Case Study 12:
Restoring the Giacomini Wetlands from Agricultural Lands, *Point Reyes National Seashore, California*

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A new channel forms on East Pasture marshplain, part of the restoration of agricultural lands to wetlands. Image credit: Lorraine Parsons, NPS.

The wetlands during a king tide. Image credit: Sarah Allen, NPS.

Goals

Point Reyes National Seashore developed the Giacomini Wetland Restoration Project to restore tidal wetlands from diked agricultural lands. Restoration efforts were accomplished through sub-goals to engage the public, manage public access, protect pre- and post-project habitats for multiple listed species, build in resilience to accommodate for potential climate change effects, and adaptively monitor effectiveness of management actions.

Challenges and Needs

The Giacomini Wetlands originally comprised tidal salt marsh, intertidal mudflats, and subtidal areas in the southern portion of the Tomales Bay watershed just north of San Francisco Bay. They were altered by human influence beginning in the 1860s, when logging and agriculture practices increased sedimentation. Later, in 1946, a large dairy ranch implemented agricultural practices and built infrastructure including tidegates and 4 km (2.5 mi) of levees that greatly reduced the condition and functionality of the wetlands. These changes converted the marsh to freshwater habitats, and channeled Lagunitas Creek. The channeling caused the river flow to bypass the wetlands, which previously served to reduce flood levels and to filter pollutants and sediment from stormwater flow. After purchasing the ranch in 2000, the National Park Service restored more than 248 ha (613 ac) of agricultural land to wetland habitat in 2007 and 2008, representing 12% of central California's outer coastal wetlands.

The ranch was purchased for several reasons: the site was identified within the park boundary, the restoration of the valuable coastal wetland would serve as mitigation for previously lost coastal habitat in the park, and the previous owner was interested in selling the land. The restoration of the wetlands was achieved through a number of measures including the removal of levees, the construction of channels and a flood spill area, the planting of native plants, the removal of

nonnative plants, and the installation of mitigation ponds for the California red-legged frog (*Rana draytonii*). Computer modeling was undertaken prior to the restoration to ensure that the restored wetland would not result in any unintended changes in salinity, particularly salt water intrusion in the nearby fresh drinking water supply. These models also looked at how changes in sea level under multiple scenarios might alter the wetlands.

The project's environmental impact statement included inventories of threatened, endangered, and keystone species and habitats, and hydrologic and hydrodynamic modeling of saltwater intrusion and flooding under several scenarios. As the project developed, climate change issues including sea level rise, salt water intrusion, habitat migration into upland areas, species diversity, invasive species, and residential floods were addressed. Based on sea level rise models, restoration design took into account habitat migration and retention of rare high marsh habitat. Because multiple listed species were present in the project area prior to restoration, it was difficult to maximize habitat for new target species while minimizing impacts on the species flourishing under pre-project conditions.

The restored wetland is vulnerable to sea level rise and impacts of increased salinization of waters, which would impact several listed species that are adapted to freshwater or brackish conditions. The resiliency of the restored area to storm surge and flooding has not yet been tested by a 100-year storm, but flooding of homes did not occur during the past few years of large winter storms. Restoration of the wetland has resulted in significant positive response by waterbirds and other wildlife with increases in number and biodiversity documented in monitoring data. Outstanding needs include assessment and analysis of field data and hindcasting to verify model accuracy. Acquiring funding for this project was challenging, particularly for post-project monitoring, despite wide recognition of this valuable component.

Responsive Actions

To address the many concerns raised by the environmental impact statement, the planning process included an engaged discussion with the local community, particularly about public access issues. The final project plan also incorporated a pre- and post-restoration monitoring program for hydrology, topography, sedimentation, water quality, zooplankton, benthic invertebrates, fisheries, vegetation, and birds. Although the National Park Service provided some support for this project, funding had to be obtained from multiple non-park sources.

This project is ongoing. This case study is an example of the following adaptation strategies:

- Incorporating climate change into policies, plans, and regulations
- Enhancing connectivity, migration corridors, and areas under protection external to the park unit
- Reducing flood risk for adjacent private lands/homes by removing channeling of river and enhancing wetland habitats
- Monitoring climate change impacts and adaptation efficacy
- Reducing non-climate stressors (e.g., river channeling, sediment management)
- Increasing/improving public awareness, education, and outreach efforts
- Conducting/gathering additional research, data, or products
- Developing/implementing an adaptation plan
- Increasing biodiversity by creating restored wetland habitat

For more information:

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http://www.nps.gov/pore/parkmgmt/planning_giacomini_wrp.htm

http://www.nps.gov/pore/parkmgmt/planning_giacomini_wrp_eiseir_final_2007.htm

http://www.nps.gov/pore/photosmultimedia/multimedia_gwrp.htm

https://baynature.org/articles/giacomini-wetland-restoration-project/

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