalum dilatatum</i>)	Sand dropseed (<i>Sporobolus cryptandrus</i>)
Downy brome (<i>Bromus tectorum</i>)	Sandbur (<i>Cenchrus</i> spp.)
Fall panicum (<i>Panicum dichotomiflorum</i>)	Smooth brome (<i>Bromus inermis</i>)
Feathertop (<i>Pennisetum villosum</i>)	Sprangletop (<i>Leptochloa</i> spp.)
Fescue (<i>Festuca</i> spp.)	Timothy (<i>Phleum pratense</i>)
Foxtail (<i>Setaria</i> spp.)	Torpedograss (<i>Panicum repens</i>)
Giant reed (<i>Arundo donax</i>)	Vaseygrass (<i>Paspalum urvillei</i>)
Goosegrass (<i>Eleusine indica</i>)	Wild barley (<i>Hordeum</i> spp.)
Guineagrass (<i>Panicum maximum</i>)	Wild oats (<i>Avena fatua</i>)
Italian ryegrass (<i>Lolium multiflorum</i>)	Wirestem muhly (<i>Muhlenbergia frondosa</i>)

Itchgrass (<i>Rottboellia exaltata</i>)	Witchgrass (<i>Panicum capillare</i>)
Johnsongrass (<i>Sorghum halepense</i>)	Woolly Cupgrass (<i>Eriochloa villosa</i>)

* **Imazapyr 2SL** is not registered for use on pinegrass in California.

¹ Use a minimum of 48 oz per acre.

BROADLEAF WEEDS

The species of annual and perennial broadleaf weeds controlled by **Imazapyr 2SL** include the following:

Arrowwood (<i>Pluchea sericea</i>)	Nettleleaf goosefoot (<i>Chenopodium murale</i>)
Broom snakeweed (<i>Gutierrezia sarothrae</i>)	Oxeye daisy (<i>Chrysanthemum leucanthemum</i>)
Bull Thistle (<i>Cirsium vulgare</i>)	Pepperweed (<i>Lepidium</i> spp.)
Burclover (<i>Medicago</i> spp.)	Pigweed (<i>Amaranthus</i> spp.)
Burdock (<i>Arctium</i> spp.)	Plantain (<i>Plantago</i> spp.)
Camphorweed (<i>Heterotheca subaxillaris</i>)	Pokeweed (<i>Phytolacca americana</i>)
Carolina geranium (<i>Geranium carolinianum</i>)	Primrose (<i>Oenothera kunthiana</i>)
Carpetweed (<i>Mullugo verticillata</i>)	Puncturevine (<i>Tribulus terrestris</i>)
Chickweed, mouseear (<i>Cerastium vulgatum</i>)	Purple loosestrife (<i>Lythrum salicaria</i>)
Clover (<i>Trifolium</i> spp.)	Purslane (<i>Portulaca</i> spp.)
Cocklebur (<i>Xanthium strumarium</i>)	Pusley, Florida (<i>Richardia scabra</i>)
Common chickweed (<i>Stellaria media</i>)	Rocket, London (<i>Sisymbrium irio</i>)
Common ragweed (<i>Ambrosia artemisiifolia</i>)	Rush skeletonweed (<i>Chondrilla juncea</i>)
Cudweed (<i>Gnaphalium</i> spp.)	Russian knapweed (<i>Centaurea repens</i>)
Dandelion (<i>Taraxacum officinale</i>)	Russian thistle (<i>Salsola kali</i>)
Desert camelthorn (<i>Alhagi pseudalhagi</i>)	Saltbrush (<i>Atriplex</i> spp.)
Diffuse knapweed (<i>Centaurea diffusa</i>)	Shepherd's purse (<i>Capsella bursa-pastoris</i>)
Dock (<i>Rumex</i> spp.)	Silverleaf nightshade (<i>Solanum elaeagnifolium</i>)
Dogfennel (<i>Eupatorium capillifolium</i>)	Smartweed (<i>Polygonum</i> spp.)
Fiddleneck (<i>Amsinckia intermedia</i>)	Sorrell (<i>Rumex</i> spp.)
Filaree (<i>Erodium</i> spp.)	Sowthistle (<i>Sonchus</i> spp.)
Fleabane (<i>Erigeron</i> spp.)	Spurge, annual (<i>Euphorbia</i> spp.)
Giant ragweed (<i>Ambrosia trifida</i>)	Stinging nettle (<i>Urtica dioica</i>)
Goldenrod (<i>Solidago</i> spp.)	Sunflower (<i>Helianthus</i> spp.)
Gray rabbitbrush (<i>Chrysothamnus nauseosus</i>)	Sweet clover (<i>Melilotus</i> spp.)
Henbit (<i>Lamium aplexicaule</i>)	Tansymustard (<i>Descurainia pinnata</i>)
Hoary vervain (<i>Verbena stricta</i>)	Texas thistle (<i>Cirsium texanum</i>)
Horseweed (<i>Conyza canadensis</i>)	Velvetleaf (<i>Abutilon theophrasti</i>)
Indian mustard (<i>Brassica juncea</i>)	Western ragweed (<i>Ambrosia psilostachya</i>)
Japanese bamboo/knotweed (<i>Polygonum cuspidatum</i>)	Wild carrot (<i>Daucus carota</i>)
Knotweed, prostrate (<i>Polygonum aviculare</i>)	Wild lettuce (<i>Lactuca</i> spp.)
Kochia (<i>Kochia scoparia</i>)	Wild parsnip (<i>Pastinaca sativa</i>)
Lambsquarters (<i>Chenopodium album</i>)	Wild turnip (<i>Brassica campestris</i>)
Little mallow (<i>Malva parviflora</i>)	Woollyleaf bursage (<i>Ambrosia grayi</i>)
Milkweed (<i>Asclepias</i> spp.)	Yellow starthistle (<i>Centaurea solstitialis</i>)
Miners lettuce (<i>Montia perfoliata</i>)	Yellow woodsorrel (<i>Oxalis stricta</i>)
Mullein (<i>Verbascum</i> spp.)	

VINES AND BRAMBLES

The species of vines and brambles controlled by **Imazapyr 2SL** include the following:

Field bindweed (<i>Convolvulus arvensis</i>)	Trumpetcreeper (<i>Campsis radicans</i>)
Hedge bindweed (<i>Calystegia sepium</i>)	Virginia creeper (<i>Parthenocissus quinquefolia</i>)
Honeysuckle (<i>Lonicera</i> spp.) ¹	Wild buckwheat (<i>Polygonum convolvulus</i>)

Morningglory (<i>Ipomoea</i> spp.)	Wild grape (<i>Vitis</i> spp.)
Poison ivy (<i>Rhus radicans</i>)	Wild rose (<i>Rosa</i> spp.) ¹
Redvine (<i>Brunnichia cirrhosa</i>)	Including Multiflora rose (<i>Rosa multiflora</i>) Macartney rose (<i>Rosa bracteata</i>)

¹Use higher labeled rates.

WOODY BRUSH AND TREES

The species of woody brush and trees controlled by **Imazapyr 2SL** include the following:

Aldus (<i>Alnus</i> spp.)	Huckleberry (<i>Gaylussacia</i> spp.)
American beech (<i>Fagus grandifolia</i>)	Lyonia spp. Including Fetterbush (<i>Lyonia lucida</i>) Staggerbush (<i>Lyonia mariana</i>)
Ash (<i>Fraxinus</i> spp.) ¹	Madrone (<i>Arbutus menziesii</i>)
Aspen (<i>Populus</i> spp.)	Manzanita, greenleaf (<i>Arctostaphylos patula</i>) ⁴
Australian pine (<i>Casuarina equisetifolia</i>) ⁵	Maple (<i>Acer</i> spp.)
Autumn olive (<i>Elaeagnus umbellata</i>)	Melaleuca (<i>Melaleuca quinquenervia</i>)
Bald cypress (<i>Taxodium distichum</i>) ⁴	Mulberry (<i>Morus</i> spp.) ^{1,3}
Bigleaf maple (<i>Acer macrophyllum</i>) ¹	Oak (<i>Quercus</i> spp.) ^{1,3}
Birch (<i>Betula</i> spp.)	Persimmon (<i>Diospyros virginiana</i>) ²
Black locust (<i>Robinia pseudoacacia</i>) ⁵	Poison oak (<i>Rhus diversiloba</i>)
Black oak (<i>Quercus kelloggii</i>)	Popcorn-tree (<i>Sapium sebiferum</i>)
Blackgum (<i>Nyssa sylvatica</i>) ²	Poplar (<i>Populus</i> spp.) ²
Boxelder (<i>Acer negundo</i>)	Privet (<i>Ligustrum vulgare</i>)
Brazilian peppertree (<i>Schinus terebinthifolius</i>)	Red alder (<i>Alnus rubra</i>)
Ceanothis (<i>Ceanothis</i> spp.)	Red maple (<i>Acer rubrum</i>)
Cherry (<i>Prunus</i> spp.) ^{1,2}	Saltcedar (<i>Tamarix pentandra</i>)
Chinaberry (<i>Melia azedarach</i>)	Sassafras (<i>Sassafras albidum</i>)
Chinese tallow-tree (<i>Sapium sebiferum</i>)	Scotch broom (<i>Cytisus scoparius</i>) ⁵
Chinquapin (<i>Castanopsis chrysophylla</i>) ⁴	Sourwood (<i>Oxydendrum arboretum</i>) ²
Cottonwood (<i>Populus</i> spp.)	Sumac (<i>Rhus</i> spp.)
Cypress (<i>Taxodium</i> spp.)	Sweetbay magnolia (<i>Magnolia virginiana</i>) ^{1,4}
Dogwood (<i>Cornus</i> spp.) ¹	Sweetgum (<i>Liquidambar styraciflua</i>)
Elderberry (<i>Sambucus</i> spp.) ⁵	Sycamore (<i>Platanus occidentalis</i>)
Elm (<i>Ulmus</i>) ⁵	Tanoak (<i>Lithocarpus densiflorus</i>) ^{1,4,5}
Eucalyptus (<i>Eucalyptus</i> spp.)	TiTi (<i>Cyrilla racemiflora</i>) ^{1,4,5}
Hawthorn (<i>Crataegus</i> spp.)	Tree of heaven (<i>Ailanthus altissima</i>)
Hazel (<i>Corylus comuta</i>) ⁵	Vaccinium spp. Including Blueberry (<i>Vaccinium</i> spp.) Sparkleberry (<i>Vaccinium arboretum</i>)
Hickory (<i>Carya</i> spp.) ¹	Waxmyrtle (<i>Myrica californica</i>) ^{1,4} (<i>Myrica cerifera</i>) ^{1,4}
Holly (<i>Ilex</i> spp.) ^{1,4} Including Gallberry (<i>Ilex glabra</i>) Tall gallberry (<i>Ilex coriacea</i>) Yaupon (<i>Ilex vomitoria</i>)	Willow (<i>Salix</i> spp.)
Honeylocust (<i>Gleditsia triacanthos</i>) ⁵	Yellow-poplar (<i>Liriodendron tulipifera</i>) ¹

¹ Use higher labeled rates.

