Vol. 19, No. 1 Spring 2011

Cal-IPC News

Protecting California's Natural Areas from Wildland Weeds

Quarterly Newsletter of the California Invasive Plant Council

Spongeplant spreading in the Delta

Lars Anderson, USDA Agricultural Research Service, hold a mature South American spongeplant (Limnobium laevigatum). *Spongeplant was first reported in northern California in 2003 and is now spreading into the Sacramento-San Joaquin Delta. Photo: USDA-ARS*

Inside:

Cal-IPC

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A California 501(c)3 nonprofit organization

Protecting California's lands and waters from ecologically-damaging invasive plants through science, education, and policy.

Cal-IPC News
Spring 2011 - Volume 19, Number 1

Editors: Doug Johnson, Elizabeth Brusati, Heather Brady, and Bertha McKinley

Criticism is a good thing

"Just as America is a nation built by waves of immigrants, our natural landscape is a shifting mosaic of plant and animal life… Designating some as native and others as alien denies this ecological and genetic dynamism. It draws an arbitrary historical line based as much on aesthetics, morality and politics as on science, a line that creates a mythic time of purity before places were polluted by interlopers."

There are many things wrong with comparing human diversity with invasive species, as Hug Raffles does in his recent op-ed in the *New York Times* (April 3, 2011). However it is not an uncommon viewpoint to encounter; protection of native biodiversity can sound like outright nativism. After wildfire swept through Griffiths Park in Los Angeles in 2008, a local elected official dismissed the need for post-fire invasive plant control based on a respect for diversity. (Some people will even take this argument so far as to point out that the Nazis were big on protecting native flora.)

Of course, human diversity might be better compared to the endemic biodiversity we are working to protect from invasive species. Less than 1% of all non-native plant species in California are considered invasive due to their impacts. There's no moral argument being made against all non-native species. Scientists do their best to gauge impacts, which the author of the op-ed (an anthropologist) believes are actually a net positive.

Challenges to the validity of our work are frustrating. For instance, a recent panel at the Public Interest Environmental Law Conference 2011 at the University of Oregon in March was titled "Environmentalism Gone Awry: The War on Invasive Species". Talks at the conference addressed "invasion biology's scientific failings" and "the widespread poisoning of plants and animals."

But I think these challenges are good. For one, increased attention, even (or especially) critical attention, reflects a broader recognition of the issue of invasive species. More than that, it provides an opportunity to engage people in thinking about the issue and about ecology in general, which I think is key for creating a sustainable future.

If you enjoy contemplating the moral aspects of invasive species control, I recommend T.C. Boyle's new novel *When the Killing Stops*. He fictionalizes past campaigns to control invasive rats and pig populations on California's Channel Islands, which produced a strong backlash from local animal rights groups. The book is an exciting read, and Boyle ably demonstrates something we all need to remember: absolutism and self-righteousness serve no one well.

Cal-IPC Staff. Diagonal left to right: Tony Morosco. Row 2: Heather Brady, Falk Schuetzenmeister. Row 3: Jen Stern, Bertha McKinley, Elizabeth Brusati, Doug Johnson. Row 4: Arpita Sinha, Ginny King. Suzanne Harmon. Row 5: Agustin Luna Dana Morawitz. Not pictured: Cynthia Powell

Wildland Weed NewsNewsNewsNewsNews

The California Dept. of Food & Agriculture proposes to eliminate its programs addressing weeds. See article p. 15.

Releasing Asian beetles to eat invasive saltcedar results in water savings. Researchers at UC Santa Barbara, USGS, and USDA have published the first substantive data showing the water conservation benefits of this biocontrol. During the first year of large-scale defoliation by the tamarisk leaf beetle (*Diorhabda carinulata*) in northern Nevada, approximately 2,500 acre-feet of water remained in the ground rather than being lost to the atmosphere, equivalent to the water required to irrigate 1,000 agricultural acres. (Oecologia, 2010 165:605-615. Mar. 2, 2011, *www.sciencedaily.com*)

A study of 26 invasive plant species on four continents found little difference between numbers in introduced and native ranges. Instead, they found that increases in species abundance are unusual, contradicting the common assumption that invasive plants are more abundant in their new settings. The authors believe that the success of a plant in its native range may be used to predict its spread at introduced sites, a criterion which currently is not included in biosecurity screening programs. (Science Alert, Feb. 7, 2011, *www.sciencealert.com.au*)

Medusahead (*Taeniatherum caput-medusae*) is the first well-established weed to be proposed for the Federal Noxious Weed List. Forest Service Employees for Environmental Ethics (FSEEE) has petitioned to have it listed by the US Dept. of Agriculture under the Plant Protection Act of 2000. Medusahead invades millions of acres of western states and is considered a serious threat to habitat needed by the endangered greater sage grouse (*Centrocercus urophasianus*). FSEEE hopes that adding medusahead to the noxious weed list will allow for regulations to prevent its spread by

...continued page 16

Cal-IPC Updates

Sierra recommendations
Cal-IPC used expert opinion data and suitability modeling to create "risk maps" and develop recommendations on eradication, containment, and surveillance for 43 invasive plant species in the Sierra Nevada. The report, including statewide maps, is available on CD or online at *www.cal-ipc.org/ip/mapping/sierra*.

20th anniversary
The 2011 Symposium will be our 20th! (See p. 10 for details.) Do you have photos or memorabilia from past Symposia (especially prior to 2003) to contribute to a retrospective display? Send digital photos with credit info and a caption to *symposium@cal-ipc.org*. Send prints or slides to our mailing address, and we will scan and return them to you. See you at the Symposium!

Arundo's impacts
Another new Cal-IPC report quantifies the distribution and impacts of *Arundo donax* (see article on p. 8.) This report and the accompanying geodatabase are available at *www.cal-ipc.org/ip/research/arundo.*

Call for nominations
The Cal-IPC Board of Directors is accepting nominations until July 1 for new board members. Know someone that has a lot to offer? Or maybe you want to nominate yourself? Elections will be held in late summer with new board members announced at the Symposium in October. Board terms are two years, beginning in January 2012. The board meets four times each year at locations around the state, and requires a commitment to fundraising, working on a committee, and attending the Symposium. Please direct nominations and questions to *board@cal-ipc.org*. Learn about current board members at *www.cal-ipc.org/about/staff.php*

Call for student nominations
The Cal-IPC student chapter is accepting nominations for student liaisons to the Cal-IPC board. Liaisons attend board meetings in their part of the state and help Cal-IPC provide more services to students. Please send nominations to *students@cal-ipc.org*.

New staff
Cal-IPC welcomes Mapping Specialist Tony Morosco. Tony co-founded and developed *Calflora.org*, and worked as Curator of Living Collections at the San Francisco Botanical Garden. He has served on the boards of the East Bay Chapter of CNPS and the California Botanical Society.

Feature

Spongeplant: A new aquatic weed threat in Delta

By Lars Anderson, USDA Agricultural Research Service, and Pat Akers, California Department of Food & Agriculture

No, we're not talking about Brazillian waterweed (*Egeria densa*). The new threat is South American spongeplant (*Limnobium laevigatum* (Humb & Bonpl. Ex Willd.Heine)). This is a prolific, floating, flowering plant in the "frogbit" family (Hydrocharitaceae), the same family containing hydrilla (*Hydrilla verticillata)*, well known as one of world's worst submersed-type aquatic weeds. As its name implies, South American spongeplant is native to South America, Central America and Central Mexico, and the underside of its leaves has spongy air-filled tissue called aerenchyma which provides buoyancy.

Underside of spongeplant leaves showing buoyant, spongy aerenchyma tissue.

