NEWSLETTER OF THE CALIFORNIA INVASIVE PLANT COUNCIL

Dispatch

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CAL-IPC
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Protecting California's environment and economy from invasive plants

Cal-IPC Dispatch
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FROM THE DIRECTOR'S DESK

Conservation and social justice

By Executive Director Doug Johnson

In our community, BLM has long meant the US Bureau of Land Management, which oversees 15% of the land area of California (and much more of some other western states). In recent months, however, the BLM on everyone's mind is Black Lives Matter.

There has been a flood of emails from conservation groups joining the fight. When a Black man birdwatching is threatened, when a Black medical technician is shot by police in her home, compassionate environmentalists are compelled to look up from their busy work and acknowledge the wildfire of injustice.

Beyond being morally reprehensible, systemic injustice hinders conservation groups from meeting our missions. We have lofty goals to protect the environment from harm — which originates with people. In the hierarchy of needs, asking people to care about, let alone work on, environmental issues can be a lot to ask when their prospects are weighed down, their very life in danger, from social structures. This is especially true for those of us working on an issue whose rationale sometimes gets mistaken for xenophobia.

The current moment, in which our federal government struggles to address a public health crisis, shows us how poorly our institutions sometimes function. This powerful moment provides an opening, a reminder of our collective duty to continue the work of building this country. Those of us working to protect biodiversity must work to protect cultural diversity, too.

Cal-IPC has taken programmatic steps over the last three years to bring issues of equity, diversity, and inclusion to the table, including at the Symposium. We are applying for capacity-building funds for staff and board to work internally on inherent biases that affect our work. We need all of us on board to build a better tomorrow.

ON THE COVER

An American Conservation Experience (ACE) conservation corps service member removes cut *Arundo donax* canes from the San Diego River watershed in Alpine, CA. (Photo by Jessica Plance, First Place in our 2019 Photo Contest). ACE crews are working with the Back Country Land Trust (BCLT) to restore native habitat and protect the community in the foothills of the Cuyamaca Mountains of San Diego County from potentially catastrophic wildfire. Jon Green, Program and Outreach Director at BCLT, explains, "*Arundo* uses five times as much water per acre as native riparian species, meaning drier conditions in the creeks and less water available for plants and people. It creates monocultures dominated by only a few kinds of plants, which means loss of biodiversity and less overall habitat value in these critical wetland areas." Along with *Arundo*, crews are controlling salt cedar (*Tamarix spp.*), castor bean (*Ricinus communis*), and tree tobacco (*Nicotiana glauca*). Once invasive species are removed, riparian areas will be replanted with native willow, cottonwood, mule fat, and herbaceous understory plants to restore the native habitat conditions historically found in our headwater creeks and streams.

Wildland Weed News


Illustration by Ryan Jones

CAL-IPC UPDATES

2020 Symposium – Now online! We are excited about the platform we have selected and expect to bring the same mix of presentations, discussion groups, and informal networking that makes the Symposium special. Join us! See page 9.

New projects – Cal-IPC has received funding from the California Dept. of Food & Agriculture to develop regional prioritizations across the state, and from the National Fish & Wildlife Society to assist with environmental documents for initiation of Canada thistle treatment on three watersheds in the Lassen National Forest.

EDRR white paper – Cal-IPC is working with the California Landscape Stewardship Network on a white paper describing the importance of early detection and rapid response. Targeting state decision-makers, the paper aims to follow the path of the network's Cutting Green Tape initiative (to reform environmental permitting) in engaging state agency leadership in addressing systemic challenges.

Trainings – After a successful run of trainings this winter (some for volunteers, some for conservation corps members), our Wildland Volunteer Network had to cancel several training events this spring. Instead, we held a Bay Area-wide training online, attended by more than 200 people.

New office – Like many others, Cal-IPC staff is working remotely. We left our Berkeley office and downsized to a new office in nearby Richmond. Our mailing address remains the same.

Invasive lunch – For the third year, Cal-IPC worked with the University of California's Cooperative Extension to put on a series of lunchtime webinars during California Invasive Species Action Week in June. The talks ranged from detection dogs to environmental DNA, garnering more than 500 attendees, including some from outside the US.

OTHER UPDATES

Eye on Invasives – The California Department of Fish and Wildlife's Invasive Species Program has revived their newsletter, *Eye on Invasives*. The latest issue focuses on partnerships. Sign up to receive notice of future issues.

Wild bee declines – A university study from Toronto links native bee declines to plant-pollinator network changes and plant species introductions. *Insect Conservation and Diversity*, May 2020.

Hyphothesis mapping – Ever wondered how all the various aspects of invasion science, from the "Tens Rule" to "enemy release," fit together? Explore the interactive visualization tool at hi-knowledge.org.

Am I an Invasive Species? – How we talk about plants and animals relates to how we think about — and treat — each other. An essay in *High Country News*, July 9, 2020.

Beaver on – The Nature Conservancy has posted a storymap on a Beaver Restoration Assessment Tool (BRAT) for determining appropriate sites for watershed improvement in California.

COVID-19 and invasive species – Authors point out how the invasion science can facilitate the cross-disciplinary effort needed to understand and manage environmental factors that promote emerging infectious disease. *Trends in Ecology and Evolution*, August 1, 2020.

Slow lane for climate change – A UC Davis study identified 15% of natural lands in California that best serve as climate refugia for plants. Part of a special issue on climate refugia, *Frontiers in Ecology and Evolution*, June 2020.

Reducing C sequestration – A New Zealand experiment demonstrated how invasive plants can accelerate carbon loss from soils through their interactions with invertebrate herbivores and soil biota. *Science*, May 29, 2020.

Megadrought – Columbia University researchers using tree ring studies say that California and other western states are in a historic drought that rivals the worst lengthy droughts on record, going back to the 1800s.

Thank you, Dana!

