Land of the West Wind

July 2025 Volume 25 Issue III

## Food for Ducks & Fish in Managed Wetlands of Suisun Marsh

By Kyle Phillips, Alice Tung, Elsie Platzer, Teejay O'Rear, and John Durand at University of California, Davis

*Figure 1. UC Davis Researcher, Kyle Phillips, setting out for a plankton-sampling survey in the managed wetland at Meins Landing (photo by A. Tung, December 2018). Other wetlands sampled include Potrero Pond, Denverton Duck Club, Grizzly King, Wings Landing, and Lower Joice Island.*

Seasonal managed wetlands are a novel feature of Suisun Marsh that have existed for just over a century. Ecologically speaking, that's relatively recent. While managed wetlands have been shown to provide critical winter feeding grounds for migratory ducks and geese, their effects on fish have been contentious, creating a decades-long rift between stakeholders. Members of the "fisheries camp" have pointed to hazards posed by managed wetlands, including dissolved oxygen sags that can occur after flooding and the risk of fish becoming trapped inside the wetlands when they're drained.

While these concerns are not unfounded, an emerging body of research suggests that managed wetlands also provide substantial *benefits* to fish, from food production to nursery grounds (Aha *et al.* 2021; Williamshen *et al.* 2021, Sousa *et al.* in progress). In a recent study by UC Davis, researchers found that seasonal managed wetlands promote massive quantities of plankton, up to *ten times* the amount found in outside tidal habitats (**Figures 1** and **2**). Plankton are tiny organisms that are suspended in the water column and are made up of two major groups: phytoplankton, which are single-celled algae; and zooplankton, which include small floating crustaceans like copepods and *Daphnia*. In the San Francisco Estuary, plankton form the base of the pelagic (open-water) food web, and are critical prey for several fishes, including shad, juvenile striped bass, juvenile chinook salmon and endangered smelt. Indirectly, plankton also support predators higher up the food chain, like adult striped bass and pikeminnow, which feed on planktivorous fishes.

Over the past half century, plankton stocks have dwindled in most of the estuary due to freshwater exports and exotic filter-feeding clams, leading to a system-wide fisheries collapse. Smelt are practically extinct and even prized sport fish, like striped bass, are declining in much of the estuary. Yet, in Suisun Marsh, managed wetlands may provide a lifeline. Managed wetlands can circumvent many of the threats to plankton production. Gated culverts, used to control water levels in the wetlands, slow water exchange which can give plankton the time needed to recruit and accumulate before the water is exported (and the plankton with it). Conversely, water that moves too quickly, like rivers and fast-moving tidal channels, can flush out plankton before they get the chance to recruit, effectively shutting down plankton production. The seasonality of managed wetlands appears to be important too. Wetlands that are seasonally drained and dried are lethal to clams, which can take the pressure off plankton production. Meanwhile, in tidal waterways, clams can form dense beds and effectively strip the water column clear of phytoplankton.

[*Win-Win,* Cont. on Pg. 4]

## Land of the West Wind

Quarterly Newsletter
Suisun Resource Conservation District
2544 Grizzly Island Road
Suisun, CA 94585

Main Office: (707) 425-9302
Water Manager Office: (707) 426-2431
E-mail: srcd@suisunrcd.org
Website: www.suisunrcd.org

**Staff**

Steven Chappell, *Executive Director*
John Takekawa, *Operations Manager*
Desmond Mackell, *Operations Manager*
Kelli Perez, *Office Supervisor*
Caitlin Perez, *Adminitrative Assistant*
Tim Edmunds, *Biologist/Water Manager*
Jeff Taylor, *Biologist/Water Manager*
Marina Guzman, *Biologist/Water Manager*
Jesirae Collins, *Biologist*
Kristin Brandon, *Biologist Analyst*
Marque Mouton, *LJI Caretaker*
Geroge Dana, *Mein's Landing Caretaker*

**Board of Directors**

Tony Vaccarella, *President*
(650) 365-1642
Dick Vanderkous, *Agency*
(707) 228-9950
H. Kent Hansen, *Finance*
(510) 459-0649
Jim Waters, *Legal*
(510) 409-3864
Mike Lewis, *Personnel*
(707) 224-3824

**Associate Directors**

Dennis Becker
John Eudy
Fred Riedel
John Telfer

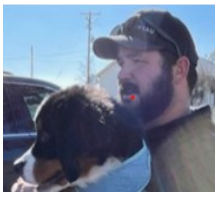
**SRCD's Board Meetings are on the second Wednesday of each month at 2PM at the Solano County Supervisors Chambers: 675 Texas Street Fairfield, CA 94533**

SRCD represents private landowners of the Suisun Marsh at the Federal, State, and local levels. It's historic goal has been to achieve a water supply of adequate quality so that preferred wetland habitat values will be retained through appropriate management practices. With cooperation from landowners and various agencies, SRCD develops new programs aimed at protecting and improving the Suisun Marsh for future generations.

