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*Protecting California's environment and  
economy from invasive plants*

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**Cal-IPC Dispatch**

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**On the cover:**

Volunteers with the Salmon River Restoration Council pull Italian thistle in the Klamath Mountains (Photo by Emily Ferrell, from the 2016 Cal-IPC Photo Contest)

# FROM THE DIRECTOR'S DESK

## Nativism

By Executive Director Doug Johnson

One of the recurring themes in critiques of invasive plant management is that it is driven by "nativism," a prejudice against that which is not native. In this time when ugly anti-immigrant sentiment is being incited, such a critique associates environmental restorationists with xenophobes. I even heard an upset citizen describe invasive plant removal as "ethnic cleansing" at an Environmental Commission hearing in San Francisco.

This critique is dead wrong. Restorationists work to protect diversity, not to limit it. We work to protect native plant communities because they are rare and precious, and because they are critical to the health of native fauna that evolved with them.

There are those who point out that the addition of naturalized non-native plants to the native flora only increases the number of species, one measure of biological diversity. But the relative handful of non-native plant species we focus on are prioritized specifically because they can spread extensively at the expense of other plants.

These accusations tend to happen near developed areas, where the management of

open space is strongly contested. Issues like the management of blue-gum eucalyptus stands and the use of herbicides are understandably divisive—cutting trees and using pesticides cuts against the grain of deeply rooted environmental orthodoxy. As one young woman said at the San Francisco hearing, we've all read Rachel Carson, right? (And we know about the Lorax fighting deforestation, and Erin Brockovich fighting toxic contamination of communities.)

Though some people are dead-set against habitat restoration and will never be convinced otherwise, in general it's a good thing that residents want to use caution before cutting trees or applying herbicides. It's our responsibility to present a clear case for projects based on thorough, science-based evaluation. As we were reminded at the March for Science on Earth Day, science is the systematic reduction of prejudice and bias. While we work to address the biases of others, we need to check our own biases as well so that charges of nativism—an unwavering confidence in the righteousness of favoring any native plant over any non-native plant in any situation—cannot gain a foothold.

### Welcome Dr. Ramona Robison!

In January, we welcomed Dr. Ramona Robison to Cal-IPC as our new Science Program Manager, replacing longtime Cal-IPC Senior Scientist Dr. Elizabeth Brusati, who took a position as Senior Scientist with the California Dept. of Fish & Wildlife in their Invasive Species Program. Mona has over twenty years of experience in the field. As the statewide Invasive Plant Coordinator for California State Parks she initiated a system-wide early detection and rapid response program. As a botanical consultant, she conducted rare plant surveys and wetland delineations, she helped PG&E develop a business-wide invasive plant strategy, and she surveyed the state for red sesbania. For her PhD in Plant Biology at UC Davis she studied Cape-ivy distribution along the California coast, and she has served on the Cal-IPC Board of Directors. She is currently overseeing several projects at Cal-IPC: coordinating *Volutaria* control in Borrego Springs, updating our Inventory, designing research to study invasive plant impacts on Sierra meadows, and drafting a best practices manual for organizations preparing weed management plans. We are excited to have her join our staff!



**2017 Symposium.** We will be in the desert, in Palm Springs, Oct. 24-27. See pages 4 and 5 for more information about our 25th Symposium last year and about the upcoming 2017 Symposium.

## CAL-IPC UPDATES

**Inventory revision.** We posted assessments for ten species proposed for addition as invasive, plus risk assessments for 87 naturalized species evaluated as having a high risk of becoming invasive. After the 60-day public comment period, we will post changes for a second comment period before finalizing.

**Arundo mapping.** Our mapping team, including partners from Sonoma Ecology Center, the Council for Watershed Health, the Cal. Dept. of Water Resources, and Dendra, Inc. is halfway done mapping *Arundo donax* at high resolution across the Central Valley, using thousands of aerial photos. The region covers some 14 million acres from Redding to Bakersfield. The resulting maps of *Arundo* distribution will provide a critical foundation for designing and implementing riparian restoration projects.

# Wildland Weed News

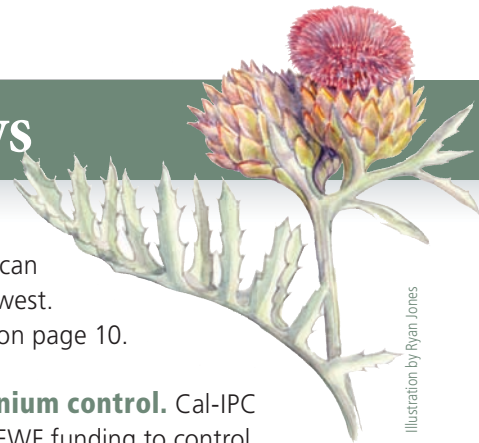


Illustration by Ryan Jones

**Planning BMPs.** Every land-managing organization should have an invasive plant management plan for their lands (and waters). The US Fish & Wildlife Service is contracting with Cal-IPC to develop a manual covering best management practices (BMPs) to help organizations craft strong plans. We have convened a technical advisory committee, and are collecting examples of plans to draw from. The manual will be complete in 2018.

**Volutaria control.** Cal-IPC received a grant from the National Fish & Wildlife Foundation (NFWF) to control *Volutaria tubuliflora*, a new Mediterranean weed that threatens to spread across the

American southwest.  
Story on page 10.