In 2010, when Cal-IPC received federal stimulus funds to create CalWeedMapper, we hired geographer Dana Morawitz to lead the effort. A decade later, after years of invaluable work as part of our team, Dana is moving on. She has been instrumental to many efforts, from coordinating regional partners to set landscape-level priorities to mapping *Arundo* across the Central Valley. She has made many connections throughout our community and will remain one of us forever. As a fitting bookend to her role in building CalWeedMapper, Dana left on a high note by raising $24,000 for enhancing CalWeedMapper. Thank you, Dana, for all the work and camaraderie!


Photo courtesy Dana Morawitz

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.

Weathering a pandemic: How land managers are dealing with COVID-19

Doug Johnson, Cal-IPC

In ways ranging from mundane to profound, California's land managers are switching gears in response to COVID-19. Cal-IPC staff talked to a few members across the state to hear how the pandemic has impacted their work. Despite frustrations, all have found resourceful ways to salvage at least part of the weed treatment season.

Social distancing makes travel tricky. Many organizations are not allowing coworkers to carpool to job sites, requiring more vehicles. Some conservation corps do allow multiple corps members in a van with good ventilation and seating plans that ensure distancing. Travel is even more tricky for the Channel Islands Biosecurity Group, which depends on ferries and small planes to reach work sites. Either traveling or on-site, it is often difficult to find an open public restroom.

Long Beach Conservation Corps setting up a coronavirus triage center. Photo courtesy Long Beach Conservation Corps.

Hiring freezes have kept positions from being filled, including seasonal hires needed to implement weed management projects. Elevated unemployment benefits can also provide a disincentive for staff to return to work if they were temporarily laid off (for instance, while an organization applied for a federal Payroll Protection Program loan). Many volunteer efforts, which provide substantial assistance in local, state, and national parks, have also been curtailed.

Some stewards maintain that restoration work is an excellent lockdown activity. Steve Rosenthal enjoys volunteers regularly with a small group in Santa Clara County, because "folks can be separated by ten feet or more and yet have the feeling of being part of a team and accomplishing something great together."

In some less populated parts of the state, work has been able to proceed as normal. In Modoc County, in northeastern California, weed crews have been out in force, according to Gary Fensler, the county's Agricultural Commissioner. As of this writing, Modoc County still had zero cases of COVID-19. Tom Getts, the Weed Ecology and Cropping Systems Advisor with UC Cooperative Extension for Lassen, Modoc, Sierra, and Plumas counties can still conduct research once he gets permission through the university for a specific project. "Working on a cooperator's property evaluating weed control methods with no one in sight is pretty low-risk work!"

Many people are struggling to balance increased pressure from home and work needs. Working from home with kids around is a real challenge, and leaving home is not an option for many folks with kids now home full-time. Hannah Wallis, Biologist with the Monterey County Agricultural Commissioner's office, is feeling the added strain. "Onboarding new weed mapping programs while attending to increased demand at home has been intense. I have been working around the clock and that is exhausting. Thank goodness the effort is for something I care about deeply."

Corps get props

Speaking with leaders from three southern California conservations corps — Orange County Conservation Corps (OCCC), Long Beach Conservation Corps (LBCC), and Urban Corps of San Diego County — it was striking that these groups have hardly missed a beat in pivoting to fulfill essential services needed in the community, like food distribution.

"We put younger people into positions that would be much riskier for elderly volunteers," says Josh Volp of OCCC. "Our folks are fired up to see people holding up signs to thank them for their work. It gives them a real sense of contributing to the community. They don't always get that when they're doing land management. They're just as likely to get yelled at for making noise with chainsaws."

While not all corps across the state were able to respond immediately, they have been able to support each other by sharing information through their association. Other states have expressed interest in California's structure. Dan Knapp of LBCC sees momentum building for a Civilian Conservation Corps 2.0. "We need jobs, just as we did when the Corps was created in the 1930s. There's a lot of work to get done in our communities, and a lot of people looking for meaningful work."

California local corps also run charter schools that help members graduate from high school. Like many other graduations this year, the corps adjusted for the times. Urban Corps held theirs online, while OCCC had each student come by in-person on scheduled ten-minute intervals.

Staying sane

Susannah Manning, Biologist with the Redwood Community Action Agency, oversees the Northcoast Knotweeds project and co-chairs the Humboldt County Weed Management Area (WMA). She has stayed grounded by serving on the board for the nonprofit Friends of the Dunes, which has engaged the community through projects such as a kids' art contest on solitary bees and the annual sand sculpture event. "Humboldt County is small. A lot of people know each other and working through all these challenges together has strengthened the community."

"It feels like going back in time," says Garrett Dickman, a botanist for Yosemite National Park, reflecting on the sleepy feel in the park with workers sheltering at home and public visitation reduced. "At work, however, we've been busier than ever, figuring out how to cover all the normal bases with the addition variable of coronavirus."

Funding constraints

Lindsey Roddick, Sr. Restoration Ecologist for the Land Conservancy of San Luis Obispo, says they have had enough capacity and resourcefulness to complete field work on their sites, but detection surveys in ten open space areas, including control sites for high-priority weeds like wooly distaff thistle (*Cartahmus lanatus*), could not be completed because of lost local funding. Another funding source required personal protective equipment (PPE) such as N95 masks and nitrile gloves that were not available during the time-sensitive window for effective control of veldtgrass, so that opportunity was lost.

But there have been silver linings. "Because our properties were closed to the public, it made upgrades to grazing infrastructure easier. We tried some new things. Goat grazing was a hit on social media. Our outreach staff, which normally leads hikes on our properties, have led virtual tours with live questions on Instagram."

Heading out before sunrise in Lassen County to spray a field trial. Photo: Tom Getts.

Missing the volunteers

Devyn Friedfel, Natural Resource Specialist at Pepperwood Preserve in Sonoma County, says he misses being able to work with their community of volunteers and the collective sense of stewardship. The preserve has also been unable to continue their engagement with student volunteers from the local Santa Rosa Junior College.

As a result of losing thousands of volunteer hours, Devyn ended up spending 100% of his time doing field work this spring, which left him feeling connected to the land. He found some new invasive plant detections and deepened his knowledge of local flora and fauna. With fewer people on the Preserve, wildlife was more active. "I saw coyotes and bobcats (never seen those before). Our cameras captured more bear activity. Some ravens nested in our field offices because we weren't there."