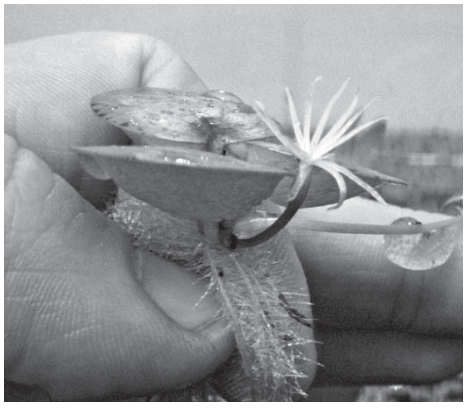
In the US, it has so far only been reported in California, where the California Department of Food & Agriculture recently listed it as an "A" rated pest. Other closely related species such as European frogbit (*Hydrocharis morsus-ranae*) have invaded eastern regions of the US.

The first known spongeplant infestations were found in small ponds in Redding and Arcata in 2003, but more widespread, patchy populations were noted along several miles of the San Joaquin River by CDFA and the USDA-Agricultural Research Service in 2007, and in the Sacramento-San Joaquin Delta in starting in 2008. The combination of greatly increased discharges from Friant Dam down the San Joaquin River beginning in 2009 coupled now with the current large spring runoff will certainly create even better dispersal conditions.

Example of mature South American spongeplant from the Sacramento-San Joaquin Delta near Brannan Island.

Worse than water hyacinth?

Spongeplant's dispersal capacity may make it even more able to spread in the Delta than water hyacinth (*Eichhornia crassipes*). Mature plants resemble small, densely packed water hyacinth, but rather than the very showy, purple flowers of that more common floating invader, spongeplant flowers are quite small (ca. 1 cm across) and inconspicuous, since they are formed near the base of the petioles. Like water hyacinth, spongeplant spreads vegetatively, as well as through abundant seed production. Spongeplant seeds germinate rapidly to produce extremely small, floating seedlings that outwardly look like duckweed (e.g. *Lemna* spp.) and are easily dispersed by wind, currents, tidal action and no doubt as hitchhikers on waterfowl, boats and even trapped on water hyacinth plants. For example, a single handful can contain over 60 fully expanded seedlings. In contrast, seeds of water hyacinth usually need cycles



Spongeplant flowers.

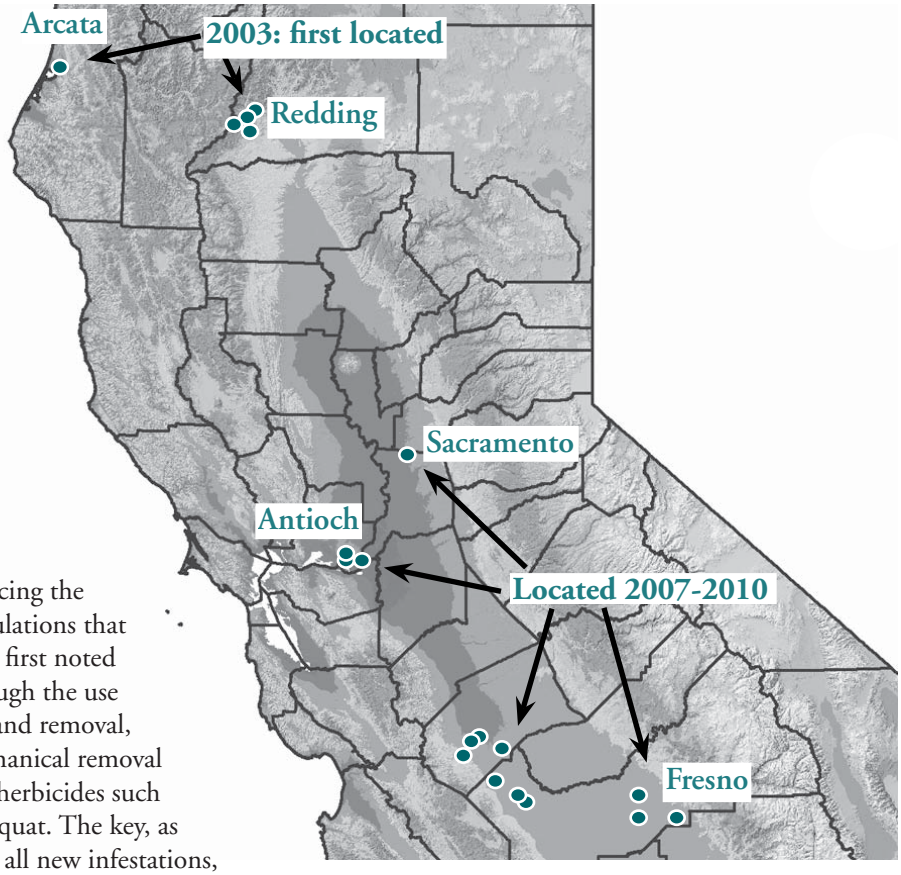
of exposure to air in order to germinate, and first form rooted seedlings with strap-like leaves that only begin to float several days to weeks later.

Little is known about growth rates, nutrient requirements and cold-tolerance for spongeplant, so our USDA-ARS laboratory is examining those characteristics now. But it is clear from the past winters that the small seedlings (e.g. from 0.2cm to 2 cm diameter) can easily withstand frost and our mild freezes since they are well protected as they float on the water amongst the taller statured frost-bitten water hyacinth, cattails and tules.

Even in February the floating seedlings are green and ready to rapidly increase their growth as both temperature and day length increases. Under summer conditions, spongeplant has the capacity to cover large areas of open water and thus render them ill-suited for healthy fish and wildlife habitat and problematic for critical Delta pumping and irrigation delivery systems.

Can spongeplant be stopped?

This invader is still in its early dispersal and establishment phase. CDFA crews have had some success in gradually reducing the populations that were first noted through the use of hand removal, mechanical removal and herbicides such as diquat. The key, as with all new infestations, is quickly containing, removing or killing the plant. However, controlling the infestations in the Delta will be a challenge due to tidal flows, net river flows, and the likelihood of widely dispersed populations, some of which will be "out of sight" behind the taller plants.



Distribution of South American spongeplant in California. Map courtesy of Pat Akers, CDFA.

Over 60 South American spongeplant seedlings in a handful. The smallest plants are duckweed.

Any effective rapid response approach will need to be a coordinated effort between CDFA and the California Department of Boating and Waterways since Boating and Waterways crews are already focusing on the long-term management of water hyacinth in the Delta and these crews are on the water regularly. To strengthen control efforts, the USDA-ARS Exotic and Invasive Weed Research laboratory on the UC Davis campus has included *L. laevigatum* in its rapid reponses research program and will be indentifying herbicides that are effective as well as initiating longer term research into discovery of potential biological control agents from spongeplant's native range.

In the meantime, please notify CDFA if you think you see this plant! You can "report a pest" at *www.cdfa.ca.gov/phpps/reportapest.*

For more information contact Lars Anderson at lwanderson@ucdavis.edu. All photos by USDA-ARS.

Profile

From bull thistle in Yosemite to ants on islands

An interview with Cal-IPC's first president, John Randall

by Gina Darin, California Department of Water Resources

As part of Cal-IPCs 20th year, we are interviewing some of the organization's founders. John Randall, the first president of the Cal-IPC Board, is currently based in San Diego and working for The Nature Conservancy's California Field Office. I caught John on the phone in February to get some of his thoughts on Cal-IPC's twenty years.

John's beginning with invasive plants

John was introduced to invasive plants in 1982 when he followed his girlfriend (now wife) Lesley to Hawai'i for an internship at National Tropical Botanical Garden on Kauai. Not a bad gig! His internship included time for exploring Kauai's bogs and high elevation forests where invasive plant problems were all-too-obvious, especially after Hurricane Iwa struck in November of that year. John's interest in invasive plants went dormant for a few years after he returned to the mainland in 1983 to study coastal ecology at Louisiana State University but then really bloomed when he moved to UC Davis to study under Dr. Marcel Rejmanek in 1986. Within a year he had begun his dissertation project on the ecology and control of bull thistle in Yosemite National Park and the Sierra Nevada.

