Coastal Zone Management Act Performance Measurement System:

Contextual Indicators Manual

WORKING DRAFT
Last updated March 2007

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Ocean and Coastal Resource Management

OCRM appreciates any questions or comments regarding the contextual indicator manual. We are happy to share additional information about the indicators that may not be available in the manual. We also welcome suggestions of additional or alternative data sources and suggestions on additional contextual indicators that may be useful to the coastal management community. Please send any questions or comments to:

Ralph Cantral
NOAA Office of Ocean and Coastal Resource Management
National Policy and Evaluation Division
Ralph.Cantral@noaa.gov

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Introduction

The Coastal Zone Management Act Performance Measurement System (CZMAPMS) tracks indicators of effectiveness of the Coastal Zone Management (CZM) and National Estuarine Research Reserve System (NERRS) programs at the national level. The system consists of two components: 1) A suite of performance measures to assess how well programs are achieving the goals of the Coastal Zone Management Act (CZMA) and their program strategic objectives, and 2) A set of contextual indicators to provide information on environmental and socioeconomic factors influencing program actions. This report focuses on the contextual indicators component of the CZMAPMS.

The contextual indicators were chosen by the NOAA Office of Ocean and Coastal Resource Management (OCRM) in partnership with the coastal management programs and estuarine reserves during the development of the CZMAPMS to complement and inform the performance measures. Indicators of pressures on the coastal zone, such as population growth, and indicators of coastal condition, such as water quality, provide a picture of the social, economic, and ecological environments in which CZMA programs are working. Understanding this context is important to assessing and reporting program direction and progress.

The contextual indicator data is collected primarily by OCRM, with a subset collected by coastal management programs. The data for the indicators collected by OCRM comes from existing national data sources. For the past year, OCRM has searched for reliable national data sets and has populated the contextual indicators when data was available.

Purpose of Manual

The purpose of this manual is to summarize the results of the data exploration and collection phase for the contextual indicators collected by OCRM. This information will assist programs in understanding what contextual indicators can be consistently reported over time to complement the performance measures. In addition, the data source information may be useful to programs wishing to access and analyze the original data for other purposes.

The manual includes detailed information about the current contextual indicators. For each indicator where reliable data could be found, the manual provides the following:

- Description of the importance of the indicator
- Description of the data including the data source, scale of data (national/state/county), frequency of updating, data limitations, methods and analysis, and reference information
- Connections to performance measures

The manual also includes an explanation regarding indicators that were deleted because no reliable national data source was available.

The manual does not provide the data results for the current contextual indicators, as this information will be periodically updated and released on the OCRM website at www.coastalmanagement.noaa/success. As OCRM works with the CZM and NERRS programs on performance measures, feedback on the existing contextual indicators and ideas for additional indicators that should be explored are encouraged.

Overview of Methods

In collecting data for the contextual indicators, OCRM relies on existing national data sets. The data set needs to be updated regularly using consistent methodology so changes are comparable over time. For the current suite of contextual indicators, the data sources used are available from a variety of agencies and programs and updated on different schedules. Due to the different original sources, some indicators include data for both states and territories while other are limited to only states. In addition, some data can be compiled at the county, state, regional, and national scale while other data exists only at the regional or national level.

Using existing data sets, OCRM works to manipulate the data sets to focus the results at the geographical scale which provides the best context for the program performance measures. This includes, when possible, compiling data on the scale of coastal counties to best approximate the coastal zone in which coastal management programs and reserves are working. In other cases, data is compiled to coastal watersheds to reflect environmental conditions that may affect the coastal zone or specific estuarine areas. For some indicators, data is tracked for coastal counties as well as non-coastal counties in each state so they can be compared as desired. Regional and national data also provide important context for environmental and socioeconomic trends that may influence program priorities.

The following provides information on the geographical scales at which OCRM collects contextual data, depending on the resolution of the original data source. The regional and national scales are the only scales used in reporting with performance measures, though the state and county level data can be made available to coastal managers to use for other purposes.

Coastal counties

OCRM defines coastal counties for inclusion as those counties which include in whole or part the area within the boundary of the coastal zone, as defined by each state participating in the Coastal Zone Management Program. Four states include the entire state in the coastal zone (Rhode Island, Delaware, Florida, and Hawaii). Nine states (Washington, Alaska, Texas, Louisiana, Georgia, South Carolina, North Carolina, Virginia, and Maryland) define their coastal zones using county or county-equivalent boundaries. Other states use various combinations of political (e.g. town boundaries) and geographic features (adjacency to tidal waters) to define their coastal zones. For American Samoa, Guam, Northern Mariana Islands, and U.S. Virgin Island, the coastal zone includes all of the territory.

Several data sources provide socioeconomic data at the county level. The U.S. Census Bureau, the National Ocean Economic Program, and the NOAA Spatial Trends in Coastal Socioeconomics (STICS) websites all allow population and economic information to be queried by county. The coastal counties available though NOEP and STICs differ from the OCRM coastal counties. To review the difference in counties, a comparison chart is available on the OCRM website (www.coastalmanagement.noaa.gov/success). Due to the analysis of economic data by NOEP, the difficulty in calculating comparable data for missing counties, and the small difference between the two coastal county sets, OCRM used NOEP counties for economic indicators. Since the U.S. Census could easily be queried by OCRM counties, it was chosen as the source for population indicators. STICS, however, does provide a user-friendly way to calculate demographic data so it is mentioned to inform coastal managers of its availability as an alternative data resource.

Coastal watersheds

"Watershed" is the term used to describe the geographic area of land that drains water to a shared destination (NOAA). A watershed can thus be a large hydrologic unit, an entire river basin for example, or small one, such as a tributary. In order to identify specific watersheds, a standardized naming protocol has been developed. The federal system divides the U.S into a four-tiered hierarchical system, which is defined by the U.S. Geological Survey's hydrologic unit codes (HUC)**.** HUCs are first defined at the regional scale, and then are broken down into sequentially smaller watershed units for management purposes. OCRM defines "coastal watersheds" as those 8-digit HUCs that are contained within the coastal zone. Exceptions in this document are Indiana, Illinois and Alaska, as coastal zone boundary files for those states are currently unavailable.

Coastal states and territories

Coastal states included in the contextual indicator results refer to the 29 coastal states and 5 territories participating in the Coastal Zone Management Program. In some cases, Illinois is also included to provide a complete picture of the conditions in the coastal areas of the country. For some of the contextual indicators, data was not available for the territories or if it was available from a different data sources, the two data sources were not comparable and thus not added to provide a national number. Information on which contextual indicators included data for the territories can be found within each indicator description.

Regions

Most of the contextual indicator data is available at the regional scale – either from the original data source or as a sum of data from the state or county scales. Below are the regions and associated states used by OCRM for the CMZAPMS:

Northeast – Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, and New York (parts)
Mid-Atlantic – New Jersey, Pennsylvania (parts), Delaware, Maryland, and Virginia
Southeast – North Carolina, South Carolina, Georgia, and Florida (parts)
Gulf of Mexico – Florida (parts), Alabama, Mississippi, Louisiana, and Texas
Great Lakes – Pennsylvania (parts), New York (parts), Ohio, Michigan, Indiana, Wisconsin, and Minnesota
West Coast - California, Oregon, and Washington
Alaska – Alaska
Islands and Territories – Hawaii, Guam, Northern Mariana Islands, American Samoa, Puerto Rico, and U.S. Virgin Islands

For New York, Pennsylvania, and Florida, their coastal zone falls into two different regions. For the indicators where data is available to the county scale, the state information is split between the two regions according to their counties. For example, for Pennsylvania, data for the three counties on the Atlantic coast are included in the Mid-Atlantic region while the data for the one county on the Great Lakes coast is included in the Great Lakes region. When data is not available at the county level, and thus not easily split between two regions, Pennsylvania is included in the Great Lakes region, New York is included in the Northeast region, and Florida is included in the Southeast region.

An exception to this regional delineation is for the indexes originating from the National Coastal Condition Report (NCCR). Regions are delineated in the NCCR as follows:

Northeast – Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia
Southeast – North Carolina, South Carolina, Georgia, and Florida (east coast)
Gulf Coast – Florida (west coast), Alabama, Mississippi, Louisiana, and Texas
Great Lakes – Pennsylvania, New York, Ohio, Michigan, Indiana, Illinois, Wisconsin, and Minnesota
West Coast - California, Oregon, and Washington
Alaska, Islands and Territories – Alaska, Hawaii, Guam, Northern Mariana Islands, American Samoa, and U.S. Virgin Islands
Puerto Rico – Puerto Rico

Current Contextual Indicators

Percent change in population of coastal counties

Description
This indicator reflects the percent change in the population of coastal counties in the U.S. from1990 to 2000. Percent population change represents the difference between the population of an area at the beginning and end of a time period, expressed as a percentage of the beginning population.

Importance
Coastal areas attract an increasing number of people who are drawn to the wealth of natural resources as well as the wealth of economic opportunities. The growth in population serves as a key pressure on coastal ecosystems, leaving them more vulnerable to pollution, habitat degradation and loss, overfishing, invasive species, and coastal hazards impacts.

While only one component of the socioeconomic system, population change over time serves as a key indicator because it provides insight into patterns of economic growth, resource use, land development, infrastructure expansion, and other pressures on coastal ecosystems. Reviewing population information in conjunction with land use change and other indicators can explain changing demand for natural resources.

Data
Source Description
The U.S. Census Bureau conducts a decadal census to track changes in population in the country, including all states and territories. The last two censuses were completed in 1990 and 2000. On its website, the Census Bureau provides population numbers at various geographic scales including national, state, territory, and county. The next full census will occur in 2010 so population numbers and percent change in population will be updated when those results are released. The website does provide population numbers by county for all states (no territories) back to 1900.

Source Reference
2000 state and territories data: US Census Bureau. American Fact Finder. http://factfinder.census.gov/servlet/SAFFPopulation?_sse=on.
1990 state data: US Census Bureau. http://www.census.gov/prod/www/abs/decennial.html.
1990 territories data: US Census Bureau. http://www.census.gov/population/www/proas/pi_cen.html.

Methods and Analysis
Population numbers by county are downloaded from U.S. Census for both 1990 and 2000. Coastal counties are selected to isolate the population in coastal counties only. Population numbers of all coastal counties and the territories are summed to provide the national population in coastal counties for both 1990 and 2000, and percent change is calculated for the 10 years. To reflect regional coastal population change, population numbers for the states and territories within each region are isolated, summed, and calculated for percent change between 1990 and 2000. In states where coastal counties were split between two regions (FL, NY, PA), the county population numbers are included in the regional calculations according to the division outlined in Appendix A.

Complementary Information
The following two population figures are also calculated to provide additional information for this indicator:

- Population change in all coastal counties in coastal states
- Population change in all states (total U.S. population change)

Connections to Performance Measures within CZMA PMS
Measuring the percent change in population of coastal counties may provide context for the following performance measures:

- Number of new public access sites added through acquisition or easement using CZM funds
- Number of existing public access sites that have been enhanced using CZM funds
- Number of sites where public access is a) created or b) protected through CZM regulatory activities
- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce future damage from hazards and b) implemented programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of communities supported by CZM funds a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects
- Number of coastal communities that have been recognized for growth management efforts through national or state award programs

Current estimated population of coastal counties

Description
This indicator reflects the current estimated population of the coastal counties of the U.S. The estimated population is the calculated number of people living in an area as of July 1 each year. The current estimated population is calculated from a change model that incorporates information on natural change (births, deaths) and net migration (net internal migration, net international migration) that has occurred in an area since a Census 2000 reference date.