**Limonium control.** Cal-IPC has NFWF funding to control

invasive sea lavender (*Limonium ramosissimum* and *L. duriusculum*) in San Francisco Bay salt marshes. Our second season at 13 sites is underway. Story in the Fall 2016 *Dispatch*.



Pat Matthews

*Volutaria bolting* above desert wildflowers, including desert dandelion, sand verbena, and *Cryptantha*.

**Sierra meadows.** Cal-IPC is developing a rating system to gauge vulnerability of Sierra meadows to impacts from invasive plants. We are also developing BMPs to prevent weed spread during hydrologic restoration

of meadows, and research designs for gauging the impact of invasive plants on wildlife, water, and carbon in Sierra meadows.

**Volunteer training.** Cal-IPC has organized four workshops around the SF Bay Area this summer to train volunteers on invasive plant management and provide networking opportunities for local watershed groups working on weeds. See page 16.

## OTHER NEWS

**English ivy petition.** Twenty organizations from the north coast, including the BLM, Sierra Club, and Yurok Tribe, have petitioned the Cal. Dept. of Food & Agriculture to list English ivy (*Hedera helix*) as a noxious weed based on

(Continued on page 14)



Michelle Foyss

English ivy covers forest understory at Trinidad State Beach in Humboldt County.

# Invocation to Cal-IPC's 25<sup>th</sup> Symposium

**Garrett Dickman,  
Yosemite National Park**

*Editor's Note: Garrett Dickman is Restoration Ecologist at Yosemite National Park, where he oversees invasive plant management work that interfaces with fire management, cultural resource management and recreation. He is a longtime member of Cal-IPC, and he was a major contributor to our prevention best management practices manuals and videos. He also helped set up our 25th Anniversary Symposium last fall at the Tenaya Lodge near Yosemite. Some of us attended his field trip, and along with fascinating ecology we also learned about climbing El Capitan and other huge rock faces in the park. His connection to the place goes much deeper than employment. So it's not surprising that when we invited him to open the Symposium by welcoming us to Yosemite he went deeper, providing a moving personal testimony to the work we do. We reprint his welcome here.*

**W**elcome to the 2016 Cal-IPC Symposium. Allow me to briefly perch on a soapbox and reinforce that you are doing some of the world's most important work—protecting biodiversity—and also to introduce the idea that you may not want Millennials to speak in front of large audiences (though age being what it is, you might be stuck with us). So, I apologize, because as a scientist born in the 80s and growing up on a steady diet of *The Onion* and *The Far Side*, I must spend a little time wallowing as I rattle my pom-poms at you.



Garrett leading a field trip discussing the restoration history of Yosemite Valley.

Doug Johnson

If you're a casual observer of the natural world, you have heard or contributed to the near fever pitched collective cry coming from the conservation communities. The trees are dying and the sky is falling, or at least becoming increasingly laden with CO<sub>2</sub>. There hasn't been that much CO<sub>2</sub> in the atmosphere since the Pliocene, when camels walked around the Berkeley Hills and the seas were 30 meters higher.

We've entered a new epoch. That is a geologic term for what is really a biologic event. Admittance doesn't come easy, but our communal love of burning decomposed dinosaurs has paved the way. It's also partial acknowledgement that we've

created the 6<sup>th</sup> major extinction event in earth's history. Welcome to the Anthropocene.

In reading the World Wildlife Fund's "Living Planet" report, the world has been emptied of almost 2/3 of its vertebrate animals since 1970 (to clarify, that's individuals, not species). The freshwater systems have declined 81%, terrestrial systems by 38%, marine systems have stabilized to a 36% loss. Coral reefs have declined by 75%, and 87% of the world's wetlands are lost.

If you were alive in the 1970s your world was more magical than someone born this year will ever experience. We now have less than half as many antelope galloping across the plains, less than half as many whales migrating up and down the coastlines, less than half the chorus of frogs. The flocks, the herds—they've been thinned, hunted, eaten, turned into hats, their homes destroyed and paved over.

Why should people care? Why is this biodiversity so important?

Imagine that species are the parts of a plane, soaring through the sky that we're all aboard. Take pieces off at random: you'll find most are connected.

Maybe you dismantle a screw on a turbine, maybe an elevator. Maybe you take out a bag of peanuts. Eventually, you'll

*(Continued on page 6)*



Evening socializing around the campfire at Tenaya Lodge during Cal-IPC's 2016 Symposium.

Bob Case

# 2017 Symposium in Palm Springs, October 24–27

## “WORKING ACROSS BOUNDARIES”

Join us in the desert this year to catch up on the latest in invasive plant science and management! Our program includes talks, posters, trainings, discussion groups and field trips on projects addressing invasive plants from riparian, grassland, mountain, coastal, and aquatic/wetland habitats. Attendees will share information about effective tools, relevant research, non-chemical management approaches as well as the latest on herbicides. We will discuss the importance of engaging diverse communities, ways to incorporate traditional ecological knowledge into management, and the roles botanic gardens can play in addressing invasive plants.

