

2019 Annual IPM Report



Integrated Pest Management Program Goal:

“Control pests by consistent implementation of IPM principles to protect and restore the natural environment and provide for human safety and enjoyment while visiting and working on District lands.”

Table of Contents

List of Figures ii

List of Tables iii

1 Introduction..... - 1 -

2 Implementation of IPM Program..... - 2 -

3 Summary of Pest Management..... - 3 -

4 Summary of Pest Control Treatments - 11 -

5 Effectiveness of Pest Control Program - 15 -

6 Summary of Pesticide Use - 21 -

7 Public Interactions..... - 23 -

8 Consultants and Contractors..... - 25 -

9 Compliance with Guidance Manual..... - 26 -

10 - 28 -

11 List of Preparers and Contributors - 29 -

Appendix A – Invasive Plant Treatment List - 30 -

List of Figures

Figure 1: Contractors mow Distaff thistle (<i>Carthamus creticus</i>) near Kneudler Lake in Russian Ridge OSP	1 -
Figure 2: Crews build a shaded fuel break at Sierra Azul OSP	6 -
Figure 3: Preserve roads are maintained to allow safe passage of emergency vehicles.....	7 -
Figure 4: Preserve Partners volunteers remove Purple starthistle (<i>Centaurea calcitrapa</i>) at La Honda Creek OSP	10 -
Figure 5: Treatment Method Breakout.....	11 -
Figure 6: Resource Management by Crew Type	12 -
Figure 7: Annual IPM Labor Hours for Natural Lands and Rangeland	13 -
Figure 8: Treatment Cost per Acre.....	14 -
Figure 9: Yellow starthistle (<i>Centaurea solstitialis</i>) at Long Ridge OSP	14 -
Figure 10: Roundup Usage at Select Sites.....	17 -
Figure 11: ARMS volunteer pulling French Broom at Bear Creek Redwoods OSP.....	19 -
Figure 12: Preserve Partners volunteers pull Hanging sedge (<i>Carex pendula</i>) at Purisima Creek OSP	20 -
Figure 13: District biologists give biological sensitivity training to staff and volunteers working in endangered species habitat	20 -
Figure 14. Herbicide use from 2016-2019	22 -
Figure 15: Pesticide Notification Sign	24 -

List of Tables

Table 1: Number of Pre-Treatment Surveys	- 4 -
Table 2: Treated Species by Rating for Ongoing and New Projects.....	- 5 -
Table 3: Invasive fauna species present in District Preserves.....	- 5 -
Table 4: Summary of Fuel Reduction projects District-wide	- 7 -
Table 5: District Properties in the Conservation Grazing Program	- 8 -
Table 6: New Pests Control Projects	- 9 -
Table 7: New Fuel Management Projects	- 10 -
Table 8: Treatment Methods and Hours in Natural Areas and Rangelands in 2019	- 11 -
Table 9: Comparison of Hours by Crew Type and Year.....	- 13 -
Table 10: Pesticides Approved for Use in Buildings and Recreational Structures.....	- 15 -
Table 11: Total herbicide used by species	- 22 -
Table 12: Total herbicide used by Preserve	- 23 -
Table 13: Public Inquiries into the IPM Program	- 25 -
Table 14: Consultants and Contractors who performed IPM related work	- 26 -

1 Introduction

This report presents the results of the fifth year of pest management activities prescribed under the Midpeninsula Regional Open Space District (District) Integrated Pest Management (IPM) Program. The Program was established in 2014 upon adoption by the Board of Directors of the IPM Guidance Manual. Five policies set the foundation of the Program:

- Develop specific pest management strategies and priorities that address each of the five work categories;
- Take appropriate actions to prevent the introduction of new pest species to District preserves, especially new invasive plants in natural areas, rangeland, and agriculture properties;
- Manage pests using the procedures outlined in the implementation measures;
- Monitor pest occurrences and results of control actions, and use adaptive management to improve results;
- Develop and implement an IPM Guidance Manual to standardize pest management, and IPM procedures across all District Lands.



Figure 1: Contractors mow Distaff thistle (*Carthamus creticus*) near Kneudler Lake in Russian Ridge OSP

2 Implementation of IPM Program

The full implementation of the IPM Program was originally scheduled to be completed by 2019. Due to shifts in staff capacity to fulfill Measure AA commitments as well as multiple key vacancies of positions that support the IPM Program during the last three years, some aspects of the IPM Program are still underway. Complete implementation of all elements of the Program is anticipated by the end of 2021. Staff is currently developing a landscape-level monitoring protocol and an Early Detection/Rapid Response Protocol as new elements under the IPM Program. Both are described below and would be brought to the Board at a later date for approval and inclusion into the IPM Program. As described in the Final Environmental Impact Report of the Program, the entire IPM Program will be revisited in 2025 to set the framework for the next cycle of IPM work.

2.1 Landscape-Level Monitoring Protocol

To better assess both natural (e.g. succession, disturbances such as wildlife fire) and human caused effects (e.g. management activities, climate change) in natural areas, a landscape-level monitoring protocol is needed. This protocol will allow staff to see changes in vegetation and habitat over time. The District is currently part of a regional effort to develop a fine-scale vegetation map for all of San Mateo County. This map will be extremely helpful for tracking landscape-level vegetation changes over time. The District has already received new high-resolution imagery and shaded relief map components and expects to receive the final vegetation map in 2021. A similar regional mapping effort is now in the early planning stages for Santa Clara and Santa Cruz counties, which will complete the imagery coverage for the entire Santa Cruz Mountains landscape.

On January 8, 2020 (R-20-01) the Board selected three research questions for study by a Science Advisory Panel (SAP). One question is focused on monitoring: “How can the District effectively and efficiently monitor changes in priority plant and animal populations at the landscape scale?”. The SAP will address this question in two phases, the first phase will be conducted between July and December 2020, and the second conducted (upon Board approval of funding for the second research phase) between January and June 2021. The first phase of research will seek to refine the District’s monitoring objectives, identify priority species and communities, and develop a conceptual model for monitoring. In the second phase of research, the SAP would use that information to create a monitoring framework with the following elements:

- A clear problem statement that includes the temporal and spatial extent of the question;
- Ecological objectives that define desired conditions;
- Ecological and statistical justifications for monitoring elements and sampling design;
- A prioritized list of taxa that can be effectively and cost-efficiently monitored; and
- Recommendations for monitoring protocols, sampling designs, and monitoring intervals.

2.2 Early Detection / Rapid Response Protocol

Early Detection / Rapid Response (EDRR) places emphasis on preventing the establishment of new pest populations on District lands through increased surveys for pests. If new pest populations get established, EDRR would implement rapid response measures to control pests before they spread. EDRR programs

increase the likelihood that pest invasions are addressed successfully before the population sizes and/or extents are beyond that which can be practically and economically contained and eradicated. The District treats several species considered to be early detection targets (i.e. spotted knapweed, hanging sedge); however, a dedicated early detection surveillance program will help ensure timely discovery and treatment of emerging threats.

Increased pest surveys may allow District personnel and/or contractors to more rapidly identify and prevent pest infestations prior to establishment, thereby decreasing the amount of pest management treatments necessary on District lands over time. The IPM Guidance Manual includes EDRR strategies to respond to pests, however, current staffing levels and commitments limit the District's ability to fully implement a comprehensive EDRR program. The District is currently evaluating the long-term resource (i.e., staffing, volunteers, contractors, etc.) and funding needs to implement the EDRR strategies, which include:

- Identifying potential threats early to allow control or mitigation measures to be taken;
- Detecting new invasive species in time for allowing efficient and safe eradication or control decisions to be made;
- Taking additional preventive actions such as providing facilities to clean vehicles and tools to stop the spread of seeds of invasive plants;
- Responding to invasions effectively to prevent the spread and permanent establishment of invasive species;
- Providing adequate and timely information to decision-makers, the public, and to partner agencies concerned about the status of invasive species within an area; and
- Adaptively implementing detection and early response strategies over time.

The District has budgeted funds for Fiscal Year 2020-2021 to implement a small-scale effort of EDRR strategies and will bring those results and recommendations to the full Board during the 2021 Annual IPM Report. Increased pest surveys may allow District personnel and/or contractors to more rapidly identify and prevent pest infestations prior to establishment, thereby decreasing the amount of pest management treatments necessary on District lands over time.

3 Summary of Pest Management

This section is a summary of the pest problems that the District has encountered during the year.

3.1 Pre-Treatment Surveys

The District's Best Management Practices from the FEIR Integrated Pest Management Program outlines the use of pretreatment surveys. Specifically, it states:

"A District biologist shall survey all selected treatment sites prior to work to determine site conditions and develop any necessary site-specific measures. On a repeating basis, grassland treatment sites shall be surveyed once every five years and brushy and wooded sites shall be surveyed once every three years. Brush removal on rangelands will require biological surveys before work is conducted in any year. Site

inspections shall evaluate existing conditions at a given treatment site including the presence, population size, growth stage, and percent cover of target weeds and pests relative to native plant cover and the presence of special-status species and their habitat, or sensitive natural communities.”

