Coastal Zone Management Act Performance Measurement System:

Contextual Indicators Manual

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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:

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Introduction

The Coastal Zone Management Act Performance Measurement System (CZMAPMS) measures national success of the Coastal Zone Management (CZM) Program and National Estuarine Research Reserve System (NERRS). The CZMAPMS consists of two components: 1) performance measures to assess how well programs are achieving the goals of the Coastal Zone Management Act (CZMA), and 2) a suite of contextual indicators to provide information on social, economic, and environmental factors influencing program actions. This document focuses on the contextual indicators within the CZMAPMS.

The contextual indicators are intended to complement and inform performance measurement data. 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 indicators were identified collaboratively during the development of the CZMAPMS by the NOAA Office of Ocean and Coastal Resource Management (OCRM) and representatives of state coastal management programs. Contextual indicator data is collected primarily by OCRM and the Coastal Services Center (CSC), with a subset collected by coastal management programs. Indicator data collected by OCRM comes from existing national data sources, and a report on the contextual indicators is produced annually to provide new data where available (see www.coastalmanagement.noaa.gov/success/indicators.html). Depending on the availability of data from the original data source, contextual indicator data are available at the national, regional, and/or state level.

Purpose of This Manual

The purpose of this manual is generally to describe the contextual indicators within the CZMAPMS and to document the original data sources and methods used by OCRM in reporting the indicator data. The manual is intended to help OCRM staff perform consistent data collection every year for reporting purposes, to provide CZMA programs and other audiences with the necessary information to access the original sources of contextual indicator data, and to serve as a general reference on social, economic, and environmental indicators. The manual is updated as needed, when new methods, sources of information, or contextual indicators are adopted.

The manual includes detailed information about the current contextual indicators. For each indicator, the manual discusses the following:

- What the indicator measures
- Why the indicator is important
- The indicator data, including the original source of the data used and the methods and analysis employed
- The indicator's connections to CZM Program performance measures within the CZMAPMS

The manual does not provide data on the current contextual indicators, as this information will be annually reported and released on the OCRM website at http://coastalmanagement.noaa.gov/success/indicators.html. 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 that are updated regularly, using consistent methodologies, so that changes are comparable over time. For the current suite of contextual indicators, the original data come from a variety of agencies and programs and are updated on different schedules, as illustrated in the "Quick Guide to Contextual Indicator Reporting" at the end of this document.

Drawing from these existing data sets, OCRM manipulates and presents the data at the geographical scale which provides the best context for the CZMA program performance measures, which is generally at the state coastal zone scale. In some cases, however, original data is not available at the county level and thus cannot be summed to the state coastal zone level. In these cases, data may be presented at a state, watershed, or regional scale.

The following provides information on the geographical scales at which OCRM collects contextual data, depending on the resolution of the original data source.

The Coastal Zone

For the purposes of this reporting, the coastal zone includes those counties that are wholly or partially within the boundaries of a state's approved coastal zone management program. For Illinois, which does not have an approved Coastal Zone Management Program at the time of this publication, those counties directly contacting the coast are deemed within the coastal zone. Four states include their 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 (http://coastalmanagement.noaa.gov/success/indicators.html). 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 reports refer to the 29 coastal states and 5 territories participating in the Coastal Zone Management Program, as well as the state of Illinois, which is pursuing participation in the program. For many of the contextual indicators, U.S. territory data were either not available or not comparable to other data and were thus not included in calculations. Information on which contextual indicators included data for the territories can be found within each indicator description.

Regional Delineations

Indicators reported at the regional level are reported according to the below regional delineation as identified by the NOAA OCRM Coastal Programs Division. This applies to indicators 1-11, and 13.

West Coast – CA, OR, WA
Gulf Coast – AL, LA, MS, TX
Southeast – FL, GA, NC, SC
Mid-Atlantic – DE, MD, NJ, VA
Northeast – CT, MA, ME, NH, NY, RI
Great Lakes – IL, IN, MI, MN, OH, PA, WI
Alaska – AK
Islands and Territories – AS, CNMI, GU, HI, PR, USVI

Indicator 12 and its components, as reported in the National Coastal Condition Report (NCCR), are reported according to the below regional delineation:

Northeast – ME, NH, MA, RI, CT, NJ, DE, MD, VA
Southeast – NC, SC, GA, FL (east coast)
Gulf Coast – FL (west coast), AL, MS, LA, TX
West Coast – CA, OR, WA
Great Lakes – PA, NY, OH, MI, IN, IL, WI, MN
Puerto Rico – Puerto Rico

Current Contextual Indicators

Population in the Coastal Zone

Description
This indicator measures the current estimated population of the coastal zone counties of the U.S.

