

OSTP Energy & Environment Division Update

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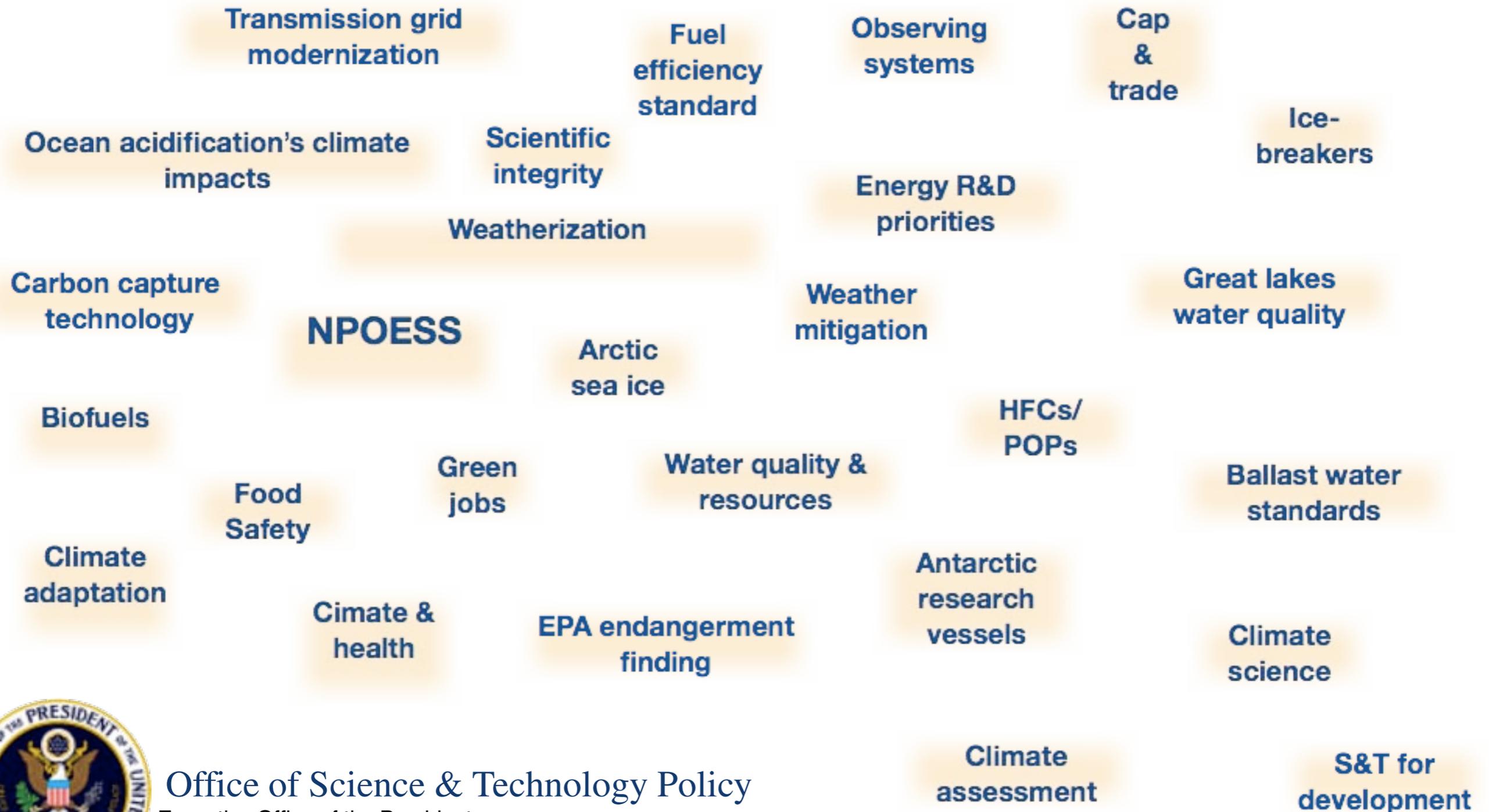
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E&E Framing: Grand Challenges