Like many organizations, Pepperwood's education team took the opportunity to ramp up their social media channels. Take a look at their Wild Wonders channel on YouTube!

Glad for WMA grant

Hannah Wallis expressed gratitude for a grant from CDFA for the Monterey County WMA to map priority weed populations. Staff in the Agricultural Commissioner's office are getting up to speed on using Calflora's Weed Manager tools to track A-rated weeds, weed abatement investigations, and roadside vegetation for a new survey project.

"It's been a godsend in terms of maintaining workloads for staff and having work that can be done while socially distancing. Having a new program has kept staff morale high. They are learning new skills and working in different regions across the county. Plus, with mapping it is immediately gratifying to see the progress of your work, while actual weed control work can often feel Sisyphean. Right now, new is good."

Lessons learned

Our partners acted as quickly as possible to adapt programs to new conditions. Some were able to get back to a new workflow within two weeks, while others took two months. With luck (and planning), organizations are now better prepared to meet future emergencies. Stay safe and healthy out there!

Knocking Out Knotweed in Marin County

Anna Dirkse, Japanese Knotweed Outreach Coordinator,
UC Cooperative Extension, Marin County

Japanese knotweed (*Fallopia japonica*) is no different from other invasive weeds in that it shows no respect for arbitrary boundaries such as property lines. In Marin County, this was a problem when knotweed was being treated downstream on public lands beginning in 2017, and not upstream on private lands. The formation of the Marin Knotweed Action Team (MKAT) ensures a holistic approach to the control and long-term eradication of Japanese knotweed from the San Geronimo Creek and Lagunitas Creek watersheds in West Marin.

MKAT is a coalition of public agencies and nonprofit organizations, including California State Parks, Marin County Department of Agriculture, Marin County Parks, Marin Municipal Water District, Marin Resource Conservation District, Point Reyes National Seashore, and the University of California Cooperative Extension. Together, we are dedicated to sustaining the Lagunitas Creek and San Geronimo Creek watersheds and their valuable habitat for endangered Coho salmon and threatened steelhead. We strive to be a resource to educate community members about Japanese knotweed and to help landowners identify and manage Japanese knotweed on their land.

Large leaves with a distinctive shape and zig-zag stem. Photo courtesy MKAT.

Japanese knotweed has a mythic reputation elsewhere in the United States and in the United Kingdom due to the notorious damage it wreaks on property and the environment. Although its stems resemble bamboo, Japanese knotweed is a member of the buckwheat family and was known as *Reynoutria japonica* and *Polygonum cuspidatum* before its more recent naming as *Fallopia japonica*. It is a shrub-like perennial with hollow stems (it is not a vine nor is it woody). It can grow up to eight feet tall in late summer before dying back in the winter, though some plants may remain only a foot or two feet tall during the growing season. Distinctive characteristics include spade-shaped leaves with a flat base, zig-zag stems and plumes of small cream-colored flowers appearing in mid to late summer.

Known for its vigorous growth and its extensive rhizome network, Japanese knotweed outcompetes other vegetation, establishing monoculture stands and reducing native species. Specifically, it prevents tree seedling establishment that is important to nutrient cycling and other stream functions. As a result, salmon are impacted by the loss of leaf litter, shade, and large woody debris. In addition, Japanese knotweed can grow through asphalt, septic systems, cracks in home foundations, and concrete, making a compelling argument to homeowners to allow it to be managed on their property.

Mechanical or physical means of removal and control of Japanese knotweed are either not effective or not feasible. In addition, attempts at mechanical removal stimulate plant growth. Japanese knotweed relies on its extensive rhizome system to come back each spring. This underground stem system stores an incredible amount of energy that the plant can utilize, so that tiny fragments of rhizome can create new infestations following flood events.

Japanese knotweed can also spread via cut stems, which is why cutting or mowing is not recommended. The rhizomes can stretch 10 feet down and up to 23 feet away from an aboveground patch, making it highly unlikely it can be dug up completely without spreading it in the process. Newly deposited, single-stem plants have been successfully dug up though. Any plant material needs to be carefully bagged and sent to a landfill facility because of its propensity to regrow and spread. A biological control is on the horizon, a psyllid known as

Aphalara itadori, but it is still undergoing USDA APHIS review.

By far, the most effective treatments are a foliar spray of an aquatically-approved formulation of imazapyr and/or glyphosate and an adjuvant. This is applied in the late summer or early fall as the plant is bringing energy back down into its rhizomes. Spraying earlier in the year is not effective, though some land managers will conduct two separate treatments six weeks apart in the fall to catch missed plants. MKAT's ability to use both glyphosate and imazapyr has been important. Glyphosate can be used when homeowners are concerned about neighboring desirable vegetation or when wells are present. For homeowners who shy away from the name recognition of glyphosate, imazapyr presents itself as an alternative (though imazapyr does not bind to soil particles and has a greater risk of leaching).

MKAT's outreach included initial targeted mailings to streamside homeowners and follow-up door knocking as well as mailers sent to all 2,000 households in the San Geronimo Valley. Community talks, ads in community newspapers, postings on Nextdoor and Facebook and appearances on local radio were also used to appeal to a sense of responsibility to help us eradicate this weed. Our work requires the public to trust us and our intentions. Likewise, we need to trust the intentions of the public and have faith that they are invested in the health of the San Geronimo and Lagunitas Creek watersheds. Community members are an asset, not a liability.

Initial funding through the National Park Service and the County of Marin enabled a full-time coordinator to be hired in 2019. Two grants in 2019 and 2020 from the California Department of Food and Agriculture were key to sustaining the surveying and treatment efforts. The Marin County Fish and Wildlife Commission also awarded a small grant for outreach materials.

It is important that Japanese knotweed is listed as a Noxious Weed in California Code of Regulations Section 4500 and has a pest rating of A, indicating that it is a pest worthy of managing throughout any part of California where it occurs. This designation, along with Food and Agricultural Code Sections 5402 and 5403, give the County Agricultural Commissioner the legal authority to abate a nuisance by eradicating, controlling, or destroying the pest. This designation also allowed a CEQA categorical exemption to be filed for CDFA granting purposes. Section 15307 "Actions by Regulatory Agencies for Protection of Natural Resources" allows for actions taken by regulatory agencies as authorized by state law or local ordinance to assure the maintenance, restoration, or enhancement of a natural resource where the regulatory process involves procedures for protection of the environment.

