NCCOS

Strategic Plan

FY 2005 – FY 2009

Foreword

The National Centers for Coastal Ocean Science (NCCOS) is pleased to present to its customers, partners and staff its Strategic Plan for FY 2005 to FY 2009.

The strategic plan will guide NCCOS activities over the next five years as the organization provides the scientific understanding and tools needed to support the coastal and oceans management responsibilities of NOAA and the National Ocean Service (NOS).

NCCOS will revisit the plan each year as it prepares a more detailed annual operating plan. The NCCOS strategic plan and annual operating plans will in turn drive the specific plans for each of NCCOS' five Centers and other subparts of the organization.

This plan was developed by NCCOS management and staff. NCCOS welcomes continued input on the plan from its customers and other stakeholders.

The plan is divided into the following sections:

- Introduction
- NCCOS Vision Statement
- NCCOS Mission Statement
- NCCOS Core Principles and Fundamental Approach (the "Integrated Assessment")
- NCCOS Process for Defining FY 05-09 Research Agenda and Activities
- NCCOS FY 05-09 Goals and Objectives

Introduction

NOAA created the National Centers for Coastal Ocean Science (NCCOS) in 1999 to support NOS' scientific mission and NOAA's coastal mandates.

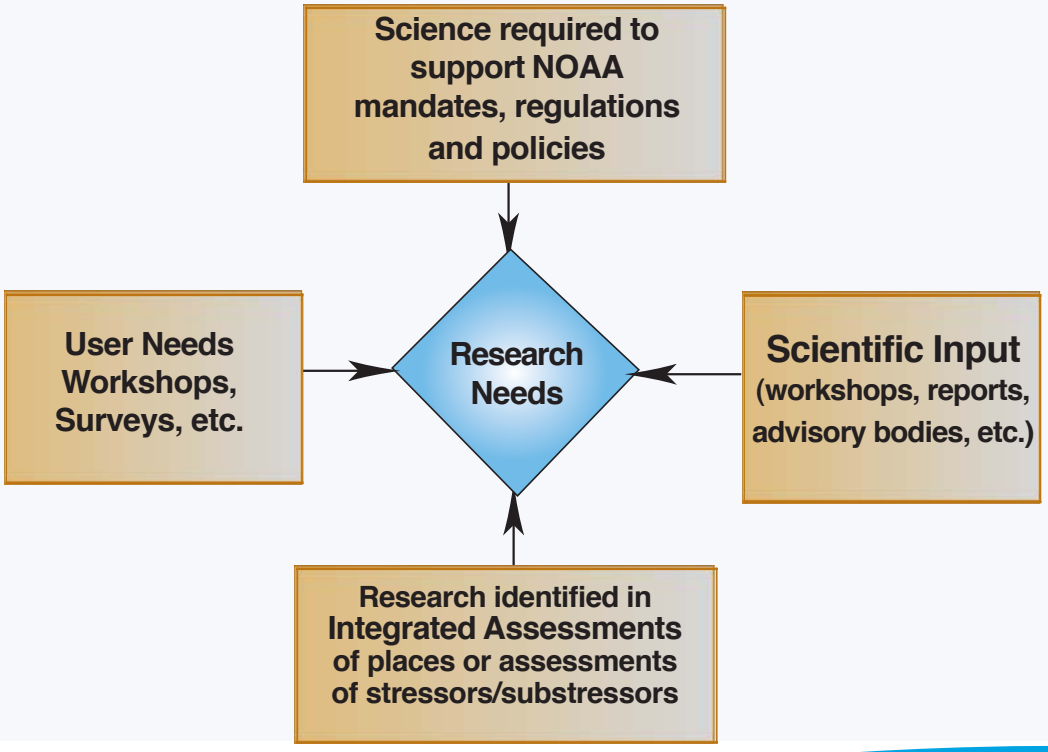
NCCOS' scientists:

- Conduct applied research
- Manage complex long-term research projects
- Provide a link between the science conducted in academia and the specific needs of coastal decision-makers
- Integrate research across scientific disciplines

As part of NOAA/NOS, NCCOS is governed by a series of statutes defining the national oceans policy. These statutes require NOAA, through NOS, to manage places, such as National Marine Sanctuaries, and to provide coastal managers with financial assistance, scientific knowledge and other support to manage the coastal zone to support society's needs. A list of those statutes, with short descriptions of NCCOS-related research, is attached as Appendix A.

Much of NCCOS research responds to its legal mandates. NCCOS responds, as well, to national research needs on specific topics and to NOAA constituent needs. NCCOS' research agenda is also the product of scientific findings by itself and others, including the results of NCCOS' "Integrated Assessments" of NOAA protected areas. Figure 1 shows how these factors come together to produce the NCCOS research agenda.

Figure 1: Identification of NCCOS' Research Needs



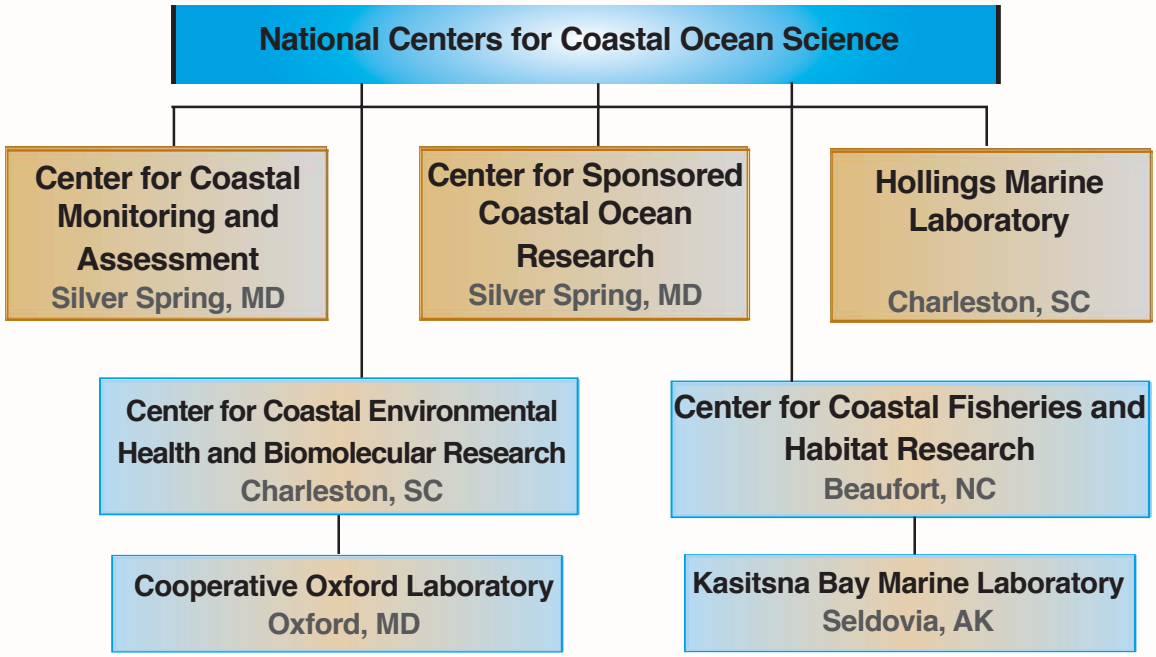
NCCOS is comprised of five main organizational research centers, each with specific areas of focus and expertise. Three of the centers have on-site research facilities. Two of the centers conduct research through analyses of field data or through sponsored extramural research.

The five centers include:

- The Center for Coastal Fisheries and Habitat Research (CCFHR) in Beaufort, North Carolina and Seldovia, Alaska.
- The Center for Coastal Environmental Health and Biomolecular Research (CCEHBR) in Charleston, South Carolina and Oxford, Maryland
- The Center for Sponsored Coastal Ocean Research (CSCOR), in Silver Spring, Maryland
- The Center for Coastal Monitoring and Assessment (CCMA), also in Silver Spring
- A new center (yet to be named) housed at the Hollings Marine Laboratory (HML) in Charleston, South Carolina

In addition to NCCOS' in-house research, the Coastal Ocean Program, within CSCOR, supports an extramural scientific research program of multi-disciplinary studies. These studies are focused on ecological research relating to coastal fisheries management and impacts from human-related activities. This program supports long-range management and policy decisions at regional scales. The Coastal Ocean Program allows NCCOS to tap into the general research community to provide expertise not available through NCCOS' centers, each of which specializes in

Figure 2: NCCOS Centers and Laboratories



a specific scientific area. Over 65% of the FY 2000 NCCOS budget, or approximately $25 million, paid for extramural grants, contracts, or transfers to researchers and support personnel in other federal agencies, states, tribes, academia, and the private sector (including small minority-owned businesses).

The remainder of NCCOS' budget supports technical managers of the extramural research program, federal researchers, administrators, and support personnel.

