



California Society for Ecological Restoration Quarterly Newsletter Spring 2020 Volume 30, Issue 1

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Above: Attendees plant native high marsh grasses, during the Volunteer Planting Day hosted by The California Department of Water Resources and partners. Photo taken February 29, 2020.

*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 member of the board (see page 11).

## Dutch Slough: Turning the Corner on the Largest Delta Wetland Restoration Project to Date

by Charlotte Biggs<sup>1</sup> and Allen Young<sup>2</sup> Photos courtesy Ken James / CDWR

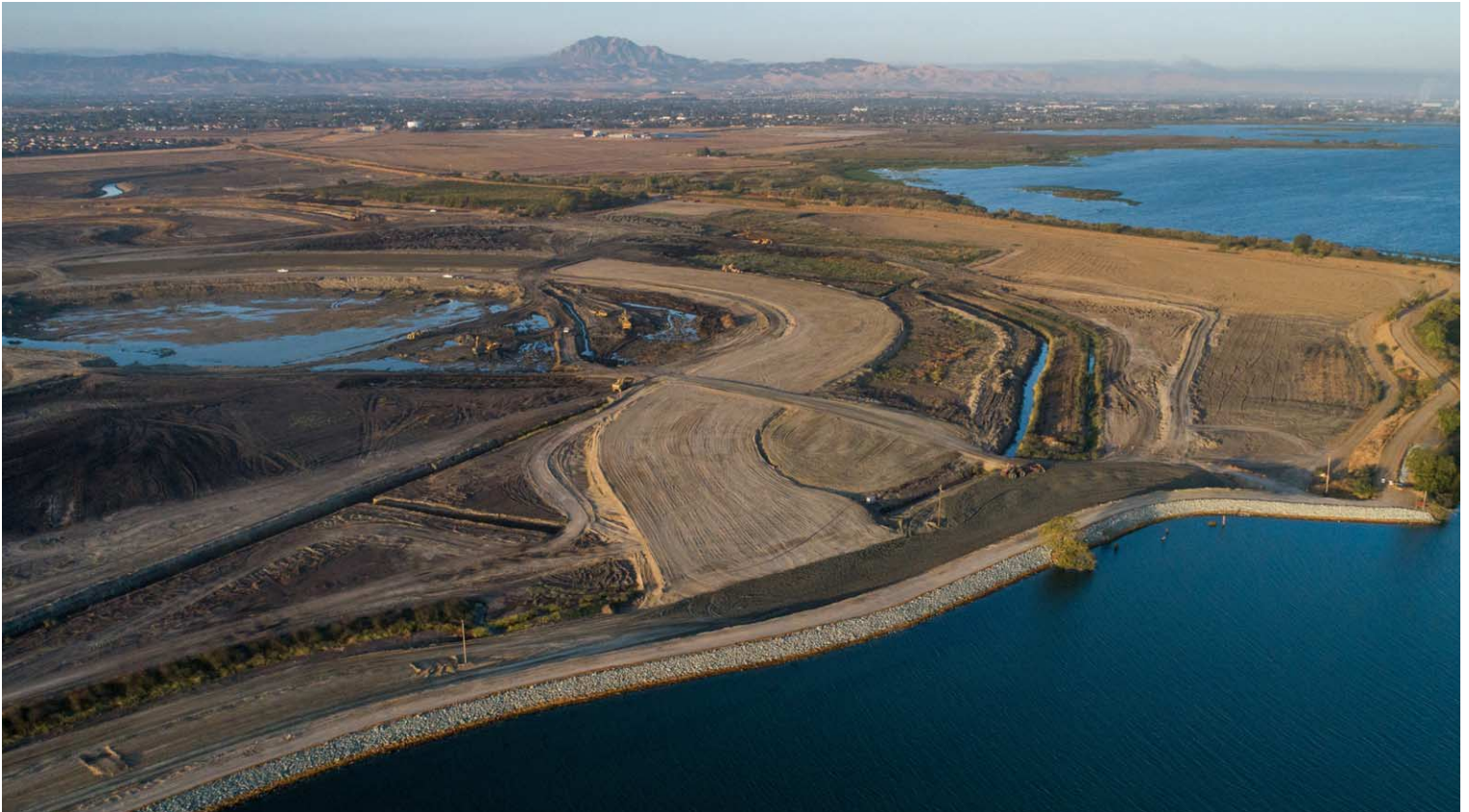
The California Department of Water Resources (DWR) is actively working on the largest tidal wetland restoration effort in the Sacramento-San Joaquin Delta (Delta) to date. The approximately 1,200-acre [Dutch Slough Tidal Marsh Restoration Project](#) is located on the Delta's western edge in Contra Costa County, within the city of Oakley near Antioch. The Dutch Slough project will transform former grazing and dairy lands that were once slated for urban housing development, into a rich habitat for fish and wildlife and a recreation area for the community.

