RENEWABLE NATURAL RESOURCES FOUNDATION

Congress on Building Capacity for Coastal Solutions

Conducted December 6-7, 2004
Washington, DC

Summary of Key Findings and Recommendations

Sponsored by:
National Oceanic and Atmospheric Administration
U.S. Geological Survey
USDA Forest Service
U.S. Environmental Protection Agency

Outline

- **Introduction**
- **The Ocean Commissions**
- **Complexities in Governance**
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- **Empowering Communities**
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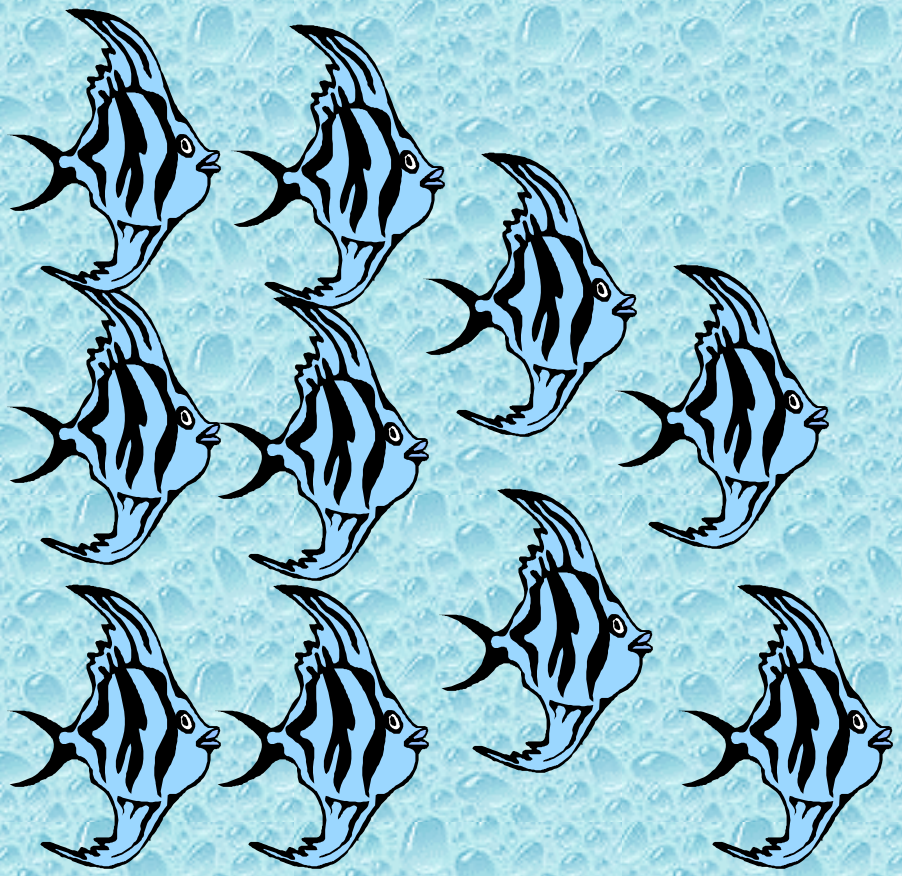
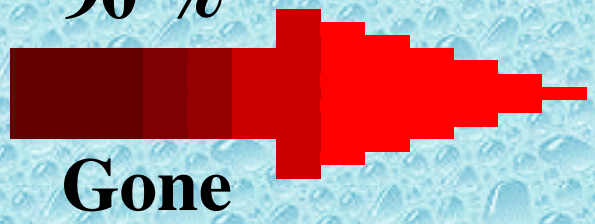
Introduction:
Understanding Ocean and Coastal Problems

- Fishery Problems
- Waste Not, Want Not
- Human Impact on Land
- Why are Coastal Systems Collapsing?

Fishery Problems

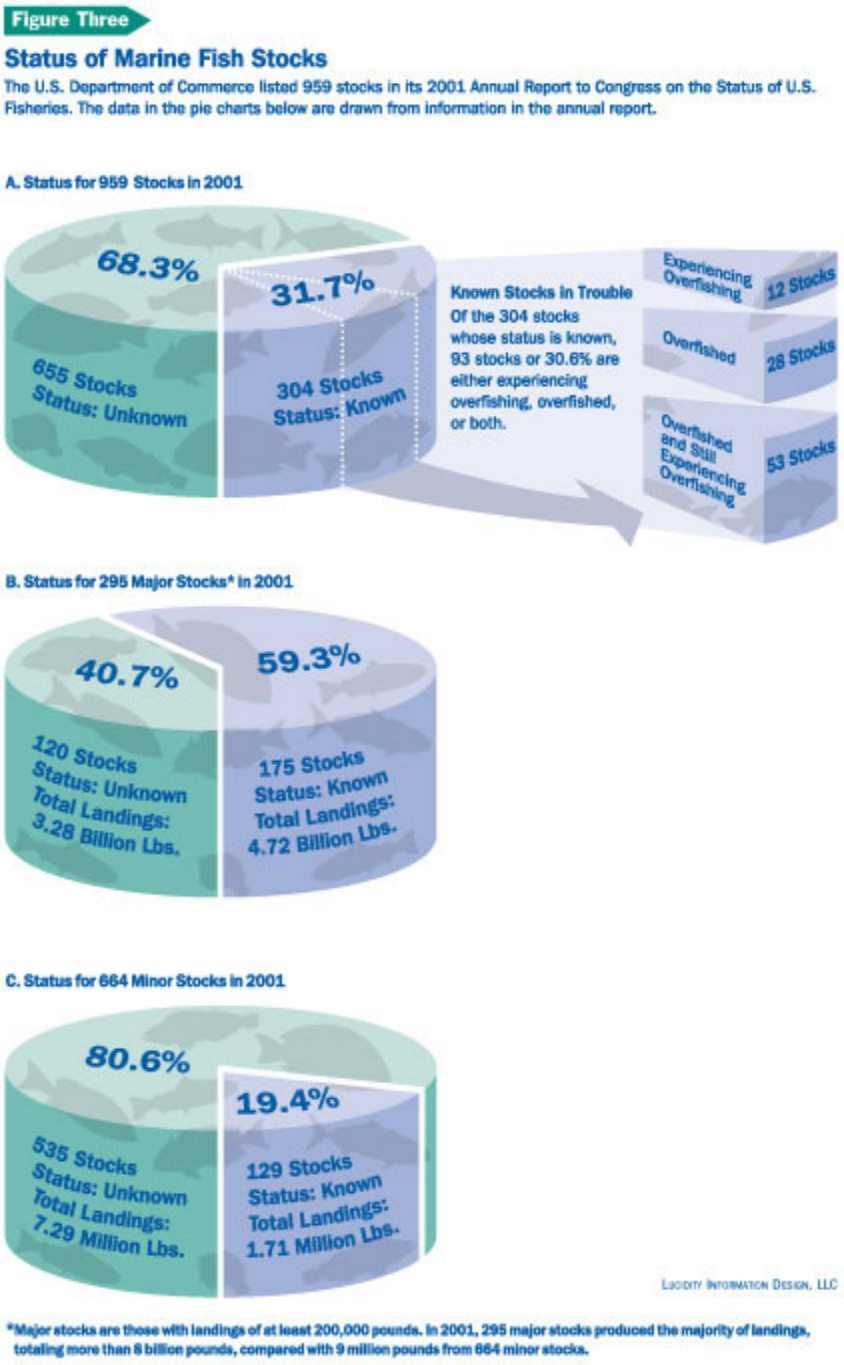
- The number of large fish has declined to about 10% of what it was in 1950.