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. Annual changes in the population, even estimates, serve as an important indicator of the pressures on and impacts to coastal and estuarine areas.

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. 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.

Source Reference
US Census Bureau. Population Estimates. http://www.census.gov/popest/estimates.html.

Methods and Analysis
The most recent population estimates available are downloaded for coastal zone counties. County level estimates are then summed to produce coastal zone estimates for the state, regional, and national levels.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Government coordination and decision making
- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Percentage of the Population Residing in the Coastal Zone

Description
This indicator measures the proportion of U.S. populations that live in coastal zone 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 zone 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 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
US Census Bureau. Population Estimates. http://www.census.gov/popest/estimates.html.

Methods and Analysis
The most recent population estimates available are downloaded for coastal zone counties. County level estimates are then summed to produce coastal zone estimates for the state, regional, and national levels. State, regional, and national coastal zone populations are then compared to the correlating state, regional, and national population totals to derive the proportion of the population that lives in coastal zone counties.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Government coordination and decision making
- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Five-year Change in the Population of the Coastal Zone

Description
This indicator measures the five-year change in the estimated population of coastal zone counties in the U.S. 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 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
US Census Bureau. Population Estimates. http://www.census.gov/popest/estimates.html.

Methods and Analysis
The most recent population estimates available, as well as estimates for five years before then, are downloaded for coastal zone counties. County level estimates are then summed to produce coastal zone estimates for the state, regional, and national levels. Current state, regional, and national coastal zone populations are then compared to the correlating state, regional, and national coastal zone populations of five years ago to derive a percentage of change in coastal zone population.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Government coordination and decision making
- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Population Density in the Coastal Zone

Description
This indicator measures population density in the coastal zone of the U.S. Population density represents the average number of people per square mile living in the coastal zone.

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 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.

The U.S. Census Bureau also produces statistics on land area (square miles) of each U.S. county every ten years with its decennial census.

Source Reference
Population: US Census Bureau. Population Estimates. http://www.census.gov/popest/estimates.html.

Land area: US Census Bureau. State and County QuickFacts. http://quickfacts.census.gov/qfd/index.html.

Methods and Analysis
The most recent population estimates available are downloaded for coastal zone counties. County level estimates are then summed to produce coastal zone estimates for the state, regional, and national levels. State, regional, and national coastal zone populations are then compared to the correlating state, regional, and national coastal zone areas to derive the population density in the coastal zone.

Connections to CZM Program Performance Measures within the CZMAPMS

Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Government coordination and decision making
- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Land Cover Change in Coastal Watersheds

Description
This indicator describes periodic changes in the amount of land in various land cover categories for coastal watersheds.

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 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). 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
C-CAP measures land cover within the boundaries of coastal watersheds, which differ from the boundaries of the coastal zone as defined by OCRM's Coastal Programs Division. As such, data for this indicator are not directly comparable to other indicator data collected for the coastal zone.

Source Reference
National Oceanic and Atmospheric Administration Coastal Services Center. 2006. *NOAA Coastal Change Analysis Program*. http://www.csc.noaa.gov/digitalcoast/data/ccapregional/index.html.

Methods and Analysis
State land cover statistics following C-CAP's simplified classification scheme are downloaded. State statistics are then aggregated to produce regional and national land cover statistics for each of the three available dates.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Freshwater Use in the Coastal Zone

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

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. 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. Water Use in the United States. http://water.usgs.gov/watuse/.

Methods and Analysis
County level data on total withdrawals, fresh, in millions cubic gallons per day is downloaded and summed to produce state, regional, and national coastal zone totals. 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.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Coastal habitat
- Coastal water quality

Percentage of the Economy Attributable to the Coastal Zone

Description
This indicator reflects the proportion of U.S. economies, represented by the Gross Domestic Product (GDP), generated in the coastal zone.

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 GDP 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.

GDP 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. GDP does, however, provide insight into value of the economy, especially when complemented with other indicators about employment and businesses. GDP generated by the coastal counties serves as an accepted and useful indicator of level of contribution by coastal areas to the national economy.

