

Oceans and Ecosystems Research

Ocean Chemistry and Ecosystems Division (OCED)



Dr. Jim Hendee, OCED Acting Director
AOML Program Review, 4-6 March 2014



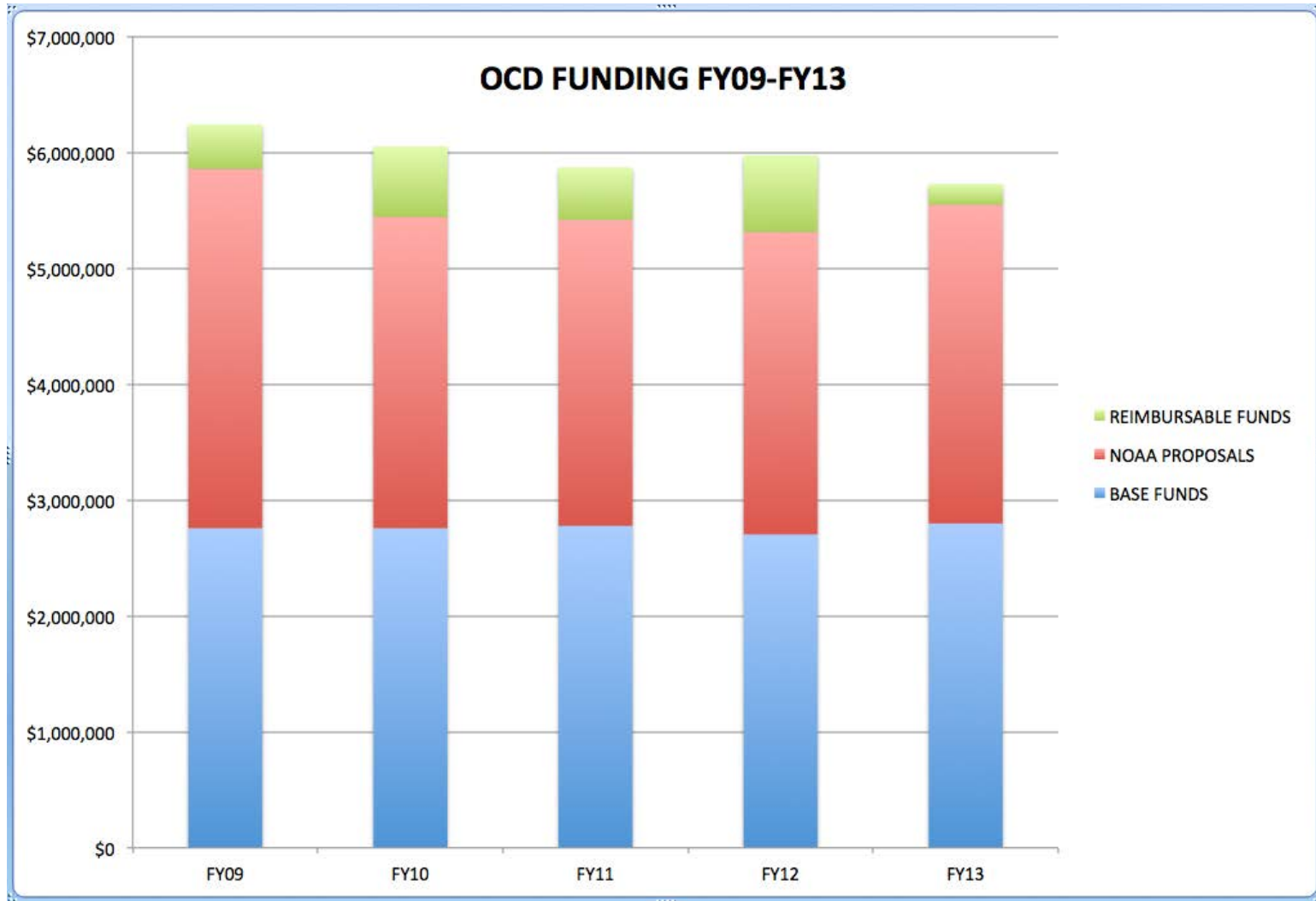
Presentation Overview

- Budget
- Personnel
- Publications
- Major science questions
- Programs addressing questions

Take home messages from OCED:

1. We are a premier group for ocean carbon and ocean acidification research.
2. Our coral reef ecosystem research has diversified and grown considerably.
3. We have adopted Ecosystem-Based Management (EBM) research as a prime directive.
4. We have a burgeoning microbiology program that will soon be NOAA's leader in 'Omics (e.g., genomics, metagenomics) research.
5. We plan, organize and execute world-class oceanographic research cruises globally.

