

San Mateo County Parks Department Integrated Pest Management (IPM) Program 2024 Annual Report



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Overview

The San Mateo County Parks Department (County Parks) utilizes science-based Integrated Pest Management (IPM) practices to improve habitat quality, protect biodiversity, mitigate the risk of wildfire, 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 a combination of techniques such as biological control, habitat manipulation, and modification of cultural practices (**UCANR, 2024**). Chemical treatments (i.e. herbicides) are only used when the above techniques are found to be either ineffective or infeasible. Chemical treatments are always conducted in accordance with established regulations and guidelines, 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 depend on the department to improve public safety by mitigating the threat of wildfire.

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. 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 in an attempt to reduce the spread of Cape Ivy which is an invasive vine that suppresses native riparian vegetation, especially along the San Mateo coastside.
- *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 state-licensed Pest Control Advisor (PCA) with expertise in wildland IPM to receive 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 2024. Projects include those conducted with a focus on wildfire fuel management, habitat enhancement, parks operations, and volunteer opportunities.

2024 Summary

In 2024, using the County Parks IPM program as a guide, the department conducted vegetation management activities across 1,583 acres of parkland including 100 miles of trail, hosted 68 volunteer weeding events which accounted for more than 4,404 volunteer-hours, and performed six large-scale fuel reduction projects (**Appendix A, B**). This represents an increase of 654 acres treated when compared to 2023 numbers. 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 2024.

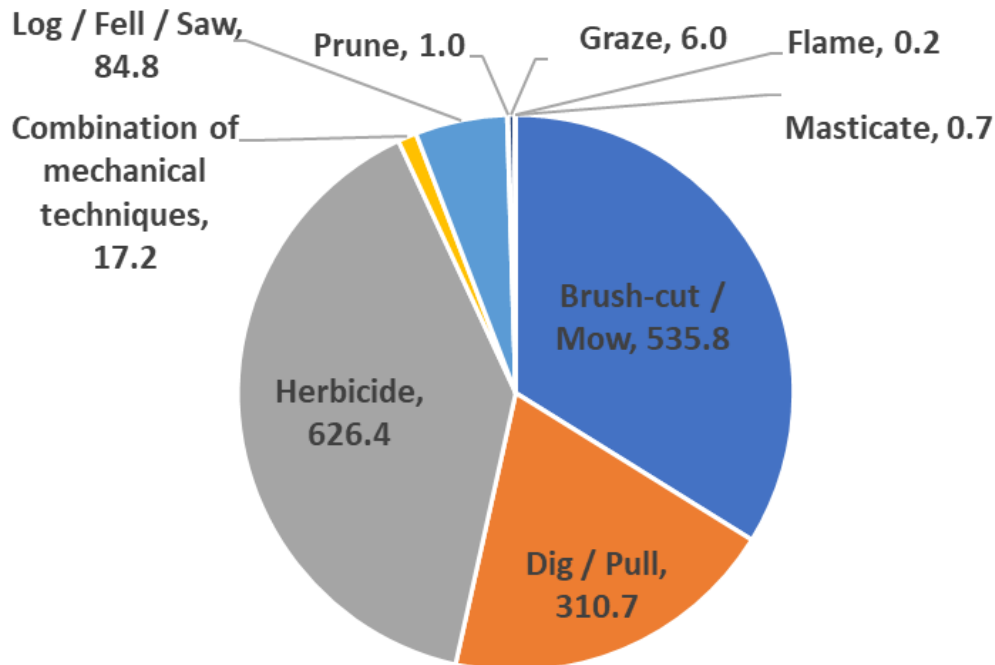


Figure 1. County Parks 2024 IPM vegetation management projects broken down by primary treatment type. In this figure, acreage is represented by gross acres rather than infested acres. Gross acres are a representation of the entire area that was scoped for a pest infestation, and overestimates the exact 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 acres in the charts despite the fact that only ten trees were treated. 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 is not included in the acreage here as these projects are not mapped, however volunteers contributed an additional 4,404 hours of hand weeding work in our parks.

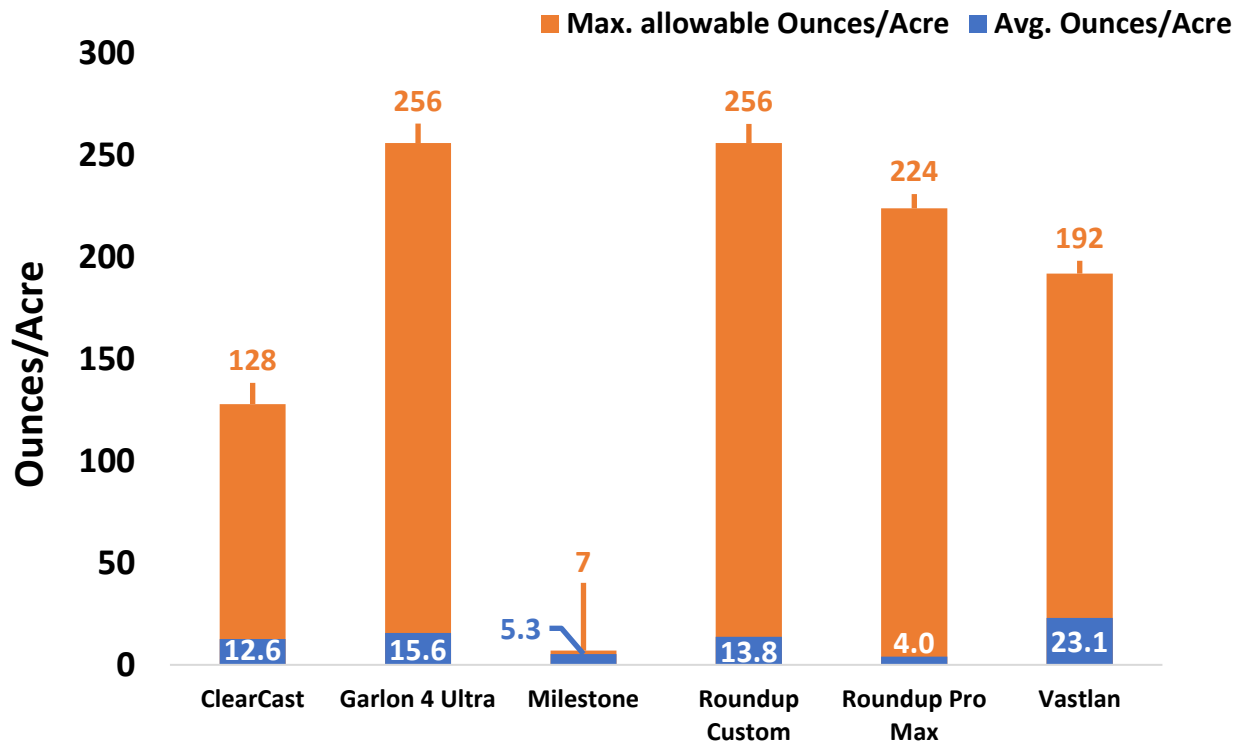


Figure 2. The average ounces/acre of herbicides used for County Parks IPM treatments within the San Mateo County Park system in 2024. Blue (dark) bars represent actual use averages, while orange (light) bars represent the maximum allowable rate according to the label which is reviewed and approved by 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. While the herbicide Polaris was used to treat a small area of English Ivy at San Bruno Mountain in 2024, this chemical is not included in the chart as less than one acre was treated and an average per acre could not be calculated. For the Polaris treatment, 58.9 ounces of herbicide was used (the maximum allowable rate per acre is 96 ounces).

