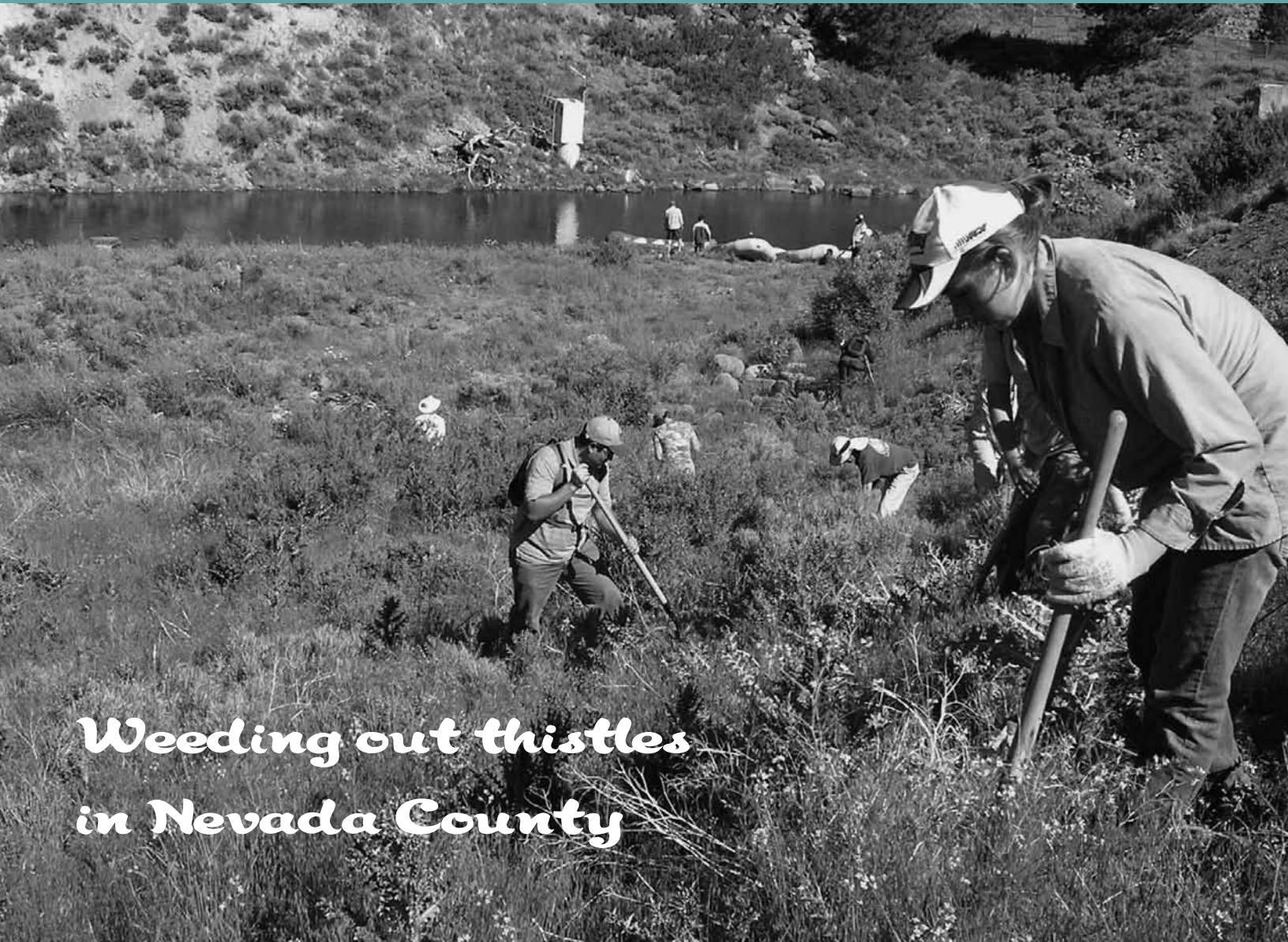




Cal-IPC News

Protecting California's Natural Areas from Wildland Weeds

Quarterly Newsletter of the California Invasive Plant Council



Weeding out thistles in Nevada County

Volunteers remove musk thistle (Carduus nutans) as part of an annual work party. The Nevada-Placer WMA has made treating this infestation a priority because musk thistle is an "A" rated weed that is being treated with herbicide on adjacent lands.

Photo: Susi Urie, Tahoe National Forest

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A California 501(c)(3) nonprofit organization

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

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Cal-IPC News

Summer 2010 - Volume 18, Number 2

Editors: Doug Johnson, Elizabeth Brusati, Heather Brady

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From the Director's Desk

Weighing in on disclosure of herbicide ingredients

Cal-IPC exists to serve the folks on the ground addressing invasive plants throughout California. Much of our work relates to providing information on the biology and management of wildland weeds, through trainings, publications (like this newsletter), maps, web tools, and our annual Symposium, this year in Ventura, Oct. 14-16!

We also serve you by seeking to improve policies that affect your work. This includes advocating for some self-evident needs, like secure funding for local Weed Management Areas. But we are also on the lookout for other improvements to the policies that impact restoration, from efficient permitting processes, sensible horticultural practices, and consistent listing criteria for invasive plants across state lines.

One recent issue that Cal-IPC weighed in on is the proposal by the Environmental Protection Agency to begin requiring the public disclosure of all ingredients in pesticide formulations. Currently, only the active ingredients are disclosed to protect the manufacturer's proprietary information. However, so-called "inert" ingredients (such as surfactants in herbicides) can have an environmental impact.

We strongly support this disclosure. While it poses difficulties for industry competition, it fulfills a basic "right to know" for a public increasingly concerned about the impacts of pesticides in our environment. And natural resource managers, who select the best tools based on factors including potential non-target effects, have a stake in knowing as much as possible about the tools in their toolbox.

Disclosure has significant advantages. It enables further research by third parties, including research on applications for habitat restoration. Market forces will encourage improved formulations (such as the use of safer surfactants) when consumers can compare full product information. Both of these are likely to increase public confidence in product safety; the current lack of transparency feeds distrust. Public support for our work is vital, and addressing concerns over herbicide safety is an important part of earning that support.