Map from Calflora showing the infestation in the San Geronimo Valley in Marin County.


Japanese knotweed is found along streams in a handful of California counties. It is one of the top weeds in Oregon and Washington, and is listed by the IUCN as one of the world's 100 top invasive species. Photo courtesy MKAT.

Thanks to both community support and regulatory tools, all known streambank populations of Japanese knotweed on private land adjoining San Geronimo Creek were treated in 2019, as well as populations further downstream on public land. Eradicating Japanese knotweed will require time and continued surveying, as well as sustained long-term funding sources for monitoring to ensure that populations do not return or move throughout the watershed. Lastly, Japanese knotweed has been found in streams in other counties such as Santa Rosa Creek in Sonoma and the San Lorenzo River in Santa Cruz, highlighting the need for a sustained management effort across the state.

See Japanese knotweed near you? Enter your sighting and pictures in Calflora! For more information and resources, visit MKAT's website at https://ucanr.edu/sites/MarinKnotweedActionTeam/

Cape-ivy galling fly established and thriving along the California Coast

Scott L. Portman and Patrick J. Moran, USDA Agricultural Research Service (ARS)

The long-time program to develop biocontrol agents against Cape-ivy — one of California's worst invasive plants — has reached an important milestone. Populations of the Cape-ivy galling fly from South Africa have successfully established in the wild at sites on the California coast.

Since Cape-ivy (*Delairea odorata*) was first introduced to California, it has invaded riparian, forest, and scrub habitats along the coast. It smothers and displaces native herbs and shrubs, consumes water resources, and can clog water flow along streams. Natural resource agencies have spent substantial amounts of money and time on control.

One characteristic that has contributed to Cape-ivy's success is its ability to flourish in diverse habitats by changing its growth to suit different conditions. In riparian and forest habitats, the plant produces a sprawling network of vine-like shoots and broad, delicate leaves. In coastal scrub habitats, where the plant is exposed to more intense sun light and coastal winds, the plant produces short, stout shoots that grow more upright, with small, tough leaves.

Starting in 1997, a coalition including Cal-IPC, the California Native Plant Society (CNPS), and a network of land trusts raised funds to support a biological control program for Cape-ivy. Entomologist Dr. Joe Balciunas (since retired), from the USDA-ARS Invasive Species and Pollinator Health Research Unit based in Albany, CA, worked with South African colleagues to identify two promising biological control agents: a shoot tip-galling fly, *Parafreutreta regalis* (*Diptera: Tephritidae*), and a leaf mining moth *Digitivalva delaireae* (*Lepidoptera: Glyphipterigidae*).

An adult shoot-tip galling fly, P. regalis*, on a Cape-ivy leaf.*

After years of rigorous host-specificity testing and environmental permitting to ensure the agents cannot damage other plants, we began releasing the Cape-ivy fly in September 2016. Since then, we have conducted more than 80 field releases of *P. regalis* at 18 different locations along the coast, from Humboldt County in northern California to San Luis Obispo County in southern California. Collaborators at UC Santa Barbara have also released the fly in Santa Barbara and Los Angeles Counties.

In total, more than 2,500 female and male flies have been released in cages at different field sites. USDA-ARS scientists discovered that repeated releases at the same sites over several months (May-September) improved the likelihood that the fly would take up residence; however, it established after just a single release in San Luis Obispo.

ARS researchers have now confirmed that *P. regalis* is established at four sites along the coast: Coast Dairies State Park in Santa Cruz County; Garrapata State Park and the Big Sur Land Trust's Glen Deven Ranch in Monterey County; and a San Luis Obispo Land Conservancy site in San Luis Obispo County.

The fly established in both riparian and coastal scrub habitats. This is good news for biological control because it confirms that the insect is not constrained by variation in the plant's morphology. ARS scientists are now monitoring the fly's population levels to determine important parameters such as population growth rate, timing of the fly's lifecycle (phenology), and geographic distribution.

The fly's population is growing rapidly and spreading beyond the original release locations. In May 2019, approximately one *P. regalis* gall was observed for every 10 square meters of Cape-ivy. One year later (May 2020), the number had grown to 41 galls per 10 square meters — a forty-fold increase. Population levels were highest in November 2019, topping off at 75 galls for every 10 square meters, suggesting that the insect's population peaks in the fall. If the fly's population continues to increase at the current rate, by the end of

Galls on Cape-ivy from P. regalis *at an Alameda County release site. The dark spot on the gall on far left shows the 'window' from which adult flies will emerge.*

(Continued on page 14)

Join us online! Connect with colleagues from across the state – and beyond – to share the latest in invasive plant biology and management!

SYMPOSIUM FEATURES

Learn the latest updates on effective tools, relevant research, and strategic management approaches. Our online format will include opportunities to chat with sponsors/exhibitors, engage during discussion groups, talk to poster presenters, and create video meetups with friends and colleagues.

SPECIAL SPEAKER

Photo courtesy Daniel Simberloff

Dr. Daniel Simberloff is the Gore Hunger Professor of Environmental Studies at the University of Tennessee and a leading voice for invasion biology worldwide. Along with some 500 publications on ecology, biogeography, evolution, and conservation biology he is Editor-in-Chief of the journal *Biological Invasions* and author of the book *Invasive Species: What Everyone Needs to Know.*

TUES., OCT. 27: WMA MEETING AND LAWS & REGS

9:00 am – 11:00 am: 2020 Statewide WMA Meeting. Representatives from Weed Management Areas convene to share information on project design, new weeds, control techniques, early detection, mapping, and funding. (no cost)
1:00 pm – 3:00 pm: DPR Laws & Regs

WED. to FRI., OCT. 28-30: MAIN CONFERENCE

Session talks, plenaries, discussion groups, and posters cover a wide range of topics on invasive species biology and management, including:

- Forest pests, weeds, and fire
- The role of invasive plant management in recovery and resilience
- Management lessons learned from projects across California and beyond
- Management tools and techniques
- Ecology of invasive plants
- Productive partnerships
- Moving toward equity in conservation
- Management planning, mapping, and prioritization
- And more!

