CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

Focus on Marine Resources

2014 Climate College

2014 Climate College – opening class
February 10, 2014
2:00 PM - 04:00 PM

State Resources Building, First Floor Auditorium
1416 Ninth Street, Sacramento, CA

Welcome

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

Focus on Marine Resources

2014 Climate College

For 2014:

- CDFW Staff: training certification (registration – all classes)
- Unit/Program-level recognition (check web page for updates on how to apply)
- Classes will be held near coastal areas throughout the state, as well as in Sacramento
- Tribal perspectives on marine ecosystem management

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2014 Climate College

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Fish, Wildlife and Habitat Management |

Climate Science Program

- Activities
- Resources
- CDFW Climate College
- CDFW Climate Stakeholders
- CDFW Going Green
- Climate Change Case Studies
- Vulnerability Assessment Tools
- For Teachers
- National Adaptation Forum
- Western Association of Fish and Wildlife Agencies
- Director's Bulletins
- Legislation and Policy

CDFW Climate Science and Renewable Energy Branch
1416 9th Street
Sacramento, CA 95814
climatechange@wildlife.ca.gov

Home » Climate and Energy » Climate Change » **Climate College**

2014 California Department of Fish and Wildlife Climate College

In Spring 2014, CDFW will hold the second iteration of its Climate College, this time focusing on the state's Marine resources and featuring tribal perspectives on marine ecosystem management.

The CDFW Climate College is intended to provide a basic foundation of knowledge for all staff and partners on climate change science and its impacts to fish, wildlife, and habitats. This iteration of the course will focus on how climate change affects the state's marine resources to enhance participants' understanding of marine-related climate change science, impacts to species and habitats, and the implications for marine region management and planning. In the interest of developing stronger partnerships between tribal nations and the Department, this course is being developed as a collaborative effort with tribal representatives, and will introduce traditional ecological knowledge (TEK). TEK can be defined as the "holistic, evolving practices and beliefs passed down through generations about the relationships of living beings to their environment" (Swinomish 2010, in National Strategy, 2013).

The course will describe California's unique challenges and opportunities in managing its 1,100 miles of coastline, bays/estuaries, and marine protected areas under climate impacts. The course will also discuss case studies to show examples of responses to climate impacts. Through this course, the Department will demonstrate California's continuing leadership in addressing climate impacts as well as managing natural resources through diverse input and coordination with similar efforts at the federal and local levels.

Lecture topics will cover atmospheric changes, physical oceanic changes, sea level rise, species response, and conservation planning. The lectures will also cover biological ocean changes such as primary productivity and related processes, and productivity/abundance/phenology. This course will also provide examples of adaptation strategies to address the issues discussed.

The course will consist of a 7-part lecture series scheduled to begin in February 2014, however specific course dates and times are still to be determined. Please check this web page for future updates. In the spirit of increasing climate literacy and partnership the course is **open to all partners and the public**. We encourage all who are interested to participate either in person or via WebEx.

http://www.dfg.ca.gov/Climate_and_Energy/Climate_Change/Climate_College/

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~Reminders~

At the facility:

- Please sign in
- Please mute cell phones

Webex users:

- Remote users will be muted for recording purposes
- Please submit questions via “Chat” feature to the Host during Q&A/Discussion following class presentation

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

2014 Climate College

CALIFORNIA natural resources AGENCY

John Laird
California Secretary for Natural Resources

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

CDFW Director Chuck Bonham

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2014 Climate College

Cat Kuhlman
OPC Executive Director/
Deputy Secretary for Oceans and Coastal Matters
California Natural Resources Agency

All hands on deck:

Novel and cross-boundary approaches for effective management in the face of climate change.

OR

Working together against a common threat.

Catherine Kuhlman
Executive Director, California Ocean Protection Council
February 10th 2014

California Leads on Climate

- California is at the forefront in the use of science
  - Agencies
  - Academics institutions
- Multidisciplinary teams
- Our statutes
  - instruct us to work together
  - emphasize focus on ecosystems

Key State Agencies

CALIFORNIA
OST
Ocean Science Trust
Connecting Science to Ocean Management

CALIFORNIA
COASTAL
COMMISSION

Ocean Protection Act

"It is the state's policy to **incorporate ecosystem perspectives** into the management of coastal and ocean resources, **using sound science**, with a priority of protecting, conserving and restoring coastal and ocean ecosystems, rather than managing on a single species or single resource."

