

Estuarine Blue Infrastructure: Final Priority Conservation Areas for Chesapeake Bay and its Tidal Tributaries and Back Bay – Version 2.0

9/29/2010 (Revised)

Virginia Institute of Marine Science

Center for Coastal Resources Management

Final Project Report Submitted to

Virginia Coastal Zone Management Program

Virginia Department of Environmental Quality

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Executive Summary

This project is an extension of earlier efforts within the coastal zone of Virginia to build a platform for enhanced Blue and Green Infrastructure planning. This project is motivated by an interest in extending statewide conservation efforts into estuarine systems and recognition that land use decisions on the upland effect water quality and habitat health in the receiving waters.

The project in its entirety has been accomplished in distinct parts. Part one develops a Cumulative Resource Assessment to evaluate the distribution of aquatic natural resources within waters of Virginia's Chesapeake Bay waters, Back Bay of Virginia Beach, Virginia, and the seaside of the Eastern Shore of Virginia. This task mined data resources at all levels of government to bring together a comprehensive representation of information available for the study areas. The outcome of the CRA would indicate where the maximum number of resources co-exists, but not necessarily where the most important resources exist.

The second part of the project develops a process to prioritize the most ecologically valuable regions within Virginia tidal waters. Using the data output from the CRA, an Aquatic Priority Conservation Area (APCA) analysis was developed which ranks individual resources based on potential to provide important ecosystem services. A weighting function was applied and zones of good, very high, and exceptional habitat value were designated.

Phase three of the project reviewed priority conservation areas (PCAs) designated on the upland and modeled spatial relationships between terrestrial PCAs and Aquatic PCAs. Linkages established between the two could potentially elevate areas on the upland for conservation due to the geo-spatial relationship to important aquatic areas. The analysis only focused on the highest valued conservation areas within both datasets.

Finally where data was available and could support an analysis of climate change impacts, the APCA output was assessed for areas vulnerable to sea level rise impacts. The results of the analysis, which focused only within the Chesapeake Bay portion of Virginia, could indicate where APCA were unlikely to be sustained as a result of long-term impacts of rising water levels. The analysis used climate change vulnerability data derived for wetlands and beach environments as the indicator and identified APCAs adjacent to or coincident with these locations.

Introduction

This project is an extension of earlier efforts by the Virginia CZM Program to build a platform for enhanced Blue and Green Infrastructure planning. Our interest is two-fold. First, to extend the work in Blue Infrastructure (begun as FY 2003 Task 95.02 to VIMS) so we begin to develop tools to assist local governments with aquatic conservation planning, and two to initiate the process where aquatic conservation and terrestrial conservation priorities are linked. This later focus represents a truly integrated approach to conservation planning and offers a new capacity building model for local level conservation management. CZM grants to other state agencies have resulted in the identification of priority terrestrial areas that should be conserved. So combined with the results of the VIMS Blue Infrastructure projects, local governments and other planning entities will begin to have a seamless view of both land and water resources by downloading these layers into their own GIS or by simply viewing them through tools such as Coastal GEMS.

This project is motivated by an interest in extending statewide conservation efforts into estuarine systems and recognition that land use decisions on the upland effect water quality and habitat health in the receiving waters. Conservation and preservation of aquatic systems in estuaries was given a boost when President Obama, in May of 2009 characterized the Chesapeake Bay as a national treasure. The executive order issued by the White House states that the government should "... identify and prioritize critical living resources of the Chesapeake Bay and its watershed" for restoration and protection. To that end, this project focuses on defining where within the Virginia portion of the Chesapeake Bay we find an abundance of aquatic living resources and essential habitat to support living resources. The effort is important because it paves the way for prioritizing tributaries that are considered highly valuable, potentially vulnerable to upland land use practices, and therefore targets for conservation.

While there have been efforts within the Bay to target individual or multi-species living resources habitat, there have been few efforts strategically focused on defining aquatic areas of importance for the purpose of identifying resource sensitivity and prioritizing conservation goals. Furthermore, there have been even fewer efforts that anticipate a user audience at the local level and end products that assist local governments in conservation efforts. Local

planners benefit from tools that can point to areas where resources are highly valued and potentially at risk.

Objective

This project integrates multiple data sources and employs a valuation technique to identify the most resource rich and potentially ecologically valuable aquatic habitat within Virginia's coastal waters. The project builds on an earlier effort to assess cumulative resource sensitivity within the region by placing ecological value to the actual resources found in any given area. The study will focus on aquatic systems only.

A secondary objective is to attempt to develop linkages between the aquatic areas of importance and terrestrial areas previously identified as priority conservation areas (DGIF, 2009). This represents an effort on the part of Virginia to take a holistic approach to prioritizing conservation areas; particularly on the upland. Recognizing that land use decisions on the upland affect the quality of the adjacent waters, a comprehensive conservation targeting plan would be remiss if it did not consider connectivity between the two landscapes.

Finally, using output generated from an analysis of shallow water habitat vulnerability to climate change impacts (CCRM, 2009), this study will review aquatic areas of importance with respect to climate change vulnerability. This last analysis attempts to define hotspots where climate change impacts may indicate a need to shift conservation efforts inland or redirect conservation effort away from areas most likely to be impacted by natural processes in the near future.

Project Scope

Geographically this project includes all tidal waters within the Chesapeake Bay portion of Virginia as well as the Back Bay estuary in Virginia Beach. Since a comparable effort occurring in tandem will address the seaside of the Eastern Shore of Virginia (Task Task 96.01, FY 07), readers will note that this geographic area is included in most final map products presented here.

The tasks to be accomplished include the following:

1. Using the output of the Cumulative Resource Assessment (CRA) apply a valuation system to rank ecological value of the aquatic areas within the study boundaries and generate Aquatic Priority Conservation Areas (APCA) for future conservation targeting;
2. Review recent terrestrial conservation models developed within Virginia (DGIF, 2009) and assess where spatial connectivity exists between aquatic and terrestrial areas of importance;
3. Consider where potential climate change impacts to shallow water habitat may impact aquatic areas targeted for conservation;
4. Generate maps to illustrate the outcome and prepare data and metadata for Coastal GEMS.

Background

A Cumulative Resource Assessment (CRA) was developed to define where clusters of aquatic natural resources exist within the tidal tributaries and bays of Virginia. The basis for a CRA is to collect and geographically juxtapose living resource data. The results of this study are documented in a final project report submitted to the Virginia Coastal Zone Management Program (CCRM, 2010). Using 17 different aquatic resource layers, the study concluded that no more than 7 layers were located anywhere within the study area, and these represented very small isolated areas. The study also recognized that a cumulative analysis of this type could not accurately represent areas of ecological importance unless the ecosystem services provided by the individual resources were considered. To that end, this study carries on where the CRA left off and applies that valuation step to the CRA. In doing so, products generated can define areas that should be targeted for conservation based on their ecological value. These products are useful for local governments with a desire to apply conservation measures but who deal with limited resources, competition for uses, and economic pressures.