- **Climate change**
 - Science, adaptation, and mitigation
- **Sustainable development**
 - Institutions and resource use
- **Energy**
 - Renewables, efficiency, and innovation



Sample of Issues: May 2009



Presidential Priorities

- Protecting our nation from the serious economic and strategic risks associated with our reliance on foreign oil and the destabilizing effects of a changing climate
- Advancing energy and climate security via promoting economic recovery efforts, accelerating job creation, and driving clean energy manufacturing



E&E Framing: Presidential Priorities

Three pronged challenge of climate change, sustainable development, and clean energy

- Comprehensive domestic energy legislation and international action
- Policies to promote US leadership in marine stewardship
- Benefits to Americans (green jobs, environmental quality, sustainable agriculture)



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E&E Framing: President Obama on what PCAST can do

“To engage the scientific community directly in the work of public policy

In environmental science, it will require strengthening our weather forecasting, our Earth observation from space, the management of our nation’s land, water and forests, and the stewardship of our coastal zones and ocean fisheries.”

President Obama, National Academies (April, 2009)



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E&E Framing: Topical and Issue Areas

Energy (buildings technology, smart grid, weatherization, R&D, mountaintop mining)

Climate (climate science, adaptation, carbon monitoring and verification, assessments, domestic and international policy)

Oceans (national policy, marine spatial planning, seabed mapping, ocean acidification, R&D)

Environmental Quality (pesticides and toxic substances, urban and regional air, water, marine pollution, hazardous and solid wastes, natural hazards)

Ecosystems (biodiversity, deforestation, invasives, land use, agriculture)



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What OSTP Can Do

- Address S&T policy issues
- Raise the visibility of S&T issues
- Guide R&D budgets
- Recruit personnel
- Promote interagency collaboration



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Example: Establishing a Science-Based Ocean Policy



Pacific sunrise from space



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The Challenge

- Human & ecosystem health threatened by toxins, HABs
- Warming waters impacting ecosystem structure & function
- Coastal communities are facing sea level rise & storm surge
- Decreased biodiversity from overfishing & invasive species
- AND imprinted over these challenges is increased human use



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Federal Interagency Effort

- President established the Interagency Ocean Policy Task Force June 2009:
“We have a stewardship responsibility to maintain healthy, resilient, and sustainable oceans, coasts, and Great Lakes resources for the benefit of this and future generations.”
- Charged the Task Force to deliver a national Ocean Policy in 90 days & a Coastal & Marine Spatial Planning Framework in 120 days
- Over 20 Federal agencies; 10’s of working groups; >100 stakeholder listening sessions; 6 national stakeholder workshops
- **National Ocean Policy** delivered September 2009
- **Coastal & Ocean Marine Spatial Planning Framework** delivered December 2009
- Both are out for public comment



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(Draft) National Ocean Policy

Four priority objectives:

- Ecosystem-based management
- Coastal and marine spatial planning
- Inform decisions & improve understanding using sound science
- Coordinate & support regional management across agencies

Five areas of special focus:

- Resiliency & adaptation to climate change & ocean acidification
- Regional ecosystem protection & restoration
- Water quality & sustainable practices on land
- Changing conditions in the Arctic Ocean
- Ocean, coastal & Great Lakes observations & infrastructure