Importance
Each year, coastal areas become more and more crowded. Population growth and related development place many of the Nation's coastal areas under increasing pressure. While growth brings new jobs, industries, infrastructure, and tax revenues, it can also burden local environments. These burdens include increased waste production, higher volumes of polluted runoff, loss of green space and habitat, declines in water quality, and increased demands for wastewater treatment, potable water and energy supplies. Understanding annual changes to the current population, even as estimates, serves as an important indicator of the pressures on, and impacts to, to coastal and estuarine areas.

Data
Data
Source Description
The U.S. Census Bureau Population Estimates Program publishes total resident population estimates and demographic components of change (births, deaths, migration) each year on July 1. On its website, the Census Bureau provides estimated population numbers at various geographic scales including national, state, territory, and county. With each new issue of population estimates on July 1, estimates for years back to the last census are revised and archived.

Source Reference
Data for states: US Census Bureau. Population Estimates. http://www.census.gov/popest/datasets.html.
Data for territories: US Census Bureau. International Data Base.
http://www.census.gov/ipc/www/idbacc.html.

Methods and Analysis
Population estimates are downloaded from U.S. Census by county for the most recent year. Coastal counties in states and coastal municipalities in Puerto Rico are selected to isolate the population in coastal counties only. Population estimates of all coastal counties and the territories are summed to provide the national population estimate in coastal counties for the most recent year. To reflect regional population, population estimates for the states and territories within each region are isolated and summed for the most recent year. In states where coastal counties are split between two regions (FL, NY, PA), the county population estimates are included in the regional calculations according to the division outlined in Appendix A.

Complementary Information
The following two population figures are also calculated to provide additional information for this indicator:

- Population estimates in non-coastal counties in coastal states
- Population estimated for all states

Connections to Performance Measures within CZMA PMS

Measuring the current estimated population of coastal counties may provide context for the following performance measures:

- Number of new public access sites added through acquisition or easement using CZM funds
- Number of existing public access sites that have been enhanced using CZM funds
- Number of sites where public access is a) created or b) protected through CZM regulatory activities
- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce future damage from hazards and b) implemented programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of communities supported by CZM funds a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects
- Number of coastal communities that have been recognized for growth management efforts through national or state award programs

Proportion of national population living in coastal counties

Description
This indicator reflects the proportion of the total U.S. population that lives in coastal counties.

Importance
Drawn by the significant natural resources and economic opportunities, there is an increasing migration of people moving from non-coastal areas into coastal areas around the U.S. This continuous influx of people translates into more industries, more houses, more roads, and a greater demand for resources such as water and land. In addition, as populations increase in hazard-prone areas, the protection of people, property, and natural resources becomes more difficult.

While the proportion of the national population living in coastal counties serves as an indicator of the popularity and thus the importance of protecting coastal areas, it also indicates the impacts of growth and development on the limited amount of coastal land in the country.

Data
Source Description
The U.S. Census Bureau conducts a decadal census to track changes in population in the country, including all states and territories. The last census was completed in 2000. On its website, the Census Bureau provides population numbers at various geographic scales including national, state, territory, and county. The next full census will occur in 2010 so population numbers and the calculation of proportion of the total population living in coastal counties will be updated when those results are released.

Source Reference
2000 state and territories data: US Census Bureau. American Fact Finder. http://factfinder.census.gov/servlet/SAFFPopulation?_sse=on.

Methods and Analysis
Population numbers by county are downloaded from U.S. Census for 2000. Coastal counties are selected to isolate the population in coastal counties only. Population numbers of all coastal counties and the territories are summed to provide the total population in coastal counties for 2000. This is compared against the total national population to derive the proportion of the U.S. population that lives in coastal counties.

Complementary Information
The following population figure is also calculated to provide additional information for this indicator:

- Proportion of national population living in coastal states

Connections to Performance Measures within CZMA PMS
Measuring the proportion of the national population living in coastal counties may provide context for the following performance measures:

- Number of new public access sites added through acquisition or easement using CZM funds
- Number of existing public access sites that have been enhanced using CZM funds
- Number of sites where public access is a) created or b) protected through CZM regulatory activities

- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce future damage from hazards and b) implemented programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of communities supported by CZM funds a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects
- Number of coastal communities that have been recognized for growth management efforts through national or state award programs

Population density in coastal counties

Description
This indicator reflects the population density in the coastal counties and territories of the U.S. Population density represents the average number of people per square mile living in the coastal areas.

Importance
Coastal areas are home to a variety of natural resources and support wealth of economic activity. Employment, recreation, and commerce are among the driving forces that draw people to move to the coast. As coastal areas become more and more crowded, the increasing density of the population serves as a significant indicator of the impact of growth and development upon the land, the resources, and infrastructure.

A high concentration of population in coastal counties can impact coastal ecosystems through habitat modifications and increased pollution. Increases in population density often lead to sprawling patterns of development. As population becomes denser, more and more land is used for transportation, housing, and commercial uses. Denser populations both support and require community services such as public water and sewer. This development alters natural landscapes, leading to habitat fragmentation, and increases impervious surface coverage, leading to impacts on water quality. In conjunction with information about land use change, population density helps define the degree of fragmentation of natural habitats into smaller pieces and the potential severity of population impacts on water quality and the hydrology of a watershed.

Data
Source Description
The U.S. Census Bureau conducts a decadal census to track changes in population in the country, including all states and territories. The last census was completed in 2000. On its website, the Census Bureau provides population numbers at various geographic scales including national, state, territory, and county. The next full census will occur in 2010 so population numbers will be updated when those results are released.

The NOAA Spatial Trends in Coastal Socioeconomics (STICS) website provides the land area (square miles) of each coastal county by state and in Puerto Rico and the land area of each of the territories.

Source Reference
2000 state and territories population data: US Census Bureau. American Fact Finder. http://factfinder.census.gov/servlet/SAFFPopulation?_sse=on.
State and territory land area data: NOAA Spatial Trends in Coastal Socioeconomics (STICS). Coastal Zone County Facts. http://marineeconomics.noaa.gov/socioeconomics/czcounties/cz_pop_housing/cz_county_mainpage.html.

Methods and Analysis
Population numbers by county are downloaded from U.S. Census for 2000. Coastal counties are selected to isolate the population in coastal counties only. Population numbers of all coastal counties and the territories are summed to provide the national population in coastal counties in 2000. The land area of all coastal counties and the territories are calculated from STICS data, and population density is

derived by dividing the total number of people living in the coastal counties by the total acreage of land in the counties. To reflect regional coastal population density, population numbers and land area for the coastal counties in the states and territories within each region are isolated, summed, and calculated. In states where coastal counties are split between two regions (FL, NY, PA), the county population numbers are included in the regional calculations according to the division outlined in Appendix A.

Complementary Information

The following two population figures are also calculated to provide additional information for this indicator:

- Population density in all counties in coastal states
- Population density in all states (total U.S. population density)

Connections to Performance Measures within CZMA PMS

Measuring the population density in coastal counties may provide context for the following performance measures:

- Number of new public access sites added through acquisition or easement using CZM funds
- Number of existing public access sites that have been enhanced using CZM funds
- Number of sites where public access is a) created or b) protected through CZM regulatory activities
- Number of acres of key coastal habitats a) created or b) restored using CZM funds
- Number of acres of key coastal habitats protected by acquisition or easement using CZM funds
- Number of acres of key coastal habitats lost or gained due to core CZM regulatory (including mitigation) programs
- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce future damage from hazards and b) implemented programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of communities supported by CZM funds a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects
- Number of coastal communities that have been recognized for growth management efforts through national or state award programs

Percent change in value of coastal tourism and recreation

Description
This indicator measures changes in the value of the tourism and recreation sector, as defined in the North American Industrial Classification System (NAICS). Specifically, the indicator quantifies statewide and regional percent changes in the Gross State Products of the tourism and recreation sector for counties within National Ocean Economics Program analysis.

Importance
Coasts are some of the most heavily visited areas in the nation, and tourism is an economic driver for many coastal communities. For some coastal managers, planning for and accommodating tourists is critical. Measuring the percent change in the value of the coastal tourism and recreation sector helps illustrate the relative changes in this sector's importance to coastal communities and economies.

Data
Source Description
Data for this contextual indicator comes from the National Ocean Economics Program (NOEP). NOEP is a collaborative effort that provides a range of economic and socio-economic information on changes and trends along the U.S. coast and in coastal waters. The program provides data on ocean-dependent sectors and industries, as well as more general economic and demographic data for coastal states. Methods used to develop these statistics are detailed at the Web site. The "Ocean Sector and Industry Data" component of NOEP, from which data for this contextual indicator was taken, currently offers data on all NAICS sectors and industries for 1990-2004. The NOEP periodically updates its data.

Data limitations and caveats
NOEP does not include information for U.S. territories and other outlying areas.

Also, the NOEP coastal counties are slightly different from the OCRM coastal counties, with NOEP reporting on eight non-OCRM counties and not reporting on seven OCRM counties. Due to the methodology used by the NOEP to disaggregate the BLS data and recompiling for coastal counties, economic numbers derived directly from the BLS for the seven counties would not be comparable to NOEP data. Therefore, for this indicator, NOEP counties were used.

Finally, county-level economic data is not available for all states within the NOEP. States must therefore be analyzed wholly and are included in only a single region, in contrast with OCRM's regional designations for Florida, New York, and Pennsylvania.

Source Reference
National Ocean Economics Program. Ocean Economic Data by Sector and Industry. http://noep.mbari.org/Market/ocean/oceaneconomy.asp.

Methods and Analysis
In the NOEP Ocean Sector and Industry Data within the Market Values Database, gross state products (GSP) adjusted to year 2000 values for all industries of the Tourism and Recreation sector are downloaded. The gross state products of coastal states are summed to provide regional totals according to the regions outlined in Appendix A.

Connections to Performance Measures within CZMA PMS

Measuring the percent change in tourism dollars spent in coastal counties may provide context to public access performance measures, such as:

- Number of new public access sites added through acquisition or easement using CZM funds
- Number of existing public access sites that have been enhanced using CZM funds
- Number of sites where public access is a) created or b) protected through CZM regulatory activities

Percent of national employment in coastal counties

Description
This indicator represents the proportion of the U.S. population that is employed in coastal counties.

Importance
Coastal areas attract an increasing number of people who are drawn to the wealth of natural resources as well as the wealth of economic opportunities. Employment opportunities include jobs related to coastal and ocean resources such as fishing and tourism as well as jobs not tied to resources such as car dealerships and retail stores. The number of people employed in coastal areas indicates not only the strength of the local economy but also the extent of pressure on coastal resources as more businesses are built, new people arrive, and new infrastructure is constructed to support commercial and residential needs. This type of economic information may serve as a useful tool in managing coastal areas for economic growth while protecting the resources that draw many people and jobs.

