NEWSLETTER OF THE CALIFORNIA INVASIVE PLANT COUNCIL

Dispatch

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Protecting California's environment and economy from invasive plants

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FROM THE DIRECTOR'S DESK

"Good herbicide"

By Executive Director Doug Johnson

Cal-IPC's work to protect the full IPM toolbox is heating up on multiple fronts. In the near term, two issues — a bill before the legislature and the grantmaking approach of the state's Wildlife Conservation Board — are both concerning. For the longer term, the recently released draft roadmap for Sustainable Pest Management is generating lots of questions.

New Assembly Member Damon Connolly, from District 12 covering Marin County and the southern half of Sonoma County, introduced a bill (AB-99) to the state legislature to restrict Caltrans herbicide use along roadsides. In counties where the board of supervisors vote to ban roadside herbicide use, Caltrans would not be allowed to use herbicides. Given that there are important invasive plants that are difficult, even impossible, to control without herbicides, a complete ban will result in weed spread. This spread not only affects a county choosing the ban, but adjacent counties as well. (See article on *Geranium lucidum*, page 9.) Given that roadsides are a major vector for weed spread, Cal-IPC will be working to make sure the bill takes a more nuanced approach.

At the Wildlife Conservation Board, one of the largest grant makers in the state for protecting habitat values, the views of one board member continue to threaten funding decisions on projects that use herbicides. Targeted uses of herbicides to restore habitat are portrayed as a threat to communities and the environment. When the board member mentioned how glyphosate is blamed for killing milkweeds (from crop overspray) and thus harming monarch butterflies, a land manager from a Resource Conservation District responded that they use glyphosate to remove weeds that threaten milkweeds. There are hopeful signs that other board members understand the importance of herbicides as part of the restoration toolbox. Cal-IPC helped organize a dozen conservation organizations to provide testimony to WCB on the necessity of using herbicides in restoration.

For the last two years, a diverse working group met to hash out a Sustainable Pest Management roadmap. Organized by the California Dept. of Pesticide Regulation, the California Environmental Protection Agency, and the California Dept. of Food and Agriculture, the working group focused on agricultural and urban uses of pesticides. The roadmap states that they did not consider usage for habitat management, aquatic weed management, or rights of way. However, the process kicked off by the roadmap, which aims to reduce use of pesticides over the coming decades, is sure to impact use of herbicides by land managers. Cal-IPC will be on the lookout for opportunities for input from the habitat management community, and any threats to the sensible use of herbicides in restoration.

At appropriate levels, herbicides can be incredibly helpful.

In the most recent issue of *Flora* from CNPS, the term "good fire" is mentioned when referring to cultural burning by native peoples as a valuable land management practice. A longtime southern California weed management practitioner, Bill Neill, commented that we need to likewise talk about "good herbicide." As Mark Twain, a familiar of the Mississippi River, said, "Water, taken in moderation, cannot hurt anybody." At immoderate levels, water, fire, and herbicides can be harmful, but, at appropriate levels, they can be incredibly helpful.

Wildland Weed News


Illustration by Ryan Jones

CAL-IPC UPDATES

Symposium 2023 – We will be meeting October 25-28 in Chico, with an online option for those who cannot join us in person. See details on page 9.

Action Week – Cal-IPC is again coordinating with University of California Cooperative Extension partners to organize lunchtime webinars on weekdays during California Invasive Species Action Week, June 3-11. Let youngsters know about the youth art and video contest run by the California Department of Fish and Wildlife.

Advocacy – Cal-IPC is advocating for a return of the $5 million for invasive species response that was pulled out of the state budget. We are requesting that AB-99, a bill addressing roadside herbicide use by Caltrans, does not restrict applications that are essential for stopping the spread of invasive plants. By studying the state's legal code, we are looking for ways to clarify agency responsibilities for different types of invasive species.

***Spartina* and *Limonium* –** We secured funding for this season's control work on invasive cordgrass and sea lavender in San Francisco Bay marsh habitat, with associated revegetation and bird monitoring.

***Volutaria* –** Cal-IPC is part of the partnership working to contain the continent's only major infestation of desert knapweed in Borrego Springs. This year's rains have flushed the seedbank, and the San Diego County Agricultural Commissioner's office and the Anza Borrego Desert State Park are busy controlling as much as they can during the short treatment window.

WeedCUT – A technical team is drafting content for adding chemical methods to the online WeedCUT tool for determining appropriate control approaches.

YOUR MEMBERSHIP

Thank you for keeping your membership current. Note that your expiration date is shown on the mailing label of this newsletter. Cal-IPC's success in meeting its mission depends on your vital support.

OTHER NEWS

Global goal – The COP 15 Summit last December resulted in adoption of the Kunming-Montreal Global Biodiversity Framework. Target 6 sets a goal of reducing by at least 50% the introduction and establishment of known or potential invasive species.

Sobering assessment – A February 24 article in *The Guardian* summarized the fundings of researchers examining fossil evidence of the Permian-Triassic mass extinction. Their conclusion? Ecosystem collapse is inevitable if wildlife loss continues.

Fascinating story – *National Geographic* (January 11, 2022) features an article telling the story of "The prince, the mayor, and the US fish that ate Japan," in which a gift of 18 bluegills, the Illinois state fish, led to "an invasive, species-destroying nightmare" in Japan.

Organic herbicides – The Winter 2023 issue of the *Green Bulletin* from the University of California Integrated Pest Management Program featured an article on a study of organic herbicides. Many have higher signal words ("warning" and "danger") because of their acute toxicity for the applicator. None are systemic, so plants grow back.