John served on the Cal-IPC Board of Directors from 1992 to 2000, and was the board's first President. John worked with fellow Cal-IPC founders Carla Bossard and Marc Hoshovsky of California Fish & Game to publish *Invasive Plants of California Wildlands* (UC Press 2000). For many years, John led The Nature Conservancy's Global Invasive Species Team (GIST) at UC Davis. GIST provided valuable resources to weed workers, including Element Species Abstracts describing biology and management methods for many invasive plants; the Handbook of Weed Control Methods; and an extensive photo gallery. Sadly, the GIST was a victim of TNC budget cuts in 2009 and most staff were laid off. (GIST's website and its resources are preserved at *www.invasive.org/gist.*) As part of his work with GIST, John became TNC's representative for the PlantRight coalition to reduce the sale of invasive ornamental plants.

Fast-forward to 2011 and you may find John cruising the farmer's markets in San Diego where he has been based with The Nature Conservancy's Southern California field office since 2009. His work focuses on a variety of conservation issues in the southern third of the state, ranging from assessing conservation values of California's deserts to inform renewable energy siting and mitigation decisions, to promoting implementation of Multi-Species Habitat Plans. Not surprisingly, invasive species are still part of his work, but animal invaders now draw more of his attention: feral pigs in San Diego County where they were first detected about four years ago, and Argentine ants on Santa Cruz Island. John's weed work at UC Davis and for TNC's Global Invasive Species Team surely prepared him with the patience and determination to deal with these mobile pests!

John Randall accepting the Jake Sigg Award for Vision and Dedicated Service at the 2008 Cal-IPC Symposium. John received the award based on his years of tireless service and leadership on invasive plant issues in California.

John's favorite Cal-IPC memory

"It was exciting to be part of the first Symposium in 1992 at Morro Bay. Around 150 people attended, and after a day and a half of great talks, the final session brought everyone back together to discuss whether we should form a new invasive plant organization. Each of the folks who helped organize the Symposium, and others who signed on there, had a distinctive personality, skills and strengths. Some of us were great at drawing out the interest and enthusiasm of the folks there, but not so skilled at

directing the discussion to a conclusion. Fortunately, one of the organizers, Greg Archibald, was focused on keeping to the agenda, staying on time and coming to some conclusion – Were we going to form a group or not? If so, what were the organization's top priorities? Who would help lead? What would they commit to do? Folks were enthused and full of energy. We emerged from that meeting with a clear mandate to form an organization and a great group of people who volunteered and followed through to make it a reality."

John's hopes in starting Cal-IPC

"We hoped that Cal-IPC would boost the profile of invasive plants in conservation areas, and prompt agricultural and land managing agencies and organizations and businesses to take action to prevent and control the worst invaders. We also hoped to engage the research community to gain understanding of the ecology, prevention and control of invasive plants. Many conservation land managers in California were trying to figure out how to deal with invasive plant threats by the early 1990s but didn't know where to turn for more information on the effects of invasive plants on native species, communities and ecological processes, as well as on control methods and the effects of controlling invasives on native species and communities."

John thinks Cal-IPC has had major impacts on the prevention and management of invasive plants and the restoration of native plant communities throughout the state and beyond. But these are tough, tough times for federal, state and local agencies and organizations and it remains to be seen how looming budget cuts will affect their priorities. John sees Cal-IPC working with regulators and businesses to prevent new introductions of species likely to cause problems. Cal-IPC has a big role to play in setting priorities in this brave new world.

Advice to weed workers

"Keep your focus on what you are working to protect – the species, communities and ecological processes you want. Look for new ways to achieve those ends, including new ways to prevent and control the invasive plants that threaten them, and to new paradigms for managing mixed systems of native and introduced species that allow the natives to thrive and persist. The idea of managing mixed communities (or "novel ecosystems") has been getting more attention in the past few years and it's worth testing approaches to this, especially in situations where the invaders are beyond our ability or resources to control."

Ecologist E.O. Wilson speaks at UC Merced

By Chelsey Carey, UC Merced

Two-time Pulitzer Prize winning author and scientist Edward O. Wilson delivered a keynote address on the management of natural areas, focusing on the role of National Parks in sustaining our ecosystems, as part of the National Parks Institute Executive Leadership Seminar at the University of California Merced on April 9. In attendance were National Park staff and senior executives of land management organizations representing six continents, University of California faculty and students, and interested locals from the Central Valley.

I was fortunate enough to be one of twelve UC Merced faculty and graduate students who sat down with Wilson for an intimate hour and a half discussion prior to his formal keynote address. During this time, we discussed the importance of research from taxonomy to climate change. When I told Wilson that my Ph.D. project focuses on invasive plant species, he responded by saying, "Those are the bad actors that we need to concentrate on and somehow keep out [of our native ecosystems]." To extend the point, Wilson spoke of the negative impacts of the brown tree snake (*Boiga irregularis*) on the native bird population in Guam. Wilson went on to say that he would like to investigate the range and impacts of the invasive fire ant (*Wasmannia auropunctata*) in New Caledonia and Vanuatu.

An hour later, Wilson's keynote address to an excited room started with him reliving his childhood memories of "hunting for fireflies and ants, one glorious expedition at a time" through what later became a forest in the National Park system. With a combination of solemnity and wit, Wilson elegantly tackled some of the major issues facing the National Park system and the world today. "If we save the living environment," Wilson said, "we will automatically save the physical environment. If we save only the physical environment, we will ultimately lose them both."

Wilson's main thesis was clear: America needs to become more involved in studying and saving biodiversity for its own sake. This effort, he claimed, includes joining global efforts to save species that are on the brink of extinction. A major part of this should focus on preventing, managing, and eradicating invasive species, since, as he pointed out, "Climate change, the spread of invasive species, overpopulation and overharvesting are among the causes of species extinction." The keynote address ended with Wilson encouraging the audience to consider biodiversity in every scientific and managerial endeavor, and his applauding the work of the National Park Service in their continual efforts to maintain America's natural ecosystems.

Chelsea Carey is a member of the Cal-IPC Student Chapter

New Release

Mapping Arundo and its impacts

by Jason Giessow, DENDRA, Inc., Jason Casanova, Los Angeles/ San Gabriel Rivers Watershed Council, and Rene Leclerc, Northwest Hydraulic Consultants, Inc.

Justifying invasive plant management often relies upon the assumption that the benefits gained outweigh the expense of the project itself. Managers would prefer a more rigorous justification based on a comprehensive analysis of the plant's impacts, but this is difficult to perform. In a recently completed multi-year project, Cal-IPC provides such comprehensive analysis for one of California's worst invasive plants, *Arundo donax* (giant reed).

