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*Protecting California's environment and
economy from invasive plants*

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On the cover:

A volunteer hikes across rough terrain to assist the U.S. Fish and Wildlife Service in the eradication of New Zealand spinach (*Tetragonia tetragonioides*) from the Farallon Islands National Wildlife Refuge, to protect seabird nesting sites.

Photo: Aaron Echols

FROM THE DIRECTOR'S DESK

Glyphosate, Nelroy, and Cal-IPC

By Executive Director Doug Johnson

Is Roundup killing people with cancer, or are trial lawyers taking advantage of junk science to sue Monsanto? The debate is more than philosophical and political — on a practical level, it is affecting the ability of natural lands stewards to control weeds in some communities in California.

The preponderance of scientific data does not show human health concerns from glyphosate, the active ingredient in Roundup. Based on this data, Cal-IPC's current policy is that glyphosate can be used safely as part of an integrated pest management (IPM) approach to wildland weed control.

That said, we need to ensure that our government agencies and research community are diligent in studying ecological and human health impacts of synthetic chemicals in the environment. And while herbicide use for wildland restoration is small in scale relative to agricultural (or even residential) usage, we can still be vigilant about using herbicide judiciously as one tool in the IPM toolbox.

To that end, Cal-IPC has received a grant from the California Department of Pesticide Regulation to compile best practices for non-chemical invasive plant control. In collaboration with the University of California's IPM Program, Cal-IPC will collect expert knowledge from land managers across the state to develop guidance regarding which non-chemical methods work best in which situations.

We will build an online decision-support system to serve land managers. A complementary document will provide

a summary for decision-makers with limited land management experience, summarizing the factors that go into selecting effective methods for weed control. Comparisons between different methods (including chemical methods) will clarify trade-offs in efficacy and cost at different scales.

In this issue of *Dispatch*, Joe DiTomaso writes in remembrance of Nelroy Jackson, who passed away earlier this year. Nelroy was a unique voice in the wildland weed

management community. He worked for Monsanto and was an unabashed supporter of herbicides. He also found common cause with environmentalists working to control wildland weeds, dedicating himself to bringing stakeholders together to coordinate in a variety of settings.

Over the years, Cal-IPC has been painted by some as being "in the pocket

of the herbicide industry" because of Nelroy's involvement in the early days of the organization. Some have taken their suspicions farther, weaving Nelroy into a broader conspiratorial web that calls into question the ecological relevance of invasive species themselves.

I welcome constructive critique, but these views miss the mark. I have great trust in the individual and collective intelligence of diverse scientists and land managers throughout the stewardship community. The energy at the Symposium in November was indicative not of blind ideology but of a passion for investigation and learning. In this passion lies hope for the future.

**We need to ensure
that our government
agencies and research
community are
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ecological and human
health impacts of
synthetic chemicals
in the environment.**

CAL-IPC UPDATES

Symposium in Monterey – 450

attendees made the 27th annual Symposium our largest ever. See photos, page 8.

AB 2470 – The bill was approved by the state legislature and signed into law by Gov. Brown at the end of the session, codifying the state's interagency coordinating council. A budget request provided \$2M for weed management to the California Dept. of Food & Agriculture, which is considering how best to move forward with reviving programs that have been mostly dormant since 2011. cal-ipc.org/AB2470.

Invasive sea lavender – After our third year of removal efforts across San Francisco Bay, *Limonium* cover at some major sites has been reduced by more than 90%. We are beginning to map smaller populations at less accessible sites. cal-ipc.org/projects.

Arundo mapping – Based on our mapping of giant reed across the Central Valley, we are assessing impacts to water resources and wildlife while working with local partners to design, permit, and fund watershed-scale removal projects. cal-ipc.org/projects.

Wildland Volunteer Network –

Trainings for volunteers will be held this winter and spring around the SF Bay Area, including some for local conservation corps members. cal-ipc.org/wvn.

OTHER NEWS

Biodiversity Initiative – Gov. Brown signed an Executive Order directing state agencies to protect California's diverse natural heritage, including control of invasive species. gov.ca.gov/press-releases/9/7/18.

Parks FONSI – The National Park Service has prepared a Finding of No Significant Impact (FONSI) to complete its conservation planning process for the Redwood National Park and Santa Monica Mountains National Recreation Area Invasive Plant Management Plan Environmental Assessment. nps.gov/redw and nps.gov/samo.

Tree pest – The spotted lantern fly from Asia was found in Pennsylvania in 2014. It will damage California trees if it makes its way here. It likes tree-of-heaven; so if you work on *Ailanthus*, keep your eyes peeled.

Wildland Weed News

NECIS letter – The National Environmental Coalition on Invasive Species (in which Cal-IPC participates) wrote in support of Sen. Kirsten Gillibrand's reintroduction of the "Invasive Fish and Wildlife Prevention Act" (S. 3210) to formalize US Fish & Wildlife Service's regulatory power for addressing invasive species.

USGS list – The US Geological Survey has published the "First comprehensive list of non-native species established in three major regions of the United States," a report and dataset covering Alaska, Hawaii, and the lower 48 states. sciencebase.gov.

IPM Road Map – Federal agencies produced the first update since 2013 of the National Road Map for Integrated Pest Management (IPM). usda.gov/media/press-releases/10/24/18.

Ballast water – Great Lakes advocacy groups and others successfully advocated for putting ballast water rules, resisted by shipping interests, back into the U.S. Coast Guard Authorization Act, which was recently passed by the U.S. Senate.