Data
Source Description
For states, the National Ocean Economics Program (NOEP) Market database provides coastal economic data. Coastal data includes all economic sectors and industries that are reported by the Bureau of Labor Statistics (BLS) which occur in the coastal states. The economic data include the number of establishments, total employment, total wages, and the Gross State Product for all supersectors of the U.S. coastal states and counties. Appendix B shows the supersectors included in the coastal economy.

All current economic data are based on the current North American Industrial Classification System (NAICS). Data may be selected for individual counties in each coastal state or may include the totals of other geographic areas. National (all coastal states), state, watershed, coastal zone, shore adjacent, non-shore adjacent, and inland totals are available in NAICS values for 1990-2004. NOEP data is updated annually, with revisions by BLS to past data incorporated in the NOEP during periodic updates.

The Bureau of Labor Statistics provides updates to the total number of people employed in the nation twice per year, in May and November. This national number includes all states but does not include territories.

Data limitations and caveats
The NOEP coastal counties are slightly different from the OCRM coastal counties, with NOEP reporting on eight non-OCRM counties and not reporting on seven OCRM counties. Due to the methodology used by the NOEP to disaggregate the BLS data and recompile for coastal counties, economic numbers derived directly from the BLS for the seven counties would not be comparable to NOEP data. Therefore, for this indicator, NOEP counties were used.

The NOEP Market database does not include territories. For the territories, the U.S. Census Economic Census of Island Areas website provides data from the Economic Census of Islands Areas. The last economic census was completed in 2002 and published for the first time on the basis of the North American Industry Classification System (NAICS). The economic census data includes the number of establishments, annual payroll, total employment, and sales and revenues. The economic census for island area is updated every five years, with reported data reflecting economic activity taking place

during the year of the census. With territory data last updated in 2002, it is not compiled with the state data from 2004.

The economic data for Puerto Rico only included the manufacturing and construction industries in 2002 and its last complete industry census in 1997 was based on Standard Industrial Classification codes and not NAICS codes. These differences mean that the data for Puerto Rico is not directly comparable to economic data from other territories which were obtained from BLS or to data from the states which were obtained from NOEP.

Source Reference
Data for states: National Ocean Economics Program. Market Data. http://noep.mbari.org/Market/coastal/coastalEcon.asp.
Data for territories: U.S. Census Bureau, Bureau of Labor Statistics. U.S. Economic Census of Island Areas, 2002. http://www.census.gov/csd/ia/index.html.
Data for nation: U.S. Census Bureau of Labor Statistics. www.bls.gov.

Methods and Analysis
In the NOEP Market coastal economy database, data for employment in all industry sectors for coastal zone counties in each coastal state is downloaded. The employment in coastal counties in each state is summed to provide regional totals. In states where coastal counties were split between two regions (FL, NY, PA), the economic data is downloaded by county and included in the regional calculations according to the division outlined in Appendix A.

The total national employment is found on the BLS website, with this national number including all states but no territories. The national number of employment in the coastal counties is divided by the total national number of people employed in all states and multiplied by 100, to determine the percent of national employment in coastal counties.

Complementary Information
The following two employment figures were also calculated to provide additional information for this indicator:

- Total number of people employed in coastal states (all counties)
- Percent of national employment in coastal states (all counties)

Connections to Performance Measures within CZMA PMS
Measuring the percent of national employment in coastal counties may provide context for the following performance measures:

- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce future damage from hazards and b) implemented programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of communities supported by CZM funds in a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects
- Number of coastal communities that have been recognized for growth management efforts through national or state award programs

Percent of employment within coastal counties dependent on coastal and ocean resources

Description
This indicator represents the proportion of the people working in coastal counties who are employed by industries that are dependent on coastal and ocean resources, as defined in the North American Industrial Classification System (NAICS). This subset of employment refers to jobs that either require ocean or Great Lakes resources as an input into their products or services, or require close proximity to the ocean or Great Lakes.

Importance
Coastal areas attract an increasing number of people who are drawn to the wealth of natural resources as well as the wealth of economic opportunities. Employment opportunities include jobs related to coastal and ocean resources such as fishing and tourism as well as jobs not tied to resources such as car dealerships and retail stores. The number of jobs tied to coastal and ocean resources or the proximity to the ocean and Great Lakes serves as an indicator of the economy's dependency on natural resources. An increase may indicate additional extraction of resources or other pressures such as increased pollution from boats and debris from tourists. A decrease may signal an inability of the natural environment to support certain industries, such as fisheries, or the inability of specific industries to compete with others, such as fish processing plants closed due to high taxation of waterfront properties. Either trend may alert coastal managers of a need to investigate the cause and adjust policies or management practices as needed.

Data
Source Description
For states, the National Ocean Economics Program (NOEP) Market database provides the number of establishments, employment, and wages derived from the U.S. Census Bureau of Labor Statistics (BLS) for two series of market value – coastal economy and ocean economy. Coastal economy data includes all economic activity occurring in coastal counties while the ocean economy data consists of all economic activities that derive all or part of its inputs from the ocean or Great Lakes. Appendix B shows the sectors and industries included in the ocean economy. Since the ocean economy data more directly reflects economic activities tied to coastal and ocean resources, it is used for calculating the percent of national employment dependent on coastal and ocean resources.

All current economic data are based on the current NAICS codes. Data may be selected for individual counties in each coastal state or may include the totals of other geographic areas. National (all coastal states), state, watershed, coastal zone, shore adjacent, non-shore adjacent, and inland totals are available in NAICS values for 1990-2004. NOEP data is updated periodically, with revisions by BLS to past data incorporated in the NOEP during updates.

Data limitations and caveats
The NOEP coastal counties are slightly different from the OCRM coastal counties, with NOEP reporting on eight non-OCRM counties and not reporting on seven OCRM counties. Due to the methodology used by the NOEP to disaggregate the BLS data and recompile for coastal counties, economic numbers derived directly from the BLS for the seven counties would not be comparable to NOEP data. Therefore, for this indicator, NOEP counties were used.

The NOEP Market database does not include territories. While the U.S Census Economic Census of Island Areas provides economic data, its broader categories do not provide enough resolution to determine employment dependent on coastal and ocean resources. Due to the incompatibility of the two data sets, economic data for the territories were excluded from this indicator.

Source Reference
National Ocean Economics Program. Market Data.
http://noep.mbari.org/Market/ocean/oceaneconomy.asp.

Methods and Analysis
In the NOEP Market ocean economy database, data for employment in all industries in all ocean sectors for all coastal counties in each coastal state is downloaded. The employment in coastal counties in each state is summed to provide regional totals. In states where coastal counties are split between two regions (FL, NY, PA), the economic data is downloaded by county and included in the regional calculations according to the division outlined in Appendix A.

To obtain the total number of people employed in coastal counties in the U.S., data for employment in all industry sectors for coastal zone counties in each coastal state is downloaded from the NOEP Market coastal economy database.

To calculate the percent of employment in coastal counties that is dependent on coastal and ocean resources, the number of people employed in ocean economy industries in coastal counties is divided by the total number of people employed in coastal counties and multiplied by 100.

Connections to Performance Measures within CZMA PMS
Measuring the percent of employment within coastal counties dependent on coastal and ocean resources may provide context for the following performance measure, such as:

- Number of communities supported by CZM funds in a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects

Number of businesses in coastal counties dependent on coastal and ocean resources

Description
This indicator represents the number of businesses in coastal counties that are dependent on coastal and ocean resources. This subset of businesses either requires ocean or Great Lakes resources as an input into their products or services, or requires close proximity to the ocean or Great Lakes.

Importance
Many businesses are attracted to coastal areas because of the wealth of natural resources that may be needed for products and services. Some businesses in coastal areas, such as fishing and shipping, are directly dependent on coastal and ocean resources while others, such as hotels and restaurants, are tied to these resources because tourists are drawn to the ocean and Great Lakes. The number of businesses dependent on natural resources serves as indicator of extent to which the coastal economy relies on these resources. An increase may indicate additional extraction of resources or other pressures such as increased pollution from boats and debris from tourists. A decrease may signal an inability of the natural environment to support certain industries, such as fisheries, or the inability of specific industries to compete with others, such as fish processing plants closed due to high taxation of water front properties. Either trend may alert coastal managers of a need to investigate the cause and adjust policies or management practices as needed.

Data
Source Description
For states, the National Ocean Economics Program (NOEP) Market database provides the number of establishments, employment, and wages derived from the U.S. Census Bureau of Labor Statistics (BLS) for two series of market value – coastal economy and ocean economy. Coastal economy data includes all economic activity occurring in coastal counties while the ocean economy data consists of all economic activities that derive all or part of its inputs from the ocean or Great Lakes. Appendix B shows the sectors and industries included in the ocean economy. Since the ocean economy data more directly reflects economic activities tied to coastal and ocean resources, it is used for calculating the number of businesses dependent on coastal and ocean resources.

All current economic data are based on the current NAICS codes. Data may be selected for individual counties in each coastal state or may include the totals of other geographic areas. National (all coastal states), state, watershed, coastal zone, shore adjacent, non-shore adjacent, and inland totals are available in NAICS values for 1990-2004. NOEP data is updated periodically, with revisions by BLS to past data incorporated in the NOEP during updates.

Data limitations and caveats
The NOEP coastal counties are slightly different from the OCRM coastal counties, with NOEP reporting on eight non-OCRM counties and not reporting on seven OCRM counties. Due to the methodology used by the NOEP to disaggregate the BLS data and recompile for coastal counties, economic numbers derived directly from the BLS for the seven counties would not be comparable to NOEP data. Therefore, for this indicator, NOEP counties were used.

The NOEP Market database does not include territories. While the U.S Census Economic Census of Island Areas provides economic data, its broader categories do not provide enough resolution to

determine businesses dependent on coastal and ocean resources. Due to the incompatibility of the two data sets, economic data for the territories were excluded from this indicator.

Source Reference
National Ocean Economics Program. Market Data.
http://noep.mbari.org/Market/ocean/oceaneconomy.asp.

Methods and Analysis
In the NOEP Market ocean economy database, data for establishments in all industries in all ocean sectors for all coastal counties in each coastal state is downloaded. The number of establishments in coastal counties in each state is summed to provide regional totals. In states where coastal counties were split between two regions (FL, NY, PA), the establishment data is downloaded by county and included in the regional calculations according to the division outlined in Appendix A. To get the total number of businesses in coastal counties that are dependent on coastal and ocean resources, the number of establishments is added from all of the states.

Connections to Performance Measures within CZMA PMS
Measuring the number of businesses in coastal counties that are dependent on coastal and ocean resources may provide context for the following performance measure:

- Number of communities supported by CZM funds in a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects

Percent of national economy attributable to coastal counties

Description
This indicator reflects the proportion of the national economy, represented by Gross State Product (GSP), which is generated in coastal counties, as defined in the North American Industrial Classification System (NAICS).

Importance
Many people live, work, and play in coastal areas, leading to numerous and diverse businesses that produce the goods and services to support local citizens as well as visiting tourists. The GSP measures everything that is bought and sold in a state, thereby reflecting the value added to the economy by industries in the area. Primary industries in coastal areas include tourism, marine transportation and commerce, fisheries, minerals extraction, and oil and gas production.