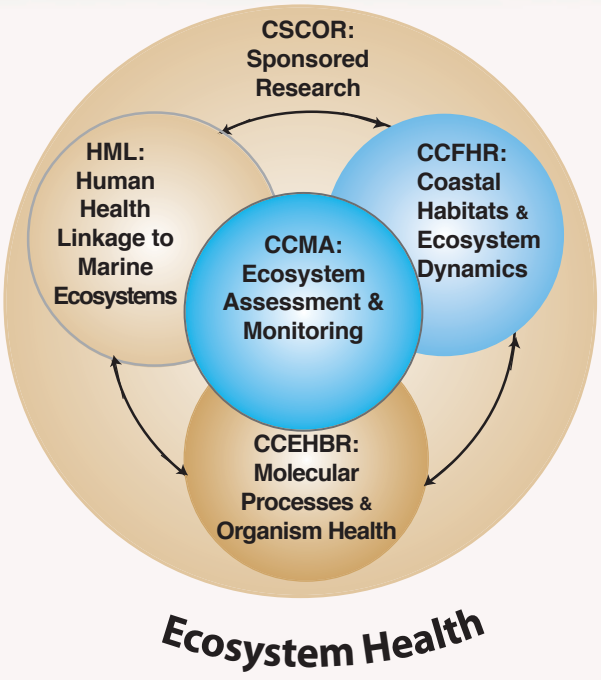
An overview of the scientific focus of each NCCOS Center is shown in Figure 3.

NCCOS Vision Statement

Coastal stewardship decisions are guided by science to maximize societal benefits.

In NCCOS' vision, *science* is the basis for coastal management decisions. By implementing this vision, NCCOS provides scientific support for the NOS' vision that "NOS is the global leader for integrated management of the oceans." NCCOS is committed to providing science of world-class quality that is credible, relevant, and timely.

Figure 3: NCCOS Centers



NCCOS Mission Statement

Provide coastal managers with scientific information and tools needed to balance society's environmental, social and economic goals.

Coastal managers at the federal, state, tribal, and local levels are responsible for reducing or mitigating the negative impacts of ecosystem stressors while balancing environmental with social and economic goals in their decision-making. NCCOS' mission is to provide them with the scientific information and tools needed to make effective decisions, often in cases where knowledge is imperfect. NCCOS mission is to provide coastal managers with scientific knowledge that is both sound *and* useful.

NCCOS' commitment to practical science drives both its fundamental approach to its research output and its relationship to its customers and partners.

NCCOS Core Principles and Fundamental Approach

NCCOS has identified a set of core principles and a fundamental approach (the "Integrated Assessment") that will guide it in providing sound and useful scientific information to coastal managers. A common set of principles and a single fundamental approach ensures that NCCOS effectively serves its stakeholders as a single organization. NCCOS is also committed to an ongoing process of "assessment, feedback, and improvement" with its partners and customers.

I. NCCOS core principles

NCCOS' core principles ensure that NCCOS produces a high quality product for its stakeholders and that all parts of NCCOS reflect the same values and approach to their work.

NCCOS' core principles are:

- To deliver high quality science in a timely and consistent manner using productive and strong partnerships
- To develop and maintain relevant research, long-term data collection and analyses, and forecasting capabilities in support of its customers, stakeholders, and partners
- To build capacity in the private, local, state, and tribal sectors by transferring technology, and by providing technical assistance and knowledge to its customers and partners
- To conduct the anticipatory science necessary for managing the potential impacts of multiple stressors on coastal ecosystems
- To provide the best possible work environment for each employee by treating each individual with fairness, respect and recognition, and with adequate training in the safest facilities with the most current equipment possible

II. NCCOS' fundamental approach to fulfilling its scientific mission: the "Integrated Assessment"

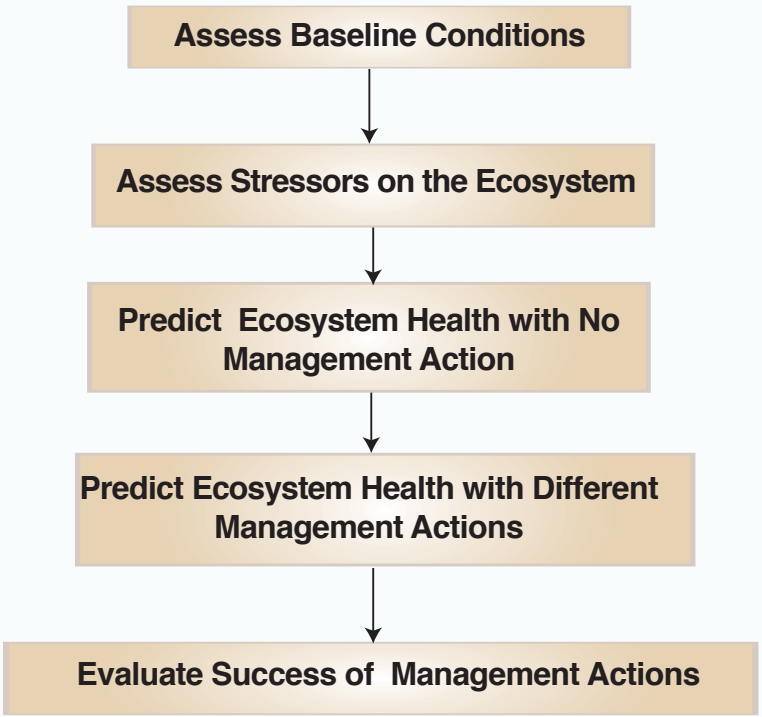
NCCOS' formal mechanism linking science and management is the "Integrated Assessment" (IA). An IA is similar to an Environmental Impact Statement done pursuant to the National Environmental Policy Act less the selection of a preferred alternative. The structure of each IA consists of five components, as shown in Figure 4.

A successful Integrated Assessment:

- Responds to policy-relevant questions
- Identifies uncertainties in the existing data and information
- Includes public participation and peer review
- Integrates and synthesizes data and information across multiple disciplines
- Uses existing high-quality data and information
- Forecasts future conditions and outcomes

During the next five years NCCOS will build its in-house and extramural research capabilities to prepare IAs. NCCOS will work through partnerships with the external research community and within NOAA to determine the status of ecosystems based upon specified criteria (ecological indicators), and to understand the causes and consequences of environmental stressors.

Figure 4 - Integrated Assessment



III. NCCOS' relationship with its partners and customers: continuing assessment, feedback and improvement

NCCOS is committed to a continuing process of assessment, feedback, and improvement in cooperation with its customers, stakeholders, and partners.

This process will be based on a life cycle of events: generating Integrated Assessments, distributing the information contained therein, determining the use of the information by managers, adjusting the NCCOS research agenda where needed, and producing updated Integrated Assessments.

Through this process NCCOS will learn whether or not the science it produces was actually used, and if not, why not; and whether or not the decisions made actually maintained ecosystems at sustainable levels.

NCCOS works with:

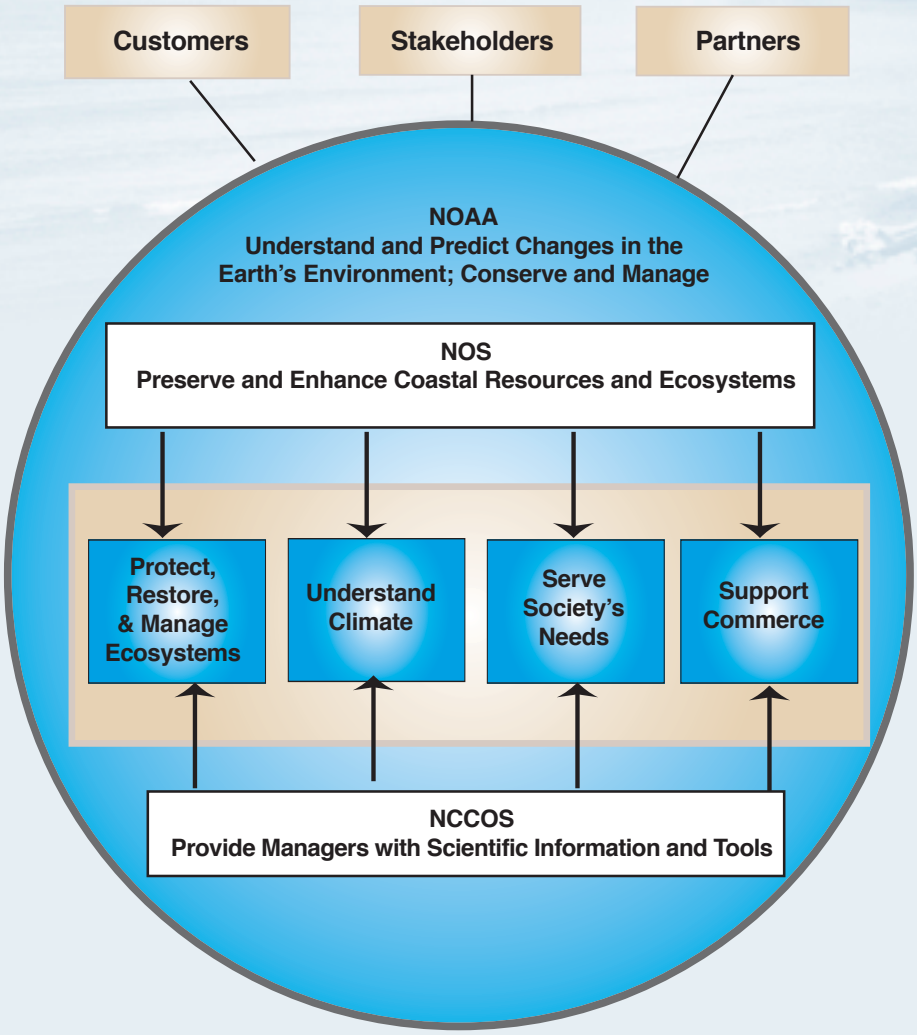
Customers: Coastal managers (including those in NOAA, NOS, other federal and state agencies), tribes, and other governments.