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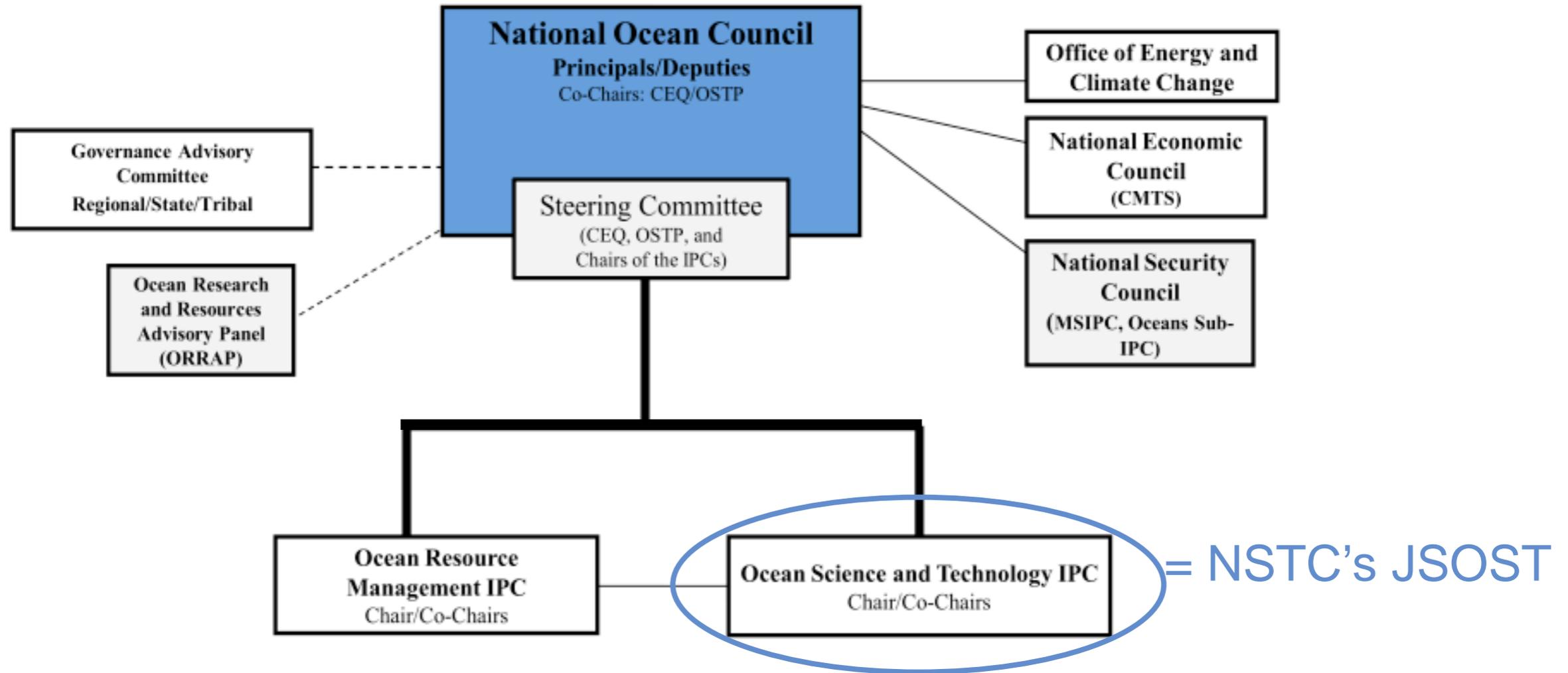
Proposed Governance Structure

- National Ocean Council
 - co-chaired by CEQ & OSTP
 - includes an active Steering Committee
 - strong link with regional/state/tribal stakeholders
- Oversees an Ocean S&T Interagency Policy Committee under OSTP's NSTC
- Oversees an Ocean Resources Management Interagency Policy Committee



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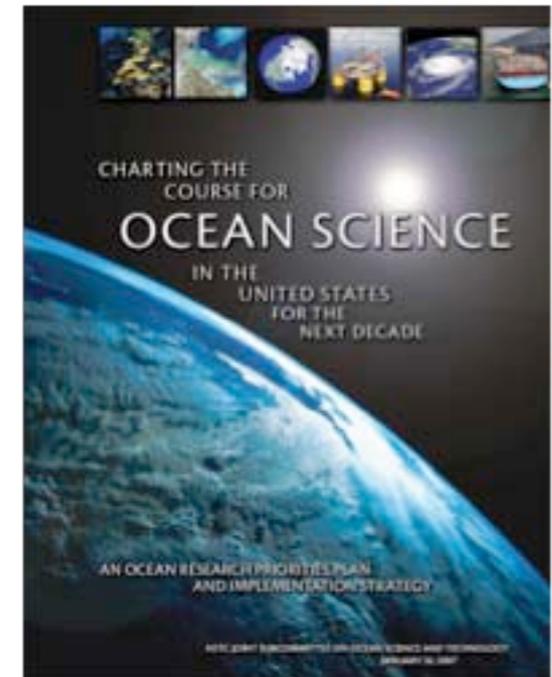
Proposed Governance Structure