GSP only measures material success and does not account for non-material outputs such as pollution into the environment that degrade ecosystems and jeopardize human health. GSP does, however, provide insight into value of the economy, especially when complemented with other indicators about employment and businesses. GSP generated by the coastal counties serves as an accepted and useful indicator of level of contribution by coastal areas to the national economy.

Data
Source Description
For states, the National Ocean Economics Program (NOEP) Market database provides Gross State Product (GSP) data derived from the Bureau of Economic Analysis (BEA) for all coastal states. Coastal economy data include the number of establishments, total employment, total wages, and the GSP for all supersectors (Appendix B) of the U.S. coastal states and counties.

All current NOEP economic data are based on the current NAICS codes. Data may be selected for individual counties in each coastal state or may include the totals of other geographic areas. National (all coastal states), state, watershed, coastal zone, shore adjacent, non-shore adjacent, and inland totals are available in NAICS values for 1990-2004. NOEP data is updated periodically, with revisions by BEA to past data incorporated in the NOEP during updates.

Total national Gross Domestic Product (GDP) by State (renamed from GSP) is obtained from U.S. Department of Commerce's Bureau of Economic Analysis (www.bea.gov).

Data limitations and caveats
The NOEP coastal counties are slightly different from the OCRM coastal counties, with NOEP reporting on eight non-OCRM counties and not reporting on seven OCRM counties. Due to the methodology used by the NOEP to disaggregate the BLS data and recompile for coastal counties, economic numbers derived directly from the BLS for the seven counties would not be comparable to NOEP data. Therefore, for this indicator, NOEP counties were used.

The NOEP Market database does not include territories and no comparable data is available for the territories. The U.S. Central Intelligence Agency publishes economic information, including Gross Domestic Product (GDP), for each of the territories in The World Factbook

(https://www.cia.gov/cia/publications/factbook/index.html). However, the information on GDP for the different territories is compiled in different years, meaning they cannot be summed across territories or with the states. OCRM does track the individual GDP for the territories for the year it is available, but does not combine the territory data with state data.

Source Reference
Data for states: National Ocean Economics Program. Market Data.
http://noep.mbari.org/Market/coastal/coastalEcon.asp.

Methods and Analysis
In the NOEP Market coastal economy database, data for GSP adjusted to year 200o values from all industry sectors for coastal zone counties in each coastal state is downloaded. The GSP in coastal counties in each state is summed to provide regional totals. In states where coastal counties are split between two regions (FL, NY, PA), the economic data is downloaded by county and included in the regional calculations according to the division outlined in Appendix A. The total GSP from coastal states is divided by the total national GDP by State from the BEA and multiplied by 100 to determine the percent of national economy produced by coastal counties.

Complementary Information
The following economic figure was also calculated to provide additional information for this indicator:

- Percent of each coastal state's economy attributable to coastal counties

Connections to Performance Measures within CZMA PMS
Measuring the percent of the national economy attributable to coastal counties may provide context for performance measures, such as:

- Number of new public access sites added through acquisition or easement using CZM funds
- Number of existing public access sites that have been enhanced using CZM funds
- Number of sites where public access is a) created or b) protected through CZM regulatory activities
- Number of acres of key coastal habitats a) created or b) restored using CZM funds
- Number of acres of key coastal habitats protected by acquisition or easement using CZM funds
- Number of acres of key coastal habitats lost or gained due to core CZM regulatory (including mitigation) programs
- Number of communities supported by CZM funds in a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects

Number of invasive species identified in coastal watersheds

Description
This indicator provides the number of invasive species identified in coastal watersheds and states.

Importance
Coastal habitats, such as wetlands, estuaries, and submerged aquatic vegetation beds, provide food, shelter and breeding grounds for a number of coastal and marine species. These habitats are both ecologically and economically valuable, and the balance of species in them is vulnerable to human activities in the coastal zone. The introduction of nonindigenous or invasive species into coastal and estuarine habitats not only threatens their ecological health but can also have significant economic consequences. For example, Great Lakes power plants and municipalities spend tens of millions of dollars every year to control invasive zebra mussels (Aquatic Nuisance Species Task Force), as they not only out-competes native bivalves, but also grow on and clog water intake pipes and other structures.

The U.S. Geological Survey (USGS) defines nonindigenous aquatic species as an organism that enters a body of water or aquatic ecosystem outside of its historic or native range. Most nonindigenous species introductions have resulted from human activities over the last few centuries. Nonindigenous species include not only those that have arrived from outside of North America, commonly referred to as exotics, but also those native to North America that have been introduced into watershed outside their native ranges. An "invasive" species is defined as a species that is:1) nonindigenous to the ecosystem, and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. (From Executive Order 13112, 1999, establishing the National Invasive Species Council.) It is important to track this indicator given the serious effects invasive species may have on the native organisms, physical environment, and economy of the coastal zone.

Data
Source Descriptions
The USGS is charged with collecting and providing information on the presence and distribution of nonindigenous aquatic species to the Aquatic Nuisance Species Task Force, per the Nonindigenous Aquatic Nuisance Species Control and Prevention Act of 1990. USGS thus developed the Nonindigenous Aquatic Species (NAS) information resource, and established a website (http://nas.er.usgs.gov) as a central repository for accurate and spatially referenced biogeographic accounts of nonindigenous aquatic species. The NAS program also provides scientific reports, online queries, spatial data sets, regional contact lists, and general information. The data are obtained from sources including literature, museums, databases, monitoring programs, state and federal agencies, professional communications, online reporting forms, and Aquatic Nuisance Species hotline reports. They are publicly available and the geographical coverage is the United States.

Invasive species counts for Island Territories are obtained via the Global Invasive Species Database (GISD). This database is managed by the Invasive Species Specialist Group of the Species Survival Commission of the IUCN-World Conservation Union. The GISD was developed to increase awareness about invasive species and to facilitate effective prevention and management activities.

Both databases are updated as new species are discovered and reported.

Source References

U.S. Geological Survey. 2004. Nonindigenous Aquatic Species Database, Gainesville, FL. http://nas.er.usgs.gov/2005.

IUCN Species Survival Commission Invasive Species Specialist Group. Global Invasive Species Database. http://www.invasivespecies.net/database/welcome.

Methods and Analysis

Invasive species data for the States are collected in two ways: 1) by State; and 2) by 6-digit HUC(s) associated with each NERR. For most states, species lists were generated using marine/estuarine as sort criteria in order to restrict results to coastal areas. The exception being the Great Lakes states (including New York and Pennsylvania), for which all species were included. Therefore, invasive species count for the Great Lakes may be overestimated. Regional totals are a combination of all states within the region, with duplicates eliminated. For states with more than one NERR, individual species lists were combined and duplicates eliminated. Maryland and Virginia NERRs also include freshwater species in the query.

Invasive species data for the Island Territories were queried by island and habitat. Habitats included marine, estuaries, lakes, coastlands, wetlands, riparian zones. Duplicates were eliminated.

Since the methodologies for data collection for the two databases are different, the numbers of invasive species identified for states cannot be compared with those for the Island Territories.

Connections to Performance Measures within CZMA PMS

Tracking the number of invasive species identified in coastal habitats may provide context for performance measures, such as:

- Number of CZM programs that have mapped inventories of key coastal habitat
- Number of CZM programs that have habitat restoration plans for key coastal habitats

Coastal Habitat Index

Description
This indicator provides information on the rate of coastal wetland loss, determined via data collected by the National Wetland Inventory.

Importance
The coastal zone contains a wide range of natural habitats such as sand dunes, wetlands, mangrove forests, and submerged aquatic vegetation beds. These coastal habitats are ecologically and economically valuable. They provide food, shelter, and breeding grounds for coastal and marine species, including blue crabs, shrimp and oysters. According to NOAA's Fishery Service, approximately 75 percent of the commercially important fish species depend upon coastal wetlands and estuaries at some point during their lifetime. Coastal habitats also provide other irreplaceable services. For example, wetland habitats filter pollutants and retain nutrients, helping to maintain good coastal water quality. They also provide significant protection against coastal storms—dissipating wave energy and absorbing flood waters.

Unfortunately, many coastal habitat areas are facing intensified pressure from human activities in the coastal zone. While activities such as residential construction, the dredging of navigation channels, and beach nourishment can provide economic benefits to coastal communities, they also have the potential to negatively impact delicate coastal ecosystems. In the most recent CZMA Section 309 Assessments, state coastal programs indicated that the primary threat to coastal wetlands is increased development and filling. Programs also identified the need for additional wetland monitoring data to assist in tracking wetland acreage gains and losses, as well as trends in wetland habitat quality. The coastal habitat index is an important indicator of the rate of loss of coastal wetlands regionally and nationally. The index does not characterize wetland habitat quality, as there is not currently a universal methodology.

Data
Source Description
The National Coastal Condition Report (NCCR) is developed and published via a collaborative effort of the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior (DOI), and the U.S. Department of Agriculture (USDA). The agencies involved in this project chose to assess the national coastal condition using monitoring surveys that were consistent on the national level in order to minimize the problems created by compiling data collected using multiple approaches. This assessment occurs periodically, and the results are then published in a NCCR. The purpose of the NCCR is to present a broad baseline picture of the condition of estuaries across the U.S. The first (NCCR I) was published in 2001, using available data from 1990 to 1996; the second (NCCR II) was published in 2004, using available data from 1997 to 2000. Agencies contributing data included EPA, NOAA, USDA, the U.S. Fish and Wildlife Service, and the U.S. Geological Service. Several state, regional, and local organizations also provided information.

The NCCR (I and II) focuses only on estuarine areas for which nationally consistent and comparable data are available. For most indicators, this means the conterminous 48 states (NCCR I and II) and Puerto Rico (NCCR II). Data for Alaska and Hawaii have been included in some analyses. Coastal

conditions in the NCCR II are reported nationally and by region. Regions are described in the Overview of Methods section.

Source Reference
United States Environmental Protection Agency. National Coastal Condition Report II. EPA-620/R-03/002. December 2004. http://www.epa.gov/owow/oceans/nccr2/.

Methods and Analysis
Data used to determine the coastal habitat index are obtained from the U.S. Fish and Wildlife Service's National Wetland Inventory (NWI). The 2002 NWI includes data for all coastal states for 1990 and 2000, except Hawaii and Puerto Rico. Data for Hawaii and Puerto Rico are available for 1980 and 1990. First, the proportional change in coastal wetland area over the most current ten year period was calculated by region; this is called the "present" loss rate. This number was then combined with the long-term decadal loss rates for the period 1780 to 1990, called the "historic" loss rate. The average of these two loss rates multiplied by 100 is the regional value of the coastal habitat index. The national value of the index is a weighted mean that reflects the extent of wetlands existing in each region.

The coastal habitat index is based on the following criteria:

Index Rating	**Criteria**
Good	The index score is less than 1.0
Fair	The index score is between 1.0 and 1.25
Poor	The index score is greater than 1.25

Connections to Performance Measures within CZMA PMS
The coastal habitat index in each region may provide context for following performance measures:

- Number of acres of key coastal habitats a) created or b) restored using CZM funds
- Number of acres of key coastal habitats protected by acquisition or easement using CZM funds
- Number of acres of key coastal habitats lost or gained due to core CZM regulatory (including mitigation) programs

Water-use in coastal counties and states

Description
This indicator provides information on water-use (total freshwater withdrawals) in coastal counties and states.