The Delta is a crucial water and ecological resource for California, however, 98% of its native habitat has been lost over the last 150 years. Restoring native tidal and upland habitats benefits fish and wildlife displaced by decades of land and levee development. Wetlands contribute to the base of the food chain by producing tiny brine shrimp known as zooplankton which feed from decaying vegetation floating in the water. Opening sites up to daily tides carry this food out to the main channels of the Delta. Within the wetland, the tall vegetation and turbidity can protect smaller fish from predators.

*continued next page*

Department of Water Resources. <sup>1</sup>Program Manager, [Charlotte.biggs@water.ca.gov](mailto:Charlotte.biggs@water.ca.gov) <sup>2</sup>Information Officer. [allen.young@water.ca.gov](mailto:allen.young@water.ca.gov)





A drone provides a bird's-eye view of construction equipment removing sand from a borrow pit for placement on the site to raise the ground elevation during the construction of the tidal marsh at the Dutch Slough, in Oakley, California. Photo taken October 11, 2018

## Turning the Corner on the Largest Delta Wetland Restoration Project to Date *continued*

Once completed, the Dutch Slough restoration project will utilize natural daily tides to allow water to flow in and out of the marsh, creating a natural tidal wetland that provides a safer environment for salmon, splittail, and other endangered fish species. Migrating salmon will have a place to hide from predators and have greater access to food, which will help them grow stronger.

The site also offers many benefits to the local community. The wetland will provide flood protection to surrounding neighborhoods, acting as a buffer against rising sea levels triggered by climate change. In partnership with the city, the project includes a 55-acre regional park that will allow visitors to hike, bike, boat, fish and birdwatch. The project also protects a historical vineyard, a local cultural heritage site that the public will be able to enjoy as part of the planned regional park.

This project was designed to help scientists learn about restoration in the Delta. It will serve as a living laboratory where scientists can advance their understanding about the benefits of tidal habitat at a

range of elevations. This knowledge will help inform future restoration projects — making them more cost-effective and ecologically valuable.

This project will serve as a living laboratory where scientists can advance their understanding about the benefits of tidal habitat at a range of elevations.

Since breaking ground in summer 2018, DWR has moved nearly 2.5 million cubic yards of dirt between higher and lower elevations to create a more gradually sloping marsh plain, returning the area to its original tidal marsh. With the grading effort now completed, in February 2020 DWR and its partners hosted over 100 community volunteers to assist in the revegetation effort. These volunteers helped plant thousands of high marsh native grasses and shrubs to

stabilize the soil and combat invasive weeds. The plants will benefit birds and other upland wildlife species by providing structure for nesting, foraging, and protection from predation.