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Interagency Ocean S&T Priorities

- Updating the Ocean Research Priorities Plan of the NSTC's Ocean Science & Technology Subcommittee
- Structured around six societal themes:
 - Stewardship of natural & cultural ocean resources
 - Increasing resilience to natural hazards
 - Enabling marine operations
 - Improved understanding of the ocean's role in climate
 - Improving ecosystem health
 - Enhancing human health



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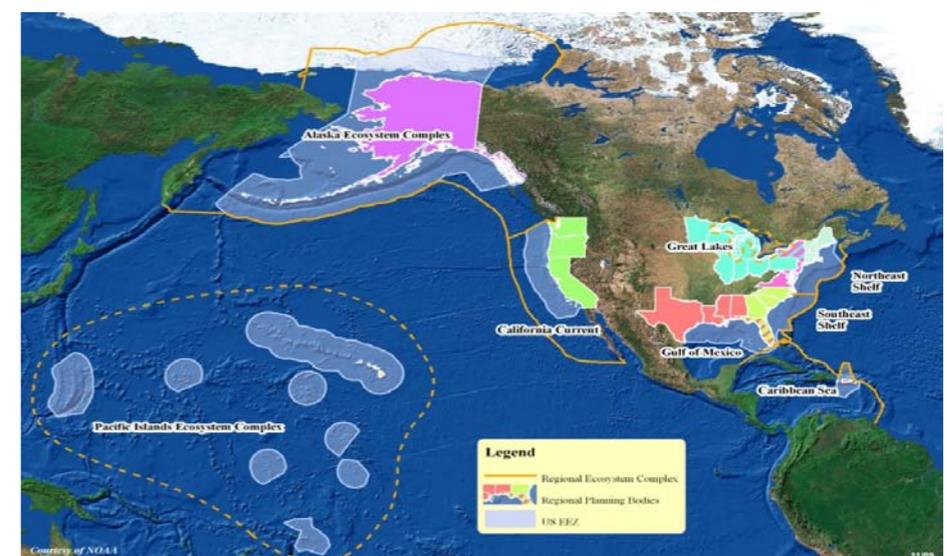
Coastal & Marine Spatial Planning

“.. A comprehensive, adaptive, integrated, ecosystem-based, and transparent process, based on sound science, for analyzing current and anticipated ocean, coastal, and Great Lake areas... that allows forward planning to integrate a wide range of ecosystem services.”

- Provisioning for energy, seafood, biomedical
- Regulating & supporting for flood prevention, biodiversity maintenance, climate regulation, erosion control, control of pests & pathogens, nutrient recycling, & primary production
- Cultural services for education, recreational, heritage, & spiritual



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Example: Earth Observations



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Earth Observations for What?

- Reducing loss of life and property from natural and human-induced disasters
- Understanding environmental factors affecting human health and well-being
- Improving management of energy resources
- Understanding, assessing, predicting, mitigating, and adapting to climate variability and change
- Improving water resource management through better understanding of the water cycle
- Improving weather information, forecasting, and warning
- Improving the management and protection of terrestrial, coastal, and marine ecosystems
- Supporting sustainable agriculture and combating desertification
- Understanding, monitoring, and conserving biodiversity