Ocean Protection Act

"The governance of ocean resources should be guided by principles of sustainability, ecosystem health, precaution, recognition of the interconnectedness between land and ocean **decisions informed by good science** and improved understanding of coastal and ocean ecosystems and **public participation in decision-making**."

Department of Fish and Wildlife (from the Visioning Process)

"That the department and the commission seek to **create, foster, and actively participate in effective partnerships and collaborations with other agencies and stakeholders to achieve shared goals** and to better integrate fish and wildlife resource conservation and management with the natural resource management responsibilities of other agencies."

Coastal Management Act

"That to promote the public safety health and welfare, and to protect public and private property, wildlife, marine fisheries, and other ocean resources, and the natural environment it is **necessary to protect the ecological balance of the coastal zone** and prevent its deterioration and destruction."

Other State Agencies

- State Lands Commission – interprets statements in its law about the Public Trust to include ecosystem protections

- Water Boards – sets regulations and are now considering (incorporating) cumulative impacts in their decisions and investing in science to understand acidification

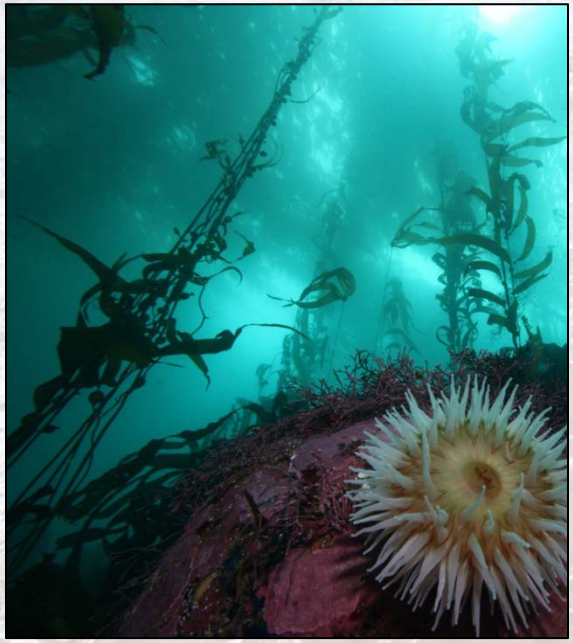
Broader Interagency Collaboration

Our statutes urge every agency with an ocean mandate to **break down the silos and work in a larger partnership**, informed by science

Climate Change and our Oceans

- The oceans are warming
- Sea level is rising
- Currents are shifting
- Physical and chemical properties are changing
- Biota is impacted as well as public health

Three Case Studies



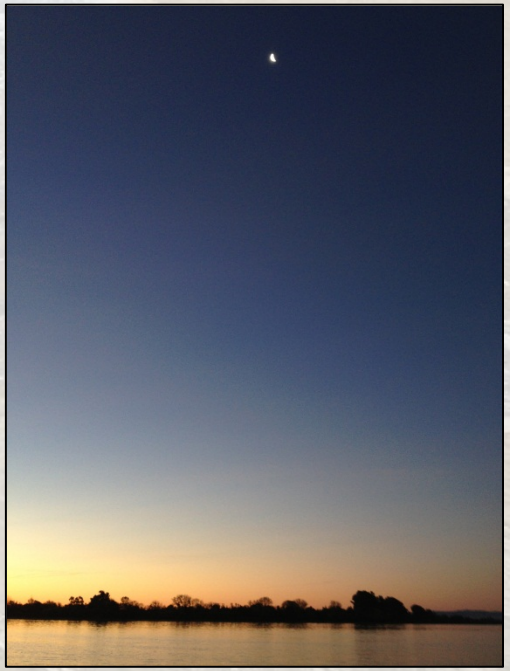
- Sea Level Rise
- Ocean Acidification
- Marine Protected Areas