Method and Approach

The initial steps to develop the Aquatic Priority Conservation Areas (APCA) required a review of all data within Cumulative Resource Assessment (CRA). These data and the original

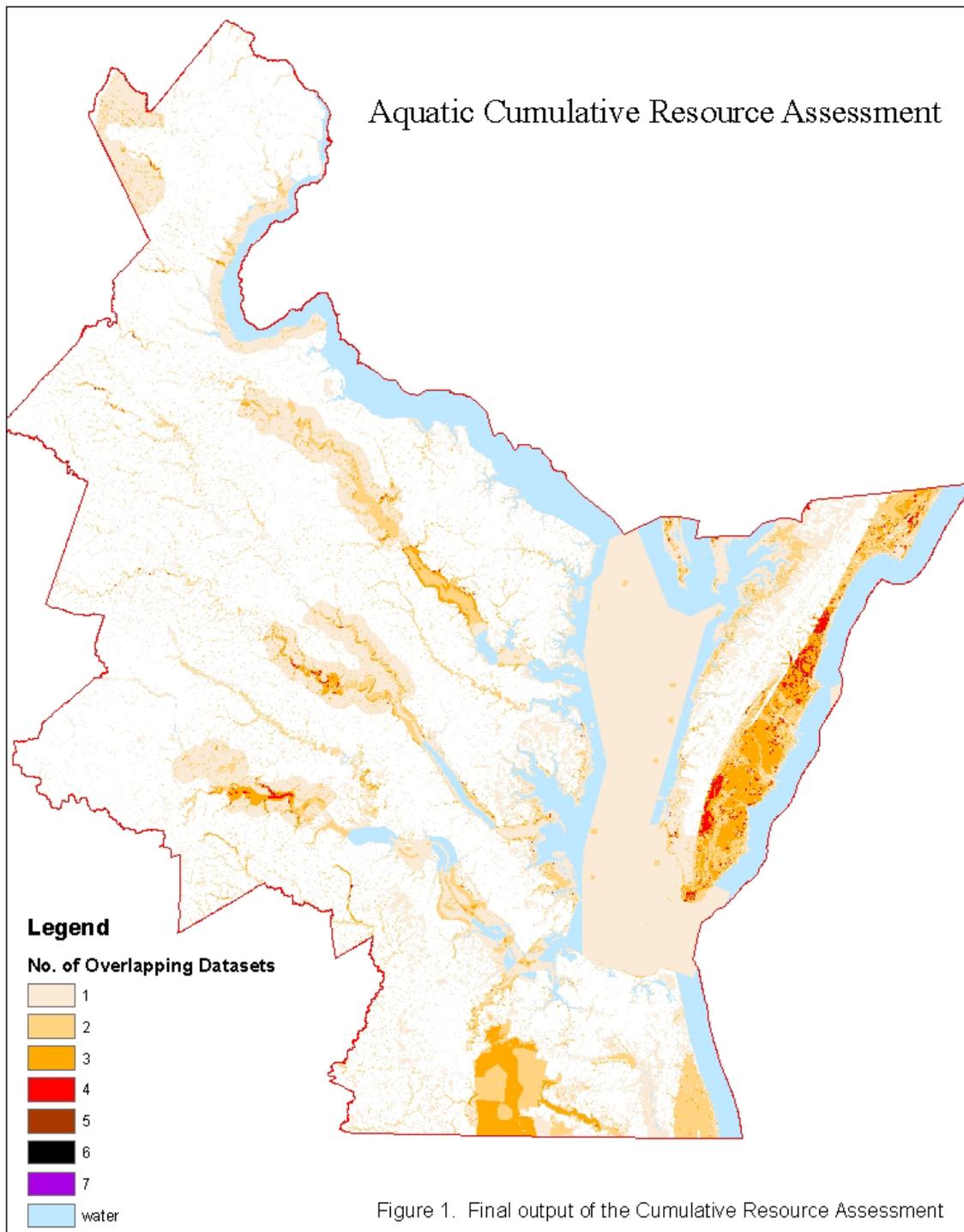
CRA analysis would be the building blocks for the APCA (Figure 1). Table 1 lists all the data used in the CRA and the data originators. The data review included consultation with data developers, as well as detailed metadata reviews to address a few specific issues.

First, it was critical to insure there was no duplication or double counting of resources. Since several of the datasets were derived from analytical interpretation (e.g. Aquatic Resource Integrity Layer) it was conceivable that baseline data may have already been considered. This was the case in several original products considered. For these, we turned to the baseline data inputs.

Second, it was important to have a complete understanding of the resource, as mapped, in order to assign a value which would ultimately represent its ecological value or ability to perform ecological services. We used best professional judgment when ultimately assigning values to each data layer; however, we did so only following a robust review of the dataset for clarity.

Table 1. Baseline data for the Cumulative Resource Assessment

Dataset	Originator
1) Colonial Waterbird Database	Center for Conservation Biology, William and Mary
2) Audubon Important Bird Areas	VA Department of Game and Inland Fisheries
3) Shellfish Suitability	VIMS CCRM
4) Reef Restoration Sites	VMRC/VIMS CCRM
5) Oyster Reefs	VMRC/VIMS Eastern Shore Lab/ CCRM
6) Artificial Fishing Reef	VMRC
7) Wetlands (2009)	National Wetlands Inventory, US Fish and Wildlife
8) Sand/Mud Flats (2009)	National Wetlands Inventory, US Fish and Wildlife
9) Seed Areas	VMRC/VIMS CCRM
10) Aquaculture sites	VMRC/VIMS CCRM
11) Turtle Nest	NOAA Environmental Sensitivity Index Atlas
12) SAV (1999 – 2008)	VIMS Submerged Aquatic Vegetation Program
13) Aquatic Confirmed Habitat	VA Department of Game and Inland Fisheries
14) Aquatic Resource Integrity	Center for Environmental Studies/VCU
15) Stream Conservation Areas	VA Department of Conservation and Recreation
16) Threatened & Endangered Waters	VA Department of Game and Inland Fisheries
17) Regulated Areas	VMRC/VIMS CCRM



Task 1. Aquatic Priority Conservation Area Designation

Since the CRA output already eliminated resource starved areas from the analysis (CCRM, 2010), the classification for the APCA reflects a relatively healthy spectrum of each attribute. In other words low density or regions void of a specific resource have already been eliminated from the analysis and therefore the classification does not need to be expanded to low end conditions. In the ranking or valuation analysis, each data raster was coded with a value based on best professional judgment (Table 2). The classes assigned to the APCA and their corresponding values are as followed:

- Exceptional Habitat Value: 3
- Very High Habitat Value: 2
- Good Habitat Value: 1

Using the ArcMap® tool set “Mosaic to New Raster Tool (Mosaic Method: Maximum)” rasters were superimposed and combined by cell (30m cell size). Using this technique, the output raster retains the maximum cell value on each overlapping cell. Therefore an area with only two resources that score a value of 3 each are not outweighed by an areas with 4 resources with values of 1 each. Finally, this raster set was divided into 3 categories (excluding 0) to reflect the proposed classification. The results of this analysis are illustrated in Figure 2.

Task 2. Linking Aquatic Priority Conservation Areas to Terrestrial Priority Conservation Areas

We understand that conservation of important aquatic systems may begin with upland based management practices. We also understand that conservation of “isolated” areas; whether they are aquatic or terrestrial systems, does not necessarily meet conservation goals of reducing habitat fragmentation and loss. The next task in this analysis begins the process of establishing connection between terrestrial areas identified for conservation and highly valued aquatic systems prioritized for conservation.

Since the interaction between terrestrial and aquatic based ecosystems is complex and a full study is beyond the scope of this project, the analysis here focuses strictly on geospatial relationships between the two only. Why might this be useful? First, and generally speaking, a healthy aquatic system is most likely found adjacent to a well managed, natural terrestrial landscape. Given this, sustainability of a highly valued aquatic system may be more attainable

Table 2. Summary of ecological value scores

LAYER	SCORE
1) Colonial Waterbird Database	3
2) Audubon Important Bird Areas	2
3) Shellfish Suitability	2
4) Reef Restoration Sites	3
5) Oyster Reefs	3
6) Artificial Fishing Reef	1
7) Wetlands (2009 NWI)	3
8) Sand/Mud Flats (from 2009 NWI)	2
9) Seed Areas	1
10) Aquaculture sites	2
11) Turtle Nest	3
12) SAV (1999 – 2008)	3
13) Aquatic Confirmed Habitat	3
14) VCU Aquatic Resource Integrity	3
15) Stream Conservation Areas	2
16) Threatened & Endangered Waters	3
17) Regulated Areas	1

if geographically connected to an upland area set aside for conservation purposes. Our analysis therefore seeks to identify those areas where this may occur.

Using the terrestrial based component of the Priority Conservation Areas (PCAs) identified by DGIF (2009) and output of the APCA conducted here and described above, areas of spatial adjacency or geographic juxtaposition have been identified. In other words the spatial connectivity between the terrestrial component of the PCA and the APCA is based on where both data sets overlap or touch. For this demonstration we have decided to use only those areas classified in the APCA as “exceptional” and only the top two highest ranked upland priority areas in from the PCA (“imperative opportunity” and “very high opportunity”).