OCED Funding, FY09 – FY13



OCED Personnel

NOAA FTEs

1. Joe Bishop
2. Dr. Tom Carsey
3. Bob Castle
4. Chuck Featherstone
5. Charlie Fischer
6. Dr. Kelly Goodwin
7. Dr. Jim Hendee
8. Betty Huss
9. Dr. Chris Kelble
10. Dr. Derek Manzello
11. Esa Peltola
12. Emy Rodriguez
13. Mike Shoemaker
14. Dr. Chris Sinigalliano
15. Jack Stamates
16. Dr. Rik Wanninkhof
17. Dr. Jia-Zhong Zhang

RSMAS/CIMAS

1. Dr. Natchanon Amornthammarong
2. Dr. Leticia Barbero
3. George Berberian
4. Renee Carlton
5. Dr. Geoff Cook
6. Dr. Ian Enochs
7. Dr. Maribeth Gidley
8. Dr. Lew Gramer
9. Dr. Kevin Helmle
10. Mike Jankulak
11. Kelly Kearney
12. Graham Kolodziej
13. Dr. Denis Pierrot
14. Kevin Sullivan
15. Dr. Ruben Van Hoodonk
16. Lindsey Visser

NOAA Corps

1. Michael Doig
2. Rachel Kotkowski

Sea Grant

1. Pamela Fletcher

NRC Post-Docs

