



# Cal-IPC News

*Protecting California's Natural Areas from Wildland Weeds*

Quarterly Newsletter of the California Invasive Plant Council



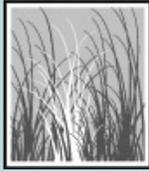
## Bentgrass stymies wetland plans

*Jeremiah Mann of the USDA Natural Resources Conservation Service holds up windblown pannicles from Australian bentgrass (Agrostis avenacea) from a seasonal wetland managed by the Sonoma Land Trust.*

*Photo: Karl Kraft, NRCS*

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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.

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## Cal-IPC News

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## From the Director's Desk

### Front page news

Here at Cal-IPC we consider the environmental impacts of invasive plants to be front page news. It is not often that the media does, too. On May 26 the *Sacramento Bee* carried a front page article on yellow starthistle and state budget cuts to weed programs. Cal-IPC staff and members provided information for the article, and the story was picked up by national press and radio. The article describes what's at stake in the effort to stop yellow starthistle from infesting higher elevations in the Sierra Nevada. By focusing on "leading edge" populations at the 4000-foot level, the project is a cost-effective approach to protecting uninvaded areas higher up. An example like this helps convey the dynamic nature of weed spread, and how land management strategy is set.

The author gets a few things wrong in trying to dramatize and personalize the threat. When was the last time you encountered starthistle six feet tall, with spikes "perfectly placed to stab a shoulder or poke an eye"? And though it reduces abundance of native grassland species, starthistle cannot literally "turn meadows into deserts." Such inaccuracies are inevitable with media attention. Online comments appended to the article make it clear that there are skeptics ready to use any such weakness to dismiss the entire topic. But many more readers are informed about an issue that affects them.

Environmental communications experts caution against alarmist messages that can, in aggregate, contribute to resignation in the face of seemingly insurmountable problems. We are challenged to convey the urgency of this issue while pointing to positive work that can and should be done. Like us, you may get excited when you see or hear invasive plants covered in the news. When you do, send us clippings or links to help us track invasive species and public perceptions. We will continue to push for increased coverage.

Regarding the article on page 8, all I can say is that is has been and continues to be an incredible team effort, and I am privileged to hold this position. See you at our 21<sup>st</sup> Symposium, October 10-13 in Sonoma County!



**Goats browsing Spanish broom** on lands of the Robinson Rancheria Band of Pomo Indians in Lake County. The goats successfully treated 5 acres, eating leaves and young shoots and barking the remainder of the plants, which were finished off by applying clove oil to the crown in the summer. *Photo courtesy of Greg Dills, East Lake & West Lake RCDs and Alisa Carlson, Cow Mountain Kiko Goats.*

# Wildland Weed News

Nevada, Placer and Sierra counties received Sierra Nevada Conservancy grants for weed work. Two grants totaling \$73,867 will allow the counties to treat invasive plants at 25 strategic locations totaling 120 acres on the west side of the Tahoe National Forest, reducing the threat of catastrophic fires by removing ladder fuels and improving stream bank habitat. Removal of musk thistle along the Truckee and Little Truckee River and reservoirs will also be supported.

**California's Wildlife Action Plan is being updated.** The plan was first completed in 2007 by the state Department of Fish and Game (DFG) and UC Davis to fulfill federal requirements for receiving wildlife grants. Invasive species were identified as a major statewide stressor. DFG is coordinating an update of the plan with the goal of developing detailed regional priorities. Cal-IPC aims to partner with DFG and others in identifying invasive plant management priorities for the new plan. ([www.dfg.ca.gov/wildlife/WAP/](http://www.dfg.ca.gov/wildlife/WAP/))

**Non-native and native plant species use different strategies to be successful.** German researchers compared features such as lifespan, type of pollination, and habitats occupied for native and non-native plants. They found differences, such

as non-native plants typically flowered later than native German species and were more likely to be self-pollinated, therefore avoiding competition for pollinators. On the other hand, native plants tended to live in a wider variety of habitats, while non-natives specialized in fewer habitats. These differences persisted even for species that were introduced centuries ago. According to one researcher, "These results are an argument in support of the view that the need to differentiate between native and non-native species in ecological systems remains". The study was published in *Ecology Letters*. (Science Daily, May 4, [www.sciencedaily.com/news/plants\\_animals](http://www.sciencedaily.com/news/plants_animals))

**The Sacramento Bee covered yellow starthistle and state budget cuts.** The article highlighted the Yellow Starthistle Leading Edge project which coordinates projects in 14 counties to prevent the spread of the weed into higher elevations of the Sierra Nevada. In 2011 the program received \$2.7 million in state funding. Now it receives nothing. The mapping effort, as of last year, identified 586 "outlier" starthistle populations that have already jumped across the Leading Edge line and edged higher into the Sierra. Without treatment, these will

likely become the origins of new infestations. (*Sacramento Bee*, May 26, [www.sacbee.com/2012/05/26/4517821/budget-cuts-hurt-long-battle-against.html](http://www.sacbee.com/2012/05/26/4517821/budget-cuts-hurt-long-battle-against.html))