Pet problems – Release of unwanted pets is the top mechanism for introduction of non-native reptiles and amphibians. A recent paper discusses the biological

cal and economic reasons.

Journal of Applied Ecology 8/21/18.

Snakes adapt – Studies of Burmese pythons in Florida show that parts of their genome have changed significantly since an extreme freeze event in 2010, providing evidence of evolution occurring over a short time period. ScienceDaily.com 10/19/18.

South Africa report – A report has been produced on the status of biological invasions in South Africa and the efficacy of management strategies. sanbi.org and *Nature* 11/6/18.

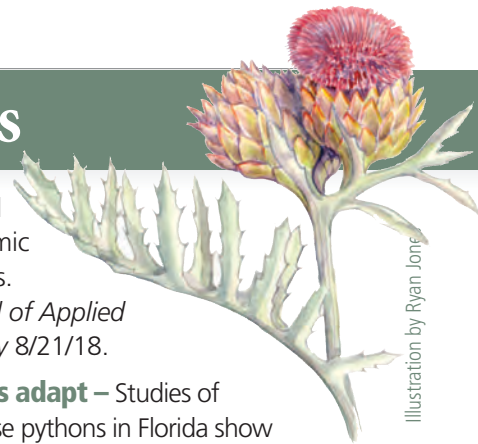
Island ants eradicated – Australia declared eradication success of the invasive African big-headed ant from Lord Howe Island, helping to protect endangered wildlife at the World Heritage site. csiro.au/en/News 11/7/18.

YOUR MEMBERSHIP

Thank you for keeping your membership current. Note that your expiration date is shown on the mailing label of this newsletter.

Welcome Jutta C. Burger!

In October, we welcomed past Cal-IPC Board President Dr. Jutta C. Burger to our team as Science Program Director. Jutta has 23 years of experience working in California wildland ecosystems and a passion for protecting them. Previously, she served as Managing Director of the Science and Stewardship department with the Irvine Ranch Conservancy in Orange County, overseeing natural resource programs, including landscape-scale invasive plant management, tree pest management, large-scale restoration and native seed farming, wildlife camera trapping, and butterfly monitoring. She also served on the OC-CNPS Chapter Board and supported its leading work on locally emergent invasive plant species. Jutta completed her dissertation and post-doc at UC Riverside and University of Georgia, respectively, on the origins and evolution of traits favoring invasiveness in crop plants and their wild relatives. Prior to that, she conducted vegetation and arthropod surveys in coastal sage scrub with UC Riverside's Department of Entomology, where she observed first-hand the impacts of native type conversion to invasive annual cover on biodiversity and fire patterns. Jutta is excited to apply her experience to strengthening and expanding Cal-IPC's science programming and development of decision-making support tools for use across the state. In her spare time, Jutta enjoys hiking, botanizing, native plant gardening, insects, and supporting organizations such as Cal-IPC, Calflora, and the California Native Plant Society. We are very excited to have her join us!



Invasive species management in Lake Tahoe

Nicole Cartwright, Tahoe Resource Conservation District
and Doug Johnson, Cal-IPC

Lake Tahoe is world-renowned for its clear, blue water. Over the past 10 years, Eurasian watermilfoil and curlyleaf pondweed, two aquatic invasive plants, have been spreading in the lake. Watermilfoil and curlyleaf pondweed clog marinas and nearshore habitats as their roots attach to the bottom substrate. Curlyleaf pondweed can also grow in deeper, open water. Invasive Asian clams have also been found in the lake in recent years.

In 2007, as awareness of aquatic invasive species expansion grew, 40 public and private groups collaborated to form the Lake Tahoe Aquatic Invasive Species Coordination Committee (LTAISCC). Local agencies realized that invasive species could have devastating impacts to the lake, as well as docks, water pipes, filtration systems, piers, ramps, and boats, posing serious threats to the ecology, recreation, infrastructure, and economy of the Lake Tahoe Basin. In 2009, the LTAISCC developed the first Lake Tahoe Aquatic Invasive Species Management Plan. The bi-state regulatory Tahoe Regional Planning Agency (TRPA) and Tahoe Resource Conservation District (Tahoe RCD) coordinate on implementing the plan, which lays out critical needs for prevention, control, and detection.

Aquatic invasive species are notoriously difficult and costly to control once they become widespread. So far, the strategy for Lake Tahoe has demonstrated effectiveness in controlling satellite infestations. This effectiveness is giving partners hope for their ability to protect the lake in the future.



Field tests of the ultraviolet-C (UVC) light rig used to treat invasive plants.

Prevention: Watercraft inspections

This year marks the 10th anniversary of Lake Tahoe's Watercraft Inspection Program. Under the program, every motorized watercraft is inspected to ensure it is free of aquatic invasive species (AIS) before launching at Lake Tahoe. Thanks to diligent boaters and watercraft inspectors, no new aquatic invasive species have been detected in Lake Tahoe since the program began 10 years ago.

All watercraft are required to be inspected prior to launching in Lake Tahoe. Of the nearly 8,000 vessels watercraft inspectors have examined this boating season, 56 percent of them arrived clean, drained, and dry, a percentage that continues to increase each year. This trend is important, as it demonstrates behavior change by the boaters who are making a conscious choice to help prevent the spread of AIS. However, 11 vessels were still found carrying

invasive mussels and 40 more harboring other species. These numbers exemplify the value of the program, and the thorough work by inspectors. Each fouled vessel was decontaminated prior to launching in Lake Tahoe. (Decontamination fees apply for watercraft that are not clean, drained, and dry.)