Adjuvant guide – The USDA Forest Service has posted an updated version of David Bakke's report, "Analysis of Issues Surrounding the Use of Spray Adjuvants with Herbicides."

Online CEUs – The UC IPM Program's website has an extensive (and inexpensive) library of online courses designed to provide CEUs for licensed applicators. Through October 31, use the code "ipm50" for half off course prices.

Beaver partners – The California Department of Fish and Wildlife is hiring five scientists for a statewide program to support projects designed to harness beavers' natural ability to improve California's ecosystems.

Not just in CA – An article in *Science* (August 4, 2022) describes the role of invasive grasses in increasing wildfire risk around the world.

ON THE COVER

Grassroots Ecology is a nonprofit that engages communities in environmental stewardship at public parks and preserves in San Mateo and Santa Clara Counties. Here, intern Christian Tensuan identifies an aggressive weed, medusahead, in preparation of large-scale invasive species removal in Pearson-Arastradero Preserve, Palo Alto. Learn more about their paid Habitat Restoration Internship programs on page 5. Photo credit: Grassroots Ecology.

Interns greet park visitors and lead education programs in the parks.

Spotting rare weeds in Bay Area creeks

Jennifer Mo, Valley Water

Clockwise from top left: Asparagus vine, Jerusalem artichoke flowers and large underground tubers, skeleton weed flower heads (top) and stalks (bottom), stinknet flowers, sunwort flowers, and sunwort plants. Photos: Skeleton weed flower heads © 2015 Neal Kramer, all others by Jennifer Mo.

In the Bay Area, creeks run right behind back yards, construction sites, golf courses, and office complexes. They provide important remnant habitat in urbanized areas. They are also home to a wide variety of weeds, and the availability of water and space makes them highly susceptible to new ones. In my work managing invasive plants for the Santa Clara Valley Water District, I routinely find new weeds with few or no records of occurrence in the area. None are having major impacts yet, but their presence and spread raises concerns for the future. Here are a few of my encounters with rare weeds, plus some tips on spotting them in the wild.

Asparagus vine (*Asparagus asparagoides*) is a wiry perennial vine in the same genus as edible asparagus. It's hard to mistake this plant for any other: it produces dense masses of shiny leaves with parallel veins and a dry, plasticky feel. The vines can swarm up a shrub or crawl over the ground. Asparagus vine produces leaves in late winter, tiny white flowers in February, and red-orange berries in early spring. It then dies back to overwinter as mats of spiky tubers under the soil surface. During removal, the mats tend to fragment, and any tubers left behind can become new vines. Unfortunately, asparagus vine is steadily becoming less rare in the Bay Area. Birds eat the berries and disperse the seeds, so I regularly find new seedlings far away from any other known populations. Mature plants can shade out shrubs and crowd out grass and herbaceous natives.

Look for: a mass of bright green, shiny leaves that have parallel veins and tough, wiry stems.

Jerusalem artichoke (*Helianthus tuberosus*) is a perennial sunflower that forms abundant tubers and is sometimes grown for food. The population I discovered was growing in a shady, muddy area in willow riparian forest. From the road, I thought it was an unusually dark stand of stinging nettle, which has the same tall, upright habit and pointed leaves. Up close, the leaves were alternate rather than opposite, and the coarse hairs on the stem did not sting. I couldn't key it out without flowers, so I ran a photo through the iNaturalist app, which suggested Jerusalem artichoke as its top guess. I put the bloom time into my calendar so I would remember to come back in September to make a positive ID. When I returned, the bright yellow sunflowers were a good sign, but the real clincher was the waxy, knobby tubers in the soil underneath.

Look for: a very tall (up to ten feet tall), single-stemmed herb with pointed, dark green leaves and multiple sunflowers near the top.

Skeleton weed (*Chondrilla juncea*) If you crossed a shortpod mustard with a

dandelion, you might end up with something like skeleton weed: a wiry perennial species with few leaves and tiny yellow composite flowers. From a distance, it has the gestalt of *Hirschfeldia*, but up close, the basal rosette leaves are sharply toothed, and the central stalk has coarse, downward angled hairs that are very different from the fuzz of shortpod mustard. A long taproot (up to eight feet deep) makes removal difficult, as it can resprout from root fragments or remnants. Skeleton weed grows in open, disturbed areas. Valley Water crews found it on the bank of dry percolation ponds, likely brought in by contaminated equipment, and it has also been reported along train tracks.

Look for: a wiry, much-branched herb with few leaves and small dandelion-like flowers, milky white juice when injured, and hairs that point downward near the bottom of the central stalk.

Stinknet or Globe Chamomile (*Oncosiphon pilulifer*) is a small, unpleasant-smelling chamomile rapidly taking over arid parts of Southern California and Arizona. I spotted what looked like an out-of-place brass buttons (*Cotula coronopifolia*) on a maintenance road of Stevens Creek. Brass buttons grows on this site, but only in saturated areas. It was so odd that I went over to get a better look. As I got closer, the perfectly round yellow flower heads set off alarm bells in my head. I couldn't remember much about stinknet, which I had dismissed as a SoCal weed, but I did remember that it had globular heads. The odor of the lacy leaves — somewhere between turpentine and old cheese — corroborated its common name. I got very lucky with the timing: the plant was in full bloom and extremely conspicuous, but it had not yet started to seed. It was growing next to a construction site and likely came in with contaminated equipment or materials.

Look for: a chamomile a half-foot to one-and-a-half feet tall with smelly, deeply dissected leaves and spherical yellow heads.

