



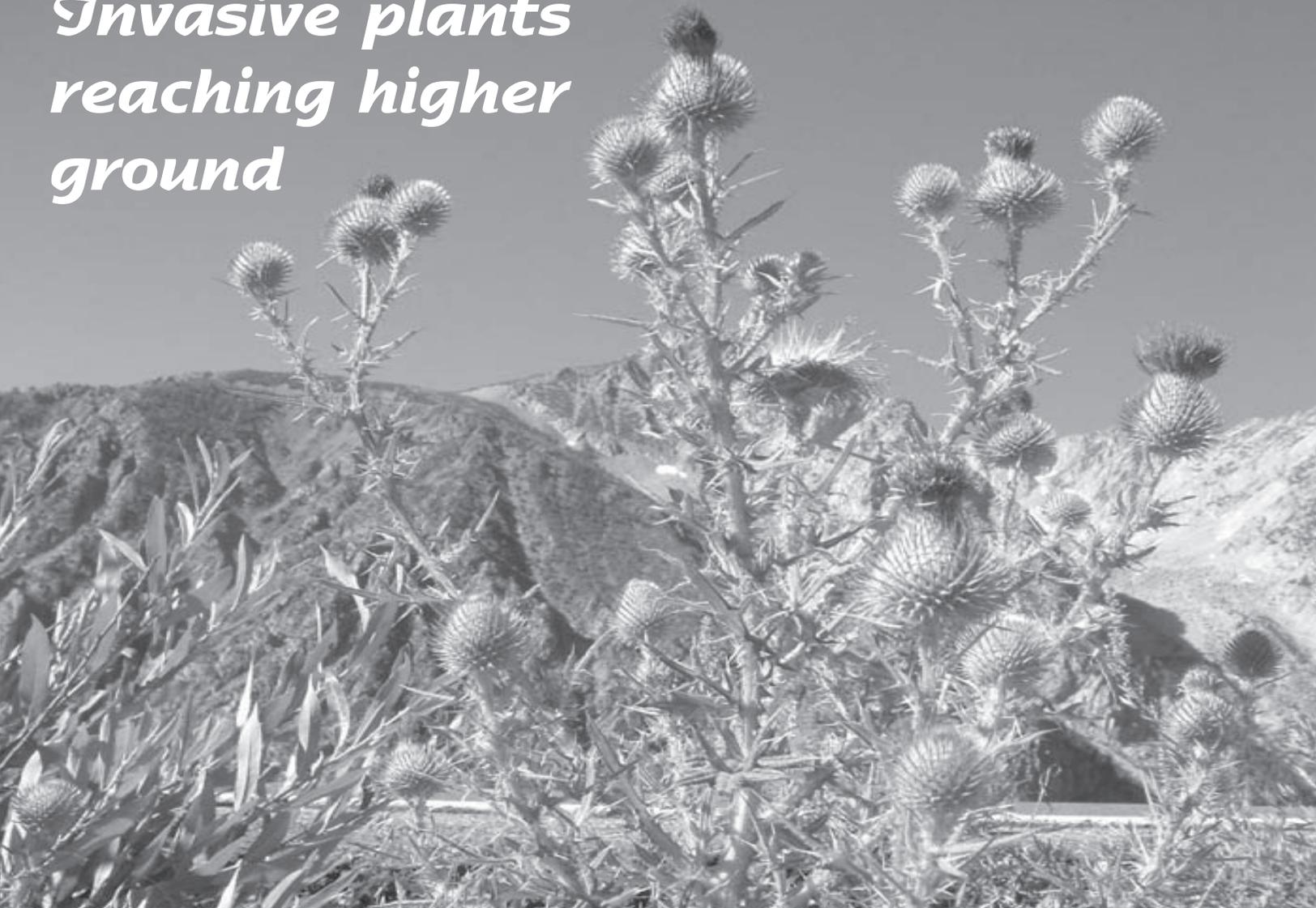
Cal-IPC News

*Protecting California's Natural Areas
from Wildland Weeds*

Vol. 14, No. 1, Spring 2006

Quarterly Newsletter of the California Invasive Plant Council

Invasive plants reaching higher ground



Plants such as bull thistle (Cirsium vulgare) are reaching high-elevation sites like Yosemite's Tioga Pass. Bull thistle received a Moderate rating for its statewide impacts in Cal-IPC's recently-released Invasive Plant Inventory. Photo: Bob Case.

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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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Editors: Doug Johnson and Elizabeth Brusati

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From the Director's Desk

Strength in partnership

Some things in life can be accomplished alone, but controlling invasive plants is not one of them (though many individuals make valiant and valuable efforts). The articles in this issue reflect the power of partnership.

Many of Cal-IPC's goals entail working with other groups that are discovering the impact of invasive plants in their own efforts. This greatly expands the potential impact of our work. Our partnership with nursery and landscape trade organizations, for instance, has built new trust and the potential to eliminate known invasives from use in California horticulture. It establishes a great avenue for educating the public about invasives, as well.

Our partnership with agricultural groups such as the California Farm Bureau Federation and California Cattlemen's Association provides a strong alliance with which to approach the legislature regarding invasive plant programs and policies. Initial funding for the state's network of Weed Management Areas came about because of this partnership, and we are currently working together for renewed funding. And it was only a few short years ago when the state would have lost the USDA ARS biocontrols research lab in Albany without the coordinated intervention of environmental and agricultural advocates. The partial list of supporters for AB 2479 on page 4 shows the breadth of this partnership.

We also partner with those in the business of invasive plant control, from ecological consultants to herbicide manufacturers, by offering exhibit space at our Symposium. It is important for restoration workers to have access to information on tools and services available in the marketplace, both from businesses themselves and from outside evaluators.

Partnership is not simple. It requires defining the boundaries of mutually beneficial collaboration, and building trust in working together. But the rewards are significant, both in the intended goals as well as the new relationships. There may be no more important way to gauge our own strength and vitality than by the partners who want to work with us.

Draft Policy on Integrated Weed Management

The Cal-IPC Board of Directors drafted this policy statement in order to clarify Cal-IPC's basic position on invasive plant management. If you would like to comment on this draft statement, please write to us at info@cal-ipc.org or the address in the box at left.

Invasive plants cause serious damage to California's wildlands. Land managers and scientists have developed many methods to eradicate or control invasive plants, including mechanical, chemical, cultural and biological control methods. Specifically, these methods include: hand tools for cutting or uprooting; heavy equipment; herbicide application; grazing; prescribed fire and other heat treatments; mulching and tarping; competitive plantings; and release of host-specific insects or pathogens. Typically, the goal is to apply control methods for a limited time in order to promote the restoration of a self-sustaining native habitat.

Deciding which methods to use for a given project is based on many factors—effectiveness, ecological impacts, human health risk, cost, and availability of materials and labor. Evaluating these factors and selecting the best set of methods for a given project is generally called Integrated Pest Management (IPM) or Integrated Weed Management (IWM).

Cal-IPC supports the practice of IWM, in which all available methods are considered and evaluated scientifically for benefits and risks. Professional land managers should evaluate the impacts of both invasive plants and control methods when selecting appropriate methods for a specific project or program.

Wildland Weed NewsNewsNewsNewsNews

15TH ANNUAL CAL-IPC SYMPOSIUM

Research and Management: Bridging the Gap

OCTOBER 5-7, SONOMA DOUBLETREE HOTEL, ROHNERT PARK

SAVE THE DATE! This year's theme addresses the need for communication between those who conduct research and those who manage and restore land. Registration opens June 1. The preliminary program will be mailed to Cal-IPC members in July.

ABSTRACTS FOR CONTRIBUTED PAPERS are due June 1. Instructions are at www.cal-ipc.org.

PRE-SYMPOSIUM FIELD COURSE October 4 - Tools for Early Detection Programs. Learn how to identify invasive plants, collect voucher specimens, design a monitoring program, and integrate GPS into your projects. Registration opens June 1.