The largest number of decontaminations occur on vessels containing standing water, which can contain unwanted seeds, plant fragments, or microscopic larvae. This July, Tahoe RCD watercraft inspectors intercepted a boat coming from the Eastern U.S. with adult quagga and zebra mussels, aquatic vegetation, New Zealand mudsnails, and multiple other species inside the pontoon system.

"This incident is the perfect example of how boats play a

role in transporting aquatic invasive species," said Christopher Kilian, program manager at the Tahoe RCD. "It highlights the importance of being diligent when practicing *Clean, Drain, and Dry* techniques before travelling to a new location."

Information on how to clean, drain, and dry a vessel and prepare for a watercraft inspection can be found at www.TahoeBoatInspections.com. For non-motorized watercraft preparing to boat in the Lake Tahoe Region, visit www.TahoeKeepers.org to learn more.

Control: Bottom mats and UV light

The primary approach for controlling aquatic weeds already established in Lake Tahoe has been a combination of bottom barriers (mats that lay on top of vegetation) and diver-assisted suction removal. The need for concerted control efforts became urgent as surveys found twice the

acreage (6 acres) of invasive plants in 2010 as had been known in 2008. Infestations in iconic Emerald Bay, where watermilfoil was first spotted in 2000, were fully removed by 2014. The success from Emerald Bay work has since been replicated around the lake at several other locations with small populations. But larger populations are more troublesome.

Since 2005, the control program has removed over 32,000 gallons of aquatic invasive plant biomass. To date, over 60 acres of Lake Tahoe and the Truckee River have been treated by the aquatic invasive plant control program.

2018 control sites included Fleur du Lac, Tahoe Vista, Crystal Shores, Lakeside Marina, Elk Point Marina, and the Truckee River stretching downstream of the dam. Funding comes from a mix of sources, showcasing the importance of public-private partnerships. For example, Elk Point Marina work is supported by the Elk Point Country Club Homeowners Association, complemented with funds from the Nevada Division of State Lands.

New research at Lake Tahoe shows that ultraviolet-C (UVC) light could be an effective method to control aquatic invasive plants. UVC light works by damaging the DNA and cellular structure of invasive plants, causing it to die back. The approach has been tested in lab studies and small field tests in Lake Tahoe, with results due in 2019. Ultraviolet light could augment the currently available methods Tahoe RCD already uses, especially in low-water years, in tight spaces within marinas, or in river systems.

"We are thrilled to be a part of such an exciting project that demonstrates the innovative impact technology can have on the environment and our community," said Amy Berry, CEO of the Tahoe Fund, which along with the California Tahoe Conservancy, is helping to pay for testing the UV tool.

Tahoe RCD anticipates continuing aquatic invasive plant control work in Lake Tahoe and the Truckee River. With the success in Emerald Bay and new tools, partners are cautiously optimistic they can keep current infestations to low numbers and maybe fully eradicate them.



Asian clam bed on the East Shore of Lake Tahoe.

Detection: "Eyes on the Lake"

Those who recreate in, on, and around Lake Tahoe are well-positioned to see new infestations of aquatic weeds. Because the lake is devoid of aquatic vegetation other than these weeds, they stand out as something that should not be there. As people kayak and paddleboard around the shoreline's "water trails" taking photos of the lake's remarkable clarity, they can also take photos of any suspect invasive plants and report it.

The League to Save Lake Tahoe got the idea for a community monitoring program that would encourage recreationists to "Protect While You Play" and worked to pull together a smartphone app, a video, and web content for sites catering to visitors. The program is entirely funded by members of the League and, since its inception in 2013, has been a free program for anyone interested in participating, including staff from many Tahoe marinas. They started collecting reports five years ago, and this year they have received 198 reports. In addition to sightings, they collect reports of 'absence'—when no weeds are found in a location.

Jesse Patterson, chief strategy officer, of the League says, "We have regulars now who treat it like a treasure hunt, an excuse to go explore different areas and look closely to see what's there and what's not. It really captivates some people who love getting out on the lake."

Eyes on the Lake is a great way for



Diver-assisted suction removal of Eurasian watermilfoil in Truckee River.

anyone that enjoys Tahoe's waters to gather important data to inform management efforts. "We have seen the program really take off with everyone from the dedicated local who surveys their favorite spot regularly to visitors who are only in Tahoe for a few days," Paterson says. Five previously unreported infestations have been found by community members having fun on the Lake.

The work in Lake Tahoe shows the power of integrating key program components — prevention, control and detection — through coordinated regional efforts. The LTAISCC have demonstrated success in removing satellite populations, keeping new invasive species out of the lake, and engaging the community to help with detection. Just as important, they have involved a range of public and private funders in supporting the effort. We can look to the partnership protecting Lake Tahoe from aquatic invaders as a strong example of what can be accomplished with resources, focus, and coordination.

All photos courtesy of the Tahoe Resource Conservation District

Training youth stewards with Golden Gate National Parks Conservancy

Sue Gardner, Park Stewardship Program Director, Golden Gate National Parks Conservancy
and Claire F. Meyler, Cal-IPC



A LINC intern helps with propagation efforts at the Presidio Native Plant Nursery.



LINC Participant Dana helps to improve red-legged frog habitat in the ponds at Mori Point.



LINC Participant Susu helps collect data for a bee pollination study with the Marin Municipal Water District.