Surveys are entered into CalFlora, an online database. In 2019, District biologists completed the following surveys:

Table 1: Number of Pre-Treatment Surveys

Category	El Corte de Madera Creek	Foothills	Long Ridge	Los Trancos	Pulgas Ridge	Purissima Creek Redwoods	Rancho San Antonio	Total
Fuel Management	3	-	6	3	1	1	1	12
Natural Lands	33	-	12	14	-	-	-	59
Rangeland	-	-	-	-	-	2	-	2
Recreational Facilities	24	2	19	7	-	1	-	1
Total	60	2	37	24	1	4	1	127

Surveys identified both biotic and abiotic environmental factors including:

- Special status plants and animals in the area (e.g. California red-legged frog)
- Cultural resources (e.g. known archeological sites)
- Aquatic systems (e.g. ephemeral streams)
- Jurisdictional areas
- Erosive conditions (e.g. steep hillside with treatment to remove large areas of vegetation)
- Presence of disease (e.g. Sudden Oak Death)

The information recorded during pre-treatment surveys is provided to staff and contractors on the Annual Project Spreadsheet.

3.2 Ongoing and General Maintenance

3.2.1 Vegetative Pest Species

Sixty-eight (68) plant pest species found on District lands are treated on an on-going basis (Appendix A) to control for asset-based protection and long-term management, an increase of seven (7) species from 2019. These species have the potential to invade natural areas, displace native plant and wildlife species, and reduce biodiversity. Of the listed species, twenty (20) are considered noxious weeds by the State of California (Table 2). Some species that are considered a low priority for treatment in wildlands are treated in restoration sites to ensure that recently installed native plants have a higher chance of survival. An increase in the number of species treated is partially due to increased quality of the field data collection.

Table 2: Treated Species by Rating for Ongoing and New Projects

Year	Species Treated	Cal-IPC ^a Rating			CDFA ^b Rated	Alert
		Limited	Moderate	High		
2019	68	11	23	11	20	2
2018	61	14	22	13	20	2
2017	44	5	17	9	16	4
2016	33	3	14	10	17	3
2015	31	4	12	8	12	4

^aCal-IPC – California Invasive Plant Council
^bCDFA – California Department of Food and Agriculture

3.2.2 Fauna Pest Species

Eight (8) species of invasive fauna were monitored and/or treated in 2019.

Table 3: Invasive fauna species present in District Preserves

Scientific Name	Common Name	Preserve	Location	Activity
<i>Felis catus</i>	Cat, feral	Rancho San Antonio		Monitoring
<i>Mus musculus</i>	House mouse	Multiple – see below	Deer Hollow Farm; Residential	Monitoring, Trapping
<i>Otospermophilus beecheyi</i>	California Ground squirrel	Rancho San Antonio	Deer Hollow Farm	Exclusion
<i>Pseudemys nelsoni</i>	Florida red-bellied cooter	Skyline Ridge	Alpine Pond	Attempted trapping
<i>Rattus norvegicus</i>	Norway rat	Multiple – see below	Deer Hollow Farm; Residential	Monitoring, Trapping
<i>Rattus</i>	Black rat	Multiple – see below	Deer Hollow Farm; Residential	Monitoring, Trapping
<i>Sus scrofa</i>	Pig, feral	Russian Ridge, Sierra Azul	Mindego Ranch	Monitoring
<i>Trachemys scripta elegans</i>	Red-eared slider	Bear Creek Redwoods	Mud Lake	Monitoring, Trapping

3.2.3 Pest Control in Buildings

Between January and December of 2019, the District hired *Complete Pest Control* to perform rodent control at thirteen Open Space Preserve locations, with seventeen residences.^[1] The District performed all rodent control in 2019 using traps, and did not resort to the use of any rodenticides. Locations of IPM in buildings are listed below:

- El Corte de Madera OSP (1) – 4 residences
- Fremont Older (1)

^[1] The number in parenthesis is the number of building that pest control activities occurred.

- La Honda OSP (2)
- Monte Bello OSP (1)
- Rancho San Antonio (1) – duplex with 2 residences
- Russian Ridge OSP (2)
- Skyline OSP (2)
- Thornewood (1)
- Tunitas Creek OSP (1) – two structures, one location
- Windy Hill OSP (1)

3.2.4 Fuel Management

The District works with local communities and fire districts to minimize the potential for fires to spread to and from Preserve lands. The District provides necessary fire and fuel management practices to protect forest resources, public health, and safety by taking the following actions:

- Maintain essential roads for emergency fire access, and forest management activities to reduce fire hazard.
- Maintain adequate fire clearance around District structures and facilities.
- Encourage neighboring property owners to maintain adequate fire clearance around existing development; consult with regulatory agencies to encourage that construction of new development maintains fire agency recommended setbacks for fire



Figure 2: Crews build a shaded fuel break at Sierra Azul OSP

- clearance between new development and District forests and woodlands.
- Evaluate the potential to reduce forest fuel loading through the removal of smaller trees to reduce forest floor fuel buildup and ladder fuels.
- Coordinate with fire agencies and local communities to define locations where fire protection infrastructure is desirable and practical.
- Reintroduce fire as a resource management tool to reduce forest floor fuels and reestablish fire for ecosystem health where stand conditions, access, and public safety permit; coordinate with other agencies for planning and implementation.
- Seek grant opportunities and partnerships for fuel management projects and monitoring.

The District is developing an Environmental Impact Report (EIR) to increase fuel management work. The fuel management portion of the EIR is expected in Fall 2020, and at that time, fuel management work will become a component of the fire program.

3.2.4.1 Fuel Reduction Permits

Preserve neighbors wishing to modify vegetation on District preserves to create defensible space around their homes and occupied structures may apply for a Fuel Reduction Permit. District staff perform pre-surveys prior to issuing a permit to ensure adequate protection and mitigation measures are implemented during the work.

In 2019, there were no new requests for fuel management permits, and two permits remain active from previous years.

3.2.4.2 Fuel Reduction Projects Implemented by the District

The District currently maintains various types of fuel breaks at many preserves. This work is accomplished primarily through mechanical means using handheld power tools or heavy equipment. In addition to the acreage listed below, the District maintains approximately 30 miles of disc lines (a gap in vegetation or other combustible material that acts as a barrier to slow or stop the progress of wildfire, created by plowing the ground with a tractor pulling a disc harrow apparatus), mostly along Preserve boundaries.

The IPM program covers maintenance for existing fuel breaks and does not allow for the construction of major new fuel breaks.

The District is seeking additional CEQA

compliance that will greatly expand the fuel reduction program on District lands and allow for the creation of new fuel breaks.



Figure 3: Preserve roads are maintained to allow safe passage of emergency vehicles

Table 4: Summary of Fuel Reduction projects District-wide

Purpose	Acres		Total Area
	Foothills	Skyline	
Defensible Space	21.9	33.23	55.13
Landing Zones	6.5	5.25	11.76
Shaded Fuel Break	36.8	22.7	59.5
Other Fuel Break	-	14.4	12.2

Purpose	Acres		Total Area
	Foothills	Skyline	
TOTAL	65.2	75.58	140.78

3.3 Conservation Grazing

The District's conservation grazing program manages more than 11,000 acres of coastal property as rangelands. On these lands, grazing is used as a broad management tool to achieve outcomes for both conservation of biodiversity and fuel management to reduce wildfire risk while supporting local sustainable agriculture and the viability of grazing in our region. Grazing can reduce the height and thatch build-up of non-native annual grasses, which benefits native bunch grasses and forb species. Since grasslands generally support more plant diversity than nearby wooded or brushy areas, control of non-native annual grasses is one of the most significant actions that can be taken to promote plant diversity. In addition, several special status wildlife species benefit from the vegetation structure created by grazing activity. As the conservation grazing program continues to grow, the District will continue to work with grazing tenants to develop new grazing strategies that target priority invasive plant species.

Grazing can also be an effective tool to reduce biomass and fuel loads, which helps reduce the intensity of wildfires. Using mechanical methods for fuel management can be prohibitively expensive, and grazing allows fuel reduction at scales that would be unfeasible with other methods. Additionally, brush removal for rangeland improvement also contributes to a significant amount of fuel management District-wide.

Table 5: District Properties in the Conservation Grazing Program¹

Property	Preserve	Total Acres ²
Apple Orchard	La Honda	222
Driscoll Ranch	La Honda	3,700
McDonald Ranch	La Honda	2,060
Bluebrush Canyon	Purisima Creek Redwoods	302
Elkus-Lobitos	Purisima Creek Redwoods	839
October Farms	Purisima Creek Redwoods	270
Mindego Hill	Russian Ridge	1,047
Big Dipper	Skyline Ridge	955
Toto Ranch	Tunitas Creek	952
Tunitas Creek Ranch	Tunitas Creek	707
TOTAL		11,054

3.4 New Pest Control Projects

Potential pest control projects were submitted to the IPM Coordinator using the District's New Pest Control Project form. Potential projects were evaluated using the Project Ranking System developed by the IPM Coordination Team. The Project Ranking System evaluates projects using five categories:

¹ Several new properties have been purchased that will be included in the grazing program in coming years, including Gordon Ridge (Tunitas Creek OSP), and Purisima Uplands (Purisima Creek Redwoods OSP)

² This acreage accounts for grazing leases, and includes some ungrazed land (e.g. drainages, brush patches, etc.) A full inventory of actively grazed lands will result from the upcoming San Mateo Vegetation Map

- Safety
 - Human health
 - Environmental health
- Prevents and controls the most destructive pests
- Protects biodiversity
- Provides for public engagement
- Feasibility and effectiveness

Twenty (20) new pest control projects were determined to have a high priority for treatment on District lands (Table 6).

