San Mateo County Parks Department
Integrated Pest Management (IPM) Program
2025 Annual Report



Stinkwort (*Dittrichia graveolens*) seedling hand-pulled by San Mateo County Parks Staff at San Bruno Mountain State and County Park

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Table of Contents

Overview 3
2025 Summary 5
IPM Best Practices for Natural Resource Management 8
Wildfire Fuel Management 10
Habitat Enhancement 14
Park Operations 19
Volunteer Stewardship 21
Future Directions 24
References 25
Appendix A – 2025 County Parks volunteer weeding hours 26
Appendix B – 2025 County Parks herbicide treatments 27
  Summary of organic herbicide trial treatments 27
Appendix C – 2025 County Parks Organic Herbicide Trial Qualitative Results 28
Appendix D – Comparison of County Parks IPM projects across years 30

Overview

The San Mateo County Parks Department (County Parks) utilizes science-based Integrated Pest Management (IPM) practices to improve habitat quality, protect biodiversity, mitigate wildfire risk, and ensure safe recreation opportunities within the County Parks system. IPM is an effective ecosystem-based stewardship strategy that focuses on the efficient and long-term prevention of pests or their damage through an integration of techniques and tools such as biological control, habitat manipulation, and modification of cultural practices **(UCANR, 2024)**. Chemical treatments (e.g. herbicides) are a "last resort" tool only used in integration with above techniques when non-chemical (i.e. manual or mechanical) management approaches are found to be either ineffective or infeasible. Several of the high priority weed species that County Parks manages require chemical treatments for the most effective control. Chemical treatments are always in accordance with established state and federal regulations, County guidelines, and IPM Best Management Practices (BMPs) and are done so with the goal of only removing target organisms. Herbicides are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.

County Parks' IPM program supports the department's mission of preserving the County's natural and cultural treasures and providing safe, accessible parks, recreation, and learning opportunities that enhance the community's quality of life. Through vegetation management projects, County Parks maintains ecosystem health and function, controls the spread of invasive species, enhances and restores habitat for rare plant and wildlife species and other sensitive natural resources, maintains park infrastructure such as trails, and improves public safety by mitigating the threat of wildfire by reducing fuel loads.

Of note, invasive plant species have greatly altered many of California's natural plant communities. The Intergovernmental Platform on Biodiversity and Ecosystem Services has identified invasive species as a major threat to nature and nature's contributions to people and good quality of life, highlighting that invasive species have contributed to up to 60% of global extinctions **(IPBES, 2023)**. Because they have not co-evolved with native organisms, invasive plants are generally less susceptible to predation and diseases of our region. Invasive plants are extremely adaptable and can thrive in a wide range of conditions. They can grow quickly, reproduce early, produce many long-lasting seeds, and tolerate disturbance. These non-native species reduce native biodiversity by gradually crowding out or competing with native plants for water, nutrients, and sunlight, and by reducing or modifying habitat for native wildlife. Dense stands of invasive plant species can also create significant wildfire threats across California landscapes, increasing the threat of catastrophic wildfires in our region.

Without actively managing the landscape to protect native biodiversity and habitat value, the department risks losing the presence of sensitive species, and in some cases having species go extinct or become extirpated from an area, such as the Coast Yellow

leptosiphon, found only in a single isolated location on the San Mateo coast, or the Mission blue butterfly and San Bruno elfin whose populations reach their highest numbers in San Mateo County parks. In total, there are 81 rare, threatened, and endangered species (50 plant and 31 wildlife) that are found in the San Mateo County parks system. The health of these populations depend on County Parks' active and effective stewardship. Moreover, there are numerous residential communities that benefit from the department's efforts to mitigate wildfire risk.

In accordance with the department's IPM program, County Parks uses a variety of treatment methods, often in combination to increase efficacy. These methods include mechanical and physical controls, cultural controls, biological controls, and chemical controls.

Mechanical controls include the use of hand tools to dig or pull weedy plants, mowing and brushing using hand-held or heavy equipment, mastication, felling, and pruning.

Cultural controls include altering human behavior to prevent and reduce the spread of pests with tools such as boot brushes at park trail heads, and using tarps or mulch to suppress weeds before they sprout. Additional examples of cultural practices that the Department is currently exploring include prescribed fire (with approval from CALFIRE, local fire agencies, and all other relevant regulatory agencies) and grazing with goats and cattle.

Biological controls are organisms that have naturally evolved with a pest organism in its native range and reduce the population of that pest through predation, parasitism, or infection. These "natural enemies" are approved by the US Department of Agriculture prior to release **(USDA, 2024)**. For example, a pilot release of Cape Ivy shoot-tipped galling flies has been trialed in our parks to reduce the spread of Cape Ivy which is an invasive vine that suppresses native riparian vegetation, especially along the San Mateo coast-side.

Chemical controls include herbicides listed as effective in *Weeds of California and Other Western States* (**DiTomaso and Healy 2007**), a University of California Agriculture and Natural Resources publication, or by the California Invasive Plant Council. Any herbicides used within County Parks are approved for use by all levels of federal, state, and local regulation, and are judicially applied using targeted application methods. The County of San Mateo does not authorize broadcast application within County parks.

In accordance with County Parks' IPM program and California law, the department's Natural Resource Management Division (NRM) works with a Pest Control Advisor (PCA) licensed by the California Department of Pesticide Regulation with expertise in wildland IPM to establish written pest control recommendations (PCRs) before the application of any herbicides (see IPM Best Practices for Natural Resource Management on page 8 for further information on the PCR process).

This report describes the vegetation management IPM activities conducted by County Parks staff, contractors, and volunteers in 2025. Projects include those conducted with a focus on wildfire fuel management, habitat enhancement, parks operations, and volunteer opportunities.

2025 Summary

In 2025, using the County Parks IPM program as a guide, the department conducted vegetation management activities across 1525.5 acres of parkland including 113 miles of trail, hosted 70 volunteer weeding events which accounted for more than 4,763 volunteer-hours, and performed 5 large-scale fuel reduction projects (**Appendix A, B**). Objectives of the department's IPM work include: improving public safety by mitigating the risk of wildfire, enhancing habitat value by protecting and expanding native ecosystems, managing invasive species by controlling and reducing their presence, and ensuring safe recreation opportunities by maintaining park facilities. County Parks staff, volunteers, and contractors utilized the full spectrum of treatment strategies within the IPM toolbox, including mechanical control using hand tools, power tools, and heavy machinery; cultural control strategies such as mulching, tarping, and preventative decontamination strategies for equipment and boots; and chemical control involving the targeted use of herbicides. No biological controls were used in the parks in 2025.

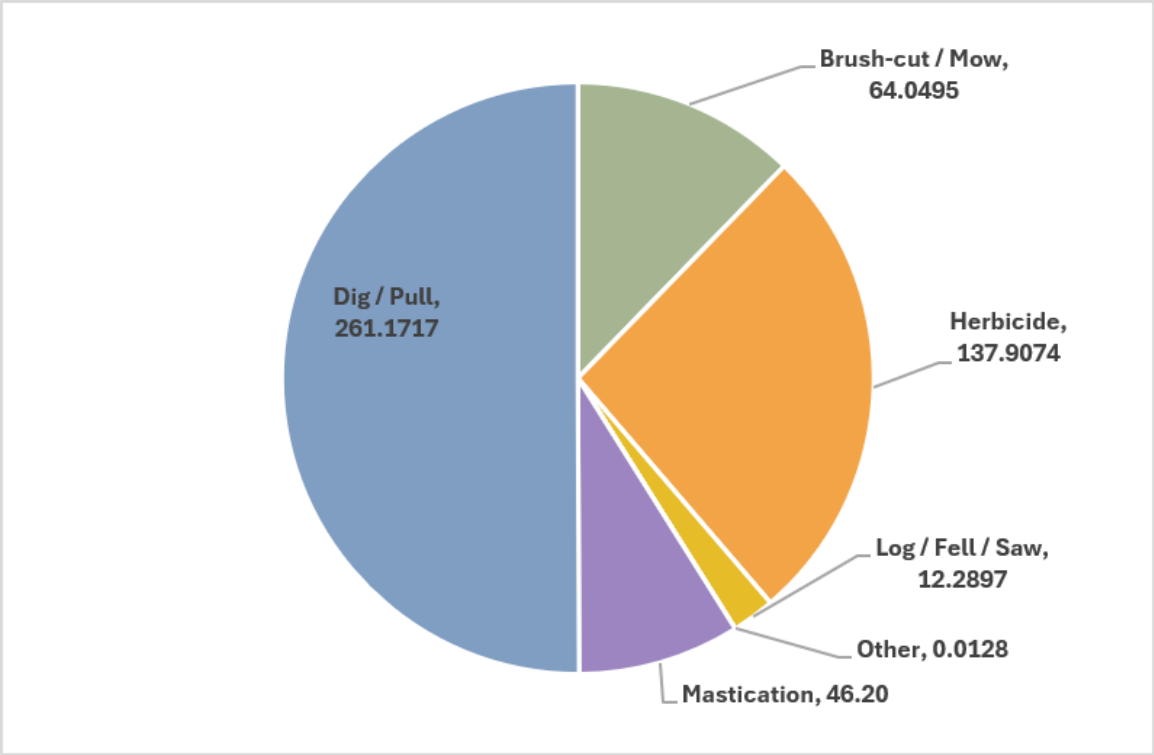

Figure 1. County Parks 2025 IPM vegetation management projects broken down by primary treatment type. In this figure, acreage is represented by gross acres rather than

infested acres. Gross acres encompass the entire area that was scoped for a pest infestation, and overestimates the exact area where treatment was required. For example, if 1.0 gross acre of an invasive vegetation pest was treated using hand pulling techniques and the pest species represented 40% cover of that acre, then only 0.4 (infested) acres were hand pulled. Please note, for the purpose of this report this will be represented as 1.0 gross acre in the charts. Moreover, if an acre had ten (10) Eucalyptus trees that were treated using the cut-stump application method, that will be represented as 1.0 gross acre in the charts despite the fact that ten trees individually cover less than 1.0 acre. For clarity on how herbicides are applied during chemical treatment, please see **Figure 3**. All herbicide treatments are targeted and do not involve broadcast application of materials on the landscape. Volunteer weeding and park operations data are not included in the acreage here as these projects are not mapped, however volunteers contributed an additional 4,763 hours of hand weeding work in our parks and ranger staff completed total of 7,745.6 staff-hours to manage 1083.6 acres of parklands for visitor safety and park operations.

