

A WET WINTER LOOMS: WHAT A POTENTIALLY SUPER EL NIÑO COULD MEAN FOR THE SUISUN MARSH

By: Brock Riggs (SRCD)



Higher-than-normal summer tides caused erosion from overtopping, as seen on this Suisun Marsh levee.

The coming winter could bring a familiar California paradox: for wetland properties within the Suisun Marsh, too much water, too quickly. A potentially historic El Niño is strengthening in the tropical Pacific, and forecasters are increasingly confident that the 2026–27 winter will be wetter than normal across much

of California. El Niño is an ocean-atmosphere climate pattern characterized by unusually warm waters in the central and eastern tropical Pacific. Those warm waters influence atmospheric circulation, which in turn can alter the position and strength of Pacific storms. The National Weather Service's early-September California preparedness guide says a strong El Niño has already developed in the eastern tropical Pacific. The National Weather Service gives a 90% probability of a very strong event through the fall and winter and a 69% probability that the event will become historic in strength (National Weather Service, 2026).

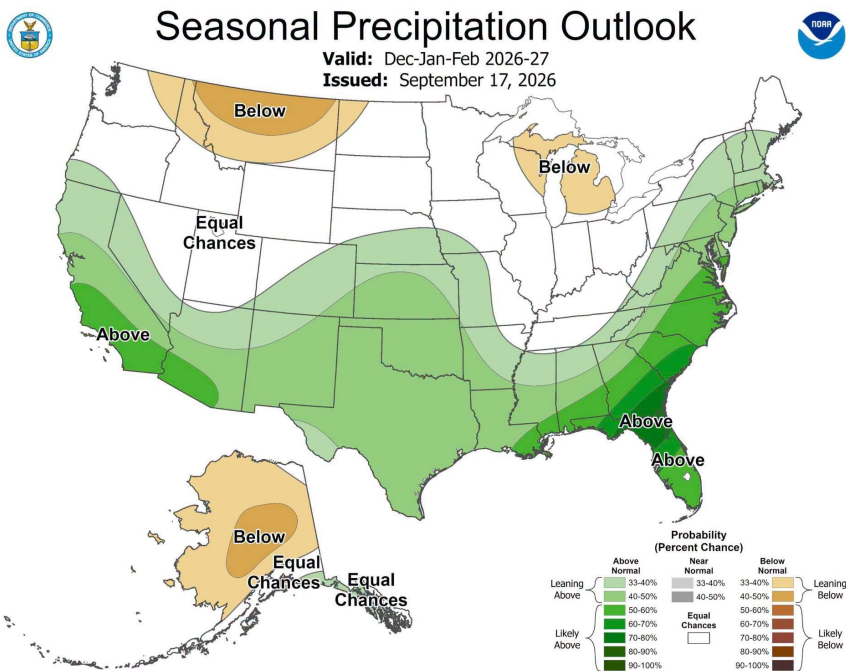


Figure 1. Current seasonal precipitation models from the National Oceanic and Atmospheric Administration predict higher than average amounts for the coming winter.

Recent forecasts have also shifted noticeably toward a wetter California (Figure 1). NOAA's September seasonal outlook moved much of California into the above-normal precipitation

[Wet Winter, Cont. on Pg. 2]

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: srkd@suisunrcd.org
Website: www.suisunrcd.org

Staff

Steven Chappell, *Executive Director*
Desmond Mackell, *Operations Manager*
Caitlin Perez, *Administrative Assistant*
Jeff Taylor, *Biologist/Sr. Water Manager*
Tim Edmunds, *Biologist/Water Manager*
Brock Riggs, *Biologist/Water Manager*
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(707) 224-3824

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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.



[Wet Winter, Cont. from Pg. 1]

category for December through February. The Bay Area had previously been in an "equal chances" category, but the newer forecast increased the odds of a wetter winter.

That does not predict that the Bay Area will receive a particular amount of rain. Seasonal models are considerably better at identifying broad tendencies than predicting the exact location and timing of individual storms. That distinction could become particularly important for the Suisun Marsh. These predictions have attracted attention from across California, particularly after the devastating floods associated with several recent atmospheric-river seasons. But in the Bay-Delta region, the implications are especially complicated.

