

Greater Farallones National Marine Sanctuary

Invasive Species

Management Issue

Invasive species can cause impacts to wildlife and habitats, decrease biodiversity and limit resiliency of wildlife and habitats to recover from anthropogenic impacts, limit effectiveness of restoration actions, and compound the impacts from climate change. It is essential that priority invasive species are located, quantified and removed quickly and effectively. The abundance and distribution of introduced species are not well documented within Greater Farallones National Marine Sanctuary (GNFMS or sanctuary) and northern portion of Monterey Bay National Marine Sanctuary (sanctuary). An inventory of all introduced species was completed in 2005. The inventory should be updated and mapping of abundance and distribution are needed. Priorities are Bolinas Lagoon, Tomales Bay, and the Esteros Americano and de San Antonio. Once the most destructive invasive species are quantified, removal or control efforts should begin, if they have not already been implemented.

Description

Introduced species have been identified in and around the sanctuary and have the potential to cause ecological and economic degradation to the affected coastal areas. If detection, prevention, and eradication efforts are not taken, further introduction and spread of introduced species will continue in and adjacent to the sanctuary and potentially impact sanctuary wildlife and habitats, decrease biodiversity, limit resiliency of wildlife and habitats to recover from anthropogenic and climate change impacts, and limit effectiveness of restoration actions. Climate change could also allow for additional settlement and spread of introduced species into areas where they may have previously been constricted. A species inventory of introduced species was completed in 2005 but current levels, in terms of abundance, distribution, and diversity of introduced species are not well documented and the impacts, existing or potential, are not well understood. Although there are several agencies and organizations that document and eradicate introduced species, a complete inventory of all introduced species is needed, including coordination of existing information and data, identifying data gaps, and updated mapping of abundance and distribution. It is also necessary to identify the pathways by which new species are introduced into the sanctuary, prioritize which pathways pose the greatest threat to sanctuary resources, and identify which species pose the greatest threat to the success of future habitat restoration and carbon sequestration efforts.



A green crab; an invasive species in Bolinas Lagoon. Photo credit: MassBay.mit.edu

Questions and Information Needs

- 1) What and where are the data gaps for detecting and documenting introduced species?
- 2) Which introduced species are most likely to be invasive and cause impacts to sanctuary resources and which species pose the greatest threat to the success of future habitat restoration and carbon sequestration efforts?
- 3) Where are the priority areas and species for eradication?
- 4) Where are the priority areas for early detection?
- 5) What are the abundance, distribution and diversity of introduced species throughout the sanctuary habitats?
- 6) How may the sanctuary integrate new or updated introduced species inventories with the existing monitoring programs?
- 7) Where, how and for how long should monitoring studies be conducted in the sanctuary to further our understanding of species already introduced to the sanctuary and to detect early invaders?
- 8) What are the most feasible and efficient methods of eradication, containment or management for existing and future introduced species in the Sanctuary?
- 9) What are the ecological and economic impacts of introduced species within the sanctuary?



Priority areas for invasive species investigations: Bolinas Lagoon, Tomales Bay, and the Esteros Americano and de San Antonio.

Updated: 11/30/2016

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

Scientific Approach and Actions

- Conduct an introduced species data inventory and literature search, develop an annotated bibliography and inventory of current invasive species removal or control programs in the sanctuary, particularly in the recently (2015) expanded area, from Bodega Head to Point Arena
- Link sanctuary species inventory with CalFed and Smithsonian web-enabled, species inventories
- Conduct an all-taxa inventory and map species abundance and distribution to fill in informational gaps
- Through a data gap analysis, determine locations where additional data collection is needed
- Integrate introduced species monitoring components to all current sanctuary monitoring programs
- Assess pathways of introduction and evaluate most likely pathways for each habitat
- Track range expansion or contraction of invasive species and influences from climate change
- Identify linkages between presence and extent of introduced species and global climate change
- Develop and implement a community-based monitoring program to track current invasive species, effectiveness of eradication and restoration measures, and to detect early invaders

Key Partners and Information Sources

Point Reyes National Seashore, Coastal Biophysical Inventory Program, Integrative Graduate Education and Research Traineeship Program (IGERT), National Centers for Coastal Ocean Science, National Audubon Society, CA Department of Fish and Wildlife, Smithsonian Institution, National Marine Fisheries Service, NOAA Restoration Center, US Fish and Wildlife Service, CalFed, Bodega Marine Laboratory, San Francisco State University, PISCO

Management Support Products

- Develop a web-enabled database compatible with the CalFed program
- Develop training products for community-based monitoring
- Develop West Coast wide introduced species database through SIMoN MPA Monitoring map program
- Develop outreach products, such as podcasts regarding new and potential invasive species in the sanctuary, how the public can help avoid new introductions and best management practices

Planned Use of Products and Actions

- Identify new and most likely invaders as well as priority locations and species
- Develop a Technical Advisory Team to produce a rapid response plan and streamlined permit process in order to respond in a timely manner to necessary eradication or control efforts in the sanctuary
- Develop management collaborations and attain permits in advance of detection of new invaders
- Track expansion or contraction of invasive species
- Prevent future introductions through outreach programs
- Develop outreach programs to educate communities on introduced and invasive species, and best management practices to eliminate introducing new species
- Periodic assessment of: 1) the types of activities taking place that might accidentally introduce invasive species; and 2) ways to link research or monitoring of introduced species to a rapid response program
- Determine the ecological and economic impacts of introduced species within the sanctuary

Program References

GFNMS Management Plan (2014)

- STRATEGY IS-1: Develop a native and introduced species inventory and database
- STRATEGY IS-2: Develop a program to detect introduced species in estuarine environments of GFNMS
- STRATEGY IS-3: Develop a program to detect and monitor introduced species in the rocky intertidal
- STRATEGY FA-1: Develop a resource characterization of GFNMS
- STRATEGY RP-14: Integrate climate change mitigation, monitoring, education, and adaptation into sanctuary management through the development of the Greater Farallones National Marine Sanctuary Climate Smart Conservation Plan.

GFNMS Condition Report (2010)

- Questions: 1, 5, 11, 12, and 14

Climate Action Plan (2016)

- Strategies: E-1, H-7, IS-1-4

Updated: 11/30/2016

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