² Best control with applications prior to formation of fall leaf color.

³ The degree of control may be species dependent.

⁴ Use an oil emulsion carrier.

⁵ Tank mix with **Garlon® 4** as a basal or cut stump treatment.

⁶ Suppression only.

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STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

PESTICIDE STORAGE: Do not store below 10°F.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on-site or at an approved waste disposal facility.

CONTAINER DISPOSAL:

[NONREFILLABLE CONTAINERS]: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying.

(Nonrefillable \leq 5 gallons): Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container $\frac{1}{4}$ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

(Nonrefillable $>$ 5 gallons): Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container $\frac{1}{4}$ full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

[REFILLABLE CONTAINERS]: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Steps to be taken in case material is released or spilled:

- Dike and contain the spill with inert material (sand, earth, etc.) and transfer liquid and solid diking material to separate containers for disposal.
- Remove contaminated clothing and wash affected skin areas with soap and water.
- Wash clothing before reuse.
- Keep the spill out of all sewers and open bodies of water.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

Tide International, USA, Inc. warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. This warranty does not extend to the use of this product contrary to label instructions, or under abnormal conditions or under conditions not reasonably foreseeable to or beyond the control of Seller or Tide International, USA,

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Inc., and Buyer and User assumes the risk of any such used. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, TIDE INTERNATIONAL, USA, INC. MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product in the event of ineffectiveness or other unintended consequences that may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of Tide International, USA, Inc. or Seller. To the extent consistent with applicable law, all such risks shall be assumed by Buyer and User, and Buyer and User agree to hold Tide International, USA, Inc. and Seller harmless for any claims relating to such factors.

To the extent consistent with applicable law, in no event shall Tide International, USA, Inc. or Seller be liable for any incidental, consequential, or special damages resulting from the use or handling of this product. **TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER AND BUYER, AND THE EXCLUSIVE LIABILITY OF TIDE INTERNATIONAL, USA, INC. AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT SHALL BE, AT THE ELECTION OF TIDE INTERNATIONAL, USA, INC. OR SELLER, THE REPLACEMENT OF THE PRODUCT, OR COMPENSATION LIMITED TO DAMAGES NOT EXCEEDING THE FAIR MARKET PURCHASE PRICE, AND SHALL NOT INCLUDE INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

Tide International, USA, Inc. and Seller offer this product, and Buyer and User accept it, subject to the foregoing conditions of sale and limitations of warranty and of liability, which may not be modified except by written agreement signed by the duly authorized representative of Tide International, USA, Inc.

Overdrive and Pendulum are registered trademarks of BASF.

AquaCap is a trademark of BASF.

Accord, Garlon and Tordon are registered trademarks of Dow AgroSciences LLC.

Campaign and Roundup are registered trademarks of Monsanto Technology LLC.

Embark is a registered trademark of PBI/Gordon Corporation.

Escort and Krenite are registered trademarks of E.I. DuPont de Nemours and Company.

Microfoil is a trademark of Rhone Poulenc Ag Company.

Thru-Valve is a trademark of Waldrum Specialties.

[EPA approval date]

66222-153

04/29/2008

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

APR 29 2008

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

Ms. Jane Rothwell
Makhteshim Agan of North America, Inc.
4515 Falls of Neuse Road, Suite 300
Raleigh, NC 27609

Subject: Triclopyr 4 Herbicide
EPA Registration No. 66222-153
Label amendment submitted February 8, 2008

Dear Ms. Rothwell:

The amended labeling referred to above is acceptable provided that you adhere to the following conditions:

1. Make all of the changes specified in the attached document "Summary of Comments on TRICOLOPYR BUTOXYETHYL ESTER TECHNICAL".
2. Submit final labeling within 30 days of the date on this letter.

This labeling supersedes all previously accepted labeling for this product except for supplemental labeling. A stamped copy of the label is enclosed for your records.

If you have any questions about this letter, you may call Tobi Colvin-Snyder at 703-305-7801.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Tompkins", written over a circular stamp.

Jim Tompkins
Product Manager 25
Herbicide Branch
Registration Division (7505P)

APR 29 2008

Under the Federal Insecticide,
Fungicide, and Rodenticide Act
as amended, for the pesticide
registered under EPA Reg. No.

66222-153

2/18

TRICLOPYR 4

A Herbicide for Control of Woody Plants, Annuals and Perennial Broadleaf Weeds in Forests, Grass Pastures, Rangeland, CRP acres, Rights-of-Way, and in Non-Crop Areas and Ornamental Turf, Industrial Sites and Non-irrigation ditch banks

ACTIVE INGREDIENT:	% BY WT.
*Triclopyr BEE: (3,5,6 Trichloro-2-Pyridinyl)oxyacetic acid, butoxyethyl ester.....	61.6%
OTHER INGREDIENTS:	38.4%
	TOTAL 100.0%

Contains petroleum distillates

*Contains 4 pounds of triclopyr acid equivalent per gallon (44.3%)

KEEP OUT OF REACH OF CHILDREN CAUTION

EPA Reg. No 66222-153

EPA Est. No. xxxxx

Manufactured for:
Makhteshim Agan of North America, Inc.
4515 Falls of Neuse Rd., Suite 300
Raleigh, NC 27609

NET CONTENTS: 2 ½ GALLONS

FIRST AID	
IF ON SKIN OR CLOTHING:	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
IF SWALLOWED:	<ul style="list-style-type: none"> • Immediately call a poison control center or doctor. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give any liquid to the person. • Do not give anything by mouth to an unconscious person.
IF INHALED:	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth if possible. • Call a poison control center or doctor for further treatment advice.
IF IN EYES:	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact Prozar at 1-877-250-9291 for emergency medical treatment information.	
NOTE TO PHYSICIAN	
Contains petroleum distillate. Vomiting may cause aspiration pneumonia.	

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Causes moderate eye irritation. Harmful if absorbed through skin, inhaled, or swallowed. Avoid contact with skin, eyes, or clothing. Avoid breathing vapor or spray mist. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selection chart.

Applicators and other handlers who handle this pesticide for any use covered by the Worker Protection Standard (40 CFR Part 170), in general, agricultural-plant uses are covered, must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as barrier laminate, nitrile rubber, neoprene rubber, or Viton
- Shoes plus socks

Applicators and other handlers who handle this pesticide for any use NOT covered by the Worker Protection Standard (40 CFR Part 170), in general, only agricultural-plant uses are covered by the WPS, must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables are given, use detergent and hot water. Keep and wash PPE separately from other laundry.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

PHYSICAL OR CHEMICAL HAZARDS

Do not use or store near heat or open flame. Do not cut or weld container.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval (REI). The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as barrier laminate, nitrile rubber, neoprene rubber, or viton
- Shoes plus socks

NON AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forest, nurseries, or greenhouses.

Do not enter or allow others to enter the treated area until sprays have dried.

GENERAL INFORMATION

Triclopyr 4 is an herbicide used to control unwanted woody plants and annual and perennial broadleaf weeds

- in forests
- on permanent grass pastures, rangelands, and conservation reserve program (CRP) acres (including non-irrigation ditch banks and fence rows within these areas)
- on non-crop areas including industrial manufacturing and storage sites
- on rights-of-way such as electrical power lines, communication lines, pipelines, roadsides, and railroads
- on fence rows
- on non-irrigation ditch banks
- around farm buildings
- on perennial bluegrass, perennial ryegrass, and tall fescue ornamental turf (including sod farms, ~~home lawns~~, commercial turf, and golf courses)

Triclopyr 4 use on these sites may include application to grazed areas as well as for the establishment and maintenance of wildlife openings.

GENERAL USE PRECAUTIONS

- **Agricultural Use Requirements for Forestry Uses:** For use of this product on forestry sites, follow the Personal Protective Equipment (PPE) and Reentry Interval (REI) restrictions in the AGRICULTURAL USE REQUIREMENTS section of this label
- **Use Requirements for Non-Cropland Areas:** No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is applied to non-cropland.
- **In Arizona:** The state of Arizona has not approved Triclopyr 4 for use on plants grown for commercial production; specifically on designated grazing areas or for use on sod farms.
- Local conditions may affect the use of herbicides. Consult your local specialist for advice in selecting treatments from this label to best fit local conditions.
- Triclopyr 4 may injure certain turfgrass species. Do not apply to bahiagrass, bentgrass, bermudagrass, centipedegrass, St. Augustine grass, or zoysiagrass, unless turf injury can be tolerated.
- Do not apply Triclopyr 4 to exposed roots of shallow rooted trees and shrubs.
- Do not apply Triclopyr 4 to golf course greens.
- Do not apply more than 2 quarts of Triclopyr 4 per acre in a single application when spot treating.
- Do not apply this product through any type of irrigation system.
- Do not apply to ditches used to transport irrigation water. Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result.
- It is permissible to treat non-irrigation ditch banks, seasonably dry wetlands, flood plains, deltas, marshes, swamps, bogs and transitional areas between upland and lowland sites. Do not apply to open water such as lakes, reservoirs, rivers, streams, creeks, salt water bays, or estuaries.
- Do not apply this product through mist blowers unless a drift control additive, high viscosity inverting system, or equivalent is used to control spray drift.
- Avoid direct application to Christmas trees as conifer injury may result. When treating unwanted vegetation in Christmas tree plantations, use sprays directed away from conifers.
- Do not make direct applications of Triclopyr 4 or allow spray mists containing Triclopyr 4 to drift onto cotton, fruit or orchard trees, shrubs, grapes, peanuts, soybeans, tobacco, vegetable crops, flowers, citrus, or other desirable broadleaf plants.
- Many forbs (herbaceous broadleaves) are susceptible to Triclopyr 4. Unless injury or loss of such plants can be tolerated, do not spray pastures containing desirable broadleaf forbs (especially legumes such as clover). After applications the stand and growth of established grasses is usually improved, however, especially when rainfall is adequate and grazing is deferred.
- While established grasses are tolerant to this product, newly seeded grasses may be injured until well established (as indicated by vigorous growth, tillering and the development of a secondary root system). Do not reseed treated areas for a minimum of three weeks after treatment.
- While Triclopyr 4 is formulated as a low volatile ester, the combination of spray contact with impervious surfaces (such as roads and rocks) and increasing ambient air temperatures may result in an increase in the volatility potential for this herbicide, increasing a risk for off-target injury to sensitive crops such as grapes and tomatoes.



