Ecesis

California Society for Ecological Restoration Quarterly Newsletter *Autumn Volume 24, Issue 3*

No Compassion for Compaction — SERCAL's workshop this October in Carlsbad — gave eight participants a lot of hands-on experience with soil and the low-impact equipment that moves it.

The Dirty Details of Habitat Restoration: A Contractor's View

by Mark Girard, President of Habitat Restoration Sciences, Inc.

Over the past twenty years, I have been practicing restoration in California's varied landscapes from the tidal marshes of the Tijuana Estuary to the Colorado River at the Picacho State Recreation Area, then north into the Sierras and west to the Bay Delta. I would opine that the number one enemy to restoration is compaction. Every successful restoration starts with a plan to re-create what took Mother Nature millions of years to perfect. Often our sites are newly graded areas, cut slopes, fill slopes, old agricultural lands, and decommissioned mines and oil fields. The most common problem is compaction and soil lacking proper structure and nutrients. Finding a balance between the engineers looking for compaction and the agronomist looking for agricultural suitability is a challenge. Most engineers do not allow any organics in the soil profile.

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This issue was compiled by SERCAL Region 9 Director, Mark Girard

Ecesis is published quarterly by the California Society for Ecological Restoration, a nonprofit corporation, as a service to its members. Newsletter contributions of all types are welcome and may be submitted to any of the regional directors (see page 3). Articles should be sent as a word processing document and accompanying images sent as jpg or tif files.

Proper fuel modification and use of fire-resistant vegetation can mitigate losses and greatly benefit property owners in fire prone areas, as evidenced in the above photo.

Hidden Habitat Implications of California's Drought

by Mark Girard (HRS), Mike Sweesy (Dudek), Mike Huff (Dudek), and Bob Mackie (HRS)

California had its worst drought conditions in 90 years between January and May last year, and the first seasonal snow survey in early January of 2014 showed the state's water content at about 20% of average. It was made official on Jan. 17, 2014, when Governor Edmund Brown Jr. declared a drought emergency.

The effects of an ongoing drought may result in plant diseases and insect infestations along with increased erosion, a decrease in air quality and degradation of landscape and habitat, along with an increased risk of fire due to drier vegetation. While the environments can quickly bounce back from short-term droughts, it's the long-term droughts that cause the most damage to not only animal life but plant life too.

Plant/Tree Diseases and Insect Infestations — *Quercus Agrifolia*

While California's oak trees are well adapted to survive the state's drought, the right approach to supplemental irrigation is critical in preventing pests from taking advantage of drought-stressed oaks. In a drought, oaks conserve water by reallocating resources to sustain basic physiological functions. Unfortunately, this can lower a tree's defenses against disease and insects, including borer colonization. Trees showing foliage discoloration, leaf loss, and burned leaves need supplemental irrigation to mimic the rain associated with winter storms. Slowly soaking the ground beyond the tree's dripline in the late spring and early fall — for several days every few weeks — allows the water to saturate the root zone. Keeping the ground immediately around the trunk dry — moist, warm soil increases the risk of root, crown, and collar rots caused by fungal pathogens — can be achieved by building a 12-inch-high, firmly-packed soil berm, 2 to 3 feet out from the trunk.

Fuel Modification for Fire Protection

With California fire officials concerned about a more dangerous fire season, performing fuel modification maintenance is a key part of effective fire protection planning, particularly as vegetation dries out. Fuel maintenance should focus on dead and dying plants, highly flammable species, thick vegetation, and 'ladder' fuels that reach tree canopies.

Each site's environment determines the fire risk and how wide a defensible space needs to extend from structures. Although 100 feet is the norm, very hazardous sites may require more than 200 feet of defensible space, and flat, predominantly grass-covered landscapes with an ignition-resistant structure may justify reduced space.

Where 100 feet of defensible space isn't possible, a fire protection plan can justify use of alternative materials and methods that will

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Dirty Details of Habitat Restoration

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This creates several negative effects for the restoration. Compacted soil not only prohibits active root growth, it also inhibits water infiltration and water retainage. This results in most rainfall disappearing as run-off and creating erosion. Compacted soils do not provide adequate space for storage and movement of air, water, and nutrients for soil animals and root growth. This is why the use of low ground pressure equipment on restoration sites is so relevant — it allows the contractor to implement the project without compacting the soil. In fact, typical heavy equipment will leave the soil compacted and not prepared for the planting and seeding components of the project. A 6 foot, 250-lb. human actually exerts approximately 3.9 psi at the heel of a boot. Caterpillar's 292 — a 14,000-lb. track steer loader — exerts only 3.5 psi!