“The volunteer planting day marks a significant milestone in the Dutch Slough restoration effort after nearly 10 years of planning, permitting and design,” said Kris Tjernell, DWR Deputy Director of

*continued next page*

# Meet a Member: **Allegra Bukojemsky**

**Occupation:** Landscape Architect

**County of residence:** Santa Clara

**What services do you provide for restoration in California, or what is your restoration passion?**

I am a designer and design conservation and mitigation banks, nature interpretive areas, as well as consult on urban ecology. My focus is on designing the framework for ecological function, but human perception, interface, and aesthetic considerations play an important role in some of my projects as well. I like to say that my clients are the bugs and bunnies.

**How did you get into the field of ecological restoration?**

I took a long meandering path. I bounced between biology and design through my lengthy school career, eventually realizing I could combine the two in landscape architecture. In the field of landscape architecture I was initially enamored with zoo design designing for the specific needs of the animals, as well as the visitors perception of them; ultimately so they were



treated as and served as ambassadors for their species and greater habitats. Then I discovered I could work directly on helping preserve and restore those habitats working in the field of ecological restoration.

**How long have you been a member of SERCAL?**

I don't know, I haven't been counting.

**What do you like best about the SERCAL conferences?**

The honest and direct sharing of the details about project successes, trials and errors, at every step of the way. I also love to hear about all the diverse projects being undertaken all over the state.

**What is your favorite California native species?**

Of what? Tree, forb, insect, vertebrate? I guess I don't have a favorite individual, I'm more enamored with the relationships in ecology.

**Any advice for others in the field of restoration?**

Keep trying and pushing the boundaries, we learn from everything, and keep networking and sharing what you learned.



*On 7 May 2020, Allegra begins her two-year term as SERCAL President. We are excited to see where her leadership takes the organization! Also, I remember meeting Allegra at SERCAL's 2014 conference in Santa Rosa — I always remember people who show up as team players, and there she was, offering to help with setting up. — JSJ*

## Turning the Corner... *continued*

Integrated Water Management. "We're thrilled that our partners and local community were able to come out, roll up their sleeves, and take part in restoring native plants that provide immediate and long-term benefits to the local ecosystem, while supporting conservation efforts in their own backyard."

Depending on the rate of vegetation established, DWR plans to breach the existing levees in late fall of 2021, allowing Delta waters to circulate around the new marsh. Once the construction effort is complete, DWR will work with partners and scientists to study and monitor the site.

Dutch Slough is part of the [California EcoRestore Initiative](#) to accelerate 30,000 acres of critically needed Delta habitat restoration on public lands or through partnerships. This effort is implemented through DWR's Delta Levee Program, which ensures zero net habitat loss in the Delta because of the state's levee improvement projects. The Dutch Slough Tidal Restoration Project is the result of years of hard work and a dedicated partnership between local, state, and federal agencies.







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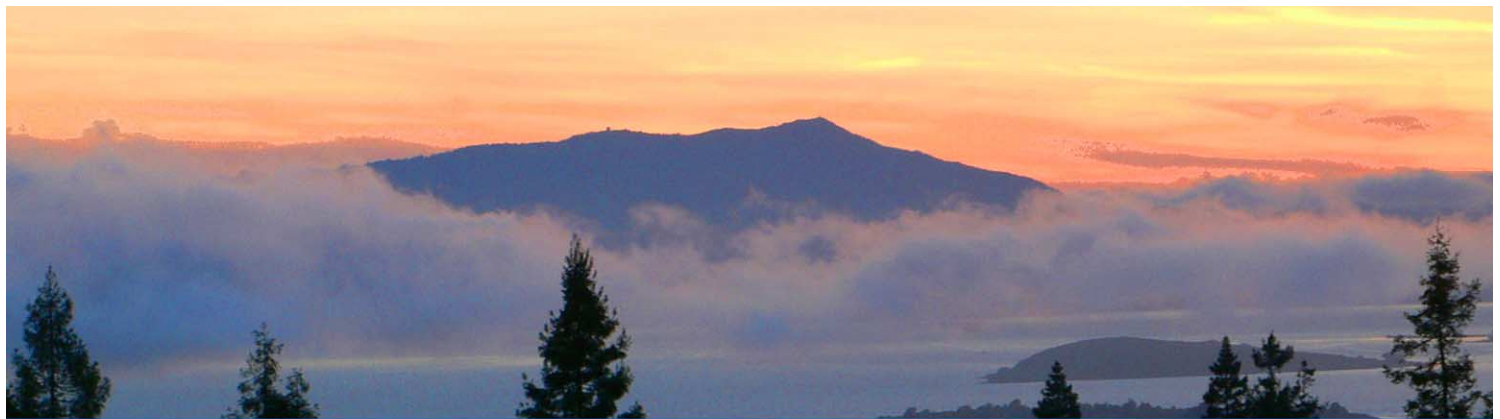
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A hybrid approach using hard and soft engineering bank stabilization where riprap and pieces of wood were installed to stabilize the toe of the streambank. The upper portion was then laid back to a gentle slope, planted with willows, seeded with shade-tolerant native riparian species, and protected with a biodegradable coir erosion control blanket. Designed by Matt Smeltzer at geomorphDESIGN and constructed by Spye Construction. *Photo courtesy Marin County DPW.*