California's strength lies in its diversity – both biological diversity and cultural diversity. To protect our wildlands into the future, we need to reach out and connect with youth while increasing our own relevancy to the communities that surround us. The Golden Gate National Parks Conservancy (GGNPC) in San Francisco is passionate about teaching future generations of land stewards through engaging, immersive learning experiences. Programs are designed to make the park experience relevant and accessible for all communities, including groups who may have limited access to open spaces. Sue Gardner, Director of Park Stewardship, shares insight into their award-winning programs, and offers tips for organizations looking to expand and diversify youth stewardship opportunities.

The Parks Conservancy runs many youth programs — from one-day educational experiences to summer camps to leadership opportunities — driven by a core belief that everyone has the potential for a deep connection to nature. For those lacking in exposure or experience, our youth programs work to ignite that passion. Connection is the starting place for stewardship, which then builds toward service. Our youth programs work at every level, with an initial focus on expanding this core connection and relationship.

To support the participants in each experience, we create a culture that sustains youth development. Our staff is trained on how to be a successful mentor to youth participants. We have created a work place and environment that values and celebrates youth participation, making them feel welcomed and valued. We hire talented Youth Program leaders who employ a youth development approach to support participants, including: insuring a sense of safety, creating a trustful and non-judgmental environment, and allowing the ability to exercise their own initiative. All our youth programs are infused with a healthy dose of environmental education, helping them understand the whole system and the threats. The desire to support these restoration sites comes more naturally if our youth understand the urgency and need. We have also found it helpful to partner with other groups, like environmental clubs, that are already oriented towards the kind of work we do.

Youth Leadership

One of our most popular and longest-running leadership programs is the Linking Individuals to their Natural Community Program (LINC), a summer internship for 40 high school students offered in partnership with the National Park Service, and the One Tam partners (in Marin). The

six-week summer program starts with a 4-day camping trip, immersing the youth in outdoor adventure, play, and exploration, while building social connections between the group participants. We have found that connecting to nature while connecting to others doubles the impact. Socially, the youth prefer to work as a team, and that is how we have organized the program. Having the support and understanding of others they can relate to amplifies the experience.

After the camping trip, students assist with service projects, gain career and leadership skills, and take field trips to special park sites including Alcatraz and Muir Woods. Projects and activities vary by week and include trail work, plant propagation, and habitat restoration. Those who complete the program receive a \$1,000 stipend and gain the opportunity to return the following summer in an advanced internship that helps to strengthen their knowledge and skills.

LINC participants complete survey evaluations before and after the program, to measure changes in attitude and behavior. In a final survey, we ask if they will return to the parks, participate in programs, and bring their family. We consistently have over 90% of the youth report “yes” to these survey questions. One of the most telling indicators of



The LINC team helped trail crews install trail fencing in the San Francisco Presidio

success, however, is if they return to our regular volunteer program or come back the following year as an advanced intern.

The selection process for LINC program participants involves a careful look at candidates. We try to consider which youth will gain the most “lift” from participation. We look for individuals that have not necessarily had as many opportunities as their peers but have great potential. We prioritize individuals who want the opportunity, not just those who are applying because their parents think it is a good idea, or because they want something on their resume. Most essential is a predisposition towards teamwork. The group of 20 spends all their time together for 6 weeks. We strive to build a diverse team, balancing a mix of cultural backgrounds and experiences. Prospects with little exposure and great enthusiasm can pair well with prospects that have much more experience and are good team players. If we get the mix right, the students will learn as much from each other as they do from the team leaders.

When it comes to weed management, we work to build an understanding in a much larger context. In all our programs, youth and adults, we strive to build an understanding of the full ecology of the area, the values and threats. Once individuals understand the threat, and the impact of their

service and support, they are much more enthusiastic about volunteering (whether it be pulling weeds, planting, or monitoring progress). Rather than focus on the idea of “invasives” (terminology that can be off-putting to the casual learner or to immigrant families), we talk about what we value, and the importance of diversity. Then we explain how natural biodiversity is threatened by wildland weeds, and the need to restore balance.

Expanding your program

If land management agencies or organizations are looking to engage diverse youth in their projects, there are several key steps to success. Pivot your internal culture so youth engagement, diversity, and inclusion become a core value and focus of the work. Invest resources and energy to creating youth programs and pathways. Some of this can be accomplished by partnering with other youth focused organizations,

and some can happen within your own organization or agency. We started with small pilot programs, funded from a variety of sources, and then expanded outward.

To keep programs running successfully, hire talented and diverse youth program managers that are knowledgeable about ecology and passionate about the environment. Alternatively, you could discover a person on your team who is passionate about youth engagement and eager to learn and give them the space to be creative and try new programs. Create an authentically welcoming environment in your office space and restoration sites. Build on your strengths to offer more education programming that inspires service. And, of course, it helps to provide delicious food and fun stories at your restoration events!

Looking to the future

We have a duty to teach and guide the next generation of land stewards. With the impacts of climate change, our youth are inheriting an environmental crisis. They will not have the luxury to ignore or deny this challenge, and the costs will be enormous to the environment and human health. Providing them with the knowledge and tools to adapt to this challenge and manage forward is critical. The onus is on us — the current ecologists, scientists, and practitioners. We need to invest time and resources to reach out and engage the next generation of open space advocates and land stewards.