After communicating with partners in the herbicide industry to help understand their concerns, the Cal-IPC Board of Directors adopted this stance and submitted formal comment to the EPA. What do you think? Let us know if you have strong feelings about this, pro or con. My email address is dwjohnson@cal-ipc.org. Meanwhile, have a great field season and know that we are hard at work behind the scenes, aiming to strengthen the policy environment we work in.



Cal-IPC's weed mapping team will be coming to a WMA meeting near you! Here the Sierra-San Joaquin Noxious Weed Alliance shares expert knowledge and data. *Photo: Dana Morawitz, Cal-IPC*

Cal-IPC Updates

We keep growing!

Cal-IPC continues to expand! Mapping and Modeling Specialist Cynthia Powell (right) will assist with our statewide mapping program and our risk assessment projects. She is finishing a Master's in Geography at San Francisco State University. Ginny King (left) has returned as a Program Assistant while Bertha McKinley is recovering from shoulder surgery. Ginny worked for us in a temporary position two years ago. www.cal-ipc.org/about/staff.php

Board elections

Ballots for board elections will be mailed soon. Please take this opportunity to choose the people who oversee the future of Cal-IPC.



Mid-year donation drive

By now you should have received a mid-year donation request. Your donations are extremely valuable for our programs by giving us the flexibility to continue activities that are not directly supported by grants. Anything you can give is greatly

appreciated. Donate online at www.cal-ipc.org/about/membership.

New Grants

Thank you to the US Forest Service's Special Technology Development Program for supporting our risk assessment and mapping projects. Thank you to the Switzer Foundation and the Firedoll Foundation for funding Doug Johnson's work as Chair of the California Invasive Species Council's Advisory Committee. The

Switzer Foundation also interviewed Doug, a former Switzer Foundation Fellow, for their podcast. www.switzernetwork.org/news/podcast (posted June 17).

The California Invasive Species Advisory Council (CISAC) presented a list of invasive species to the Invasive Species Council of California on April 21. The full list of 1,700 species is available at CISAC's website. Scorecards have been completed for 200 species; 36% of those species are not yet in California but 51% have a high risk for introduction into the state. This list is the first step in developing a set of priority species on which the state can focus its efforts for control and prevention. www.iscc.ca.gov/species.html

A lawsuit by the Center for Biological Diversity and the Maricopa Audubon Society has stopped the USDA Animal and Plant Health Inspection Service's research and release of leaf eating beetles (*Diorhabda elongata*) for biocontrol of saltcedar (*Tamarix* spp.) in 13 states. The concern was that the beetle would destroy the habitat, albeit non-native habitat, of the endangered Southwestern Willow Flycatcher. The bird can be

found nesting in saltcedar, in addition to willow and cottonwood. Saltcedar is an invasive, noxious tree that has ironically reduced native plant biodiversity on some riparian shorelines. The USDA moved to end the beetle program last year. Releasing saltcedar leaf beetles became subject to Endangered Species Act violations punishable by a fine up to \$250,000 per violation after the beetles moved further south than expected. www.examiner.com/a-2692416-USDA_stops_using_beetles_vs_invasive_saltcedar.html

The U.S. Department of Agriculture has approved the expansion of genetically-engineered eucalyptus trees. Freeze-tolerant eucalyptus trees are already planted but were only allowed to flower at two experimental sites. USDA's approval will allow them to flower at 28 sites in the southern U.S. Biotech firm ArborGen LLC plans to use the trees for biomass power plants and as cellulosic biofuels.

One parent of ArborGen's eucalyptus has been classified as an invasive threat in Florida. (E and E News, www.eenews.net) For more information, see www.aphis.usda.gov/newsroom/content/2010/05/ge_eucalyptus.shtml

The notorious kudzu vine is also a major source of ozone, according to a study from the University of Virginia. Kudzu produces the chemicals isoprene and nitric oxide, which combine with nitrogen in the air to form ozone, an air pollutant that causes significant health problems for humans. Ozone also hinders the growth of many plants, including crops. Researchers found that the chemical reaction produced by kudzu causes a 50% increase in the number of days in which ozone levels are considered unhealthy, an impact that overwhelms the reductions in ozone due to auto pollution regulations. (Science Daily, May 18) www.sciencedaily.com

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Working together against weeds: Workshops, materials, and Best Management Practices to prevent invasive species spread due to land management operations

Christy Brigham, National Park Service (NPS) Santa Monica Mountains National Recreation Area, Thousand Oaks

Jay Goldsmith, NPS Pacific West Regional Office, Oakland

Sylvia Haultain, NPS Sequoia and Kings Canyon National Parks, Three Rivers

Unintentional spread of invasive species during management operations is often overlooked and may be a major driver of invasions in some management areas. Activities such as road maintenance, weed abatement, research activities, planting, seeding, hiking, backpacking, pack stock, and other activities can all spread weeds. Finding workable solutions to these operational hazards is not easy and takes participation from all sectors of the organization. The Pacific West Region of the National Park Service has recently embarked on a multi-faceted effort to raise awareness of unintentional weed spread, cooperatively develop best management practices to limit spread, and improve management operations with respect to invasive species management.

There are numerous examples within the National Park Service (NPS) of unintentional spread of non-native invasive plant species through park operations. These examples include introduction of yellow starthistle into Yosemite Valley during road construction activities, movement of perennial pepperweed to an uninfested park site during invasive species control and restoration field work in the Santa Monica Mountains National Recreation Area and introduction of yellow starthistle from contaminated hay during post-fire rehabilitation projects at Whiskeytown National Recreation Area, to give just a few examples. These and similar incidents prompted the Pacific West Region of the NPS to ask whether we could take a com-

prehensive look at how park operations spread weeds and develop feasible best management practices for different park operations to limit this spread.

Although the program described here was developed by the NPS for use in park sites, it will have relevance to any land manager or agency that engages in

that would raise awareness of the potential for operational activities to unintentionally spread weeds through use of contaminated materials or equipment or importation or movement of seeds, root stocks, or contaminated materials. This unintentional spread often involves work that is completely unrelated to resource management work but involves vehicles, people, stock, or equipment moving from an infested area to an uninfested area.

