

Reports

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9-1998

## Internet Access to Cumulative Wetland Impacts in Virginia

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Final Report  
to the  
U.S. Environmental Protection Agency

**Internet Access to Cumulative Wetland  
Impacts in Virginia**

Grant Number CD-993560-01

Prepared by

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Virginia Institute of Marine Science

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and

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Information Technology and Network Services

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**September, 1998**

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# FINAL REPORT

Grant Title Internet Access to Cumulative Wetland Impacts in Virginia

Assistance # CD CD993560-01

Budget/Project Period 4/1/97 to 9/30/98

Grantee's Project Officer Jerry Harrison

Project Officer's Telephone # (804) 684-7028

Federal Funding: \$ 61,561

Federal Funds Expended: \$ 61,561

Federal Funds Remaining: \$ 0

## GOALS/OBJECTIVES:

Provide internet access to tidal wetlands impacts data.

## PLANNED VS ACTUAL ACCOMPLISHMENTS:

Cumulative impacts to wetland and coastal ecosystems is of increasing concern to environmental managers, the academic community and the concerned citizenry. The quantification of cumulative impacts is problematic due to the diffuse nature of the contributing factors. Since 1988, the Virginia Institute of Marine Science (VIMS) has been collecting data on the impacts to Virginia tidal wetlands from erosion control and shoreline development projects. For each project subject to the Joint Permit process, with the exception of private open pile piers, the Wetlands Advisory Program has quantified direct impacts for various development activity categories on 18 separate vegetated and nonvegetated wetland community types and subaqueous bottom. These data are further classified into proposed impacts and permitted impacts (permitted by Wetlands Boards and/or the Virginia Marine Resources Commission). Additional information related to the project which is contained in the database includes the primary and secondary waterways adjacent to the project site, the watershed, project location (city or county), total project cost, the stated purpose of the project, permit application number, and the amount of required compensatory mitigation by community type.

Prior to the completion of this project, tidal wetlands data were not readily accessible. Responses to data requests from managers, researchers and others were difficult and untimely due to a lack of structured data querying capabilities. Through this project, tidal wetland impacts in Virginia are now readily accessible through the internet. Access is provided through the VIMS web page in a hierarchical manner. VIMS' web page is cataloged on a dozen or more web search engines including Yahoo, Infoseek, Alta Vista, and Excite. Currently, the VIMS web page receives approximately 20,000 page hits per week. Access will also be advertized through the Wetlands Program's outreach publications.

## Methods

The tidal wetlands data is entered, stored and managed through dBASE and Visual dBASE applications, and transferred to a Sybase System 10 database running on a SparcStation 20. The data is accessed through html (hyper text markup language) forms which allow users to select specific data summaries. The html forms run cgi programs written in C programming language to retrieve the data and format the output. Streamlined global data update routines were

also developed.

## Results

The web site (<http://www.vims.edu/rmap/wetlands/cgi-bin/index.htm>) presents the following information:

- a guide to the site including general descriptions of each link included on the Home Page.
- a history and explanation of tidal wetlands management
- a detailed explanation of data collection and summarization methods
- static and interactive general data summaries in graphic and tabular format
- an interactive routine which allows selection of the year, wetland community type, and either locality or watershed for data from 1988-1992
- an interactive routine which allows selection of the year, type of activity and watershed for data from 1993-1997 and subsequent years
- output includes impacts summarized by square footage for the chosen categories. A digital photograph of the selected vegetated wetlands community or activity is included on the output form
- a link to the document *A review of nontidal wetland projects and impacts in Virginia, 1991-1993* which provides nontidal wetlands impacts data
- an email link for questions and data requests
- links explaining watersheds, localities and definitions of wetland community types
- links to other state and federal agencies involved in tidal wetlands management
- disclaimer and copyright information
- an acknowledgment of the Environmental Protection Agency as the funding source on the Home Page footer

## Page Examples

Home Page (Figure 1): The home page was designed for readability and facilitating rapid links to selected data categories. It was our intent to keep the hierarchical structure to a minimum. This page is accessible through the VIMS Home Page via the successive links to Research Departments, Resource Management and Policy, Wetlands Program.

Copyright and Disclaimer (Figure 2): This page describes the legal requirement to identify information sources and the proper methods of citing the information retrieved from this site. This page is displayed prior to delivery of any data menu pages and must be removed by the operator before data can be accessed.

General Data Summaries Selection Page (Figures 3-9): This page provides both static and interactive menus for selection of data summaries for tidal wetlands impacts by either locality or watershed by year, shoreline alterations by locality and year, and graphic displays of shoreline alterations (termed construction activity for the general public) and wetlands impacts by locality. Examples of output are included.

Query Selection Page 1988-1992 (Figures 10-12): The operator is able to select data summaries by year, wetland community type, and either watershed or locality. Examples of output are included.

Query Selection Page 1993-1997 (Figures 13-15): The operator is able to select data summaries by year, activity category and watershed. Examples of output are included.

The differences in categories between the pre- 1993 and post-1992 data sets is a result of changes in data collection methods and data structure beginning in 1993. This is explained in detail in the *An overview of the VIMS Wetlands Program and data collection methods* link from the home page. We are in the process of preparing detailed tidal wetlands impacts manuscripts for peer reviewed journals using the 1993-1997 data set. When publication is complete, these data will be made available in a broader format when they are determined complete.

