



Cal-IPC News

Protecting California's Natural Areas from Wildland Weeds

Quarterly Newsletter of the California Invasive Plant Council



*Removing invasive
plants to help
butterflies thrive*

The endangered Lange's metalmark butterfly (Apodemia mormo langei) lives only on the Antioch Dunes National Wildlife Refuge and a neighboring Pacific Gas & Electric property. US Fish & Wildlife and PG&E have teamed up to protect its host plant from invasive plants. Read more on page 8.

Photo: Eric Palm, USFWS

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A California 501 (c)3 nonprofit organization

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

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Cal-IPC News

Winter 2012 - Volume 20, Number 1

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From the Director's Desk

A new plan

The State of California has adopted its first comprehensive plan on invasive species. "Stopping the Spread: A Strategic Framework for Protecting California from Invasive Species" was developed by the state's advisory committee on invasive species and approved by the heads of six state agencies.

Recommended actions cover the basics of prevention, early detection/rapid response, management, research and outreach. The advisory committee borrowed from other states' plans and from existing California plans that focus on particular types of invasive species.

But there are new ideas as well. To address concerns over pesticide use, the plan recommends creating a working group to review public health risks of invasive species and their management, providing a forum for public-health advocates to directly help shape approaches to invasive species management. Another recommendation calls for the state to conduct a Program Environmental Impact Report on pesticide use for invasive species control, providing an opportunity to review the state's use of pesticides through a CEQA process.

Cal-IPC programs are already addressing several key recommendations. We provide resources on best management practices for preventing the spread of invasive plants. We conduct risk assessment and compile mapping data to coordinate detection and management efforts. And we work to make sure that information on invasive plants is accessible to those in the field and the public.

Given that the state has eliminated key invasive plant programs in the last year, we also need "a new plan" for funding on-the-ground weed management. Cal-IPC is actively following the state Natural Resource Agency's Fish & Wildlife Vision process (online at vision.ca.gov), which provides an opportunity to shape the work of the state's Dept. of Fish & Game in the future. Invasive plants impact the state's water, wildlife, and wildfire. They will play an important role in climate change adaptation. Now is the time to create funding opportunities through related issues that have clout in Sacramento. We are working with partners to do just that.

Put March 14 on your calendar. Cal-IPC and partners will hold the 9th Annual Invasive Weeds Awareness Day at the Capitol in Sacramento. It is an important opportunity to make sure our elected officials understand the importance of addressing invasive species. Our grassroots advocacy can make a difference!



Wildland Weed NewsNewsNewsNewsNews

Stinkwort is spreading in San Diego County. *Dittrichia graveolens* was recognized in San Diego County less than five years ago but appears to be expanding rapidly. The local chapter of California Native Plant Society is working to remove it. www.signonsandiego.com/news/2011/oct/04/rogue-weed-marches-through-county/?ap

A USDA researcher has found a soil micro-organism that may kill weeds. After examining 10,000 and testing 100 potential organisms, Ann Kennedy of USDA has found that the bacteria *Pseudomonas fluorescens* will inhibit the growth of weeds without harming native plants or crops. So far it has shown promising results on cheatgrass, medusahead, and jointed goatgrass, all serious invasive plants in the Western U.S. One pint per acre caused a 20-40% reduction in cheatgrass in the first year after application, with additional reduction in the following year. (*Capital Press*, Dec. 5, 2012) www.capitalpress.com/content/w-Ann-Kennedy-medusahead-120911-art

A proposal passed by the U.S. House would strip states of the authority to establish ballast water standards that are more stringent than those set at the federal level. Ballast water is a major pathway for aquatic invasive species entering estuaries. This proposal would also set a new national treatment standard in line with that of the International Maritime Organization. California is one of the states whose ballast water standards exceed that of the federal government. www.invasivespeciesinfo.gov/aquatics/ballast.shtml

According to a NASA study, climate change will modify the plant communities over 40% of the earth's surface by 2100. These plant communities will change from one major ecological type to another, such as forest, grassland, or tundra. The researchers used computer modeling that predicts the type of plant community that is adapted to any climate on Earth. Most of the planet's land that is not covered by ice or desert is projected to undergo at least a 30% change in plant cover. www.nasa.gov/topics/earth/features/climate20111214.html

The public can view draft chapters of the Bay Delta Conservation Plan. The Plan has the dual goals of providing for the conservation and management of aquatic and terrestrial species in the Sacramento-San Joaquin River Delta, and improving current water supplies. The public comment period will begin in June; until then, you can see the working drafts. Aquatic plant removal is covered in Appendix F of the "BDCP Documents". Cal-IPC plans to submit comments. If there's something you would like us to include, please send your comments to Elizabeth Brusati, edbrusati@cal-ipc.org. www.baydeltaconservationplan.com

The U.S. Forest Service published the "National Strategy and Implementation Plan" for the management of invasive species. The Strategy covers prevention; early detection and rapid response; control and management; and rehabilitation and restoration across aquatic and terrestrial areas of the National Forest System. www.fs.fed.us/foresthealth/management/fhm-invasives.shtml

Cal-IPC Updates

Board update

Former Cal-IPC Board President Jason Giessow is recovering well after a serious work-related accident in San Diego County. We wish you the best, Jason!

Symposium presentations

Presentations from the 2011 symposium are now available. www.cal-ipc.org/symposium

Membership renewal

Have you renewed your membership for 2012? Check your address label to see if you are current. Renew now so you do not miss the Spring newsletter with information about the upcoming Symposium!

Join Us!

9th Annual Invasive Weeds Awareness Day at the Capitol March 14 ~ Sacramento

This is your opportunity to educate state legislators about the importance of controlling invasive plants.

Register to join us at www.cal-ipc.org!