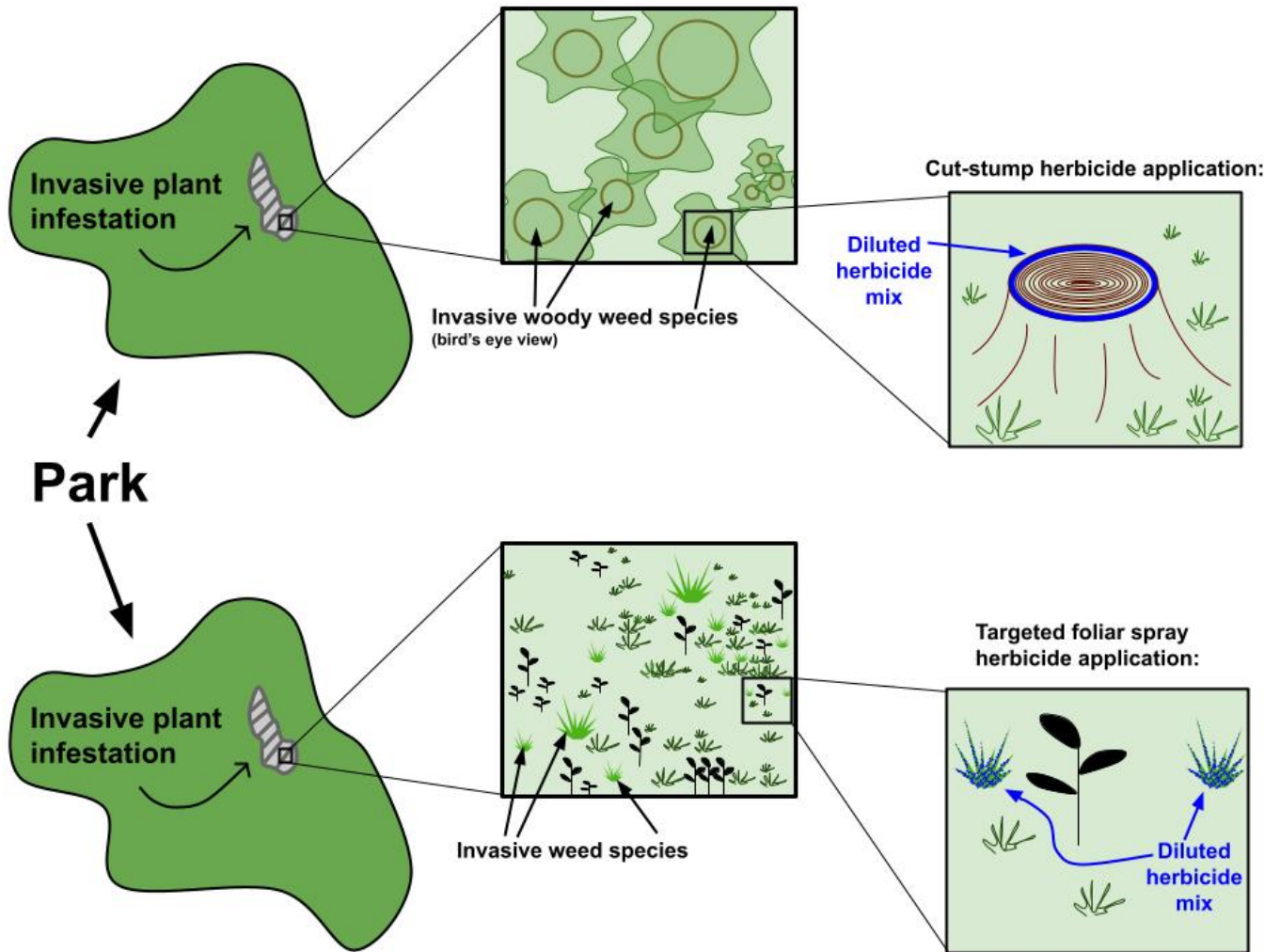


Figure 3. Visual examples of the two herbicide application techniques used in County parks. The top example is a cut-stump technique in which an herbicide mix is applied directly to the cambium of the exposed stump after woody vegetation is removed. This technique prevents the stump from re-sprouting 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). 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 newly available 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, 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 2024 are shown in **Figure 2**. In all cases, County Parks ensures our projects stay below this rate limit.

Wildfire Fuel Management

In 2024, County Parks coordinated or implemented six 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 efforts were 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 was either removed off site, chipped on site, lopped and scattered, or incinerated in air curtain burners.

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 or Cotoneaster after hand work. Utilization of the cut-stump application method is necessary because these species aggressively re-sprout. 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 the initial treatment.

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

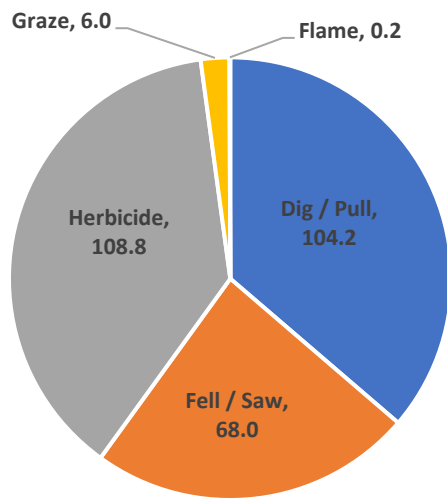


Figure 4. 2024. County Parks wildfire fuels reduction acreage categorized by primary treatment type. Although cut-stump treatments use a combination of mechanical and herbicide techniques, they are included in the 'herbicide' category of this figure as the application of herbicide is what kills the tree. See **Figure 3** for a visual representation of targeted herbicide techniques.

