Vol. 24, No. 1 Spring 2016

Cal-IPC News

Protecting California's Environment and Economy from Invasive Plants

Newsletter of the California Invasive Plant Council

Stopping the spread

Protecting Sierra meadows 4
25 years of Cal-IPC! 6
Managing Sahara mustard 8
National EDRR framework 11
Cal-IPC wins IPM award 11
Protecting San Diego wetlands 12
Identifying emerging weeds 13

Tall whitetop (*Lepidium latifolium*): The weed that tried to win the West. Deputy Agricultural Biologist, LeeAnne Mila, works along Highway 50, a prime noxious weed nursery corridor, in El Dorado County. *Photo by Jessica Honeycutt.*

Cal-IPC

1442-A Walnut Street, #462
Berkeley, CA 94709
ph (510) 843-3902 fax (510) 217-3500
www.cal-ipc.org info@cal-ipc.org

Protecting California's environment and economy from invasive plants

Cal-IPC News
Spring 2016 - Vol. 24, No. 1

Editors: Doug Johnson & Elizabeth Brusati.

From the Director's Desk

Getting it done on the ground

By Executive Director Doug Johnson

It's been five years since the State of California cut its weed programs. We're saving about 5 cents a person each year by not funding the work of county Weed Management Areas, by not having district biologists and not distributing biocontrol agents But the economy got better and the budget crisis loosened, so why have the programs not been restored?

Basically it's bureaucratic gridlock. The California Department of Food and Agriculture, which has the historic mandate to manage invasive plants, has a sharp focus on protecting agriculture and the economy, and plenty of work to do to fulfill that primary mission. They reserve their political capital for funding programs thtat protect high-walut crops from major pests.

The California Department of Fish and Wildlife is charged with protecting the state's biodiversity. Their Wildlife Action Plan makes clear how much of a threat invasive species are to the state's wildlife. They have a program to address quagga and zebra mussels because a funding source was developed via boater fees. But they do not have a funding source to address weed work. And like CDFA, they have lots of budget needs that rank higher than addressing invasive plants.

While we continue to look for openings to advocate for these programs (or a new version of them), we have also looked to access other funding to make on-the-ground work happen. We funded priority weed removal in the Sierra for the last three years with grants from private foundations and the US Forest Service. We will be mapping *Arundo donax* (giant reed) across the Central Valley using restoration funding from the Prop. 1 water bond (a source which is also funding the Monterey Resource Conservation District to remove *Arundo* from the Salinas River).

The Southern California Wetlands Recovery Project funded invasive sea lavender removal in San Diego wetlands last year, and a new National Fish and Wildlife Foundation grant is funding invasive sea lavender removal in San Francisco Bay salt marshes this year. The California Wildlife Conservation Board is funding knotweed removal on the north coast.

There are lots of areas and lots of weeds that still need attention. We have plans in various stages of development for most parts of the state. And grants, even five-year grants, are just a start. Our goal is to get the work done on the ground, funded one way or the other.

Cal-IPC board members remove Moroccan knapweed (*Volutaria tubuliflora*), an early eradication target, in Borrego Springs at their annual strategic retreat this spring. *Photo by Gina Darin.*

Cal-IPC Updates

2016 Symposium set. Our 25th annual Symposium will be held at the Tenaya Lodge near Yosemite, November 2-5. Abstract submission and registration are open. See pages 6-7.

New projects. Cal-IPC is kicking off several new efforts in 2016. We will be mapping giant reed (*Arundo donax*) along Central Valley waterways, developing a index for rating the vulnerability of Sierra meadows to invasive plants, and working with Calflora to develop functionality that further supports landscape-level early-eradication planning. Funding for this work comes from the California Wildlife Conservation Board, the National Fish and Wildlife Foundation and the US Forest Service/State and Private Forestry, respectively.

Weed identification cards. New identification cards for 90 species are available for download. The cards are designed to help non-botanically trained staff or volunteers detect species of local importance, with photos, brief description of the plant and its habitat, and removal method for small populations. Made to be printed and laminated for fieldwork. *www.cal-ipc.org/ip/edrr/*

Landscaping guidelines for building codes. We have posted a guide that shows how CDFA noxious weeds, PlantRight voluntary recommendations, and Cal-IPC Inventory relate to each other for plants potentially found in horticulture. The list flags those species that have benefits as food, forage, or turf. With water-efficient landscaping now included in California's building code, including the mandate to avoid the use of invasive plants, we will be using these guidelines to inform designers how to comply.

Wildland Weed News

Herbicide BMPs read far and wide. Cal-IPC's Best Management Practices manual for protecting wildlife when using herbicides for invasive plant management has been downloaded over 2,000 times, from 45 states and 32 countries. See story on our IPM Innovator award on page 11.

New board members. Welcome Bill Hoyer (US Navy), Laura Pavliscak (Tejon Ranch Conservancy) Heather Schneider (Santa Barbara Botanic Garden) and Lynn Sweet (UC Riverside). Amanda Swanson (UC Riverside) joins Marina LaForgia (UC Davis) as our student liaisons. *www.cal-ipc.org/about/staff.php*

Lowe's and OSH join PlantRight. Lowe's and Orchard Supply Hardware have agreed to avoid PlantRight's list of invasive plants in their California stores and stock non-invasive alternatives. Cal-IPC is a partner of PlantRight, a program of Sustainable Conservation. *www.plantright.org*.

