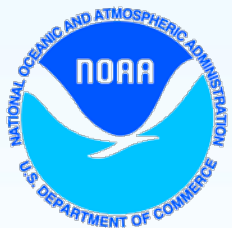


GFNMS and MBNMS Climate Change Activities

Kelley Higgason
GFNMS Ocean Climate Initiative Coordinator

Joint Advisory Council Meeting

February 10, 2011



GFNMS OCEAN CLIMATE INITIATIVE



Goal

Address local climate change impacts through fostering awareness, advocating solutions, and promoting action to build ecosystem resilience and sustainability.

Objectives

Coordinate across GFNMS program areas to integrate climate into the work we do.

Coordinate partnerships and collaborations to address climate change impacts to sanctuary resources.

Work within NOAA and with other Bay Area agencies and orgs to form an alliance to share resources and knowledge.

GFNMS OCEAN CLIMATE INITIATIVE

Initiative Activities

- Ocean Climate Summits
- Climate Change Impacts Report
- Climate Change Action Plan
- Ocean Climate Center
- Our Coast–Our Future
- *West Coast OA Task Force*
- *ONMS Climate Subcommittee*
- *Bay Area Ecosystems CC Consortium*

ONMS Climate Smart Status

- ✓ Minimum green standards (Aug 09)
- ✓ Adaptation Training (Nov 09, Feb 10)
- ✓ Climate Change Impacts Report (June 10)
- ✓ Condition Report (June 10)
Climate Change Action Plan (in progress)



GF/CB CLIMATE CHANGE IMPACTS REPORT



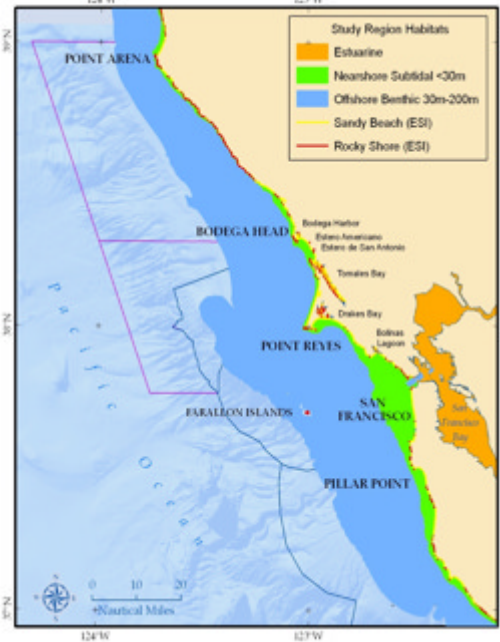
CLIMATE CHANGE IMPACTS



GULF OF THE FARALLONES AND CORDELL BANK
NATIONAL MARINE SANCTUARIES

Report of a Joint Working Group of the Gulf of the Farallones and Cordell Bank
National Marine Sanctuaries

Editors John Largier



Goal

Determine observed and predicted physical and biological climate change impacts to the north-central CA coast through local scientific consensus

Extensive Collaboration

17 WG members, 36 contributors, 16 agencies, orgs, institutions; 2 WG staff, 2 superintendents

Outcome

Foundation to guide development and prioritization of R&M activities, and inform future outreach and management actions

Public Release June 10, 2010

Cal Academy of Sciences Planetarium

Key Issues

- ⇒ Observed increase in sea level (100 year record at mouth of San Francisco Bay)
- ⇒ Expected increase in coastal erosion associated with changes in sea level and storm waves
- ⇒ Observed decrease in spring runoff of freshwater through San Francisco Bay, due to decreased snowpack
- ⇒ Observed increase in precipitation variability (drier dry years, wetter wet years)
- ⇒ Observed increase in surface ocean temperature offshore (50 year record)
- ⇒ Observed increase in winds driving the upwelling of cold, nutrient-rich waters (30 year record at offshore buoys)
- ⇒ Observed increase in extreme weather events (winds, waves, storms)
- ⇒ Expected decrease in pH, due to uptake of CO₂ by the ocean
- ⇒ Observed northward shift of key species (including Humboldt squid, volcano barnacle, gray whales, bottlenose dolphins)
- ⇒ Possible shift in dominant phytoplankton (from diatom to dinoflagellate blooms)
- ⇒ Potential for effects of climate change to be compounded by parallel environmental changes associated with local human activities

<http://farallones.noaa.gov>

Recommendations

- ⇒ *Educate society – inform people to allow for optimum decisions*
- ⇒ *Put ecosystems in context – link greenhouse gas emissions with marine ecosystem health*
- ⇒ *Anticipate change – obtain best available information on changing and future conditions*
- ⇒ *Mitigate impacts on the system – reduce manageable stressors that compromise system resiliency*
- ⇒ *Adapt to change – create policies and management strategies that are flexible to future changes*

2nd BIENNIAL OCEAN CLIMATE SUMMIT

June 2010

Frame strategies based on Climate Impacts Report

Public Outreach; Science and Information; Adaptation and Innovation Breakout Groups

Share successes/challenges, promote collaborations amongst local educators, managers, scientists

Partners: Cal Academy, SF Bay NERR Coastal Training Program, 11th Hour Project, ONMS

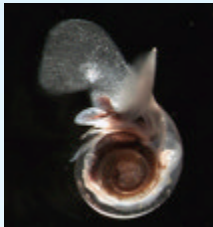


OCEAN CLIMATE INITIATIVE ACTION PLAN



✓ **Green Operations: Reducing Our Carbon Footprint**

Working group developed over 130 strategies, annual emissions audits: <http://farallones.noaa.gov/about/facilities.html>