Fishery Problems
Continued

- Lack of Knowledge
  - We only know the condition of one third of fish stocks.



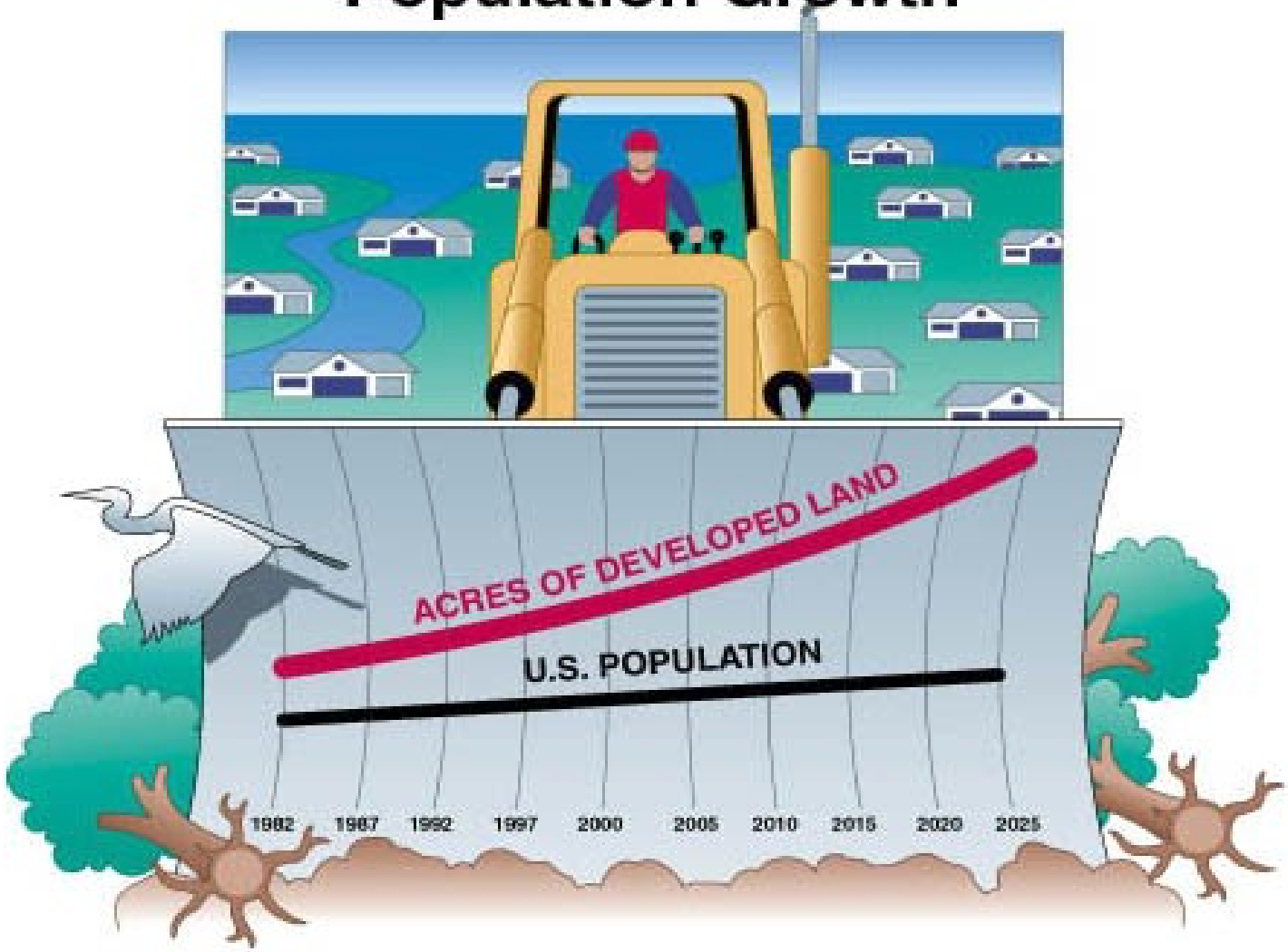
Waste Not, Want Not

- More than 2.3 billion pounds of fish are discarded each year, accounting for a quarter of the total catch.

Human Impact on Land

- Land consumption occurred at twice the pace of population growth.
  - Many coastal areas experienced even greater growth.
- When impervious cover in a watershed reaches ten percent, the watershed becomes seriously degraded.
  - This is worse in coastal areas where all the consequences of upstream land use coalesce.

Land Development and Population Growth



Human Impact on Land Cont.

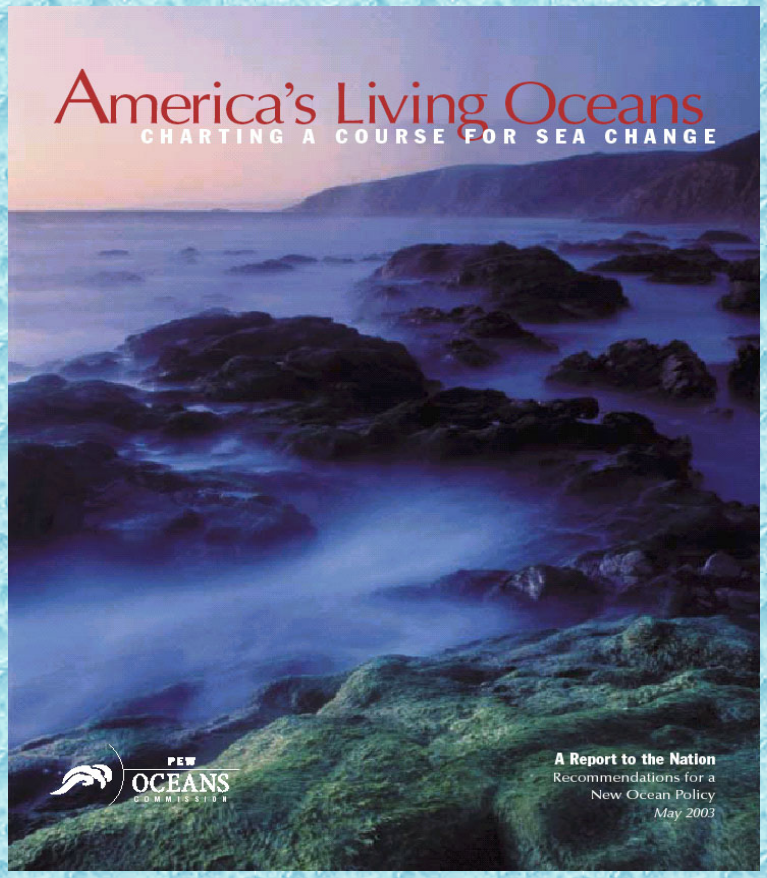
- Runoff, agricultural runoff,and atmospheric deposition from industrial processes leads to nutrient overload in streams and rivers and ultimately in their outlets along the coast, contributing to “dead zones” along the coasts.