In total, the department treated: 2.5 acres of initial Eucalyptus thinning at Quarry Park, 2.5 acres of hazard Eucalyptus removals at Mirada Surf, 0.3 acres of Eucalyptus fuel break maintenance at San Bruno Mountain, 6.0 acres of understory thinning at San Pedro Valley, and an additional 220.6 acres of follow-up fuels management work across the County parks system including the treatment of French broom, gorse, Jubata grass, poison hemlock, cotoneaster, thistles, Bermuda buttercup, Monterey cypress, and Eucalyptus saplings and re-sprouts (**Figures 4,5**). Some acres were treated multiple times within calendar year 2024 and are therefore double counted in these totals. The department also worked with the San Mateo County Resource Conservation District (RCD) to facilitate the treatment of 55.3 acres of area along the La Honda shaded fuel break within Sam McDonald County Park.

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 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 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.

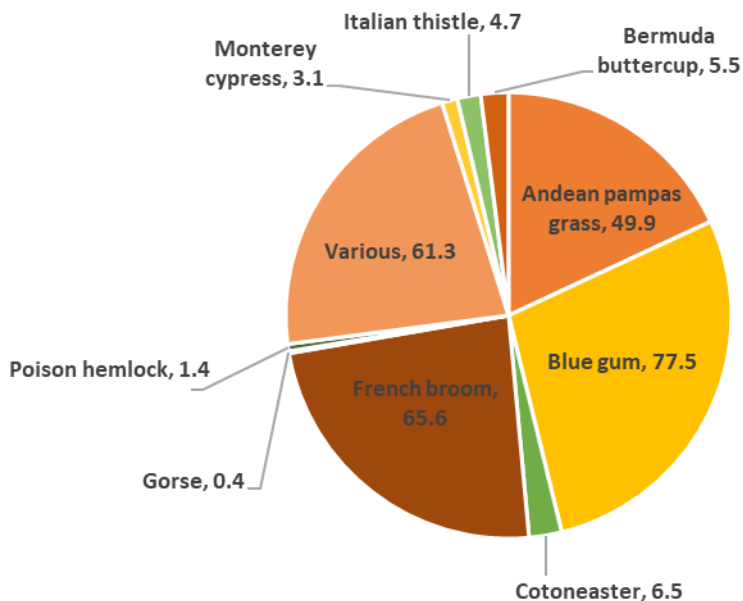


Figure 5. 2024. County Parks’ fuels reduction project acreage categorized by target species. Values are in gross acres.

There were three large-scale wildfire fuel management projects conducted in 2024 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, a project to manage large woody debris and hazard trees in Mirada East that were windthrown during the winters of 2022-23 and 2023-24, 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 overtime reducing the efficacy of the treatment area.

For the Quarry Park and Mirada Surf East 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, and returning a significant fire and public safety threat.

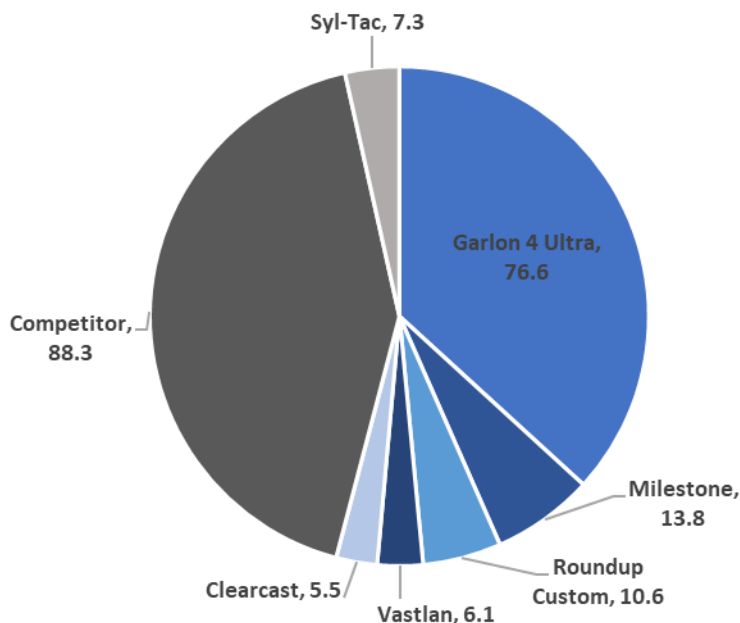


Figure 6. 2024. County Parks wildfire fuel reduction project acreage broken down by product name for all projects involving the use of herbicides, including both initial and follow-up treatments. Values are in gross acres. Some products such as Competitor and Syl-Tac are additives used in herbicide mixtures 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. See **Appendix B** for the locations of all herbicide treatments.

Habitat Enhancement

In 2024, County Parks implemented and managed IPM habitat enhancement projects that targeted at least 34 species across more than 732 gross acres (more than 18 infested acres), which accounted for 5,096 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 Bermuda buttercup (*Oxalis pes-caprae*), both of which commonly invade coastal scrub and coastal prairie communities that serve as habitat for wildlife. If not controlled, these species will outcompete native species for resources and degrade habitat quality 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.