Research and Monitoring

Est. working group of local scientists: identify gaps, develop strategies, identify leads/partnerships to implement



Adaptive Management and Policy

Est. working group in 2011: identify local planning obstacles, develop strategies and collaborative outcomes



Education and Outreach

Internal staff team, partner workshop and review: exhibits, school and public programs

OCEAN CLIMATE CENTER OPENING

October 26, 2010



OCEAN CLIMATE CENTER OPENING



OCEAN CLIMATE CENTER

NOAA HOME WEATHER OCEANS FISHERIES CHARTING SATELLITES CLIMATE RESEARCH COASTS CAREERS

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Ocean Climate Center Unveiled at NOAA's Gulf of the Farallones National Marine Sanctuary in California

Facility will serve as resource for understanding climate variability and change in the Sanctuary

October 26, 2010

[NOAA's Gulf of the Farallones National Marine Sanctuary](#) opened its new Ocean Climate Center today at its headquarters in San Francisco. The Ocean Climate Center will serve as an ocean and climate change communication center for the Bay Area and facilitate the exchange of technical, scientific, policy and education information and ideas.



The Ocean Climate Center opens today at the Gulf of the Farallones National Marine Sanctuary. [High resolution](#) (Credit: NOAA)

The Center will bring together a diversity of knowledge and expertise amongst several federal, state, and local agencies and other academic and non-profit partners to identify, assess and address the effects of climate variability and change on the sanctuary and the surrounding marine region from Sonoma to Santa Cruz County. Staff at the new Ocean Climate Center will work collaboratively with NOAA's world-renowned climate scientists and experts and eventually with NOAA's proposed Climate Service once established. The center will also help catalyze the development of information and outreach programs to help inform the public about how climate variability and change may affect ocean ecosystems.

"This center strives to understand the linkages between climate change and ocean ecosystems," said Margaret Spring, NOAA chief of staff. "This NOAA center — the first of its kind — draws expertise from across the agency's climate, weather, research, coastal, and fisheries programs, using a place-based approach with federal, state and local partners. We're pleased that by locating this center in a national marine sanctuary, it can foster a strong connection between the public and the wildlife and marine resources that are naturally linked to a changing climate. It will promote the Northern California region as a study area for the effects of climate change and serve as a model for climate change investigations and solutions nationally."

The Farallones Sanctuary will use the center to promote partnerships within the greater San Francisco Bay and Northern-Central Coast area to share resources and knowledge and to work together to address this and other effects of climate change in the region.

Today's ribbon-cutting ceremony also featured several agencies signing a Letter of Intent to collaborate on climate change issues within the San Francisco Bay Area region. Participants include Gulf of the Farallones National Marine Sanctuary, San Francisco Bay National Estuarine Research Reserve, Golden Gate National

Focus

Implement OCI and other Resource Protection programs

Communicate local coast and ocean climate change issues and pathways toward solutions through exhibits and programs

Serve as a regional hub for info exchange, partnerships, and collaborations

Our Coast—Our Future: Planning for Sea Level Rise and Storm Hazards Along the Bay Area's Outer Coast

Goal

- Provide Bay Area natural resource managers, local governments, and others with science-based, decision-support tools to plan for and respond to sea level rise and storm hazards along the region's outer coast.

Objectives

- Model vulnerabilities to SLR & storm hazards.
- Assess stakeholder info needs and ideal formats.
- Map societal and ecosystem vulnerabilities at the scale needed for management action.
- Communicate products in accessible, user-friendly formats to apply to adaptation and response plans.



Tomales Bay, CA

Our Future—Our Coast



Team

- USGS: seamless digital elevation model, 2 m resolution; suite of 10 year interval SLR and storm scenarios
- PRBO: web-based decision support tools and interactive maps
- GFNMS: project management, stakeholder participation, working group coordination
- NPS: Additional funding for data collection and modeling

Funding

- NOAA Climate Program Office - Sectoral Applications Research Program (SARP)
- Sept 2010 – Aug 2012 with possibility of no cost extension; official start Nov 2010
- Seeking additional funds: finer scale model; additional trainings on tools; modification of products based on feedback; current data

Our Coast—Our Future Study Region



Half Moon Bay to Bodega Head

Ocean Acidification Symposium

The Ocean in a High CO₂ World 2012, Monterey

- 3rd International Symposium
- September 24 – 27th at the Monterey Marriott & Conference Center
- Planning Committee members include MBARI, Hopkins Marine Station, MBA, NPS, MBNMS, COS & others
- Participants include 300-500 scientists; one day planned for media and outreach, as well as field trips to local institutions and on the water trips
- Hosting the meeting raises the profile of the region and local institutions in the field of ocean acidification
- MBNMS will keep SAC members informed as plans develop

Adaptation to Climate Change Workshop

2011 Adaptation to Climate Change in the Monterey Bay Region

- November 2011: 1-Day Workshop focused on Climate Change Adaptation Planning for Cities and Coastal Communities
- Planning Team includes MBNMS, Center for Ocean Solutions, CCC, AMBAG, Cities of Santa Cruz and Carmel, ICLEI (Local Governments for Sustainability), CENCOOS, NOAA Coastal Training Center, & others
- Participants will include local elected officials and city staff (planners) and resource managers
- Workshop goals: equip participants with knowledge on climate change impacts & adaptation planning processes in the Monterey Bay region that can assist with specific issues such as sea level rise, infrastructure issues and wetlands/shoreline habitat protection
- For more information, contact karen.grimmer@noaa.gov

THANK YOU!

FOR MORE INFORMATION VISIT

<http://farallones.noaa.gov/eco/climate/climate.html>

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**Climate and its influence on evolution.
A theory.**