# Eco-Friendly Approaches to Bank Stabilization in Urban Environments

by Sarah Phillips<sup>1</sup>

There is no shortage of obstacles to consider while carrying out restoration and habitat rehabilitation in urbanized environments. That being said, what such work does provide is the incentive to think creatively, outside of the box. And by “box”, I mean culverts, concrete-lined stream channels, banks stacked up with failing riprap, gabion cages, and dilapidated retaining walls. In a more natural setting, when creek banks erode, you step back and let the channel naturally evolve. After all, erosion is a completely natural process. It is through that process that our mountains become beautiful rolling hills, our alluvial valleys create such vast braided channels of complex habitat, and the contributed sediment is tossed, tumbled, and sorted into perfectly sized gravels that become the ideal conditions for salmonids to build their redds (nests for their eggs).

So why step in to *fix the problem* of a creek bank eroding when the deposition itself is obviously beneficial and natural? Here are just a few

reasons why we find ourselves in this predicament of arresting erosion along creek banks in urbanized watersheds;

- 1 Protection infrastructure.
- 2 Maintaining property values (e.g. every square foot of land in California, especially in the Bay Area, is VERY valuable so ensuring nothing washes away is vital).
- 3 Improving water quality by reducing fine sediment input, especially in watersheds with regulations that set limits on fine sediment. In watersheds with salmon, for example, excess sediment can fill the interstitial spaces of redds and suffocate incubating salmon eggs.

Urban environments have increased areas of impervious surfaces that directly shed water off into the storm drains which discharge into our waterways (with the exception of some cities) as opposed to soaking into the ground, recharging groundwater supply. Keeping in mind that

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From left: An exemplary alder tree (*Alnus* sp.) demonstrating how riparian species assist in streambank protection and erosion control by using their vast network of roots while simultaneously providing streamside habitat. *Photo courtesy Sarah Phillips.* An emerging arroyo willow (*Salix lasiolepis*) stake from a Marin RCD salmonid habitat enhancement project site on San Geronimo Creek (planted December 2019, leafing out March 2020). *Photo courtesy Sarah Phillips.* A willow wall (also known as a spilling wall) being installed along the outside bend of an eroding streambank where the potential for ongoing scouring is high. *Photo courtesy <http://riparianhabitatrestoration.ca>.*

## Eco-Friendly Approaches to Bank Stabilization... *continued*

one gallon of water weighs more than eight pounds, when you connect the amount of increased runoff that enters the streams with such density, the creeks now need to become larger to convey that runoff so they erode both laterally and vertically, which in turn leads to incision and creates instability of the channel, forcing banks to collapse. Here are some outcomes to consider when someone installs riprap or a retaining wall — a common treatment in developed landscapes — to prevent creek bank erosion:

- 1 The velocity of water increases when it comes in contact with hard surfaces — as opposed to decreased velocity when it interacts with rough surfaces like vegetation — sending the increasing stream power downstream which leads to problematic impacts.
- 2 There is a reduction in canopy cover and habitat loss because retaining walls and riprap do not support natural recruitment of riparian species.
- 3 Some installations are put in without permits or guiding oversight which can result in inappropriate materials being used, such as chemically harmful pressure-treated wood or undersized rock. Undersized rock will ultimately fall into the stream, filling in the channel, and potentially increasing the risk of flooding by reducing the volume of water the channel can convey.
- 4 There is a decrease in aquatic habitat for species such as salmonids (*Oncorhynchus* sp.), which rely on undercut banks for shade, cover from predators, and protection from high flow events. Additionally, if present, California freshwater shrimp (*Syncares pacifica*) rely on fine root structures along the creek banks for habitat.

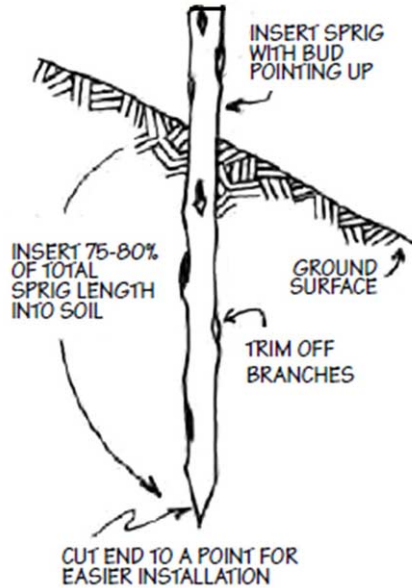
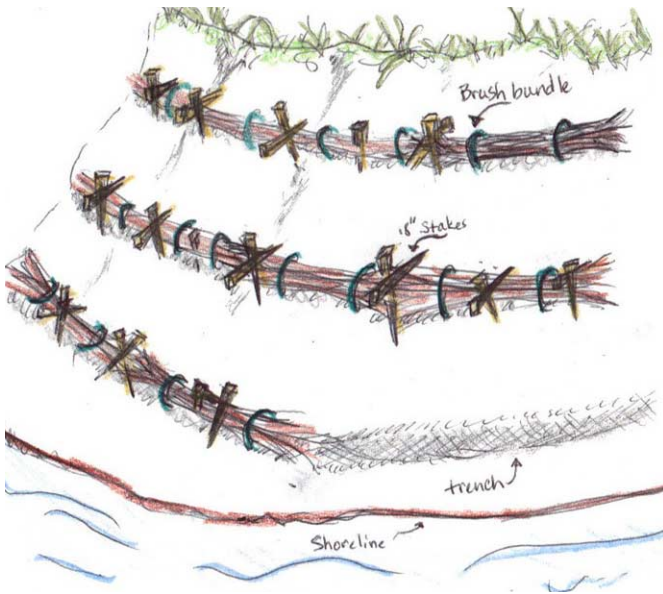
Watershed resource managers can acknowledge that there are vulnerable areas that must be protected in an urbanized setting and that over the years, we have learned that certain approaches that seemed right at the time, are in fact detrimental to the quality of stream habitat.

So how can we balance the needs of human development and existence while still maintaining the environmental integrity, knowing that the environment works FOR us and not against us by providing such efficient ecosystem services? Maybe there is a way we can work with the environment much like how wetlands help us remediate pollutants. Maybe there is a way to provide streambank protection that upholds riparian habitat and watershed function. Luckily there is such a tool in the restoration toolbox that has been at our fingertips, literally, for thousands of years.

