Gulf of the Farallones National Marine Sanctuary

Ocean Climate Initiative

Presentation to the Sanctuary Advisory Council

April 16, 2009
OCEAN CLIMATE INITIATIVE GOAL:
Provide solutions on a local, state, and federal level through partnerships, research collaborations, education, and policy reform.

• Site Scenario
• Action Plan
• Ocean Climate Action Center
OCEAN CLIMATE INITIATIVE OBJECTIVES:

- Identify physical drivers and address biological impacts of climate change on the region’s coast and ocean;
- Act as a climate change communication center;
- Manage local marine ecosystems for resiliency;
- Rehabilitate GFNMS facilities and operations to become a model of sustainability; and
- Promote inter and intra-agency, non-profit organization, and business partnerships within the region
INITIATIVE ACTION PLAN:

• Conservation Science (Research and Monitoring)
• Ecosystem Resilience and Protection (Resource Protection)
• Community Action (Education and Outreach)
• Carbon Footprint Reduction (Operations)
INITIATIVE WORKING GROUPS:

- Climate Change Site Scenario - joint with CBNMS (will become Research and Monitoring)
  - Chair: John Largier
  - Other SAC members: Bob Breen
- Green Operations
  - Chair: Chris Powell (Brenda Donald in Chris’ absence)
  - Other SAC members: Bob Wilson, Bob Breen
- Ecosystem Resilience and Protection
- Community Action
INTERNAL STAFF TEAMS:

- Green Operations - Employee Green Team
- Ecosystem Resilience and Protection - Ecosystem Protection Team
- Community Action - Education and Outreach Team
Climate Change Site Scenario:

- Jointly developing with CBNMS
- Requested by ONMS - preliminary template provided
- All 14 sites will complete in addition to action plan and greening to become “Climate Ready Sanctuary”
- GFNMS/CBNMS are pilot project
North-Central California Coast and Ocean Climate Change Site Scenario

- Team of 20+ scientists
- Downscale information - Point Arena to Año Nuevo
- Shared understanding
- Synthesize
- Informed decision-making
- Prioritize actions
- Guide policy development
- Guide management actions
CLIMATE CHANGE SITE SCENARIO

DRIVERS OF REGIONAL CHANGE

- **Sea level rise** (mean trend, storm surge, etc.)
- **Regional winds** (increases, delays, shifting patterns)
- **Changing waves** (increased amplitude, frequency, extremes)
- **Ocean circulation** (California Current System)
- **Water properties** (temperature, salinity, pH, DO, etc.)
- **Precipitation and land runoff** (amount and timing, discussion on fire, etc.)
- **Local atmospheric conditions** (fog, cloudiness, air temps, etc.)
CLIMATE CHANGE SITE SCENARIO

REGIONAL ENVIRONMENTAL RESPONSES

• Coastal upwelling
• Regional water properties (nutrients, DO, temp, etc.)
• Regional ocean acidification
• Estuarine circulation, stratification, residence, and plumes
• Coastal erosion and inundation
CLIMATE CHANGE SITE SCENARIO

CHANGING PHYSICAL HABITAT STRUCTURE

- Offshore pelagic
- Offshore benthic
- Offshore island
- Sandy beach
- Rocky intertidal
- Nearshore sub-tidal
- Estuarine
CLIMATE CHANGE SITE SCENARIO

BIOTIC RESPONSES

- Plankton
- Invertebrates
- Macroalgae and plants
- Fish (will be added)
- Seabirds
- Marine mammals

May change to leading section:

- Population connectivity
- Phenology
- Physiology
- Range shifts
Climate Change Site Scenario:

ECOSYSTEM AND COMMUNITY RESPONSE MECHANISMS

- Pelagic habitat
- Nearshore intertidal habitat
- Estuarine habitat
- Sandy beach habitat (may be added)
CLIMATE CHANGE SITE SCENARIO

ADDITIONAL DRIVERS OF CHANGE

• **Fishing** (needs to be expanded)
• **Disease**
• **Contaminants**
• In general, this section will be expanded
CLIMATE CHANGE SITE SCENARIO

DIRECT IMPACTS ON HUMANS

• Public health
• Fisheries
• Ecotourism
• Coastal infrastructure
• Short and long-term economic consequences
  (will add SM County)
CLIMATE CHANGE SITE SCENARIO

TO COME...

• Conclusion

• Supplementary boxes (will be formatted, modified, etc.)

• Tables, figures, maps, images, etc.

• Press conference for final release (anticipated July/early August)
OCEAN ACIDIFICATION

• West coast sanctuaries all adopted resolutions

• West coast writing team - NOAA Ocean Acidification West Coast Research Plan
  Partners include PMEL, NWFSC, ONMS
  Sanctuaries as sentinel sites; education and outreach

• Regional collaboration - GFNMS, CBNMS, Bodega Marine Lab, UCSF, PRBO
National Involvement

• ONMS Green Team

• ONMS Climate Subcommittee
  Coordinate climate efforts into a cohesive national program
  Maximize ability to prepare for and protect resources from climate change impacts
  ONMS as part of the larger climate effort within and outside of NOAA

• Trilateral Committee for Wildlife and Ecosystem Conservation and Management (May 11-14)
  Lead by USFWS with NOAA as partner (U.S., Canada, Mexico)
  Ecosystem Conservation Table
  GFNMS as project example for U.S. marine protected areas