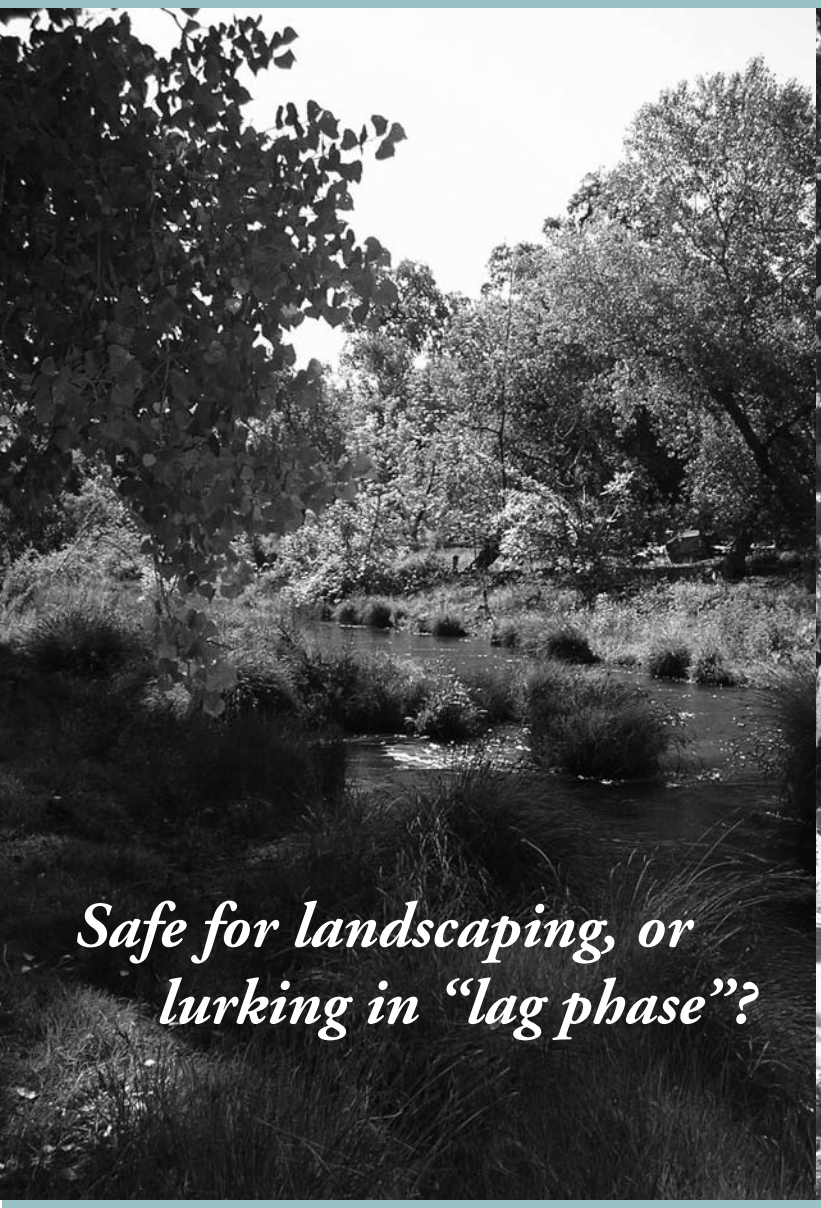
Cal-IPC News

Protecting California's Natural Areas from Wildland Weeds

Vol. 16, No. 2 Summer 2008 Quarterly Newsletter of the California Invasive Plant Council



Safe for landscaping, or lurking in "lag phase"?

*The popular street tree Chinese tallow (*Sapium sebiferum *or* Triadica sebifera*), is naturalized in only a few locations in California but may have potential to spread in riparian areas. Shown above left naturalized along Putah Creek near Davis. Story page 4.*

Photos: Michael Bower, UC Davis

Inside:

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A California 501(c)3 nonprofit organization

Protecting California's natural areas
from wildland weeds through
research, restoration, and education.

Cal-IPC News
Summer 2008 - Volume 16, Number 2

Editors: Doug Johnson, Elizabeth Brusati, Heather Brady

Controversy over aerial spraying

Even if you are not from the San Francisco Bay Area, chances are you have heard about the public outcry over plans by the state to spray pheromones in an effort to contain the light brown apple moth (LBAM), a pest that officials fear could cause major agricultural and environmental damage in California. Email campaigns and public protests have galvanized public concerns over potential human health risks of the treatment plans. At this point it appears the state will be pursuing alternate approaches to controlling LBAM.

State officials charged with controlling agricultural and environmental pests are disappointed that their efforts to organize a safe and effective program have been so poorly received. Though nobody knows just how bad a full-blown LBAM infestation might be for the state, stopping the control program at this critical stage could cause us to miss an opportunity for containing, perhaps even eradicating, the pest. Though officials feel like they were successful at "early detection", they are being stymied on "rapid response."

On the public side, citizens are wary of new synthetic chemicals in their environment, especially when it comes to long-term health impacts that are difficult to predict. Assurances from government agencies charged with assessing health risk are not seen as completely reliable. As weed workers know, it can be vitally important to build community support for projects up front. Such a process is especially difficult when attempting to respond quickly to a new invader.

This dramatic situation reveals much about Californian perspectives on invasive species, and holds information that we can all learn from. Though LBAM can damage native plant communities as well as crops, agencies and the public have focused their attention almost exclusively on agricultural impacts. According to state entomologist Kenneth Brown, LBAM could impact many native insect and plant species, some of which are already endangered. Such environmental impacts should be a major concern for the state's conservation groups.

By ignoring the environmental impacts, officials risk reinforcing a mindset that pits agriculture against the environment. Although wildland weed workers know partnerships between agricultural and environmental stakeholders can be extremely productive when facing invasive species, much the public does not fully understand the linkages between land managers on all sides of the fence. It is important that we continue education on these relationships, and that we remind agencies that much of the public cares deeply about environmental impacts, even if they are not easily translated into dollars.

This situation points out the need—and opportunity—for organizations concerned with preserving California's wildlands to work together on sound policy and to inform the public about the complexities involved in addressing invasive species. Citizens need to understand that invasive species will impact us all in ways that may not be obvious, and that we will face tough decisions about how to manage them. How much are we willing to curtail international trade to avoid such introductions? How can we make sure agencies charged with testing the safety of substances formulated for controlling pests are trusted by the public?

Cal-IPC is working with partners on one key element of setting California on a path to effectively address invasives at the landscape scale—establishment of a state interagency council on invasive species, such as those that have been established in other states, including Oregon, Washington, Arizona and Hawaii. Over twenty federal and state agencies in California have jurisdictions that touch on invasive species, and clear leadership and coordination among these agencies is essential. (As Abe Doherty reports on page 10, the state is beginning just such an effort on aquatic invasive species, a welcome sign.) Look for more on this major advocacy effort in future issues of *Cal-IPC News*. In the meantime, take note of the lessons to be learned from this recent invasive species controversy.