As noted in the *Journal of Ecological Engineering*, “China has the world’s longest history of soil bioengineering, with the first mention of giant fascines to control torrential floodwaters dating from over 2000 BC” (Stokes *et al.* 2010). Soil bioengineering or biotechnical bank protection includes the use of living plant material. The concept is straightforward: use root systems of plants to provide erosion control. Using such techniques to mitigate creek bank erosion is supported by regulatory agencies. FEMA has a publication called *Engineering with Nature: Alternative Techniques to Riprap Bank Stabilization*, speaking to the impacts of using riprap versus soil bioengineering to stabilize creek banks. That booklet was based on a paper published by the Army Corps of Engineers called *Bioengineering for Streambank Erosion Control; Report 1, Guidelines* (Allen and Leech, 1997).

There are cases when a hybrid approach is necessary — where riprap is installed along the toe then the rest of the bank is laid back to a 2:1 slope and planted, or where willow stakes are planted within riprap which can be effective in achieving the goals of stabilization and increased riparian habitat. Willow species (*Salix* sp.) are most commonly used because of the ease of cloning them due to their bark containing substances that enhance root growth (salicylic and indolebutyric acids). Willows are also the pioneering species that develop floodplains and creek banks

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From left: On-contour, entrenched willow fascines (wattles) installed to naturally prevent erosion of a steepened creek bank and improve riparian habitat conditions. *Illustration by Valerie Cepa.* Live willow stake drawing from *Groundwork: A Handbook for Small-Scale Erosion Control in Coastal California.* *Illustrated by Prunuske Chatham, Inc. and modified by Sarah Phillips.* At a hands-on Marin RCD soil bioengineering workshop, landowner Katie Warfield learns how to secure a willow fascine for installation at the toe of her eroding creek bank in west Marin. *Photo courtesy Sarah Phillips.*

## Eco-Friendly Approaches to Bank Stabilization... *continued*

post-disturbance (natural and anthropogenic) — they sprout from branch fragments, grow quickly, and spread a vast network of roots that stabilize erosive soils which allows other plants to grow.

There are a multitude of techniques which can be used; stakes, fascines (stick bundles), brush layering, brush mattresses, posts, and more. It is important to know your site and understand the dynamics that are causing the erosion in order to implement the best techniques, customized for your site.

Some basic guidelines to consider:

- \* Willows, dogwoods, and cottonwoods do well with cloning; ensure they are properly placed in the watershed as the dominant riparian vegetation transitions from headwaters to valleys.
- \* Know your site and water availability, then plant accordingly (e.g., willows prefer full sun and dogwoods prefer shade).
- \* Harvest ethically — do not take more than 5% from the donor plant. Be aware of habitat. Harvest in the winter, once the landscape is saturated and the plants have gone dormant.
- \* During installation, ensure good contact between soil and plant material with a majority of the stake belowground. Cut the tops of the stakes flat and the bottom of the stakes at an angle.

Soil bioengineering is eco-friendly, natural, and cost-effective, attempting to balance natural processes with human needs. By creating riparian habitat, it provides:

- \* Canopy cover that shades the water, keeping cooler temperatures and higher dissolved oxygen content, both critical for sensitive aquatic species, such as salmonids.

- \* Nutrient cycling via leaf litter that drops in and feeds benthic macroinvertebrates (BMIs) which in turn feed salmonids and other species in higher trophic levels.
- \* Potential for passive wood recruitment from fallen trees and limbs that provide great instream habitat with roughness, shelter, velocity refuge, habitat complexity, and additional food supply for BMIs.
- \* Filtration of stormwater runoff by intercepting surface flow.
- \* Habitat diversity and migratory corridors in urban landscapes.

In conclusion, the technique of soil bioengineering isn't a one-size-fits-all, golden ticket approach, yet it is one of the many tools in our restoration toolbox that can be used in urban landscapes when a more eco-friendly approach is desired. When considering this approach, make sure to check in with the regulators as some practices trigger permitting.

To learn more about soil bioengineering and identifying and harvesting willows, you can visit the Marin RCD's website on bank stabilization within the Urban Streams Program: <https://www.marinrcd.org/urban-streams-coordination/> or simply look up 'soil bioengineering.'