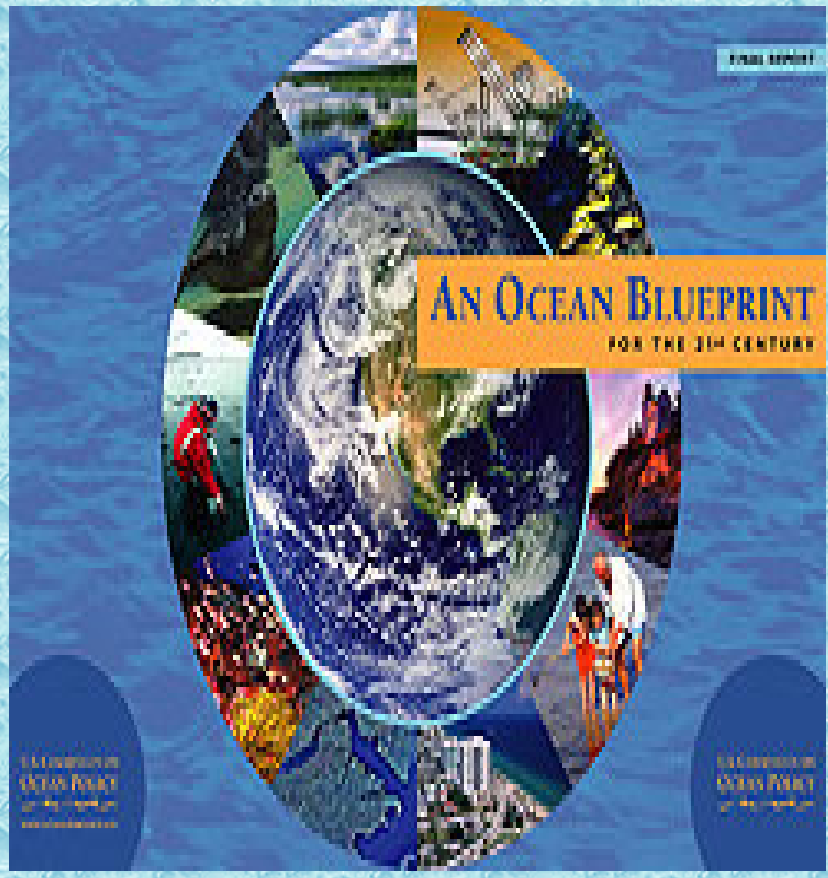
Dead Zone Proliferation

Why Are Coastal Systems Collapsing?

- We are removing more resources than the natural system is able to reproduce, and introducing more contaminates than the system is able to assimilate.
- Government and management processing are failing.
- Current approach is crisis driven not a long-term holistic policy approach.
- Ocean and coastal policy is governed ad hoc under 145 federal statutes.

The Ocean Commissions





The Pew Oceans Commission

- A bipartisan, independent group formed in June 2000, that met for two years holding regional meetings, public hearings, and workshops to listen to those who live and work around the coasts.
- Commissioners came from: science, fishing, conservation, government, education, business, and philanthropy.
- Mission: to identify policies and practices necessary to restore and protect living marine resources in U.S. waters and the ocean and coastal habitats on which they depend.

The Pew Oceans Commission

- Charged with raising public awareness of the principal threats to marine biodiversity and the importance of ocean and coastal resources to the U.S. economy.
- Four committees were formed to review the core issues of governance, fishing, pollution, and coastal development.
- The commission also investigated marine aquaculture, invasive species, ocean zoning, climate change, science, and education.

U.S. Commission on Ocean Policy

- Formed in August 2000 by the *Oceans Act of 2000* as a fully independent yet publicly financed commission to carry out the first comprehensive review of marine related issues in more than 30 years.
- In July 2001, President George W. Bush appointed 16 commissioners from diverse positions and backgrounds.
  - Federal, state and local governments; private industry, and academic and research institutions.
- Directed to address numerous issues ranging from the stewardship of fisheries and marine life to the status of knowledge about the marine environment.