Importance
The majority of the nation's population is concentrated in coastal areas, and population in many of these areas is expected to increase. This projected growth will not only intensify localized pressure on water resources for public consumption, but also ultimately increase freshwater demand upstream for agricultural purposes. The competition for freshwater resources is increasingly of concern to planners and policy makers. The impact of increased use of water for agriculture/irrigation upstream translates into a decrease in the quality and quantity of freshwater river flow, affecting both downstream municipal and industrial supplies and aquatic ecosystem functioning.

The U.S. Geological Survey (USGS) compiles data on the amount of water used in homes, businesses, industries, and on farms throughout the United States. They have done so at five year intervals since 1950. In 2000, the coastal states of California, Texas, and Florida accounted for one-fourth of all such water withdrawals. Water-use data, or freshwater demand, in combination with other contextual and performance measure data, will facilitate a greater understanding of the effects of human activity on the Nation's freshwater resources.

Data
Source Description
The United States Geological Service (USGS) is charged with providing water information that benefits the Nation's citizens. The USGS' National Water-Use Information Program is responsible for compiling and disseminating the nation's water-use data. The USGS works in cooperation with local, State, and Federal environmental agencies to collect water-use information at a site-specific level. The USGS also compiles the data from these sites to produce water-use information aggregated at the county, state, and national levels. Every five years, the USGS compiles data at the state level into a national water-use data system, publishes a national circular, and makes the data available on the USGS website (http://water.usgs.gov). Data are available electronically for the United States, the District of Columbia, Puerto Rico and the U.S. Virgin Islands starting in 1985; national circulars are available in pdf format starting with 1950.

Source Reference
United States Geological Survey. Estimated Use of Water in the United States County-Level Data for 2000. http://water.usgs.gov/watuse/data/2000/index.html

Hutson, S.S., Barber, N.L., Kenny, J.F., Linsey, K.S., Lumia, D.S., and Maupin, M.A., 2004, Estimated use of water in the United States in 2000: Reston, Va., U.S. Geological Survey Circular 1268, 46 p.

Methods and Analysis
The USGS Water-Use Information Program compiled water-use estimates by county for the United States, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. All States collected data for public supply, domestic, irrigation, industrial, and thermoelectric power water use. Data used in this analysis included total withdrawals, fresh, in millions cubic gallons per day. The USGS provides

county level data using the Federal Information Processing Standard (FIPS) code. For the purposes of this report, OCRM matched these codes with in-house lists of coastal county names and removed data for non-coastal counties. OCRM also converted million cubic gallons per day to million cubic meters per day using the conversion factor provide by USGS. Additional caveats of the data collection and reporting can be found in *Estimated use of water in the United States in 2000* (2004).

Connections to Performance Measures within CZMA PMS

Measuring the water-use characteristics in coastal counties and states may provide context for the following performance measures:

- Number of capacity building activities in coastal watersheds conducted using CZM funds to improve, safeguard, and restore the quality of coastal waters, by category
- Number of coastal communities that have been recognized for growth management efforts through national or state award programs
- Number of acres of key coastal habitat a) created and restored and b) protected through acquisition or easement by the State.

Water Quality Index

Description
This indicator is based on five common water quality measurements: dissolved inorganic nitrogen, dissolved inorganic phosphorus, chlorophyll-*a*, dissolved oxygen, and water clarity.

Importance
Coastal waters are valuable resources, providing society with food, recreational opportunities, commerce pathways, and solace. Healthy coastal ecosystems, home to numerous marine and estuarine species, require good water quality. Currently in the United States, nonpoint source pollution poses the greatest threat to coastal water quality. Nonpoint pollution is a result of rain water or snow melt washing over impervious surfaces such as roads, or over agricultural fields or suburban lawns. This runoff picks up pollutants such as salt, gasoline, and fertilizers, along the way, transporting them into coastal waterways. Nonpoint source pollution has been linked to loss of aquatic species diversity and abundance, algal blooms, and hypoxia, as well as beach and shellfish bed closures.

This index provides a fairly broad look at water quality conditions. The individual indicators—dissolved inorganic nitrogen, dissolved inorganic phosphorus, chlorophyll-*a*, dissolved oxygen, and water clarity—illustrate the water quality parameters that are commonly affected by anthropogenic pollution. Nutrients, such as nitrogen and phosphorus, are essential for healthy, functioning estuarine and coastal ecosystems. However, the excessive amounts that enter coastal waterways from various point and nonpoint sources can severely impair water quality. Excess nutrients fuel larger phytoplankton blooms, measured via chlorophyll-*a* concentration, which in turn compromise water clarity and lead to low dissolved oxygen concentrations. Water clarity, or the ability for light to penetrate surface waters, is important for healthy submerged aquatic vegetation as well as the overall productivity of coastal ecosystems. Low levels of dissolved oxygen (hypoxia), which often result from the decomposition of phytoplankton blooms, are stressful to many aquatic species. Using these indicators, and the criteria described below, the water quality index is able to characterize regions that exhibit severely degraded water quality conditions.

Data
Source Description
The National Coastal Condition Report (NCCR) is developed and published via a collaborative effort of the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior (DOI), and the U.S. Department of Agriculture (USDA). The agencies involved in this project chose to assess the national coastal condition using monitoring surveys that were consistent on the national level in order to minimize the problems created by compiling data collected using multiple approaches. This assessment occurs periodically, and the results are then published in a NCCR. The purpose of the NCCR is to present a broad baseline picture of the condition of estuaries across the United States. To date, there have been two such reports. The first (NCCR I) was published in 2001, using available data from 1990 to 1996; the second (NCCR II) was published in 2004, using available data from 1997 to 2000. Agencies contributing data included EPA, NOAA, USDA, the U.S. Fish and Wildlife Service, and the U.S. Geological Service. Several state, regional, and local organizations also provided information.

The NCCR (I and II) focuses only on estuarine areas for which nationally consistent and comparable data are available. For most indicators, this means the conterminous 48 states (NCCR I and II) and

Puerto Rico (NCCR II). Data for Alaska and Hawaii have been included in some analyses. Coastal conditions in the NCCR II are reported nationally and by region. Regions are described in the Overview of Methods section.

Source Reference
United States Environmental Protection Agency. National Coastal Condition Report II. EPA-620/R-03/002. December 2004. http://www.epa.gov/owow/oceans/nccr2/

Methods and Analysis
The water quality index is made up of five indicators: dissolved inorganic nitrogen (DIN), dissolved inorganic phosphorus (DIP), chlorophyll-*a*, water clarity and dissolved oxygen. For the NCCR II, DIN and DIP were determined via chemical analysis of surface water at each site using samples collected in late summer. (It should be noted that this is generally not a time at which peak concentrations are observed due to uptake of nutrients by phytoplankton populations throughout the spring and summer.) Chlorophyll-*a* concentrations were determined from filtered surface water collected at each site. The water clarity indicator (WCI) is based on a ratio of observed clarity at 1 meter to regional reference condition at 1 meter. Regional reference conditions were determined via available data. Dissolved oxygen data were collected through EPA's National Coastal Assessment Program. Criteria for ranking individual indicator condition (good, fair, poor) are specific to coastal region, and can be found in the NCCR II.

Using the individual indicator information available for a given site, the water quality index was determined based on the following criteria:

Index Rating	**Criteria**
Good	A maximum of one indicator is fair, and no indicators are poor.
Fair	One of the indicators is rated poor, or two or more indicators are rated fair.
Poor	Two or more of the indicators are rated poor.
Missing	Two components of the index are missing and the available indicators do not suggest a fair or poor rating.

This index is intended to characterize only severely degraded water quality conditions, not identify sites experiencing occasional nutrient enrichment, hypoxia or decreased water clarity.

Connections to Performance Measures within CZMA PMS
The water quality index may provide context for the following performance measures:

- Number of dollars spent on activities to manage coastal development to improve, safeguard, and restore the quality of coastal waters
- Number of capacity building activities in coastal watersheds to improve, safeguard, and restore the quality of coastal waters

Sediment Quality Index

Description
This index is based on three indicators of sediment condition: sediment toxicity, sediment contaminants and sediment total organic carbon concentration.

Importance
Sediment quality is critical to the health of many coastal and estuarine organisms. Unfortunately, the contamination of coastal and estuarine sediments is also a common problem, and one that can pose a threat to whole ecosystem functioning. Sediment conditions can be compromised by a variety of factors, mostly anthropogenic, such as chemical enrichment from polluted runoff. Sediment contamination in coastal systems is of particular concern, as metals and organic substances (i.e. PCBs and pesticides) that are discharged into estuaries often adsorb and accumulate there. These contaminants are not only potentially toxic to benthic communities, but also may bioaccumulate and threaten the health of organisms all the way up the food chain.

Data
Source Description
The National Coastal Condition Report (NCCR) is developed and published via a collaborative effort of the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior (DOI), and the U.S. Department of Agriculture (USDA). The agencies involved in this project chose to assess the national coastal condition using monitoring surveys that were consistent on the national level in order to minimize the problems created by compiling data collected using multiple approaches. This assessment occurs periodically, and the results are then published in a NCCR. The purpose of the NCCR is to present a broad baseline picture of the condition of estuaries across the United States. To date, there have been two such reports. The first (NCCR I) was published in 2001, using available data from 1990 to 1996; the second (NCCR II) was published in 2004, using available data from 1997 to 2000. Agencies contributing data included EPA, NOAA, USDA, the U.S. Fish and Wildlife Service, and the U.S. Geological Service. Several state, regional, and local organizations also provided information.

The NCCR (I and II) focuses only on estuarine areas for which nationally consistent and comparable data are available. For most indicators, this means the conterminous 48 states (NCCR I and II) and Puerto Rico (NCCR II). Data for Alaska and Hawaii have been included in some analyses. Coastal conditions in the NCCR II are reported nationally and by region. Regions are described in the Overview of Methods section.

Source Reference
United States Environmental Protection Agency. National Coastal Condition Report II. EPA-620/R-03/002. December 2004.
http://www.epa.gov/owow/oceans/nccr2/

Methods and Analysis
The sediment quality index is determined via three indicators: sediment toxicity, sediment contaminants, and sediment total organic carbon (TOC). Toxicity is measured via a direct test to determine the survival of amphipods exposed to sediments (from each estuarine sample site) for ten days under laboratory conditions. Survival is measured relative to that occurring in a reference sediment. Sediment contamination is determined using criteria as described by the Effects Range

Median (ERM) and Effects Range Low (ERL) specific to each contaminant measured, as published in toxicity literature. Sediment TOC is determined at each site as a percentage based on the dry weight concentration from a sample. Criteria for ranking individual indicator condition (good, fair, poor) are specific to coastal region, and can be found in the NCCR II.

The sediment quality index for each site is then calculated based on these three indicators. Criteria for site index rating is as follows:

Index Rating	**Criteria**
Good	All three indices are at levels that would be unlikely to result in adverse biological effects due to sediment quality.
Fair	The sediment contaminants indicator is ranked fair.
Poor	Any one of the elements is categorized as poor; high potential for exposure effects on biota.