Sunwort (*Euphorbia helioscopia*) is an annual spurge that oozes toxic milky juice when the plant is damaged. It has a striking, five-sided inflorescence up to three inches across, chartreuse leaves and bracts, and rubbery reddish stems. Sunwort flowers in March; when ripe, seeds disperse by exploding from the capsules. Infestations are a carpet-like monoculture visible from satellite imagery, and research suggests it is allelopathic to grasses and other plants. I did not find either of the known populations in the county: one was reported by a CNPS member whose post and terrifying photo I happened to see on Facebook, and the other was found by a coworker after I sounded the alarm on this species. More eyes — especially those of trained and knowledgeable plant people — are critical for early detection work.

Look for: a single-stemmed annual about a half-foot to one-and-a-half feet tall, larger than the very common *Euphorbia peplus*, smaller and more shallowly rooted than the bushy *Euphorbia oblongata*.

If you see any of these plants, report them! Help with early detection by mapping them using Calflora or iNaturalist. And if you see any other new species of concern, please email Cal-IPC at info@cal-ipc.org.

Commitment to community: Grassroots Ecology's Habitat Restoration Internship

Intern Melissa Murphy monitors a bird box used by several local avian species each year at Byrne Preserve, Los Altos Hills.

Valerie Lee, Grassroots Ecology

Grassroots Ecology is a nonprofit organization that engages communities in environmental stewardship at parks and preserves in San Mateo and Santa Clara Counties. They work to protect local public lands and waters by conducting environmental education programs, designing and implementing community-based ecological restoration plans, and growing watershed-specific native plants in their nursery.

This Palo Alto-based nonprofit has been a key education partner of Cal-IPC by providing training for young adults through the San Jose Conservation Corps and Charter School. Grassroots Ecology staff provide weed management training sessions for these outdoor professionals, including context around invasive species, removal impacts, management techniques, and, of course, plant identification.

As much as they are local experts on the lands and waters they steward in the South San Francisco Bay Area, Grassroots Ecology is fine-tuned through their programming to support local youth through leadership and job training positions. They invest so heavily in the next generation that the nonprofit's staffing model includes up to 10 part-time, paid Habitat Restoration Interns that support their geographic and community range of more than 20 parks and preserves in the area.

Habitat Restoration Interns work

(Continued on page 14)

Aquatic weed management in the Delta

Doug Johnson, Executive Director, Cal-IPC

UC Davis postdoc measuring reinvasion rate of water primrose in previously treated experimental control plots at a restoration study site in the Delta. Photo: Gina Darin, California Dept. of Water Resources.

San Francisco Bay has the dubious distinction of being known as the most invaded estuary in the world. Invasive organisms have arrived over the last 150 years via many pathways, especially from ships discharging ballast water or simply bringing organisms attached to their hulls. Green crabs, Asian clams, Atlantic oyster drill — the list is long, and the impacts on Bay ecology are extensive.

Today, the state's Marine Invasive Species Program (under the State Lands Commission, oddly enough) works to prevent new introductions, funded in part by a fee levied on shipping vessels. There are challenges trying to set rules here in California versus those negotiated at the national and international level, but that is another story.

Plants are an important part of the mix. In the bay, Cal-IPC is working with a range of partners to remove three invaders from marsh habitat: non-native cordgrass (*Spartina* species), non-native sea lavender (*Limonium* species), and seashore paspalum (*Paspalum vaginatum*). Control of these weeds is especially critical as major restoration projects return sites (notably, South Bay salt ponds) to natural flows, which make them vulnerable to colonization by invasive plants.

Farther upstream, in Suisun Marsh (the largest brackish marsh on the west coast) and the Sacramento-San Joaquin Rivers Delta, a number of aquatic weeds require substantial management every year to maintain navigable harbors and waterways and protect pumping infrastructure. Large infestations of water hyacinth (*Eichhornia crassipes*), Brazilian Egeria (*Egeria densa*), and water primrose (*Ludwigia* species) grow quickly as the weather warms. California State Parks' Division of Boating and Waterways (DBW) works to address both submerged and floating aquatic species. There are also emergent weed species in shallow waters along shorelines like giant reed (*Arundo donax*) and common reed (*Phragmites australis*).

Newer weeds like South American spongeplant (*Limnobium laevigatum*) are also a threat. Cal-IPC sponsored a bill in 2013 that now enables DBW to work on new weeds once the California Dept. of Fish and Wildlife has completed a risk assessment rather than wait for legislation to add a new weed to their jurisdiction.

Remote sensing, whether from satellite or airplane imagery, has been a useful tool to monitor invasive plants in the Delta. One of the common challenges to using remote sensing for mapping weeds is that other vegetation can form a canopy that blocks the view. This is much less of a factor in open water.

Biological controls are an important potential approach, though efficacy to date has been low. The USDA Agricultural Research Service lab in Albany, California is working to develop biocontrol agents for alligator weed (*Alternanthera philoxeroides*) and invasive *Ludwigia* species in the Delta, though for the latter it has been difficult to find agents that are sufficiently host specific and not a potential threat to native *Ludwigia* species. For giant reed, a shoot-tip galling wasp and a shoot-feeding armored scale have been released and their establishment is being monitored.

Aquatic weeds are a big problem across the globe. (In some places, they receive more attention than terrestrial weeds, as I realized in a recent meeting with Minnesota's state interagency invasive species council.) Control in lentic systems like lakes, where water is relatively motionless, is one thing. Control in lotic systems like the Delta, where water is flowing, presents additional challenges. Plus, the hydrology of the Delta is affected by both river flows and ocean tides, which makes aquatic weeds literally a moving target in the Delta.