SPECIAL SESSIONS:

- Recovery and resilience: Invasive plant management in a global context
- Fire, forest pest, and weeds: How climate change may alter our forests forever
- Progress! Invasive plant management success stories across California

Plus our annual Career Panel, Poster Session, Photo Contest, and Auction!

PRICING

Early bird rate ends Sept. 1. Registration deadline Oct. 26, 5:00 pm.

Member: $75 early bird/$100 regular

Non-Member: $100 early bird/$125 reg.

Student Member: $25 early bird/$40 reg.

Student Non-Member: $40 early bird/ $55 reg.

Presenter: $25 early bird/$40 reg.

Student Presenter: $0 early bird/$15 reg.

ADDITIONAL COSTS/DISCOUNTS:

Extra charge for processing DPR continuing education credits: $50
Discount for attending SERCAL or CNGA: Subtract $25 (Discount code required)

Visit **cal-ipc.org/symposium** to register, participate in the Photo Contest, and find more Symposium information.

California's 2017 wildfires visible from space. Photo courtesy NASA Goddard Space Flight Center

CDFW generates new ACE layer from Cal-IPC data

Elizabeth Brusati, California Department of Fish and Wildlife,
and Dana Morawitz, Cal-IPC (former staff)

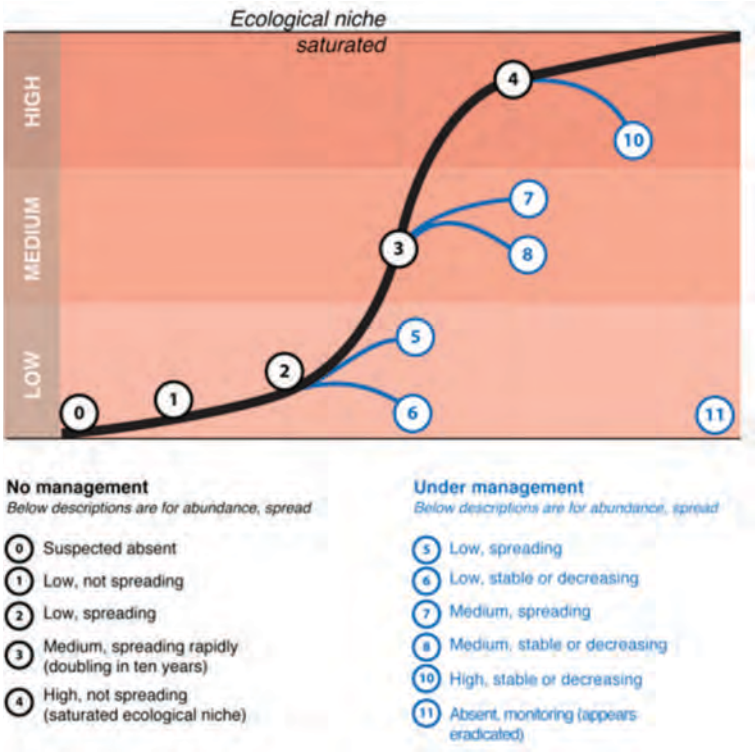
Cal-IPC partnered with the California Department of Fish and Wildlife (CDFW) to create two statewide maps of invasive plants for CDFW's Areas of Conservation Emphasis (ACE 3.0) project. The maps compare invasive plant levels throughout California, one for terrestrial species and the other covering aquatic and riparian plants. The maps may be useful for planners or anyone who wants to see a comparison of invasive plants across a large area.

ACE analyzes large amounts of spatial data to summarize biodiversity, significant habitats, habitat connectivity, and climate change resilience. Its maps provide information for conservation planning, ecological research, and land-use planning (available at www.wildlife.ca.gov/Data/Analysis/ACE). The Statewide Biological Richness layer from ACE 2.0 has been an integral part of Cal-IPC's Invasive Plant Regional Planning efforts; as included in the CalWeedMapper online tool, this layer adds the geographic element showing areas of conservation emphasis.

In 2018, CDFW began adding "stressor" layers to show where important ecological areas might be threatened. The initial stressor layers covered urbanization and sea level rise. CDFW's Biogeographic Data Branch, which oversees ACE as well as other mapping tools such as the California Natural Diversity Database, wanted to add a layer on invasive species but did not have its own comprehensive dataset, so turned to Cal-IPC for assistance.

The new ACE maps use statewide data from CalWeedMapper and Calflora. CalWeedMapper combines GIS data and expert knowledge from land managers, updated by datasets and individual observations from the Calflora database, displaying individual maps for the 225 invasive plant species on the Cal-IPC Inventory (not including Watch species). The dataset provides three important pieces of information: which invasive plant species are present in a location, how widespread each species is in that location, and the potential for impact of each species. The power of these data lies in the fact that a single suite of species was scored consistently across the entire state using GIS datasets and meeting with Weed Management Areas. The final product is an objective assessment of the most problematic invasive species over a large area (spanning the state) that exists in no other region in the country. All three elements together provide a more accurate picture of the role of invasive plants as stressors than any one element alone. The original CalWeedMapper data have been augmented with recent observation records to provide an updated view of the extent of invasive plants in the state. Few comprehensive datasets exist for non-plant invaders in California, other than a few well-tracked species such as quagga mussels, so we limited our ACE map to plants to provide a consistent comparison across the state.

Following the format of ACE's biodiversity maps, we separated the invasive plant map into terrestrial and aquatic habitats, with riparian species incorporated into both. We included all Cal-IPC Inventory species with a High, Moderate, or Limited rating. (Plants with a Watch rating are not yet mapped in CalWeedMapper; they are also not considered invasive at this point). The terrestrial map includes terrestrial and riparian species, as determined within the Inventory plant assessments. The aquatic/riparian map includes all species with a National Wetland Plant List wetland indicator status of Obligate or Facultative-Wetland (USDA PLANTS Database, plants.usda.gov). The duplication of riparian and some marsh species in the two maps is not a problem because the maps are intended to be viewed separately. This method keeps the maps consistent with ACE's biodiversity maps, which also include riparian species in both the terrestrial and aquatic versions.