Stakeholders: Those who have an interest in what NCCOS does and how NCCOS decides which research to conduct. These include universities, environmental groups, recreational and commercial industry groups, other NOAA Line Offices (especially the National Marine Fisheries Service, Oceanic and Atmospheric Research and the National Environmental Satellite and Data Information Service), and the general public.

Partners: Those with which NCCOS collaborates in a mutually beneficial way, including universities and state agencies.

The following graphic, Figure 5, shows how NCCOS' customers, stakeholders and partners support NOAA, NOS, and NCCOS in achieving their goals.

Figure 5: NCCOS Customers, Stakeholders, Partners



NCCOS Process for Defining FY 05 – 09 Research Agenda and Activities

NCCOS will follow a three step process in determining its research agenda. The research agenda will be consistent with the objectives and goals set out in the next section of the Plan.

I. Produce Integrated Assessments of NOAA-protected areas in terms of key stressors.

NCCOS' principal output measure for the next five years is to produce Integrated Assessments, using the best available scientific knowledge, of all NOAA protected areas in terms of the key stressors identified below. In the process of conducting the IAs NCCOS will identify areas for new research.

The IAs can be defined by a matrix that combines protected areas with the key stressors with the integrated assessment representing the assessment of each stressor against the area being studied (see Figure 6.)

The NOAA Protected Areas

The NOAA protected areas on which NCCOS will concentrate its work include:

- **Coastal Estuaries (including the subset of National Estuarine Research Reserves)**

  There are 155 recognized estuaries in the contiguous U.S. NCCOS will work with federal, state, and other agencies to supply the research information needed to manage these ecosystems. The 26 National Estuarine Research Reserves (2 more are proposed) are a network of protected areas established for long-term research, education and stewardship.

- **National Marine Sanctuaries**

  National Marine Sanctuaries have been established in the Great Lakes, Exclusive Economic Zone (EEZ) and adjacent states' territorial seas to protect the unique biodiversity, sustainability of use or cultural heritage of certain areas. There are currently thirteen National Marine Sanctuaries, with one Ecosystem Reserve under consideration for Sanctuary status.

- **Coral Reef Ecosystems**

  In addition to producing the IAs for each NOAA protected area that is a coral reef ecosystem, NCCOS will fulfill, on behalf

Figure 6: Protected Areas & Environmental Stressors

Protected Areas:	Environmental Stressors:
Coastal Estuaries & Estuarine Research Reserves	Climate Change
National Marine Sanctuaries	Extreme Natural Events
Coral Reef Ecosystems	Pollution
Coastal Oceans	Invasive Species
	Land & Resource Use

of NOAA, the biannual reporting requirements of the Coral Reef Conservation Act of 2000. There are approximately 1,825 coral reefs in waters of the U.S. and Pacific Freely Associated States, which are divided into 9 regions.

- **Coastal Oceans (all ocean areas within 200 miles of the coastline—i.e., the Exclusive Economic Zone or EEZ—that are not in one of the other categories)**

  In working on coastal oceans NCCOS will rely upon and assist the National Marine Fisheries Service and its partners in their efforts to manage fisheries and protect marine mammals and threatened and endangered species, and their supporting habitats. NCCOS' activities will address further the ecosystem sustain-ability goal in the EEZ and adjacent State's Territorial Seas.

The Key Stressors

NCCOS has identified five key categories of ecosystem stress. As NCCOS carries out its mission, it is committed to understanding these stressors individually and as they interact.

- **Climate Change**

  Climate change may alter sea level, temperature, water current and stratification patterns, storm frequency and intensity, and change precipitation delivery of freshwater, sediments and pollution to the coastal zone. Salinity and tidal changes and increases in erosion and coastal flooding exacerbate the vulnerability of coastal ecosystems and communities. Predicting these changes and associated consequences allows more informed decisions that can mitigate adverse environmental and economic effects.

- **Extreme Natural Events**

  Hurricanes, coastal storms, floods and droughts produce profound ecosystem changes both directly and indirectly. Such events may result in unusual biological events such as harmful algal blooms. Predicting these impacts is useful in both emergency response and long-term planning and mitigation.

- **Pollution**

  Point source pollution (including such events as oil spills and the impacts of past contamination) continues to require diligence, despite progress over the last three decades. In addition, non-point sources (particularly excess nitrogen from agricultural and suburban runoff and atmospheric deposition of automobile and industrial emissions) have become increasingly significant stresses on coastal ecosystems. Predicting the effects and effectiveness of these control actions allows more cost effective and environmentally beneficial actions to be taken.

- **Invasive Species**

  Exotic plants and animals brought to the U.S. from other countries, or moved to new areas from within the U.S., can damage native plants and animals, change native community structure, and produce enormous economic impacts. NCCOS will predict the potential risk from non-indigenous species introduction by understanding species tolerances and life cycles. This will provide the focus for management to address high risk species and the tools for mitigating their effects.

- **Land and Resource Use**

  Increasing domestic and international demands for food, fiber and space are accelerating changes in land and resource use, resulting

in exhausted fisheries, loss of habitat, degraded water quality and increased chemical and sediment runoff. Increased understanding of the consequences of these human uses will allow for better regulation and balancing of economic demands and environmental sustainability.

These stresses often occur together and their cumulative effects are poorly understood. NCCOS is committed to developing new paradigms for studying, understanding, and predicting the effects of these stressors alone and in combination.

Figure 7: Stressors and Substressors

This figure presents the key stressors and related substressors. The Figure also shows the anticipated level of effort for each substressor on the part of NCCOS.

Stressor/Ecosystem	Coastal Ocean	Corals	Estuaries	NERRS	NMS
Pollution	◒	◒	●	◒	◒
Toxic Contaminants	◒	◒	●	◒	◒
Oil Spills	○		○		
Pharmaceuticals	○		○		
Coliform Bacteria			◒		
Nutrients	○	○	●	◒	◒
Disease	○	●	◒	○	○
Land/Resource Use	○	◒	●	◒	◒
Navigation	○		○		○
Waste Management	○		○		○
Recreation			○		
Fishing	◒	◒	◒	◒	◒
Development/Urbanization	○		◒	○	
Habitat Modification	○	◒	●	◒	◒
Freshwater delivery/removal	◒		◒		○
Aquaculture	○		◒		
Ecotourism					
Invasive Species	◒	◒	●	◒	◒
Ballast Water	○		○		
Interspecies Competition	○	○	○	○	○
Climate & Long Term Change	○	○	○	○	○
Sea Level Rise	○	○	◒	○	○
Global Warming	◒	◒	◒		
Salinity Change			◒	○	○
Carbon/Nitrogen Cycle	○				
Subsidence			◒		
Extreme Natural Events	●	◒	●	○	◒
Hurricanes	○		◒	○	○
Coastal Storms	○		◒	○	○
Floods			○	○	○
Droughts			○	○	○
El Niño/ La Niña	○				
HABs	●		●	◒	◒

No activity if blank ● High ◒ Medium ○ Low

II. Based on the IAs and interaction with customers and stakeholders, NCCOS will develop a specific research agenda for each protected area.