Other News

National EDRR Framework released. Federal agencies released a framework for addressing invasive species through EDRR. Cal-IPC served on the stakeholder advisory committee. See page 11.

North American herbaria are withering away. Collections of preserved plant specimens that have been accumulating for a century or more are being closed and consolidated as tight budgets and competition for space put pressure on universities to direct resources to facilities such as labs. *www.nature.com/news/plant-collections-left-in-the-cold-by-cuts-1.17875*

LCCs survive budget scare. Cal-IPC joined other organizations in protesting a proposed 50% funding cut for the nation's network of Landscape Conservation Cooperatives (LCCs), regional collaborations funded through the US Fish & Wildlife Service. (The California LCC helped Cal-IPC develop CalWeedMapper and design landscape-level invasive plant management strategies across the state.) Signatures from hundreds of conservation groups like Cal-IPC, as well as a new National Academy of Sciences report concluding that landscape-level approaches are essential for addressing today's conservation challenges, resulted in the LCC budget being restored. See *lccnetwork.org/about/national-academy-sciences-review-lccs* for more information on the NAS report.

Climate-smart restoration. Point Blue has resources to help land managers design projects that address the impacts of climate change, including a restoration checklist, riparian restoration design database, and resources on climate change projections. *www.pointblue.org/our-science-and-services/conservation-science/habitat-restoration/climate-smart-restorationtoolkit/*

Water primrose management report. Creeping water primroses (*Ludwigia* spp.) are aggressive aquatic plants. This new report presents an overview of the biology and ecology of these invasive plant species, along with management case studies and research efforts. It proposes research priorities and gives resource managers recommendations for how to prevent and prioritize management of these aquatic weeds. *acwc.sdp.sirsi.net/client/en_US/search/asset/1048352*

UC Restoration Research Information Center (RIC). UC Davis is setting up a RIC website for restoration practitioners, similar to the existing Weed RIC. If you have good restoration-related photos to share, such as before-after, restoration in progress, or completed sites, send with captions to Elise Gornish at egornish@ucdavis.edu.

Keep current!

Remember to check your Cal-IPC membership status on the mailing label. Keep your membership current so you don't miss out on any of the new happenings in the field. Renew online or with the enclosed envelope. Thank you for your membership and the support it provides for our work!

Weeds and climate resilience in Sierra meadows

By Elizabeth Brusati and Doug Johnson, Cal-IPC

Thanks to funding from the Wildlife Conservation Society's Climate Adaptation Fund over the last two years, Cal-IPC has worked with local partners in the Sierra Nevada to begin invasive plant eradication efforts in a set of Sierra meadows, while developing guidelines for incorporating climate resiliency into invasive plant management.

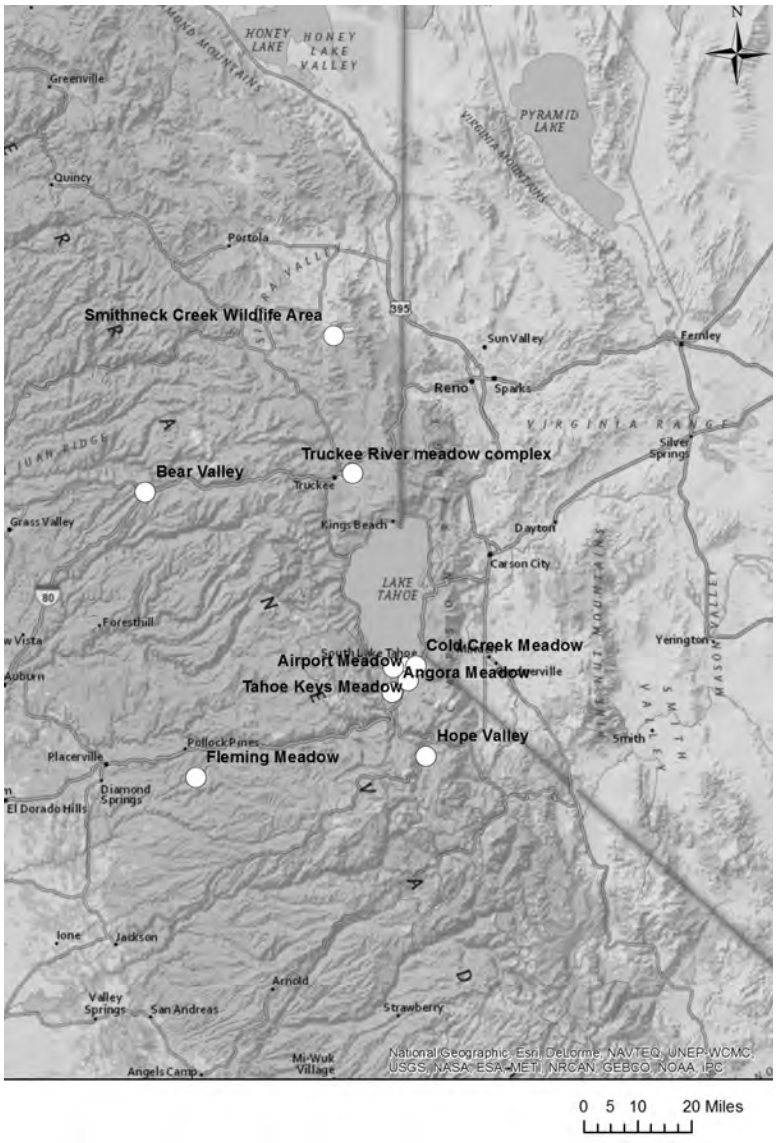
Meadows play a vital role in the lives of almost every wildlife species in the Sierra Nevada, from songbirds to frogs to bears. The resiliency of these meadows to environmental change is critical to protecting the region's wildlife. With a warming climate, the Sierra Nevada will see increasing pressure from invasive plants, even at high elevations. Invasive plants degrade meadow habitats by replacing native plants on which wildlife depends. Some invasives may also alter processes such as water flow.