Publications

Cal-IPC published an article in the Fall 2011 journal of the Bay Area Automated Mapping Association. "Mapping invasive plant ranges in California: An innovative combination of quantitative

and qualitative data" describes how these two types of data work together to improve our view of invasive plant distribution. BAAMA's journal reaches 1,000 GIS professionals. www.baama.org/journal

Mapping the spread

An update from Cal-IPC's Science and Mapping Program

2011 kept the Science and Mapping Team busy! We completed statewide data collection on 200 invasive plant species, built the online CalWeedMapper tool to use data with suitable range maps, and collected an array of datasets for contribution to Calflora. Thanks to this two-year effort we now have a much stronger foundation for maintaining and using statewide maps for invasive plants in California.

CalWeedMapper

CalWeedMapper is an online mapping tool that displays data by USGS quadrangle (quad) for 200 species from the Cal-IPC Invasive Plant Inventory (see calweedmapper.calflora.org).

These data combine two sources: our interviews with invasive plant experts (108 meetings with 384 participants across the state) and occurrence information from Calflora and the Consortium of California Herbaria (CCH). For each species, CalWeedMapper shows where it occurs, how abundant it is, where it is spreading, and where it is currently being treated.

When a user selects a region, CalWeedMapper generates a list of species that are potential targets for surveillance, eradication and containment in the region. By exploring the maps for each of these species, users can investigate which species in which areas may be top regional priorities.

To accommodate the needs of different users, CalWeedMapper includes a variety of regional choices, including WMAs, National Forests, National Parks, large State Parks, Jepson floristic regions, and a draft set of regional groupings of WMAs.

For a summary of the information, users can generate a Regional Management Opportunity Report to serve as the basis of regional strategic planning (see opposite page).

Commenting and updating functions will help keep the maps current.



By clicking on a quad, the user sees information about the mapping meeting at which the expert knowledge was gathered and also about the occurrences from Calflora and CCH that are in the quad. Users can then add a comment to the quad or update information if they have editing permission.

Any new occurrence data submitted to Calflora or CCH will update CalWeedMapper. CalWeedMapper will facilitate data correction by pointing out where there are discrepancies between occurrence data from Calflora or CCH and the “expert knowledge” data collected from our interviews.

To show where a given plant is most likely to spread, CalWeedMapper also displays suitable range based on climate. Computer models were used to generate suitable range for 30 plant species based on where they currently grow. The maps show the areas that contain suitable range based on climate conditions in 2010 and 2050. These maps can help land managers with climate adaptation planning and

preparing for the movement of new invasive plants into their region. More species will be added in 2012.

Adding GIS data

CalWeedMapper joins existing tools at Calflora for tracking invasive plants.

Cal-IPC plans to work closely with Calflora to continue to develop new tools. During the last year, Cal-IPC worked with Calflora to add to their existing online database, which is already used by many professional botanists and native plant enthusiasts.

By collecting GIS datasets from those we met with across the state for “expert knowledge” meetings and uploading these datasets to Calflora, we were able to increase the amount of invasive plant occurrence data in Calflora by 89,000 records, an increase of 70%. Some 25% of these records are lines and polygons, and we worked with Calflora to build capacity for storing and displaying these. We provided funding to build a stronger shapefile upload tool, the ability to collect and display lines and polygons and a central database for all invasive plant point, line and polygons occurrences.

Here's what you can do at CalWeedMapper:

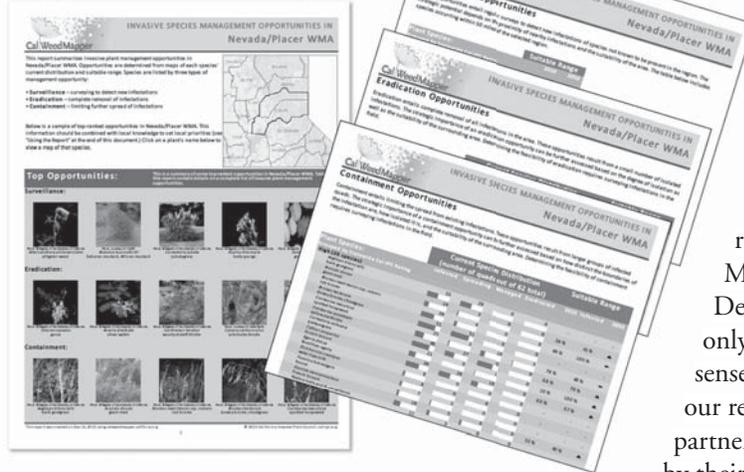
- * Create maps and reports of invasive plant distribution
- * Identify management opportunities in a county, WMA or region
- * Update species distribution data

Setting strategic priorities in the Central Sierra

In December, we met in Jackson with a dozen representatives from Amador, Alpine, Calaveras, El Dorado and Tuolumne counties to discuss how the maps and reports from CalWeedMapper can support coordinated regional planning in the Central Sierra. The goal was to use CalWeedMapper to reach consensus on a strategic list of species that are top priorities for surveillance and eradication. We focused on identifying which species are the highest priority for surveillance and for region-wide eradication. The group whittled the region's priorities down to 21 species for eradication and 24 species for surveillance based on CalWeedMapper's reports and attendees' knowledge of existing efforts.

the meeting brought up new species of importance to their region that they wanted to learn about before they became a bigger problem. Wendy West from UC

Regional Management Opportunities Report



“It’s great to know what is coming your way and where from... This is something we’ve been asking for a long time.”

~ Mike Boitano, Amador County Agricultural Commissioner

infestation, spreading, and already under management (and marked as containment targets in CalWeedMapper's report). “Eradication targets represent goals that we can make real headway on,” said LeeAnne Mila of the El Dorado County Department of Agriculture. “Not only does CalWeedMapper give us a sense of the minimal occurrences in our region, it also helps us call on other partners in our region to be inspired by their headway or get ideas on their treatment successes.”