The goal of the new research agenda will be specific tools, approaches, or knowledge that improve outcomes for NCCOS customers. Upon completing the baseline IA defined by the NOAA protected area/key stressor matrix, NCCOS will generate a specific research agenda for each protected area using the following process:

1. NCCOS will first work with customers and other stakeholders for each protected area to understand their practical needs in managing and responding to stresses in their areas of responsibility

2. NCCOS will get input from the broad scientific community, including its own Center directors, to determine national research needs

3. NCCOS will then determine, based on the IA and stakeholder needs:
   - 3.1. Which questions need to be addressed through research
   - 3.2. The best approach for addressing areas that are unknown

4. NCCOS will use the following "screening criteria" to determine if the proposed research is appropriate for NCCOS:
   - 4.1. Specified by Legislative, Executive, and Judicial requirements
   - 4.2. Is a key NOAA/NOS mission
   - 4.3. Has been identified as high annual priority (area of emphasis) by NOAA or NOS
   - 4.4. Has a defined user community which considers the topic very important for coastal management
   - 4.5. Has a defined outcome
   - 4.6. Can be transitioned to the user community when research completed
   - 4.7. Is a topic of growing concern and expected to be significant in 3-5 years
   - 4.8. Builds on related NCCOS scientific capabilities or ongoing NCCOS programs
   - 4.9. NCCOS has capabilities in house or can obtain from external community
   - 4.10 Has cross-cutting or general application to other protected areas

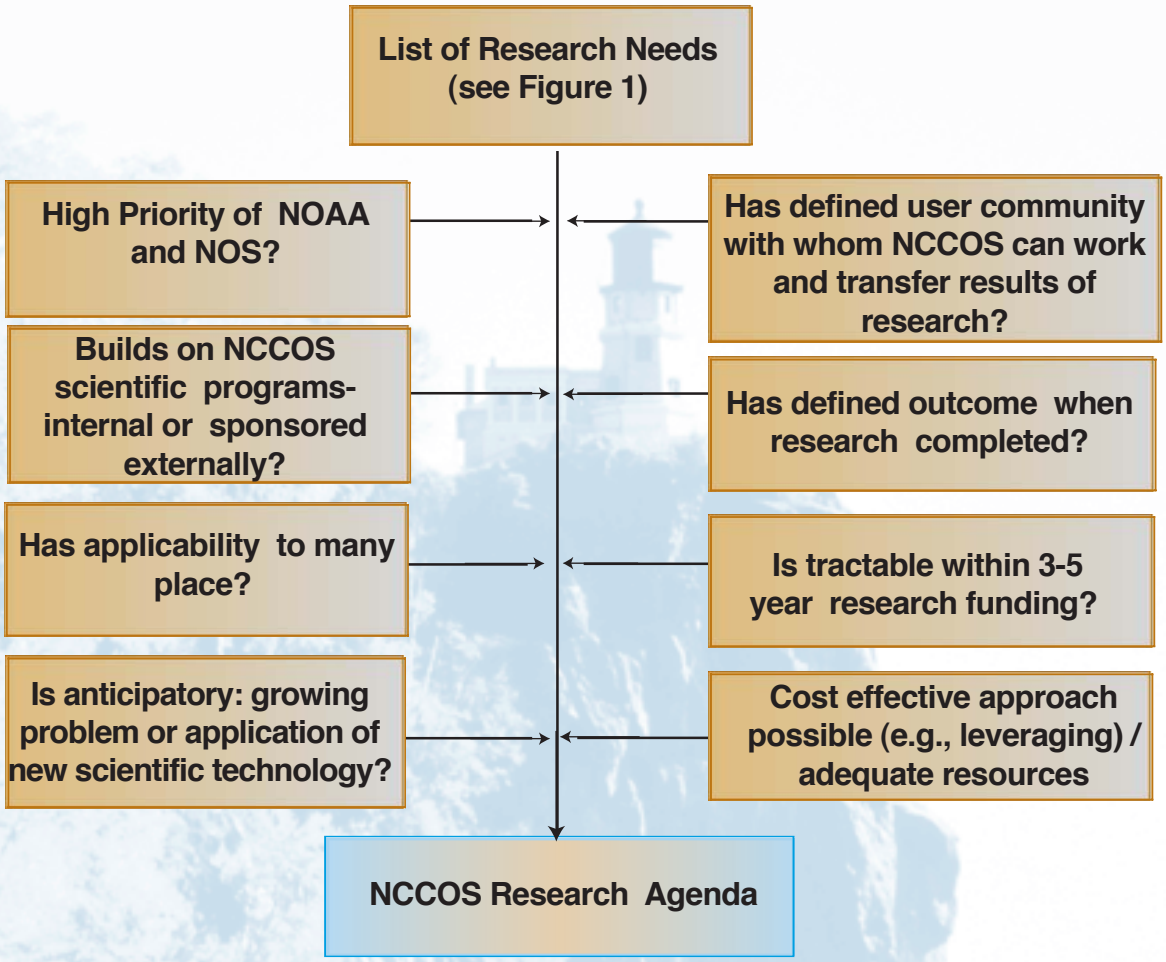
5. NCCOS will review the proposed research to ensure that the mix of NCCOS projects includes the social and economic costs and benefits of human activities

6. NCCOS will design the project with the end-use community and include it in the annual operating plan

III. NCCOS will undertake research or activities of general importance that cut across specific protected areas.

NCCOS will also undertake research or other activities that have general or cross-cutting application to the needs of its customers and other stakeholders and that meet the general criteria for research selection described in II, above. NCCOS will give priority to projects that have applications to more than one protected area, and that address larger scientific or management issues. Some of these projects will be undertaken without initial IAs. Included in these activities will be the preparation of synopses of activities and research needs on specific stressors or substressors of high agency or stakeholder interest. The development of NCCOS' research agenda is shown in Figure 8 and its planning implementation cycle is depicted in Appendix B.

Figure 8: Setting NCCOS Research Priorities



NCCOS FY 2005 – 2009 Strategic Goals and Objectives

NCCOS has identified four Strategic Goals that are critical to achieving its vision and mission. The four goals address the natural and social aspects of ecosystem management as well as the internal operations, workforce, and partnerships of NCCOS.

Three of the goals support NCCOS' "substantive" responsibility of providing accurate, timely, and useful scientific support to coastal/ocean managers.

The first goal is to support coastal/ocean managers in preserving ecosystems at sustainable levels. This goal includes NCCOS' fundamental objective of completing baseline IAs of all NOAA-protected areas.

NCCOS then commits itself to understanding the human (Goal 2) and natural (Goal 3) stressors that affect coastal ecosystems. Goals 2 and 3 are in a sense, subsets of Goal 1. They are separated in this plan, however, because of the importance of understanding human and natural stressors separately from the overall ecosystem assessments in Goal 1.

NCCOS' fourth goal is institutional — ensuring that NCCOS continuously improves its leadership as a group of skilled professionals and as an organization.

Under each goal the plan lists more specific strategic objectives that show more concretely how the goal will be achieved.

NCCOS' multi-year and annual operating plans will provide further detail on the implementation of each of the strategic goals and their supporting objectives. The specific research activities in support of the goals will be determined through the process outlined in the last section. They will therefore flow from the baseline IAs and/or represent general or cross-cutting projects addressing key issues of concern to coastal managers. Some important projects will also continue as part of NCCOS' current activities.

1.0 Ecosystem Conservation

Coastal Managers rely upon science to maintain ecosystems at levels consistent with society's desires and ecological constraints.

The first step in meeting this goal is for NCCOS to accomplish its fundamental output measure of producing IAs for all NOAA protected areas.

Once IAs are completed, the information will be distributed to the appropriate audiences. NCCOS will learn from them their practical needs for tools to meet their coastal management responsibilities. By integrating what NCCOS learns from the IAs, input from the scientific community, and user needs, NCCOS will generate a research agenda to produce specific tools, approaches, or knowledge that improves outcomes for NCCOS customers.

NCCOS will also monitor how effectively its information is distributed and used. NCCOS will rely upon its existing capabilities and the academic social science community to identify appropriate techniques for communicating and monitoring its results.

In addition to the IAs for the four specific categories of "NOAA Protected Areas," NCCOS will also undertake projects of more general application that examine the impacts of selected stressors on ecosystems. This will further NCCOS' ability to understand changes in ecosystems beyond its focused geographic scope.

Strategic Objectives – Goal 1.0

1.1 All NOAA-protected areas will have baseline assessments of ecological "resources".

These assessments are the first step in NCCOS' goal of producing integrated assessments for all NOAA protected areas. The "resource" assessments will include definition, geographic boundaries, and trends in ecological indicators (e.g., physical, chemical and biological composition of the resources) within each area. These assessments will define key parameters important to each ecosystem and the baseline values that characterize it. NCCOS will place particular emphasis on National Marine Sanctuaries, National Estuarine Research Reserves, and coral reef ecosystems. In estuaries beyond the reserves and coastal oceans, NCCOS will work with others to identify key parameters for characterizing their condition and develop assessments of their present "health". They will be done in partnership with the NOS office responsible for the protected area and with the affected States. Where possible, existing information will be used as the foundation for these assessments.