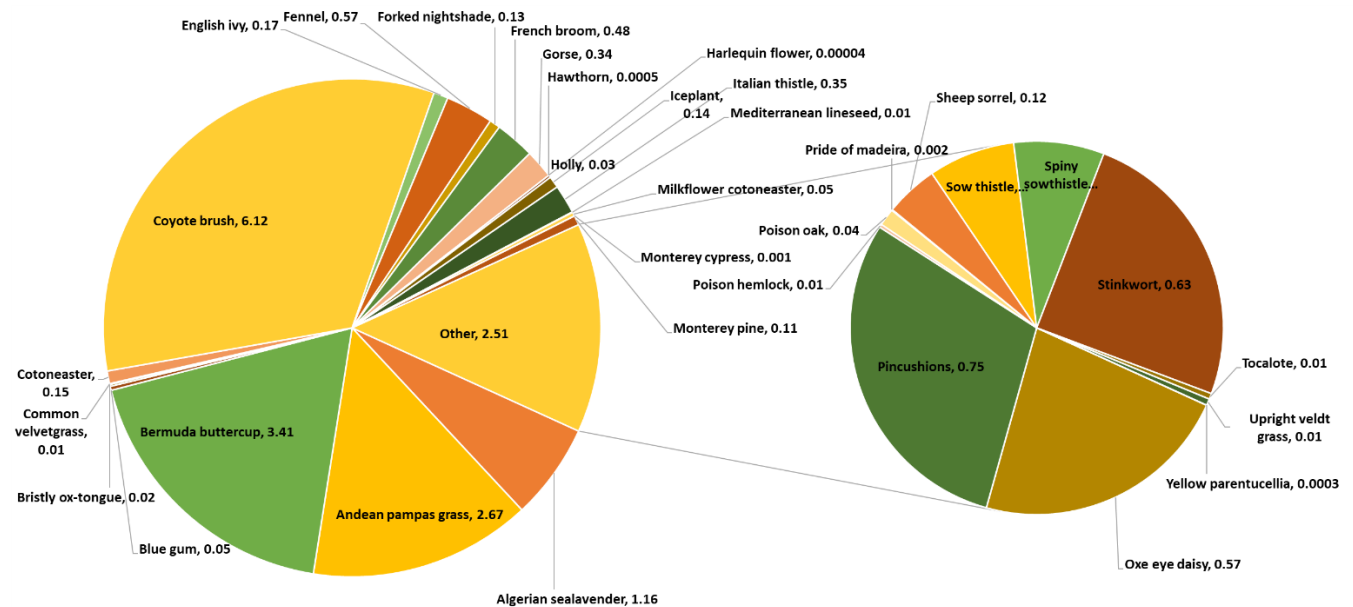


Figure 7. Infested acres managed during our 2024 habitat enhancement IPM projects, broken down by target species. Infested acres are calculated by multiplying the gross treatment acres by the percent cover of the target species to reflect the actual area treated.

For the majority of habitat enhancement IPM projects conducted by County Parks in 2024—approximately 18.5 infested acres—targeted herbicide application was the most appropriate method of treatment. 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 these 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 most gross acres treated, Jubata grass, 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. The species with the second-most gross and infested acres treated, Bermuda buttercup, has bulbs that grow deep below the soil surface. Removing only the aboveground biomass of the plant does not provide effective long-term management for this species. For large infestations or infestations located on steep slopes, digging the underground bulb can cause severe environmental degradation, erosion, and/or slope instability. The largest Bermuda buttercup infestations are located in San Bruno Mountain State and County Park, where the species forms dense monocultures that rapidly out-compete the host and nectar plants of the federally threatened and endangered butterfly species that make their home there. These butterfly species are host specific and if their host plants are lost due to pressure from competition, the butterflies will also be extirpated from the site. Because these species’ larvae go into diapause (a period of suspended development) in the leaf litter of their host plants or underground, ground disturbance when Bermuda buttercup is visible (winter and spring) is inappropriate due to the potential for take of listed species. Hand pulling Bermuda buttercup is also only effective in extremely small patches where each bulb and root can be carefully and delicately removed. Even with careful hand removal, the thin roots will often break and leave small bulbs in the soil, which will develop the following winter.

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**).

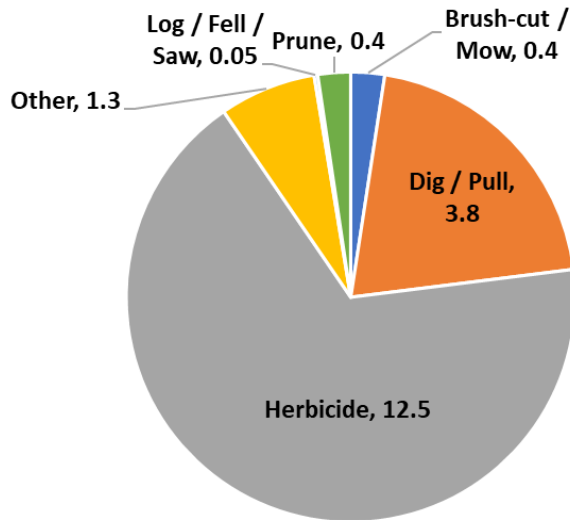


Figure 8. The total infested acres managed during County Parks' 2024 habitat enhancement IPM projects, categorized by treatment method. “Other” includes unique mechanical techniques such as mastication with a remotely operated masticator. “Dig/pull” includes any hand removal technique, including the 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 2024, 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 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. The third most-used product was Clearcast, which is an herbicide with the active ingredient ammonium salt of imazamox (EPA registration number 241-437-67690, signal word of Caution). In 2024, this herbicide was only used to treat Bermuda buttercup. Please note, broadcast application of herbicide is not authorized in County parks per County Board of Supervisors’ resolution.

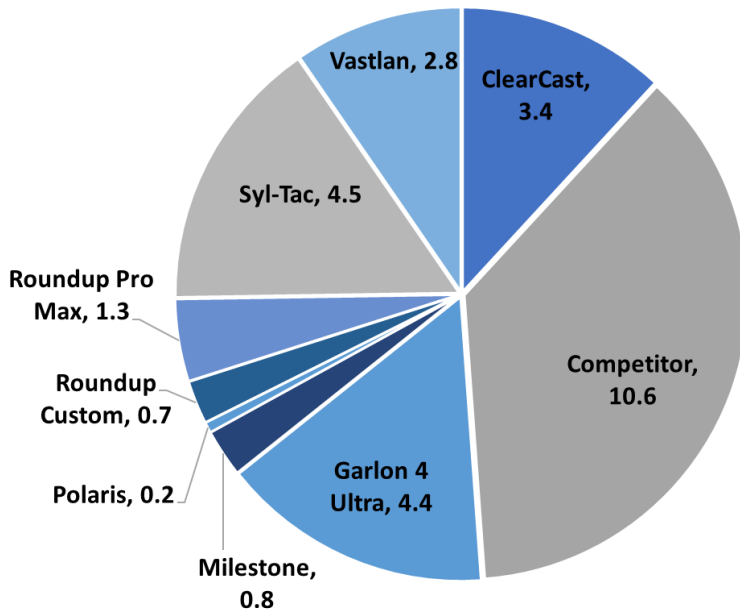


Figure 9. 2024. County Parks' habitat enhancement IPM project acreage (infested) categorized by product name for all projects involving the use of herbicides. Some products such as Competitor and Syl-Tac are additives used in herbicide mixtures to assist with application or absorption by the target species. 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 **Appendix B** for information about all herbicide treatments. See **Figure 3** for a visual representation of targeted herbicide techniques.

Appendix B includes more information regarding all herbicide applications carried out by County Parks in 2024, 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.

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 10**). 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 563 gross acres including 100 miles of trail, accounting for 4,847 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 11**), 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.