The regional sediment quality index was rated using the criteria below:

Index Rating	**Criteria**
Good	Less than 5% of coastal sediments are in poor condition, and less than 50% of coastal sediments are in combined poor and fair condition.
Fair	5% to 15% of coastal sediments are in poor condition, or more than 50% of coastal sediments are in combined poor and fair condition.
Poor	More than 15% of coastal sediments are in poor condition.

Connections to Performance Measures within CZMA PMS

The benthic index may provide context for the following performance measures:

- Number of dollars spent on activities to manage coastal development to improve, safeguard, and restore the quality of coastal waters
- Number of capacity building activities in coastal watersheds to improve, safeguard, and restore the quality of coastal waters

Benthic Index

Description
This indicator is based on benthic community diversity, and the abundance of pollution-tolerant and pollution-sensitive species present in a region.

Importance
Benthic macroinvertebrates are the organisms that inhabit the bottom substrates of aquatic systems. Healthy benthos are integral to maintaining sediment and water quality, and are an important food source for other coastal and estuarine organisms. Benthic organisms are also generally immobile, and are thus good indicators of their environments. The overall health of the benthos, their population size and community diversity, is a good indicator of habitat stressors such as hypoxia, salinity fluctuations and aquatic contaminants.

Data
Source Description
The National Coastal Condition Report (NCCR) is developed and published via a collaborative effort of the U.S. Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior (DOI), and the U.S. Department of Agriculture (USDA). The agencies involved in this project chose to assess the national coastal condition using monitoring surveys that were consistent on the national level in order to minimize the problems created by compiling data collected using multiple approaches. This assessment occurs periodically, and the results are then published in a NCCR. The purpose of the NCCR is to present a broad baseline picture of the condition of estuaries across the United States. To date, there have been two such reports. The first (NCCR I) was published in 2001, using available data from 1990 to 1996; the second (NCCR II) was published in 2004, using available data from 1997 to 2000. Agencies contributing data included EPA, NOAA, USDA, the U.S. Fish and Wildlife Service, and the U.S. Geological Service. Several state, regional, and local organizations also provided information.

The NCCR (I and II) focuses only on estuarine areas for which nationally consistent and comparable data are available. For most indicators, this means the conterminous 48 states (NCCR I and II) and Puerto Rico (NCCR II). Data for Alaska and Hawaii have been included in some analyses. Coastal conditions in the NCCR II are reported nationally and by region. Regions are described in the Overview of Methods section.

Source Reference
United States Environmental Protection Agency. National Coastal Condition Report II. EPA-620/R-03/002. December 2004. http://www.epa.gov/owow/oceans/nccr2/

Methods and Analysis
Regional benthic indices were developed by EPA's Environmental Monitoring and Assessment Program and National Coastal Assessment. The indices reflect changes in diversity and population size of indicator species to distinguish degraded benthic habitats from undegraded ones. (See the NCCR II for references.) In general, a high benthic index reflects benthos samples that contain a wide variety of species, with a lower number of pollution tolerant species and a higher number of pollution sensitive species. The criteria used to rank an index (good, fair or poor) are region-specific, as the potential species assemblages depend on the region-specific prevailing environmental conditions. Criteria are as follows:

Area	Good	Fair	Poor
Northeast	Benthic index > 0.0	N/A	Benthic index < 0.0
Southeast	Benthic index > 2.5	Benthic index between 2.0 and 2.5	Benthic index < 2.0
Gulf	Benthic index > 5.0	Benthic index between 3.0 and 5.0	Benthic index < 3.0

Note that not all regions have developed benthic indices. The NCCR II does not include indices for the West Coast, Puerto Rico, Alaska and Hawaii. Benthic community diversity, and its relationship to natural conditions in the region, was used as a surrogate for these states in the NCCR II. See the document for additional information and a description of criteria used in those cases.

Connections to Performance Measures within CZMA PMS

The benthic index may provide context for the following performance measures:

- Number of dollars spent on activities to manage coastal development to improve, safeguard, and restore the quality of coastal waters
- Number of capacity building activities in coastal watersheds to improve, safeguard, and restore the quality of coastal waters

Proportion of Federal Disaster Declarations occurring in coastal areas

Description
This indicator compares the annual sum of Federal Major Disaster Declarations declared in coastal states and territories to the annual sum of all Federal Major Disaster Declarations.

Importance
Coastal areas are vulnerable to a variety of hazards ranging from tornadoes, wildfires, and storms to hazards endemic to the coast such as hurricanes, tropical storms, tidal surge, and tidal waves. State governments request a Major Disaster Declaration from the President when any of these or other hazards cause damage that warrants federal aid.

The majority of the nation's population is concentrated in coastal areas, and population in many coastal areas is expected in increase. Measuring the proportion of Federal Disaster Declarations in coastal areas reveals the concentration of disastrous events in coastal areas and may help to inform allocation of emergency management resources.

Data
Source Description
The Federal Emergency Management Agency (FEMA) is charged with preparing the nation for all hazards, and managing the federal response and recovery efforts following a national emergency. At its Web site (www.fema.gov), FEMA provides the capability to search all Major Disaster Declarations, Emergency Declarations, and Fire Management Assistance Declarations by year or by state. Declaration information is available from 1953 to present, and the Web site is continually updated to provide nearly real-time data.

Source Reference
Federal Emergency Management Agency. *Declared Disasters by Year or State*. http://www.fema.gov/news/disaster_totals_annual.fema.

Methods and Analysis
Major Disaster Declarations are evaluated for each of the past three completed calendar years. Annual Major Disaster Declarations in all coastal states, including the Great Lakes states, and all coastal territories, including Puerto Rico, American Samoa, Guam, Commonwealth of the Northern Mariana Islands, U.S. Virgin Islands, and the Federated States of Micronesia are totaled. These totals are then compared to annual totals of all Major Disaster Declarations occurring in the same year to yield the national proportion of Federal Disaster Declarations occurring in coastal areas.

Connections to Performance Measures within CZMA PMS
Measuring the proportion of Federal Disaster Declarations occurring in coastal areas may provide context for performance measures in the Coastal Hazards category, such as:

- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce future damage from hazards and b) implemented educational programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of educational programs or campaigns to raise public awareness of coastal hazards implemented using CZM funds

Proportion of coastal Federal Disaster Declarations that are directly related to coastal hazards

Description
This indicator compares the annual sum of coastal Federal Major Disaster Declarations caused by coastal hazards to the annual sum of all coastal Federal Major Disaster Declarations.

Importance
Coastal areas are vulnerable to a variety of hazards ranging from tornadoes, wildfires, and storms to hazards endemic to the coast such as hurricanes, tropical storms, tidal surge, and tidal waves. State governments request a Major Disaster Declaration from the President when any of these or other hazards cause damage that warrants federal aid.

The majority of the nation's population is concentrated in coastal areas, and population in many coastal areas is expected to increase. Measuring the proportion of coastal Federal Disaster Declarations directly attributable to coastal hazards reveals how frequently disasters in coastal areas are caused by events endemic to the coast.

Data
Source Description
The Federal Emergency Management Agency (FEMA) is charged with preparing the nation for all hazards, and managing the federal response and recovery efforts following a national emergency. At its Web site (www.fema.gov), FEMA provides the capability to search all Major Disaster Declarations, Emergency Declarations, and Fire Management Assistance Declarations by year or by state. Declaration information is available from 1953 to present, and the Web site is continually updated to provide nearly real-time data.

Source Reference
Federal Emergency Management Agency. *Declared Disasters by Year or State*. http://www.fema.gov/news/disaster_totals_annual.fema.

Methods and Analysis
Major Disaster Declarations are evaluated for each of the past three completed calendar years. For all coastal states, including the Great Lakes states, and all coastal territories, including Puerto Rico, American Samoa, Guam, Commonwealth of the Northern Mariana Islands, U.S. Virgin Islands, and the Federated States of Micronesia, Major Disaster Declarations directly attributable to coastal hazards are totaled. Declarations are deemed directly attributable to coastal hazards if their titles include explicit reference to exclusively coastal events (tidal surges, typhoons, hurricanes, tropical storms, tropical cyclones, tropical depressions, high surf, storm surges, and super typhoons). These totals are then compared to annual totals of all Major Disaster Declarations occurring in the same locations and years to yield the national proportion of coastal Federal Disaster Declarations that are directly related to coastal hazards.

Connections to Performance Measures within CZMA PMS
Measuring the proportion of coastal Federal Disaster Declarations that are directly related to coastal hazards may provide context for performance measures in the Coastal Hazards category, such as:

- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce

future damage from hazards and b) implemented educational programs or campaigns to raise public awareness of coastal hazards using CZM funds

- Number of educational programs or campaigns to raise public awareness of coastal hazards implemented using CZM funds

Total estimated cost of all billion-dollar weather disasters related to coastal hazards

Description
This indicator presents estimated annual costs of billion-dollar Federal Major Disaster Declarations caused by coastal hazards.

Importance
Coastal areas are vulnerable to a variety of hazards ranging from tornadoes, wildfires, and storms to hazards endemic to the coast such as hurricanes, tropical storms, tidal surge, and tidal waves. State governments request a Major Disaster Declaration from the President when any of these or other hazards cause damage that warrants federal aid.

The majority of the nation's population is concentrated in coastal areas, and population in many coastal areas is expected to increase. As these increases occur, the costs of major coastal disaster events are likely to become greater. Measuring the total estimated cost of all billion-dollar weather disasters related to coastal hazards helps to quantify the damage incurred through the most catastrophic coastal hazard disasters.

Data
Source Description
The National Climactic Data Center (NCDC) is the world's largest active archive of weather data, producing numerous climate publications and responding to data requests from all over the world. Because no single government agency is responsible for collecting data specifically on damage and fatality associated with weather events, the NCDC compiles such statistics annually for all weather disasters with estimated costs greater than 1 billion dollars. Data are available from 1980 onward. The data is available online at the NCDC Web site (http://www.ncdc.noaa.gov/oa/ncdc.html), and data from 1980-2005 is available in a 2006 conference paper authored by NCDC.

The statistics presented in the NCDC report are estimations derived from a variety of sources. Methods used to derive the estimates are described briefly at the Web site and are detailed in the 2006 conference paper. Additionally, as noted above, the analysis includes only those disasters with estimated costs of 1 billion dollars or more. As such, the report does not provide estimated costs for *all* coastal disasters resulting from coastal hazards occurring in a given year.

Source Reference
National Climatic Data Center. *Billion Dollar U.S. Weather Disasters*. http://www.ncdc.noaa.gov/oa/reports/billionz.html.

Lott, N., and T. Ross. 2006. "Tracking and Evaluating U.S. Billion Dollar Weather Disasters, 1980-2005." Prepared for the 2006 meeting of the American Meteorological Society. Also available online at http://www1.ncdc.noaa.gov/pub/data/papers/200686ams1.2nlfree.pdf.

Methods and Analysis
Disaster costs are evaluated for each of the past three completed calendar years. Billion-dollar disaster declarations are deemed directly attributable to coastal hazards if their titles include explicit reference to exclusively coastal events (tidal surges, typhoons, hurricanes, tropical storms, tropical cyclones,

tropical depressions, high surf, storm surges, and super typhoons). Estimated costs of billion-dollar disasters attributable to coastal hazards are summed to produce estimated annual costs of billion-dollar weather disasters related to coastal hazards.