What can we do during this extended period of drought to ensure our restoration projects will be successful? We can create healthy de-compacted soils that will allow for infiltration of rain events. Don't let that rain run-off your site. It's really not 'how much did it rain?' but 'how much rain did we retain on our restoration site?'

At SERCAL's SoCal Soils Workshop, held October 4 in Carlsbad, Vic Claassen demonstrates a useable water reserve in a non-irrigation field that is only 12 inches below the surface

Simply ripping, tilling or disking the soil does not correct the compacted situation without adding compost. How much compost do you need? Consult your local Soil Lab. As a general guideline, for most natives it is a 1% minimum, and ideally if we were to recreate Mother Nature in the Great Plains circa 1800, it would be 5%. With 5% organic matter in the top 8-12 inches of soil, we can build soil structure which will reduce compaction and improve infiltration. With 5% organic compost we can retain approximately 3.35 inches of the rainfall in the root zone (1/3 of southern California's annual rainfall). That's 90,000 gallons of water per acre of useable water reserve that would just be run-off on a compacted site. Compost is inexpensive and readily available in our recycle reuse programs throughout the state. So, while you are preparing your habitat restoration project to sustain and thrive during the drought, remember to "retain the rain" on your project site through use of low impact equipment for less compaction and by applying the proper amendments to the soil.

Hidden Habitat Implications in California's Drought *continued*

allow a fire authority to make a finding that equivalent protection is achieved.

While many ordinances refer to clearing vegetation, effective fuel modification does not necessarily mean clearing/cutting the defensible space. Proper fuel modification strategies include selective thinning of vegetation to reduce fuel load and planting fire-resistant species to reduce fire risk while maintaining vegetative cover for erosion control.

Fuel modification plans to implement include:

- Removing, thin, or replace combustible vegetation,
- Planting adequately-spaced, drought-tolerant, and fire-resistant plants
- Complying with U.S. Fish & Wildlife regulations when working in sensitive habitat areas
- Being aware of bird nesting and breeding seasons
- Understanding the role of irrigation in vegetation management for defensible space
- Being knowledgeable of seasonal erosion issues and the effect on vegetation management.

Degradation of Landscape and Native Habitat

Exotic species compete with native vegetation and this is even more pronounced during a drought. Exotics, such as tamarisk, consume large quantities of water, an already limited resource. Exotics also establish and spread more quickly than natives, reducing the quality and quantity of indigenous plant populations. Many California cities and counties are removing banned species from their properties to promote all the benefits of native vegetation with the added benefit of water conservation.

Delays to Habitat Mitigation Projects

Project owners with pending permits and habitat mitigation programs will need to plan for potential setbacks if California's extended dry weather continues. A seed shortage for native plant species will likely occur that could delay the implementation of habitat mitigation requirements on construction projects.

Although native species flower year-round, the largest number of native species flower in the Spring. In typical seasons, seeds are collected by experts and then sold for use in mitigation projects. Plant species can still flower in the dry conditions but it would be deceptive — it's likely these plants won't form seeds without greater rainfall. Without adequate water resources, viable seeds may not form even though the plant flowers.

As part of mitigation, resource agencies often require that seeds come from within 5 to 20 miles of the mitigation site in order to

Plant and animal species surveys may also be affected by drought. Dormant plants can cause loss of local habitat or food shortages which in turn can affect populations of sensitive species like the California gnatcatcher.

Hidden Habitat Implications *continued*

be consistent with local genetic populations. This limits the source vegetation where seed can be collected. It pays to collect seed during wet rain years, even if the project is years away. Also, many seed collection sites in coastal California are located in the wildland-urban interface (WUI) so the local seed supply would be at risk if the extreme drought brings on catastrophic fires.