In Suisun, winter storms do not operate in isolation. Rain falling in the Sacramento and San Joaquin valley watersheds and rivers eventually move towards the marsh. At the western edge of that system, freshwater runoff encounters the tides of San Francisco Bay. This can mean higher tides, saturated levees, high delta outflows, and drainage problems. At the same time, higher coastal water levels and strong winter storms can compound the problem by making it harder for Delta waters to drain toward the Bay (Rolling Out, 2026).

While El Niño does not guarantee flooding, it increases the possibility of repeated heavy storms. For landowners managing privately owned wetlands, the biggest concern may be what those storms do to the exterior levee system that keeps the property functioning.

All privately managed wetlands in the Suisun Marsh depend on levees to separate managed ponds from surrounding sloughs and tidal waters. These levees are critical not only for protecting property, but also for maintaining the ability to control water levels and provide seasonal wetland habitat. A particularly wet winter puts additional stress on that levee system. Heavy rainfall can saturate levees and surrounding soils. Rising water levels in adjacent sloughs can increase pressure against the outside face and toe of a levee, while wind-driven waves can contribute to erosion. Repeated storms can compound these problems, particularly if water levels remain elevated between storms. The concern is not necessarily one large flood, it could be storm after storm after storm. A levee that performs adequately during one high-water event may become increasingly vulnerable when exposed to elevated water levels for weeks at a time.

Another factor Suisun Marsh landowners should watch is the Kelvin wave associated with the developing El Niño. As unusually warm Pacific water moves eastward, it can cause a temporary rise in sea level along the California coast. This rise in baseline sea level could add to flooding concerns in the Suisun Marsh as El Niño develops further (Scripps Institute of Oceanography, 2026).

In the past months, the Suisun Marsh has experienced higher than normal tides, in part due to a previous Kelvin wave. Currently there is one forming off the coast of Mexico. This previous Kelvin wave rose baseline sea levels in May and June. The developing wave will add to this rise, and effects should be seen by mid-October. When combined with warmer sea surface temperatures allowing water to expand, one source is predicting a 4 to 8 inch rise, and another a 10-14 inch rise in baseline sea level (CNN, 2026). For the Suisun Marsh, the primary concern is that higher

[Wet Winter, Cont. on Pg. 7]

Methods of Flood Fighting and Levee Erosion Control

For Suisun Marsh landowners, preparing for high water means being ready to respond when levees begin to show signs of overtopping or erosion. The California Department of Water Resources' 2024 Flood Fighting Methods manual outlines several emergency techniques that can help protect vulnerable levee sections. Four methods are particularly relevant to privately managed wetlands: proper use of sandbags, emergency spillways, wave wash protection, and utilizing Muscle Wall® barriers. These are emergency flood-fighting measures—not substitutes for permanent levee improvements—but having the materials, equipment and personnel ready before a storm can provide valuable protection when conditions deteriorate.

When water is expected to overtop a levee, an emergency spillway can be constructed at a known low spot or an area where overtopping has occurred previously. The objective is to control and direct where water crosses the levee rather than allowing it to flow uncontrolled over the levee slope. Uncontrolled overtopping can rapidly erode the backslope of the levee and potentially lead to a levee breach. Emergency spillways utilize plastic sheeting and sandbags to protect the levee surface and establish a defined flow path. Plastic sheeting is placed over the low section of levee, with the edges secured by at least a single row of sandbags (Figure 1). Additional tied sandbags can be used to hold the plastic in place, and the protected spillway should extend beyond the levee toe so that water is carried over the plastic sheeting, rather than travelling underneath it. The emergency spillway method of levee protection is the best option when protecting a known low point or previously overtopped section of exterior levee from further erosion.

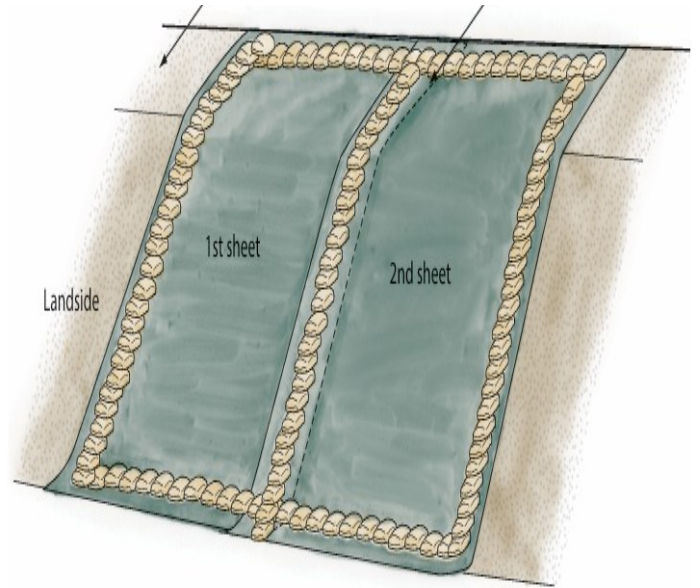


Figure 1. Diagram of an emergency spillway method of levee protection, to reduce erosion from overtopping.