Overlap between the terrestrial PCA and the APCA occurs primarily within analytical buffers conducted in the independent analyses originating from the CRA. These buffers, which varied depending up the resource (25m-300m), represent areas within which a resource logically migrate or within which the resource can be affected by external measures.

Some buffers were used merely to create polygons from features originally mapped as points or lines (e.g. artificial reef locations or nontidal wetland areas). In only one instance was the overlap generated as a function of duplication between datasets. Both the Terrestrial PCA and the APCA use non-tidal wetlands from NWI. Within the APCA the nontidal wetlands make up an important component of the stream conservation units.

PCA upland areas defined as “imperative opportunity” and/or “very high opportunity” that were not coincident with, but adjacent to an aquatic region valued as “exceptional”, were also highlighted. Figure 3 illustrates both the overlap and the adjacent for a simplistic comprehensive overview of spatial connectivity between the two.

The areas highlighted in Figure 3 may assist local governments in filtering out the absolute best areas to target for conservation. Ideally these areas would reflect upland areas identified for conservation that are coincident with or adjacent to important aquatic systems. The analysis does not consider constraints that may arise due to land ownership, regulatory restrictions, or limitations on the capacity of local governments to implement conservation policy. This would be a valuable piece for further study.

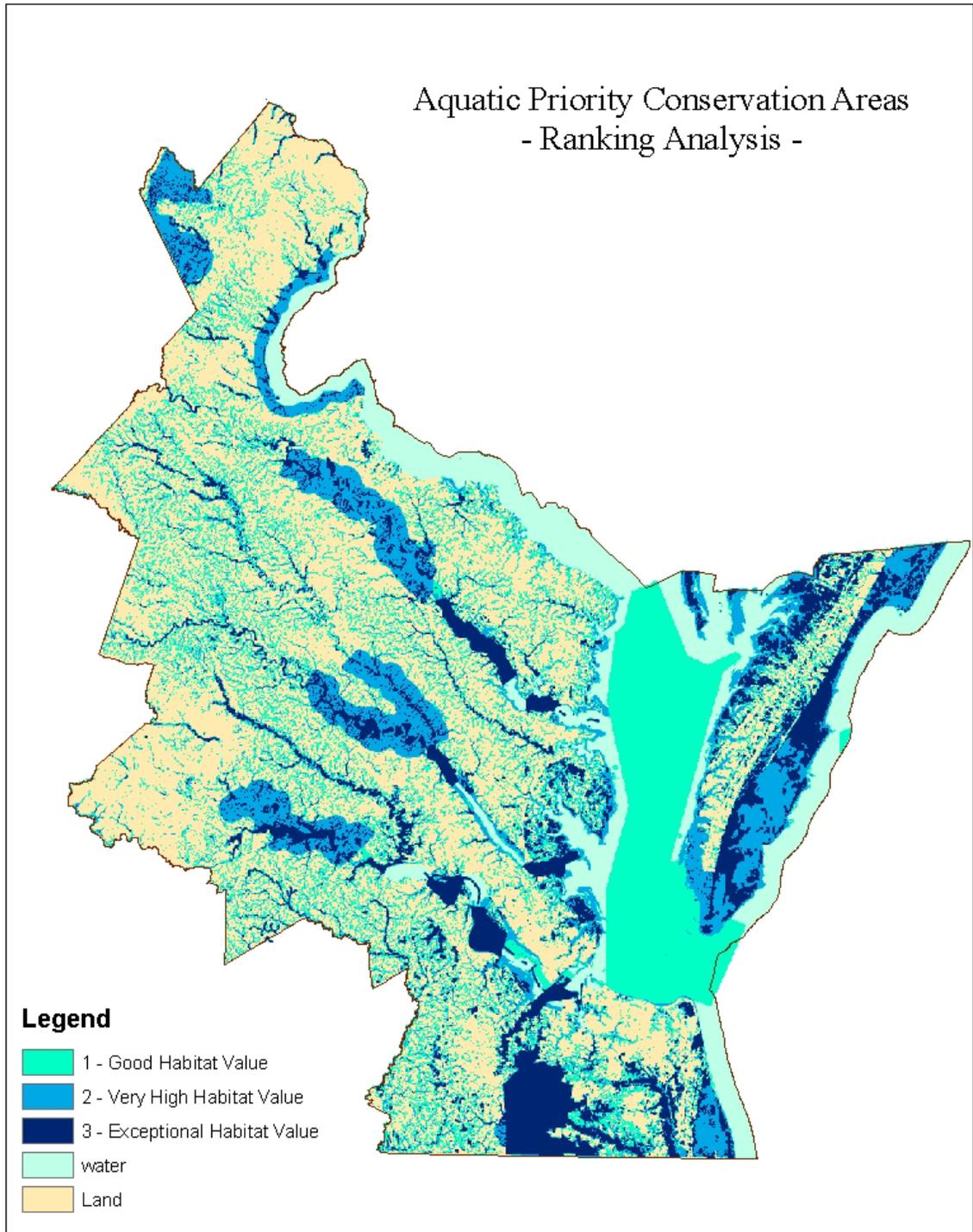


Figure 2. Aquatic Priority Conservation Areas

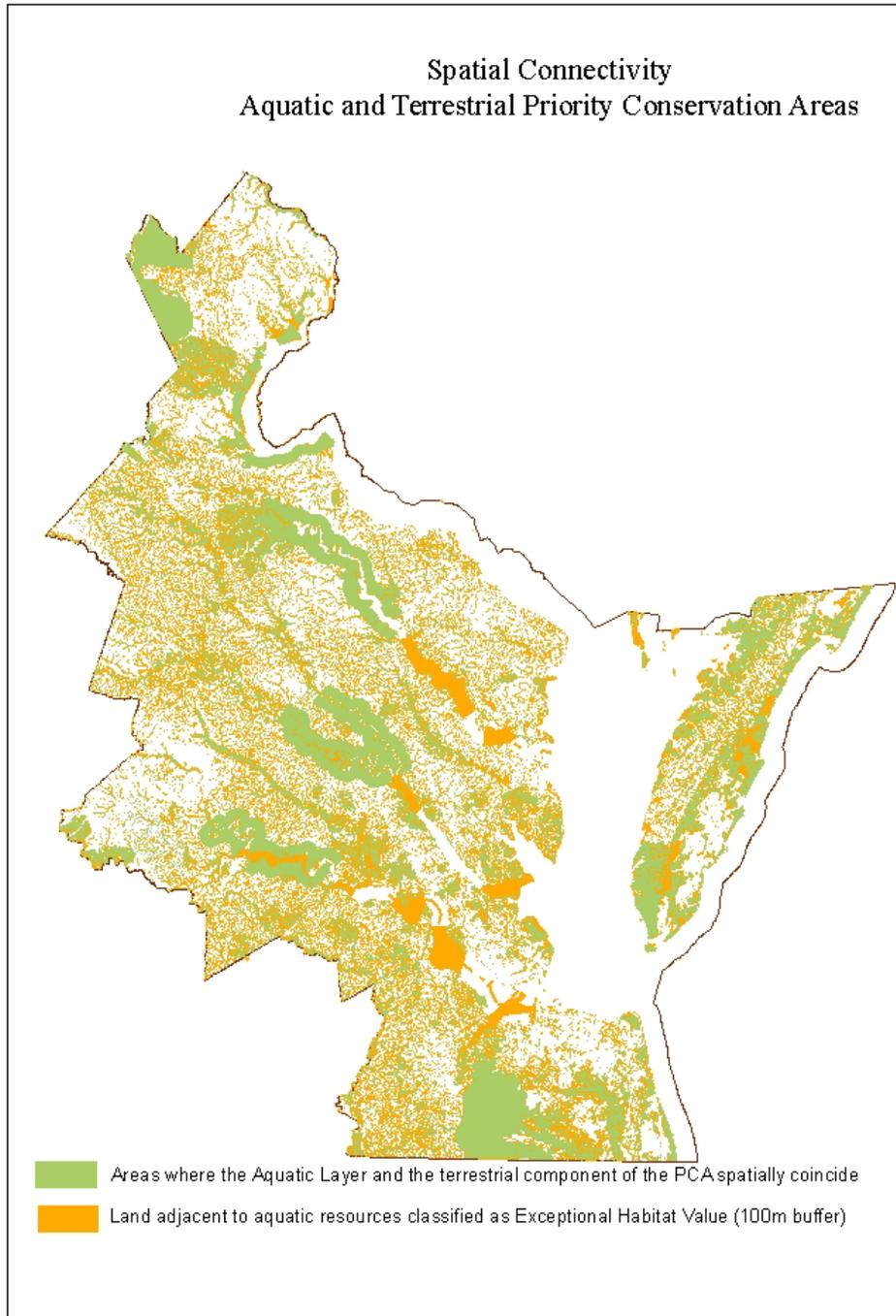


Figure 3. Observed linkages between highly ranked terrestrial conservation areas and aquatic zones of exceptional value.

Task 3. Climate Change Considerations

Also important for consideration in any comprehensive conservation plan would be a consideration of the impact that climate change could have on the aquatic resources identified for conservation. Two issues are paramount. First, is the climate change risk so great that any monetary investment in onsite protection of the resources would be wasted? Second, does the landscape allow for habitat migration or translation under a scenario of sea level rise? This is particularly essential for shallow water aquatic habitat such as wetlands. For these areas, preservation on site may not be nearly as critical as conservation of adjacent upland to allow for inland migration of the vegetative system.