Data
See Appendix B for *Source Description, Data limitations and caveats,* and *Source Reference.*

Methods and Analysis
In the NOEP Coastal Economy Sector Data, within the Market Data, GDP for all industry supersectors for each coastal state is downloaded, selecting the optional regional total for "Coastal Zone Counties." State coastal zone GDPs are summed to provide regional coastal zone totals according to the regional delineations outlined in Appendix A, as well as a national coastal zone total. State, regional, and national coastal zone GDPs are divided by the respective state, regional, and national GDPs, also available from the NOEP Coastal Economy Sector Data, and multiplied by 100 to determine the percent of the economy attributable to the coastal zone.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Value of Coastal Zone Tourism and Recreation

Description
This indicator measures the value of the tourism and recreation sector within the coastal zone, as defined in the North American Industrial Classification System (NAICS). Specifically, the indicator quantifies statewide, regional, and national Gross Domestic Products of the tourism and recreation sector for the coastal zone.

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
See Appendix B for *Source Description, Data limitations and caveats*, and *Source Reference.*

Methods and Analysis
In the NOEP Ocean Economy Sector and Industry Data, within the Market Data, gross domestic products (GDP) for all industries within the Tourism and Recreation sector for each coastal state are downloaded. State coastal zone GDPs are summed to provide regional coastal zone totals according to the regional delineations outlined in Appendix A, as well as a national coastal zone total.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Percentage of Employment in the Coastal Zone

Description
This indicator represents the proportion of U.S. populations that are employed in the coastal zone.

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
See Appendix B for *Source Description, Data limitations and caveats,* and *Source Reference.*

Methods and Analysis
In the NOEP Coastal Economy Sector Data, within the Market Data, employment for all supersectors for each coastal state is downloaded, selecting the optional regional total for "Coastal Zone Counties." State coastal zone employment is summed to provide regional coastal zone totals according to the regional delineations outlined in Appendix A, as well as a national coastal zone total. State, regional, and national coastal zone employment are divided by the respective state, regional, and national occupational employments, also available from the NOEP Coastal Economy Sector Data, and multiplied by 100 to determine the percent of national employment attributable to the coastal zone.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Percentage of Coastal Zone Employment Dependent on Coastal and Ocean Resources

Description
This indicator represents the proportion of the people working in coastal zone counties who are employed by industries that are dependent on coastal and ocean resources, as defined by the National Ocean Economics Program (NOEP). 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
See Appendix B for *Source Description, Data limitations and caveats,* and *Source Reference.*

Methods and Analysis
In the NOEP Ocean Economy Sector and Industry Data, within the Market Data, employment for all sectors for each coastal state is downloaded. State coastal zone employment is summed to provide regional coastal zone totals according to the regional delineations outlined in Appendix A, as well as a national coastal zone total. State, regional, and national coastal zone employment dependent on coastal and ocean resources are then divided by the respective state, regional and national coastal zone employments, available from the NOEP Coastal Economy Sector Data, and multiplied by 100 to determine the percent of coastal zone employment dependent on coastal and ocean resources.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Number of Coastal Zone Establishments Dependent on Coastal and Ocean Resources

Description
This indicator represents the number of establishments in the coastal zone that are dependent on coastal and ocean resources, as defined by the National Ocean Economics Program (NOEP). This subset of establishments 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
See Appendix B for *Source Description, Data limitations and caveats,* and *Source Reference.*

Methods and Analysis
In the NOEP Ocean Economy Sector and Industry Data, within the Market Data, establishments for all sectors for each coastal state are downloaded. State coastal zone establishments are summed to provide regional coastal zone totals according to the regional delineations outlined in Appendix A, as well as a national coastal zone total.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Public access
- Coastal habitat
- Coastal water quality
- Coastal hazards
- Coastal dependent uses and community development

Overall Condition of Coastal Waters

Description

This indicator provides regional and national ratings of the overall condition of coastal waters, based on ratings for the below five environmental indices:

a) Water Quality Index—based on five common water quality measurements: dissolved inorganic nitrogen, dissolved inorganic phosphorus, chlorophyll-*a*, dissolved oxygen, and water clarity.
b) Sediment Quality Index—based on three indicators of sediment condition: sediment toxicity, sediment contaminants and sediment total organic carbon concentration.
c) Coastal Habitat Index—provides information on the rate of coastal wetland loss, determined via data collected by the National Wetland Inventory.
d) Benthic Index—based on benthic community diversity, and the abundance of pollution-tolerant and pollution-sensitive species present in a region.
e) Fish Tissue Contaminants Index—indicates the level of chemical contamination in target fish and shellfish species.