- Portions of grazed areas of non-crop land and forestry sites that are located adjacent to non-grazed use sites may be treated at the application rate for the non-grazed area so long as the grazed area treated at this rate comprises no more than 10% of the total grazable area at that site.
- On use sites other than grazable areas and forestry sites, do not apply more than 8 lbs. per acre per year of triclopyr (8 qts. per acre per year Triclopyr 4).
- On use sites that may be grazed, including rights-of-way, pasture, fence rows, and rangeland, do not apply more than 2 lbs. active ingredient per acre per year of triclopyr (2 quarts per acre per year of Triclopyr 4).
- On forestry use sites, do not apply more than 6 lbs. active ingredient per acre per year of triclopyr (6 quarts per acre per year of Triclopyr 4).

GRAZING AND HAYING RESTRICTIONS

Grazing or harvesting green forage:

Lactating dairy animals:

- Two quarts per acre or less: Do not graze or harvest green forage from treated area for 14 days after treatment.
- Greater than 2 to 6 quarts per acre: Do not graze or harvest green forage until the next growing season.

Other livestock:

- Two quarts per acre or less: No grazing restrictions.
- Greater than 2 to 6 quarts per acre: Do not graze or harvest green forage from treated areas for 14 days after treatment. Note: there is no grazing restriction if less than 25% of a grazed area is treated.

Haying (harvesting of dried forage)

Lactating dairy animals:

- Do not harvest hay until the next growing season.

Other livestock:

- Two quarts per acre or less: Do not harvest for 7 days after treatment.
- Greater than 2 to 4 quarts per acre: Do not harvest hay for 14 days after treatment.
- Greater than 4 quarts per acre: Do not harvest hay until the next growing season.

Slaughter Restrictions:

Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.

APPLICATION DIRECTIONS RATES

This table assists in determining proper volumes of Triclopyr 4 in the spray tank to avoid exceeding the maximum use rates listed:

Maximum Application Rates

Spray Volume Per Acre	Triclopyr 4		
	Quarts per 100 gallons of spray volume		
	2 quart/acre	6 quarts/acre	8 quarts/acre
400	Do not use	1.5	2
300	Do not use	2	2.7
200	Do not use	3	4
100	2	6	8
50	4	12	16
20	10	30	40
10	20	60	80

SPRAY ADDITIVES

Surfactants-If a standard agricultural surfactant is used, use at a rate of 1 to 2 quarts per acre.
Drift Control Agents-Agriculturally registered spray thickening drift control agents or high viscosity invert systems may be used with Triclopyr 4. When using these agents, follow all use directions and precautions on the product label. Do not use a thickening agent with the Microfoil boom, Thru Valve boom, or other systems that cannot accommodate thick sprays.

MIXING DIRECTIONS

Apply Triclopyr 4 foliarly by diluting with water or as an oil-water emulsion. NOTE: An oil-water emulsion performs more dependably under a broader range of conditions than a straight water dilution for woody plant control and is recommended for aerial applications.

Oil-Water Emulsions

NOTE: Prior to preparing oil-water emulsion sprays in the mixing tank, conduct a jar test to check spray mix compatibility.

Prepare the oil-water emulsion using diesel fuel, fuel oil, or kerosene plus and emulsifier such as Sponto 712 or Triton X-100.

- **Ground Application:** Add oil at a rate of 5 to 10% of the total to the spray mix (up to a maximum of 1 gallon of oil per acre) and use an agricultural spray emulsifier according to mixing instructions below.
- **Aerial Application:** Add a 1:5 ratio of oil and water (1 part oil to 5 parts water) to the spray mixture (up to a maximum of 1 gallon of oil per acre) according to the mixing instructions below.

Oil Mixture Sprays for Basal Treatment

When preparing an oil mixture, be sure to read and follow the use directions and precautions on the manufacturer's product label. Prepare oil-based spray mixtures using either diesel fuel, No. 1 or No. 2 fuel oil, kerosene or a commercially available basal oil. Substitute other oils or diluents only as recommended by the oil or diluent's manufacturer. Add Triclopyr 4 to the required amount of oil in the spray tank or mixing tank and mix thoroughly. Reagitate if the mixture stands for over 4 hours.

Water Dilutions

To provide improved wetting of foliage using water dilutions, an agricultural surfactant at the manufacturer's recommended rate may be added to the spray mixture. To help minimize spray drift, a drift control and deposition aid cleared for application to growing crops is recommended.

Tank Mixing

Triclopyr 4 may be applied in combination with labeled rates of other herbicides provided:

- The tank mix product(s) are labeled for the timing and method of application for the use site to be treated; and,
- Tank mixing is not prohibited by the label of the tank mix product(s).

NOTE: The following compatibility test (jar test) should be conducted prior to mixing ingredients in the spray tank when tank mixing Triclopyr 4 with other materials:

1. Use a clear glass quart jar with lid and mix the tank mix ingredients in the required order and their relative proportions.
2. Invert the jar containing the mixture several times and observe the mixture for approximately ½ hour.
3. If the mixture balls-up, forms flakes, sludges, jells, oily films or layers, or other precipitates, it is not compatible and the tank mix combination should not be used.

Mixing Order for Tank Mixes: Add one-half of the needed water to the mixing tank and begin agitation. Add the tank mix partners in the order indicated below, allowing time for complete dispersion and mixing after the addition of each product.

1. Water soluble herbicide (if used)
2. Premix of oil, emulsifier, Triclopyr 4 and other oil-soluble herbicide (if used); see below

Add the remaining water. During the final filling of the tank, a drift control and deposition aid cleared for application to growing crops may be added, as well as an agricultural surfactant if a water dilution rather than an oil-water emulsion spray is used. To ensure spray uniformity, maintain continuous agitation of the spray mixture during mixing, final filling and throughout application.

Premixing: Prepare a premix of oil, emulsifier (if oil-water emulsion), and Triclopyr 4 plus other oil-soluble herbicides if used (for example 2,4-D ester). **Note:** Do not allow water or mixtures containing water to get into the premix or Triclopyr 4 since a thick "invert" (water in oil) emulsion may form that will be difficult to break. An emulsion may also be formed if the premix or Triclopyr 4 is put into the mixing tank prior to the addition of water.

Tank Mixing Precautions:

- Read carefully and follow all applicable use directions, limitations and precautions in the respective product labels.
- Do not exceed recommended application rates. If products containing the same active ingredient are tank mixed, do not exceed the maximum allowable active ingredient use rates.
- When using spray equipment where the product formulations will be mixed in undiluted form (such as direct injection), special care should be taken to ensure tank mix compatibility.

Mixing with Liquid Fertilizer for Broadleaf Weed Control

For weed control and fertilization of grass pastures, Triclopyr 4 may be tank mixed with liquid nitrogen fertilizer and applied foliarly. Use Triclopyr 4 according to the recommendations in this label for grass pastures, and apply at the rates recommended by your supplier or Extension Service Specialist. **Note:** Because foliage burn caused

by liquid fertilizer may reduce herbicide effectiveness on woody plants, Triclopyr 4 is not recommended for use with liquid fertilizer on woody plants (brush).

Test for mixing compatibility using the desired procedure and spray mix proportions in clear glass jar before mixing in spray tank. A compatibility aid such as Unite or Compex may be needed in some situations, and in difficult situations premixing Triclopyr 4 with 1 to 4 parts water may help. **NOTE: Compatibility is best with straight liquid nitrogen fertilizer solutions. Mixing with N-P-K solutions or suspensions may not be satisfactory even with the addition of a compatibility aid.**

Fill the spray tank approximately half full with the liquid fertilizer, then begin agitating and add the herbicide. Complete filling the tank with fertilizer and apply immediately maintaining continuous agitation in the spray tank during application. **Do not store liquid fertilizer spray mixtures.** Because the likelihood of mixing or compatibility problems with liquid fertilizer increases under cold conditions, application during very cold weather (near freezing) is not recommended.

Note: Do not use spray equipment for other applications to land planted (or to be planted) to susceptible crops or desirable plants **unless** it has been determined that all phytotoxic herbicide residue has been removed by thoroughly cleaning the equipment.

APPLICATION EQUIPMENT AND TECHNIQUES

Avoid drift. Very small quantities of spray may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible desirable vegetation. The applicator may detect the potential for drift by producing smoke at or near the spray site and observing for a temperature inversion or for potential of off-site movement. If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

Broadcast Applications

Triclopyr 4 may be applied aurally by fixed wing aircraft or helicopter to rangeland, permanent grass pastures, and conservation reserve program acres. For all other use sites listed on this label, Triclopyr 4 may only be applied aurally by helicopter

For aerial application to rangeland, permanent grass pastures, and conservation reserve program acres:

Air (Fixed wing aircraft or Helicopter)-For aerial applications to rangeland, permanent grass pastures, and conservation reserve program acres, apply Triclopyr 4 through a Microfoil or Thru-Valve boom, or use an agriculturally labeled drift control additive. Do not use a thickening agent with the Microfoil or Thru-Valve booms, or other systems that cannot accommodate thick sprays. Keep spray pressures low enough to provide coarse spray droplets and spray only when the wind velocity is low (follow state regulations). Avoid application during air inversions.

Air (Helicopter Only)-When making aerial applications on rights-of-way or other areas near susceptible crops, efforts should be made to minimize drift. Applications should be made with nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles. Drift can be minimized by applying through the Microfoil boom or Thru-Valve boom. Drift control agents or high viscosity invert systems can also be used to minimize drift. Do not use the high viscosity invert system unless it is as effective as the booms listed or as effective as available drift control agents. Use of low pressure nozzles; and operating these nozzles in the lower end of the manufacturer's recommendations is advised. To minimize drift, use a spray boom that is no longer than $\frac{3}{4}$ the rotor length, spray when wind velocities are low; or by using an approved drift control system.

Note: Reference within this label to equipment produced by or available from other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by Nations Ag II is not intended as an endorsement of such equipment, shall not constitute a warranty (express or implied) of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than is advised in directions available from the equipment's manufacturer. The reader is responsible for exercising their own judgment and expertise, or consulting with sources other than Nations Ag II, in selecting and determining how to use its equipment.

