

INTEGRATED PEST MANAGEMENT

Prepared by
Marin County Parks

2022 ANNUAL REPORT



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2022 Summary

Marin County maintained the same number of locations with less labor and pesticide use in 2021

Marin County's Integrated Pest Management program applies to 147 sites governed by the County's IPM ordinance, 133 of which were managed without pesticides, and included a total of 33,564 hours dedicated to non-chemical IPM.

This annual report for the year of 2022 is written for the Board of Supervisors as a requirement of the County of Marin Ordinance No. 3521 and the County of Marin Integrated Pest Management Policy. It serves as a review and summary of the county's pesticide use, cultural practices and non-chemical pest control activities, exemptions granted, training offered, proposed modifications to the county's pesticide list and suggestions for amendments or resources needed for effective implementation of the IPM policy and ordinance.

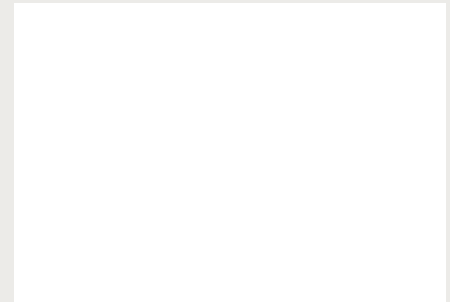
Measure A funding supports some IPM staff positions, and many volunteer projects. However, because Integrated Pest Management is being implemented by multiple departments across many project areas, funding for IPM work itself comes from a variety of associated sources, the majority of which comes from Marin County Parks and the Marin County Department of Public Works.

The IPM Ordinance and Policy were last updated in 2013, requiring that the IPM program is able to maintain accurate statistics that show meaningful reduction in pesticide use over time. Since then, organic and minimum-risk products have largely replaced synthetic pesticides wherever possible, and overall product use has tapered down to a steadier and significantly lower rate, especially within the last four years. This Coordinator Annual Report presents completed set of data for product usage, non-chemical pest control activities, training offered, and proposed modifications to the county's pesticide list.

Marin IPM program staff will continue to search for new solutions that prioritize organic and minimum risk alternatives.

[* See Glossary on page 15 for definitions.](#)

Integrated Pest Management (IPM) is a system of managing pests using careful consideration and integration of all available pest control tools and techniques.



2022 IPM Achievement Awardee

The IPM Achievement Award recognizes individuals and organizations that further the goal of eliminating pesticide use within the Marin County IPM Program.

The award winner will be named at the 1/27/23 meeting of the IPM Commission.

IPM Governance

Marin County Integrated Pest Management

Integrated Pest Management (IPM) is a system of managing pests using careful consideration and integration of all available pest control tools and techniques.

The target pest, goals, and site conditions guide a systematic decision-making process on what control methods to use. Mechanical and physical pest controls include weeding, mulching, weed-whipping, and mowing. Cultural control means changing work practices to reduce pests, such as altering irrigation practices to reduce weeds. Biological controls are natural enemies (predators, parasites, pathogens, and competitors) that control pests. Pesticides are used only after it is determined that alternative methods will not be effective. A pesticide is a natural or synthetic chemical preparation used to destroy plant, fungal, insect, or animal pests, and all pesticides used by the county are reported to the California Department of Pesticide Regulation.

Marin County Parks, in collaboration with other County departments, administers IPM for the County of Marin.

The program is governed by [County Ordinance 3598](#).

[Marin County's IPM policy](#) applies to 147 sites

that include county parks and libraries, Marin County government offices, Marin County Health and Human Services sites, County Service Areas, roadsides, and traffic medians throughout Marin. Common IPM challenges in these locations include wasps, ants, roaches, rodents, and weeds. In addition to managing pests, the county IPM program provides outreach to the public through volunteer opportunities and education.

The Integrated Pest Management Commission oversees the implementation of the Marin County Integrated Pest Management ordinance and policy.