The capacity for environmental connection and action is embedded in all of us — we just need to light the embers. And in doing so, we need to engage a much broader cross section of youth, so that the demographics of those who actively engage in land management actions mirrors the changing demographics across the state of California. We’ve had many successes on a small scale. Now is the time to take what we have learned and apply it on a much larger scale. If we rise to the challenge, the impacts will be transformative.



LINC youth assist with a trail project in the Marin Headlands

All images courtesy of GGNPC

2018 SYMPOSIUM IN PHOTOS

In early November, nearly 450 land managers, researchers, and conservationists gathered in Monterey for the 27th annual Cal-IPC Symposium. The theme of the Symposium was “BioDiversity: Expanding Our Vision.” Over four days, we shared the latest in invasive plant biology and management with talks, posters, training, discussion groups, and field trips. Here are some highlights.



Ron Eby, volunteer and community scientist at the Elkhorn Slough National Estuarine Research Reserve, led field trip attendees on a kayak tour of the slough's diverse wildlife and invasive weeds. Below the water, a recovering field of eelgrass has taken root after mechanical removal of European beachgrass and perennial pepperweed from sedimentary soils. In the background, a grove of eucalyptus stands on private property; nearby groves have been successfully removed via cut-stump herbicide application and tarping. Photo: Claire F. Meyler



In a training session, Ted Swiecki from Phytosphere Research demonstrates a technique to test nursery stock for *Phytophthora* species. Photo: Doug Johnson



Martin Genova from the UC Santa Cruz Ecology and Evolutionary Biology Dept., describes his work investigating the conversion of waste eucalyptus biomass into biochar to lock carbon underground. Photo: Claire F. Meyler



Attendees enjoy discussing their land management projects during meals and breaks. Photo: Drew Kerr



During the popular social hour, attendees consider their options at the Auction & Raffle fundraiser. Thanks to our generous donors and guests, we raised \$13,000 for Cal-IPC's work. Photo: Drew Kerr



The Resource Conservation District of Monterey County won Cal-IPC's Organization of the Year award for their work removing *Arundo* from the Salinas River. Emily Zefferman (left) and Paul Robins (right) accepted the award, pictured here with Jason Giessow of DENDRA, Inc. (center). Photo: Paul Robins



Bruce Delgado (left, in white), from the Bureau of Land Management (BLM), gave field trip attendees a tour of restoration efforts on land from the former Fort Ord Military Base, now managed by California State Parks and the BLM. Top threats include: European beach grass, iceplant, jubatagrass, and yellow starthistle. Photo: Dee Shea Himes



California Conservation Corps staff members share their work at a sponsor table. Thirty-nine sponsoring organizations reached a broad cross-section of the land management community, while providing crucial support to this year's Symposium. Photo: Claire F. Meyler



Hannah Wallis (center) of the Monterey County Agricultural Commissioner's office won Cal-IPC's Catalyst Award for her work organizing the popular annual Central Coast Invasive Weeds Symposium. She stands with Commissioner Henry Gonzalez (right) and Assistant Commissioner Bob Roach (left). Photo: Paul Robins



Mike Pitcairn (left), biocontrol scientist with the California Dept. of Agriculture, was this year's recipient of the Jake Sigg Award for Vision and Dedicated Service. He is congratulated by colleague Lincoln Smith of the USDA Agricultural Research Service. Photo: Bobbi Simpson



Sue Hubbard of the BLM at Fort Ord (with Cal-IPC Executive Director Doug Johnson) received the Golden Weed Wrench Award for Land Manager of the Year. Photo: Doug Johnson

Remembering Nelroy Jackson

Joseph M. DiTomaso, UC Davis (retired)

I am sad to say that Dr. Nelroy Jackson, one of the early champions in the fight against invasive plants, passed away on Sunday, July 29, 2018, in Corona, CA. He was 76 years old. He received his Ph.D. in Plant Pathology from Ohio State University in 1970 and worked for Monsanto on herbicide development for most of his career.

Nelroy was the husband of Barbara Jackson, father of Stephen and Evan Jackson, and grandfather to three children. He was very active and well-respected for his work in California and nationally. Nelroy received many awards

in his career. He was a Fellow of the Western Society of Weed Science and received the Presidential Award of Merit. He also received the Outstanding Industry Award from the Weed Science Society of California. In 2007, Nelroy received the Cal-IPC Jake Sigg Award for Vision and Dedicated Service.

I have known Nelroy since my first couple of months at UC Davis in 1995. He was truly dedicated to addressing the issues of invasive plants and was one of the founders of Cal-IPC (then called Cal-EPPC), serving on the Board of Directors for several years. He also helped to start Team Arundo and was part of the organizing committee to establish the California Noxious and Invasive Weed Action Plan in 2005. He was instrumental in helping to set up the National Invasive



Nelroy Jackson (far right) joined Cal-IPC advocacy group at the 2004 National Invasive Weeds Awareness Week in Washington, here with (left to right) David Chang, Bob Case, Steve Schoenig, and Brianna Richardson. Photo: Bob Case



Nelroy Jackson received the Jake Sigg Award for Vision and Service at the 2007 Symposium in San Diego. Photo: Bob Case

Species Advisory Committee in Washington, DC, and served on the committee when it was initiated. It was because of Nelroy that I was selected to that committee a few years later.

There are many sayings used by Nelroy that colleagues still repeat, such as "Do no harm," "Go for the low-hanging fruit," and "Do the do-able." Dr. Nelroy Jackson was a friend of mine for many years, and I was honored to call him that. I think it is fair to say that his legacy will certainly outlive him.