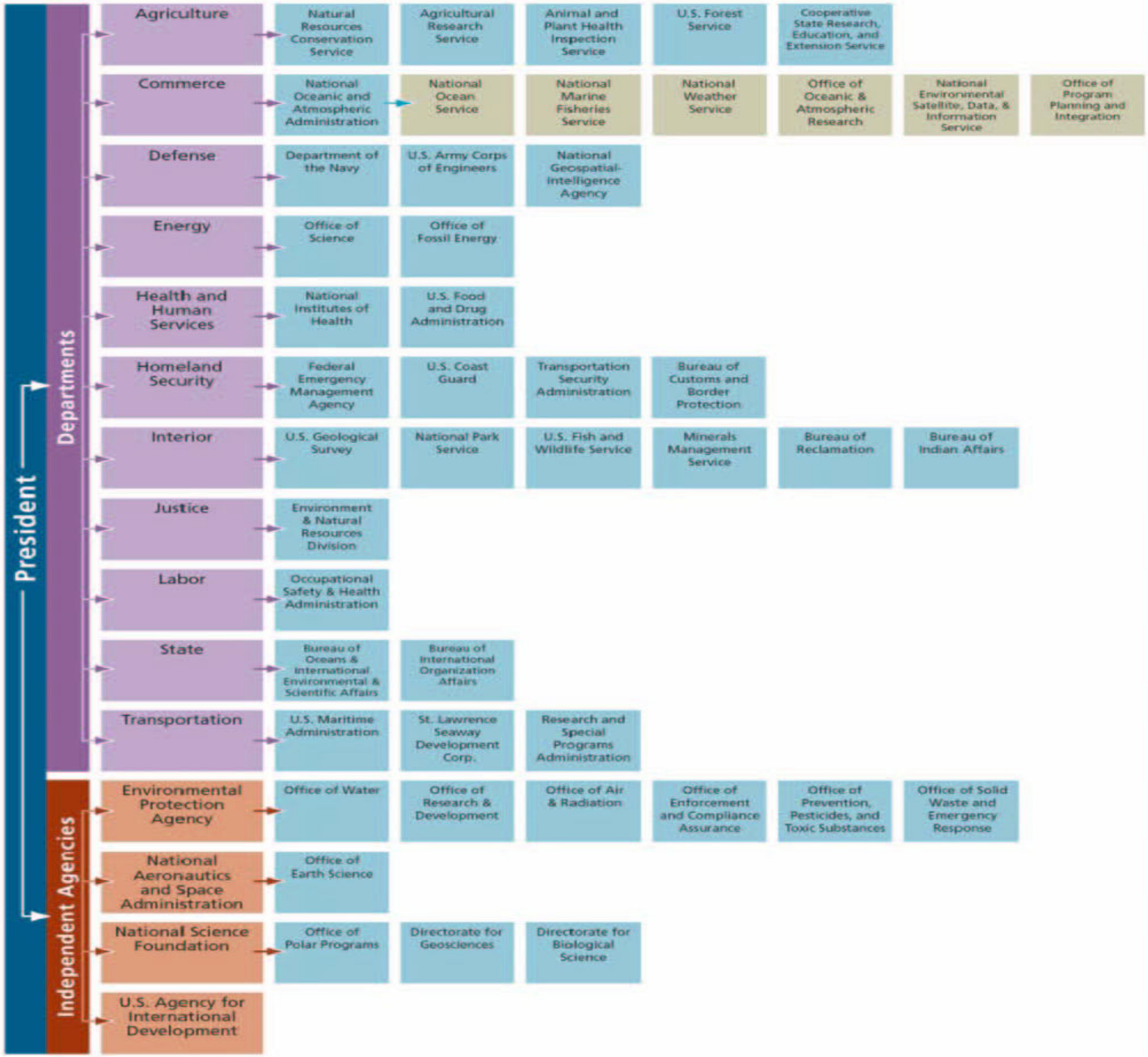
U.S. Commission on Ocean Policy

- Examine relationships among federal, state, and local governments and the private sector in carrying out ocean and coastal activities.
- Prepare recommendations on developing a coordinated and comprehensive national ocean policy.
- Four working groups in the areas of research, education, stewardship, and investment and implementation.
- The National Academy of Sciences assisted in forming a multidisciplinary science advisory panel of experts.

Complexities in Ocean Governance

- More than half of the 15 existing federal cabinet level departments plus several independent agencies play important roles in the development and implementation of ocean and coastal policy. State and local governments also have responsibilities.

Figure 4.1 Ocean and Coastal Activities Are Conducted by Many Federal Departments and Agencies



The agencies and departments depicted have varying ocean and coastal responsibilities. Their number and variety make it clear that coordination is essential to effectively manage the nation's oceans and coasts.

Large Marine Ecosystems

- Globally there are 64 Large Marine Ecosystems (LMEs) ten of which are within the U.S.
- LMEs are regions of the ocean including coastal areas out to the seaward boundaries of the continental shelves and major current systems.
- They take into account biological and physical components of the marine environment including terrestrial features such as river basins and estuaries, which drain into these ocean areas.

Figure 3.1 Large Marine Ecosystems Correspond to Natural Features

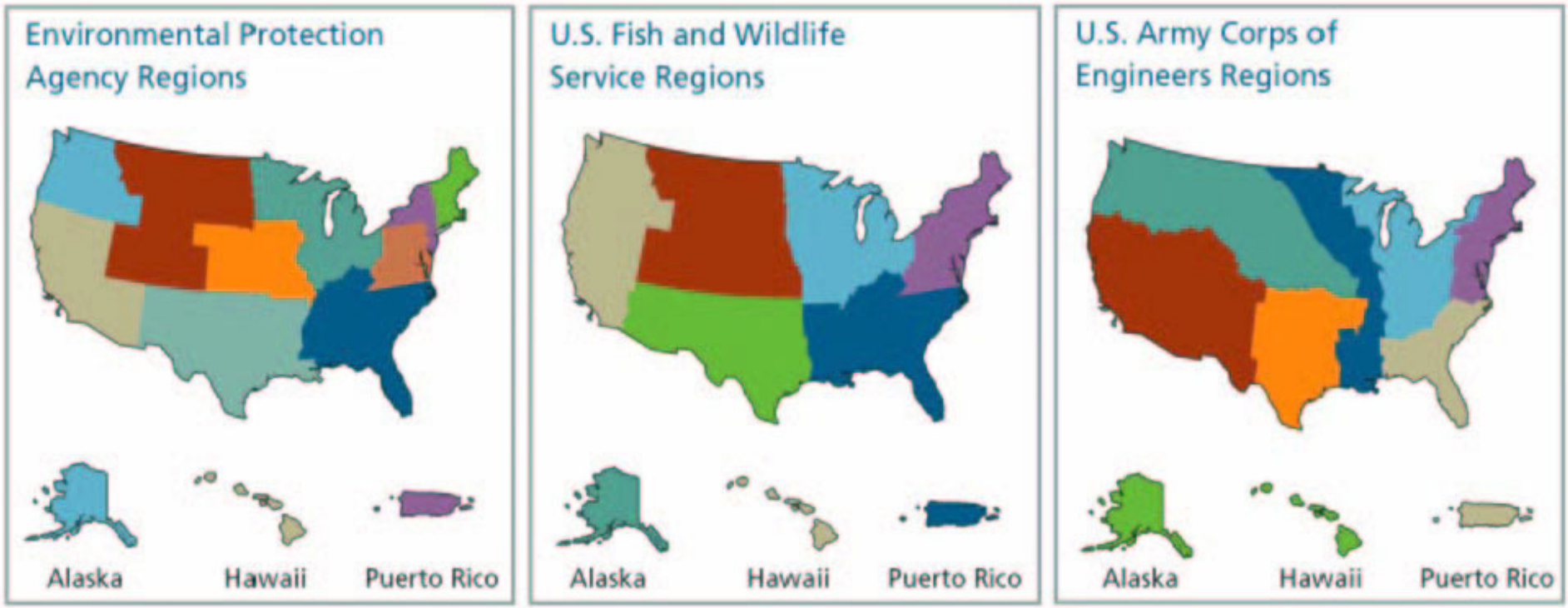
Ten large marine ecosystems (LMEs) have been identified for the United States. These LMEs are regions of the ocean starting in coastal areas and extending out to the seaward boundaries of continental shelves and major current systems. They take into account the biological and physical components of the marine environment as well as terrestrial features such as river basins and estuaries that drain into these ocean areas.

Source: University of Rhode Island Environmental Data Center, Department of Natural Resources. <http://mapper.edc.uri.edu/website/lmeims/viewer.htm> (Accessed January 2004).

Jurisdiction and Natural Resources

- A major problem in ocean governance is that pollution and fish are not stationary and do not observe political boundaries.
- While many viable programs may exist, they are not integrated into a regional/ecosystem-based approach.
- This makes managing watersheds all but impossible according to some critics

Figure 5.1 Alignment of Federal Regions Is Essential for Communication



Shown above are the existing regional management areas for three federal agencies. Because these areas do not coincide, it is difficult for the agencies to coordinate and communicate about issues of common concern at the regional level. Furthermore, this lack of coordination impedes their ability to effectively interact with regional, state, territorial, tribal, and local entities on a regional basis.