An introductory look at these questions was undertaken for the final project task. Output from a collection of climate change vulnerability models developed by the Center for Coastal Resources Management (CCRM) at VIMS was used to simulate climate change risk. The APCAs generated from Task 1 were evaluated for potential climate change vulnerability based on a simple assessment of the spatial relationship between the APCAs and the climate change model output. The analysis combined the climate change vulnerability assessment for both tidal wetlands and beach environments. These two habitats were originally modeled for their ability to sustain themselves given rising sea level conditions in combination with existing and projected development practices on the upland. The CCRM model considered shoreline hardening and the likelihood shorelines would be hardened in the future based on existing development. Both would contribute to the inability of the habitat to migrate landward. Figure 4 illustrates the results.

Areas shown in red have are predicted to be at risk under rising sea level conditions. Should these areas be abandoned for consideration by a local government seeking to identify aquatic areas for conservation? Perhaps this may be the case. A review of the resources comprising these areas should occur. Since the climate models already address the potential for a habitat like a wetland or a beach to migrate landward, there is a high probability that the upland area has already been compromised and transgression is unlikely at these sites. The terrestrial component of the PCA model may reveal there is restoration potential of these uplands and therefore some opportunity for the APCA to be sustained over time. More work is necessary to confirm these types of relationships between the APCA and the terrestrial PCA.

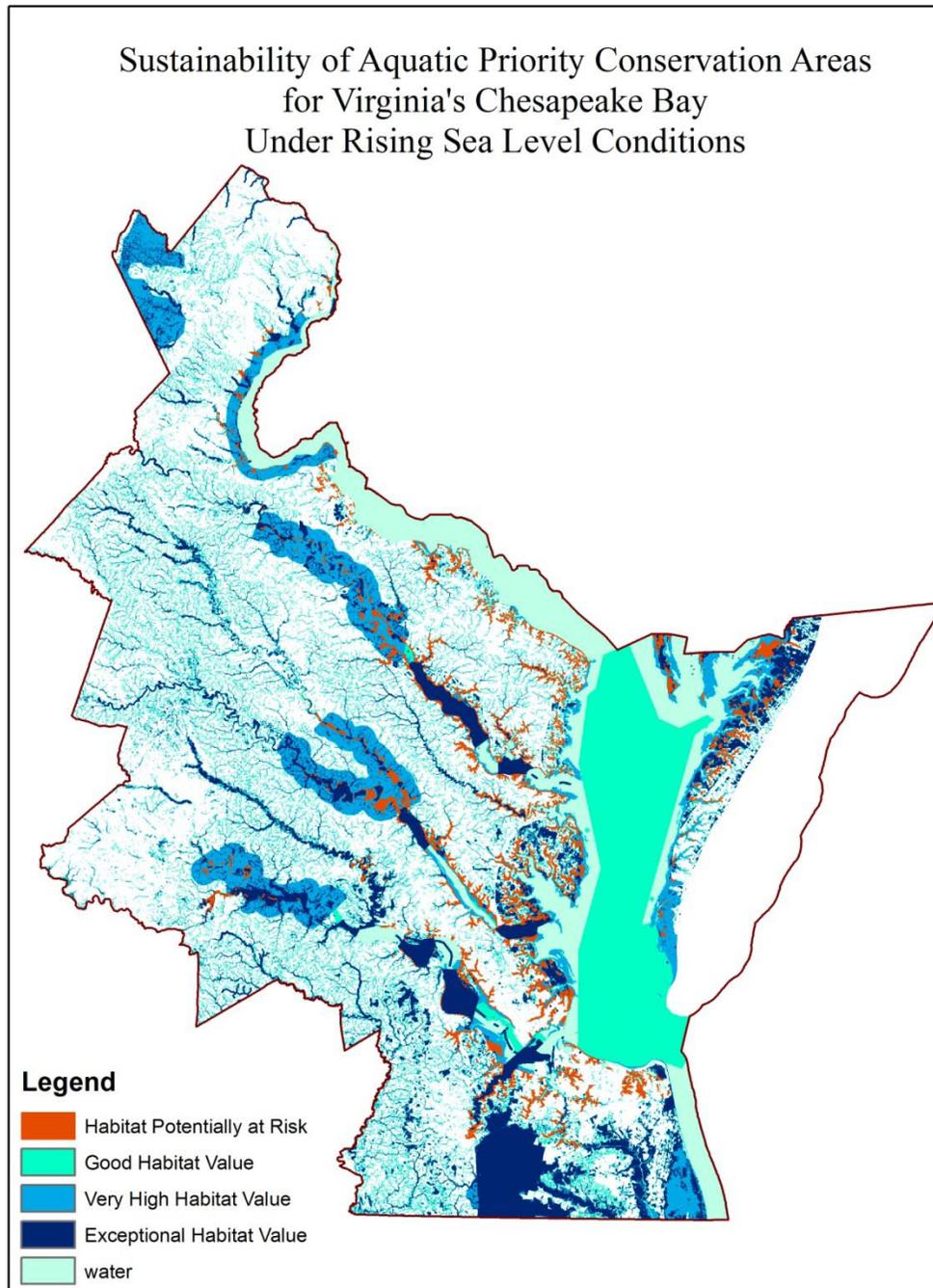


Figure 4. Aquatic conservation areas potentially at risk to sea level rise are illustrated in red

Summary Remarks

This study reflects a statewide need to address the quality of Blue Infrastructure within Virginia's tidal waters. It revitalizes prior efforts and begins developing tools to assist local governments identify and prioritize essential aquatic habitat for conservation consideration. The respective analyses comprising this study have been undertaken using best available data, science, and management practices. While better data and more data will improve on results, the effort responds to a growing consensus that waiting is no longer an option.

Issues such as open space, use conflict, public access, and preservation of the public trust confront local governments daily. They are complicated by economic development, population growth, dwindling resources, and natural pressures. Conservation has been in the forefront for many years. Aquatic conservation is getting more attention as alternative energy exploration such as wind farms, and traditional energy exploration such as offshore drilling call for environmental reviews to assess potential impacts. Marine Spatial Planning will play a significant role in this process. The tasks accomplished under this study exemplify the utility of Marine Spatial Planning at the local and state level. The products developed will serve as a baseline resource for local governments engaged in or considering implementation of a conservation management plan.