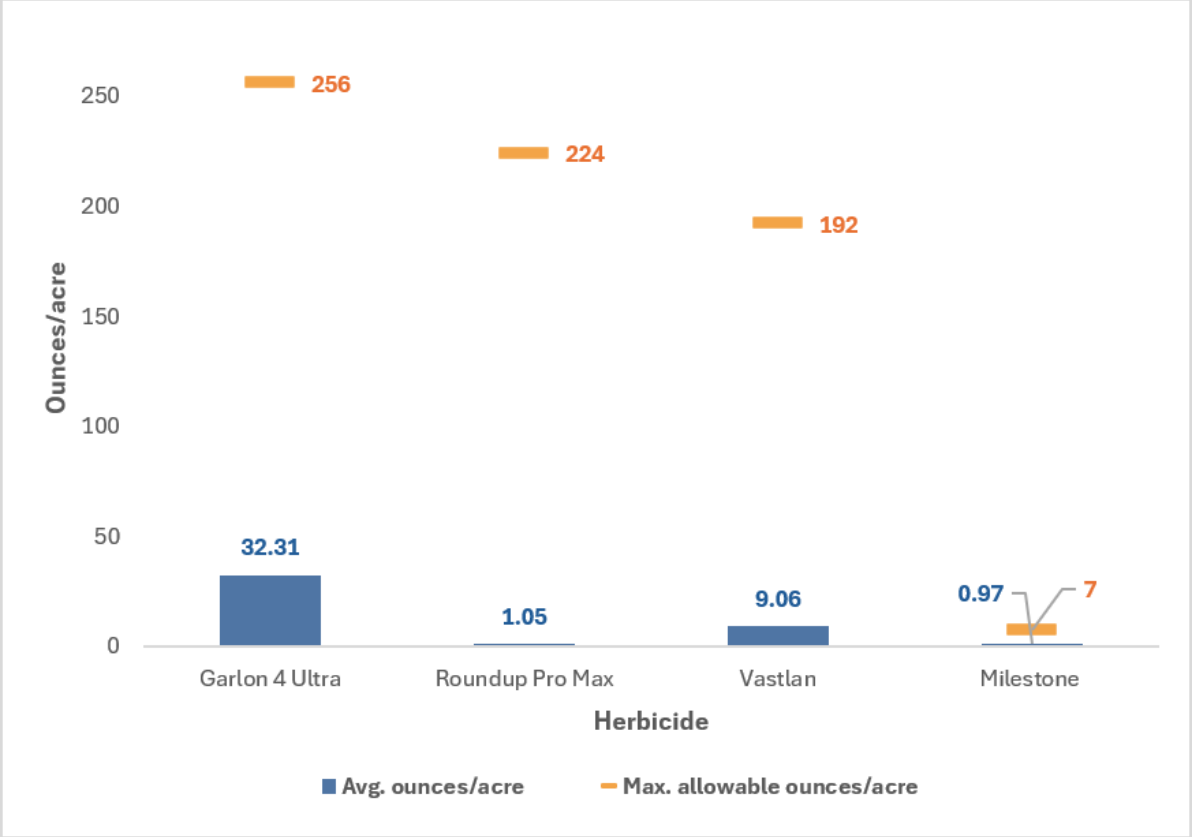

Figure 2. The average ounces/acre of herbicides used for County Parks IPM treatments within the San Mateo County Park system in 2025. Blue (dark) bars represent actual use averages, while orange (light) bars represent the maximum allowable rate according to the label which is reviewed and approved by the EPA. In some cases, the

label has multiple maximum rates, depending on the land use type. In these instances, the lowest maximum use rate is represented, regardless of the land use type or application locations.

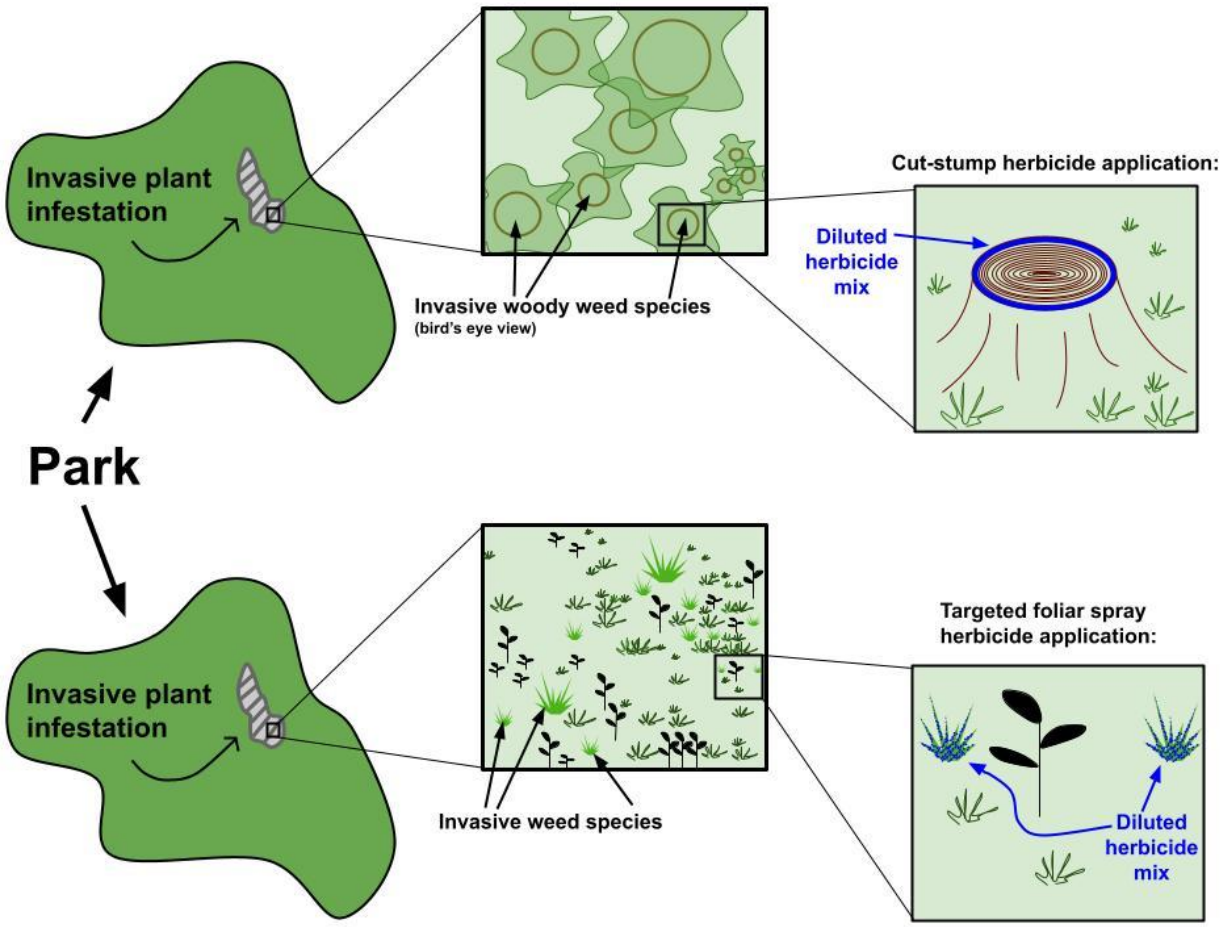

Figure 3. Visual examples of the two herbicide application techniques used in County Parks. The top example is a cut-stump technique in which an herbicide mix is applied directly to the cambium of the exposed stump after woody vegetation is removed. This technique prevents the stump from re-sprouting and is an important tool for managing woody species that are not killed by the initial cut such as Eucalyptus or Broom species. The bottom example is a targeted foliar application. In this technique, herbicide is only applied to the target pest species, and any natives or species desired for retention within the infested area are not treated. If a pest species and native species are overlapping, the applicator can use a shield to prevent any application to the native species. In some cases, the department may choose to skip treatment of these pest individuals. Another technique to prevent treatment of non-pest species in this instance is to apply herbicide only to the side of the target plant that is opposite the plant to be retained. Please note, broadcast application of herbicide is not authorized in County parks per County Board of Supervisors' resolution.

IPM Best Practices for Natural Resource Management

Using conservation and ecological principles and practices grounded in science, County Parks' Natural Resource Management (NRM) Division manages the land, water, soil, plant and animal resources within the County park system to achieve healthy ecosystems. The primary objectives of NRM's IPM work are (i) to conserve and enhance habitat for rare plant and wildlife species and (ii) to maintain ecosystem function and resilience to stressors such as climate change, drought, disease, and wildfire. NRM accomplishes these objectives through early detection and rapid response to new weed infestations and careful identification, prioritization, and implementation of vegetation management projects to manage existing weed infestations and protect native species and high-value habitat.

Responsible for protecting the ecological health of County parks, NRM conducts regular field visits and assessments, and coordinates closely with operations staff and Friends groups to identify, prioritize, and scope vegetation management projects. NRM uses three factors to evaluate whether and how to prioritize management of a plant pest:

1) Does the pest population pose a significant threat to ecosystem health, ecological function, or sensitive natural resources including native plants, wildlife, or cultural resources?

2) Does the pest population create or exacerbate wildfire hazard on the landscape?

3) Does the pest population impact visitor use of the parks?

NRM also utilizes a decision-making system that prioritizes habitat enhancement projects based on the weed species and location of the infestation. For example, if the pest is located within (i) habitat for a federally or state-listed threatened or endangered species, (ii) a sensitive ecological community such as serpentine grassland or coastal prairie, (iii) a dispersal corridor with a high potential to spread seed, or (iv) an ongoing restoration area, NRM prioritizes control efforts above other projects in recognition of the heightened sensitivity of these areas and overall benefits to the local ecosystems. Additionally, wildfire fuel management projects are prioritized based on their ability to improve public safety, enhance access for first responders, and disrupt the spread of fire.

Once projects have been identified and prioritized, NRM evaluates which treatment method(s) is/are most appropriate based on the species and site conditions. County Parks only considers treatment methods grounded in conservation science and approved for use by the appropriate regulatory bodies such as the U.S. Environmental Protection Agency (EPA), California Department of Pesticide Regulation (DPR), U.S. Department of Agriculture (USDA), Cal Fire, local fire protection districts, the San Mateo County's Agricultural Commissioner's office, U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW). NRM also evaluates the

effectiveness of treatment methods after project completion through formal data collection or informal observations by project managers.

When evaluating which treatment method(s) is/are most appropriate, NRM takes into account the characteristics and phenology of the weed species being managed, the size of the infestation, environmental context, and any treatment constraints such as site accessibility or restrictions on activities that can be carried out in endangered species habitat. All non-chemical treatment options are evaluated before herbicide is considered as a treatment option. This evaluation process, which is conducted by our NRM staff in collaboration with a licensed Pest Control Advisor, utilizes knowledge from prior treatments in the County parks system, work performed by other agencies, and treatments trialed or compared in scientific literature. The department also consults with other practitioners, researchers, and experts to determine which treatment techniques should be considered or ruled out. If a new weed species is discovered, the department works with our Pest Control Advisor to trial treatment methods based on literature or regional experience from the control of similar or genetically related species. If non-chemical treatment methods are available and equally or more effective at controlling the target pest species within an appropriate management timeframe, the Department will select a non-chemical treatment method.

In accordance with County Parks' IPM program and California law, NRM works with a state-licensed Pest Control Advisor (PCA) with expertise in wildland IPM to receive written pest control recommendations (PCRs) before the application of any herbicides. Pest Control Advisors are licensed through the California Department of Pesticide Regulation (CDPR), which requires the PCA to meet minimum qualifications and pass qualifying examinations (Laws, Regulations, Basic Principles, and the appropriate pest control category). Following county policy, PCA's are non-incentivized, meaning they do not receive any financial benefit or reward from any products included in the PCRs.