**A dock dislodged by last year's tsunami in Japan brought 100 tons of organisms and dozens of species to Oregon.** Scientists have collected barnacles, starfish, urchins, anemones, amphipods, worms, mussels, limpets, snails, solitary tunicates and algae that survived the trip across the Pacific. They include a brown alga (seaweed) called wakame (*Undaria pinnatifida*) which has never before been found north of Monterey (and is on the Cal-IPC Inventory). (Eureka Science News, June 7. [esciencenews.com/articles/2012/06/07/floating.dock.japan.carries.potential.invasive.species](http://esciencenews.com/articles/2012/06/07/floating.dock.japan.carries.potential.invasive.species))

**Four botanical gardens will compile information on 400,000 plant species worldwide.** The New York Botanical Garden, Missouri Botanical Garden, The Royal Botanic Gardens at Kew, and the Royal Botanic Garden Edinburgh have announced plans to develop the World Flora, the first modern, online catalog of the world's plants, by the year 2020. (Phys.org, April 23, [phys.org/news/2012-04-online-botanical-gardens.html](http://phys.org/news/2012-04-online-botanical-gardens.html))

## Cal-IPC Updates

### Fire BMPs Coming Soon

A new chapter of our Prevention Best Management Practices Manual will cover prevention for wildfire-related activities, with funding from the US Forest Service. [www.cal-ipc.org/ipl/prevention](http://www.cal-ipc.org/ipl/prevention).

### Watchlist Updated

This list of new plants of concern has been updated and is available as a spreadsheet or pdf. Send information on new weeds to Elizabeth Brusati, [edbrusati@cal-ipc.org](mailto:edbrusati@cal-ipc.org). [www.cal-ipc.org/ipl/inventory/weedlist.php](http://www.cal-ipc.org/ipl/inventory/weedlist.php)

## Regional Strategies

Cal-IPC is working with regional partners to develop strategies for top priority eradication targets using our online CalWeedMapper tool. From there, we work together on proposals for funding to implement projects. The central Sierra (Alpine, Amador, Calaveras, El Dorado, Tuolumne counties) is applying for grants to eradicate several species in its region. See [calweedmapper.calflora.org](http://calweedmapper.calflora.org).

## Board Elections

Ballots will be mailed in late summer. Please return yours by the deadline on the ballot so your vote can be counted!

## Thank You, Funders!

We recently received grants from the California Landscape Conservation Cooperative for regional planning, as well as from the US Forest Service and the US Fish & Wildlife Service to develop an online version of the WHIPPET prioritization tool with Calflora (see Winter 2011 issue).

## Error

The last issue stated that symposium registration includes lodging. It does not. We apologize for the error.

# Best laid plans... Australian bentgrass (*Agrostis avenacea*) invades following seasonal wetland enhancement

by Julian Meisler, Sonoma Land Trust

[The unanticipated impact of Australian bentgrass on this hydrological restoration project illustrates one of the myriad unpredictable ways in which invasive plants can impede stewardship activities.]

The character of northern San Pablo Bay, which spans portions of Marin, Sonoma, Napa, and Solano counties, is decidedly rural. In the right season (and outside of rush hour), a drive along its edge via State Highway 37 can be a birder's dream with large flocks of waterfowl and shorebirds easily visible in roadside marshes and sloughs.

However, it is by no means pristine. Like most of the San Francisco Bay Estuary, this area was largely diked and drained some 150 years ago resulting in an estimated 70 to 85% loss of both seasonal freshwater and tidal wetlands (Goals Project 1999). Through the efforts of many public agencies, nonprofits, and individuals, great progress has and continues to be made in restoring the area's tidal marshes. Within five years the total area of restored tidal marsh along this stretch will exceed 15,000 acres and more is planned.

Less effort, however, has been devoted to seasonal wetland restoration despite its widely recognized importance. Along Sonoma County's Bay shoreline and adjacent uplands, the Sonoma Land Trust (SLT) owns or has conservation easements over nearly 5,000 acres, including a 279-acre property known as North Parcel. Nearly 10 years ago SLT implemented a project at the North Parcel property intended to create seasonal wetlands on formerly cultivated land, a project that yielded successes but came with a significant unintended consequence.

## Creating wetlands

The primary goal was to create roosting and foraging habitat for shorebirds and dabbling ducks, particularly during high tides and storms when the Bay's mudflats are unavailable. The parameters for such habitat are simple: relatively shallow pools without emergent vegetation accompanied by short statured plants in the surrounding uplands for predator detection.

The project entailed restriction of the site's surface and subsurface drainage to promote ponding in natural depressions. To keep vegetation low, cattle grazing, and to a lesser extent mowing, are the tools used. Initially the pasture was seeded with perennial ryegrass, a species that although non-native, dominates the region and is easily managed with livestock.

The careful engineering used to facilitate ponding was a great success with wetter years yielding more than 160 acres of wetlands. Shorebirds and ducks responded vigorously. Monitoring revealed more than 22,000 individual waterbirds using the site during 17 monitoring visits in 2008 (Wetland and Water Resources 2009).

## Bentgrass invades

But this habitat came at a price. By the close of the first wetland season, the site experienced a massive invasion by Australian bentgrass (*Agrostis avenacea*), a species only occasionally seen in the region and never before in abundance.

Australian bentgrass is native to Australia and apparently to some south Pacific Islands. Classified as a perennial, it may act as an annual (Bauder et al. 2002) and most frequently occurs in temporarily

wet or flooded habitats (Zedler and Black 2004). Known also as blowngrass, its seed-laden panicles disperse by snapping off in the wind and tumbling in great numbers to surrounding lands.

