

5 MINUTE READ

Lower Elkhorn Basin



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by US Army Engineer Research and Development Center



Sacramento, California, United States

Increasing resiliency and capacity through the use of levee setbacks.

The Lower Elkhorn Basin Levee Setback (LEBLS) Project is a multibenefit project that provides broad flood risk reduction and ecosystem benefits for a large region within California's Central Valley. For this project, the California Department of Water Resources (DWR) has constructed an approximately 11,500-meter setback levee to expand the Sacramento and Yolo bypasses by about 450 meters. Construction started in August 2020, and the existing levees were breached in summer 2023 for use of the expanded bypass in winter. The expansion of the bypasses significantly reduces the risk of flooding for the Sacramento area; when coupled with the U.S. Army Corps of Engineers (USACE) Sacramento Weir Widening Project, the water surface elevation in the Sacramento River will be reduced by nearly 30 centimeters during high-water events. The expanded bypass footprint area will be used for agriculture and habitat, compatible with seasonal flooding. LEBLS is the first state-led project to be implemented from the Central Valley Flood Protection Plan (CVFPP), which was developed to better manage the risk of flooding in California's Central

Valley, specifically in areas classified as protected by the State Plan of Flood Control. LEBLS has been recognized as a well-performing project at state and local levels.

Article Cover: Flow from the Yolo Bypass entering the expanded bypass and moving south along the new setback levee in February 2024. The breached Yolo Bypass levee with the tree-lined Tule Canal is visible in the center of the photo. (Photo by Sara Nevis, California DWR)

Producing Efficiencies

The project was designed to use on-site soil to comply with air-quality regulations, reduce costs, and create construction and operational efficiencies. The on-site soil is a high-plasticity (“fat”) clay not typically suitable for levee construction; however, the levee will have a larger prism and flatter slopes than usual to accommodate this material. To protect the levee from erosive wave wash from the Yolo Bypass while providing ecosystem benefits, the project uses a tied concrete block mat with soil cover and native perennial grass over the mats. This is the first use of the product on state-federal levees in California.

Using Natural Processes

The project expands the inundated Yolo Bypass floodplain and has been designed to inundate the expanded floodplain with frequent flows that will benefit rearing juvenile salmon. The floodplain connects to the Tule Canal riparian corridor, which provides habitat to a variety of fish and wildlife species. The project also creates the opportunity for future habitat improvements to be developed along the Tule Canal corridor that would then allow even greater benefits for aquatic species.





Aerial view of cured concrete block mats ready to be rolled and placed on the waterside of the new setback levee. The tied concrete block mats are less expensive than placing rock for erosion protection, easier and more efficient to maintain, and more friendly to wildlife. Production of the mats was completed in bulk in approximately 1,219-meter linear increments and cut to size prior to installation.

(Photo by Florence Low, California DWR)

Broadening Benefits

The expanded Yolo Bypass area will be used for floodplain-compatible agriculture, like growing rice. This land use allows seasonal flows that benefit the ecosystem and the local economy. For example, the rice paddies will be used by migrating birds, and the nutrients in the paddies can be used during the life cycle of fish in the bypass and downstream. Native grasses will provide foraging habitat for Swainson's hawks (*Buteo swainsoni*), a listed species. The levee degrade plan includes leaving portions of the existing east Yolo Bypass levee intact and spaced at various intervals to provide areas of higher elevation refuge for giant garter snakes (*Thamnophis gigas*) and other species during high water events.