DONATE ITEMS FOR THE CAL-IPC RAFFLE! We need your weedy items - useful, decorative, or just creative. Artwork, books, weed worker tools, gift certificates for activities or restaurants... Contact Marla Knight, maknight@fs.fed.us or (530) 468-1238 to donate.

PHOTO CONTEST: Show off your camera skills to your fellow weed workers in the 3rd Annual Photo Contest! Instructions for submission are at www.cal-ipc.org. Categories include: Specimen, Landscape, Impacts, Weed Workers, Before & After, and Humor. Deadline September 1. Winners will be announced at the Symposium.

The U.S. Forest Service has completed an **Environmental Impact Statement** for Region 6 (WA and OR) on invasive plants. It includes economic costs and projections of different control methods, and potential costs of delaying management efforts. www.fs.fed.us/r6/invasiveplant-eis

The New York Times described **unintended consequences of a biocontrol project** in Montana. A gall fly released to control spotted knapweed has become a food source for deer mice, causing mouse populations to triple and raising fears of hantavirus. *The New York Times*, April 4, 2006, D2

The **State of Oregon** added yellow floating heart, garlic mustard, policeman's helmet, and yellow flag iris to its Noxious Weed Quarantine on January 13, 2006. www.oregon.gov/ODA/PLANT/weed_index.shtml

Non-native plants that are in the presence of their natural enemies do better in their introduced ranges than those that have escaped their natural enemies. Researchers at the Georgia Institute of Technology found that non-native herbivores, including cattle, rabbits and goats, can encourage the spread of invasive plants, while native herbivores, are far more effective in reducing their number. Most previous assessments of this

"natural enemies hypothesis" focused on insects. Although insects reduce plant growth and biomass, vertebrate herbivores are often larger and thus more commonly kill plants outright, creating a stronger impact on plant communities. *Science*, March 10, 2006

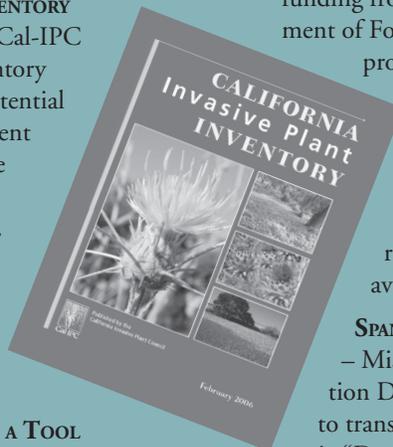
Paul Gobster, a social scientist with the US Forest Service, compared the terminology used in outreach materials and popular

literature on invasive species to that used in restoration. He suggests that invasion biologists' focus on fear may backfire with the public, and instead encourages an **emphasis on removal of invasives as part of a more positive message on restoration** and preservation of native habitats. Cal-IPC founding member Jake Sigg is pictured leading a community restoration day. *Ecological Restoration*, December 2005.

CAL-IPC UPDATES...

INVASIVE PLANT INVENTORY
It's here! The 2006 Cal-IPC Invasive Plant Inventory rates the impact, potential for spread, and current distribution of more than 200 invasive plants in California. Copies may be purchased through the Cal-IPC website or by calling (510) 843-3902.

THE USE OF FIRE AS A TOOL FOR CONTROLLING INVASIVE PLANTS— See p. 12.



AQUATIC DPP— Cal-IPC has received funding from the California Department of Food and Agriculture to produce a "Don't Plant a Pest!" brochure for aquatic plants. It will be a state-wide brochure, similar to the existing Trees version, and will complement the regional brochures. Target availability is late 2006.

SPANISH DPP TRANSLATION— Mission Resource Conservation District has acquired funding to translate the Southern California "Don't Plant a Pest!" brochure into Spanish. They expect to go to print this summer.

Working to Renew Weed Management Area Funding

February and March were busy months for Cal-IPC's legislative activities. This time of year, we join with a number of other organizations that are concerned about invasive plants to organize and participate in two events: National Invasive Weeds Awareness Week in Washington, D.C., and Invasive Weeds Awareness Day at the Capitol in Sacramento. Our activities are coordinated through the California Invasive Weeds Awareness Coalition (CALIWAC). This year's activities were more exciting than usual because we are working to support passage of a bill in the state legislature that would restore funding to California's network of Weed Management Areas and allow them to continue their work.

Day at the Capitol

Cal-IPC took the lead role in organizing the Third Annual California Weeds Awareness Day at the Capitol in Sacramento, March 8, 2006. The event was energized by the last-minute introduction of AB 2479 to provide Weed Management Area funding.

Morning presentations included information on Weed Management Areas, the California Biodiversity Council's work to coordinate agencies on invasive species issues, and the California Agricultural Commissioners and Sealers Association and California Department of Food and Agriculture (CDFA)'s work to revise the state noxious weed rating system. In the



Cal-IPC Board Member Bob Case visits Congresswoman Ellen Tauscher's office at National Invasive Weeds Awareness Week.

afternoon, fifty attendees met with 45 legislative offices and distributed information to all other representatives' offices, including those of key committee staff.

Cal-IPC is working to build support for AB 2479. Introduced in February, the bill would provide \$2.5 million in funding for Weed Management Areas through CDFA. California's Weed Management Area program was created in 1990 and expanded in 2000. The funds expired in June 2004, and the program has been without funding since then.

California's WMA program has grown to 45 WMAs covering all 58 counties. Many entities participate in WMAs, including federal, state, and local agencies, land trusts, farmers and ranchers, and nonprofit organizations. The program's accomplishments include: 1) permanent eradication

of 2,015 populations of high priority weed infestations; 2) effective treatment of more than 128,421 acres of weed infestations; 3) leveraging a 3-to-1 match from outside grant funding and in-kind donations and services; and 4) development of new local partnerships between public agencies, private landowners, agriculturalists and conservationists, and 5) outreach programs reaching 88,803 people.

National Invasive Weeds Awareness Week

The Seventh Annual National Invasive Weeds Awareness Week was held in Washington, DC on February 26 – March 3, 2006. Each year, a team of Californians from the California Invasive Weeds Awareness Coalition (CALIWAC) attends the event to learn what fellow weed workers around the United States are accomplishing and to push for invasive weeds legislation. This year's team included: Nelroy Jackson; Andrea Fox, CA Farm Bureau; Carl Bell, CA Weed Science Society; Mark Lockhart, Trinity Co. Agricultural Commissioner; Gina Skurka, Cal-IPC/CDFA; Elizabeth Brusati, Cal-IPC; Jake Sigg, California Native Plant Society (CNPS); Bob Case, CNPS/Cal-IPC; Dan Gluesenkamp, Audubon Canyon Ranch/Cal-IPC; and Steve Schoenig, CDFA.

While in Washington, Team CALIWAC visited the offices of the entire California Congressional delegation, meeting with staff of 24 legislators, including Senators Boxer and Feinstein, and leaving folders

SUPPORTERS FOR AB 2479

AB 2479 (Cogdill) would renew funding for the state's network of Weed Management Areas (WMAs) at \$2.5 million. Cal-IPC has helped organize grassroots support for the bill. This is a partial list of organizations that have expressed official support, which number more than 80 at press time. The full list—and instructions on sending a letter—is available at www.cal-ipc.org.

Statewide Organizations:

CA Agricultural Commissioners & Sealers Assn.
CA Assn. of Resource Conservation Districts
CA Cattlemen's Assn.

