

Tidal Habitat Restoration and Regional Flood Protection Nexus: Planning for Multiple-Benefits in the Lower Sacramento North Delta Region

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Problem: Two concurrent goals, regional planning for flood risk reduction and flood plain and tidal habitat restoration efforts, are planned for the Lower Sacramento River/North Delta Region. Effective inter- and intra-agency coordination, communication, and collaboration will be fundamental to the success of meeting both goals in a region where land available to achieve these goals is limited.

Approach: DWR funds locally driven efforts to develop flood management plans. FloodProtect, in the Lower Sacramento North Delta Region, seeks to coordinate flood planning efforts with stakeholders and present a landscape level regional flood management plan to DWR. The Fish Restoration Program (FRP), a joint effort by DWR and CDFW, must restore 8,000 acres of intertidal and associated subtidal habitat and a minimum of 17,000 acres of flood plain habitat by 2018 to meet specific State and Federal restoration requirements. There is great potential to achieve the goals of these two compatible efforts through close coordination between programs, departments, and agencies.

Results: Close collaboration has already begun between CDFW and DWR through the FRP and FloodSAFE Environmental Stewardship and Statewide Resources Office. Bit by bit, lines of communication between the agency silos are being formed, regional planning for multiple-benefits is taking shape, and these collaborative efforts are identifying where the opportunities exist in the system.

Conclusions: Multiple-benefit projects, that meet ecological, flood safety, and agricultural needs in a finite landscape, where the land is already performing multiple functions, will require continued close collaboration for planning operations and maintenance of the system.

Keywords: Tidal Habitats, Lower-Sacramento, North-Delta, collaboration, Yolo Bypass, Flood Protection, Multiple-Benefit

Poster topic: Flood Management

The AFRI Rice Project: Benefits of Nitrogen Fertilizer Treatment in Rice Planting on the Sacramento-San Joaquin Delta to Encourage Subsidence Prevention, Sustainability of Soil Conditions & Water Management Effects on GHG Emissions

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About two-thirds of the Sacramento-San Joaquin Delta (Delta) islands are agriculture lands. The drained peat soils of the Delta have provided fertile soils for agriculture since the late 1800s. Unfortunately during that time, the environment in the Delta island region has dramatically deteriorated as evidenced by subsidence. On many of the Delta islands peat soil has oxidized causing subsidence of up to 20 feet, or more, below sea level.

Subsidence is responsible for severe consequences including extensive greenhouse gas emissions, construction of a 110-mile levee network, risks to California's water supply and the degradation of water quality. If current agricultural practices remain unchanged, things will only get worse.

As a partner in a UC Davis and UC Berkeley study, East Contra Costa County high school students are participating in the AFRI Rice Culture Mitigation Study to determine if growing rice, as opposed to other Delta crops, would help in mitigating subsidence and concurrently mitigating GHG emissions and soil loss; reducing risks to California water supply, including the agricultural users throughout the San Joaquin Valley downstream of the Delta; and protecting water quality.

In this study, conducted in a Learning Lab rice field on Jersey Island, the main focus is the effect of fertilizers on rice as related to yield and environmental effects. A number of hypotheses will be tested: nitrogen is a limiting nutrient in the Delta for rice; soil under treatments with nitrogen fertilizer additions will contain higher concentrations of extractable NO₃ during the growing season compared to treatments lacking nitrogen; GHG emissions are affected by water management and rice developmental stages; rice fields are sources of NO₃ and PO₄ in water.

Through soil, water and air quality samplings students hope to use examples of soil nitrogen levels, N₂O and CH₄ emissions and chloride changes to prove hypotheses.

Keywords: Island Subsidence, Levee, GHG, Greenhouse Gas, Carbon Emissions, Rice, Peat

Poster topic: Flood Management