Wildland Weed NewsNewsNewsNewsNews

As of press time, the **Weed Management Area program is maintaining its $1.5 million in annual state funding** for fiscal year 2008-09. We hope the funding is still there once the governor signs the final budget. *www.cdfa.ca.gov/phpps/ipc/weedmgtareas/wma_index_hp.htm*

California native plants may face greatly reduced ranges as global climate change continues, according to a study by UC Berkeley researchers. They predict that up to 66% of native plant taxa found only in California will experience an 80% reduction in range within a century. California's varied terrain may break up present-day plant associations as species move in different directions. The research also identified regions where species may persist despite range reductions. *PLoS One, June 2008, www.plosone.org*

The **Climate Security Act** (S. 3036) recently failed a vote in the U.S. Senate and will now have to wait until 2009. The bill, supported by environmental and sportsmens' groups, would provide $288 billion to address wildlife adaptation to global warming. Federal and state resources agencies would gain an average $7.2 billion in extra funding each year for the program's first 19 years. The money would come from auctioning greenhouse gas credits among industry sectors and go to the Interior Department, Forest Service, National Oceanic and Atmospheric Administration, U.S. EPA, state Fish and Wildlife Agencies and the federal and state Land and Water Conservation Fund. *http://thomas.loc.gov*

With the dramatic increase in oil prices, **biofuels continue to receive extensive press coverage.** Scientists from several groups including The Nature Conservancy and the Global Invasive Species Program released a report during a United Nations meeting in May warning about **risks posed if biofuel crops spread and become invasive**. Researchers found a large overlap between species proposed as biofuels and known invasive plants. *New York Times, May 21, www.nytimes.com/2008/05/21/science/earth/21biofuels.html*

Are you missing Cal-IPC email announcements? We occasionally send announcements and reminders for field courses, Day at the Capitol, the Symposium, and important advocacy opportunities. We are missing accurate email addresses for some members. If you are not receiving announcements and would like to, or if you would prefer to receive the newsletter electronically rather than by mail, please contact *info@cal-ipc.org.*

Help us estimate how much weeds cost California! Learn more on p. 8.

Proving that you don't need large budgets or academic degrees to make an impact on invasive plants, a married couple from Alaska used grassroots organizing to convince Governor Sarah Palin to sign a bill starting a **statewide Alaska weed program with funding for a statewide coordinator.** Lori and Troy Zaumseil are the founders of CANWIN, Citizens Against Noxious Weeds Invading the North. *Anchorage Daily News*

An amateur botanist discovered **two unrecorded plant species on Mount Diablo** in the San Francisco Bay Area. Dave Godwin, a retired carpenter who took up botany as a hobby when hang gliding became too physically demanding, found the first plant on a hike ten years ago and searched experts to find out what it was. He eventually found a second new species. Both are annual wildflowers and are named Lime Ridge navarettia (*Navarretia gowenii*) and Lime Ridge woollystar (*Eriastrum sp. nov.*). *www.savemountdiablo.org*

A new report estimates the **global economic losses caused by ecosystem degradation to be between $2.1 and 4.8 trillion annually**. "The Economics of Ecosystems and Biodiversity," commissioned by the European Union and the government of Germany, estimates a dollar value for clean water, healthy soil, protection from floods and soil erosion, natural medicines and natural sinks that store greenhouse gases such as carbon dioxide (CO_2) and methane. *United Nations Environment Programme*

Cal-IPC Updates

17th Annual Symposium and Revegetation Field Course – Registration is open! See pages 6-7.

Vote for Board of Directors – All Cal-IPC members will receive the annual Board of Directors ballot in August. Board Members serve two-year terms; Officers serve one-year terms. Current board members' profiles are at *www.cal-ipc.org/about/staff.php*.

Cal-IPC on TV! KPIX (CBS) in San Francisco featured Executive Director Doug Johnson and several Cal-IPC members in a segment on June 24 describing how invasive plants increase fire danger and contribute to the decline of native plants. Search on "native California plants" at *http://cbs5.com/video*.

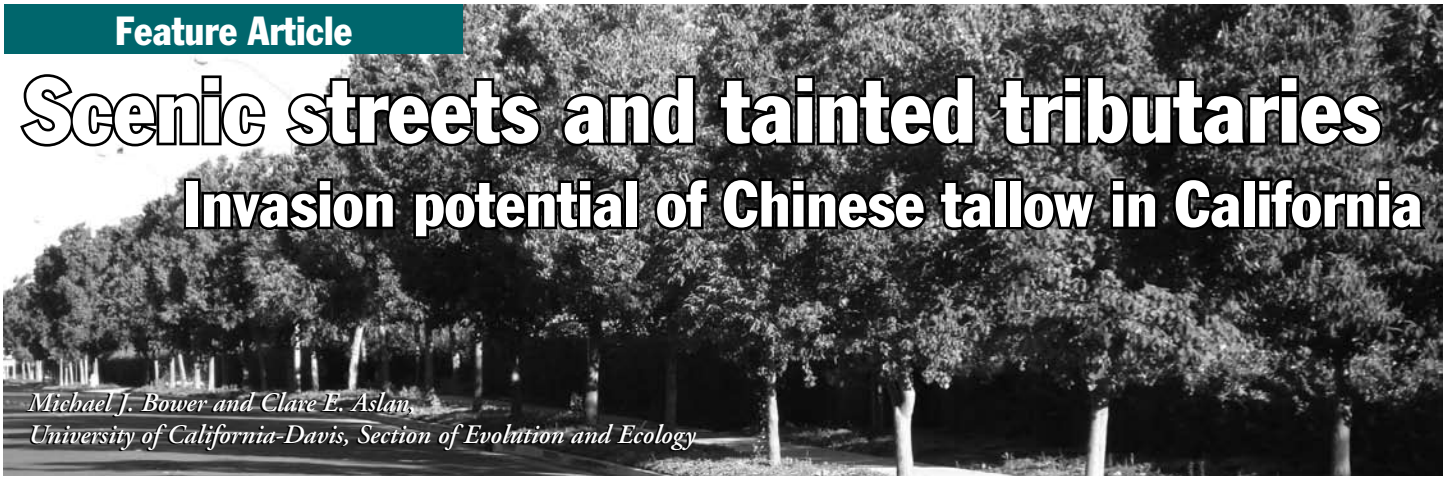
Mapping Field Course – Registration will open in August for this year's final field course. Mapping Techniques will be held on November 6 at the Trudeau Center, Redwood Regional Park, Oakland. This is a repeat of the sold-out mapping course at the 2007 Symposium in San Diego. Volunteers and interns may register for just $35. *www.cal-ipc.org/fieldcourses*