SPRAY DRIFT MANAGEMENT

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outer most nozzles on the boom must not exceed $\frac{3}{4}$ the length of the wingspan or rotor.
2. Nozzles must always point backwards parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they ~~should~~ be observed.

The applicator should be familiar with and take into account the information covered in the AERIAL DRIFT REDUCTION ADVISORY section of this label. [This section is advisory in nature and does not supersede the mandatory label requirements]

**AERIAL DRIFT REDUCTION ADVISORY
INFORMATION ON DROPLET SIZE**

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (See Wind, Temperature and Humidity, and Temperature Inversions).

CONTROLLING DROPLET SIZE

- Volume – Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure – Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- Number of nozzles – Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation – Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- Nozzle Type – Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

BOOM LENGTH

For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

APPLICATION HEIGHT

Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

SWATH ADJUSTMENT

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller drops, etc.)

WIND

Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

TEMPERATURE INVERSIONS

Applications should not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small-suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

SENSITIVE AREAS

The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

Ground-Applications should be made with nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles. Large droplet producing equipment, such as the Radiarc sprayer

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may aid in reducing off-target drift. Drift control agents or high viscosity invert systems can also be used to minimize drift. Use of low pressure nozzles; and operating these nozzles in the lower end of the manufacturer's recommendations is advised. To minimize drift, keep the spray boom as low as possible, apply in ≥ 20 gallons of spray volume per acre, spray when wind velocities are low; or use an approved drift control agent.

High Volume Leaf-Stem Treatments: Make applications no higher than brush tops with low pressure and coarse spray droplets to minimize spray drift. A drift control agent may be used to reduce spray drift.

APPLICATION DIRECTIONS FOR RIGHTS-OF-WAY, INDUSTRIAL SITES, NON-CROP AREAS, NON-IRRIGATION DITCH BANKS, FORESTS, AND WILDLIFE OPENINGS INCLUDING GRAZED AREAS ON THESE SITES

Refer to Tables 1 and 2 of this label for a list of woody plants and broadleaf weeds that are controlled by Triclopyr 4.

Foliar Applications

Apply Triclopyr 4 at rates of 1 to 8 quarts per acre for the control of broadleaf weeds and woody plants. Apply in enough water to provide uniform and complete coverage of the plants to be controlled. For best results make applications when woody plants and weeds are actively growing. Use higher doses within the range when brush averages 15 feet or more in height or when brush covers $> 60\%$ of the area to be treated.

For hard-to-control species such as ash, black gum, choke cherry, elm, maples (other than vine or big leaf), oaks, pines, or winged elm; during late summer applications when plants are mature; or during drought; use higher rates of Triclopyr 4 alone or use in combination with Tordon* 101 Mixture or Tordon* or Picloram K. If lower rates are used on hard-to-control species, re-sprouting may occur in the year following treatment.

If easy to control brush species dominate, rates less than those recommended may be effective. Consult state or local extension personnel for information.

When making applications of Triclopyr 4 in a tank mix with 2,4-D low volatile ester herbicide, use higher rates of Triclopyr 4 within the range for satisfactory brush control.

When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Foliar Applications with Ground Equipment

High Volume Foliar Applications

For control of woody plants, apply Triclopyr 4 at 1 to 3 quarts per 100 gallons of spray mixture. Coverage should be thorough to wet all leaves, stems, and root collars. See Table in RATES section for relationship between mixing rate, spray volume and maximum application rate.

Tank Mixing: 1 to 3 quarts of Triclopyr 4 may be tank mixed with labeled rates of 2,4-D low volatile ester herbicide, Tordon* or Picloram K, or Tordon* 101 Mixture diluted to make 100 gallons of spray. These applications should be made in 100 to 400 gallons of total spray per acre depending on size and density of woody plants. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Low Volume Foliar Applications

For control of woody plants, mix up to 20 quarts of Triclopyr 4 in 10 to 100 gallons of spray solution. Adjust the spray concentration of Triclopyr 4 and total spray volume per acre to match the size and density of target woody plants and kinds of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars. For best results, a surfactant should be added to all spray mixtures. See the SPRAY ADDITIVES section for a rate recommendation.

Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a truck mounted spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 PSI may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush. See Table in RATES section for relationship between mixing rate, spray volume and maximum application rate.

Tank Mixing: Up to 12 quarts of Triclopyr 4 may be applied in tank mix combinations with labeled rates of Tordon* or Picloram K, or Tordon* 101 Mixture as a low volume foliar spray. These applications should be made in 10 to 100 gallons of spray solution. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Broadcast Application with Ground Equipment

Use equipment that will assure thorough and uniform coverage at spray volumes applied.

Woody Plant Control

Foliage Treatment-Apply 4 to 8 quarts of Triclopyr 4 in a minimum of 5 gallons of spray solution per acre. Triclopyr 4 at 1.5 to 3 quarts per acre may be tank mixed with labeled rates of 2,4-D low volatile ester, Tordon*

101 Mixture, or Tordon* or Picloram K in a minimum of 5 gallons of spray solution per acre. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Broadleaf Weed Control

Apply 1 to 4 quarts of Triclopyr 4 in a minimum of 5 gallons of spray solution per acre. Apply at any time weeds are actively growing. Triclopyr 4 at 0.25 to 3 quarts per acre may be tank mixed with labeled rates of 2,4-D amine or low volatile ester; Tordon* or Picloram K; or Tordon* 101 Mixture to improve the spectrum of activity. For thickened (high viscosity) spray mixtures, Triclopyr 4 can be mixed with diesel oil or other inverting agent. When using an inverting agent, read and follow the use directions and precautions on the product label. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Aerial Application (Helicopter Only)-Aerial sprays should be applied using suitable drift control. See the SPRAY ADDITIVES and the APPLICATION EQUIPMENT AND TECHNIQUES section.

Foliage Treatment (Utility and Pipeline Rights-of-Way)-Apply 4 to 8 quarts of Triclopyr 4 alone per acre or tank mix 3 to 4 quarts per acre of Triclopyr 4 with labeled rates of 2,4-D low volatile ester; Tordon* 101 Mixture; or Tordon* or Picloram K. Apply in total spray volume of 10 to 30 gallons per acre. Do not apply more than 2 quarts per acre of Triclopyr 4 alone or in tank mix to areas that may be grazed unless the requirements specified in the General Use Restrictions section are followed. Use the higher rates and volumes when plants are dense or under drought conditions. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Basal Bark and Dormant Brush Treatments

To control woody plants in rights-of-way, in other non-crop areas, forests, rangeland and permanent grass pastures; use Triclopyr 4 in oil or oil-water mixtures prepared and applied as described in the "Mixing Directions-Oil Mixture Sprays for Basal Treatment" section of this label. Do not graze treated areas following use of oil or oil-water mixtures. For non-foliar applications on rangeland and permanent grass pastures, apply no more than 2 quarts of Triclopyr 4 (2 lb. ae of triclopyr) per acre per year.

Oil Mixture Sprays-Add Triclopyr 4 to the required amount of oil in the spray tank or mixing tank and mix thoroughly. If the mixture is allowed to stand for more than 4 hours, agitation is required.

Oil-Water Mixture Sprays-Prepare a premix of Triclopyr 4, oil, and surfactant in a separate container. Do not allow any water or mixtures containing water to get into the Triclopyr 4 or the premix. Mix in spray tank as follows:

1. Fill spray tank 1/2 full with water.
2. Begin tank agitation and continue throughout mixing and spraying.
3. Add premix
4. Continue moderate agitation.
5. Fill remainder of spray tank.

Note: If the premix is put in the tank without any water, the first water added may form a thick "invert" (water in oil) emulsion which will be hard to break.

Oil-Water Mixtures of Triclopyr 4 and Tordon* or Picloram K: When mixed together in oil, these herbicides are incompatible and will not form a stable mixture. Stable tank mixtures of Triclopyr 4 and Tordon* or Picloram K for basal bark application can be made if each product is first combined with a compatibility agent prior to final mixing in oil in the desired ratio. (See product bulletin for mixing instructions.)

Basal Bark Treatment-To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 1 to 5 gallons of Triclopyr 4 in enough oil to make 100 gallons of spray solution. Apply with knapsack sprayer or power spraying equipment using low pressure (20-40 PSI). Spray the basal parts of brush and tree trunks to a height of 12 to 15 inches from the ground. Thorough wetting is necessary for good control. Spray until runoff at the ground line is noticeable. Old or rough bark requires more spray than smooth young bark. Apply at any time, including the winter months, except when snow or water prevents spraying to the ground line.

Low Volume Basal Bark Treatment-To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Triclopyr 4 in enough oil to make 100 gallons of spray solution. Apply with a back pack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Spray the basal parts of brush and tree trunks in a manner which thoroughly wets the lower stems, including the root collar area, but not to the point of runoff. Herbicide concentration should vary with size and susceptibility of species treated. Apply at any time, including the winter months, except when snow or water prevents spraying to the ground line or when stem surfaces are saturated with water.

Triclopyr 4 Plus Tordon* or Picloram K in Oil Tank Mix-Triclopyr 4 and Tordon* or Picloram K may be applied as a low volume basal bark treatment to improve control of certain woody species such as ash, elm, maple, poplar, aspen, hackberry, oak, oceanspray, birch, hickory, pine, tanoak, cherry, locust, sassafras, and multiflora rose. (See product bulletin for mixing instructions.)

Streamline Basal Bark Treatment-To control or suppress susceptible woody plants, mix 20 to 30 gallons of Triclopyr 4 with 10% penetrant such as Cide-Kick or similar penetrant in enough oil to make 100 gallons of spray solution. Apply with a backpack or knapsack sprayer using equipment which provides a directed straight stream spray. For stems less than 3 inches in basal diameter, apply sufficient spray to one side of the stems to form a treated zone that is 6 inches in height. When the optimum amount of spray mixture is applied, the treated zone should widen to encircle the stem within approximately 30 minutes.

Treat both sides of stems which are 3 to 4 inches in basal diameter. Direct the spray at bark that is approximately 12 to 24 inches above the ground. Pines (loblolly, slash, shortleaf, and Virginia) up to 2 inches in diameter breast height (dbh) can be controlled by directing the spray at a point approximately 4 feet above ground. Vary spray mixture concentration with size and susceptibility of the species being treated.