1. Paul Jones
2. Xaymara Serrano

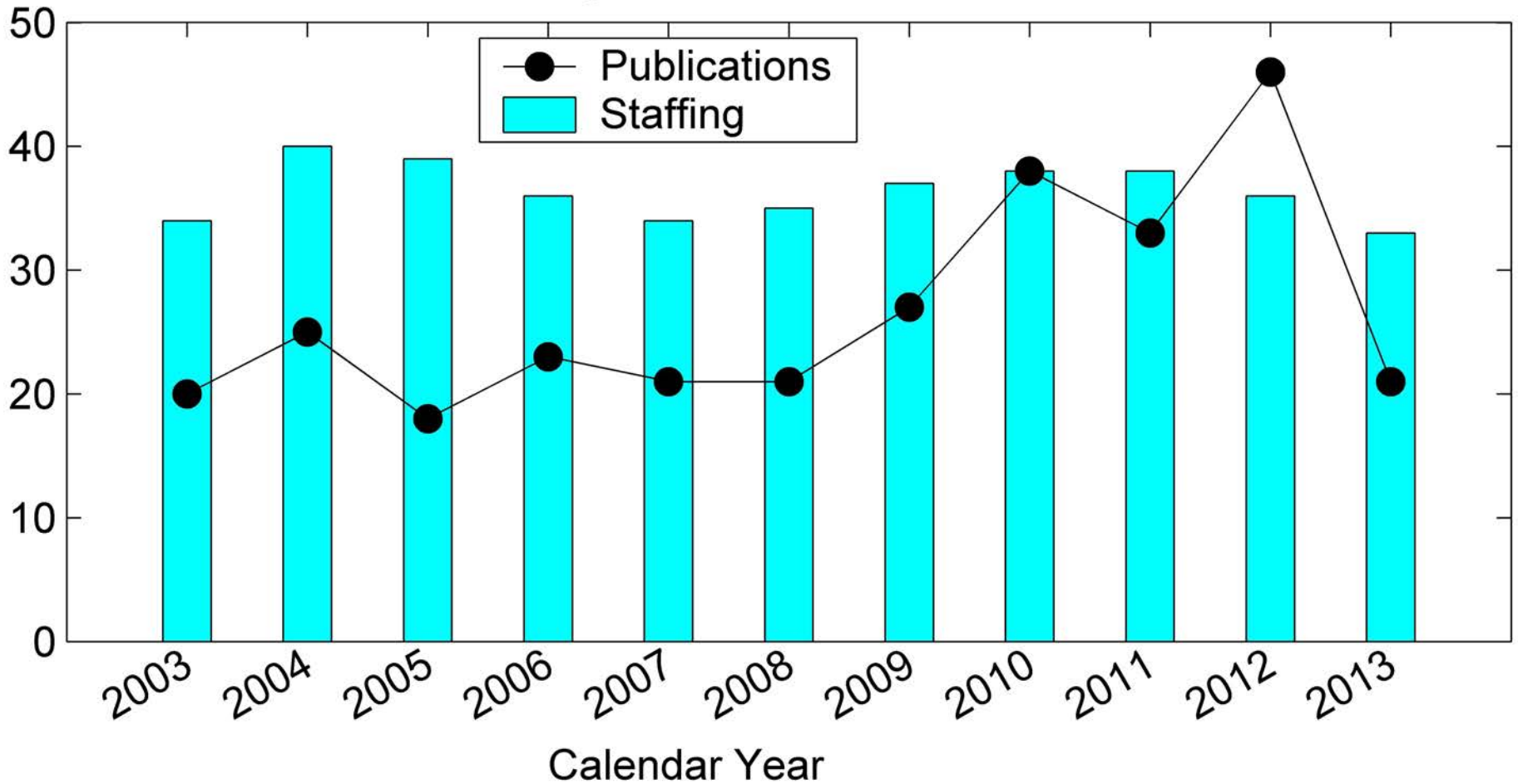
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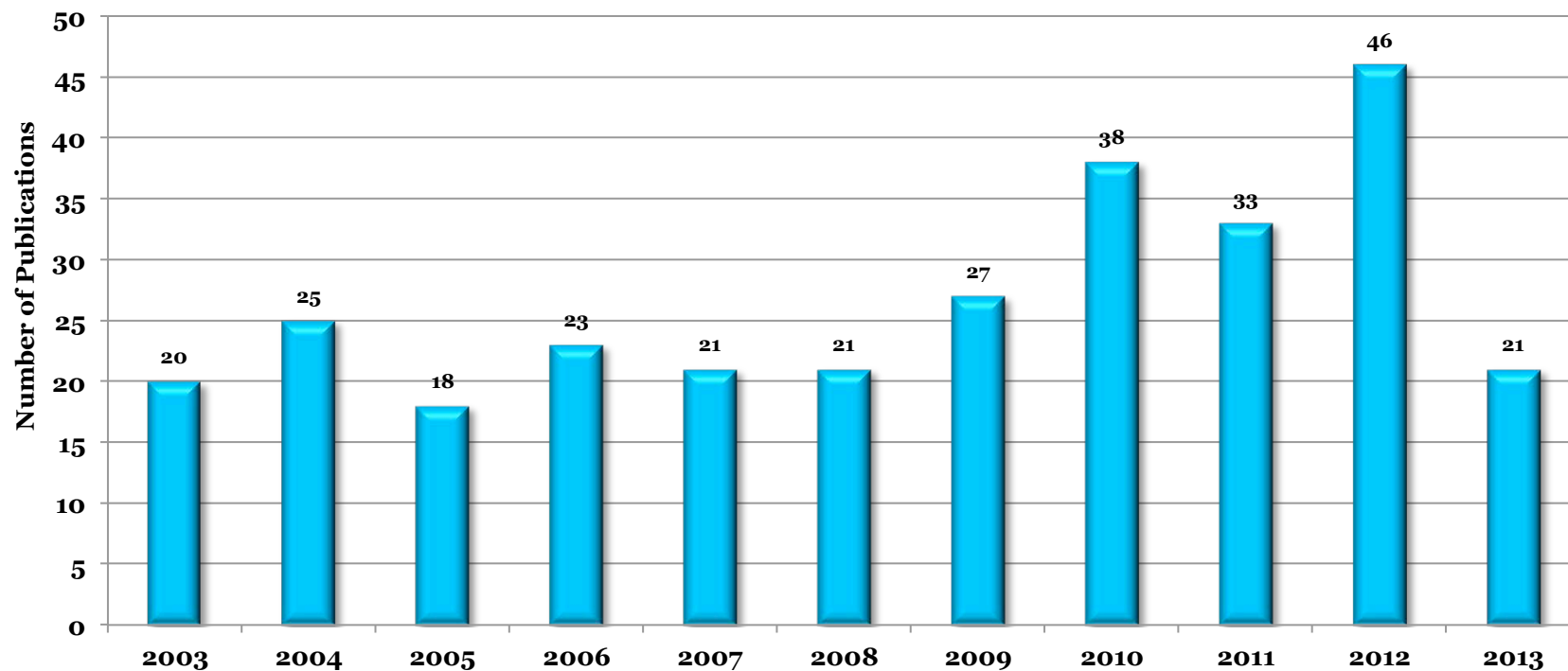
Recent Awards

- CO₂ Group: DOC's Gold Medal (2007): 15 years of research and observations that have shown the oceans are becoming more acidic as a result of the uptake and storage of anthropogenic carbon dioxide.
- CHAMP/CREWS: Bronze Award (2005). For implementation of the CREWS Network.
- Microbiology Program: NOAA Technology Transfer Award (2012), The Takeda Techno Entrepreneurship Award (2001) Finalist Commendation
- J. Hendee (2000). OAR Researcher of the Year.
- Derek Manzello: OAR Outstanding Paper of the Year Award (2011) -- Coral growth with thermal stress and ocean acidification: Lessons from the eastern Pacific. *Coral Reefs* 29 (3): 749-758.)