For species with suitable range maps, we determined how much uninvaded range was at risk, and looked for possible future trends as the climate shifts. Two species of concern were *Isatis tinctoria* (dyer's woad) and *Carduus nutans* (musk thistle). In both cases, infestations occur to the north and there is considerable concern about isolated occurrences in the region. Musk thistle can easily travel on equipment, but working diligently to remove this species is a viable goal.

Centaurea maculosa (spotted knapweed) and *Centaurea diffusa* (diffuse knapweed) are amply present in the county yet we used local analysis and knowledge to deem them strategic eradication targets. Participants believed all of the known populations are eradicable and agreed to keep targeting them as such.

Outcomes

Future steps include honing the suite of surveillance and eradication targets to a regional Top 10 list to help convey regional priorities to funders

“This is going to be a great tool for weed managers.”

~ Matt Brown, El Dorado National Forest

Participants noticed right away that it was important to consider two parallel paths: their agency's management priorities and their region's management priorities and to understand that there will likely be a difference between the two. The region's top priorities will provide rationale and opportunity so that the two trajectories might meet in the future.

Surveillance priorities

As Margaret Willets, Stanislaus National Forest, noted about CalWeedMapper's view on possible surveillance targets, “It's so helpful to have this regional perspective because of the many vectors of dispersal at play in our region.” Participants agreed that

Cooperative Extension pointed out the usefulness to outreach: “This tool helps prioritize education. There are some obvious species to use for outreach and education to the general public.”

Surveillance targets are species not yet present within the region, but occurring within 50 miles. Two species that jumped out to the group were *Cynara cardunculus* (artichoke thistle) and *Nicotiana glauca* (tree tobacco). Attendees expressed concern that artichoke thistle could rapidly expand in foothill ecosystems and rangeland, and they suspected that tree tobacco could establish in the foothills. *Piptatherum miliaceum* (smilgrass) has already been reported in the region, but investigation of the infested quads in CalWeedMapper showed that all known occurrences from Calflora or CCH are under treatment for eradication, so the species was included as a surveillance target.

Eradication priorities

Eradication targets included species found only in isolated quads, as well as some species that were a bit more widespread but at relatively low level of

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“Harness the Boomers!”

An interview with Ann Howald

by Gina Darin, California Department of Water Resources

Continuing our series of interviews of founding board members, Gina Darin spoke with Ann Howald.

Ann currently works for Garcia and Associates, a consulting firm for biological surveys from plants to bats to lizards – Oh my! Ann’s work focuses on the Mojave Desert surveys ahead of solar projects. As rare plant surveys usually have a weed component, Ann shared with me some of her good and not-so-good discoveries in the desert. The good news is lots of null finds, meaning she’s not seeing too much weediness in the desert beyond the occasional red brome (*Bromus rubens*) infestation, and those have a tendency to dry out rapidly.

The bad news, however, is she’s finding a few halogeton (*Halogeton glomeratus*) infestations in very out-of-the-way areas. African mustard (*Brassica tournefortii*) has also moved in from Nevada, and is now showing up in Death Valley National Park. Ann is sure to document all her weed finds, knowing full well that documentation influences control, although she admitted “Or I map it and

pull it!” On Ann’s wish list is a legal requirement for all consultants performing surveys to submit weed finds to Calflora, similar to rare plant survey guidelines for submitting to the California Natural Diversity Database.

When Ann’s not botanizing for work, she’s volunteering her time to many worthy causes, including helping the California State Parks with weed concerns. She’s currently working on how to keep velvet grass from overrunning a variety of wetlands and coastal grasslands, and hand-pulling experiments around California red-legged frog breeding habitat in Annadel State Park, Sonoma County.

How Ann got involved with weeds

When Ann was working on her undergraduate and graduate degrees at UC Santa Barbara, people generally didn’t have awareness of weeds like they do today. Goleta, next to UCSB, historically farmland, is likely where pampas grass was introduced to the US in 1875, imported for plumes for Victorian drawing rooms. Goleta Slough is a natural wetland, and Ann clearly saw the spread of the weed. “Pampas grass was all over the place.” At the same time, iceplant was spreading over the dunes near the UCSB campus. Juxtapose those scenarios with the Santa Barbara garden plants and street trees that didn’t move. It was clear to a botanist that most non-native plants stayed where they were planted, but



Ann surveying weeds and rare plants in the Mojave Desert. Photo: Fred Roberts

some definitely had the potential to take over the landscape.

Ann went on to work for the California Department of Fish and Game’s Endangered Plant Program, where she tackled the big questions about weeds. Ann attended the first CalEPPC symposium in Morro Bay both because she was personally interested in the topic and because it was related to her job. It was perfect timing in Ann’s career to get involved in this new organization. Pre-CalEPPC, weed experts were scattered. “We’d had interagency botanist meetings occasionally, but no central functioning entity to deal with the issue.”

Fond Cal-IPC memories

Ann’s fondest memory as a CalEPPC founding board member was getting the first weed list published. Having been involved in the California Native Plant Society for years, Ann knew the strong influence the rare plant list had on awareness and conservation. “CalEPPC needs a list”, she would say, arguing that people love lists, but the board thought it too daunting of a task at the time. Ann brought up the idea and second and then a third time. Finally, Nelroy Jackson was on her side and the board agreed it was time to take on the task. Ann started a committee, which worked diligently to



Ann and husband climbing Bluff Knoll, Australia.

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Cheatgrass in erosion control projects

by Julie Etra, MS, Western Botanical Services Inc., and Adrian Juncosa, PhD, Ecosynthesis.

As featured on the cover of *Cal-IPC News*, Summer 2011, cheatgrass (*Bromus tectorum*) has become a serious invasive species in the Lake Tahoe Basin. This is a relatively recent problem, as the plant was only an occasional nuisance up until about 2000.

In addition to appearing on some infrastructure projects, it has become extremely problematic on numerous revegetation and erosion control projects due to implementation of counter-productive best management practices (BMPs) intended to decrease slope runoff and establish vegetation. Our goal is to identify counter-productive practices that enhance invasive plant establishment and to eliminate their use.