The second goal of our program was to involve individuals working in a particular operational area in the identification of weed movement pathways and the construction of best management practices. It was our hypothesis that involvement of field workers in each operational area would result in higher buy-in from these constituents and best management practices that were feasible for the targeted user group and thus more likely to be implemented.

Finally, our third goal was to gather, design, and implement best management practices across all management operations to reduce the unintentional weed spread that occurs in parks (and other open space areas) as a result of operational activity.

Park Workshops

A small working group of resource managers from parks throughout the Pacific West Region was formed in 2007 to identify possible pathways for weed



A “bumper crop” of weeds. Trucks and other maintenance equipment can spread invasive plants. *Photo: Mike Kelly*

operational activities such as campground maintenance, road maintenance, resource work, research, or any other field activities that have the potential to spread weeds. Many of the best management practices (BMPs) that we adopted and built upon for our program came from other agencies and groups such as the United States Forest Service and regional weed management area guidelines.

The goals of our Working Together Against Weeds program were three-fold. First, we wanted to develop a program

spread within each operation. This working group spent approximately six months assembling materials on best management practices for each management operation from as many sources as possible including other agencies and non-profits. After this material was assembled, a three-day workshop was held at Point Reyes National Seashore. For the workshop, we recruited staff from all park operational groups from parks throughout the Pacific West Region. These operational groups included Interpretation and Education, Law Enforcement, Building and Utilities Maintenance, Trail Maintenance, Construction, Road Maintenance, Resource Management, Permits, Concessions, Horse Operations, Fire, Wilderness Operations, and more! We identified five outcomes for our workshop:

1. Understand why non-native invasive species are a critical concern to park management
2. Identify how to better integrate prevention and control activities into operational activities
3. Enhance participants' knowledge of what plans, tools, programs, and resources are available to staff and how they can best be delivered and used at individual parks
4. Discover ways to use our educational resources to increase awareness of and participation in weed control and prevention programs, and
5. Identify Best Management Practices (BMPs), roadblocks to implementation, and solutions to those roadblocks for Pacific West Region parks

The workshop included general background information and presentations on why weeds are a problem for national parks, what we know about invasive species biology and spread, examples of unintentional weed spread, and introductions to each operational area. Following this introduction, the group broke into working groups focusing on each operational area. Each working group was tasked with identifying pathways to unintentional weed introductions stemming from their

operational activities, reviewing available BMPs that were assembled prior to the meeting, brainstorming new BMPs, identifying potential roadblocks to BMP implementation, and identifying solutions to perceived roadblocks.

The initial working group took the materials generated from the workshop and condensed them into a set of reference materials including all of the assembled BMPs, introductory Powerpoint presentations, and other reference materials. These materials were sent to all of the parks within the region and were also made available online.

The second phase of the project was initiated in 2009 and involved developing a one-day workshop around the materials developed by the earlier working group. This workshop was then offered as a service to parks throughout the Pacific West Region. During 2009, we had funding to put on four workshops at Joshua Tree National Park, Death Valley National Park, North Cascades National Park, and Olympic National Park. During summer and fall 2009, a team of two to three NPS and USGS staff traveled to these parks and worked with the park staff to facilitate a workshop similar to the initial Point Reyes workshop. The goals of these park-specific workshops were to:

1. Raise the level of awareness of weed problems within the park
2. Expose park staff to existing BMPs for various park operations
3. Conduct focused brainstorming sessions on pathways most relevant to individual parks with the goal



Field of weeds. Contaminated hay has spread yellow starthistle into national parks. *Photo: Joe DiTomaso*

of developing BMPs in partnership with the staff working in these particular operations, and

4. Leave the park with an overview of some steps that they might take to effectively combat their weed problems.

Workshops were attended by park staff from all operational divisions and were planned as a day-long focus on weed problems within the park. Resource management staff at the host park provided background material on the weeds of concern at the park hosting the workshop. In addition, local resource managers provided focus for the workshop facilitators on what the largest sources of operational weed spread were in that particular park. Brainstorming sessions for BMPs focused on these areas of greatest potential weed spread.

Results and Conclusions

A total of five Working Together Against Weeds workshops have been presented. There has not been sufficient time since these workshops to evaluate how many parks developed and adopted best management practices as a result of these workshops. Nor is it possible to evaluate whether these workshops had significant

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Nevada County Scotch Broom Challenge

by Lynn Lorensen, Nevada County Fire Safe Council Defensible Space Advisor

Drive through Nevada County in the spring and you will see the beautiful and terrible contrast presented by the red and yellow blooms of California redbud (*Cercis occidentalis*) and Scotch broom (*Cytisus scoparius*).



Pulling Scotch broom. Photo: Lynn Lorensen

Nevada County has unique botanical sites and is a high wildfire fire danger area with 70% of the evacuation routes being private roads. Most of these roads are lined with Scotch broom. Highways 49 and 174 are also heavily infested with Scotch broom. To add to this dire state we found that local garden centers were selling brooms.

In 2007 the Fire Safe Council joined with the Resource Conservation District to develop the Scotch Broom Challenge. We developed cards to be left at nurseries asking that they not sell Scotch broom. A group of interested representatives, including neighborhood associations, US Forest Service, California Native Plant Society, watershed groups, land trusts, the California Department of Forestry and Fire Protection (Cal-Fire), all county and city fire districts, schools and churches joined the Fire Safe Council to plan how

Scotch broom can be brought under control along evacuation routes and in sensitive watershed and botanical areas.

The first control projects were implemented in the spring of 2008. A five-year commitment of monitoring and removal is required. We began with four project areas and now are up to 10. In the first two years we cleared over 10 acres of broom from the landscape. Over 700 volunteers have pulled and cut Scotch broom. The fire districts oversee the burning of the scotch broom that is removed.

Weed-Wrenches from the Fire Safe Council and fire districts are loaned to private landowners to remove broom as part of the Fire Safe Council Defensible Space program.

The ongoing community commitment gave the Agricultural Commissioner the support needed to ban the sale, importation and propagation of Scotch broom in Nevada County.