Best results are achieved when applications are made to young vigorously growing stems which have not developed the thicker bark characteristic of slower growing, under-story trees in older stands. This technique is not recommended for scrub and live oak species, including blackjack, turkey, post, live, bluejack and laurel oaks, or bigleaf maple. Apply from approximately 6 weeks prior to hardwood leaf expansion in the spring until approximately 2 months after leaf expansion is completed. Do not apply when snow or water prevent spraying at the desired height above ground level.

Low Volume Stem Bark Band Treatment (North Central and Lake States)-To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Triclopyr 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Apply the spray in a 6 to 10 inch wide band that completely encircles the stem. Spray in a manner that completely wets the bark, but not to the point of runoff. The treatment band may be positioned at any height up to the first major branch. For best results apply the band as low as possible. Spray mixture concentration should vary with size and susceptibility of species to be treated. Applications may be made at any time, including winter months.

Thinline Basal Bark Treatment-To control susceptible woody plants with stems less than 6 inches in diameter, apply Triclopyr 4 either undiluted or mixed at 50-75% v/v with oil in a thin stream to all sides of the lower stems. The stream should be directed horizontally to apply a narrow band around each stem or clump. Use a minimum of 2 to 15 milliliters of Triclopyr 4 or oil mixture with Triclopyr 4 to treat single stems and from 25 to 100 milliliters to treat clumps of stems. Use an applicator metered or calibrated to deliver the small amounts required.

Dormant Stem Treatment-Dormant stem treatments can be used to control susceptible woody plants and vines with < 2 inch diameter stems. Plants with > 2 inch diameter stems may not be controlled and resprouting may occur. This application method works best in dense areas with small diameter brush. Dormant stem treatments of Triclopyr 4 can also be used as a chemical side-trim to control lateral branches of larger trees that encroach onto roadside, utility, or other rights-of-way.

Mix 3 to 8 quarts of Triclopyr 4 in 2 to 3 gallons of crop oil concentrate or other recommended oil. Add this mixture to enough water to make 100 gallons of spray solution. Use continuous agitation to maintain mix. Apply in 70 to 100 gallons per acre with Radiarc, OC or equivalent nozzles, or handgun to ensure uniform stem coverage. In western states, apply anytime after woody plants are dormant. In other areas, apply anytime within 10 weeks of bud break, generally February through April. Do not apply to wet or saturated bark as poor control may result.

For improved control of black cherry, mix Triclopyr 4 with 4 quarts of Weedone 170 herbicide. When tank mixing, refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

For root suckering species such as sumac, sassafras and locust, also spray the ground under the plant to cover small root suckers which may not be visible above the soil surface.

Cut Stump Treatment

Resprouting of cut stumps of susceptible species can be controlled by mixing 20 to 30 gallons of Triclopyr 4 in enough oil to make 100 gallons of spray solution. Apply at low pressure with a backpack or knapsack sprayer; using either solid cone or flat fan nozzles. Apply to the root collar area, sides of the stump, and the outer portion of the cut surface including cambium. The treated area should be thoroughly wet, but do not apply to the point of runoff. Vary spray mixture concentration according to size and susceptibility of treated species. Applications can be made at any time of the year, including in winter months. Do not apply when snow or water prevent application to the ground line.

Cut Stump Treatment in Western States

Resprouting of cut stumps of salt-cedar and other *Tamarix* spp, bigleaf maple, tanoak, Oregon myrtle, and other susceptible species can be controlled by treating the cambium and adjacent wood around the circumference of the cut stump to wet. Applications may be made at any time during the year, however, reduced control may occur during periods of moisture stress as can occur in late summer. Use an applicator which can be calibrated to deliver small amounts.

Note: All basal bark and dormant brush treatments may be used on grazed range and permanent pasture land provided that no more than 2 quarts/acre/year of Triclopyr 4 is applied. Large plants or species requiring higher rates of Triclopyr may not be completely controlled. See the GENERAL USE PRECAUTIONS section for grazing restrictions.

Chemical Mowing on Non-Cropland Sites Infested with Annual and Perennial Broadleaf Weeds or Woody Plants

To control of annual and perennial broadleaf weeds and for suppression and stem density reduction of woody plants that occur on rights-of-way, airport grounds, petroleum tank farms or other industrial sites, Triclopyr 4 may be applied to the cut surfaces of weed or brush stubble under the deck of a rotary mower such as the Lucas "64" System or other approved equipment that is designed to uniformly apply the herbicide. Apply when growing conditions are favorable and the weeds are actively growing.

Broadleaf Weed Control: Using a minimum spray volume of 3 gallons per acre, apply the rate recommended in the "Broadcast Applications with Ground Equipment – Broadleaf Weed Control" section of this label. To improve weed control or broaden the spectrum of weeds controlled, follow the label recommendations for herbicides that may be applied in tank mix combination with Triclopyr 4.

Woody Plant Control: For suppressing and reducing stem density of woody species, use 3 to 6 quarts of Triclopyr 4 in a minimum spray volume of 5 gallons per acre. To improve woody plant control or broaden the spectrum of woody plants controlled, follow label recommendations for herbicides that may be applied in tank mix combination with Triclopyr 4.

Forest Management Applications

For broadcast applications, apply the recommended rate of Triclopyr 4 in a total of 5 to 25 gallons per acre by air or in 10 to 100 gallons per acre by ground. Use sufficient spray volumes to provide thorough coverage of treated foliage. Use application systems designed to prevent spray drift to off-target sites. Nozzles or additives used for drift minimization that produce larger droplets may require higher spray volumes to provide adequate plant coverage.

Conifer Plant Back Interval – Conifer injury may occur if conifers are planted sooner than 1 month after Triclopyr 4 treatments at rates up to 4 quarts per acre; or if conifers are planted sooner than 2 months after treatment with rates of 4 to 8 quarts per acre. When herbicide tank mixtures are used for forest site preparation, use the longest plant back waiting period recommended on any tank mix partner.

Forest Site Preparation (Not For Conifer Release)

Broadcast Applications in Southern States (Alabama, Arkansas, Delaware, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia) - To control susceptible woody plants and broadleaf weeds, apply 4 to 8 quarts per acre of Triclopyr 4. Triclopyr 4 may be applied at a rate of 2 to 4 quarts per acre in a tank mix combination with labeled rates of Tordon* 101 Mixture or Picloram K or Picloram K to broaden the spectrum of woody plants and broadleaf weeds controlled. Tordon* 101 Mixture and Tordon* or Picloram K are not registered for use in California and Florida. For grass control, Triclopyr 4, alone or in combination with Tordon* or Picloram K or Tordon* 101 Mixture, may be tank mixed with other herbicides registered for grass control in forests.

Refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Broadcast Applications in All Other States (Except those listed as Southern States) - To control susceptible woody plants and broadleaf weeds, apply 3 to 6 quarts per acre of Triclopyr 4. Triclopyr 4 may be applied at a rate of 1.5 to 3 quarts per acre in a tank mix combination with labeled rates of Tordon* 101 Mixture, Tordon* or Picloram K, or 2,4-D low volatile ester to broaden the spectrum of woody plants and broadleaf weeds controlled. Tordon* 101 Mixture and Tordon* or Picloram K are not registered for use in California and Florida. For grass control, Triclopyr 4, alone or in combination with Tordon* or Picloram K or Tordon* 101 Mixture, may be tank mixed with other herbicides registered for grass control in forests.

Refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Site Preparation in Southern Coastal Flatwoods - To control susceptible broadleaf weeds and woody species such as gallberry and wax-myrtle, and for partial control of saw-palmetto, apply 2 to 4 quarts per acre of Triclopyr 4. To control species such as fetterbush, staggerbush, titi, and grasses, apply Triclopyr 4 at 2 to 3 quarts per acre in a tank mix combination with labeled rates of Arsenal Applicator's Concentrate or Imazapyr 4SL herbicide. To control gallberry, wax-myrtle, broadleaf weeds, and grasses, 2 to 3 quarts per acre of Triclopyr 4 may be applied in tank mix combination with labeled rates of Glyphosate 4 herbicide.

Apply as broadcast applications during site preparation of flat planted or bedded sites; or as bands over the tops of beds on bedded sites. Best results will occur if applications are made in late summer or fall. Efficacy may not be satisfactory for early season applications made prior to August.

Note: Do not apply after planting pines.

Conifer Release Applications

Note: Conifer release applications may cause temporary damage and growth suppression of conifers where direct contact occurs; however, injured conifers should recover and grow normally. Over-the-top spray applications can kill pines.

Directed Sprays

To release conifers from competing hardwoods and brush such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, hickory, alder, birch, aspen, pin cherry, *Ceanothus* spp, blackberry, chinquapin, and poison oak, mix 4 to 20 quarts of Triclopyr 4 in enough water to make 100 gallons of spray mixture. Direct the spray onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent. Make applications any time after the hardwoods and brush have reached full leaf size, but before autumn coloration. The majority of treated hardwoods and brush should be less than 6 feet in height to ensure adequate spray coverage. Care should be taken to direct the spray solution away from conifer foliage, particularly foliage of desirable pines. See the **RATES** Table in the **APPLICATIONS DIRECTIONS** section for relationship between mixing rate, spray volume and maximum application rate.

Mid-Rotation Understory Brush Control in Southern Coastal Flatwoods Pine Stands (Ground Equipment Only)

Make broadcast applications of Triclopyr 4 at 2 to 4 quarts per acre for control of broadleaf weeds and susceptible woody plant species such as gallberry and wax-myrtle. To broaden the spectrum of woody plants controlled to include fetterbush, staggerbush, and titi, apply 2 to 3 quarts per acre of Triclopyr 4 in a tank mix with labeled rates of Arsenal Applicators Concentrate. Saw-palmetto will be partially controlled by use of Triclopyr 4 at 4 quarts per acre or by a tank mix of Triclopyr 4 at 2 to 3 quarts per acre with either Arsenal Applicator's Concentrate, Imazapyr 4SL, Escort, or Metsulfuron Methyl 60DF herbicide.

These mixtures should be broadcast applied over target understory brush species, **but to prevent injury to pines, make applications underneath the foliage of pines.** For best results, apply 30 or more gallons per acre of spray solution. Make applications in late summer or fall. Efficacy may not be satisfactory when applications are made in early season prior to August.

Refer to the individual product labels for precautionary statements, restrictions, recommended rates, approved uses, and a list of weeds and woody plants controlled.