Remembering Jo Kitz

Jo Kitz was a founding board member of Cal-IPC in the early 1990s and continued to be an active Cal-IPC member in the Santa Monica Mountains region where she was long-time Co-Director of the Mountain Restoration Trust (MRT). Jo joined MRT in 1989, and managed the Cold Creek Canyon Preserve and MRT's Commemorative Oaks Program at Malibu Creek State Park. She worked ceaselessly as their 'Intrepid Weed Warrior.'

Jo was a Fellow of the California Native Plant Society and a board member of the Santa Monica Trails Council. In 2004, she was named State Assembly Member Fran Pavley's Woman of the Year. Jo had a lifelong passion for the environment and was a "true eco-warrior," according to Lee Kats, Biology Professor and Provost at Pepperdine University and MRT Board Member. Jo Kitz's colleagues stand in tribute to a remarkable woman.



Jo Kitz led a field trip for attendees of the 2004 Cal-IPC Symposium in Ventura. Photo: Doug Johnson

Municipal compost and wildland weeds

Hilary Near, Recycling Specialist at the City of Oakland and Claire F. Meyler, Cal-IPC

Cal-IPC often fields questions from colleagues and concerned community members. We thought our readership might appreciate the answer to an email we received about proper disposal of invasive plant materials:

We have been removing Cape ivy from some of our sites in Oakland and have questions on the proper way to dispose of the plant materials. Do you know if it is safe to put Cape ivy in the municipal composting facility? Do the compost piles get hot enough to prevent propagation, or is the best practice to seal the Cape ivy in plastic and dispose in the trash?

Hilary Near, Recycling Specialist at the City of Oakland Environmental Services, helped answer this question. She assured us that there is no restriction against placing Cape ivy (or other invasive plants) in the composting collection. To directly answer the question: Yes, the industrial composting process is designed to completely transform the material and eliminate any danger of propagation.

Industrial composting facilities in California most commonly use either static pile or active/turned windrow compost systems. Static pile composting involves creating large, moist piles of evenly mixed compostable material like yard trimmings and branches. To aerate the pile, layers of loosely piled bulking agents (e.g., wood chips, shredded newspaper) are distributed throughout the compostable feedstocks so that air can pass from the bottom to the top of the pile. The piles also can be placed over a network of pipes that deliver air into or draw air out of the pile. Air blowers might be activated by a timer or a temperature sensor. The pile is then covered to retain heat generated by the composting process, and carefully monitored to ensure even temperature.

Aerated or turned windrow



A worker measures both temperature and oxygen at a typical static compost pile. The thermometer is visible. The cables in the foreground are connected to the oxygen sensor inside the compost pile. Photo courtesy of the Sustainable Sanitation Alliance

composting involves forming organic materials into rows of long piles called “windrows” and aerating them periodically by either manually or mechanically turning the piles. The ideal pile height is between four and eight feet with a width of 14 to 16 feet. This size pile is large enough to generate enough heat and maintain temperatures. It is small enough to allow oxygen flow to the windrow’s core.

State-wide operating guidelines dictate temperature regulations for each composting process. Per state regulations, compost operations must demonstrate compliance with the process to further reduce pathogens (PFRP), defined in section 17868.3 of Title 14. The regulations dictate 131 degrees Fahrenheit (55 degrees Celsius) for 3 days for aerated static piles, covered with 6-12 inches of insulating material.

If the facility uses a windrow composting process, active compost piles must be maintained at 131 degrees Fahrenheit (55 degrees Celsius) or higher for 15 days and must also be turned 5 times within the 15 days.

To ensure adherence to these guidelines, compost facilities throughout the state are regulated by CalRecycle, with assistance from the California Water Authority, and the Air Resources Control Board. The US Composting Council



Heavy machinery is used to water and turn windrows at a municipal composting facility. Photo: Erica Pomeroy, for the US Food and Drug Administration

administers an additional Seal of Testing Assurance (STA) Program that further qualifies the suitability of compost products that participate.

The letter writer asked if she should put bagged yard trimmings in Oakland trash containers: the answer is “No.” Alameda

(Continued on page 14)

For more info:

CalRecycle info for compost & mulch producers: <https://www.calrecycle.ca.gov/organics/Processors/>

CalRecycle composting regulations: <https://www.calrecycle.ca.gov/Laws/Regulations/Title14/>

CalRecycle mandatory commercial organics recycling: <https://www.calrecycle.ca.gov/recycle/commercial/organics>

Alameda County Plant Debris Ban Regulation: <http://www.recyclingrulesac.org/ordinance-overview/#plant-debris-landfill-ban-ordinance>

City of Oakland Recycling: 510-238-7283 or www.OaklandRecycles.com

State of Composting in the US (2014 Study by the Institute for Local Self-Reliance): <https://ilsr.org/wp-content/uploads/2014/07/state-of-composting-in-us.pdf>

USCC Seal of Testing Assurance Program: <https://compostingcouncil.org/seal-of-testing-assurance/>

Restoring zombie ecosystems: An interview with Craig Dremann

Doug Johnson, Executive Director, Cal-IPC

"From my own experience restoring grasslands, there's no reason we can't restore a grassland to 100% native cover — with biodiversity — within ten years. When we're already spending money to restore a grassland, it's outrageous that we don't have this as our measure of success. We still have a lot of native diversity in the grassland soil seed bank, like a time capsule in the ground. We may be the last generation with an opportunity to revive it."