# Comings and Goings at SRCD

After 24 years, we are celebrating the retirement of office supervisor Kelli Perez. An employee since July 2001, Kelli was hired originally as the District Secretary and Secretary to the Board of Directors. In addition to those roles, she served as the District Bookkeeper, Human Resources Officer, Computer Technician, and Insurance Administrator. Kelli has lived in the Marsh for most of those years, including recently at the Cordelia Duck Club. Following her retirement, she plans to spend more time visiting her children and many grandchildren. Congratulations Kelli!

We are pleased to introduce the new SRCD Administrative Assistant, Caitlin Perez. Caitlin began working with SRCD part-time in September 2023 and moved to full time in July 2024. Caitlin will oversee Billing & Accounting, Human Resources, and general finances. She has a passion for hunting, since her father formerly hunted at Mallard Inn Duck Club. She has an education from Casa Granda High School and Santa Rosa Junior College in its Veterinary Technician Program.



After 16 years as a SRCD Water Manager, Jeff Taylor will be advancing to the position of Senior Water Manager. He will be tasked with leading the water manager program and scheduling the activities of the group. Jeff began work at SRCD in 2009, and he has spent most of his time supporting landowners on the west side of the Marsh.

Kristin Brandon will be leaving SRCD at the end of July after two years working as a biologist analyst on estuary projects including cooperative range-wide studies of the salt marsh harvest mouse. An expert in geospatial and quantitative data analyses, she has supported the staff in developing programs to summarize complex datasets. Thanks to Kristin for all of her efforts!

At the beginning of August, John Takekawa will be stepping down at SRCD after 8 years as the Operations Manager. John began work at SRCD in 2017 after a 34-year career as a federal research biologist and as a program manager with Audubon. He plans to continue living in Benicia with frequent trips to the Marsh during the waterfowl season with his dog Sadie.

Desmond Mackell will be succeeding John as the new Operations Manager. Desmond was formerly a biologist with USGS based in Dixon, but he led field projects ranging from Chesapeake Bay to Klamath Basin to Guam. Desmond attended UC Santa Cruz for his Bachelors and received a Master's degree from UC Davis with a thesis on movements of cinnamon teal.

# A Basin Gone Dry - Water Shortages and Disease Threaten Klamath Basin Waterfowl

Sump 1A at Tule Lake National Wildlife Refuge in 2024 .

Summer has arrived, bringing new challenges to waterfowl in the Klamath Basin. As the dry season progresses, limited water supplies and warm temperatures present a threat to wetland health and bird survival in this region along the California-Oregon border. Water shortages in the Klamath Basin are driven by drought and complex water management priorities. Refuges depend on water from Upper Klamath Lake, but deliveries are only possible after requirements for sensitive wildlife, senior water rights, and other legal obligations are met. There is no fixed formula for allocations, and in dry years, refuge water deliveries may be greatly reduced or eliminated entirely.

Refuges like Tule Lake and Lower Klamath National Wildlife Refuges depend on steady water deliveries to keep wetlands healthy. In contrast, the Suisun Marsh benefits from reliable water and higher salinity levels that help prevent avian botulism outbreaks. When Klamath Basin wetlands become shallow, warm, and stagnant due to water shortages, they create ideal conditions for *Clostridium botulinum*, the bacteria that cause deadly botulism outbreaks and can kill thousands of birds each year. In 2024, these refuges experienced their worst botulism outbreak on record, resulting in more than 80,000 bird deaths. Combined with a severe outbreak in 2020, over 150,000 birds have died in recent years. The toxin paralyzes birds, preventing them from escaping contaminated wetlands and often causing them to drown.