Findings and Recommendations

- Overcoming Current Challenges
  - The large number of legislative authorities and agencies makes management very cumbersome.
  - Coastal management has been driven more by economic rather than conservation goals.
  - Greater collaboration and consultation across natural resource agencies will allow for formation of a more comprehensive and all-inclusive management approach
  - Expanding collaborative efforts to include state natural resource agencies would further enhance development of a comprehensive approach to coastal management

Findings and Recommendations

- Overcoming Current Challenges
  - Existing boundaries separating federal from state jurisdiction weaken management—ecosystems should be managed as a whole
  - Piecemeal management does not allow for integration of complexities inherent in natural systems, an ecosystem approach is better
  - Policy makers, scientists ,and managers should consider all inputs and elements of an ecosystem when developing management plans
  - Efforts to deal with nonpoint source pollution need a coastal focus

Findings and Recommendations

- Overcoming Current Challenges
  - Adaptive management should be used in an effort to integrate ecosystem complexities.
  - Each agency needs to examine why it cannot implement adaptive management and take necessary steps to allow implementation
    - Within NOAA, the formation of regional offices, ideally ecosystem based, would allow for more integrated management approaches through the formation of teams of scientists and managers with expertise and knowledge in a particular region
  - A meaningful and widely accepted international effort to protect the oceans as a common resource also is needed, but first the U.S. must ratify the United Nations Convention on the Law of the Sea

Findings and Recommendations

- Formation and Management of Regional Councils
  - Delegates concluded that the most promising path to comprehensive and integrated management of coastal resources would be though the widespread establishment of regional commissions or councils based upon watersheds, ecosystems, or other meaningful divisions.

Findings and Recommendations

- For the councils to be effective several elements must be in place:
  - Effective leadership and direction from relevant federal and state agencies is crucial
  - Continuity in service by council members to foster effective and knowledgeable leadership
  - Continuity in funding
  - Questions of authority must be answered
  - Councils must be formed around a manageable region

Findings and Recommendations

- The Atlantic States Marine Fisheries Commission (ASMFC) was cited as an example of an appropriate starting point.
  - ASMFC has an ecosystem based orientation with collaborative structure and legal authority
  - NOAA Fisheries provides oversight and a safety net, but ASMFC has the ultimate responsibility
  - Limits placed on allowable total catch are separated from allocations of individual catch limits, unlike the management process within many fisheries management councils
- The ideal commission would have structure and authority like ASMFC, supplemented with local authority to influence decisions impacting habitats, watersheds, and airsheds

Lessons from Commissions and Councils

- Establishing effective regional governance that takes into account the complexity and interconnectedness of natural systems will require consideration of local watersheds, river basins, and near-shore marine systems

- Developing a structure that incorporates elements of the previous examples will be necessary

The Future of Integrated Coastal Management and Governance

- NOAA an important leader in coastal and ocean governance
  - Mission areas in ecosystems, commerce and transportation, weather and water, and climate
  - Established the NOAA Ocean Council which coordinates all NOAA ocean and coastal interests to address the need for a more unified approach for ocean and coastal issues within the agency

The Future of Integrated Coastal Management and Governance

- U.S. Commission's fundamental principles for integrated management:
  - Consider ocean-land-atmosphere connections
  - Implement regional approaches to ecosystem based management
  - Utilizing multiple-use management
  - Employ best available science and information
- Implementing this vision requires:
  - Coordination of efforts, partnerships, capacity building, and technology transfer
  - Bring science and technology to management
  - Have management needs define future directions

The Future of Integrated Coastal Management and Governance

- NOAA along with its partners is bringing science and technology to management. This requires:
  - Involve coastal managers in a dialogue with scientists to help share priorities for policy driven research
  - Ask the right kinds of questions--from the perspective of users--to ensure the utility of products and supporting technologies
  - Move research results to operational, value added context
  - Create a process for evaluation and assessment of effectiveness
  - Provide data and decision support information

Building Solutions: IT and Science Capacity

- Barriers to data sharing
- Information Technology Standards
- Scientific literacy

Barriers to Data Integration

- Federal, state, and local partners at different places on the technology curve
- Volume of data is too great
- Real or perceived security issues
- New directions (i.e., regional focus) bring more complex issues

Information Technology Standards

- Standards are necessary for effective communication
  - They allow data users and produces to communicate regardless of where they are on the technology curve.
  - They minimize data integration time and costs, and permit data operations under known conditions
- Some effort at data standardization has already been made through groups like:
  - International Organization for Standardization (ISO)
  - American National Standards Institute (ANSI)
  - Federal Geographic Data Committee (FGDC)

Geospatial One-Stop

- Web-based portal for access to maps and data
- Making it easier, faster, less expensive for government and the public to access geospatial information
- Increases federal agency accountability
- Establishes a collaborative model to support decision making

www.geo-one-stop.gov

National Oceanographic Partnership Program (NOPP)

