

INTEGRATED PEST MANAGEMENT

2021 ANNUAL REPORT

Prepared by
Marin County Parks



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2021 Summary

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


In 2021, County staff, volunteer coordinators, landscape managers, and contractors focused on adapting the program during a rapidly changing year; for example volunteer coordinators needed to get creative due to the limitations created by the COVID-19 pandemic. Marin County's IPM program applies to 147 sites governed by the County's IPM ordinance, 130 of which were managed without pesticides, and included a total of 39,250 hours dedicated to non-chemical IPM.

This annual report for the year of 2021 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.

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

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 eco-exempt products have replaced synthetic pesticides, and overall product use has tapered down to a steadier and significantly lower rate, especially within the last three 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.



2021 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.

[To come after award is presented]

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.

* See glossary on page 18 for definitions.

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

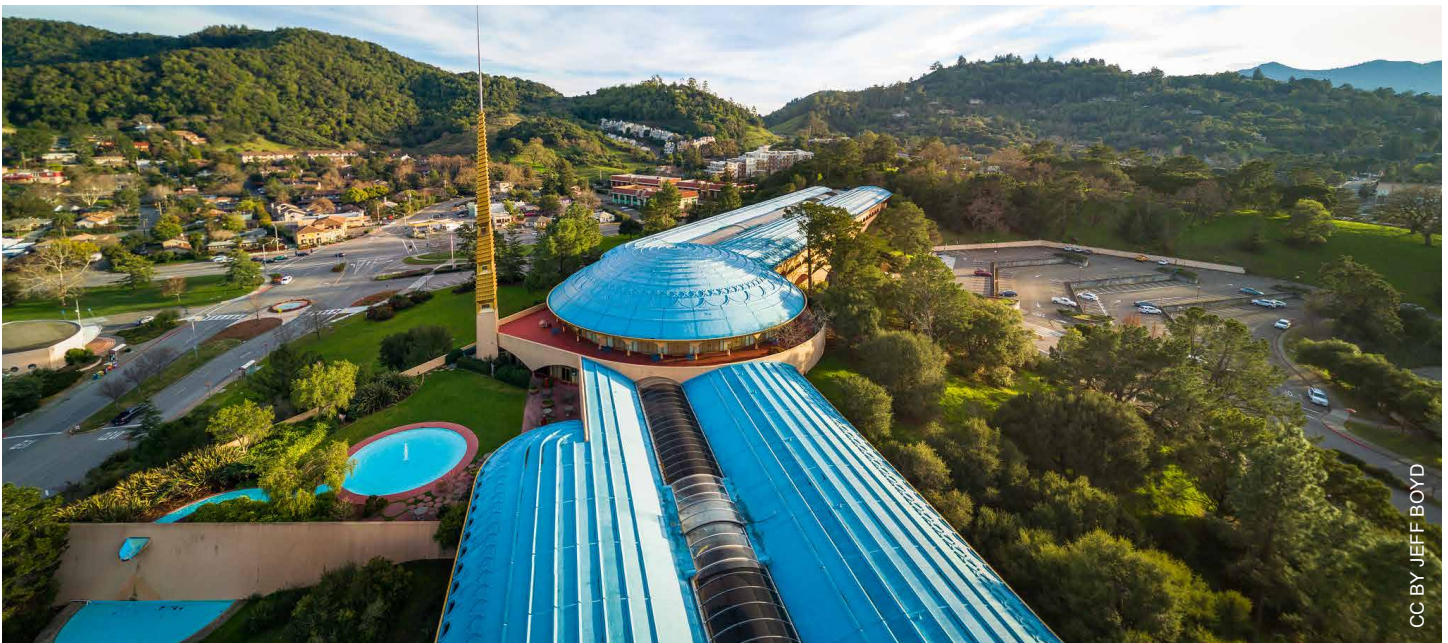
The program is governed by County Ordinance 3598.

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.