The National Fish, Wildlife and Plants Climate Adaptation Strategy recommends addressing existing threats such as invasive species as an immediate no-regrets action that we can take to help wildlife adapt to climate change (www.wildlifeadaptationstrategy.gov). The California State Wildlife Action Plan lists invasive species as one of the major threats to wildlife in California (www.wildlife.ca.gov/SWAP/Final).

Cal-IPC formed partnerships with county agriculture departments, the US Forest Service, the California Conservation Corps, California Department of Fish and Wildlife, and Truckee River Watershed Council to conduct field work in 2014 and 2015 towards eradicating invasive plant populations from a set of high-value meadows. Some of these species have limited distribution in California. Others are more widespread but can be prevented from reaching high-altitude meadows by targeting populations that are likely to spread into these areas. We also developed guidelines on climate resilience to help other land managers.

Cal-IPC worked with local partners to identify the set of meadows to use for this pilot project. Meadows were selected in Sierra, Nevada, Placer, El Dorado, and Alpine Counties. Treatment was recorded on the Calflora website and land managers prepared long-term management plans for each site to describe plans for full eradication. Over all sites, 87 populations of 11 invasive plant species were removed, with eventual eradication of these species from these meadow sites as the goal.

In addition, we compiled guidelines for land managers with suggestions on how to incorporate climate resilience into invasive plant work (and vice versa). We also wrote a report on the impacts of invasive plants and climate change on Sierra meadows. These are available on the Cal-IPC website at www.cal-ipc.org/ip/climateadaptation.



Meadows: Sites ranged from Sierra County in the north to El Dorado County in the south, and from 2400 to 6100 ft elevation.

Smithneck Creek State Wildlife Area: The sagebrush-bitterbrush habitat at Smithneck Creek, in Sierra County, is a critical winter-range area for migratory deer and also supports goshawks, falcons, a variety of warbler species, and snowshoe hares. California Conservation Corps crews worked with California Department of Fish and Wildlife staff to remove musk thistle and Canada thistle, continuing work underway since 2009. Musk thistle (*Carduus nutans*) is encroaching upon the rare Sierra valley mousetail (*Ivesia aperta*). *Photo by Joel Trumbo, CDFW.*

Bear Valley: Bear Valley sits along the Bear River on the border of Nevada and Placer Counties, on property owned by Pacific Gas and Electric Company. It provides habitat for trout, willow flycatcher, and yellow-legged frog as well as a migration corridor and winter range for deer. Placer County Department of Agriculture crews removed rush skeletonweed (*Chondrilla juncea*), yellow starthistle (*Centaurea solstitialis*), Scotch broom (*Cytisus scoparius*), and Scotch thistle (*Onopordum acanthium*). *Photo by Ed King, Placer Department of Agriculture.*

Truckee River: Meadows along the Truckee River provide habitat for numerous birds and are a migration corridor and summer range for regional deer populations. The Truckee River Watershed Council used contractors and volunteers to work on a complex of meadow sites along the Truckee River near the town of Truckee, including the Truckee River Wildlife Area. Species removed included musk thistle, bull thistle (*Cirsium vulgare*), perennial pepperweed/tall white-top (*Lepidium latifolium*) and Russian knapweed (*Acroptilon repens*). *Photo by Jeannette Halderman, TRWC.*

...continued page 10

Celebrate 25 years of protecting California from invasive plants

Photo by Dana Morawitz

Join fellow land managers, researchers, and conservationists for the 25th annual Cal-IPC Symposium amidst the granite of the Sierra Nevada! We'll be celebrating in style November 2-5 at Tenaya Lodge at Yosemite.

Special sessions will focus on park stewardship in honor of the National Park Service's Centennial, including an opening plenary session featuring talks by Don Neubacher, superintendent of Yosemite National Park, and Terri Hogan, national coordinator for NPS invasive plant programs.

Natural resource managers will discuss how invasive plant control can find common ground with protection of cultural resources, fire protection, and wilderness designation. And of course lots of talks and posters on the latest in research and management approaches, discussion groups on hot topics, trainings to help you do your work better, and the opportunity to learn from the amazing network of land stewards in California.