First collected in California in 1904, bentgrass now occurs from Kern County to Tehama County in coastal, valley, and foothill areas from sea level to nearly 1,000 feet in elevation (Zedler and Black 2004, Calflora website 2012). A discontinuous population occurs in San Diego County where it has invaded vernal pools. Importantly, as of 2004, the San Diego vernal pools were the only reported site of significant invasion in all of California (Cal-IPC website).

While bentgrass was first observed in Solano and Marin counties in 1946 and 1957, respectively (Consortium of California Herbaria, [ucjeps.berkeley.edu/consortium](http://ucjeps.berkeley.edu/consortium)), the first record from Sonoma County, which separates Solano and Marin, apparently was not until 1991 (Best et al. 1996). However, it is likely that it has been in Sonoma County far longer but not reported, perhaps because of its low numbers.

Although bentgrass inhabits temporarily wet or flooded habitats, it appears to require disturbance before becoming invasive. For example, bentgrass has been observed for decades at Solano County's Jepson Prairie Preserve, a vernal pool grassland, but it remains a minor component of the flora there.

## Disturbance does it

The wetland project marked a radical change in management at North Parcel and the invasion seems to be the result of several factors. For decades the site had been disked and planted to produce



**Bentgrass** (the finely-textured, light-colored grass in the photo) lines the bottom and banks of this drainage ditch. The grass is tall enough to hide predators of shorebirds and dabbling ducks, the species for which this property is being managed, and control has proven challenging.

oat hay. It is likely that herbicides were used and any weeds, including bentgrass, would have been minimized. Following the cessation of disking, the site was seeded with ryegrass and given over to grazing which in its first year included an unfortunate episode of winter trampling.

Finally, and possibly of greatest importance, the artificial impoundment of water, particularly for extended periods, appears to favor bentgrass. Zedler and Black (2004) report that the species can tolerate prolonged flooding and can germinate in up to 30 cm of water. While other species can do this, there are few that can also tolerate prolonged drought.

### **Management challenges**

At North Parcel, bentgrass is proving extremely difficult to control. Grazing can

be effective in controlling its spread but it must be grazed before going to seed. As the plant matures it becomes unpalatable to cows and the panicles are free to snap and take flight with the region's incessant summer wind. As any land manager using grazing as a management tool can attest, timing can easily be thwarted by logistical challenges including rapid changes in weather, infrastructure failures, lessee challenges, and more.

At North Parcel a somewhat unique factor limiting SLT's ability to graze at the proper time is a conservation easement over half the property held by the USDA Natural Resources Conservation Service (NRCS) under the Wetland Reserve Program (WRP). The WRP is a successful national program that provides financial incentives to private landowners

to enhance wetlands in exchange for retiring marginal land from agriculture. Because it is a wetlands program and not an agricultural program, grazing of the easement area is governed by an annual Cooperative Use Agreement (CUA) produced by NRCS that dictates when and whether grazing (or other agricultural activity) can occur.

Although the goals of the WRP at North Parcel may include shorebird habitat, it cannot be at the expense of other species' habitats, grassland birds for example, which are negatively affected by close cropping of vegetation by livestock.

This challenge was exemplified in 2012. The CUA permitted grazing to

**...continued page 10**

# Cal-IPC's 21<sup>st</sup> Annual Symposium

## Bay to Basin: Coordinating Response to Invasive Plants across California

October 10 - 13, 2012

Wine Country Doubletree, Rohnert Park

*Join us in Sonoma County for this year's Symposium!*

From oak woodlands to redwood groves, San Francisco Bay shoreline to the planned Blueridge-Berryessa National Conservation Area in wild Napa County, Sonoma County is a spectacular part of California.

Join natural resource managers, ecologists, students, and restoration volunteers from across the state to learn about and discuss the latest in control techniques and research results while networking and mingling during the awards banquet, social hour and field trips.



**Pulling *Parentucellia*** is the focus of an annual volunteer workday organized by Americorps at the Van Hoosear Wildflower Preserve in Sonoma County. *Parentucellia viscosa* (yellow glandweed) is parasitic, so land managers have avoided herbicide treatments that could translocate to the preserve's diverse native plants.

Presenters

Posters

Discussion Groups

Awards Banquet

Exhibitors

Photo Contest

Raffle & Auction

Field Trips

## Special Sessions

“Working Across Landscapes”

“Working Across Taxa”

“Working Across Time”

Invited speakers will discuss large-scale and long-term efforts on invasive plants.

Credits are pending from the Department of Pesticide Regulation, including 2 hrs. of Laws and Regulations.

## Discussion Groups

- Weed control methods Q&A
- Prevention Best Management Practices video
- Reducing the potential for wildlife impacts from herbicides
- Protecting native pollinators
- A coordinated statewide management strategy for stinkwort (*Dittrichia graveolens*)
- Seeking funding in a competitive environment

## And More!

- Cal-IPC project updates
- Student lunch
- Photo contest voting (entries due September 7)

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## Habitat Restoration Workday: Wednesday, October 10

Cal-IPC's newest training opportunity! Get your hands dirty and learn about specific management techniques, on-the-ground. Location to be announced!



**Mount Tamalpais** overlooks San Francisco Bay from Marin County and is home to both Mount Tamalpais State Park and watershed lands of the Marin Municipal Water District. *Photo by Dana Morawitz, Cal-IPC*

## Field Trips: Saturday, October 13

Half-day and full-day field trips. Detailed descriptions are available on the Symposium webpage.