High Risk to Non-irrigated Mitigation Projects

Non-irrigated mitigation projects are challenging in normal rain years; during consecutive dry seasons it is virtually impossible for them to succeed because seeds may not germinate. If non-irrigated, project owners should anticipate losing a year on their mitigation program and expect to pay for adaptive remedial actions such as hand-watering container plants, and/or replanting or reseeding when wet weather returns.

In addition, there is increased risk of plant loss due to browsing by local herbivores such as deer and rabbits. As the quality of surrounding "browse" diminishes due to drought, these species are more likely to impact typically more succulent mitigation sites.

Permitting Implications for Biology Surveys

Sensitive and rare plant species may not come up in these dry years, so vegetation surveys may not detect the presence or the full extent of the plant population. A drought year can leave open questions about potentially significant constraints on land use such as the presence of a rare or endangered plant or animal species.

Required focused surveys for some species may not even be possible or only partially possible. For example, fairy shrimp

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surveys might be compromised because few to none of the vernal depressions might support standing water for a long enough period to support a shrimp life-cycle. If this occurs during a low-rainfall year, then the wildlife agencies usually question the negative survey results.

As an example of the dry spell's domino effect, dormant coastal sage scrub could threaten the California gnatcatcher (*Polioptila californica*) population. Coastal sage scrub supports the gnatcatchers' food supply of insects and spiders. Dormant vegetation will reduce the insect population, and the resulting stress will trickle up the food chain. Native vegetation also hides the gnatcatchers' nests and protects them from rain, dew, and too intense direct sunlight. Drought-stressed vegetation makes the nests more exposed and susceptible to failure.

Although it is frustrating that no short-term action can be taken to counter these problems — except to monitor the extent of the impact and be prepared to adjust plans when the situation changes — awareness of these hidden ramifications allows for recommended mitigation strategies that inoculate clients and their projects from the climate-driven delays. Such recommendations might seem strange at the time, but these are the years that demonstrate the wisdom of forward thinking.

With proper planning and implementation, we can help native flora and fauna survive the drought.



The morning started off with an advanced soils workshop presented by the guru of soil himself, Vic Claassen.

SERCAL in the Field: No Compassion for Compaction Workshop Digs into SoCal Soil Issues


And then came the afternoon of test-driving the heavy machinery! Feel like you missed out? You did! But no worries, the workshop will be a part of the SERCAL 2015 conference this upcoming May in San Diego. Watch sercal.org for details on the conference and more field events.


When in Drought, Low Compaction is Key

by Mark Girard, President of Habitat Restoration Sciences, Inc.

In some habitat restoration projects, due to the location or how the mitigation plan was written, the restoration contractor may not be able to install a temporary irrigation system to provide water to the native plants. During years of drought, this can create even more of a challenge for the contractor.

This was the case for a riparian mitigation project constructed in southern California for a local school district. The project included the removal of 1,300 non-native trees and shrubs including *Arundo donax*, *Tamarix* and *Fraxinus* (Ash), along with the creation of 3.5 acres of riparian habitat. We reviewed the site grading plans and realized the site would need a cut of about 12 feet in order to achieve the proper hydrology for the riparian plant pallet.

Due to the deep cut, we surmised that we would be dealing with soils that were compacted and devoid of any nutrients. Along with this, we were in ongoing drought conditions with a project that would not allow for temporary irrigation. Low water and nutrient weak and compacted soils — for a successful project, this would require some careful planning.

We started with the removal of the *Arundo donax* and *Tamarix* (see photo below) to a local green waste facility. But, the *Fraxinus* and other shrubs were composted and stored in piles onsite while the site was graded. Keeping with our schedule, we cleared the land prior to the Migratory Bird Treaty Act (MBTA) deadline on March 15, and over the summer months graded the new riparian corridor while the school was built. In September, we took over the newly graded mitigation site.

The first step for this newly graded site was to pull soil samples and send them out to the soils lab. We then crossed-ripped the site to 18 inches with agricultural rippers on our low ground pressure CAT 277 (see photo next page). Our soils lab recommended three cubic yards of compost per thousand square feet. We utilized our salvage compost that had been decomposing over the summer, and using the CAT 277 with grapple bucket, we placed chippings over the ripped site.

Although it would have taken less time to use a CAT 950 loader than the CAT 277, we would have re-compacted the soil — and compaction is the enemy of restoration. With the CAT 277 and

continued next page

Clearing brush prior to the MTBA March 15 deadline. The compost remained onsite to compost, and was incorporated into the soil after grading.