The County's IPM policy applies to 147 sites

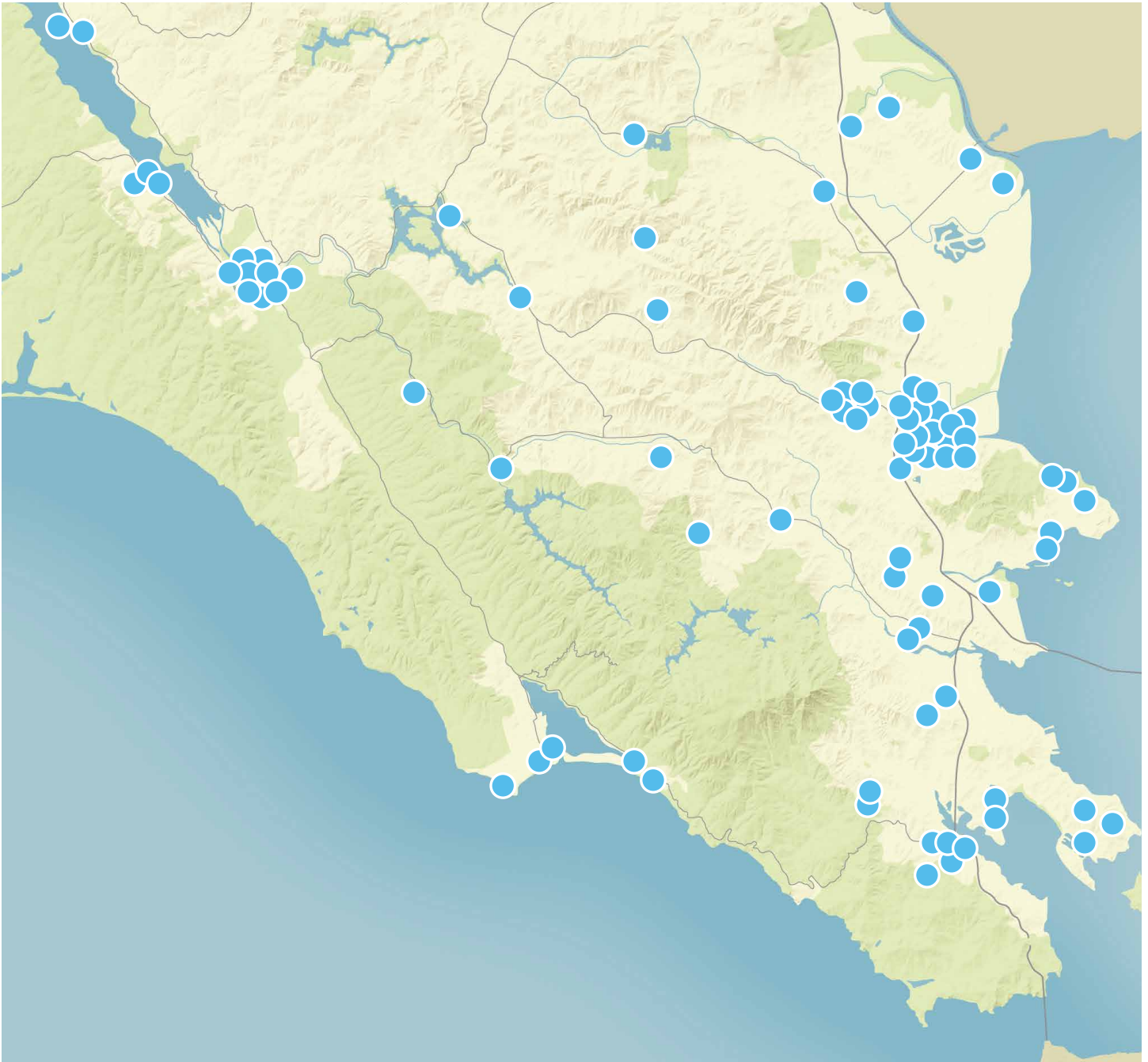
that include county parks and libraries, Marin County government offices, Marin County Health and Human Services sites, County Service Areas, roadsides, and traffic medians throughout Marin. Common IPM challenges in these locations include wasps, ants, roaches, rodents, and weeds. In addition to managing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



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

2021 Locations

In 2021, Parks staff, contractors, and volunteers maintained 147 sites, including 130 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.