**Mount Tamalpais:** Learn about innovative trials on nonchemical methods for removing broom, as well as meadow restoration.

**Pollinator Tour:** Visit one of Sonoma's many organic farms, featuring native hedgerows supporting pollinators.

**Sonoma Restoration Hotspots:** Sonoma County has numerous reserves managed by Audubon Canyon Ranch, the Sonoma Ecology Center, the Pepperwood Preserve, State Parks and others. Visit some of the region's top wildland restoration sites, from native wildflowers and woodlands.

**Blue Ridge-Berryessa Natural Area:** Venture to restoration sites deep in the wilds of northern Napa and learn about the effort to create the Berryessa Snow Mountain National Conservation Area.

[www.cal-ipc.org/symposia](http://www.cal-ipc.org/symposia)

# Doug Johnson: 10 years with Cal-IPC!

by Joe DiTomaso, UC Davis, Cal-IPC President 2002-03

As far back as 2000, the Board of Directors for Cal-IPC discussed the possibility of hiring an executive director. At that time, nearly everything we did was through volunteered time from our Board or membership. We hired Sally Davis to put out the newsletter, but that was pretty much the extent of our budget in those days. Our primary revenue was through the annual symposium.

Then-President Mike Kelly felt that hiring an executive director primarily to write grants might allow Cal-IPC to expand and take on new projects as well as increase our operating funds. Like most good ideas, this one had to simmer for a couple of years while the Board contemplated the pros and cons of such a decision. Because Cal-IPC's total annual budget was around \$40,000 in those days, we feared that hiring an executive director that was unable to bring in grants might drive the society broke and, dare I say, to extinction within a couple of years. This was particularly troublesome to me, as I was the President of the society in 2002, when we made the decision. As you could imagine, I did not want my legacy to be as the President that drove the society to bankruptcy.

Obviously, the Board of Directors decided to take a chance and recruit for an executive director. We felt that we had less than two years to invest with our existing funds. From that point forward, the Board and society made every correct decision that could be made and we are benefiting in so many ways today.

When Doug Johnson interviewed for the executive director position, he had already been notified that he was the recipient of the Robert & Patricia Switzer Foundation Fellowship. This

allowed Cal-IPC to hire Doug for two years and only pay half of his salary, as the Fellowship paid the other half. Prior to being hired as the Executive Director, Doug was a geographer by training, but he also had experience with wildland weeds from field work conducted in Mendocino and the San Francisco Bay Area. As he stated in his introductory ar-



Doug taking a break on a field trip at last year's Symposium.

Photo: Dana Morawitz, Cal-IPC

ticle in the *Cal-EPPC News* (now *Cal-IPC News*) in 2002, "Working on wildland weeds presents a special opportunity to work together with partners brought together by concern for the health of the land. With that kind of cooperation, we can make things happen!" And make things happen he did!

It is difficult even to imagine what Doug Johnson has done for Cal-IPC. I am pretty sure that the Board of Directors in 2002, even in their wildest optimism, would not have been able to envision where the society would be 10 years later. In Doug's first two months on the job he wrote five grant proposals, with one of them funded. Other Board members, including myself, also wrote grants that provided some funding to Cal-IPC. It was a heck of a team effort, with everyone

fully aware of what was at stake.

Within a couple of years, Doug's contributions were already numerous and the Board felt confident that the experiment was over and we had made an exceptionally good decision. Over the past several years, the modest yearly budget has grown to several hundred thousand dollars per year. Today, the society employs eight additional people and has two student liaisons. The website is information rich, the inventory is considered the gold standard for other states, the publications are high quality, the field courses are outstanding, and all the other projects, particularly CalWeedMapper are innovative and pioneering.

Cal-IPC, through the leadership of Doug Johnson, plays a major role in the National Association of Exotic Pest Plant Councils and National Invasive Species Awareness Week in Washington DC. The society even has a student chapter. Doug has become the high-profile face of Cal-IPC. He served as the Chair of the inaugural California Invasive Species Advisory Committee and as an officer with the National Association of EPPCs. His easygoing demeanor and calmness allows him to influence people and form alliances. Through his organizational skills he is able to get things done efficiently and quickly.

In Doug's 10 years as Executive Director of Cal-IPC, he has elevated the society to national status and the influence that the society has on legislators, scientists, policy makers, students, and field practitioners is remarkable. While there many dedicated people that have contributed to this progress, one stands at the top. Congratulations to Doug Johnson for his incredible accomplishments in 10 years with Cal-IPC.

# Partnering with college helps track medusahead

by Jim Alford\*, American River College (formerly California Dept. of Fish & Game); Daniel Benedetti, U.S. Army Corps of Engineers; and Nathan Jennings, American River College

Wildland managers must deal with biotic invasions in spite of ever more limited resources and in many cases without botanical staff. This project demonstrates the utility of remote sensing to identify invasive plant infestations.

In an era of shrinking government support for weed eradication, remote sensing can help fill the gap for restoration programs. Geographic Information Systems (GIS) build upon field data and the use of vegetative indices can guide both survey and treatment. Many universities and colleges have GIS programs. For example, American River College in Sacramento has GIS work experience slots for 48 students a year. Many GIS students

are former professionals working to build new skills. These students can help build your organizational capabilities. The newest version of the most commonly used mapping software, ArcGIS 10, can implement the most common vegetative indices. Vegetative indices literally show us things our eyes cannot see.