Another challenge is the presence of rare and endangered species, such as Delta smelt and Sacramento Winter-run Chinook salmon. Regulatory protections can make it harder to control aquatic weeds, even when the control is designed to protect habitat for the sensitive species. Invasive plants can impact sensitive species directly, and when the vegetation dies back its decomposition can harm them indirectly as it consumes dissolved oxygen in the water column.

Managers from the California Dept. of Water Resources, UC Davis, the USDA Agricultural Research Service, and the California Dept. of Fish and Wildlife recently published an overview of the history and science of invasive aquatic weed control efforts in the journal *San Francisco Estuary & Watershed Science*. The paper cites studies showing significant expansion of many weeds over the last two decades, despite control efforts using a range of approaches including chemical treatments, mechanical removal, and biological control.

Unlike a weed management effort where the goal may be to contain and eventually eradicate populations of an invasive plant, DBW's work each year necessarily focuses on keeping ports, harbors and waterways navigable. Is this annual clean up, costing $15 million a year, the sole long-term goal, or can we do more? The paper recommends that agencies determine a set of appropriate goals, which may require social science tools to ascertain stakeholder needs in each area and consideration of the desired outcomes from wetland restoration projects. Continued experimentation is needed to improve the effectiveness of integrated physical, mechanical, chemical, and biological control methods, and regulatory rules are needed to make this possible.

The paper points out that a consistent monitoring program is needed for submerged, floating, and emergent weeds. Ecological modeling can help prepare for climate change, and "bioeconomic" modeling can assess the social and ecological tradeoffs between different weed management alternatives.

While the aquatic weed management in the Delta is huge and complex, there is some cause for optimism. As the paper points out, collaborative science is on the rise, which "provides the needed platform for discussions among managers and scientists to inform adaptive management." The formation of the Delta Interagency Invasive Species Coordination (DIISC) Team in recent years reflects this collaborative approach, which will be essential to success in managing invasive aquatic vegetation in the Delta in the future.

Stay tuned for the date of the next biennial Delta Invasive Species Symposium later this year.

UC Davis postdoc measuring reinvasion rate of water primrose in previously treated experimental control plots at a restoration study site in the Delta. Photo: Gina Darin, California Dept. of Water Resources.

Opportunity lost: EDRR for *Geranium lucidum*

Doug Johnson, Executive Director, Cal-IPC

Shining geranium (*Geranium lucidum*) is a low-growing Eurasian annual that escaped from gardens into wildlands in coastal Washington and Oregon in the early 2000s. It can spread in woodland habitats, dominating the understory.

It was found in California along Highway 101 in the northwestern part of the state in 2011, first in Del Norte County on the Oregon border, then in Humboldt County in 2013 (per Calflora records). The California Dept. of Food and Agriculture gave the species an "A" rating in 2017, indicating that it was a candidate for statewide eradication.

A roadside invasion of shining geranium in Humboldt County in 2015. Photo courtesy of Caltrans District 1.

The Landscape Specialist for Caltrans District 1 brought the issue to the local Weed Management Area. One of the local participants, the Redwood Community Action Agency (RCAA), was applying to the state's Wildlife Conservation Board for funding to eradicate invasive knotweeds and *Arundo*, both of which occurred sparsely in the region and were deemed a significant threat to expansion. They decided to include *Geranium lucidum* in the project as well, since it was also an eradication target. At this stage, shining geranium was an "early detection and rapid response" (EDDR) target. The grant proposal indicated a total of six known populations totaling three acres.

Control of shining geranium can be difficult without herbicides. Deep mulching can work, where appropriate, though that is nonselective and kills all other plants, too. It is also not suitable or practical for many roadside sites and depends on availability of wood chips. However, Caltrans has long abstained from herbicide use on roadsides in Humboldt County based on an agreement with the county board of supervisors.

Geranium lucidum *(shining geranium) flower and leaf detail. Photo: Amadej Trnkoczy*

Progress has been made in Del Norte County, where herbicide has been used to reduce the extent of the infestation by 30%. Whereas in Humboldt County, the infestation has more than doubled and is now found scattered over 100 miles of Highway 101. Despite the state funding starting in 2016 dedicated to eradicating regional priority weeds including *Geranium lucidum*, at this point the EDRR opportunity for eradication has most likely been lost.

The County Agricultural Commissioner's office, which is responsible for controlling A-rated weeds in the county, and RCAA have both tried hand-pulling shining geranium, but found that the plant's sometimes miniscule size makes manual removal labor intensive and not effective. The county is now trying full removal of the top layer of soil. Staff at Redwood National Park tried diligent hand treatment of shining geranium for several years, with retreatment several times a year, but saw no progress and switched to chemical treatment. They have since seen a significant reduction at all locations in the park, and eradication at two locations. However, shining geranium continues to spread into the park, especially in the south, from mowing on 101, with a small new infestation recently found in the park's interior, possibly spread by cyclists.

Illustrating how the actions (or inaction) of one county can affect another, shining geranium has now been found along Highway 101 south of Humboldt County in northern Mendocino County. Historically, Caltrans has not used herbicides on Mendocino County roadsides. So, unless they can negotiate an exception, *Geranium lucidum* will continue its southern spread, with Sonoma and Marin counties next.

Roads are a primary vector for spreading weeds around California. Some of these weeds remain ruderal, only growing in the disturbed roadside environment. Others spread into undisturbed neighboring wildlands, impacting habitat. This spread may not happen immediately, given the "lag phase" that is common in invasive species. A "precautionary approach" dictates removing new non-native plant species before they spread when feasible. We were not able to do that with shining geranium. Time will tell what price native plants and animals will pay for us missing that opportunity.