2021 Integrated Pest Management (IPM) Program

The IPM program set goals to reduce aquatic pests such as weeds and algae.

In summer of 2021, staff implemented a program to gather data about water quality at the civic center lagoon in order to understand how water quality changes in different seasons. Although the lagoon is not a recreational water body designated for water contact, algae blooms can create an environment that is not ideal for the health of fish. With quarterly sampling through 2021, IPM staff were able to measure important indicators of lagoon health, which will be used to impact future management decisions with the goal of preventing large algae blooms. 2021 marks completion of the “baseline study,” after which we will be able to continue to take measurements to see how different management methods impact water quality.

Treating competitive weeds using hand tools and aquatic excavators. In 2021, the IPM program continued to manage the highly invasive Uruguayan creeping water primrose (*Ludwigia peploides* sp.) at the Civic Center Lagoon Park. However, with a combination of early detection and careful hand-pulling by staff, contractors from Forest and Kroger, and DK Environmental, a large amount of Ludwigia was able to be removed. While it is expected to return in 2022, continued early detection combined with hand-pulling should soon eradicate the species from the site entirely.

The IPM program continues to focus on organic and minimum-risk products. The IPM policy sets a goal of replacing non-organic products with those certified organic by the USDA’s National Organic Program. Each year, our Allowed Products List is published in order to show staff, contractors, and the public which pesticides are allowed to be used on Marin County Properties under the IPM Ordinance and Policy. Goals for the products on that list include reducing risks to applicators, including organic and minimum-risk alternatives to more conventional products, and reducing long term health risks to the public by avoiding products on California’s Prop 65 list.

Collaborations continued in 2021. Marin County parks continues to participate in the Marin Knotweed Action Team (MKAT), which was formed in response to sightings of Japanese knotweed (*Fallopia japonica*). This class A noxious weed is considered to be one of the most invasive plant species in the world, and is currently spreading along San Geronimo Creek, which is home to endangered salmonids. Because this environmentally important watershed is managed by multiple agencies, collaboration is crucial to effective management. However, as of the release of this report, no knotweed has been found in Marin County parks or Open Space lands. In addition to MKAT, IPM staff represent the department in the newly reconvened Sonoma/Marin Weed Management Area, Bay Area IPM Regional Coordinators, and the Maintenance and Superintendents Association’s Redwood Empire Chapter.

Partnerships

The Marin County IPM program would not be possible without community partners and their volunteers, including but not limited to:

- California Invasive Plant Council
- Conservation Corps North Bay
- Hungry Owl Project and Wildcare
- Maintenance and Superintendents Association
- Marin County Department of Agriculture
- Marin County’s Adult Work Offender Program
- Marin Knotweed Action Team (MKAT)
- Marin Master Gardeners
- Sonoma Marin Weed Management Area
- Yardsmart Marin

2021 Adult Offender Work Program (AWOP)

AWOP volunteers perform IPM in their community in 2021.

The Adult Offender Work Program (AWOP) is a jail alternative program which is administered by the Marin County Probation Department. California law allows an individual to receive one day jail credit for every 8 hours of manual labor performed for a non profit agency.¹ The majority of AWOP volunteers that perform IPM are supervised by parks staff. These activities include drain cleaning (which helps to prevent flies), picking up and disposing of litter (which prevents a variety of animal pests including rats, cockroaches, mice, pigeons, and insect pests), hand-pulling weeds, mulching landscapes, removing grass clippings to prevent mildew from forming on wet grass, and pruning, which can

prevent insect pests from attacking dead or dying wood, and can help plants make the most of the resources available to them, improving their immune systems and allowing them to fight back naturally against pests that prey on trees and shrubs.