The methods used in this study are easily repeatable. While high-end image processing software is prohibitively expensive for agencies and non-profits, free or low cost access is available to students. In this case, the total project software cost was less than \$200. Community college GIS programs make good partners. The students benefit from real world



**Medusahead's common name** derives from Medusa and her hair of snakes in Greek mythology. Photo: Zoya Akulova, Cal-IPC Photo Contest 2011

conditions and also produce materials for an effective portfolio. Wildlands managers benefit by adding to their weed management tools.

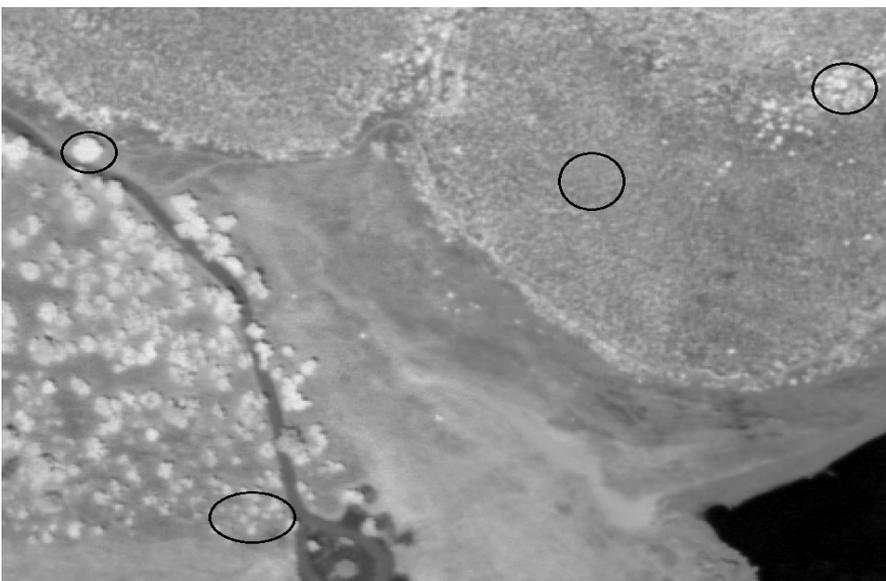
## Methods

The study site is New Hogan Lake, Calaveras County, California. It is managed for recreation and flood control by the Army Corps of Engineers. The Corps has an aggressive weed removal program. However; they are hampered by a lack of botanical staff. The site is highly disturbed by historic and current mining, dam operations and roads. The grasslands are typical of central California low elevations: they are dominated by Eurasian plants. In this case, the highly invasive medusahead grass, *Taeniatherum caput-medusae*, dominates grasslands of intermediate disturbance.

We used ENVI 4.8 (ITT Visual Solutions, 2010) for image processing and ArcGIS 10 (ESRI, 2009) for mapping, although all described tasks can be completed with only ArcGIS 10. Data were obtained from the California Geospatial Clearing House ([atlas.ca.gov/imagerySearch.html](http://atlas.ca.gov/imagerySearch.html)). We used free imagery from the United States Department of Agriculture's National Agricultural Information Program (NAIP). These are



**Two examples using National Agricultural Information Program data.** At left: Medusahead populations (small, dark dots) on a 2009 image of New Hogan Lake, Calaveras, County. Below: Blue oak-chaparral community. From left to right the circled signatures are blue oak (*Quercus douglassi*), interior live oak (*Quercus wislizeni*), chamise (*Adenostoma fasciculatum*), and manzanita (*Arctostaphylos viscida*). NAIP imagery is acquired every year during the spring and is public domain. Photos: J. Alford.



...continued page 12

# New control manual for 350 weed species

by Joe DiTomaso, Department of Plant Science, UC Davis, [jmditomaso@ucdavis.edu](mailto:jmditomaso@ucdavis.edu)

[Look for this amazing new reference on our website and at the Symposium this October!]

While several publications provide detailed information on the management of weeds in agricultural systems, there is currently no comprehensive book that provides control options for invasive and weedy species in natural areas. This year, the first such book will be published by the Weed Research and Information Center at UC Davis ([wric.ucdavis.edu](http://wric.ucdavis.edu)).

*Weed Control Handbook for Natural Areas in the Western United States* covers ~350 species of weeds that invade or cause problems in wildland and natural areas, rangelands, grasslands, pastures, riparian and aquatic areas across thirteen western states, including California. It's expected to retail for approximately \$30. The species chosen were those on the state noxious weed lists of the western states, as well as other non-crop weeds that are frequently problematic in natural areas of the western U.S.

The book describes chemical, mechanical, biological and cultural

control options for each species. This information is based on peer-reviewed and non-peer-reviewed literature and the personal experience of the authors. Extensive internet searches located multiple credible sources for detailed information on invasive plant control. The authors summarized what they considered to be the most relevant and practical control options for each plant. Our goal is to provide as many options as possible, with the hope that at least a few can achieve the desired objective for a given situation when assessed in an Integrated Pest Management approach.

While the bulk of the text is dedicated to providing control options, the book also includes information on the range of control techniques and equipment used in natural areas, as well as safety and environmental considerations, herbicide characteristics, rainfall periods, and grazing and haying restrictions for terrestrial herbicides, a list of species with biological control agents either available or under development, and helpful conversion tables. The chemical control

options include recommended rate, timing and any remarks or cautions.