Wavewash erosion is another concern for the tidal side of levees bordering wide expanses of water. These levees should be actively monitored during periods of high water and strong winds. Repeated wave action can progressively erode the waterside slope, especially on a westward or southern facing levee. A well-established tidal berm or established, substantial growth of phragmites or tules can provide some protection during shorter periods of high winds, but sustained wind combined with high water requires closer observation and reinforcing protection for this coming winter.

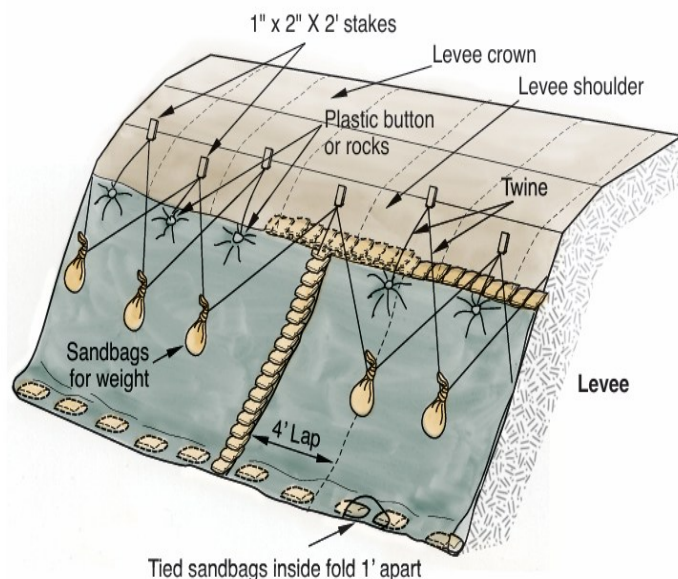


Figure 2. Diagram of wave-wash protection, to protect a levee from wind-driven wave erosion.

DWR describes an envelope method using heavy plastic sheeting to protect the levee from wavewash. The plastic is folded in half to create an envelope and secured to the levee using knotted sandbags, stakes and twine (Figure 2). The 2024 manual specifies 10-mil plastic sheeting, typically supplied in 20-by-100-foot rolls. Stakes are driven into the ground above the levee shoulder, approximately four feet apart and staggered vertically. The plastic is then secured to the slope, with sandbags providing additional weight and helping hold the lower portion of the protection in place. Proper installation is important because loose or poorly secured plastic can become ineffective—or potentially create additional problems—when exposed to strong wind and waves.

Where additional freeboard is needed, a Muscle Wall® portable flood barrier can provide another emergency option. Muscle Wall is often referred to as “plastic k-rails” as each section locks into each other and acts as a barrier to keep large amounts of water controlled (Figure 3). This method works best when the application begins with laying a 20-by-100-foot, 10-mil sheet of plastic over the area to be protected, leaving excess plastic toward the exterior side. Sections of Muscle Wall are then positioned on the plastic with the toe facing the exterior side of the levee and the sections interlocked. Ratchet straps are used to tie the sections together for additional stability, and each section is filled at least three-quarters full with water. The plastic is then rolled over the top of the barrier and secured on the landside with a stretcher row of sandbags. Key-folded or knotted sandbags along the toe of the Muscle Wall are imperative to securing the barrier to the levee and avoid any movement or tipping. The system essentially creates additional temporary height along a vulnerable section of levee, helping reduce the likelihood of water reaching and overtopping the existing levee crown. Muscle Wall is not water-tight, but prevents large amounts of water spilling over the levee crown, preventing large amounts of erosion.



Figure 3. Muscle Wall installed and in action, keeping flood waters from overtopping a levee.