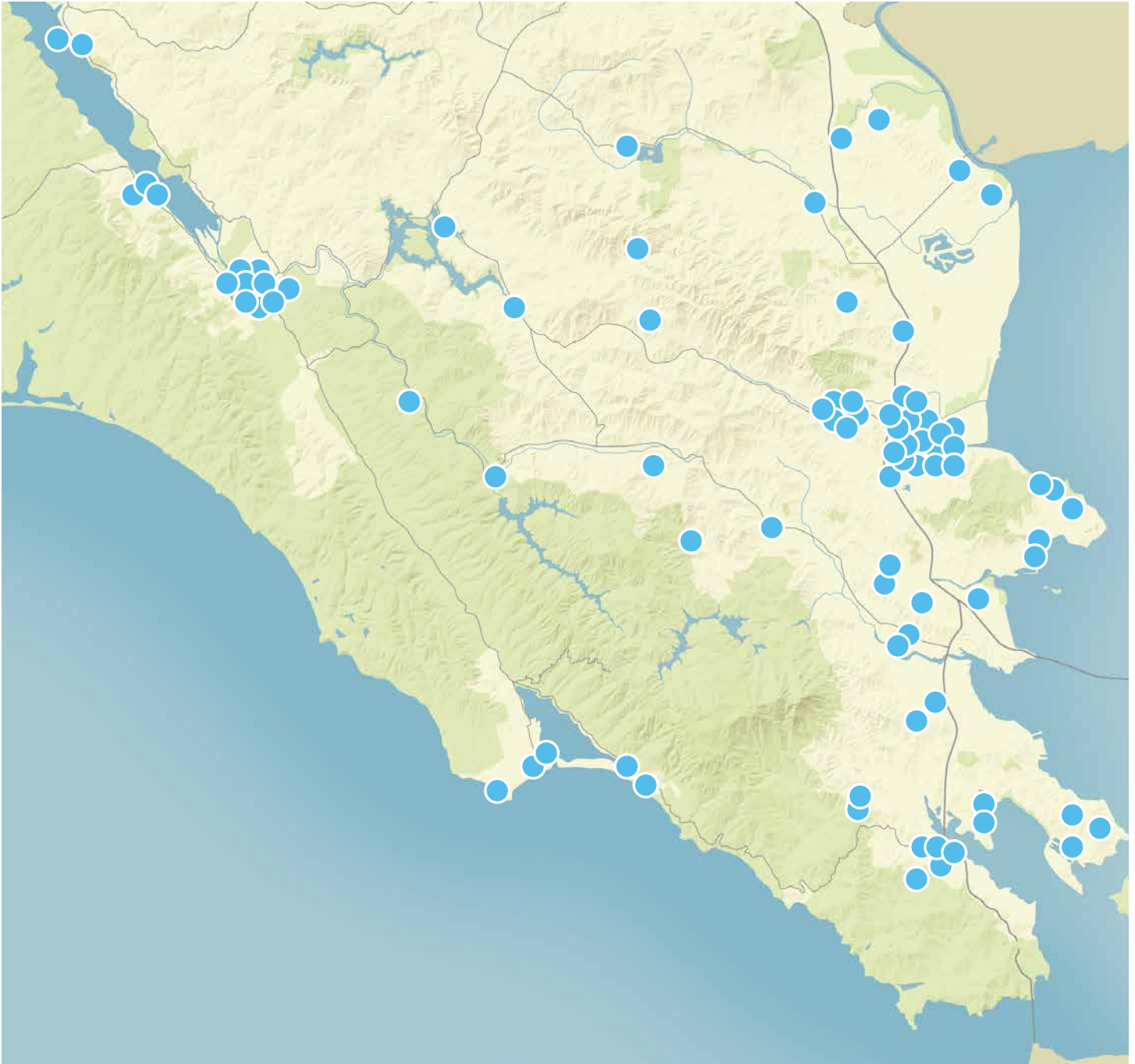
The nine-member Commission also advises and makes recommendations to Marin County's IPM Coordinator and the County Board of Supervisors as needed. Commission meetings are held quarterly and are open to the public, who are encouraged to participate via public comment in addition to direct communication with program staff.



One of the sites that the Marin County IPM program cares for is the The Marin County Civic Center campus.

2022 Locations

In 2022, Parks staff, contractors, and volunteers maintained 147 locations, including 133 without pesticides.



County ordinance 3598 governs IPM for parks, libraries, fire stations, office buildings, traffic medians, other buildings, and ornamental landscapes on county properties across Marin. The Marin County Open Space Preserves are governed by the Parks and Open Space Commission and the Open Space District Board of Directors. They are not covered in this report. Visit marincountyparks.org to view the Vegetation and Biodiversity Report and Work Plan for more information on IPM in the preserve system.

Native Plant Nursery Improvements

Marin County's native plant nursery program operated entirely without the use of pesticides in 2022.

In 2022, Marin County Parks reinvigorated the native plant nursery program, and invite volunteers to return after two seasons of dormancy due to the COVID-19 pandemic. The nursery is located at the civic center lagoon campus, which falls under the jurisdiction of the county's IPM ordinance and policy, and was managed without the use

of any pesticides in 2022. Nursery staff and volunteers collect seed from local watersheds in order to grow plants for projects in Marin County's parks, open space district, and flood control district. By collecting seeds locally, staff can ensure that the genetic biodiversity of our native plants continue into future generations.



Marin Master Gardeners volunteer help to collect seeds at Ring Mountain Preserve

Native Plant Nursery Improvements

The Native Plant Nursery site saw major facility improvements in 2022.

