

# DELTA SCIENCE FELLOW 2017



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## WHY THIS RESEARCH MATTERS

As a center of California's agriculture, recreation, water supply, transportation, history, and culture, the Sacramento-San Joaquin Delta has been ripe with political controversies stemming from conflicting interests for decades. Reliance on the protection of 1800 km of levees places the delta in a precarious position as a result of climate change and natural disasters.

While scholars have studied the risk perceptions of urban residents on the periphery of the delta and of people with expert knowledge of the levees, little is understood about the perceptions of the broader range of people whose livelihood is dependent upon the region's natural resources.

## *Perceptions of risk and management of the Delta levee system*



ABOVE: As a result of the decay of peat soils, much of the Sacramento-San Joaquin Delta land is below sea level and relies on levees for protection from flooding.  
LEFT: A street sign in the town of Locke  
*Pamela Rittelmeyer*

## PROJECT

This project aimed to identify key drivers in the resistance for reconciling expert opinion, stakeholder interests, and landowner priorities. In doing so, this study explored the broad range of discourses on flood risk and flood management in the region.

By providing an understanding of the reasons behind the flood risk perceptions of stakeholders using a socio-cultural framework of risk perception, this research will increase the understanding of how social values motivate the measures supported for adaptation to climate change. In particular, this study explored the social acceptability of alternatives to the current levee system.

## RESULTS

This project used quantitative and qualitative methods to explore the structure and content of a diverse group of stakeholders' perceptions of flood risk and management.

The data collection included interviews, focusing on the history of the delta, attempts at solutions, current threats, and possible management solutions. Data also included participant observation at public meetings, and analysis of hundreds of public comments and media coverage.

The results of this study reveal five distinct views regarding the flood risk due to levee failures. The findings elucidate narratives on the viability of anticipatory climate change adaptation in the delta. Proximity, sense of vulnerability, values, trust, and views of climate change are the underlying factors in these perspectives. The five perspectives shared the view that residents will need to adapt in the future; however, they differed in their view of what constitutes adaptation.

Ongoing work includes media and geospatial analysis of past flood events.

## MANAGEMENT APPLICATIONS

Management in the delta continues to face a major challenge to resolve decades of distrust among stakeholder groups. There are a number of interagency and science advisory boards working on this problem, however, current efforts do not take social values into the analysis. This study found that the combination of trust, what a person values most about a place, their perception of the scale of risk, and their definition of nature is a strong determinant of their tolerance for risk. Illuminating such subtle areas of disagreement and agreement may provide a path towards more equitable and efficient decision-making.

This research may be used by the California Department of Water Resources as they develop more comprehensive plans for the delta levee system. The insights gained from this research can inform the policy that will move the delta to be better prepared for natural hazards.

## RESEARCH MENTOR

Andrew Szasz, University of California, Santa Cruz

## COMMUNITY MENTOR

Dave Mraz, California Department of Water Resources

## SELECT PUBLICATIONS AND PRESENTATIONS

Rittelmeyer, P. (2019). Socio-cultural perceptions of flood risk and management of a levee system: Applying the Q methodology in the California Delta. *In review*.

Rittelmeyer, P (2018). Perceptions of Flood Risk and Management of the Delta Levee System. *Bay Delta Science Conference*. Sacramento, CA. September 2018.

Rittelmeyer, P (2018). Perceptions of Flood Risk and Management of the California Delta Levee System. *International Society for the Scientific Study of Subjectivity*. Charlotte, NC. October 2018.

Rittelmeyer, P (2019). Meanings behind perceptions: Flood Risk and Management of the California Delta Levee System. *American Association of Geographers*. Washington, DC. April 2019

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