Invasive Species

Management Issue

Incomplete knowledge of the presence, abundance, and impacts of non-indigenous species within Cordell Bank National Marine Sanctuary (CBNMS or Sanctuary) hampers our ability to understand changes in the ecosystem as well as plan and implement mitigation strategies.

Description

Non-indigenous species can alter species composition, threaten the abundance and diversity of native species and interfere with healthy ecosystem structure and function. Once established, non-indigenous species can be extremely difficult to remove, especially in deep water habitats. A number of non-native species are present in the marine environment near Cordell Bank Sanctuary, but none are known to currently exist in the sanctuary. It is necessary to identify the pathways by which new species are introduced into the Sanctuary, and prioritize which pathways pose the greatest threat to Sanctuary resources. Researchers need to establish baseline information and monitor for new invasions to rapidly evaluate the most feasible and efficient methods of eradication, containment, or management of existing and future introduced species. This type of information is critical to minimizing the impact of introduced species on Sanctuary resources and to implementing the protection of species and habitats threatened by introductions.

Non-indigenous colonial tunicates can alter benthic habitats, as illustrated by this Didemnum species in Georges Bank. A similar non-indigenous species has been detected in areas close to Cordell Bank. Photo credit: Page Valentine/U.S. Geological Survey.

Questions and Information Needs

1) Are there any non-indigenous species in Cordell Bank Sanctuary?

2) What habitats and species assemblages are most at risk of impacts from non-indigenous species?

3) What are the pathways by which species are introduced (or could be introduced) into the Sanctuary?

4) If non-indigenous species are present within the Sanctuary, are there any feasible methods for eradication?

Scientific Approach and Actions

- Assess known pathways of introduction (including ballast water, hull fouling, aquaculture, dispersal of adults, eggs and larvae) and determine those pathways most likely to lead to species introduction within the Sanctuary
- Evaluate lists of potential non-native species that have a higher probability of occurrence in the Sanctuary (based on known occurrence in surrounding area, life history strategies, pathways of introduction) and develop sampling methods to screen for potential non-native species
- Conduct baseline sampling to screen for potential non-native species
- If non-indigenous species are found within the Sanctuary, evaluate methods of removal and remediation and determine feasibility of these actions
- Develop a voucher collection of specimens and photographs of taxa that will include introduced species

Potential Key Partners and Information Sources

University of California-Davis, Smithsonian Environmental Research Center, California Academy of Sciences

Management Support Products

- Voucher collection of specimens and photographs of taxa, including non-indigenous species in the Sanctuary
- Maps of known distribution, abundance and habitat associations of non-indigenous species
- Monitoring protocols to detect and assess changes in non-indigenous species presence and abundance
- Understanding of species assemblages most sensitive to impacts from non-indigenous species
- Assessment of the feasibility of removing non-indigenous species

Ballast water is one transport pathway that could introduce non-indigenous species into the sanctuary. Photo credit: Smithsonian Environmental Research Center.

Planned Use of Products and Actions

- Develop and implement prevention program for known introduction pathways
- If non-indigenous species are found, monitor to assess changes in distribution, abundance and impacts
- If non-indigenous species are found, evaluate usefulness and feasibility of non-indigenous species removal and conduct removal operations if necessary
- Develop educational material for the general public that will provide information on the effects of introduced species to the ecosystem of Cordell Bank NMS and public actions that will prevent the spread of introduced species

Program References

CBNMS Management Plan

- Conservation Science Action Plan, strategy CS-3, CS-4, CS-5, CS-8

CBNMS Condition Report

- Status of non-indigenous species (question 11)

ONMS Performance Measures

- By 2015, 100% of the sanctuary system is adequately characterized.
- Number of sites in which select living marine resources, based on long term monitoring data, are being maintained or improved.
- Number of sites in which habitat quality, based on long-term monitoring data, is being maintained or improved.