Site improvements in 2022 include additional shade structures, potting tables, comfortable chairs for volunteers, improvements to storage facilities, and additional plumbing, irrigation, and electrical access. Nursery staff designed and planted a native plant demonstration garden, which was installed thanks to the help of very dedicated volunteers.

The Marin Master Gardeners joined nursery staff for weekly volunteer days, and participated in a variety of IPM tasks, particularly biosecurity and weed management. They helped to pull weeds around the nursery site by hand, and staff even hand-crushed aphids to prevent the need for

insecticide use at the nursery. Volunteers assisted with cleaning seeds, and soil and pot sterilization, all of which is important for preventing the spread of *Phytophthora ramorum* (also known as Sudden Oak Death), a disease that can injure and kill a variety of native plants that live in Marin. Volunteers and staff also sprayed their shoes with isopropyl alcohol to ensure that this pathogen did not enter the shade house on their shoes. In addition to IPM tasks, they assisted in seed collection, planting cleaned seeds, up-potting growing plants, pruning to improve plant health, and planting the demonstration garden. In the 2023 season, we look forward to seeing many of these native plants thrive in county managed sites around Marin.



Top left: Plants thriving in the shade house at the native plant nursery. These plants will be planted in the same preserves where their seeds were collected to preserve local plant biodiversity.

Top right: After hand-weeding, nursery staff use cardboard and bark to form layers of sheet mulching. This mulch suppresses weeds, eliminating the need for herbicides.

Bottom left: Marin Master Gardeners volunteers help to prune native plants, to improve overall plant health. Focusing on plant health can help plants form their own resistance to disease and insects, reducing the potential need for insecticides and fungicides at the nursery.

2022 Volunteers & Employees

In 2022, volunteers contributed 9,293 hours in support of non-chemical IPM, equivalent to approximately 5 full-time employees.

Marin County Parks owes much of its success to volunteer programs, which allow the department to complete many projects with the help of the local community. Each year, parks landscaping projects involve hand-weeding, mulching, flaming, and weed-whipping in order to

maintain a variety of common weeds. Litter cleanup helps to prevent rodents, yellow jackets, raccoons, cockroaches, and flies from thriving in county operated structures, and parks and picnic areas, in addition to helping to create a healthier watershed.



The Marin County Parks community of volunteers make it possible to successfully manage our parks, playgrounds, and picnic areas without herbicides. They receive and provide education related to IPM, and perform services including trash cleanup, sheet mulching, hand-pulling, weed whipping. Above, One Tam's LINC (Linking Individuals with Their Natural Communities) interns use artistic sheet mulch to suppress weeds at Hal Brown Park at Creekside, July 10, 2022.

2022 Labor Hours

Overall IPM labor hours decreased in 2022.

Labor Hours by Month

| Month | Staff IPM | Volunteer IPM | Contractor IPM | Total Hours |
|--------------------|---------------|---------------|----------------|---------------|
| JANUARY | 1,358 | 1,019 | 771 | 3,148 |
| FEBRUARY | 1,043 | 627 | 759 | 2,429 |
| MARCH | 1,290 | 435 | 814 | 2,351 |
| APRIL | 1,244 | 1,174 | 944.25 | 2,828 |
| MAY | 1,596.5 | 549 | 824.35 | 2,970 |
| JUNE | 1,613.5 | 482 | 770.75 | 2,866 |
| JULY | 1,291 | 611 | 765 | 2,667 |
| AUGUST | 1,240.5 | 677 | 875 | 2,793 |
| SEPTEMBER | 1,262 | 1,320 | 941 | 3,523 |
| OCTOBER | 1,062 | 1,175 | 657.25 | 2,894 |
| NOVEMBER | 931 | 655 | 708 | 2,294 |
| DECEMBER | 806 | 569 | 704 | 2,079 |
| Total Hours | 14,738 | 9,293 | 9,534 | 33,564 |