WMA Webpages – We have nearly completed online profiles for all California Weed Management Areas, with links to WMA websites and summary pages describing their projects, partners, meeting schedule, and contact information. Thanks to all WMA coordinators for providing information. Help us keep these pages up-to-date by sending any corrections! *www.cal-ipc.org/WMAs*

Feature Article

Scenic streets and tainted tributaries

Invasion potential of Chinese tallow in California



Michael J. Bower and Clare E. Aslan,
University of California-Davis, Section of Evolution and Ecology

Chinese tallow (*Sapium sebiferum* or *Triadica sebifera*) has been regularly planted as an ornamental tree in California's Central Valley for at least 30 years, with the earliest plantings probably occurring around 1888 (Butterfield 1964). It is possible to count thousands of mature trees throughout Sacramento, Davis, Woodland, and surrounding cities. The tree has been documented naturalizing along the American River Parkway (Hrusa *et al.* 2002), at North Davis Pond (Cal-IPC 2006), and in riparian areas in Folsom and Roseville (R. Robison, pers. comm.). This is particularly worrisome given the invasion history of Chinese tallow in the southeast United States where, since an initial 1785 introduction and deliberate widespread planting, the tree has not only naturalized along most of the Gulf Coast but has behaved aggressively, transforming plant communities by forming monocultures and displacing native plants even in undisturbed environments.

Were Chinese tallow to behave similarly in California, we would expect to see some of the same self-promoting mechanisms that have been documented in the Southeast, such as enrichment of soil with nitrogen from fast-decomposing litter or shading of neighboring plants (Siemann and Rogers 2006), both of which help to explain why even a small number of reproductive adults can lead to a monoculture in as little as 10 years (Barrilleaux and Grace 2000). We might also expect to see invasion first in riparian areas, where the earliest invasions occurred in the Southeast (Davis *et al.* 1946).

California's Mediterranean climate may serve an important role here, since the long dry summer can be extremely stressful and can lead to significant seedling mortality among maladapted species. This could potentially preclude invasion or restrict invasion of Chinese tallow to milder subclimates (such as the coast or the delta and its tributaries). Chinese tallow is drought tolerant (cited in Barrilleaux and Grace 2000), and numerous gardening websites praise Chinese tallow as drought resistant (e.g., *www.burkesbackyard.com.au; www.virtualplanttags.com*), so the degree to which Mediterranean summers prohibit Chinese tallow is unclear and the extent to which Chinese tallow is likely to become invasive in California remains uncertain. The few known naturalized populations may indicate a low invasiveness of this species in California, or they may represent the beginning of an invasion similar to that which has occurred in the southeastern U.S. Many invasive plants undergo a "lag phase" between time of introduction and when they begin to spread into wildlands.

If large numbers of suitable sites remain for Chinese tallow to colonize, then it may only be a matter of time before rapid invasion occurs, especially in light of the increasing amount of propagule pressure accruing as young horticultural and naturalized individuals achieve reproductive maturity (often exceeding 100,000 seeds per tree in a year). Under ideal conditions, Chinese tallow can reach maturity and begin producing viable seed at three years of age.

Studies of climate matching between native or known invaded regions and other areas where a species does not yet occur often help inform land managers about the relative threat of invasion by a species. In their climate model, Pattison and Mack (2008) found potential for Chinese tallow growth in California only in riparian areas. This proposed potential range, however, is large and full of sensitive habitat. The potential for ecological impact is enormous. Empirical exploration of the extent of potential colonization is therefore important while the extent of Chinese tallow's naturalization is still relatively limited.

Evaluation of Invasion Potential

We set out to determine experimentally Chinese tallow's capacity for establishment and seedling survival along riparian systems and adjacent elevated habitats that drain into the Bay-Delta system. To accomplish this, we looked systematically at Chinese tallow lifestages that are frequently limiting and readily assessed. We focused on germination and initial seedling growth and survival, combining both experimental and observational approaches.

Current extent of Chinese tallow in California, based on data provided to Cal-IPC by Weed Management Areas, 2007. Abundance is low in all areas.

Because we know that different dispersal vectors can influence subsequent germination (Baskin and Baskin 1998), we selected two common natural dispersal scenarios (by birds and water, both of which we have observed in California) along with two controls (seeds that remained on tree and seeds that had fallen to the ground underneath parent trees) as seed pretreatments for an experimental out-planting at Putah Creek Reserve. We marked all plant material and retrieved it at the experiment's conclusion.

We applied pretreatments to Chinese tallow seeds acquired from more than 20 trees throughout Davis, CA, and planted these seeds and controls across an elevational gradient at Putah Creek Reserve in mid-March, 2007. We applied pretreatments to seeds as follows: 500 seeds were soaked in concentrated sulfuric acid (after Baskin and Baskin) to simulate bird gut passage; 500 seeds were soaked in water for 30 days to simulate flood transport; 500 seeds were collected directly from the ground and stored without further treatment until planting; 500 seeds were collected directly from the trees and stored without further treatment until planting. Seeds were then divided into lots of 20 and one lot per treatment was buried at each of five elevations along five replicate transects so that final calculations included seed treatment and elevation. Seeds recovered one month later showed high germination (well within the range of germination success observed in the invaded Southeast) across all elevations, treatments, and controls (Fig. 1).

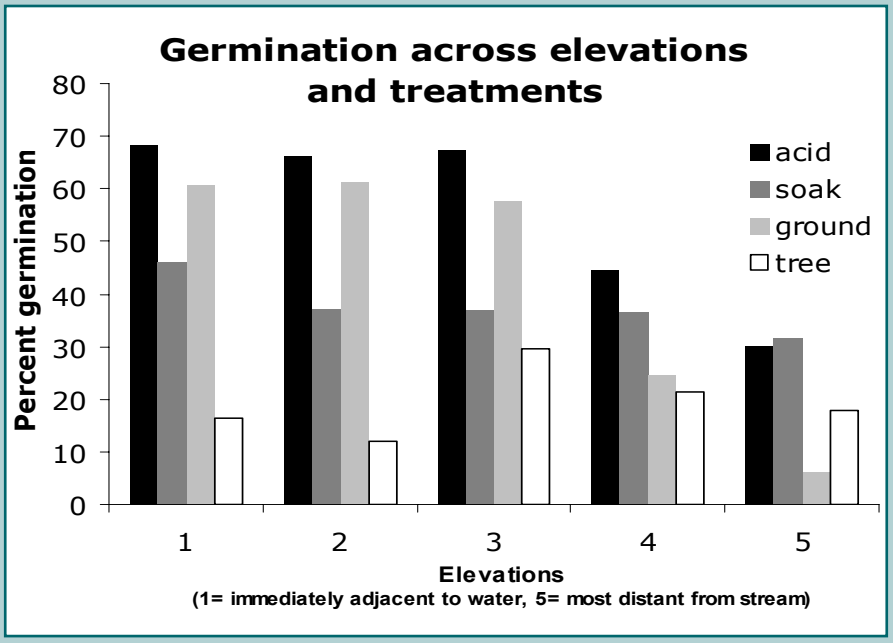
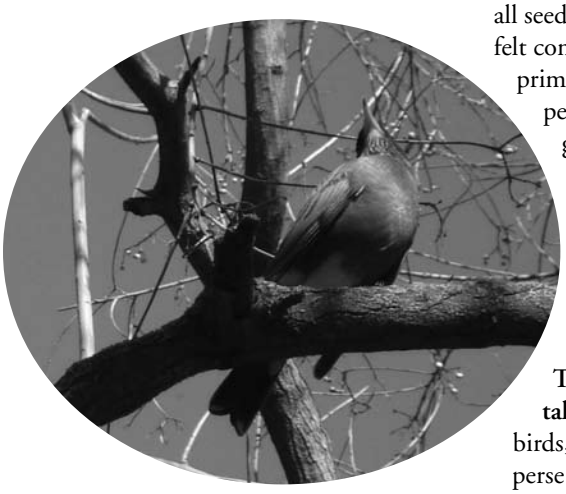