OCED Staffing and Publications, 2003-2013



Ocean Chemistry and Ecosystems Division Peer-Reviewed Publications (FY2003-2013)



Partnerships and Stakeholders

- **Southeast Fisheries Science Center (NMFS)**
- **NOS, NESDIS, OAR (GLERL)**
- **US Army Corps of Engineers**
- **Audubon of Florida**
- **State of Florida Fish and Wildlife Commission**
- **National Parks Service (Everglades, St. Croix)**
- **Environmental Protection Agency**
- **Harbor Branch Oceanographic Institute**
- **Nova Southeastern University & NCRI**
- **University of Miami**
- **University of South Florida**
- **University of Puerto Rico**
- **Many other academic institutions**
- **Commercial: Weston Solutions**
- **SOCAT: surface ocean carbon atlas**
- **GO-SHIP: Global Ocean ship-based hydrographic investigations program**
- **DOOS: Deep ocean observing system**
- **EOV: Essential ocean variable effort**
- **East and Gulf Coast Ocean Acidification consortium (in collaboration with regional IOOS)**
- **GCP: Global Carbon Project Stakeholders**
- **IPCC**
- **State/Federal/Regional Gulf of Mexico Governor's Alliance**
- **Southern California Coastal Water Research Project (SCCWRP)**
- **Florida Department of Environmental Protection**
- **Miami-Dade Water and Sewer Department**
- **AND MANY MORE!**



Major Science Question – Carbon Program

How and why are CO₂ levels changing in the ocean?

- GOSHIP Repeat Hydrography/CO₂ Inventories
- Quantifying sea-air CO₂ fluxes using surface water CO₂ measurements from ships of opportunity
- Oceanic, Coastal and Estuarine OA Observing Networks: North Atlantic Ocean, East and Gulf Coast

Major Science Questions – Coral Reef Research

1. What are the spatial and temporal trends in temperature and ocean acidification (OA) on US coral reefs?,
 2. What are the ecosystem impacts of OA on US coral reefs?
 3. How will climate change and OA alter the physical environment of coral reefs in the future?
- The Coral Reef Early Warning System (CREWS)
 - Integrated Coral Observing Network (ICON)
 - National Coral Reef Monitoring Plan (NCRMP)
 - Ocean Acidification Program (OAP)
 - Global Modeling and Coral Bleaching
 - Land-based Sources of Pollution: Effects on South Florida's Corals
 - Providing Real-Time Information for Marine Ecosystem Decision Support

Major Science Questions – EBM Research

1. How do we assess, evaluate, and predict the holistic integrated state of coastal ecosystems?
 2. How can we quantify the interaction between humans and coastal ecosystems to improve the management of our coastal ecosystems and communities?
- Ecosystem Restoration, Assessment, and Modeling (ERAM)
 - Gulf of Mexico Integrated Ecosystem Assessment (GoM-IEA)
 - Integrated Models for Evaluating Climate Change, Population Growth, & Water Management
 - Juvenile Sportfish Research in Florida Bay
 - Marine & Estuarine Goal Setting for South Florida (MARES): A Testbed for Science-to-Ecosystem Based Management

Major Science Questions – Coastal South Florida

1. What are the sources and concentrations of nutrients, pathogens, and fecal indicators in south Florida coastal waters?
 2. Are there detectable changes in south Florida coastal ecosystems attributable to anthropogenic nutrients or pathogens?
- The Florida Area Coastal Environment (FACE) program
 - The Biscayne Bay Turbidity Study
 - South Florida Inlets as Land-Based Sources of Pollution
 - The South Florida Project (SFP)
 - Development of an Autonomous Ammonium Fluorescence Sensor (AAFS) with a View Toward In-situ Application.

Major Science Question – Microbiology

How can we improve the capability to measure and understand the sources of degradation in coastal ecosystems and their impact on ecosystem health and resilience including the relationship of the oceans to human health?

- Development, Testing, and Validation of Molecular Microbial Source Tracking Tools and Biosensors
- Microbiological Studies of Beach and Ocean Water Quality to Support Coral Reef and Coastal Ecosystem Health
- Microbiological Studies on Oceans and Human Health Interactions
- Microbial Diversity and Ecosystem Function of Marine Microbial Communities
- Research Mentorship in Environmental Microbiology: Training the Next Generation Workforce in Environmental Science

Looking Ahead

- Having a permanent Director will provide stability and a persistent vision for the future.
- OCED will provide leadership in South Florida and the Caribbean for Ecosystem-Based Management Research, and carbon-based research (including OA).
- We will define new stewardship roles for microbiological research in coral ecosystems, fisheries, and human health.
- We will better define the role of Land-Based Sources of Pollution in south Florida's coral reefs and coastal resources.
- We will build stronger relationships with our academic and agency partners, which will enable us all to produce better ocean and coastal research and publications.





Questions?