Cheatgrass occurs in abundance on erosion control projects (specifically road cuts) in the Lake Tahoe Basin. The practices of deep tilling and application of fertilizers, including slow-release and compost, enhance the establishment and spread of this plant and other weeds.

Deep tilling

The recent publication *Revegetation Guidance Document for Erosion Control Projects in the Tahoe Basin* (AECOM, 2011), resulted from studies, workshops, and documentation of erosion control projects in the Lake Tahoe Basin. Section 5.2, on revegetation, recommends that practitioners “minimize soil disturbance and removal, and maximize stockpiling and reuse topsoil that must be removed, if any. Remove existing invasive plants and other weeds potentially interfering with successful revegetation before planting.”

Further, it states, “...extensive soil preparation is costly, and itself disturbs the soil. In addition, on steeper slopes, the ‘fluffy,’ lesser strength, lighter soil that temporarily results from soil loosening may locally slump. Therefore, on steeper slopes, soil should be loosened to an irregular and perhaps shallower

depth (e.g., 6 inches rather than 12 inches) to reduce the risk of mass wasting.” This is particularly critical on roadways such as Brockway Summit above Lake Tahoe, featured on the cover of the summer Cal-IPC newsletter. This site supported almost no cheatgrass prior to the original slope treatments and test plots in 2000, which included adding soil amendments to container plantings in test plots (no container plantings survived).

Fertilizer application

Fertilizing a revegetation site can lead to an explosion in cheatgrass infestations. Nitrogen, often a significant component of fertilizer mixes, is not required for seed germination, but stimulates the growth of cheatgrass and other invasive weeds.

The *Northeastern Nevada Revegetation Guide: Planting Desirable Vegetation to Compete with Invasive Weeds* states, “Where possible, seedbeds should be prepared with as little soil disturbance as possible in order to retain soil moisture and organic matter. Keep in mind that any disturbance of the soil can bring more competitive weed seeds to the surface as well. Application of fertilizer on arid rangelands after seeding establishment is not usually recommended. Most annual weeds (e.g. cheatgrass) thrive on high nutrient availability. Therefore, fertilizing the newly planted site at seeding time or in early spring can result in record class weed infestations.”

This is indeed what has occurred and is continuing to occur on numerous sites in the Lake Tahoe Basin where deep tilling with heavy applications of fertilizers has been adopted. Unfortunately these practices continue despite the widespread recognition that suitable revegetation species drawn from California’s native flora are well-adapted to thrive in what



This solid stand of cheatgrass (*Bromus tectorum*) established after revegetation work. Photo by Julie Etra.

are considered to be agronomically low nutrient soils.

Fertilizers may pose additional threats when nutrients leach from soil amendments into the groundwater. This is of particular concern in Lake Tahoe, a highly nutrient-sensitive system. Nutrient-contaminated groundwater can enter the lake; fertilizers and compost may further contribute nutrients to the lake, which revegetation projects are intended to reduce. This topic requires closer examination.

Conclusions & control

Instead of deep-tilling and fertilizing, a well-balanced seed mix that includes native colonizers, nitrogen-fixing, and ‘climax’ species, will help out-compete weeds such as cheatgrass. Designers and specification writers can also require the use of weed-free seed.

Once established, cheatgrass can be controlled through the judicious use of appropriate herbicides and by mechanically removing the plants with weed eaters before setting seed. However, repeated disturbance, including hand-pulling, especially after seed set, exacerbates the problem. Thick application of mulches can reduce emergence, but also limits establishment of desirable species.

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USFWS and PG&E partner to protect species

by Louis Terrazas, U.S. Fish & Wildlife Service

[Ed. Note: The Center for Biological Diversity and two other organizations are suing the California Energy Commission and USEPA over approval of three additional power plants in the Antioch area. Their concerns include the impact on sensitive habitat from nitrogen deposition stemming from power plant emissions. Look for a future article on the impacts of nitrogen deposition on invasive plant spread.]

Invasive plants are pushing three endangered species to the brink of extinction in and around the Antioch Dunes National Wildlife Refuge (NWR). Invasive plants like winter vetch (*Vicia villosa*), yellow starthistle (*Centaurea solstitialis*), and riggut brome (*Bromus diandrus*) pose a direct threat to the federally listed Contra Costa wallflower (*Erysimum capitatum angustatum*) and the Antioch Dunes evening primrose (*Oenothera deltoides howellii*).

The endangered Lange's metalmark butterfly (*Apodemia mormo langei*) is also threatened due to the loss of its host plant, the naked stem buckwheat (*Eriogonum*

nudum psychicola). The United States Fish & Wildlife Service (FWS) and the Pacific Gas & Electric Company (PG&E) are teaming up to protect these three federally listed endangered species from being overrun by invasive plants.

The two parties have signed a Safe Harbor Agreement, which establishes a relationship between FWS and a cooperating non-federal landowner. The purpose of a Safe Harbor Agreement is to promote voluntary management of endangered species on non-federal property, while giving assurances to participating landowners that there will be no additional regulatory restrictions in the future.

In this agreement PG&E is provided with an "enhancement of survival permit" that allows them incidental take of endangered species while maintaining their power lines and other structures on their bordering property. In turn, PG&E is providing a "net conservation

benefit" to the refuge by restoring available habitat on PG&E's parcels, by creating opportunities for population re-colonization and expansion, and by maintaining suitable habitat. By completing a Safe Harbor Agreement FWS and PG&E can now officially partner to protect the three endangered species and their habitat by controlling and eradicating the threatening invasive plants on the neighboring PG&E property. This is a great example of how the Endangered Species



Federally-endangered evening primrose (*Oenothera deltoides howellii*) is being protected from invasive plants by the US Fish & Wildlife and PG&E.

Act can be flexible and allow non-federal landowners to work together with the FWS to protect endangered species and their habitat.