The project at Hell's Half Acre, just west of the City of Grass Valley, is in a unique botanical area where over 100 species of plants grow. The area is

formed by an ancient volcanic mudflow (gabbro) of shallow rocky soils containing small vernal pools. Scotch broom growing along the roadsides was beginning to infest this sensitive site. The Redbud Chapter of CNPS, Wildflowers Forever, Twin Cities Church and other property owners are working on removing Scotch broom from this site.

On April 3, 2010, 30 cubic yards of broom were removed from 10 acres on the Adam Ryan Wildlife Preserve in the Alta Sierra area of Nevada County.

Nevada County residents of all ages, from 8 to 80, are committed to the long-term goal of bringing brooms under control to preserve unique botanical sites, restore watershed areas, and create defensible space around our homes with safe evacuation routes in the event of a wildfire. The Nevada County Fire Safe Council and the Agricultural Commissioner are now working with surrounding counties on an area wide Scotch Broom Challenge and to ban on the sale of brooms.

Contact the author at weedsalotmore@hughs.net.



Volunteers celebrate after a long day of pulling Scotch broom.

Photo: Lynn Lorensen

2010 Cal-IPC Symposium

“Weeds and Wildlife: Impacts and Interactions”
Ventura Beach Crowne Plaza, Ventura, CA
October 14-16, 2010, Field Course October 13

Featured Speakers

There's an app for that: Tracking weeds with mobile technology, *Christy Brigham, Santa Monica Mountain National Recreation Area*

BAEDN, LAEDN, SAEDN, California EDN? Can we build a coordinated early detection network to protect CA from new invasions?, *Dan Gluesenkamp, Audubon Canyon Ranch*

Cal-IPC's statewide weed mapping project, *Dana Morawitz, Cal-IPC*

Risk management and liability insurance in habitat restoration and weed control, *Jeanette Heinrichs, Van Beurden Insurance*

Wildlife protection during habitat restoration and weed control, *Natasha Lohmus, CA Department of Fish & Game*

The inspection process: What does the Agricultural Commissioner look for?, *Rudy Martel, Ventura County Agricultural Commissioner's Office*

Effects of Sahara mustard, *Brassica tournefortii*, on the biodiversity of a desert landscape, *Michelle Murphy, UC Riverside*

How will tamarisk biocontrol affect wildlife?, *Tom Dudley, UC Santa Barbara*

Species composition changes, habitat effects and the role of livestock grazing in improving recovery potential for Ohlone Tiger Beetle in Santa Cruz County, *John Gustafson, USDA, NRCS*

Targeted grazing for weed and wildlife management, *Morgan Doran, UC Cooperative Extension*

Impacts of California's invasive plant species on invertebrate fauna: A review, *Denise Knapp, UC Santa Barbara*

Influence of a large herbivore reintroduction on plant invasion and community composition in a California grassland, *Brent Johnson, Pinnacles National Monument*

Understanding research on herbicide impacts: Toxicology resources for today's habitat restoration worker, *Susan Kegley, Pesticide Research Institute*



Photo: Brian Murphy

Hey, what are they doing over there? What we can learn from animal and pathogen prevention and control projects, *John Randall, TNC*

Full program online, www.cal-ipc.org/symposia/index.php. Department of Pesticide Regulation CE credits available for licensed applicators.

Strategic Approaches Field Course

Join Cal-IPC for our new Wildland Weed Field Course: Strategic Approaches on Wednesday, October 13. Topics will include developing goals and objectives, prioritizing target species, creating treatment plans, permitting requirements, planning for monitoring, and integrating adaptive management. Throughout the day, we will provide applicable examples to enhance your learning.



Photo Contest

See information on our website and submit entries by September 1 to breemerr@yahoo.com.

Raffle and Auction

This is a fun event and a fundraiser for Cal-IPC. Books, wine, tools, art, and fabulous trips will be up for grabs. Do you have something to donate? Contact raffle@cal-ipc.org.

And More...

Discussion Groups \$ Sponsor Exhibits \$ Job Board
Student Paper & Poster Contest \$ Student Lunch
Social Hour \$ Awards Banquet \$ Saturday Field Trips
Strategic Approaches Field Course \$

To Register...

Online form at www.cal-ipc.org; you can pay online, over the phone, or by sending a check.

Register and reserve lodging by **September 21** for discounts. Additional discounts for students and volunteers.

Full details at www.cal-ipc.org

Aquatic pesticide use, permits and injunctions: What weed managers need to know

by Mike Blankinship, Blankinship & Associates, Davis, CA

Is arundo or pampas grass in or near water on your list of species to control? Or perhaps more mundane cattails or tules? Maybe you have endangered or listed species in an area where vegetation management is planned. Be aware of the following regulatory topics in order for your weed management project to succeed.

California's Aquatic Pesticide Permit

Since 2002, intentional application of herbicides to "Waters of the United States" requires a permit issued by the State Water Resources Control Board (SWRCB). First, it is critical that you know what constitutes "Waters of the US".

Be aware of the "tributary" concept. Because many California creeks, streams and ponds drain directly to, or are tributary to a "Water of the US", this permit may apply. Think "connectivity" here. If you are hydrologically connected to a "Water of the US", you need to consider



NPDES permits are required for all herbicide application into "Waters of the U.S.", including creeks, streams, and ponds that drain directly into "Waters of the U.S." Photo: Mike Blankinship

this permit. Put another way, if you are "hydrologically isolated", this permit probably doesn't apply to you.

If you apply herbicides to Waters of the US, the permit you need is the statewide general National Pollutant Discharge Elimination System (NPDES) permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the US.

Although currently being revised by SWRCB staff, the permit is still active and available for use.

In addition to surfactants, only 10 herbicides are approved for aquatic use. Special circumstances apply to the use of acrolein and copper that likely require California

Environmental Quality Act (CEQA) compliance.

Permit Benefits

What do you get out of this permit except more paper and a hit to your budget? Simply put: Protection. The citizen lawsuit provision of the Cleanwater Act provides an opportunity for anyone (read environmental advocacy groups) to sue you if they feel you have adversely impacted water quality. Although not bullet-proof Teflon, the permit provides significant defense against such a suit.

Since 2002, a variety of lawsuits have resulted in confusion regarding the need for the aquatic weed permit. Earlier this year, the U.S. Supreme Court refused to hear further arguments, effectively putting an end to the debate and once and for all stating that a permit is, in fact, needed.