Landscape Services supervisor Don Gallerani oversaw hundreds of AWOP volunteer hours in 2021. Because the program often involves work in teams of one or two, and offers personal protective equipment such as masks and gloves, this has been a successful program that allows volunteers to work safely through COVID restrictions.

¹ Source: [Adult Offender Work Program website](#)



Don Gallerani, second from right, who oversees AWOP volunteers, works with staff to apply water more efficiently.

2021 Volunteers

In 2021, volunteers contributed 9,333 hours in support of non-chemical IPM.

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.



Volunteer Kristine Ball, removing invasive plants near a population of the rare and endangered Pt. Reyes Bird's Beak Plant, Mill Valley Bike Path/Bothin Marsh, June 1st, 2021.



Novato Girl Scout's Silver Project Award project at Stafford Lake Park, 3 events in June 2021 to conclude a project that started in the winter before the pandemic.



Our volunteers were flexible in changing conditions

Due to ongoing shelter in place orders in 2021, parks served as a hub for community service, exercise, recreation, and wellness. Volunteers were able to work outside with personal protective equipment and social distancing. These programs provided a large portion of non-chemical IPM hours in the spring and summer of 2021. Volunteer coordinators are always an especially critical part of this effort. By staying updated on changing policies related to safety during COVID, they were able to continue to provide opportunities for outdoor exercise, service, and community-building through IPM and other projects.

In 2021, some volunteers were trained by parks staff to help at vaccine distribution centers, including the Marin Civic Center. Although those volunteers were not completing IPM work at that time, we want to extend our thanks to the many community members who were critical to the lifesaving efforts of our public health programs.

Above: Volunteers and staff have been part of the Marin County COVID-19 response.

2021 Volunteers

Volunteers contributed to many different non-chemical methods of IPM



Russian thistle removal along the Mill Valley Multi-use Pathway, August, 2021.



Sheet mulching work at Hal Brown Park at Creekside, August 29th, 2021.

We appreciate all the organizations and groups who volunteered

- Branson School
- Community Action Marin
- Cub Scouts
- GreenPlay campers
- Marin Master Gardeners
- North Marin Community Services
- Novato Girl Scouts
- One Tam's LINC interns
- One Tam's Rising Environmental Youth Leaders program



Volunteers from One Tam's Rising Environmental Youth Leaders program **remove weeds** and **install drought tolerant native plants** at the front entrance of McNears Beach Park, April 3rd, 2021.

2021 Employees

20 full-time employee equivalents supported non-chemical IPM.



Top left: Hand pulling Fennel (Feniculum Vulgare)

Top right: Limonium ramosissimum, a species of high concern in our tidal marshlands, and one included in our Early Detection/Rapid Response approach to habitat protection, is a target species for our weekly workdays with volunteers at the Sausalito/Mill Valley Multi-Use Pathway and Bothin Marsh.

Bottom right: French Broom (Genista monspessulana) being removed.

2021 Labor Hours

Overall IPM labor hours decreased in 2021.

Labor Hours by Month

Month	Staff IPM	Volunteer IPM	Contractor IPM	Total Hours
JANUARY	1,953	515	895	3,363
FEBRUARY	2,042	691	937	3,670
MARCH	1,441	898	1,179	3,518
APRIL	2,201	892	1,134	4,227
MAY	2,772	854	1,004	4,629
JUNE	1,640	644	1,031	3,315
JULY	1,061	1,038	843	2,942
AUGUST	1,266	437	828	2,531
SEPTEMBER	1,302	1,037	837	3,176
OCTOBER	992	1,342	958	3,292
NOVEMBER	1,004	480	862	2,346
DECEMBER	868	505	867	2,240
Total Hours	18,541	9,333	11,376	39,250