Prior to writing a recommendation, the PCA and NRM staff will discuss possible treatment options (including non-chemical treatment), the effectiveness of previous treatments, and any options for treatment modifications (i.e. type of equipment, timing, rate of herbicide application) based on up-to-date research, the PCA's knowledge of past treatments within the County Park system, and/or strategies from other local agencies facing similar pest issues. The PCRs used in County Parks projects represent the most appropriate treatment method based on project specifications and include descriptions of the site(s) where treatment will occur, target pests, materials, and material mixing ratios. The PCRs also include precautions that must be observed to avoid negative impacts to people and non-target species through drift or runoff, including strict parameters for weather conditions during herbicide applications, the interval after which people and pets may be allowed to re-enter the treatment area, application method, and other information on how to apply the pesticide in a way that minimizes negative environmental impacts. All PCRs must be renewed by the PCA on an annual basis.

The allowable use rates for all herbicides utilized by County Parks IPM projects in 2025 are shown in **Figure 2**. In all cases, County Parks ensures our projects stay below this rate limit.

Wildfire Fuel Management

In 2025, County Parks coordinated or implemented five large-scale wildfire fuel management projects throughout the San Mateo County parks system and maintained several fuel reduction project areas initially treated in previous years. These projects implement vegetative fuel reduction efforts which are conducted in accordance with County Parks' IPM program and Wildfire Fuel Management program. Through the department's wildfire fuel management work, County Parks is able to improve ingress and egress for first responders, create defensible space for firefighters to stage equipment and conduct fire containment and suppression activities, and disrupt the spread of fire by breaking the horizontal and vertical continuity of fire fuels.

Mechanical treatment methods utilized during wildfire fuel management projects included mastication of small-diameter trees using heavy equipment, cutting of small-diameter trees and vegetation by hand, and felling of medium- and large-diameter trees deemed a hazard by qualified arborists. Resulting debris are hauled off site, chipped on site, or lopped and scattered to achieve wildfire debris management objectives.

Initial treatment of wildfire fuel management areas involved either mechanical control methods (for woody species that do not re-grow after being cut), or the cut-stump application of herbicides to the cambium of Eucalyptus, Cotoneaster, English Ivy and other resprouting species after hand work. Utilization of the cut-stump application method is necessary because these species aggressively re-sprout quickly negating the benefits of fuels reduction projects. For example, Eucalyptus can regrow at a rate of approximately six feet per year. Regenerating at such a rapid rate allows Eucalyptus to return a significant fire threat in a short period of time diminishing and eliminating the benefit of initial treatment.

Maintenance efforts utilized a combination of mechanical and chemical techniques to manage re-sprouting woody vegetation along with the control of any invasive herbaceous species that spread into the understory of the forest. Management of herbaceous invasive species integrate various methods including; brush cutting, hand pulling, targeted herbicide application, mastication, and mowing techniques depending on the location, topography, and biology of the target species.

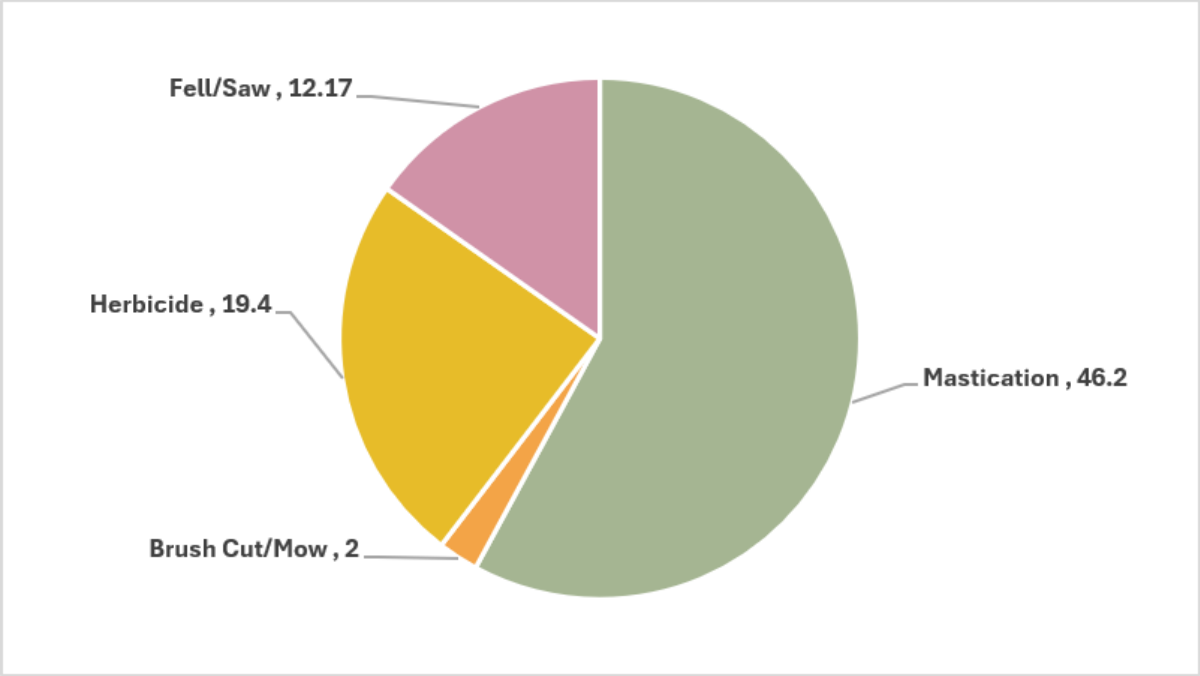

Figure 4. 2025. County Parks wildfire fuels reduction acreage categorized by primary treatment type represented in gross treatment acreage. Although cut-stump treatments use a combination of mechanical and herbicide techniques, they are included in the 'herbicide' category of this figure as the application of herbicide is what kills the tree. See **Figure 3** for a visual representation of targeted herbicide techniques.

In total, the Department treated: 5.6 acres of initial Eucalyptus thinning and English ivy treatment for fuel break creation at San Bruno Mountain; 40.6 acres of understory mastication, thinning and hazard tree removal at Pescadero Creek Park as part of the ongoing County Parks Forest Health Project, in collaboration with the San Mateo Resource Conservation District (RCD); 13.8 acres of French Broom and Cotoneaster treatment at Quarry Park; creation of a 10 acre shaded fuel break at Junipero Serra County Park including thinning of Eucalyptus, hazard tree removal and mechanical treatment of understory species; and creation of a 2 acre shaded fuel break at Wunderlich county park via mowing of French broom, and thinning of trees and shrubs. (**Figures 4,5**).

Wildfire fuels reduction projects are recorded in gross acres (rather than infested acres) as the treatment plan (i.e. prescription) includes the removal of all species meeting certain size or hazard-level criteria within the project footprint. Therefore, the entire acreage is considered managed even if the initial species cover is a smaller portion of the overall footprint. For example, if an acre had 10 Eucalyptus trees that were treated using the cut-stump application method, that will be represented as 1.0 gross acre in the charts despite the fact that only ten trees within the acre were treated. The gross acreage in **Figure 5** represents the entire area scoped and treated for the species represented. The La Honda shaded fuel break project focused on the removal of all

woody species under 16-inch diameter at breast height in forested areas, so this project is shown as “various” species in the pie chart.

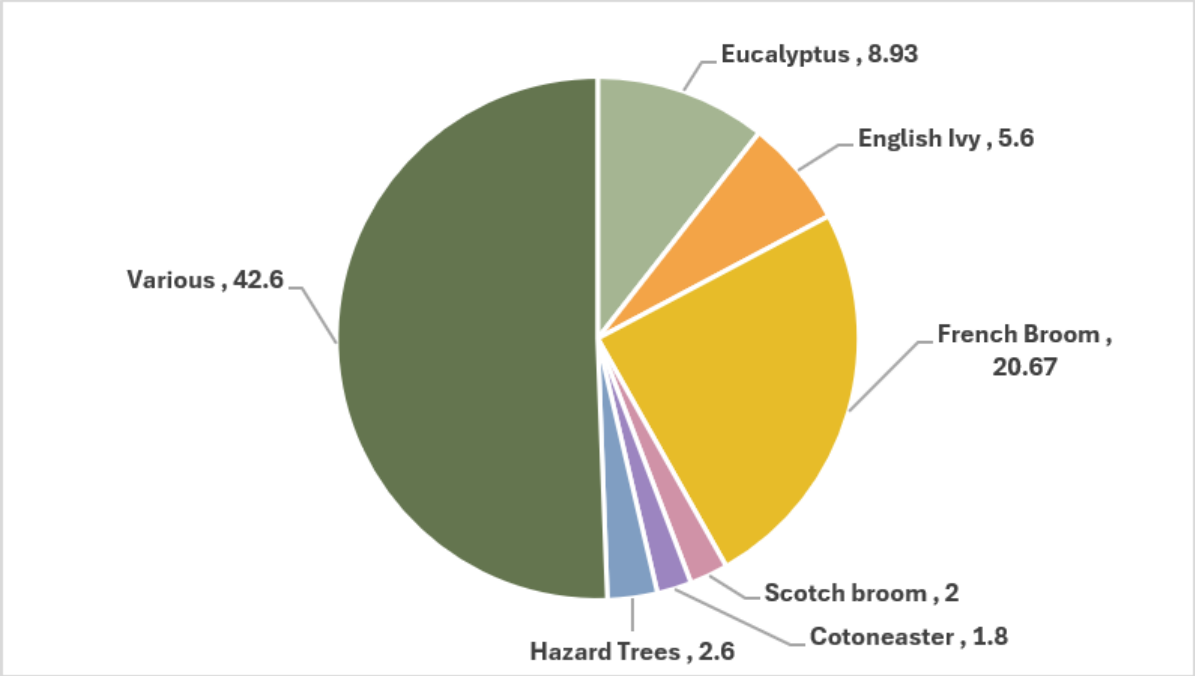

Figure 5. 2025. County Parks’ fuels reduction project acreage categorized by target species. Values are in gross acres. The ‘Various” category refers to understory mastication or fuels removal that was not selective by species. However, during these non-selective treatments, County Parks staff flag rare, endangered, and important habitat species for protection and retention within project boundaries.

There were three large-scale wildfire fuel management projects conducted in 2025 in which mechanical and chemical treatment methods were required to achieve project objectives including initial treatment and maintenance of shaded fuel breaks along strategic fire roads within Quarry Park, initial treatment for a project to create a fuel break in Junipero Serra Park, and the completion of a Eucalyptus fuel-break at San Bruno Mountain. All three projects took place within stands of invasive Eucalyptus (*Eucalyptus globulus*), which vigorously re-sprouts from stumps when the cuts are left untreated. If proper efforts are not made to control the re-sprouting of felled trees, the trees will re-grow, compromising the efficacy of the fuel break and fire road, and returning a significant fire and public safety threat. *Weed Control in Natural Areas in the Western United States*, a widely used resource authored by experts from the western U.S., states that following initial cutting of a blue gum eucalyptus tree, it can take four or more years of cutting back shoots, which can grow at a rate of approximately six feet a year, before the tree is killed (**DiTomaso et al., 2013**). Given slopes, access constraints, environmental impacts, and other factors, it is infeasible to use this approach at many locations within the County parks system without causing environmental degradation and over time reducing the efficacy of the treatment area.