Basic Facts About Warming Oceans and Sea Level Rise

- Thermal expansion and melting ice will lead to steeply rising sea levels globally
- On the California Coast south of Cape Mendocino the ocean is projected to rise
  - 5-25 inches by 2050 and
  - 17-66 inches by 2100 (NRC Report, 2012)
- The combination of sea level rise and extreme events will cause the most damage

SLR Will Damage Coastal Assets

- Roads, ports, airports, bridges, buildings
- Coastal wastewater systems
- Hazardous waste contaminated land will be flooded
- Erosion of coastal bluffs will increase
- Stockton is the city in the state at the most risk
- The Delta is particularly vulnerable



SLR Will Change or Flood Natural Areas

- Many coastal habitats, including wetlands and rocky intertidal zones, will be lost
- Freshwater marshes will become brackish
- Additional “hardening” of the coast will reduce beach size which impacts both coastal access and habitat (e.g.: haul out areas).
- Access to our beaches is critical to the coastal economy

California's Response

- Federal and state governments are increasingly working together to deliver tools for local land use planners
- Agencies within California are aligned and proactively engaged with CalEPA taking the lead for emissions and Resources of adaptation
- OPC, Coastal Commission, and Coastal Conservancy are cooperating to fund local government planning
- The state and nation are leaning on scientists for guidance

Why is This Important?

- Planning for sea level rise needs to be done at the local level
- State and federal agencies need to provide science, tools and cohesion
- Funding for assessments, planning and adaptation is sparse and scattered
- The projected ranges for sea level rise are big, new science is emerging weekly

Ocean Chemistry is Changing

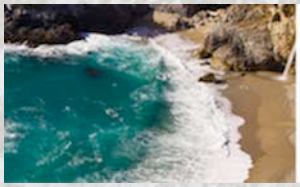
- The ocean is becoming more acidic
  - Not just a carbon issue, but what about the sub-lethal effects of inorganics?
- Hypoxic zones are demonstrably shallower and closer to shore
- Stratification may decrease mixing which will impact productivity
- The patterns of coastal upwelling will change

Basic Facts of Ocean Acidification and Hypoxia

- Uptake of carbon dioxide by the ocean is decreasing its pH
- Regional and local factors along the West Coast can contribute to lower pH in the ocean
- In addition, hypoxia, or the phenomena of very low oxygen levels, is often coupled with acidified waters
- The magnitude of the threat to marine ecosystems is not known

California's Response to Ocean Acidification and Hypoxia

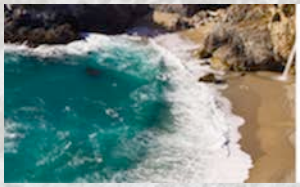
- Ocean Protection Council requested that the Ocean Science Trust empanel top experts to evaluate the state of the science
- Panel has grown to include Oregon, Washington and British Columbia scientists
- Resources managers in California and Oregon were interviewed in order to frame the Panel's charge



The West Coast Ocean Acidification & Hypoxia Science Panel

Panel's Charge

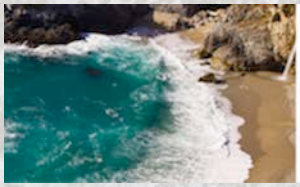
- What are the naturally occurring variations in acidification and hypoxia parameters in both space and time?
- To what extent have, or are, we going to deviate from "naturally occurring variations"
  - How much do regional and local inputs affect the deviations?
- What are the consequences of the deviations identified?
- What research and monitoring would most efficiently fill critical information gaps encountered by the Panel in answering these questions?



The West Coast Ocean Acidification & Hypoxia Science Panel

Why is the Panel Important?

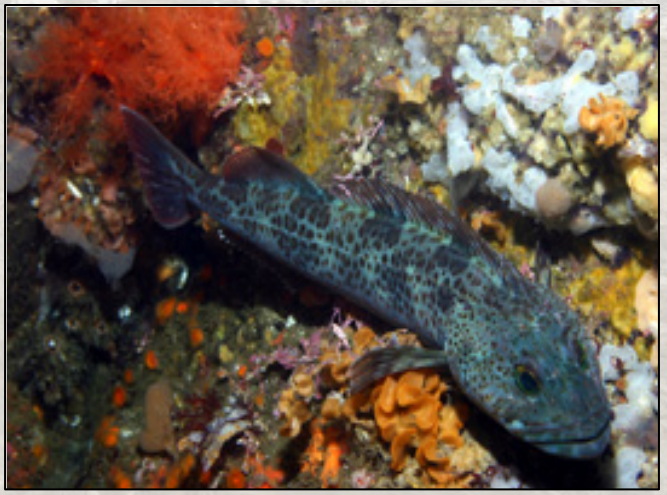
- Time is of the essence
- Linking resource managers and policy makers to scientists provides for a quicker and more efficient response
- The regional partnership approach garners support from national and state leadership as well as support from foundations
- Limited funds are used most effectively, as new funds are sought