I led a team of authors which included a range of individuals that conduct research on the control of invasive plants and other non-crop weeds: Lars Anderson from USDA, Tim Prather from the University of Idaho, Tim Miller from Washington State University, and University of California Cooperative Extension experts including Guy Kyser, Scott Oneto, Steve Orloff, John Roncoroni, Rob Wilson, Steve Wright, Katie Wilson, and Jeremiah Mann.

The field of invasive plant management is dynamic, with new species appearing each year and new control techniques being developed by researchers and field practitioners. Our objective is to update and reprint the handbook about every three years so the information stays current. This will also allow us to improve the handbook with the feedback we receive from those who use this new resource.

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## Bentgrass continued...

begin in late February, assuming dry soil conditions, but prohibited grazing after mid-March unless a survey determined the absence of nesting grassland birds. However the rains did not begin until March and continued through early April. By the time the ground was sufficiently dry, nesting in the tall grasses was underway and grazing within the easement area was restricted. Bentgrass was left to thrive and multiply.

Such challenges aside, bentgrass has now reached a level at which it cannot be controlled by grazing and mowing alone. NRCS recognizes the problem and is working with SLT and the San Pablo Bay National Wildlife Refuge (the future owner of the site) to prepare a plan for more direct control. This is likely to include a change in water management

(e.g. no impoundment), application of herbicide, and seeding with native grasses. Will this mean that the original shorebird goals will have to be modified? Possibly. In the same manner that SLT has modified its management practices (grazing, mowing, flooding) to achieve habitat goals, it may be that the goals themselves must change to respond to altered conditions.

The fact that rapid changes in land management can lead to weed invasions is not novel. Nor is the fact that artificial changes to hydrology (i.e. prolonged water impoundment) is a form of disturbance. But at North Parcel these lessons have surfaced again and we as a land management community are reminded of the need to continually learn, modify, and adapt our management with changing conditions.

## Resources

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# Update on the California Aquatic Pesticide Permit: Déjà vu all over again?

by Michael Blankinship, Blankinship & Associates, Inc., Davis, CA

Have you ever been on a trip and swear that you have been there before? Things for some reason just seem to have that eerie look of familiarity. It's easy to get that same feeling with the ongoing evolution of environmental permitting for weed management work in or near water.

Application of herbicides to “waters of the United States” requires a permit issued by the State Water Resources Control Board (SWRCB). This affects invasive plant management projects taking place near open water. Since 2002, we have learned to live with the current NPDES (National Pollutant Discharge Elimination System) aquatic pesticide permit. It has become familiar and largely workable to us.

The existing permit is currently being re-drafted by the SWRCB. The goal is to “catch-up” and develop consistency with other recently adopted permit requirements for vector (e.g. mosquito) and aquatic animal applications.

Early indications suggest that the new permit is similar in many ways to the old permit. The Association of California Water Agencies Aquatic Pesticide Work Group has worked to help SWRCB staff better understand what it takes to control aquatic vegetation. The soon-to-be-released draft permit requirements reflect plenty of dialogue on how to reasonably “bracket,” measure and report potential impacts to water quality without invoking expensive and often confounding techniques like toxicity testing. Keep an eye out for the public review version of the draft at [www.swrcb.ca.gov/water\\_issues/programs/npdes/aquatic.shtml](http://www.swrcb.ca.gov/water_issues/programs/npdes/aquatic.shtml) sometime this summer, and be prepared to comment and contribute to the final permit that will be used for the 2013 weed season.

## Permit Benefits

What do you get out of this permit except more paper and a hit to your budget? Simply put: Protection from potential

### Think you have a permit? Better double check!

There is ongoing confusion between staff at the SWCRB and the Regional Water Quality Control Boards on permit payment and issuance. Anyone that is not listed by the SWRCB is not enrolled and is not covered by the permit. To review the permittee list:

1. Go to the website [ciwqs.waterboards.ca.gov/ciwqs/readOnly/PublicReportGeneralOrderServlet?inCommand=reset](http://ciwqs.waterboards.ca.gov/ciwqs/readOnly/PublicReportGeneralOrderServlet?inCommand=reset).
2. Type “2004-0009-DWQ” in the Order Number box, click Run Report and click on the number value under the “No. of Active Enrollees” column.
3. Review the report for your organization's name. If you are not listed, or are listed as inactive, contact your local RWQCB to resolve the problem.

lawsuits. The citizen lawsuit provision of the Clean Water Act provides an opportunity for anyone (such as environmental advocacy groups) to sue you if they feel you have adversely impacted water quality. Although not bullet-proof, the permit provides significant defense and “coverage” against such legal action.

What can go into water? Only 11 herbicides are approved for aquatic use in California, and of those only a few such as glyphosate and imazapyr are in common use by restoration workers. Surfactants are restricted to non-ionic varieties.

Contact the author at [mike@h2osci.com](mailto:mike@h2osci.com).



**Pesticides have been approved for use in Lake Tahoe.** The State Water Resource Control Board recently approved an amendment that would allow aquatic pesticides to be used in Lake Tahoe to preserve public health and combat invasive species (especially an aquatic plant, Eurasian watermilfoil). This is a considerable change, given that the previous versions of the Basin Plan did not allow the use of aquatic herbicides. The amendment must be approved by the U.S. EPA and California's Office of Administrative Law before it can be implemented. *Photo by Elizabeth Brusati*

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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!