Table 6: New Pests Control Projects

Scientific Name	Species	Cal-IPC ^a rating	CDFA ^b rating	Alert	Gross Acres	Person Hours
<i>Genista monspessulana</i>	French Broom	High	Noxious	-	5.2	122
<i>Dipsacus sativus</i>	Teasel	Moderate	-	-	1	6
<i>Carduus pycnocephalus</i>	Italian thistle	Moderate	Noxious	-	2	8
<i>Cytisus scoparius</i>	Scotch Broom	High	Noxious		0.4	18
<i>Centaurea solstitialis</i>	Yellow starthistle	High	Noxious	-	0.1	4
<i>Carthamus lanatus</i>	Distaff thistle	Moderate	Noxious	-	1.0	0.21
<i>Eucalyptus globulus</i>	Eucalyptus	-	-	-	0.1	6
<i>Dittrichia graveolens</i>	Stinkwort	Moderate	Noxious	X	0.5	8
<i>Foeniculum vulgare</i>	Fennel	High	-	-	0.25	8
<i>Hedera helix</i>	English Ivy	High	-	-	0.1	4
<i>Cortaderia jubata</i>	Jubatagrass	High	-	-	1.8	70
<i>Pinus radiata</i>	Monterey Pine		-	-	0.5	12
Total					12.95	266.21
^a Cal-IPC – California Invasive Plant Council						
^b CDFA – California Department of Food and Agriculture						

Table 7: New Fuel Management Projects

Preserve	Location	Purpose	Treatment Type	Treatment Method	Gross Acres	Person-Hours
La Honda OSP	Driscoll-Djerassi	Fuel Break	Manual & Mechanical	Mowing & Cutting	1.0	8
Purisima Creek Redwoods OSP	Irish Ridge	Shaded Fuel Break	Manual & Mechanical	Mowing & Cutting	4	200
Saratoga Gap OSP	Stevens Canyon Ranch	Shaded Fuel Break	Manual & Mechanical	Mowing & Cutting	2	40



Figure 4: Preserve Partners volunteers remove Purple starthistle (*Centaurea calcitrapa*) at La Honda Creek OSP

4 Summary of Pest Control Treatments

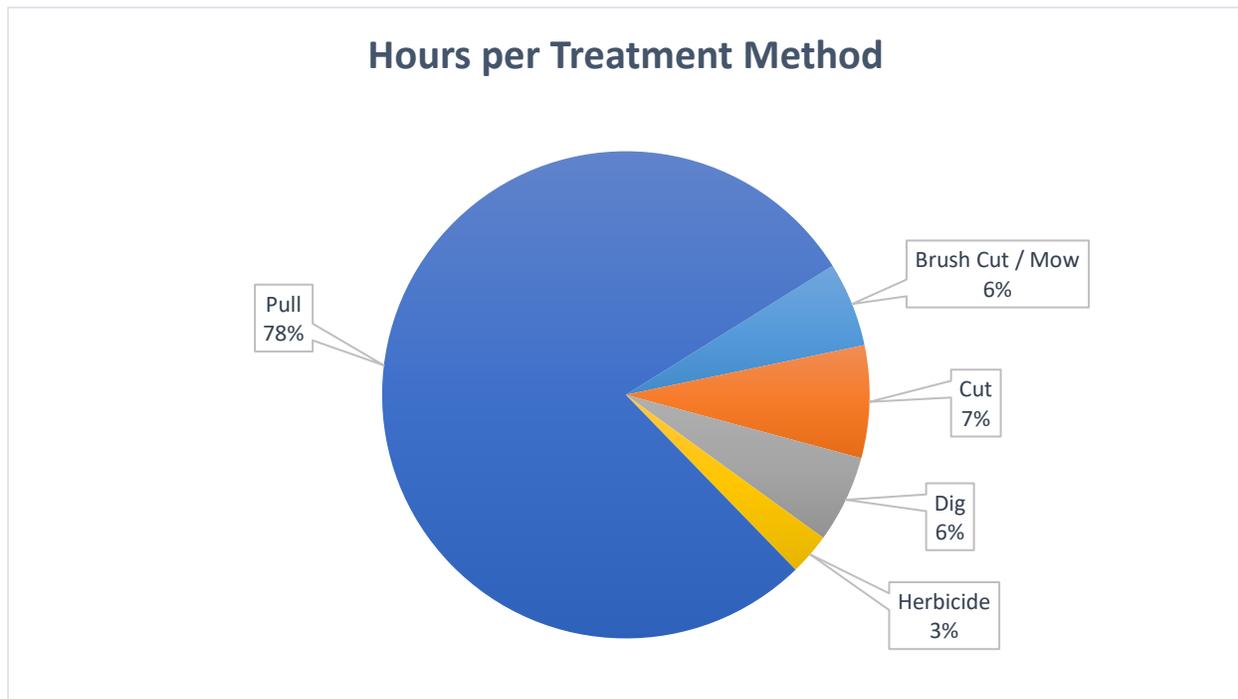
4.1 Invasive Plant Control

The following data reflects natural areas and does not include brushing/mowing of roads, trails, defensible space, or emergency landing zones. Data for brushing/mowing of roads, trails, defensible space, or emergency landing zones are not presented because these activities do not change from year to year.

Table 8: Treatment Methods and Hours in Natural Areas and Rangelands in 2019

Treatment Method	Hours			Total	% of Total
	Staff	Contractor	Volunteer		
Brush Cut / Mow	108	576	-	684	6 %
Cut	197	183	530	910	7 %
Dig	183	265	258	706	6 %
Herbicide	34	302	-	336	3 %
Pull	980	5,095	3,473	9,548	78 %
TOTAL	1,502	6,421	4,261	12,184	
% of Total	12 %	53 %	35 %		

Figure 5: Treatment Method Breakout



Manual weed pulling remains the most common treatment method at 78% of all hours; herbicide use accounted for only 3% of all hours. Herbicide hours were low in 2019 because of the implementation of the Santa Clara Valley Water District (Valley Water) Memorandum of Understanding (MOU), which focused on manual treatment methods. In addition, some past herbicide projects have effectively reduced the cover of the target invasive species enough that follow up manual control is feasible. In a typical year, herbicide use

accounts for approximately 10% of labor hours and may have periods of increased use as new projects are initiated.

During the creation of the IPM Annual Plan, treatment methods are evaluated using the best available science in weed management. The IPM Annual Plan, which is finalized in January of each year, lays out the work plan for the new calendar year. Treatment methods have shifted across the five years of the Program, with the largest change in the reduction of hours spent applying herbicide (reduced from 60.8% to 3 %, with a relative reduction of 57.8%) and the largest increase in the percentage of hours spent hand pulling (increased from 35.5% to 78%, with a relative increase of 42.5%).

The total number of hours for IPM-related work (Table 9) has increased by 20% from 2015 levels. Field staff hours have fluctuated since 2015 depending on other annual competing priorities, including the number of scheduled Measure AA capital improvement projects under construction. Volunteer and contractor hours have substantially increased since 2015. The hiring of a second Volunteer Program Lead in 2018 increased the capacity of volunteers for IPM projects, and in 2019 they have begun to host simultaneous projects. The five-year MOU grant agreement with Valley Water (R-17-79) provided substantial funding for manual IPM related work at Bear Creek Redwoods Open Space Preserve.