Acknowledgements

This project was funded in part by the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant # NA08NOS4190466, Task 11.03 of the United States Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

The principal investigator would like to thank CCRM GIS analysts Karinna Nunez and Tamia Rudnicky for their contributions to this project. The project elements were critiqued by the Special Area Management Committee for the Seaside of the Eastern Shore and their suggestions were greatly appreciated. Special thanks to Nick Meade and Laura McKay.

Special thanks to external partners who shared data in this study: Dave Morton of the VA Department of Game and Inland Fisheries; Jason Bulluck and Joe Weber of the VA Department of Conservation and Recreation, Division of Natural Heritage; Will Shuart, Jennifer Ciminelli, and Greg Garmen of the VCU Center for Environmental Studies; Brian Watts of the William and Mary Center for Conservation Biology; and P.G. Ross and Mark Luckenbach from the Virginia Institute of Marine Science's Wachapreague Lab.

References

Center for Coastal Resources Management, 2010. Estuarine Blue Infrastructure: Draft Priority Conservation Areas for Chesapeake Bay and its Tidal Tributaries and Back Bay – A Cumulative Resource Assessment, Final Project Report to the Virginia Coastal Zone Management Program, NOAA Grant # NA07NOS4190178, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia.

Center for Coastal Resources Management, 2009. Vulnerability of Shallow Tidal Water Habitats in Virginia to Climate Change, Final Project Report to National Oceanic and Atmospheric Administration, NOAA Grant #NA07NMF4570342, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, Virginia.

Department of Game and Inland Fisheries, 2009. Sustainable Communities: Assessment of Priority Conservation Areas and their Vulnerability to Development, Final Project Report to Virginia Coastal Zone Management Program, NOAA Grant # 08NOS4190466, Virginia Department of Game and Inland Fisheries, Richmond, Virginia.

Virginia Aquatic Priority Conservation Areas Ranking Analysis

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Comprehensive Coastal Inventory, Virginia Institute of Marine Science

Publication_Date: 2010

Title:

Virginia Aquatic Priority Conservation Areas Ranking Analysis

Geospatial_Data_Presentation_Form: vector digital data

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Virginia Institute of Marine Science

Online_Linkage: <http://www.deq.state.va.us/coastal/coastalgems.html>

Online_Linkage: http://ccrm.vims.edu/publications/completed_projects/index.html

Description:

Abstract:

This data set is the result of overlaying 17 datasets that reflect high ecosystem service potential and living resource areas within the Virginia portion of the Chesapeake Bay, the seaside lagoons on the Eastern Shore, and Back Bay in the City of Virginia Beach. The cumulative sensitivity analysis shows the areas of highest concentration of living resource features. Datasets included are Colonial Waterbirds, Audubon Important Bird Areas, Shellfish Suitability, Reef Restoration Sites, Oyster Reefs, Artificial Fishing Reefs, Wetlands, Sand/Mud Flats, Seed Areas, Aquaculture Sites, Turtle Nesting Locations, Submerged Aquatic Vegetation, Aquatic Confirmed Habitat, VCU Aquatic Resource Integrity, Stream Conservation Areas, Threatened and Endangered Waters, and Regulated Areas.

Purpose:

To rank areas of high ecological importance in the Chesapeake Bay and its tidal tributaries, Back Bay, and the seaside of the Eastern Shore, by overlaying living resource datasets.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 2002

Ending_Date: present

Currentness_Reference:

data of data sets used

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -77.993088

East_Bounding_Coordinate: -75.172070

North_Bounding_Coordinate: 39.085431

South_Bounding_Coordinate: 36.518365

Keywords:

Theme:

Theme_Keyword_Thesaurus: none

Theme_Keyword: blue infrastructure

Theme_Keyword: ranking analysis

Place:

Place_Keyword_Thesaurus: none

Place_Keyword: Virginia

Place_Keyword: Eastern Shore

Place_Keyword: Chesapeake Bay

Place_Keyword: Back Bay

Access_Constraints: none

Use_Constraints:

This analysis uses best available data to make the determinations. These data have not been verified as part of this study. The outcome of the analysis does not consider local, state, or

federal regulations for maintaining, establishing or enforcing conservation areas. The outcome does not include property ownership and whether conservation measures at the local or state level conflict with private property owner use. The study is merely conducted and presented as a guide for local governments seeking direction on where ecologically important areas may benefit from managed conservation practices.

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Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

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Data_Quality_Information:

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Comprehensive Coastal Inventory, Virginia Institute of Marine Science

Publication_Date: 2003

Title:

Hard Clam and Oyster Suitability Models

Geospatial_Data_Presentation_Form: digital data

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Virginia Institute of Marine Science

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2000

Source_Currentness_Reference:

dates of base data

Source_Citation_Abbreviation:

shellfish_suit

Source_Contribution:

shows suitable shallow water habitat for hard clam and oyster aquaculture (used optimal and suitable habitat rankings).

Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Marine Resources Commission

Publication_Date: 2005/2006

Title:

Regulated Areas

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Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2005/2006

Source_Citation_Abbreviation:

regareas

Source_Contribution:

Regulated areas: broodstock management area, oyster management area, SAV sanctuary, shellfish management area, Striped Bass spawning sanctuary, harvest area, Black Drum management area, Blue Crab sanctuary.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Marine Resources Commission

Publication_Date: 2009

Title:

Oyster Reef Restoration Sites

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

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Source_Citation_Abbreviation:

reefs09

Source_Contribution:

oyster reef restoration locations.

Source_Information:

Source_Citation:

Citation_Information:

Originator: U.S. Fish and Wildlife Service

Publication_Date: 20090925

Title:

National Wetlands Inventory

Publication_Information:

Publication_Place: Washington, D.C.

Publisher: U.S. Fish and Wildlife Service

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Time_Period_Information:

Range_of_Dates/Times:

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Ending_Date: present

Source_Citation_Abbreviation:

NWI

Source_Contribution:

wetlands data including mud/sand flats.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Watts, B.D. and B. J. Paxton, The Center for Conservation Biology

Publication_Date: 2009

Title:

Colonial Waterbirds

Publication_Information:

Publication_Place: Williamsburg, Virginia

Publisher: The Center for Conservation Biology, College of William and Mary

Type_of_Source_Media: digital data

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Time_Period_Information:

Range_of_Dates/Times:

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Ending_Date: 7/16/2008

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colwtrbird

Source_Contribution:

location of waterbird nesting colonies

Source_Information:

Source_Citation:

Citation_Information:

Originator: Aimee Weldon - Virginia Audubon Society

Publication_Date: 2007

Title:

Virginia Important Bird Areas

Publication_Information:

Publication_Place: Richmond, Virginia

Publisher: Virginia Dept. of Game and Inland Fisheries

Type_of_Source_Media: digital data

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Time_Period_Information:

Single_Date/Time:

Calendar_Date: 1/24/2008

Source_Citation_Abbreviation:

iba

Source_Contribution:

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Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Marine Resources Commission

Publication_Date: 2005/2006

Title:

Artificial Fishing Reefs

Type_of_Source_Media: digital data

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Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2005/2006

Source_Citation_Abbreviation:

fish_reefs

Source_Contribution:

location of fishing reefs.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Marine Resources Commission

Publication_Date: 2005/2006

Title:

Seed Areas

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Time_Period_Information:

Single_Date/Time:

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Source_Citation_Abbreviation:

seed

Source_Contribution:

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Source_Information:

Source_Citation:

Citation_Information:

Originator: Ross, P.G. and Luckenbach, M.L., College of William and Mary, Virginia Institute of Marine Science, Eastern Shore Laboratory

Publication_Date: 12/31/2008

Title:

Seaside Oyster Mapping Patch Reefs

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Time_Period_Information:

Range_of_Dates/Times:

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Ending_Date: 7/1/2008

Source_Citation_Abbreviation:

patch reefs

Source_Contribution:

location of isolated patch and fringe reefs on the seaside of Virginia's Eastern Shore.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Marine Resources Commission

Publication_Date: 2002

Title:

Aquaculture Sites

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Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2002

Source_Contribution:

location of aquaculture sites.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Center for Environmental Studies at VCU

Publication_Date: October 2009

Title:

Aquatic Resource Layer

Publication_Information:

Publication_Place: Richmond, Virginia

Publisher: Center for Environmental Studies at VCU

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: October 2009

Source_Citation_Abbreviation:

arl

Source_Contribution:

aquatic resource integrity: location of exceptional and healthy areas.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Dept. of Game and Inland Fisheries

Publication_Date: 2008

Title:

Aquatic Confirmed Habitat

Publication_Information:

Publication_Place: Richmond, Virginia

Publisher: Virginia Dept. of Game and Inland Fisheries

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2008

Source_Citation_Abbreviation:

aquaTier

Source_Contribution:

tiers 1 and 2 aquatic confirmed habitat.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Division of Natural Heritage, VA DCR

Publication_Date: 2008

Title:

Stream Conservation Units

Publication_Information:

Publication_Place: Richmond, Virginia

Publisher: Division of Natural Heritage, VA DCR

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2008

Source_Citation_Abbreviation:

SCU

Source_Contribution:

location of stream conservation areas.