Labor Hours Year-Over-Year

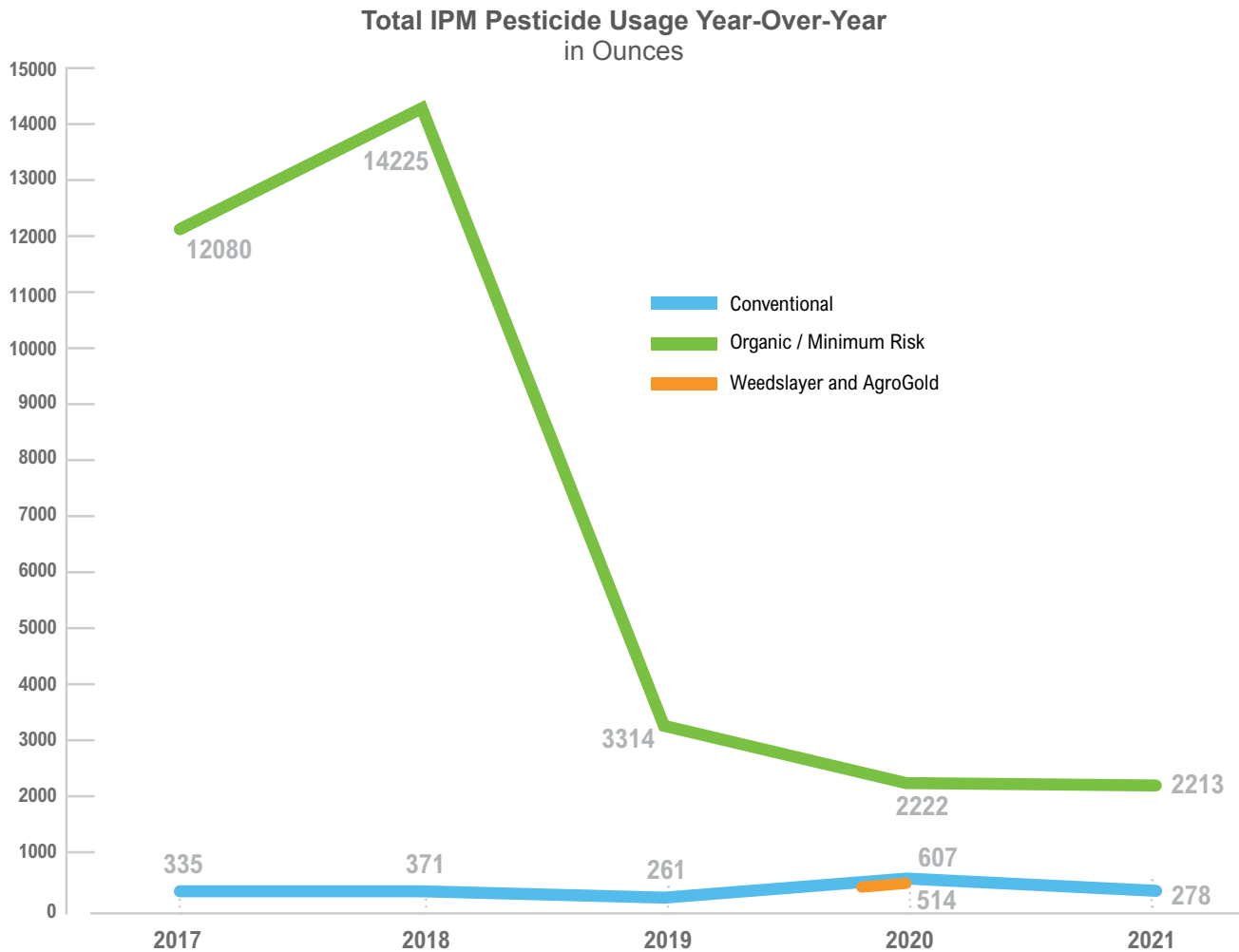
Year	Staff IPM	Volunteer IPM	Contractor IPM	Total Hours	% Change Total
2014	15,774	6,678	8,201	30,653	4
2015	20,718	7,983	8,687	37,388	22
2016	26,888	7,086	8,808	42,782	14
2017	25,052	9,439	8,542	43,033	.6
2018	21,970	10,766	10,563	43,299	.62
2019	23,328	11,694	11,232	46,254	7
2020	22,259	11,889	11,891	46,038	-.5
2021	18,541	9,333	11,376	39,250*	-17

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.