We will apply for Continuing Education credits from the California Department of Pesticide Regulation.

Photo by J.P. Marie

Important Dates

June 1	Abstracts due
September 15	Early bird discount ends
October 1	Deadline for discounted room rate
October 26	Advance registration ends
November 2-5	Cal-IPC's 25th Symposium!

Abstract Deadline June 1

Share your work with 300 land managers and researchers. We welcome papers and posters covering diverse aspects of invasive plant biology and control, as well as related topics of interest to those working in land stewardship. Contributed papers selected for oral presentation receive a 20-minute time slot. Our designated poster session allows our attendees to interact with poster presenters. Undergraduates, grad students, and recent graduates are encouraged to enter our Student Paper and Poster Contest!

2016 Cal-IPC Symposium
Tenaya Lodge at Yosemite

Schedule

Wednesday, November 2

Trainings (day). Separate registration required.

- Using Certified Weed-Free Forage and Mulch (11am-5pm)
- Invasive Plant Management 101 (11am-5pm)
- Calflora's Weed Manager Applications (1pm-5pm)

Invasive Plant Laws and Regulations (6pm-8pm) – Continuing Education credits for licensed applicators. Included with symposium registration.

Thursday/Friday, November 3-4

- Paper and poster sessions
- Discussion groups
- Social hour and raffle
- Awards banquet

Saturday Field Trips, November 5

- Sierra National Forest / Nelder Grove of Giant Sequoias (half day)
- Merced River Canyon (full day)
- Yosemite National Park (full day)

Photo by David Greenwood

Reach Attendees - Be a Sponsor

Show your organization to 300 land managers and demonstrate your commitment to invasive plant work. Sponsors help make the event possible. Be a special 25th Anniversary Sponsor and join us in bringing the land management community together to grow stronger!

Fun Stuff

- Raffle and Auction - Featuring tools, books, maybe even a European river cruise!
- Photo Contest - Watch our website for entry information!
- Awards Banquet - Honor your fellow invasive plant managers (included with registration).

Photo by Frank Row

www.cal-ipc.org

New insights for managing Sahara mustard

By Yue Max Li. University of Arizona, Department of Ecology and Evolutionary Biology

Sahara mustard (*Brassica tournefortii*) is an invasive winter annual plant unintentionally introduced to southern California in the 1920s. Since it was first recorded in Coachella in 1927, it has spread widely across the southwest and raised serious concerns about its impact on native plants. My first encounter with Sahara mustard in the Coachella Valley Preserve in 2006 eventually led me to conduct a doctoral study to reveal the nature its invasion. After years of research, my colleagues and I are encouraged to discover some of the limitations of this species, which can facilitate its control.

Research Findings

Our first finding was that Sahara mustard had reached the boundaries of its suitable climate and had stopped its inter-state spread in North America. My collaborators and I synthesized all historical herbarium records of Sahara mustard in North America to reconstruct its expansions on a wide range of spatial scales (5 km – 500 km). Expansions on a relatively small scale (e.g. 5 km) would imply the species was filling local landscapes, whereas expansions on a relatively large scale (e.g. 500 km) would imply the species was crossing states and foraying into other parts of the continent. We found that Sahara mustard experienced rapid expansions both locally and over long distance between the 1960s and the 1980s. But in the 2000s, it experienced almost no long distance expansion but quite rapid expansions on smaller scales (5 – 50 km).

We also found that its recorded occurrences almost exclusively fell within the range of its suitable climate predicted by models. Moreover, its suitable climate in North America largely matched that in its native range, suggesting that the North American Sahara mustard had not evolved to thrive under new climatic conditions.

This first study, published in the March 2015 issue of *Ecography*, offers two important insights for managing this species over North America. First, the confinement of Sahara mustard by its climatic envelope and the match between its suitable climate over North America and its native range hint that this species may have limited ability to evolve. Sahara mustard is known to occupy a wide range of environmental conditions, ranging from coastal dunes to mountain slopes besides its typical habitat of desert sandy flats and dunes. Many people are worried that the wide range of its habitat may indicate its strong ability to evolve.

The view of the Mohawk Valley from the Mohawk Mountains. *Photo by Yue Max Li.*

However, a species need not evolve readily in order to thrive under various environments. Instead, it can be highly plastic through having a "general purpose genotype". Many weedy species have such a genotype. Sahara mustard reproduces primarily by self-fertilization. The lack of gene exchanges between self-fertilizing individuals, on one hand, would preserve the unique general purpose genotype that allows Sahara mustard to grow under different conditions. On the other hand, it would also limit the chance of having new genetic combinations adapted to a brand new type of environment. To confirm that Sahara mustard has indeed limited ability to evolve, we need further studies to show that this species has limited genetic variation across its populations in North America.

The second important insights from the first study is that we ought to be worried about its ongoing rapid local expansions within its climatic envelope. What can we do to effectively slow down its local expansions? A finding from our three-year field study brings strong hope for the effective control of this species.