Photo: Phoca 2004 via Flickr

Connect with your colleagues in land management at the 2023 Cal-IPC Symposium!

Join us at CSU Chico, October 25 - 28, to share the latest in invasive plant management. This year's theme, "Reuniting for Resilience," shares our excitement to gather once again in-person. It's a reminder that we are most effective when we come together — whether it's to share landscape-level insights across agency borders, to pull weeds side-by-side, or to mentor the next generation of California stewards.

Over the last three years, we saw the value of an interactive online platform, gathering more than 700 people from across the state (and beyond) to join the conversation. This year, for those unable to join us in Chico, we are keeping an online platform to stream talks, take questions from both virtual and in-person attendees, and offer our virtual attendees an upgraded suite of accessibility features (including automated language translation and screen reader options).

SHARE YOUR WORK

We want to hear from you! Your research and insights inform our community. Submit your proposal for a full talk, lightning talk, or poster to the **Call for Abstracts by June 15.** Find guidance at the May 17 workshop, "How to Write and Submit an Abstract."

Share your photos, too! The **2023 Photo Contest** will be open for submissions July 14 - September 14. Winners will be announced at the Symposium.

SESSION TOPICS INCLUDE:

Aquatics, riparian, and wetlands; Biocontrol; Community engagement; New weeds; Grasslands; Indigenous perspectives; Intersection of art and science; Changing landscapes; Rare plants; Regional updates; Restoration; Tools and techniques; Wildlife responses; and more.

Attendees to CSU Chico can extend their learning experience with a **Wednesday half-day workshop** and a **Saturday field trip** to explore stewardship projects in and around Chico.

2023 STATEWIDE WMA MEETING

Meet with representatives from Weed Management Areas across the state to share information on funding, coordination, mapping, early detection, and collaborative projects.

DPR CREDITS

We will apply for continuing education units from the California Dept. of Pesticide Regulation, including 2 units fulfilling Laws & Regulations requirements. Limited CEU credits will also be available for online attendees.

SPONSORSHIP

Your organization can sponsor the Symposium! Help us keep registration affordable and support our work. Benefits for sponsoring organizations include attendees for in-person or online streaming content, exhibitor space, recognition on Symposium materials, and Cal-IPC membership.

STUDENTS AND EARLY CAREER

Student presenters who choose to participate in our **Student Contests** for talks and posters receive feedback from expert reviewers. Cash prizes are awarded to top presenters!

Students and emerging professionals, join the **Career Panel** and ask advice from the experts in land management.

Limited Income and Student rates are available for individuals who find registration costs prohibitive. We encourage field techs, conservation corps members, and other front-line staff to use this rate. Limited Travel Awards are also available for student presenters to share their knowledge in Chico.

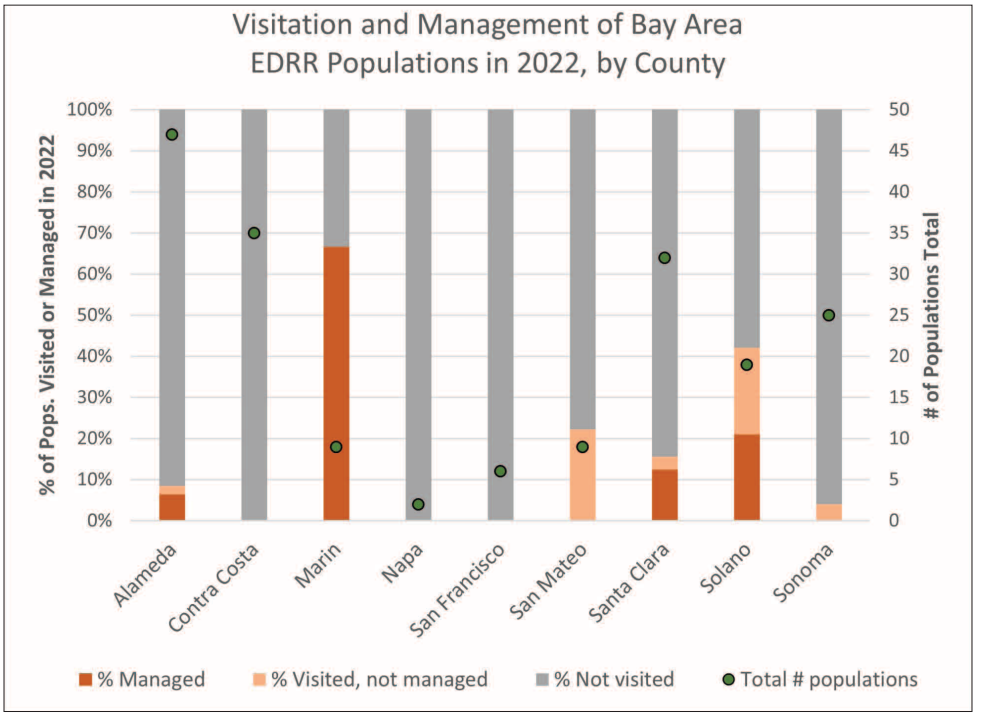
REGISTER AND MORE

All the latest Symposium information is online. Submit an abstract, join the workshop, register to attend, sign up as a sponsor, and more at **cal-ipc.org/symposium.**

Tracking progress on regional EDRR targets in the Bay Area

Nikki Valentine, Conservation Specialist, Cal-IPC

Over the last three years, Cal-IPC has worked with the California Dept. of Food & Agriculture (CDFA), county departments of agriculture, and Weed Management Areas (WMA) partners across the state to select target Early Detection Rapid Response (EDRR) species for each of 18 regions. These target species are invasive plants that are (1) listed by CDFA, (2) relatively rare in the region, and (3) deemed a priority for control by local partners. Cal-IPC has worked with Bay Area partners to track progress on controlling the region's EDRR targets.