We'll be at the Riviera, the fabled hangout for Frank Sinatra, Sammy Davis, Jr., Dean Martin and the rest of the Rat Pack. A recent review by SFGATE says it has a “playful, plush vibe (with) retro furniture and cheeky postmodern décor...” With three pools, six restaurants and bars, and warm desert air, it's bound to be a good spot for decompressing after a busy field season.

### PRE-SYMPOSIUM TRAININGS:

1. **Invasive Plant Management 101** (half day)
2. **Calflora Mapping Tools** (half day)

### FIELD TRIPS:

1. **Joshua Tree National Park** (full day)—invasive plant management in context with wildfire, nitrogen deposition, and historic landscape preservation.



Palm oasis in Coachella Valley, CA

Cameron Barrows

2. **Coachella Valley Preserve** (half day)—invasive plant management and research to protect sand dune and oasis habitats with endangered species.
3. **Whitewater Preserve** (full day)—invasive plant management in a rich riparian habitat protected within the San Gorgonio Wilderness.

### REGISTRATION:

Registration includes the DPR Laws & Regs session Oct. 24 and all sessions on Oct. 25-26. Registration includes all meals Oct. 25 and breakfast on Oct. 26. Additional costs: trainings on Oct. 24 are \$50; field trips on Oct. 27 are \$25 half-day, \$50 full-day; box lunch for the Career Panel on Oct. 26 is \$25 for non-students (students' lunches are covered).

### Members:

\$320 early-bird  
\$345 after Sept. 1  
\$370 after Oct. 15

### Non-Members:

\$370 early-bird  
\$395 after Sept. 1  
\$420 after Oct. 15

### Students:

\$50 early bird  
\$65 after Sept. 1  
\$80 after Oct. 15  
(Students receive one-year membership. Students must be enrolled in a degree program or have graduated in the last year)

### Symposium volunteers:

\$220 while they last (Requires 4 hours help with registration, session time-keeping and other tasks.)

### LODGING:

We have negotiated the State per diem rate of \$95 for our room block at the Riviera Palm Springs! Use the link on our website to make your reservation. Rate available through Oct. 2, so make your reservation early.

Visit [cal-ipc.org](http://cal-ipc.org) to register, make reservations at the Riviera, and get other Symposium information.



Bob Case

A great opportunity to network, learn, and celebrate!

(Continued from page 4)

take off a piece, or enough pieces, where you break something important and the plane spirals down. It's anybody's guess what's truly important or not, considering no one knows what makes this plane fly, let alone what most of the pieces are or how they are connected.

You already know this. We messed up. This is a crummy experiment.

Instead, imagine standing in a field of poppies next spring. The wind rustles the leaves, the ground is dewy and the robins sing each to each other, the air reeks of life.

You can intangibly feel the biodiversity and you can imagine this, because you've been there, or been someplace similar. You still get to have that experience, because someone fought for that land and those species to be protected. What if future generations can't enjoy such simple delicacies?

Now picture yourself in a field of corn. The wind blows through the leaves, a crow squawks. I like corn, nothing wrong with corn, but that's about it. The crow and the corn. It lacks the intangible and is the outdoor equivalent of cubicle walls I have known so well.

For me, the importance of protecting the pieces I didn't think I cared about came when I was at Julia Pfeifer State Park at Big Sur and was buzzed by a California condor en route to engorging itself on a dead seal pup. I had previously thought that all the fuss and expense for saving a buzzard was ridiculous. That is, until I was buzzed by Pleistocene-era megafauna. It was worth every penny and more.

Not far from here is the Mariposa Grove of Giant Sequoias. Galen Clark and John Muir came upon them, wrapped their arms around those big trees, and said "We will protect these. This is bigger than me." It still is and those trees still are. They stand today as they did then, and as they will. That reach has extended around the world. The people of this world have figured out a way to protect the most iconic natural features on this planet starting with a simple hug of a tree. America's greatest idea has been embraced world-wide.

California and its many protected lands means so much to so many people, es-



Athena Demetry of Yosemite National Park accepting the Golden Weed Wrench Award for Land Manager of the Year from Cal-IPC Executive Director Doug Johnson.

Bob Case

pecially Californians. California has spent more than any other state on conservation and land protection.

People come from all over earth to visit. They save every last penny to drive to see Half Dome, the redwoods, the superbloom. They want to see California's fabled shorelines, mountains and deserts. Biodiversity is part of our identify.

The California Floristic Province is one of 35 biodiversity hotspots worldwide. By definition, a hotspot has an unusually high number of unique flora and has lost at least 70% of the original habitat. They make up 2.3% of the earth's surface, but protect 50% of the earth's plants and 42% of the vertebrates. This land of poppies, tiger salamanders, and Joshua trees is distinctly recognized for its importance due to the high plant diversity. Over 5,000 species of plants, and 37% are endemic, growing nowhere else.

I will say with hope, the National Park concept and the concept of protecting land works. Very little loss of biodiversity occurs once these lands are protected and managed.

It is not enough to merely put your arms around a place and protect it. The biggest threats to biodiversity worldwide are habitat loss, fragmentation, overharvesting, and non-native invasive species. There is occasional public outcry when a new parking lot goes in, but few see a field of native wildflowers slowly transition into annual grasses and know what happened. They just know it's less pretty. It's a fight that many don't see, don't know what to look for, and don't know its importance.