For the Quarry Park treatments, it was determined that the most effective and scalable treatment method was the cut-stump application of herbicide due to the large scale of the projects and the steep terrain in Quarry Park that is inaccessible to equipment. These factors make repeated manual treatment methods infeasible and attempting to do so would degrade the surrounding soils and slopes. The Quarry Park shaded fuel break project is a multi-phase effort with the project footprint expanding each year of implementation. Without proper maintenance, vegetation will regrow compromising the efficacy of the fuel break and fire road, returning a significant fire and public safety threat.

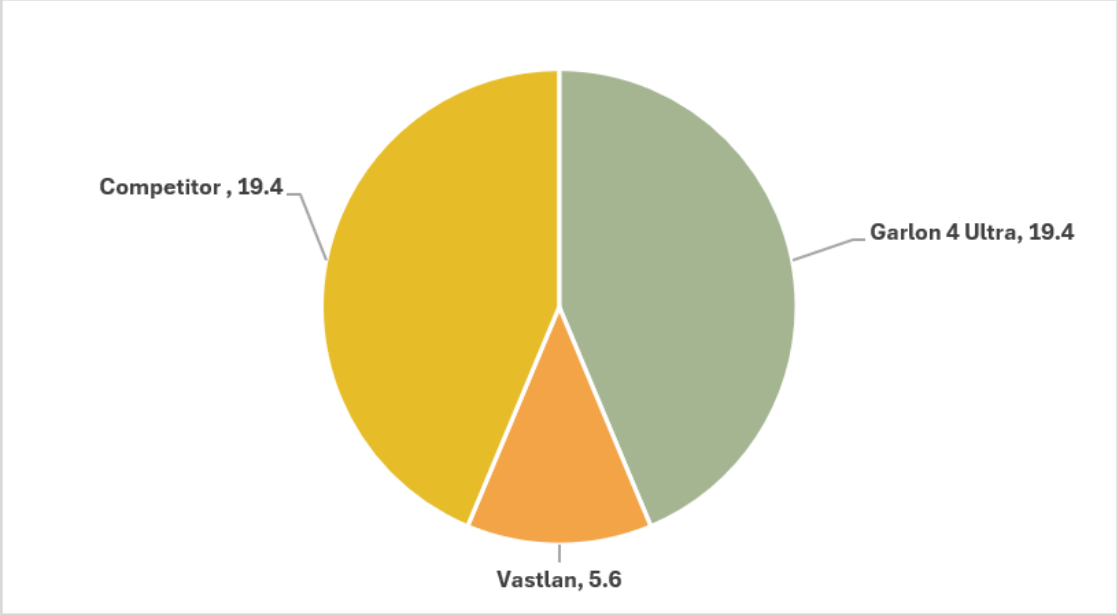

Figure 6. 2025. County Parks wildfire fuel reduction project acreage broken down by product name for all projects involving the use of herbicides, including both initial and follow-up treatments. Values are in gross acres. Percent cover of target species was not collected for Fuels Management projects, thus exact infested treatment acreage is not calculated. All of these treatments were spot spay treatments, not broadcast treatments across the entire gross acreage. Competitor is an additive used in herbicide mixtures to assist with application or absorption by the target species. Because these products were used in conjunction with herbicides, this acreage is double counted in this figure. See **Figure 3** for a visual representation of targeted herbicide techniques. See **Appendix B** for the locations and quantities of products used for all herbicide treatments.

Habitat Enhancement

In 2025, County Parks implemented and managed IPM habitat enhancement projects that targeted at least 24 species across more than 440 gross acres (more than 45 infested acres), which accounted for 3509.93 hours of labor including those performed by staff, contractors, and volunteers (**Figure 7**). Gross treatment acres refer to the total number of acres that were scoped in search of the main target species, whereas infested treatment acres refer to the area covered only by the target species. The non-native, invasive species most targeted for control by gross acreage were Andean pampas grass (*Cortaderia jubata*) and French broom (*Genista monspessulana*), both of which commonly invade coastal scrub, coastal prairie, and forested communities that serve as habitat for wildlife. The species represented by the highest infested acres treated was coyote brush (**Figure 7**). Although coyote brush is a native species, it is rapidly expanding into highly sensitive habitats such as coastal prairie and other grassland habitat throughout California due to the exclusion of periodic ecological disturbances such as low intensity fires. This scrub encroachment, especially on San Bruno Mountain, is an imminent threat to protected butterfly species and native wildflower communities, among other species which rely on grassland habitat. Without active control, this sensitive habitat will degrade.

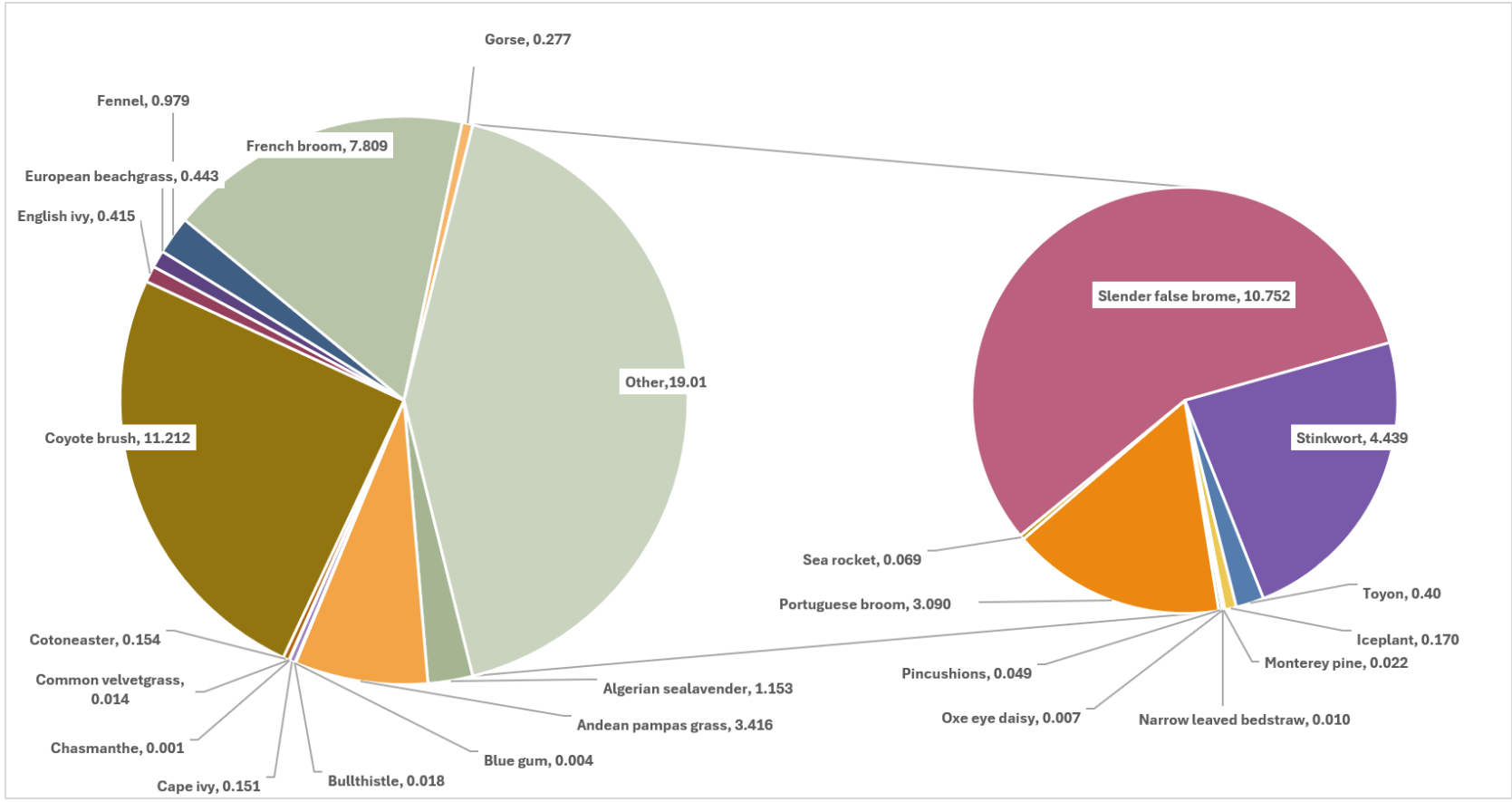

Figure 7. Infested acres managed during our 2025 habitat enhancement IPM projects, broken down by target species. Infested acres are calculated by multiplying the gross treatment acres by the percent cover of the target species to reflect the actual area treated.

During habitat enhancement IPM projects conducted by County Parks in 2025, approximately 6.8 infested acres were treated with targeted herbicide application. This is a decrease from approximately 25 infested acres in 2024. This decrease in infested acreage treated is due to multiple factors, including different areas and priority species for management from 2024, as well as lower gross acres treated and overall projects completed due to decreased staff capacity for invasive species project management during this calendar year. Given County Parks' focus on highly invasive weed species in sensitive habitats, non-chemical treatment methods are not always feasible because they are ineffective at controlling highly aggressive species (Bermuda buttercup, mature Broom, etc.), or due to restrictions on ground disturbance in butterfly habitat, steep slopes, or near streams and waterways. For example, the species with the largest gross acres treated, Coyote brush, was treated in sensitive endangered butterfly habitat. Because these species' larvae go into diapause (a period of suspended development) in the leaf litter of their host plants or underground, ground disturbance from mechanical control methods when Coyote brush treatment is most effective and feasible (Fall and Spring) is inappropriate due to the potential for take of this listed species. Andean pampas grass, another species with a high gross area managed, often grows on very steep embankments where it is unsafe for workers to dig out the roots to fully kill the plants and where ground disturbance may cause significant erosion and even slope failure.

Additional methods used include mechanical treatment methods such as brush-cutting, mowing, mastication, and the removal of the target species via hand techniques such as digging, pulling, felling, or pruning (**Figure 8**).