### Citation

Stokes, A., R. Sotir, W. Chen, G. Walter, and M. Ghestem. 2010. Soil bio- and eco-engineering in China: Past experience and future priorities. Preface. *Ecological Engineering* 36 (3): 247–257. <https://doi.org/10.1016/j.ecoleng.2009.07.008>.





### dpr Glove Category Selection Key

Label code	Materials Required by Law	Material Code
A	1,2,3,4,5,6,7,8	1 Laminate
B	1,2	2 Butyl
C	1,2,3,4,7,8	3 Nitrile
D	1,2	4 Neoprene
E	1,3,4,8	5 Natural
F	1,2,3,8	6 Polyethylene
G	1,8	7 PVC
H	1,8	8 Viton

All but Laminate and Polyethylene must be 14 mils or thicker.

If the pesticide label requires an N95, you can use a half-mask with N95 particulate filters. *Photo credit Ferdinando "Marty" Martino, UC IPM.* Some common chemical-resistant materials for gloves are barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinylchloride (PVC), and viton rubber. *Photo credit: Katrina Hunter, UC IPM.*

# PPE in Short Supply for Farm Work During the COVID-19 Crisis

by Lisa A Blecker, Whitney Brim-DeForest, A. Katrina Hunter, and Pamela Kan-Rice<sup>1</sup>

**This is an interesting and timely article on creative ways to obtain PPE for pesticide/herbicide use. It was first published 23 April 2020 on the University of California Agriculture and Natural Resources's blog, [Southern IPM Activities](#).**

While most Californians are staying home to slow the spread of the novel coronavirus, California farmers, farmworkers, and other agricultural professionals are in fields and packing houses working to produce food.

With increased demand for personal protective equipment, or PPE, to protect against COVID-19, these essential workers are facing shortages. Agricultural commissioners in 28 counties are hearing from farmers who are having trouble getting PPE for their employees and farmers in another 11 counties who are worried about running out of PPE in the next month or two according to a California Department of Pesticide Regulation survey.

Gloves, N95 respirators, coveralls, and other gear that workers wear to protect themselves from COVID-19, pesticides, dust and other health hazards, are in short supply as priority is given to healthcare workers during the pandemic.

To reduce the spread of COVID-19, workers may wear homemade face coverings, but for applying pesticides, they must wear respirators specified on the pesticide product label, said Whitney Brim-DeForest, UC Cooperative Extension Wild Rice Advisor.

Pesticide applicators may use gear that is more protective than required by the product label and regulations.

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"Although this could change in the days ahead, half-mask and full-mask respirators are more available than disposable N95 respirators for now," said Lisa Blecker, coordinator for the UC Pesticide Safety Education Program.

Before the pandemic, 10% of N95 respirators from 3M went to healthcare, but that number is now 90%, the company said in a letter to distributors. This has led to significant backorders of PPE supplies for distributors.

Carl Atwell, president of Gempler's, an online distributor of worker supplies, said that before the crisis, normal lead times for PPE was up to 10 days. He estimated disposable respirators will become available in the fall and other PPE supplies in August.

In the meantime, there is alternative PPE that agricultural professionals can use during the shortage.

Atwell suggests looking for lesser known brands of PPE as opposed to the first tier of choice: "It's sort of like searching for Purell hand sanitizer. Purell brand might be out of stock, but can you find a different disinfectant?"

On Gempler's website, the more recognizable Tyvek coverall from Dupont is sold out, however disposable protective clothing is available from other brands. Reusable chemical-resistant clothing is also available as opposed to their disposable counterparts. Supplies in high demand are reusable and disposable nitrile gloves, protective clothing, disposable respirators and certain protective eyewear, such as goggles and face shields.

*continued next page*



## PPE in Short Supply for Farm Work... *continued*

For workers who will be applying pesticides, Blecker and Brim-DeForest offered some guidelines on how to meet PPE requirements as the shortage continues.