Sixty-five-year-old Craig Dremann, a native of San Mateo County on the San Francisco Peninsula, is dedicated to grassland restoration. By his count, he has restored some 800 acres of grassland since 1992, and he is currently working on 100 new acres on 12 properties from Aptos to the Capay Valley north of Winters.

But his approach, and he himself, are admittedly unorthodox. He is not an academic, and he feels that private entrepreneurship can be more innovative than academia when it comes to on-the-ground restoration. His restoration work has occurred mostly on private property and his work has never made it far into the mainstream. But the time may have come for public land managers to give his methods a closer look.

Dremann takes an empirical approach, trialing a range of seed and soil combinations in small plots and tracking the results. "If it doesn't work in a 3-foot by 6-foot test plot, it's not going to work over acres," he says. From his perspective, many grassland management projects over the last 50 years have failed because they decided on an



Craig Dremann monitoring a grassland on the San Francisco Peninsula. Photo: Sue Dremann

approach without initial experimentation, essentially turning the entire project into one big test plot.

Dremann focuses on rebooting the native seedbank rather than "wasting resources on the exotics treadmill" of removing one or more weed species only to see new weeds move in. His approach

employs two simple techniques: mowing with a string trimmer and fertilizing. According to Dremann, this stops production of weed seeds and replaces soil nutrients lost over two centuries of cattle and sheep grazing.

Mowing happens monthly for the first 3-4 years. Dremann explains: "You can start with a solid ocean of wild oats and yellow starthistle, and in the second year you'll begin to notice islands of natives popping up, maybe a few *Stipa* in the spring and perhaps some tarplants and Spanish clover in summer. By the fourth year, you will have an ocean of natives with islands of weed grasses and scattered yellow starthistle. You need to keep coming back to make sure none of your exotics are allowed to make new seeds, and at the end of the season in early October make sure all the weed thatch is cut down to 2-3 inches (but no closer than 2 inches) so it will decay quickly and allelopathic effects will be reduced."

According to Dremann, each plant species has its own unique soil nutrient threshold for seedling survival. He adds fertilizers to increase soil nutrients for the native species he is targeting for recovery. He uses a \$50 soil test from Waypoint Analytical in San Jose to measure soil properties and relies on small demonstration plots to assess what will work best. For instance, comparing soil samples from around a reproducing stand of native grasses to samples from a nearby weedy area can indicate low nutrient levels that are limiting native plant seedling survival.

One of Dremann's most satisfying projects is the revegetation of a 100-mile



Native tidy tips bloomed this April from the seedbank in a Woodside preserve that had been covered by wild oats for four or five decades. Last year, Dremann mowed the wild oats once a month between March and June to get all re-sprouts before seeds matured. Photo: Craig Dremann

stretch of gas pipeline right-of-way along Highway 395, between Susanville and Alturas. He says his work in 1993 resulted in native areas that remain 95% free of the cheatgrass that otherwise surrounds the area, and that his original test plot site has been permanently preserved as a BLM Natural Study Area. He is traveling to Nevada later this year to provide workshops sharing his approach to controlling cheatgrass in the Great Basin.

Another of Dremann's favorite accomplishments is the property owned by Michael Shaw south of Santa Cruz, where 70 acres of grasslands have "gone from 99% weed cover in 1992 to 95% natives today, with over 100 native plant species reappearing, including two new to science." The Shaw project was published as the cover story in the June 2002 issue of the journal *Ecological Restoration*.

On the other end of the spectrum, Dremann is frustrated with what he describes as failures to restore habitat, especially grassland habitat that has been designated as critical for endangered species. Grassland work has persisted on San Bruno Mountain, site of the nation's first HCP in 1982 to protect the Mission blue butterfly, without much progress in his eyes. Similarly, he says that actions taken to restore the endangered Santa Cruz tarplant on the coast — burning, scraping and grazing — have not brought the plant back in significant numbers after 30 years of management.

If Dremann's methods are potentially more effective than business-as-usual restoration, why are they not more widely adopted in public land management? Dremann sees a potential bias in government agencies toward traditional sources of knowledge, like academia, and says that they are risk-adverse to trying something new.

Dremann has an unusual presentation style for ecological concepts. Take his image of "zombie ecosystems," in which native species have stopped reproducing. By studying the "age pyramids" of individual plants within populations, he suggests that most populations of species such as Great

Basin wild rye in Nevada and galleta grass in New Mexico stopped producing seedlings decades ago when soil nutrient levels dropped below the threshold required for seedling survival of those plants. Likewise, many of California's oak woodlands are producing few seedlings, despite abundant acorns.

Another subject that Dremann thinks we should be watching closely is the study of bio-precipitation, an active area of research in atmospheric science. Bacteria blown into the atmosphere become nuclei for ice as part of the process of raindrops forming. Researchers have found that high percentages of snow start with biological ice nucleation.

The main biological agent associated with rain forming has been *Pseudomonas syringae*, better known as a crop pathogen. These bacteria have the ability to cool vapor into precipitation at warmer temperatures than do dust and salt particles. Fungi in the *Fusarium* genus are now being found to play a similar function when they contribute aerosol particles to the atmosphere.