According to the 2024 California Waterfowl Breeding Population Survey, breeding populations declined by 30% compared to the previous year and are now 25% below the long-term average. While the exact role of botulism in this decline is unclear, the trend underscores the vulnerability of waterfowl that depend on the Klamath Basin — a vital breeding, molting, and migratory stopover in the Pacific Flyway that supports millions of birds before they winter throughout California, including in the Suisun Marsh.

Botulism infected birds from Sump 1A, Tule Lake at a local wildlife rescue and rehab center called Bird Ally X.

The largescale botulism outbreaks have regional biologist looking for solutions. Refuge managers have partnered with over 15 organizations — including Ducks Unlimited, California Waterfowl Association, Klamath Water Users Association, Audubon California, and local tribes — to advocate for emergency water deliveries. However, competing demands for agricultural, municipal, and environmental needs make this an ongoing challenge.

The Klamath Basin remains a critical area for biodiversity. It serves as one of the most important wetland complexes in the Pacific Flyway, supporting millions of waterfowl during key stages of their life cycle. However, ongoing water shortages and poor wetland conditions continue to threaten wildlife. While recent restoration efforts and funding initiatives offer hope, long-term solutions will depend on continued cooperation and effective water management.

[*Win-Win,* Cont. from Pg. 1]

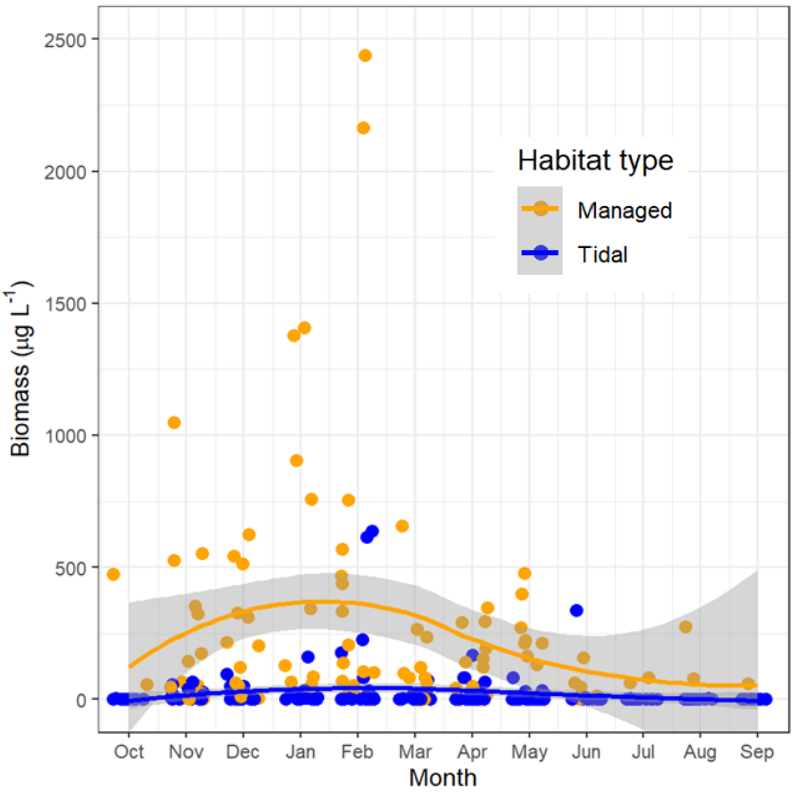



**Figure 2.** Seasonal zooplankton abundances in managed wetlands (orange) and tidal habitats (blue) in Suisun Marsh. Points represent estimated zooplankton biomass from samples. Trendlines represent the estimated average biomass across months, using LOESS regression. Gray rangeband represent the standard error of the estimated trendlines. Data were collected between autumn 2018 and autumn 2022 (Phillips *et al.* in progress).

Seasonal flooding can also create ideal growing conditions that jumpstart plankton production. Floods release a pulse of nutrients from wetland soils and decaying plants that can stimulate plankton growth. Managed wetlands also offer higher quality detritus than tidal habitats. Important plants to foraging waterfowl, like fat hen and sea purslane, grow almost exclusively in managed wetlands during the dry period. Detritus from these plants were shown to enhance plankton growth when compared to leaf litter from emergent plants, like tules, cattails, and *Phragmites*, which dominate tidal habitats in the marsh (Phillips *et al.* 2024).