Figure 6: Resource Management by Crew Type

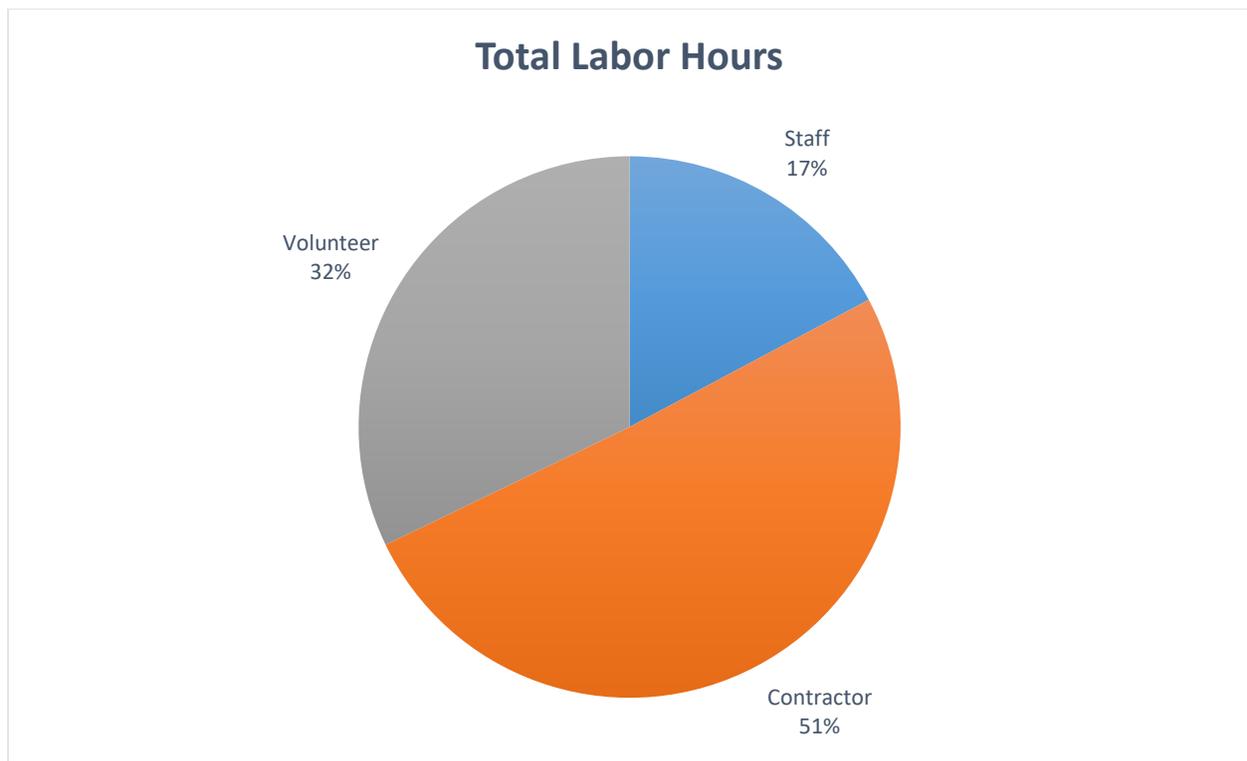
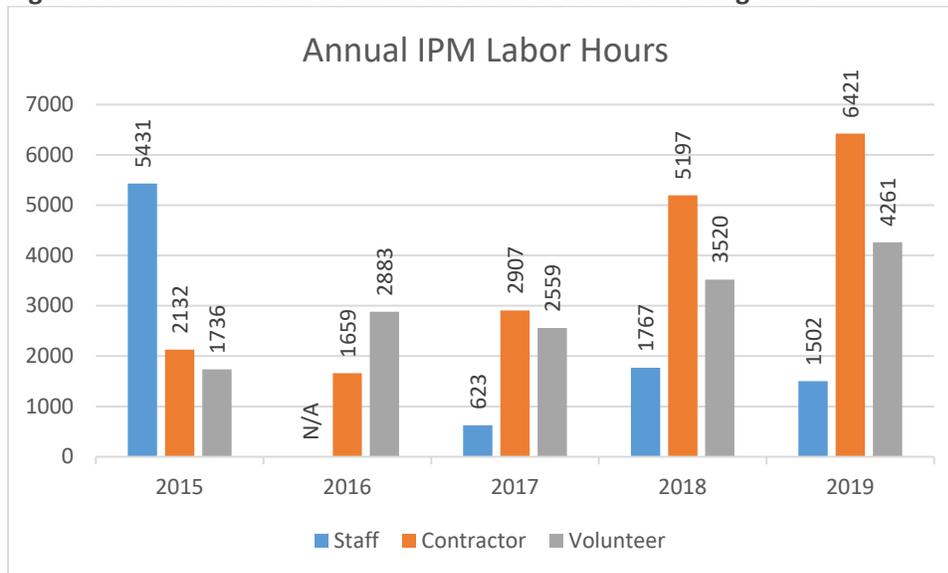


Table 9: Comparison of Hours by Crew Type and Year

Year	Staff	Contractor	Volunteer	Total
2015	5,431	2,132	1,736	9,299
2016	Unknown ³	1,659	2,883	4,542
2017	623	2,907	2,559	6,089
2018	1,767	5,197	3,520	10,484
2019	1,502	6,421	4,261	12,184

Figure 7: Annual IPM Labor Hours for Natural Lands and Rangeland⁴

Increased contractor hours are primarily due to large scale, Measure AA project-related mitigation work. In 2019, 323 contractor hours were spent removing non-native plant species at mitigation sites. Mitigation is required when District projects may potentially cause impacts to natural areas. This work often requires excessive labor input from restoration planning, site preparation, planting, site maintenance, and up to 10 years of follow-up monitoring.

Figure 8 (below) shows the comparative cost for different treatment methods for 2019. Mowing and brush cutting are shown as cost per gross acre. All other treatment methods are shown as cost per infested acre. The District uses the following hourly costs estimates for comparative cost analysis purposes only:

- Contractor - \$50.00 per hour
- Staff – \$43.45 per hour
- Volunteers - \$31.51 per hour⁵

³ Staff hours were not recorded into the Weed Database or CalFlora as this was a transitional year from one database to another.

⁴ In 2016, staff hours were not recorded into the Weed Database or CalFlora as this was a transitional year from one database to another.

⁵ Signifies the estimated value of volunteer work and not true cost, as this is pro bono, volunteer work. This value is used for analysis purposes only. Refer to: <https://independentsector.org/news-post/new-value-volunteer-time-2019/>

Figure 8: Treatment Cost per Acre

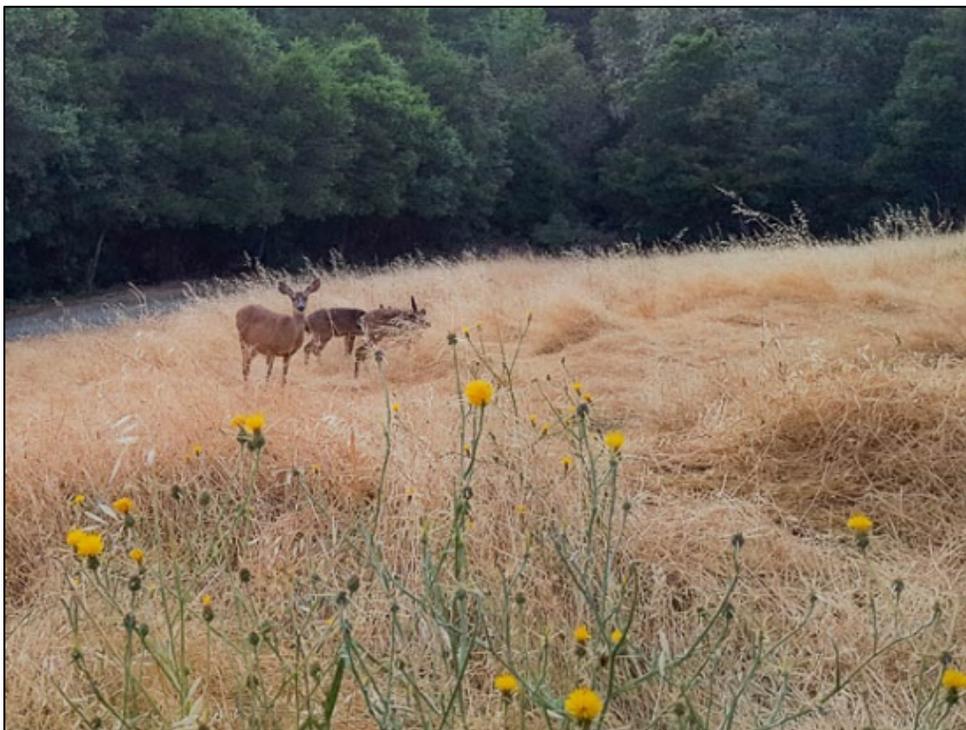
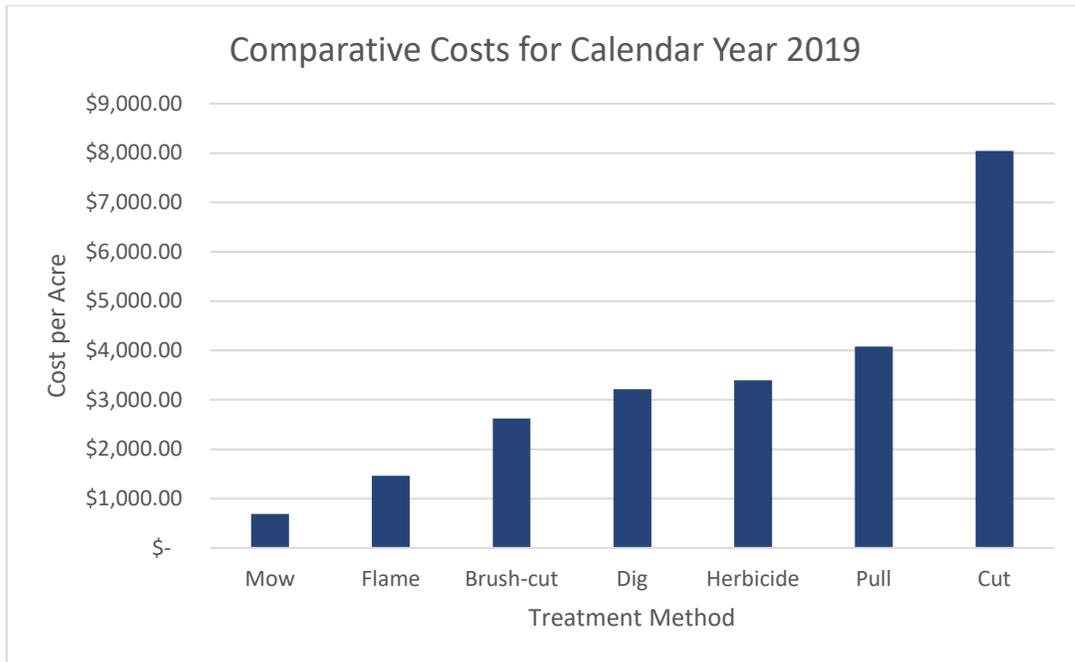


Figure 9: Yellow starthistle (*Centaurea solstitialis*) at Long Ridge OSP

5 Effectiveness of Pest Control Program

The IPM Program identifies the following criteria for assessing the effectiveness of the Program every year:

- Work health/exposure in buildings;
- Reduction of pesticide use in buildings;
- Per-acre herbicide use;
- Preservation of biodiversity and natural resource values;
- Public participation in pest control; and
- Staff training, public outreach, and educational activities.