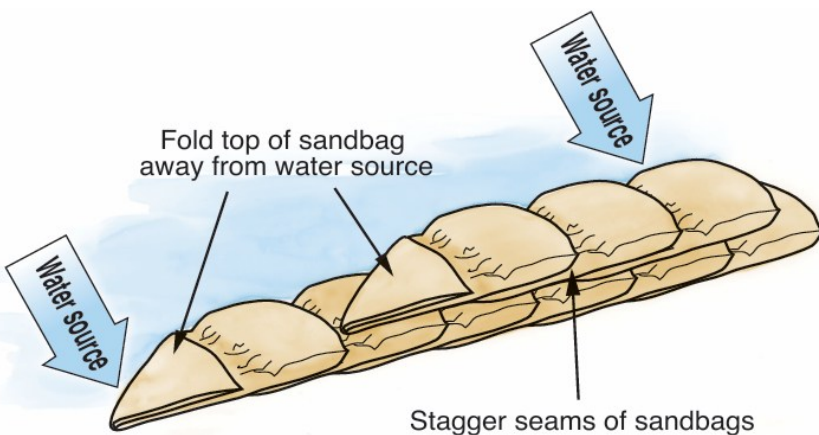


Figure 4. Demonstration of properly folded sandbags.

ture (Figure 4).

For landowners preparing for a potentially high-water winter, these techniques are most valuable when they are considered **before** an emergency begins. Identify low sections of levee where an emergency spillway or temporary barrier could potentially be deployed; identify exposed areas susceptible to wavewash; make sure pumps and water-control structures are operational; and have plastic sheeting, sandbags, stakes, twine and other necessary materials available before conditions deteriorate. Flood fighting depends on preparation and rapid identification of developing problems.

Ultimately, the goal of emergency flood fighting is not simply to react when water reaches the top of a levee. It is to control where water goes, prevent erosion from gaining a foothold, and buy time before a localized problem becomes a major failure. For Suisun Marsh landowners, having the materials on-site and readily available — and knowing how to successfully deploy them — is a crucial part of protecting privately maintained wetlands during a major high-water event.

Reference:

California Department of Water Resources Flood Fighting Methods 2024.

Sandbags are incorporated into all of these methods, and can also be used independently, to address localized flooding and erosion problems. But how the bags are filled, folded and placed matters. A properly constructed sandbag barrier relies on tightly packed bags working together rather than simply stacking loose bags on top of one another. The open end of the bag should be folded or keyed underneath when appropriate so that the sand remains contained and the bag can lock into the structure. In structures where bags are stacked in successive courses, the joints should be offset rather than lined up from one row to the next. This creates a more stable wall and reduces the likelihood that water will find a continuous pathway through the struc-

Flood Fight Preparation Is the Best Insurance

Nobody can say yet whether the coming winter will produce major flooding in the Suisun Marsh. Even strong El Niño events can produce very different weather patterns across California. However, the current forecast provides a good reason for landowners to prepare before the first major storm arrives.



Stockpiled sand near possible problem areas on an exterior levee, ready to be bagged and utilized in an emergency event.

For privately managed wetlands, a preseason checklist should include:

- Inspect levees for erosion, settlement, seepage, animal burrows and other weak areas.
- Check known problem areas from previous winters and make repairs while conditions are favorable.
- Stage emergency supplies, including purchasing sandbags, visqueen, and other flood-fighting materials, where they can be reached during high water.
- Test pumps and verify that backup equipment is operational.
- Inspect water-control structures and make sure gates and culverts can operate properly.
- Check access roads and identify areas that could become inaccessible during prolonged rain.
- Coordinate with neighboring landowners and managers so that potential levee or drainage problems can be identified and addressed quickly.

Plan Ahead

KING TIDES

Be Prepared:
November 24-26, 2026
December 22 - 25, 2026
January 20 - 23, 2027

King tides are the highest and most extreme tides of the year. The position and distance of the moon and sun affect our tides.

When they align

When the sun, moon, and earth align, solar gravity combines with lunar gravity, creating very high tides, King Tides.

King Tide

PC: Dept. of Ecology, State of Washington

Mute Swan Hunting Shows Early Success

California's effort to control the rapidly expanding population of invasive mute swans is showing significant early results. Following a change in state law that took effect January 1, 2026, licensed hunters have been allowed to take mute swans at any time, while landowners and lessees may take them on their property without a hunting license or depredation permit. The change provided another management tool for a nonnative species that has become particularly concentrated in the wetlands of the Suisun Marsh.