Bars show the percent of EDRR populations visited or managed by each county in 2022. The green dots represent the number of EDRR populations in each county.

The Bay Area is made up of seven WMAs spanning nine counties, including Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma. All WMAs are active except the Alameda-Contra Costa WMA. In late 2020, Cal-IPC began meeting with Bay Area WMA leaders to identify target EDRR weeds in the area. Together, we finalized the Bay Area EDRR list in 2021, which includes 15 species of forbs, grasses, shrubs, and vines.

Our goal is to visit, map, control, and track progress each year for all reported populations of the Bay Area EDRR list. Cal-IPC recently evaluated management progress for 2022 using publicly accessible data from Calflora. Both Calflora's "management status" field and history stack functionality enable users to track progress. Management status informs us of whether a population is being managed, or even eradicated. History stacks allow a user to reassess a population and tie these multiple assessments to a single population, tracking progress over time.

There are a total of 184 Bay Area EDRR populations given our search parameters (date restrictions, record type exclusions, and excluding the extensive Japanese knotweed in Marin already under management by the Marin Knotweed Action Team). Russian knapweed (*Rhaponticum repens*) and Japanese dodder (*Cuscuta japonica*) are the most prevalent of the EDRR species, accounting for 23% and 20% respectively of EDRR populations.

On the other end of the spectrum, there is only one population each of Jerusalem artichoke (*Helianthus tuberosus*) and stinknet (*Oncosiphon pilulifer*). Although there is a range in the number of populations, all these species are still in the early detection phase and are not widespread in the Bay Area. Likewise, the distribution of EDRR species varies among counties. Alameda has the most populations with 47, whereas Napa County represents the low range with only 2 populations.

The 2022 data shows a decrease from 2021 in visits to existing populations as well as management. Only 26 of the 184 populations, or 14%, were visited in 2022 and only 9% were managed. Although Alameda and Santa Clara Counties managed a greater percentage of their populations in 2022 than 2021, the number of populations visited or managed in 2022 decreased in all other counties. A few counties had no visits to EDRR populations in 2022. Alameda and Contra Costa have the most populations, yet they were in the low range for populations visited and managed in both 2021 and 2022.

There were 12 new populations of the target species reported in 2022, resulting in a 7% increase in the total number of EDRR populations. (This increase in populations is not enough to account for the disparity between populations visited or managed in 2022 and 2021.) One

bright spot was the single population of Jerusalem artichoke *(Helianthus tuberosus*). This population was visited and managed in both 2022 and 2021, meaning 100% of Jerusalem artichoke was controlled both years.

Our evaluation was performed using publicly accessible records published in Calflora. As a result, this may not include all EDRR records in the Bay Area. Private records in Calflora or records kept through other means will not appear publicly in Calflora or in our evaluation unless intentionally shared. We are collaborating with partners to access this information so that we can incorporate this data into future evaluations to more accurately represent EDRR management. Additionally, the "management status" field and "history stack" functionality in Calflora may not be used consistently at this point and thus some records may not accurately reflect the work happening on the ground. We are encouraging the use of both of these tools to better track management at the landscape scale.

Some populations of the target species in Calflora are only documented via records shared from the California Consortium of Herbaria. Visiting the sites of these herbarium records and creating new records for them in Calflora will allow us to confirm whether populations exist at these sites. Unconfirmed herbarium records could be falsely inflating the number of Bay Area EDRR populations. Russian knapweed and Japanese dodder account for over half of the unconfirmed herbarium records.

The sites of two unconfirmed herbarium records were visited in 2022 and new records entered into Calflora. There remain 43 unconfirmed herbarium records that have not been visited, accounting for 23% of the Bay Area EDRR populations.

*Japanese dodder (*Cuscuta japonica*) in Contra Costa County. Photo: Contra Costa CAC.*

*Russian knapweed (*Rhaponticum repens*) is the most widespread of the Bay Area EDRR species. Photo: © 2019 Richard Spellenberg*

Herbarium records are unique in Calflora in that you cannot update their management status or include them as part of a history stack. To address this, we have encouraged Bay WMA partners to make new records when visiting unconfirmed herbarium records, so that these new records can have a management status and can become history stacks.

To help with ongoing monitoring and detection efforts, we created a Calflora "email alert" specifically for any of the Bay Area EDRR weeds discovered in any of the Bay Area counties. This alert system will notify users of any new or modified records in their area, which could be a single county or the entire Bay Area.

While the Bay Area EDRR weeds were only recently identified for coordinated management in 2021, the current status of Bay Area EDRR management has highlighted significant shortcomings in WMA capacity. The goal is to eradicate all 184 target populations across the region, and we are currently only controlling 9% of them. To address this shortcoming, increased funding for WMAs is crucial to enhance their capacity to manage EDRR weeds consistently and effectively. Regular evaluations are necessary to monitor progress and identify areas for improvement.

On a positive note, history stacks and management status are being used more frequently in Calflora and email alerts are available to notify all partners of new observations. By consistently utilizing these tools and actively addressing populations only documented by herbarium records, we can work towards achieving our goal of tracking and managing all populations of EDRR weeds in the Bay Area.