Figure 1: Germination, as percent of all seeds at each elevation-pretreatment combination, was substantial and well within the range reported from invaded regions in the southeastern U.S. Germination decreased with increasing elevation. Germination of seeds taken directly from trees was lower than germination after both acid treatment (simulation of bird gut passage) and direct retrieval from the ground beneath parent trees.

Finding no barriers to germination, we then investigated initial (first summer) seedling growth and survivorship, hypothesizing that this life-stage would be most vulnerable to California's dry summers. Five months after transplanting 200 seedlings over the same elevational gradient as the seeds, we recorded only 31 survivors. These survivors were at the lowest elevation (next to the creek) and were visibly thriving by the time the autumn rains began in October, ending the most drought-stressful period of the year. In all, nine seedlings died at this lowest elevation, and we suspect that these deaths were caused by high temperatures due to local topography and lack of canopy cover. At higher elevations, we observed symptoms of drought stress (including wilting and sometimes senescence) for almost all seedlings prior to death. We therefore felt confident in naming drought as the primary cause of death in all but a small percentage of cases (in which a gopher graciously, but probably inadvertently, put a few wilted plants out of their misery).

These results support the idea that California's harsh summers act as an environmental filter by restricting Chinese tallow to areas where adequate perennial moisture is available. We note that while our experiment was quite decisive in revealing this for Putah Creek (in five separate transects along the creek), it represents only one potentially invaded habitat during one year. Other tributaries on different soils with different hydrology and vegetation may give different results.



The nutrient-rich seeds of Chinese tallow make them attractive to many birds, such as this robin, which then disperse the seeds. *Michael Bower*

Natural Observations Agree

To complement our experiment and observations at Putah Creek, and to further investigate the factors that might limit invasion of Chinese tallow in California, we conducted surveys of a naturalized population in the North Davis Pond, a man-made wetland fenced off to the public. We encountered 629 volunteer Chinese tallow individuals in a thorough search of the 1125m pond perimeter. The vast majority (570) were seedlings, and all individuals encountered were within 7m of the water's edge. These findings add support to the hypothesis that areas adjacent to perennial water are

Continued pg. 11...

Join us in Chico for the 2008 Cal-IPC Symposium!

Revegetation Field Course: Wednesday, October 1

Symposium: Thursday, October 2 - Saturday, October 4

For our 17th Annual Symposium we return to Chico State University, where the Sierra Nevada meets the Cascade Range... The Symposium brings together over 300 wildland weed workers to discuss the latest in invasive plant research and management. This year's special invited sessions address the future of wildland weed management: How will climate change impact weed spread? What new initiatives will help us do our work? How can we apply lessons learned from the past? How will career opportunities in weed work evolve?

Important Dates

August 30 - Some Symposium hotels release room blocks (reserve your room before this date)

September 1 - Photo contest entries due

September 5 - Deadline for Early Registration discount

Student Activities

We have added new activities especially for students and those early in their careers! See fellow students' work in the Student Paper and Poster Contest. Learn about career options in weed management and ecological restoration from our Career Panel. Ask more questions and share ideas in the career discussion group. Search the job board for employment and graduate school opportunities. And of course, the Symposium is an excellent place to network with leaders in the field. (Employers: Send position announcements to Elizabeth Brusati, *edbrusati@cal-ipc.org*)

Saturday Field Trips

Stay on Saturday and visit Lassen Volcanic National Park, restoration projects at Big Chico Creek Ecological Reserve, or Peace Valley in the Sutter Buttes, the world's smallest distinct mountain range. We will also have an opportunity to lend a hand in a local weed removal project.

Left: *Discussion groups allow attendees share information on the latest management techniques from the experts: their fellow Cal-IPC members!*

Registration includes Thursday banquet and 2009 membership...

Calling all photographers!

Show off your talents in the Symposium Photo Exhibit! Symposium attendees will vote for Best in Show. Submit photos by September 1. Categories include: Landscape, Specimen, Weed Workers, WMA Projects, Impacts, Before & After, and Humor. Instructions are posted on the Symposium webpage. You do not need to attend the Symposium to enter the Photo Exhibit.
(2007 First Place Photo by Greg Archbald)

Registration

Go to *www.cal-ipc.org/symposia* for online registration and a printable form. Choose online registration for faster processing. Discounted registration is available to students and volunteers.

Qualified herbicide applicators may receive Continuing Education Units from the California Department of Pesticide Regulation for attending Symposium sessions, field trips, and the field course. The Symposium includes a 2-unit Laws & Regulations session.

We're looking for raffle items!

The Thursday evening social hour features our raffle followed by a live auction during the banquet, both benefiting Cal-IPC programs. We need tools, books, clothing, recreational gear, gift certificates, artwork, wine, and more! Items may be brought to the Symposium or sent to the Cal-IPC office. Have something to donate? Please contact Raffle & Auction Chair Tanya Meyer, *meyer@yolorcd.org.*

Wildland Weed Field Course: Revegetation Techniques

When: October 1, 2008
Where: Chico Grange & TNC's Sunset Ranch
Info: *www.cal-ipc.org/fieldcourses*

Learn about the importance of integrating active revegetation into your wildland weed management program, including:

- Project planning and design
- Species selection
- Plant propagation
- Site evaluation and preparation
- Maintenance and monitoring

You may register for this course without attending the Symposium. Symposium attendees receive a $20 discount and restoration volunteers may attend for only $35!

Field courses combine classroom and outdoor presentations.

Full information at:

www.cal-ipc.org/symposia

Australian weed eradicator visits California

Gina Darin, UC Davis and CDFA

Dr. F. Dane Panetta is a noted authority on weed eradication with the Department of Primary Industries and Fisheries and leader of the Incursion Response subprogram in the Weeds Cooperative Research Centre (CRC), in Queensland, Australia. I was lucky enough to meet him while attending the 9th annual Ecology and Management of Alien Plant Invasions conference in Perth, Australia in September 2007.