Plankton, themselves, show a pulsed response to floods, with peak phytoplankton abundances occurring within the first two months after flood up, and peak zooplankton abundances occurring two to four months after flood up, then gradually decreasing as nutrients are depleted. As most managed wetlands flood in early October for duck hunting season, peak plankton abundances tend to occur in winter and early spring, which incidentally aligns with spawning periods for several native fishes. However, the study also found evidence that floods can boost plankton production at any time of year, meaning that managers can directly control when to increase plankton production.

Given their seasonal and highly productive nature, managed wetlands most closely resemble natural floodplains. Floodplains are swathes of land alongside rivers that flood whenever rivers overtop their banks. Because of the nutrients they mobilize during floods, they are among the most productive aquatic ecosystems *on earth* and often form important seasonal nursery grounds for fishes. The difference with managed wetlands is that managers can control when to flood independent of water discharge through the estuary. This offers tremendous flexibility, by being able to flood and provide food and habitat even during drought conditions.

These findings also raise questions about recent and ongoing tidal restoration efforts in the estuary, implemented with the goal of increasing food and habitat for fish. While some of the recent restoration efforts created entirely new wetlands (e.g Montezuma wetlands), others converted managed wetland habitat to open-tidal wetlands. Wetland-to-wetland restoration may be counterproductive.

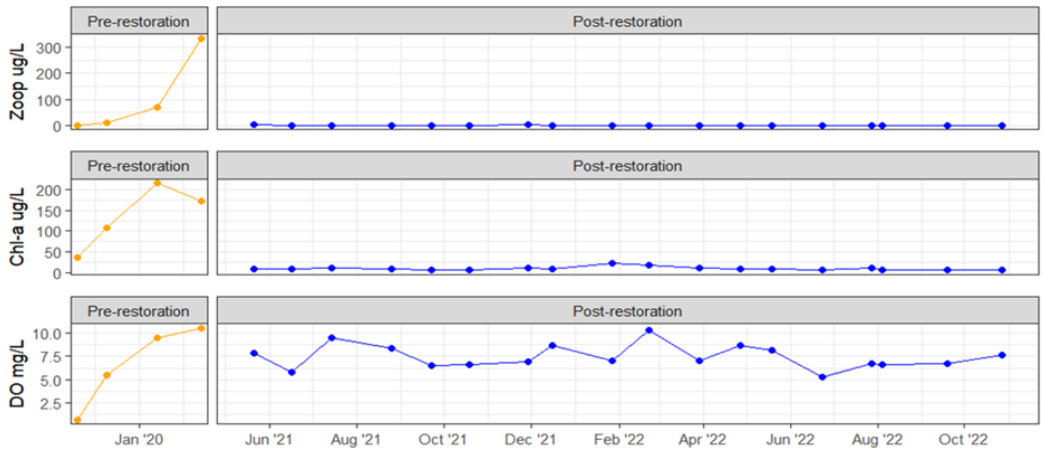



**Figure 3.** Plot depicting trends for zooplankton biomass, chlorophyll a (phytoplankton), and dissolved oxygen at Wings Landing while it was a managed wetland (2019 - early 2020) and after it was tidally restored (2021 -2022). Points represent averages across sampling stations within Wings Landing on a given sampling day (Phillips *et al.* in progress).

[*Win-Win,* Cont. on Pg. 5]

[*Win-Win,* Cont. from Pg. 4]

The restoration of Wings Landing, for example, reduced plankton stocks to a whimper, although it did also reduce seasonal impacts to dissolved oxygen (**Figure 3**). Furthermore, the fish that moved into tidally restored wetlands have been dominated by invasive inland silversides (Williamshen *et al.* 2021; Platzer *et al.* in progress), potentially compounding threats to native fishes.

The lesson here is that restoration is very difficult to do successfully, especially when both the physical landscape and species assemblages have drastically changed. Merely restoring habitat does little to control non-native species and does not necessarily restore historic ecosystem functions, like plankton production. However, as we see with managed wetlands, novel environments can offer novel solutions to the ecological problems we face today, if we're willing to think a little outside of the box.

While lots of questions remain about how best to optimize managed wetlands for waterfowl, fish, and other wildlife all at once, it is apparent that management for waterfowl does not necessarily come at the expense of fish; nor vice versa. These taxa coexist in many natural habitats, so it should not be surprising that they can coexist in man-made habitats targeted toward one of them. While there may be problems to iron out, like oxygen depletion or fish entrapment, the co-benefits that managed wetlands provide for fish and waterfowl in Suisun Marsh are increasingly clear. Unlike the wetlands, the long-standing rift between fish and waterfowl enthusiasts may not actually hold much water.