**Ann Lopez** (Fontana)  
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**Linda Stamer** (Fawnskin)  
**Joanne Whitney** (San Francisco)  
**Menuhati Kemma'atah** (San Diego)  
**Matt Weiser** (Sacramento)  
**Alicia Funk** (Nevada City)

## Medusahead continued...

aircraft derived four-band images (Red, Green, Blue and Infrared) with one meter resolution. NAIP images are acquired during the height of the growing season, typically May to June. California has excellent coverage because of the importance of its agriculture to the nation.

Data were transformed by the application of the Normalized Difference Vegetative Index (NDVI). The algorithm is  $NDVI = (Red - IR) / (Red + IR)$ . The NDVI was developed in the 1970s to predict famines in developing regions (Jensen 2005). Since that time, more than two dozen vegetative indices have come into use. The NDVI works because plants absorb red wavelengths and reflect infrared, both by a better than five to one ratio (Jones and Vaughan 2010). ArcGIS 10 provides NDVI as a built-in transformation.

We surveyed for pure medusahead stands greater than 1 m<sup>2</sup> and easily found 214 data points. Maps were produced with these data points upon NDVI-transformed NAIP imagery and subjected to expert inspection. Additionally, a ten-class K-means unsupervised classification was performed. Classifications are procedures based upon individual pixel statistics. They simply divide the pixels into groups mechanistically through typical statistical classification procedures.

## Results and Discussion

Examination of the NDVI-transformed data allowed identification of woody plants to species. We found that blue oak (*Quercus douglassi*), interior live oak (*Quercus wislizeni*), chamise (*Adenostoma fasciculatum*), and manzanita (*Arctostaphylos viscida*) were easily identifiable in the NDVI image (see photo).

Medusahead can be controlled with fire and mowing at the soft-seed stage. The study site has a tight urban interface, making fire an unlikely choice. We produced maps with medusahead data points plotted on the NDVI images. Inspection of these images resulted in the following treatment prescriptions:

1. Mow intermittent watercourses in Acorn campground. Water courses were easily identifiable in the NDVI. The development of this campground created a hydrological impediment that facilitated medusahead infestation by providing the late spring saturated soils it prefers. The hydrological impediment also facilitated an infestation of perennial pepper weed.
2. Mow intermittently flooded banks. These regularly disturbed areas provide a metapopulation source for upland infestations. Medusahead density is many thousands of stems

per meter squared in these areas.

3. Establish an area to experiment on alternative medusahead treatments. The recommended area is a 12.7 acre site near a monoculture of medusahead.

Examination of classification results found that 100% of our medusahead points fell in only 20% of the classes. This suggests that the further refinement by ground truthing plots could produce a hybrid classification predictive of infested sites. Further iterations may produce a reliable model for medusahead populations at this site (Ray 1994). Remote sensing capabilities can greatly assist in the identification, treatment and modeling of plant invasions. Recent improvements in mapping software have increased remote sensing capabilities and democratized access to these techniques. We all understand that a proper releve or plot assessment requires a bird's eye view. Remote sensing can add a new layer of information to an even larger bird's eye view than any plot system alone could provide.

This project was conceived as a community college GIS remote sensing class project. Involving student interns in your GIS work has the potential to improve your organization capabilities. Investing time in befriending professors or speaking to classes may find you students to do similar projects.

## Resources

ESRI. 2009. ArcGIS, Redlands, CA, ESRI.

ITT. 2010. ENVI. Boulder, CO, ITT Visual Information Solutions.

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Ray, T. 1994. A FAQ on Vegetation in Remote Sensing. Retrieved June 24, 2011, from [www.yale.edu/ceo/Documentation/tsvegfaq.html](http://www.yale.edu/ceo/Documentation/tsvegfaq.html).

USDA. 2009. National Agricultural Information Program.

Contact the author at [jim.alford@comcast.net](mailto:jim.alford@comcast.net)

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# Readings & Resources

Know of a resource that should be shared here? Send it to [edbrusati@cal-ipc.org](mailto:edbrusati@cal-ipc.org).

## Updated Mapping Handbook

The California Weed Mapping Handbook, originally published in 2002, has been updated by the Sonoma Ecology Center as a new online version, now with a standardized field form and accompanying spreadsheet. [www.calweedmapping-handbook.org](http://www.calweedmapping-handbook.org)

## New Calflora Functions

The Calflora Database recently added two new functions. First, species pages now display the annual bloom periods for more than 9000 plants. Users can also search for plants that bloom in a particular month. Second, users can now join or start groups for collaborating on

data. Groups can be open to the public or by invitation only. Members can share observations before they are made public. [www.calflora.org/entry/applications2.html](http://www.calflora.org/entry/applications2.html)

## Biofuels Risk

“Growing Risk: Addressing the Invasive Potential of Bioenergy Feedstocks”, a new report from the National Wildlife Federation, explores the challenges and policy solutions surrounding the use of non-native and potentially invasive bioenergy crops. [www.nwf.org/growingrisk](http://www.nwf.org/growingrisk)

## Control Database

The Midwestern Invasive Plant Network has produced an online database of control methods for 40 invasive plant species. Features include a rating of efficacy for each control method after one year of treatment. [mipncontroldatabase.wisc.edu](http://mipncontroldatabase.wisc.edu)

## Climate Change FAQ

Confused about climate change projections? The US Forest Service has released

“Climate Projections FAQ” to help land managers understand what climate projections are, their strengths and limitations, and to provide some guidance regarding how climate projections might be used for climate change impact studies. [www.fs.fed.us/rm/pubs/rmrs\\_gtr277.pdf](http://www.fs.fed.us/rm/pubs/rmrs_gtr277.pdf)