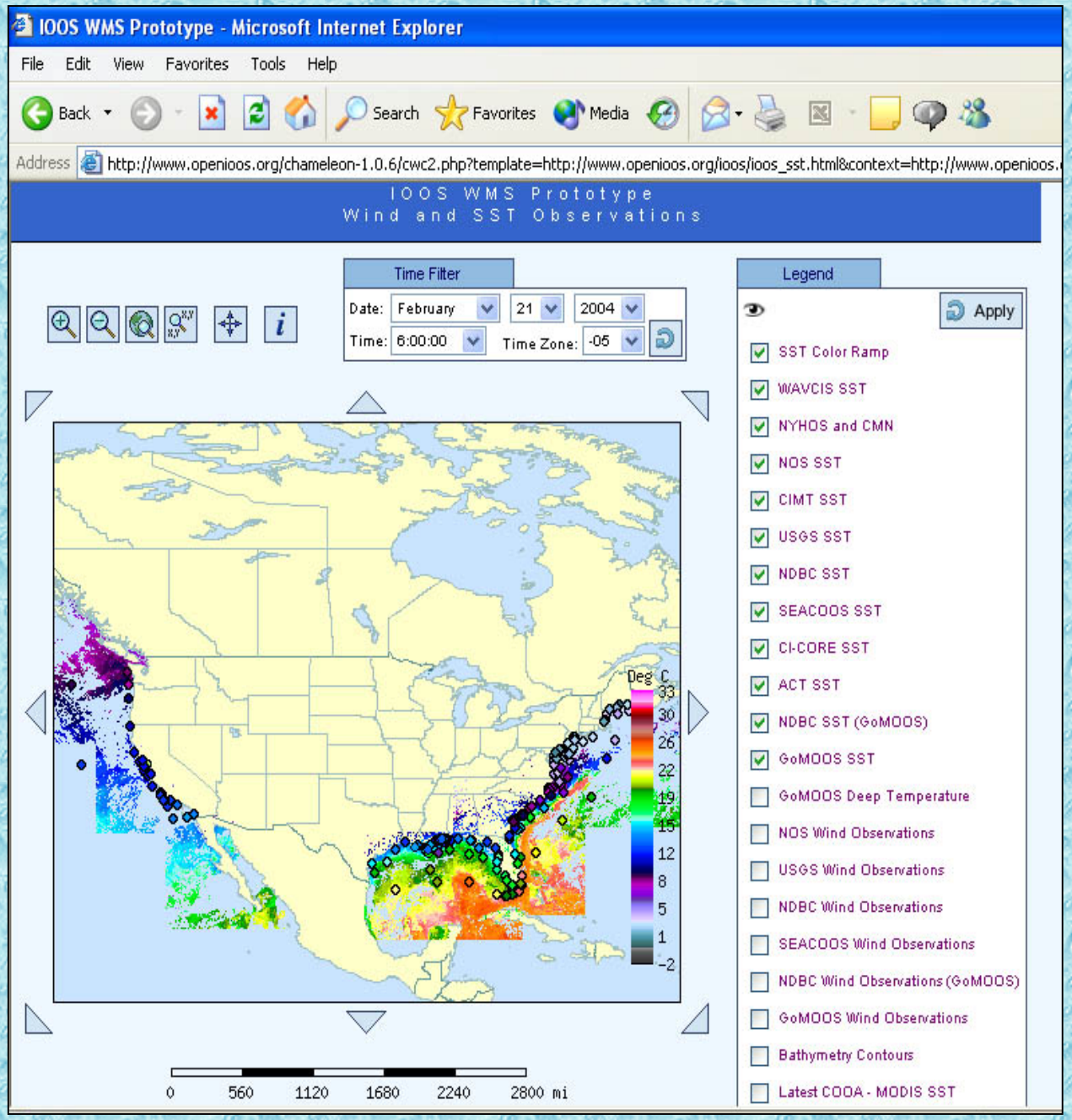
- Established in fiscal year 1997 by Congress
- NOPP facilitates new interactions among federal agencies, academia, and industry;
- Increases visibility for ocean issues on the national agenda;
- Achieves a higher level of coordinated effort and synergy across the broad oceanographic community;
- Brings together the public and private sectors to support large, comprehensive projects;
- Promotes the sharing of resources
- Fosters innovative community-wide advances in ocean science, technology, and education

Integrated Ocean Observing System (IOOS)

- Constant data streams from various data sources can be used to assess both national and regional trends
- Incorporating terrestrial and atmospheric observing systems would expand modeling capabilities and provide a better understanding of coastal impacts and opportunities for earlier prediction of crises
- Regional associations are critical to the implementation of IOOS
  - they would oversee and manage the design and sustained observing systems to address local societal needs
  - Established regional geographic boundaries
  - Obtain and disperse funds to operate and improve the regional systems
  - Ensure the timely dissemination of quality controlled data and information

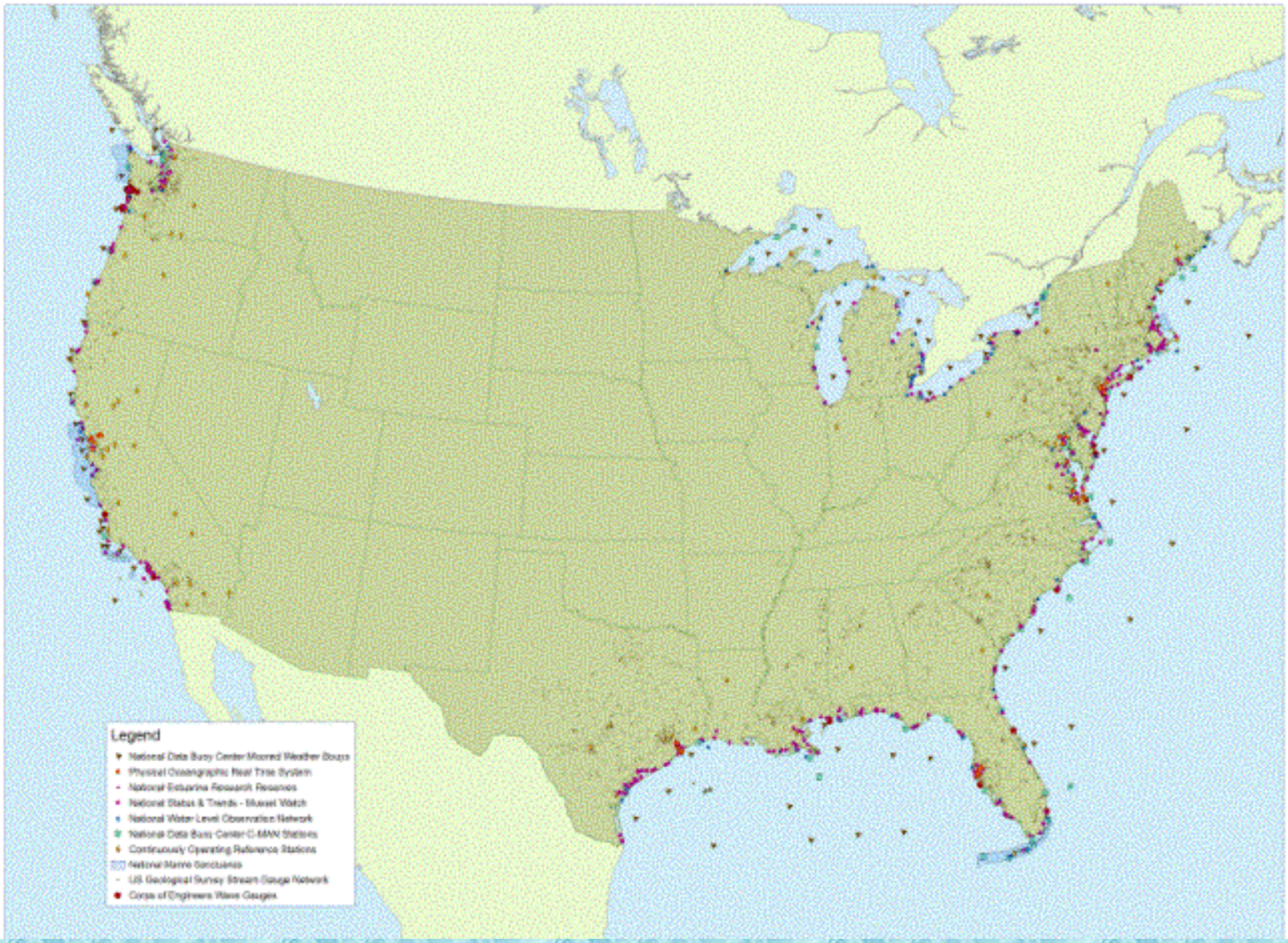
•IOOS Data Portal Prototype

www.openioos.org



Integrated Ocean Observation Systems

A Sampling of Federal Contributions to the National Backbone



Federal Contributions to the IOOS Backbone: USGS Monitoring Programs

- The coastal component is a national effort concerned with the effects of the ocean-climate system and human activities on coastal ecosystems, living resources, and the quality of life in the coastal zone
- It is conceived of as a federation of regional observing systems nested in a federally supported national backbone of observations, data management, and modeling
- The U.S. Geological Survey (USGS) will provide many key data sets to the IOOS national coastal backbone