CA Council of Land Trusts
CA Farm Bureau Federation
CA Forest Pest Council
CA Invasive Plant Council
CA Native Grasslands Association
CA Native Plant Society (CNPS)
CA Society for Ecological Restoration
Regional Council of Rural Counties
Sierra Club California
Trust for Public Land

Local organizations:

Agricultural Commissioner's Office of Colusa County (and 4 other Ag. Depts.)
Big Sur Land Trust
Butte County Resource Conservation District (and 6 other RCDs)
Cache Creek Conservancy

Catalina Island Conservancy
CNPS Alta Peak Chapter (and 8 other chapters)
East Bay Municipal Utility District
Friends of Bidwell Park (Chico)
Friends of Switzer Canyon (San Diego)
Garrapata Creek Watershed Council (Monterey)
Golden Gate Audubon Society
Land Trust for Santa Barbara County
L.A. & San Gabriel Rivers Watershed Council
Marin Conservation Corps
Mojave Water Agency
Palos Verdes Peninsula Land Conservancy
San Bruno Mountain Watch
Santa Barbara Audubon Society
Santa Clara County Parks & Recreation Dept.
Santa Lucia Conservancy (Carmel)
Solano Land Trust
Sonoma Land Trust



Visit the new Cal-IPC webpage!

The Cal-IPC website has been completely reorganized and has a brand-new look. It has more extensive information than before and is easier to use, thanks to design by Carina Merrick. Now featuring:

- ◆ New sections on impacts of invasive plants, biocontrol, and policy ◆
- ◆ Interactive Invasive Plant Inventory database ◆
- ◆ Expanded “Don’t Plant a Pest!” information ◆
 - ◆ Online book and brochure orders ◆
- ◆ Online registration for Field Courses and Symposium ◆

www.cal-ipc.org

of information at the remaining offices. We also held three private agency meetings with US Department of Agriculture-Agricultural Research Service on biocontrols, with USDA Animal Plant Health Inspection Service on Weed Management Area funding, and with the Department of Transportation on roadside management.

Through efforts after the trip, the offices of Congressmen Joel Hefley (R-CO) and Mike Thompson (D-CA) agreed to co-author a Dear Colleague letter asking their Congressional colleagues to sign a letter requesting that the Appropriations Committee provide appropriations for the Noxious Weed Control and Eradication Act of 2004, P.L. 108-412, for fiscal year 2007. The Act would provide \$15 million nationally to Weed Management Areas (the original language specified \$100 million), and California, with its well-developed program, will be in a good position to compete for these federal funds if we maintain state funding. It was signed into law in late 2004 but has not been funded. The letter received 24 signatures, including California Representatives Bono, Calvert, Costa, Davis, Filner, Herger, Hunter, Pombo, Radanovich, Tauscher, Thompson, and Woolsey.

Finally, FICMNEW presented CALIWAC with an award in recognition of its work “raising awareness and public education related to invasive plant management in

the nation’s most populous state” and gave Team CALIWAC member and NIWAW organizer Nelroy Jackson the Lifetime Achievement Award, declaring that “getting people together is Nelroy’s specialty.”

For More Information

View the updated list of supporters for AB 2479 at www.cal-ipc.org.

California’s Weed Management Areas, www.cdfa.ca.gov/weedhome

AB 2479 at the official California Legislative Information site, leginfo.ca.gov.

Noxious Weed Control and Eradication Act of 2004, P.L. 108-412, at thomas.loc.gov.



California’s NIWAW delegation: From left, Bob Case, Steve Schoenig, Jake Sigg, Dan Gluesenkamp, Elizabeth Brusati, Gina Skurka, Andrea Fox, and Carl Bell.

Low-Volume Foliar Treatment of *Arundo* Using Imazapyr

by Bill Neill, Riparian Repairs and Team Arundo Angeles

The author has supervised tractor mowing and mulching of approximately 35 net acres of Arundo and has five years' experience applying imazapyr herbicide in urban riparian areas of Los Angeles County. Mention of product names is provided for information only and does not imply endorsement by Cal-IPC. Photos by the author.

Relatively new to California, imazapyr herbicide is an effective tool for controlling *Arundo* using an unconventional "low volume" foliar treatment method. The recent registration of imazapyr's aquatic formulation named Habitat® makes the herbicide more widely useful and discussion of application methods more relevant to *Arundo* control programs.

Comparison of Foliar Application Methods

Conventional foliar spraying of tall uncut *Arundo* with glyphosate herbicide is typically a "high volume" operation, employing crews with power pumps, hoses and ladders to liberally coat all of the exposed foliage with dilute herbicide mixture at application rates of 60 to 100 gallons per acre.

For treating large *Arundo* stands that are isolated from native vegetation, high-volume foliar applications of glyphosate are rapid, nearly 100% effective, and relatively inexpensive, compared to laborious cutting using chainsaws. Where *Arundo* is intermixed with native trees, preparatory work is required to separate target *Arundo* from non-target trees to prevent damage from glyphosate, either by compacting the *Arundo* (manually pulling down and bending stalks before spraying) or by trimming tree branches that extend into the *Arundo*.

In contrast, foliar treatment of *Arundo* and invasive trees using imazapyr herbicide can employ a "low volume" method, with delivery rates of only 10 gallons of spray mixture per acre.

In the low-volume method, herbicide mixture is lightly sprinkled on target foliage, thus minimizing runoff, or applied with a few rapid slashing movements using a jet stream nozzle. In either case, contacting about 20 percent of the foliage surface area is sufficient for controlling tall uncut

Arundo, and somewhat greater coverage will control short *Arundo* resprouts plus waxy-leaved, difficult-to-kill invasive trees common in Southern California urban riparian areas, such as Brazilian peppertree and Mexican fan palms.

In either case, after herbicide treatment the dead *Arundo* can be left standing, so that it will gradually disintegrate; or the dead



Figure 1. Dead *Arundo* clump treated with imazapyr without damage to adjacent mulefat bush (right) rooted in same area.

biomass can be reduced to mulch by a flail mower.

Imazapyr products named Habitat (for aquatic use) and Stalker® are registered in California, while Arsenal® is available in other states but not California.

Advantages and Limitations of Low-Volume Method

A primary advantage of the low-volume method is that herbicide spray can be selectively placed on *Arundo* foliage, so that adjacent non-target vegetation is not contacted. The herbicide mixture need not be applied to the full length of leafy *Arundo* stalks or to all stalks in a discrete clump.

For example, beneath a tree canopy invaded by *Arundo*, herbicide treatment is restricted to the lower leaves of tall stalks

and especially the emerging new stalks.

Alternatively, where *Arundo* stalks grow through and drape over shorter native plants such as mulefat, the herbicide application is confined to the exposed upper leaves of recumbent *Arundo* stalks.

Consequently, where *Arundo* clumps are intermixed with non-target vegetation, less preparatory work is needed to compact the *Arundo* and clip off embedded tree branches, compared to the high-volume foliar treatment method using glyphosate.

A second benefit is that because the liquid volume applied per acre is less, compared to high-volume spraying, the labor requirement is reduced. A single applicator using a backpack sprayer with a full tank and jet stream nozzle can treat a quarter acre of *Arundo* clumps without needing to refill repeatedly.

Third, using a backpack sprayer, the low-volume foliar treatment method is so quiet, fast and precise that wildlife biologists with regulatory agencies may allow treatment of dispersed *Arundo* clumps in riparian corridors during spring and summer months without requiring bird nesting surveys.

A primary limitation of the low-volume treatment is the impracticality of spraying large *Arundo* stands. Although low-volume foliar applications may be possible using helicopters, for ground work the backpack sprayer is the appropriate tool: power pumps deliver fluid at rates too high for the light sprinkle or precision placement of the low-volume application method. Using a backpack sprayer with a jet stream nozzle, the maximum size of treatable clumps is about 40 ft across. Larger *Arundo* stands should be foliar sprayed using high-volume equipment, or tractor-mowed, allowed to resprout, and then treated with herbicide.

Although not a limitation, applicators should be aware that imazapyr is slow-acting compared to glyphosate, and that leaf yellowing won't be conspicuous until about one month after treatment. Follow-up spraying should be delayed until at least 6 months after the initial treatment or until

the following spring/summer growing season when new stalks may have sprouted.