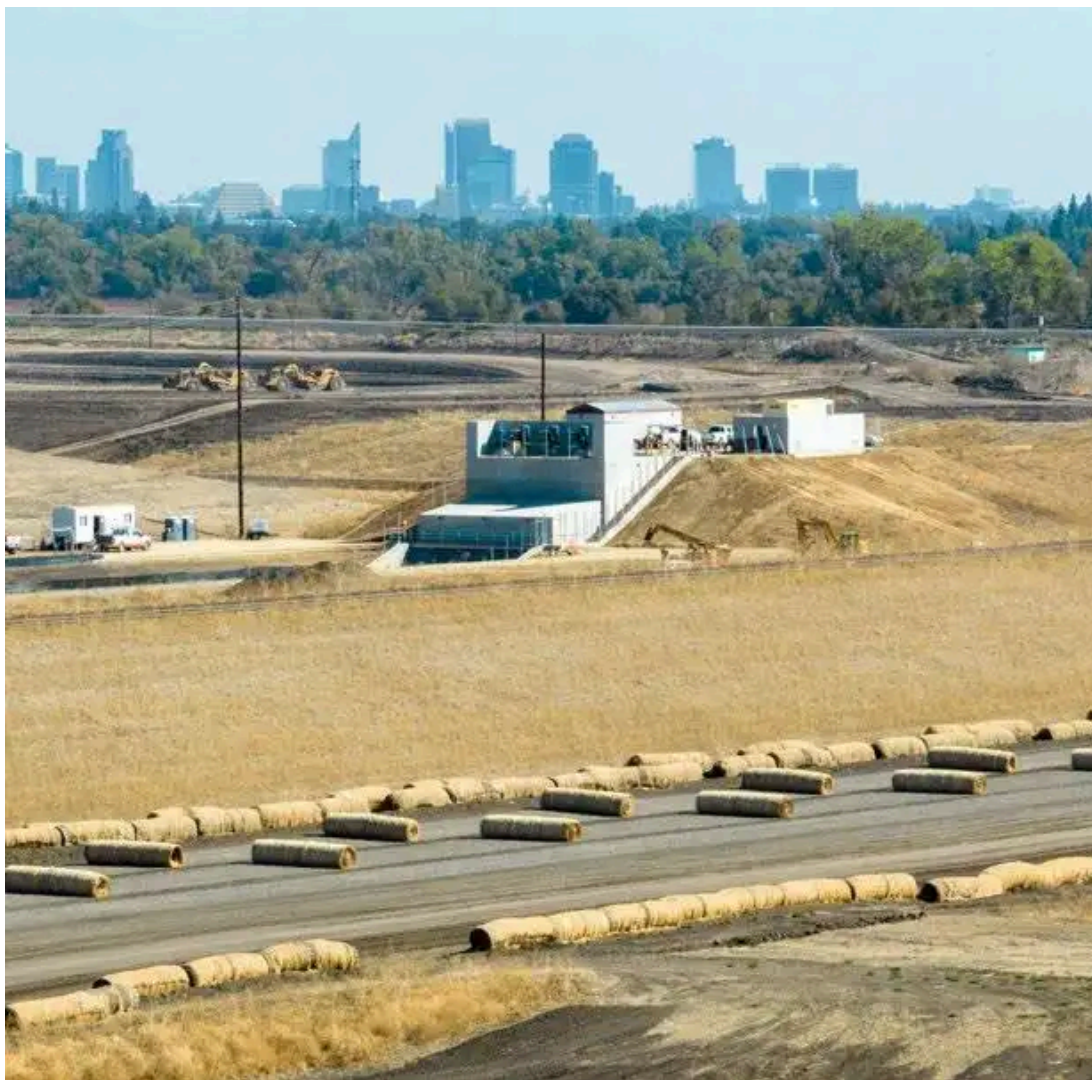


Fabrication of the tied concrete block mats before placement on the setback levee.

(Photo by Florence Low, California DWR)

Promoting Collaboration

Identified as a state priority, concept discussions began during the public planning process to develop the 2012 CVFPP, with collaboration continuing through the 2017 CVFPP and Basin-Wide Feasibility Studies, completed in partnership with locals. In 2016, DWR launched a targeted outreach effort that included gathering input from key interested parties, like the local reclamation district (formed and maintained by farmers and landowners for agricultural use), landowners, Yolo County, and Native American tribes. The project has benefited from robust partnerships with other state and local agencies, other special districts (i.e., reclamation districts), and a key partnership with a traditionally and culturally affiliated tribe. These partnerships continue through construction and during future operations, allowing flexibility in implementing and maintaining the project in a cost-effective and timely manner.

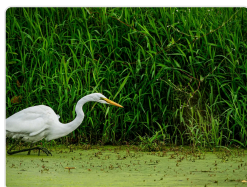


Pump station with rolls of tied concrete block mats in the foreground and the Sacramento skyline in the background.

(Photo by Florence Low, California DWR)

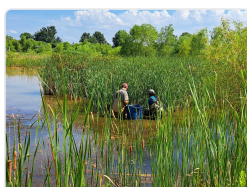


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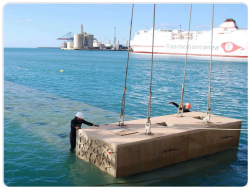


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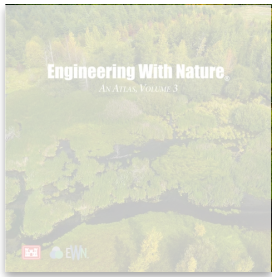
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