Further Reading:

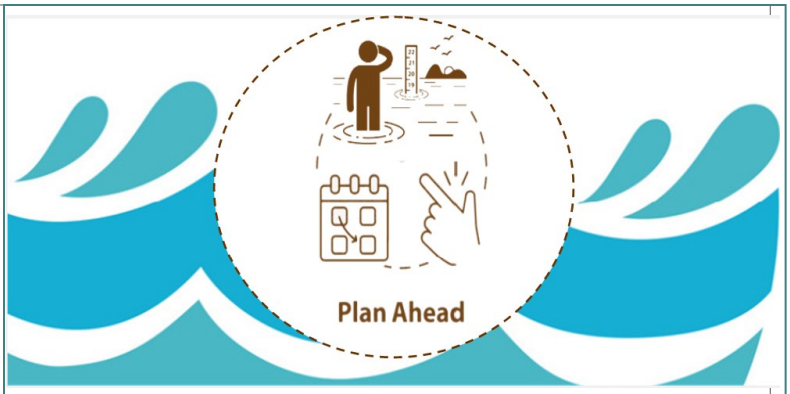

Aha, N. M., Moyle, P. B., Fangue, N. A., Rypel, A. L., & Durand, J. R. (2021). Managed wetlands can benefit juvenile Chinook Salmon in a tidal marsh. *Estuaries and Coasts*, *44*, 1440-1453.

Phillips, K. A. (2025). *Zooplankton Abundances in Managed Wetlands and Tidal Habitats of Suisun Marsh and Mechanisms of their Productivity*. University of California, Davis.

Phillips, K. A., Tung, A. M., McConnell, R. M., O'Rear, T. A., Rejmánková, E., Lawler, S. P., & Durand, J. R. (2024). Forbs from seasonal managed wetlands boost plankton production more than emergent graminoids by supplying novel labile detritus. *Freshwater Biology*.

Phillips, K., Tung, A., O'Rear, T., & Durand, J. (2024). Growing food for ducks and fish in seasonally flooded managed wetlands. California Water Blog.

Williamshen, B. O., O'Rear, T. A., Riley, M. K., Moyle, P. B., & Durand, J. R. (2021). Tidal restoration of a managed wetland in California favors non-native fishes. *Restoration Ecology*, *29*(5), e13392.


## Opening Day of Waterfowl is October 18, 2025

Important Reminder for Clubs - Waterfowl Opening Weekend 2025-26

**Early Start – The 2025-26 season begins a week earlier than last year.**

- This reduces time for summer leach cycles and for the completions of maintenance projects.
- Pond managers should plan ahead and schedule early.

**Water Management**

- Coordinate with club members and neighbors to ensure the desired water levels are reached by the third week of October (rather than the fourth).
- Engage with SRCD water managers to discuss flood dates, tide sets, and shoot level objectives.
- Sign your waivers with the Solano County Mosquito Abatement District (SCMAD) to help reduce any treatment costs.

**General Recommendations**

- Plan flooding around the best tide sets before the season begins.
- Coordinate with neighbors, water managers, and SCMAD to manage mosquito production.
- Proper planning and communication help ensure healthy wetlands and a better hunting experience.

**Be proactive, communicate, and plan ahead.**


→ Rabbit season opened on the 1st of July and will remain open until the 27th of July.

→ Infrastructure improvement projects are in full swing. Recent projects include upgraded pumps in the 15 fields, installation of a pipe under Grizzly Island Road and another into the 14 fields ditch for upland field drainage capabilities.

→ Joice Island Wildlife Area is getting prepped for a greatly needed levee and road maintenance project. The project will include dredging a large portion of the island exterior levee and importation of approved gravel and dirt material to raise access road elevations for hunters.

→ Joice Island also had a successful wild pig season. Hunters were more successful in the second half of the season when water levels on the island came up.

→ Suisun Marsh Field Day at Grizzly Ranch on June 7, 2025 was a huge success with 550 people in attendance who contributed to California Waterfowl Association's youth outdoor and veteran programs.