Invasive plant management is the sweet spot in biodiversity protection. There are many stressors to species we don't know how to fix, like climate change or nitrogen deposition. But we do know how to battle invasive plants, we're good at it, and we're getting better at it all the time. Invasive plant management protects biodiversity now and provides resistance and resilience to the landscape in the future so that managers of the future are not completely flat-footed.

California is the place where cutting-edge invasive plant management and native species restoration is happening. Where we have complete floristic inventories, where science guides management. It is the people in this room, it is the people at Cal-IPC, CalFlora, CNPS, land managers in the Park Service, the Forest Service, the many forward-thinking ranchers and farmers, utilities commissions, and the universities that make this happen. We give other land managers across the US and world a model they can look to. To show that it can be done.

Look at the agenda. You are the ones who give future generations the opportunity to experience that moment when the temperature rises on a cool spring morning and the poppies suddenly burst open. The world needs to know that places and species can be protected. Yosemite is emblematic of that idea and is proof that we can protect these places and all that's in them for over 100 years, and we will protect them for future generations. We are every bit in the business of creating hope as much as we are the business of protecting the sacred.

Thank you all for being here. Thank you for all that you do. Welcome to Cal-IPC's 2016 Symposium.

#### **Congrats to our Student Winners!**

**Best Paper**—Daniel Winkler, UC Irvine, "Using population genomics to uncover the rapid colonization of Sahara mustard (*Brassica tournefortii*) in the United States."

**Best Poster**—Michala Phillips, UC Riverside, "Do invasive grasses employ different water use and rooting strategies than a native chaparral shrub?"

# First biological control agent released against Cape-ivy

Patrick J. Moran and Scott L. Portman, USDA-ARS  
Exotic and Invasive Weeds Research Unit

Cape-ivy (*Delairea odorata*, Asteraceae) is one of the worst invasive weeds in California (rated “High” by Cal-IPC and listed by the state as a noxious weed), colonizing riparian, forest, and scrub habitats along the California coast and East Bay hills. Cape-ivy can smother native oaks and other trees, displace native herbs and shrubs, and clog water flow along freshwater creeks. To protect these habitats, federal, state, and local natural resource agencies, with the help of thousands of volunteers, have spent a lot of time and money on herbicide treatments and hand-pulling in attempts to remove Cape-ivy

Research into the potential of an effective and safe biological control agent began in the late 1990s, when now-retired entomologist Dr. Joe Balciunas found several insects feeding on Cape-ivy in the plant’s native range in South Africa. After years of host-specificity testing and environmental permitting, with support from Cal-IPC, the USDA-Agricultural Research Service (USDA-ARS) in 2016 began releasing a shoot tip-galling fly, *Parafreutreta regalis* (Diptera: Tephritidae) to help control the spread of Cape-ivy.

Female flies produce galls in Cape-ivy shoot tips by laying their eggs inside the stems. Each female lays dozens of eggs

on multiple shoot tips during her 2-week adult lifespan. Eggs hatch into larvae which live inside and feed on the gall tissue for four to six weeks as the gall expands. Larvae chew small ‘windows’ in the galls before pupating. One to three weeks later, adult flies emerge. Adult flies then repeat the life cycle. Impact tests showed that the fly reduced the stem length and biomass of potted Cape-ivy by 30-60% after just one generation. Like other biocontrol agents, they do not eliminate their host plant, but they have the potential to significantly reduce it.

Host-specificity testing was conducted by the USDA-ARS Exotic and Invasive Weeds Research Unit Quarantine Laboratory in Albany, CA, with complementary work by the South African Agricultural Research Council-Plant Protection Research Institute. Host range tests covering 99 other plant species showed that *P. regalis* produced galls and developed successfully only on Cape-ivy. Other plant species tested included 42 native species and non-native crops in Asteraceae, including California *Senecio* and *Packera* species. Major habitat associates from other plant families were tested as well.

In 2013, an application for a permit to release the fly was submitted to the USDA-Animal and Plant Health Inspection Service (USDA-APHIS), and was subjected to peer review by a panel of experts from the U.S., Canada, and Mexico. The panel recommended release of the fly. Subsequently, a Biological Assessment was prepared, which received concurrence from the U.S. Fish and Wildlife Service, and an Environmental Assessment was pre-



First galled shoot tip observed in the field in California, November 2016, at a site in Sonoma County.

S. Portman, USDA-ARS

pared for NEPA (National Environmental Protection Act) compliance. USDA-APHIS issued a release permit in May 2016. Currently, hundreds of flies are being produced in cages outside of quarantine at the USDA-ARS facility in Albany CA.

To date, *P. regalis* has been released at seven sites, ranging from southern Sonoma County to the Big Sur area in Monterey County. Cooperating landowners include the East Bay Regional Park District and several private landowners. Releases are being followed up with visits every few weeks to monitor gall formation, establishment of the fly, and eventually, dispersal and impact of the flies on Cape-ivy populations. Last week, the first open field-produced gall was documented at a site in Sonoma County. Monitoring of existing release sites will continue throughout the winter months. Additional releases will be made next spring and summer as Cape-ivy produces new shoot tips.

New release sites for the spring and summer of 2017 are still being sought, especially from Humboldt County to Ventura County (areas of heaviest Cape-ivy infestation). Public or private landowners interested in releases of *P. regalis* on their property are encouraged to contact Dr. Patrick Moran (Patrick.Moran@ars.usda.gov) for more information.