Broadcast Applications for Conifer Release in the Pacific Northwest and California

Dormant Conifers Before Bud Swell (Excluding Pines) -To control or suppress deciduous hardwoods such as vine maple, bigleaf maple, alder, scotch broom, or willow **before leaf-out** or evergreen hardwoods such as madrone, chinquapin, and *Ceanothus* spp., use Triclopyr 4 at 1 to 2 quarts per acre. Diesel or fuel oil may be used as diluents. If applying in water, add 1 to 2 gallons per acre of diesel oil, a suitable surfactant, or an oil substitute at manufacturer's recommended rates.

Conifer Plantations (Excluding Pines) Before Conifer Bud Break and After Hardwoods Begin Growth ("Early Foliar" Hardwood Stage) - Apply Triclopyr 4 at 1 to 1.5 quarts per acre alone or in a tank mix with 2,4-D low volatile ester herbicide in water carrier. Apply no more than 3 pounds acid equivalent per acre from both products. After conifer bud break, these sprays may cause more serious injury to the crop trees. Use of a surfactant may cause unacceptable injury to conifers especially after bud break.

Conifer Plantations (Excluding Pines) After Conifers Harden Off in Late Summer and While Hardwoods Are Still Growing Actively - Apply Triclopyr 4 at 1 to 1.5 quarts per acre alone or in a tank mix with 2,4-D low volatile ester in water carrier. Apply no more than 3 pounds acid equivalent per acre from both products. Treat as soon after conifer bud hardening as possible so that hardwoods and brush are actively growing. Use of oil, oil substitute, or surfactant may cause unacceptable injury to the conifers.

Broadcast Applications for Conifer Release in the Eastern United States

To release spruce, fir, red pine, and white pine from competing hardwoods such as red maple, sugar maple, striped maple, alder, birch (white, yellow, and grey), aspen, ash, pin cherry, and *Rubus* spp. and perennial and annual broadleaf weeds, apply Triclopyr 4 at 1.5 to 3 quarts per acre alone or in a tank mix with 2,4-D amine or low volatile ester. Apply no more than 4 pounds acid equivalent per acre from both products. Make applications in late summer or early fall after conifers have formed their over-wintering buds; and hardwoods are in full leaf prior to autumn coloration.

Broadcast Applications for Conifer Release in the Lake States Region

To release spruce, fir, and red pine from competing hardwoods such as aspen, birch, maple, cherry, willow, oak, hazel, and *Rubus* spp. and perennial and annual broadleaf weeds, apply Triclopyr 4 at rates of 1.5 to 3 quarts per acre. Make applications in late summer or early fall after conifers have formed their over-wintering buds and hardwoods are in full leaf prior to autumn coloration.

APPLICATION DIRECTIONS FOR RANGELAND, PERMANENT GRASS PASTURES, AND CONSERVATION RESERVE PROGRAM (CRP) ACRES

Refer to Tables 1 and 2 of this label for a list of woody plants and broadleaf weeds that are controlled by Triclopyr 4.

Florida: Triclopyr 4 may be applied to non-irrigation ditchbanks and fencerows on farms and ranches in addition to those uses listed in this section of the label.

Application Methods

Foliage Treatment with Ground Equipment

Use sufficient spray volume to completely and uniformly cover foliage using 10 or more gallons of total spray volume per acre. To ensure adequate coverage of plants with increased depth and density of foliage, and particularly for treatment of woody plants, use higher spray volumes.

High-Volume Foliage Treatment

To control of susceptible woody plants, use the recommended rate of Triclopyr 4 alone or in a tank mix to make 100 gallons of spray mixture. For rangeland and permanent pasture sites, make 1 application per year and apply no more than 2 quarts of Triclopyr 4 (2 lb ae of triclopyr) per acre. Triclopyr 4 may be tank mixed with other herbicides at recommended rates (see application rates table below) to control a broader spectrum of woody plants and broadleaf weeds. Be sure to follow all applicable use directions, precautions, and limitations on the respective product labels when tank mixing.

Apply sufficient spray volume to thoroughly wet all leaves, stems, and root collars. Minimize spray drift by using the minimum spray pressure that provides adequate plant coverage without forming a mist and direct sprays no higher than the top of the target plants. A drift control additive cleared for application to growing crops may also be used to reduce spray drift. For best results, apply when woody plants and weeds are actively growing.

Application Rates per 100 Gallons of Spray		
Triclopyr 4	Plus Tank Mix Product	Rate (qt)
1-4 qt	--	--
1-2 qt	Grazon* P+D specialty herbicide	4
1-2 pt	2,4-D low volatile ester herbicide	1-2
1-2 qt	Tordon* or Picloram 22K specialty herbicide	1-2
2 qt	Reclaim* specialty herbicide ^{1,2}	2

¹Reclaim* is registered for use only in Arizona, Texas, Oklahoma and New Mexico.

²See directions for Mesquite Control Using High Volume Foliage Treatment below.

Mesquite Control Using High Volume Foliage Treatment: To control low to moderate density mesquite infestations, apply a tank mixture of Triclopyr 4 and Reclaim* to individual plants with a backpack or hand-held sprayer or a vehicle-mounted sprayer with hand-held spray wand or spray gun. For individual plant treatment, use 2 quarts of Triclopyr 4 with 2 quarts of Reclaim* per 100 gallons of total spray solution (1/2 % v/v of each product). Apply in water or as an oil-water emulsion as described in the Mixing Directions Section. If an oil-water emulsion is used, add the oil at a rate of 5% of the total spray volume. Apply as a complete spray-to-wet foliar application, including all leaves. Thorough coverage is necessary for good results, but do not spray to the point of runoff. This application method works best for brush less than 8 feet tall since efficient treatment and thorough coverage of taller brush is difficult to achieve using this method. Do not apply when mesquite foliage is wet. The total amount of Reclaim* applied should not exceed 1 1/3 pints per acre. For best results, follow information given elsewhere in this label concerning effect of environmental conditions and application timing on control. To minimize drift, select a spray nozzle and pressure that generates a coarse spray and provides good coverage. Drift may be reduced by directing sprays no higher than the top of target plants and by using the minimum pressure necessary to obtain plant coverage without forming a mist. If desired, a spray dye may be added to the spray mixture to mark the treated plants.

Broadcast Application with Aerial or Ground Equipment

Brush and weed control results are influenced by environmental conditions and application timing; for best results, apply when woody plants and weeds are actively growing. For woody species, apply when leaf tissue is fully expanded and terminal growth has slowed after the rapid growth period of early spring. To ensure adequate foliage for herbicide absorption, brush regrowth should be at least 4 ft. high prior to treatment. The presence of healthy foliage at the time of application as well as adequate soil moisture before and after treatment are important factors contributing to optimal herbicidal activity.

Apply sufficient spray volume to completely and uniformly cover foliage using 10 or more gallons of total spray volume per acre for ground applications And at least 2 gallons of total spray volume per acre for aerial applications. To ensure adequate coverage of plants with increased depth and density of foliage, and particularly for treatment of woody plants, use higher spray volumes.

Mesquite: The herbicidal response of mesquite is strong influenced by foliage condition, growth stage and environmental conditions. For best results, apply when soil moisture is adequate for plant growth, the soil temperature is above 75°F at a depth of 12 to 18 inches, and new growth foliage has turned from light to dark

green. Apply within 60 days after the 75°F minimum soil temperature at the 12 to 18 inch depth has been reached (the rate of soil warm-up at the 12 to 18 inch depth may vary with soil texture and drainage with coarse-textured (sandy) soils warm up sooner than fine-textured (clay) soils and dry soils warm up more quickly than wet soils. If the application is made before mesquite foliage has turned from light to dark green or if foliage has been injured or removed by late frost, insects, hail or plant diseases, product performance may be adversely affected. Do not treat if mesquite exhibits new (light green) terminal growth in response to recent heavy rainfall during the growing season and to ensure adequate foliage for herbicide absorption, mesquite regrowth should be at least 4 ft. high prior to treatment.

Mesquite Only

Apply 1/2 to 1 pint of Triclopyr 4 per acre in combination with 2/3 to 1 1/3 pints per acre of Reclaim*. Refer to the Reclaim* label for additional treatment recommendations and information on mesquite control. Apply as an oil/water emulsion in 4 gallons or more total volume per acre for aerial applications or in 10 gallons or more total volume per acre for ground applications. Use no more than 1 gallon of oil per acre for both aerial and ground application.

Mesquite and Pricklypear Cactus

For pricklypear cactus in association with mesquite, apply a tank mix of 1/2 to 1 pint of Triclopyr 4 with 1 to 2 pints of Tordon* or Picloram 22K per acre. For a higher and more uniform plant kill of pricklypear, use the 2 pint per acre rate of Tordon* or Picloram 22K. To control pricklypear while providing improved control of mesquite, Tordon* or Picloram 22K may also be applied in combination with Reclaim*. Refer to the Tordon* or Picloram 22K and Reclaim* labels for additional information and treatment recommendations. Apply as an oil/water emulsion in 4 gallons or more total volume per acre for aerial applications or in 10 gallons or more total volume per acre for ground applications. Use no more than 1 gallon of oil per acre for both aerial and ground application.

South Texas Mixed Brush (Mesquite, Pricklypear Cactus, Blackbrush, Twisted Acacia and Granjeno)

If pricklypear is a problem, apply 1 to 2 pints of Triclopyr 4 in a tank mixture with 2 pints of Tordon* or Picloram 22K per acre. If mesquite is the prevalent species apply 1 to 2 pints of Triclopyr 4 with 2/3 to 1 1/3 pints of Reclaim* per acre. Triclopyr 4 contributes to the control of non-legume species such as granjeno and oaks; however, for improved control if primarily woody legume species are present, apply 2 pints of Tordon* or Picloram 22K per acre in combination with 2/3 to 1 1/3 pints of Reclaim* per acre. Refer to the Tordon* or Picloram 22K and Reclaim* labels for additional information and treatment recommendations. Apply as an oil/water emulsion in 4 gallons or more total volume per acre for aerial applications or in 15 gallons or more total volume per acre for ground applications. Use no more than 1 gallon of oil per acre for both aerial and ground application. For acceptable brush control, an oil/water emulsion and good spray coverage is critical.

Sand Shinnery Oak Suppression

In Texas, New Mexico and Oklahoma, for suppression of shinnery oak growing on sandy soils apply Triclopyr 4 alone at a rate of 1/2 to 2 pints per acre. Following suppression, grass response may be significant if rainfall is adequate. Deferring grazing after application together with proper grazing management is recommended to allow for the reestablishment of grass stands.

