Puerto Rico ESI/RSI: HYDRO (Hydrology)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: HYDRO (Hydrology)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains hydrology data.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Hydrology

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG

Data_Set_Credit:
This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:
The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:
The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:
The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological and human-use layers. All layers use the shoreline as the geographic reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS

manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

The intertidal shoreline habitats of Puerto Rico were previously mapped during overflights and ground surveys conducted by the Puerto Rico Departamento de Recursos Naturales y Ambientales (DRNA) and the National Oceanic and Atmospheric Administration (NOAA), published in 1984. For this project, the original ESI maps were re-examined and fully updated using the sources and methods described below. As a first step, infrared vertical aerial photographs were examined at the offices of DRNA in San Juan. The initial aerial photograph classification was followed by overflight surveys of the entire study area, flying at elevations of 400-600 feet and slow air speed. Overflights were conducted using U.S. Coast Guard (USCG) helicopters and fixed-wing Cessna 172s operated by the Puerto Rico Civil Air Patrol. During this work, an experienced coastal geologist delineated the intertidal shoreline habitats directly onto 1:20,000-scale USGS topographic maps (1:30,000 for Culebra and Vieques). Where appropriate, multiple habitats were described for each shoreline segment. Data from the National Wetlands Inventory (NWI) for the coastal plain of Puerto Rico, published in draft form in 1989 (based on 1983 1:40,000 CIR photography), were also used as a supplementary data source, particularly for mangrove areas and tidal flats. In many cases, the depiction of mangroves was modified substantially from the original NWI data, based on the more recent aerial photography and overflights, as well as information provided by expert reviewers.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Research Planning, Inc.
Publication_Date: Unpublished Material
Title: Overflight maps
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of survey
Source_Citation_Abbreviation: None
Source_Contribution: ESI information from overflight
Source_Information:

Source_Citation:

Citation_Information:

Originator: National Wetlands Inventory
Publication_Date: Unpublished Material
Title: National Wetlands Inventory
Geospatial_Data_Presentation_Form: Vector Digital Data
Type_of_Source_Media: Online
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of survey
Source_Citation_Abbreviation: None
Source_Contribution: ESI information
Source_Information:

Source_Citation:

Citation_Information:

Originator: USGS
Publication_Date: Unknown
Title: DLG's
Geospatial_Data_Presentation_Form: Vector digital data
Type_of_Source_Media: Online and CD-ROM
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000
Source_Currentness_Reference: Date data were received
Source_Citation_Abbreviation: None
Source_Contribution: ESI shoreline data
Source_Information:

Source_Citation:

Citation_Information:

Originator: NOAA, NOS
Publication_Date: Unknown
Title: Digital NOS Topographic sheets
Geospatial_Data_Presentation_Form: Vector digital data
Type_of_Source_Media: CD-ROM

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000
Source_Currentness_Reference: Date data were reviewed
Source_Citation_Abbreviation: None
Source_Contribution: ESI shoreline information
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 4948
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 4948
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 19646
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 858716
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 656
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 20788

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Complete chain
Entity_Type_Definition:
The data layer HYDRO contains polygonal water and land features, as well as linear features for rivers and streams. The HYDRO data layer contains all annotation used in producing the atlas. The annotation features are categorized into three subclasses in order to simplify the mapping and quality-control procedures: geog or geographic

features, soc or socioeconomic features, and hydro or water features.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: LINE
Attribute_Definition: Type of geographic feature
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: B
Enumerated_Domain_Value_Definition: Breakwater
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: F
Enumerated_Domain_Value_Definition: Flat
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: H
Enumerated_Domain_Value_Definition: Hydrography
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: I
Enumerated_Domain_Value_Definition: Index
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: M
Enumerated_Domain_Value_Definition: Marsh
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: P
Enumerated_Domain_Value_Definition: Pier
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: S
Enumerated_Domain_Value_Definition: Shoreline
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807

Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: SOURCE_ID
Attribute_Definition: Data source for the ESI
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: Original digital information
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: Low -altitude overfilght
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition:
Digitized from scanned 1:20,000 and 1:30,000 USGS topographic quadrangle
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6
Enumerated_Domain_Value_Definition: National Wetland Inventory
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 7
Enumerated_Domain_Value_Definition: Research Planning Inc. Index
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8
Enumerated_Domain_Value_Definition: USGS Digital Line Graph Data
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 9
Enumerated_Domain_Value_Definition: Digitized from 1:100,000 Navigational charts

Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-Polygons
Entity_Type_Definition:
The data layer HYDRO contains polygonal water and land features, as well as linear features for rivers and streams. The HYDRO data layer contains all annotation used in producing the atlas. The annotation features are categorized into three subclasses in order to simplify the mapping and quality-control procedures: geog or geographic features, soc or socioeconomic features, and hydro or water features.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: WATER_CODE
Attribute_Definition: Specifies a polygon as either water or land
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: L
Enumerated_Domain_Value_Definition: Land
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: W
Enumerated_Domain_Value_Definition: Water
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle

State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI and RSI: ESI (Environmental Sensitivity Index Shoreline Types) / RSI (Reach Sensitivity Index River and Stream Types)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI and RSI: ESI (Environmental Sensitivity Index Shoreline Types) / RSI (Reach Sensitivity Index River and Stream Types)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast

Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

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Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Shoreline
Theme_Keyword: RSI
Theme_Keyword: Reach

Theme_Keyword: River
Theme_Keyword: Stream
Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico
Access_Constraints: None
Use_Constraints:
DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.
Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG
Data_Set_Credit:
This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.
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The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:
The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.
Logical_Consistency_Report:
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biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

The intertidal shoreline habitats of Puerto Rico were previously mapped during overflights and ground surveys conducted by the Puerto Rico Departamento de Recursos Naturales y Ambientales (DRNA) and the National Oceanic and Atmospheric Administration (NOAA), published in 1984. For this project, the original ESI maps were re-examined and fully updated using the sources and methods described below. As a first step, infrared vertical aerial photographs were examined at the offices of DRNA in San Juan. The initial aerial photograph classification was followed by overflight surveys of the entire study area, flying at elevations of 400-600 feet and slow air speed. Overflights were conducted using U.S. Coast Guard (USCG) helicopters and fixed-wing Cessna 172s operated by the Puerto Rico Civil Air Patrol. During this work, an experienced coastal geologist delineated the intertidal shoreline habitats directly onto 1:20,000-scale USGS topographic maps (1:30,000 for Culebra and Vieques). Where appropriate, multiple habitats were described for each shoreline segment. Data from the National Wetlands Inventory (NWI) for the coastal plain of Puerto Rico, published in draft form in 1989 (based on 1983 1:40,000 CIR photography), were also used as a supplementary data source, particularly for mangrove areas and tidal flats. In many cases, the depiction of mangroves were modified substantially from the original NWI data, based on the more recent aerial photography and overflights, as well as information provided by expert reviewers. As one progresses landward up the major rivers from the coast, the streams become so narrow and shallow that even small spills could potentially contaminate the whole system. Therefore, from that point upstream, it is not useful to classify the small individual components of the stream complex with regard to habitat sensitivity, as would be done for the shoreline segments of larger rivers mapped using the ESI scale. Rather, the sensitivity of the system as a whole should be considered. It has been suggested by the National Oceanic and Atmospheric Administration (NOAA, 1994) and Hayes et al. (1997) that a watershed approach emphasizing stream reaches should be used to map the sensitivity of smaller rivers and streams. All of the rivers in Puerto Rico are small enough to be mapped using the reach concept, rather than the riverine ESI used by NOAA and others to map the Mississippi (Michel et al., 1994), Apalachicola, St. Johns (Fla.), and Columbia Rivers. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches, that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. Sixteen major river systems were mapped using the Reach Sensitivity Index (RSI) for Puerto Rico (listed alphabetically): Río

Añasco, Río Camuy, Río Cibuco, Río Culebrinas, Río Espiritu Santo, Río Fajardo, Río Grande de Arecibo, Río Grande de Loiza, Río Grande de Manati, Río Guajataca, Río Guanajibo, Río Guyanilla, Río La Plata, Río Loco, Río Mameyes, and Río Yauco. Local project sponsors chose these river systems based on size, presumed spill risk, and potential environmental consequences. The river systems included numerous tributaries to each of the individual rivers listed above. The RSI classification was continued upstream as far as possible, stopping where reaches could not be observed in the air photos, flown over, or easily accessed by land. The first step in the mapping process for the Puerto Rico rivers was ground inspection in October 1998. During this preliminary examination, a ranking scale for the different reaches of the streams was devised. This scale was based partially on work previously carried out by NOAA/EPA for river systems in the piedmont and coastal plain of the southeastern U.S. (Hayes et al., 1997). However, the fact that the rivers in Puerto Rico are primarily montane streams, not piedmont or coastal plain rivers, necessitated some modification of the ranking system previously used in the southeastern U.S. Once the ranking scale was determined, infrared vertical aerial photographs of the watersheds of the rivers under study were inspected at the offices of the Puerto Rico DRNA in San Juan. The work on the aerial photographs was followed by aerial surveys of several of the rivers using USCG helicopters. Finally, a second field trip was conducted in December 1998 to ground-truth overflight observations and to examine stream reaches that could not be mapped from the air because of their small size, vegetative cover, or hazardous flying conditions. The RSI classification scale was also finalized at this time. Detailed ground observations were made at 70 field stations during the two field surveys. In addition to reach classification, some sites that would be acceptable collection points during a spill were noted and are recorded on the maps in the atlas. These sites have ready access for vehicular equipment, workable current velocities, and relatively low-sensitive banks and channel margin sediments. In many instances, these are places where the oil would be accumulated naturally by currents. Also, noted on the maps are some areas where leakage of water, and hence floating oil if present, from the main channel would occur during normal high flow conditions. For ease of use, the division or break between the ESI and RSI classifications is defined using a line segment and special icon. The sensitivity of stream and river reaches for Puerto Rico is based on the: 1) Degree of difficulty anticipated for the containment and recovery of the spilled oil from the water surface; 2) Degree of mixing of oil into the water column; 3) Potential for retention of the oil (e.g., by penetration of the oil into coarse-grained sediments on bars in the stream, or between large boulders; trapping of oil by vegetation on bars and banks); 4) Ease of cleanup; 5) Sensitivity and vulnerability of associated wetlands; 6) Human use; and 7) Sensitivity and vulnerability for native stream biota. All of these factors have been used to determine the relative sensitivity of the stream reaches in the development of the RSI. The strength of currents and the fall of the water dictates the degree of mixing of oil and its toxic aromatic fractions into the water column, and, hence, the potential for causing the mortality of fish, shrimp, crabs, aquatic insects, and other stream biota. Therefore, in general, such kills are more likely to occur in streams with rapids and waterfalls than in smooth flowing, low-gradient coastal streams. The success of attempts to contain and recover oil from the water surface is impaired where: a) currents are too strong or follow complex paths within the channel; b) channel leakage and bifurcation allow oil to spread and/or escape; c) access is limited by steep banks or other factors; d) sediment is too coarse-grained to manipulate; and e) oil is mixed into the water column. The ease of cleanup of spilled oil and the potential for biological injury are also important factors in the RSI ranking. Cleanup is impaired by many of the factors that hinder containment and recovery of surface oil, as well as by penetration of the oil into stream sediments and heavy oiling of riparian vegetation.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Research Planning, Inc.
Publication_Date: Unpublished Material
Title: Overflight maps
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of survey
Source_Citation_Abbreviation: None
Source_Contribution: ESI information from overflight
Source_Information:

Source_Citation:

Citation_Information:

Originator: National Wetlands Inventory
Publication_Date: Unpublished Material
Title: Nationa Wetlands Inventory
Geospatial_Data_Presentation_Form: Vector Digital Data
Type_of_Source_Media: Online
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of survey
Source_Citation_Abbreviation: None
Source_Contribution: ESI information
Source_Information:

Source_Citation:

Citation_Information:

Originator: USGS
Publication_Date: Unknown
Title: DLG's
Geospatial_Data_Presentation_Form: Vector digital data
Type_of_Source_Media: Online and CD-ROM
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000
Source_Currentness_Reference: Date data were received
Source_Citation_Abbreviation: None
Source_Contribution: ESI shoreline data
Source_Information:

Source_Citation:

Citation_Information:

Originator: NOAA, NOS
Publication_Date: Unknown
Title: Digital NOS T-sheets
Geospatial_Data_Presentation_Form: Vector digital data
Type_of_Source_Media: CD-ROM
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000
Source_Currentness_Reference: Date data were reviewed
Source_Citation_Abbreviation: None
Source_Contribution: ESI shoreline information
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 2520
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 2520
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 11238
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 351730
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 10505

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Complete Chain
Entity_Type_Definition:
The data layer ESI contains ESI and RSI arcs (Complete Chain) features. The ESI shoreline classification is based on Environmental Sensitivity Index Guidelines, Version 2.0 (Halls, J., J. Michel, S. Zengel, J. Dahlin, and J. Petersen, 1997, Hazardous Materials Response and Assessment Division, NOAA). The ESI classification was performed in July 1998. The RSI classification was based on a modification of the Southeastern U.S. Stream Reach Sensitivities. The RSI classification was performed in October 1998 for Puerto Rico.
Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ESI
Attribute_Definition:
Prediction of the behavior and persistence of oil in intertidal habitats is based on an understanding of the dynamics of the coastal environments, not just the substrate type and grain size. The intensity of energy expended upon a shoreline by wave action, tidal currents, and river currents directly affects the persistence of stranded oil. The need for shoreline cleanup activities is determined, in part, by the slowness of natural processes in removal of oil stranded on the shoreline. The potential for biological injury, and ease of cleanup of spilled oil are also important factors in the ESI ranking. Generally speaking, areas exposed to high levels of physical energy, such as wave action and tidal currents, and low biological activity rank low on the scale, whereas sheltered areas with associated high biological activity have the highest ranking. The list below includes the shoreline habitats delineated for Puerto Rico, presented in order of increasing sensitivity to spilled oil: 1A) Exposed Rocky Cliffs; 1B) Exposed, Solid Man-made Structures; 2A) Exposed Wave-cut Platforms in Bedrock; 2B) Scarps and Steep Slopes in Muddy Sediments; 3A) Fine- to Medium-grained Sand Beaches; 4) Coarse-grained Sand Beaches; 5) Mixed Sand and Gravel Beaches; 6A) Gravel Beaches; 6B) Riprap; 7) Exposed Tidal Flats; 8A) Sheltered Rocky Shores; 8B) Sheltered, Solid Man-made Structures; 9A) Sheltered Tidal Flats; 9B) Sheltered, Vegetated Low Banks; 10D) Mangroves. In many cases, the shorelines are ranked with multiple codes, such as 10D/6A. The first number (10D, mangroves) is the most landward shoreline type, with gravel beach (6A) being the shoreline type closest to the water.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1A
Enumerated_Domain_Value_Definition: Exposed Rocky Cliffs
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1A/2A
Enumerated_Domain_Value_Definition: Exposed Rocky Cliffs/Exposed Wave-cut Platforms in Bedrock

Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1A/4
Enumerated_Domain_Value_Definition: Exposed Rocky Cliffs/Coarse-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1A/5
Enumerated_Domain_Value_Definition: Exposed Rocky Cliffs/Mixed Sand and Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1A/6A
Enumerated_Domain_Value_Definition: Exposed Rocky Cliffs/Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1A/7
Enumerated_Domain_Value_Definition: Exposed Rocky Cliffs/Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B
Enumerated_Domain_Value_Definition: Exposed, Solid Man-made Structures
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/2A
Enumerated_Domain_Value_Definition:
Exposed, Solid Man-made Structures/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/3A
Enumerated_Domain_Value_Definition:
Exposed, Solid Man-made Structures/Fine- to Medium-grained Sand Beaches

Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/4
Enumerated_Domain_Value_Definition: Exposed, Solid Man-made Structures/Coarse-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/4/2A
Enumerated_Domain_Value_Definition:
Exposed, Solid Man-made Structures/Coarse-grained Sand Beaches/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/5
Enumerated_Domain_Value_Definition:
Exposed, Solid Man-made Structures/Mixed Sand and Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/6A
Enumerated_Domain_Value_Definition: Exposed, Solid Man-made Structures/Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/6B
Enumerated_Domain_Value_Definition: Exposed, Solid Man-made Structures/Riprap
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/6B/7
Enumerated_Domain_Value_Definition: Exposed, Solid Man-made Structures/Riprap/Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1B/7
Enumerated_Domain_Value_Definition: Exposed, Solid Man-made Structures/Exposed Tidal Flats

Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2A
Enumerated_Domain_Value_Definition: Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2B
Enumerated_Domain_Value_Definition: Scarps and Steep Slopes in Muddy Sediments
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3A
Enumerated_Domain_Value_Definition: Fine- to Medium-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3A/2A
Enumerated_Domain_Value_Definition:
Fine- to Medium-grained Sand Beaches/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3A/6A
Enumerated_Domain_Value_Definition: Fine- to Medium-grained Sand Beaches/Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3A/7
Enumerated_Domain_Value_Definition: Fine- to Medium-grained Sand Beaches/Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 4
Enumerated_Domain_Value_Definition: Coarse-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 4/2A
Enumerated_Domain_Value_Definition:
Coarse-grained Sand Beaches/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 4/7
Enumerated_Domain_Value_Definition: Coarse-grained Sand Beaches/Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition: Mixed Sand and Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5/2A
Enumerated_Domain_Value_Definition:
Mixed Sand and Gravel Beaches/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5/7
Enumerated_Domain_Value_Definition: Mixed Sand and Gravel Beaches/Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6A
Enumerated_Domain_Value_Definition: Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6A/2A
Enumerated_Domain_Value_Definition: Gravel Beaches/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6A/4
Enumerated_Domain_Value_Definition: Gravel Beaches/Coarse-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6B
Enumerated_Domain_Value_Definition: Riprap
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6B/2A
Enumerated_Domain_Value_Definition: Riprap/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6B/3A
Enumerated_Domain_Value_Definition: Riprap/Fine- to Medium-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6B/4
Enumerated_Domain_Value_Definition: Riprap/Coarse-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6B/4/2A
Enumerated_Domain_Value_Definition:
Riprap/Coarse-grained Sand Beaches/Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6B/7
Enumerated_Domain_Value_Definition: Riprap/Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8A
Enumerated_Domain_Value_Definition: Sheltered Rocky Shores
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8A/9A
Enumerated_Domain_Value_Definition: Sheltered Rocky Shores/Sheltered Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8B
Enumerated_Domain_Value_Definition: Sheltered, Solid Man-made Structures
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8B/9A
Enumerated_Domain_Value_Definition: Sheltered, Solid Man-made Structures/Sheltered Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 9B
Enumerated_Domain_Value_Definition: Sheltered, Vegetated Low Banks
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D
Enumerated_Domain_Value_Definition: Mangroves
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/1A
Enumerated_Domain_Value_Definition: Mangroves/Exposed Rocky Cliffs
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/3A
Enumerated_Domain_Value_Definition: Mangroves/Fine- to Medium-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/4
Enumerated_Domain_Value_Definition: Mangroves/Coarse-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/5
Enumerated_Domain_Value_Definition: Mangroves/Mixed Sand and Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/6A
Enumerated_Domain_Value_Definition: Mangroves/Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/6B
Enumerated_Domain_Value_Definition: Mangroves/Riprap
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/7
Enumerated_Domain_Value_Definition: Mangroves/Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/8A
Enumerated_Domain_Value_Definition: Mangroves/Sheltered Rocky Shores
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/9A
Enumerated_Domain_Value_Definition: Mangroves/Sheltered Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: U
Enumerated_Domain_Value_Definition: Unranked
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807

Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: RSI
Attribute_Definition:
Where marshes, bogs, floodplain forests, swamps, and other wetlands are associated with streams, they can add measurably to the biological sensitivity of a stream reach. Many of the more extensive marsh areas of Puerto Rico are found in the coastal zone and are closely associated with the ESI classification rather than the RSI. Though many smaller, low-gradient, streams in Puerto Rico have an abundance of streamside marsh and aquatic vegetation, none of these areas were found along the inland stream reaches mapped during this project. Likewise, none of the remaining coastal Pterocarpus swamps of Puerto Rico were located directly adjacent to the streams mapped (some were mapped as rare habitats, more closely associated with the coastal ESI classification). Though once numerous, almost all of the coastal and lowland Pterocarpus swamps of Puerto Rico have been lost; only a few rare stands remain (Cintron, 1983). Though not often recognized, large portions of the inland mountain areas of Puerto Rico described as wet forest and rain forest are considered forested wetlands (Lugo and Brown, 1988). Specific wetland forest types in montane areas include Sierra palm breaks (palm slope forest), Colorado forest (titi or Cyrilla forest), and cloud forest (dwarf or elfin forest) (Lugo and Brown, 1988). The narrow floodplain forests of Sierra palm that border many montane stream reaches should also be considered wetlands, as would the rare montane Pterocarpus stands (Frangi and Lugo, 1985; Lugo and Brown, 1988). Wetland types associated with floodplain areas would be highly vulnerable and sensitive to spilled oil released into streams, especially during flood events. Unfortunately, due to data limitations, small inland and montane floodplain wetlands could not be adequately mapped during this project, though they are included as an RSI class (RSI = 10). One montane, streamside, Pterocarpus stand was mapped as a rare habitat type on a small tributary (RSI = 9) of the Río Mameyes (map 26). When floodplain forests and other wetland areas are identified, either by resource experts or during observations in the field, the adjacent stream channel should be considered an RSI = 10 reach (especially during high water or flood conditions). The list below outlines the stream reach classification for Puerto Rico, presented in order of increasing sensitivity to spilled oil: 1) Quiet Pool, Low-sensitive Banks; 2) Straight Channel with Currents, Low-sensitive Banks (Mud Dominant); 3) Meandering Channel, Sand Point Bars; 4) Meandering Channel, Vegetated Point Bars; 5) Rapids over Bedrock; 6) Meandering Channel, Sand and Gravel Point Bars; 7) Split Channels With Coarse Gravel, Some Rapids; 8) Small Falls, Boulders in Channel; 9) Large Falls, Boulders in Channel; 10) Channels with Associated Vulnerable Wetlands.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: Quiet Pool; Low-sensitive Banks
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition:
Straight Channel with Currents; Low-sensitive Banks (Mud Dominant)
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3
Enumerated_Domain_Value_Definition: Meandering Channel; Sand Point Bars
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 4
Enumerated_Domain_Value_Definition: Meandering Channel; Vegetated Point Bars
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition: Rapids over Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6
Enumerated_Domain_Value_Definition: Meandering Channel; Sand and Gravel Point Bars
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 7
Enumerated_Domain_Value_Definition: Split Channels With Coarse Gravel; Some Rapids
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8
Enumerated_Domain_Value_Definition: Small Falls; Boulders in Channel
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 9
Enumerated_Domain_Value_Definition: Large Falls; Boulders in Channel
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10
Enumerated_Domain_Value_Definition: Channels with Associated Vulnerable

Wetlands
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: LINE
Attribute_Definition: Type of geographic feature
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: B
Enumerated_Domain_Value_Definition: Breakwater
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: F
Enumerated_Domain_Value_Definition: Flat
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: H
Enumerated_Domain_Value_Definition: Hydrography
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: M
Enumerated_Domain_Value_Definition: Marsh
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: S
Enumerated_Domain_Value_Definition: Shoreline
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: SOURCE_ID
Attribute_Definition: Data source of the ESI arcs
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: Original digital information (from

NOAA, NOS T-sheets)
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: Low-altitude overflight
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition:
Digitized from scanned 1:20,000 and 1:30,000 USGS topographic quadrangle
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6
Enumerated_Domain_Value_Definition: National Wetland Inventory
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8
Enumerated_Domain_Value_Definition: USGS Digital Line Graph data
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 12
Enumerated_Domain_Value_Definition: Felix Lopez Additions and Edits to Puerto Rico Mangroves
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 13
Enumerated_Domain_Value_Definition: Digitized from scanned BVI topographic quadrangle
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: ENVIR
Attribute_Definition: Regional environment
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: E
Enumerated_Domain_Value_Definition: Estuarine
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: R
Enumerated_Domain_Value_Definition: Riverine
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: U
Enumerated_Domain_Value_Definition: Unranked
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-Polygon
Entity_Type_Definition:
The data layer ESI contains polygonal (GT-Polygon) features for the ESI shoreline classification and is based on Environmental Sensitivity Index Guidelines, Version 2.0 (Halls, J., J. Michel, S. Zengel, J. Dahlin, and J. Petersen, 1997, Hazardous Materials Response and Assessment Division, NOAA). The ESI classification was performed in July 1998 for Puerto Rico.
Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ESI
Attribute_Definition:
The character item ESI contains values according to the ESI ranking of the polygons. The ESI rankings progress from low to high susceptibility to oil spills. The ESI rankings of polygons are similar to the ESI rankings of shorelines (see line attribute ESI).
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2A
Enumerated_Domain_Value_Definition: Exposed Wave-cut Platforms in Bedrock
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 7
Enumerated_Domain_Value_Definition: Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 9A
Enumerated_Domain_Value_Definition: Sheltered Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: U
Enumerated_Domain_Value_Definition: Unranked
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: WATER_CODE
Attribute_Definition: Specifies a polygon as either water or land
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: L
Enumerated_Domain_Value_Definition: Land
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: W
Enumerated_Domain_Value_Definition: Water
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: ENVIR
Attribute_Definition: Regional environment
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: E
Enumerated_Domain_Value_Definition: Estuarine
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: U
Enumerated_Domain_Value_Definition: Unranked
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807

Ending_Date_of_Attribute_Values: 200101

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address

Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: INDEX

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: INDEX
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains data for the study area Index.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Index

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG

Data_Set_Credit:
This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:
The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:
The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:
The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological and human-use layers. All layers use the shoreline as the geographic reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS

manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

The intertidal shoreline habitats of Puerto Rico were previously mapped during overflights and ground surveys conducted by the Puerto Rico Departamento de Recursos Naturales y Ambientales (DRNA) and the National Oceanic and Atmospheric Administration (NOAA), published in 1984. For this project, the original ESI maps were re-examined and fully updated using the sources and methods described below. As a first step, infrared vertical aerial photographs were examined at the offices of DRNA in San Juan. The initial aerial photograph classification was followed by overflight surveys of the entire study area, flying at elevations of 400-600 feet and slow air speed. Overflights were conducted using U.S. Coast Guard (USCG) helicopters and fixed-wing Cessna 172s operated by the Puerto Rico Civil Air Patrol. During this work, an experienced coastal geologist delineated the intertidal shoreline habitats directly onto 1:20,000-scale USGS topographic maps (1:30,000 for Culebra and Vieques). Where appropriate, multiple habitats were described for each shoreline segment. Data from the National Wetlands Inventory (NWI) for the coastal plain of Puerto Rico, published in draft form in 1989 (based on 1983 1:40,000 CIR photography), were also used as a supplementary data source, particularly for mangrove areas and tidal flats. In many cases, the depiction of mangroves was modified substantially from the original NWI data, based on the more recent aerial photography and overflights, as well as information provided by expert reviewers.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Research Planning, Inc.
Publication_Date: Unpublished Material
Title: RPI Generated Index
Geospatial_Data_Presentation_Form: Vector digital data
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: CD-ROM
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000

Source_Currentness_Reference: Date of creation
Source_Citation_Abbreviation: None
Source_Contribution: Index data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 71
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 71
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 187

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 455
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 121

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-Polygon
Entity_Type_Definition:
The data layer INDEX contains the map or polygon boundaries for each map in the atlas. The INDEX layer also contains the study area boundary.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: TILE-NAME
Attribute_Definition:
The TILE-NAME contains the map number according to the specified layout of the atlas. During the map production process, the value of TILE-NAME is plotted on the map product to order the maps in a coherent manner. The values for each polygon are unique and range from 1 through 70.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 1
Range_Domain_Maximum: 70
Attribute_Units_of_Measure: Nominal
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: TOPO-NAME
Attribute_Definition:
USGS 1:20,000 (1:30,000 for Culebra and Viequez) topographic map name. Some polygons straddle two or more maps and all map names are included in this attribute. The date (latest/revised) of the USGS maps are also included in this field
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: ADJUNTAS, P.R. (1977)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: AGUADILLA, P.R. (1960)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: AGUAS BUENAS, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: ARECIBO, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: BARCELONETA, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: BARRANQUITAS, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

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Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: BAYANEY, P.R. (1982)
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Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CABO ROJO, P.R. (1966)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CAGUAS, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CAMUY, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CAROLINA, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CAYEY, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CAYO ICACOS, P.R. (1958)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CENTRAL AGUIRRE, P.R (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CENTRAL LA PLATA, P.R. (1964)
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Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: CIALES, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: COAMO, P.R. (1972)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: COROZAL, P.R. (1972)

Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: CULEBRA AND ADJACENT ISLANDS, P.R. (1948)
Enumerated_Domain_Value_Definition: USGS 1:30,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: TOPO
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: EL YUNQUE, P.R. (1982)
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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: GUANICA, P.R. (1966)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: GUAYAMA, P.R. (1982)

Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: GURABO, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: HUMACAO, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: ISABELA, P.R. (1960)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Attribute_Domain_Values:

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Enumerated_Domain_Value: ISLA DE VIEQUES, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:30,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: ISLA DESECHEO, P.R.
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Attribute_Domain_Values:

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Enumerated_Domain_Value: ISLA MONA, P.R. (1944)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: JAYUYA, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map

name
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Attribute_Domain_Values:

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Enumerated_Domain_Value: JUNCOS, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: MANATI, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: MARICAO, P.R. (1960)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: MAYAGÜEZ, P.R. (1964)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: MONTE GUILARTE, P.R. (1960)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: NAGUABO, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name

Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: NARANJITO, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: OROCOVIS, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
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Enumerated_Domain_Value: PARGUERA, P.R. (1966)
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Attribute_Domain_Values:

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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Enumerated_Domain_Value: PEÑUELAS, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Attribute_Domain_Values:

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Enumerated_Domain_Value: PLAYA DE PONCE, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Attribute_Domain_Values:

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Attribute_Domain_Values:

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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: PUNTA CUCHARA, P.R. (1982)
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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Attribute_Domain_Values:

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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Enumerated_Domain_Value: QUEBRADILLAS, P.R. (1972)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: RIO DESCALABRADO, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: RIO GRANDE, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: ROSARIO, P.R. (1964)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: SABANA GRANDE, P.R. (1966)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value: SALINAS, P.R. (1982)
Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

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Enumerated_Domain_Value_Definition: USGS 1:20,000 Topographic map name
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: SCALE
Attribute_Definition:
SCALE contains the value of the denominator of the scale at which the map is plotted in the final map product
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 55,000
Enumerated_Domain_Value_Definition: Scale = 1:55,000
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 62,000
Enumerated_Domain_Value_Definition: Scale = 1:62,000
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 65,000
Enumerated_Domain_Value_Definition: Scale = 65,000
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 350,000
Enumerated_Domain_Value_Definition: Scale = 350,000
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: MAPANGLE
Attribute_Definition:
MAPANGLE contains a value to rotate the final map product so that it is situated straight up and down
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 0.000
Range_Domain_Maximum: 90.000
Attribute_Units_of_Measure: Degree
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: PAGESIZE
Attribute_Definition:
PAGESIZE contains the value of the width and height of the map in the final map

product
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 11,17
Enumerated_Domain_Value_Definition: Page size = 11" X 17"
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 17,11
Enumerated_Domain_Value_Definition: Page size = 17" X 11"
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5,6
Enumerated_Domain_Value_Definition: Page size = 5" X 6"
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
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Enumerated_Domain_Value: 54,30
Enumerated_Domain_Value_Definition: Page size = 54" X 30"
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329

Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: BIRDS

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: BIRDS
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource data for birds.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Bird
Theme_Keyword: Gull
Theme_Keyword: Tern
Theme_Keyword: Passerine
Theme_Keyword: Pelagic
Theme_Keyword: Raptor
Theme_Keyword: Shorebird
Theme_Keyword: Wading
Theme_Keyword: Waterfowl

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked, using both on-screen and hardcopy reviews. The edited maps are updated, and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30, 000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews.

Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section, Spatial_Data_Organization_Information, refers to the source files in ARC export format only.

Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (BIRDS) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table).

EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): BIRD: bird, gull_tern, passerine, pelagic, raptor, shorebird, wading, waterfowl. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. For BIRDS, BREED1 = nesting. There are no BREED2-BREED5 activities for BIRDS, so those columns are populated with a dash (-). The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data but the data have "fuzzy" boundaries which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Saliva, J., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Seabird Colonies, Manatee Aggregations, and other Coastal Resources of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Raffaele,H., J. Wiley, et al
Publication_Date: 1998
Title: A Guide to the Birds of the West Indies
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Princeton, NJ
Publisher: Princeton University Press
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Division de Patrimonio Natural, Puerto Rico Department of Planning Natural Resources

Publication_Date: Unpublished Material
Title: Element Occurrence Record Maps and Files for Puerto Rico
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Fish and Wildlife Service
Publication_Date: 1995
Title:
Critical Habitat Designations for Threatened and Endangered Fish and Wildlife
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Washington, D.C.
Publisher: Government Printing Office
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1995
Ending_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Lopez, F., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Various Natural Resource and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Chabert, J., Ramos, D., Puerto Rico Department of Planning Natural Resources, San Jaun
Publication_Date: Unpublished Material
Title:
Waterfowl Areas and other Wildlife and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
U.S. Fish and Wildlife Service, Caribbean Field Office Contact: S, Silander, U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Threatened and Endangered Species Site Records
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Puerto Rico Department of Natural Resources
Publication_Date: 1979
Title: Critical Wildlife Areas of Puerto Rico
Geospatial_Data_Presentation_Form: Maps and Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: PR DNR, Division of Coastal Resources and Wildlife Planning
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1979
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Cardona, J.F. and M. Rivera
Publication_Date: 1988
Title: Critical Coastal Wildlife Areas of Puerto Rico
Geospatial_Data_Presentation_Form: Maps and Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Puerto Rico DNER, Coastal Zone Management Program
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1988
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator:

Garcia, E., U.S. Forest Service, Carribbean National Forest, Palmer
Publication_Date: Unpublished Material
Title:
Sensitive Natural Resource Locations for the Caribbean National Forest
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Jobos Bay NERR Staff, Puerto Rico Department of Planning Natural Resources/NOAA Contact: C. Gonzalez, Reserve Manager
Publication_Date: Unpublished Material
Title:
Resources of Jobos Bay, Including Field Verification of Shoreline and Benthic Habitats
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Arendt, W., U.S. Fishery Service, Rio Piedras, PR
Publication_Date: Unpublished Material
Title:
Bird Seasonality and Nesting Time-periods for the Caribbean National Forest
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Division of Reserves and Refuges, Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Wildlife Additions for Boqueron and Lago Luchetti Refuges
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Bird data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle

State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 1009
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 1009
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 1952
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 385780
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 1829

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Birds in this atlas are divided into several species subgroups based on taxonomy, morphology, behavior, and oil spill vulnerability and sensitivity. The species table lists all the birds included on the maps, sorted by subgroup. These species are included either because of their likelihood of direct or indirect impact by an oil spill or similar incident, their general rarity or imperilment, or their special protection status as threatened or endangered. Marine, wetland, and aquatic species; nesting sites and colonies; and protected species are especially emphasized. Seabird concentration areas and nesting colonies in this atlas were based on information provided by USFWS. Concentration areas for wetland and aquatic birds were based mainly on information provided by DRNA waterfowl and wildlife biologists. Locations for Puerto Rican parrots were derived based on information provided by USFS biologists. The DRNA Division de Patrimonio Natural provided information for protected and other species throughout the study area. These sources were augmented by information from the DRNA reports on Critical Wildlife Areas and Critical Coastal Wildlife Areas of Puerto Rico, and other expert and published sources.
Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (1), and record number. ID values of 9999 are holes in polygons and do not contain information. The following BIRDS species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 17, Northern pintail; 18, Green-winged teal; 23, Lesser scaup; 34, American coot; 77, Osprey; 86, Least tern; 91, Glossy ibis; 93, Cattle egret; 95, Roseate tern; 97, Green heron; 98, Laughing gull; 107, Peregrine falcon; 118, Brown pelican; 119, Magnificent frigatebird; 120, Yellow-crowned night-heron; 125, Clapper rail; 126, Brown noddy; 127, Sooty tern; 128, Masked (blue-faced) booby; 133, Black skimmer; 135, Sandwich tern; 137, Royal tern; 139, Snowy plover; 142, Black-necked stilt; 148, Ruddy duck; 152, American oystercatcher; 153, Piping plover; 169, American wigeon; 176, Short-eared owl; 179, Pied-billed grebe; 180, Ring-necked duck; 182, American kestrel; 188, Sora; 190, Blue-winged teal; 192, Common moorhen; 196, Common snipe; 212, Purple gallinule; 216, Belted kingfisher; 220, Merlin; 230, Red-tailed hawk; 252, White-tailed tropicbird; 260, Red-footed booby; 261, Brown booby; 267, Fulvous whistling-duck; 268, Masked duck; 269, Least grebe; 283, Bridled tern; 287, Audubon's shearwater; 297, White-crowned pigeon; 307, Caribbean coot; 308, Elfin woods warbler; 342, Red-billed tropicbird; 367, Greater flamingo; 404, Yellow-breasted crake; 420, Mangrove cuckoo; 438, Puerto Rican plain pigeon; 439, Puerto Rican nightjar; 440, Scaly-naped pigeon; 444, White-cheeked pintail; 446, Yellow-shouldered blackbird; 447, West Indian whistling-duck; 448, White-winged dove; 449, Zenaida dove; 450, Puerto Rican sharp-shinned hawk; 451, Puerto Rican broad-winged hawk; 452, Mourning dove; 453, Puerto Rican parrot; 454, Puerto Rican

lizard-cuckoo; 455, Yellow-billed cuckoo; 456, Puerto Rican bullfinch; 457, Key West quail-dove; 1001, Gulls; 1002, Shorebirds; 1003, Waterfowl; 1004, Wading birds; 1008, Terns; 1012, Neotropical migrants; 1018, Passerine birds; 1021, Ducks; 1022, Seabirds

Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660100002
Range_Domain_Maximum: 660101015
Attribute_Units_of_Measure: Ordered

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration

Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349

Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329

Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding

the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.

Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: FISH (Fish Polygons)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: FISH (Fish Polygons)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource polygonal data for fish.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Fish
Theme_Keyword: Diadromous
Theme_Keyword: Estuarine
Theme_Keyword: Freshwater
Theme_Keyword: Benthic
Theme_Keyword: Pelagic

Place:

Place_Keyword_Thesaurus: None

Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked, using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists.

The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (FISH) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage

Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): FISH: diadromous, e_nursery, freshwater, m_benthic, m_pelagic. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. For FISH, BREED1 = spawning, BREED2 = eggs, BREED3 = larvae, BREED4 = juveniles, and BREED5 = adults. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 gives a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data, but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Yoshioka, B., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Native Stream Fish, Shrimp, and Crab Distribution, Seasonality, and Life-History
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Caribbean Fishery Management Council and National Marine Fishery Service Information Contact: G. Garcia-Moliner, CFMCA
Publication_Date: Unpublished Material
Title:
Fishery Management Plans for Reef Fish, Lobster, and Conch for the U.S. Caribbean
Geospatial_Data_Presentation_Form: Document
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1981
Ending_Date: 1996
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Caribbean Fishery Management Council and NOAA SEAD
Publication_Date: 1998
Title: Essential Fish Habitat Amendments to FMPS of the U.S. Caribbean
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Caribbean Fishery Management Council
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Caribbean Fishery Management Councile and National Marine Fishery Service Contacts: G. Garcia-Moliner, CFMC, San Juan; NMFS HMS Division, Silver Springs
Publication_Date: Unpublished Material
Title:
FMPS for Coastal Migratory Pelagics, Tunas, Swordfish, Sharks, and Billfish
Geospatial_Data_Presentation_Form: Document
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1983
Ending_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator: National Marine Fishery Service
Publication_Date: 1998
Title:
Draft Amendment 1 to the Atlantic Billfish Fishery Management Plan
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Silver Spring, MD
Publisher:
National Marine Fishery Service, Highly Migratory Species

Division
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Rosario, A., Puerto Rico Department of Planning Natural Resources, Mayaguez
Publication_Date: Unpublished Material
Title:
Spawning Aggregations, Benthic Habitat, and other Resource Features of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Sadovy, Y., A. Rosario and A. Roman
Publication_Date: 1994
Title:
Reproduction in an Aggregating Grouper, The Red Hind, Epinephelus Guttatus
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: The Netherlands
Publisher: Environmental Biology of Fishes, Kluwer Acadmic Publishers
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1987
Ending_Date: 1992
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Chabert, J., Ramos, D., Puerto Rico Department of Planning Natural Resources, San Jaun, PR
Publication_Date: Unpublished Material
Title:
Waterfowl Areas and other Wildlife and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Velazco, A., Puerto Rico Department of Planning Natural Resources, San Juan
Publication_Date: Unpublished Material
Title:
Benthic Habitats and Various Fisheries and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study

Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
North Carolina State University and Puerto Rico Department of Planning Natural Resources
Publication_Date: 1996
Title:
Habitat Dependency and Marine Gamefish Population Dynamics, Snook and Tarpon
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: North Carolina
Publisher:
Final Reports to the U.S. Fish and Wildlife Service, Federal Aid Project F-33
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1991
Ending_Date: 1995
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
PR Department of Planning Natural Resources Marine Resource Division, SJ Contact: C. Lilyestron, Chief, MRD, PR DPNR
Publication_Date: Unpublished Material
Title:
Sportfish in inland Reservoirs and other Fisheries Resources of Puerto Rico
Geospatial_Data_Presentation_Form: Tables and Expert knowledge
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study

Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Neal, J.W., North Carolina State University
Publication_Date: Unpublished Material
Title:
Life-history and Seasonality for Sportfish in inland Reservoirs of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Erdman, D.S.
Publication_Date: 1976
Title: Spawning Patterns of Fishes from the Northeastern Caribbean
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Department of Agriculture
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1954
Ending_Date: 1976
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Grana Raffucci, F., Puerto Rico Department of Planning Natural Resources, San Jaun, PR
Publication_Date: Unpublished Material
Title: Comments on the Draft Puerto Rico ESI Atlas
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 2772
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 2772
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 3966
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 399904
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 3626

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Finfish depicted in this atlas include selected marine, estuarine, diadromous, and

freshwater species. Species of commercial, recreational, ecological, and/or conservation interest are emphasized. Major finfish (and invertebrate) distributions were mapped using five major geographic divisions: nearshore and shelf waters, offshore waters, estuarine areas, RSI-classified streams, and major freshwater reservoirs.

Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (2), and record number. ID values of 9999 are holes in polygons and do not contain information. The following FISH species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 143, Tarpon; 179, Largemouth bass; 201, Channel catfish; 204, Redear sunfish; 504, Hog-nosed mullet; 505, Peacock bass; 506, White catfish; 507, Tilapia; 508, Snook; 509, Red hind; 511, Tiger grouper; 514, Mutton snapper; 515, Yellowtail snapper; 521, Blue marlin; 524, Sirajo goby (seti); 1002, Reef fish; 1003, Pelagic fish; 1004, Nursery fish; 1006, Native stream fish.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660200002
Range_Domain_Maximum: 660202779
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: FISHL (Fish Lines)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: FISHL (Fish Lines)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource line data for fish.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Fish
Theme_Keyword: Diadromous

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are

no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig .jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked, using both on-screen and hardcopy reviews. The edited maps are updated, and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30, 000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To

finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological lines (FISHL) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): FISHL: diadromous. The STATUS data table contains records for each species that is threatened or

endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. For FISH, BREED1 = spawning, BREED2 = eggs, BREED3 = larvae, BREED4 = juveniles, and BREED5 = adults. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data, but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Yoshioka, B., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material

Title:
Native Stream Fish, Shrimp, and Crab Distribution, Seasonality, and Life-History
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
PR Department of Planning Natural Resources Marine Resource Division, SJ Contact: C. Lilyestron, Chief, MRD, PR DPNR
Publication_Date: Unpublished Material
Title:
Sportfish in inland Reservoirs and other Fisheries Resources of Puerto Rico
Geospatial_Data_Presentation_Form: Tables and Expert knowledge
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Erdman, D.S.
Publication_Date: 1976
Title: Spawning Patterns of Fishes from the Northeastern Caribbean
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Department of Agriculture
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1954
Ending_Date: 1976
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Fish data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 380
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 27187
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 498

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Finfish depicted in this atlas include selected marine, estuarine, diadromous, and freshwater species. Species of commercial, recreational, ecological, and/or conservation interest are emphasized. Major finfish (and invertebrate) distributions were mapped using five major geographic divisions: nearshore and shelf waters, offshore waters, estuarine areas, RSI-classified streams, and major freshwater reservoirs.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (2), and record number. The following fish species are found in the Puerto Rico ESI/RSI FISHL data set (SPECIES ID, NAME): 1004, Nursery fish; 1006, Native stream fish.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660200001
Range_Domain_Maximum: 660200380
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: INVERT (Invertebrate Polygons)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: INVERT (Invertebrate Polygons)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

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This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource polygonal data for invertebrates.

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The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Invertebrate
Theme_Keyword: Bivalve
Theme_Keyword: Cephalopod
Theme_Keyword: Crab
Theme_Keyword: Gastropod
Theme_Keyword: Lobster
Theme_Keyword: Shrimp

Theme_Keyword: Shellfish

Place:

Place_Keyword_Thesaurus: None

Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

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Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked, using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of

maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI/RSI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (INVERT) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of

ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): INVERT: bivalve, cephalopod, crab, gastropod, lobster, and shrimp. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. For INVERT, BREED1 = spawning, BREED2 = eggs, BREED3 = larvae, BREED4 = juveniles, and BREED5 = adults. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data, but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Yoshioka, B., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Native Stream Fish, Shrimp, and Crab Distribution, Seasonality, and Life-History
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Lopez, F., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Various Natural Resource and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Caribbean Fishery Management Council and National Marine Fishery Service Information Contact: G. Garcia-Moliner, CFMC
Publication_Date: Unpublished Material
Title:
Fishery Management Plans for Reef Fish, Lobster, and Conch for the

U.S. Caribbean
Geospatial_Data_Presentation_Form: Document
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1981
Ending_Date: 1996
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Appledorn, R., Universiy of Puerto Rico - Marine Science Mayaguez
Publication_Date: Unpublished Material
Title:
Queen Conch Life-History, Fishing Areas, and other Resources for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Rosario, A., Puerto Rico Department of Planning Natural Resources, Mayaguez
Publication_Date: Unpublished Material
Title:
Spawning Aggregations, Benthic Habitat, and other Resource Features of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Chabert, J., Ramos, D., Puerto Rico Department of Planning Natural Resources, San Jaun
Publication_Date: Unpublished Material
Title:
Waterfowl Areas and other Wildlife and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Figuerola, M., Puerto Rico Department of Planning Natural Resources, Mayaguez
Publication_Date: Unpublished Material
Title: Land Crab Distribution for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Creamer, D.F.
Publication_Date: Unknown
Title: Land Crab Management Plan for Vieques Island, Puerto Rico
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Panama City, FL
Publisher: U.S. Fish and Wildlife Service, Panama City Field Office
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: Unknown
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Rivera, J., National Marine Fishery Service, Mayaguez
Publication_Date: Unpublished Material
Title:
Benthic Habitats, Sea Turtles, and Various other Marine Resources for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Grana Raffucci, F., Puerto Rico Department of Planning Natural Resources, San Jaun
Publication_Date: Unpublished Material
Title: Comments on the Draft Puerto Rico ESI Atlas
Geospatial_Data_Presentation_Form: Expert knowledge

Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 2792

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 2792
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 3902
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 349186
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 3558

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Invertebrates depicted in this atlas include selected marine, estuarine, amphidromous, and freshwater species. Species of commercial, recreational, ecological, and/or conservation interest are emphasized. Major invertebrate distributions were mapped using four major geographic divisions: nearshore and shelf waters, offshore waters, estuarine areas, and RSI-classified streams.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (7), and record number. ID values of 9999 are holes in polygons and do not contain information. The following INVERT species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 30, Octopus; 72, Caribbean spiny lobster; 92, Penaeid shrimp; 100, Quahog (hard clam); 101, Queen conch; 126, Blue crabs; 127, Blackback land crab; 309, Freshwater crab; 310, Mona Island shrimp; 311, West Indian topsnail (whelk); 313, Swamp ghost crab (zambuco); 314, Blue land crab; 324, Purple land crab; 1011, Native stream shrimp.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660700002
Range_Domain_Maximum: 660702800
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington

Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: INVERTL (Invertebrate Lines)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: INVERT (Invertebrate Lines)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource line data for invertebrates.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Invertebrate
Theme_Keyword: Crab
Theme_Keyword: Shrimp
Theme_Keyword: Shellfish

Place:

Place_Keyword_Thesaurus: None

Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked, using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists.