The California Department of Food and Agriculture (CDFA) invited Dr. Panetta to showcase Australia's weed eradication research, visit weed eradication sites, and collaborate on cutting-edge prioritization research. Dr. Panetta said weed eradication science was still in its infancy in Australia and collaboration with CDFA would provide an opportunity to share and gain knowledge in this area.

This past May, Dr. Panetta made the trek across the big blue to Sacramento. During his visit he delivered a seminar on Australian weed eradication research at the Plant Sciences Department, UC Davis. He attended a CDFA workshop on weed eradication where he presented Oscar Cacho's and Paul Pheloung's WeedSearch™ model*, which helps predict eradication project success. He visited noxious weed sites in Yolo and Napa counties where weeds are currently under eradication, and he assisted in the development of CDFA's population-based prioritization method for eradication of California's A-rated noxious weeds.

According to Dr. Panetta: "The most striking observation that I made regarding incursion management in California is that the response to the current incursion of light brown apple moth has absorbed most of the budget. Pest organisms with faster rates of population increase and spread clearly require much more rapid and intensive responses than do weeds, a reflection of the longer timeframes over which weed incursions play out. How to balance the overall investment between responses to incursions of these radically different groups of organisms remains problematic both in California and Queensland."

Dane Panetta observes as Robin Breckinridge, CDFA, dissects flowerheads to determine if a weed is purple starthistle or the A-rated Iberian starthistle on a ranch near Lake Berryessa, Napa County. This was purple starthistle…false alarm! However, the two species readily hybridize. *Photo: Gina Darin*

For the past four years the Australian Weeds CRC and the Queensland Government have worked together to gather critical data targeting the control of Siam weed, Mikania vine, Limnocharis, Koster's curse and Miconia species. For more information on weed management in Australia, visit *www.dpi.qld.gov.au*.

*WeedSearch™ is a user-friendly, Microsoft Excel model available free by permission of the authors. Please contact *gdarin@cdfa.ca.gov* for a copy.

How much do weeds cost California?

"A lot!"

Somehow that answer does not always impress legislators when we are trying to secure additional funding for WMAs, or the media when we are describing the severity of the invasive plant problem. It is extremely difficult to calculate a dollar figure for the actual ecological damage caused by invasive plants.

One alternative way to address the question is totalling the amount spent on managing invasive plants. This has its own difficulties, in that management activities are spread out among numerous entities who often fold weed work within budgets for maintenance, operations, or environmental projects.

Researchers at Cornell University (Pimentel, Zuniga and Morrison 2004, *Ecological Economics*) estimated the economic costs for all invasive species in the United States at $120 billion annually, based on a wide range of extrapolations. However, for our purposes, it would be ideal to have a cost just for California, and just for plants.

Help us estimate funds spent on wildland weed work in California by filling out our survey at *www.cal-ipc.org!*

Cal-IPC is working to obtain just such a figure. We are collecting budgeted amounts for federal and state agency programs in California. For park districts, land trusts, and other regional and local programs, we need your help! Go to *www.cal-ipc.org* to fill out our brief survey for your organization. Watch our website and future issues of *Cal-IPC News* for the results.

Field courses training hundreds!

Heather Brady, Cal-IPC Project Coordinator

This year Cal-IPC ambitiously expanded our Wildland Weed Field Course program by offering eight courses during the spring and summer, including new courses on Invasive Weed Biology and Identification as well as our original course on Control Methods. Our membership and the larger community of wildland managers has responded by joining us for courses so far in San Diego, Santa Barbara, South Lake Tahoe, and (by the time you receive this newsletter) Berkeley. Still to come—courses in Oakland, and Chico.

To date this year we have trained more than 200 wildland weed workers, with most attending courses on both topics. Thanks to all of our attendees for helping to make this program a success. For those who are professionals in the field, we also thank your supervisors for recognizing the value of ongoing professional education.

This year we have been able to include many more restoration volunteers than in the past, because we obtained a private foundation grant that allows Cal-IPC to offer subsidized registration rates for this audience. These volunteer weed workers are out there doing hard work throughout the state, and the grant provides a great way to honor their efforts and to enhance their skills by training them alongside professional weed workers. So far over 50 of our attendees have been volunteers who work on wildland weeds at parks, conservancies, and other sites.

Each year we have introduced a new course topic for a field course held the day before our annual Symposium. Last year in San Diego, we premiered our Wildland Weed Mapping course. This course will be given again in Oakland on November 6. It will cover low, medium and high tech solutions to collecting spatial data in the field and processing it in the office. This is a great opportunity to learn about weed mapping strategy, mapping devices, data collection and processing, map making and analysis from leading experts in the field.

At this year's Symposium in Chico, we are featuring a new course on Revegetation Techniques. We all know that removing weeds alone is often not enough to accomplish our restoration goals. We are assembling an all-star group of instructors and a comprehensive curriculum on this critical topic. Our course site at The Nature Conservancy's Sunset Ranch boasts over a million native plants installed in a massive revegetation effort.

Lastly, if you have attended a field course in the past, keep an eye on your email inbox for our followup survey to learn how the course has impacted your work. This will help Cal-IPC track the impact of our Wildland Weed Field Courses, and to improve them based on your input. Maybe you now use a control technique on a population that you never thought you would be able to treat, or you have been working to create an early detection network to prevent new invasions. Maybe you wish the course had covered something else. Either way, we want to hear about it. Please take a minute to respond to our survey. The results will help us refine our curriculum, plan new courses, and continue to fund this important training.

Left: At the Santa Barbara field course, held on the University of California's Sedgwick Reserve, instructor Ken Moore demonstrates his arsenal of hand tools. **Top:** Attendees at the Santa Barbara course study their weeds for botanic characteristics. Eight courses were held this spring and summer in Santa Barbara, South Lake Tahoe, San Diego, and Berkeley on two topics—Weed Biology and Identification, and Control Techniques.

Vector risk assessment for aquatic invasive species

Abe Doherty, California Coastal Conservancy and California Ocean Protection Council

Freshwater and estuarine habitats are among the most infested ecosystems in California. Aquatic invasive species (AIS), including invasive plants as well as other aquatic invasive organisms, are numerous in our waterways. San Francisco Bay is one of the most heavily infested water bodies in the country, with prolific species like Chinese mitten crab having serious impacts on aquatic food webs.

Prevention is always the most effective policy when dealing with invasive species, but it is especially critical with AIS, because it is often impossible or extremely expensive to eradicate them after they have become established in marine and estuarine waters.

For California, one of the biggest vectors for AIS introductions is commercial shipping. The State Lands Commission has a commercial shipping management program for preventing introductions from ballast water discharge, and is developing a management program for hull fouling for these vessels. Unfortunately, for many of the other vectors for introduction of AIS, there is very limited management to prevent introductions from these vectors. There is also very limited information on the significance of these vectors, or what could be done to manage them.