Post Oak and Blackjack Oak – Regrowth Stands

Apply when oak leaves are fully developed (expanded) in late spring to early summer (May-July). Use 2 quarts of Triclopyr 4 alone or in tank mix combination with 0.5 to 1 pint of 2,4-D low-volatile ester herbicide per acre. Apply as an oil/water emulsion or water surfactant dilution in 5 gallons per acre total volume by fixed-wing aircraft or helicopter or 15 to 25 gallons per acre total volume by ground equipment. Use no more than 1 gallon of oil per acre for both aerial and ground application. For suppression only, lower rates may be used. Control will require at least 3 consecutive treatments. **Note:** Because regrowth plants have a large root mass relative to top growth, delay broadcast treatment until top growth is at least 4 ft. tall in order for the top growth to intercept and translocate sufficient herbicide to control the roots.

High Volume Foliage Treatment: For regrowth less than 4 ft tall, apply 2 quarts of Triclopyr 4 per 100 gallons of water and 2 quarts of ag surfactant alone or in tank mix combination with 1 gallon of Grazon* P+D or 1 quart of Tordon* or Picloram 22K. Apply to individual plants as a high volume leaf-stem treatment using ground equipment.

Post Oak and Blackjack Oak – Mature Stands

To control mature stands (greater than 5 ft tall), apply 2 quarts of Triclopyr 4 per acre when oak leaves are fully developed (expanded) in late spring to early summer (May-July). When using Triclopyr 4 alone, some understory species such as winged elm, buckbrush, tree huckleberry and ash occurring in some areas will be suppressed or defoliated but not controlled. Where these understory species occur, control may be improved by tank mixing 2 quarts of Triclopyr 4 with 1 quart of Tordon* or Picloram 22K or 4 quarts of Grazon* P+D per acre. For best results, apply using fixed-wing aircraft or helicopter as an oil/water emulsion in a total volume of 5 or more gallons per acre.

Other Susceptible Woody Plants

Apply 2 to 4 pints of Triclopyr 4 alone or in combination with 2 to 3 quarts of 3.8 lb/gal 2,4-D low volatile ester or amine formulation per acre. If applications are made when plants are mature late in the summer, during drought conditions, or if difficult to control species such as ash, choke cherry, elm, maple or oaks are prevalent on the site, use the higher rates of Triclopyr 4, alone or with 2,4-D. For increased control of certain species, Triclopyr 4 may also be applied in a tank mixture with Grazon* P+D or Tordon* or Picloram 22K, refer to the labels for Grazon* P+D and Tordon* or Picloram 22K for additional information and treatment recommendations. Apply in 4 gallons or more total volume per acre aerially or in 10 gallons or more total volume per acre when using ground equipment. Apply during or after bloom for best results on blackberry. For management of kudzu, use 1 quart of Triclopyr 4 per acre. To achieve the desired level of control, repeat applications may be necessary.

Susceptible Broadleaf Weeds

When weeds are actively growing, apply 2 pints of Triclopyr 4 per acre as a broadcast spray in a total volume of 10 or more gallons per acre by ground equipment or in a total volume of 2 or more gallons per acre aerially. Triclopyr 4 at a rate of ½ to 3 pints may be tank mixed with 1 to 2 quarts of 3.8 lb/gal 2,4-D amine or low volatile ester.

Growing Point and Leaf Base (Crown) Treatment of Yucca

Prepare a 2% v/v solution of Triclopyr 4 in diesel or fuel oil (13 fl oz of Triclopyr 4 in 5 gallons of spray mixture). Thoroughly wet the center of the plant including growing point and leaf bases to the soil surface. Complete coverage of leaves is not necessary.

Conservation Reserve Program (CRP) for Established Permanent Grass Stands

NOTE: Use Triclopyr 4 on CRP acres only after perennial grasses are well established.

Broadcast Application Ground or Aerial: For small weed control, apply 1 to 2 pints of Triclopyr 4 per acre. For deep-rooted perennial and susceptible woody species control apply up to 1 ½ quarts of Triclopyr 4 per acre. Apply in 2 gallons or more total volume per acre for aerial applications or in 10 gallons or more total volume per acre for ground applications.

Restrictions:

- Apply no more than 1 ½ quarts of Triclopyr 4 per acre per growing season on CRP acres.
- When applying to CRP lands, follow all applicable state and federal regulations. Follow the most severe grazing restriction imposed by the pesticide label or by the USDA Acreage Conservation Reserve Program. After that time period, follow local (CRP) guidelines regarding cropping and haying restrictions. If legumes are a desired cover crop during CRP, do not use Triclopyr 4.

APPLICATION DIRECTIONS FOR ORNAMENTAL TURF

Refer to Table 2 for a list of broadleaf weeds controlled by Triclopyr 4.

For spot treatments, do not apply more than 2 quarts of Triclopyr 4 per acre in a single application.

Foliar sprays should be applied during warm weather, from early spring through fall, when weeds are actively growing. Broadleaf weeds germinate at different times. Only emerged weeds present at the time of application will be controlled. Newly seeded turf should be mowed 2 or 3 times before being treated. When making applications to mature plants, hard-to-control species, or during drought conditions, use higher rates. Application under drought conditions may provide less than desirable results. Use low pressure sprays to minimize spray drift. Do not water for 24 hours after application.

Mixing Instructions

When Triclopyr 4 is mixed with water it forms an emulsion (not a solution) and separation may occur unless the spray mixture is agitated continuously.

Add about one-half the required amount of clean water to the spray tank. Start agitation and add the recommended amount of Triclopyr 4. Provide moderate agitation while completing the addition of water and during application.

Reseeding Precaution: Do not reseed for 3 weeks after application. (This precaution does not apply when bermudagrass turf is overseeded with perennial ryegrass at a minimum reseeding of 400 lb per acre.)

Broadcast Treatment of Ornamental Turf

Apply ½ to 1 quart per acre of Triclopyr 4 in enough water to provide uniform coverage of the target area to control actively growing broadleaf weeds growing in perennial bluegrass, perennial ryegrass, or tall fescue. Do not use on other turfgrass species (see General Use Precautions section of this label) unless injury can be tolerated. To minimize turf injury, do not treat if turf is under heat- or drought-stress and make repeat applications at least 4 weeks apart.

Tank Mixing: To improve the spectrum of activity, Triclopyr 4 may be tank mixed at a rate of ½ to 1 pint per acre with recommended rates of low volatile amine or ester formulations of 2,4-D, MCP, or other labeled postemergence broadleaf herbicides. Refer to tank mix product labels for specific use directions, precautions, and limitations before use.

Spot Treatment of Ornamental Turf

Mix 3/8 to 3/4 ounces of Triclopyr 4 per 1000 square feet in enough water to provide uniform coverage of the target area and apply at any time broadleaf weeds are susceptible. **Note:** Do not apply more than 2 quarts per acre or 1.5 ounces per 1000 square feet of Triclopyr 4 in a single application.

Control of Kikuyugrass

Apply Triclopyr 4 at a rate of 1/2 to 1 quart per acre. To improve activity, MSMA herbicide may be tank mixed with the 1/2 quart per acre rate of Triclopyr 4. Three to four additional applications at 4 to 6 week intervals may be required to achieve control of kikuyugrass.

Suppression of Bermudagrass

Apply Triclopyr 4 at the rate of 1 quart per acre. Three to four additional applications at 4 week intervals will be required to give adequate suppression of bermudagrass and allow fescue or other desired turfgrass species to dominate. To improve suppression and control of bermudagrass, 1 quart per acre of Triclopyr 4 may be tank mixed with a postemergence grass herbicide registered for this use pattern. Three to four additional applications of this tank mix at 4 week intervals should be made to achieve control. Reseeding following application will accelerate the transition to cool season turf (see Reseeding Precautions above).

**Table 1
Woody Plants Controlled by Triclopyr 4**

Alder	Dogwood	Oaks	Thimbleberry
Arrowwood	Douglas fir	Osage Orange	Tree-of-Heaven (<i>Ailanthus</i>) ¹
Ash	Elderberry	Pepper Vine ³	Trumpet Creeper ³
Aspen	Elm	Persimmon	Tulip Poplar
Bear Clover (Bearnat)	Gallberry	Persimmon, Eastern	Twisted Acacia
Beech	Gorse	Pine	Virginia Creeper ³
Birch	Granjeno	Poison Ivy	Wax Myrtle
Blackberry	Guajillo	Poison Oak	Wild Rose
Blackbrush	Guava ³	Poplar	Willow
Black gum	Hawthorn	Salmonberry	Winged elm
Boxelder ¹	Hazel	Saltbush (<i>Braccharis spp</i>)	
Brazilian Pepper	Hickory	Saltbush (silver myrtle) ³	
Buckthorn	Hornbeam	Salt Cedar ¹	
Cascara	Huisache (suppression)	Sassafras	
Ceanothus	Kudzu ²	Scotch Broom	
Cherry	Locust	Sumac	
Chinquapin	Madrone	Sweetbay Magnolia	
Choke Cherry	Maples	Sweet Gum	
Cottonwood	Milkweed Vine ³	Sycamore	
<i>Crataegus</i> (hawthorn)	Mulberry	Tan Oak	

¹For best control, use either a basal bark or cut stump treatment.

²For complete control, retreatment may be necessary.

³Basal or dormant stem applications only

**Table 2
Annual and Perennial Broadleaf Weeds Controlled by Triclopyr 4**

Black Medic	Curly dock	Matchweed	Sulfur Cinquefoil (2)
Bull Thistle	Dandelion	Mustard	Sweet Clover
Burdock	Dogfennel	Oxalis	Tropical Soda Apple (3)
Canada Thistle	Field Bindweed	Plantain	Vetch
Chicory	Goldenrod	Purple Loosesstrife	Wild Carrot (Queen Anne's Lace)
Cinquefoil	Ground Ivy	Ragweed	Wild Lettuce
Clover	Lambsquarters	Sericea Lespedeza	Wild Violet
		(1)	
Creeping Beggarweed	Lespedeza	Smartweed	Yarrow

- Sericea lespedeza:** Apply 1 to 2 pints of Triclopyr 4 per acre. For best results, apply after maximum foliage development in the late spring to early summer, but prior to bloom.
- Sulfur cinquefoil:** Apply 1 to 2 pints of Triclopyr 4 per acre. For best results, apply to plants in the rosette stage.
- Tropical soda apple:** When plants reach the first flower stage, apply 2 pints of Triclopyr 4 per acre. For best results, apply using ground equipment in a total spray volume of 40 gallons per acre. To provide more complete wetting and coverage of the foliage, an agricultural surfactant may be added at the manufacturer's

recommended rate. To control sparse plant stands, use spot treatments. For spot treatment use a 1 to 1.5% solution of Triclopyr 4 in water (1 to 1 1/2 gallons of Triclopyr 4 in 100 gallons total spray mixture) and spray the entire plant to completely wet the foliage. In Florida, control of tropical soda apple may be improved by using the following management practices:

- Mow plants to a height of 3 inches every 50 to 60 days or whenever they reach flowering. Continue mowing on this schedule through April.
- In late May to June (50 to 60 days after the April mowing), apply a broadcast treatment of Triclopyr 4.
- To control any remaining plants or to thin stands of plants that germinate following a broadcast treatment, use spot treatments.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: Store above 28°F or agitate before use.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product (that cannot be used according to label instructions) may be disposed of on site at an approved waste disposal facility. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the hazardous Waste Representative at the nearest EPA Regional Office for guidance.