1.2 All NOAA-protected areas will have Integrated Assessments.

NCCOS will produce Integrated Assessments that will quantify the impact of ecosystem stressors (climate change, extreme natural events, pollution, invasive species, and land and resource use) in coral reef ecosystems, estuaries, National Marine Sanctuaries, and selected coastal ocean regions. These assessments will be based upon field and laboratory studies, existing data, and models forecasting environmental conditions under different scenarios. They will include an evaluation of these protected areas with no management action in response to these stressors, as well as outcomes with different management actions.

Because of time and resource constraints, NCCOS will not be able to devote the same level of effort to all Integrated Assessments. NCCOS will prioritize its levels of effort in producing integrating assessments using the following criteria:

- NOAA/NOS mission requirements
- User community priorities
- Adequacy of data
- Significance of issue
- Consequences of management action/ inaction

1.3 NCCOS will determine the effectiveness of coastal managers' decisions in NOAA-protected areas.

To evaluate the effectiveness of NCCOS' science, NCCOS, in partnership with coastal managers, will conduct assessments of its science in affecting coastal decision-making and in predicting the outcomes of ecosystem change. The basis for these evaluations will be protected area management plans, specifically those for National Marine Sanctuaries and selected marine protected areas. In estuaries and coral reef ecosystems, where management plans may not exist, or where ecosystem management goals are not well-defined, NCCOS will develop a suite of indicators to assist states, federal agencies, and others to evaluate the effectiveness of management actions in restoring impaired or altered estuaries and coral reef ecosystems. This is critical for NCCOS to evaluate its capability in translating its science to managers, as well as the efficacy of its science for coastal managers.

2.0 Societal Stressors

Coastal managers rely upon science to influence human activities affecting coastal ecosystems.

NCCOS' second goal focuses on the human activities that affect coastal ecosystems. Successfully managing those activities to reduce the stress they impose on ecosystems requires a sound scientific basis. It also requires a good understanding of what society desires of the services provided by the management of coastal ecosystems. By combining the social expectations, economic costs and benefits, and the natural sciences, NCCOS will be able to make predictions (with specified certainty) of the social and economic costs and benefits of alternative management actions that could be taken to achieve ecosystem conservation goals.

The purpose of this goal is to ensure that NCCOS' agenda includes work on societal stressors.

The multi-year and annual operating plans describe in detail particular projects and lines of research to be pursued under this and NCCOS' other strategic objectives.

Strategic Objectives – Goal 2.0

2.1 NCCOS will determine the social and economic costs and benefits to humans of two kinds of activities dependent upon coastal ecosystems.

Humans are one component of the marine ecosystem. They not only benefit from using the ecosystem, but they also have an impact on the functioning of the other ecosystem components.

Three uses of coastal ecosystems are of particular interest to NOAA: navigation, aquaculture, and fisheries. NCCOS will focus its efforts on the social and economic costs and benefits from the ecosystem perspective of navigation and aquaculture. Although navigation is a primary mechanism sustaining the economy through the flow of goods and services, it has several negative effects on the ecosystem, such as the introduction of non-indigenous species that can become invasive by out-competing native species. Aquaculture is a growing industry that provides a means for expanding the production of seafood without harming the natural stocks; however, its successful development is dependent upon proper choice of species, location, and understanding of the local ecosystem so that negative impacts are minimized. To wisely sustain these two types of industries, it is important to know the economic and social costs and benefits so that decisions can be made with a full understanding of the negative costs as well as the economic and social benefits.

2.2 NCCOS will determine the social, economic, and biologic effects of human activities on specific coastal ecosystems.

Providing useful information to coastal decision-makers requires the integration of all sciences—social, economic, and natural. These integrated assessments will focus on specific stressors or substressors and include forecasts of the consequences of different management strategies. NCCOS will conduct assessments of the effects of human activities in four watersheds.

Candidates include:

- St Lucie Estuary, FL where proposed decreases in fresh water inflow, as well as other human activities, will potentially impact the commercial oyster industry
- Murrell's Inlet, SC where land development is affecting the sustainability of the local shellfish harvest
- Albermarle Sound, NC where increasing water temperatures are threatening ranges of native species
- Barataria watershed in Louisiana that is experiencing multiple types of human-related stresses.

Studies in three of these watersheds will examine one type of impact, whereas the Barataria study will evaluate multiple substressors and forecast the consequences with no management change and with alternative management actions.

2.3 Coastal managers' capacities will be strengthened with the transfer of knowledge and tools from NCCOS research projects.

NCCOS is a research organization, not an operational entity. Therefore, its success is evaluated by the application of its research results in meeting management's defined goals. Research results are primarily transferred to users as 'tools', such as techniques or technologies for more rapid or reliable analyses; models for improved forecasting of environmental conditions; or improved knowledge that strengthens others' models for forecasting of environmental conditions or resource sustainability. NCCOS is focusing its efforts on providing techniques/technologies that protect ocean and human health from coastal ocean-related uses and on restoring degraded environments. Its forecasting tools will focus on 1) improving projections of habitat recovery once restoration efforts have been implemented, 2) habitat impacts from different types of human activity, such as land use, and forecasts that support NOAA Fisheries models for predicting resource sustainability, such as for managed fisheries and protected species.

2.4 NCCOS will investigate the effectiveness of changing human activities in preserving ecosystems.

The success of sustaining human activities in ecosystems at desired levels requires measuring how well the expected social and economic impacts of management's actions compare to the actual impacts. NCCOS will evaluate the impacts of its harmful algal bloom research in protecting human health through improved management actions due to its forecasting tools, through effective mitigation strategies, and by creating a more informed public. It will also evaluate its success in minimizing risk to human health from pathogens associated with fecal coliform contamination by evaluating the actions taken to minimize such contamination from various sources.

3.0 Extreme Events

Coastal Managers rely upon science to mitigate effectively the effects of extreme events on coastal ecosystems.

NCCOS will use and improve the predictive capability of NOAA to lessen the environ-

mental and social impacts of natural but extreme events such as storms and climate change. The purpose of this goal is to ensure that NCCOS' agenda includes work on natural stressors, including both direct (e.g., changing precipitation and changing temperatures) and secondary impacts (e.g., harmful algal bloom events.) Again, the specific projects will be described in greater detail in NCCOS' multiyear and annual operating plans.

Strategic Objectives – Goal 3.0

3.1 NCCOS will forecast the ecological impacts of climate change.

Climate change will have multiple effects on coastal ecosystems, both directly and indirectly. These changes will in turn affect how people use the coastal environment and its resources. NCCOS will produce a forecast of the ecological impact of at least one of the consequences of climate change (e.g., sea level rise as expressed by changes in shoreline location and bathymetry) on one estuarine system in North Carolina, including the potential consequences for the people who live, work, recreate, and visit there. This pilot project will become the basis for identifying what data need to be available to forecast such impacts, as well as providing the foundation for adding other ecological changes due to climate change. NCCOS will also develop better indicators of environmental health that indicate the effects of long term climate change, such as coral bleaching.

3.2 NCCOS will provide forecasts for the ecological effects of hurricanes.

NOAA's National Weather Service provides forecasts of the landfall location and estimations of intensity of hurricane impacts. However, hurricanes also cause significant changes to ecosystems, disrupting shallow seagrass communities, exposing large expanses of coastal environments to unusual amounts of freshwater inundations with resulting lowering of salinity, increases in nutrients and chemicals from land run-off, and increasing turbidity with consequent lowering of light penetration for marine plants. Although coastal ecosystems have adapted to periodic hurricanes, the significance of effects as related to intensity of storms has not been assessed so that human activities relying on coastal resources can be adjusted to maintain sustainability. NCCOS will forecast the ecological impact for at least one region in North Carolina caused by the passage of a hurricane. These forecasts will be based on the classification of the storm, level of storm surge, rainfall amounts, and the quadrant of the storm over the forecast site. The long-term goal is to provide forecasts of ecological impacts that will allow coastal managers to predict and adjust use of the coastal environment, based upon the hurricane forecasts, to better manage for the sustainability of these ecosystems.

3.3 NCCOS will provide annual forecasts of the ecological effects of varying weather patterns.

NOAA's National Weather Service provides seasonal forecasts of certain climate conditions, such as temperature and precipitation. Since there are known linkages between certain organisms and these climate conditions, NCCOS will begin to provide forecasts of selected species abundance or distribution, based upon NOAA's National Weather Service's forecasts.

NCCOS will select two managed fishery species whose life cycle is known to be closely affiliated with weather patterns to improve predictions of abundance. Such predictions will enable resources managers to adjust estimates of sustainable harvests and for users to adapt their behaviors.