5.1 Worker Health/Exposure in Buildings

The District is committed to lowering worker health/exposure risk classifications in buildings when pesticides are used. Specific pesticides were approved for use on buildings (Table 9) and are described in the 2014 IPM Program Environmental Impact Report. All are “Caution” labeled and pose a reduced risk to workers or occupants of treated buildings. A specific type of rodenticide bait (Cholecalciferol) is approved for use under very strict conditions; however, it was not utilized. Only prevention and traps were approved for rodent control in 2019.

Table 10: Pesticides Approved for Use in Buildings and Recreational Structures

Pesticide Category	Active Ingredient	Product Formulation	Purpose	Signal Word
Rodenticide	Cholecalciferol	Cholecalciferol baits	Rodent control	Caution
Insecticide⁶	Indoxacarb	Advion Gel baits	Structural pest control	Caution
	Hydroprene	Gentrol Point Source	Structural pest control I	Caution
	Fipronil	Maxforce Bait Station	Structural pest control I	Caution
	Sodium tetraborate	Terro Ant Killer II	Structural pest control	Caution
	Diatomaceous earth	Diatomaceous earth	Structural pest control	Caution

5.2 Reduction of Pesticide Use in Buildings

The District seeks to comprehensively oversee all pesticide use in and around District buildings, including use by tenants, which is expected to result in an overall reduction of pesticide use in buildings, and in particular, eliminate the use of pesticides around human occupants or visitors, or when chemicals can inadvertently escape into the surrounding wildland environment.

⁶ Employees, contractors and tenants may install approved ant and roach bait stations inside buildings in tamperproof containers without review by a Qualified Applicator License/Certificate holder.

5.3 Wasp Control for Public Safety

Many social wasps such as yellow jackets are native species and are generally only considered pests when their nests are located in areas where they are incompatible with human use. For example, when social wasps nest under the eaves of buildings or alongside trails, they can sometimes exhibit aggressive protective behaviors that can threaten humans with painful stings that can cause allergic reactions in some people. In locations where multiple stinging incidents occur, District staff control wasp nests using physical or chemical control methods. In 2019, there were five (5) yellow jacket nests treated with the pesticide Wasp Freeze II (active ingredient Prallethrin), all along District trails.

5.4 Per-acre Herbicide Use

The District seeks a reduction in per-acre usage of herbicides over time at individual sites and acknowledges that in some instances, chemical use will initially increase, followed by a reduction in herbicide use once the pest is eliminated or reduced. Most projects utilize an integrated treatment approach which incorporates several different treatment methods throughout the life of the project. Initial treatment can consist of intensive chemical or mechanical methods, and will typically shift towards low-intensity manual methods as the infestation becomes under control and the seedbank is eliminated.

Pulses of increased herbicide use should be expected in future years as new projects are initiated due to the District:

- Acquiring new lands with priority infestations,
- Identifying high priority fuel management areas, and
- Prioritizing new pest management sites on exiting lands.

District staff selected twelve (12) distinct herbicide projects to perform trend analysis:

- Bear Creek Redwoods, Phase I (two herbicides);
- Big Dipper Ranch (two herbicides);
- Driscoll Ranch (two herbicides);
- Los Trancos (two herbicides);
- Mindego Hill;
- Slender False Brome; and
- Stinkwort (two herbicides).

All but one of the selected treatment sites have shown a decline in herbicide use over time, with several sites not requiring any herbicide use at all. The treatment area at Big Dipper Ranch was expanded in 2019 due to progress made on target invasive species at Mindego Hill. This expansion in area resulted in an increase in herbicide use. As the density of the target invasive plant species declines, manual and mechanical treatment methods become more feasible and desirable. This is the expected trend for all herbicide treatment sites within the IPM program. Figure 10 below shows select sites where Roundup has been used for invasive species control. An in-depth technical report will be presented in two years (2021 Annual IPM Report) to allow for more data to be collected.

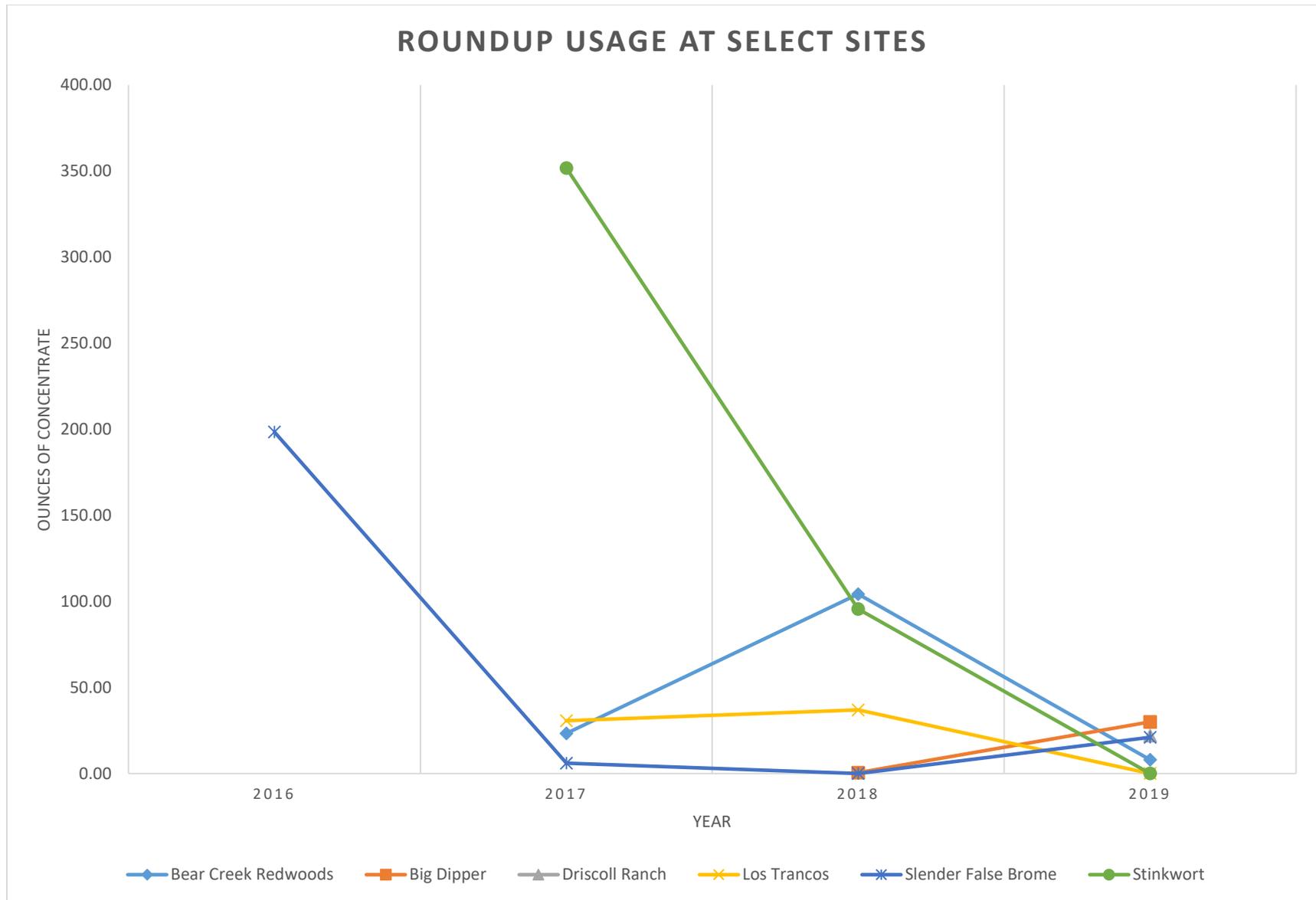


Figure 10: Roundup Usage at Select Sites

5.5 Preservation of Biodiversity and Natural Resource Values

As part of this section, District staff provides an annual qualitative assessment of natural resources conditions of IPM projects in natural areas, rangelands, and agricultural properties in the Annual IPM Report.

5.5.1 Natural Areas

In natural areas, herbicide and non-herbicide methods were used to control high priority invasive plants to protect and restore native vegetation at preserves.

5.5.2 Rangeland

The District uses conservation grazing to manage fuel (flammable vegetation) for fire protection; enhance the diversity of native plants and animals; help sustain the local agricultural economy; and foster the region's rural heritage. The District uses conservation grazing on more than 11,000 acres as a tool to manage grassland habitat on portions of these five preserves:

- Russian Ridge Open Space Preserve
- Skyline Ridge Open Space Preserve
- Purisima Creek Redwoods Open Space Preserve
- Tunitas Creek Open Space Preserve
- La Honda Creek Open Space Preserve

In the absence of natural disturbance (i.e. fire), the District periodically does brush removal on grasslands to slow the encroachment.

5.6 Volunteer Contributions to IPM

The public is an integral part of the success of the IPM program. Volunteers who assist with invasive plant control and detection are a valuable asset to the IPM program. In 2019, the District's Preserve Partner volunteers contributed 2,918 hours to resource management through seventy-two (73) outdoor service projects in eighteen (19) different Open Space Preserves. The District hosted eighteen (18) Special Group projects, a subset of Preserve Partners, which include school groups, technology companies, scout troops, running clubs, and other community groups.