Registration and Label Directions

In the late 1980's, American Cyanamid Co. introduced the Arsenal formulation of imazapyr in other states, which became widely employed for foliar treatment of saltcedar; but Arsenal was never registered in California. Instead, in 1999-2000 American Cyanamid and its successor, BASF Corporation, registered the Stalker formulation in California, which is normally employed for cut stump, tree injection, frill or girdle, and basal bark applications. Stalker has a supplement label allowing "low volume foliar application in California", that specifies mixtures of 3-5% concentration in water, intended for spot treatments of individual plants rather than broadcast applications.

For low-volume foliar treatment of *Arundo* clumps and resprouts using Stalker, pest control advisor Bob Brenton, the manufacturer's consultant in California during 1999-2000, recommended and demonstrated the following application method:

1. Mix 5% Stalker in water with 5% methylated seed oil (to promote spreading and leaf penetration) such as MSO Concentrate® from UAP Timberland, Can-Hance® from Monterey Chemical, or Hasten® from Wilbur-Ellis.

2. Apply spray mixture at rate of about 10 gal/ac, equivalent to a light sprinkle coating about 20% of the *Arundo* foliage surface area.

In August 2005 BASF obtained California registration for Habitat herbicide for control of emergent and floating aquatic vegetation and terrestrial vegetation growing near surface water. Habitat contains about the same amount of active ingredient

(Isopropylamine salt of Imazapyr) as Arsenal and Stalker, but without the emulsifiers in Stalker that enhance mixing with basal oil. For spraying the relatively sparse foliage of saltcedar or tamarisk, Mike Carrigan of BASF recommends full coverage of saltcedar foliage using 1% concentration of Habitat



Figure 2 (top). Ammbusher rotary mower is effective at clearing *Arundo* between closely spaced trees and on steep slopes. **Figure 3 (bottom).** Hydro Ax hammer-flail mower cuts and mulches as much as 1 ac/day of dense *Arundo*.

plus 1% surfactant; however the Habitat label also permits the low-volume foliar application method with 5% herbicide concentration plus spreader/penetrating oil.

Environmental Considerations

According to product literature, imazapyr has exceptionally low toxicity, carcinogenicity and mutagenicity to animal life. The chemical affects biochemical processes involved with protein synthesis that animals and humans lack.

In soil, imazapyr residues are slowly degraded by microbes, with a half-life of 85- 140 days depending on soil moisture level, and other conditions. One year after application, herbicide activity in soil should be sub-lethal and should not curtail seed germination and growth of new plants. In any case, with the low-volume application method, most spray mix should remain on the target foliage and very little should reach the ground surface.

In sunlit water, imazapyr is degraded by photolysis, with a half-life of 3 -5 days. According to the Habitat label, livestock are allowed to drink treated water; but applications are prohibited to flowing water within a half-mile reach upstream of potable water intakes.

Imazapyr has a reputation for having the potential to transfer from roots of target trees to non-target trees, but in our experience root transfer doesn't seem evident from *Arundo* to adjacent trees. Perhaps root systems of *Arundo* and trees are located at different depths or do not intergrow for some other reason (see Fig. 1).

Economic Considerations

Approximate costs per net acre of *Arundo* control methods:

Foliar treatment without cutting

- 1) Low-volume application of imazapyr to small clumps: \$1,000-\$1,500/ac.

Restricted to clumps smaller than 40 ft across, treated by applicators using backpack sprayers; assume 12 hours labor @ \$60/hr

for initial treatment and 2-3 follow-up visits over two years plus \$250 for 3 quarts imazapyr herbicide and adjuvant.

- 2) High-volume application of glyphosate to large stands: \$3,000-\$7,000/ac.

Suitable for *Arundo* stands as large as 1 acre, treated by 4-man crew using gasoline-powered pump, ladders and long hoses to apply 60-100 gal dilute glyphosate herbicide

...continued page 11

The Dose (and the Surfactant) Makes the Poison

Glyphosate formulations and amphibians

Two recent studies have addressed the toxicity of glyphosate formulations to amphibians. In August 2005, Dr. Rick Relyea of the University of Pittsburgh published a study, entitled “The lethal impact of Roundup on aquatic and terrestrial amphibians,” that has stirred discussion in the restoration community regarding herbicide use. He found that glyphosate plus the surfactant POEA caused mortality to tadpoles and juvenile frogs. Also in 2005, Joel Trumbo of the California Department of Fish and Game found few toxic effects to frogs from glyphosate using R-11 surfactant. We present summaries of each article and Joel Trumbo’s analysis of their differences.

The Two Studies

Herbicides are often applied in formulations that include a surfactant, which helps the herbicide penetrate the surface of the target plant. Surfactants can have more significant non-target impacts than the active herbicidal ingredient on other organisms, especially in aquatic habitats. Roundup® and Rodeo® are two brand names for glyphosate formulations. Rodeo has no surfactant and is designed and approved for use near open water. Roundup uses surfactant and is not approved for aquatic use.

Dr. Relyea used field and laboratory experiments to test the effects of a commercial formulation of Roundup on leopard frogs (*Rana pipiens*), American toads (*Bufo americanus*), and gray tree frogs (*Hyla versicolor*) (Relyea 2005). In his first experiment, glyphosate with POEA (polyethoxylated tallowmine) surfactant was applied as direct overspray to ponds containing the three species of amphibian tadpoles, using a concentration typically used on upland areas. (This simulated conditions that would occur with negligent overspray or inadvertent treatment of flooded depressions.) In his second experiment, juvenile amphibians (those that had undergone metamorphosis out of the tadpole stage) were placed in laboratory containers and subjected to the same direct overspray conditions. In the ponds, 98% of the tadpoles died within three weeks of the overspray, while 78% of the juvenile amphibians in the laboratory died in one day. Relyea stated that previous studies have

shown that POEA is the primary cause of death to amphibians subjected to glyphosate plus POEA and he believed that it was the cause of toxicity in his study as well, although his methods could not separate the effects of glyphosate from the surfactant.

Joel Trumbo applied Rodeo (the formulation of glyphosate approved by the EPA for aquatic environments) with R-11 surfactant directly to the surface of a pond to simulate atypically high concentrations in water, with the goal of determining the concentration that would be lethal to 50% of northern leopard frog (*Rana pipiens*) tadpoles within 96 hours (referred to by



California red-legged frog.
Photo: CA Dept. of Fish and Game

toxicologists as the 96-hour LC₅₀ value) (Trumbo 2005). Leopard frogs were used because they are closely related to the state-protected California red-legged frog, *Rana aurora draytonii*. His study failed to produce dead tadpoles in toxicity tests that contained high levels of both glyphosate and the R-11 surfactant. The hazard of the Rodeo/R-11 mixture to aquatic life was largely determined by the concentration of R-11 because it is the more toxic compound in the tank mix. Although glyphosate can be toxic at levels in excess of 500 mg/L, R-11 can be toxic at approximately 1-6 mg/L.

Analysis

by Joel Trumbo, California Department of Fish and Game

My impression of Dr. Relyea’s article was that it was well-written and accurate. Given what we already know about the aquatic toxicity of the surfactant in formu-

lated Roundup products, Relyea’s results were not at all surprising. It’s true that Roundup (glyphosate plus surfactant) is at least moderately toxic to aquatic organisms, including fish and tadpoles. That’s why the product is illegal to use in water.

One of the most confusing things about this topic is the tendency for people to be incautious as to what chemical they’re referring to. It is easy for people who read Relyea’s article to interpret the terms “glyphosate”, “Roundup”, and “formulated glyphosate products” interchangeably. Relyea points out that the surfactant in the formulated glyphosate product Roundup causes the toxicity. (That’s pretty common knowledge for those of us in this field). Glyphosate itself has been proven to be practically non-toxic for fish and tadpoles. Still, people talk about “how toxic glyphosate is to frogs”. That’s a pretty significant error. It’s the surfactant in the Roundup product, not the glyphosate, that is toxic.