Expert knowledge in CalWeedMapper is populated according to these guidelines. Abundance is shown on the left side and depicted in shades of pink. To get Distribution (D), the values in low were categorized as 'trace'; the values in medium as 'moderate'; and the values in high as 'widespread'.

The ACE invasive layers give a score for each USGS quadrangle ("quad"), calculated by summing the Cal-IPC rating and estimated place on the invasion curve for every species in that quad. (See box for detailed methods.) The maps show the relative "invasive plant level" in each quad, ranging from yellow (low) to red (high). In contrast to CalWeedMapper, which displays maps for individual species, the ACE layers combine all species in a quad. Note that results may be affected by biases in species identification and reporting, and that results strongly reflect the greater number of invasive plant species in coastal areas. The data and approach may also be used to assess relative threat within a region, calibrated to that region's weediest quad. Such analyses can be used for large-scale planning efforts, such as for Habitat Conservation Plans or CDFW's Regional Conservation Investment Strategies, to inform where more restoration may be needed. Layers will be available on ACE by using the "Add data: BIOS" and selecting "Level of Terrestrial Plant Invasive by Quad [df2810]" or "Level of Aquatic Plant Invasion by Quad [ds2811]." The layers are also on CDFW's BIOS viewer (https://apps.wildlife.ca.gov/bios/).

This project was a great opportunity for partnership between Cal-IPC and CDFW. Cal-IPC provided knowledge on the plants and the method for calculating the scores, while CDFW took the time to perform the spatial analysis to create these map layers. We look forward to working together in the future.

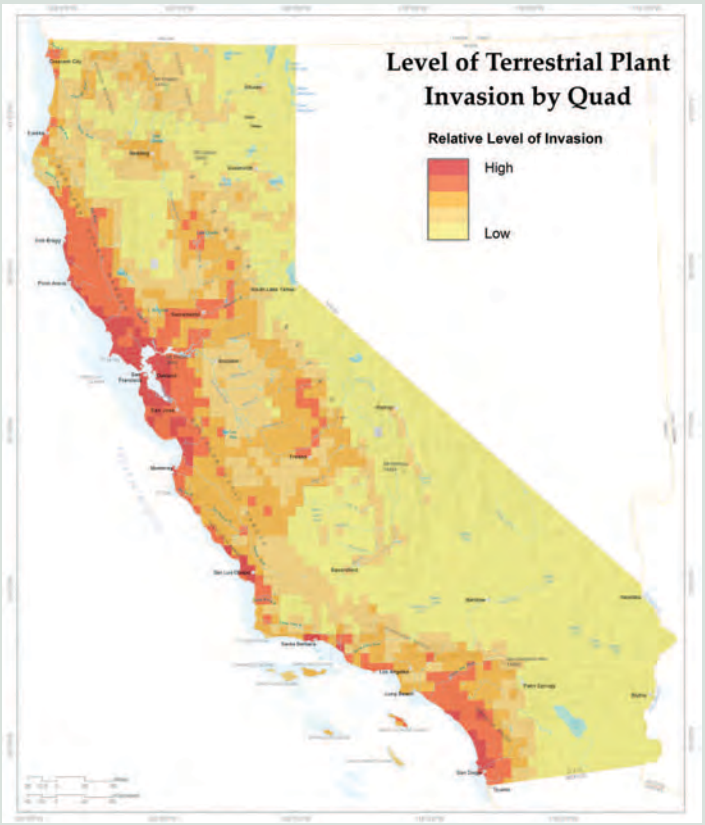
Thank you to everyone who has contributed data to CalWeedMapper and Calflora, without which this project could not have happened. Thank you to CDFW ACE Coordinator Melanie Gogol-Prokurat, CDFW BIOS Coordinator Sandra Hill, and the staff of the CDFW Biogeographic Data Branch for GIS analysis.

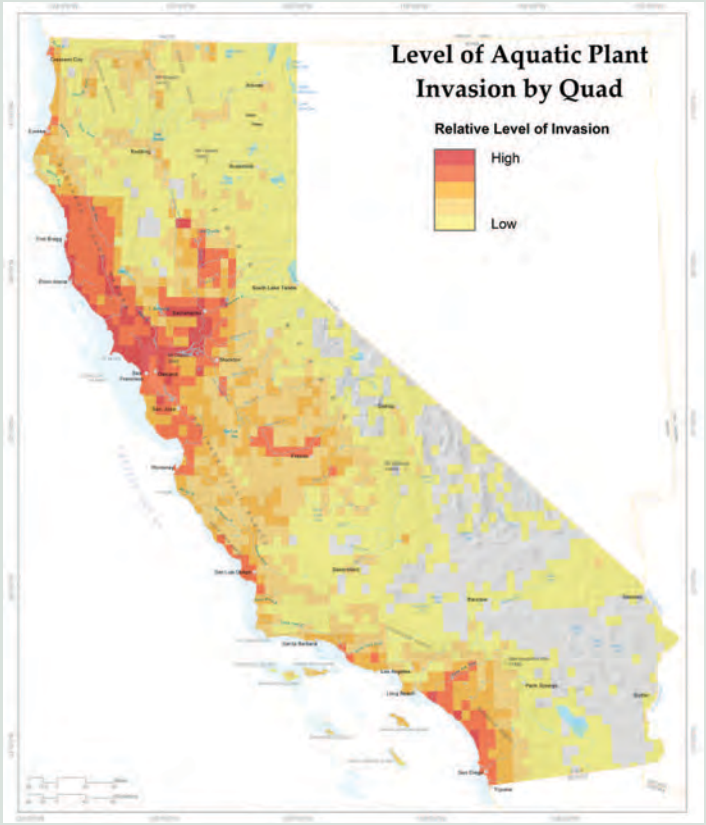
Determining Invasive Threat

The invasive threat in each quad was determined based on the species present, their Cal-IPC Inventory ratings, and their distribution. Calculations were made separately for the terrestrial layer and the aquatic/riparian layer and used data from 2000 or later. Each plant occurrence in each quad was assigned a rating (R) based on the Cal-IPC Inventory. Each occurrence was also assigned a Distribution (D) score of "widespread", "moderate," or "trace," based on the abundance noted in CalWeedMapper data (based on location on the invasion curve selected by expert knowledge, see Figure). The scale of invasion in each quad was calculated by multiplying R x D, then summing the multiplied values for all species found in the quad.