Courtesy of USDA-ARS

Cape-ivy infestation at Morro Bay State Park.

# Alliance forms to guide tamarisk biocontrol in California

Nicole Norelli, Riparian Invasion Research Lab (RIVRLab), UC Santa Barbara

*Editor's Note: You have probably heard about the tamarisk beetle, one of the most effective biocontrol agents released in recent years. (So effective, in fact, that it has engendered controversy over potential impacts to the endangered southwestern willow flycatcher by damaging tamarisk that the bird has come to depend on in the absence of native willows.) Originally released in several western states, the beetle has now made its way into California. While debate continues about tamarisk impacts on water availability and endangered species habitat along western waterways, a new alliance of partners is working to address how we can best benefit from the evolving situation here in California.*

In 1998, the northern tamarisk beetle (*Diorhabda carinulata*) from central Asia was approved for release to control tamarisk or saltcedar (*Tamarix*

*ramosissima*, *T. chinensis* and hybrids) in several western states following a decade of testing overseas and in U.S. quarantine facilities to ensure host specificity and efficacy. Since its introduction, the beetle has proven successful in suppressing the invasive target plant north of about 38°N while further south the daylength cue that induces beetles to enter diapause (insect-style hibernation) comes too early for successful over-wintering.

Rapid evolution in this developmental trait, however, allowed beetles to stay active later in the season and thus facilitated their expansion southward, as documented by Dan Bean at the Colorado Department of Agriculture. This was particularly apparent in the Virgin River

system where successive generations dispersed from southern Utah to Lake Mead, and then, following the Colorado River, they reached southern California in 2015. First detections were in the Mohave Valley using traps baited with a synthesized aggregation pheromone. In 2016, *Diorhabda* was established within the state with major defoliation of tamarisk in the Needles region and surrounding Lake Havasu, as well as along the Mojave River near Barstow. Another population exists further north on the Owens River, presumably established from original research releases there in 2001. In addition, a related species, the Mediterranean tamarisk beetle, *Diorhabda elongata*, was later released and



Tom Dudley

Tamarisk defoliation along the Colorado River near Needles, CA.



is weakly established in the northern Central Valley where it primarily feeds on a tamarisk species (*T. parviflora*) also from the Mediterranean region.

Now that the beetle has entered southern California, the California Alliance for Tamarisk Biocontrol (CATB) has been established to provide guidance to the biocontrol program in this state. CATB was formed with support from Cal-EPA Department of Pesticide Regulation as a means to reduce herbicide use by promoting natural control methods, and is comprised of experts in the fields of biocontrol, invasive species management, endangered species protection, and ecosystem restoration. The Alliance mission is to connect with interested stakeholders in watersheds across the state to identify candidate sites for biocontrol implementation, assist in new beetle releases, and to develop a standardized monitoring protocol for monitoring beetle establishment and ecosystem responses. Partners are developing guidelines for determining whether and how to apply restoration methods to promote recovery of native vegetation, and also developing outreach materials to inform the public through various media of the benefits and real, albeit minor, risks of tamarisk biocontrol. The Alliance will also be monitoring movement of the beetles using sentinel traps to detect their arrival in new areas.

The feeding action of *Diorhabda* larvae and adults results in host plant defoliation and dieback as stored metabolites are incrementally depleted followed by substantial plant mortality after 3-4 years in some areas. Loss of foliage reduces water losses to transpiration, and in northern Nevada, leads to groundwater savings of roughly 2,500 acre-feet annually. In the warmer conditions of southern California, even greater water conservation may be achieved. Birds and other wildlife have been observed feeding on the beetles themselves, and there is early evidence that reduction in competition from tamarisk is allowing return of native riparian plants, presumably to be followed by fauna that favor the native vegetation.



Bruce Kenyon (Quail Unlimited) and Alliance partner Mike Pitcairn (California Department of Food & Agriculture) in front of beetle defoliation at Camp Cady at the Mojave River.

Tom Dudley

It is relevant to note that there remains an active lawsuit filed by the Center for Biological Diversity to halt the tamarisk biocontrol program over perceived risks to nesting endangered

southwestern willow flycatchers (SWFL). That litigation led to the unprecedented rescinding of standing research and implementation permits, along with most monitoring efforts needed to provide data to support legal resolution. Federal negotiations are coming close to resolving the debate. The litigation was targeted at interstate movement of *Diorhabda* beetles and not within-state efforts. So, on federal lands we (CATB) will be developing National Environmental Protection Act (NEPA) documentation to verify the safety of biocontrol introductions while on non-federal lands, the CA Department of Food and Agriculture already has documentation supporting tamarisk biocontrol. Wildlife managers will be involved in all the watersheds where biocontrol efforts are to be targeted.

With the beetles now naturally moving into California, it is important to quickly re-establish a comprehensive monitoring program. The Alliance can provide guidance on sensitive sites, such as those within SWFL nesting territories, and planning resources for restoration where necessary ahead of the beetles' movement.



Sticky trap with male-derived aggregation pheromone for *Diorhabda*. These sentinel traps are broadly distributed to detect colonization as the beetles move into new regions. The pheromone, which is produced at our UCSB lab, is also used to retain beetle populations at the site where they are released.