What Does the Future Hold?

Although not likely to affect us in California, the USEPA just published a draft of their nationwide permit intended for use in states without an existing per-

Waters of the U.S. Include:

All interstate waters and wetlands and waters currently, formally or potentially used in interstate commerce;

All other waters, including intrastate waters the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

- which are or could be used by interstate or foreign travelers for recreational or other purposes; or
- from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
- which are used or could be used for industrial purposes by industries in interstate commerce;

Tributaries to Waters of the US; and

Wetlands adjacent to Waters of the US.

Aquatic Pesticides Allowed

2,4-D	acrolein*
copper*	diquat
endothal	fluridone
glyphosate	imazapyr
triclopyr	
sodium carbonate peroxyhydrate	
non-ionic surfactants	
*Special restrictions may apply	

mit. Because California has had a permit in place since 2002 and the California permit is more stringent than the proposed EPA permit, California will likely not adopt the EPA permit.

SWRCB staff are currently revising the existing permit and changes are ahead. These may include the addition of toxicity testing and the reinstatement of regional monitoring groups like was done in 2001. Stay informed by joining the SWRCB "aquatic weed control" list serve at [www.](http://www.waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml)

waterboards.ca.gov/resources/email_subscriptions/swrcb_subscribe.shtml.

Be Aware of Fish and Frogs

In May, the U.S. District Court for the Northern District of California issued an injunction that protects 11 federally listed threatened or endangered species, including the tidewater goby, from 75 pesticides in eight Bay Area counties as a result of a suit by the Center for Biological Diversity (CBD). The injunction requires the use of no-spray buffer zones. www.epa.gov/espp/litstatus/stipulated-injunction.html

Similarly, in 2006, the same U.S. District Court issued an injunction related to another CBD action. This time, buffer zones are needed for the use of 66 pesticides in parts of 33 counties to protect the red-legged frog. www.epa.gov/espp/litstatus/redleg-frog/steps-info.htm

And last, in 2005, an injunction was issued by the Ninth Circuit Court regard-



ing an Washington Toxics Coalition v. EPA lawsuit related to the use of 54 pesticides near salmon-bearing water. www.epa.gov/espp/litstatus/wtc/index.htm

About the Author: Michael Blankinship is a Cal-IPC member, a DPR licensed pest control advisor and a registered professional civil engineer in CA. His Davis-based consulting firm solves problems related to permitting, compliance, water quality and natural resource management throughout the Western U.S. Learn more at www.h2osci.com. Reach Mike at (530) 757-0941 or mike@h2osci.com.

California Rangeland Conservation Coalition Field Trip

On June 17, 2010, Rod Tripp, Rangeland Manager with the East Bay Municipal Utility District, Professor Jim Bartolome, UC Berkeley, and rancher Todd Swickard led a field tour of EBMUD grazing lands. They shared research and management strategies to increase native plant populations, reduce invasive species and support water quality.

The tour showcased examples of how livestock have been managed to decrease invasive plants and increase native perennial grasses and overall species diversity. Every spring the Coalition hosts field trips like this to facilitate communication among, researchers, land managers and ranchers.

The California Rangeland Conservation Coalition consists of ranchers, environmental groups, and resource agencies working together to preserve and enhance California's rangelands for biodiversity, while supporting the long-term viability of the ranching industry. Learn more about them at www.carangeland.org or join their bi-monthly e-update by emailing tracy@calcattlemen.org.



Photo: Jen Stern, Cal-IPC

Stopping the unintentional spread of arundo

by John Boland, Project Manager, Tijuana River Valley Invasive Plant Control Program

We think of arundo, *Arundo donax*, as a “super invader” because it seems to do everything well – it is large, long-lived, competitive and persistent (Dudley 2000). But arundo has an Achilles’ heel – it is a poor natural disperser in smaller watersheds. Here I describe two situations that illustrate arundo’s dispersal behavior, and make recommendations to slow the spread of arundo in California.

Goat Canyon and the Natural Spread of Arundo

Goat Canyon is a new in-line sedimentation basin on one of the tributaries leading into the Tijuana River Valley. Each year, sediment collects in the basin during winter and spring, and each fall the sediment is removed along with any plants that may have become established. The young plant community trying to establish in this basin is interesting. It consists mostly of native species (e.g., mule-fat, *Baccharis salicifolia*, 385,000 plants per ha in 2009; arroyo willow, *Salix lasiolepis*, 118,000 per ha), some common invasive species (e.g., castor bean, *Ricinus communis*, 6,000 per ha), but virtually no arundo (only 1 per ha). Arundo is a rare recruit even though it is common elsewhere downstream or upstream? in the valley and the conditions in the basin are perfect for it. The huge differences in the abundances of the native seedlings and the arundo recruits are due to the huge differences in the reproductive and dispersal capabilities of these species.

Most native riparian plants, like mule-fat and arroyo willow, produce enormous numbers of small seeds that are wind-dispersed (Faber et al. 1989); they are able to disperse upstream, downstream and from watershed to watershed, and spread to sites like the Goat Canyon sedimentation basin with ease. But arundo does not produce viable seeds in California (Johnson et al. 2006). Instead it spreads to new sites by dispersal of large vegetative fragments, particularly fragments of rhizomes (Boland 2008). This only happens under

high flood flows because rhizomes are not easily broken from a clump (Boland 2006). I have found that, on average, a force greater than 100 lbs. is needed to break a rhizome from its rootstock (average = 105 ± 35 lbs; $n = 33$). These rhizomes then move only downstream in the same watershed. Compare that to the lightest puff of wind that disperses a thousand willow seeds in all directions and you will appreciate that reproduction and dispersal is an Achilles’ heel for arundo.

the banks. Bulldozers, loaders, excavators, and other heavy equipment had inadvertently broken up the arundo, dispersed the fragments and created new clumps on-site. In addition, bulldozers had left rhizome fragments in the river channel that river flows later dispersed to areas downstream. In 2009 I counted 450 new arundo recruits per ha in an open area downstream of Smuggler’s Gulch; this density is orders of magnitude greater than the back-ground densities of new



Arundo donax is being unintentionally spread by this backhoe. Simple measures can be taken to prevent mechanical dispersal of arundo.