For each plant occurrence within a USGS quad:
R = Cal-IPC Inventory rating
D = Distribution based on invasion curve
Score for a quad = Sum of (R x D) for all species found in the quad

We calculated the score of a hypothetical "ultimate weedy quad" by summing (R x D) for all species at high distribution. For any given quad we then normalized to a 0-1 scale by dividing the (R x D) sum for that quad by the ultimate weedy quad value.





Forest Service and County Ag Commissioners Sign New MOU

Sandy Elles, Executive Director, California Agricultural Commissioners and Sealers Association;
John Exline, Director, and Diana Craig, Deputy Director, Ecosystem Management,
USDA Forest Service, Pacific Southwest Region

California's County Agricultural Commissioners (CACs) work collaboratively with the US Forest Service (USFS) to help control weeds on National Forest land in California. In the fall of 2019, the California Agricultural Commissioners and Sealers Association (CACASA) and the USFS Pacific Southwest Region began work to renew our Memorandum of Understanding (MOU) on invasive plant management.

National Forests cover 20 million acres in California, 20% of the state's area. These lands occur within 25 of the state's 58 counties (43%). The working relationship between each county and the local National Forest staff is unique to that region. The MOU sets broad parameters to support these relationships.

The MOU has a five-year term and establishes parameters for cooperation between the parties to limit the introduction, establishment, and spread of invasive plant species, especially State-listed noxious weeds. With mutual benefit and interests in mind, the MOU calls for CACs to meet with Forest Supervisors, offer expertise on Integrated Pest Management (IPM), and collaborate with USFS to achieve continuity of implementation of the 2013 Forest Service National Strategic Framework for Invasive Species Management.

Reciprocally, the MOU calls on the USFS to support the timely completion of environmental documents to implement IPM-based approaches to invasive species management, to provide National Environmental Policy Act (NEPA) guidance to CACs, to utilize Early Detection and Rapid Response program agreements, and to participate in other cooperative activities involving weed management.

Unfortunately, resource constraints for both the USFS and the counties have limited the amount of weed management that can be accomplished. While state funding for Weed Management Areas (WMAs) was resurrected in 2018, it is on the chopping block this year due to pressure on the state budget. In 2019, CDFA issued nearly $2 million in grants to counties and Resource Conservation Districts for noxious weed management projects. In 2020, CDFA approved $1.6 million to counties for weed mapping and control grants. (Additionally, Lassen and Glenn counties receive grants from the National Forest Resource Advisory Committee (RAC) for noxious weed control efforts.) Such grants are important for making progress on local and regional priority projects.

*American Conservation Experience (ACE) crews pull musk thistle (*Carduus nutans*) in Tahoe National Forest. Photo: Mary Patterson*

*Eldorado National Forest Invasive Plant Crew pulling Scotch broom (*Cytisus scoparius*). Photo: Blake Engelhardt*

Beyond weeds, CACs in Southern California counties are ramping up efforts to control forest pests in coordination with the USFS. Counties are trapping for invasive shot hole borer species and initiating tree removal programs to slow the spread of these pests.

The US Forest Service's National Strategy and Implementation Plan for Invasive Species Management was completed in 2004 and updated in 2013 as the Forest Service National Strategic Framework for Invasive Species Management. These documents direct Forest Service Units to adopt a "Systems Approach" to invasive species management. As a complement to the Framework, the US Forest Service National Strategic Plan includes objectives to reduce adverse impacts from invasive and native species, pests, and diseases, and restore and maintain healthy watersheds and diverse habitats.

Summary of Weed Work on National Forests

In 2019, the USFS Pacific Southwest Region treated about 6,200 acres of invasive plants and noxious weeds on 18 National Forests in California, as well as 680 acres of aquatic invasive plants in the Plumas National Forest. Working with partners, we aim to slow the spread of weeds through efforts such as: controlling yellow starthistle across the leading edge of infestations moving up into the Sierra; eradication of knapweeds in northern counties; and developing watershed-based approaches to musk thistle control in the Truckee River area.

One early invader, *Alyssum murale*, is on our radar screen because it is invading serpentine areas in Oregon. In some areas, we are keeping an eye out for Cape-ivy and stinkwort.

After fires, weed management is a part of Burn Area Emergency Rehabilitation (BAER) efforts. In 2017, there were 24 BAER incidents with 391,146 National Forest acres burned and $325,434 requested for weed management. In 2018, there were 23 BAER incidents with 818,495 National Forest acres burned and $686,370 requested for weed management work.

The USFS uses herbicides as part of an IPM program in most forests. Six National Forests — the Angeles, Cleveland, Eldorado, Inyo, Lake Tahoe Basin Management Unit, and Modoc — have completed Forest-wide or site-specific weed NEPA herbicide documents. In addition, seven National Forests have completed NEPA coverage for some areas of the forest, and several other forests will start site-specific documents for invasive plant control using herbicides this year.

Grants from the US Forest Service State & Private Forestry program support invasive plant work in California. Examples of work supported include: $1.4 million over five years to the California Dept. of Food & Agriculture to support grants to counties; Special Technology Development Program (STDP) grants to Cal-IPC for development of WHIPPET, Calflora tools, and PRE screening for watch species; funding to UC Santa Barbara to support Arundo and Cape-ivy biocontrols; and funding to the USDA Agricultural Research Service for work on a new rosette weevil biocontrol agent for yellow starthistle.