Preserve Partner projects focused primarily on addressing seventeen (18) invasive plant species: French broom, Spanish broom, purple starthistle, yellow starthistle, Italian thistle, milk thistle, bull thistle, acacia, fennel, summer mustard, rose clover, teasel, stinkwort, vinca, barbed goatgrass, medusahead, and tocalote. French broom removal dominated Preserve Partner projects with twenty-eight (28) French broom projects taking place in thirteen (13) open space preserves.

"Pop-Up" projects began in 2018 as a new model for volunteer participation at Rancho San Antonio Open Space Preserve. A Pop-Up project is strategically located in a place with high trail use by visitors and an adequate population of easily identifiable invasive plants in order to engage and utilize the visitors already hiking in the preserve. Pop Up projects are not advertised in advance and registration is not required. A total of ninety-five (65) visitors helped to remove Italian thistle during the two Pop Up projects held on the Rogue Valley Trail in 2019.

There were nineteen active Advanced Resource Management Stewards (ARMS) in 2019. The ARMS volunteers work independently on resource management projects in designated preserve areas and on their own time. In total, the ARMS volunteers contributed 1,061 hours to resource management with project sites located in eighteen (18) open space preserves.



Figure 11: ARMS volunteer pulling French Broom at Bear Creek Redwoods OSP



Figure 12: Preserve Partners volunteers pull Hanging sedge (*Carex pendula*) at Purisima Creek OSP

Stewardship partnerships formalized in previous years continued in 2019. Grassroots Ecology contributed over 900 hours of resource management at two sites. French broom removal and yellow starthistle mowing coordination continued at the Hawthorns Property in Windy Hill Open Space Preserve.

In 2019, the Volunteer Program Partnership continued with the Student Conservation Association (SCA). This program exposes local, underserved youth to careers in the open space management field while providing Geographic Information System (GIS) and resource management services to the District. The

SCA contributed approximately 2,000 hours mapping coyote brush (*Baccharis pilularis*) over 25 project days in Rangelands at various open space preserves.

5.7 Staff Training, Public Outreach, and Educational Activities

5.7.1 Staff Training

The mandatory annual Pesticide Safety Training was held for all field staff at the Skyline Field Office in June of 2019. California Department of Pesticide Regulation required training information was presented by the District's IPM Coordinator, Tom Reyes. Rangers who only handle Wasp Freeze received an abbreviated training focused on wasp control in 2019.

In November 2019, the IPM Coordinator participated in the annual California Invasive Species Council symposium in Monterey, California. Tom Reyes helped Cal-IPC lead a training about planning IPM projects and gave a presentation about the San Mateo County Weed Management Area, of which Midpen is a part of.



Figure 13: District biologists give biological sensitivity training to staff and volunteers working in endangered species habitat

5.7.2 Regional Cooperation

Invasive species are not limited by jurisdictional boundaries, so it is of utmost importance to work with neighboring land management agencies to target invasive species at a regional scale. The District is a part of numerous regional cooperatives, including the San Mateo and Santa Clara Weed Management Areas (WMA). These cooperatives are coordinated from the County Agricultural Commissioner's offices and help foster communication and cooperation on high-priority species among agencies in the given region. Through WMAs, the District can apply for grants to receive funding for treating invasive species across multiple jurisdictions.

The District is also a part of the Santa Cruz Mountains Stewardship Network (SCMSN), which aims to coordinate actions across all three counties (San Mateo, Santa Clara, and Santa Cruz) in the Santa Cruz Mountains. The District is helping to develop an "Atlas" in partnership with Cal-IPC and CalFlora to help facilitate sharing GIS data related to invasive species and other natural resources. As the upcoming EDRR protocol is developed, tools such as this, which will facilitate regional inter-agency data sharing, will be critical to address emerging threats quickly.

6 Summary of Pesticide Use

The following tables summarize the use of pesticides on District lands by staff and contractors. This data excludes PG&E, which is not covered under the District's Integrated Pest Management Program. PG&E is required to report pesticide use to each County Agricultural Department separately.

<i>Pesticide</i>	<i>Trade Name</i>	<i>Active Ingredient</i>	<i>Amount Used (ounces)</i>	<i>Gross Acres Treated</i>	<i>Ounces/Acre</i>
Fungicide	Reliant	Potassium salts of phosphorus acid	4,608	-	-
Herbicide	Milestone	Aminopyralid	-	-	-
	Envoy Plus	Clethodim	-	-	-
	Transline	Clopyralid	14	10.8	1.3
	Roundup Custom	Glyphosate	28	73.5	0.4
	Roundup ProMax	Glyphosate	59.5	44.7	1.3
	Polaris	Imazapyr	29.8	0.98	30.4
	Capstone	Triclopyr + aminopyralid	94	1.05	89.5

Pesticide	Trade Name	Active Ingredient	Amount Used (ounces)	Gross Acres Treated	Ounces/Acre
	Garlon 4 Ultra	Triclopyr	2	trace	-
Insecticide		Prallethrin ⁷	113.5	-	-
Rodenticide		Cholecalciferol	-	-	-

Figure 14. Herbicide use from 2016-2019

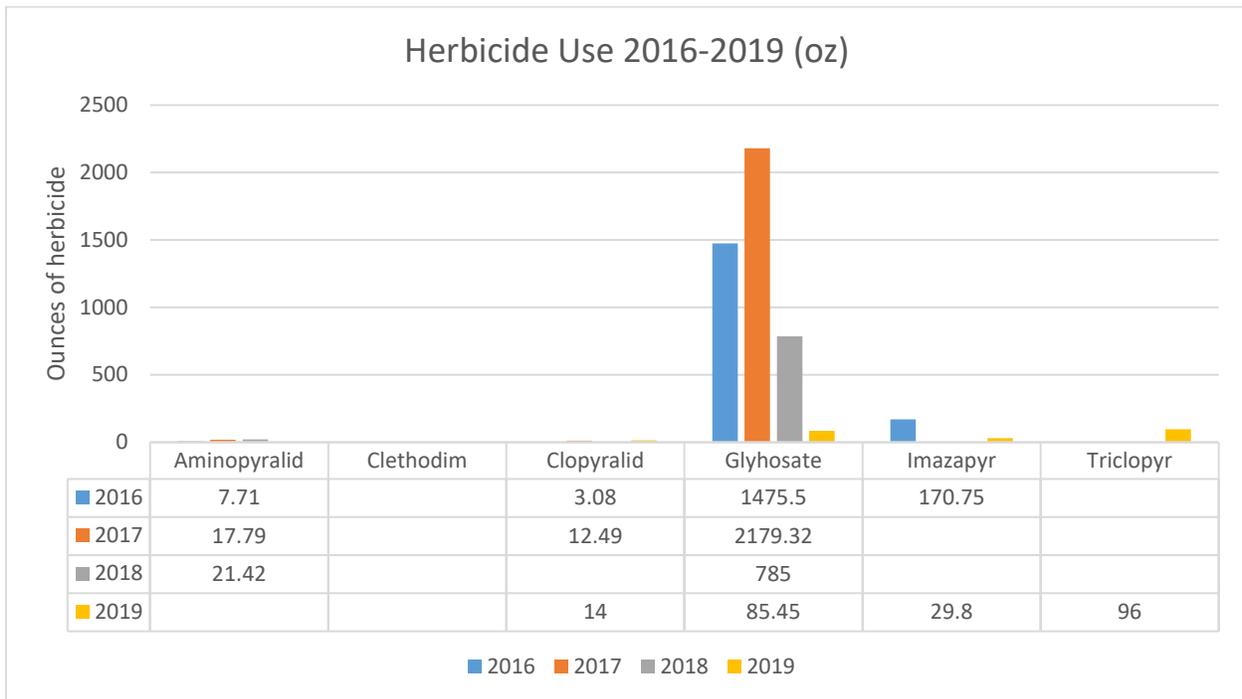


Table 11: Total herbicide used by species

Scientific Name	Product Trade Name	Total Ounces Used
<i>Acacia dealbata</i>	Capstone	24
<i>Acacia dealbata</i>	Roundup Pro Max	20
<i>Acacia melanoxylon</i>	Garlon 4 Ultra	2
<i>Ailanthus altissima</i>	Roundup Pro Max	4
<i>Baccharis pilularis</i>	Capstone	70
<i>Brachypodium sylvaticum</i>	Roundup Pro Max	5.45
<i>Brassica rapa var. rapa</i>	Roundup Custom	3
<i>Centaurea solstitialis</i>	Transline	14
<i>Dittrichia graveolens</i>	Roundup Pro Max	24

⁷ Prallethrin is used only to treat stinging insects when they pose a direct threat to public safety (i.e. nests adjacent to trails, restrooms, and parking lots).