The Antioch Dunes NWR is a unique 55 acre refuge in Antioch, Contra Costa County on the San Francisco Bay. The refuge was established in 1980 to protect the three endangered species and is the only NWR out of 555 refuges in the NWR System that was set up specifically to protect endangered plants and insects. It is a unique site where over 95% of the remaining population of the Contra Costa wallflower and the Antioch Dunes evening primrose are found on the refuge and the bordering PG&E property. The remaining wild population of the Lange's metalmark butterfly is only found on the refuge and on the bordering PG&E property.

The refuge is relatively small and is surrounded by industrial complexes, homes, roads, railroad tracks and the San Joaquin River. The habitat is severely altered, diminished and fractured. It is an island of habitat surrounded by source populations of more invasive plant populations. On the refuge, the invasive plants directly compete for sunlight and water with the endangered plants, and with the host plant for the endangered



Cal-IPC staff and Alameda-Contra Costa WMA helped pull invasive plants at the Antioch Dunes NWR at a 2011 workday.



Contra Costa wallflower (*Erysimum capitatum angustatum*) is also threatened by invasive plants.

butterfly. Invasive plants like winter vetch climb and smother the host plants for the Lange’s metalmark butterfly and alter the microclimate for the eggs and larvae of the endangered butterfly.

All this leads to the loss of host plants and the decrease in the success rate of the Lange’s metalmark butterfly. The increase in vegetation supplies fuel for wildfires that have helped deplete the endangered species on the refuge. The invasive plant

infestation on the refuge also threatens rare native plants, such as the Delta tulle pea (*Lithyrus jepsonii jepsonii*), Mason’s lilaeopsis (*Lilaeopsis masonii*), the Suisun marsh aster (*Aster lentus*), and other native plants found on the refuge.

The mosaic of endangered species and invasive plants on the refuge makes it extremely difficult and time consuming to manage. The refuge staff, with the help of many great volunteers, spend the majority of its time combating invasive plants that are entangled and mixed in with endangered plants and the host plant for the butterfly. They use many methods to battle and control invasive plants, including mowing, weed whacking, careful use of herbicides, prescribed burns, grazing with cattle, and a lot of manual labor.

Next, the Antioch Dunes NWR is planning on setting up more Safe Harbor Agreements with other neighbors, in

**Join Cal-IPC for a
Habitat
Restoration
Workday
at the
Antioch Dunes NWR
Saturday, Feb. 25
10 am - 2 pm
Sign up at
www.cal-ipc.org**

order to better control the flow of invasive species into the refuge and to further expand the available habitat for these three endangered species.

Contact the author at Louis_Terrazas@fws.gov.

...Ann Howald from page 6

produce the original CalEPPC list in 1996 and several updates as new information poured in. After the CalEPPC list was published, agencies immediately used it to prioritize weed control efforts.

“Nothing as complicated and amazing as Cal-IPC would be easy to build. Despite differences, Cal-IPC was achieved, and I’m grateful for the experience of participating.”

Cal-IPC’s next steps

Twenty years ago, the board couldn’t have anticipated the progress that has been made, and could not have anticipated the confluence of the weak economy, funding slashes to government and NGO programs, and global climate change, which all affect the mission of Cal-IPC.

Hope for the future comes from the wonderful people within the organization who have risen to the challenges and have been on the cutting edge of new

technology and resources to further the mission despite these challenges. So far, Cal-IPC has been very successful looking to the future, and needs to continue to adapt to long-term environmental change, to recognize and take advantage of potential streams of financial support, and foster greater collaboration.

Ann hopes everyone will resolve to continue interest and dedication to Cal-IPC in this time of personal financial struggle. Also, “Harness the Boomers!” Baby boomers are retiring, and there is an enormous potential volunteer pool. Be sure to include them and keep them involved. They have much knowledge and power. Ann, too, promises to stay involved.

“Raising awareness and translating awareness into action – that’s what it was all about, and that’s what happened.” Most Californians now understand the threats posed by invasive weeds, and that to protect our state’s biodiversity, education and action must continue.

...Cheatgrass from page 7

To alleviate the continual spread of cheatgrass through ill-advised practices, revegetation BMPs should be designed that are compatible with regional ecology. In the more arid areas of the West, this means minimizing soil disturbance (except to remedy compaction from human causes), eliminating the application of high-nutrient amendments, and selecting native species that best initiate ecological succession.

References

AECOM. 2010. Revegetation Guidance Document for Erosion Control Projects in the Tahoe Basin. Report prepared for the California Tahoe Conservancy, South Lake Tahoe, CA.
McAdoo, J.K., and R. Davis. 2003. Northeastern Nevada Revegetation Guide: Planting Desirable Vegetation to Compete with Invasive Weeds. UNR Cooperative Extension, SP-03-14, Reno, NV.

Julie Etra and Adrian Juncosa are both Certified Professionals in Erosion and Sediment Control.

Adding invasives to environmental education

by Ashley Gilbreath, Bren School of Environmental Science & Management, University of California at Santa Barbara

The Education and the Environment Initiative (EEI) is a landmark piece of environmental education legislation passed in 2003. The goal of the initiative is to bring environmental education to the 6.2 million students in California's public schools. Integration of multiple subjects helps schools with environmental education have higher student grades, higher testing scores, and fewer problems with discipline in the classroom.

Governor Schwarzenegger's support statement for the EEI said, "This nation-leading initiative will not only prepare the next generation to tackle the environmental issues of their day, it will also get your students ready to excel in California's growing green economy." The initiative required the development of a model K-12 curriculum for voluntary use in schools. This curriculum includes all kinds of environmental challenges – including invasive plants.

Cal-IPC evaluated the coverage of invasive species in the curriculum. We've posted a list of the invasive species focused lessons on our website (www.cal-ipc.org/

[resources/outreach/index.php](#)) as a resource for teachers and other educators. There are many lessons ranging from those that briefly cover invasive plants as part of a larger issue to lessons focusing exclusively on invasive species. The curriculum even covers non-native animals as early as the second grade!