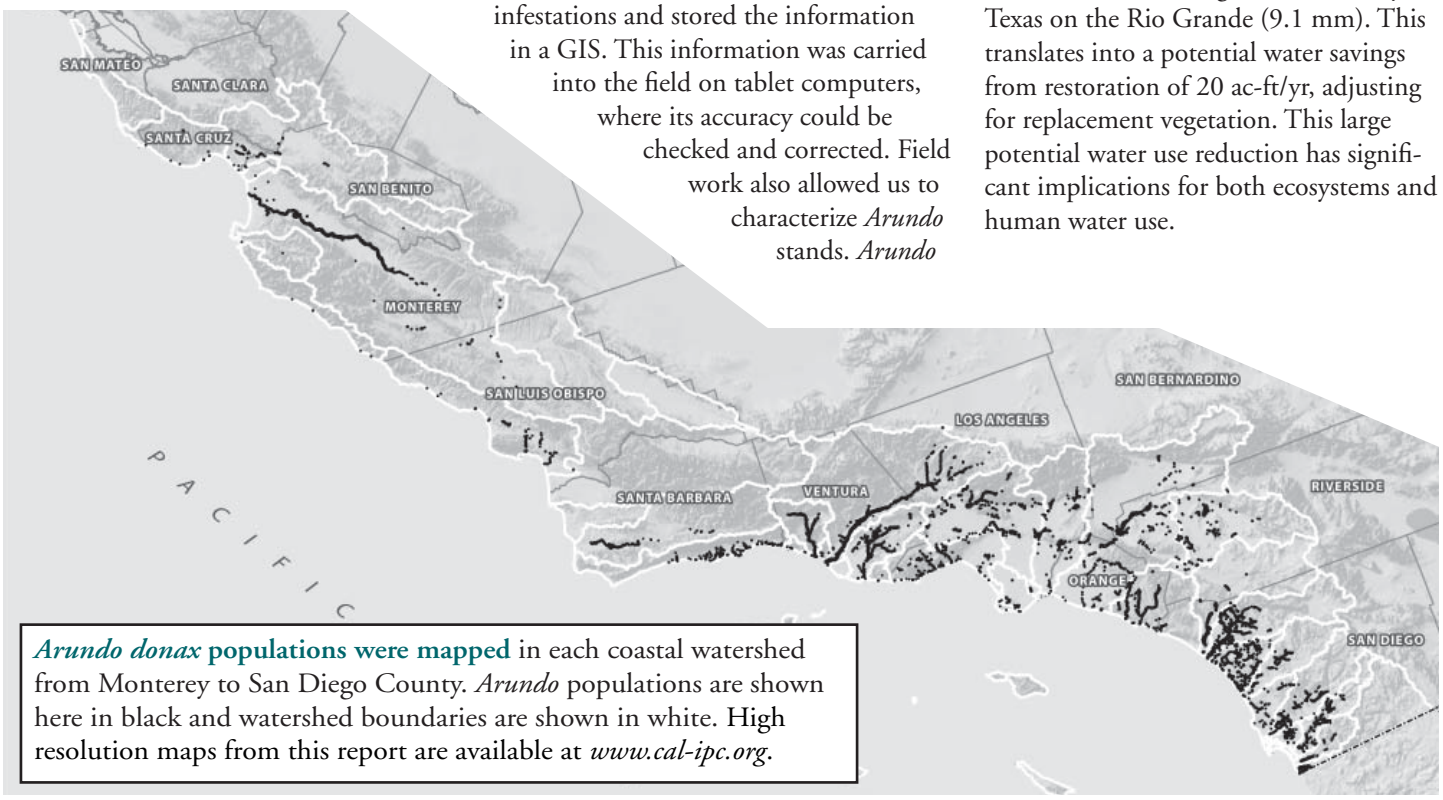
The project entailed two complementary efforts. First, we mapped *Arundo* distribution in each coastal watershed from Monterey to San Diego at high-resolution. Second, we compiled and augmented the best available information on a range of impacts from *Arundo* and used our distribution maps to estimate the impacts in each watershed. The effort began in 2007, funded by a grant from the State Water Resources Control Board.

Arundo is a high-impact invasive plant in California, densely infesting many coastal watersheds with canes growing twenty feet and higher. Historic photos show approximately 8,907 gross acres of *Arundo* in the study area prior to initiation of control programs in the last two decades. Over 34% of this acreage has been treated to date, costing more than $70 million. A high level of control (over 90%) has been achieved in two highly invaded watersheds, and infestations in other watersheds have been controlled to a level of 50% or more, indicating that effective watershed-based control is a realistic objective.

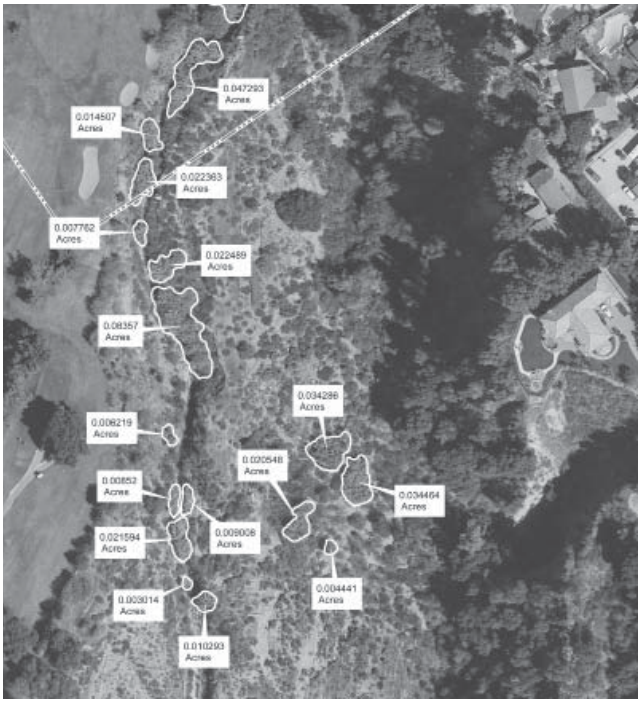
Our *Arundo* mapping integrated several techniques. Using high-resolution georeferenced aerial imagery, we drew polygons around apparent *Arundo* infestations and stored the information in a GIS. This information was carried into the field on tablet computers, where its accuracy could be checked and corrected. Field work also allowed us to characterize *Arundo* stands. *Arundo* within the study area was taller (average 6.5 m (21 ft.), maximum 9.9 m (32.5 ft.)) than reported by many previous studies. Biomass was confirmed as being extremely high (15.5 kg/m^2). Leaf area was extremely high at 15.8 m^2/m^2 (leaf area per area of ground), which is consistent with other studies in California, but higher than reported in Texas where stands are shorter. Stand structure data is an important factor in quantifying water use. In addition, we studied the impact of *Arundo* on fluvial processes, fire risk, and habitat for listed species.

Water Use

Combining our leaf area measurements with published leaf transpiration rates produced high water use for *Arundo* stands (40 mm/day). Few studies to date have measured *Arundo* water use. Our results agree with one study in California (41.1 mm) and are higher than a study in Texas on the Rio Grande (9.1 mm). This translates into a potential water savings from restoration of 20 ac-ft/yr, adjusting for replacement vegetation. This large potential water use reduction has significant implications for both ecosystems and human water use.



***Arundo donax* populations were mapped** in each coastal watershed from Monterey to San Diego County. *Arundo* populations are shown here in black and watershed boundaries are shown in white. High resolution maps from this report are available at *www.cal-ipc.org*.



***Arundo donax* was first mapped** on high-resolution georeferenced aerial imagery. These populations were then ground-truthed. Note the house on the right side of the photo for scale.

Fluvial Processes

Arundo affects fluvial processes that determine the shape and flow of a river and regulate the riparian ecosystem. Such alterations are usually negative for native species adapted to pre-invaded ecosystem function. Our field investigations and hydrologic modeling compiled by consulting firm NHC, Inc. suggest that large stands of *Arundo* functionally increase elevations by 1.5 m (5 ft.), in addition to increasing stream flow 'roughness' when flows exceed this height. Together these factors result in a significant reduction in flow capacity.

Arundo stands occur predominantly in the floodplain and terraces, and are nearly absent from the low-flow and active channels. Hydrologic modeling indicates that *Arundo* stands result in a deepening of the channel and a transformation of the system from a dynamic set of small braided channels to a single stable channel. Smaller sized flow events result in sediment removal from channel areas. During large flow events sediment aggregates on floodplains and river terraces with *Arundo* stands. These changes affect sediment transport budgets, vegetation succession following flow events, and the geomorphic structure of the habitat, all of which alter the ecosystem.