Source_Information:

Source_Citation:

Citation_Information:

Originator: National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Office of Response and Restoration, Hazardous Materials Response Division, Seattle, Washington and NOAA Chesapeake Bay Office, Gloucester Point, Virginia.

Publication_Date: 2005

Title:

Virginia ESI: Reptile Points

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

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 2002

Ending_Date: 2004

Source_Citation_Abbreviation:

ESI

Source_Contribution:

Sea turtle nesting locations.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Institute of Marine Science

Publication_Date: 2009

Title:

Chesapeake Bay SAV Coverage

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Virginia Institute of Marine Science

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 1999

Ending_Date: 2008

Source_Citation_Abbreviation:

SAV

Source_Contribution:

location of SAV

Source_Information:

Source_Citation:

Citation_Information:

Originator: Virginia Department of Game and Inland Fisheries, Wildlife Diversity Division, Fish and Wildlife Information Services

Publication_Date: 2002

Title:

Threatened and Endangered Waters

Publication_Information:

Publication_Place: Richmond, Virginia

Publisher: Virginia Department of Game and Inland Fisheries

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: 2002

Source_Citation_Abbreviation:

TE waters

Source_Contribution:

location of threatened and endangered waters.

Process_Step:

Process_Description:

Point datasets were converted to polygon shapefiles by buffering each point 200 meters (reef restoration sites, aquaculture sites, and turtle nesting locations), or 300m (colonial waterbird survey points).

Linear datasets were also buffered as follows; Aquatic Confirmed Habitat (300m), Threatened and Endangered Waters (200m), and Stream Conservation Areas (25m).

Process_Date: 2010

Process_Step:

Process_Description:

SAV shapefiles corresponding to the past 10 surveys (1999 through 2008) are included in the Cumulative Sensitivity Analysis. For each shapefile, SAV bed density equal to dense, moderate, or sparse was extracted and reclassified with a score value of 1 (to weight all the layers in the same manner). Each shapefile was converted to a raster with a cell size of 30m and combined (using the Mosaic Tool) with the raster of the study area. Each output displays the maximum cell value on each overlapping cell. Finally, all the rasters (10) were overlapped using the Weighted Sum Tool. Overlapping cells were summed and then the output grid was divided into 10 classes (excluding 0) using the Equal Interval classification method. For the purpose of this analysis, only classes corresponding from 6 to 10 were used in the final Cumulative Sensitivity

Analysis. These classes represent those beds that have been more consistently present through the time period considered here.

Process_Date: 2010

Process_Step:

Process_Description:

Each shapefile data layer was converted to a raster with a cell size of 30m. Most data sets contained large areas of no data values. To standardize the extent of each layer and set the nodata values to "0", each raster was merged with the study area boundary specifying that the resulting raster would retain the maximum cell value on each overlapping cell.

Process_Date: 2010

Process_Step:

Process_Description:

Each of the 17 raster datasets was reclassified such that data to be counted was given a value of "1", while data not to be counted was valued at "0". The following datasets and selected attributes received a value of "1": Shellfish suitability (ranking of optimal or suitable); NWI (only used vegetated wetlands and mud/sand flats); Patch reefs (areas with >10 oysters/sq m); Aquatic resource integrity layer (ranking of healthy or exceptional); Aquatic confirmed habitat (tier I and II only); Stream conservation areas (biodiversity rankings of high to outstanding); SAV 10 year cumulative grid (only areas with 6 to 10 years of overlap).

Process_Date: 2010

Process_Step:

Process_Description:

The datasets described above were reclassified for the ranking analysis based on best professional judgement. The classification categories and corresponding values are Exceptional Habitat Value (3); Very High Habitat Value (2); and Good Habitat Value (1). A value of 0 indicates no data and can be either land or water. Datasets classified as Good Habitat Value (1) are Artificial Fishing Reefs, Seed Areas and Regulated Areas. Datasets classified as Very High

Habitat Value (2) are Audubon Important Bird Areas, Shellfish Suitability, Sand/Mud Flats, Aquaculture Sites, and Stream Conservation Areas. Datasets classified as Exceptional Habitat Value (3) are Colonial Waterbird Database, Reef Restoration Sites, Oyster Reefs, Wetlands, Turtle Nesting Sites, Submerged Aquatic Vegetation, Aquatic Confirmed Habitat, VCU Aquatic Resource Integrity, and Threatened and Endangered Waters.

Process_Date: 2010

Process_Step:

Process_Description:

All rasters were combined by cell (30m cell size) using the Mosaic To New Raster Tool (Mosaic Method: Maximum). The resulting output raster retains the maximum cell value on each overlapping cell. This raster was divided into 3 categories (excluding 0) to reflect the classification scheme.

Process_Date: 2010

Process_Step:

Process_Description:

Metadata imported.

Source_Used_Citation_Abbreviation:

C:\DOCUME~1\tamia\LOCALS~1\Temp\xml1287.tmp

Process_Date: 20100526

Process_Time: 13573100

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Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 126272

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Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 18

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -75.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

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Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: va_aquatic_pca_ranking

Attribute:

Attribute_Label: FID

Attribute_Definition:

Internal feature number.

Attribute_Definition_Source:

ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition:

Feature geometry.

Attribute_Definition_Source:

ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Coordinates defining the features.

Attribute:

Attribute_Label: ID

Attribute:

Attribute_Label: GRIDCODE

Attribute:

Attribute_Label: Ranking

Attribute:

Attribute_Label: RankDefin

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Distribution_Information:

Distributor:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: Virginia Institute of Marine Science (VIMS)

Contact_Position: Director Comprehensive Coastal Inventory Program

Contact_Address:

Address_Type: mailing address

Address:

P.O. Box 1346

City: Gloucester Point

State_or_Province: Virginia

Postal_Code: 23062

Country: USA

Contact_Voice_Telephone: (804) 684-7188

Contact_Electronic_Mail_Address: marcia@vims.edu

Contact_Instructions:

Contact via email

Resource_Description: Downloadable Data

Distribution_Liability:

The Comprehensive Coastal Inventory Program (CCI) at VIMS performs a service by distributing data generated by either CCI or public agencies which offer data without restriction or charge.