3.4 NCCOS will provide forecasts of the initiation, trajectory, and behavior of harmful algal bloom events.

Harmful algal bloom events are occurring in increasing frequency and now have been reported in waters of virtually every coastal and many Great Lakes states. The economic impact of these blooms is estimated to exceed one billion dollars over the next several decades. Although the exact mechanism causing these events is not known, research has suggested that they are related to nutrient over-enrichment. These blooms can impact shellfish beds requiring them to be closed to harvest in order to protect human health from ingestion of contaminated seafood. These blooms, which can be toxic, are also thought to be responsible for over half of marine mammal mortalities, based upon analyses of stranded animals. NCCOS will develop models to forecast the trajectory of harmful algal blooms for all U.S. coasts and transfer these models to managers to protect human health. NCCOS will also develop the capability to forecast the initiation of a bloom and the longevity of the event in one area.

3.5 NCCOS will provide annual forecasts of the areal extent of the hypoxic zone in the Gulf of Mexico.

The northern Gulf of Mexico supports approximately 20% (by dollar) of the Nation's commercial fishery landings as well as supporting important recreational fisheries. The vast majority of the commercial fishery landings come from the area directly affected by the Mississippi River. This region has been significantly affected by increased nutrient enrichment from the Mississippi River that is carrying higher nutrient loads from land-based sources. Such increased nutrient loads are resulting in excessive production of algae that reduces oxygen concentrations in bottom waters due to decomposition of these plants. Such low oxygen levels (i.e., hypoxic zones) can kill animals living in these waters.

NCCOS developed its first annual forecast of the areal extent of this hypoxic zone in FY2003 and will continue to issue and improve its annual forecasts, based upon its monitoring of the area and its research to better understand the consequences of this event to fisheries.

4.0 Leadership

NCCOS is a leader in the environmental stewardship community as the employer, partner and scientific resource "of choice".

By succeeding as a high performing, integrated institution, NCCOS will ensure that it achieves its substantive goals and its mission of supporting coastal managers. Over the next five years NCCOS will make significant progress in the following areas:

- NCCOS will operate "like a business", with a commitment to continuing organizational and process improvement
- NCCOS will be the employer, partner and scientific source of choice for NOAA and the larger stewardship community
- NCCOS will attract and retain outstanding scientific, managerial, technical and administrative personnel in the nation
- NCCOS will be an effective partner for its colleagues in the coastal ocean research and application community

Strategic Objectives – Goal 4.0

4.1 NCCOS will continuously improve as an organization.

NCCOS will create a culture of continuing improvement. NCCOS will therefore use a five-year strategic plan to manage, according to a rigorous planning process, a multi-year implementation plan and annual operating plans. NCCOS' annual budget requests will flow from the planning process. NCCOS will plan for and implement improvements to its management structure, and explore opportunities to work effectively with its partners. Feedback from customers and partners will be critical to achieving continuing improvement and will be a key part of the planning process.

4.2 NCCOS will optimize the capacity of its diverse workforce to accomplish work in a professionally challenging environment.

To achieve this objective, NCCOS will develop a comprehensive human resources strategy. The purpose of the strategy will be to ensure effective recruitment of the high caliber scientific and administrative staff, with a special emphasis on ensuring a diverse work force. The strategy will also ensure effective development and performance of NCCOS' existing work force. The elements of the human resources strategy will include systems for performance planning, succession planning, staffing needs planning including increasing the diversity of the workforce and comprehensive training and career development.

4.3 NCCOS will improve its operational capabilities through the use of safe, secure, state of the art facilities, equipment and processes.

NCCOS recognizes the importance of providing an optimal work environment to attract and maintain a quality workforce. The environment must be safe and secure and the facilities and equipment must support high quality, cutting edge research. To achieve this objective, NCCOS will develop strategies to meet or exceed environmental compliance requirements and safety and security requirements. NCCOS will develop long term facility maintenance, repair and replacement plans to ensure that facilities are maintained in a safe and secure condition for the conduct of research. NCCOS will continually review its safety measures to ensure that appropriate protocols and practices are in place for the diverse range of research that NCCOS conducts. NCCOS will work with NOAA management to continually improve NCCOS facilities and research platforms so that the office can continue to attract and maintain high quality scientists.

4.4 NCCOS will expand reliance on effective partnerships.

Through aggressive outreach to customers, stakeholders and partners, NCCOS will improve the connections between its scientific capabilities and those of its partners. NCCOS will formally incorporate characteristics of successful partnership into NCCOS business practices and develop a mechanism for identifying, nurturing and recognizing successful partnerships.

4.5 NCCOS science will be world-renowned.

NCCOS' scientists will be recognized leaders in the scientific community. Their work will be published in domestic and internationally recognized peer-reviewed literature, and regularly used and cited by scientific peers and coastal managers. NCCOS will develop and use measurement techniques to ensure that NCCOS meets these standards for scientific excellence. NCCOS will also develop and implement programs to recognize individuals and partners for scientific excellence.

Appendix A: NCCOS Statutory Authorities

The following is an alphabetical list of major Statutory Authorities that apply to NCCOS research. Included for each Authority is a description of the legislation.

American Fisheries Act (PL 105-277)

The American Fisheries Act (AFA) covers management of the pollock fishery in the Bering Sea and Aleutian Islands (BSAI) management area. It also covers the other groundfish fisheries in the BSAI, the groundfish fisheries in the Gulf of Alaska (GOA), the King and tanner crab fisheries in the BSAI, and the scallop fisheries off Alaska. NCCOS has active research projects in the Gulf of Alaska funded through its CSCOR. This program, the U.S. Global Ocean Ecosystem Dynamics (GLOBEC) Northeast Pacific, is a project begun in 1997 that aims to improve the understanding of the factors controlling the major fisheries in the Gulf of Alaska to improve NMFS' ability to manage these major fisheries.

Clean Water Act (33 USC 1251 et seq)

It establishes the basic scheme for restoring and maintaining the chemical, physical and biological integrity of the nation's waters. The Clean Water Act (CWA) is the main statute governing water quality. The CWA regulates both the direct and indirect discharge of pollutants into the Nation's waters, including the coastal zones that are the principal focus of NCCOS. Through the CWA , EPA, through the states, sets standards for nutrient loads into the Nation's estuaries. NCCOS' research into the rates of nutrient input that different estuaries can accept without becoming eutrophic is critical for managing non-point source pollution.

Coast and Geodetic Survey Act of 1947 (33 USC 883a et seq) and Amendments

This Act provides the basis for NOAA's navigation service programs. It authorizes the Secretary of Commerce to conduct hydrographic and topographic surveys, tide and current observations, geodetic-control surveys, field surveys for aeronautical charts, and geomagnetic, seismological, gravity, and related geophysical measurements to provide charts and other information for safe marine and air navigation. The Act authorizes the Secretary to conduct developmental work for the improvement of surveying and cartographic methods and instruments and to conduct investigations and research in geophysical sciences. Some of NCCOS' research is in the geophysical sciences. Additionally, NCCOS' research in remote sensing has improved NOS' charting capabilities, particularly in remote areas such as the Western Pacific.

Coastal Ocean Program (201(c) of PL 102-567)

Section 201(c) of PL 102-567 – The National Oceanic and Atmospheric Administration Reauthorization Act — authorizes a Coastal Ocean Program, and is therefore basic authorizing legislation for NCCOS. In the words of the law: "Such program shall augment and integrate existing programs of the National Oceanic and Atmospheric

Administration and shall include efforts to improve predictions of fish stocks, to better conserve and manage living marine resources, to improve predictions of coastal ocean pollution to help correct and prevent degradation of the ocean environment, to promote development of ocean technology to support the effort of science to understand and characterize the role oceans play in global climate and environmental analysis, and to improve predictions of coastal hazards to protect human life and personal property." The Coastal Ocean Program, implemented through CSCOR, sponsors 3-5 year competitive, peer-reviewed research projects, addressing NOS and NOAA coastal management needs. These projects support high quality scientific studies conducted by experts from state, local, and federal government agencies and private organizations.

Coastal Zone Management Act (16 USC 1451 et seq) and Amendments

The Coastal Zone Management Act (CZMA) is the statutory basis of NCCOS' responsibility for supporting coastal zone managers. The goal of CZMA is to encourage states to preserve, protect, develop and, where possible, restore and enhance valuable natural coastal resources. Participation by states is voluntary. Most coastal states have a federally approved program. CZMA was amended in 1990 to require coastal states with federally approved coastal zone management plans to prepare and submit coastal non-point source pollution control programs. This requirement expands upon EPA's non-point source programs to include consideration of land and water uses affecting coastal waters.

The CZMA also authorizes the National Estuarine Research Reserve System (NERRS). Under the CZMA, the Secretary of Commerce may make grants to enable coastal states to acquire, develop, and operate estuarine research reserves. Designation of an estuarine reserve requires a state to agree to long term management of the site for research purposes and to provide information for use by coastal zone managers. NCCOS participates in estuarine research under NERRS and works with the NERRS program to better understand these unusual sites and to provide the tools to monitor their condition.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 et seq)

CERCLA, or the "Superfund Act", establishes the federal government's authority to respond to releases or threatened releases of hazardous substances into the environment. CERCLA is of significance to NOAA because the Act holds responsible parties liable for damages, including reasonable assessment costs, for injuries to, or the loss of, natural resources. This liability for natural resource damages gives NOAA the authority to work with responsible parties to restore the injured environment, once damages have been assessed. NCCOS conducts research to support a legally defensible assessment of injuries to the coastal environment and the tools to successfully restore the injured resources.

