A Monitoring Program of the Gulf of the Farallones National Marine Sanctuary
SEAS-Pelagic Habitat Overview

• Purpose of SEAS-PH

• Methods
  • How our Partnerships Shape Data Collection

• Strategies & Management Issues
  • Examples of how we use these data
SEAS-Pelagic Habitat Overview

Sanctuary Ecosystem Assessment Surveys (SEAS)-Pelagic Habitat is a vessel-based, monitoring program of the GFNMS. Surveys are designed for long-term monitoring and baseline assessment of coastal and offshore areas of the Gulf of the Farallones, Cordell Bank and Bodega Bay regions.
SEAS Addresses NOAA-Performance Measures

• Collect long-term monitoring data, to determine if water quality is being maintained or improved.

• Collect long-term monitoring data, to determine if select living marine resources are being maintained or improved.

• Adequately characterize the sanctuary.

• Develop and implement methodologies to assess the effectiveness of marine zones.
SEAS-Pelagic Habitat Overview

- Highly productive
- Localized influences
- Unique pressures
- Multi-agency marine protected areas
SEAS methods were developed in consultation with partners and researchers to provide data on various nearshore and offshore issues.

- Key species distribution in relation to marine zoning and climate change
- Marine debris
- Vessel activities
- Early detection of mortality events from harmful algal blooms, e.g. biotoxins
- Developing rapid damage assessment techniques
SEAS-Pelagic Habitat Partners

• OCNMS, CBNMS, MBNMS, CINMS
• California Dept. of Public Health
• University of California, Davis, Berkeley, Bodega Marine Lab
• SFSU Romberg Tiburon Center for Environmental Studies
• CDFG Office of Spill Prevention & Response
• NOAA Fisheries Office of Restoration and Response
• NOAA Oceanographic Data Center and the Climate Database Modernization Program
• NMFS - SWFSC
• USFWS
• PRBO Conservation Science
• More to follow…
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Collecting “piggyback samples” for HAB and oceanographic research
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• More to follow…
SEAS - Current Sample Design

SEAS Sample Stations

- Football
- Botella Canyon
- Cordell Bank
- Rittenberg Bank
- Farallon Islands

- Bird Island Seabird Count
- North Farallon Pinniped Count
- Krill Water Column Station
- SEAS Transect
- SF Bay Vessel Traffic

Deep Reef
SEAS-Pelagic Habitat Examples of Collaborations

• Point station samples
  • Krill, copepods, water column characteristics, special counts - Bird Island and North Farallon Island
SEAS - Methods

- Vessel-based surveys from R/V FULMAR
- Currently seasonal; future plans for year-round surveys
- Strip Transect
  - Birds, turtles, marine debris, fronts/convergent zones, jellyfish, drift algae, sharks and sunfish
- Line transect
  - Mammals and vessel activities
- Demographics & Behavior
  - Age, Sex, Feeding, Mating, Traveling, Milling, etc.
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SEAS - Methods

Line Transect
• 2 Observers
• 180° Observation Zone to Horizon
  • Mammals
  • Vessel & Activities

Strip Transect
• 2 Observers
• 180° Three-100 m Zones
  • Sea Turtles
  • Marine Debris
  • Drift Algae
  • Jellyfish
  • Sharks/Sunfish
  • Fronts

Strip Transect
• 1 Observer
• 90° Three-100 m Zones
  • Birds

Research • Education • Conservation • Stewardship
SEAS - Methods

- Continuous, underway sampling for sea surface temperature and starting in 2009/10 acoustic sampling for biomass
  - Future funding needed for fluorescence sampling on R/V FULMAR
- Remote sensing for chlorophyll and sea surface temperature

Chlorophyll-a Satellite Image  SST Satellite Image

Research • Education • Conservation • Stewardship
SEAS Addresses GFNMS Management Issues

- Map spatial and temporal changes in areas of convergent water mass and frontal zones concentrating floating/feeding birds, algae, oil and anthropogenic flotsam, to better characterize ephemeral and persistent areas of higher ecological richness for resources at risk from oil pollution, marine debris and disturbance.
SEAS Addresses GFNMS Management Issues

- Identify and map ecological hotspots that are consistently of higher productivity for birds and mammals.

Common Murre
local breeder

Sooty Shearwater
migrant species

Research • Education • Conservation • Stewardship
SEAS Addresses GFNMS Management Issues

- Identify shifts in range of vertebrates such as seabirds, marine mammals and sea turtles, as potential indicators of global climate changes
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SEAS - Example of Current Use of Data

- Identify areas of concentrated marine debris and derelict fishing gear such as crab pots out of season.
SEAS - Example of Current Use of Data

Drift Algae Sightings
May and June 2008 SEAS Cruises

- Football
- Bodega Canyon
- Cordell Bank
- Rittenberg Bank
- Farallon Islands
- Fanny Steal
- Deep Reef

Legend:
- 0
- 1
- 2
- 3
- 4-5

Tracklines

Nautical Miles
SEAS Sample Stations

- Bird Island Seabird Count
- North Farallon Pinniped Count
- Krill Water Column Station
- SEAS Transect
- SF Bay Vessel Traffic

Location • Conservation • Stewardship
SEAS- Expansion of Parameters

• Identify water column features to help track impacts from oil spills and effects of response measures such as dispersants, fate of dispersed oil, and trophic level impacts.
Example of vertical progression of fronts throughout the water column.
SEAS Addresses GFNMS Management Issues

• Develop a damage assessment “Strike Team” to be deployed to assess the offshore and water column natural resources during an oil spill and to aid management in determining the use of dispersants and in-situ burning.
SEAS - Products

- Near-real-time maps and tables of the location and density of key species, fronts and biological habitats
- “What’s New” findings for ONMS Exploration pages, GFNMS and GF-SIMoN web sites
- Link with other ecosystem monitoring observations programs
- Link with sanctuary SHIELDs program for rapid access to environmental information, sensitive species, and resources at risk information during emergency response
- Develop techniques to rapidly assess water column features, such as layered fronts
- Annual reports
Photo Credits - Thank you!

Jamie Hall
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PRBO Conservation Science Library
Peter Pyle
Jan Roletto
Ben Saenz
Jason Thompson
Sophie Webb