Fire

Both fires and fire suppression have significant impacts in riparian areas. *Arundo's* high biomass and stored energy are well-established based on field and published data. In addition, *Arundo* stands have a tall, well-ventilated structure containing dry fuels throughout the year. Because of this, *Arundo* stands may convey wildfire across a riparian zone better than native vegetation. The Simi fire in the Santa Clara watershed was one of the clearest examples of an upland wildfire spreading across a riparian zone dominated by *Arundo*, and then igniting fuels on a separate mountain range.

Perhaps more importantly, this study documented a new class of fire events that are fully ascribed to *Arundo*, in which transient encampments and highway overpasses serve as ignition sources. Fires are now starting in riparian areas, which did not occur historically. Over a ten year period *Arundo*-initiated fires were estimated to impact 557 acres of *Arundo* and 732 acres of riparian habitat in the study area, while wildfire initiated outside the riparian area burned 544 acres of *Arundo*.

Listed Species

Impacts to plants and animals were explored by examining 22 federally-listed species and assessing types of impact and co-occurrence between *Arundo* and the species. Avian and fish species were the most impacted by *Arundo*, with amphibians also ranking high. Plants and mammals were much less affected. The two most severely impacted species were least Bell's vireo (*Vireo bellii pusillus*) and the arroyo toad (*Bufo californicus*), followed by the southwestern willow flycatcher (*Empidonax traillii extimus*), southern steelhead (*Oncorhynchus mykiss*), and tidewater goby (*Eucyclogobius newberryi*). *Arundo* also impacts several species that occur in estuary and beach habitat near river mouths. The Santa Margarita, Santa Ana, San Luis Rey, and Santa Clara watersheds had the highest impacts to federally-listed species.

Costs vs. Benefits

We calculated benefits in economic terms, and compared them against the costs of *Arundo* control. Cost was determined based on completed control work on numerous watersheds over the past 15 years. Benefits are based on each impact (water use, sediment trapping, flood damage, fire, habitat, and beach debris) applied across the study area and at the watershed level. We valued benefits conservatively, and also noted additional

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***Arundo* canes grow densely** in riparian areas. This new report quantifies impacts and provides high-resolution maps to aid treatment.

20th Annual Cal-IPC Symposium

Invasive Plants and Ecological Change

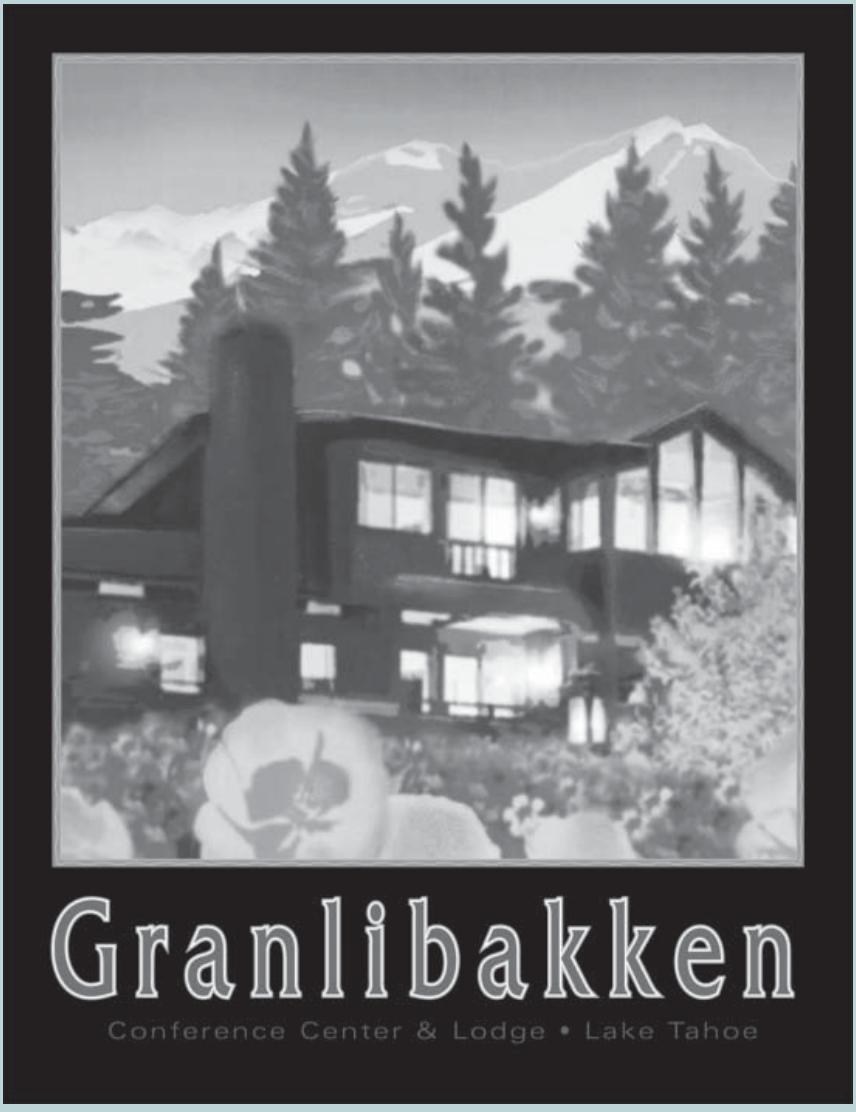
October 4 – 7, 2011

Granlibakken Conference Center, Tahoe City

Join us under the trees at the Granlibakken Conference Center and Lodge in Tahoe City to celebrate Cal-IPC's 20th anniversary! Special sessions will address the many facets of ecological change, especially the impacts of climate change in the Sierra Nevada.

Lake Tahoe, the jewel of the High Sierra, is the highest lake of its size in the United States, with 72 miles of shoreline. Tahoe City is perched on the shore of Lake Tahoe at the headwaters of the Truckee River.

Field Course
Presentations
Discussion Groups
Posters
Awards
Photos
Raffle
Exhibitors
Field Trips



Field Course: On Wednesday, October 4, we will host a course on Field Techniques for Reporting Invasive Plants. Topics include data-recording standards, vouchering techniques, estimating distance and cover, occurence reporting, data management, communicating about your program, field safety, and landscape level planning. Register with the Symposium and receive a discount!

Keynote speaker: Carla D'Antonio, now at UC Santa Barbara, was the keynote speaker at our first Symposium. She will address change over the last twenty years, and planning for the next twenty.

Discussion Groups: Best Management Practices for Prevention; Aquatic Invasive Plants; Contractor/Client Relationships; Management Q&A, and more.

Field Trips: On Friday, October 7, come explore Lake Tahoe Basin's invasive plant sites by boat, bike, foot or car. Visit the Angora Fire area, a demonstration garden and restoration projects, invasive detection and eradication projects of the local WMA or aquatic weed control projects at Emerald Bay.

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More at www.cal-ipc.org

2010 Golden Weed Wrench Award Winner Sandy DeSimone is congratulated by Cal-IPC Board Member Katharine Suding at last year's Symposium.

More on the Symposium. . .

Registration, Transportation, Lodging

Registration opens in June! Register online for faster processing and choose from several payment options. Registration includes meals, lodging, and 2012 Cal-IPC membership.

Rates: Regular: $290 ($315 after Sept. 2, $340 on-site)
Student: $100 ($125 after Sept. 2, $150 on-site)
Symposium Volunteer: $185 (before Sept. 2 only)
Restoration Volunteer: $185 (before Sept. 2 only)
Field Course: $145 ($165 without Symposium)

Getting There: Tahoe City is located on the north shore of Lake Tahoe, two hours northeast of Sacramento and 50 minutes southwest of Reno, NV. Granlibakken offers transportation from the Reno/Tahoe International Airport for $40/person each way, with 7 days advance notice.