PLASTIC CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities by burning. If burned, stay out of smoke.

METAL CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

LIMITATION OF WARRANTY AND LIABILITY

Read the entire Directions for Use, Conditions of Warranties and Limitations of Liability before using this product. If terms are not acceptable, return the unopened product container at once.

By using this product, user or buyer accepts the following Conditions, Disclaimer of Warranties and Limitations of Liability.

CONDITIONS: The directions for use of this product are believed to be adequate and must be followed carefully. However, it is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Makhteshim Agan of North America, Inc. All such risks shall be assumed by the user or buyer.

DISCLAIMER OF WARRANTIES: To the extent consistent with applicable law, Makhteshim Agan of North America, Inc. makes no other warranties, express or implied, of merchantability or of fitness for a particular purpose or otherwise, that extend beyond the statements made on this label. No agent of Makhteshim Agan of North America, Inc. is authorized to make any warranties beyond those contained herein or to modify the warranties contained herein. To the extent consistent with applicable law, Makhteshim Agan of North America, Inc. disclaims any liability whatsoever for special, incidental or consequential damages resulting from the use or handling of this product.

LIMITATIONS OF LIABILITY: To the extent consistent with applicable law, the exclusive remedy of the user or buyer for any and all losses, injuries or damages resulting from the use or handling of this product, whether in contract, warranty, tort, negligence, strict liability or otherwise, shall not exceed the purchase price paid or at Makhteshim Agan of North America, Inc.'s election, the replacement of product.

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APPENDIX H. BEST MANAGEMENT PRACTICES FOR HERBICIDE APPLICATION

These measures implement Best Management Practices and are designed to ensure worker safety, environmental compatibility, protection of threatened and endangered species, and maximize treatment efficacy and efficiency when applying herbicide.

General Best Management Practices for Herbicide Treatment

- All herbicide applications will be performed under the direct supervision of a Qualified Applicator (applicator holding a Qualified Applicator Certificate or Qualified Applicator License from the California Department of Pesticide Regulations).
- All applicators will follow the product label instructions.
- All applicable permits will be obtained from the local Agricultural Commissioner prior to any herbicide application. All applicable records will be maintained.
- All herbicides used will be registered for the use in an aquatic environment by the California Department of Pesticide Regulations. All herbicide label requirements will be followed.
- All applicators will follow all California Department of Pesticide Regulation guidelines as to acceptable application weather conditions.
- Work will not be performed if there is a greater than 30% chance of rain within 72 hours of the workday.
- Herbicide application will be terminated if excessive wind speed occurs (according to product label).
- When the air is calm or moving away from the habitat of concern (HOC), commence application on the side nearest the habitat, and proceed away from the habitat.
- In order to avoid inadvertent or accidental exposure to non-target plants, whenever possible non-target plants are bent away from the target plant before application.
- Spill kits will be on site at all times and all workers will be trained in a spill contingency plan.
- All areas treated with herbicide will be posted according to State Law. Areas treated will be signed and closed during and following treatment (1 day).
- All herbicide mixing, loading, and application equipment will be kept in good condition and routinely cleaned and calibrated to avoid over or under application.
- In order to avoid inadvertent or accidental exposure to non-target plants, all workers will be trained in the identification of the target plant at all growth stages.

- All applicators will wear personal protective equipment (PPE) when applying or mixing herbicides (according to the product label). Clothing will be washed daily. Soap and water will be on site for washing hands and face and for emergencies.
- All workers will be trained in safety and emergency procedures.

General Best Management Practices for Herbicide Foliar Applications

Foliar applications involve spraying the leaves of the target species with a low concentration mixture of herbicide in accordance with label instructions. Foliar treatments will be done during the active growing season, after full plant growth expansion in early fall. Foliar spraying is most effective when temperatures are between 60° F and 90° F, the air is humid, there is a light breeze (9 mph or less), and when rain is not expected for 8 to 12 hours. Herbicide will be applied to cover foliage thoroughly, but not to the point of run-off. Foliar treatments will not be conducted where leaves of target plants are above applicator's shoulder height. The lowest herbicide concentration that proves effective will be used in accordance with specific label instructions, including personal protective equipment and storage requirements.

APPENDIX I. GENETIC INTEGRITY POLICY

California State Parks and Recreation Commission Statement of Policy
Policy 11.4
Preservation of Vegetative Entities
(Amended 5-4-94)

“In order to maintain the genetic integrity and diversity of native California plants, revegetation or transplant efforts in the State Parks System will be from local populations, unless shown by scientific analysis that these populations are not genetically distinct from populations being proposed for use. If local populations have been decimated, the closest, most genetically similar population(s) to that State Park System unit will be used.”

District Policy:

Locality of Collection:

In order to maintain the genetic integrity and diversity of native California plants, all transplant and propagation in the North Coast Redwoods District will be from local populations (preferably from within the same stand). For the purpose of this policy, local is defined as being from the immediate project area (as close as possible, but generally less than one mile). Local populations will be considered decimated, and therefore not available for collection, only if there are not enough plants remaining to accomplish propagation and/or seed collection.

If the plant material or seed cannot be collected from local populations because: plants are not available or accessible; there is not enough time to collect and propagate material prior to the planting deadline; then collection can occur within the same CalWater Planning Watershed Unit, or park unit or seed zone provided the planting area is within an elevation of + or – 800 feet of the collection site.

Collection Diversity:

If available seed and propagation collection should come from a minimum of 10- 15 different plants for larger projects to insure that sufficient genetic variability is obtained.

Emergencies:

In emergencies (large fires, emergency slope stability projects etc.) consideration of the use of commercial stock will be given provided that the stock meets the location and elevation constraints outlined above.

California State Parks and Recreation Department Operation Manual
Policy 0310.4.1
Genetic Integrity Policy

“In order to maintain the genetic integrity and diversity of native California plants, revegetation or transplant efforts in the State Parks System will be from local populations, unless it is shown by scientific analysis that these populations are not genetically distinct from other populations for use. If local populations have been decimated, the closest, most genetically similar population(s) to those being lost from the State Park System unit will be used (California State Parks and Recreation Commission Statement of Policy Policy 11.4).”

Sources of materials for revegetation will be, in preferred order:

1. Seeds, plants, cuttings salvaged from the site prior to disturbance;
2. Materials from similar vegetation and sites within the unit;
3. Materials collected offsite, but within the same ecological region, elevation, and site characteristics as the site to be revegetated.

If seeds or plants must be acquired from commercial sources, the origin of the materials should be from within the same ecological region, elevation, and site characteristics as the project area.

In order to eliminate the possibility of genetic contamination of any naturally occurring population at or near a revegetation site, threatened or endangered plant taxa will not be used for revegetation unless the revegetation is being done as part of a restoration plan for that taxon (see DOM Section 0310.5.3.1).

APPENDIX J. PROJECT REQUIREMENTS AND MEASURES TO AVOID TAKE OF SENSITIVE NATURAL OR CULTURAL RESOURCES

Project Requirements

Botanical

- Floristically appropriate surveys will be conducted prior to the initiation of project activities and shall be in conformance with DFG guidelines (CDFG 2008). If sensitive plant species are found, a 5 m (16.5 ft) buffer will be allotted and flagged. Any removal efforts targeted within the protected buffer zone will be removed by hand.
- Heavy equipment will remain onsite until the completion of each year's implementation phases, at which time that equipment will exit from where it came. Objects to obstruct the entrance to the path will be placed at the trailhead once heavy equipment moves through.
- Symbolic fencing will be erected around treated areas to avoid human disturbance of newly created habitat and reseeding efforts.
- Interpretive signs will be used on the symbolic fencing to inform the public of the restoration project and sensitive species. The signs will focus on the restoration project.
- A Hazardous Material Spill Contingency Plan and Safety Plan will be reviewed daily and kept onsite.

Cultural

- If it is determined the find indicates a sacred or religious site, the site will be avoided to the maximum extent practicable. Formal consultation with the State Historic Preservation Officer (SHPO) and review by the NAHC/tribal representatives will also occur as necessary to define additional site mitigation or future restrictions.
- Prior to operating in area(s) identified in the confidential 5024 document as potentially culturally sensitive, the project manager will contact the North Coast District Archaeologist at least two weeks prior to operations. The Archaeologist (or his designee) shall determine the boundaries of the sensitive area(s) and flag with black and yellow candy-stripe flagging. The Archaeologist will determine if a tribal monitor needs to be present during operations within these area(s). No heavy equipment will be allowed within designated culturally sensitive area(s).
- In the event that human remains are discovered, work will cease immediately in the area of the find and the project manager/site supervisor will notify the appropriate DPR personnel. Any human remains and/or funerary objects will be left in place. The DPR Sector Superintendent (or authorized representative) will notify the Humboldt County Coroner, in accordance with §7050.5 of the California Health and Safety Code, and the Native American Heritage Commission (NAHC) will be notified within 24 hours of the discovery if the Coroner determines that the remains are Native American. The NAHC will designate the "Most Likely Descendent" (MLD) of the deceased Native American.

The MLD will recommend an appropriate disposition of the remains. If a Native American monitor is on-site at the time of the discovery and that person has been designated the MLD by the NAHC, the monitor will make the recommendation of the appropriate disposition.

- If the coroner or a tribal representative determines that the remains represent Native American internment, the NAHC in Sacramento and/or tribe will be consulted to identify the Most Likely Descendent (MLD) and appropriate disposition of the remains. Work shall not resume in the area of the find until proper disposition is complete as part of PRC §5097.98. No human remains or funerary objects will be cleaned, photographed, analyzed, or removed from the site prior to determination.