Smuggler’s Gulch and the Unintentional Spread of Arundo

Smuggler’s Gulch is just 1 mile away from Goat Canyon and it too is a tributary leading into the Tijuana River Valley. But Smuggler’s Gulch goes through farmland before joining the main river channel and the City of San Diego maintains the 800 m long channel so that the farms are not flooded. Every two to three years bulldozers deepen the sandy channel, and raise the sandy banks by depositing sediment from the channel onto the banks. In 2004 there were only three patches of arundo growing on the banks but in 2009, after three bulldozer-maintenance events, there were 52 discrete patches on

recruits seen in places like Goat Canyon.

The bulldozing of Smuggler’s Gulch resulted in many new arundo clumps becoming established at, and downstream of, the bulldozer site (see Figure). Therefore, at Smuggler’s Gulch, humans unknowingly helped arundo through its reproduction/dispersal bottle-neck.

Synthesis and Recommendations

The situations at Goat Canyon and Smuggler’s Gulch show that the reproduction and dispersal of arundo is poor under natural conditions in small watersheds, but that the use of bulldozers can greatly increase arundo dispersal and reproduction. There are many other sites where

you can see similar results. Within San Diego County many of the places where *Arundo* is most abundant are sites where bulldozers are frequently used, particularly quarries and channel maintenance sites (Boland 2007).

In California, a tremendous amount of effort has gone into controlling arundo, but it is still common in most watersheds and some exasperated researchers recently wrote, “The invasion of California riparian areas by arundo continues despite efforts to control its spread, and there remains some uncertainty as to how it is able to do so” (Johnson et al. 2006). I believe that the bulldozer-facilitated dispersal mechanism described here is an underappreciated way that arundo spreads.

Recognizing the role of bulldozers in the spread of arundo should focus our control strategy in two ways:

1. Stop the spread of arundo by bulldozers – resource management agencies should require spraying of arundo clumps before, during, and after earthmoving activities; and
2. Target the arundo at bulldozer sites – arundo at quarries and other bulldozer hotspots should be given the highest priority because these are the sources of new invasions downstream.

Because arundo is a poor natural disperser except for extreme flood and erosion events, reducing its unintentional spread by bulldozers can help significantly reduce its overall abundance in the long term.

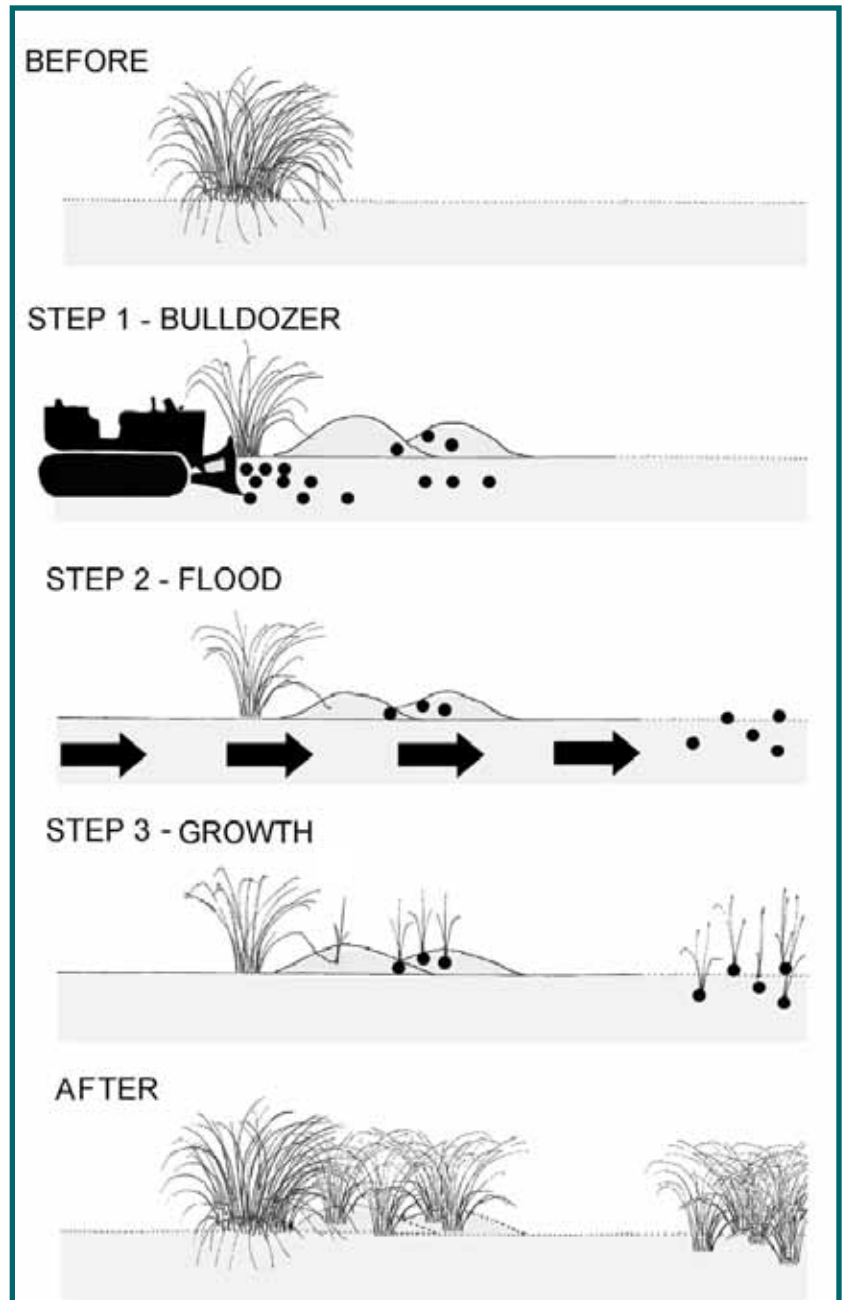
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Boland, J.M. 2006. The importance of layering in the rapid spread of *Arundo donax* (giant reed). *Madroño* 53 (4): 303-312.