On May 15, 2008, the California Ocean Protection Council authorized a grant of $1 million to the California Ocean Science Trust to administer a competitive process to select teams of invasive species experts to perform risk assessments for six critical vectors. The vectors are:

1. commercial fishing,
2. recreational boating,
3. aquaculture,
4. live bait,
5. live imported seafood, and
6. aquariums and aquascaping

These vectors are all thought to be responsible for significantly contributing to introductions of AIS to the state, but they have not been investigated in a systematic manner and there are very limited management programs to address them. For each of these vectors, experts will collect and synthesize data and information on the significance of these vectors for introducing species to the state and to different regions of the state. Each study will also identify control points and make recommendations for management actions that could prevent future introductions of invasive species from that vector. These studies are on a timetable that aims for having results in fall 2009.

The Ocean Science Trust will also administer a competitive selection process for a study that will compare the results of the different vector studies in order to identify which vectors are most harmful to the state. This larger study will recommend how to most effectively develop management programs to target the most risky vectors.

One potential outcome for the risk assessments is that they may lead to consideration of new legislation to establish programs aimed at preventing introductions of aquatic invasive species and to create new funding sources for these programs.

Completion of the vector risk assessments will achieve one of the top five priorities of the California Aquatic Invasive Species Plan (AIS Plan), which was signed by Governor Schwarzenegger in January of 2008. Another priority of the AIS Plan is to create an AIS Working Group, comprised of agency staff, researchers, non-profit groups, tribes, industry representatives and other interested stakeholders. It is expected that the first meeting of the AIS Working Group will be held this summer.

Together these steps begin the important process of determining the most effective way to move forward strategically to prevent introduction of damaging AIS.

Abe Doherty can be reached at adoherty@scc.ca.gov.

For more information:

California Ocean Protection Council
resources.ca.gov/copc

California Ocean Science Trust
www.calost.org

California Aquatic Invasive Species Plan
www.dfg.ca.gov/invasives/plan

Quagga mussels are moving into California water bodies on recreational boats. State agencies are implementing tighter border inspections and educational efforts. For updated information on impacts and spread, visit www.dfg.ca.gov/invasives/quaggamussel. As with weeds, early detection is extremely important for aquatic invasive species. *Photos: CA Dept. of Fish & Game.*

Algae-harboring hydrilla causing bald eagle deaths in the Southeast

[From the Weed Science Society of America. Hydrilla is under eradication in CA.]

Hydrilla (*Hydrilla verticillata*) not only is a costly nuisance impeding waterways and recreational lakes, it also may have deadly impacts on eagles and waterfowl. Hydrilla, which is under statewide eradication in California, forms a dense mat in lakes, ponds and reservoirs. It is a safe haven for the fast-growing epiphytic cyanobacterial algae, a blue-green algae, which grows on top of the hydrilla and is potentially toxic to birds. It is suspected that when waterfowl, namely coots, eat the algae-harboring hydrilla, they become poisoned by the algae's neurotoxins and subsequently suffer from a neurological disease known as avian vacuolar myelinopathy. The eagles, in turn, eat the infected coots and succumb to the disease as well.

"According to the research, avian vacuolar myelinopathy was first documented in 1994 at DeGray Lake in Arkansas," says Susan B. Wilde, Ph.D., research professor at the University of South Carolina and member of the Weed Science Society of America. "Since then, more than one hundred bald eagle deaths are believed to be associated with the disease. And it is estimated that the numbers of deaths are much higher, but because of scavenging animals, it often is difficult to recover the carcasses of dead eagles soon enough to test for the disease. But in places where dead eagles are found, invasive aquatic vegetation—primarily hydrilla—and the blue-green algae are always present."

Hydrilla was first introduced into the United States as an aquarium plant in the 1950s. Improper disposal of hydrilla from aquariums, distribution through animal contact and the plant's ability to "hitchhike" on boats that have been in multiple bodies of water and not cleaned underneath after each use, has lead to its voracious spread over the years. "Hydrilla is most prevalent in the southeast but can be found in fresh water lakes and rivers in most coastal states," says Wilde.

Chinese tallow, continued from page 5...

the most susceptible to invasion. We were uncertain whether plants were restricted to the seven-meter band next to the water because of inappropriate growing conditions elsewhere or because patterns of dispersal favored this area (as would be expected by predominantly water-dispersed seeds) but we do know that successful recruitment was extensive here without human assistance.

Due to their small size, we suspected that the majority of the Chinese tallow individuals we encountered were first- or second-year seedlings. To explore how the hot, dry summer might limit a naturalizing population, we marked 50 seedlings distributed at regular intervals around the pond in July, noted their position and height, and returned just before the first substantial rain (Oct 26, 2007) to see how many had survived. Of the 50 marked seedlings, 35 survived, suggesting again that a perennial (or near-perennial) water source is important for Chinese tallow seedling survival in California. The fact that the majority of our marked seedlings survived the height of the summer drought demonstrates the potential suitability of North Davis Pond and similar sites to colonization.

Some Sobering Conclusions

Based on our research and the behavior of this species in its currently recognized invasive range, we believe that there is significant reason to be concerned about Chinese tallow invading at least riparian areas of the Central Valley. Mounting propagule pressure from maturing and newly planted horticultural trees and increasing numbers of naturalized individuals (which may serve as remote centers for further invasion) can only mean increasing probability of invasion. Though recognition that this species may be a potential problem plant in California has been increasing, it remains an extremely common introduced tree in our urban and suburban landscapes. We found through our field study that initial seedling survival and drought stress will likely restrict Chinese tallow to perennial water sources, despite high amounts of germination across all of our experimental plots. In the larger context of California, however, a potential distribution restricted to perennial water bodies is still alarming given the high conservation value of our wetlands and riparian forests. The maturing source of Chinese tallow propagules upstream of the Bay-Delta raises the question of how long it will take for more naturalized populations to appear throughout the Bay-Delta region. Land stewards, nature lovers, and landscapers: take heed!

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Michael J. Bower and Clare E. Aslan are graduate students in Ecology in Dr. Marcel Rejmánek's lab at UC Davis. A formal, peer-reviewed publication describing their work is expected in 2008. Contact them at mjbower@ucdavis.edu and ceaslan@ucdavis.edu.

Reports from recent conferences

Cal Fish & Game Climate Change Workshop

Natural resource professionals gathered June 6 at the California Energy Commission in Sacramento for presentations on how climate change will impact ecological resources in California. Topics included impacts on wildlife, water, vegetation and wildfire. Cal-IPC Executive Director Doug Johnson presented on the impacts of climate change on invasive plants in the state. Increased temperatures, carbon dioxide levels, and wildfire will impact the vigor and range of each invasive plant in particular ways. Cal-IPC's current modeling work aimed at predicting spread of 36 wildland weeds in the state indicates that California will be more hospitable to some invasive plants (eg. *Ricinus communis,* castorbean) and less hospitable for others (eg. *Hedera* spp., ivy). In general, as with native plant populations, ranges tend to shift north. More detailed information will emerge from ongoing research, and invasives will be an important component of adaptation planning.