Connections to Performance Measures within CZMA PMS

Measuring the annual estimated cost of all billion-dollar weather disasters related to coastal hazards may provide context for performance measures in the Coastal Hazards category, such as:

- Number of communities in hazardous coastal areas that have a) undertaken activities to reduce future damage from hazards and b) implemented educational programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of educational programs or campaigns to raise public awareness of coastal hazards implemented using CZM funds

Percent land cover change in coastal areas

Description
This indicator compares annual statistics on multiple categories of coastal land cover to statistics from previous years.

Importance
As land along the nation's coasts becomes more densely populated, it is often converted from its natural state for residential, commercial, and industrial uses. These types of land uses usually lead to increased impervious surface coverage. Impervious surfaces reduce the absorptive capability of land and contribute to non-point source pollution. Additionally, more intensive use of coastal areas near beaches and marshes may decrease amounts of coastal habitat and lessen the ability of those areas to mitigate coastal hazards like storms and flooding.

Data
Source Description
The NOAA Coastal Services Center (CSC) provides a nationally standardized database of land cover and change information for the coastal regions of the U.S. as part of its Coastal Change Analysis Program (C-CAP). As described at its Web site (http://www.csc.noaa.gov/crs/lca/ccap.html), C-CAP products inventory coastal intertidal areas, wetlands, and adjacent uplands with the goal of monitoring changes in these habitats on a five-year cycle (i.e. 1996, 2001, 2006). C-CAP products are developed using remotely sensed imagery, and provide quantitative data for multiple categories of coastal land cover. Land cover data for specific states or pre-defined regions can be downloaded directly from the Web site, or site users can query C-CAP data for a user-defined region using a map server feature.

Data limitations and caveats
There are two important caveats on C-CAP data. As mentioned above, the C-CAP currently defines its own U.S. regions, and these regions do not correlate with the regional definitions of OCRM's Coastal Programs Division. C-CAP data must thus be collected on a state basis and re-aggregated into regions for purposes of the CZMAPMS. Additionally, C-CAP data is not yet available for all coastal states and regions. Complete national data for 1996 and 2001 is expected to be completed in summer 2007.

Source Reference
National Oceanic and Atmospheric Administration Coastal Services Center. 2006. *NOAA Coastal Change Analysis Program*. http://www.csc.noaa.gov/crs/lca/ccap.html.

Methods and Analysis
All available state data are aggregated into regions as defined by NOAA OCRM's Coastal Programs Division. Land cover data for each of the C-CAP land cover categories are totaled. Land cover category data for the most recent available year is then compared the next most recent year to develop a regional percent increase or decrease in the respective land cover category. Percentages of change are presented primarily through charts and other figures.

Connections to Performance Measures within CZMA PMS
Measuring the percent land cover change in coastal areas may provide context for performance measures in the water quality, coastal habitats, and coastal dependent uses and community development categories, such as:

- Percent of coastal watersheds enhanced through CZM funded capacity-building activities
- Number of acres of key coastal habitats a) created or b) restored using CZM funds
- Number of coastal communities supported by CZM funds in a) developing and implementing local plans that incorporate growth management principles and b) port or waterfront redevelopment projects

Deleted Contextual Indicators - *Data not available over time*

Land area vulnerable to sea level rise

Description
This indicator provides estimates of the area of coastal land that falls within elevations close to sea level.

Importance
Sea level rise has been widely documented and is one of the most monumental issues facing coastal managers today. Predictions on and illustrations of sea level rise, however, vary dramatically and make it difficult for policy makers to gain traction in proactively addressing this long-term issue. Additionally, public perceptions on and understanding of climate change and sea level rise are quite variable. Coastal managers and policy makers are searching for data, and illustrations of that data, that can help communicate sea level rise and broader climate change issues.

Data
Source Description
Climate Research is an academic journal addressing all aspects of the interactions of climate with organisms, ecosystems and human societies. In 2001, the journal published original estimates of land area falling within 1.5 m. and 3.5 m. of sea level, authored by scientists within the U.S. Environmental Protection Agency's (EPA) Office of Atmospheric Programs. The study includes data only for the Atlantic and Gulf U.S. coasts. The Pacific and Arctic coasts are omitted for three reasons provided by the authors: 1) Elevation data for those areas is poor; 2) the Atlantic and Gulf coasts account for 95% of the land within one meter of mean high water (EPA 1989); and 3) except Hawaii, hurricanes and other storm surges are rare in the developed areas. The specific methods used to derive the land area estimations presented in the research are detailed in the manuscript. ***There do not appear to be plans to update these estimates.***

Source Reference
Titus, J. G. and C. Richman. 2001. "Maps of lands vulnerable to sea level rise: modeled elevations along the US Atlantic and Gulf coasts." *Climate Research* 18: 205-228. Also available online at http://www.int-res.com/articles/cr/18/c018p205.pdf.

A pre-publication, public version of the journal article is available online at the EPA Web site at http://www.epa.gov/climatechange/effects/downloads/maps.pdf.

Methods and Analysis
Table 3 of both the original journal article and the public article provide the quantitative data used for this indicator. Data for area with elevation where 0 < Elevation < 1.5 m. as well as area with elevation where 1.5 m. < Elevation < 3.5 m. are presented in the indicator. For those states in Table 3 that have values under the "With edit" heading, those values are used. For states without "With edit" values in Table 3, values under the "With NOAA" heading are used. State data are aggregated into NOAA OCRM regions to present regional totals.

Results

Table: Amounts (km^2) of Low Land on Gulf and East Coasts

Geographic Area	0 < Elevation < 1.5 m	1.5 m < Elevation < 3.5 m
Connecticut	63.0	48.6
Maine	382.9	176.1
Massachusetts	364.7	375.0
New Hampshire	42.4	20.0
New York	239.9	265.8
Rhode Island	121.9	61.7
Northeast Region Total	**1214.8**	**947.2**
Delaware	387.8	172.0
District of Columbia	1.5	4.0
Maryland	1547.1	806.1
New Jersey	1083.0	637.8
Pennsylvania	2.5	2.5
Virginia	968.5	1041.4
Mid-Atlantic Region Total	**3990.4**	**2663.8**
Florida	12250.8	12742.9
Georgia	1742.6	1078.3
North Carolina	5835.9	3864.6
South Carolina	2333.7	2401.7
Southeast Region Total	**22163**	**20087.5**
Alabama	194.7	354.6
Louisiana	24724.7	4345.2
Mississippi	173.2	824.1
Texas	5177.7	4213.2
Gulf of Mexico Region Total	**30270.3**	**9737.1**
National Total	**57638.5**	**33435.6**

Connections to Performance Measures within CZMA PMS

Measuring the land area vulnerable to sea level rise may provide context for many performance measures in the Coastal Hazards category, such as:

- Number of communities in hazardous areas that have a) undertaken activities to reduce future damage from hazards and b) implemented educational programs or campaigns to raise public awareness of coastal hazards using CZM funds
- Number of educational programs or campaigns to raise public awareness of coastal hazards implemented using CZM funds

Deleted Contextual Indicators - *Data not available*

Percent of waterbodies impaired in the coastal zone
Knowledge of the percent of waterbodies impaired in the coastal zone would have provided contextual information for water quality and coastal habitat performance measures. Impaired waterbpodies would have been defined as those waterbodies listed under Section 303(d) of the Clean Water Act (CWA) as impaired due, at least in part, to nonpoint source pollution. The percent would have been calculated as: impaired waterbodies divided by total waterbodies. However, OCRM was unable to complete this calculation with the available data, as the total number of waterbodies in the coastal zone is unknown. Data collected per the CWA Section 303(d) would only provide the number of waterbodies assessed. This number likely differs significantly from the total number of waterbodies, because those assessed would be those already assumed to be impaired. A potential surrogate contextual indicator is the water quality index, although this indicator does not directly link poor water quality to nonpoint source pollution.

Total federal dollars spent on coastal water quality activities
This indicator was to provide information on the dollars provided by all federal agencies to states to fund coastal water quality activities. However, OCRM was unable to obtain an accurate estimate of total federal dollars spent specifically on coastal, as opposed to general, water quality issues. Therefore, this indicator will not be collected. Funding for water quality initiatives funded via CZM programs will be captured as a performance measure.

Population and Land Area in FEMA V-Zone
The Federal Emergency Management Agency (FEMA) administers the nation's National Flood Insurance Program (NFIP), which provides flood insurance coverage for those homeowners living in flood-prone areas. Through the NFIP, FEMA defines many different flood zones according to the flood risk in a particular area. V-Zones are defined as high-risk coastal areas subject to flooding and the additional hazard of storm waves. Monitoring the population and area in FEMA V-Zones would help coastal and emergency managers understand the extent of life and land existing in these areas that are highly vulnerable to coastal flooding and wave action.

At the request of both the NOAA Coastal Services Center and the National Academy of Sciences, FEMA prepared statistics on population and land area in V-Zones. These statistics, however, have not yet been peer reviewed or published and are therefore currently unavailable for inclusion as contextual indicator data.

Percent change in impervious surface coverage in coastal areas
All states and territories participating in the CZM Program are charged with implementing measures to control non-point source pollution from six primary sources: forestry, agriculture, urban areas, marinas, hydromodification (shoreline and stream channel modification), and wetlands and vegetated shorelines, or riparian areas. Measuring the percent change in impervious surface coverage in coastal areas would help illustrate changes in land use and potentially help to explain water quality conditions in coastal waters.

Measurements of impervious surface coverage in an area are generally achieved by first assessing the types and amounts of land cover present, then developing impervious cover coefficients for those land

cover categories. The coefficients essentially describe what proportion of land in a given land cover category is covered with impervious surface.

Comprehensive national datasets on coastal impervious surface coverage are not available at this time. Although national datasets on coastal land cover exist, such as the NOAA Coastal Services Center's Coastal Change Analysis Program (C-CAP) data, the necessary national level impervious surface coverage coefficients are nonexistent, and furthermore, may yield inaccurate results. Impervious surface coverage is typically calculated on a smaller scale, so development of reliable national impervious surface cover estimates would require acquisition of localized impervious surface cover coefficients for all coastal areas.

Contextual Indicator Results and Updates

Contextual indicator data can be found on the OCRM website at www.coastalmanagement.com/success. Depending on the availability of data from the original data source, data results are available at the national, regional, and/or state level. Contextual indicator data on the website will be updated periodically to reflect more recent data as released by the original data source. The table below shows how often each indicator will be updated, when the next update will occur, and who is responsible for updating the original data source.