Scientific Name	Product Trade Name	Total Ounces Used
<i>Ehrharta erecta</i>	Roundup Pro Max	2
<i>Eucalyptus globulus</i>	Roundup Pro Max	4
<i>Vinca major</i>	Polaris	29.8
Various (Restoration Site)	Roundup Custom	25

Table 12: Total herbicide used by Preserve

Preserve	Product Trade Name	Total Ounces Used
Bear Creek Redwoods	Capstone	70
Bear Creek Redwoods	Polaris	29.8
El Corte de Madera Creek	Roundup Pro Max	4
El Sereno	Roundup Pro Max	16
La Honda Creek	Roundup Pro Max	4
Pulgas Ridge	Roundup Pro Max	20
Purisima Creek Redwoods	Garlon 4 Ultra	2
Purisima Creek Redwoods	Roundup Pro Max	2
Russian Ridge	Roundup Custom	28
Russian Ridge	Transline	14
Sierra Azul	Capstone	24
Sierra Azul	Roundup Pro Max	8
Thornewood	Roundup Pro Max	5.45

7 Public Interactions

7.1 Notifications

7.1.1 Pesticide Applications

Prior, during, and after the application of a pesticide (including herbicides, insecticides, or other types of pesticides) on District preserves, employees or contractors post signs at the treatment area notifying the public, employees, and contractors of the District's use of pesticide. Posting periods designated below are the District's minimum requirements; signs may be posted earlier and left in place for longer periods of time if it serves a public purpose or if it provides staff flexibility in accessing remote locations.

- For pesticide application in outdoor areas of all District-owned preserves and in buildings that are not occupied or are rarely visited (e.g. pump houses), signs are posted at the treatment areas 24 hours before the start of treatment until 72 hours after the end of treatment. Signs stating “Pesticide Use Notification” are placed at each end of the outdoor treatment area and any intersecting trails.
- For urgent application of pesticides to control stinging insects, signs are posted at the treatment area 72 hours after the end of treatment, but no pre-treatment posting is required.
- For pesticide applications in occupied buildings such as visitor centers, offices, and residences, notification is provided to building occupants (employees, visitors, residents) 24 hours before the start of treatment by email, letters, or telephone calls. Additionally, for buildings that might be visited by more than just a single-family, signs stating “Pesticide Use Notification” will be placed at the entrances to the building 24 hours before the start of treatment until 72 hours after the end of treatment. The use of approved insecticidal baits in tamper-proof containers requires notification 24 hours before the start of treatment by email, letters, or telephone calls.
- The information contained in the pesticide application signs includes: product name, EPA registration number, target pest, preserve name and/or building, date and time of application, and contact person with a telephone number. The contact person is the IPM Coordinator.
- On lands that the District manages but does not own (e.g., Rancho San Antonio County Park), the District will provide notification of pesticide use in the same manner and applies the same actions as it does with its properties unless the contracting agencies have adopted more restrictive management standards. In those cases, the more restrictive management standards would be implemented by the District.
- In the event of an immediate public safety concern, notification occurs at the time of treatment, but pre-posting may not be possible.

Pesticide Treated Area
Application of a Pesticide is in this area.

Signal Word: Caution Warning Danger

Product Name: _____ Manufacturer: _____

Active Ingredient: _____ EPA Registration #: _____

Target Pest(s): _____

Preserve: _____ Location: _____

Date(s) of Application: _____ to _____

Date Sign May Be Removed: _____

If you have any questions regarding this notification or require additional information,
Contact: City Silenciosal (850) 691-1300




Figure 15: Pesticide Notification Sign

All contractors notify the District before application on any property and comply with requirements for notification and posting of signs described above.

At the discretion of District staff and depending on the site conditions, neighboring landowners are notified if the District is conducting pest management near a property line.

7.2 Inquiries

The District received several inquiries in 2019 concerning the IPM Program. This list does not include public comments received at IPM-related Board meetings.

Table 13: Public Inquiries into the IPM Program

Date	Inquirer	Contact Method	Request/Comment	Response
3/6/2019	Raptors are the Solution (RATS)	Board Contact Form	Inquired about whether or not we use anticoagulant rodenticides at Midpen.	Midpen does not use anti-coagulant rodenticides. Midpen has one rodenticide on the Approved Pesticide List, and it has not been used in several years.
5/13/2019	Preserve Visitor	General Info	Request to stop using glyphosate herbicides	Explained safety protocols in place to protect people and the environment.
7/23/2019	Preserve Neighbor near Long Ridge	Phone	Responding to stinkwort notification flyers. Notified of stinkwort on his property.	Informed him of the stinkwort control efforts in the nearby areas.
7/23/2019	BCR Visitor	Email	Saw pesticide notification sign at BCR and was concerned about bee health.	Explained safety protocols in place to protect people and the environment.
9/11/2019	Pulgas Visitor	Email	Does not think that Midpen should use glyphosate	Explained safety protocols in place to protect people and the environment.
10/3/2019	Sierra Azul Visitor	Phone	Concerned about stinkwort growing along Hicks Road.	Informed him of the stinkwort control efforts in the nearby areas of Sierra Azul.
Multiple (20)	Russian Ridge Visitor	Various (phone, email, in-person)	Provided a proposal to provide vegetation management at Russian Ridge; submitted a variety of information requests and concerns about District practices.	Staff have provided several point by point responses and engaged in discussion with the inquirer.

8 Consultants and Contractors

The District contracts with consultants and contractors to assist in the implementation and maintenance of the IPM Program. Table 14 outlines the scope of services and work by these firms.

Table 14: Consultants and Contractors who performed IPM related work⁸

<i>Firm</i>	<i>Scope of Services/Work</i>	<i>Amount</i>
<i>AECOM</i>	Biomonitoring for invasive species management at Russian Ridge OSP	\$24,560
<i>CalFlora</i>	Annual subscription and improvements to the CalFlora Weed Manager Database	\$8,275
<i>Community Tree Service</i>	Bear Creek Redwoods Tree Farm Mitigation Project	\$88,500
<i>Ecological Concerns</i>	Treatment of invasive species District-wide	\$380,154
<i>On Point Land Management</i>	Preparation of Pest Control Recommendations	\$3,750
<i>Phytosphere Research</i>	Treatment of Sudden Oak Death in three (3) District Preserves	\$11,677
<i>San Jose Conservation Corps</i>	Treatment of invasive plant species at Purisima Creek Redwoods OSP	\$30,000
<i>San Mateo County RCD</i>	Treatment of slender false brome on private properties that have the potential to infest District lands	\$65,221
<i>Sara Grove, PhD Ecological Consulting</i>	Preparation of the pesticide Literature Review	\$10,000

9 Compliance with Guidance Manual

9.1 Updates to the IPM Program

On February 22, 2019 (R-19-11), the full Board approved the IPM EIR Addendum, which included six (6) new recommendations aimed at further reducing glyphosate use and increasing worker and visitor safety. These recommendations have been incorporated into the IPM program beginning in the 2019 field season, and are summarized below:

1. Increase Field Crew Training
 - a. Ensure all District field crew who perform herbicide treatments have specialized experience and training in pesticide safety, IPM principles, and special status species.
 - b. Evaluate the suitability of securing Qualified Applicator Certificate (QAC) certifications for additional field staff, and implement as appropriate.
2. Re-examine ongoing IPM projects
 - a. Identify suitable sites to shift treatment methods away from glyphosate.
 - b. Ensure that all projects are performed at the time of year and phenological window for maximum effectiveness, thereby increasing the efficiency of current pesticide treatments.
3. Add Garlon 4 Ultra and Capstone to the list of approved pesticides
 - a. Garlon is more effective at controlling woody vegetation than glyphosate
 - b. Capstone is more effective at controlling some broadleaf weed species than glyphosate
4. Assess the availability of an alternative pesticide to replace glyphosate. This herbicide would be the safest available, broad-spectrum, post-emergent herbicide with minimal residual soil activity

⁸ This list is not to be considered exhaustive as some contracts contain IPM related work that is secondary to the main scope (e.g. plant maintenance contracts for mitigation sites).

5. Expand the BMPs that reduce staff and visitor exposure to pesticides.
 - a. Establish no-spray trail buffers where no herbicides can be sprayed within 5-feet of trails, trailheads, or parking lots UNLESS a 24-hour trail closure is put into place.
 - b. Define “Spare-the-Air” days as a no-spray day due to the likely possibility of an inversion layer being present.
6. Implement an annual pesticide literature review of all newly published toxicological research and court proceedings related to pesticides on the “Approved Pesticides List” to inform updates to the IPM Program.

9.2 Experimental Pest Control Projects

9.2.1 Slender False Brome (*Brachypodium sylvaticum*)

The District, RCD, and Santa Clara University partnered to assess the efficacy of several non-herbicidal treatment methods, including mechanical mowing and several types of mulch. Field experiments and data collection for non-herbicide control of Slender false brome were concluded in 2019, and a final report is expected in December 2020.

9.2.2 Tall Oatgrass treatments

Tall oatgrass occurs in dense monocultures in several grasslands throughout the District, possibly introduced as forage from earlier grazing operations. To restore biodiversity in these grasslands, the District plans to implement a treatment study in Long Ridge OSP in Fiscal Year 2020-21 (FY21) to test the efficacy of a treatment method described in the academic journal *Applied Vegetation Science*. If trial treatments prove successful, this method will be expanded to infestations within Skyline Ridge OSP, Los Trancos OSP, and Monte Bello OSP.

9.2.3 Sudden Oak Death (SOD)

The District partnered with Phytosphere to test several potential treatment methods for Sudden Oak Death, including targeted Bay tree removal and fungicide applications. While unlikely to result in viable landscape-level treatment options, this is an important contribution to SOD science and may provide tools to protect significant heritage oaks and areas with high natural resource value. A final report is expected in December 2020.