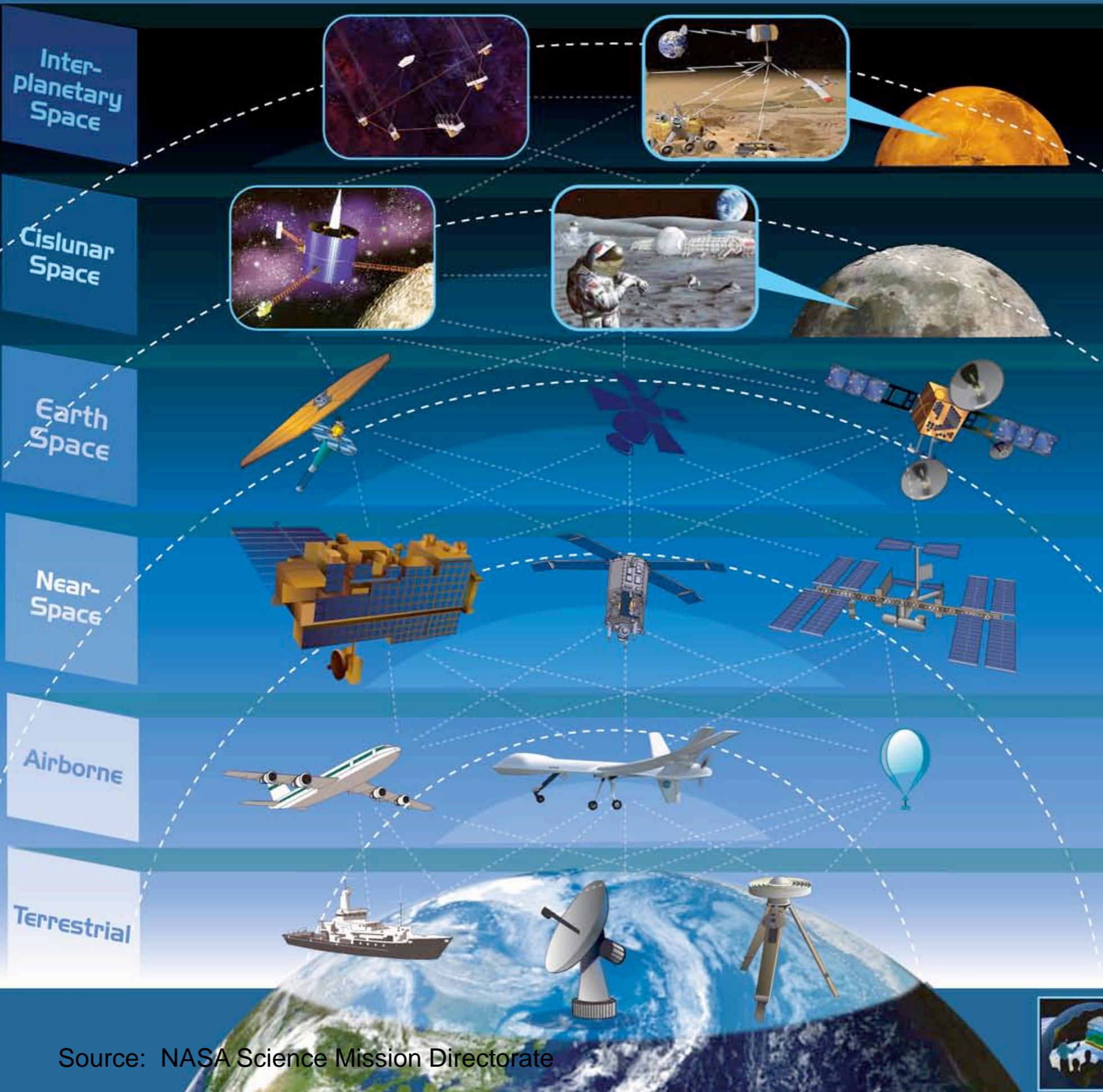
Source: Group on Earth Observations, *GEOSS 10-Year Implementation Plan* (June, 2009)



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Vantage Points

Observation Capabilities



Solar System

Communications infrastructure and space/Mars; In situ observation Exploratory vehicles

LI/L2/GEO/HEO

Communications infrastructure
In situ lunar vehicles; Sentinel satellites for continuous monitoring of Earth & Space

LEO/MEO

Active & passive sensors for trends & process studies

Suborbital

In situ measurement in research campaigns & validation of new remote sensors

Surface-Based Networks

Ocean buoys, air samplers, strain detectors, ground validation sites

Information Systems

Data management, data assimilation, modeling & synthesis



Earth Observation Challenges

- Develop a national strategy for earth observations (including measurements, modeling, data systems, decision-support tools) for global societal benefits
- Develop and commit to a “plan” for long-term, continuous data acquisition for essential Earth observations
- Establish a governance structure for delivering Earth observations and their applications (including international cooperation)