→ The Suisun Marsh Salinity Control Gates will be operated for Delta Smelt habitat from June 23rd until at least August 22nd. There will likely be additional operations after August 22nd, which should lower salinity during 2025 flood up.


Domestic cats are prevalent in Suisun Marsh, and staff from the Suisun Resource Conservation District (SRCD) and the California Department of Fish and Wildlife (CDFW) are working hard to monitor and manage their populations. While beloved as pets, free-roaming cats are one of the world's most ecologically damaging invasive species, having contributed to the extinction of at least 63 species of birds, mammals, and reptiles.

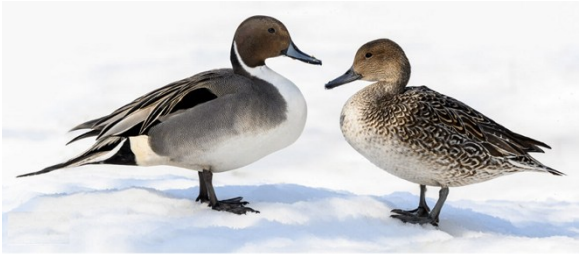
In Suisun Marsh, these cats depredate sensitive wildlife, including the state- and federally-endangered salt marsh harvest mouse, lizards, snakes, and ground-nesting waterfowl. As part of ongoing efforts to protect these vulnerable species, we have safely removed 18 cats from the Marsh to date.

To support this work, we're asking the public to report cat sightings in the Marsh. Scan the QR code below to complete a short, anonymous survey. To report sick or injured cats or kittens, please email: GrizzlyIsland@Wildlife.ca.gov.

Interested in supporting the program? Donations can be made through the link at the QR code.

Your involvement makes a difference—thank you for helping us protect local wildlife!

## Northern Pintail — *Anas acuta*



- The harvest limit of pintail changed to a 3 bag limit for the 2025 -26 hunting season.
- This is the first time in almost 30 years where hunters will be able to harvest 3 pintail.
- The new limits for pintail are part of a larger plan to understand how bag limits for the species impact populations as part of an adaptive harvest management plan.
- Results will help regulatory biologist understand whether hunter harvest is compensatory or additive.

**Compensatory vs Additive Mortality**

- Compensatory Mortality: Hunting mortality replaces deaths that would have occurred anyway due to natural causes and does not decrease population size.

- Additive Mortality: Hunting mortality is added to natural mortality, decreasing population size.

# Suisun Conservation Fund's
# 21st Annual
# Shoot and Social Fundraiser

## Sporting Clays Shoot, Steak BBQ Lunch, Raffle, and Auction

"Come Sharpen Your Shooting Eye for the Upcoming Season!"

All proceeds to benefit SRCD Landowners

## Friday, July 25 @ 9AM-3PM
## Sign-Up: 9AM-10AM
## Shoot: 10AM-12PM
## Lunch, Auction, Raffle: 12:30PM-2:00PM

## Birds Landing Hunting Preserve and Sporting Clays

**Cost $100.00 per Person**

The organizing committee is actively soliciting volunteers, donations of cash, auction, and raffle prizes

**For more information contact: SRCD @ (707) 425-9302, SRCD@SuisunRCD.org, Or John Takekawa 707-631-1402, jtakekawa@suisunrcd.org**

Land Of The West Wind
SRCD Newsletter
2544 Grizzly Island Road
Suisun CA 94585
Address Correction Requested

PRESORTED NONPROFIT
U.S. POSTAGE PAID
SUISUN, CA 94585
PERMIT NO. 124

**Address Correction Requested**

## Suisun Conservation Fund's 21st Annual Shoot & Social Fundraiser

*Please RSVP by Friday, July 18th, 2025*

I would like to attend the SCF 21st Annual Shoot & Social Fundraiser on **Friday, July 25th 2025.**

How many _____ at $100.00 per person. I have included a tax deductible cash donation of $_____.
Please contact me for an auction or raffle item:

Email SRCD@suisunrcd.org or call (707) 425-9302 for more information.
Make check payable to Suisun Conservation Fund and mail to:

Suisun Conservation Fund
2544 Grizzly Island Road
Suisun, CA 94585-9539

Name_____Phone_____Email_____

Name_____Phone_____Email_____

Name_____Phone_____Email_____

Name_____Phone_____Email_____

*The Suisun Conservation Fund is a 501©(3) organization establish exclusively to support the conservation work of the Suisun Resource Conservation District.*