Coral Reef Conservation Act (16 USC 6401-6409)

The Coral Reef Conservation Act requires the Secretary of Commerce to develop a national coral reef action strategy and to fund state and

local projects that advance that strategy. The Act also authorizes mapping, monitoring, assessment, restoration, and scientific research of coral reefs. NCCOS conducts research 1– to better understand indicators of the health of coral reef ecosystems, 2 – to characterize existing coral reef ecosystems through mapping and assessment of biological communities, and 3 – to effectively restore injured coral reefs ecosystems. In addition, NCCOS prepares a biennial report on the status of coral reefs.

Coral Reef Protection Executive Order (No. 13089)

The order establishes an interagency U.S. Coral Reef Task Force, co-chaired by the Secretary of the Interior and the Secretary of Commerce through the Administrator of NOAA. The U.S. Coral Reef Task Force is charged with developing and implementing a comprehensive program of research and mapping to inventory, monitor, and identify the major causes and consequences of degradation of coral reef ecosystems. This Task Force is central to the implementation of the Coral Reef Conservation Act.

Endangered Species Act (16 USC 1531-1543)

The Endangered Species Act (ESA) requires that the Secretary of Commerce list any species that is threatened with extinction in all or a significant portion of its range and designate critical habitat for that species. Through its capabilities in supporting law enforcement against illegal smuggling of protected species into this country, to determining causes of mortality or degraded health, NCCOS' research aids the NMFS in more effectively implementing the requirements of the ESA.

Estuary (Estuarine) Protection Act (16 USC 1221-1226)

The Estuary (Estuarine) Protection Act provides a means to protect, conserve, and restore estuaries. The Act requires the Secretary of the Interior to work with the states and other federal agencies in undertaking studies and inventories of the Nation's estuaries. These studies and inventories shall include the assessment of the wildlife and recreation potential of estuaries, their ecology, their value to the marine, anadromous and shellfish fisheries, and their aesthetic value; their importance to navigation and flood control and their mineral value for more intensive economic development. NCCOS research aids in understanding the dynamics of marine ecosystems so that assessments are effective in representing the critical components required for sustainable human uses.

Estuary Restoration Act of 2000 (33 USC 2901 et seq)

The Act highlights the importance of estuaries for sustaining coastal ecosystems by establishing an estuary habitat restoration program under which the Secretary of the Army (Corps of Engineers) leads a federal effort to restore the Nation's estuaries. The Act also requires NOAA to develop monitoring protocols for funded restoration projects and to track those funded projects for their effectiveness in restoration. NCCOS, on behalf of NOS, developed the monitoring protocols to

meet this requirement, and continues to conduct research to refine these protocols.

Fish and Wildlife Coordination Act (16 USC 661-666e)

The Act requires federal departments and agencies that undertake an action, or issue a federal permit or license that proposes to modify any stream or other body of water, to first consult with the U.S. Fish and Wildlife Service, Department of the Interior; the National Marine Fisheries Service (NMFS); and appropriate state fish and wildlife agencies. The purpose of the Act is to ensure that wildlife conservation receives equal consideration, and be coordinated with other aspects of water resources development. NCCOS research on the environmental consequences of coastal managers' actions has provided both NCCOS scientists and other NOAA managers with information required to assess the significance of proposed federal permits.

Florida Keys National Marine Sanctuary and Protection Act (16 USC 1433)

This Act protects the unique and invaluable natural and cultural resources of the Florida Keys and establishes the Florida Keys National Marine Sanctuary (FKNMS). The Act directed the Secretary of Commerce to develop a comprehensive management plan and regulations for the Sanctuary. NCCOS has conducted extensive research in the FKNMS to support effective management of this valuable area, as well as supporting multiple cases of litigation for natural resource damages caused by navigation accidents and recreational use. NCCOS is also supporting research that assesses the potential effects on the FKNMS of altering the freshwater flow from the Florida Everglades.

Harmful Algal Bloom and Hypoxia Research and Control Act of 1998 (16 USC 1451)

The Harmful Algal Bloom and Hypoxia Research and Control Act of 1998 establishes an inter-agency task force, chaired by the Secretary of Commerce, to assess ecological and economic impacts of Harmful Algal Blooms on the ecosystems in which they live and to develop alternatives for reducing, mitigating, or controlling those impacts.

The Act also charges the task force with assessing the ecological and economic impacts of hypoxia (reduced oxygen concentration within sea water) in United States coastal waters and alternatives for reducing, mitigating, and managing hypoxia. The Act specifically charges the task force with assessing hypoxia in the Northern Gulf of Mexico.

For both hypoxia and Harmful Algal Blooms, the Act requires the conduct of research, education, and monitoring. NCCOS has conducted an extensive program on understanding the causes, behavior, techniques for early detection and prediction, and mitigation strategies for harmful algal blooms. NCCOS has also supported long term monitoring of the 'dead zone' off the Mississippi River and research into the prediction and consequences of this large area of depleted oxygen in the Gulf of Mexico.

Invasive Species Executive Order (No. 13112)

Executive Order 13112 requires federal agencies, to the extent practicable and permitted by law, to prevent the introduction and spread of invasive species. The EO creates the Invasive Species Council, and states that it shall be chaired jointly by the Secretaries of Commerce, Interior and Agriculture. The Invasive Species Council is required to provide national leadership on invasive species and prepare and issue a National Invasive Species Management Plan. NCCOS provides technical support to both national and regional councils that are addressing the goals of this Executive Order.

Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq)

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) establishes exclusive federal management authority over fishery resources of the Exclusive Economic Zone. It is the principal Act governing U.S. fisheries policy. NCCOS research on ecosystem health, on the role of estuaries in nurseries for commercial fisheries, and on contaminants, such as bacteria or harmful algae, of commercial fisheries are key components in supporting NMFS in managing the Nation's fishery stocks.

Marine Mammal Health and Stranding Response Act (16 USC 1361)

The Act establishes the "Marine Mammal Health and Stranding Response Program." The Program facilitates the collection and dissemination of reference data on the health of marine mammals and health trends of marine mammal populations in the wild; correlates the health of marine mammals and marine mammal populations in the wild with available data on physical, chemical, and biological environmental parameters; and coordinates effective responses to unusual mortality events. NCCOS' research on marine mammal populations and the potential causes of failing populations is assisting NMFS in better protecting these species. NCCOS' also supports the marine mammal stranding network in helping identify specific causes of unexpected marine mortalities.

National Marine Mammal Tissue Bank and Tissue Analysis (16 U.S.C. 1421f)

The Act makes provision for the storage, preparation, examination, and archiving of marine mammal tissues. NCCOS, through its partnership with the National Institute of Standards and Technology, helps to identify causes of marine mammal mortality through the use of biomolecular and genetic analyses.

Marine Mammal Protection Act (16 USC 1361-1421h)

The Marine Mammal Protection Act (MMPA) generally prohibits taking and importation of all marine mammals, except under limited exceptions. NCCOS' research in understanding marine mammal health and identifying early markers of deteriorating health helps in the long-term protection of these important animals.

Marine Protected Areas Executive Order (No. 13158)

Executive Order 13158 is intended to strengthen management and protection of marine protected areas (MPAs). The EO requires the Secretaries of Commerce and Interior, in consultation with other agencies and affected States and territories, to develop a national system of MPAs, to share information, to develop an MPA website, and to publish a list of MPAs. The EO also requires each federal agency to take appropriate steps to enhance protection for existing MPAs or to recommend, if appropriate, new MPAs. NCCOS conducts research to assist managers in the effective delineation of boundaries for protected areas. Its research focuses on characterizing regions being considered for protection and the identification of the ecological principles governing the distribution of biota.

Marine Protection, Research, and Sanctuaries Act (MPRSA) (16 U.S.C. 1431 et seq., 1447 et seq.; 33 U.S.C. 1401 et seq., 2801 et seq)

MPRSA creates a comprehensive and continuing program of research on the long-range effects of pollution, over fishing, and man-induced changes of ocean ecosystems. The Act also covers ocean dumping. NCCOS supports one of the largest collections of environmental monitoring data on contaminants in coastal ecosystems. The National Status and Trends program collects samples of sediment and biota to provide a long term contaminant 'report card' on the Nation's coastal environments for the major chemical pollutants.