Importance

a) Water Quality Index—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.
b) Sediment Quality Index—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.

c) Coastal Habitat Index—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.

d) Benthic Index—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.

e) Fish Tissue Contaminants Index—chemical contaminants enter marine organisms in a number of ways, for example consumption of other contaminated organisms, uptake through the water in which organisms live, and consumption of contaminated sediment. Contaminants tend to remain in the tissues of marine organisms and thus accumulate over time. This accumulation of contaminants in marine organisms can pose health risks to human populations, which rely heavily on marine fisheries as a source of sustenance.

Data

Source Description

The National Coastal Condition Report III (NCCR III) is the third in a series of environmental assessments of U.S. coastal waters and the Great Lakes. The report includes assessments of all the nation's estuaries in the contiguous 48 states and Puerto Rico, south-central Alaska, and Hawaii. The NCCR III presents three main types of data: (1) coastal monitoring data, (2) offshore fisheries data, and (3) assessment and advisory data. The NCCR III relies heavily on coastal monitoring data from EPA's National Coastal Assessment (NCA) to assess coastal condition by evaluating five indicators of condition: water quality, sediment quality, benthic community condition, coastal habitat loss, and fish tissue contaminants in each region of the U.S. (Northeast Coast, Southeast Coast, Gulf Coast, West Coast, Great Lakes, Alaska, Hawaii, and Puerto Rico).

The National Coastal Condition Reports represent collaboration among EPA (OW and ORD), NOAA, USGS, USFWS, and coastal state agencies. The first National Coastal Condition Report (NCCR I), published in 2001, reported that the nation's estuarine resources were in fair condition. The NCCR I used available data from 1990 to 1996 to characterize approximately 70% of the nation's estuarine resources. The second National Coastal Condition Report (NCCR II) was based on available data from 1997 to 2000. These data were representative of 100% of estuarine acreage in the conterminous 48 states and Puerto Rico, and showed that the nation's coastal waters continued to be in fair condition. This third National Coastal Condition Report assesses condition of the nation's coastal waters, including Alaska and Hawaii, based primarily on NCA data collected in 2001 and 2002. The condition of the nation's coastal waters continues to be fair. An analysis of temporal changes in estuarine condition from 1990 to 2002 is presented for the nation's coastal waters and by region.

Source Reference
United States Environmental Protection Agency. National Coastal Condition Report III. EPA/842-R-08-002. December 2008. http://www.epa.gov/owow/oceans/nccr3/downloads.html.

Methods and Analysis
Data are gleaned directly from the NCCR for this report. NCCR calculates overall condition for each region by summing scores for the available indices and dividing by the number of available indices (i.e. equally weighted), where good = 5, good to fair = 4, fair = 3, fair to poor = 2, and poor = 1. Index scores for the nation are calculated based on a weighted average of the regional scores for each index. The national overall condition score is then calculated by summing each national index score and dividing by five.

A more detailed discussion of methods and analysis for the overall condition and for the individual indices comprising overall condition of coastal waters is available in the source.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Coastal habitat
- Coastal water quality

Number of Non-Native Species Detected in Tidal Waters

Description
This indicator provides the number of non-native species of invertebrates, protozoans, algae, and fungi detected in tidal waters of the continental U.S. Atlantic, Gulf, and Pacific coasts.

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-compete native bivalves, but also grow on and clog water intake pipes and other structures. 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 Description
The Smithsonian Environmental Research Center (SERC) developed and maintains National Exotic Marine and Estuarine Species Information System (NEMESIS), a national database of marine and estuarine invasions of the continental U.S. and Alaska. This relational database compiles detailed information on approximately 500 different non-native species of plants, fish, invertebrates, protists and algae that have invaded our coastal waters. The database identifies which species have been reported, their current population status (i.e., whether established or not), as well as when, where, and how they invaded; it also summarizes key information on the biology, ecology, and known impacts of each invader. The database is updated as new species are discovered and reported.

Source Reference
National Exotic Marine and Estuarine Species Information System (NEMESIS), Smithsonian Environmental Research Center. http://invasions.si.edu/nemesis/index.html, accessed November, 2010.

Methods and Analysis
Because the NEMESIS website does not provide access to its complete databases, data for this indicator are requested directly from SERC administrators of the database. Database administrators are asked to provide a national total of non-native species in tidal waters.