Audio and slides from all presentations are available at *www.climatechange.ca.gov/events/research.html*.

California Native Grasslands Association Annual Conference

Collaboration is necessary to protect native habitats. These is especially true for grasslands, as many grassland-dependent species live in working rangelands. CNGA's 2008 conference in Santa Rosa featured speakers who described partnerships that have brought disparate groups together to protect grasslands. Topics included, "Ranchers and conservationists preserving California's grasslands together", "Managing public open space grasslands with proper livestock grazing programs", and "Restoration takes a village: Successful collaboration to burn and restore a vernal pool grassland". Conference program and abstracts are available at *www.cnga.org*.

National Cooperative Weed Management Area Conference

Thirty-seven states were represented at the first ever national WMA conference, held April 15-17 in Reno. Attendees represented local, state, and federal agencies (51%), non-profit organizations (23%), universities and other educational institutions (12%), business interests (2%), and other people concerned about invasive plants (12%). The event was organized by the Center for Invasive Plant Management, located at Montana State University in Bozeman, and co-hosted by eight other entities, including Cal-IPC. Executive Director Doug Johnson chaired a session on how WMAs can participate in invasive plant advocacy. Other topics included funding, volunteers, mapping, early detection/rapid response, and outreach.

Audio and slides from all presentations are available online at *www.weedcenter.org/CWMAconf/CWMA_conf_home.html*

Help Cal-IPC every time you search the web!

Cal-IPC is on GoodSearch - GoodSearch is an internet search engine that provides a penny per search to the charity you select. The affiliated GoodShop gives a percentage of money spent on purchases through their shopping portal. Help raise money for Cal-IPC while looking up baseball scores, movie times, or control techniques for that nasty new weed. Go to *www.goodsearch.com* and enter "California Invasive Plant Council" under ***"Who do you search for?"***

Arundo/Phragmites Symposium

The Arundo/Phragmites Symposium, held in conjunction with the Western Society of Weed Science conference, addressed biology and growth dynamics of these two problematic species, their impacts on native flora and fauna, and management techniques. *www.wsweedscience.org*

Field trip to Swan Lake Restoration project in Stead, Nevada, during the National Cooperative Weed Management Area Conference. *Photo: Bob Case.*

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Donations to Cape Ivy Biocontrols

Patricia Howard (Littleriver), **Michael Swimmer** (Swimmer Family Foundation, Los Angeles)

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William Abbott (Carpinteria), **Shannon Allen** (HDR Engineering, Inc., San Diego), **Manuel Almendarez** (Caltrans, San Jose), **John Anderson** (City of San Diego Park & Rec. 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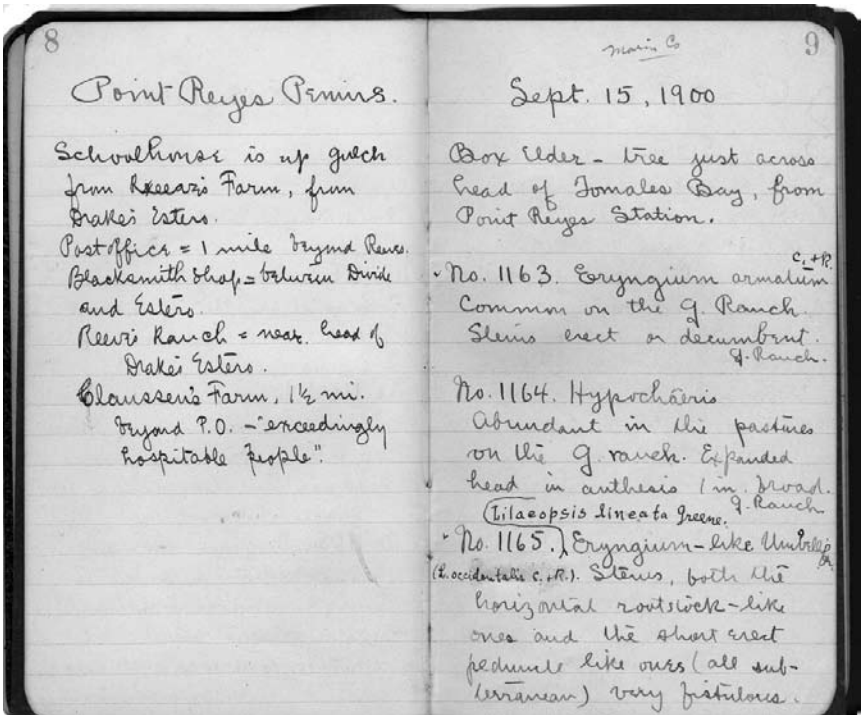
Continued on next page...

Readings & Resources

Know of a resource your fellow weed workers should hear about? Please contact info@cal-ipc.org.

Help Transcribe Jepson's Field Books

The University and Jepson Herbaria at UC Berkeley want to increase the accessibility of famed botanist Willis Linn Jepson's field books by linking them to online specimen records. However, the books first need to be transcribed so internet search engines can find them. The Herbarium is seeking volunteers to help - all you need is an internet connection and a few minutes for each page. Contact Richard Moe, *rlmoe@berkeley.edu*. *http://ucfeps.berkeley.edu/images/fieldbooks/jepson_fieldbooks.html*


8

Point Reyes Penins.

Schoolhouse is up gulch from Kessel's Farm, from Drake's Esters.
Post office = 1 mile beyond Revs.
Blacksmith shop = between Divide and Esters.
Revis Ranch = near head of Drake's Esters.
Clausen's Farm, 1½ mi. beyond P.O. – "exceedingly hospitable people".

9

Sept. 15, 1900

Box Elder – tree just across head of Tomales Bay, from Point Reyes Station.

No. 1163. Eryngium armatum C. & R. Common on the G. Ranch. Stems erect or decumbent. G. Ranch.

No. 1164. Hypochaeris Abundant in the pastures on the G. ranch. Expanded head in anthesis 1 in. broad. (Tilaeopsis lineata Greene.) G. Ranch

No. 1165.) Eryngium-like Umbellif. (E. occidentale C. & R.). Stems, both the horizontal rootstock-like ones and the short erect peduncle like ones (all subterranean) very fistulous.

Willis Linn Jepson's notes from the Point Reyes Peninsula, September 15, 1900. *Courtesy Jepson Herbarium.*

Complete Works of Darwin

Scanning historical field books is suddenly popular. The complete works of Charles Darwin are now available online from Cambridge University. *http://darwin-online.org.uk/manuscriptsBrowse.html.*

Pollinator Presentation

In celebration of National Pollinator Week, June 22-28, the U.S. Fish and Wildlife Service offers a PowerPoint presentation at its website. "The Birds and the Bees and... the Beetles? Why we should care about pollinators", provides an introduction to pollinators for refuges, nature centers, scouts, 4-H, and other community groups. *www.fws.gov/pollinators*

Cacti, Agave, and Yuccas

Cacti, Agaves, and Yuccas of California and Nevada, a new book by Stephen Ingram features 262 color photographs, 52 range maps, and references for more than 60 species. *www.cnps.org*.