Relyea makes a couple of important points: 1) the surfactant in the formulation, not the active ingredient glyphosate, is toxic to tadpoles, and 2) the high levels of amphibian mortality in his results were the product of “direct overspray” to water. I believe he means an accidental (and illegal) overspray to water that is of the same magnitude as the intended application to the terrestrial target. In other words, the applicator didn’t try to avoid the water; the water surface got the same dose as the land. I think this type of overspray is not outside of the realm of the real world. It does happen, but there can be a significant difference between this type of “direct overspray” and the lowered residues that might be the product of drift. The difference between the two scenarios (drift vs. direct overspray) becomes all the more critical depending on the application method. Drift from an aircraft is likely to be of a greater magnitude than drift from a low-pressure backpack spray delivered several inches above the terrestrial weed target. Remember, the dose makes the poison.

My study used the aquatically-approved glyphosate product, Rodeo, but I did add the surfactant R-11 to the tank mix. Add-

In Memoriam: Jan Lowrey

Jan Lowrey, past Executive Director of the Cache Creek Conservancy in Woodland, died on January 21, 2006, at the age of 57. He was a longtime member of Cal-IPC and a strong advocate for restoration work. He will be missed. The following are just a few highlights from Jan's work with the conservancy, as described in the California Watershed Network E-News.

With Jan's lead, the Cache Creek Conservancy restored an abandoned mine pit in Yolo County into a flourishing wetland system. The 40-acre wetland site is now a key component of the 130-acre Cache Creek Nature Preserve. The preserve includes restored wetlands, interpretive kiosks, a "tending and gathering garden," nature trails, and observation platforms.

Jan led numerous invasive species removal projects along Cache Creek. In

an effort to tackle the tamarisk and *Arundo donax* problem in the watershed, the Cache Creek Conservancy, with grants from CAL-FED and Wildlife Conservation Board, removed and controlled these invasive species along a 12-mile stretch of the creek. Jan was instrumental in working with the USDA to establish biological control of tamarisk using leaf-feeding beetles.

Jan solicited UC Davis graduate students and members of the Native American community to develop the Tending and Gathering Garden. This natural resource gallery hosts plants native to the local watershed that have been used traditionally for basketry, fiber, food, and medicine. Native American cultural practitioners have access to this secure resource for teaching, cultural interpretation, and public outreach. The garden is also used to examine traditional

indigenous fire management practices.

Jan also spearheaded a creative and effective environmental education program that offers an extremely diverse and rewarding educational experience for students grades K-12, as well as field trips for university level classes.

One of Jan's talents was the ability to build partnerships. As a fourth generation farmer along Cache Creek, Jan could not only "talk the talk" with local landowners, but continuously impressed decision-makers at all levels, from county Boards of Supervisors to state politicians. Assembly Member Lois Wolk remembered Jan as being "truly committed to open space and agricultural preservation in Yolo County."

ing the surfactant in to the tank mix pretty much gets you back to a higher hazard situation used by Relyea for tadpoles because R-11 is moderately toxic to aquatic fauna. In that way, our studies are similar. Relyea's use of Roundup and my use of Rodeo + R-11 present a moderately toxic scenario to tadpoles. The question then becomes one of exposure. In my study, we used high rates of both Rodeo and R-11 in impounded water with no aquatic vegetation. That means any non-target fish or tadpoles would be exposed to high chemical levels. It wasn't a typical scenario, but not outside the realm of the possible or probable.

The main difference between the two studies is likely the type and amount of surfactant. Relyea's Roundup formulation contained the surfactant POEA; my experiment used R-11, which contains the surfactant NPE (nonphenyl polyethoxates). My study failed to produce dead tadpoles in toxicity tests that contained high levels of both glyphosate and the R-11 surfactant. My application method was the same as Relyea's "direct overspray". Since both surfactants have similar tadpole toxicities (around 1-6 ppm), you have to assume that the difference between his study and mine would then be the concentrations of the surfactants that ended up in the water. Relyea mentions glyphosate concentrations in his study, but

does not list POEA concentrations. It would be interesting to know how much POEA was in the water. My NPE concentrations peaked on Day 0 at around 1ppm but were down to 0.02 ppm by Day 4 (96 hrs., the exposure time needed to produce 1-6 ppm toxicity.)

In spite of the fact that I applied herbicide and added R-11 surfactant to the water surface at high levels, the NPE concentration in the pond still wasn't high enough to produce tadpole mortality. Again, the dose makes the poison. It's not a question of whether or not the NPE is toxic to tadpoles. If you get enough in the water, you will kill them. In the case of my study, direct spray of high use rates still didn't produce dead tadpoles.

In summary, low volume/low pressure/low drift applications of glyphosate and surfactant to terrestrial sites near frog habitat should not be expected to produce tadpole mortality. This is especially true if you use a lower aquatic risk surfactant. There are several on the market. I don't want to exaggerate the aquatic toxicity risk posed by R-11 (I feel it can be used safely near water), but there are lower aquatic toxicity surfactants on the market. Further, ground-based applications produce very little drift (backpack sprayers produce almost none).

Finally, you should give some thought to whether tadpoles are actually present in the water when you are making the applications. Most glyphosate applications to established perennial weeds should be done at or near flowering (late summer or early fall). I think that most frogs should be in the adult stage by then. If you go with the commonly held thought that the tadpoles are the most sensitive life stage, you can increase your margin of safety by spraying when there are no tadpoles.

For More Information

Relyea, R. A. 2005. The lethal impact of Roundup on terrestrial and aquatic amphibians. *Ecological Applications*. 15(4):1118-1124.

Trumbo, J. 2005. An assessment of the hazard of a mixture of the herbicide Rodeo® and the non-ionic surfactant R-11® to aquatic invertebrates and larval amphibians. *California Fish and Game*. 91(1):38-46

US Environmental Protection Agency Pesticide Information. www.epa.gov/pesticides

California Department of Pesticide Regulation. www.cdpr.ca.gov

Rick Relyea's webpage: www.pitt.edu/~relyea

Contact the author at jtrumbo@ospr.dfg.ca.gov

Recommended Action on Invasive Ornamentals

The Cal-HIP (California Horticultural Invasives Prevention) Partnership, which brings Cal-IPC, Sustainable Conservation, and The Nature Conservancy together with representatives from the horticultural community, is deciding on the steps necessary to remove invasive plants from the nursery trade. The following recommendations were submitted by Cal-IPC for consideration by Cal-HIP partners in March. Some of the researchers listed here collaborated with Cal-IPC on a proposal submitted to the USDA National Research Initiative in January to further research genetic and distribution issues on these plants.

In its work to prevent the introduction of invasive plants through horticulture in California, Cal-HIP faces the need to act on several high-profile invasive plants with incomplete knowledge about precisely which species or cultivars are—and are not—problematic. While further research has been proposed to work on determining the culprits with more accuracy and certainty, the partnership may want to act before new information is available. This set of recommendations, reviewed by top invasive plant scientists in the state, provides potential near-term actions that seem appropriate based on existing knowledge.

Cortaderia selloana (pampasgrass), *C. jubata* (jubatagrass)

Both plants are listed in the Cal-IPC Invasive Plant Inventory with High ecological impact. *C. jubata* is listed as a Noxious Weed by the California Department of Food



Jubatagrass in Richmond (Contra Costa County). Photo by Bob Case.

and Agriculture (CDFA), and is not thought to be available in horticulture. It should not be used in horticulture. *C. selloana* remains available, including multiple cultivars. Existing research indicates that all cultivars of *C. selloana* may contribute to the introduction of invasive populations. Additional research has been proposed to determine to what extent genetic varieties and cultural practices contribute to the likelihood that a given planting can contribute to invasive populations. *C. selloana* infestations are found in California coastal habitats, and more recently in Central Valley riparian locations and other habitats with adequate moisture, typically near urbanized areas. The most cautious approach would be to eliminate the use of all *C. selloana* cultivars. This is also the simplest approach, since distinction between relatively safe cultivars and cultural practices may be complicated.