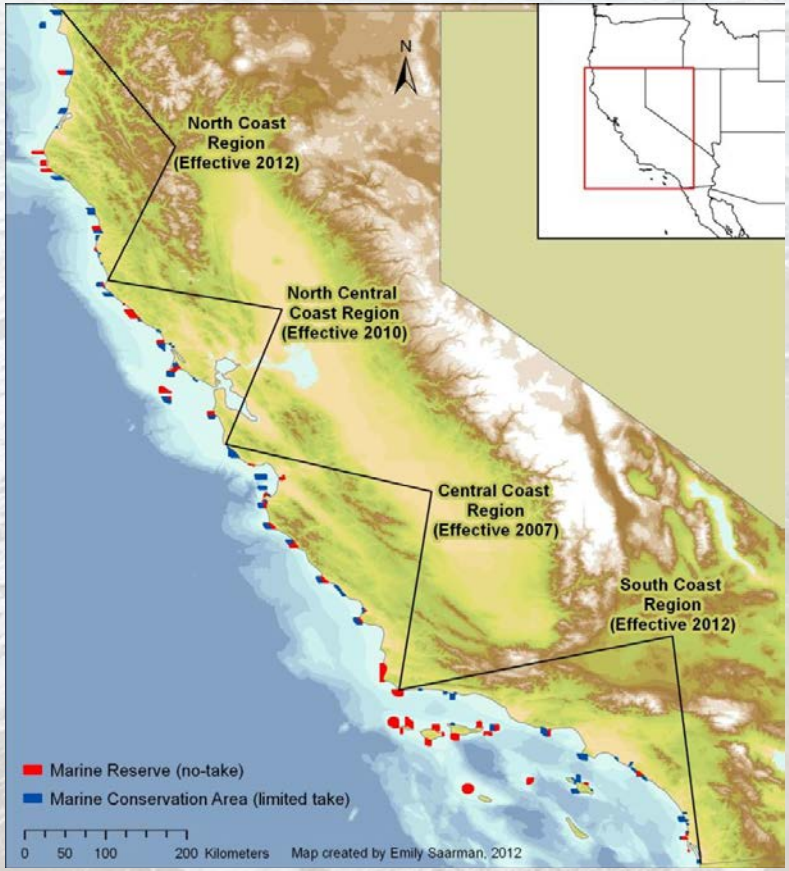
The West Coast Ocean Acidification & Hypoxia Science Panel

Goals of the Marine Life Protection Act

- Structure, function and integrity of ecosystems
- Improve recreational, research, and educational opportunities
- Promote effective governance and enforcement
- Design and manage MPAs as a network
- Use best readily available science, monitoring and adaptive management