Labor Hours Year-Over-Year

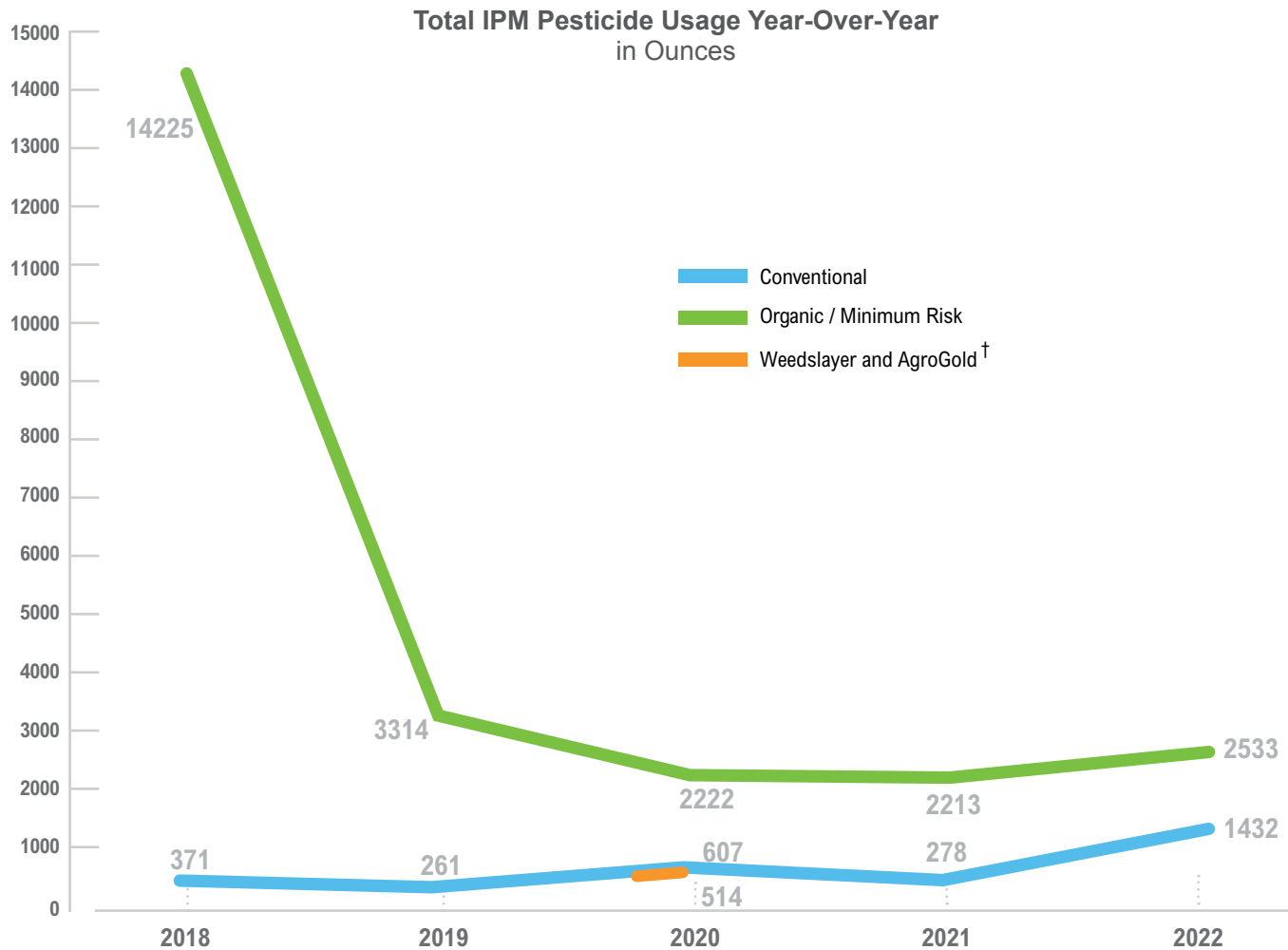
| Year | Staff IPM | Volunteer IPM | Contractor IPM | Total Hours | % Change Total |
|-------------|---------------|---------------|----------------|---------------|----------------|
| 2015 | 20,718 | 7,983 | 8,687 | 37,388 | +22 |
| 2016 | 26,888 | 7,086 | 8,808 | 42,782 | +14 |
| 2017 | 25,052 | 9,439 | 8,542 | 43,033 | +0.6 |
| 2018 | 21,970 | 10,766 | 10,563 | 43,299 | +0.62 |
| 2019 | 23,328 | 11,694 | 11,232 | 46,254 | +7 |
| 2020 | 22,259 | 11,889 | 11,891 | 46,038 | -0.5 |
| 2021 | 18,541 | 9,333 | 11,376 | 39,250 | -17 |
| 2022 | 14,738 | 9,293 | 9,534 | 33,564 | -14.5 |

This reduction in total hours between 2021 and 2022 can be attributed in part to a temporary decrease in staff availability, changes in the Adult Offender Work Program task assignment system, and probable underreporting of IPM tasks. In order to address this going forward, staffing levels are being evaluated and IPM labor reporting systems are being improved.

The County maintains a strong commitment to Integrated Pest Management that emphasizes non-chemical, least toxic methods. Mechanical and manual weed removal, sheet mulching, mowing, trapping, turf aeration, irrigation system improvements, and other site modifications are used in combination to help control various pest populations.

Total Pesticide Use

In 2022, the total amount of conventional and organic/minimum risk* pesticide use increased.