Funding

Western SARE (USDA's Sustainable Agriculture Research and Education) is now accepting applications for 2009. SARE functions through competitive grants conducted cooperatively by farmers, ranchers, researchers and agricultural professionals to advance farm and ranch systems that are profitable, environmentally sound and good for communities. Deadlines vary from now to Dec. 5, 2008. *http://wsare.usu.edu*

Resources in Spanish

Looking for Spanish-language resources on weeds and other plants? The Center for Invasive Plant Management in Montana has added a new section to its website with links to publications and websites in Spanish. *www.weedcenter.org/inv_plant_info/Spanish_resources.htm* Cal-IPC also has two brochures in Spanish: The Don't Plant a Pest! brochure for Southern California, and the Biological Pollution brochure (PDF only) *www.cal-ipc.org/resources/brochures.php*

Online Learning Library

The Center for Invasive Plant Management has a new Learning Library featuring online textbooks and learning modules. Topics range from management and prevention to information on invasive plants for the public. *www.weedcenter.org/library.html*

New Members, continued...

Service, South Lake Tahoe), **Nancy Stearns** (UCSB Sedgwick Reserve, Santa Ynez), **Eric Sutera** (Forester's Co-Op, Grass Valley), **Chinda Teas** (Caltrans, San Jose), **Thomas Thompson** (La Mesa), **Morgan Trieger** (WRA, Inc., San Rafael), **Wendy Trowbridge** (Great Basin Institute, Reno, NV), **Jacob Tybo** (South Fork Band Environmental, Spring Creek, NV), **Cheryl Vann** (WRA, Inc., San Rafael), **Jim Versteeg** (Buckeye Ranch, Porterville), **Paula Voigt** (Caltrans, Santa Barbara), **Daylin Wade** (CA Tahoe Conservancy, South Lake Tahoe), **Debbie Waldecker** (CA Department of Parks & Recreation, San Diego), **Steve Waldman** (City of San Diego Park & Rec. Dept.), **Courtney Walker** (Tahoe RCD, South Lake Tahoe), **John Warpeha** (Washoe Tribes Environmental Protection Dept.), **Brian Weller** (Ecosystems Restoration Associates, San Diego), **Marit Wilkerson** (UC Davis, Davis), **Carol Williams** (Shipley Nature Center, Huntington Beach), **Eric Winford** (NV Tahoe Conservation District, Stateline, NV)

The Wildland Weed Calendar

Cal. Invasive Weeds Awareness Week

July 21-27
Statewide
www.cal-ipc.org/policy/state/ciwaw.php

SERCAL Annual Conference

August 13-16
Santa Rosa

Restoration's Bigger Picture: Linking local restoration with regional and global issues
www.sercal.org/2008_conference.htm

Lepidium Science & Management Workshops

September 10 - Science
Rush Ranch Nature Center, Suisun City
October 29 - Management
Oakland
www.sfbaynerr.org

Statewide Master Gardeners' Conference

September 24-26
"Digging Deeper: Lessons in sustainability"
Asilomar
http://camastergardeners.ucdavis.edu

Cal-IPC Symposium & Revegetation Field Course

October 1-4
Chico
www.cal-ipc.org/symposia

National Association of Exotic Pest Plant Councils Conference

October 14-17
Nashville, TN
In association with the Natural Areas Conference.
www.naeppc.org

Southern California Botanists Symposium

October
CSU Fullerton
www.socalbot.org/symposia.php

Cal-IPC Mapping Field Course

November 6
Oakland
www.cal-ipc.org/fieldcourses

10th Annual Central California Invasive Weed Symposium

November 14
Monterey

"Evolution/Revolution: What's new in the invasive weed world." (Formerly War on Weeds)

Contact Henry Gonzales, *gonzalesh@co.monterey.ca.us* or Bruce Delgado, *bdelgado@mbay.net*.

California Native Plant Society Conservation Conference

January 17-19, 2009
Sacramento
"Strategies and Solutions for Plant Conservation in the 21st Century"
www.cnps.org

Quotable

"Stopping the influx of new detrimental non-native species and containing their spread is essential to Hawaii's and the Nation's future well-being. The present problem is severe and the future is uncertain. Only legislation, such as this measure, will begin to address the continued loss of our Nation's natural resources."

Domingo Cravalho, Jr., Inspection and Compliance Chief, Hawaii Department of Agriculture, testifying before the House Subcommittee on Fisheries, Widlife, and Oceans regarding H.R. 6311, the Non-Native wildlife Invasion Prevention Act.

"We are trying to navigate uncharted and turbulent waters with an old and defective economic compass."

Pavan Sukhdev, head of Deutsche Bank's global markets business in India, on ignoring the economic value of ecosystem services (United Nations Environment Programme report, May 2008)

"I met with people in lots of cities about the light-brown apple moth spray program, and I heard a lot of emotion from the public. We need to also get this level of passion about preventing invasive species in California."

California Secretary of Food & Agriculture A.G. Kawamura, radio interview on a KFOG's Morning Show (June 25, 2008)

Cal-IPC Membership Form

We're working to protect California's wildlands from invasive plants—join us!

Cal-IPC's effectiveness comes from a strong membership that includes scientists, land managers, policy makers, and concerned citizens. Please complete this form and mail with check or credit card number. Additional donations support our projects. We are a 501(c)(3) non-profit organization, and donations beyond regular membership rates are tax deductible. **Join or donate online at www.cal-ipc.org.**

Membership

- ☐ **Regular** **$40**
- ☐ Student/Volunteer $20
- ☐ Organization* $150

** Receives member benefits for three individuals. Attach contact information for add'l individuals.*

Joint Memberships

- ☐ add SERCAL only +$25
- ☐ add CNGA only +$35
- ☐ add SERCAL & CNGA +$65

Cal-IPC Membership runs on the calendar year. Those who join after June 30 each year will be current through the following calendar year. Joint memberships receive a $5 discount on each organization's normal rate, and apply only to Regular Cal-IPC memberships.

Donation

- ☐ Amount of gift _____
  - Friend ($1 - $99)
  - Contributor ($100 - $249)
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- ☐ I would like to consider a legacy gift. Please send information on planned giving.

- ☐ Check here if you would prefer to receive the *Cal-IPC News* as a link to a pdf file online rather than a paper copy.
- ☐ Occasionally, we share members' addresses with like-minded organizations. Check if you ***do not*** want your information shared.

Mail this form with check (payable to "Cal-IPC") or credit card info to:
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