The first population estimates following the change are striking. According to the California Department of Fish and Wildlife's (CDFW) 2026 Waterfowl Breeding Population Survey, the statewide mute swan estimate declined from **15,713** birds in 2025 to **7,393** in 2026, a **53% decrease** in a single year. Still, CDFW's 17-year average is only 1,956 mute swans, meaning that even after the recent decline, the 2026 estimate remains approximately 278% above the long-term average. CDFW has monitored feral mute swans through its breeding waterfowl survey since 2007.

The reduction is especially notable because the population had expanded extremely rapidly. CDFW biologists had estimated only about 1,500 mute swans in California in 2022, before the population climbed to more than 15,000 by 2025. Most of that growth occurred in and around the Suisun Marsh, making the issue particularly important to local wetland managers and landowners.

Mute swans can create substantial problems in managed and natural wetlands. Unlike native migratory swans, mute swans are a nonnative species introduced from Eurasia and generally remain in California throughout the year. CDFW reports that an adult can consume as much as **eight pounds of submerged aquatic vegetation per day**, while destroying additional vegetation through its feeding activity. This vegetation provides important food and habitat for local breeding and migratory waterfowl, fish and aquatic invertebrates. Mute swans are also highly territorial and can displace, injure or kill other waterbirds.

Although one year of survey data cannot establish the long-term effect of hunting and landowner take by itself, the initial population change is substantial and occurred immediately after those management options became available. The decline from more than 15,000 to approximately 7,400 birds represents an important early indication that direct removal can contribute to controlling California's invasive mute swan population. Continued CDFW monitoring will show whether these reductions can be sustained and whether the population can be brought closer to historical levels while reducing pressure on the Suisun Marsh and other important California wetlands.



The U.S. Fish and Wildlife Service has released its numbers for the 2026 Waterfowl Breeding Population and Habitat Survey. This process is conducted annually in May and June in a joint effort with the Canadian Wildlife Service. Aerial surveys provide information on spring population size and breeding habitat for waterfowl. These surveys are completed in the states of Alaska, Maine, Montana, North Dakota, and South Dakota, in conjunction with several provinces of Canada. These data directly impact and help establish annual hunting regulations in both countries. Below are the major findings regarding species that frequent the Suisun Marsh.

- Mallards declined 11% below the surveyed population number from 2025.
- Northern Pintail also declined 11% below the surveyed population in 2025.
- Gadwall (+13%), Wigeon (+12%), and Green-wings (+6%) all exhibited growth in populations when compared to the long-term average for each species.
- The dabbling duck with the most population growth, in both change from 2025 (+19%) and long-term average (+24%), was the Northern Shoveler.
- Redheads (+1%), Canvasbacks(+13%), and Scaup (+13%) all exhibited population growth when compared to 2025.
- The total ducks surveyed came in at 33.439 million, a 2% decline from 2025.
- Breeding habitat increased 14% when compared to 2025.

According to the companion Adaptive Harvest Management report, the U.S. Fish and Wildlife Service is expected to recommend liberal frameworks across the flyways for the 2027-2028 season. The bag limits in the immediate future should stay similar to that of 2026-2027. While bag limits may remain similar, these data suggest that continued conservation work and managed wetland preservation remain imperative to support migratory waterfowl.

than normal background water levels could make it easier for high tides, storm surge and heavy runoff to reach or overtop vulnerable sections of privately maintained levees. A levee that normally has several inches of clearance during a high tide may have substantially less during an El Niño-enhanced high-water event. If that coincides with strong winds or heavy rainfall, overtopping could become a significant concern, making early and regular inspection and repair of low or vulnerable levee sections especially important.

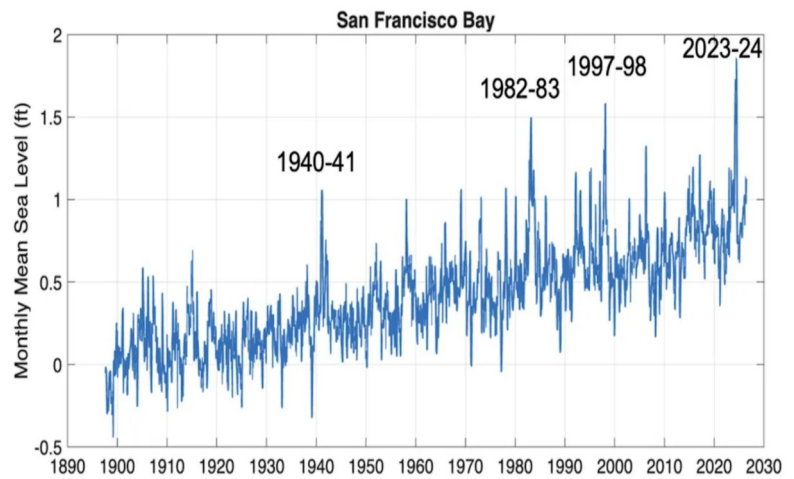
Early detection of levee issues and erosion is key to maintaining the protection of a managed wetland. Landowners and managers should pay particular attention to areas showing erosion, seepage, settlement, sloughing or boils. A boil occurs when water moves through or underneath a levee and emerges on the landward side, potentially carrying soil particles with it. Continued seepage can remove material from inside the levee and weaken the structure. These problems are considerably easier to address before a major storm rather than during one.