Pennisetum setaceum (fountain grass)

Cal-IPC lists *P. setaceum* with Moderate ecological impact. Existing research indicates that green varieties of *P. setaceum* are invasive, while red varieties (*P. setaceum* ‘Rubrum’) are not. Additional research is proposed to further delineate species behavior. Green varieties of *P. setaceum* seem most aggressively invasive in southern California, but have been reported in northern California. The appropriate action at this time is to eliminate use of green *P. setaceum* only.

Hedera species

Invasive ivies are found statewide, with the largest problems in riparian areas and forest understories. Weed workers in California think of *Hedera helix* and *Hedera canariensis* as invasive (and Cal-IPC lists them with High ecological impact), but to date there is no detailed research into exactly which species or cultivars are invasive in California. Researchers in Washington state using molecular analysis found that certain cultivars (such as *Hedera hibernica* and *H. helix* ‘Star’) were most problematic there (*Hedera canariensis* is not present in Washington). Similar research is proposed for California to determine which cultivars are most problematic here.

Because genetic testing may be able to isolate a relative few problematic cultivars,

or at least those driving current invasions, it may be most appropriate to wait for further research before recommended the restriction of any particular ivies. In the meantime, the potential risks associated with ivies should be presented, and responsible practices to reduce possible spread should be promoted. These include proper trimming to prevent fruiting (and thus spread of seed by birds), and proper disposal of potentially viable vegetative matter.

Brooms

Many brooms are known to be invasive in California and other Pacific coast states, including French broom (*Genista monspesulana*), Scotch broom (*Cytisus scoparius*), Spanish broom (*Spartium junceum*), Portuguese broom (*Cytisus striatus*), and bridal veil broom (*Retama monosperma*). Several of these are listed as Noxious Weeds by CDFA, and none should be used in horticulture. “Sweet broom” (*C. spachianus* or *G. racemosa*) has not to date been found to be invasive, but should not be recommended.

Reviewers

Dr. Carla Bossard, Biology Department, St. Mary’s College of California

Dr. Joseph DiTomaso, Weed Science Program, University of California, Davis

Dr. Jodie Holt, Chair, Botany and Plant Sciences Department, UC Riverside

Dr. Marie Jasieniuk, Vegetable Crops Department, UC Davis

Dr. Ingrid Parker, Biology Department, UC Santa Cruz

Dr. Sarah Reichard, Conservation Biology, University of Washington

Dr. Giles Waines, Botany and Plant Sciences Department, UC Riverside

For More Information

Connick, S., and M. Gerel. Don’t sell a pest: A new partnership to prevent plant invasions through horticulture. *Cal-IPC News*, Summer 2005.

“Friends of the Partnership” online newsletter, www.suscon.org/invasives

They're Relentless...

INVASIVE WEEDS!

California Invasive Weed Awareness Week July 17 - 23, 2006

Across the Golden State, invasive plants reduce plant diversity and wildlife habitat, consume needed water, reduce agricultural production and create fire hazards.

How Can You Help?

- **LEARN** to identify invasive plants in your area
- **REPORT** weed sightings to the land manager or local weed group
- **SUPPORT** local, state and federal efforts to control invasive weeds

FEATURING...



Bull thistle! **Dalmatian toadflax!** **Sesbania!**

...and other bad actors!

For more information on invasive weeds and local events in your area contact:

Visit www.cal-ipc.org for more information about California Invasive Weeds Awareness Week activities around the state

CALIFORNIA INVASIVE WEEDS AWARENESS COALITION

California Association of Resource Conservation & Development Councils

This year's California Invasive Weed Awareness Week is July 17-23. Weeds Week is a chance for community groups around the state to make their local citizens and policy makers aware of the problems caused by invasive plants, as well as the important work done to protect California's native habitats.

We encourage you to organize an activity for Invasive Weeds Week: hold a work day or an open house at a restoration project, design an exhibit for a local event, invite your politicians and their staff for a tour of projects, or write an article for a local paper. The Cal-IPC website has a guide for developing Invasive Weeds Week activities, with how-to tips for a variety of events.

The Cal-IPC website will also serve as a central location for posting activities. Please send a short announcement of your event, including date, time, place and contact information, to Elizabeth Brusati (edbrusati@cal-ipc.org). Afterward, let us know how many people attended and send photos and a copy of any local press coverage. We will compile a summary of events to help even more groups develop activities in future years, and to show legislators at next year's Day at the Capitol that citizens across California are concerned about invasive plants.

To obtain a copy of the poster at left, contact Katie Filippini (kfilippini@cdfa.ca.gov) at the California Department of Food and Agriculture.

Seeking Outreach Articles for Summer Newsletter

Two of the most challenging aspects of invasive plant work can be building community support for projects and providing information to diverse audiences. In the next issue of *Cal-IPC News*, we would like to showcase innovative outreach efforts related to invasive plants or habitat restoration. Has your group developed creative outreach materials? Increased participation from the local community, including children? Overcome community suspicion about a controversial project? Tell your fellow weed workers about your successes and help them learn from your mistakes. We are seeking short articles from a couple of paragraphs to a page of text in length. Photos are encouraged. Please send submissions to Elizabeth Brusati, edbrusati@cal-ipc.org by June 30.

Arundo and Imazapyr, continued...

mixture; high end of price range includes labor to compact *Arundo* and trim native trees where intermixed.

Mechanical biomass reduction plus herbicide treatment

1) Large flail mower followed by resprout spraying: \$4,000-\$6,000/ac.

Suitable for dense stands larger than one acre on relatively open, level terrain; assume \$3000-5000/ac for biomass reduction by flail mower (Fig. 2) and \$1000/ac for low volume foliar treatment of resprouts using imazapyr herbicide.

2) Small flail or rotary mower followed by resprout spraying: \$7,000-\$10,000/ac.

Suitable for steep slopes and stands intermixed with trees; assume \$6000-\$9000/ac for biomass reduction by smaller flail or rotary mower (see Figure 3) and \$1000/ac for low volume foliar treatment of resprouts using imazapyr.

3) Chainsaw crew with portable shredder: \$20,000-\$150,000/ac.

Suitable for locations requiring biomass reduction but not accessible to mower tractors; price range depends on stand density,

accessibility, amount of dead thatch, etc.

For More Information

Bob Brenton, Brenton VMS, 916-716-9822, brenvms@comcast.net

Mike Carrigan, BASF Corp., 970-674-9147, carrigi@basf-corp.com

Contact the author at bgneill@earthlink.net

Cal-IPC Response to “Border War”

On March 19, The New York Times ran an op-ed piece by George Ball, president of Burpee Seed Company and former president of the American Horticultural Society, that was critical of attempts to remove invasive ornamentals (voluntarily or by regulation) from commercial trade. Cal-IPC and others responded to his piece with letters to the editor. Here is Cal-IPC's letter.

Dear Editor,

I read with interest the opinions of George Ball, former president of the American Horticultural Society, regarding “chauvinism against non-native plants” (“Border War,” March 19). Sadly, Mr. Ball expresses a common misperception—that concern over the extensive impacts of invasive plants on our natural areas and economy requires a rejection of all non-native plants.

In California, about 200 plants are considered invasive, a minute fraction of the non-native plants in the state. Invasive plant management has nothing to do with rejecting valuable crop or ornamental plants, xenophobia, or “elite snobbery.” Such management is based on sound science and good public policy.

Fortunately, we have many willing partners in nursery and landscape trade organizations who recognize the valuable role the horticultural community plays in preventing the introduction of invasive plants. We look forward to having current leadership at the American Horticultural Society join us in this important work.