With team support, I studied both seed banks and aboveground growth of Sahara mustard and other winter annual plants in the Mohawk Valley, about 40 miles east of Yuma, Arizona. Desert annual plants are usually known to maintain highly persistent seed banks. A long-lasting seed bank can be an impenetrable barrier for eradicating an invasive annual species. Killing the aboveground growth would do little to reduce an annual plant population if the majority of it remains below the ground.

Attacking the Seed Bank

A persistent seed bank requires two essential factors: a low rate of germination and a high survival rate of dormant seeds. The first factor is necessary because the desert environments are highly unpredictable. Good germination conditions

often are not followed by good growing conditions. By having seeds stay dormant, regardless the current condition, an annual species can hedge against adverse growing conditions. High survival of these dormant seeds then ensures that they will germinate some day in the future to find their odds for successful reproduction. We found these two factors were true for all native winter annual plants and the introduced *Schismus arabicus* in the Mohawk Valley. Sahara mustard, on the other hand, had very high germination rate and very low seed survival, resulting in ephemeral seed banks.

An ephemeral seed bank should lead to large swings of plant abundance as growing conditions change from one year to the other. This was indeed what we observed in the Mohawk Valley. The Sahara mustard population plummeted after three years of dry growing seasons. In contrast, all native winter annual species and the introduced *Schismus arabicus* maintained a healthy population either above or below the ground.

Basic tools used for surveying Sahara mustard and other winter annual plants in the Mohawk Valley: a notebook, sampling ring, and Trimble GPS unit that led me to randomly selected locations. Sahara mustard individuals (upper right corner) were intermingled with native annual plants on the dune. *Photo by Yue Max Li.*

A clump of newly emerged Sahara mustard seedlings on the sand flat of the Mohawk Valley. The clump was most likely a product of a seed-cashing rodent worked hard for its food stock. *Photo by Yue Max Li.*

We are in the process of publishing this second study. The low seed bank persistency brings hope to the effective containment of this species through eliminating its above ground growth, especially over poor growing seasons. Even in bad years when the population of Sahara mustard is overall declining, there will be spatial strongholds for this species over a heterogeneous landscape. These strongholds can be washes or roadsides, where the accumulation of water would consistently provide favorable growing conditions for adult plants. These persisting patches would be the key for the return of Sahara mustard dominance over a landscape when wet winters come back. Eliminating these strongholds should, therefore, effectively reduce the chance for this species to persist over large landscapes.

However, there is a caveat of finding low seed bank persistency from the Arizona Sonoran Desert. The high mortality of Sahara mustard seeds in Mohawk Valley was due to fungal infection. High heat and humidity of soil during the summer monsoon season perhaps encouraged fungal growth to kill the seeds. The monsoon regime is much weaker in California. Without high humidity, fungi would be less active in killing mustard seeds. We need a follow-up study to compare seed mortality of Sahara mustard between its populations in California and Arizona.

Despite this caveat, the high rates of germination of Sahara mustard likely applies to its populations everywhere. Studies from Nevada, Australia and Greece showed similar results of very high germination of Sahara mustard seeds. If a high percentage of seeds germinate, eliminating these germinated individuals should effectively deplete an existing population.

In summary, we found that Sahara mustard had been confined within its climatic envelope in North America. Moreover, seed banks of Sahara mustard were ephemeral due respectively to very high germination rates and low survival of ungerminated seeds. These two findings bring hope to the effective control of this species. Sahara mustard is unlikely to spread everywhere and eliminating adult plants before seed production should be highly effective in reducing its population.

Contact the author at liyue@email.arizona.edu.

Sierra meadows, continued

Eldorado National Forest: These meadows provide habitat for spotted owls, great gray owl, western pond turtle, northern goshawk, western bumblebee habitat, fringe-tailed bat, pallid bat and Townsend's big-eared bat, wild turkeys, black bear, and mule deer. Yellow starthistle, Maltese starthistle (*Centaurea melitensis*), Scotch broom, French broom (*Genista monspessulana*), barbed goatgrass (*Aegilops triuncialis*), and medusahead (*Elymus caput-medusae*) were removed from Fleming Meadow and Traverse Creek in summer 2015. At right, a Boy Scout shows off barbed goatgrass. Below, a crew from the Forest Service Generation Green program handpulls yellow starthistle at Traverse Creek during follow-up treatment for the spring string trim. *Photos by Matt Brown, USFS.*

"This funding has really helped us to do more comprehensive surveys in the meadow areas. We found new populations last year and two new Canada thistle populations this year (2015). This is especially important since the majority of the meadows have water sources flowing through them, natural conduits for weed movement."