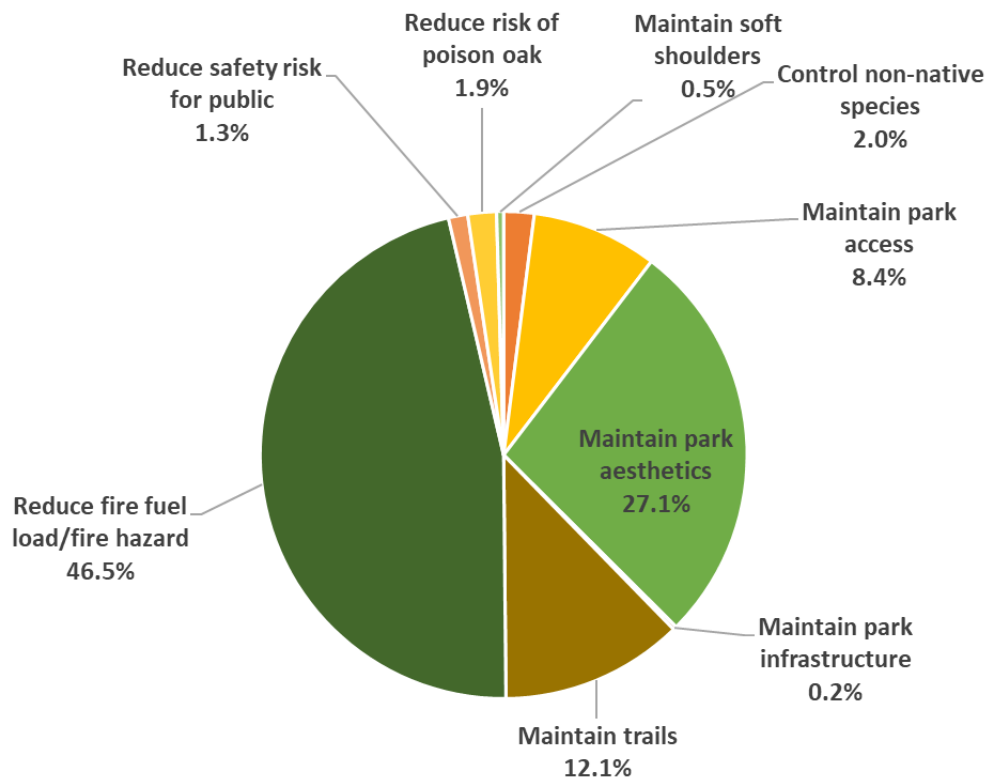


Figure 10. 2024. The percentage of gross acres treated by the County Parks Operations' IPM program, aggregated by project objectives. Many of the IPM projects have multiple objectives. In this figure, the data represents primary, secondary, and tertiary objectives of the projects, therefore some projects are represented multiple times if they have two or more goals for treatment. A total of 563 gross acres, including 100 trail miles were managed by our Operations program in 2024.

In 2024, 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.

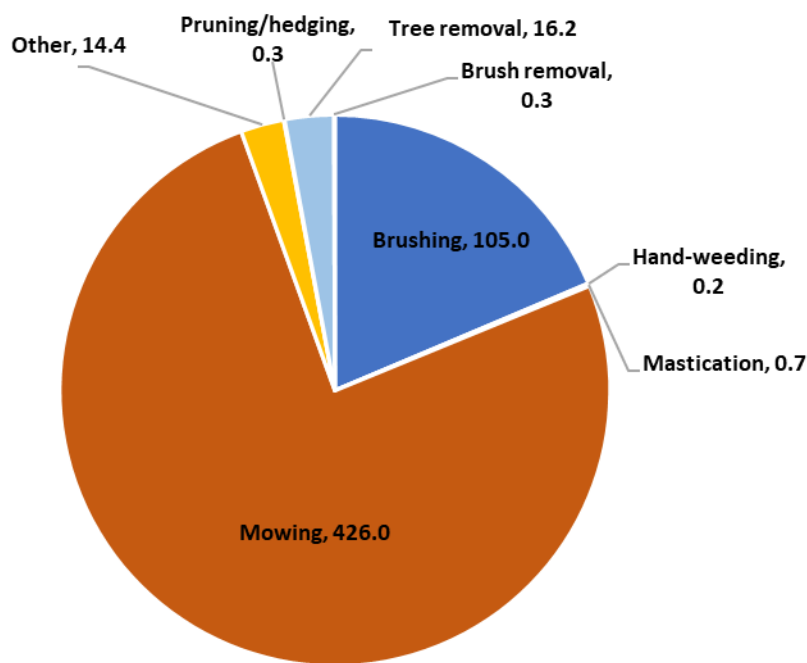


Figure 11. 2024. Gross acreage of County Parks Operations' IPM projects, represented by treatment type. A total of 4,847 staff-hours were logged to manage 563 acres. Several tree removals were not included in the acreage or person-hour data for the Operations IPM program because they were performed on an as-needed basis or under emergency circumstances and data was not able to be collected.

Park Operation's IPM management techniques included mowing, brushing, hand-weeding, mastication, pruning, hedging, and felling. The "combination of mechanical techniques" category represented in **Figure 11** represents projects in which various hand-held equipment was used for the same project, such as brush cutters and hedge trimmers or chain saws and loppers. Park Operations did not apply any herbicide during their IPM projects in 2024.

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 2024, volunteers carried out 4,404 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 12**). This is more than double the volunteer hours supervised in 2023 (2,082 hours in 2023) which is due to a variety of differences between the two years: 1) after multiple years of heavy rains, the 2024 weed season produced large populations of weeds that were appropriate for hand pulling; 2) many volunteer events needed to be canceled in 2023 due to storms; 3) we saw heightened volunteer interest for Broom and Algerian sea lavender pulling events in 2024; 4) with the construction closures at the Don Horsley Park at Tunitas Creek Beach in 2024, many of our beach cleanup events were converted to weeding events in nearby parks; and 5) the Parks Foundation's support of Grassroots Ecology allowed the group to bring large volunteer weeding events to Huddart Park throughout 2024.