Connections to CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Coastal habitat
- Coastal water quality

Proportion of Federal Disaster Declarations Occurring in Coastal States and Territories

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
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 CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Government coordination and decision making
- Coastal habitat
- Coastal hazards
- Coastal dependent uses and community development

Proportion of Coastal Federal Disaster Declarations 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
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, super typhoons, and high surf). 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 CZM Program Performance Measures within the CZMAPMS
Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Government coordination and decision making
- Coastal habitat
- Coastal hazards
- Coastal dependent uses and community development

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
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, super typhoons, and high surf).

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.

Also, the NCDC updates previous years' estimates as more accurate information becomes available, so information reported in previous contextual indicator reports should be verified annually.

Connections to CZM Program Performance Measures within the CZMAPMS

Data for this indicator may provide context for CZM Program performance measures (see Appendix B) in the following categories:

- Government coordination and decision making
- Coastal habitat
- Coastal hazards
- Coastal dependent uses and community development

Quick Guide to Contextual Indicator Reporting

The table below indicates how often new data for each indicator is made available by the original data source.

Indicator	Source	Frequency of Data Update
1. Population in the coastal zone	U.S. Census	Annual (July 1)
2. Percentage of the population residing in the coastal zone	U.S. Census	Annual (July 1)
3. Five-year change in the population of the coastal zone	U.S. Census	Annual (July 1)
4. Population density in the coastal zone	U.S. Census	Annual (July 1)
5. Land cover change in coastal watersheds	C-CAP	Every 5 years
6. Freshwater use in the coastal zone	USGS	Every 5 years
7. Percentage of the economy attributable to the coastal zone	NOEP	Periodically
8. Value of coastal zone tourism and recreation	NOEP	Periodically
9. Percentage of employment in the coastal zone	NOEP	Periodically
10. Percentage of coastal zone employment dependent on coastal and ocean resources	NOEP	Periodically
11. Number of coastal zone establishments dependent on coastal and ocean resources	NOEP	Periodically
12. Overall condition of coastal waters a) Water quality index b) Sediment quality index c) Coastal habitat index d) Benthic index e) Fish tissue contaminants index	EPA	Periodically
13. Number of invasive marine species reported in coastal states	SERC	Continually
14. Proportion of Federal Disaster Declarations occurring in coastal states and territories	FEMA	Continually
15. Proportion of coastal Federal Disaster Declarations directly related to coastal hazards	FEMA	Continually
16. Total estimated cost of all billion-dollar weather disasters related to coastal hazards	NCDC	Annually

Appendix A
Counties within the Coastal Zone

The below counties are those that are wholly or partially within the boundaries of a state's approved coastal zone management program, as identified by the NOAA OCRM Coastal Programs Division.

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
Coastal Zone Management Program Performance Measures

Below are the performance measures as revised after the phased implementation period:

Government Coordination & Decision Making (reported annually)

1. Percent of federal consistency projects reviewed where the project was modified due to consultation with the applicant to meet State CZM policies
2. Number of a) educational activities offered by the CZM Program and b) the number of participants, by category[1].
3. Number of a) training or outreach events offered by the CZM Program and b) the number of participants, by category[2].

Public Access (reported annually)

4. Number of public access sites a) created through acquisition or easement and b) enhanced with assistance from CZM funding or staff
5. Number of public access sites a) created and b) enhanced through CZM regulatory requirements.

Coastal Habitat (reported annually)

6. Number of acres of coastal habitats a) protected by acquisition or easement and b) restored with assistance from CZM funding or staff, by category.[3]
7. Number of acres of a) permit-estimated loss and b) required gain or mitigation due to activities subject to CZM regulatory programs, by category[3] [to be phased in by all programs for reporting by 2010].
8. Number of a) marine debris removal activities completed with assistance from CZM funding or staff and b) pounds of marine debris removed during those activities.

Coastal Water Quality (reported annually)

9. Number of marinas in the coastal zone a) pledged to and b) designated by a Clean Marina Program.
10. Number of sites where water quality was monitored with assistance from CZM funding or staff.
11. Number of coastal communities a) that developed or updated polluted runoff management ordinances, policies, and plans and b) completed projects to implement polluted runoff management plans with assistance from CZM funding or staff.

[1] Reporting categories for education activities: government coordination; public access; coastal habitat; coastal water quality; coastal hazards; and coastal dependent uses and community development.
[2] Reporting categories for training and outreach events: government coordination; public access; coastal habitat; coastal water quality; coastal hazards; and coastal dependent uses and community development.
[3] Reporting categories for coastal habitats: a) tidal wetlands (Great Lakes wetlands); b) beach and dune; c) nearshore (intertidal, sub-tidal, submerged) habitat; and d) other habitat types

Coastal Hazards (reported annually)

12. Number of communities in the coastal zone that completed projects to a) reduce future damage from hazards and b) increase public awareness of hazards with assistance from CZM funding or staff.