~ LeeAnne Mila, Deputy Agricultural Commissioner, El Dorado and Alpine Agricultural Commissioner's office

South Tahoe meadows: The Lake Tahoe Basin is home to many native and a few endangered species. The meadows provide habitat, biological corridors and protected areas or buffers for many species, including the mountain yellow-legged frog, willow flycatcher, and the Tahoe yellow cress. The El Dorado/Alpine Agricultural Commissioner's staff surveyed meadows in El Dorado and Alpine Counties for invasive plants. These meadows contain flowing water, which creates a conduit for weed movement to new sites. Sites included Kirkwood Meadow, Hope Valley, Angora Meadow, Trout Creek Meadow, Cold Creek Meadow, and Tahoe Keys Meadow. All populations of perennial pepperweed, diffuse knapweed (*Centaurea diffusa*), Canada thistle, and other noxious weeds were treated. *Photo by LeeAnne Mila, El Dorado Ag. Commissioner's Office.*

Eradication in the central Sierra

Over the last three years, Cal-IPC has partnered with county agricultural departments in central Sierra counties of Tuolumne, Calaveras, El Dorado, and Alpine to work toward eradication of three target species: purple starthistle (*Centaurea calcitrapa*), diffuse knapweed (*Centaurea diffusa*), and Canada thistle (*Cirsium arvense)*. Agricultural department personnel have visited every known site as well as any site that had been reported in Calflora over the last 30 years. Seventeen sites were treated and are being monitored each year toward the goal of full eradication. Another 29 reported sites were visited and determined to not have the weed.

Partners also treated outlier populations of plumeless thistle (*Carduus acanthoides*), spotted knapweed (*Centaurea maculosa*), French broom (*Genista monspessulana*) and gorse (*Ulex europaeous*).

In addition, a major leading-edge infestation of Spanish broom (*Spartium junceum*) was mapped along Highway 120 near Groveland, on the way to Yosemite. Of the 61 populations found, 43 have been treated. These are along county right-of-way or on Bureau of Land Management land. The other 18 are on private property or US Forest Service land, and will be addressed as the project progresses.

This work was funded primarily by the National Fish and Wildlife Foundation, through their Pulling Together Initiative. Funding from the Sierra Nevada Conservancy supported work on an environmental assessment by the BLM's Mother Lode field office to allow control work on Spanish broom.

A Calaveras Department of Agriculture worker controls plumeless thistle.

Cal-IPC honored as IPM Innovator

In January, Cal-IPC received an award as an "IPM Innovator" for our work training land managers in integrated approaches to invasive plant management. The California Dept. of Pesticide Regulation makes the awards each year to support Integrated Pest Management (IPM). Cal-IPC recently released a Best Management Practices manual on protecting wildlife when using herbicides to control invasive plants as part of an integrated approach. The manual, which has been downloaded over 2,000 times by managers in 45 states and 32 countries, was prepared in partnership with IPM experts at the US Forest Service and the California Dept. of Fish and Wildlife, as well as the Pesticide Research Insitute. Pictured, left to right: Gina Darin, CA Dept. of Water Resources (Cal-IPC board member); Dave Bakke, US Forest Service; Steve Schoenig, retired from CA Dept. of Fish and Wildlife (Cal-IPC board member); Susan Kegley, Pesticide Research Institute; Doug Johnson, Cal-IPC; Brian Leahy, Director of the CA Dept. of Pesticide Regulation; Joel Trumbo, CA Dept. of Fish and Wildlife; Ed King, Placer County Dept. of Agriculture (Cal-IPC board member).

Protecting San Diego wetlands

Cal-IPC helped initiate early eradication work in San Diego wetlands through a project last year funded by the Southern California Wetlands Recovery Project. The San Diego Association of Governments has a well-developed list of top-priority invasive plants. This project addressed *Ageratina adenophora* (eupatory), *Sesbania punicea* (rattlebox), *Lythrum salicaria* (purple loosestrife), *Iris pseudacorus* (yellow flag iris), and *Limonium ramosissimum* and *L. duriusculum* (invasive sea lavenders).

The effort had three components: professional mapping of known infestation sites (and surveying the vicinity), training of volunteers to identify and report and sightings, and herbicide treatment of high priority invasive sea lavender populations. Some 500 people were reached with trainings, and identification handouts were widely distributed. All high-priority marsh areas were surveyed, and 13 new populations were found and mapped.

The San Diego County Department of Agriculture treated invasive sea lavender at the Port of San Diego and Ocean Terrace. A total of 4.6 acres were treated with 3% glyphosate, and another 27 acres were surveyed. This will require follow-up for several years. The efficacy of treatments here will help inform treatments to be conducted on invasive sea lavender in salt marshes around San Francisco Bay.

EDRR in action: The San Diego County Agriculture Department controls invasive sea lavender (top left). Above right: Dave Flietner, volunteer with San Diego Canyonlands, pulls sea lavender from Shepherd Canyon. Volunteers have helped by pulling and bagging plants in areas where the infestation is low, allowing contractors to focus on areas with larger infestations and keep costs down. Bottom: Shannon Quigley-Raymond, program coordinator for the San Diego River Park Foundation, helps pull and bag invasive sea lavender along Forrester Creek in the San Diego River watershed. *Photos by Mark Martinez and Carolyn Martus.*

Identifying emerging weeds

By Elizabeth Brusati, Cal-IPC

Which new potentially-invasive plants in California have the most potential to cause harm to our ecosystems? A project underway at Cal-IPC aims to answer this question by evaluating 200 species from the Cal-IPC watchlist to develop a list of "emerging invasive plants." Not all non-native, naturalized plants will become invasive so this project aims to identify those that pose the most risk to help land managers prioritize their removal.