Doug Johnson
Executive Director, California Invasive Plant Council

Working with Landscape Architects in San Diego

The San Diego Chapter of the American Society of the Landscape Architects and the San Diego Chapter of the California Native Plant Society worked together to produce the *San Diego County Invasive Ornamental Plant Guide*. This online guide was designed to educate landscape professionals and the general public on invasive plants and how to avoid their use in planted landscapes in the San Diego region.

The *Guide* is especially important for landscape architects working in the wildland-urban interface where urban development borders natural plant communities. It is intended to be a reference to landscape professionals as they choose plants for projects near wildlands.

The *Guide* divides plants into two categories: Most Invasive and Moderately Invasive. Most Invasive plants are those that spread to wildlands even when they are not planted nearby. They are aggressive invaders and the *Guide* strongly discourages their use in the landscape. Moderately Invasive plants have been documented in wildlands and have the potential to spread into native plant communities from planted landscapes near natural areas. For these plants, the *Guide* offers suggestions on evaluating whether a plant will be invasive in a particular location.

For More Information:

American Society of Landscape Architects - San Diego Chapter
www.asla-sandiego.org/content/plantguide.html

California Native Plant Society - San Diego Chapter
www.cnpsd.org

New and Contributing Members

Thank you for your generous support! This list reflects donors and new members since the last newsletter.

New Members

John Boland, Boland Ecological Services San Diego - Alasdair Coyne, Ojai - Adrienne DeBissehop, Oakland - Mike Dungan, TEC, Inc., Santa Barbara - Bob Falconer, CA Association of Nurseries and Garden Centers, Sacramento - Leora Feeney, Alameda - Jeffrey Firestone, UC Davis - Gary Halsey, Watershed Collaborative, Sacramento - Graciela Hinshaw, BLM, Folsom - John Holloway, Sea Ranch - Deveree Kopp, US Forest Service, Fawnskin - Amy Litton, Irvine Open Space Preserve, Costa Mesa - Robert McKee, Davis - Barbara Meislin, Tiburon - Eddie Meyerholz, La Mesa - Regine Miller, Downieville - Bruce Orr, Stillwater Sciences, Berkeley - Randi Paris, NRCS,

Yreka - Sharon Parker, Jensen Landscape, Fremont - Marcel Rejmanek, UC Davis - Cristina Schultz, CA State Parks, Avenery - Lauren Singleton, Modesto - Harry Spanglet, CA Dept. of Water Resources, Sacramento - Nicholas Staddon, Monrovia Growers, Azusa - Denise Stearer, USFWS, Ojai - Jocelyn Torralba, Sant Clara Valley Water District, San Jose - Chariss Tweedy, Jones & Stokes, Fair Oaks - Jessie Vinje, Cetner for Natural Lands Management, Escondido - Douglas Weihe, Chula Vista - Frederick Wisor, Santa Rosa

Donations

Greg Archbald, Nevada City - Dan Gluesenkamp, San Francisco - Barbara Meislin, Tiburon - Audrey Miller, Ferndale - Kelly

Rose, Playa Del Rey - Jake Sigg, San Francisco

Donations for Cape Ivy Biocontrol

[Cal-IPC sends 100% of these donations to USDA-ARS to support South African research partners.]

P. Van Aggelen, San Francisco - California Native Plant Society (CNPS) Los Angeles/Santa Monica Mountains Chapter - CNPS Monterey Chapter - CNPS Orange County Chapter - CNPS San Diego Chapter - CNPS Santa Clara Valley Chapter - Jean Conner, San Francisco - El Cerrito Garden Club, El Cerrito - Lawrence Janeway, Chico - Rio Piedras Club, Carmel - Swimmer Family Foundation, Los Angeles - Susan Wilde, San Francisco

“Bay-Friendly” Program Integrates Non-Invasive Landscaping with Waste Reduction

by Cynthia Havstad, StopWaste.Org

Cal-IPC is a partner in the Bay Friendly Program, an innovative local project aimed at promoting sustainable landscaping. The program provides an excellent avenue for educating the public about invasive plants.

Sustainable landscaping is gaining support nationwide, because of its multiple benefits to the environment and the community. In Alameda County, StopWaste.Org, aka the Alameda County Waste Management Authority, considers sustainable landscaping an essential means of reducing the tons of plant debris that are landfilled every year, while building markets for compost and mulch.

StopWaste.Org launched the Bay-Friendly Landscaping and Gardening program, reaching out to residents, landscape professionals and local public agencies with a broad array of educational materials, including printed guidelines, trainings, model public policy, technical assistance, grants, and awards. The goal is to encourage broad participation in Bay-friendly landscaping in Alameda County and the greater Bay Area.

Bay-Friendly Landscaping and Gardening offers a holistic approach that recognizes that one component of reducing waste from the landscape is plant choice and placement. Reducing plant debris is also about watering practices, fertilizing practices, and building soils with compost for vibrant, disease resistant plants that don't need to be replaced before they've reached their natural life expectancy.

With this integrated approach comes the opportunity to collaborate with other agencies and organizations that have similar, sometimes intersecting missions, messages, and audiences, such as Cal-IPC. Although the Bay-Friendly program focuses primarily on the built landscape, we recommend that plant species that are invasive to the San Francisco Bay area be avoided in order to minimize future plant debris while protecting our local ecosystem.

Towards this end, the Bay-Friendly Landscaping Guidelines: Sustainable Practices for the Landscape Professional

and the Bay-Friendly Gardening Guide for Homeowners include Cal-IPC's list of Invasive Garden Plants of the Greater San Francisco Bay Area and their recommended alternatives. StopWaste.Org's Bay-Friendly programs have distributed more than 3,000 of Cal-IPC's "Don't Plant a Pest!" brochures.

The Bay-Friendly Gardening Program is partnering with Cal-IPC, local nurseries, Alameda County Countywide Clean Water Program and East Bay Municipal Utility District to:

1. Educate more residents at point-of-sale about selecting appropriate plants and other Bay-Friendly practices.
2. Provide a resource for beginner gardeners so that they can avoid invasives as well as plants that require heavy water use.
3. Develop relationships with nurseries, and in the future the growers and wholesalers who provide the plants, and educate their staff about the Bay-Friendly Program.

The collaboration has generated a list of California native and Mediterranean species that are conserve water, thrive in Bay-Area microclimates, grow fairly easily, and are relatively disease resistant. The plants are identified as Bay-Friendly Plants in the nurseries with our pelican logo and are stocked at five nurseries in Berkeley, Fremont, San Leandro and Oakland.

Civic landscape projects can also access technical assistance and grants from StopWaste.Org. The recommendation to avoid invasive plant species becomes a requirement if an Alameda County public agency receives a Bay-Friendly Landscape grant to build or renovate a public use landscape. Existing Bay-Friendly landscape projects, including a new fire station in Pleasanton and renovated street medians in Albany, were presented to 125 professional landscape designers and public agency decision makers in March. Both projects met the requirement that the planting plans not specify invasive plant species.

As a part of our comprehensive approach we also encourage our 14 member

cities in Alameda County

to adopt Bay-Friendly Landscaping policies for both civic and private sector projects. In civic projects the model policy recommends that all new public landscapes meet a minimum of 60 points on the "Bay-Friendly Landscaping Plan Review and Scorecard". By adopting these model policies, Cities are also adopting the Bay-Friendly practice to not plant invasive plant species. For private sector projects, the policy recommends adopting Bay-Friendly Landscape Guidelines as an official city document, encouraging (but not requiring) private landscape projects that qualify for planning commission review to use the Bay-Friendly Landscape Guidelines and Score Card for their projects. This voluntary approach is seen as the best first step for introducing these practices to the private sector.