When in Drought *continued*

the rototiller attachment, we tilled in the amendments approximately 8 inches.

Walking on this newly amended soil was like walking on a sponge. The 6,300 pole cuttings of various *Salix* species were installed and watered in with a hose; then we applied 3 inches of our project-generated composted mulch around the cuttings to retain moisture and impede weed growth. Over the next few months we had less than 2 inches of rain and we did not water the cuttings.

The pole cuttings budded out and thrived in the newly-created riparian corridor. At the end of Year One, the average willow height was 6 feet. At the end of Year Two, they reached 12 feet, and by Year Three, we could no longer pull the tape from the transects stations. The site was already exceeding the 5-year coverage criteria.

Looking back, 12 years later, the willow canopy is forty-plus feet tall and thriving. This project site has survived one El Niño and the current 90-year historical drought. The three keys to this success was creating a healthy soil through de-compaction, agronomy, and utilizing low ground pressure equipment.

Natural Resource Events Calendar

Watch sercal.org for the latest event news.

SERCAL 2015's Call for Abstracts will arrive in your mailbox soon!

November 3-6 7th California Oak Symposium. Visalia Convention Center, Visalia. **ucanr.org/oaksymposium**

November 5 Western Chapter of International Erosion Control Association Sacramento Area Symposium: *Soil and Vegetation Management in Response to Drought.* Rancho Cordova. **www.wcieca.org/**

2015

January 15-17 CNPS Conservation Conference: *Celebrating 50 years of Progress and Promise.* Double Tree/Hilton Hotel, San Jose. **www.cnps.org**

January 31-February 6 68th Society for Range Management's Annual Meeting and Trade Show: *Managing Diversity.* Sacramento Convention Center. **rangelands.org/events/**

March 24-25 CalCAN's 4th California Climate and Agriculture Summit. UC Davis Conference Center. **www.calclimateag.org**

May 12-14 SERCAL 2015: *Restoration for the Next Generation*. San Diego.

Low ground equipment created the new riparian corridor.… with no compaction!

Many Thanks to Our 2014 Special Members...

$1,000 Summit Circle:

DUDEK *Encinitas*

Sustaining Business $500

Helix Environmental Construction Group *La Mesa*

Integrated Environmental Restoration Services *Tahoe City*

RECON Environmental, Inc. *San Diego*

S & S Seeds, Inc. *Carpinteria*

Westervelt Ecological Services *Sacramento*

Contributing Business $250

cbec, inc., eco engineering *West Sacramento*

E. Read & Associates *Orange*

H.T. Harvey & Associates *Los Gatos*

Habitat Restoration Sciences, Inc. *Carlsbad*

Northwest Hydraulic Consultants, Inc. *West Sacramento*

Olofson Environmental *Oakland*

Orange County Parks *Irvine*

Sacramento Area Flood Control Agency

Santa Clara Valley Water District *San Jose*

Sustaining Individual $100

John Anderson Hedgerow Farms *Winters*

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David B. Kelley K & AES, Inc. *Winters*

Kevin MacKay ICF International *San Jose*

Harry Oakes ICF International *Sacramento*

Liza Prunuske Prunuske Chatham, Inc.

Sustaining Individual Half Year $60

Playlina Bojanowski Sonoma RCD *Santa Rosa*

Michael Love Michael Love & Associates *Bayside*

SERCAL in the FIeld! A fine June day at Franklin Point —some of the finest coastal prairie habitat along the California Coast.

Welcome New Members

(as of 21 October 2014)

Carin Apperson San Francisco Public Utilities Commission *Castro Valley*

Aditya Pal BFS Landscape Architects *Palo Alto*

Lititia U. Brown *San Francisco*

Ronald Rizo RECON Environmental, Inc. *San Diego*

Erin Chen *Huntington Beach*

Terressa Whitaker RECON Environmental, Inc. *San Diego*

Have you moved? Are you planning to?

Don't forget to let us know your new address. Even if you dutifully file a forwarding order, it doesn't necessarily mean the post office will comply with that order. We continue to see too much returned mail.