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Dudley, T.L. 2000. *Arundo donax* L. Pp. 53-58 in C. Bossard, J. Randall and M. Hoshovsky (eds.). *Invasive Plants of California's Wildlands*. University of California Press, Berkeley, CA.



A bulldozer disperses arundo by cutting rhizomes (black dots) from the rootstock. Later, many new clumps become established at, and downstream of, the bulldozer site.

Faber, P., E. Keller, A. Sands, and B. Massey. 1989. The ecology of riparian habitats of the Southern California coastal region: a community profile. U.S. Fish Wildlife Service Biological Report 85 (7.27). 152 pp.

Johnson, M., T. Dudley and C. Burns. 2006. Seed production in *Arundo donax*? *Cal-IPC News* 14: 12-13.

California weed worker travels down under

by John Knapp, Native Range, Inc. and Cal-IPC board member

In 2001, the IUCN hosted an international conference in Auckland, New Zealand, on the eradication of island invasives titled, “Turning the tide: The eradication of invasive species”. The conference proceedings have inspired me throughout my career, and so when the conference organizers planned a follow-up conference in February 8-12, 2010, I knew I had to attend. After touring the North Island for a week of southern hemisphere summer surf, I found that I had to share what I experienced during that time as well.

My accent must have given me away, because I was commonly asked where I was from and what I did for a living. When I responded, “weed management in California,” I wasn’t told that they had some weeds for me to pull or given that funny look that suggests “what have you been smoking?” Surprisingly, I was asked, “What species are problems in California?”

During my stay, television commercials aired advertising certifications in invasive species management, and the radio broadcasted stories on invasive species control to protect biodiversity. I was awestruck by the Kiwis’ understanding of invasive species issues, and realized that we have a long way to go in achieving the same level of awareness and support in California. The scope and sheer number

of eradications presented at the conference was impressive.

The conference began with a Maori blessing and traditional gathering rituals. The nearly 300 attendees included three Cal-IPC members, 10 people from California (the majority from The Nature Conservancy and Santa Cruz-based Island Conservation), and 23 people from the States. Plant eradication talks were under-represented, with the majority of international talks and posters focused on vertebrate eradications; however, the strategies, extensive planning, and ecological considerations presented could easily be applied to plant eradications.

Several themes surfaced throughout the talks: 1) the benefits of multi-species eradications, 2) the need to investigate potential outcomes/impacts of completing eradications, and 3) how to determine when you have achieved eradication. Interestingly, helicopters were utilized in the majority of eradications, contingency funding was built into eradication budgets, and projects were conducted by teams of international personnel.

A concern expressed in several talks was the need to retain experienced eradication contractors; because of the lag time between eradications, contractors may not be able to stay in business. One major idea presented was to garner international support and funding for invasive species



Detection dogs survey sites eradicated of pests such as stoats, rats, cats, mice, hedgehogs, and rabbits to ensure project success. Photo: J. Knapp

eradications on islands by purchasing a ship that could hold several helicopters, which would travel throughout the globe with species-specific eradication specialists going from one locale to the next.

It was refreshing to be in a place where such ideas seemed possible- an “eradication Jacques Cousteau,” if you will, traveling the seas on the Calypso ridding islands of invasive species. Throughout the 12-hour flight home I wondered if we aim too low in the northern hemisphere. Are we more insular in our approach to eradications and thinking than our peers working on islands throughout the globe? Do we dare dream such dreams? Regardless, much as I do after attending a Cal-IPC symposium, I came away recharged and inspired.

Contact the author at john@nativerange.us

...BMPs from page 5

impacts on park operations or reduced inadvertent weed spread from park operations. However, the workshops were well-attended by a diversity of park staff, were well-received based on workshop evaluations, and served to raise the general level of weed awareness within each park.

Although each park we visited was different and had unique weed problems, several patterns emerged from our workshop visits. First, all parks appear to be seriously under-staffed when it comes

to dealing with their weed problems. Each park typically had only one to a small handful of staff available to work on weed problems that were threatening the majority of ecosystem types found within each park. Second, many parks are feeling overwhelmed by their weed problems and are considering “giving up” on many problematic species. This decision about when to “give up” on species appears to be occurring in a vacuum of guidance or scientifically derived criteria for when to

consider an invasive species problem a lost cause. Third, all of the parks that we visited appeared to be poised on the brink of disaster with respect to weed problems. Each had at least one if not several species that were present in the park at low densities but had the potential to significantly modify ecosystem functioning were they to spread beyond their initial small infestations.

Contact the author at Christy_Brigham@nps.gov.

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...News from page 3

Geocachers are helping track down invasive plants in Idaho. Geocaching is a sort of treasure hunt where recreationists use GPS receivers to locate caches hidden around the world, often in remote areas. Ada County, ID, hid four containers with information about invasive plants infestations and control efforts in order to spread the word about weeds. Geocachers can also submit coordinates of new infestations they find. www.govtech.com/gt/articles/765293

Saltcedar and Russian olive may not use as much water as previously thought. *Tamarix ramosissima* and *Eleagnus angustifolia* are invasive trees along many waterways in the western U.S. However, a study by the U.S. Geological Survey found that, contrary to what is often thought, these trees use no more water than native cottonwoods and willows. The study also found that the trees provide habitat for some wildlife species but not specialized birds such as woodpeckers and cavity-nesting species. (USGS Newsroom,

April 28) www.usgs.gov/newsroom/article.asp?ID=2451

A new invasive snail has reached the Lake Tahoe Basin. The New Zealand mud snail was detected on a boat at an inspection station at the lake in May. The snails are a concern because they outcompete invertebrates living in stream channels that are important food sources for trout and other fish. The fish generally do not eat the snails. Mud snails are already present in several rivers in California. (*Tahoe Daily Tribune*, May 29)

Readings & Resources

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

Social aspects of weed management

A recently-published study discusses how land use changes and interactions among land managers contribute to the outcome of invasive plant control efforts at a regional scale. Using yellow starthistle in the Sierra Nevada foothills as a case study, the researchers examined how increasing subdivision of the landscape results in each manager having responsibility for less land, and consequently increases the difficulty of coordination among manager while increasing the possibility that an infestation will not be controlled and therefore will become a source for new infestations.