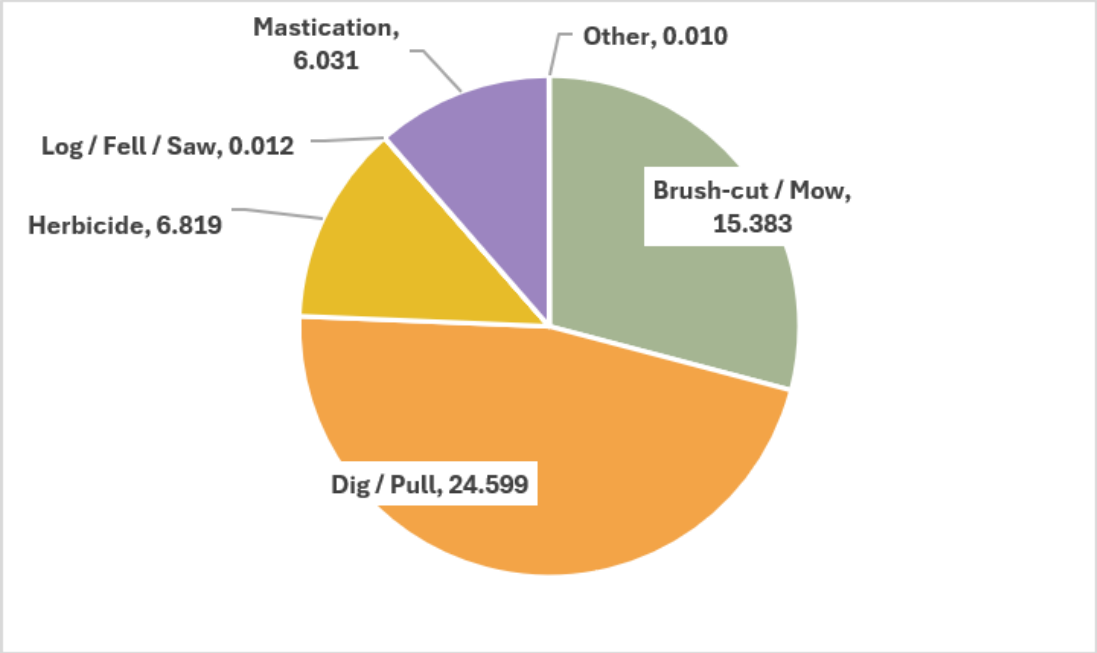

Figure 8. The total infested acres managed during County Parks' 2025 habitat enhancement IPM projects, categorized by treatment method. “Other” includes instances where multiple mechanical methods were utilized during the same project. “Dig/pull” includes any hand removal technique, including the use of various hand tools. “Herbicide” includes targeted foliar applications and cut-stump applications. See **Figure 3** for a visual representation of targeted herbicide techniques.

For chemical treatments conducted during habitat enhancement projects in 2025, the most used product in terms of infested acres managed (**Figure 9**) was Competitor (California registration number 2935-50173), which is a modified vegetable oil that assists with absorption of the active ingredient in herbicide mixes. The second most used product was Vastlan, an herbicide with the active ingredient triclopyr choline (EPA registration number 62719-687, signal word Warning). This product is used to as a targeted foliar treatment to woody species including French broom and gorse. The third-most used product was Garlon 4 Ultra, which is an herbicide with the active ingredient triclopyr (EPA registration number 62719-527, signal word of Caution). This product is used to treat broad-leaved pest species (including blue gum eucalyptus, fennel, and coyote brush, among others) and was applied as either a targeted foliar or cut-stump treatment. Please note, broadcast application of herbicide is not authorized in County parks per County Board of Supervisors’ resolution.

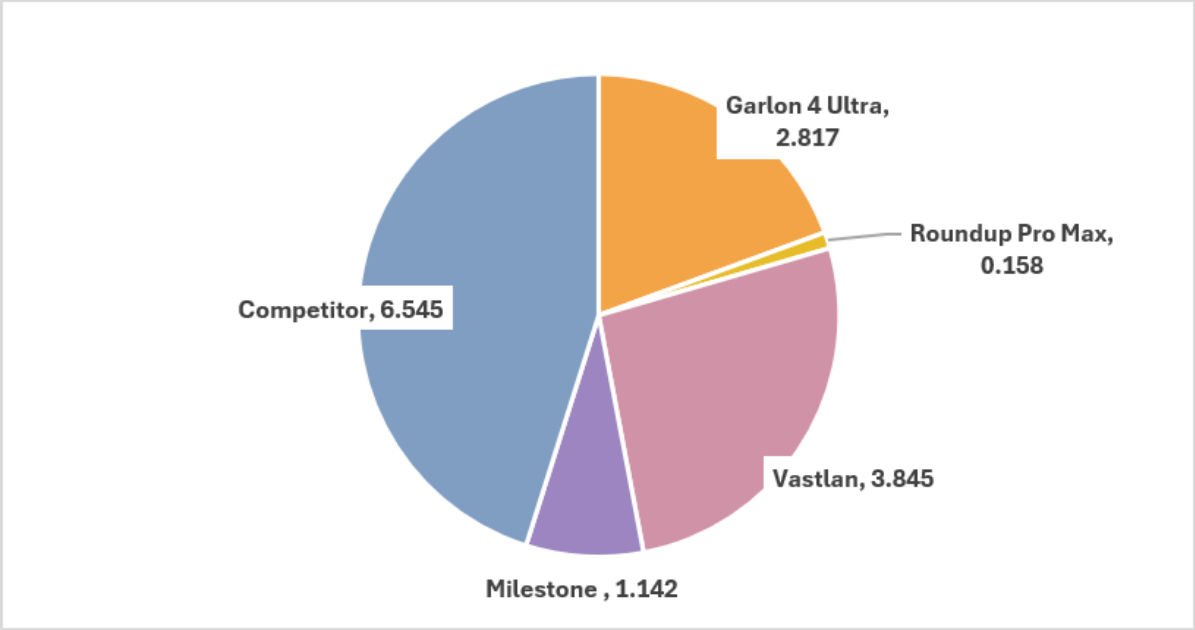

Figure 9. 2025. County Parks' habitat enhancement IPM project acreage (infested) categorized by product name for all projects involving the use of herbicides. Some products such as Competitor are additives used in herbicide mixtures to assist with application or absorption by the target species. Because these products were used in conjunction with herbicides, some acreage is double or triple counted in this figure. In a few instances, two herbicides were used in the same mix to increase efficacy, so these treatment acreages are also double counted. See **Figure 3** for a visual representation of targeted herbicide techniques.

Appendix B includes more information regarding herbicide applications carried out by County Parks in 2025, including patch identity number, target species, gross area treated, chemical treatment method used, the name and amount of each product used, start and end dates for the treatments, and latitude and longitude for the treatment location.

Organic Herbicide Trial

In Spring of 2025, organic herbicides were tested for efficacy of controlling undesirable species, in comparison to synthetic herbicides. These trials occurred at San Bruno Mountain State and County Park, using 7 paired plots, ranging in size from 1 square meter to 3 square meters, and compared effects of synthetic and organic herbicides on vegetation within these plots over several months following the initial application. The organic herbicide used in this trial was Fireworxx, which contains the active ingredients Caprilyc Acid and Capric Acid (EPA registration number 67702-54-59807, Signal Word Caution). The primary synthetic herbicide used in this trial was Vastlan, which contains the active ingredient triclopyr choline (EPA registration number 62719-687, signal word Warning). Two plots tested the combination of Vastlan and Milestone (EPA registration number 62719-519, signal word Caution). One plot tested Roundup Custom (EPA

registration number 524-343, signal word Caution). Both quantitative (percent cover), and qualitative (observations comparing impacts of herbicide type by plant species) data were taken for approximately three months following initial herbicide applications. **Figure 10** shows quantitative cover observations, and a summary of qualitative observations and suitability for further testing are included in **Appendix C.**

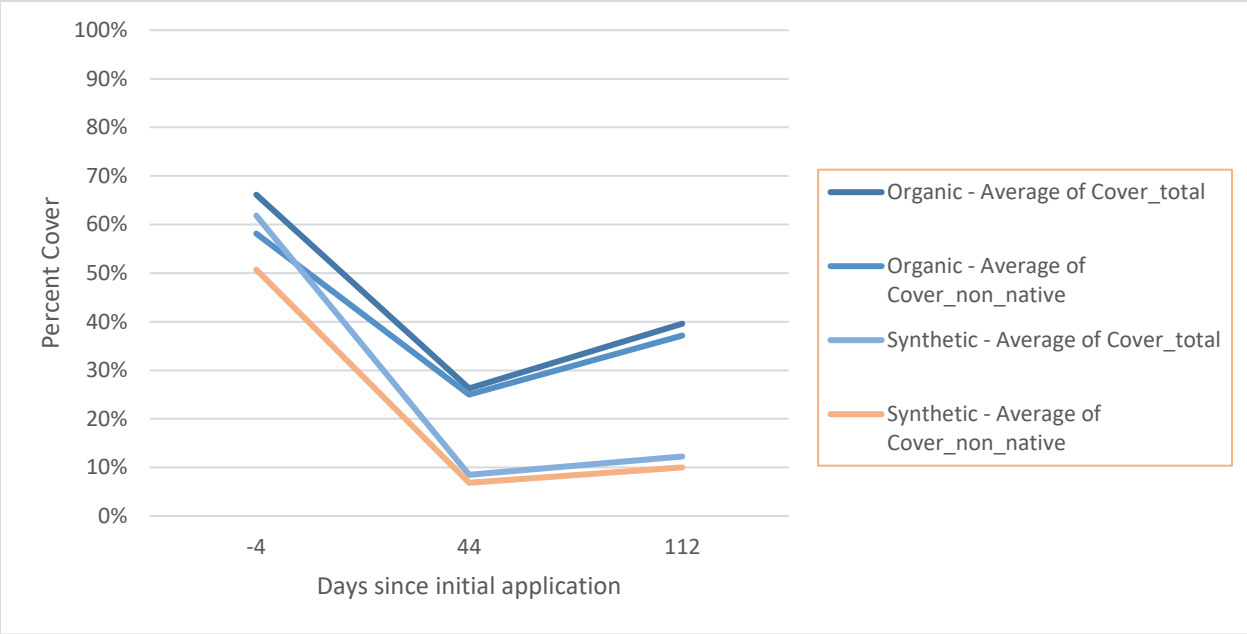

Figure 10. 2025. Organic Herbicide trial quantitative results. Both synthetic and organic herbicides used show an initial decrease in percent cover, and then a slight increase in cover after 44 days since initial treatment. Synthetic herbicide application yielded nearly 30% less non-native cover than use of organic herbicides after 112 days since initial application.

The herbicide treatments completed for these trials are not included in the summary of herbicide usage for habitat enhancement activities in **Figure 9,** however a summary of these applications are included in **Appendix B**.

Park Operations

County Parks Operations, which includes park rangers and maintenance staff, conducts IPM activities on an annual basis to maintain safe and accessible parks for visitors and the surrounding communities. The objectives of these projects include reducing the public's risk of making contact with poison oak, ticks, or snakes; maintaining park facilities; and enhancing public safety by reducing wildfire fuel load and hazards from unmanaged landscapes (**Figure 11**). When selecting the most appropriate treatment technique for a given project, efficiency, effectiveness, safety, and the environmental context are all considered and evaluated.

In total, Operations managed non-native, invasive, or otherwise weedy species across 1083.6 gross acres including 113.3 miles of trail, accounting for 7,745.6 staff-hours of

effort. Most of the off-trail work (projects conducted in the interior of parks) was conducted with mowing and brush-cutting equipment (**Figure 12**), both of which are effective ways of (i) preventing invasive seed spread, (ii) allowing short-statured native plants to compete with surrounding non-native species, and (iii) reducing fire fuel load from invasive annual grass thatch buildup. The trailside IPM work included brush cutters and string trimmers used to reduce non-native vegetation growing along trails and fire roads and to prevent the spread of those seeds, while also allowing for safe access to the parks for hikers by pruning back safety hazards such as poison oak and brushing back vegetation to reduce the likelihood of encountering ticks or snakes.