* Equal to 20 full-time staff.

Total Pesticide Use

In 2021, the total amount of conventional and organic/minimum risk* pesticide use decreased in volume by 25%.

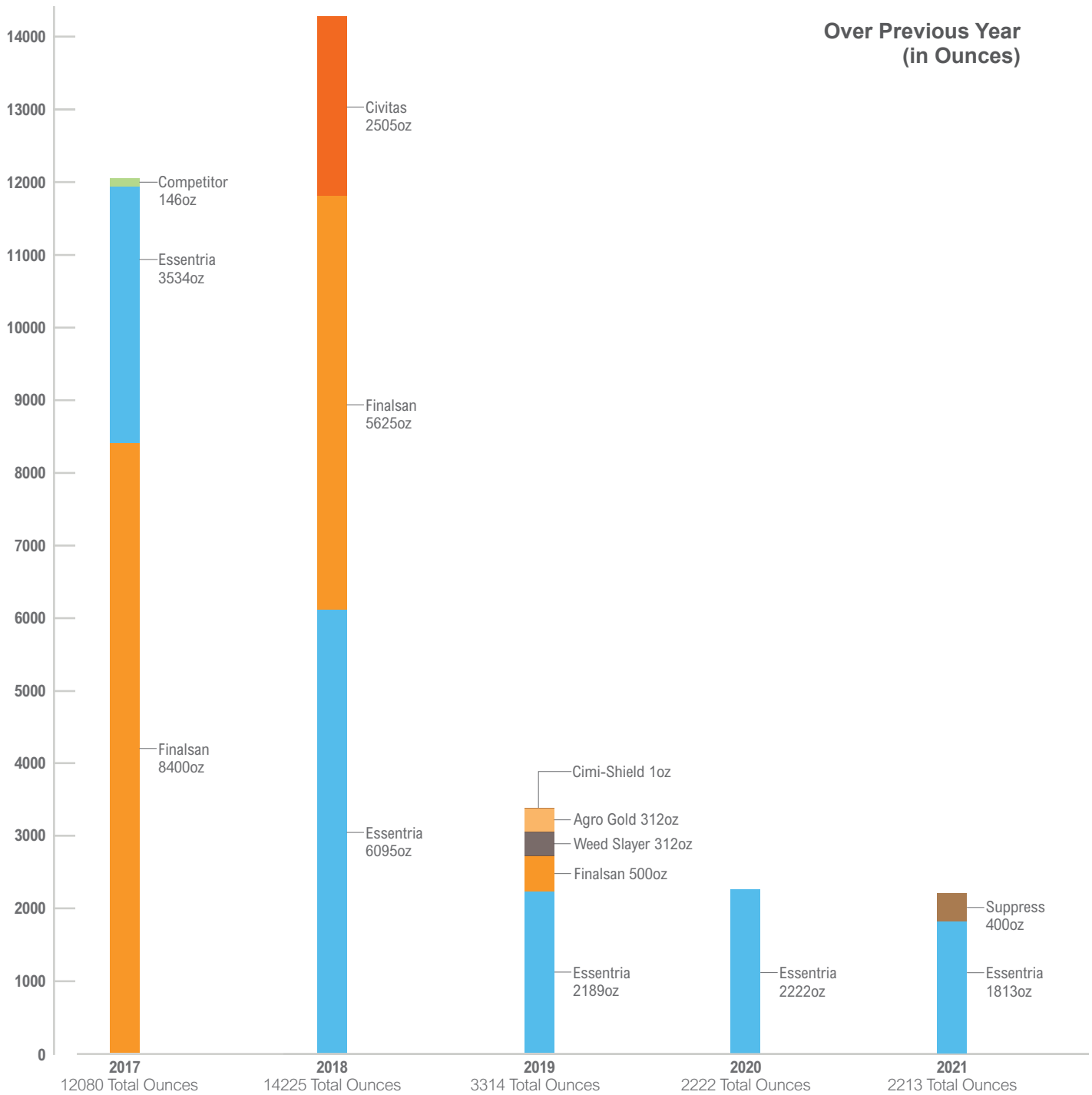


Conventional pesticide use decreased in volume by 54% in 2021, while organic pesticide stayed about the same. At the end of 2020, WeedSlayer was removed from the list of “Mimimum Risk” (FIFRA25B) pesticides, and all use was immediately halted. Because