2022 DELTA SCIENCE FELLOW FINAL REPORT

Sea Grant CALIFORNIA

Delta Stewardship Council
Delta Science Program

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Focus
Assessing the effect of tidal marsh restoration on food webs

Award
$150,725

Research Mentor
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Community Mentors
Dr. Susan De La Cruz,
USGS Western Ecological Research Center

PROJECT

Thousands of acres of land have been restored to tidal marsh in the San Francisco Bay and Delta (Bay-Delta) over the last two decades, often by breaching old dikes. Currently, several more large-scale, multiagency marsh restoration projects are planned or underway. Nevertheless, the extent to which dike breaching yields robust and diverse aquatic food webs remains unclear. This project conducted isotopic analyses to compare food webs at several tidal marshes, thereby investigating how – and why – food webs differ at restored and reference sites.

RESEARCH CONCLUSIONS

The results indicated that, among other outcomes, restored sites tended to have smaller food-chain lengths – fewer steps between the primary producer and the top predator. Further, fish at the restored sites relied more on a "brown" food web than a "green" food web; the organisms get their energy from consuming decaying biomass, rather than from eating vegetation or algae. This suggests that food-web structure is not immediately recovered with tidal marsh restoration. That fact highlights that successful ecosystem restoration must include the recovery of energy pathways as a crucial measure of success. The current study is specifically relevant to the understanding and assessment of the recent restoration of Tule Red in Grizzly Bay.

"Given the increasing number of restoration projects planned for the Bay-Delta, understanding how tidal marsh restoration may affect food web recovery is key. The goal of our study is to use novel research methods to inform the design of restoration projects."