Youth conservation crews remove tamarisk in Palm Canyon in partnership with the San Bernardino National Forest, the Bureau of Land Management, and the Friends of the Desert Mountains. Photo: Lance Woolley

*Crews cutting and spraying the stumps of edible fig (*Ficus carica*) in Holy Jim Canyon on the Cleveland National Forest (funded Prop 84). Photo: Lance Criley*

The USFS Pacific Southwest Region and CACASA continue to support cooperative weed mapping efforts through CalFlora, CalWeedMapper, and EDDMapS. These efforts support weed inventory, mapping, monitoring, and refine focus for future work. As memorialized in our renewed MOU, we are committed to working together on a variety of terrestrial and aquatic invasive species issues, to improving coordination across jurisdictional boundaries, and to making progress on weed control in California.

Why I joined Cal-IPC's Equity, Diversity, and Inclusion Working Group

Miriam Sachs Martin, Land Manager,
Portal Valley Ranch and Park Ranger, City of San Jose

Article written by Cal-IPC staff from an interview. This article represents Miriam's personal views and should not be interpreted as a statement by her employers.

Early in my career, I had a formative experience that made me rethink the ways we talk about weeds. I was training Conservation Corps members on management of blackberry, explaining how we get rid of "invasive plants" when an African American teenager said, "Just like me." That single comment changed my life.

I was raised with a strong multi-cultural identity: my mother is from Cuba and my father is Jewish. But, as a person with fair features, I grew up in a world where I never thought to question the implications of words like "native" or "invasive." However, the California that we live in is racialized. If we use words that convey exclusion, people who feel excluded in their daily lives are going to be sensitive to those overtones. I'm interested in shifting the language so that, instead, we're talking about saving biological diversity and looking at those connections to cultural diversity.

Let's focus on inclusion in our conservation efforts. In both contexts, diversity is a strength. Diverse perspectives add to our strength as a society. Likewise, a healthy ecosystem has a diversity of plants with functions that support each other in balance.

Miriam checks out the growth one her French broom patches during the pandemic shut down. Photo: Miriam Sachs Martin.

Personally, I see parallels between weed work and anti-racist work. I find joy in the process. There may never be an end to it,

(Continued on page 14)

Cape-ivy galling fly

(Continued from page 8)

2020 some locations may have increased up to 30 galls per square meter of Cape-ivy. That level of galling fly pressure will likely have a significant negative impact on the plant's ability to thrive.

ARS is continuing to release the Cape-ivy fly at additional sites with the expectation that it will establish at more locations along the coast. This year, more field releases are planned for Humboldt, Mendocino, San Francisco, Alameda, and San Diego counties. A new release method, involving temporary planting of greenhouse-reared, galled plants at field sites, is being tested. Beginning in 2021, ARS scientists will focus on studying the fly's effect on Cape-ivy and monitoring the abundance of native plant species.

Moreover, host-specificity tests on second biocontrol agent, the Cape-ivy moth, have been completed, and ARS scientists will be submitting a petition to the federal Technical Advisory Group for permission to release the new agent.

Anyone observing Cape-ivy galls outside of the release sites is encouraged to send us a photograph and location information (GPS if possible). This information would help us track the fly's dispersal ability and geographic distribution.

Authors can be contacted at patrick.moran@usda.gov and scott.portman@usda.gov. All photos courtesy Scott L. Portman.

P. regalis *field release cage.*

Why I joined Cal-IPC's Equity, Diversity, and Inclusion Working Group

(Continued from page 13)

but I enjoy knowing that we've made a difference. Every year that I can buy for these big oaks is another year that science advances. Every year we work towards greater equality, we find greater collaboration across organizations and across barriers. It's like eating or cleaning our house — we'll do it again tomorrow. Anti-racism work is never done.

I was excited to join the discussion on equity, diversity, and inclusion (EDI) at the 2018 Cal-IPC Symposium, I volunteered to join the newly formed EDI working group soon after. I'm pleased with the progress we've made together: putting an EDI statement on the website, awarding travel grants for underrepresented professionals to the 2019 Symposium, and taking conscious measures to make the annual gathering an even more welcoming experience. This year, I was inspired to celebrate my birthday with a Facebook fundraiser to support EDI work at Cal-IPC. I was surprised at how generous folks were, despite the pandemic.

As we continue to expand the conversation, I'm interested in also expanding our definition of who is a weed worker. Collectively, Latinx gardeners in suburban neighborhoods manage huge parcels of land. They hold so much knowledge. How can we open lines of communication to learn from each other? I want to see a bigger "we" in the land management community. Let's make sure that our conferences include more diverse attendees, and more speakers that represent our diverse California. In the same way that teenager opened my eyes with his statement of "Just like me," I want us, collectively, as a professional community, to open our minds and reexamine the possibilities. Thank you, Cal-IPC, for inching this conversation forward.

Find links to join the EDI Mailing list, read Cal-IPC's EDI statement, or read more about EDI in conservation at cal-ipc.org/EDIconservation. Interested in joining the EDI Working Group? Email info@cal-ipc.org.

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sercal.org/zooming-into-2020

NEOBIOTA
September 15-18, Vodice, Croatia
neobiota2020.biol.pmf.hr

NAISMA Annual Conference
October 6-8, Online
naisma.org/conferences

Cal-IPC Symposium
October 27-30, Online
cal-ipc.org/symposium

Innovations in Invasive Species Management Conference and Training
December 14-17, Nashville, TN
invasiveplantcontrol.com/conference20/

California Weed Science Society
January 2021, Online
cwss.org

Public Lands Alliance Convention and Trade Show
February 7 – 11, 2021, Portland, OR
publiclandsalliance.org/what-we-do/convention

Western Society of Weed Science
March 1-4, 2021, Boise, ID
wsweedscience.org/annual-meeting

"The words we use when we talk about nature have a life beyond the pages of scientific journals... When popular media reports discuss* Vespa mandarini *[also known as the 'Asian giant hornet'] and the possibility of containment, it's in the unspoken but inevitable context of an Asiatic contagion that we failed to contain."

Jenny Liou, "Am I an invasive species?" in High Country News*, August 2020*