Tom Dudley

More information available at <http://rivrlab.msi.ucsb.edu/projects/california-alliance-tamarisk-biocontrol>.

# Partnership aims to eradicate *Volutaria tubuliflora*

Ramona Robison, Cal-IPC

Pat Matthews, Anza Borrego Desert Natural History Association

Chris McDonald, UC Cooperative Extension

Frank Harris, Volunteer

**Y**ou may have already heard about the new weed invading Southern California: *Volutaria tubuliflora*. To date it is only known from three locations in North America, so this qualifies as a classic early detection/rapid response opportunity. Based on the climate in the plant's native range, we believe this plant has the ability to spread across the desert Southwest, from the California coast to New Mexico. Local volunteers have been tracking its distribution for the past few years and a few researchers have started studies, but with no funding or coordinator, efforts have been limited. Fortunately, Cal-IPC and local partners were awarded a National Fish and Wildlife Foundation (NFWF) grant in early 2017 and efforts toward coalition building and eradication accelerated.

*Volutaria* is a winter annual in the sunflower family and is closely related to knapweeds and starthistles. It germinates after winter rains and blooms from February to April. The urn-shaped inflorescence has phyllaries that are spine



*Volutaria* flower heads.

Pat Matthews

tipped and covered with white hairs. It produces white disk flowers and sometimes a few long white ray flowers, and anthers have white pollen. The rosettes look a bit like knapweeds, and the stems are winged. It can grow from 6 inches to as tall as 5 feet and spreads rapidly. The leaves of *Volutaria* have a distinct wavy lobe pattern that can differentiate it from other winter annuals.

The *Volutaria* we have in California was first thought to be *V. canariensis*, a plant found only in the Canary Islands. This is what is currently described in the Jepson Manual, and has caused confusion. It has more recently been determined to be *V. tubuliflora*, which has a much wider native range: the Canary Islands, Morocco, Spain, Algeria, Tunisia, Libya, Egypt and Saudi Arabia and likely other countries. *V. tubuliflora* is also invading the Atacama Desert in Chile where it has spread 80 miles along roadsides in 30 years.

In California, *Volutaria* was first noticed in 2010 in Borrego Springs, in eastern San Diego County near Anza-Borrego Desert State Park. Starting in 2011 volunteers there began mapping and removing plants, and unfortunately more were found every successive year as new searches were conducted. Another location was reported in Newport Bay, Orange County, in 2015. After some careful herbarium research it was determined that *Volutaria* was collected in Newport in 1987, but mistakenly identified as the wrong species. This new information moved the California introduction date back 23 years. Another location was reported in Chula Vista, coastal San Diego County, in 2016, and was large enough that it is thought to have been there several years. Both the Newport Bay and Chula Vista locations have local managers working on them, and they are small enough that all known plants were treated in early 2017 and relatively few new individuals were discovered. These sites are hopefully on their way to eradication.

Since the coastal *Volutaria* populations are smaller and have local management available, the NFWF grant funds are focused on Borrego Springs, where



Pat Matthews (left) and some of her volunteers marking sites. The recycled plastic bottles on belts are Pat's innovation for stripping and collecting flower heads.

Ramona Robison, Cal-IPC



Pat Matthews

Volunteer Nancy Baumeister holding *Volutaria* in her right hand and Sahara mustard in her left. Nancy lives in Corvallis, OR and winters in the desert. She does volunteer weed work at a native prairie restoration project at home, and she says she was “delighted to have a chance to do invasive species work in the desert.”

*Volutaria* is found over some 15 square miles. Most of the locations there are on undeveloped private land, so coordination and collaboration are key to success. Despite very low rainfall in Borrego Springs the past 5 years, *Volutaria* populations have flowered and produced seeds every year, thus eradication efforts must be continuous to be effective. The overall range of infestation is on the order of 32 sites covering 1,000 acres, so eradication will be a big undertaking.

Borrego Springs is a small community, with only 3,800 residents, many of whom are only there during winter months. Since the 2010 detection, Anza-Borrego State Park has been a key player, surveying their lands and sharing information with volunteers on nearby private parcels. Other collaborators include the San Diego County Agricultural Commissioner, California Department of Food and Agriculture, Borrego Springs Sahara Mustard/*Volutaria* Task Force, Anza Borrego Desert Natural History Association (ABDNHA), Anza Borrego Foundation, UC Irvine, UC Cooperative Extension, US Bureau of Land Management, as well as the local landfill, nurseries, and agricultural producers.

In January 2017, Cal-IPC hired Pat Matthews to serve as our local on-the-ground coordinator to leverage volunteer efforts, oversee mapping, and provide a source of information and inspiration in the community. Efforts toward detection and eradication increased dramatically in 2017, with 37 work days held and 48 volunteers participating for an estimated 200 person-days donated. This is a significant increase over the

11 volunteers involved in previous years. The San Diego County Department of Agriculture was a key player in this containment effort, working closely with Pat to manage roadsides and treat private properties where *Volutaria* occurs.

After UC Cooperative Extension and California State Parks provided two training sessions for volunteers on how to use Calflora, a consistent effort was made to employ Calflora to track locations and volunteer effort in 2017. Additionally, Pat and partners were able to get the word out about the *Volutaria* eradication effort through newspaper articles, newsletter

notices, flyers, websites, and a community presentation by Chris McDonald, Natural Resources Advisor from University of California Cooperative Extension, at the ABDNHA library.