Federal Contributions to the IOOS Backbone: USGS Monitoring Programs

- USGS Streamgage Program
  - Since 1889, USGS has operated a streamgaging network to collect information about the nation's water resources
  - A significant portion of the existing streamgages monitor coastal watersheds and basins that flow into ocean or coastal waters
  - There has been a decline in the total number of stations and a commensurate decline in the attainment of federal goals
  - Recognizing the nation's concern over long-term environmental change, the decline in the streamgaging network is troubling

Federal Contributions to the IOOS Backbone: USGS Monitoring Programs

- National Water Quality Assessment Program (NAQWA)
  - Primary source for long-term, nationwide information on the quality of streams, groundwater, & aquatic ecosystems.
  - From 1991-2001 NAQWA completed assessments on 51 major river basins and aquifers and plans to reassess 42 of the 51 study units between 2001-2011
  - Within IOOS, such assessments and raw data can be used to determine discharge measurements, chemical analysis, sediment concentrations, and particle size distribution of suspended and bed-load sediment
  - NAQWA's resources have not grown to keep pace with annual inflation, and it has had to significantly redesign for Cycle II

Other Efforts to Integrate and Provide Access to Data

- NOS Data Explorer
  - http://oceanservice.noaa.gov/dataexplorer
- Ocean Planning Information System
  - http://www.csc.noaa.gov/opis
- Gulf of Maine Ocean Data Partnership
  - http://gmbis.iris.usm.maine.edu/Partnership.asp
- Coastal Data Information Program
  - http://www.cdip.ecsd.edu
- USGS National Map
  - http://nationalmap.usgs.gov
- Interagency Coastal and Ocean Mapping
  - http://ocean.us

Scientific Literacy

- Scientific literacy in all communities, from the general public to policymakers, is crucial to finding and implementing coastal solutions

- First steps have been taken, but expanded coastal education is necessary

Centers for Ocean Sciences Education Excellence

- Network of seven regional centers, with the goals of . . .
  - developing effective partnerships between researchers and educators
  - disseminating effective ocean sciences programs and best practices
  - promoting a vision of ocean education as vehicle to create scientifically literate citizenry

Nonpoint Education for Municipal Officers (NEMO)

- Programs that educate local land-use decision makers about the links between land use and natural resources

- A major objective is to demonstrate the effectiveness of using remote sensing and GIS technologies to inform and enhance educational programs

Coastal America

- Partnership of federal, state, and local agencies and private organizations

Combines resources of federal agencies with marine educational centers to educate and involve the public in protecting coastal ecosystems

Findings and Recommendations

- Overcoming impediments to sharing and increasing access
- Understanding and fulfilling data needs

Findings and Recommendations

- Overcoming Impediments to Sharing and Increasing Access
  - Agency cultures and structures often inhibit sharing
  - Delegates suggested that government managers should be rewarded for collaborating
  - A lack of interoperability among government IT departments complicates collaboration efforts
  - Legislation or a commitment from the executive branch may be necessary to overcome current reluctance to motivate agencies to commit funding and personnel to collaboration efforts

Findings and Recommendations

- Overcoming Impediments to Sharing and Increasing Access:
  - Key barriers to coordinating water quality data, they have also complicated efforts to synthesize data from different collecting efforts
    - Data collected for different organizations are geared to serving different purposes
    - Inconsistent methods are used to obtain samples and interpret their results
    - Data collectors are unaware as to which entities collect what types of data
    - Low priority for data coordination as shown in a lack of support for national and state councils that have been established to improve coordination

Findings and Recommendations

- Overcoming Impediments to Sharing and Increasing Access:
  - Fear of inaccuracies and a lack of universal standards for determining quality of data
  - Regional variations in terminology also can hamper collaboration
  - Need to develop standards in terminology, classifications, and sampling and monitoring methods, all public entities and those receiving public funding should comply with those standards

Findings and Recommendations

- Overcoming Impediments to Sharing and Increasing Access:
  - Delegates recognized the promise of an integrated ocean observing system, but acknowledged the need to first inventory and catalogue existing databases
  - A “Library of Congress” should be established for data with a commitment for necessary funding and personnel
  - A culture of linked portals, openness, and interoperability must be fostered
  - Consistent funding for data collection and maintenance is crucial as data becomes more valuable the longer it is collected

Findings and Recommendations

- Understanding and Fulfilling Data Needs
  - Data efforts must be properly focused to utilize scarce resources
  - Educating the public on data and how it is used by the agencies and could be used by the public to make decisions could lead to greater support
  - Restoration projects were seen as a means for engaging the public by demonstrating the success of science in their neighborhood and as a return on investment
  - Better mechanisms are needed for scientists to determine which issues are most important and deserve more attention

Findings and Recommendations

- Understanding and Fulfilling Data Needs
  - An urgent research and development effort is needed to advance technologies to collect biological and habitat data
  - Ocean science needs better landscape-level science and planning to include synergistic effects, multi-stressor issues, and matters of scale
  - Local government planning in watersheds needs to be considered

Findings and Recommendations

- Delegates recognized several specific data deficiencies. Needs include:
  - Habitat data for fish from the top of the watershed out to the continental shelf
  - Data on populations, particularly in wetlands, including tools to measure populations and their movements
  - High-resolution mapping of submerged aquatic vegetation
  - Economic data on costs of environmental degradation and the value of resources

Findings and Recommendations

- Delegates recognized several specific data deficiencies. Needs include:
  - Better understanding of nutrient, surface, and groundwater flow
  - stream flow, bathymetric, estuary, and topobathy mapping
  - Data on de-nitrification in wetlands, including tools to measure the effects of riparian and so-called "isolated" wetlands on down-stream biologically available nitrogen

Mobilizing and Empowering Communities

- Communities
- Science and coastal governance
- How do you define “coast?”
- Analysis, Facilitation, and Advocacy in Coastal Governance
- New Directions in Coastal Governance

Communities

- Community: a group of people with shared interests, perceptions and values

- Developing a governance structure involves compromise by each community—human behavior must change and trade-off between the bio-physical environment and the socio-cultural environment must exist

Science and Coastal Governance

- Science:
  - Objectivity, reliability, validity
    (non-normative:what will or might happen)