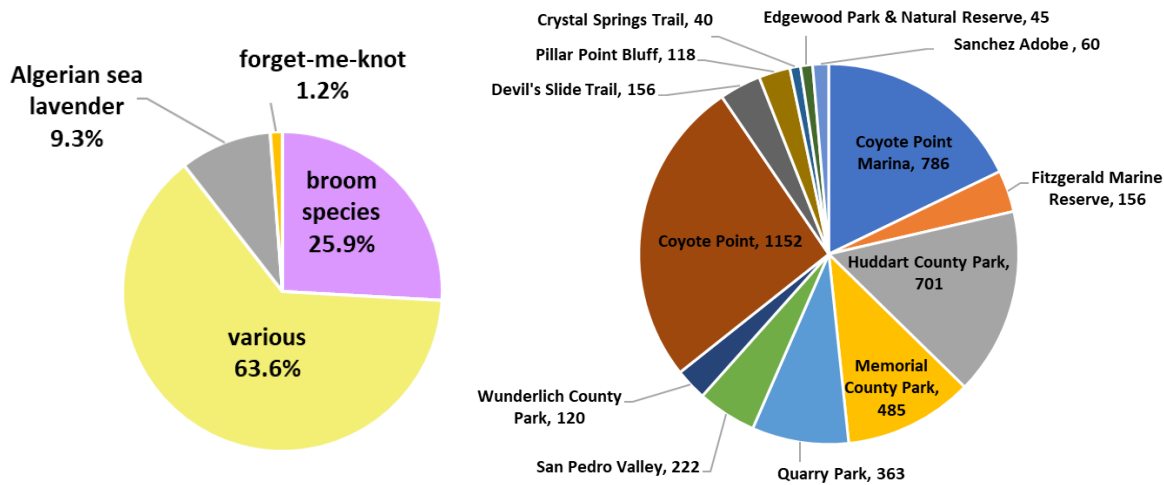


Figure 12. 2024. The number of County Parks volunteer weeding hours categorized by i) target species and ii) park. A total of 4,404 volunteer-hours were logged during 68 weeding events, accounting for hand weeding activities during every month, except June of 2024. ‘Various weed’ species refers to volunteer programs in which volunteers scoped and removed several weed species from a site.

The primary target species for these projects included broom species (25.9% of volunteer hours), Algerian sea lavender (9.3% of volunteer hours), and forget-me-knots (1.2% of volunteer hours) (**Figure 12**). All three 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. However, 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, ice plant, 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), 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 2025. An organic herbicide experiment will be conducted 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. The experiment has been designed to 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 2025.

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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<https://www.cdfa.ca.gov/plant/ipc/encycloweedia/pdf/CaliforniaNoxiousWeeds.pdf>

Appendix A – 2024 County Parks volunteer weeding hours

Month	Park	Primary Target Species	Volunteers	Person-hours
January	Coyote Point	various	16	32
January	Huddart County Park	broom species	81	243
January	Coyote Point	Algerian sea lavender	7	21
January	Coyote Point	various	30	150
February	Quarry Park	broom species	89	267
February	Coyote Point Marina	Algerian sea lavender	6	21
February	Coyote Point	various	21	42
February	Wunderlich County Park	various	4	15
February	Huddart County Park	broom species	4	12
February	Coyote Point	various	21	42
March	Wunderlich County Park	various	6	24
March	San Pedro Valley	various	8	192
March	Coyote Point	Algerian sea lavender	22	132
March	Memorial County Park	broom species	35	105
March	Coyote Point	Algerian sea lavender	7	21
March	Memorial County Park	broom species	18	54
March	Fitzgerald Marine Reserve	various	25	75
April	Memorial County Park	forget-me-knot	18	54
April	Coyote Point	various	8	24
April	Devil's Slide Trail	various	25	75
April	Coyote Point	Algerian sea lavender	7	21
April	Wunderlich County Park	broom species	6	18
April	Wunderlich County Park	broom species	14	42
April	Huddart County Park	broom species	28	150
May	Coyote Point	various	15	45
May	Coyote Point	various	8	24
May	Wunderlich County Park	broom species	7	21
May	Pillar Point Bluff	various	18	30
May	Memorial County Park	various	18	54
May	Crystal Springs Trail	various	20	40
May	Memorial County Park	various	27	152
May	Huddart County Park	various	4	8
May	Huddart County Park	various	22	81
May	Fitzgerald Marine Reserve	various	9	27
July	Coyote Point Marina	Algerian sea lavender	7	56
July	Huddart Count Park	various	15	45
July	Coyote Point	various	52	156
July	Quarry Park	various	22	96
July	Fitzgerald Marine Reserve	various	18	54
August	Coyote Point	various	31	93
August	Coyote Point Marina	Algerian sea lavender	11	33
August	Huddart County Park	broom species	9	27
August	Pillar Point Bluff	various	22	66
August	Coyote Point Marina	Algerian sea lavender	35	105
September	Huddart County Park	broom species	6	12
October	Coyote Point Marina	various	22	66
October	Coyote Point	various	13	26
October	Coyote Point Marina	various	19	136
October	Coyote Point	various	14	42
October	Pillar Point Bluff	various	11	22
October	Edgewood Park & Natural Reserve	various	9	27
October	Coyote Point Marina	various	10	30
October	Coyote Point Marina	various	24	48
October	Coyote Point	various	17	34
October	Coyote Point Marina	various	18	36
October	San Pedro Valley	various	10	30
October	Devil's Slide Trail	various	27	81
October	Edgewood Park & Natural Reserve	various	6	18
November	Coyote Point Marina	various	24	138
November	Huddart County Park	broom species	41	123
November	Coyote Point	various	9	27
November	Coyote Point	various	14	42
November	Coyote Point Marina	various	36	117
November	Sanchez Adobe	various	20	60
December	Coyote Point	various	19	156
December	Memorial County Park	broom species	21	66
December	Coyote Point	various	2	16
December	Coyote Point	various	3	6