Curriculum examples:

- The third grade lesson "Lights, camera, action!" uses invasive grasses to teach about changing habitats.
- The fourth grade lesson "Cultivating California" teaches how the introduction of livestock permanently changed the landscape of California with the introduction of new plants.
- The seventh grade lesson "Changes



in ecosystems" teaches how European beachgrass is invading coastal sand dunes and impacting wildlife.

- The high school biology lesson "Effects of introduced species" teaches the ecological effects of invasive plants, giving four examples.

The California Environmental Protection Agency (Cal-EPA) and partners designed this curriculum to teach students to think critically about the environment. The lessons are meant to teach students how to make

...continued page 12

2012 Field Course Schedule

Cal-IPC Field Courses provide a solid grounding in the tools and knowledge needed to manage invasive plants. Learn from our expert instructors, and work towards your Cal-IPC Trained Wildland Manager certificate. Courses are designed for professional land managers and restoration volunteers. Check our website to learn more about course curricula, habitat restoration workdays and the certificate program!

Register at www.cal-ipc.org, or call us at (510) 843-3902

Ben Lomond (Santa Cruz Co.)

Ben Lomond Conference & Retreat Center
April 24 - Biology & ID
April 25 - Control Methods
April 26 - Mapping

Idyllwild (Riverside Co.)

James San Jacinto Mountain Reserve
June 5 - Strategic Approaches
June 6 - Biology & ID
June 7 - Control Methods



Registration rates

Fees are per day of training

Cal-IPC member: \$155

Non-member: \$175

Restoration volunteer: \$55

Preventing the Introduction and Spread of Invasive Plants

Best management guidelines for land managers, aggregate production, maintenance operations and construction.

- Exeter: Jan. 26; 11 a.m. - 4 p.m.
- Los Angeles: March 8; 10 a.m. - 3 p.m.
- Sonora: April 9; 10 a.m. - 3 p.m.
- Truckee: May 2; 10 a.m. - 3 p.m.

Register and find agenda at:
ucanr.org/registration2012preventionworkshops

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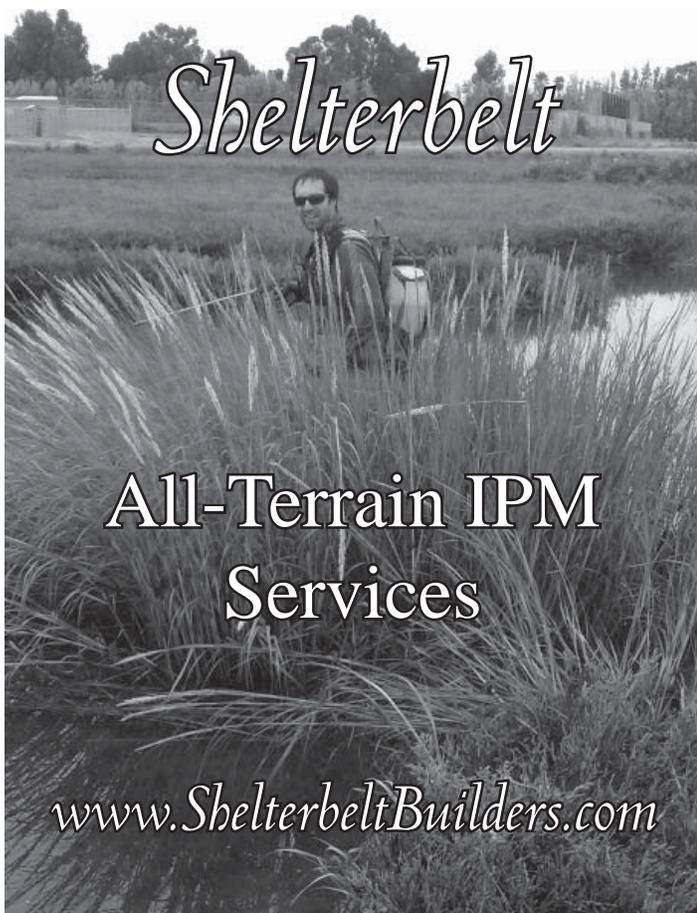
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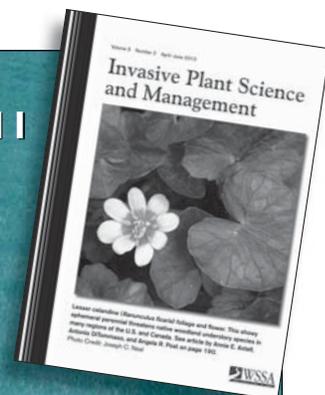
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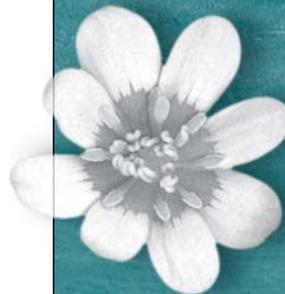
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...Education from page 10

evidence-based judgments. According to Phil LaFontaine of the Department of Education, "The overarching theme of this curriculum is the interactions and interdependence of human societies and natural systems." Teaching in this style provides an opportunity for students to apply what they learn in school to real life problems. This kind of critical thinking is another reason students who participate in environmental education do better in school.

The lessons meet California academic content standards by integrating subjects like history, reading, and science together. In fact, the EEI curriculum is so well designed that the State Board of Education certified it in 2010 – making

it the first state certified environmental curriculum in the country!

It is our hope that the EEI curriculum will make environmental problems like invasive plants common knowledge among the general population. Education is essential to making invasive plants a mainstream part of life. Students will not only learn themselves but will take knowledge about invasive plants home to their families. This cascade of knowledge might make a difference in everyday decisions – from what garden plants to buy to where they buy firewood.