Interagency Process for Earth Observations

US Group on Earth Observations (USGEO, a NSTC/CENR Subcommittee) Strategic Assessment Group (SAG) report “Observing Earth’s Vital Signs: USGEO Strategic Assessment – June 2009.”

establishes a cross-cutting strategic portfolio of high priority national Earth observation investment recommendations

- Extend across all Agencies
- Provide an integrated picture of national Earth observation priorities
- Consider measurements from all types of platforms
- Address continuity of current measurements
- Extend across all scientific disciplines
- Highlight investments that will maximize societal benefit
- (Next step) Provide cross-cutting budget analysis and schedule



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Observational Needs / Critical Measurements

Step 1:
Gather

Hundreds

SBA Teams identified and assessed key observations
Drawn from national and international experts and documents

~75

Measurements having benefits across multiple SBAs
OR
Deemed critical to an individual SBA

~30

Measurement particularly at risk--
current or looming gap
OR
Measurement not yet being
made but great promise
for dramatic gains
or a scientific
breakthrough

Step 2: Filter

Step 3: Filter
Some More

- Assessment
- Methodology

Near-Term Threats and Major Opportunities

International Challenge

- To address identified common user requirements,
- To acquire observational data,
- To process data into useful products,
- To freely and comprehensively exchange, disseminate, and archive shared data, metadata, and products,
- To monitor performance against the defined requirements and intended benefits.



International Challenge

“..(Build) a global Earth observation infrastructure to serve the global public good and empower decision makers to meet the challenges of an increasingly complex world”
(GEO, 2009)

Sixth GEO Plenary (GEO-VI) in Washington, DC The United States hosted and chaired from November 17-18, 2009

- Over 600 participants representing the 80 Members
- The meeting advanced discussion (global monitoring of greenhouse gases, establishing a common information architecture for integrating global environmental data, agreement on sharing and exchanging environmental data more freely and openly, the inclusion of Japan into the Executive Committee of GEO, to ensure Japan's critical technical and financial contribution to building the Earth monitoring system)



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Example: Responding to Climate Change



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The Challenge

- Wide-spread climate-related impacts are occurring NOW and increasing

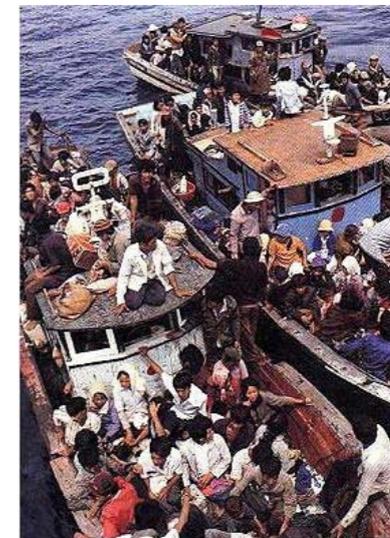
- Water resources will be stressed



- Coastal areas are at increased risk



- Threats to human health



- Climate change will exacerbate existing social & environmental stresses



Federal Interagency Efforts

- Interagency Task Force on Climate Change Adaptation established July 09 to:

“assess, develop, and implement priority areas for Federal government action on climate change resilience and adaptation capacity.”