Appendix B – 2024 County Parks herbicide treatments

Patch ID	Park	Project Type	Target Species	Percent Cover	Gross Area (Acres)	Chemical Method	Product 1	Ounces	Product 2	Ounces	Product 3	Ounces	Start Date	End Date	Latitude	Longitude
N/A	Quarry County Park	Fuels reduction	Blue gum	varies	2.50	Cut-stump	Garlon 4 Ultra	512	Competitor	512			2023	2024	37.50796	-122.45858
N/A	Mirada Surf	Fuels reduction	Blue gum	varies	2.50	Cut-stump	Garlon 4 Ultra	512	Competitor	512			2023	2024	37.49999	-122.45888
N/A	San Bruno Mountain	Fuels reduction	Blue gum	varies	0.29	Cut-stump	Garlon 4 Ultra	10.24	Competitor	10.24			12/1/2023	2/1/2024	37.69832	-122.457242
io119963	Edgewood Park	Fuels reduction	Bermuda buttercup	<1%	3.09	Spot Spray	ClearCast	18	Competitor	14	Syl-Tac	1.3	1/25/2024	1/26/2024	37.470153	-122.27629
io119960	Edgewood Park	Fuels reduction	Italian thistle	1 - 5%	2.73	Spot Spray	Vastlan	37	Competitor	56		1/25/2024	1/26/2024	37.469875	-122.27613	
io119961	Edgewood Park	Fuels reduction	Poison hemlock	6 - 10%	1.43	Spot Spray	Vastlan	23	Competitor	18		1/26/2024	1/26/2024	37.468925	-122.2753	
io119964	Edgewood Park	Fuels reduction	Bermuda buttercup	<1%	1.70	Spot Spray	ClearCast	5	Competitor	4	Syl-Tac	0.5	1/29/2024	1/29/2024	37.467628	-122.27505
io119965	Edgewood Park	Fuels reduction	Andean pampas grass	6 - 10%	0.02	Spot Spray	Roundup Custom	20	Competitor	4		1/29/2024	1/29/2024	37.465127	-122.27343	
io122750	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	1 - 5%	45.45	Spot Spray	ClearCast	566	Competitor	442	Syl-Tac	24.6	2/9/2024	3/19/2024	37.672304	-122.42887
io120303	Pillar Point Bluff	Habitat enhancement	Bermuda buttercup	<1%	42.31	Spot Spray	ClearCast	20	Competitor	163	Syl-Tac	5	2/13/2024	2/21/2024	37.50363	-122.49882
io120302	Valleamar Bluff	Habitat enhancement	Bermuda buttercup	<1%	0.75	Spot Spray	ClearCast	10.2	Competitor	8	Syl-Tac	0.7	2/15/2024	2/15/2024	37.529465	-122.51682
io122152	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	1 - 5%	2.26	Spot Spray	ClearCast	16	Competitor	13	Syl-Tac	0.8	2/23/2024	2/27/2024	37.676573	-122.41083
io121920	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	1 - 5%	12.77	Spot Spray	ClearCast	36	Competitor	28	Syl-Tac	1.5	2/23/2024	3/14/2024	37.673281	-122.4024
io122151	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	6 - 10%	1.02	Spot Spray	ClearCast	82	Competitor	66	Syl-Tac	3.5	2/27/2024	3/14/2024	37.677674	-122.42498
io122153	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	1 - 5%	8.16	Spot Spray	ClearCast	35	Competitor	28	Syl-Tac	1.6	2/27/2024	2/27/2024	37.677389	-122.41663
io121918	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	11 - 20%	0.39	Spot Spray	ClearCast	20	Competitor	16	Syl-Tac	0.9	2/27/2024	2/27/2024	37.675761	-122.41309
io122436	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	<1%	1.52	Spot Spray	ClearCast	5	Competitor	4	Syl-Tac	0.1	3/7/2024	3/7/2024	37.693265	-122.43133
io122418	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	1 - 5%	0.47	Spot Spray	ClearCast	11	Competitor	8	Syl-Tac	0.4	3/7/2024	3/7/2024	37.694941	-122.43604
io122420	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	<1%	1.00	Spot Spray	ClearCast	17	Competitor	13.6	Syl-Tac	0.7	3/7/2024	3/7/2024	37.690985	-122.43389
io122419	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	<1%	1.50	Spot Spray	ClearCast	6	Competitor	4.8	Syl-Tac	0.2	3/7/2024	3/7/2024	37.692014	-122.43629
io122417	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	11 - 20%	0.19	Spot Spray	ClearCast	30	Competitor	24	Syl-Tac	1.2	3/7/2024	3/7/2024	37.6949	-122.43503
io123591	Pillar Point Bluff	Habitat enhancement	Cotoneaster	<1%	22.28	Cut-stump	Garlon 4 Ultra	134	Competitor	402			3/11/2024	4/2/2024	37.505782	-122.50016
io122751	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	1 - 5%	2.32	Spot Spray	ClearCast	42	Competitor	33	Syl-Tac	1.8	3/14/2024	3/14/2024	37.701279	-122.43001
io122748	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	<1%	8.16	Spot Spray	ClearCast	92	Competitor	72	Syl-Tac	4	3/14/2024	3/14/2024	37.699171	-122.42716
io122154	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	11 - 20%	1.43	Spot Spray	ClearCast	71	Competitor	57	Syl-Tac	3	3/14/2024	3/14/2024	37.680122	-122.42978
io122752	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	11 - 20%	3.23	Spot Spray	ClearCast	275	Competitor	215	Syl-Tac	11.9	3/15/2024	3/18/2024	37.694841	-122.42507
io122753	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	<1%	1.03	Spot Spray	ClearCast	11.5	Competitor	9	Syl-Tac	0.5	3/15/2024	3/15/2024	37.696811	-122.42774
io122749	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	<1%	0.03	Spot Spray	ClearCast	2.6	Competitor	2	Syl-Tac	0.1	3/15/2024	3/15/2024	37.694944	-122.42298
io122761	Edgewood Park	Habitat enhancement	Bermuda buttercup	<1%	0.83	Spot Spray	ClearCast	23	Competitor	18	Syl-Tac	1	3/20/2024	3/20/2024	37.471374	-122.28625
io122763	Edgewood Park	Habitat enhancement	Bermuda buttercup	<1%	0.15	Spot Spray	ClearCast	0.64	Competitor	0.5	Syl-Tac	0.03	3/20/2024	3/20/2024	37.467914	-122.27645
io122760	Edgewood Park	Fuels reduction	Bermuda buttercup	<1%	0.67	Spot Spray	ClearCast	0.9	Competitor	0.7	Syl-Tac	0.04	3/20/2024	3/20/2024	37.467448	-122.27551
io122759	Edgewood Park	Fuels reduction	Bermuda buttercup	<1%	0.06	Spot Spray	ClearCast	0.13	Competitor	0.1	Syl-Tac	0.01	3/20/2024	3/20/2024	37.468182	-122.27537
io122762	Edgewood Park	Habitat enhancement	Bermuda buttercup	<1%	3.16	Spot Spray	ClearCast	5.5	Competitor	4.3	Syl-Tac	0.24	3/20/2024	3/20/2024	37.470822	-122.27706