Coastal Dependent Uses & Community Development (reported annually)

13. Number of coastal communities that a) developed or updated sustainable development ordinances, policies, and plans; b) completed a project to implement a sustainable development plan; c) developed or updated port or waterfront redevelopment ordinances, policies, and plans; and d) completed a project to implement a port or waterfront redevelopment plan with assistance from CZM funding or staff.

Financial Measures (reported annually)

14. Number of a) CZM federal and matching dollars spent and b) dollars leveraged by CZM funds, by category[4].
15. Number of CZM federal and matching dollars a) spent on technical assistance and b) provided as financial assistance to local governments.

State-reported Contextual Measures (reported every 5 years)

Public Access

16. Percent of the public that feels they have adequate or better access to the coast for recreation.
17. Number of acres in the coastal zone that are available for public access.
18. Miles of shoreline available for public access.

Coastal Habitat

19. Number of Coastal Management Programs that have habitat restoration plans for coastal habitat, by category[3.]
20. Number of Coastal Management Programs that have mapped inventories of coastal habitat, by category[3]
21. Number of acres of coastal habitat a) restored and b) protected through acquisition or easement using non-CZM or non-CELCP funds.

Coastal Hazards

22. Number of communities in the coastal zone that use setbacks, buffers, or land use policies to direct development away from areas vulnerable to coastal hazards.
23. Number of communities in the coastal zone that have a mapped inventory of areas affected by coastal hazards, by category[5].

[4] Reporting categories for financial measures: a) Government Coordination; b) Public Access; c) Coastal Habitat; d) Coastal Water Quality; e) Coastal Hazards; and f) Coastal Dependent Uses and Community Development

[5] Reporting categories for hazards: a) flooding; b) storm surge; c) shoreline erosion; d) sea level rise (Great Lake level fluctuation); e) geologic hazards; f) land subsidence; and g) other types of hazards

Appendix C
National Ocean Economics Program (NOEP)

Source Description

Background
Established in 1999, the National Ocean Economics Program (NOEP) provides a full range of the most current economic and socio-economic information available on changes and trends along the U.S. coast and in coastal waters. The program is funded by federal, state, university, and private grants and contracts.

One component of the NOEP is its Market Data, which contains a subset of economic values in the Ocean and Coastal economies derived from market transactions. NOEP Market Data are drawn from the Bureau of Labor Statistics (BLS) and are categorized according to the North American Industrial Classification System (NAICS). The NOEP Market Database provides values on establishments, employment, wages and Gross Domestic Product (GDP) at various levels of analysis, including coastal zone-level analyses. Analyses are provided for two series of market data: the "ocean economy" and the "coastal economy."

Ocean Economy Sector and Industry Data
Ocean Economy Sector & Industry Data includes six primary sectors of economic activity that derives all or part of its inputs from the ocean and/or Great Lakes. These sectors and some of their component industries comprise the NOEP Ocean Economy and are provided below. For those industries in italics, only establishments in zip codes adjacent to the shoreline are included.

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*

Coastal Economy Sector Data
Coastal Economy Sector Data consist of all economic activity in the coastal region from barber shops to surf shops. The industries that represent these activities are aggregated into the supersectors defined by the Bureau of Labor Statistics. These supersectors are available in different geographic subsets of the coastal region and comprise the NOEP Coastal Economy as described below:

Super 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

Data limitations and caveats

- NOEP Market Data does not include data for U.S. territories and other outlying areas. While the U.S Census Economic Census of Island Areas (see http://www.census.gov/csd/ia/) and the U.S. Central Intelligence Agency (see https://www.cia.gov/library/publications/the-world-factbook/index.html) both provide economic data for island areas, this data generally is not comparable to NOEP data and therefore is not reported alongside it.
- The NOEP's designation of coastal zone counties differs slightly from NOAA OCRM's designation of coastal zone counties. The NOEP reports on eight non-OCRM coastal zone counties and does not report on seven OCRM coastal zone counties. Data on the seven "missing" OCRM coastal zone counties taken directly from the BLS would not be comparable to NOEP data, so for those indicators drawing from the NOEP, NOEP's definition of coastal zone counties is observed, and the regional delineations described in the introduction of this document are followed.

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