**General PPE requirements:** “Remember, the label is the law,” said Brim-DeForest. “PPE requirements for agriculture are not being loosened.” The UCCE advisor recommends purchasing only what you need for the season and choosing reusable PPE whenever possible. Growers who have excess supplies of PPE can coordinate with their county agricultural commissioner or UCCE advisor to help other producers in their area.

**Respirators:** If you can’t find the respirator required on the label, Blecker said, “Use an alternative, more-protective respirator. For example, if an N95 is required, you can use a half-mask with N95 particulate filters; these can be stand-alone filters or ones that attach to an organic vapor cartridge. You could also use a different pesticide that doesn’t require a respirator. Consult with your PCA (pest control adviser) for options.”

**Gloves:** Chemical-resistant gloves, usually 14 mil or more in thickness, are required for most California pesticide applications and should be worn by mixers, handlers, and applicators. If nitrile gloves are not available, viton and laminate gloves are universal chemical-resistant materials for most pesticide labels. If the glove material is specified on the label, that instruction must be followed.

“Disposable gloves less than 14 mil can be worn, but not for more than 15 minutes at a time,” Blecker said. “Farmers should also note that thinner gloves cannot be layered on top of one another.”

**Coveralls:** Coveralls should be worn when required by the pesticide label or when the signal word is “WARNING” or “DANGER,” or when applying by backpack or airblast. “Coveralls can be made out of high-density polyethylene fibers (Tyvek and other brands), which are disposable, or cotton, which are reusable,” Brim-DeForest said. “If reusable coveralls are worn, the employer must ensure employees are provided clean coveralls.”

**Goggles/face shields:** For mixing and loading pesticides, face shields are required only if it’s stated on the label. “If a face shield is unavailable, a full-face respirator can be used,” Blecker said. “Goggles or protective eyewear should always be worn in California when handling pesticides, regardless of what the label says. The face shield, goggles, or safety glasses must provide front, side, and brow protection and meet the American National Standards Institute Z87.1 standard for impact resistance.



For more information about PPE, contact your county agricultural commissioner or see the California Department of Pesticide Regulation’s posters at [https://www.cdpr.ca.gov/docs/whs/pdf/gloves\\_for\\_pesticide\\_handling.pdf](https://www.cdpr.ca.gov/docs/whs/pdf/gloves_for_pesticide_handling.pdf) and [https://www.cdpr.ca.gov/docs/whs/pdf/n95\\_alternatives\\_for\\_pesticide\\_handling.pdf](https://www.cdpr.ca.gov/docs/whs/pdf/n95_alternatives_for_pesticide_handling.pdf).

UC IPM also covers these topics in their pesticide safety webinar series at <http://ipm.ucanr.edu/IPMPROJECT/workshops.html>.





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## You are crucial to the resilience of California's native habitats

Just like our floral first responders, SERCAL members make California's ecological systems healthy and whole again. In the almost 3 decades since SERCAL was founded, so much — almost everything — has changed. Yet one thing remains constant: The exceptional power we have when we work together. We are grateful for all our members and want to recognize these individuals and businesses for their generous support in 2020:

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**Stay Healthy, Be Safe,  
Take care of yourselves.  
We missed seeing you this  
Spring, but will reconvene ASAP!**



## A post-script instead of a postal stamp!

We MISSED YOU last week on what would have been the gathering of our AMAZING conference. And though we've rescheduled for September 15–16, there's no way we can predict how COVID-19 will affect our plans. That said, we are running a very tight ship due to the fact that our bottom line depends on the conference boost. That's why you'll be receiving your newsletters via email for now, even if you asked for a print copy.

Any support you can give us during the month of May will be MUCH appreciated as we move forward. Thank you!

[CLICK HERE FOR A LINK](#)

**From May 5 through the end of the month...**

**SERCAL connects  
the dots: YOU...  
Your work...  
New ideas...  
Opportunities...**

**GIVING  
TUESDAY  
NOW**

**Your support would  
mean a great deal**