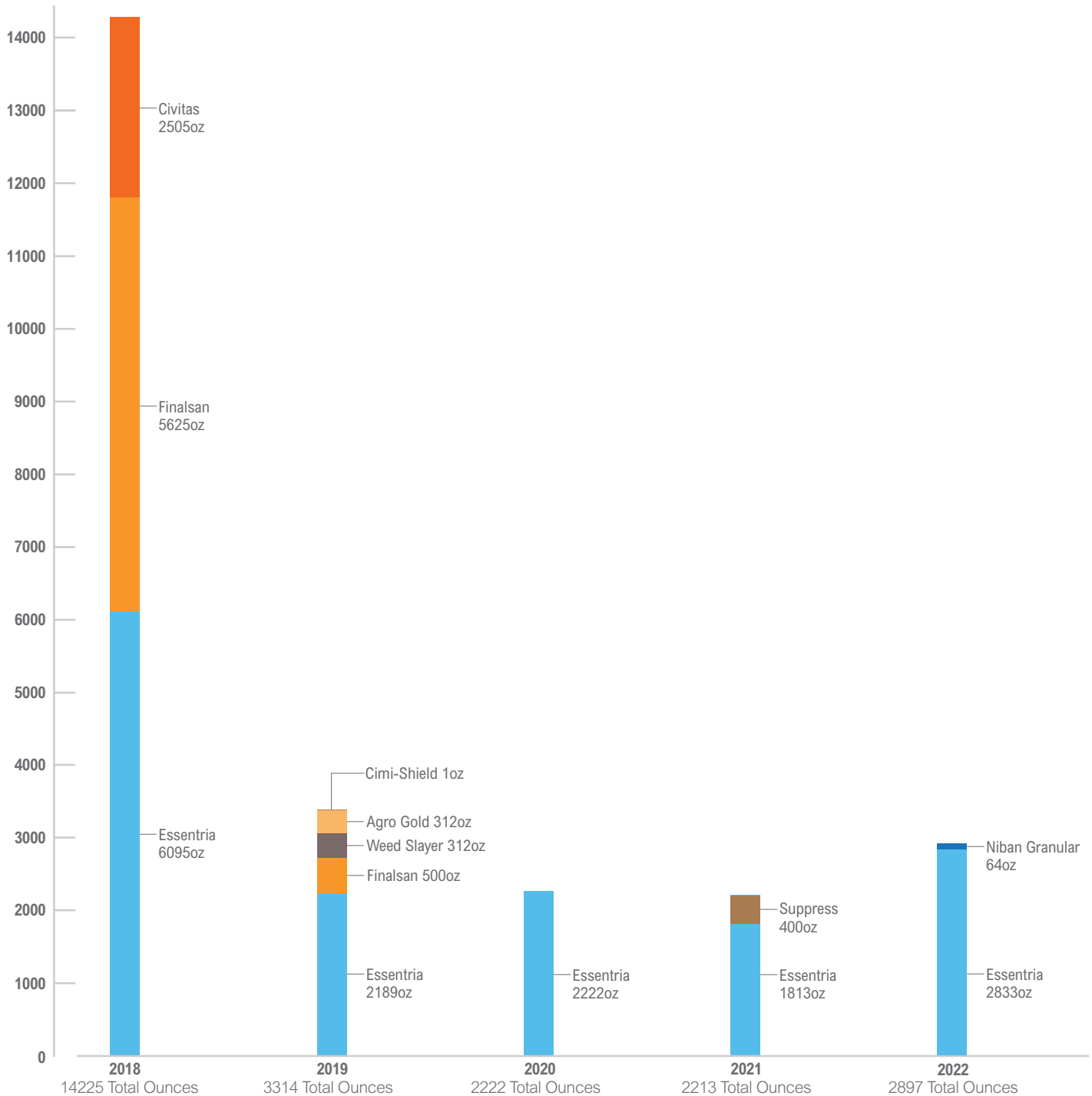
Conventional pesticide use increased in 2022, while organic pesticide stayed about the same. The increase in conventional applications is due to a single application of Reliant, a phosphorus-based product that was used to treat heritage oaks in CSA 16 with the goal of preventing the progress of sudden oak death. IPM will vary each year based on the types of pests, risks, and conditions in the field.

* Product verified by the Organic Materials Review Institute (OMRI) to meet federally-regulated organic standards used by certified organic food and fiber producers, or is exempt from EPA registration by qualifying for the FIFRA 25B Minimum Risk ingredients list (aka "Eco-Exempt").

† At the end of 2020, WeedSlayer was removed from the list of "Minimum Risk" (FIFRA25B) pesticides, and all use was immediately halted. Because of this change, WeedSlayer was removed from these calculations and is displayed separately from organic and conventional products.