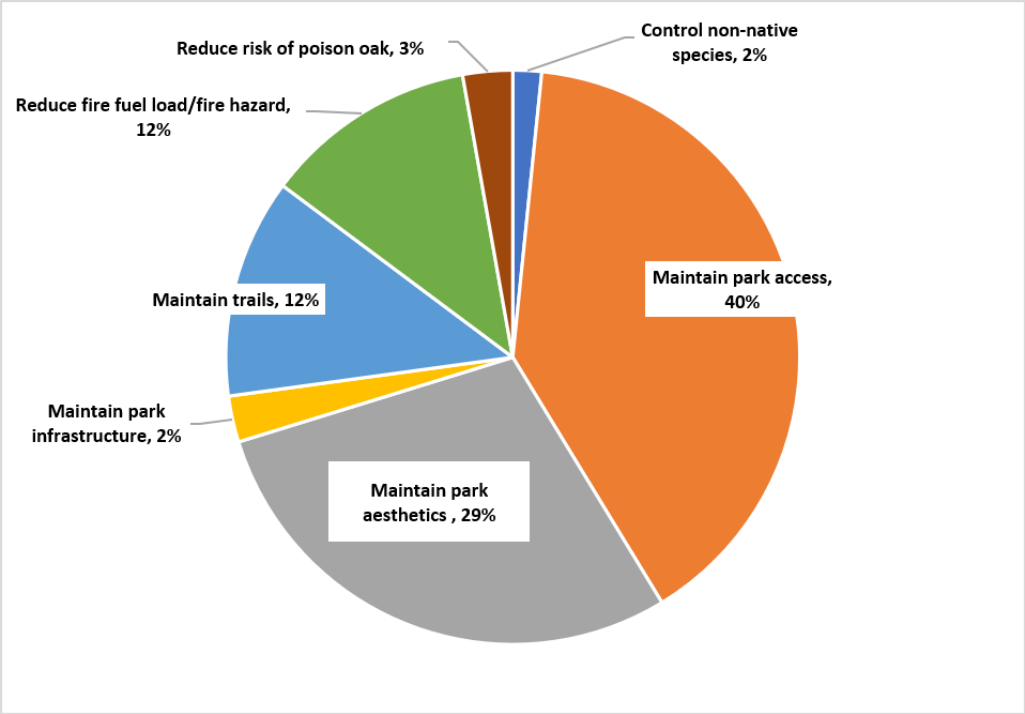

Figure 11. 2025. The percentage of gross acres treated by the County Parks Operations' IPM program, aggregated by project objectives. Many of the IPM projects have multiple objectives. In this figure, the data represents primary, secondary, and tertiary objectives of the projects, therefore some projects are represented multiple times if they have two or more goals for treatment. A total of 1083.6 gross acres, including 113.3 trail miles were managed by our Operations program in 2025.

In 2025, County Parks Operations' IPM projects included the management of vegetation at 25 parks, trails, and facilities, including the Alpine Trail, the Cowell-Purissima Trail, Coyote Point Recreation Area and Marina, the Crystal Springs Regional Trail, the Devil's Slide Trail, Edgewood Park and Natural Preserve, Fitzgerald Marine Reserve, Flood Park, Huddart Park, Junipero Serra Park, Memorial Park, the Midcoast Multimodal Trail, Mirada Surf Park, Moss Beach Park, Pescadero Creek Park, Pigeon Point Overlook, Pillar Point Bluff Park, Quarry Park, Sam McDonald Park, San Bruno

Mountain State and County Park, San Pedro Valley Park, the Sanchez Adobe, the Sheep Camp Trail, and Wunderlich Park.

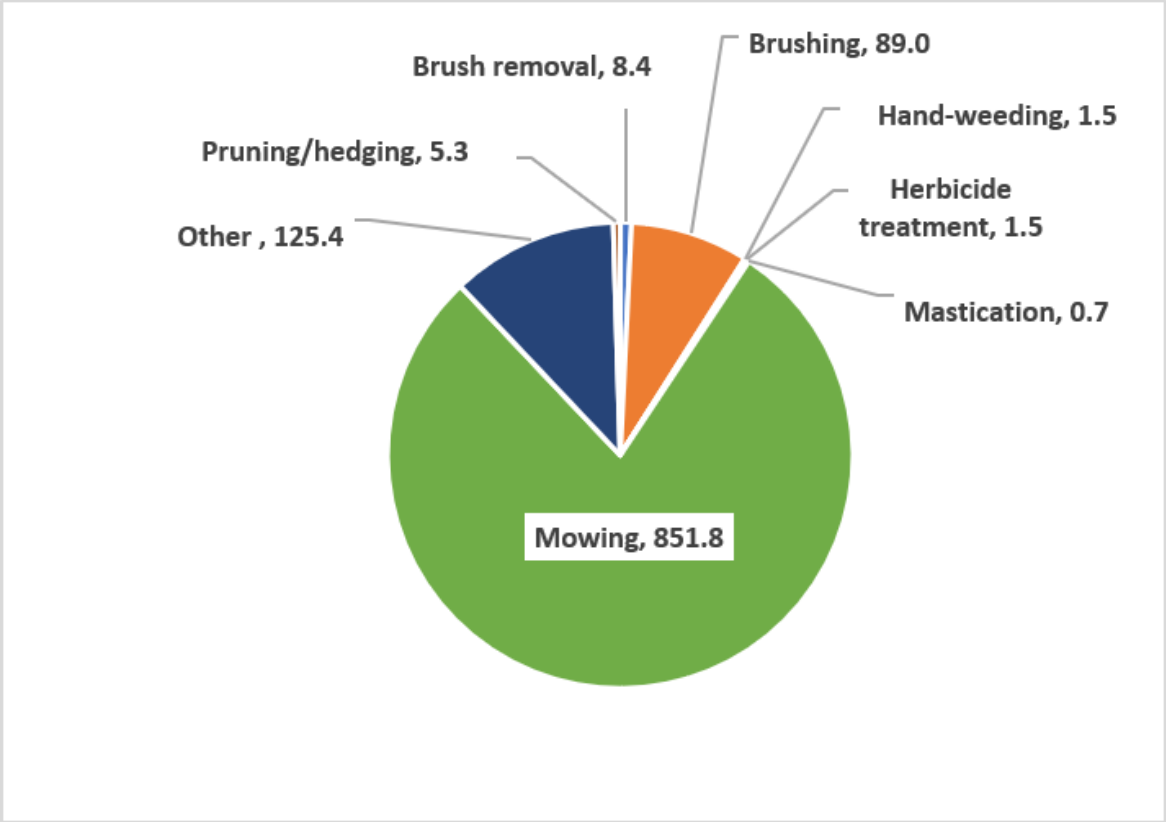

Figure 12. 2025. Gross acreage of County Parks Operations' IPM projects, represented by treatment type. A total of 7,745.6 staff-hours were logged to manage 1083.6 acres. Several tree removals were not included in the acreage or person-hour data for the Operations IPM program because they were performed on an as-needed basis or under emergency circumstances and data was not able to be collected.

Herbicide treatments performed for parks operations included two applications of cut stump treatment with Garlon 4 Ultra in San Pedro Valley Park to control Blue Gum Eucalyptus (7 oz of herbicide for 0.5 acres) and Acacia species (4 oz of herbicide for 1 acre) invading native grasslands. The maximum allowable rate per acre for Garlon 4 Ultra determined by the EPA is 256 ounces per acre, as shown in **Figure 2**. These treatments are not included in summaries of herbicide treatments

Park Operation's IPM management techniques included mowing, brushing, hand-weeding, mastication, pruning, hedging, felling, and herbicide treatment.

Volunteer Stewardship

The County Parks Volunteer Stewardship Program is another important component of County Parks' habitat enhancement work and accounts for the majority of hand-weeding performed each year. Goals of the program include habitat restoration, early

detection and rapid response to small weed infestations (EDRR), and prevention of seed dispersal to adjacent lands. In 2025, volunteers carried out 4,763.5 hours of weeding in 13 County parks (Coyote Point Recreation Area and Marina, Crystal Springs Trail, Devil's Slide Trail, Edgewood Park & Natural Reserve, Fitzgerald Marine Reserve, Huddart Park, Memorial Park, Pillar Point Bluff, Quarry Park, San Pedro Valley Park, Sanchez Adobe, and Wunderlich Park) (**Figure 13**). This is slightly higher than the volunteer hours supervised in 2024, and about double the hours supervised in 2023 (4,404 hours in 2024 and 2,082 hours in 2023).

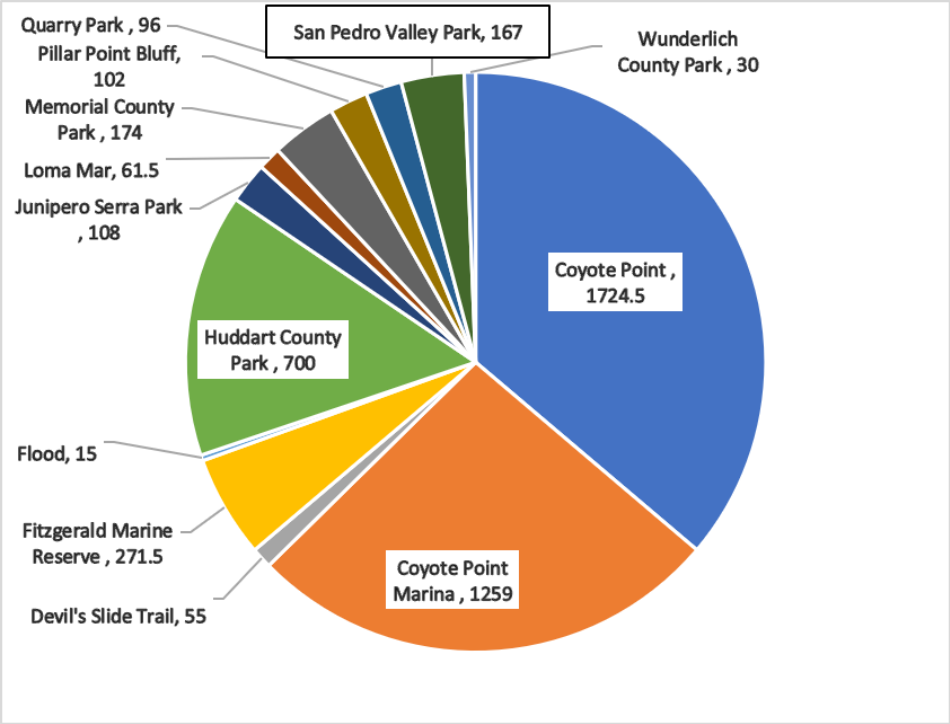

Figure 13. 2025. The number of County Parks volunteer weeding hours categorized by park. A total of 4,763.5 volunteer-hours were logged during 70 weeding events, accounting for hand weeding activities during every month of the year.