Lodging: Granlibakken Conference Center offers a variety of room options. See our website for more information. Some rooms are reserved at special rates for government employees. Attendees receive free internet and parking. Reserve your room through our website by Sept. 3 to receive the discounted group rates.

Sponsorship Opportunities

Sponsoring the Symposium is a great way for your organization to reach California's natural resource managers while supporting the event. Five levels of sponsorship offer benefits including free registration, exhibit space, and recognition in Symposium materials. Info at *www.cal-ipc.org*.

Cal-IPC staff member Bertha McKinley and attendees enjoy the keynote address at the 2010 Symposium.

Call for Papers & Posters: Due June 20

Submit your abstracts on invasive plant biology, management, or outreach programs by Monday, June 20. We especially encourage presentations that address this year's theme of "Ecological Change". Full details and instructions for abstract submission are available at *www.cal-ipc.org/symposia/presenters.php*.

Student Contest

Students are invited to enter our fourth annual Student Paper and Poster Contest. First place in each category receives $250. First, second, and third places will be recognized at the Symposium and in *Cal-IPC News*. Info at *www.cal-ipc.org*.

Award Nominations: due July 9

The Symposium is an opportunity to honor individuals and organizations who have made exceptional contributions to invasive plant research or management. We welcome nominations for: the Jake Sigg Award for Vision and Service; the Golden Weed Wrench Award for Land Manager of the Year; the Ryan Jones Catalyst Award; the Invasive Plants Policy Award; and the Organization of the Year Award. Send nominations to *awards@cal-ipc.org*. See past honorees at *www.cal-ipc.org/symposia/awards.php*.

Photo Contest: Due September 2

Show off your photographic talents in the annual Cal-IPC Photo Contest! Photos will be displayed at the Symposium and attendees will choose Best in Show. Entries can include specimen photos of individual plants, landscape photos, or action photos of weed workers. We especially encourage photos that illustrate the impacts of weeds. Send entries to *photos@cal-ipc.org*.

Auction and Raffle

The Symposium is not just about learning the newest research results and management techniques; it's also about having fun with fellow weed workers! Our Wednesday night happy hour includes a raffle with a variety of great prizes: tools, trips, wine, books, artwork, clothing, and more. The banquet later in the evening features a live auction of a few special items. Come mingle with like-minded folks from around the state and recharge your batteries. Contact *raffle@cal-ipc.org* if you have a special item to contribute.

Workshop

Hybrid Spartina Forum: Defining eradication for a genetic invader

by Ingrid Hogle, San Francisco Estuary Invasive Spartina Project

Eighty-five land managers, agency personnel, representatives of environmental organizations and world-class scientists gathered for two days to discuss the "end game" of invasive cordgrass eradication at the recent Hybrid Spartina Forum in Oakland, California.

The forum was timely as the State Coastal Conservancy (SCC) marks the tenth year of its San Francisco Estuary Invasive Spartina Project (ISP). The SCC initiated the ISP in 2000 with the goal to reverse the spread of invasive *Spartina*, and to eradicate it from the estuary if possible. This invasive *Spartina* is primarily a result of hybridization between the native Pacific cordgrass (*Spartina foliosa*) and smooth cordgrass (*Spartina alterniflora*) from the East Coast, which was introduced by the Army Corps of Engineers in the 1970s. The resulting hybrid plants, discovered and documented by scientists at UC Davis in the late 1990s, are extremely invasive "ecosystem engineers" that threaten the integrity of marshes, mudflats, flood control channels, mosquito abatement efforts and habitat restoration efforts around the bay.

Successful, coordinated, regional treatment of invasive, hybrid cordgrass by the ISP since 2005 has led to a nearly 90% reduction in hybrid *Spartina* acreage throughout the estuary. However, genetic results indicating presence of hybrid *Spartina* in sites that appear to contain only pure Pacific cordgrass complicate the issue of when and what to treat, and thus complicate the definition of eradication. The devil is truly in the details of how one defines the target of eradication.

SCC Project Manager Marilyn Latta kicked off the forum with the announcement that the Conservancy expects to complete control by 2013, and expects continued monitoring for zero net acres through 2016. ISP Project Director Peggy Olofson explained that eradication of all discernable hybrids is possible, and that the challenge is now to determine what to do about those hybrids that are not discernable. The question, she posed, is "how far do we go?"

Forum participants were challenged to identify native vs. invasive hybrid *Spartina* plants in 19 hands-on displays. "Votes" were tallied using red and green dots, after which the true identification was revealed. The verdict? "It's not easy!" Photo by Jude Stalker, Invasive Spartina Project.

The forum was designed to provide an opportunity for thoughtful consideration of this question in light of the management objectives of the region's many stakeholders. Participants were asked to consider the likely impacts of continued elimination of discernable *S. alterniflora* x *foliosa* hybrids from the marshes and mudflats of the San Francisco Bay in light of their organization's missions and the tidal ecosystem goals for the entire estuary.

To inform the consideration of this question, a multitude of invited speakers gave presentations on topics ranging from genetics to restoration, and from ecology to federal endangered species policy. The full list of speakers and talks is available at *www.spartina.org/Hybrid_Forum.htm*.

Geneticist Valerie Hipkins, USDA National Forest Genetics Lab, spoke about the unique challenges of conducting management-based genetic work. Malika Ainouche, University of Rennes, France, explained work done in her lab on similarly closely related hybrids of different *Spartina* species. Tom Witham discussed his work on hybrid cottonwoods, eucalyptus and other species which indicates that minor variation in genotypes within a species can impact the accumulation of heritable traits, and that changes to the genetic structure of a species within a site can change the community of other plants and animals supported by that species, and may ultimately affect the evolution of the entire community.

Joy Zedler, University of Wisconsin, discussed the ecology of native *Spartina foliosa*, especially as it grows in southern California, where it appears to have great phenotypic plasticity in response to wet or dry years, and where she has found a long period of low salinity a requirement for its establishment in restored marshes. Dan Simberloff, University of Tennessee, discussed examples of other invasive, hybrid species and cautioned that no

...continued page 16

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New Members

As a Cal-IPC Member, you join a powerful network of land managers, researchers, volunteers, and concerned citizens. Welcome!

Douglas Anthony (DriWater, Inc., Point Richmond), **Charles Baughman** (Boulder Creek), **William Bianco** (West Sacramento), **Mark Bibbo** (Westervelt Ecological Services, Sacramento), **Fred Booker** (Alameda County Master Gardeners, Berkeley), **Ian Boyd** (Restoration Resources, Rocklin), **Greg Bringelson** (Santa Clara County Parks & Rec., Los Gatos), **Hattie Brown** (Laguna de Santa Rosa Foundation), **Tish Brown** (San Francisco), **Cherilyn Burton** (CDFG, Sacramento), **Rosemarie Calzontzi** (Santa Rosa), **Scott Carnegie** (W.M. Beaty & Associates, Inc., Fall River), **John Chapman** (Santa Clara Valley Water District, San Jose), **Kathleen Chasey** (CNPS, Napa), **Heather Clayton** (Yorba Linda), **Kara Doolin** (Sonoma Land Trust), **David Dzuik** (Chico), **Shama Ejaz** (Fremont), **David Emmerson** (La Costa Canyon HS, Carlsbad), **Loren Eppler** (Hazleton, PA), **Scott Kent Fowler** (Woodmans Pest Control & Horticultural Pest Management, Oroville), **Gretchen Garwood** (Western Shasta RCD, Anderson), **Holly Gellerman** (CDFG, Sacramento), **Zoe Glas** (Oak Run), **Jonathan Gomes** (Alameda County Dept. of Agriculture, Livermore), **Joanne Greer** (Alameda County Dept. of Agriculture, Livermore), **Alyssa Hernandez** (San Mateo RCD, Half Moom Bay), **Bruce Heublein** (Cayucos), **Bridget Hilbig** (Riverside), **Brandon Hill** (Fresno), **John Holson** (ICF International, Sacramento), **Melissa Howe** (Bon Terra Consulting, Consta Mesa), **Andrew Isner** (UCCE, Tulare), **Matt James** (Coastal Restoration Consultants, Carpinteria), **Bill Johnson** (City of Novato Public Works), **Sally Krenn** (PG&E, Avila Beach), **Chris Long** (California National Guard, San Luis Obispo), **Mark Lujan** (Audubon Canyon Ranch, Stinson Beach), **Alejandra Martinez-Berdeja** (UC Riverside), **Kathryn McEachern** (USGS Channel Islands), **Chelsea Moller** (San Mateo County RCD), **Max Neale** (Tahoe RCD, South Lake Tahoe), **Jesse Patterson** (Santa Ynez Banch of Chumash Indians), **Raynelle Rino** (Literacy for Environmental Justice, San Francisco), **Ginny Short** (Center for Natural Lands Management, Thousand Palms), **KC Sorgen** (Sacramento Area Flood Control Authority), **Jennifer Steele** (San Luis Obispo County Ag Dept., Arroyo Grande), **Steven Swain** (UCCE, Novato), **Ashenafi Tadesse** (Alameda County Dept. of Agriculture, Livermore), **Lina Valenzuela** (San Joaquin Valley Parkway Trust), **Hannah Wallis** (Watsonville), **Catherine Waterston** (Peninsula Open Space Trust, Palo Alto), **Shana Welles** (Riverside), **Christina Williams** (Atascadero), **David Williams** (Fremont)