of this change, WeedSlayer was removed from these calculations and is displayed seperately from organic and conventional products. 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”).

Organic/Minimum Risk Pesticide Use

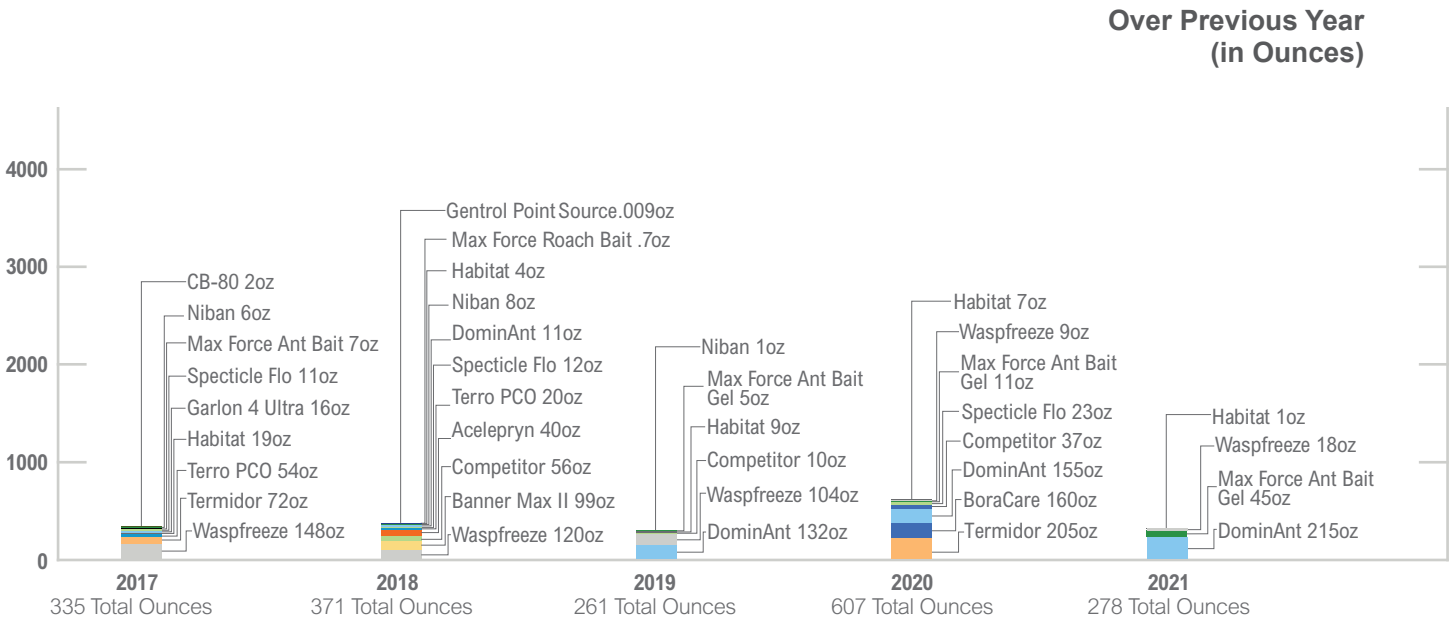
Use of organic pesticides in 2021 stayed steady with previous year



In 2021, the only organic and/or minimum risk products applied to Marin County IPM sites were Suppress and Essentria IC3.