9.2.4 Pesticide Literature Review

To assist with an understanding of the least harmful and most effective pesticides to use in the IPM Program, Midpen has entered a 4-year partnership with a UC Santa Cruz researcher to perform an annual literature review of the latest science surrounding the products on our List of Approved Pesticides. The scientific literature review focuses on land management with pesticides in natural areas or rangeland as it relates to human and environmental health. The District has received the 2015-2018 Pesticide Literature Review and Annotated Bibliography, which is now available to the public on the District website. The District received the draft 2019 Review in June 2020, and the final version will be provided to the Board and posted on the District’s website. Glyphosate continues to undergo a significant amount of scientific studies related to human and environmental health. Most notably, a new study correlates increased rates of non-Hodgkin’s

lymphoma (NHL) in workers who were at the highest frequency and intensity of exposure in agricultural settings. Due to the very low use of glyphosate at the District and extensive Best Management Practices followed during applications, these new findings should not impact the IPM Program.

9.3 Changes to Guidance Manual

9.3.1 Updating the List of Approved Pesticides

The List of Approved Pesticides is intended to change over time as the science of pest control advances and more effective, safer, and less harmful pesticides are developed; as manufacturers update, discontinue, or substitute products; and as the District's target pests change over time.

In instances where new products with new active ingredients are found to be safer, more effective, and/or less costly than products on the List of Approved Pesticides, the District may elect to add new pesticides. This type of change typically requires additional toxicological review, and depending on the results, may also require additional environmental review.

9.3.1.1 *Use of the disinfectant Virex II*

Per the IPM program, in the event of an emergency (such as a human health disease outbreak), pesticides that are not included on the List of Approved Pesticides may be used for short periods. In these unusual situations the District will comply with required regulatory procedures, then will evaluate the emergency response pesticide use and determine if its IPM program needs to be modified to accommodate similar future emergencies. To protect staff during the COVID-19 pandemic, the District is using the viral disinfectant Virex II (active ingredient didecyl dimethyl ammonium chloride) to clean offices, vehicles, and other high-touch surfaces. Virex II in its undiluted form is registered as a pesticide, and only trained staff who hold valid Qualified Applicator Certificates (QAC) with the CA Department of Pesticide Regulation (DPR) are authorized to mix the undiluted product. The District is only cleaning with the product in its diluted form, which is not regulated and is a widely used cleaning disinfectant. However, it is only available in concentrate so trained staff must first dilute it for use as a disinfectant. District staff will continue to use Virex II to clean surfaces at regular intervals throughout the duration of the pandemic. The District will evaluate whether this pesticide or other suitable pesticides authorized to use against the virus by the Department of Pesticide Regulations, should be permanently added to the District's Approved Pesticide List. The Annual IPM Report, as approved by the General Manager and accepted/approved by the Board of Directors will be the basis for making changes to the Program, including modification of any IPM procedures or changes to the List of Approved Pesticides.

11 List of Preparers and Contributors

MROSD

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Appendix A – Invasive Plant Treatment List

Ongoing and general maintenance plant pest species that were treated in 2019 sorted by total treatment hours:

Scientific Name	Common Name	Cal-IPC Rating	State Noxious Weed	Labor Hours
<i>Genista monspessulana</i>	French broom	High	X	5294.78
<i>Hedera helix</i>	English ivy	High		1531.35
<i>Centaurea solstitialis</i>	Yellow starthistle	High	X	753.8
<i>Vinca major</i>	Vinca	Moderate		752.4
<i>Carthamus creticus</i>	Smooth distaff thistle		X	389
<i>Centaurea calcitrapa</i>	Purple star thistle	Moderate	X	359.95
<i>Carduus pycnocephalus</i>	Italian thistle	Moderate	X	357
<i>Cortaderia jubata</i>	Andean pampas grass	High	X	351.8
<i>Dittrichia graveolens</i>	Stinkwort	Moderate	X	320.45
<i>Aegilops triuncialis</i>	Goatgrass	High	X	298
<i>Dipsacus fullonum</i>	Wild teasel	Moderate		245.2
<i>Spartium junceum</i>	Spanish broom	High	X	184.2
<i>Pseudotsuga menziesii</i> (cultivar) ⁹	Douglas fir			152
<i>Conium maculatum</i>	Poison hemlock	Moderate		140.75
<i>Ehrharta erecta</i>	Upright veldt grass	Moderate		135.85
<i>Acacia dealbata</i>	Silver wattle	Moderate		126
<i>Hirschfeldia incana</i>	Mustard	Moderate		121.75
<i>Carex pendula</i>	Hanging sedge	Watch		115.5
<i>Phalaris aquatica</i>	Harding grass	Moderate		85.15
<i>Eucalyptus globulus</i>	Blue gum	Limited		74.5
<i>Baccharis pilularis</i> ¹⁰	Coyote brush			68
<i>Acacia melanoxylon</i>	Blackwood acacia	Limited		60.5
<i>Foeniculum vulgare</i>	Fennel	Moderate		57.25
<i>Silybum marianum</i>	Milk thistle	Limited		54.5
<i>Dipsacus sativus</i>	Indian teasel	Moderate		51.1
<i>Typha domingensis</i> ¹¹	Cattail			45
<i>Brachypodium sylvaticum</i>	Slender false brome	Moderate	X	35.25
<i>Aegilops cylindrica</i>	Jointed goatgrass	Watch	X	29.47
<i>Rubus armeniacus</i>	Himalayan blackberry	High		22.5
<i>Vinca minor</i>	Common periwinkle			21
<i>Cytisus scoparius</i>	Scotch broom	High	X	20.25

⁹ Douglas Fir cultivars at a former tree farm in Bear Creek Redwoods were removed for mitigation.

¹⁰ Although *Baccharis pilularis* (coyote brush) is a native species, the District selectively removes this to slow down the encroachment into and type conversion of California grasslands.

¹¹ *Typha domingensis* (cattail) is selectively removed for aquatic habitat improvements for Special Status Species.

Scientific Name	Common Name	Cal-IPC Rating	State Noxious Weed	Labor Hours
<i>Pinus radiata</i> (cultivar) ¹²	Monterey pine	Limited		16
<i>Cirsium vulgare</i>	Bullthistle	Moderate	X	15.6
<i>Plantago lanceolata</i>	Ribwort	Limited		12.25
<i>Delairea odorata</i>	Cape ivy	High	X	12
<i>Elymus caput-medusae</i>	Medusa head	High	X	11
<i>Myosotis latifolia</i>	Wide leaved forget me not	Limited		10
<i>Sonchus oleraceus</i>	Sow thistle			10
<i>Rumex crispus</i>	Curly dock	Limited		10
<i>Avena fatua</i>	Wildoats	Moderate		9
<i>Medicago polymorpha</i>	California burclover	Limited		8
<i>Brassica nigra</i>	Black mustard	Moderate		8
<i>Centaurea melitensis</i>	Tocalote	Moderate	X	7.5
<i>Ranunculus californicus</i>	Common buttercup			7
<i>Solanum furcatum</i>	Forked nightshade			6
<i>Polygonum aviculare</i>	Prostrate knotweed			6
<i>Brassica rapa</i>	Common mustard	Limited		6
<i>Baccharis pilularis ssp. Consanguinea</i>	Coyote brush			5
<i>Helminthotheca echioides</i>	Bristly ox-tongue	Limited		4
<i>Stellaria media</i>	Chickweed			4
<i>Taraxacum officinale ssp. officinale</i>	Common dandelion			4
<i>Trifolium hirtum</i>	Rose clover	Limited		4
<i>Carduus pycnocephalus ssp. pycnocephalus</i>	Italian thistle	Moderate		3.5
<i>Cynodon dactylon</i>	Bermuda grass	Moderate		3.5
<i>Helminthotheca echioids</i>	Bristly ox-tongue	Limited		3.5
<i>Erodium botrys</i>	Big heron bill			3
<i>Bromus diandrus</i>	Ripgut brome	Moderate		2.5
<i>Ailanthus altissima</i>	Tree of heaven	Moderate	X	1.4
<i>Solanum nigrum</i>	Black nightshade			1
<i>Senecio vulgaris</i>	Common groundsel			1
<i>Hypericum perforatum ssp. perforatum</i>	Klamathweed	Limited		1
<i>Avena sativa</i>	Wild oat			1
<i>Lysimachia arvensis</i>	Scarlet pimpernel			0.5
<i>Brassica rapa var. rapa</i>	Turnip			0.5
<i>Lactuca serriola</i>	Prickly lettuce			0.5
<i>Lactuca saligna</i>	Willow lettuce			0.5

¹² *Pinus radiata* (Monterey pine) is the most widely planted commercial timber tree in the world. However, in its native range, consisting of five populations in California and Baja California, Mexico, the species is threatened by several human-caused impacts: development, human-dispersed plant pathogens, non-native herbivores, etc. Cal-IPC's assessment is specifically based only on populations, stands, or individuals of the species that have become established due to human introductions, or reasonably considered to have been dispersed from such human introductions of the species.

Scientific Name	Common Name	Cal-IPC Rating	State Noxious Weed	Labor Hours
<i>Erigeron bonariensis</i>	Flax-leaved horseweed			0.25
<i>Carthamus lanatus</i>	Woolly distaff thistle	High	X	0.2
<i>Leucanthemum vulgare</i>	Oxe eye daisy	Moderate		0.1
<i>Holcus lanatus</i>	Common velvetgrass	Moderate		0.1
<i>Poa bulbosa</i>	Bulbous blue grass			0.01