New Organizational Members

Organizational Members advance Cal-IPC's mission to protect California's wildlands from invasive plants.

Big Sur Land Trust
Cabrillo National Monument
Cache Creek Conservancy
City of Walnut Creek
CNPS - Los Angeles Chapter
County of Marin Flood Control & Water Conservation District
Contra Costa County RCD
Cooley Ranch, Inc.
County of Santa Clara
DeAngelo Brothers, Inc.
Fallbrook Land Conservancy
Go Native, Inc.
Huntington Library
Inyo County Water Department
Olofson Environmental, Inc.
Orange County Water District
Presidio Trust
Restoration Resources
Sacramento Area Flood Control Agency
Tom Dodson & Associates
Tule River Tribal Council
Yocha Dehe Wintun Nation

Policy Update

Cuts and More Cuts

by Doug Johnson, California Invasive Plant Council

As much as natural resource managers desire secure, steady funding to maintain effective programs, public funding for invasive plant management has been anything but steady in recent years. After last year's injection of federal stimulus funding (benefitting the work of Cal-IPC, among others) California state government funding for weed work is crashing.

Funding for Weed Management Areas through the California Dept. of Food & Agriculture's general fund budget has been eliminated. It's not the first time. In 2006, after the program's initial funding sunset, Cal-IPC led a statewide letter-writing campaign that convinced the legislature to restore program funding.

At the current juncture, however, it is clear that the state is bent on squeezing general fund programs out of CDFA, leaving the department to exist on federal and industry funding. There may be potential to engage the California Natural Resources Agency in the future, given that the WMA program serves a public environmental purpose.

Having the WMA program within CDFA has always presented a challenge – support for weed programs, especially when they address wildland weeds as much as agricultural weeds, always takes a back seat to support for high-impact crop pests. This is understandable, but unfortunate.

Despite this imperfect fit, the historic relationship between CDFA and the statewide network of county agricultural commissioners is a tremendous asset in coordinating weed work. Although the state's noxious weed list leaves out many invasive plants with an ecological impact, the list and ratings provided a framework for coordinated action. WMAs were also able to address plants from Cal-IPC's Inventory.

So it is a significant blow that CDFA is also cutting all funding for its century-old terrestrial weed eradication program, which provided a network of regional field biologists to work with county agricultural commissioners on identifying and managing high priority weed populations. CDFA has also cut the entire weed biocontrol program, which serves to distribute appropriate biocontrol agents to counties. In addition, the CDFA Botany Lab, which helps identify plants and maintain what may be the state's largest collection of herbarium specimens, has been cut significantly. Needless to say, Cal-IPC will be working with partners in the departments and the legislature to find creative solutions.

Some of the crew from the 8th Annual Invasive Weeds Awareness Day at the Capital.

On March 16, 40 intrepid weed workers came to Sacramento for the 8th Annual Invasive Weeds Awareness Day at the Capitol. We walked the halls of the state legislature, visiting the offices of all 120 Assembly Members and State Senators. We were met with near universal support, and a high degree of understanding of the issue, due in large part to previous years' efforts. (One staffer had four species of plastic weeds in his office from past visits!) We particularly noted interest from several Los Angeles area representatives.

Cal-IPC Executive Director Doug Johnson at National Invasive Species Awareness Week, Washington, DC. Photo by Janet Clark.

Earlier in March, I joined other invasive species specialists in Washington, DC, for National Invasive Species Awareness Week. Panel sessions explored coordination needs across the country for WMAs, state invasive species councils, and mapping networks. The National Environmental Coalition on Invasive Species held a well-attended lunchtime meeting at Defenders of Wildlife offices that covered topics ranging from Asian carp spread to forest pest prevention campaigns and animal import screening law.

While funding for invasive species management is not encouraging at this point, there are grounds for optimism in the evolving potential for collaboration. Such collaboration holds promise for strengthening the case for renewed support for invasive species management.

...*Spartina* from page 13

successful eradication has ever faced an issue of hybridization. With regard to the eradication of hybrid *Spartina*, he pronounced:"If you succeed…it would be the greatest triumph of invasion biology."

Marc Holmes, San Francisco Bay Joint Venture, described the history of tidal marsh restoration in the San Francisco Bay, putting into perspective the impressive size and extent of current restoration projects underway in the Bay Area and emphasizing how each project builds on the successes of previous ones. John Bourgeois, South Bay Salt Pond Restoration, discussed the challenges in moving forward with restoration knowing that invasion by hybrid *Spartina* threatens the success of restoration, and creation of new habitat for invasion threatens to delay the success of invasive *Spartina* eradication. Diane Elam, U.S. Fish and Wildlife Service, presented an impressive number of case studies involving endangered species and hybridity.

On each day, participants were assigned to one of four break-out groups to discuss a question and then report back to the whole group. On Day 1, their exercise was to describe the main impact of invasive, non-native *Spartina* in terms of the mission of their organization, and to describe their organization's current goal with regards to *Spartina*. On Day 2, the question was, "Do you care if any hybrid alleles are left? If so, why? If not, why not?" In other words, does it matter to you and/or your organization if any genetic variability not present in pure native *S. foliosa* prior to the introduction of *S. alterniflora*, remains in any of the *Spartina* left behind by the ISP that is not visually discernible as hybrid *Spartina*.

At the end of the forum, participants seemed to reach a consensus that the conservation community should prioritize the big picture goal of restoring tidal ecosystem functions, and needed to accept that the detection and removal of all hybrid alleles was simply not feasible. Fears that those alleles left behind might be able to recombine and allow the re-emergence of invasive traits in future generations of plants was a strong concern, however, for such a re-emergence of invasive *Spartina* would once again threaten the ultimate goal of maintaining and restoring tidal ecosystem function.