## UC Extension Resources

“Wildflowers” is a growing educational resource for people who are interested in land management in Southern California, hosted by UC Cooperative Extension. [wildflowers.ucanr.org/Wildflowers/Home.html](http://wildflowers.ucanr.org/Wildflowers/Home.html)

## Wildflower Blog

If you want to improve your botanical knowledge, check out this blog by a woman in Marin County who is learning one local plant each day. She includes photos and information about each plant, covering both natives and non-natives. [flowersofmarin.wordpress.com](http://flowersofmarin.wordpress.com)

## Cal-IPC's Habitat Restoration Workdays

Gain hands-on field experience controlling invasive plants at Cal-IPC's Habitat Restoration Workdays, conducted in partnership with land management organizations across the state! Discuss the theory behind various invasive plant control techniques and practice these techniques under expert guidance. These half-day events can also be counted toward your Wildland Manager certificate.



Tarping to control purple velvet grass (*Holcus lanatus*) during a Habitat Restoration Workday in the Presidio, San Francisco.

## 2012 Schedule

- **Friday, August 24**  
Arcata (Humboldt County)  
Early Detection Mapping in Dunes Habitat
- **Saturday, September 29,**  
Felton (Santa Cruz County)  
Woody Plant Control Tools at Old Quarry Site
- **Saturday, October 20,**  
Chico (Butte County)  
Manual Methods for Removing Invasive Trees
- **Saturday, November 3,**  
Tiburon/Corte Madera (Marin County)  
Mapping Methods for New Invaders
- **Saturday, December 8**  
Big Sur (Monterey County)  
Control Methods for Cape Ivy and Periwinkle

Find more information and register at: [cal-ipc.org/fieldcourses](http://cal-ipc.org/fieldcourses)

# THE WILDLAND WEED CALENDAR

## August-October

### Ecological Society of America Annual Mtg

August 5-10  
Portland, Oregon  
[www.esa.org/portland](http://www.esa.org/portland)

### Rangeland & Livestock Management

August 20-31  
Swanton Pacific Ranch, Davenport  
[rrutherford@calpoly.edu](mailto:rrutherford@calpoly.edu)

### UC Davis Aquatic Weed School

September 5-6  
Davis  
[wric.ucdavis.edu](http://wric.ucdavis.edu)

### California Estuarine Research Federation

September 27-28  
Long Beach  
[online.sfsu.edu/~caers/](http://online.sfsu.edu/~caers/)

### Southern California Botanists Symposium

October 6  
San Marino  
[www.socalbot.org/symposia.php](http://www.socalbot.org/symposia.php)

### Natural Areas Conference

October 9-12  
Norfolk, Virginia  
[www.naturalarea.org/12conference](http://www.naturalarea.org/12conference)

### Cal-IPC's 21<sup>st</sup> Annual Symposium

October 10-13  
Rohnert Park  
[www.cal-ipc.org](http://www.cal-ipc.org)

### North American Weed Mgmt. Assoc. Conf.

October 29-November 1  
Branson, Missouri  
[www.nawma.org](http://www.nawma.org)

## November - December

### Russian River Watershed Symposium

November 2  
Cloverdale  
[rrsymposium@yahoo.com](mailto:rrsymposium@yahoo.com)

### Central California Invasive Weed Symp.

November 8  
Felton, Santa Cruz County  
[symposium@yahoo.com](mailto:symposium@yahoo.com)

## 2013

### CNPS Vegetation Mapping Course

January 2013  
UC Berkeley  
[cnps.org/cnps/education/workshops/](http://cnps.org/cnps/education/workshops/)

### USDA Forum on Invasive Species

January 10-13  
Annapolis, Maryland  
[www.nrs.fs.fed.us/disturbance/invasive\\_species/interagency\\_forum/](http://www.nrs.fs.fed.us/disturbance/invasive_species/interagency_forum/)

### Northern California Botanists Symposium

January 14-16  
Chico  
[www.norcalbotanists.org](http://www.norcalbotanists.org)

### California Weed Science Society Conf.

January 23-25  
Sacramento  
[www.cwss.org](http://www.cwss.org)

### Weed Science Society of America Meeting

February 4-7  
Baltimore, Maryland  
[www.wssa.net](http://www.wssa.net)

## Quotable

**“Usually just provided with one perspective, the public [has] largely accepted the idea that non-natives, as a group, are noxious and undesirable... Efforts to vilify non-native species by misrepresenting their effects are ultimately counterproductive, as is the use of pejorative language to describe them... When there is no demonstrable harm—and instead simply ecological change—a much more sensible approach to non-native species is to learn to live with them.”**

~ Dr. Mark Davis, Macalester College, “Harm is in the Eye of the Beholder”. This essay and the one quoted below were presented as a point/counterpoint feature in *Earth Island Journal* (Winter 2012).

**“Naysayers are unlikely to make much scientific headway, given the demonstrated costs of invasions on the ground and the remarkable finds of hundreds of scientists worldwide who have turned their attention over the last two decades to detailed study of invasions. However, it doesn't take much for a few credentialed scientists to influence policymakers, particularly when the policymakers are glad, for political reasons, to be able to justify not acting.”**

~ Dr. Daniel Simberloff, Univ. of Tennessee, “An Ounce of Prevention is Worth a Pound of Cure”



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