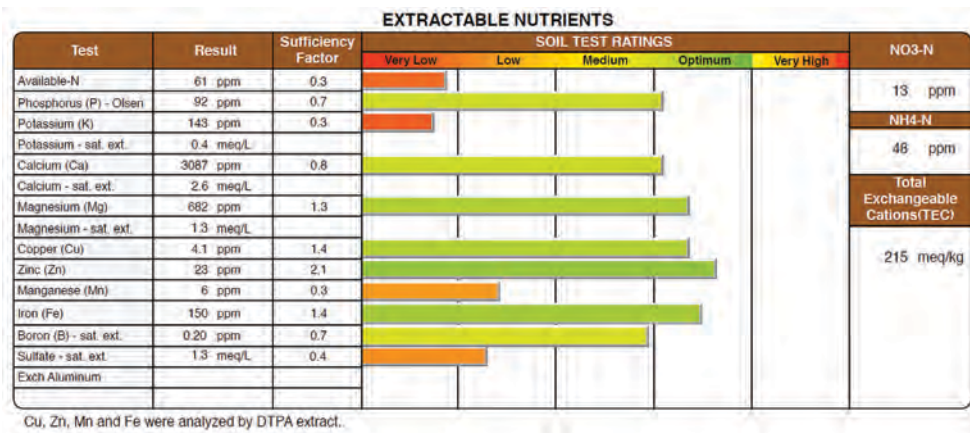
Dremann worries about how the elimination of native grassland and



Revegetation along the 100-mile Tuscarora gas pipeline in Lassen County, where Dremann addressed the cheatgrass problem with local native grass seeds, fertilizers and sawdust. "Twenty-five years later," he says, "local shrubs have moved in, producing a beautiful, diverse, 95% weed-free Great Basin sagebrush habitat." Photo: Craig Dremann

native vegetation understory in California may contribute to increasingly frequent drought. We don't know which of our thousands of native plant species are host plants for *P. syringae*, but Dremann maintains that it's likely that vegetation management impacts precipitation, and warns that we should attend to this if we don't want to "end up like Anasazi or Indus Valley civilizations" that declined due to extended drought.

To learn more about Craig Dremann and his work, visit www.ecoseeds.com/sagefix where you can see his eight steps toward rangeland success, a link to his fertilizer protocol, and the program for his 2019 "SageFix" workshops in Carson City, NV. Craig sets up workshops anywhere in the West where there is demand. Contact him if interested at rwc-seed@batnet.com.



Soil nutrient report from Waypoint Analytical in San Jose. Craig Dremman uses their A17 package, specifying "data only in bar graph."

Restoration funding from Prop. 68

With the passage of Proposition 68 on California's June ballot, new bond funds are coming available through grant programs from the Dept. of Fish & Wildlife, the Wildlife Conservation Board, the Coastal Conservancy, the Sierra Nevada Conservancy and others. Because of Cal-IPC advocacy, the definition of restoration in Prop. 68 explicitly includes invasive species control. Eligible projects include efforts to provide wildlife corridors, protect threatened and endangered species, improve climate adaptation and resilience, steward aquatic and riparian habitats, implement regional conservation investment strategies, protect upper watersheds in the Sierra Nevada and Cascades and more. Consider how your top priority weed management projects meet these goals and apply for funding. If you need help coordinating partners on a regional-scale project, contact Cal-IPC Conservation & GIS Program Manager Dana Morawitz at dfmorawitz@cal-ipc.org.

Proposition 3 on the November ballot, which Cal-IPC supported, did not pass. The bond included \$100 million for invasive plant management that protects water resources.



Municipal compost and wildland weeds

(Continued from page 11)

County has a law prohibiting disposal of plant debris in county landfills. Plant Debris Landfill Ban Ordinance 2008-01 requires landscape professionals, residents, and businesses to separate all plant debris (grass, leaves, shrubbery, vines, and tree branches) from garbage and place in designated composting collection containers. This law applies to any person or organization generating significant amounts of plant debris that hauls the material to Alameda County disposal facilities or places the material in containers for collection, including: commercial and institutional customers (e.g. colleges, hospitals, park districts, golf courses) subscribing to 4 or more cubic yards of weekly solid waste collection service; landscapers and gardeners; and municipalities. Those who haul to their local facility must deposit plant debris in the disposal facility's designated "clean green" area.

The City of Oakland and Alameda County are early-adopters of composting requirements, and the whole state is following suit. Recovering all organic materials to produce compost, fertilizers and biofuels instead of contributing to landfills and associated methane production is one of California's most important strategies for reaching climate and recycling goals.

In conclusion, it is safe to dispose of waste from invasive plants (including Cape ivy) in California's municipal composting collection containers, and it may be the legally-required course of action.

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www.cwss.org/conferences/

Public Lands Alliance Convention & Trade Show

February 24-28, Denver, CO
www.publiclandsalliance.org/what-we-do/convention

Cal-IPC Wildland Volunteer Network Trainings

Spring and summer dates TBD
www.cal-ipc.org/wvn

SERCAL Conference

April 10-12, Santa Barbara, CA
www.sercal.org

California Native Grasslands Association Field Day

April 16, Winters, CA
www.cnga.org/Events

Healthy Plants in a World with Phytophthora

June 25-27, San Francisco, CA
<https://ucanr.edu/sites/sod7/>

Society for Ecological Restoration World Conference

September 24-28, Cape Town, South Africa
www.ser.org/page/SER2019

Cal-IPC Symposium

October 15-17, Riverside, CA
www.cal-ipc.org/symposium

"The State of California, in partnership with others, must embark upon a far-reaching and synergized set of environmental initiatives; ... heeding the urgent call from our California scientists to protect biodiversity, I hereby release the first-ever California Biodiversity Initiative."

— Governor Edmund G. Brown,
Executive Order (www.gov.ca.gov/2018/09/07)