Unfortunately, the program needs more funding to meet its goals. Despite suffering huge funding cuts Cal-EPA is ambitiously continuing their planned rollout of curriculum to public schools. In fall 2010 they embarked on a campaign

to raise \$22 million. Part of this funding will go towards printing the EEI materials for teachers and students and training for teachers. This campaign has resulted in several successful partnerships. The Semptra Energy Foundation provided a \$50,000 grant for the Santa Monica-Malibu Unified School District to implement the curriculum. In Manteca, teacher training was funded by the locally based American Modular Systems.

You can help to support the EEI curriculum by spreading the word to educators and supporting state funding for the program. If you help run an environmental education program check out the EEI website (www.calepa.ca.gov/education/eei) and make sure your program meets their environmental principles.

Thank You for Supporting our Work!

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Your tax-deductible donations are extremely valuable in supporting our programs. Thank you!

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New Members

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

Leif Bryant (Napa County Flood Control), **Arlene Hopkins** (Arlene Hopkins & Assoc., Santa Monica), **Sabrina Hopton** (McKinleyville), **Wendy Horn** (Palmdale), **Shawn Horne** (Napa County Flood Control), **Art Janke** (City of Walnut Creek Open Space District), **James Rexroth** (San Joaquin County Parks & Recreation), **Patrick Reynolds** (H.T. Harvey & Assoc., Davis), **Victor Schaff** (S&S Seeds, Inc., Carpinteria), **Kathy Van Zuuk** (USDA Forest Service, Colfax), **Nancy VanAntwerp** (Carpinteria), **Connie Varnhagen** (Edmonton, Canada), **Brian Werner** (Three Rivers), **Jacob Whall** (Pacific Restoration Group, Inc., Perris)

Building on our past to enhance the future

by Mike Bell, Cal-IPC Student Chapter Co-Chair, UC Riverside

At the 2011 symposium, the Cal-IPC Student Chapter gathered with alumni, Cal-IPC board members, and land managers to discuss development over the past four years and a plan to expand in the future.

Past

The Student Chapter was founded and has actively participated in Cal-IPC activities since 2007. During the first few years, students from the University of California, Riverside, reached out to graduate students and other academic members of Cal-IPC to promote communication between students and professionals working on the control of invasive plants.

We built a strong base of students from institutions across the state who participate in outreach activities and weed removal days. These events have allowed students to trade knowledge on the impacts of invasive plant species with the public and local land managers. The southern California branch of the Student Chapter has worked closely with local Weed Management Areas (WMA), to procure funding to create and purchase educational materials to present to the public at local plant sales, Earth Day events, and Cal-IPC Speaker's Bureau talks. Associating with WMAs provided us with the resources needed to develop outreach materials consistent with Cal-IPC's mission, which students could easily modify for their own region.

Present

This year we expanded our goals, and have begun to create partnerships with land managers to provide students with an opportunity to learn some of the details of day-to-day and long term management of invasives; skills not taught within a normal graduate program. In April 2011, we were hosted by the Catalina Habitat Improvement and Restoration Program from the Catalina Island Conservancy.

Over the course of our three-day trip, we were given a tour of the island, educated on their diverse methods of weed treatments, surveyed the protected native flora for sensitive species, and treated multiple invasive species populations. It was a great experience for all students who attended. We also learned the use of GIS to map the spread and control of species, how to mix and apply herbicides, and came away with a general sense of the time and resources it takes to fight the spread.

We are going to continue our weekend weed program this March with a trip to Joshua Tree National Park. Students interested in attending the weekend should contact us as soon as possible.

Once back on the mainland, we have been working to update an educational brochure on the most prolific invasive species within the Santa Ana River watershed. Using knowledge we gathered for public outreach events, we were able to help describe and provide clear images to help the public identify each species. The updated brochure is available for download on our website and available to partners for future outreach.

Future

One of the main objectives identified at the symposium was the need to get more students involved with Cal-IPC and more of them educated on the opportunities that exist within invasive plant science. Up to this point, the Student Chapter has focused our attention on current graduate students and motivated



Cal-IPC Student Chapter members pull New Zealand spinach with Tony Summers of CHIRP along the coast of Catalina Island.

undergraduates. As we grow, we intend to expand our reach to link current students with each other, and to connect students with information about how they can expand their research projects through grants. We also want to link prospective students with current research on the spread and control of invasive plant species.

In order to do this, we are in the process of transforming our website to not only contain educational materials and information about outreach events, but also to guide students towards internships, research grants, and graduate programs. Getting students familiar with Cal-IPC prior to starting a graduate program will introduce them to our community early and will help fulfill the research needs of new and spreading species. We want the information on our site to be fluid and up to date, so if you know of opportunities that students would be interested in, please let us know and we will add them.

If you would like more information about the Cal-IPC Student Chapter, or are interested in keeping up-to-date on events, visit our website at calipsc.org or 'Like' our Facebook page at www.facebook.com/calipsc.

Readings & Resources

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

Jepson eFlora

The Jepson eFlora parallels the second edition of *The Jepson Manual, Vascular Plants of California*. The eFlora includes all of the taxonomic treatments of the print Manual and in addition to treatments for taxa that were excluded from the print Manual because of doubts about naturalization status. It includes interactive distribution maps linked to specimen data from the Consortium of California Herbaria. The eFlora is linked to numerous electronic tools through the Jepson Online Interchange.

ucjeps.berkeley.edu/IJM.html

Benefits of Rangelands

“Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps” is a synthesis of rangeland-related literature. It provides information to guide the development and assessment of management practices and conservation programs on rangelands. It assesses the effectiveness of seven NRCS-recommended rangeland conservation practices: prescribed grazing, prescribed fire, brush management, range planting, riparian management practices, wildlife management practices, and invasive plant management. Also assessed were a landscape approach to

rangeland conservation, and a social and economic assessment of rangeland conservation practices. www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/?&cid=stelprdb1045811