Impressions from north of the border: Oregon's 2022 Interagency Noxious Weed Symposium

Jutta Burger, PhD, Science Program Director, Cal-IPC

Last December, I had the opportunity to attend Oregon's Interagency Noxious Weed Symposium in Corvallis. It was a treat! Every other year, the Oregon Department of Agriculture's (ODA) Noxious Weed Program organizes this event, which includes updates from agencies and other natural resource partners, applied research reports, regulatory updates, and a chance for land managers and agencies to mingle and learn from one another.

Members of the Oregon State Weed Board gather at the annual fall meeting. Photo courtesy Oregon Dept. of Agriculture.

Like many groups, Oregon folks were just coming out of a three-year COVID-induced social drought, which made getting together in person even more meaningful. Tim Butler, ODA's Weed Program Manager and past organizer, also got a fitting retirement send-off at the meeting, complete with testimonials, standing ovation, slide show, and cake celebrating 44.5 years of service protecting Oregon's resources from noxious weeds.

As a newcomer to this meeting, I was impressed with the level of state and federal agency involvement and collaboration around weed work. The Bureau of Land Management, the US Forest Service, ODA, and others all shared their recent weed discoveries and management actions from across the five Oregon regions that represent Oregon's 27 Cooperative Weed Management Areas (WMAs).

Californians were also invited and well represented. Cal-IPC's Executive Director, Doug Johnson, reviewed progress on rebooting California's WMA program. I presented on an inter-regional plant risk evaluation working group that includes Oregon (funded by Western IPM, reported on in *Dispatch* Summer 2022), Dr. Brenda Grewell, from the US Dept. of Agriculture and UC Davis, presented on aquatic weed research, and Dr. Chris Borkent, CA Dept. of Food and Agriculture (CDFA), gave an update on biological control agents under development.

Aside from meeting old and new colleagues, highlights for me were learning about new Oregon "early detection rapid response" priorities, seeing interagency collaboration, hearing about tribal "first food"-based management priorities, and getting introduced to the large-scale "Defend the Core, Grow the Core" annual grass management and sagebrush conservation initiative being launched for the intermountain West.

Several of the early detection and local eradication targets discussed in Oregon are familiar foes to us in California, but others are not. Speakers reported on progress hunting for and treating oblong spurge (*Euphorbia oblongata*; Cal-IPC "Limited," CDFA noxious weed list), a relative newcomer to Oregon that probably spread from California. Another species, Turkish thistle (*Carduus cinereus*; to date unknown in California), was a newer find which (unfortunately) looks almost identical to Italian and slender thistle. It was confirmed along the Oregon/Idaho border in 2014 and is now being targeted for eradication in both states.

Dense-flowered cordgrass (*Spartina densiflora*; Cal-IPC "High," CDFA noxious weed list) was highlighted as a priority species by ODA, which is using a combination of chemical and mechanical techniques to combat the species. (*Spartina densiflora* has also been aggressively controlled in California in the San Francisco Bay, where it has nearly been eradicated!) Several speakers provided updates on yellow floatingheart (*Nymphoides peltata*; CDFA "A," highlighted in Cal-IPC's 2022 Weed Alerts), an aquatic invasive plant that is a very high priority in Oregon and being treated at all accessible ponds where it is known to occur.

Orange hawkweed (*Hieracium aurantiacum*; Cal-IPC "Watch," CDFA "B") was also mentioned as a species that is being treated at many sites but becoming difficult to contain. Major management successes celebrated in Oregon include removal of the only known occurrence of giant hogweed (*Heracleum mantegazzianum*; Cal-IPC "Watch," CDFA "A"), consistent control and reduction of matgrass (*Nardus stricta*; Cal-IPC "Watch"), and collaborative management and population reduction of plumeless thistle (*Carduus acanthoides*; Cal-IPC "Limited," CDFA noxious weed list) and Scotch broom (*Cytisus scoparius*; Cal-IPC "High," CDFA noxious weed list).

Oregon agencies are targeting several other species at a statewide level that are not listed here. In general, the outlook was optimistic, thanks to new pulses of federal and state funding that were available for control programs.

Habitat protection and feedback loops

(Continued on page 14)

Check out the Cal-IPC Video Library

Claire F. Meyler, Communications and Donor Relations Manager, Cal-IPC

Have you visited the Cal-IPC Video Library online? Find recordings from past workshops, trainings, and online Symposia. Land management experts from across California share years of experience and best practices on topics such as prevention, mechanical control, herbicide control, and more. Here are a few highlights to enjoy.

Ken Moore shares his tool expertise. Photo: Cal-IPC archive.

Symposium Archive: Discover inspiring speakers, projects, and lessons learned from the past three years of Cal-IPC Symposia (2020-2022). Review your favorite recorded sessions, including workshops, herbicide laws and regulations sessions, and most discussion groups. Jump to the archive to find PowerPoint presentations or proceedings from 31 years of shared knowledge.

Bob Case shares insights on plant ID and control. Photo: Cal-IPC archive.

Introduction to Invasive Thistles of the Bay Area: Led by Bob Case, formerly with Contra Costa Department of Agriculture, this 4-part guide has excellent information on plant ID and control for several invasive thistles, including yellow starthistle, Italian thistle, bull thistle, and more.

Mechanical Control Tools: Educator and tool innovator Ken Moore, formerly with Wildlands Restoration Team, leads several detailed instructional videos on manually controlling invasive plants. Of special note, the 40-minute video, *A Weed Worker's Tool Guide*, shares Ken's wisdom and insights from a lifetime of work in weed management. He generously created this video and shared it with Cal-IPC in his final years.