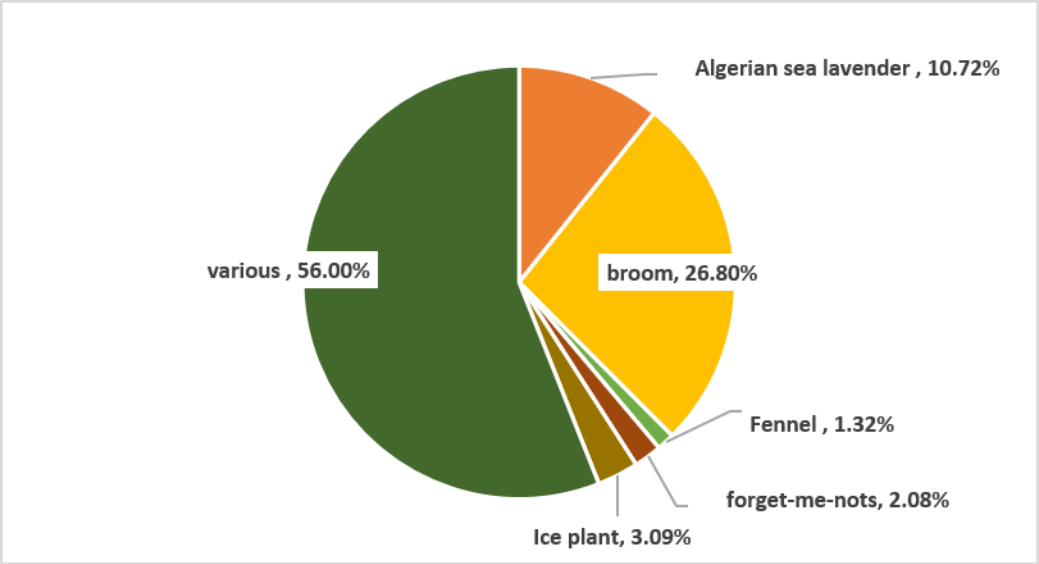

Figure 14. 2025. Species controlled by volunteers. 'Various weed' species refers to volunteer programs in which volunteers scoped and removed several weed species from a site.

The primary target species for these projects included broom species (26.8% of volunteer hours), Algerian sea lavender (10.72% of volunteer hours), Ice plant (3.09% of volunteer hours), forget-me-nots (2.08% of volunteer hours), and fennel (1.32% of volunteer hours) (**Figure 14**). Most of these species are appropriate for hand-pulling during all or some of their growth stages as the entire plant can be easily removed with the root system, preventing their re-growth if seed has not yet developed. Fennel is an exception to this, and volunteer hours contributed to fennel removal were focused on seedling removal, cutting back seedheads or removing the main stems of plants to prevent further spread of plants. However, fennel produces strong tap roots are extremely difficult to remove by hand, and plants will re-sprout if the entire tap root is not removed. Additionally, broom species such as French, Scotch, and Portuguese broom, become difficult to remove once the plants have matured past their seedling stage as these perennial woody species develop a deep tap root within a couple years. Other species managed in part by volunteers in 2024 include thistles, bristly ox-tongue, and jubata grass seedlings. Similarly to broom, once jubata grass has matured past its seedling stage, the plants become extremely difficult to remove with hand tools, though volunteers can help delay the spread of seed by removing the tall seed heads if the plants are in accessible locations.

Without effectively controlling the spread of species like Algerian sea lavender and broom, native plants and habitat are at risk of being outcompeted for resources because of the species' aggressive growth which can lead to natural vegetation communities being entirely replaced. Invasive species are also sometimes avoided by wildlife which can cause an increase in pressure on native plants.

In addition to volunteer programs managed by County Parks staff, the department works with many partner organizations who host volunteer weeding activities on park lands. Partner organizations include the California Native Plant Society (CNPS), Grassroots Ecology, Friends groups, and San Bruno Mountain Watch. While we value the commitment and dedication of our Friends organizations, only San Bruno Mountain Watch's hours and activities are included in this report (see the **Habitat Enhancement** section).

Future Directions

County Parks is scheduled to trial new IPM strategies in 2026. No additional organic herbicide experiments will take place in 2026, due to staff turnover. However, additional trials are planned for Spring of 2027 at San Bruno Mountain State and County Park which will utilize an appropriate Pest Control Recommendations (PCR) written by our on-call Pest Control Advisor (PCA) to compare the efficacy of organic and synthetic herbicides. This experiment will continue to investigate and document initial control, long-term control, and any regrowth of several non-native or weedy species including poison hemlock, mustard, Italian thistle, bull thistle, sow thistles, bristly ox-tongue, sheep sorrel, scarlet pimpernel, ox-eye daisy, purple velvet grass, vetch, and coyote brush. Observations of off-target impacts will also be documented if they occur. We will not be comparing the applicator or environmental safety of organic and synthetic herbicide products.

In addition, the Natural Resource Management Division is planning an expansion of the County Parks goat grazing program. Initial efforts to utilize grazing for management of understory fuel hazards took place at San Pedro Valley in 2024 and were deemed largely successful. NRM is now in the planning stages of a goat grazing project to create and maintain a strategic fuel break within Edgewood Park and Natural Preserve in 2026.

Lastly, County Parks has been in communication with the U.S. Department of Agriculture (USDA) and the California Department of Food and Agriculture (CDFA) regarding a biocontrol project planned for the control of Klamathweed at San Bruno Mountain. An approved biocontrol agent (the Klamathweed beetle) has been selected for use and County Parks is planning to collect and release the beetle once a source colony has been identified. After release, the Klamathweed infestation and Klamathweed beetle populations will be monitored to determine efficacy of this control mechanism.

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Appendix A – 2025 County Parks volunteer weeding hours

Month	Park	Primary Target Species	Volunteers	Person Hours
January	Coyote Point	various	18	54
January	Coyote Point	various	3	3
January	Huddart	Broom	88	264
January	Junipero Serra Park	various	27	81
February	Huddart	broom	27	81
February	Junipero Serra Park	various	9	27
February	Coyote Point	Algerian sea lavender	17	34
February	Coyote Point	Algerian sea lavender	24	58
February	Fitzgerald Marine Reserve	various	25	111
February	Coyote Point	various	16	64
March	Memorial	broom	12	24
March	Fitzgerald Marine Reserve	various	29	87
March	Flood	various	5	15
March	Coyote Point	various	8	24
March	Fitzgerald Marine Reserve	various	10	22.5
April	Coyote Point Marina	Algerian sea lavender	11	33
April	Coyote Point	broom	17	54
April	San Pedro Valley	forget-me-nots	11	33
April	Coyote Point	various	3	3
April	Coyote Point	various	27	135
April	Coyote Point	various	39	117
April	Coyote Point Marina	various	10	40
April	Devil's Slide Trail	various	14	19
April	Coyote Point	various	12	24
April	Coyote Point	various	15	30
April	Coyote Point	various	22	66
May	Huddart	broom	8	24
May	Huddart	broom	26	54
May	Memorial	broom	50	150
May	Huddart	broom	19	38
May	Huddart	broom	11	33
May	Huddart	broom	8	24
May	Coyote Point Marina	Algerian sea lavender	30	90
May	Coyote Point Marina	Algerian sea lavender	45	135
June	San Pedro Valley	broom	1	20
June	Huddart	broom	24	72
June	Loma Mar	broom	19	57
June	San Pedro Valley	forget-me-nots	22	66
June	Coyote Point Marina	various	21	63
June	Coyote Point	various	125	375
June	Coyote Point	various	27	84
July	Coyote Point	various	37	148
August	Coyote Point	various	3	6
August	Coyote Point	various	31	210
August	Coyote Point Marina	Algerian sea lavender	28	42
August	Coyote Point Marina	Algerian sea lavender	10	30
August	Coyote Point Marina	Algerian sea lavender	27	84
September	Loma Mar	Broom	3	4.5
September	Coyote Point Marina	various	42	84
September	Coyote Point Marina	various	8	24
September	Coyote Point	various	18	36
September	Pillar Point Bluff	various	34	102
October	Wunderlich	broom	10	30
October	Huddart	broom	3	6
October	Coyote Point	Algerian sea lavender	3	4.5
October	Coyote Point Marina	Ice plant	34	147
October	Coyote Point Marina	Fennel	25	63
October	Fitzgerald Marine Reserve	various	17	51
October	Devil's Slide Trail	various	11	33
October	Coyote Point Marina	various	31	62
November	San Pedro Valley	broom	16	48
November	Huddart	Broom	4	8
November	Quarry	broom	32	96
November	Coyote Point	broom	31	93
November	Huddart	broom	24	96
November	Coyote Point Marina	various	17	34
November	Coyote Point Marina	various	26	52
November	Coyote Point Marina	various	92	276
November	Devil's Slide Trail	various	2	3
November	Coyote Point	various	34	102