The Cal-IPC watchlist contains more than 300 species that land managers have reported as potential concerns from their observations. It's available as a spreadsheet download at *www.cal-ipc.org/paf*. Some species were reviewed for the Inventory during our last big update in 2006 but had insufficient information to make the Inventory; others are new species waiting for evaluation. The Inventory is based on assessing known impacts in California and is not designed for predicting the impact of new invaders.

We are using the PRE (Plant Risk Evaluation) tool developed by UC Davis, the University of Washington, and the PlantRight program to screen 200 watchlist species this year, thanks to funding from the US Forest Service. PRE uses 20 questions assessing invasiveness in other areas, impacts, reproductive biology, and dispersal characteristics to classify a species as "Reject" (likely to be invasive in California) or "Accept" (not likely to be invasive). An intermediate category of "Evaluate Further"indicates species whose results are uncertain. PRE is a shorter, faster screening method derived from the 49-question Australian Weed Risk Assessment that has been used around the globe since 1999. PRE was developed to help the horticulture industry identify new cultivars that are likely to become invasive in order to avoid those plants. Tests show that PRE is 95% accurate at classifying species as invasive or non-invasive. More information on PRE is available from the UC Davis Center for Urban Horticulture at *ccuh.ucdavis.edu/Publications/pre*.

The trickiest questions to answer on PRE are those that require answering whether a species is naturalized or invasive in another region "with similar climate to California." To develop a consistent way to answer these questions, we consulted with the US Department of Agriculture's weed risk assessment staff and decided to use a variation on their method. Locations are classified based on three factors: USDA Plant Hardiness zones (familiar to gardeners), average annual precipitation, and Global Ecological Zones (from the United Nations). Areas that count as similar to California must have a combination of those three factors that match a combination found within California.

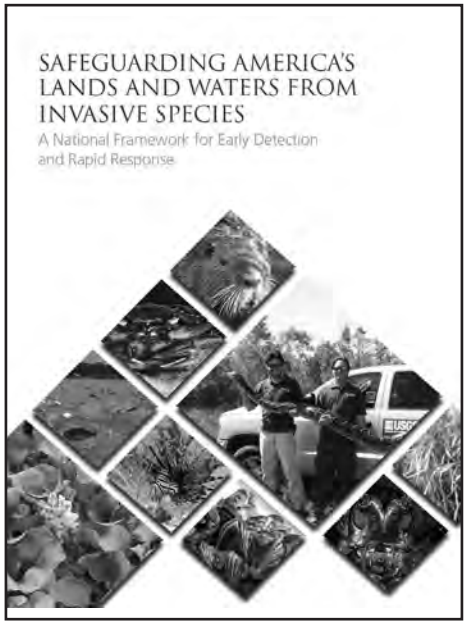
We will be evaluating species through 2016. A committee of invasive plant biologists are reviewing draft evaluations for accuracy and consistency. PlantRight is allowing us to use their online system at UC Davis for scoring evaluations, which will save us much time and provide a way to store the results. We plan to unveil preliminary results at the Symposium in November, followed by posting results to a public website in early 2017.

The next big invaders?
Top: *Chrysanthemoides monilifera*, called bitou bush or boneseed, is such a problem in Australia it's rated a Weed of National Significance. Populations have been found spreading in Orange County.
Bottom: Taro (*Colocasia esculenta*) is grown for food in tropical areas and is expanding in the Delta. These species are among those that will be evaluated using PRE this year. *Photos by Ron Vanderhoff and Ramona Robison.*

National EDRR framework released

By Doug Johnson, Cal-IPC

A coalition of 15 federal agencies released "Safeguarding America's Lands and Waters from Invasive Species: A National Framework for Early Detection and Rapid Response (EDRR)" in March. The work was requested by the 2014 "Priority Agenda: Enhancing the Climate Resilience of America's Natural Resource" from the White House Council on Climate Preparedness, which identified invasive species as one of the most pervasive threats to ecosystem resilience. Cal-IPC and other non-federal entities contributed through an advisory panel.



Top-level recommendations from the document include establishing a national EDRR coordinator, coordinating agency programs, advancing key initiatives on particular species, and developing better analytical approaches. Funding is needed for preparedness as well as response.

Cal-IPC pushed for consideration of invasive plant early-eradication efforts as part of an EDRR approach. Though terrestrial plant species rarely spread at the pace of insect pests or aquatic organisms, the key concept of addressing them before they spread is the same. In the end, the agency team decided to stick with a strict definition of EDRR, in which immediate response follows detection of a new pest.

The staff of the National Invasive Species Council worked hard bringing together the many entities needed to prepare this framework. Now it's up to the many agencies involved to dedicate the necessary resources for implementation.

Individual Membership

Stewardship Circle	$1000
Champion	$ 500
Partner	$ 250
Professional	$ 100
Friend	$ 50
Student	$ 25

Members receive *Cal-IPC News* and discounts on Symposium registration!

Organizational Membership

Benefactor	$2000	Pro membership for 8	Quarter-page in newsletter
Patron	$1000	Pro membership for 6	Eighth-page in newsletter
Sustainer	$ 500	Pro membership for 4	Logo in newsletter
Supporter	$ 250	Pro membership for 3	Name in newsletter

Organizations receive Professional membership for their staff and newsletter recognition for 12 months!