Organic/Minimum Risk Pesticide Use

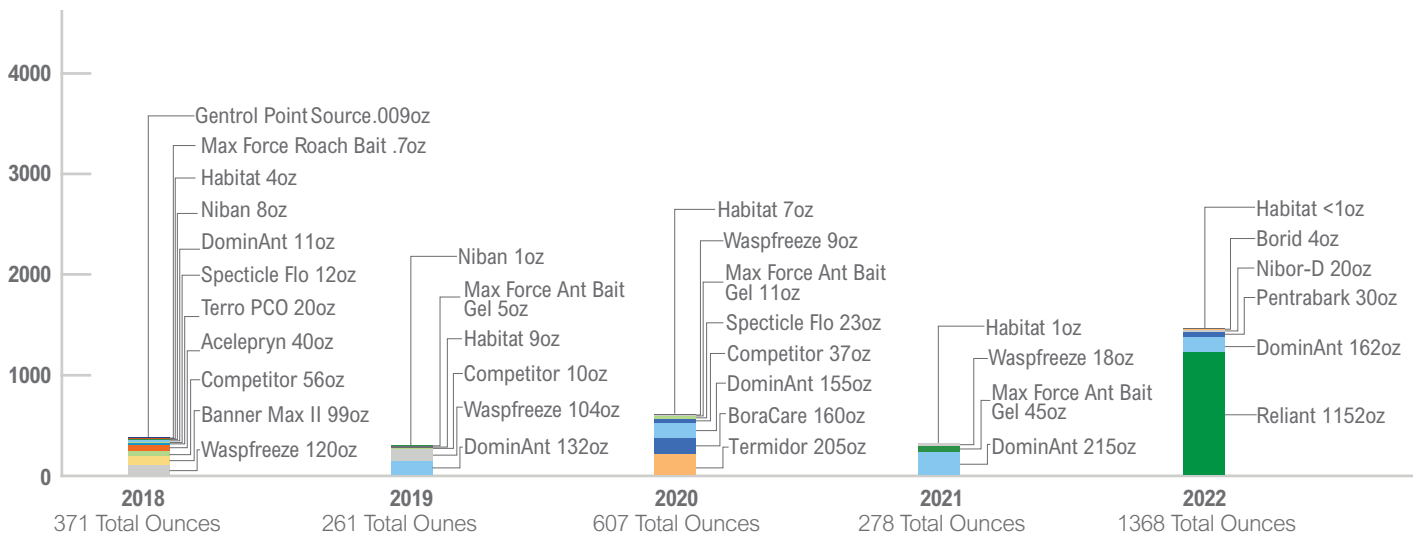
Use of organic pesticides increased slightly in 2022.



The organic pesticide used in 2022 was Essentria, which is derived from common plant oils, and is sprayed outside building perimeters of select county buildings on a quarterly basis, to act as a repellent for crawling insects such as ants, spiders, and cockroaches. Some variability year after year is to be expected with FIFRA25B products that are sprayed in larger quantities, and is within the appropriate range for sites of this size.

Conventional Pesticide Use

Use of conventional products increased in 2022 due to efforts to protect heritage oaks.



The increase in conventional applications is due to a single application of Reliant, a phosphorus-based product that was used to treat heritage oaks in CSA 16 with the goal of preventing the progress of sudden oak death. Refer to page 12 of this report for detailed summaries of each product used. The other most commonly used conventional pesticides on IPM sites are small ant bait stations filled with boric acid, and are the same product commonly used in households to manage ants.

Information from previous years and the full list of allowable organic and conventional pesticides is available at marincountyparks.org.

Organic Pesticides Applied in 2022

Organic and minimum risk* Products Used for Indoor Structural Pest Control

Essentria IC 3 is an insecticide with active ingredients comprised of rosemary oil, geraniol, and peppermint oil. When applied to the perimeter of a building, this product can prevent insect pest problems from affecting structures. This product was used at Gross Field Airport, Lucas Valley Field Office, and Marin Civic Center Campus, the Marin Health and Wellness campus, and others.

Niban Granular uses boric acid, a low-toxicity mineral, to control insects. It was applied to manage cockroaches at the Novato library.

Organic and minimum risk* Products Used for Landscape Pest Control

No pesticides were used on county landscapes in 2022.

** Product verified by the Organic Materials Review Institute (OMRI) to meet federally-regulated organic standards used by certified organic food and fiber producers, or is exempt from EPA registration by qualifying for the FIFRA 25B Minimum Risk ingredients list (aka "Eco-Exempt").*

Conventional Pesticides Applied in 2022

Conventional* Products Used for Outdoor Landscape Maintenance

Pentrabark is a surfactant with active ingredient polyethylene glycol. It is a substance that is sprayed on tree trunks prior to spraying a pesticide, which allows the pesticide to penetrate the bark more effectively. More effective penetration allows for the same results with less pesticidal product compared to applications without Pentrabark. Increasing the amount of product that penetrates bark decreases the amount of product that runs off into the landscape. It was used to treat a limited number of heritage oak trees for *Phytophthora ramorum*, aka Sudden Oak Death, in CSA 16.