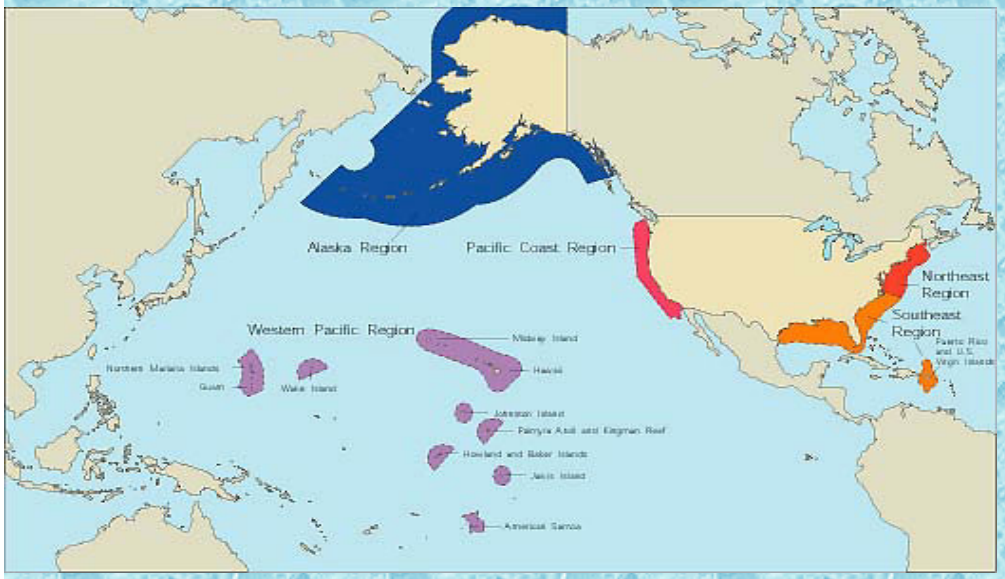
- Governance:
  - Human value-based decision-making and advocacy
    (Normative: what should happen)

SCIENCE AND COASTAL GOVERNANCE

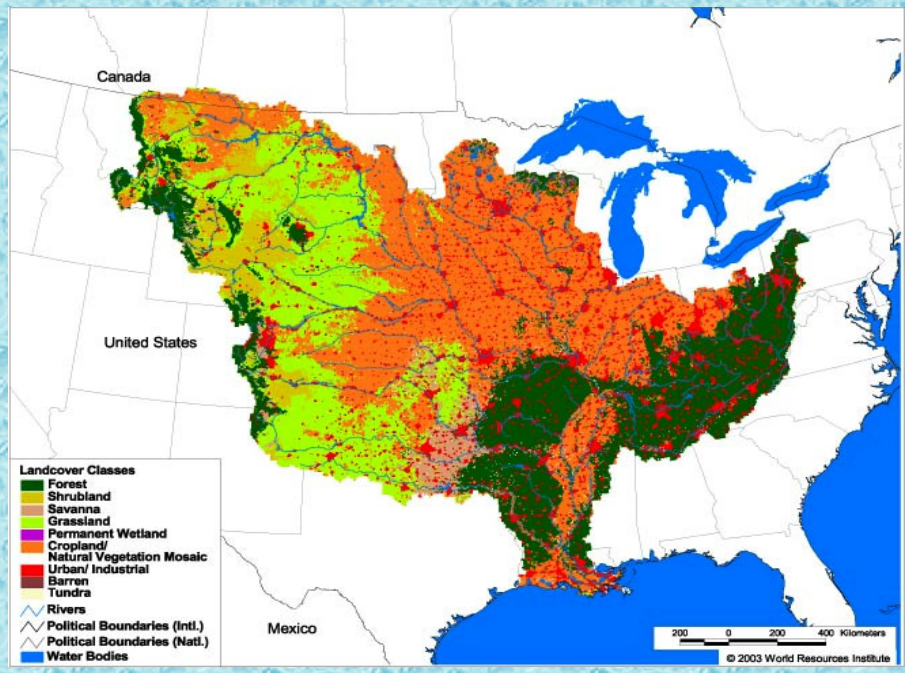
- Science can inform governance, but decisions must be based on human values

Defining the "Coast"

Upper reaches of the watersheds to the limits of the 200-mile EEZ



U.S. Exclusive Economic Zone



Mississippi River Watershed

Coastal Community

- To effect change within that area the human coastal community must include not only those who live on the coast, but also those who live in the greater watershed.

Analysis, Facilitation, and Advocacy in Coastal Governance

- Analysis
  - Analyzing the potential need for perceptual or behavioral change
- Facilitation
  - Facilitating the process of consideration of perceptual or behavioral change, without bias towards a particular end state
- Advocacy
  - Advocating a particular solution or end state

New Directions in Coastal Governance

- Identify the Communities/Constituencies
- Evaluate Their Attitudes, Perceptions, and Values
- Engage Them in a Facilitation/Consensus-Building Process
- Evaluate Common Goals and Commonly-developed Alternatives
- Promote Effective Advocacy

Coastal Solutions

- Both cultural and social analysis is necessary to develop coastal solutions
- Coastal issues are not the sole burden of those living nearest the coast—everyone lives in a coastal watershed and they should recognize how they impact the coasts and how the coasts impact them

Findings and Recommendations

- Engagement and Empowerment
- Scientific Education

Findings and Recommendations

- Engagement and Empowerment
  - Good communication and education are essential
  - Policy makers and scientists must listen, build trust, and communicate openly
  - Place based and common inertest communities must be engaged
  - Coastal solutions must be both bottom up and top down
  - They must mix local and national efforts and include nontraditional groups

Findings and Recommendations

- Engagement and Empowerment
  - Citizens must be willing to take action
  - The historic and complementary recommendations of the two commissions are not enough to create political will to implement necessary social change
  - Behavioral change requires the ability to make informed choices, to affect or influence outcomes, and access to tools to address issues of concern
  - Knowledge of alternative and potential impacts, along with clear objectives and cost and benefit of a given proposal are also crucial

Findings and Recommendations

- Scientific Education
  - The professional and scientific community has a responsibility to provide the tools, education, and technical assistance that citizens need to become active and effective participants
  - Options, opportunities, and a fair assessment of relevant trade-offs also should be offered
  - Scientists must be more engaged at the community level and need charismatic scientists who engage the public

Findings and Recommendations

- Scientific Education
  - Education efforts must include a greater emphasis on the interrelatedness of resources
  - Need to connect individual actions to environmental impact
  - Educational programs for citizens upstream from the coast should be created including why people should care about coastal issues and the impacts that poor development choices have on water quality, coastal habitats, marine life health, and taxes.
  - Town meetings may be a good educational start on particular coastal issues

Next Steps

- An important first step is to organize and coordinate efforts on behalf of the coasts.
  - A forum should be convened and include federal and state agency leaders; ocean commission members; and representatives of professional, scientific, educational, community, academic, and industry organization.
  - Outcomes could be a strategic plan to implement recommendations of the commissions, and to support funding for ocean and coastal science and management.