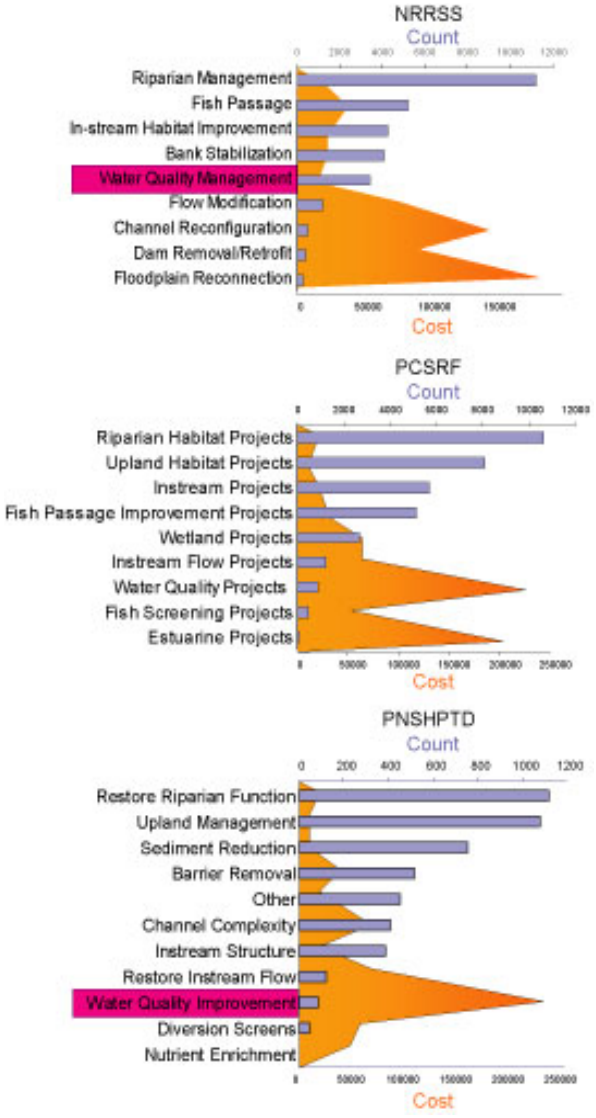
Channel Islands National Marine Sanctuary
Informatics

Management Issue

Much data is collected within the Channel Islands National Marine Sanctuary (CINMS or Sanctuary) that could inform current and future management and evaluation of resource status, but this utility is not realized because the information conveyed by that data is not accessible.

Description

In reviewing the information and process used by regional experts in composing the 2008 CINMS Condition Report for the CINMS it was apparent that data is collected, but not available in an accessible format for use by sanctuary managers. For example, in answering questions about Living Marine Resources (i.e. what is the status of key species and how is it changing?) contributors relied on raw data or other local data holdings for 40% of their assessment, but peer-reviewed literature only 19% of the time – and the remaining 41% of the time they relied on no more than professional judgment having no access to relevant data. Follow up revealed that the Sanctuary is as intensively studied as any regional ecosystem in the Nation, but the agents collecting the data are not coordinated. Specifically, there are no data standards, protocols or business rules – in short, no informatics standards—that allow the sharing and confederation of the data that could inform management of the sanctuary. In addition, the cyber infrastructure (i.e. computing systems, data storage systems, advanced instruments and data repositories, visualization environments, and people, all linked together by software and high performance networks) necessary to make this work are not currently in place. Therefore, there is a need established for the introduction of an informatics program to confederate the available data in an accessible data network to replace current assessments that are forced to rely exclusively on judgment and guesswork.



Three different data dictionaries (semantics) in use to describe management actions in the Pacific Northwest give polar opposite information when applied to the same management data. For example, water quality improvement projects go from very numerous (>2000 implemented) to rarely done (<200) – just by changing the data management protocols.

Questions and Information Needs

1) Who is collecting relevant data in the Sanctuary (i.e. how big a problem is this)?

2) How diverse are the data collection programs and the motivations for the individual agents and programs collecting monitoring data in the Sanctuary?

3) Who are and how diverse are the clients for the relevant data products that would be produced from a confederated informatics program in the Sanctuary?

4) How do we confederate atmospheric, oceanographic, acoustic, ecological and behavioral data that are all of different dimensionality and collected on different spatial and temporal scales and resolutions into common conceptual frameworks?

5) How do we confederate these diverse data types that are all of different dimensionality and collected on different spatial and temporal scales and resolutions into common data management framework?

Scientific Approach and Actions

- Perform information needs assessment – survey of information users to determine the scope and diversity of data that needs to be incorporated into the system
- Review the history of data collection in and around the Sanctuary
- Deploy back bone of data storage and access infrastructure
- Develop cooperative partnerships with data confederation and data visualization resources in region (NCEAS & UCSB)

Key Partners and Information Sources

CDFG, NMFS, the University of California at Santa Barbara and Los Angeles (UCSB & UCLA), the National Center for Ecological Analysis and Synthesis (NCEAS), and the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO)

Management Support Products

- Concise and relevant monitoring data to support assessments of resource status in the sanctuary
- Appropriate information as input for decision support models for management decisions
- Reduction in guesswork as an assessment method
- Compiled data available for scientific access to improve research productivity and enable breakthroughs not otherwise possible (i.e. the ability to ask questions on spatial and conceptual scales not possible in the absence of confederated data)

Planned Use of Products and Actions

- Organized and coordinated data will be available to provide science-based answers to assessments such as the CINMS Condition Report, performance measures, and assessments of ecosystem health.

Program References

CINMS Management Plan

- Conservation Science Action Plan - CS.2
- Marine Reserve Monitoring - CS.2
- Comprehensive Data Management - CS.6
- Biological Monitoring of MPA Network – CS.6

CINMS Condition Report

This project would be relevant to the entire condition report process as well as question such as:

- What is the status of biodiversity and how is it changing?
- What is the status of key species and how is it changing?
- What is the condition or health of key species and how is it changing?
- What are the levels of human activities that may influence living resource quality and how are they changing?

ONMS Performance Measures

- Number of sites in which water quality, based on long-term monitoring data, is being maintained or improved
- Number of sites in which habitat, based on long-term monitoring data, is being maintained or improved
- Number of sites in which living marine resources (LMRs), based on long-term monitoring data, is being maintained or improved
- By 2017, 100% of the marine zones or networks of zones in place in the ONMS have methods implemented to assess their effectiveness