Appendix B – 2025 County Parks herbicide treatments

Patch ID	Park	Projec type	Target Species	Percent Cover	Gross Area (Acres)	Infested Acres	Chemical Method	Herbicide 1	Ounces of herbicide 1	Herbicide 2	Ounces of herbicide 2	Herbicide 3	Ounces of herbicide 3	Start Date	End Date	Latitude	Longitude
io172720	Huddart	Habitat Enhancement	French broom	0.005	0.059	0.000	Spot Spray	Vastlan	0.6	Milestone	0.1	Competitor	0.4	12/9/2025	12/9/2025	37.44179	-122.291
io172726	Huddart	Habitat Enhancement	French broom	0.005	9.223	0.046	Spot Spray	Vastlan	26.1	Milestone	4.3	Competitor	17	12/8/2025	12/9/2025	37.43612	-122.287
io172724	Huddart	Habitat Enhancement	French broom	0.005	0.947	0.005	Spot Spray	Vastlan	0.9	Milestone	0.15	Competitor	0.6	12/11/2025	12/16/2025	37.43241	-122.288
io172729	Huddart	Habitat Enhancement	French broom	0.005	0.674	0.003	Spot Spray	Vastlan	3.1	Milestone	0.5	Competitor	2	12/9/2025	12/10/2025	37.43361	-122.291
io172721	Huddart	Habitat Enhancement	French broom	0.005	12.819	0.064	Spot Spray	Vastlan	35.3	Milestone	5.89	Competitor	23	12/8/2025	12/11/2025	37.43471	-122.291
io172722	Huddart	Habitat Enhancement	French broom	0.005	0.136	0.001	Spot Spray	Vastlan	0.6	Milestone	0.1	Competitor	0.4	12/9/2025	12/9/2025	37.43975	-122.292
io172727	Huddart	Habitat Enhancement	French broom	0.005	0.964	0.005	Spot Spray	Vastlan	1.2	Milestone	0.2	Competitor	0.8	12/9/2025	12/10/2025	37.43642	-122.292
io172725	Huddart	Habitat Enhancement	French broom	0.005	7.889	0.039	Spot Spray	Vastlan	30.7	Milestone	5.1	Competitor	20	12/9/2025	12/10/2025	37.43372	-122.292
io172728	Huddart	Habitat Enhancement	French broom	0.005	1.874	0.009	Spot Spray	Vastlan	0.6	Milestone	0.1	Competitor	0.4	12/9/2025	12/9/2025	37.43118	-122.294
io172723	Huddart	Habitat Enhancement	French broom	0.08	7.849	0.628	Spot Spray	Vastlan	89.7	Milestone	15	Competitor	58.4	12/10/2025	12/11/2025	37.43034	-122.299
io166331	San Bruno Mountain	Habitat Enhancement	Gorse	0.005	0.519	0.003	Spot Spray	Vastlan	6.1	Competitor	4			8/15/2025	8/15/2025	37.68724	-122.435
io166329	San Bruno Mountain	Habitat Enhancement	Gorse	0.005	0.649	0.003	Spot Spray	Vastlan	3.1	Competitor	2			8/15/2025	8/15/2025	37.69123	-122.439
io166328	San Bruno Mountain	Habitat Enhancement	Gorse	0.005	9.303	0.047	Cut-stump	Garlon 4 Ultra	19.2	Competitor	57.6			8/12/2025	8/15/2025	37.70261	-122.434
io166330	San Bruno Mountain	Habitat Enhancement	Gorse	0.005	44.845	0.224	Spot Spray	Vastlan	244.2	Milestone	40.7	Competitor	159	8/12/2025	8/15/2025	37.70286	-122.432
mg296570	San Bruno Mountain	Habitat Enhancement	Andean pampas grass	0.03	0.245	0.007	Spot Spray	Roundup Pro Max	1.0					11/11/2025	11/11/2025	37.69063	-122.446
mg296569	San Bruno Mountain	Habitat Enhancement	Andean pampas grass	0.03	0.760	0.023	Spot Spray	Roundup Pro Max	2.0					11/11/2025	11/11/2025	37.69229	-122.448
mg296567	San Bruno Mountain	Habitat Enhancement	Andean pampas grass	0.03	4.098	0.123	Spot Spray	Roundup Pro Max	2.0					11/10/2025	11/10/2025	37.69726	-122.439
mg296566	San Bruno Mountain	Habitat Enhancement	Andean pampas grass	0.03	0.155	0.005	Spot Spray	Roundup Pro Max	0.5					11/10/2025	11/20/2025	37.70156	-122.439
io166335	San Bruno Mountain	Habitat Enhancement	Toyon	0.755	0.362	0.273	Cut-stump	Garlon 4 Ultra	156.8	Competitor	470.4			7/21/2025	7/24/2025	37.69937	-122.413
io166322	San Bruno Mountain	Habitat Enhancement	Coyote brush	0.355	6.709	2.382	Spot Spray	Vastlan	89.6	Competitor	35			8/6/2025	8/8/2025	37.67099	-122.404
io166324	San Bruno Mountain	Habitat Enhancement	Coyote brush	0.355	1.216	0.432	Spot Spray	Vastlan	20.5	Competitor	8			8/6/2025	8/6/2025	37.67432	-122.405
io166332	San Bruno Mountain	Habitat Enhancement	Coyote brush	0.355	6.670	2.368	Cut-stump	Garlon 4 Ultra	339.2	Competitor	1017			8/5/2025	8/11/2025	37.66956	-122.403
io166321	San Bruno Mountain	Habitat Enhancement	Coyote brush	0.255	0.000	0.000	Cut-stump	Garlon 4 Ultra	51.2	Competitor	153.6			7/25/2025	8/5/2025	37.67425	-122.405
io166325	San Bruno Mountain	Habitat Enhancement	Toyon	0.03	0.405	0.012	Spot Spray	Garlon 4 Ultra	15.4	Competitor	6.4			7/24/2025	7/24/2025	37.69917	-122.413
io166323	San Bruno Mountain	Habitat Enhancement	Toyon	0.855	0.137	0.117	Cut-stump	Garlon 4 Ultra	38.4	Milestone	12.8			7/21/2025	7/23/2025	37.69993	-122.412
No Data	San Bruno Mountain	Fuels Management	Various	No Data	5.6	No Data	Cut stump	Garlon 4 Ultra	224	Vastlan	286.72	Competitor	715.52	9/22/2025	11/30/2025	37.42041	-122.264
io153710	Quarry Park	Fuels Management	Cotoneaster and French Broom	No Data	13.8	No Data	Cut-stump	Garlon 4 Ultra	83.2	Competitor	243.84			5/1/2025	5/25/2025	37.50299	-122.4605

Summary of herbicide treatments for habitat enhancement and fuels management projects. Percent cover data for fuels management projects was not collected, thus infested acreage for these projects is not available. All treatments completed in County Parks are spot treatments, as broadcast spraying is not permitted.

Summary of organic herbicide trial treatments

Patch ID	Park	Primary species in plot	Percent Cover	Herbicide 1	Ounces of herbicide 1	Herbicide 2	Ounces of herbicide 2	Herbicide 3	Ounces of herbicide 3	Start Date	End Date	Latitude	Longitude
io153699	San Bruno Mountain	Bristly ox-tongue	31 - 40 %	Vastlan	2.3	Competitor	0.92			4/29/2025	4/29/2025	37.70295	-122.43422
io153706	San Bruno Mountain	Bristly ox-tongue	21 - 30 %	Fireworxx	3.7	Competitor	0.33			4/29/2025	4/29/2025	37.70297	-122.43422
io153713	San Bruno Mountain	Sheep sorrel	71 - 80 %	Vastlan	1.2	Competitor	0.5			4/29/2025	4/29/2025	37.70342	-122.43333
io153702	San Bruno Mountain	Sheep sorrel	41 - 50 %	Fireworxx	5.1	Competitor	0.46			4/29/2025	4/29/2025	37.70345	-122.43335
io153698	San Bruno Mountain	Sheep sorrel	51 - 60 %	Roundup Custom	1.3	Competitor	0.51			4/29/2025	4/29/2025	37.7032	-122.43333
io153704	San Bruno Mountain	Sheep sorrel	61 - 70 %	Fireworxx	6.3	Competitor	0.56			4/29/2025	4/29/2025	37.70323	-122.43336
io153700	San Bruno Mountain	Coyote brush	31 - 40 %	Vastlan	0.6	Milestone	0.072	Competitor	0.32	4/29/2025	4/29/2025	37.69473	-122.43235
io153701	San Bruno Mountain	Common mustard	21 - 30 %	Fireworxx	4.05	Competitor	0.36			4/29/2025	4/29/2025	37.69477	-122.43232
io153703	San Bruno Mountain	Italian thistle	31 - 40 %	Vastlan	0.75	Milestone	0.09	Competitor	0.4	4/29/2025	4/29/2025	37.6949	-122.43428
io153696	San Bruno Mountain	Italian thistle	31 - 40 %	Fireworxx	5.04	Competitor	0.45			4/29/2025	4/29/2025	37.6949	-122.43429
io153707	San Bruno Mountain	Common mustard	61 - 70 %	Vastlan	0.92	Competitor	0.37			4/29/2025	4/29/2025	37.69501	-122.43438
io153695	San Bruno Mountain	Common mustard	61 - 70 %	Fireworxx	6.57	Competitor	0.34			4/29/2025	4/29/2025	37.69501	-122.43438
io153697	San Bruno Mountain	Poison hemlock	81 - 90 %	Vastlan	1.52	Competitor	0.61			4/29/2025	4/29/2025	37.69514	-122.43443
io153715	San Bruno Mountain	Poison hemlock	81 - 90 %	Fireworxx	6.6	Competitor	5.8			4/29/2025	4/29/2025	37.69515	-122.43439

Appendix C – 2025 County Parks Organic Herbicide Trial Qualitative Results

Species	Organic treatment effective?	Potential for ongoing success with Fireworxx?
Poison Hemlock (*Conium maculatum*)	No	Unlikely – paired synthetic treatment was effective
Mustards/Brassica (multiple species)	No	Possibly if treatment is timed to treat when plants are in very small seedling/rosette form. Not ideal – this would require multiple treatments over the course of the mustard germination window.
Thistles (multiple species)	No	Possibly if treatment is timed to treat when plants are in very small seedling/rosette form. Not ideal – this would require multiple treatments over the course of the thistle germination window.
Scarlett pimpernel (*Lysmachia arvensis*)	No	Almost no sign of injury, but LYAR sample size was very low. LYAR in synthetic plots appeared to be missed by applicator, difficult to determine if a treatment during a different season would have been more successful. This is not a species County Parks would regularly treat with herbicide as it is not very invasive.
Coyote brush (*Baccharis pilularis*) (seedlings)	Yes	Likely if seedlings are treated when they are very small, but more data is needed. Plot 4 BAPI seedlings died in organic plot. Not enough data to determine if this was solely due to treatment or combined with other factors such as dry weather, etc. However, difficult to find continuous areas with very small BAPI seedlings that would be worth using an

		herbicide application for. Many of these can be dug up. Potential in the future to trail Fireworxx on BAPI that are 4-24 in diameter in size. That would be a more useful application if successful.
Ox-eye daisy (*Leucanthemum vulgare*)	Possibly	Not a large sample size. Seedlings in Plot 4 died over the course of the monitoring window. It is difficult to determine if this was only due to the treatment.
Purple velvet grass (*Holcus lanatus*)	No	Unlikely – paired synthetic treatment was mostly effective.
Rumex (*Rumex acetocella*)	No	Unlikely – paired synthetic treatment was effective.
Himalayan blackberry (*Rubus armeniacus*)	Not enough data	Not enough data
Bristly ox-tongue (*Helmenthothica eichioides*)	No	Unlikely – paired synthetic treatment was largely successful. Possibly if treatment is timed to treat when plants are in very small seedling/rosette form. Not ideal – this would require multiple treatments over the course of the Bristly ox-tongue germination window.
Sonchus sp.	Not enough data	Not enough data
Gorse (*Ulex Europeans*)	No	Unlikely – although paired synthetic treatment was also not fully successful, we have a more effective synthetic PCR that was not used during these trials and which usually is highly effective at killing gorse in May.

Appendix D – Comparison of County Parks IPM projects across years

	2023	2024	2025
Gross acres managed	929	1583	1598
Trail-miles managed	129	100	113
Volunteer weeding events	36	68	70
Volunteer weeding hours	2082	4404	4764
Acres treated with herbicide spot treatment techniques (primary treatment type)	444.8	626.4	139.4
Acres treated with non-herbicide techniques (primary treatment type)	709.9	956.4	1465.8
Acres treated with brush-cut/mow techniques (primary treatment type)	458.5	535.8	913.8
Acres treated with dig/pull techniques (primary treatment type)	179.0	310.7	261.2
Acres treated with flaming techniques (primary treatment type)	0.0	0.2	0.0
Acres treated with grazing techniques (primary treatment type)	0.0	6.0	0.0
Acres treated with log/fell/saw techniques (primary treatment type)	5.7	84.8	12.3
Acres treated with mastication techniques (primary treatment type)	46.1	0.7	46.3
Acres treated with a combination of mechanical techniques (primary treatment type)	14.4	17.2	125.4
Acres treated with pruning techniques (primary treatment type)	6.4	1.0	5.3
Acres treated with the primary goal of wildfire fuel management	226.1	287.2	72.0
Acres treated with the primary goal of habitat enhancement	458.0	732.0	441.9
Acres treated with the primary goal of parks operations	471.0	563.0	1083.6

*all acreages listed as gross acres