Basic Facts About California's MPAs

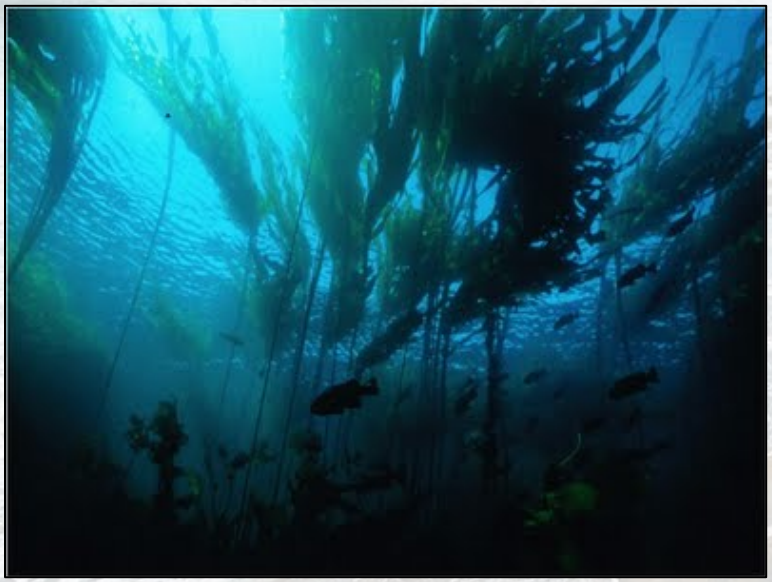


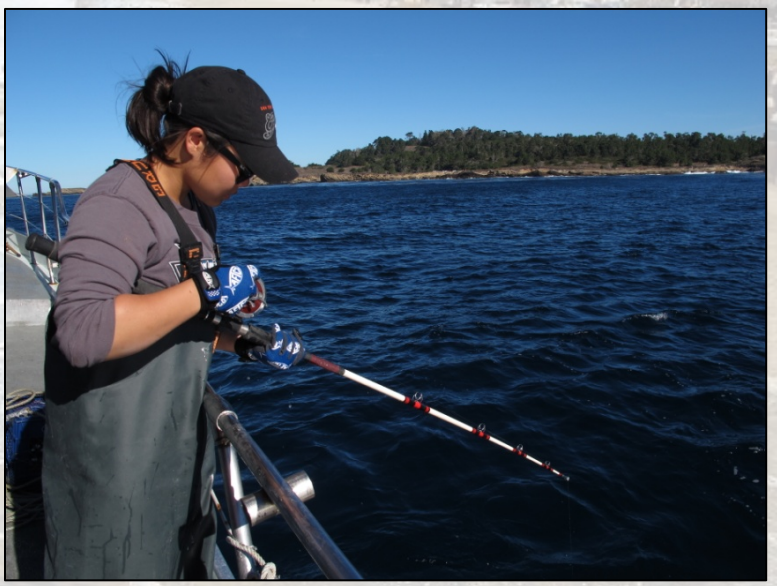
- 124 MPAs established in a science-based process from 2004 – 2012
- 2,200 square kilometers spanning the entire coastline
- 16% of California's waters under protection (9% no-take)

Marine Protected Areas

- Incredible partnership to put together engendered a wealth of social capital
- Shifting into long term management
- Driving force that the state agencies do not have the funding to fully manage the resource
- Creates the need for a shared approach
- These are important areas for climate change

Getting the Partnerships Right





- Experimenting using new shared management structures with tribes and local governments
- Developed local collaboratives to drive local implementation efforts

New Ways of Working Together: Implementing on "All Hands on Deck"

- Developed a shared vision among OPC, DFW, FGC, CNRA
- We are incorporating State Parks, and plan to add Waterboards and the Coastal Commission soon
- Organized constituencies around sound science, *and build processes to incorporate new science as it becomes available*
- Agencies must become adept and agile at creating policies and pathways for the uptake of new knowledge/science.
  - We need to learn from our fishermen
  - We need to exchange knowledge with Tribes
  - Deploy citizen scientists

Why is This Important

- Resilience is connectivity, including connectivity among those of us safeguarding our resources for future generations.
- We no longer have funding to work in silos.
- Permitting activities that affect the MPAs is shared among agencies
- MPAs belong to everyone, therefore everyone needs a voice

Principles for the Future

- Scientists must understand the needs of resource managers in order to produce relevant and accessible information
- Resource managers and decision-makers must use the best science to inform new policy
- Cross disciplinary teams, like healthy ecosystems, are resilient and productive

Wrap up

- The time is now, responding to climate change is our issue
- California is a leader in responding to climate change
- As decision makers, scientists and citizens, we need to be alert to and create opportunities that keep us working together in the face of our generation's challenge
- All hands on deck: the world is changing, the sea is rising

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Questions/Discussion

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Next Class: Monday, March 10, 1-3pm

Climate Change Impacts: Temperature, Atmospheric and Hydrologic Cycles

-Nate Mantua, NOAA Fisheries Service

-Santa Cruz, CA

http://www.dfg.ca.gov/Climate_and_Energy/Climate_Change/Climate_College/