Through survey efforts our team was able to increase our understanding of the population’s spatial limits—filling in gaps in our mapping and confirming the outside boundary or leading edge of the population. In addition to continued efforts toward eradication within Borrego Springs, we are seeking to limit the spread of *Volutaria* further into Anza-Borrego State Park and stop it from jumping outside the Borrego Springs valley. Increased survey efforts in 2017 discovered several large populations, and several known infestations turned out to be more widespread than previously believed. Our population trends indicate there are still new plants to discover. Time is of the essence to get on top of this infestation.

The NFWF grant is for 3 years, but eradication will take much longer than that. Management and subsequent monitoring will still be required far into the future if we hope to keep *Volutaria* from becoming as widespread as another recent desert weed, Sahara mustard. We are seeking funding to carry the work into the future and the partnerships formed this year provide a foundation for continued communication and collaboration. We would not be where we are now without the efforts of dedicated volunteers and the

involvement of local land management agencies. With the aggressive spread of *Volutaria*, even during the 5-year-long drought, it is clear that we are going to need to galvanize extensive collaboration across the community and garner more financial support to stop this new weed from spreading widely across the American Southwest.



Ramona Robison, Cal-IPC

A hula hoe is the tool of choice for removing small *Volutaria* rosettes.

# Clean your boots!

## Guidelines to minimize site contamination

The Working Group for Phytophthoras in Native Habitats has developed a guide for minimizing soil contamination in restoration and sensitive sites to prevent the spread of Sudden Oak Death and other diseases caused by soil-borne pathogens. The practices described in the guide are useful for preventing the spread of invasive plant seeds as well, since these can be spread on boots. Land managers, volunteers and hikers should follow boot hygiene protocol when moving between sites. Preventive steps can minimize the risk of spreading damaging soil-borne pathogens and invasive plants.



Cal-IPC now carries handy boot brushes to clean soil from your footwear. These are distributed by the PlayCleanGo recreational campaign to "stop invasive species in your tracks." \$5 each, \$40 for a pack of ten.

### BASIC BOOT CLEANING

**Step 1.** Boot soles and any other dirty surfaces should be brushed to remove soil and debris. It's best to clean your boots on-site before you leave an area where you have been working or hiking. Otherwise, clean your boots at home or another place where you can address any weeds that come up.

**Step 2.** Thoroughly wet boot soles and other surface with the sanitizing solution using a spray bottle (see below). Note that if items are rinsed with water first, they should be allowed to dry so the sanitizing solution is not diluted excessively.



**Spray Bottles:** For easy boot treatment in the field and routine small-scale disinfecting, you can make convenient carry-along spray bottles. Replace the caps of 16 or 32 oz. isopropanol bottles with sprayer caps recycled from non-toxic spray-on products (such as glass cleaner). The threads generally match.

### RECOMMENDED SANITIZING SOLUTION

For routine cleaning of shoes and tools, 70% isopropanol is the easiest to buy and use. (It's the rubbing alcohol you buy at the pharmacy.) Because bleach can be difficult to work with—it corrodes steel, leaves bleach spots on fabric, etc.—it is best used only in contained situations (such as soaking plastic pots) or when using a large volume of solution and appropriate personal protective equipment (such as when cleaning benches or similar surfaces).

For more detail about using other cleaning solutions including bleach, see <http://phytosphere.com/BMPsnursery/phytosan1.htm>.

### TEACHER'S GUIDE AVAILABLE

Also new from Cal-IPC: A teacher's guide for Teaching About Invasive Species. This tool kit helps educators to engage K-12 students in learning about invasive species. Includes 11 innovative education programs and 20 ready-to-use activities appropriate for various age groups. \$15.00 each, \$55.00 for pack of 5.

# Yellow starthistle and water supply: An experiment

Dr. Jerry Meral, Natural Heritage Institute

Two papers (Gerlach 2004; Enloe et al. 2004) have suggested that when yellow starthistle (*Centaurea solstitialis*) is removed, the annual grasses which tend to replace it use considerably less water from the soil profile than does the thistle. Because yellow starthistle is found (sometimes in very extensive stands) on millions of acres of California, it is possible that removal of the thistle could substantially increase groundwater recharge and subsequent surface runoff.

Removal could improve range conditions, wildlife habitat and water supply, especially in the Sacramento Valley where groundwater levels are generally still fairly high and connected to surface water streams. Thus, improvements in groundwater levels in the Sacramento Valley could be expected to translate to improved surface runoff and enhanced streamflows.

An experiment is underway to test the hypothesis that yellow starthistle removal can improve groundwater levels and surface runoff. If the experiment demonstrates that water supplies can be improved, local water districts and those agencies that export water from the Sacramento Delta may find it financially attractive to pay for extensive yellow starthistle removal.

The experi-

ment, to be carried out on a ranch in Yolo County, will be performed on four similar small watersheds covering about 30 acres. The watersheds will be fenced to exclude cattle, and instrumented to measure soil moisture, depth to groundwater, surface runoff, precipitation, meteorological conditions, and water quality. The initial study year will be used to develop baseline data. Subsequently, yellow starthistle will be removed from two of the watersheds and left in place on the other two. Continuous field measurements will be carried out for at least two years to assess treatment versus non-treatment watershed response.