CCI assumes no responsibility for data accuracy or precision, metadata completeness or correctness for digital information. CCI assumes no liability for misuse of any data which may arise as a result of any alteration, conversion, or combination with other data sources. As well, the timeliness and scale of these products must be considered when evaluating appropriate use.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 4.670

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Metadata_Reference_Information:

Metadata_Date: 20100526

Metadata_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: Virginia Institute of Marine Science (VIMS)

Contact_Person: Tamia Rudnicki

Contact_Position: GIS Programmer/Analyst

Contact_Address:

Address_Type: mailing address

Address:

P.O. Box 1346

City: Gloucester Point

State_or_Province: Virginia

Postal_Code: 23062

Country: USA

Contact_Voice_Telephone: (804) 684-7181

Contact_Facsimile_Telephone: (804) 684-7179

Contact_Electronic_Mail_Address: tamia@vims.edu

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

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Virginia Aquatic Priority Conservation Areas Spatial Connectivity with Terrestrial Priority Conservation Areas

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Comprehensive Coastal Inventory, Virginia Institute of Marine Science

Publication_Date: 2010

Title:

Virginia Aquatic Priority Conservation Areas Spatial Connectivity with Terrestrial Priority Conservation Areas

Geospatial_Data_Presentation_Form: vector digital data

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Virginia Institute of Marine Science

Online_Linkage: <http://www.deq.state.va.us/coastal/coastalgems.html>

Online_Linkage: http://ccrm.vims.edu/publications/completed_projects/index.html

*Description:**Abstract:*

This data set explores the spatial connectivity of the highest values within the terrestrial portion of the Priority Conservation Areas (PCA) and the Aquatic Priority Conservation Areas (APCA). The targeted areas are where both data sets overlap and the adjacent land to those areas classified as "Exceptional Habitat Value" in the Aquatic Priority Conservation Areas.

Purpose:

To look for spatial connectivity between the highly valued waterbodies (Aquatic Priority Conservation Areas) and the Priority Land Conservation Areas (PCA) in the Chesapeake Bay and its tidal tributaries, Back Bay, and the seaside of the Eastern Shore.

*Time_Period_of_Content:**Time_Period_Information:**Range_of_Dates/Times:*

Beginning_Date: 2002

Ending_Date: present

Currentness_Reference:

data of data sets used

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

*Spatial_Domain:**Bounding_Coordinates:*

West_Bounding_Coordinate: -77.993928

East_Bounding_Coordinate: -75.237001

North_Bounding_Coordinate: 39.086085

South_Bounding_Coordinate: 36.517445

Keywords:

Theme:

Theme_Keyword_Thesaurus: none

Theme_Keyword: blue infrastructure

Theme_Keyword: Spatial Connectivity

Place:

Place_Keyword_Thesaurus: none

Place_Keyword: Virginia

Place_Keyword: Eastern Shore

Place_Keyword: Chesapeake Bay

Place_Keyword: Back Bay

Access_Constraints: none

Use_Constraints:

This analysis uses best available data to make the determinations. These data have not been verified as part of this study. The outcome of the analysis does not consider local, state, or federal regulations for maintaining, establishing or enforcing conservation areas. The outcome does not include property ownership and whether conservation measures at the local or state level conflict with private property owner use. The study is merely conducted and presented as a guide for local governments seeking direction on where ecologically important areas may benefit from managed conservation practices.

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Marcia Berman

Contact_Organization: Virginia Institute of Marine Science (VIMS)

Contact_Position: Director Comprehensive Coastal Inventory Program

Contact_Address:

Address_Type: mailing address

Address:

P.O. Box 1346

City: Gloucester Point

State_or_Province: Virginia

Postal_Code: 23062

Country: USA

Contact_Voice_Telephone: (804) 684-7188

Contact_Facsimile_Telephone: (804) 684-7179

Contact_Electronic_Mail_Address: marcia@vims.edu

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog
9.3.1.3000

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Data_Quality_Information:

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Comprehensive Coastal Inventory, Virginia Institute of Marine Science

Publication_Date: 2010

Title:

Virginia Aquatic Priority Conservation Areas Ranking Analysis

Geospatial_Data_Presentation_Form: digital data

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Virginia Institute of Marine Science

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 2002

Ending_Date: 2009

Source_Currentness_Reference:

dates of base data

Source_Citation_Abbreviation:

APCA

Source_Contribution:

location of Aquatic Priority Conservation Areas. Used only those areas of 'Exceptional Habitat Value'.

Source_Information:

Source_Citation:

Citation_Information:

Originator: VA Department of Game and Inland Fisheries

Originator: VA Department of Conservation and Recreation Division of Natural Heritage

Originator: Virginia Commonwealth University Center for Environmental Studies

Publication_Date: 2009

Title:

Priority Conservation Areas

Geospatial_Data_Presentation_Form: digital data

Publication_Information:

Publication_Place: Richmond, Virginia

Publisher: VA Department of Game and Inland Fisheries

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 2001

Ending_Date: 2009

Source_Currentness_Reference:

dates of base data

Source_Citation_Abbreviation:

PCA

Source_Contribution:

Terrestrial component of the Priority Conservation Areas.

Process_Step:

Process_Description:

The PCA and the APCA rasters were converted into polygon shapefiles.

Process_Date: 2010

Process_Step:

Process_Description:

The terrestrial component of the PCA was selected and the highest categories (Very High Opportunity and Imperative Opportunity) were extracted from the dataset.

Process_Date: 2010

Process_Step:

Process_Description:

The category Exceptional Habitat Value was extracted from the Aquatic Priority Conservation Areas and combined (Union Tool) with the data extracted from the PCA.

Process_Date: 2010

*Process_Step:**Process_Description:*

A 100m buffer was generated using the combined output from the PCA and the APCA. This buffer reflects the adjacent land to those aquatic resources classified as Exceptional Habitat Value.

Process_Date: 2010

*Process_Step:**Process_Description:*

The buffer was then merged with the areas where the Aquatic Priority Conservation Areas and the terrestrial component of the Priority Conservation Areas overlap.

Process_Date: 2010

*Process_Step:**Process_Description:*

Metadata imported.

Source_Used_Citation_Abbreviation:

C:\DOCUME~1\tamia\LOCALS~1\Temp\xml17B3.tmp

Process_Date: 20100527

Process_Time: 13395300

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Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 104800

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Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 18

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -75.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abcissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

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Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: APCA_PCA_Connectivity

Attribute:

Attribute_Label: FID

Attribute_Definition:

Internal feature number.

Attribute_Definition_Source:

ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition:

Feature geometry.

Attribute_Definition_Source:

ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Coordinates defining the features.

Attribute:

Attribute_Label: SpatialCon

Attribute_Definition:

Spatial Connectivity

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: coincide

Enumerated_Domain_Value_Definition:

high valued areas of the PCA and the APCA overlap

Enumerated_Domain:

Enumerated_Domain_Value: adjacent

Enumerated_Domain_Value_Definition:

land adjacent to aquatic resources classified as "Exceptional Habitat Value"

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Distribution_Information:

Distributor:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: Virginia Institute of Marine Science (VIMS)

Contact_Position: Director Comprehensive Coastal Inventory Program

Contact_Address:

Address_Type: mailing address

Address:

P.O. Box 1346

City: Gloucester Point

State_or_Province: Virginia

Postal_Code: 23062

Country: USA

Contact_Voice_Telephone: (804) 684-7188

Contact_Electronic_Mail_Address: marcia@vims.edu

Contact_Instructions:

Contact via email

Resource_Description: Downloadable Data

Distribution_Liability:

The Comprehensive Coastal Inventory Program (CCI) at VIMS performs a service by distributing data generated by either CCI or public agencies which offer data without restriction or charge. CCI assumes no responsibility for data accuracy or precision, metadata completeness or correctness for digital information. CCI assumes no liability for misuse of any data which may arise as a result of any alteration, conversion, or combination with other data sources. As well, the timeliness and scale of these products must be considered when evaluating appropriate use.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 4.670

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Metadata_Reference_Information:

Metadata_Date: 20100527

Metadata_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: Virginia Institute of Marine Science (VIMS)

Contact_Person: Tamia Rudnicki

Contact_Position: GIS Programmer/Analyst

Contact_Address:

Address_Type: mailing address

Address:

P.O. Box 1346

City: Gloucester Point

State_or_Province: Virginia

Postal_Code: 23062

Country: USA

Contact_Voice_Telephone: (804) 684-7181

Contact_Facsimile_Telephone: (804) 684-7179

Contact_Electronic_Mail_Address: tamia@vims.edu

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

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Virginia Aquatic Priority Conservation Areas and Climate Change Risk Assessment

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Comprehensive Coastal Inventory, Virginia Institute of Marine Science

Publication_Date: 2010

Title:

Virginia Aquatic Priority Conservation Areas and Climate Change Risk Assessment

Geospatial_Data_Presentation_Form: vector digital data

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Virginia Institute of Marine Science

Online_Linkage: <http://www.deq.state.va.us/coastal/coastalgems.html>

Online_Linkage: http://ccrm.vims.edu/publications/completed_projects/index.html

Description:

Abstract:

The Aquatic Priority Conservation Areas (APCA) were evaluated for potential climate change vulnerability based on a simple assessment of the spatial relationship between the APCAs and the climate change model output (developed by the Center for Coastal Resources Management (CCRM) at VIMS). The analysis combined the climate change vulnerability assessment for both tidal wetlands and beach environments. These two habitats were originally modeled for their ability to sustain themselves given rising sea level conditions in combination with existing and projected development practices on the upland. The CCRM model considered shoreline hardening and the likelihood shorelines would be hardened in the future based on existing development. Both would contribute to the inability of the habitat to migrate landward.