National Aquaculture Act (16 USC 2801-2810)

The Act requires the Secretaries of Agriculture, Commerce, and the Interior to establish a National Aquaculture Development Plan in consultation with appropriate federal officers, states, regional fishery management councils and the aquaculture industry. The Act also mandates a continuing assessment of aquaculture in the United States.

The Act requires that the Secretary of Commerce conduct a study and report to Congress whether existing capture fisheries could be adversely affected by competition from commercial aquaculture products.

NCCOS research on the potential species for successful coastal aquaculture based upon the regional environmental characteristics will provide the scientific foundation for coastal managers to determine location, species, and other requirements to support sustainability of the coastal environment and augmentation of the local economy.

National Coastal Monitoring Act (Title V of 33 USC 2801-2805)

The Act requires the Administrator of the Environmental Protection Agency and the NOAA Under Secretary, in conjunction with other federal, state and local authorities, jointly to develop and implement a program for the long-term collection, assimilation, and analysis of scientific data designed to measure the environmental quality of the nation's coastal ecosystems. The Act requires the Administrator and the Under Secretary jointly to submit to Congress a report, every other year, on the condition of the nation's coastal ecosystems. NCCOS not only supports the National Status and Trends

program, a long term national monitoring program of contaminants in the Nation's coastal sediments and biota, but also is a major author of the biennial report to Congress.

National Contaminated Sediment Assessment and Management Act (33 USC 1271)

Section 1271 of the National Contaminated Sediment Assessment and Management Act requires the Environmental Protection Agency, in consultation with NOAA and the Department of the Army, to conduct a comprehensive national survey of data regarding sediment quality and a continuing program to assess such quality. NCCOS' National Status and Trends program, within CCMA, is a major source of the data used for this survey.

National Environmental Policy Act (42 USC 4321 et seq)

The National Environmental Policy Act (NEPA) requires federal agencies to take certain steps in their decision-making processes to ensure consideration of environmental impacts and alternatives.

In addition to the analytical requirements, NEPA also requires agency decision makers to integrate natural and social sciences and environmental design in planning and decision-making; recognize the worldwide and long-range character of environmental problems; make available to states, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment.

Ecological forecasting is one of the major thrusts in NCCOS' scientific endeavors. Such forecasting of the consequences and significance of major federal actions is the foundation of environmental impact statements that resulted from the passage of NEPA. In addition, NCCOS has made major strides in the incorporation of the social and economic sciences with its natural sciences. It has integrated with its restoration protocols guidelines for analyzing the social and economic consequences of restoration projects so that society's desires for restoration can be included in the definition of a successful restoration project. NCCOS is also working in other areas to include the social and economic sciences as a routine aspect of its research agenda.

National Marine Sanctuaries Act (Title III 16 USC 1431-1445c-1)

The National Marine Sanctuaries Act (NMSA) provides the Secretary of Commerce with the authority to protect and manage the resources of significant marine areas of the United States. This authority has been delegated to NOAA. NOAA's administration of the marine sanctuary program involves designating marine sanctuaries and adopting management practices to protect the conservation, recreational, ecological, educational, and aesthetic values of these areas.

NCCOS devotes a considerable degree of attention to providing the science to manage these sanctuaries wisely. NCCOS is continuing its characterization of these special places in order to guide managers in conserving their resources as well as conducting research that improves managers' ability to forecast the impacts of different management options.

Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 and National Invasive Species Act of 1996 (16 USC 4701-4751)

These Acts are intended to manage the adverse impacts of aquatic nuisance species (ANS) by preventing their unintentional introduction and dispersal into the waters of the United States through ships' ballast water and other means. They also provide for the management of those ANS that have already become established and for research and development. NCCOS, in collaboration with numerous partners, is developing an early warning system for coastal managers to alert them to the introduction of new species in their coastal waters that may become invasive.

Northwest Hawaiian Islands Executive Order (No. 13178)

This recently signed Executive Order establishes the 84 million-acre Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve — the largest protected area ever created in the United States. NCCOS is responsible for research on all protected areas. NCCOS is conducting surveys of this largely unknown region to characterize its resources so that wise management plans can be developed.

Oil Pollution Act (33 USC 2701 et seq)

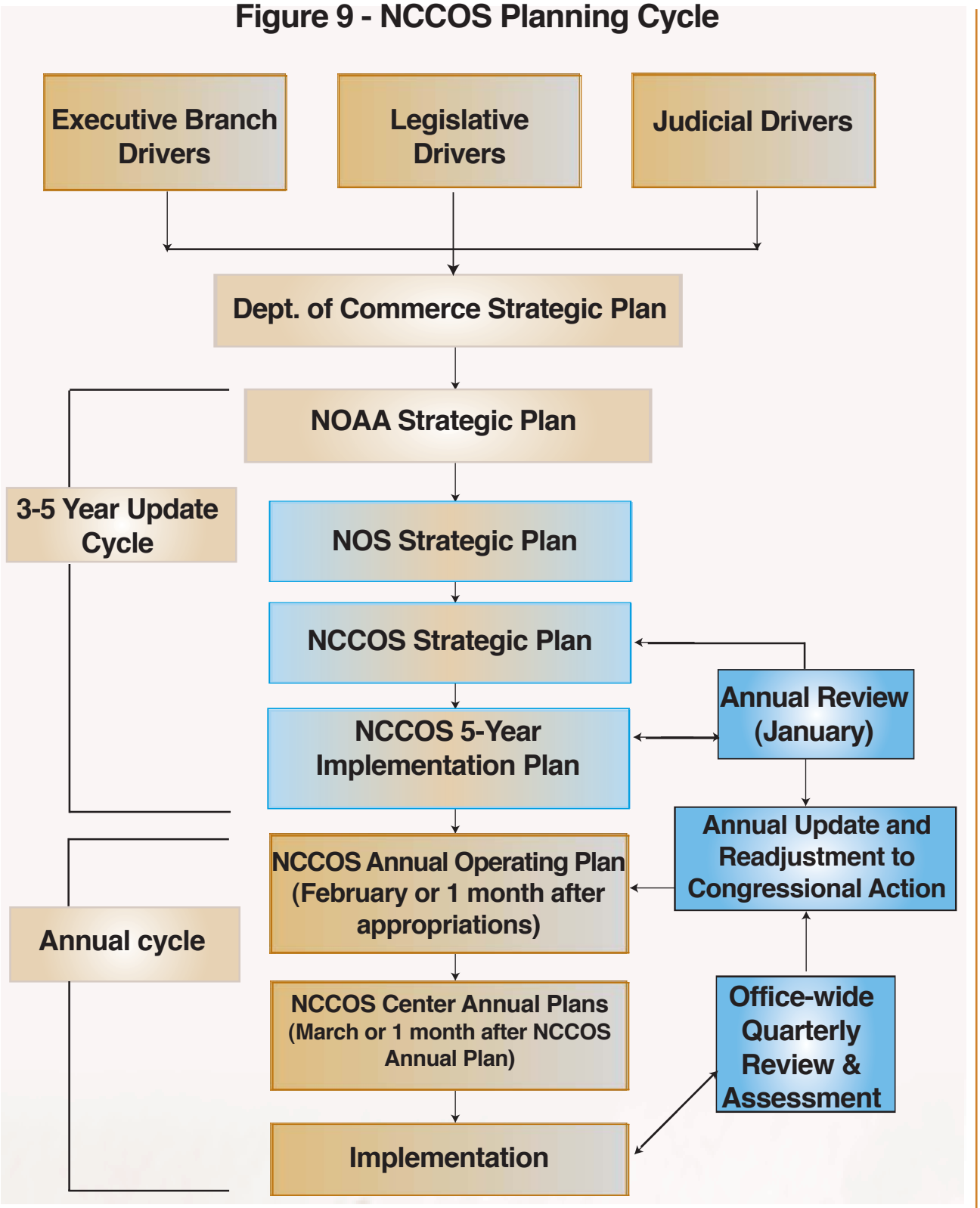
The Oil Pollution Act (OPA or the Act) establishes a liability regime for oil spills. As the primary federal natural resource trustee for coastal resources, NOAA, as with the "Superfund Act", has responsibility for ensuring the restoration of coastal resources injured by releases of oil and hazardous materials and of national marine sanctuary resources injured by physical impacts. NCCOS conducts research to support damage assessment claims and to support effective restoration of natural resources.

Protection and Conservation of Sea Turtles (16 USC 1537)

This statute requires the Department of State to seek agreements with foreign governments whose commercial fishing operations may adversely affect endangered species of sea turtles. The Secretary of Commerce must determine which foreign nations have commercial fishing operations that may adversely affect the sea turtles. The statute also bans imports of shrimp from any nation with commercial shrimping operations that may adversely affect the turtles. NCCOS support law enforcement cases seeking to stop illegal smuggling of protected species products, such as sea turtles, from entering this country.



Appendix B
Figure 9 - NCCOS Planning Cycle



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