The principal researchers are Dr. Joseph DiTomaso, Professor in the UC Davis Department of Plant Sciences, and Dr. Mike Deas, principal at Watercourse Engineering in Davis. Funding

for the study is provided by the State and Federal Water Contractors Agency, Metropolitan Water District of Southern California, Yuba County Water Agency, Russell L. Rustici Rangeland and Cattle research endowment of the College of Agricultural and Environmental Sciences, University of California, Davis, and private companies and individuals.

For more information contact the author at [jerrymeral@gmail.com](mailto:jerrymeral@gmail.com).

Enloe, Stephen F., Joseph M. DiTomaso, Steve B. Orloff, and Daniel J. Drake. 2004. Soil water dynamics differ among rangeland plant communities dominated by yellow starthistle (*Centaurea solstitialis*), annual grasses, or perennial grasses. *Weed Science* 52(6):929-935.

Gerlach, John D. Jr. 2004. The impacts of serial land-use changes and biological invasions on soil water resources in California, USA. *Journal of Arid Environments* 57: 365-379.



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Yellow starthistle (*Centaurea solstitialis*) infestation.

# Wildland Weed News

(Continued from page 3)

environmental impact in the region. The plant is listed as a noxious weed in Oregon and Washington.

**Economic impact.** The State of Washington produced a report concluding that without prevention and control, invasive species cost Washington \$1.3 billion and 8,200 jobs annually. Impacts analyzed included water facilities, crops, livestock, timber and recreation. Twenty-one species were included in the assessment. The costliest plants were rush skeletonweed and Scotch broom.

### Rate of invasions not slowing.

A paper in the Feb. 15 issue of *Nature Communications* studied the rate of new introductions over the last 200 years and found no signs that the rate is slowing down (Seebens et al.). <https://www.nature.com/articles/ncomms14435>

**Botanists wanted.** Congressman Mike Quigley (D-IL) introduced the "Botanical Sciences and Native Plant Materials Research, Restoration and Promotion Act" to increase botanical science capacity of the federal government by creating financial incentives for students to pursue careers in the field.

**Western states push BLM.** Senator John Barrasso (R-WY) and Congressman Mark Amodei (R-NV) introduced S.509 and H.R.1330 to require federal land management agencies, most notably the Bureau of Land Management, to set measurable goals for reducing invasive

species each year and to spend no less than 75% of their invasive species funding on control activities. The bill also seeks a Categorical Exclusion from NEPA for certain invasive species management projects. The bill does not include any funding. Cal-IPC, as part of the National Environmental Coalition on Invasive Species, submitted comment expressing concerns about aspects of the bill while supporting the intent of strengthening landscape-level response.

**Phytophthora bill.** Cal-IPC signed on as a supporter to S.B.287, which sets requirements for native plant nurseries to avoid the spread of soil-borne pathogens via restoration plantings.

### Regulatory loss on invasive reptiles.

The DC Circuit Court of Appeals ruled that the US Fish & Wildlife Service's longstanding program of regulating interstate transportation of injurious species such as the Burmese python is not supported by the Lacey Act, first written in 1900 and last amended in 1960. The suit was brought by the US Association of Reptile Keepers, and will result in spread of the animals unless new regulation is passed.

**Shot-hole borers spread.** Conservation agencies continue to cobble together a response to shot-hole borers, which have decimated native riparian trees in some southern California locations. Agricultural impacts have been limited, and there is no formal pest designation from the state or USDA. Researchers at UC Riverside are researching potential biocontrols and modeling spread.

## Park Stewardship Sponsors for the 2016 Symposium



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### Cal-IPC Bay Area Volunteer Trainings

June 17, Mill Valley  
June 24, San Jose  
July 15, Portola Valley  
[cal-ipc.org/fieldcourses/VolunteerTraining2017.php](http://cal-ipc.org/fieldcourses/VolunteerTraining2017.php)

### Delta Invasive Species Conference

August 29, UC Davis

### Aquatic Nuisance Species

September 13-15, San Diego  
[fws.gov/answest/meetings.html](http://fws.gov/answest/meetings.html)

### State of the Estuary

October 10-11, Oakland  
[sfestuary.org/soe/](http://sfestuary.org/soe/)

### Cal-IPC Symposium

October 24-27, Palm Springs  
[cal-ipc.org](http://cal-ipc.org)

### California Forest Pest Council

Nov. 15-16, Davis  
[caforestpestcouncil.org](http://caforestpestcouncil.org)

### California Association of RCDs

Nov. 15-18, Sacramento  
[carcd.org](http://carcd.org)

### Central Coast Invasive Weeds Symposium

Nov. 9, Santa Cruz

### CNPS Conservation Conference

February 1-3, 2018, Los Angeles  
[conference.cnps.org](http://conference.cnps.org)

***“For those appalled by the mostly rightwing resistance to acknowledging and taking action to slow climate change, you can find a parallel form of denial among a subset of liberal-leaning people who deny the reality of—and any solutions for—invasive species.”***

*—“The Latest False Revisionism About Invasive Species” by Stephen Hiltner, 12/5/2016, at <http://newscompanion.blogspot.com/2016/12/the-latest-false-revisionism-about.html>.*