Habitat, an herbicide with active ingredient imazapyr, is formulated specifically for aquatic and riparian areas. It is used in spot treatment as part of the Bay area wide invasive *Spartina* project. Only 4 oz were applied this year to Hal Brown Marsh as part of the final stages of the battle against *Spartina densiflora*.

Reliant is a product with active ingredient phosphoric acid. It was used to treat a limited number of heritage oak trees for *Phytophthora ramorum*, aka Sudden Oak Death, in CSA 16.

Conventional* Products Used for Indoor Structural Pest Control

Nibor-D uses Disodium Octaborate Tetrahydrate, a low-toxicity mineral, to control insects. It was applied to manage cockroaches at the Novato library.

DominAnt also uses Orthoboric acid and was used to aid controlling ants and other crawling insects at multiple structural sites including the civic center interior and Gness Field buildings. This product uses borax as its active ingredient and was used in protected bait stations.

Borid also uses boric acid and was applied to manage cockroaches at the Novato library.

* Conventional pesticides are pest control substances or mixtures that are generally produced synthetically. If a product has not been verified by the Organic Materials Review Institute (OMRI) to meet federally-regulated organic standards, or is not on the EPA's FIFRA 25B Minimum Risk ingredient list (aka "Eco-Exempt"), the Marin County IPM program lists it as "conventional."

Violations and Exemptions

Violations

County Ordinance 3598 governs the Marin County IPM program. Any events that differ from the policies laid out in the ordinance are considered violations. There were no violations of the IPM Ordinance and Policy documented in 2022.

Exemptions

A product that is not on the list of allowable pesticides may be approved for a specific and limited purpose by the IPM coordinator. These are considered limited-use exemptions.

On May 22, an exemption was approved for PT **Waspfreze II**, active ingredient Prallethrin, an insecticide used to treat yellow jacket nests in park, playground, and picnic areas. This product was not used in 2022.

On August 4, 2022, an exemption was approved for **Habitat**, active ingredient Imazapyr, to treat spartina species at Creekside Marsh. Less than one ounce of this product was used in 2022.

Proposed Changes to the Allowed Products List 2023

Product Removals: the products EcoExempt D and EcoExempt G are no longer commercially available, and therefore will be removed from our list in 2023.

Nibor D: in order to allow contractors more flexibility in the formulations they can apply, we propose that the boric-acid based Nibor-D is added to the allowed products list. There are already multiple boric acid products on our allowed products list, because it is considered to be relatively nontoxic. However, the powdered formulation can be applied to smaller cracks and crevices than Niban Granular.

Essentria G, with active ingredients Eugenol (Clove oil), and Thyme oil, is on the FIFRA 25B aka “minimum risk” list, and is analogous to Essentria IC3, which is already used at the county. The reason for adding this product is that the granular formulation can last longer than the liquid formulation that is currently used.

Ecovia WD, with active ingredients Thyme Oil, and 2-Phenethyl Propionate, is on the FIFRA 25B aka “minimum risk” list, and is analogous to EcoExempt D, which was on allowed products list until 2023. The reason for adding this product is that EcoExempt D is not longer on the market.

Marin County Parks IPM Team



Jim Chayka

Parks and Open Space Superintendent, Integrated Pest Management Program Coordinator

Jim Chayka has worked for 20 years in the fields of natural resource management, watershed restoration, and environmental stewardship. Prior to joining Marin County Parks, Jim served as Director of Natural Resources at Conservation Corps North Bay—a regional program dedicated to developing and engaging youth through environmental stewardship. As a consultant with Watershed Sciences and the Urban Creeks Council, Jim spent 10 years as a fluvial geomorphologist supporting research and restoration efforts throughout Bay Area watersheds. Jim has also held leadership positions with Fire Safe Marin, East Bay Conservation Corps, the Student Conservation Association, and the Sonoma Ecology Center.

Jim holds the following degrees, licenses, and certifications: a BA in Political Science and a MS in Geosciences; Parks and Recreation Professional (CPRP) certification through the National Recreation and Parks Association; C-27 Landscape Contractors License; Qualified Stormwater Pollution Plan Developer & Practitioner (QSD/QSP); Certified Professional in Erosion and Sediment Control (CPESC).

Katherine Knecht

Integrated Pest Management Specialist

Katherine joined the IPM team in February 2021, bringing experience with education programming, habitat restoration planning, and volunteer coordination. After growing up in Novato, she obtained a B.S. in Environmental Studies with an emphasis on ecological systems and habitat restoration from UC Santa Barbara. Her graduate thesis focused on salmonid habitat restoration project planning on the Columbia River, which was accompanied by work managing Japanese knotweed in Clark County Washington. In 2015, she worked as a program coordinator and educator at an outdoor and environmental education facility and is thrilled to have the opportunity to bring these skills and experience home to serve Marin County as IPM specialist.