Non-Chemical Weed Control: In 2020 and 2021, Cal-IPC hosted a series of trainings for non-chemical weed control, thanks to funding from the California Department of Pesticide Regulation's Alliance Grant Program. In short demonstration videos, experts from around the state share best practices for some commonly-used tools and methods of removal: whole plant removal, severing roots, bladed hand tools, scuffle hoes and grub hoes, string trimmers and brush cutters, steaming, solarization, and targeted grazing. The training and video series share research collected for the 291-page manual, *Best Management Practices for Non-Chemical Weed Control*, available in the Cal-IPC Publication Library. This knowledge also formed the foundation for the WeedCUT online decision-support tool.

Shani Pynn, Riverside-Corona Resource Conservation District, demonstrates how to severe tree roots. Photo courtesy Shani Pynn.

Joe DiTomaso holds (clean and empty) equipment for a Field Course demonstration on herbicide control methods. Photo: Bob Case.

Herbicide Control Methods: Cal-IPC hosted a 2009 Wildland Weed Field Course titled *Herbicide Control Methods*. We partnered with the National Park Service's California Exotic Plant Management Team and the Pacific Coast Science and Learning Center to film this training and make it available online. Find nine videos capturing a full day of learning on herbicide application.

Expand your knowledge or share expert tips with your staff! Find the Video Library online at cal-ipc.org/video

Oregon's 2022 Interagency Noxious Weed Symposium

(Continued from page 12)

between annual grasses and wildfire were a special topic at the Symposium. Matt Cahill, Sagebrush Sea Program Director at The Nature Conservancy, and Megan Creutzburg from Oregon State University described research and strategies to protect sagebrush and sage grouse habitat under the impacts of invasive grasses and grass-fueled wildfires. Sagebrush habitat is notoriously slow to regenerate after fire: mature shrubs are killed and establishment from seed is rare. Invasive annual grasses such as cheatgrass (*Bromus tectorum*) have fueled wildfires and reduced shrub recruitment.

Matt described tools that the Sagebrush Conservation Initiative has created, including an impressive management strategy map for land managers in Oregon to identify sites where invasive grass cover can be reduced to protect high quality sagebrush and a management toolkit to help guide control. Megan showed maps of annual grasses that helped to create strategies. Claire Tortorelli, a postdoctoral researcher at UC Davis, described how *Ventenata dubia*, a newer invasive grass to Oregon, has occupied new sites that downy brome has not been able to colonize and made them more flammable.

A big thanks from Cal-IPC goes out to Carri Pirosko and Troy Abercrombie, both of ODA, for the invitation to speak and to exchange ideas with Oregon colleagues.

Find the Sagebrush Conservation Initiative tools online at oregonexplorer.info. Find the management tool kits online at westgov.org.

Grassroots Ecology's Habitat Restoration Internship

(Continued from page 5)

alongside Grassroots Ecology staff in the field and with the community for 10 months. Their roles vary based on the ecosystems that they are assigned to steward, which can include bayside marshlands, grassland meadows, oak woodlands, creeks, and more. Interns work with staff to manage the site's seasonal restoration priorities. They also gain valuable experience delivering environmental education and volunteer engagement at community workdays. Here are a few direct quotes from participants:

"Before I joined Grassroots Ecology, I had lost my confidence in pursuing a career in STEM. I felt like I wasn't smart enough and wasn't prepared enough, partially because of the lack of representation of women and people of color in the STEM fields. Grassroots Ecology has helped me gain confidence and interact with and learn from staff members who represent me as a woman of color." – Cheyenne Lopez Gil

Intern Cheyenne Lopez Gil shows a crab in her palm while conducting a biological study to measure and analyze various crab species' health in Redwood Creek, Redwood City.

"The paid internship made a huge difference for me because I needed a part time job throughout the school year, and it was a great opportunity for me to actually work in the field I am interested in." – Melissa Murphy

"This is a region of California that I consider myself to be a stakeholder of, and I want to find somewhere to work that will allow me to bring positive physical change to our environment. Being at Grassroots [Ecology] has allowed me to pursue this goal, and I'm incredibly grateful." – Christian Tensuan

The Habitat Restoration Internship has enabled these individuals to develop valuable job skills and field experience in local conservation efforts, without sacrificing income. Over the course of interns' field work with Grassroots Ecology, nature has become a space for action, growth, and empowerment.

We can all help new generations take the reins of land stewardship. Institutionalize, support, and tend to youth presence in these conversations — because we will not be successful in this fight without them.

Learn more about Grassroots Ecology and their mission to engage the public to restore local ecosystems at www.grassrootsecology.org. All photos courtesy Grassroots Ecology.

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June 3-11
wildlife.ca.gov/Conservation/Invasives/Action-Week

California Forest Pest Council Weed Tour
June 21-22, Blue Lake, CA
caforestpestcouncil.org/events

Land Trust Alliance Rally
September 6-9, Portland, OR
alliancerally.org

NAISMA Annual Conference
October 16-19, Lincoln, NE
conference.naisma.org

Cal-IPC Symposium
October 25-28, CSU Chico, CA and Online
cal-ipc.org/symposium

Southern California Botanists Symposium
November 5, Pomona, CA
socalbot.org/symposia

California Islands Symposium
November 6-10, Ventura Beach, CA
californiaislands.net/symposium

"We agree that risks associated with using this herbicide on a large scale exist, but on a small scale, such as in invasive plants control, glyphosate has an important role and is not easy to replace."

— Jan Pergl and others, from "Don't throw the baby out with the bathwater – ban of glyphosate use depends on context," *NeoBiota*, April 23, 2020