...News from page 3

livestock and machinery. (FSEEE Stay Informed Newsletter, Spring 2011, *fseee.org)*

In honor of National Invasive Species Awareness Week, National Public Radio produced a segment on "The Art of War on Invasive Species". The program profiles an artist and volunteer weed worker in Washington, D.C. who uses weeds pulled from Rock Creek Park to create handmade paper, paint brushes, and art. For instance, he derives ink from English ivy. (February 28, 2011, *www.npr.org*)

The Lake Tahoe Restoration Act (S. 432), introduced in Congress on March 2, would provide $415 million over ten years to improve water clarity, reduce the threat of fire and restore the environment of the Tahoe Basin. Among other provisions, the bill would authorize $20.5 million for watercraft inspections and removal of aquatic invasive species. It was originally introduced last year but stalled in Congress. Information on the bill's status is at *thomas.loc.gov.*

The EPA and conservation groups reached a settlement to limit the introduction of invasive species into the Great Lakes. The agreement requires the EPA to issue a new permit regulating ballast water discharges from commercial vessels in settlement of lawsuits brought by a dozen conservation groups challenging the legality of the EPA's existing permit. Ballast water, water taken into tanks on commercial ships to main stability, is a major transport mechanism of invasive aquatic species. (Natural Resources Defense Council, March 8, 2011, *www.nrdc.org*)

2011 Field Course Schedule

San Francisco

The Presidio's Log Cabin

June 21 - Strategic Approaches

June 22 - Control Methods

San Diego

Tijuana River NERR

August 3 - Mapping

August 4 - Control Methods

Tahoe City

Granlibakken Conference Center

Oct. 4 - Field Techniques for Reporting Invasive Plants NEW!

Cal-IPC Field Courses give you access to expert instructors and core information needed to manage invasive plants. Take more courses and work towards your Cal-IPC Trained Wildland Manager certificate.

Register for courses, or learn more about course curricula and the certificate program at www.cal-ipc.org, or call us at (510) 843-3902.

Readings & Resources

Know of a resource that should be shared here? Send it to edbrusati@cal-ipc.org.

Online Training Program

Southeastern Community College in North Carolina offers an online, college-level training program in invasive species management. Students may complete classes for continuing education requirements, a Certificate of Invasive Species Management, or an Associate in Science degree in Environmental Science Technology with a second year focus in invasive species management. *www.invasiveplantcontrol.com/ManagementTrainingProgram-Overview.pdf*

Every Plant

The Plant List is a working list of all known plant species (vascular plants and bryophytes). It provides the accepted Latin name for most species, with links to all synonyms by which that species has been known and includes 620 plant families and 16,167 plant genera. *www.theplantlist.org*

Weed of the Month

The Monthly Weed Post is a two-page pdf bulletin featuring a noxious weed, interesting research finding, or other weed management issue, followed by a crossword puzzle or other educational activity to test your knowledge. *msuextension.org/invasiveplantsMangold/extensionsub.html*

Weeds and Climate Change

The new book *Weed Biology and Climate Change* provides a synthesis of known information on the probable impact of environmental change on weed biology, including impacts of weed biology on agriculture, invasive species that limit ecological diversity, and weeds that are health risks. In addition, it looks at current weed management strategies. *www.wiley.com*

Climate Adaptation

The Climate Adaptation Knowledge Exchange (CAKE) is a joint project of Island Press and EcoAdapt aimed at building a shared knowledge base for managing natural systems in the face of rapid climate change. It features a virtual library, case studies, a project directory, and climate modeling tools. *www.cakex.org*

Teacher Resources

The Aquatic Invasive Species Toolkit is a comprehensive set of fun, challenging, inspiring lessons and activities designed to help kids understand what invasive species are, how they affect the environment, and what we can all do about them. Produced as a collaboration between Sea Grant and teachers in Oregon, Washington and California. *seagrant.oregonstate.edu*

Recreation Prevention Videos

"Playing Smart against Invasive Species" by the USDA Forest Service explains how people can avoid spreading invasive species while enjoying the great outdoors. Videos range from 6-27 minutes, can be viewed online, and cover camping, horseback riding, canoeing, snowmobiling, cross-country skiing, and biking. *www.fs.fed.us*

Humboldt Bay Maps

New full-color, digital aerial photographs and benthic habitat maps of Humboldt Bay and Eel River Estuary are now available. The images, all orthorectified and GIS-compatible, provide a detailed inventory of intertidal and subtidal bottom habitats. *www.csc.noaa.gov/digitalcoast/index.html*

...*Arundo* from page 9

funds invested. This confirms a significant benefit in controlling *Arundo* in the study area.

Recommendations

We encourage programs to implement control starting in the upper reaches of the watershed, particularly if the watershed is heavily invaded. Treatment priorities in the region include: continuing treatment of *Arundo* in areas that have already been treated (protecting initial investment); controlling *Arundo* in watersheds where it is not yet abundant but could spread (early control is more cost effective); and controlling *Arundo* in more highly invaded watersheds in a ranked order. We ranked watersheds based on four impact classes (water use, geomorphology, fire, and listed species) and two classes of existing program capacity (experience and regulatory permits).

This study provides a foundation for justifying investments in *Arundo* removal in coastal watersheds from Monterey to San Diego, and it's methods allow for assessing particular benefits in each watershed. The reports detailed maps also provide a blueprint for planning management efforts in each watershed, and we hope it will be used to catalyze future work protecting the region's riparian areas.

The complete report, along with maps and a geodatabase of the mapping results, may be downloaded from *www.cal-ipc.org/ip/research/arundo*.

The Wildland Weed Calendar

May - July

SERCAL's 18th Annual Conference
May 10-12
San Diego
www.sercal.org/conference.htm

Cal-IPC Bio & ID and Control Courses
May 17 & 18
Redding
www.cal-ipc.org

CNGA Workshops:
Grassland Monitoring
May 27, Davis

Intro to CA Grasslands Workshop
June 11, Santa Rosa

Grass ID Wrksp
June 25-26, Point Reyes Station
www.cnga.org

Cal-IPC Strategic Approaches and Control
June 21 & 22
San Francisco
www.cal-ipc.org

ESRI International User Conference
July 11-15
San Diego
www.esri.com/events

55th Annual Weed Day
July 14
UC Davis
wric.ucdavis.edu

California Invasive Weeds Awareness Week
July 18-22, Statewide
Sponsor an event!
www.cal-ipc.org/policy/state/ciwaw.php

51st Aquatic Plant Management Meeting
July 24-27
Baltimore, MD
www.apms.org

August & September

Cal-IPC Mapping and Control Courses
August 3 & 4
San Diego
www.cal-ipc.org

Ecological Society of America
August 7-12
Austin, TX
www.esa.org/austin

SER Int'l Congress on Ecological Restoration
August 21-25
Merida, Yucatan, Mexico
www.ser2011.org

Weed Science School
August 30 - Sept. 1
UC Davis
wric.ucdavis.edu

Int'l Conf. on Alien Plant Invasions
August 30-September 3
Szombathely, Hungary
www.emapi2011.org

October & beyond

Cal-IPC's 20th Annual Symposium
October 4-7
Granlibakken, Tahoe City
www.cal-ipc.org

Continental Dialogue on Non-Native Forest Insects & Disease
October 5-6
Boulder, CO
www.continentalforestdialogue.org

Natural Areas Conference
November 1-4
Tallahassee, FL
www.naturalarea.org

North America Congress for Conservation Biology
July 15-18, 2012
Oakland
www.scbnacongress.org

CNPS Conservation Conference
January 10-14, 2012
San Diego
www.cnps.org/cnps/conservation/conference/2012

CA Weed Science Society Conference
January 23 – 25, 2012
Santa Barbara
www.cwss.org

Quotable

"By turning weeds into art that honors weeds, he found the meta in the metamorphosis."

~ Linton Weeks, NPR, discussing artist Patterson Clark of Washington, DC, "The Art of War on Invasive Species", *www.npr.org,* February 28, 2011.

"It's easy to get burned out if you chainsaw honeysuckle eight hours a day"

~ Claire Nicholson, natural resource technician in Illinois, describing her interest in a variety of control methods, in "Techs bring the heat to rid the region of invasive plant species" by Annie Getsinger, *www.herald-review.com*, November 25, 2010

California Invasive Plant Council

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☐ SERCAL & CNGA	add $65

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