The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

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Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological lines (INVERTL) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage

Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): INVERTL: crab, shrimp. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. For INVERTL, BREED1 = spawning, BREED2 = eggs, BREED3 = larvae, BREED4 = juveniles and BREED5 = adults. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Yoshioka, B., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Native Stream Fish, Shrimp, and Crab Distribution, Seasonality, and Life-History
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
PR Department of Planning Natural Resources Marine Resource Division, SJ Contact: C. Lilyestron, Chief, MRD, PR DPNR
Publication_Date: Unpublished Material
Title:
Sportfish in inland Reservoirs and other Fisheries Resources of Puerto Rico
Geospatial_Data_Presentation_Form: Tables and Expert knowledge
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Erdman, D.S.
Publication_Date: 1976
Title: Spawning Patterns of Fishes from the Northeastern Caribbean
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: San Juan, PR

Publisher: Department of Agriculture
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1954
Ending_Date: 1976
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Invertebrate data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 439
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 31464
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 498

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Invertebrates depicted in this atlas include selected marine, estuarine, amphidromous, and freshwater species. Species of commercial, recreational, ecological, and/or conservation interest are emphasized. Major invertebrate distributions were mapped using four major geographic divisions: nearshore and shelf waters, offshore waters, estuarine areas, and RSI-classified streams.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (7), and record number. The following INVERTL species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 309,

Freshwater crab; 314, Blue land crab; 1011, Native stream shrimp.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660700001
Range_Domain_Maximum: 660700439
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input

peripherals, or when the physical medium is delivered in damaged condition.

Custom_Order_Process:

Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: M_MAMMAL (Marine Mammal Polygons)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: M_MAMMAL (Marine Mammal Polygons)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource polygonal data for marine mammals.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Marine mammal
Theme_Keyword: Dolphin
Theme_Keyword: Manatee
Theme_Keyword: Whale

Place:

Place_Keyword_Thesaurus: None

Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

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Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (M_MAMMAL) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage

Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): M_MAMMAL: dolphin, manatee, and whale. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. For M_MAMMAL, BREED1 = mating and BREED2 = calving. There are no BREED3-BREED5 activities for M_MAMMAL, so those columns are populated with a dash (-). The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Saliva, J., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Seabird Colonies, Manatee Aggregations, and other Coastal Resources of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Marine mammal data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Division de Patrimonio Natural, Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Element Occurrence Record Maps and Files for Puerto Rico
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Marine mammal data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Mignucci-Giannoni, A.A.
Publication_Date: 1998
Title:
Zoogeography of Cetaceans off Puerto Rico and the Virgin Islands
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Mayaguez, PR
Publisher: University of Puerto Rico, College of Arts and Sciences
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1989
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Marine mammal data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Jobos Bay NERR Staff, Puerto Rico Department of Planning Natural Resources/NOAA Contact: C. Gonzalez, Reserve Manager
Publication_Date: Unpublished Material
Title:
Resources of Jobos Bay, Including Field Verification of Shoreline and Benthic Habitats
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Marine mammal data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Mignucci-Giannoni, A., University Metro
Publication_Date: Unpublished Material
Title:
Marine Mammals Distribution, Life-History, and Seasonality Edits
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000

Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Marine mammal data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Laguer, Y.T., U.S. Enivronmental Protection Agency, San Juan
Publication_Date: Unpublished Material
Title: Water Intakes Edits, Addresses and contacts
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Marine mammal data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 2321
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 2321
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 3110
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 337936
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 2993

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Marine mammals depicted in the Puerto Rico atlas include whales, dolphins, and manatees. Concentration areas and highly sensitive areas for humpback whales, sperm whales, and manatees are specifically indicated on the maps. These areas include nearshore humpback migration routes along the northern coast of Puerto Rico, humpback and sperm whale breeding and calving areas, and known concentration areas or aggregation sites for manatees (based mainly on USFWS manatee surveys). It should be recognized that humpback and sperm whales, and other whales and dolphins, can occur throughout nearly all marine waters of Puerto Rico. Likewise, manatees commonly occur throughout all coastal waters of Puerto Rico, not just in the concentration areas depicted.
Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (4), and record number. ID values of 9999 are holes in polygons and do not contain information. The following M_MAMMAL species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 10, West Indian manatee; 13, Humpback whale; 48, Sperm whale; 1000, Whales; 1001, Dolphins.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660400002
Range_Domain_Maximum: 660402106
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way, N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349

Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: REPTILES (Reptiles and Amphibians)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: REPTILES (Reptiles and Amphibians)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource data for reptiles and amphibians.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Reptile
Theme_Keyword: Amphibian
Theme_Keyword: Lizard
Theme_Keyword: Snake
Theme_Keyword: Turtle

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked, using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized checked using both digital and on-screen

procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (REPTILES) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described

above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): REPTILES: amphibian, lizard, snake, and turtle. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. For REPTILES, BREED1 = nesting, BREED2 = hatching, BREED3 = internesting, BREED4 = juveniles, and BREED5 = adults. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Saliva, J., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Seabird Colonies, Manatee Aggregations, and other Coastal Resources of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Raffaele,H., J. Wiley, et al
Publication_Date: 1998
Title: A Guide to the Birds of the West Indies
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Princeton, NJ
Publisher: Princeton University Press
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Division de Patrimonio Natural, Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Element Occurrence Record Maps and Files for Puerto Rico

Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Rivero, J.A.
Publication_Date: 1998
Title:
Los Anfibios y Reptiles de Puerto Rico, Segunda Edicion Revisada
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Editorial de la Universidad de Puerto Rico
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Diez, C., Puerto Rico Department of Planning Natural Resources, San Juan
Publication_Date: Unpublished Material
Title:
Sea Turtle, Ground Iguana, and Other Reptile Data for Mona Island
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Rivera, M., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Sea Turtle Nesting Beaches, Seasonality, and Life-History in Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Fish and Wildlife Service
Publication_Date: 1995
Title:
Critical Habitat Designations for Threatened and Endangered Fish and Wildlife
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Washington, D.C.
Publisher: Government Printing Office
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1995
Ending_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data

Source_Information:

Source_Citation:

Citation_Information:

Originator: Lopez, F., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Various Natural Resource and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
U.S. Fish and Wildlife Service, Caribbean Field Office Contact: S, Silander, U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Threatened and Endangered Species Site Records
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Puerto Rico Department of Natural Resources
Publication_Date: 1979
Title: Critical Wildlife Areas of Puerto Rico
Geospatial_Data_Presentation_Form: Maps and Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: PR DNR, Division of Coastal Resources and Wildlife Planning
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1979
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Rivera, J., National Marine Fishery Service, Mayaguez
Publication_Date: Unpublished Material
Title:
Benthic Habitats, Sea Turtles, and Various other Marine Resources for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Garcia, E., U.S. Forest Service, Carribbean National Forest, Palmer
Publication_Date: Unpublished Material
Title:
Sensitive Natural Resource Locations for the Caribbean National Forest
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Jobos Bay NERR Staff, Puerto Rico Department of Planning Natural Resources/NOAA Contact: C. Gonzalez, Reserve Manager
Publication_Date: Unpublished Material
Title:
Resources of Jobos Bay, Including Field Verification of Shoreline and Benthic Habitats
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Sustache, J., Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Wildlife Edits and Additions for Inland Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Division of Reserves and Refuges, Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Wildlife Additions for Boqueron and Lago Luchetti Refuges
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Reptile data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 1643
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 1643
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 2426
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 273805
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 1999

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
For the coastal and marine portions of this atlas, mapping of sea turtle nesting beaches

was emphasized. A few known sea turtle in-water concentrations were also mapped. Using information provided by the USFWS (US Fish and Wildlife Service), it was determined that nearly every coastal USGS (US Geological Survey) topographic map with sand beach habitats (or mixed sand and gravel beach) had records for sea turtle nesting on at least one beach. It is likely that all such beaches have the potential for sea turtle nesting in Puerto Rico. Accordingly, nesting sea turtles have been indicated on nearly every sand beach (ESI = 3A or 4) and mixed sand and gravel beach (ESI = 5) in this atlas. Known sea turtle in-water areas were mapped mainly using expert knowledge, although DRNA (Departamento de Recursos Naturales y Ambientales) DPN (Division de Patrimonio Natural) and NMFS (National Marine Fishery Service) records were consulted as well. Note that designated critical habitats for nesting and in-water sea turtles are also mapped as special natural resource management areas. Locations for rare and protected amphibians and reptiles in coastal and inland areas (coquíes, toads, lizards, snakes, and freshwater turtles) were based mainly on information provided by the DRNA DPN, augmented with information from DRNA wildlife biologists and resource managers, USFS (U.S. Department of Agriculture Forest Service) biologists [coquíes in CNF (Caribbean National Forest)], USFWS, and the DRNA reports on Critical Wildlife Areas. Seasonality and life-history information for rare and protected amphibians and reptiles was mainly derived from Rivero (1998), supplemented by expert information.

Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (6), and record number. ID values of 9999 are holes in polygons and do not contain information. The following REPTILES species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 2, Green sea turtle; 5, Leatherback sea turtle; 9, Hawksbill sea turtle; 67, Cook's anole; 68, Culebra Island giant; 69, Mona ground iguana; 70, Guajon; 71, Mottled coqui; 72, Golden coqui; 73, Web-footed coqui; 74, Puerto Rican boa; 75, Mona boa; 76, Mabuya; 77, Puerto Rican crested; 78, Monito gecko; 79, Virgin Islands tree; 80, Mona coqui; 81, Pygmy anole; 82, Burrow coqui; 83, Warty coqui; 84, Ground coqui; 88, Jicotea.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660600002
Range_Domain_Maximum: 660601652
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807

Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address

Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: T_MAMMAL (Terrestrial Mammals)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: T_MAMMAL (Terrestrial Mammals)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource data for terrestrial mammals.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Terrestrial mammal
Theme_Keyword: Bat

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:
DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.
Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG
Data_Set_Credit:
This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.
Native_Data_Set_Environment:
The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:
The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.
Logical_Consistency_Report:
The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked, using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes

final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (T_MAMMAL) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.] The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item

SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): T_MAMMAL: bat. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. There are no BREED activities for T_MAMMAL. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator:
Division de Patrimonio Natural, Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Element Occurrence Record Maps and Files for Puerto Rico
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Terrestrial mammal data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Puerto Rico Department of Natural Resources
Publication_Date: 1979
Title: Critical Wildlife Areas of Puerto Rico
Geospatial_Data_Presentation_Form: Maps and Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher:
PR Department of Natural Resources, Division of Coastal Resources and Wildlife Planning
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1979
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Terrestrial mammal data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.

Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 6
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 6
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 100
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 39798
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 100

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Terrestrial mammals depicted in this atlas are limited to bats. Bats were generally indicated where large continuous tracks of forested karst areas were considered critical wildlife habitat by resource experts. In addition, red fruit bats (a U.S. Forest Service (USFS) "sensitive species") were specifically mapped in the Caribbean National Forest (CNF), based on information provided by DRNA Division de Patrimonio Natural. It should be recognized that important bat habitats and occurrence sites are present in other locations throughout Puerto Rico.
Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (9), and record number. ID values of 9999 are holes in polygons and do not contain information. The following T_MAMMAL species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 9, Red fruit bat; 1001, Bats.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660900002
Range_Domain_Maximum: 660900007
Attribute_Units_of_Measure: Ordered

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RARNUM

Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: HABITATS

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: HABITATS
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains data for habitats.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Habitat
Theme_Keyword: Floating aquatic vegetation (FAV)
Theme_Keyword: Submersed aquatic vegetation (SAV)
Theme_Keyword: Upland
Theme_Keyword: Wetland

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:
DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.
Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG
Data_Set_Credit:
This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.
Native_Data_Set_Environment:
The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:
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Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (HABITATS) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM. [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases]. The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item

SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): HABITATS: floating aquatic vegetation (FAV), submersed aquatic vegetation (SAV), upland, and wetland. The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. There are no BREED activities for HABITATS. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator:
Division de Patrimonio Natural, Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Element Occurrence Record Maps and Files for Puerto Rico
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Habitat data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Lopez, F., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Various Natural Resource and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Habitat data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Chabert, J., Ramos, D., Puerto Rico Department of Planning Natural Resources, San Juan, PR
Publication_Date: Unpublished Material
Title:
Waterfowl Areas and other Wildlife and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999

Source_Currentness_Reference: Date of communication

Source_Citation_Abbreviation: None

Source_Contribution: Habitat data

Source_Information:

Source_Citation:

Citation_Information:

Originator:

Velazco, A., Puerto Rico Department of Planning Natural Resources, San Juan

Publication_Date: Unpublished Material

Title:

Benthic Habitats and Various Fisheries and Human-use Features for Puerto Rico

Geospatial_Data_Presentation_Form: Expert knowledge

Type_of_Source_Media: Personal communication

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999

Source_Currentness_Reference: Date of study

Source_Citation_Abbreviation: None

Source_Contribution: Habitat data

Source_Information:

Source_Citation:

Citation_Information:

Originator:

U.S. Fish and Wildlife Service, NWI Program Contact: U.S. Fish and Wildlife Service, National Wetlands Inventory Center, (See also <http://www.nwi.fws.gov/>)

Publication_Date: Unpublished Material

Title: Draft National Wetlands Inventory (NWI) Data for Puerto Rico

Geospatial_Data_Presentation_Form: Vetcor digital data

Source_Scale_Denominator: 40000

Type_of_Source_Media: Online

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1983

Source_Currentness_Reference: Date of study

Source_Citation_Abbreviation: None

Source_Contribution: Habitat data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
U.S. Fish and Wildlife Service, Caribbean Field Office Contact: S, Silander, U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Threatened and Endangered Species Site Records
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Habitat data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Cardona, J.F. and M. Rivera
Publication_Date: 1988
Title: Critical Coastal Wildlife Areas of Puerto Rico
Geospatial_Data_Presentation_Form: Maps and Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Puerto Rico DNER, Coastal Zone Management Program
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1988
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Habitat data
Source_Information:

Source_Citation:

Citation_Information:

Originator:

Division of Reserves and Refuges, Puerto Rico Department of Planning Natural Resources
Publication_Date: Unpublished Material
Title: Wildlife Additions for Boqueron and Lago Luchetti Refuges
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Habitat data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 219
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 219
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 324
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 73693
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 312

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Threatened and endangered (T&E) plants for both coastal and inland areas are emphasized in this atlas. Pterocarpus swamps are also shown. T&E plants and

Pterocarpus swamps were mapped based on information provided by DRNA (Departamento de Recursos Naturales y Ambientales), Division de Patrimonio Natural, and USFWS (US Fish and Wildlife Service). Floating and submersed aquatic vegetation (FAV, SAV), mainly freshwater or low salinity species, were mapped in the lower sections of rivers and coastal lagoons, based on NWI (National Wetlands Inventory) data and information provided by DRNA, Division de Patrimonio Natural, and expert sources. Note that marine and estuarine seagrass beds were not mapped with this group of resources. Seagrasses were mapped as benthic marine habitats.

Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (3), and record number. ID values of 9999 are holes in polygons and do not contain information. The following HABITATS species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 213, Submersed aquatic vegetation; 215, Water lettuce; 217, Water hyacinth; 221, Floating aquatic vegetation; 304, Polystichum calderonense; 414, Banara vanderbiltii; 415, Callicarpa ampla; 416, Calyptronoma rivalis; 417, Crescentia portoricensis; 418, Eugenia woodburyana; 419, Gesneria pauciflora; 420, Goetzea elegans; 421, Harrisia portoricensis; 422, Lyonia truncata proctorii; 423, Myrcia paganii; 424, Ottoschulzia rhodoxylon; 425, Pterocarpus swamp; 426, Schoepfia arenaria; 427, Solanum drymophilum; 428, Stahlia monosperma; 429, Vernonia proctorii; 430, Zanthoxylum thomasianum; 431, Adiantum vivesii; 432, Aristida chaseae; 433, Aristida portoricensis; 434, Auerodendron pauciflorum; 435, Buxus vahlii; 436, Calyptranthes thomasiana; 437, Cornutia obovata; 438, Cyathea dryopteroides; 439, Daphnopsis hellerana; 440, Elaphoglossum serpens; 441, Eugenia haematocarpa; 442, Ilex cookii; 443, Ilex sintenisii; 444, Juglans jamaicensis; 445, Lepanthes eltoroensis; 446, Leptocereus grantianus; 448, Mitracarpus maxwelliae; 449, Mitracarpus polycladus; 450, Peperomia wheeleri; 452, Styrax portoricensis; 453, Ternstroemia luquillensis; 454, Ternstroemia subsessilis; 455, Trichilia triacantha; 456, Spiny naiad; 457, Chamaecrista glandulosa mirabilis; 458, Thelypteris verecunda; 459, Pleodendron macranthum; 460, Thelypteris inabonensis; 461, Thelypteris yaucoensis; 499, Cranichis ricartii; 500, Tectaria estremerana.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660300002
Range_Domain_Maximum: 660300221
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001

Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: BENTHIC (Benthic Marine Habitats)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: BENTHIC (Benthic Marine Habitats)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains sensitive biological resource data for benthic marine habitats.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Benthic
Theme_Keyword: Coral
Theme_Keyword: Hardbottom
Theme_Keyword: Reef
Theme_Keyword: Submersed aquatic vegetation (SAV)

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline and wetlands data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen

procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE (r) and ARC/INFO (r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. After the data are delivered to NOAA, they are again subjected to a number of quality and consistency checks. In the process of checking for topological and database consistencies, new IDs and RARNUMs or HUNUMs are also generated. The new IDs are a combination of atlas number, element number, and record number. In addition, the value used to represent the element is modified to reflect the type of feature being mapped. In the case of an element that is normally represented by a point or polygon, a value of 20 is added to the standard element value for mapping of linear features. In the case where an element usually mapped as a polygon is represented by a point, a value of 30 is added to the regular element value. The RARNUMs are also modified to include the atlas number, so multiple atlases can be combined and RARNUMs remain unique. RARNUMs are redefined on an element basis, so "resource at risk" groupings will contain only a single element. HUNUMs are also modified to include the atlas number. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Biological information presented in this atlas was collected and compiled with the assistance of biologists from the US Fish and Wildlife Service, and various other agencies, organizations, and groups. Information collected and depicted on the maps denotes the key biological resources that are most likely at risk in the event of an oil spill. Seven major categories, or ELEMENTs, of biological resources were considered during data compilation: birds; fish; invertebrates; habitats; marine mammals; terrestrial mammals; and reptiles. The ELEMENTs generally correspond to the coverage or geographic data layer names. There are also six attribute, or data tables, BIORES, BREED, SEASONAL, SOURCES, SPECIES, and STATUS, that are used to store the complex biological data. The biological polygons (BENTHIC) are linked to the Biological Resources table (BIORES) using the unique ID and the lookup table BIO_LUT, or they can be linked directly using RARNUM [The ID is a unique combination of the atlas number (for Puerto Rico this is 66), an element specific number (birds are layer 1, fish are layer 2, etc.) and a unique record number. The RARNUM represents a unique combination of species, seasonalities, concentrations, and source information. For each of these groupings, a number is generated. That number is concatenated with the atlas number to create a "resource at risk" number that is unique across atlases.]. The items in BIORES include: RARNUM, SPECIES_ID, CONC, SEASON_ID, G_SOURCE, S_SOURCE, ELEMENT, EL_SPE, and EL_SPE_SEA. SPECIES_ID is the numeric identifier of each species and is unique within each ELEMENT. CONC is the concentration of the species and can be descriptive (LOW, MEDIUM, HIGH, etc.) or an actual count of the number of individuals or nests associated with a polygon. SEASON_ID contains a numeric identifier for the unique monthly presence and life history characteristics of each species at a given location. There can be one seasonality record per species, or the same species can have different monthly presence or breeding activities at different sites. When this occurs, a new record with a different SEASON_ID is referenced. G_SOURCE contains the SOURCE_ID for geographic information, and S_SOURCE contains the SOURCE_ID for seasonality information. Both items link to the SOURCES data table. EL_SPE is a concatenation of ELEMENT and SPECIES_ID and links to other data tables (primarily the SPECIES table). EL_SPE_SEA is a concatenation of ELEMENT, SPECIES_ID, and SEASON_ID and links to the SEASONAL and BREED data tables. The SPECIES data table contains the SPECIES_ID (described

above), common name (NAME), scientific name (GEN_SPEC), date the list of Natural Heritage Program (NHP) ranks was published (DATE_PUB), biological element (ELEMENT), biological subelement (SUBELEMENT), and the NHP global conservation status rank. The item SUBELEMENT refers to the grouping of the species: (ELEMENT, subelement): BENTHIC: coral, hardbottom, reef, sav (submersed aquatic vegetation). The STATUS data table contains records for each species that is threatened or endangered on state or federal lists. The items include: ELEMENT, SPECIES_ID, STATE (two-letter state abbreviation, populated with "PR" for Puerto Rico), S_F (state or federal status, populated with "S" for the Commonwealth States), T_E (threatened or endangered status), DATE_PUB (the date the atlas was published when the given state and federal listings were in effect), and EL_SPE. The SEASONAL data table indicates the presence of a particular species in a particular location by month (JAN-DEC). The BIORES table is linked to the SEASONAL table using the item EL_SPE_SEA (a concatenation of the first letter of the ELEMENT, SPECIES_ID, and SEASON_ID). The BREED data table contains the life stage or life history data for each unique combination of ELEMENT, SPECIES_ID, and SEASON_ID (or EL_SPE_SEA). It contains up to 12 records corresponding to each month of the year that the species is present in that location. The items BREED1-BREED5 will reflect different life activities, depending on the ELEMENT referenced. There are no BREED activities for BENTHIC. The SOURCES data table contains metadata for each biological and human-use source listed in the ESI atlas. The items in SOURCES include: SOURCE_ID; ORIGINATOR (author); DATE_PUB (date of publication); TITLE (title of the data set); DATA_FORMAT (digital type, hardcopy maps, etc.); PUBLICATION (additional citation); SCALE (source scale denominator); and TIME_PERIOD (beginning and ending dates of original data collection). The SOURCES data table is linked to all biological data at the feature plus species-level and human-use data at the feature-level. Due to the complexity of the relational database model, the biological data items are also post-processed into a flat file format. This file is entitled BIOFILE and it may be used in place of the relational files to ease simple data queries. The items in the flat file are ELEMENT, SUBELEMENT, NAME, GEN_SPEC, S_F, T_E, NHP, DATE_PUB, CONC, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, BREED1, BREED2, BREED3, BREED4, BREED5, RARNUM, G_SOURCE, S_SOURCE, and BREED. All of these items are the same as their counterparts in the individual files described above, except the BREED1-BREED5 items. BREED is a newly generated variable used to link to the BREED_DT file, a modified, more compact version of the aforementioned BREED file. BREED1-BREED5 give a text summary of when each life stage occurs within that polygon. The life stages referred to are the same as those listed in the previous table. The link to the BIOFILE may be made through BIO_LUT using ID to link to RARNUM, or it may be linked directly to the RARNUM in each of the biology cover's attribute files. As mentioned, BREED_DT is an auxiliary support file to the flat file structure, which allows the user to do searches based on month for seasonal breeding activities. The link from the flat file to BREED_DT is the BREED item. A second supporting data file is SOURCES. This is the same as the source file described above, and the link from the flat file is both G_SOURCE and S_SOURCE. It should be noted that although the flat file eases data query, it is not a normalized database structure, and actual updates performed by the states and other responsible agencies should be done using the relational files.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The biological data sets are developed primarily using regional experts who estimate concentration areas. Unlike shorelines, which maintain relative spatial stability through time, the biological data by nature vary in distribution across the landscape. Therefore, the 1:20,000 and 1:30,000 USGS quadrangles are used as a basemap in gathering the data but the data have "fuzzy" boundaries, which must be understood when utilizing this information.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Geological Survey
Publication_Date: 1944-1982
Title: USGS Topographic Quadrangles
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Reston, VA
Publisher: U.S. Geological Survey
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1944
Ending_Date: 1982
Source_Currentness_Reference: Date of observation
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Lopez, F., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Various Natural Resource and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Univ. Nac. Pedro Henriquez Urena Contact: C.E. Diez, Puerto Rico Department of Planning Natural Resources, San Juan
Publication_Date: Unpublished Material
Title: Habitats del Fondo Marino en la Reserva Natural Isla de Noma
Geospatial_Data_Presentation_Form: Maps

Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: Unknown
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Rosario, A., Puerto Rico Department of Planning Natural Resources, Mayaguez
Publication_Date: Unpublished Material
Title:
Spawning Aggregations, Benthic Habitat, and other Resource Features of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Florida Caribbean Science Center, U.S.Geological Survey Biological Resource Division
Publication_Date: 1998
Title: Nearshore Benthic Habitats Around Vieques Island, Puerto Rico
Geospatial_Data_Presentation_Form: Vetcor digital data, Maps
Publication_Information:

Publication_Place: Gainesville, FL
Publisher:
Sirenia Project, Florida Caribbean Science Center, USGS Biological Resource Division
Source_Scale_Denominator: 33150
Type_of_Source_Media: Disk
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1991
Ending_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: NOAA
Publication_Date: Varies
Title: NOAA Nautical Charts
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Washington, D.C.
Publisher: NOAA, National Ocean Service, Coast Survey
Source_Scale_Denominator: 100000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: Varies
Source_Currentness_Reference: Date of map production
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Garcia, J.R., J. Morelock, et al.
Publication_Date: 2000
Title:
Puerto Rican Reefs: Research Synthesis, Present Threats and Management Perspectives
Geospatial_Data_Presentation_Form: Document, Maps
Publication_Information:

Publication_Place: The Netherlands
Publisher: Elsevier Publishers (IN PRESS)
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Morelock, J., E. A. Winget, et al.
Publication_Date: 1994
Title:
Geologic Maps of the Southwestern Puerto Rico Parguera to Guanica Insular Shelf
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Reston, VA
Publisher: U.S. Geological Survey, Miscellaneous Investigation Series
Source_Scale_Denominator: 40000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1996
Ending_Date: 1989
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Velazco, A., Puerto Rico Department of Planning Natural Resources, San Juan
Publication_Date: Unpublished Material
Title:
Benthic Habitats and Various Fisheries and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999

Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
U.S. Fish and Wildlife Service, NWI Program Contact:U.S. Fish and Wildlife Service, National Wetlands Inventory Center, (See also <http://www.nwi.fws.gov/>)
Publication_Date: Unpublished Material
Title: Draft National Wetlands Inventory (NWI) Data for Puerto Rico
Geospatial_Data_Presentation_Form: Vetcor digital data
Source_Scale_Denominator: 40000
Type_of_Source_Media: Online
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1983
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
U.S. Fish and Wildlife Service, Caribbean Field Office Contact: S, Silander, U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Threatened and Endangered Species Site Records
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Rivera, J., National Marine Fishery Service, Mayaguez
Publication_Date: Unpublished Material
Title:
Benthic Habitats, Sea Turtles, and Various other Marine Resources for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Florida, Caribbean Science Center, U.S. Geological Survey Biological Resource Division
Publication_Date: 1995
Title:
Benthic Communities Mapping, Roosevelt Roads Navel Station, CEIBA, Puerto Rico
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Gainsville, FL
Publisher:
Sirenia Project, Florida Caribbean Science Center, USGS Biological Resource Division
Source_Scale_Denominator: Varies
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1994
Ending_Date: 1995
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Goenaga, C. and G. Cintron
Publication_Date: 1979
Title: Inventory of Puerto Rican Coral Reefs
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Puerto Rico DNR
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1978
Ending_Date: 1979
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Trias, J.
Publication_Date: 1991
Title:
Marine Geologic Map of the Puerto Rico Insular Shelf-Guanica to Ponce Area
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Reston, VA
Publisher: U.S. Geological Survey, Miscellaneous Investigations Series
Source_Scale_Denominator: 40000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1991
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Beach, D.K. and J.V.A. Trumbull
Publication_Date: 1981

Title:
Marine Geologic Map of the Puerto Rico Insular Shelf, Isla Caja de Muertos Area
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Reston, VA
Publisher: U.S. Geological Survey, Miscellaneous Investigations Series
Source_Scale_Denominator: 40000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1981
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Jobos Bay NERR Staff, Puerto Rico Department of Planning Natural Resources/NOAA Contact: C. Gonzalez, Reserve Manager
Publication_Date: Unpublished Material
Title:
Resources of Jobos Bay, Including Field Verification of Shoreline and Benthic Habitats
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Rodriguez, R.W., et al.
Publication_Date: 1998
Title:
Marine Geologic Map of the NE Insular Shelf of Puerto Rico-Luquillo Area

Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Reston, VA
Publisher: U.S. Geological Survey, Miscellaneous Investigations Series
Source_Scale_Denominator: 40000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1991
Ending_Date: 1992
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Vicente, V.
Publication_Date: Unpublished Material
Title: Edits to Benthic Habitats for the Draft Puerto Rico ESI Atlas
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Benthic information
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 3210
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 3210
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 5032
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 861290
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 4687

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005

Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-polygon
Entity_Type_Definition:
Three types of benthic marine habitats were mapped for Puerto Rico: 1) coral reefs, 2) hardbottoms, and 3) seagrass beds. These resources were mapped using a variety of data sources and methods. Geographic sources included NWI (National Wetlands Inventory) data, the USGS (U.S. Geological Survey) Marine Geologic Map series for the Insular Shelf of Puerto Rico, USGS-BRD (Biological Resources Division) benthic habitat maps for Roosevelt Roads and Isla de Vieques, DRNA (Departamento de Recursos Naturales y Ambientales) benthic habitat maps for Isla Mona, USGS topographic quadrangles, and other sources. Where previous data or maps did not exist, biologists from DRNA and other groups used bathymetric features shown on USGS topographic maps and NOAA nautical charts to estimate the distribution of reef and seagrass areas. The type of a benthic habitat feature was often described by experts and resource managers and then applied to geographic boundaries from an existing source (e.g., a polygon derived from NWI data was given a new and different classification based on information provided by a resource manager familiar with the area). Classifications were also based on various reports and publications, including Goenega and Cintron (1979), Goenega and Boulon (1992), Garcia et al. (2000), various materials provided by the CFMC (Caribbean Fishery Management Council), and other documents and reports. The reef classification and definitions used by Garcia et al. (2000) were followed as closely as possible. Garcia et al. (2000) also provided a map graphic showing the general distribution of reef types and reef survey areas for Puerto Rico. Hardbottom categories used during this project included: Hardground and Rock Reef. Coral Reef categories included: Coral Patch Reef, Coral Reef, Shelf-edge Reef, and Reef (unclassified). "Hardground" refers to areas of relatively low relief, such as hard calcareous banks or eolianite platforms dominated by encrusting species, turf algae, soft corals, sponges, etc. The "Rock Reef" classification was used mostly for nearshore and emergent reefs found along the northern and northwestern coast of Puerto Rico. These are typically submerged bedrock features of moderate to high relief, mostly colonized by turf algae, encrusting biota, and low coral cover. "Coral Reef" was used for areas containing high cover of living, structure-building, hard-coral species, where an outline of the major reef structure could be approximated (mainly along the southern, southwestern, and eastern coasts of Puerto Rico). Many of the areas mapped would be considered fringing coral reefs. In this project, "Coral Patch Reef" was used for large areas containing numerous coral patch reefs that could not be individually depicted due to lack of information and/or small patch size relative to the mapping scale (roughly 1:20,

000 at best; 1:100,000 at worst). In areas where individual patches were differentiated, the "Coral Reef" classification was used. "Shelf-edge Reef" was used for the "drowned" or submerged coral reefs occurring along the southern and southwestern shelf-edge of Puerto Rico, and parts of Vieques and Culebra. Well-developed shelf-edge reef also occurs off the south side of Isla Mona (but was not mapped). Shelf-edge reefs are a major spawning habitat for aggregating reef fish such as red hind, mutton snapper, and tiger grouper. Finally, the "Reef" category was a default category used when reef type could not be differentiated.

Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the BIO_LUT table. ID is a concatenation of atlas number (66), element number (8), and record number. ID values of 9999 are holes in polygons and do not contain information. The following BENTHIC species are found in the Puerto Rico ESI/RSI data set (SPECIES ID, NAME): 85, Seagrass; 411, Reef; 1030, Coral reef; 1031, Hardground; 1032, Rock reef; 1033, Shelf-edge reef; 1034, Coral patch reef.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 660800002
Range_Domain_Maximum: 660803218
Attribute_Units_of_Measure: Ordered
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RARNUM
Attribute_Definition:
An identifier that links directly to the BIORES table or the flat format BIOFILE table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Minimum: 66000001
Range_Domain_Maximum: 66000511
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: MGT (Management Areas)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: MGT (Management Areas)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains polygonal data for human-use resources.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Management
Theme_Keyword: Human Use

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:
DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG

Data_Set_Credit:
This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:
The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:
The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:
The human-use resources were obtained in either digital format or in hardcopy format on 1:20,000 and 1:30,000 scale topographic quadrangles. Under this project, new digital data sources are imported, projected, checked for quality control, and integrated into the spatial data structure (for selected resources). The data are checked using both digital and on-screen procedures. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Human-Use Resources: Several human-use, or socioeconomic, features are included in ESI/RSI atlases. Entity points and complete chains (arcs) are digitized into the data layer SOCECON and managed area polygonal data (GT-polygons) are stored in the MGT data layer. Both data sets are linked to the data table SOC_DAT using the SOC_LUT lookup table and the items HUNUM and ID. HUNUM is a unique reference number concatenated with the atlas number (for Puerto Rico this is 66). ID is a unique combination of the atlas number (66), an element specific number (MGT = 11) and a unique record number. The TYPE item for polygons may contain the following values: Designated Critical Habitat, CH; Forest, FO; National Park, NP; Marine Sanctuary, MS; Wildlife Refuge, WR. The table SOC_DAT contains the human-use number (HUNUM), feature type (TYPE), name of the facility (NAME), owner/manager or contact person (CONTACT), telephone number (PHONE), geographic source (G_SOURCE), and attribute source (A_SOURCE). Detailed contact information is only included for select management features, where available. Source information is included for all features.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The majority of management area data came from existing digital sources. See the Lineage section (below) for specific information on each source. For the few management areas not covered by existing sources, hard copy boundary information was transferred to USGS 1:20,000 and 1:30,000 topographic quadrangles and digitized.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Geological Survey
Publication_Date: 1944-1982
Title: USGS Topographic Quadrangles
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Reston, VA
Publisher: U.S. Geological Survey

Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1944
Ending_Date: 1982

Source_Currentness_Reference: Date of observation
Source_Citation_Abbreviation: None
Source_Contribution: National park data

Source_Information:

Source_Citation:

Citation_Information:

Originator: Lopez, F., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title: Various Natural Resource and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Wildlife refuge data
Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Fish and Wildlife Service, Real Estate Division
Publication_Date: Varies
Title: Maps of National Wildlife Refuge Boundaries
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Atlanta, GA
Publisher: U.S. Fish and Wildlife Service, Real Estate division
Source_Scale_Denominator: Varies
Type_of_Source_Media: Poa
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: Varies
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Wildlife refuge data
Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Forest Service
Publication_Date: 1981
Title: Caribbean National Forest, Puerto Rico (Boundary Map)
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Atlanta, GA
Publisher: U.S. Forest Service, Southern Region

Source_Scale_Denominator: 20000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1962
Ending_Date: 1981
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Forest data
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Puerto Rico Department of Planning Natural Resources, San Juan
Contacts: E. Diaz, R. Matos, E. Gonzalez, PR DPNR, San Juan
Publication_Date: Unpublished Material
Title:
Natural Reserves, Wildlife Refuges, and Commonwealth Forests of Puerto Rico
Geospatial_Data_Presentation_Form: Vetcor digital data
Type_of_Source_Media: Disk
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: Varies
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Wildlife refuge, forest, and marine sanctuary data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 588
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 588
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 919
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 104653
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 823

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-Polygon
Entity_Type_Definition:
The management features depicted on the maps are those that could be impacted by an oil spill or could provide access for response operations. Archaeological/Historical Site: Location of archaeological and historic sites for coastal and inland areas. These resources include known archaeological sites documented in the master site file for Puerto Rico, and most National Register listed and potentially eligible historic sites. The exact location and extent of these sites are not represented on the maps due to their sensitivity to disturbance and vandalism. Instead, sites are depicted on the maps with an icon placed in the general vicinity of the site (or group of sites). This information was provided by the Puerto Rico State Historic Preservation Office. For more specific site information and guidance during planning and response operations, please contact the State Historic Preservation Officer at 787/721-3737. NOTE: For these data, the Archaeological/Historical sites have been deleted from the digital data at the request of the data providers. Designated Critical Habitat: Areas managed or regulated by the USFWS (U.S. Fish & Wildlife Service) or NMFS (National Marine Fishery Service) as critical habitat for federally listed threatened and endangered species, under authority of the U.S. Endangered Species Act, as amended. The species involved, responsible agency, and contact information are provided on the data tables for each map. Forest: Areas managed by the DRNA (Departamento de Recursos Naturales y Ambientales) Division de Manejo Bosques Estatales as Commonwealth Forests, or the USFS (U.S. Department of Agriculture Forest Service) as National Forests. Forest names, the managing authority, and contact information are provided on the data tables for each map. National Estuarine Research Reserve: Areas jointly managed by NOAA and DRNA as National Estuarine Research Reserves. Site names and contact information are provided on the data tables for each map. National Park: Areas managed by the National Park Service, including national parks, national historic sites, national monuments, etc. Site names and contact information are provided on the data tables for each map. Wildlife Refuge/Natural Reserve: Areas managed by the USFWS as National Wildlife Refuges or the DRNA Division de Reservas Naturales y Refugios de Vida Silvestre as Natural Reserves and Wildlife Refuges. Most Natural Reserves that extend into marine waters continue to 9 nautical miles offshore. Site names and contact information are provided on the data tables for each map.
Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: Type
Attribute_Definition:
Identifies a polygon with a management feature. This attribute allows direct access to

the type of feature instead of linking to the more detailed SOC_DAT table.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: CH
Enumerated_Domain_Value_Definition: Designated Critical Habitat
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: FO
Enumerated_Domain_Value_Definition: Forest
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: NP
Enumerated_Domain_Value_Definition: National Park
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: MS
Enumerated_Domain_Value_Definition: Marine Sanctuary
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: WR
Enumerated_Domain_Value_Definition: Wildlife Refuge
Enumerated_Domain_Value_Definition_Source: Wildlife Refuge/Reserve/Sanctuary
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the SOC_LUT table. ID is a concatenation of atlas number (66), element number (11), and record number.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Maximum: 661100002
Range_Domain_Minimum: 661100646
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: HUNUM
Attribute_Definition: An identifier that links directly to the SOC_DAT table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Maximum: 66000001
Range_Domain_Minimum: 66000372
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: SOCECON (Socioeconomic Lines and Points)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: SOCECON (Socioeconomic Lines and Points)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:

This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains point and line data for human-use resources.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Socioeconomic
Theme_Keyword: Human use

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The human-use resources were obtained in either digital format or in hardcopy format on 1:20,000 and 1:30,000 scale topographic quadrangles. Under this project, new digital data sources are imported, projected, checked for quality control, and integrated into the spatial data structure (for selected resources). The data are checked using both digital and on-screen procedures. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Human-Use Resources: Several human-use, or socioeconomic, features are included in ESI/RSI atlases. Entity points and complete chains (arcs) are digitized into the data layer SOCECON and managed area polygonal data (GT-polygons) are stored in the MGT data layer. Both data sets are linked to the data table SOC_DAT using the SOC_LUT lookup table and the items HUNUM and ID. HUNUM is a unique reference number concatenated with the atlas number (for the Puerto Rico this is 66). ID is a unique combination of the atlas number (66), an element specific number (SOCECON = 10) and a unique record number. The TYPE item for entity points may contain the following values: Airport, A; Aquaculture, AQ; Artisanal/Commercial Fishing, CF; Boat Ramp, BR; Coast Guard, CG; Collection Point, CP; Dam, LD; Dive Site, DV; RSI High-Water Leakage Point; Marina, M; Recreational Beach, B; Recreational Fishing, RF; Subsistence, S; Water Intake, WI. The TYPE item for complete chains may contain the following values: ESI/RSI Break, ER; Roads/Bridges, R. The table SOC_DAT contains the human-use number (HUNUM), feature type (TYPE), name of the facility (NAME), owner/manager or contact person (CONTACT), telephone number (PHONE), geographic source (G_SOURCE), and attribute source (A_SOURCE). Detailed contact information is only included for select management features, where available. Source information is included for all features.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Research Planning, Inc.
Publication_Date: Unpublished material
Title:
Boat Ramps, Marinas, and other Features From Overflights and Air Photos
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date of overflight
Source_Citation_Abbreviation: None
Source_Contribution:
Boat ramp, marina, water intake, collection point, and leakage point information

Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Geological Survey
Publication_Date: 1944-1982
Title: USGS Topographic Quadrangles
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Reston, VA
Publisher: U.S. Geological Survey
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1944
Ending_Date: 1982
Source_Currentness_Reference: Date of observation
Source_Citation_Abbreviation: None
Source_Contribution: Airport, Coast Guard station, and water intake locations
Source_Information:

Source_Citation:

Citation_Information:

Originator: Rivera, M., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Sea Turtle Nesting Beaches, Seasonality, and Life-History in Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Commercial fishing information
Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Fish and Wildlife Service
Publication_Date: 1995
Title:
Critical Habitat Designations for Threatened and Endangered Fish and Wildlife
Geospatial_Data_Presentation_Form: Document

Publication_Information:

Publication_Place: Washington, D.C.
Publisher: Government Printing Office
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1995
Ending_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Critical habitat data
Source_Information:

Source_Citation:

Citation_Information:

Originator: National Marine Fishery Service
Publication_Date: 1995
Title:
Critical Habitat Designations for Threatened and Endangered Marine Species
Geospatial_Data_Presentation_Form: Document
Publication_Information:

Publication_Place: Washington, D.C.
Publisher: Government Printing Office
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1995
Ending_Date: 1998
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Critical habitat data
Source_Information:

Source_Citation:

Citation_Information:

Originator: Yoshioka, B., U.S. Fish and Wildlife Service, Boqueron
Publication_Date: Unpublished Material
Title:
Native Stream Fish, Shrimp, and Crab Distribution, Seasonality, and Life-History
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999

Source_Currentness_Reference: Date of communication

Source_Citation_Abbreviation: None

Source_Contribution: Water intake locations

Source_Information:

Source_Citation:

Citation_Information:

Originator: Lopez, F., U.S. Fish and Wildlife Service, Boqueron

Publication_Date: Unpublished Material

Title: Various Natural Resource and Human-use Features for Puerto Rico

Geospatial_Data_Presentation_Form: Expert knowledge

Type_of_Source_Media: Personal communication

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999

Source_Currentness_Reference: Date of study

Source_Citation_Abbreviation: None

Source_Contribution:

Airport, aquaculture, beach, boat ramp, Coast Guard station, commercial fishing, diving, marina, recreational fishing, water intake, and subsistence information

Source_Information:

Source_Citation:

Citation_Information:

Originator:

Appledorn, R., Universiy of Puerto Rico - Marine Science Mayaguez

Publication_Date: Unpublished Material

Title:

Queen Conch Life-History, Fishing Areas, and other Resources for Puerto Rico

Geospatial_Data_Presentation_Form: Expert knowledge

Type_of_Source_Media: Personal communication

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999

Source_Currentness_Reference: Date of communication

Source_Citation_Abbreviation: None

Source_Contribution:

Aquaculture, boat ramp, commercial fishing, marina, water intake, and subsistence information

Source_Information:

Source_Citation:

Citation_Information:

Originator:
Rosario, A., Puerto Rico Department of Planning Natural Resources, Mayaguez
Publication_Date: Unpublished Material
Title:
Spawning Aggregations, Benthic Habitat, and other Resource Features of Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Aquaculture, commercial fishing, recreational fishing data

Source_Information:

Source_Citation:

Citation_Information:

Originator: Simonsen, S.
Publication_Date: 1996
Title: Diving and Snorkeling Guide to Puerto Rico
Geospatial_Data_Presentation_Form: Maps and Documents
Publication_Information:

Publication_Place: Houston, TX
Publisher: Gulf Publishing Company
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1996
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Diving locations

Source_Information:

Source_Citation:

Citation_Information:

Originator:
Chabert, J., Ramos, D., Puerto Rico Department of Planning Natural Resources, San Juan, PR
Publication_Date: Unpublished Material
Title:
Waterfowl Areas and other Wildlife and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Recreational fishing information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Velazco, A., Puerto Rico Department of Planning Natural Resources, San Juan
Publication_Date: Unpublished Material
Title:
Benthic Habitats and Various Fisheries and Human-use Features for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution:
Beach, boat ramp, commercial fishing, diving, recreational fishing, and subsistence information
Source_Information:

Source_Citation:

Citation_Information:

Originator: Aqueduct and Sewer Authority (PRASA)
Publication_Date: Unpublished Material
Title: PRASA Water Supplies
Geospatial_Data_Presentation_Form: Maps

Source_Scale_Denominator: 120000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: Unknown
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Lock and dam, and water intake locations
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Puerto Rico Department of Planning Natural Resources Fisheries Division Contact: C. Lilyestrom, Chief, Marine Resources division, PR DPNR, San Juan, PR
Publication_Date: Unpublished Material
Title: Locations of Fishing Assiciations and Cooperatives
Geospatial_Data_Presentation_Form: Maps
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: Unknown
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Subsistence information
Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Coast Guard, MSO San Juan
Publication_Date: Varies
Title:
Sensitive Areas and Protection Strategies for the U.S. Caribbean
Geospatial_Data_Presentation_Form: Maps and Tables
Publication_Information:

Publication_Place: San Juan, PR
Publisher: Annex E to the ACP for the U.S. Caribbean, U.S. Coast Guard
Source_Scale_Denominator: Varies
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1993
Ending_Date: 1994
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Beach, boat ramp, and water intake locations
Source_Information:

Source_Citation:

Citation_Information:

Originator:
PR Department of Planning Natural Resources Marine Resource Division, SJ Contact: C. Lilyestron, Chief, MRD, PR DPNR
Publication_Date: Unpublished Material
Title:
Sportfigh in inland Reservoirs and other Fisheries Resources of Puerto Rico
Geospatial_Data_Presentation_Form: Tables and Expert knowledge
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution:
Boat ramp, commercial fishing, diving, marina, recreational fishing, and subsistence information
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Garcia, M., Puerto Rico Department of Planning Natural Resources, San Juan
Publication_Date: Unpublished Material
Title: Various Human-use Features for Coastal Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None

Source_Contribution: Boat ramp locations
Source_Information:

Source_Citation:

Citation_Information:

Originator: Cepeda, E., University of Puerto Rico CIDACPR, Mayaguez
Publication_Date: Unpublished Material
Title: Major Mariculture Sites for Puerto Rico
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Aquaculture information
Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Forest Service
Publication_Date: 1981
Title: Caribbean National Forest, Puerto Rico (Boundary Map)
Geospatial_Data_Presentation_Form: Maps
Publication_Information:

Publication_Place: Atlanta, GA
Publisher: U.S. Forest Service, Southern Region
Source_Scale_Denominator: 20000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1962
Ending_Date: 1981
Source_Currentness_Reference: Date of study
Source_Citation_Abbreviation: None
Source_Contribution: Water intake locations
Source_Information:

Source_Citation:

Citation_Information:

Originator:
Jobos Bay NERR Staff, Puerto Rico Department of Planning Natural

Resources/NOAA Contact: C. Gonzalez, Reserve Manager
Publication_Date: Unpublished Material
Title:
Resources of Jobos Bay, Including Field Verification of Shoreline and Benthic Habitats
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Boat ramp, and water intake locations
Source_Information:

Source_Citation:

Citation_Information:

Originator: Laguer, Y.T., U.S. Enivronmental Protection Agency, San Juan
Publication_Date: Unpublished Material
Title: Water Intakes Edits, Addresses and contacts
Geospatial_Data_Presentation_Form: Expert knowledge
Type_of_Source_Media: Personal communication
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1999
Source_Currentness_Reference: Date of communication
Source_Citation_Abbreviation: None
Source_Contribution: Water intake locations
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 73
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 79
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point
Point_and_Vector_Object_Count: 867
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 146

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Complete Chain
Entity_Type_Definition:
The human-use features depicted on the maps are those that could be impacted by an oil spill or could provide access for response operations.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: Type
Attribute_Definition:
Identifies a line or point with a socioeconomic, or human-use, feature. This attribute allows direct access to the type of feature instead of linking to the more detailed SOC_DAT table.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: ER
Enumerated_Domain_Value_Definition: ESI/RSI Break
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: R
Enumerated_Domain_Value_Definition: Roads/ Bridges
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Detailed_Description:

Entity_Type:

Entity_Type_Label: Entity point
Entity_Type_Definition:
Airport: Location of airports, airfields, landing strips, helipads, etc., whether they are manned or unmanned. Aquaculture: Location of aquaculture sites and facilities. When known, the site name, owner/manager, and contact information are provided on the data tables for each map. Artisanal/Commercial Fishing: General areas where artisanal and commercial fishing take place. Queen conch harvest areas contributed to the largest number of sites, although other types of fishing areas are depicted as well. Fishing activities, especially harvest of lobsters, octopus, reef fish, etc. may take place throughout the study area. This information was provided by the UPR

(University of Puerto Rico) Department of Marine Sciences (queen conch areas) and expert sources. Boat Ramp: Location of boat ramps. This information was gathered from overflight observations, aerial photographs, DRNA (Departamento de Recursos Naturales y Ambientales) information and expert sources. Coast Guard: Location of Coast Guard facilities. Dam: Locations of dams, especially major high dams on RSI-classified streams. Dams were mainly mapped based on information provided by the Puerto Rico Electric and Power Authority (PREPA). Designated Critical Habitat: Areas managed or regulated by the USFWS (U.S. Fish & Wildlife Service) or NMFS (National Marine Fishery Service) as critical habitat for federally-listed threatened and endangered species, under authority of the U.S. Endangered Species Act, as amended. The species involved, responsible agency, and contact information are provided on the data tables for each map. Dive Site: Location of recreational diving sites. This information was derived mainly from published guidebooks and expert sources. Fishing Association: Locations of fishing associations and fisheries cooperatives in coastal areas. These sites indicate areas with significant artisanal and commercial fishing interests. This information was provided by DRNA. Marina: Location of marinas. This information was gathered from overflight observations, aerial photographs, DRNA information, and expert sources. Recreational Beach: Location of recreational beaches used for activities such as swimming, sun-bathing, fishing, etc. This information was provided by expert sources. Recreational Fishing: Location of recreational fishing sites. This information was provided by DRNA and expert sources. Water Intake: Location of surface water intakes. For inland areas, intakes associated with Puerto Rico Aqueduct and Sewer Authority (PRASA) facilities are emphasized (mapped locations for most other intakes were not available). When known, the site name, owner/manager, and telephone number are provided on the data tables for each map. For PRASA intakes, highway addresses provided by USEPA staff are also included in the data tables.

Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: Type
Attribute_Definition:
Identifies a line or point with a socioeconomic, or human-use, feature. This attribute allows direct access to the type of feature instead of linking to the more detailed SOC_DAT table.

Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: A
Enumerated_Domain_Value_Definition: Airport
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: AQ
Enumerated_Domain_Value_Definition: Aquaculture
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: CF
Enumerated_Domain_Value_Definition: Artisanal/Commercial Fishing
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: BR
Enumerated_Domain_Value_Definition: Boat Ramp
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: CG
Enumerated_Domain_Value_Definition: Coast Guard
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: CP
Enumerated_Domain_Value_Definition: Collection Point
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: LD
Enumerated_Domain_Value_Definition: Dam
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: DV
Enumerated_Domain_Value_Definition: Dive Site
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: LP
Enumerated_Domain_Value_Definition: RSI High-water Leakage Point
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: M
Enumerated_Domain_Value_Definition: Marina
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: B
Enumerated_Domain_Value_Definition: Recreational Beach
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: RF
Enumerated_Domain_Value_Definition: Recreational Fishing
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: S
Enumerated_Domain_Value_Definition: Subsistence
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: WI
Enumerated_Domain_Value_Definition: Water Intake
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: ID
Attribute_Definition:
A unique identifier that links to the SOC_LUT table. ID is a concatenation of atlas number (66), element number (10), and record number.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Maximum: 661000001
Range_Domain_Minimum: 661000867

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: HUNUM
Attribute_Definition: An identifier that links directly to the SOC_DAT table.
Attribute_Definition_Source: NOAA
Attribute_Domain_Values:

Range_Domain:

Range_Domain_Maximum: 66000001
Range_Domain_Minimum: 66000372

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200106

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI and RSI: WETLANDS

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI and RSI: WETLANDS
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains wetlands data.

Purpose:

The ESI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Wetland
Theme_Keyword: RSI

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg
Browse_Graphic_File_Description:
Relationships between spatial data layers and attribute data tables for the Puerto Rico data.
Browse_Graphic_File_Type: JPEG

Data_Set_Credit:
This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:
The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:
The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:
The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The wetlands data were generated from existing digital National Wetlands Inventory (NWI) data. These data were reclassified based on the NWI codes to match the ESI coding definitions. These data were used "as is" after reclassification. No field checks were performed on the original NWI data where the reclassified data were salt- and brackish-water marshes, freshwater marshes, freshwater swamps, and freshwater scrub/shrub. However, extensive overflight and field verification was performed on NWI data where the reclassified data were mangroves. After reclassification, the data were checked using both on-screen and hardcopy reviews. Next, the edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological and human-use layers. All layers use the shoreline as the geographic reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again,

and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

The intertidal shoreline habitats of Puerto Rico were previously mapped during overflights and ground surveys conducted by the Puerto Rico Departamento de Recursos Naturales y Ambientales (DRNA) and the National Oceanic and Atmospheric Administration (NOAA), published in 1984. For this project, the original ESI maps were re-examined and fully updated using the sources and methods described below. As a first step, infrared vertical aerial photographs were examined at the offices of DRNA in San Juan. The initial aerial photograph classification was followed by overflight surveys of the entire study area, flying at elevations of 400-600 feet and slow air speed. Overflights were conducted using U.S. Coast Guard (USCG) helicopters and fixed-wing Cessna 172s operated by the Puerto Rico Civil Air Patrol. During this work, an experienced coastal geologist delineated the intertidal shoreline habitats directly onto 1:20,000-scale USGS topographic maps (1:30,000 for Culebra and Vieques). Where appropriate, multiple habitats were described for each shoreline segment. Data from the National Wetlands Inventory (NWI) for the coastal plain of Puerto Rico, published in draft form in 1989 (based on 1983 1:40,000 CIR photography), were also used as a supplementary data source, particularly for mangrove areas and tidal flats. In many cases, the depiction of mangroves was modified substantially from the original NWI data, based on the more recent aerial photography and overflights, as well as information provided by expert reviewers.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Research Planning. Inc.
Publication_Date: Unknown
Title: Reclassified NWI wetlands for Puerto Rico
Geospatial_Data_Presentation_Form: Vector digital data
Type_of_Source_Media: Online
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1998
Source_Currentness_Reference: Date data were downloaded
Source_Citation_Abbreviation: None
Source_Contribution: Wetland information
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 4162
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 4162

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 8709
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 307434
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 7691

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Complete Chain
Entity_Type_Definition:
The data layer WETLANDS contains arc (Complete Chain) features for the Wetlands shoreline classification and is based on Environmental Sensitivity Index Guidelines, Version 2.0 (Halls, J., J. Michel, S. Zengel, J. Dahlin, and J. Petersen, 1997, Hazardous Materials Response and Assessment Division, NOAA). The ESI classification was performed in July 1998 for Puerto Rico.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: ESI
Attribute_Definition:
The character item ESI contains values according to the ESI ranking of the arcs. The

ESI rankings progress from low to high susceptibility to oil spills. The list below includes the shoreline habitats delineated for the Puerto Rico wetlands ESI classification, presented in order of increasing sensitivity to spilled oil: 1A) Exposed Rocky Cliffs; 2B) Scarps and Steep Slopes in Muddy Sediments; 3A) Fine- to Medium-grained Sand Beaches; 4) Coarse-grained Sand Beaches; 5) Mixed Sand and Gravel Beaches; 6A) Gravel Beaches; 6B) Riprap; 7) Exposed Tidal Flats; 8B) Sheltered, Solid Man-made Structures; 9A) Sheltered Tidal Flats; 10D) Mangroves. In some cases, the shorelines are ranked with multiple codes, such as 10D/7. The first number (10D, mangroves) is the most landward shoreline type, with exposed tidal flats (7) being the shoreline type closest to the water.

Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1A
Enumerated_Domain_Value_Definition: Exposed Rocky Cliffs
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2B
Enumerated_Domain_Value_Definition: Scarps and Steep Slopes in Muddy Sediments
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3A
Enumerated_Domain_Value_Definition: Fine- to Medium-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3A/7
Enumerated_Domain_Value_Definition: Fine- to Medium-grained Sand Beaches/ Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 4
Enumerated_Domain_Value_Definition: Coarse-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition: Mixed Sand and Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5/7
Enumerated_Domain_Value_Definition: Mixed Sand and Gravel Beaches/ Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6A
Enumerated_Domain_Value_Definition: Gravel Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6B
Enumerated_Domain_Value_Definition: Riprap
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8B
Enumerated_Domain_Value_Definition: Sheltered, Solid Man-made Structures
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 9B
Enumerated_Domain_Value_Definition: Sheltered, Vegetated Low Banks
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D
Enumerated_Domain_Value_Definition: Mangroves
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/3A
Enumerated_Domain_Value_Definition: Mangroves/ Fine- to Medium-grained Sand Beaches
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 10D/7
Enumerated_Domain_Value_Definition: Mangroves/ Exposed Tidal Flats
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: U
Enumerated_Domain_Value_Definition: Unranked
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Attribute:

Attribute_Label: RSI
Attribute_Definition:
The character item RSI contains values according to the RSI ranking of the arcs. The RSI rankings progress from low to high susceptibility to oil spills. The list below includes the shoreline habitats delineated for the Puerto Rico wetlands RSI classification, presented in order of increasing sensitivity to spilled oil: 2) Straight Channel with Currents, Low-sensitive Banks (Mud Dominant); 3) Meandering Channel, Sand Point Bars; 4) Meandering Channel, Vegetated Point Bars; 6) Meandering Channel, Sand and Gravel Point Bars; 7) Split Channels With Coarse Gravel, Some Rapids; 8) Small Falls, Boulders in Channel; U) Unranked.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition:
Straight Channel with Currents; Low-sensitive Banks (Mud Dominant)
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 3
Enumerated_Domain_Value_Definition: Meandering Channel; Sand Point Bars
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 4
Enumerated_Domain_Value_Definition: Meandering Channel; Vegetated Point Bars
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6
Enumerated_Domain_Value_Definition: Meandering Channel; Sand and Gravel Point Bars
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 7
Enumerated_Domain_Value_Definition: Split Channels With Coarse Gravel; Some Rapids
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8
Enumerated_Domain_Value_Definition: Small Falls; Boulders in Channel
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: U
Enumerated_Domain_Value_Definition: Unranked
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: LINE
Attribute_Definition: Type of geographic feature
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: H
Enumerated_Domain_Value_Definition: Hydrography
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: M
Enumerated_Domain_Value_Definition: Marsh
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: S
Enumerated_Domain_Value_Definition: Shoreline
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: SOURCE_ID
Attribute_Definition: Data source of the ESI arcs
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition: Original digital information
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 2
Enumerated_Domain_Value_Definition: Low-altitude overflight
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition:
Digitized from scanned 1:20,000 and 1:30,000 USGS topographic quadrangle
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 6
Enumerated_Domain_Value_Definition: National Wetland Inventory
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 8
Enumerated_Domain_Value_Definition: USGS Digital Line Graph Data
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 12
Enumerated_Domain_Value_Definition: Felix Lopez Additions and Edits to Puerto Rico Mangroves
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: ENVIR
Attribute_Definition: Regional environment
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: E
Enumerated_Domain_Value_Definition: Estuarine
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: R
Enumerated_Domain_Value_Definition: Riverine
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: U
Enumerated_Domain_Value_Definition: Unranked
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-Polygon
Entity_Type_Definition:
The data layer WETLANDS contains polygonal (GT-Polygon) features for the Wetlands shoreline classification. These wetlands were reclassified from NWI Data and have not been field checked.
Entity_Type_Definition_Source: Research Planning, Inc.

Attribute:

Attribute_Label: WET_TYPE
Attribute_Definition:
The character item WET_TYPE contains values according to the wetlands ranking of the polygons. The wetlands rankings progress from low to high susceptibility to oil spills. The list below includes the wetland habitats delineated for Puerto Rico, presented in order of increasing sensitivity to spilled oil: Salt- and Brackish-Water Marshes; Freshwater Marshes; Freshwater Swamps; Freshwater Scrub/Shrub.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Salt- and Brackish-Water Marshes
Enumerated_Domain_Value_Definition: Wetlands classification
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Freshwater Marshes
Enumerated_Domain_Value_Definition: Wetland classification
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Freshwater Swamps
Enumerated_Domain_Value_Definition: Wetland classification
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Freshwater Scrub/Shurb
Enumerated_Domain_Value_Definition: Wetland classification
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101
Attribute:

Attribute_Label: WATER_CODE
Attribute_Definition: Specifies a polygon as either water or land
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: L
Enumerated_Domain_Value_Definition: Land
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: W
Enumerated_Domain_Value_Definition: Water
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding

the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.

Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI/RSI: KARST

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI/RSI: KARST
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains data for karst (underground channel) areas.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: RSI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: Karst

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in

Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The hardcopy maps are then digitized and checked using both on-screen and hardcopy reviews. The edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological and human-use layers. All layers use the shoreline as the geographic reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each

data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

The intertidal shoreline habitats of Puerto Rico were previously mapped during overflights and ground surveys conducted by the Puerto Rico Departamento de Recursos Naturales y Ambientales (DRNA) and the National Oceanic and Atmospheric Administration (NOAA), published in 1984. For this project, the original ESI maps were re-examined and fully updated using the sources and methods described below. As a first step, infrared vertical aerial photographs were examined at the offices of DRNA in San Juan. The initial aerial photograph classification was followed by overflight surveys of the entire study area, flying at elevations of 400-600 feet and slow air speed. Overflights were conducted using U.S. Coast Guard (USCG) helicopters and fixed-wing Cessna 172s operated by the Puerto Rico Civil Air Patrol. During this work, an experienced coastal geologist delineated the intertidal shoreline habitats directly onto 1:20,000-scale USGS topographic maps (1:30,000 for Culebra and Vieques). Where appropriate, multiple habitats were described for each shoreline segment. Data from the National Wetlands Inventory (NWI) for the coastal plain of Puerto Rico, published in draft form in 1989 (based on 1983 1:40,000 CIR photography), were also used as a supplementary data source, particularly for mangrove areas and tidal flats. In many cases, the depiction of mangroves was modified substantially from the original NWI data, based on the more recent aerial photography and overflights, as well as information provided by expert reviewers.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Research Planning, Inc.
Publication_Date: Unpublished Material
Title: RPI Generated Karst
Geospatial_Data_Presentation_Form: Vector digital data
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: CD-ROM
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000
Source_Currentness_Reference: Date of creation
Source_Citation_Abbreviation: None
Source_Contribution: Karst data
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 260
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 260
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain

Point_and_Vector_Object_Count: 559
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 87849
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 559

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: GT-Polygon
Entity_Type_Definition:
In north-central and northwestern Puerto Rico is an area underlain mostly by Tertiary limestones, in which the topography is chiefly formed by solution (Monroe, 1976). This area comprises a physiographic province known as the karst belt. In this area, most of the drainage is underground except along the channels of those rivers that flow north across the belt from the mountains to the sea. Parts of two of the rivers mapped in this project, Río Camuy and Río Tanamá (a tributary of Río Grande de Arecibo), flow underground for part of their courses. Five additional rivers mapped, Río de la Plata, Río Cibuco (and its tributary Río Indio), Río Grande de Manatí, Río Guajataca, and Río Grande de Arecibo, also flow through the karst belt. Any river flowing across karst areas has the potential for losing a part of its flow to underground channels and caverns. Responders should be aware of the possibility of channel leakage and groundwater pollution during oil spills in these areas.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: WATER_CODE
Attribute_Definition: Specifies a polygon as either water or land
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: L
Enumerated_Domain_Value_Definition: Land
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: W
Enumerated_Domain_Value_Definition: Water
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.
Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI and RSI: STATIONS

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI and RSI: STATIONS
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife

by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains data for river/stream field stations.

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: RSI
Theme_Keyword: Station
Theme_Keyword: Field station

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in

Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The stations (point) data were digitized from 1:20, 000 and 1:30,000 USGS topographic quadrangles. These data represent the field stations established along rivers/streams where RSI's were identified. These data were digitized and checked using both on-screen and hardcopy reviews. Next, the edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological and human-use layers. All layers use the shoreline as the geographic reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes final edits. The data are then merged to

form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

Detailed ground observations were made at field stations during the two field surveys.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Research Planning, Inc.
Publication_Date: Unpublished Material
Title: Overflight maps
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 20000-30000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 1998
Source_Currentness_Reference: Date of survey
Source_Citation_Abbreviation: None
Source_Contribution: Station locations
Process_Step:

Process_Description:

All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.

Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
Contact_Address:

Address_Type: Physical address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity Point
Point_and_Vector_Object_Count: 109

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Entity point
Entity_Type_Definition:
The station location features depicted on the maps are those of field stations that were identified during RSI classification.
Entity_Type_Definition_Source: Research Planning, Inc.
Attribute:

Attribute_Label: TYPE
Attribute_Definition:
Identifies a point as a station feature. This data set is not linked to the SOC_DAT table. All points in these data identify field stations.
Attribute_Definition_Source: Research Planning, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: FS
Enumerated_Domain_Value_Definition: Field Station
Enumerated_Domain_Value_Definition_Source: Research Planning, Inc.
Beginning_Date_of_Attribute_Values: 199807
Ending_Date_of_Attribute_Values: 200101

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kaperick
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6400
Contact_Facsimile_Telephone: (206) 526-6329
Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
Although these data have been processed successfully on a computer system at the National Oceanic and Atmospheric Administration, no warranty, expressed or implied, is made by NOAA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. NOAA warrants the delivery of this product in computer-readable format, and will offer a

replacement copy of the product when the product is determined unreadable by computer input peripherals, or when the physical medium is delivered in damaged condition.

Custom_Order_Process:

Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Jill Petersen
Contact_Organization: NOAA, Office of Response and Restoration
Contact_Position: GIS Manager
Contact_Address:

Address_Type: Physical Address
Address: 7600 Sand Point Way N.E.
City: Seattle
State_or_Province: Washington
Postal_Code: 98115-6349
Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Puerto Rico ESI and RSI: SHELFBND (Shelf Boundary)

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington; United States Environmental Protection Agency; United States Coast Guard; Puerto Rico Departamento de Recursos Naturales y Ambientales; and United States Department of the Interior.
Publication_Date: 200106
Title: Puerto Rico ESI and RSI: SHELFBND (Shelf Boundary)
Edition: Second
Geospatial_Data_Presentation_Form: Atlas
Series_Information:

Series_Name: None
Issue_Identification: Puerto Rico
Publication_Information:

Publication_Place: Seattle, Washington
Publisher:
National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington
Other_Citation_Details:
Prepared by Research Planning, Inc., Columbia, South Carolina for the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales, and United States Department of the Interior.

Description:

Abstract:
This data set comprises the Environmental Sensitivity Index (ESI) and Reach Sensitivity

Index (RSI) data for Puerto Rico. ESI data characterize estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. Most rivers and streams can be readily subdivided into clear-cut segments, or reaches (RSI), that have very distinct and uniform characteristics within that reach of the stream. The definition of reach type is usually based on whatever the intended use of the reach classification might be. In this project, stream reaches are defined as those segments where similar spill-response modes and potential ecological and/or socioeconomic impacts from the spill are to be anticipated. However defined, the boundary of the reach is usually marked by an abrupt change in the morphology of the stream, a change commonly, but not always, brought about by an alteration in the stream's gradient. This data set contains data representing the shelf boundary (the seaward extent of the shelf edge reef).

Purpose:

The ESI and RSI data were collected, mapped, and digitized to provide environmental data for oil spill planning and response. The Clean Water Act with amendments by the Oil Pollution Act of 1990 requires response plans for immediate and effective protection of sensitive resources.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 199807
Ending_Date: 200106

Currentness_Reference: Project time span

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None Scheduled

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -68.168
East_Bounding_Coordinate: -65.167
North_Bounding_Coordinate: 18.711
South_Bounding_Coordinate: 17.517

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: ESI
Theme_Keyword: Sensitivity maps
Theme_Keyword: Coastal resources
Theme_Keyword: Oil spill planning
Theme_Keyword: Coastal Zone Management
Theme_Keyword: RSI
Theme_Keyword: Shelf boundary

Place:

Place_Keyword_Thesaurus: None
Place_Keyword: Puerto Rico

Access_Constraints: None

Use_Constraints:

DO NOT USE MAPS FOR NAVIGATIONAL PURPOSES. Besides the above warning, there are

no use constraints on these data. Acknowledgment of the publishers and contributing sources listed in Data_Set_Credit (below) would be appreciated in products derived from these data.

Browse_Graphic:

Browse_Graphic_File_Name: prdatafig.jpg

Browse_Graphic_File_Description:

Relationships between spatial data layers and attribute data tables for the Puerto Rico data.

Browse_Graphic_File_Type: JPEG

Data_Set_Credit:

This project was supported by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington, United States Environmental Protection Agency, United States Coast Guard, Puerto Rico Departamento de Recursos Naturales y Ambientales and United States Department of the Interior.

Native_Data_Set_Environment:

The software packages used to develop the atlas are Environmental Systems Research Institute's ARC/INFO(r) (version 8.0.2) and ORACLE(r) RDBMS (version 8.0.5.0.0). The hardware configuration is Hewlett Packard workstations (models 715/50 and 712/80i with 4 X-terminals) with UNIX operating system (HP-UX Release A.10.20). The following files are included in the data set: benthic.e00, birds.e00, bio_lut.e00, biofile.e00, biores.e00, breed.e00, breed_dt.e00, esi.e00, fish.e00, fishl.e00, habitats.e00, hydro.e00, index.e00, invert.e00, invertl.e00, karst.e00, mgt.e00, m_mammal.e00, reptiles.e00, seasonal.e00, shelfbnd.e00, soc_dat.e00, soc_lut.e00, socecon.e00, sources.e00, species.e00, stations.e00, status.e00, t_mammal.e00, wetlands.e00.

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

The attribute accuracy is estimated to be "good" given the years of ESI experience, the data input methodology, the quality control review sessions, and the digital logical consistency checks.

Logical_Consistency_Report:

The digitization of shoreline types, biological resources, and human-use resources is a complex and highly quality-controlled process. Existing digital shoreline data are integrated into a study-wide basemap. In order to facilitate digitizing, the entire study area is split into individual quadrangles using the INDEX data layer. The first layer of information digitized is the ESI/RSI shoreline classification. The ESI/RSI habitat ranking is compiled onto 1:20,000 and 1:30,000 USGS topographic quadrangles by a geomorphologist. The shelf boundary data were digitized from 1:100, 000 NOAA Navigational Charts. These data represent the seaward extent of the shelf edge reef. These data were digitized and checked using both on-screen and hardcopy reviews. Next, the edited maps are updated and checked once again for completeness and topological and logical consistency. Any errors in the shoreline classification are updated prior to digitization of the biological and human-use layers. All layers use the shoreline as the geographic reference so that there are no slivers in the geographic coordinates. The hardcopy biological information is compiled onto 1:20,000 and 1:20, 000 USGS topographic quadrangles by a biological expert using data from regional specialists in the form of maps, tables, charts, written descriptions of wildlife distributions, and personal interviews. Concurrently, digital data sources are imported, projected, checked for quality control, and integrated into the data structure. The hardcopy data are digitized, checked using both digital and on-screen procedures, integrated with existing data, plotted, and sent out for review by the regional specialists. The edited maps are updated, checked once again, and the final product plotted (at approximately 1:55,000 scale). A team of specialists reviews the entire series of maps, checks all data, and makes

final edits. The data are then merged to form the study-wide layers. The data merging includes a final quality control check where labels, chains, and polygons are checked for attribute accuracy. To finalize the data checking process, each data layer is checked using a standardized form by two GIS personnel (a technician and the GIS manager), and each attribute database is checked using several programs that test the files for missing or duplicate data, rules for proper coding, GIS topological consistencies (such as dangles, unnecessary nodes, etc.), and ORACLE(r) to ARC/INFO(r) consistencies. A final review is made by the GIS manager, where the data are written to CD-ROM and the metadata are written. ESI data are processed into multiple formats to make them useful to a wider community of GIS/mapping users. Distribution formats include ARC export, MOSS and Shape files, and MARPLOT map folders. An ArcView ESI project and ESI_Viewer product are also included on the CDs for ease of use of the ESI data. The database files are distributed both in the NOAA standard relational database format (see NOAA Technical Memorandum NOS ORCA 115) and in a simplified desktop flat file format. This metadata document includes information on both of these database formats. The section Spatial_Data_Organization_Information refers to the source files in ARC export format only.

Completeness_Report:

The intertidal shoreline habitats of Puerto Rico were previously mapped during overflights and ground surveys conducted by the Puerto Rico Departamento de Recursos Naturales y Ambientales (DRNA) and the National Oceanic and Atmospheric Administration (NOAA), published in 1984. For this project, the original ESI maps were re-examined and fully updated using the sources and methods described below. As a first step, infrared vertical aerial photographs were examined at the offices of DRNA in San Juan. The initial aerial photograph classification was followed by overflight surveys of the entire study area, flying at elevations of 400-600 feet and slow air speed. Overflights were conducted using U.S. Coast Guard (USCG) helicopters and fixed-wing Cessna 172s operated by the Puerto Rico Civil Air Patrol. During this work, an experienced coastal geologist delineated the intertidal shoreline habitats directly onto 1:20,000-scale USGS topographic maps (1:30,000 for Culebra and Vieques). Where appropriate, multiple habitats were described for each shoreline segment. Data from the National Wetlands Inventory (NWI) for the coastal plain of Puerto Rico, published in draft form in 1989 (based on 1983 1:40,000 CIR photography), were also used as a supplementary data source, particularly for mangrove areas and tidal flats. In many cases, the depiction of mangroves was modified substantially from the original NWI data, based on the more recent aerial photography and overflights, as well as information provided by expert reviewers.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report:

The ESI data use USGS 1:20,000 and 1:30,000 topographic quadrangles as the basemap. It is estimated that the ESI shoreline classification has a minimum mapping unit of 50 feet.

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator:

Research Planning, Inc.; digitized from NOAA, NOS Navigational charts

Publication_Date: Unpublished Material
Title: Digital Shelf boundary
Geospatial_Data_Presentation_Form: Maps
Source_Scale_Denominator: 100000
Type_of_Source_Media: Paper
Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 199903
Source_Currentness_Reference: Date of digitization
Source_Citation_Abbreviation: None
Source_Contribution: Shelf boundary
Process_Step:

Process_Description:
All the digital data were checked using both digital and on-screen procedures, plotted, checked by the biological expert, edited to remove any errors, and plotted for review by the regional specialists. The reviewed maps were updated on the computer, checked once again, and plotted at final map scale. A team of specialists reviewed the entire series of maps, checked all data, and made final edits. The data were merged to form the study-wide layers that are described in the document. The data merging included a final quality control check where topological consistency, rules for geography, and database to geography were checked and validated for all relationships.
Process_Date: 20010601
Process_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: NOAA, Office of Response and Restoration
Contact_Person: Jill Petersen
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Contact_Voice_Telephone: (206) 526-6944
Contact_Facsimile_Telephone: (206) 526-6329
Contact_Electronic_Mail_Address: jill.petersen@noaa.gov

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of rings
Point_and_Vector_Object_Count: 4
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Area point
Point_and_Vector_Object_Count: 4
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Complete chain
Point_and_Vector_Object_Count: 388
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Link
Point_and_Vector_Object_Count: 146052
SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Node, planar graph
Point_and_Vector_Object_Count: 388

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Geographic:

Latitude_Resolution: 0.00005
Longitude_Resolution: 0.00005
Geographic_Coordinate_Units: Decimal degrees
Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137
Denominator_of_Flattening_Ratio: 298.257222

Distribution_Information:

Distributor:

Contact_Information:

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Contact_Person: John Kaperick
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State_or_Province: Washington
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Resource_Description: ESI/RSI Atlas for Puerto Rico
Distribution_Liability:
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Custom_Order_Process:
Contact NOAA for distribution options (see Distribution_Information).

Metadata_Reference_Information:

Metadata_Date: 200106
Metadata_Review_Date: 200106
Metadata_Contact:

Contact_Information:

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Contact_Electronic_Mail_Address: jill.petersen@noaa.gov
Metadata_Standard_Name: Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

Relationships between spatial data layers and attribute data tables