io122757	Edgewood Park	Habitat enhancement	Bermuda buttercup	<1%	1.40	Spot Spray	ClearCast	18.4	Competitor	14.4	Syl-Tac	0.8	3/20/2024	3/20/2024	37.472448	-122.27872
io122765	Edgewood Park	Fuels reduction	Italian thistle	<1%	1.79	Spot Spray	Garlon 4 Ultra	108	Competitor	42	Syl-Tac	2.3	3/26/2024	3/26/2024	37.471249	-122.2767
io122766	Edgewood Park	Habitat enhancement	Bermuda buttercup	<1%	1.57	Spot Spray	ClearCast	22	Competitor	17.2	Syl-Tac	0.96	3/26/2024	3/26/2024	37.459373	-122.28137
io122767	Edgewood Park	Habitat enhancement	Bermuda buttercup	<1%	0.03	Spot Spray	ClearCast	0.3	Competitor	0.2	Syl-Tac	0.01	3/26/2024	3/26/2024	37.463871	-122.27852
io122758	Edgewood Park	Habitat enhancement	Bermuda buttercup	<1%	0.57	Spot Spray	ClearCast	5.9	Competitor	4.6	Syl-Tac	0.3	3/26/2024	3/26/2024	37.463007	-122.27547
io123589	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	1 - 5%	1.07	Spot Spray	ClearCast	57.6	Competitor	45	Syl-Tac	2.5	4/1/2024	4/1/2024	37.670345	-122.43982
io123593	San Bruno Mountain	Habitat enhancement	Bermuda buttercup	<1%	2.58	Spot Spray	ClearCast	206.6	Competitor	161.4	Syl-Tac	9	4/1/2024	4/1/2024	37.670799	-122.39337
io128836	San Bruno Mountain	Habitat enhancement	Fennel	1 - 5%	11.43	Spot Spray	Vastlan	532	Competitor	260	Syl-Tac	14.4	4/10/2024	4/11/2024	37.673096	-122.40319
io128833	San Bruno Mountain	Habitat enhancement	Pincushions	1 - 5%	4.49	Spot Spray	Vastlan	299	Competitor	146	Syl-Tac	8.1	4/11/2024	4/15/2024	37.674563	-122.40618
io128832	San Bruno Mountain	Habitat enhancement	Pincushions	<1%	5.90	Spot Spray	Vastlan	229	Competitor	112	Syl-Tac	6.2	4/16/2024	4/16/2024	37.680399	-122.40965
io128831	San Bruno Mountain	Habitat enhancement	Fennel	<1%	10.40	Spot Spray	Vastlan	199	Competitor	97	Syl-Tac	5.4	4/17/2024	4/17/2024	37.67074	-122.42618
io128830	San Bruno Mountain	Habitat enhancement	Fennel	<1%	12.12	Spot Spray	Vastlan	330	Competitor	161	Syl-Tac	8.9	4/18/2024	4/26/2024	37.673683	-122.41228
io128835	San Bruno Mountain	Habitat enhancement	Fennel	<1%	9.82	Spot Spray	Vastlan	428	Competitor	209	Syl-Tac	11.6	4/18/2024	4/24/2024	37.67745	-122.4154
io128834	San Bruno Mountain	Habitat enhancement	Fennel	<1%	6.73	Spot Spray	Vastlan	115	Competitor	97	Syl-Tac	5.39	4/19/2024	4/19/2024	37.671781	-122.43056
io130862	San Bruno Mountain	Habitat enhancement	Fennel	<1%	0.74	Spot Spray	Vastlan	18.4	Competitor	9	Syl-Tac	0.5	4/26/2024	4/26/2024	37.695708	-122.4268
io130841	San Bruno Mountain	Habitat enhancement	Fennel	<1%	3.84	Spot Spray	Vastlan	135	Competitor	66	Syl-Tac	3.7	4/26/2024	5/15/2024	37.694737	-122.42351
io128952	Quarry County Park	Fuels reduction	French broom	1 - 5%	11.77	Spot Spray	Garlon 4 Ultra	339	Milestone	36.8	Competitor	221	5/1/2024	5/2/2024	37.500024	-122.45403
io128954	Quarry County Park	Fuels reduction	Blue gum	<1%	1.63	Cut-stump	Garlon 4 Ultra	0.4	Competitor	51.2			5/2/2024	5/2/2024	37.511023	-122.4514
io130844	San Bruno Mountain	Habitat enhancement	Oxe eye daisy	1 - 5%	0.15	Spot Spray	Vastlan	9.2	Competitor	6	Milestone	0.15	5/14/2024	5/14/2024	37.693189	-122.43423
io130845	San Bruno Mountain	Habitat enhancement	Oxe eye daisy	6 - 10%	6.36	Spot Spray	Vastlan	323	Competitor	210	Milestone	53.8	5/14/2024	5/15/2023	37.695041	-122.43336
io130842	San Bruno Mountain	Habitat enhancement	Poison oak	6 - 10%	0.47	Cut-stump	Garlon 4 Ultra	0.21	Competitor	0.64			5/14/2024	5/14/2024	37.695037	-122.43384
io130935	San Bruno Mountain	Habitat enhancement	Oxe eye daisy	1 - 5%	1.10	Spot Spray	Vastlan	18.4	Competitor	12	Milestone	3.1	5/15/2024	5/15/2024	37.697719	-122.43071
io130843	San Bruno Mountain	Habitat enhancement	Fennel	<1%	2.39	Spot Spray	Vastlan	42.2	Competitor	22	Syl-Tac	1.2	5/15/2024	5/15/2024	37.699336	-122.42505
io130846	San Bruno Mountain	Habitat enhancement	Coyote brush	6 - 10%	2.38	Spot Spray	Vastlan	307.2	Competitor	160	Syl-Tac	8.9	5/16/2024	5/17/2024	37.672998	-122.40341
io130847	San Bruno Mountain	Habitat enhancement	Italian thistle	6 - 10%	2.34	Spot Spray	Vastlan	284	Competitor	148	Syl-Tac	8.2	5/17/2024	5/17/2024	37.673318	-122.40347
io139403	Quarry County Park	Fuels reduction	Blue gum	1 - 5%	28.70	Cut-stump	Garlon 4 Ultra	1.64	Competitor	5.03			8/5/2024	8/8/2024	37.507607	-122.45894
io139404	Quarry County Park	Fuels reduction	Blue gum	<1%	10.05	Cut-stump	Garlon 4 Ultra	0.4	Competitor	1.2			8/9/2024	8/9/2024	37.505921	-122.46198
io143351	San Bruno Mountain	Habitat enhancement	Gorse	<1%	46.19	Spot Spray	Garlon 4 Ultra	44.8	Vastlan	51.2	Milestone	266.2	9/16/2024	9/18/2024	37.701353	-122.43135
io143348	San Bruno Mountain	Habitat enhancement	Gorse	<1%	22.44	Cut-stump	Garlon 4 Ultra	32	Vastlan	32	Competitor	192	9/17/2024	9/18/2024	37.702352	-122.43278
mg281833	San Bruno Mountain	Habitat enhancement	Andean pampas grass	1 - 5%	4.82	Spot Spray	Roundup Pro Max	6				9/18/2024	9/18/2024	37.690327	-122.43423	
mg281832	San Bruno Mountain	Habitat enhancement	Andean pampas grass	1 - 5%	1.88	Spot Spray	Roundup Pro Max	12				9/18/2024	9/18/2024	37.6922	-122.44792	
io143353	Pillar Point Bluff	Habitat enhancement	Andean pampas grass	<1%	44.63	Spot Spray	Roundup Custom	123	Competitor	48			9/19/2024	9/19/2024	37.514129	-122.50509
mg281842	San Bruno Mountain	Habitat enhancement	Andean pampas grass	1 - 5%	2.92	Spot Spray	Roundup Custom	24				9/19/2024	9/19/2024	37.688262	-122.43823	
io143																

Appendix C – Comparison of County Parks IPM projects across years

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

*All acreages are listed in gross acres.