While levees are the primary concern, they are only one part of the system. Pumps, culverts, water-control structures, and access roads all become increasingly important during an extreme wet season. All pumps and discharge pipes should be tested before they are needed. Water-control structures should be inspected for damage or obstruction. Drainage ditches should be checked for and cleared of accumulated vegetation and debris. Exterior levee access is also crucial to prevent catastrophic damage if flooding and overtopping occur. DWR's flood-fighting guidance recommends having materials such as sandbags and plastic sheeting available for emergency response. In certain situations, sandbags and visqueen can be used to direct water cleanly over levees, reduce the movement of water and soil through a levee, and control seepage.

For Suisun Marsh landowners, water is both the resource that makes the wetlands valuable and the force that can threaten them. A wet winter can provide important water resources and habitat benefits. The challenge comes when water arrives faster than the property's infrastructure can handle it—or when high water persists long enough to expose weaknesses. With a potentially strong El Niño ahead, the best opportunity to address those weaknesses is before the water rises. The coming months are the time to inspect, repair, test and prepare. Because once the first major storm arrives, the question will no longer be whether the levees are ready. It will be whether they can hold.

References:

- CNN. 2026. *El Niño brings sudden sea level rise to the California coast.*
- National Weather Service (NWS). 2026. *El Niño in California: Information & Preparedness Guide.* NOAA/National Weather Service, Sacramento, CA.
- Rolling Out. 2026, August 25. *Super El Niño could bring California's worst coastal winter.*
- Scripps Institution of Oceanography. 2026. *How Does El Niño Impact the California Coast?* University of California San Diego.



Monthly average sea levels in the San Francisco Bay (NOAA)

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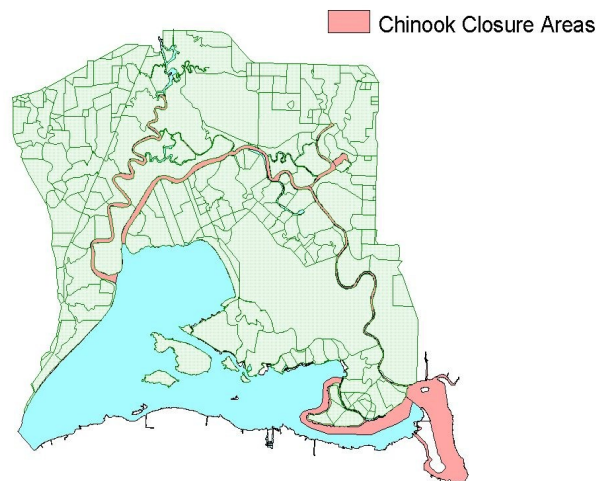
Fall Reminders

Chinook Salmon Gate Monitoring Starts November 1:

The Suisun Resource Conservation District will begin gate monitoring for the Fall Run of Chinook Salmon starting **November 1, 2026 through January 31, 2027**. During this restriction period, intake gates along the designated sloughs (indicated in pink on adjacent map) can only be opened to 25% capacity. SRCD staff will be inspecting all intake diversions along these areas at various times during this period. Below is a conversion table for varying sizes of intake gates.

<u>Diameter of Pipe</u>	<u>25% Open</u>
12 inches	3 inches
18 inches	4 inches
24 inches	6 inches
30 inches	7 inches
36 inches	9 inches
48 inches	12 inches

Should an intake be found out of compliance, SRCD is required to report to the appropriate agencies and the landowner will be contacted and asked to reduce their intake immediately.



Actual Work Reports

All landowners who applied under the USACE RGP3 permit should report back to their Water Manager on work that was completed during the summer work season.