Save SERCAL the time and additional postage and yourself the headache of delayed mail — send a postcard or email the SERCAL Administrative Office with your new contact information. It will make everybody happy!

Thank you !

SERCAL 2015 Membership Application/Renewal Form

Annual Membership Dues

INDIVIDUAL	BUSINESS
$15 STUDENT	**$50 NONPROFIT ORG.**
$45 REGULAR	**$250 CONTRIBUTING***
$80 JOINT SERCAL+CNGA *(discounted)*	**$500 SUSTAINING***
$100 SUSTAINING*	**$1,000 SUMMIT CIRCLE***

***** *Receive quarterly recognition in* Ecesis

SERCAL's quarterly newsletter, *Ecesis*, is received with ALL rates. *Additional member benefits include:*

Category	Copies of each *Ecesis* issue **	Number of discounted rates at SERCAL events
Nonprofit Org.	2	1
Contributing Business	3	3
Sustaining Business	4	4
Summit Circle	6	6

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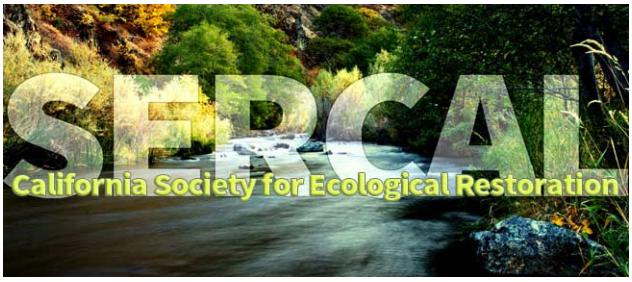

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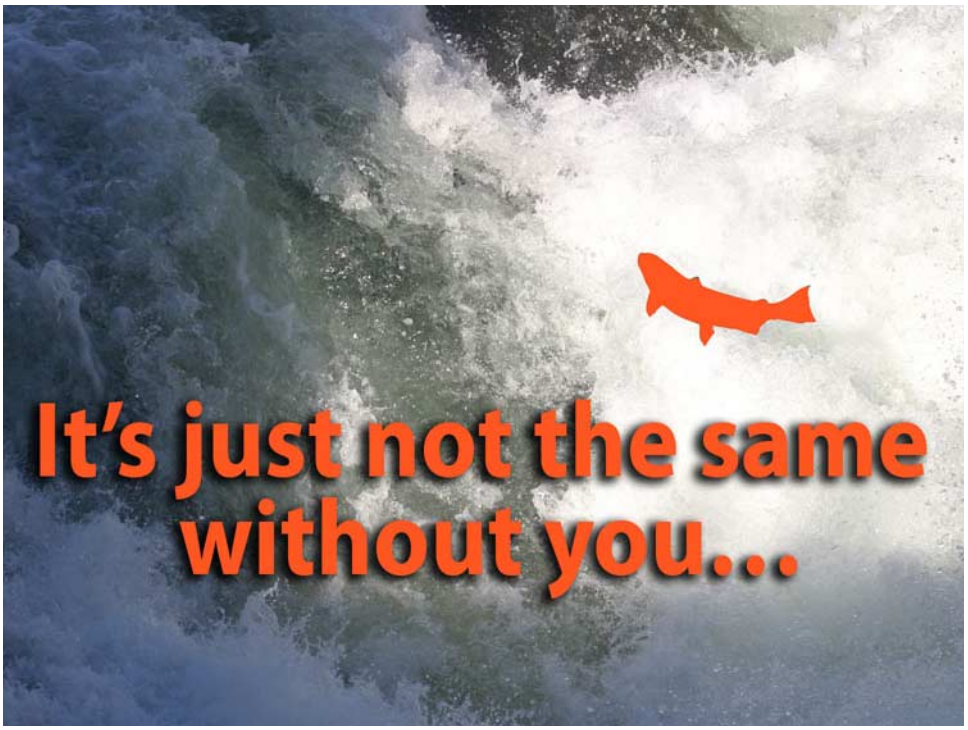

Please join us!

Membership renewals *and* the Call for Abstracts for our 2015 conference in San Diego will be appearing in your mailbox in the next 4-6 weeks.

We hope you will respond to both! SERCAL depends on YOUR engagement in this vibrant network of habitat restoration professionals and enthusiasts.