2020 DELTA SCIENCE FELLOW FINAL REPORT

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Focus Environmental geochemistry and tidal wetland support of pelagic food webs

Award $129,800

Research Mentor
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"This project aims to provide guidance for future wetland restoration activities in the Delta so they can be implemented in a way that maximizes support for pelagic aquatic habitats."

How tidal wetlands support pelagic food webs: using metagenomics and field flow fractionation to evaluate the role of particulate wetland organic matter

This project characterized and quantified where detrital material (decaying plant matter) originates within wetlands, the composition of that material, and how export of detrital particles occurs. By combining powerful characterization tools and techniques that scale from molecules to ecosystems, the research team was able to assess spatial and temporal trends in the export of detrital material from wetlands, the composition of that material, and how it is exported.

Because restoration projects in the Sacramento-San Joaquin Delta will fundamentally alter particle distribution and food availability for aquatic organisms, this study will inform habitat restoration efforts and the revival of native fish populations. The ability to quickly identify areas that have the resources necessary for continued ecosystem survival illuminates at-risk areas in need of targeted support through external management. The tools developed and adapted for this project may also inform management response during extreme conditions and climate events by helping to identify areas that may act as refugia for species.

Research Conclusions

Particle scarcity is an endemic issue in the Delta, shifting even greater importance onto the particles that are present in the system. The large seasonal and regional variability in particulate organic carbon is of no surprise, but prior to this work it was still a vague abstraction.

There is now a concrete basis for understanding how the whole Delta changes with respect to particulate organic carbon. The most important thing to understand is that there is no one size fits all approach to the Delta, from analysis methods all the way to management options, methods should be customized based on goals. The findings of this research illustrate that our biomarker analyses need further customization to address our desired goals. Updates to existing endmember signatures and a more comprehensive survey of organic material sources across the entire Delta are required before advising management policies.