This data set shows the areas that are predicted to be at risk under rising sea level conditions.

Purpose:

To look for areas that might be at risk to rising sea levels by examining the Aquatic Priority Conservation Areas and the Climate Change Models developed at VIMS for the Chesapeake Bay and its tidal tributaries, and Back Bay.

*Time_Period_of_Content:**Time_Period_Information:**Single_Date/Time:*

Calendar_Date: 2010

Currentness_Reference:

publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

*Spatial_Domain:**Bounding_Coordinates:**West_Bounding_Coordinate:* -77.476480*East_Bounding_Coordinate:* -75.590801*North_Bounding_Coordinate:* 38.882311*South_Bounding_Coordinate:* 36.699257*Keywords:**Theme:**Theme_Keyword_Thesaurus:* none*Theme_Keyword:* blue infrastructure*Theme_Keyword:* Aquatic Priority Conservation Areas*Theme_Keyword:* Climate Change Vulnerability Models*Place:**Place_Keyword_Thesaurus:* none*Place_Keyword:* Virginia*Place_Keyword:* Chesapeake Bay*Place_Keyword:* Back Bay*Access_Constraints:* none*Use_Constraints:*

This analysis uses best available data to make the determinations. These data have not been verified as part of this study. The outcome of the analysis does not consider local, state, or federal regulations for maintaining, establishing or enforcing conservation areas. The outcome does not include property ownership and whether conservation

measures at the local or state level conflict with private property owner use. The study is merely conducted and presented as a guide for local governments seeking direction on where ecologically important areas may benefit from managed conservation practices.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

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Data_Quality_Information:

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Comprehensive Coastal Inventory, Virginia Institute of Marine Science

Publication_Date: 2010

Title:

Virginia Aquatic Priority Conservation Areas Ranking Analysis

Geospatial_Data_Presentation_Form: vector digital data

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Comprehensive Coastal Inventory, Virginia Institute of Marine Science

Type_of_Source_Media: digital data

Source_Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 2002

Ending_Date: 2009

Source_Currentness_Reference:

dates of base data

Source_Citation_Abbreviation:

APCA

Source_Contribution:

location of Aquatic Priority Conservation Areas.

Source_Information:

Source_Citation:

Citation_Information:

Originator: Center for Coastal Resources Management, Virginia Institute of Marine Science

Publication_Date: 2010

Title:

Climate Change Vulnerability Models

Geospatial_Data_Presentation_Form: vector digital data

Publication_Information:

Publication_Place: Gloucester Point, Virginia

Publisher: Center for Coastal Resources Management, Virginia Institute of Marine Science

Type_of_Source_Media: Source_Currentness_Reference dates of base data

Source_Contribution:

Climate change vulnerability models for tidal wetlands and beach environments.

Process_Step:

Process_Description:

The Climate Change Vulnerability Model outputs utilized for this analysis were the beach risk layer (line feature) and the wetland risk layer (polygon feature). In order to analyze all the inputs together, the beach layer was buffered (10 meters).

Process_Date: 2010

Process_Step:

Process_Description:

The grid corresponding to the Ranking Analysis was converted into a shapefile, and subsequently, it was combined (Union Tool) with the beach and wetland shapefile. Different queries were performed to highlight those habitats in the Ranking Analysis (classified as good, very high, or exceptional habitat value) that are coincident or adjacent to beaches or wetlands classified as either moderate or high risk.

Process_Date: 2010

Process_Step:

Process_Description:

The resulting shapefile shows the habitat that may be at risk in sea level rise conditions.

Process_Date: 2010

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Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 20283

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Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 18

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -75.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

[Back to Top](#)

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: APCA_ClimateChange

Attribute:

Attribute_Label: FID

Attribute_Definition:

Internal feature number.

Attribute_Definition_Source:

ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition:

Feature geometry.

Attribute_Definition_Source:

ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Coordinates defining the features.

Attribute:

Attribute_Label: BEACH_RISK

Attribute_Definition:

risk to sea level rise

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: high

Enumerated_Domain_Value_Definition:

high risk

Enumerated_Domain:

Enumerated_Domain_Value: mod

Enumerated_Domain_Value_Definition:

moderate risk

Enumerated_Domain:

Enumerated_Domain_Value: low

Enumerated_Domain_Value_Definition:

low risk

Attribute:

Attribute_Label: GRIDCODE

Attribute_Definition:

APCA ranking

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Good Habitat Value

Enumerated_Domain:

Enumerated_Domain_Value: 2

Enumerated_Domain_Value_Definition:

Very High Habitat Value

Enumerated_Domain:

Enumerated_Domain_Value: 3

Enumerated_Domain_Value_Definition:

Exceptional Habitat Value

Attribute:

Attribute_Label: NAME

Attribute_Definition:

wetland type

Attribute:

Attribute_Label: RISK

Attribute_Definition:

wetland risk to sea level rise

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: H

Enumerated_Domain_Value_Definition:

high risk

Enumerated_Domain:

Enumerated_Domain_Value: M

Enumerated_Domain_Value_Definition:

moderate risk

Enumerated_Domain:

Enumerated_Domain_Value: L

Enumerated_Domain_Value_Definition:

low risk

Attribute:

Attribute_Label: Risk_SLR

Attribute_Definition:

Habitat potentially at risk due to sea level rise

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Distribution_Information:

Distributor:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: Virginia Institute of Marine Science (VIMS)

Contact_Position: Director Comprehensive Coastal Inventory Program

Contact_Address:

Address_Type: mailing address

Address:

P.O. Box 1346

City: Gloucester Point

State_or_Province: Virginia

Postal_Code: 23062

Country: USA

Contact_Voice_Telephone: (804) 684-7188

Contact_Electronic_Mail_Address: marcia@vims.edu

Contact Instructions:

Contact via email

Resource_Description: Downloadable Data

Distribution_Liability:

The Comprehensive Coastal Inventory Program (CCI) at VIMS performs a service by distributing data generated by either CCI or public agencies which offer data without restriction or charge. CCI assumes no responsibility for data accuracy or precision, metadata completeness or correctness for digital information. CCI assumes no liability for misuse of any data which may arise as a result of any alteration, conversion, or combination with other data sources. As well, the timeliness and scale of these products must be considered when evaluating appropriate use.

*Standard_Order_Process:**Digital_Form:**Digital_Transfer_Information:*

Transfer_Size: 4.670

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Metadata_Reference_Information:

Metadata_Date: 20100527

Metadata_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: Virginia Institute of Marine Science (VIMS)

Contact_Person: Tamia Rudnicki

Contact_Position: GIS Programmer/Analyst

Contact_Address:

Address_Type: mailing address

Address:

P.O. Box 1346

City: Gloucester Point

State_or_Province: Virginia

Postal_Code: 23062

Country: USA

Contact_Voice_Telephone: (804) 684-7181

Contact_Facsimile_Telephone: (804) 684-7179

Contact_Electronic_Mail_Address: tamia@vims.edu

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

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