Epanchin-Neill et al. 2010. Controlling invasive species in complex social landscapes. *Frontiers in Ecology and Environment*. 8(4)210-216

Evaluating state policies

The Union of Concerned Scientists examined invasive species policies in 11 states, including California, to evaluate their effectiveness in preventing and eradicating invasions. Factsheets for each state and a summary for all 11 states are available on their website. www.ucsusa.org/invasive_species/solutions/current-state-invasive.html

Dogs vs. humans against knapweed

If you want to find hidden weeds, maybe you need to hire dogs as your field assistants. Researchers in Montana trained three dogs to find spotted knapweed by smell and found that the dogs performed better than their human counterparts, with accuracy rates of 81% (dogs) vs. 59% (humans).

Goodwin, K.M., et al. 2010. Trained dogs outperform human surveyors in the detection of rare spotted knapweed (*Centaurea stoebe*). *Invasive Plant Science and Management*, 3(2): 113-121. Available: www2.allenpress.com/pdf/IIPSM-3.2-113-121.pdf

Invasive species follow the money

Wealth, population density, and the consequent increase in trade are the most important factors determining invasive species' spread in Europe, according to an article to be published in *Proceeding of the National Academy of Sciences*. Other factors such as climate change and land use were less important than expected. Identifying these factors may be important for developing better methods to prevent the spread of invasive species, especially since most international trade agreements do not address them. www.physorg.com/news195133654.html

Book Review

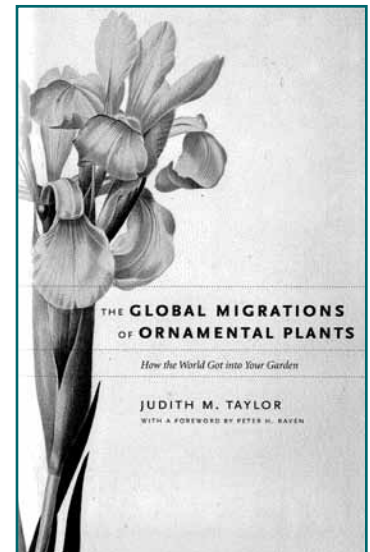
The Global Migrations of Ornamental Plants: How the world got into your garden

The Global Migrations of Ornamental Plants starts with a picture of a typical English cottage garden, featuring a profusion of lovely and familiar plants, not a single one of which is actually native to England. The book traces how European colonization led to the introduction of hundreds of ornamental species over the past four centuries.

Organized by the region where the plants originated, much of the story follows the plant hunters who sought fame and fortune by bringing back exotic species, along with the interpersonal and political rivalries that affected their work. Readers who know Latin plant names will find the stories of how many of them were named interesting. One of the surprising points in the book is how long ago some of our modern garden plants were cultivated as ornamentals. One species of orchid was brought from the New World as early as 1698. The book contains an

extensive appendix listing plants brought into North America and England and the main native and imported plants grown in Early America. It also includes photographs of some of the plants and plant hunters. My one criticism of this book is that sometimes the lists of name after name (both for plants and plant hunters) can get to be too much and it becomes difficult to keep track of them all.

Global Migrations also contains numerous pieces of trivia: Did you know that the first professional nursery in California opened in 1849? Its owner, Colonel J.L. Warren, lobbied the state legislature to create horticultural and agricultural boards and also established the California State Fair to stimulate development of new plants. The first botanical gardens in Europe grew out of "physic gardens" in medieval monasteries and were used to teach medical students about herbs.



The Global Migrations of Ornamental Plants: How the world got into your garden by Judith M. Taylor, Missouri Botanical Garden Press, 312 pp., 2009

THE WILDLAND WEED CALENDAR

August

Ecological Society of America
August 1-6
Pittsburgh, PA
www.esa.org/pittsburgh

International Workshop on Invasive Plants
in Mediterranean Regions of the World
August 2-6
Trabzon, Turkey
archives.eppo.org/MEETINGS/2010_conferences/mediterranean_ias.htm

SER International European Conference
August 23-28
Avignon, France
www.seravignon2010.org

17th Intl. Conf. on Aquatic Invasive Species
August 29-September 2
San Diego
www.icaais.org

September

6th European Conference on Biological
Invasion NEOBIOTA
September 14-17
Copenhagen, Denmark
cis.danbif.dk/neobiota2010

North American Weed Management
Association

September 27-30
Pueblo, Colorado
www.nawma.org

October

Biological Control for Nature Conference
October 3-7
Northampton, MA
biocontrolfornature.ucr.edu

Cal-IPC 2010 Symposium
October 13-16
Ventura
www.cal-ipc.org/symposia

November

Central CA Invasive Weeds Symposium
November 12
Monterey or Santa Cruz County
For more info: StuartK@co.monterey.ca.us

December

Oregon InterAgency Noxious Weed Symp
December 7-9
Corvallis, OR
www.oregon.gov/ODA/PLANT/WEEDS

2011

Weed Science Society of America
Annual Meeting
February 7-10, 2011
Portland, OR
www.wssa.net

2nd International Invasive Bird Conference
March 7-9, 2011
Cape Town, South Africa
www.iibc2011.co.za

Western Society of Weed Science
March 7-10, 2011
Spokane, WA
www.wsweedscience.org

Ecological Society of America
August 7-12, 2011
Austin, TX

SER Int. Congress on Ecological Restoration
August 21-25, 2011
Merida, Yucatan, Mexico
www.ser2011.org

3rd Symposium on Environmental Weeds &
Invasive Plants
October 2-7, 2011
Ascona, Switzerland
www.evors.org/invasive_plants.asp

Quotable

“Pick It or Ticket.”

~ Slogan for a new law in Minnesota that requires boaters to clean off aquatic weeds and drain their boat before leaving a lake or river to reduce the spread of invasive species.
(Minnesota Department of Natural Resources, July 1)

“We attribute mistakes and lower accuracy to distraction by ground squirrels.”

~ Goodwin et al. (2010) *Invasive Plant Science & Management*
(Describing a study where trained dogs searched for invasive spotted knapweed.)

“The plant can eat through concrete...”

~ Paul Greaves (Birmingham Mail, England) discussing Japanese knotweed



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