Kirk Schroeder

Volunteer Program Coordinator

Kirk Schroeder has worked at Marin County Parks for 20 years, and has over a decade of experience organizing volunteers. In his current role he coordinates volunteers to support non-chemical IPM in County parks, multiuse pathways, and other landscape service areas. He began his career as a seasonal extra-hire and moved up to Park Ranger and Supervising Ranger positions. Kirk graduated from University of California, Santa Cruz with a bachelor's degree in Fine Art, and is a certified professional lifeguard.

Glossary

Active Ingredient. An active ingredient is the part of a substance or compound that produces its chemical or biological effect. In Integrated Pest Management, it is the ingredient that prevents, destroys, repels, or mitigates a pest, or is a plant regulator, defoliant, desiccant, or nitrogen stabilizer.

Biological Control. A method of controlling pests using natural enemies such as predators, parasites, pathogens, and competitors. An example of biological control is releasing green lacewings to control aphids.

Conventional Pesticide. Pest control substances or mixtures of substances that are generally produced synthetically. Synthetic products are made by a synthetic or chemical process by human origin as opposed to occurring naturally. To avoid confusion with organic standards, the Marin County IPM program lists all non-OMRI verified pesticides as “conventional” even if the active ingredient is naturally occurring.

Cultural Control. A method of controlling pests by changing work practices to reduce pest establishment, reproduction, dispersal, and survival. Changing irrigation practices to reduce the amount of root diseases and weeds is an example of cultural control.

Fungicide. A substance or preparation used to kill fungi, including blights, mildews, molds, and rusts.

Herbicide. A substance or preparation used to kill weeds and other plants that grow where they are not wanted.

Insecticide. A substance or preparation used to kill insects and other arthropods.

Integrated Pest Management (IPM). An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism.

Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and nontarget organisms, and the environment.

Mechanical Control. The management and control of pests using physical means such as weeding, mowing, fences, or barriers.

“Minimum Risk” aka Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 25(b) The EPA has exempted certain products from federal registration. This designation is sometimes referred to as “minimum risk.” However, these products are subject to registration by individual states. Products that are on this list must meet a series of requirements, which limit the ingredients that can be allowed. It is required that these products list all active and inert ingredients on the product label.

Organic Materials Review Institute (OMRI). A 501(c)(3) nonprofit organization providing organic certifiers, growers, manufacturers, and suppliers an independent review of products intended for use in certified organic production, handling, and processing.

Organic Pesticide. Pest control substances or mixtures of substances that are compliant with USDA National Organic Program standards. In the United States, the term “organic” is federally regulated and governed by standards in the Code of Federal Regulations when used on food or fiber products. When the Marin County IPM program uses the term “organic,” it refers to pesticides verified by OMRI to meet federally-regulated organic standards used by certified organic food and fiber producers.

Pest. Pests are organisms that damage or interfere with desirable plants in fields and orchards, landscapes, or wildlands, or damage homes or other structures. Pests also include organisms that impact human or animal health. Pests may transmit disease or may be just a nuisance. A pest can be a plant (weed), vertebrate (bird, rodent, or other mammal), invertebrate (insect, tick, mite, or snail), nematode, pathogen (bacteria, virus, or fungus) that causes disease, or other unwanted organism that may harm water quality, animal life, or other parts of the ecosystem.

Glossary

Pesticide. A pesticide is any substance or mixture of substances intended for: preventing, destroying, repelling or mitigating any pest; use as a plant regulator, defoliant, or desiccant; or use as a nitrogen stabilizer. Fungicides, herbicides, insecticides, and rodenticides are all types of pesticides.

Pesticide Precautionary Statements. Written, printed, or graphic matter which provide the pesticide user with information regarding the toxicity, irritation and sensitization on hazards associated with the use of a pesticide as well as treatment instructions and information to reduce exposure potential.

Pesticide Product Label. The written, printed, or graphic matter on, or attached to, the pesticide or device or any of its containers or wrappers. It provides critical information about how to safely and legally handle and use pesticide product. Unlike most other types of product labels, pesticide labels are legally enforceable, and all of them carry the statement: "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."

Pesticide Toxicity Category. The EPA established four Toxicity Categories for acute hazards of pesticide products, with "Category I" being the highest toxicity category. Acute toxicity studies examine a product's toxicity as it relates to six different types of exposures (acute oral, acute dermal, acute inhalation, primary eye irritation, primary skin irritation, and dermal sensitization). The product is assigned a toxicity category (I–IV) for each type of exposure based on the results of five of the six studies.

Rodenticide. A substance or preparation used to control mice and other rodents.