Conventional Pesticide Use

Use of conventional products decreased by 54%



The 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. Refer to page 14 of this report for detailed summaries of each product used.

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

Organic Pesticides Applied in 2021

Organic and minimum risk product alternatives were an integral component of IPM in 2021.

Organic and minimum risk* products used for outdoor landscape maintenance

Suppress® Herbicide EC is an OMRI certified non-selective, post-emergent, foliar herbicide for use in and around all food and non-food crop areas. Suppress works best on newly emerged weeds and the active ingredients are Caprylic Acid (47%) and Capric Acid (32%). A total of 400 oz was sprayed on Civic Center Drive, Alameda Del Prado, Bon Air Medians, and Santa Venetia Drive.

Organic and minimum risk* products used for indoor structural pest control

Essentria IC 3 is an insecticide with active ingredients comprised of rosemary oil, genaniol, 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.

** 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 2021

In 2021, Marin County Parks decreased application of conventional products.

Conventional* products used for outdoor landscape maintenance

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 1 oz was applied in 2021, down from 4 oz in 2020, to Hal Brown Marsh as part of the final stages of the battle against invasive Spartina species and their hybrids.

WaspFreeze II, with active ingredient prallethrin, was applied to as few nests as possible, and only when a yellowjacket nest posed a health risk to the public or staff. These products were applied in limited quantities at various park sites during the summer and fall.

Conventional* products used for indoor structural pest control

Max Force Ant bait gel with active ingredient fipronil was used to control insects at Marin Exhibit Hall, Gness Field, the Hall of Justice Planters, and Stafford Lake.

DominAnt also uses boric acid and was used to aid controlling ants and other crawling insects at multiple structural sites including the Civic Center, West Marin Health and Wellness, Hall of Justice Planters, Gness Field, Lucas Valley Parks Field Office, Stafford Lake Field Office, and the Marin Health and Wellness Center. This product uses borax as its active ingredient and was used in protected bait stations.

** 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

The number of violations and exemptions remained low in 2021.

County Ordinance 3598 governs the Marin County IPM program. Any events that differ from the policies laid out in the ordinance are considered violations.

Violations

There are no known IPM Ordinance or Policy violations by staff, contractors, or volunteers in 2021.

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.

Exemptions

Since 2003, Friends of Corte Madera Creek Watershed has received funding from the California State Coastal Conservancy's Invasive *Spartina* Project (ISP) to work toward eliminating three species of invasive, non-native cordgrasses (*Spartina* spp.) and their hybrids found in this estuary. These destructive plants alter both the structure and function of tidal mudflats, creeks and marshes, harming native bird, mammal, and fish species. Invasive cordgrasses also clog open channels, increasing flood risk.

In July, 2021, an exemption to the IPM Policy was granted by the Department of Environmental Health to approve the application of Imazapyr. This exemption was granted in order to allow the Invasive *Spartina* Project to continue its important work managing highly invasive species of *Spartina* (aka Cordgrass) from Hal Brown Park Marsh. In 2021, in addition to nonchemical work such as digging and tarping, 1 oz of Imazapyr was applied to the marsh site.

Proposed Changes to 2022 Allowed Products List

County IPM staff review products on an annual basis. No changes are currently proposed for the product list in 2022.

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 2018, bringing experience with education programming, habitat restoration planning, and volunteer coordination. After growing up in Mill Valley, San Rafael, and 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 19 years, and has 12 years 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.