

Greater Farallones National Marine Sanctuary

Esteros Habitat Characterization

Management Issue

The Esteros Americano and de San Antonio are both part of Greater Farallones National Marine Sanctuary (GFNMS or sanctuary) and often go unnoticed because private landowners surround them for the most part. A complete characterization of these specialized habitats is needed in order to identify and understand any major or minor management issues and allow us to better incorporate ecosystem-based management for improved water quality, reduction and control of introduced species, detect status and trend of habitats, restoration of eelgrass beds, and identify threatened and endangered species. The characterization may be used to assess the feasibility and effectiveness of eelgrass enhancement and restoration activities, e.g. removal of illegal manmade structures, to help combat climate change impacts and promote carbon sequestration.

Description

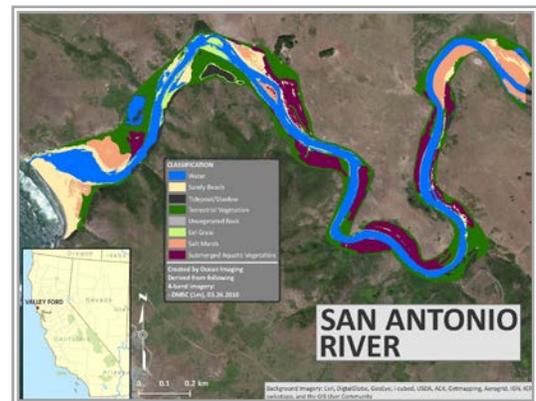
Unlike many of the estuaries along the California coast, both of the Esteros Americano and de San Antonio are surrounded for the most part, by privately owned lands and are considered to be relatively pristine and undisturbed. They were originally formed from “drowned river valleys” and have steeply sloping hillsides and an abrupt transition from uplands to open water, resulting in a fjord-like system that is not seen in any other California estuary. The unique habitats of the Estero Americano and Estero de San Antonio have not been fully characterized since 1977, prior to designation of the sanctuary. From 1989-1995, there were several studies of the hydrology and chemical composition of the esteros, but these studies are not compiled into a single document nor do they reveal any connectivity or ecological linkages between the watershed, the esteros or the adjacent nearshore habitats of Bodega Bay. Extensive aerial mapping was performed in 2010, resulting in habitat classification maps. These data were used to establish both Esteros Americano and de San Antonio as part of the state’s marine protected areas, as State Marine Recreational Management Areas (SMRMA).

Other disparate studies have taken place, such as slope, rainfall and sedimentation, baseline levels of eelgrass beds, rainfall and nutrient loading and other water quality assessments. The surveys prior to 1995 were conducted prior to modern mapping and habitat quantification standards. Ground-truthing of the 2010 aerial maps is needed to map introduced and native species, quantify key ecological species, as well as identification and mapping of anthropogenic structures such as pipe outfalls, fences, dams, dikes, etc. in order to begin to assess the health and functionality of the esteros as well as siting and feasibility of new restoration efforts.



It is unknown as to how many fences, dikes, out falls, and other anthropogenic structures are found along the shores of or projects into the esteros.

Photo credit: Tom Yarish.



Map produced by Ocean Imaging for baseline habitat classification of Estero de San Antonio in 2010.

Photo credit: Ocean Imaging, 2013.

Questions and Information Needs

- 1) What species occur in and along the shoreline of the esteros?
- 2) Are there threatened and/or endangered species in the esteros? If so, where and to what extent?
- 3) Are there non-native and/or invasive species in the esteros? If so, where and to what extent?
- 4) What are the benthic substrates, depth and biogenic species (e.g. eelgrass, marsh vegetation) of the esteros?
- 5) How have the hydrology, salinity and siltation of the esteros changed over time?
- 6) What is the water quality of the point-source outfalls and major drainages that occur within the esteros?
- 7) Are there unmapped or uncharted anthropogenic structures in the esteros?

Updated: 11/30/2016

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>

Scientific Approach and Actions

- Ground-truth LIDAR and other mapping efforts performed in 2010
- Conduct shallow water side-scan and benthic coring to characterize benthic infauna and epifauna, and to characterize the substrate and geology
- Conduct geo-spatial and species inventories and complete biological inventory maps, and habitat maps; eelgrass status and trends is a priority
- Sample seasonal and event driven (heavy rainfall and first rain event) water quality sampling, using both ecological indicator species as well as sample for traditional chemical parameters
- Map regulatory boundaries and zoning and determine the status and trends of seasonal closure and opening of the mouths of the two esteros
- Search and quantify satellite, aerial and/or ground imagery to track the seasonal opening and closing of mouth of the esteros
- Identify surrounding landowners and potential, related threats and investigate any plans for open space and increased access by the public

Key Partners and Information Sources

CA Department of Fish and Wildlife, University of CA Davis and Bodega Marine Lab, State Water Resources Control Board Northern Monitoring Ocean Unit, CA Marine Protected Areas, San Francisco State University-Romberg Tiburon Center for Environmental Studies, CA Ocean Protection Council and Ocean Science Trust, CA Sea Grant, EPA EMAP program, NOAA Status and Trends, San Francisco Bay National Estuarine Research Reserve, NOAA Restoration Center

Management Support Products

- Maps showing abundance and distribution of key species and introduced species, jurisdictional boundaries, zoning land ownership, hydrology, habitats, anthropogenic features, such as pipes or fences
- Produce maps of species inventories, identifying key species and introduced and invasive species abundance and distribution
- Determine factors that influence the opening or closing of mouths of the esteros
- Produce podcasts showing the unique habitats, functionality of the esteros, and highlight successful best management practices implemented by adjacent landowners and planned open space agencies and NGOs

Planned Use of Products and Actions

- Identify pressures/stressors
- Re-establish communication with landowners in order to revive implementation of best management practices for watersheds and to develop a community-based stewardship program
- Produce maps and post them on GFNMS-SIMoN and OpenSpaces web sites for distribution to interested parties and agencies
- Develop community-based water quality and biological monitoring programs and add data to the Our Coast Our Future sea level rise mapping tool

Program References

GFNMS Management Plan (2014)

- STRATEGY IS-1: Develop a native and introduced species inventory and database specifically for GFNMS and areas adjacent to the sanctuary.
- STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring
- STRATEGY CS-4: Develop and implement sanctuary ecosystem assessment and monitoring programs, and integrate with regional ocean observation programs along the west coast and the sanctuary program's System Wide Monitoring guidelines.
- STRATEGY CS-5: Complete characterization of sanctuary biological and physical features.
- STRATEGY RP-14: Integrate climate change mitigation, monitoring, education, and adaptation into sanctuary management through the development of the sanctuary's Climate Smart Conservation Plan.

GFNMS Condition Report (2010)

- Questions: 1, 2, 3, 6, 7, 11, and 12

Climate Action Plan (2016)

- Strategies: H-1-3, LS-1, LS-2, E-1, IS-1-4, SN-1, SN-3-6

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