Indicator	How often updated?	Next update?	Who will update?
Percent change in population of coastal counties	Every 10 years	2010	U.S. Census
Current estimated population in coastal counties	Every year	2007 (for 2006 data)	U.S. Census
Proportion of national population in coastal counties	Every 10 years	2010	U.S. Census
Population density in coastal counties	Every 10 years	2010	U.S. Census
Percent change in value of coastal tourism and recreation	Periodically	2007/2008	National Ocean Economics Program
Percent of national economy attributable to coastal counties	Every year (states and territories)	2007 (for 2004 data)	National Ocean Economics Project
Percent of national employment attributable to coastal counties	Every year (states); Every 5 years (territories)	2007 (for 2004 state data)	National Ocean Economics Project; Bureau of Labor Statistics
Percent of employment in coastal counties dependent on coastal and ocean resources	Every year (states)	2007 (for 2004 data)	National Ocean Economics Program
Number of businesses in coastal counties dependent on coastal and ocean resources	Every year (states)	2007 (for 2004 data)	National Ocean Economics Program
Number of invasive species identified in coastal watersheds	Continuously	2007	U.S. Geological Survey (states) IUCN (territories)
Coastal habitat index	Periodically		Environmental Protection Agency
Water use in coastal counties and states	Every five years	2010	U.S. Geological Survey
Water quality index	Periodically		Environmental Protection Agency
Sediment quality index	Periodically		Environmental Protection Agency
Benthic index	Periodically		Environmental Protection Agency

Proportion of Federal Disaster Declarations occurring in coastal areas	Annually	2007	Federal Emergency Management Agency
Proportion of coastal Federal Disaster Declarations that are directly related to coastal hazards	Annually	2007	Federal Emergency Management Agency
Total estimated cost of all billion-dollar weather disasters related to coastal hazards	Annually	2007	Federal Emergency Management Agency
Percent land cover change in coastal areas	Every 5 years	2007 (for national 2006 data)	Coastal Change Analysis Program, NOAA CSC

Appendix A
List of Coastal Counties

State	CZM Coastal Counties	
Alabama	Baldwin	
	Mobile	
Alaska	Aleutians East	Matanuska Susitna
	Aleutians West	Nome
	Anchorage Borough	North Slope Borough
	Bethel Census Area	Northwest Arctic
	Bristol Bay Borough	Prince of Wales
	Dillingham Census Area	Sitka
	Haines Borough	Shagway-Yakutat
	Juneau Borough	Valdez-Cordova
	Kenai Peninsula	Wade Hampton
	Ketchikan	Wrangell-Petersburg
	Kodiak Island Borough	Yukon-Koyukuk
	Lake and Peninsula	
California	Alameda	San Diego
	Contra Costa	San Francisco
	Del Norte	San Luis Obispo
	Humboldt	San Mateo
	Los Angeles	Santa Barbara
	Marin	Santa Clara
	Mendocino	Santa Cruz
	Monterey	Solana
	Napa	Sonoma
	Orange	Ventura
Connecticut	Fairfield	New Haven
	Middlesex	New London
Delaware	Kent	Sussex
	New Castle	
Florida	Alachua*	Lee
	Baker*	Leon
	Bay	Levy
	Bradford	Liberty
	Brevard*	Madison
	Broward*	Manatee
	Calhoun	Marion
	Charlotte	Martin*
	Citrus	Miami-Dade*
	Clay*	Monroe
	Collier	Nassau*

	Columbia	Okaloosa
	DeSoto	Okeechobee*
	Dixie	Orange*
	Duval*	Osceola*
	Escambia	Palm Beach*
	Flagler*	Pasco
	Franklin	Pinellas
	Gadsden	Polk
	Gilchrest	Putnam*
	Glades	Santa Rosa
	Gulf	Sarasota
	Hamilton	Seminole*
	Hardee	St. Johns*
	Hendry	St. Lucie*
	Hernando	Sumter
	Highlands	Suwannee
	Hillsborough	Taylor
	Holmes	Union
	Indian River*	Volusia*
	Jackson	Wakulla
	Jefferson	Walton
	Lafayette	Washington
	Lake	
	** - Southeast Counties. All others are Gulf of Mexico.*	
Georgia	Brantley	Glynn
	Bryan	Liberty
	Camden	Long
	Charlton	McIntosh
	Chatham	Wayne
	Effingham	
Hawaii	Hawaii	Kauai
	Honolulu	Maui
	Kalawao	
Illinois	Cook	
	Lake	
Indiana	Lake	Porter
	LaPorte	
Louisiana	Assumption	St. Charles
	Calcasieu	St. James
	Cameron	St. John the Baptist
	Iberia	St. Martin
	Jefferson	St. Mary
	Lafourche	St. Tammany

	Livingston	Tangipoha
	Orleans	Terrebonne
	Plaquemines	Vermilion
	St. Bernard	
Maine	Cumberland	Penobscot
	Hancock	Sagadohoc
	Kennebec	Waldo
	Knox	Washington
	Lincoln	York
Maryland	Anne Arundel	Kent
	Baltimore	Prince Georges
	Baltimore City	Queen Anne
	Calvert	St. Mary
	Caroline	Somerset
	Cecil	Talbot
	Charles	Wicomico
	Dorchester	Worchester
	Harford	
Massachusetts	Barnstable	Nantucket
	Bristol	Norfolk
	Dukes	Plymouth
	Essex	Suffolk
	Middlesex	
Michigan	Alcona	Leelanau
	Alger	Luce
	Allegan	Mackinac
	Alpena	Macomb
	Antrim	Manistee
	Arenac	Marquette
	Baraga	Mason
	Bay	Menominee
	Benzie	Monroe
	Berrien	Muskegon
	Charlevoix	Ocena
	Cheboygan	Ontonagon
	Chippewa	Ottawa
	Delta	Presque Isle
	Emmet	St. Clair
	Gogebic	Sanilac
	Grand Traverse	Schoolcraft
	Houghton	Tuscola
	Huron	Vanburen
	Iosco	Wayne
	Keweenaw	

Minnesota	Carlton	Lake
	Cook	St. Louis
Mississippi	Hancock	Jackson
	Harrison	
New Hampshire	Rockingham	
	Strafford	
New Jersey	Atlantic	Mercer
	Bergen	Middlesex
	Burlington	Monmouth
	Camden	Ocean
	Cape May	Passaic
	Cumberland	Salem
	Essex	Somerset
	Gloucester	Union
	Hudson	
New York	Albany	Niagara*
	Bronx	Orange
	Cayuga*	Orleans*
	Chautauqua*	Oswego*
	Columbia	Putnam
	Dutchess	Queens
	Erie*	Rensselaer
	Franklin	Richmond
	Greene	Rockland
	Jefferson*	St. Lawrence*
	Kings	Suffolk
	Manhattan (New York County)	Ulster
	Monroe*	Wayne*
	Nassau	Westchester
	* - Great Lakes Counties. All others are Northeast	
North Carolina	Beaufort	Hertford
	Bertie	Hyde
	Brunswick	New Hanover
	Camden	Onslow
	Carteret	Pamlico
	Chowan	Pasquotank
	Craven	Pender
	Currituck	Perquimans
	Dare	Tyrrell
	Gates	Washington
Ohio	Ashtabula	Lucas

	Cuyahoga	Ottawa
	Erie	Sandusky
	Lake	Wood
	Lorain	
Oregon	Benton	Lane
	Clatsop	Lincoln
	Columbia	Polk
	Coos	Tillamook
	Curry	Washington
	Douglas	Yamhill
Pennsylvania	Bucks	Erie*
	Delaware	Philadelphia
	* - Great Lakes county. Others are Mid-Atlantic.	
Rhode Island	Bristol	Providence
	Kent	Washington
	Newport	
South Carolina	Beaufort	Dorchester
	Berkeley	Georgetown
	Charleston	Horry
	Colleton	Jasper
Texas	Aransas	Kleberg
	Brazoria	Liberty
	Calhoun	Matagorda
	Cameron	Nueces
	Chambers	Orange
	Galveston	Refugio
	Harris	San Patricio
	Jackson	Victoria
	Jefferson	Willacy
	Kenedy	
Virginia	Accomack	Mathews
	Alexandria City	Middlesex
	Arlington City	New Kent
	Caroline	Newport News
	Charles City	Norfolk City
	Chesapeake City	Northhampton
	Chesterfield	Northumberland
	Colonial Heights	Petersburgh
	Essex	Poquoson City
	Fairfax	Portsmouth
	Fredericksburg	Prince George
	Gloucester	Prince William

	Hampton	Richmond
	Hanover	Richmond City
	Henrico	Spotsylvania
	Hopewell City	Stafford
	Isle of Wight	Suffolk City
	James City	Surry
	King and Queen	Virginia Beach
	King George	Westmorland
	King William	Williamsburg
	Lancaster	York
Washington	Clallam	Pierce
	Greys Harbor	San Juan
	Island	Skagit
	Jefferson	Snohomish
	King	Thurston
	Kitsap	Wahkiakum
	Mason	Whatcom
	Pacific	
Wisconsin	Ashland	Manitowoc
	Bayfield	Marinette
	Brown	Milwaukee
	Door	Oconto
	Douglas	Ozaukee
	Iron	Racine
	Kenosha	Sheboygan
	Kewaunee	
American Samoa	American Samoa	
Guam	Guam	
Northern Mariana Islands	Northern Mariana Islands	
USVI	USVI	
Puerto Rico	Aguada	Juana Diaz
	Aguadilla	Lajas
	Anasco	Loiza
	Arecibo	Luquillo
	Arroyo	Manati
	Barceloneta	Maunabo
	Bayamon	Mayaguez
	Cabo Rojo	Naguabo
	Camuy	Patillas
	Carolina	Penuelas
	Catano	Ponce

	Ceiba	Quebradillas
	Coamo	Rincon
	Culebra	Rio Grande
	Dorado	Salinas
	Fajardo	San Juan
	Guanica	Toa Baja
	Guayama	Vega Alta
	Guayanilla	Vega Baja
	Guaynabo	Vieques
	Hatillo	Yabucoa
	Humacao	Yauco
	Isabela	

Appendix B
National Ocean Economics Program Markets Series Comparison

The comparison between the Coastal Economy and Ocean Economy used by the National Ocean Economic Program (NOEP) explains which sectors are included in each market series. Detailed information on each market series can be found on the NOEP website (http://noep.mbari.org/Market).

Coastal Economy

The coastal economy consists of all economic activities in the coastal region. Some of the Coastal Economy is the Ocean Economy but the Coastal Economy includes a broader set of economic activities. The Coastal Economy includes the following sectors, based on the NAICS codes:

Sectors
Construction
Education and Health Services
Financial Activities
Information
Leisure and Hospitality
Manufacturing
Natural Resources and Mining
Other Services
Professional and Business Services
Public Administration
Trade, Transportation, and Utilities

Ocean Economy

The Ocean Economy consists of all economic activity that derives all or part of its inputs from the ocean or Great Lakes. While most of the Ocean Economy is located in coastal areas, some activities (e.g. some boat building and seafood retailers) are located in non-coastal regions. Certain industries, in italics, are defined as ocean if establishments are located in near-shore zip codes. The Ocean Economy includes the following sectors and industries, based on NAICS codes:

Sectors	**Industries**
Construction	Marine Related Construction
Living Resources	Fish Hatcheries and Aquaculture Fishing Seafood Markets Seafood Processing
Minerals	*Limestone, Sand, and Gravel* *Oil and Gas Exploration and Production*
Ship and Boat Building	Boat Building and Repair Ship Building and Repair
Tourism and Recreation	*Amusement and Recreation Services* *Boat Dealers* *Eating and Drinking Places*

	Hotels and Lodging Places *Marinas* *Recreational Vehicle Parks and Campsites* *Scenic Water Tours* *Sporting Goods Retailers* *Zoos, Aquaria*
Transportation	Deep Sea Freight Transportation Marine Passenger Transportation Marine Transportation Services Service and Navigation Equipment *Warehousing*