See www.cal-ipc.org for full membership details

Thank You for Supporting our Work!

Individual Supporters

[New and renewing]

Stewardship Circle ($1,000)

Edith Allen (Riverside)
Anonymous

Champion ($500)

Shelagh & Bob Brodersen (Berkeley)
Jennifer Funk (Santa Ana)
Gary & Lillian Giessow (St.Louis)
Carolyn Johnson & Rick Theis (Sebastopol)
Laura Pavliscak (Frazier Park)
Steve Schoenig (Davis)

Partner ($250)

Thomas Anderson (Pt Reyes)
Jutta Burger (Santa Ana)
Darlene Chirman (Santa Barbara)
Helen Conway (San Jose)
Gina Darin (West Sacramento)
Jason Giessow (Encinitas)
Kim Hayes (Moss Landing)
William Hoyer (Santa Barbara)
Drew Kerr (Pinole)
Tamia Marg (Berkeley)
Gerald & Mary Edith Moore (Petaluma)
Patrick Skain (San Francisco)

Organizational Supporters:

American Conservation Experience
Aquatic Environments
Bolsa Chica Land Trust
Cabrillo National Monument
CalFlora
California Association of Local Conservation Corps
California Association of Resource Conservation Districts
California Dept. of Food & Agriculture
California Native Grasslands Association
California Wildlife Foundation/ California Oaks
Channel Islands Restoration
Chapman University

Organizational Supporters

City of San Diego Open Space
City of Walnut Creek
Claremont Canyon Conservancy
CNPS - Bristlecone Chapter
CNPS - East Bay Chapter
CNPS – Los Angeles/Santa Monica Mountains Chapter
CNPS - Milo Baker Chapter
CNPS - Orange County Chapter
CNPS - Riverside-San Bernardino Chapter
CNPS - Sacramento Valley Chapter
CNPS - San Diego Chapter
CNPS - San Gabriel Mountains Chapter
CNPS - Yerba Buena Chapter
CNPS Sierra Foothills Chapter
Coastal San Luis Resource Conservation District
County of Santa Barbara Agricultural Commissioner
Dendra, Inc
Dow Agrosciences
East Bay Regional Park District
Ecological Concerns, Inc.
H.T. Harvey & Associates
Hedgerow Farms
Inyo County Water Department
Irvine Ranch Conservancy
Land Trust of Santa Cruz County
Marin Municipal Water District
Mission Resource Conservation District
Mission Trails Regional Park
Moosa Creek Nursery
National Park Service, California Exotic Plant Management Team
Natomas Basin Conservancy
Nomad Ecology
Pacific Gas & Electric Company
Pesticide Research Institute
Placer County Dept. of Agriculture
PlantRight/Sustainable Conservation
RECON Environmental, Inc.
Restoration Design Group
Sacramento Area Flood Control Agency
San Joaquin Regional Conservation Corps
Santa Ana Watershed Association
Santa Barbara Botanic Garden
Santa Clara County Parks
Santa Monica Mountains Fund
SERCAL
Sierra Foothill Conservancy
Southern California Edison
Sweetwater Authority
The Nature Conservancy, California
Tule River Indian Tribe
US Bureau of Land Management
US Fish & Wildlife Service
West Coast Watershed

California Invasive Plant Council

1442-A Walnut Street, #462
Berkeley, CA 94709

ADDRESS SERVICE REQUESTED

Non-Profit Org.
U.S. Postage
PAID
Berkeley, CA
Permit No. 1435

Your mailing label includes your membership renewal date. Renew online at www.cal-ipc.org or by using the envelope included inside this newsletter. Thank you for your membership!

The WILDLAND WEED CALENDAR

CNGA Hedgerow Farms Field Day
April 22, Winters
www.cnga.org

SERCAL
May 11-13, Kings Beach
www.sercal.org

Wetland & Riparian Plant Identification
May 18-20, Ojai
www.cnps.org

California Invasive Species Action Week
June 4-12, statewide
www.wildlife.ca.gov/Conservation/Invasives/Action-Week

Plant Camp - Florida Invasive Plant Education Initiative
June 20-24, 2016, Gainesville, FL
plants.ifas.ufl.edu/education/plantcamp/application/

North American Congress for Conservation Biology
July 17-20, Madison, WI
www.conbio.org/groups/sections/north-america

Botany 2016
July 30- August 3, Savannah, GA
www.botanyconference.org

Natural Areas Conference
October 18-21, Davis
www.naturalareasconference.org

Cal-IPC Symposium
November 2-5, Tenaya Lodge, Yosemite
www.cal-ipc.org

Central Coast Invasive Weed Symposium
November, Monterey County
www.cciws.org

"In *Half-Earth* I propose that only by committing half of the planet's surface to nature can we hope to save the immensity of life-forms that compose it...

"I cannot stress enough the menace of invasive species… Allowing the entry of alien species of any kind is the ecological equivalent of Russian roulette. How many cylinders spin in the barrel of the extinction gun?"

~ E.O. Wilson, from Half Earth: Our Planet's Fight for Life, *2016.*