National Forest Foundation grants

The National Forest Foundation is currently soliciting proposals for its Matching Awards Program (MAP), that provides matching funds for direct on-the-ground and citizen-based monitoring projects benefitting America's National Forests and Grasslands. MAP funds can be used to support conservation and restoration projects benefitting wildlife habitat, recreation, watershed health, and community-based forestry. Deadline: July 2, 2012. www.nationalforests.org/conservation/grantprograms/ontheground/map/application

SF Bay Restoration

The online journal *San Francisco Estuary and Watershed Science* has published a special two-part issue on “Ecology and Regional Context of Tidal Wetlands in the San Francisco Bay National Estuarine Research Reserve”. These open-access articles address estuarine ecology, the history and future of restoration in San Francisco Bay, and the possible effects of climate change on the Bay and Delta. www.escholarship.org/uc/jmie_sfews

Wildlife and Climate

The Food and Agriculture Organization of the UN published, “Wildlife in a Changing Climate” describing consequences of climate change on wildlife, as well as potential conservation measures to adapt to climate change, including

restoring and adopting landscape approaches. The report also calls for developing and communicating information on the value of species and ecosystems to humanity, describes the role of protected areas, and discusses mainstreaming biodiversity needs. www.fao.org/forestry/30032-043e91af6fddb0d073537f6249fd0cc2e.pdf

Bridging the Gap

The *Journal of Applied Ecology* has launched a major new initiative to bridge the gap between applied ecological research and practical environmental management. “Practitioner's Perspectives” provide a platform for individuals involved in hands-on management of ecological resources to explain what is needed to ensure effective take-up of the results of research.

www.journalofappliedecology.org/view/0/PractitionersPerspective.html

International Proceedings

Proceedings from the 2nd International Workshop on Invasive Plants in the Mediterranean Type Regions of the World, held in Trabzon, Turkey, are now available. The conference included participants from 29 countries. (See page 168 for an article from California.) archives.eppo.org/MEETINGS/2010_conferences/mediterranean_ias.htm

Smartphones

Interested in smartphone applications for tracking invasive species? The National Invasive Species Information Center has a new page devoted to these tools. www.invasivespeciesinfo.gov/toolkit/monitoringsmart.shtml

...CalWeedMapper from page 5

and the public. Attendees agreed that outreach and education can and should continue through WMA partners. For instance, *Linaria genistifolia* ssp. *dalmatica* (Dalmatian toadflax) has been spread unknowingly by gardeners in the Tahoe region, but an outreach and education campaign has increased the number of reported populations as El Dorado residents have begun looking for the plant. Another ornamental plant, *Sesbania punicea* (red sesbania) is moving toward

the region from the west and represents an opportunity to engage the public in surveillance and wise plant selection for landscaping.

Working at the level of multiple counties was a larger scale than what most people were used to, and it provided a chance for attendees to devise new ways to work together, whether for on-the-ground projects or joint outreach and education projects. Identifying surveillance and eradication targets in the region helped participants put their minds together and think about where limited funds can make

the largest difference in the future.

Contact Cal-IPC Science Program Manager Elizabeth Brusati (edbrusati@cal-ipc.org) or Mapping Program Manager Dana Morawitz (dfmorawitz@cal-ipc.org).

Funding provided by USDA Forest Service, California Department of Food and Agriculture, California Landscape Conservation Cooperative, National Fish & Wildlife Foundation, Resources Legacy Fund, and Richard and Rhoda Goldman Fund. Cal-IPC is an equal opportunity provider.

THE WILDLAND WEED CALENDAR

February - April

National Invasive Species Awareness Week
February 26-March 3
Washington, D.C.
www.nisaw.org

Western Society for Weed Science Mtg
March 12-15
Reno, NV
www.wsweedscience.org

California Invasive Weeds Awareness Day
March 14
Sacramento
www.cal-ipc.org

Western Aquatic Plant Mngmt Conference
April 2-4
San Diego
www.wapms.org

Noxious Weed Short Course
April 16-19
Loveland, CO
www.wsweedscience.org

Cal-IPC Field Courses
April 24-26
Ben Lomond, Santa Cruz County
www.cal-ipc.org/fieldcourses

May - July

North Bay Grasslands Symposium
May 4-6
Sonoma County
www.cnga.org

SERCAL's Annual Conference
May 15-17
UC Davis
www.sercal.org/conference.htm

Cal-IPC Field Courses
June 5-7
Idyllwild, Riverside County
www.cal-ipc.org

Invasive Plant Short Course
June 26-28
North Platte, NE
ipscourse.unl.edu

N.A. Congress for Conservation Biology
July 15-18
Oakland
www.scbnacongress.org

Aquatic Plant Management Society
July 22-25
Salt Lake City, UT
www.apms.org

August & beyond

Ecological Society of America Annual Mtg
Aug 5-10
Portland, OR
www.esa.org/portland

Cal-IPC's 21st Annual Symposium
October 10-13
Rohnert Park, Sonoma County
www.cal-ipc.org

Global Herbicide Resistance Challenge
February 19-22, 2013
Perth, Australia
www.herbicideresistanceconference.com.au

Quotable

“Your jaw drops at what’s going to happen. The weeds don’t stop.”

~ Lars Anderson of the U.S. Department of Agriculture’s agricultural research service, referring to the alarming rate of spread of South American spongeplant in “New Delta invader, spongeplant, threatens to clog waterways, pumps”, *Contra Costa Times*, December 20, 2011.

“Nature doesn’t have a direction, function or purpose. Humans decide that. It’s up to us to decide what we want nature to be like...”

~ Ecologist Mark Davis in the *Leaf Litter* newsletter, www.biohabitats.com, Winter 2011. He continues, “The field of invasion biology isn’t going to exist in several decades. This native vs. non-native notion is not going to hold up. Our biota will be such a mixture of long term and recently arrived species, and for the people who grew up with this mixture, it’s going to seem ridiculous to continue to characterize some species as native and some as not.”



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

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

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