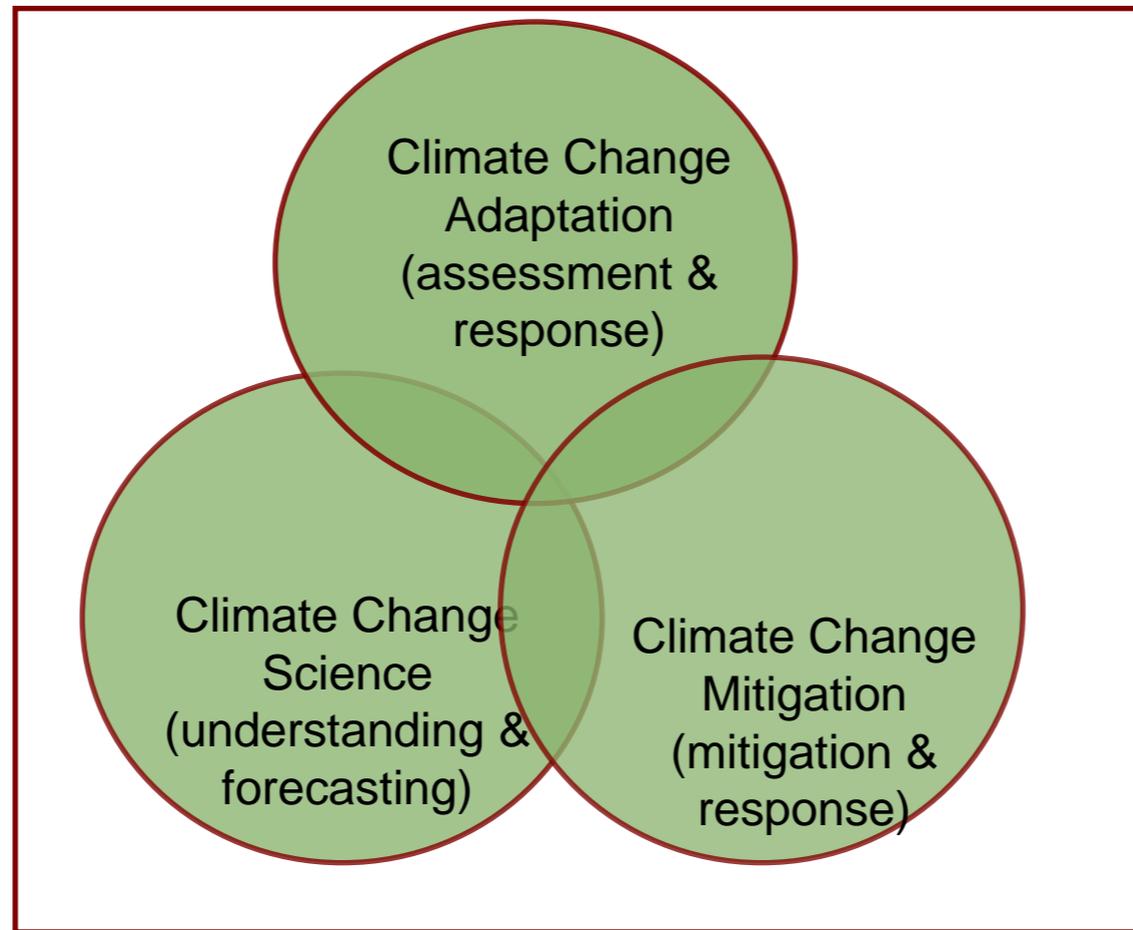
- Task Force established an Adaptation Science Work Group (draft reported completed in December)
- USGCRP Subgroup on Climate Adaptation Research
- USGCRP/UCAR National Summit on Climate Adaptation



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Conceptual Framework



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International Issues

- World Climate Conference - 3 (WCC-3) focused on adaptation:
- *“...to enhance the resilience of society in a changing climate, through improvement of the availability, accessibility and dissemination of user-oriented climate information and services.”*

- UNFCCC COP-15 in Copenhagen:
- *“Adaptation.....is a challenge faced by all countries. Enhanced action and international cooperation on adaptation is urgently required... to ensure ... adaptation actions aimed at reducing vulnerability and building resilience in developing countries, especially in those that are particularly vulnerable.... We agree that developed countries shall provide adequate, predictable and sustainable financial resources, technology and capacity-building to support the implementation of adaptation action in developing countries.”*



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International Issues Continued

- US is leading (Chris Field is co-Chair) Working Group 2 (Impacts, Adaptation, and Vulnerability) for the Intergovernmental Panel on Climate Change Fifth Assessment Report (AR5)
- AR5 is placing greater emphasis on adaptation
 - Chapter 14 – Adaptation Needs and Options
 - Chapter 15 – Adaptation Planning and Implementation
 - Chapter 16 - Adaptation Opportunities, Constraints, and Limits
 - Chapter 17 – Economics of Adaptation
- The world wide body of literature available to assess in this area has grown significantly since AR4
- There is a desire to ramp up US interagency investments in adaptation research, however US currently is lagging other countries in this area of work



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