Primary to our agency goals, Bay-Friendly Landscape and Gardening recommends that invasive weed debris be kept out of the landfill to the maximum extent possible. Invasive plant species often are pervasive and difficult to compost in such a manner as to prevent re-infestation. Placing invasive plant debris in the green carts for municipal collection and composting is often a better option than trying to compost it in a backyard compost pile. We also recommend *The Weed Worker's Handbook*, from The Watershed Project and Cal-IPC which details appropriate disposal methods for 27 Bay Area invasive weeds, balancing the goals of reducing waste and preventing their spread.

In your pursuit of minimizing the impacts of invasive plants, we invite you to participate in this broader approach and to use the Bay-Friendly Landscape Guidelines and materials as a resource.

For copies of the Bay-Friendly Landscape Guidelines, model policies, scorecard, resources for residents or to find out about other tools, visit www.StopWaste.org.



Readings & Resources

Grassland Newsletter: Jeff Corbin, a graduate student at UC Berkeley, produces the online CA Grassland Newsletter, with research summaries, job announcements, and a variety of other grass-related info. cbc.berkeley.edu/grass

Video: The National Forest System released the first video of a series on best management practices for invasive species prevention. “**Dangerous Travelers – Controlling Invasive Plants along America’s Roadways**” is a 26-min. program that targets road maintenance personnel and equipment operators. The initial production run is available on DVD or via the internet free of charge. www.fs.fed.us/invasivespecies/news.shtml

Historic Photos: 3100 US Forest Service photos from vegetation surveys in the 1920s and ‘30s are available through the UC Berkeley Library. They are part of the **Wieslander Vegetation Type Map Survey**, which covered national forests in California, Oregon, and Nevada. Photos can be searched by USGS quad, location, key word, or species. www.lib.berkeley.edu/BIOS/vtm

Ivy Video: A video and DVD on English ivy have been produced by Leif Joslyn,

*Seen a new resource your fellow weed workers should know about?
Please contact edbrusati@cal-ipc.org.*

who previously produced videos on yellow starthistle, pampasgrass, and brooms. Contents include “What is a weed?”, urban and wildland impacts, other views, identification and life cycle, and threat to the coast redwood ecosystem. The video or DVD can be purchased for \$25. www.xenob.com

Position Paper: The Ecological Society of America has produced a position paper entitled **Biological Invasions: Recommendations for U.S. Policy and Management**. It evaluates U.S. national policies and practices on biological invasions in light of current scientific knowledge and makes six recommendations for future actions. ESA released the paper was released during National Invasive Weeds Awareness Week in February and distributed it to Congressional offices, committees, and federal agencies. www.esa.org/pao/esaPositions

Military Report: The National Wildlife Federation produced a report in October 2005 entitled “**Under Siege: Invasive Species on Military Bases**” that describes the costs and damages that the Defense Department has incurred from invasive species, including examples from several bases in California. www.afpmb.org/bulletin/vol25/under_siege.pdf or www.nwf.org

New Book: In summer 2006, Montana State University Extension will release **Inventory and Survey Methods for Nonindigenous Plant Species**, a 180-page guide that “demystifies mapping terminology and presents information on choosing and designing the most appropriate method for a particular management area.” www.weedcenter.org

NOW AVAILABLE FROM CAL-IPC



The Use of Fire as a Tool for Controlling Invasive Plants

By Joseph DiTomaso, Matt Brooks, Edith Allen, and Ralph Minnich

49 pp., color photographs

This report is the result of a workshop organized by Cal-IPC and sponsored by the Center for Invasive Plant Management, USGS, and the Joint Fire Science Program.

Chapters include:

- Planning and Implementing Prescribed Burns
- Control of Invasive Plants with Prescribed Fire
- Using Prescribed Fire in Integrated Strategies
- Effects of Fire on Plant Communities
- Effects of Fire on Chemical, Physical, and Biotic Properties of Soil

First printing is Free, plus \$5 shipping & handling. Call Cal-IPC at (510) 843-3902, or order from our website.



Cytisus scoparius on former ponderosa pine area. Images from the Wieslander Vegetation Type Mapping Collection are courtesy of the Marian Koshland Bioscience and Natural Resources Library, University of California, Berkeley, www.lib.berkeley.edu/BIOS/vtm/.

The WILDLAND WEED CALENDAR

*Know of an event that should be posted here?
Please contact edbrusati@cal-ipc.org.*

California Mapping Coalition Conference

Week of May 15 (date TBA)
University of California - Davis
Call Cal-IPC at (510) 843-3902 for details.

Cal-IPC Wildland Weed Field Course: Management Techniques

May 24-25
Cache Creek Conservancy, Woodland, CA
An expanded two-day version of the course taught at the Chico Symposium. Includes an exercise in designing a management program. \$250 Cal-IPC members / \$270 non-members. www.cal-ipc.org

Weeds Across Borders

May 25-28
Hermosillo, Sonora, Mexico
The 3rd Weeds Across Borders Conference sponsored by the Federal Highway Administration and the Arizona-Sonora Desert Museum. Share information with scientists, practitioners, and policy makers from Canada and Mexico.
www.desertmuseum.org/borderweeds
borderweeds@desertmuseum.org

Bay Area Open Space Council

June 2
San Francisco, CA
The theme of this year's annual conference is Building Whole Communities, honoring connections between people and land.
OpenSpaceCouncil.org

Quotable

“Yellow Star Thistle... When botanists first made known its presence in California it could have been exterminated for less than a hundred dollars; at the present time, millions of dollars would not suffice.”

Jepson's A High School Flora for California (1935). Contributed by Roy West.

Using California Native Grasses in the Urban Landscape

June 2
Oakland, CA
This workshop by the California Native Grasslands Association presents uses of California native grasses in urban landscaping projects.
www.cnga.org

Society for Conservation Biology: Conservation Without Borders

June 24-28
San Jose, CA
This meeting aims “to transcend real and perceived boundaries of ecology, sociology, politics, and human behavior that impede conservation science and its application.”
www.conbio.org/2006

Conference on Biological Control

July 25-27
Riverside, CA
Topics are importance of biological control to the citrus industry, history of the Agricultural Experiment Station, risk assessment for weed biological control, and ongoing biological control research for the urban environment.
www.cnr.berkeley.edu/biocon/CCBC%20V.htm

Ecological Society of America

Memphis, TN
August 6-11
www.esa.org

North American Weed Management Association

September 18-21
Calgary, Alberta, Canada
www.nawma.org

Meeting the Challenge: Invasive Plants in Pacific Northwest Ecosystems

University of Washington
September 19-20
Seattle, WA
The conference goal is to create strategies and partnerships to understand and manage plant invasions in the Pacific Northwest. Contact Timothy B. Harrington, tharrington@fs.fed.us or 360-753-7674.

15th Australian Weeds Conference: Managing Weeds in a Changing Climate

September 24-28
Adelaide, South Australia
www.plevin.com.au/15AWC2006

Cal-IPC Pre-Symposium Field Course: Tools for Early Detection Programs

October 4
Audubon Canyon Ranch's Bouverie Preserve, Glen Ellen
www.cal-ipc.org

15th Annual Cal-IPC Symposium Research and Management: Bridging the Gap

October 5-7
Rohnert Park, CA
www.cal-ipc.org

Tamarisk Research Conference Current Status and Future Directions

October 3-4, 2006
Fort Collins, Colorado
A meeting devoted to tamarisk ecology and management.
www.tamarisk.colostate.edu

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.**

2006 Individual Membership

- Regular \$35
- Family \$60
- Contributing \$75
- Life \$1,000
- Joint Cal-IPC/SERCAL \$55
- Joint Cal-IPC/CNGA \$70
- Cal-IPC/SERCAL/CNGA \$95
- Student/Volunteer \$15

2006 Institutional Membership

- Regular \$150
- Small company or nonprofit \$100

Donation: \$ _____

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Mail this form with check (payable to "Cal-IPC") or credit card info to Cal-IPC, 1442-A Walnut Street #462, Berkeley, CA 94709.

Fax form with credit card info to 510/217-3500.

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