Much of the information summarized through this web page will also be disseminated in the form of a VIMS Wetlands Program technical report in 1998. The 1993-1997 data will also be disseminated via technical report to our mailing list at a later date.

## **Conclusions**

This web page provides accurate and detailed summarized tidal wetlands impacts data to all parties or persons concerned about Virginia tidal wetlands. Online documentation explaining data retrieval procedures are included. This information will be updated regularly and will be perpetually available.

## **HIGHLIGHTS:**

The project was completed.

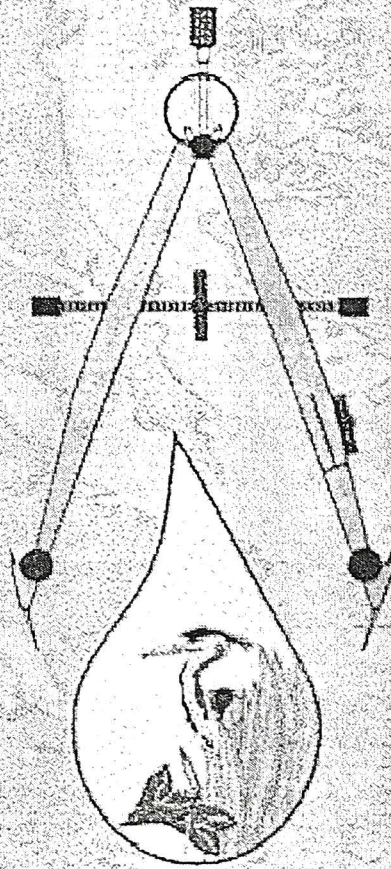
## **POLLUTION PREVENTION ACCOMPLISHMENTS:**

NA

## **DEFICIENCIES/CORRECTIVE ACTION:**

None.

# Tidal Wetlands Impacts Data Home Page



[A guide to this site](#)

[Design a query of the data for 1993-1997](#)

[Design a query of the data for 1988-1992](#)

[Nontidal wetlands impacts information](#)

[General Data Summaries](#)

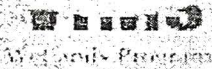
[An overview of Virginia tidal wetlands management](#)

[An overview of the VIMS Wetlands Program and data collection methods](#)

[Department of Resource Management and Policy Home Page](#)

[VIMS Home Page](#)

[Request further information](#)



This site is made possible in part by a grant from the U.S. Environmental Protection Agency

Figure 1

## Referencing the Information From This Web Site

All data and material in this web site are the property of the Virginia Institute of Marine Science. Any information obtained from this web site and used in any way should be referenced as follows:

Virginia Institute of Marine Science Wetlands Program (1998) *Tidal Wetlands Impacts Data Home Page* [Online]. Available: <http://www.vims.edu/rmap/wetlands>.

## Disclaimer and Copyright Information

- **Use information here at your own risk.** To the best of our knowledge the data and information available from this web site are accurate; however, the accuracy cannot be guaranteed due to the numerous sources of information and the large number of people involved in Virginia tidal wetlands regulatory programs.

Copyright 1998, Wetlands Program, Department of Resource Management and Policy,  
Virginia Institute of Marine Science

[Design a query](#)

Return to [Tidal Wetlands Impacts Home Page](#)



# Graphic and Tabular Summaries of Tidal Wetlands Impacts

## Tables

Table 1. Tidal Wetlands Impacts by Locality

1988	▼	Submit	Reset
------	---	--------	-------

Table 2. Tidal Wetlands Impacts by Watershed

1988	▼	Submit	Reset
------	---	--------	-------

Table 3. Shoreline Alterations by Locality

1988	▼	Submit	Reset
------	---	--------	-------

## Graphs

Construction activity by watershed

<u>1988</u>	<u>1993</u>
<u>1989</u>	<u>1994</u>
<u>1990</u>	<u>1995</u>
<u>1991</u>	<u>1996</u>
<u>1992</u>	<u>1997</u>

Tidal wetlands impacts by watershed

<u>1988</u>	<u>1993</u>
<u>1989</u>	<u>1994</u>
<u>1990</u>	<u>1995</u>
<u>1991</u>	<u>1996</u>
<u>1992</u>	<u>1997</u>

Virginia Beach	20944	65208	86152
Westmoreland County	4920	32332	37252
Williamsburg	0	50	50
West Point	10970	14325	25295
York County	0	0	0
<b>TOTAL</b>	<b>305870</b>	<b>600813</b>	<b>906683</b>

*Tidal wetlands impacts permitted in 1996 by watershed.*

WS	TOTVEG (square ft)	%	TOTNVEG (square ft)	%
AC	492	0.1	46385	5.2
BBN	48988	12.5	1774	0.2
ESB	6260	1.6	13790	1.6
ESS	36015	9.2	3474	0.4
JR	84219	21.5	172184	19.5
MPB	27437	7.0	58597	6.6
NNB	2922	0.7	84158	9.5
PB	68051	17.3	224661	25.4
PR	12603	3.2	106969	12.1
RR	18689	4.8	86546	9.8
SB	66720	17.0	62172	7.0
YR	19868	5.1	22821	2.6

**WATERSHED**

- AC = Atlantic Coast
- BBN = Back Bay/North Landing River
- ESB = Eastern Shore Bayside
- ESS = Eastern Shore Seaside
- JR = James River
- MPB = Middle Peninsula Bayshore
- NNB = Northern Neck Bayshore
- PB = Peninsula Bayshore
- PR = Potomac River
- RR = Rappahannock River
- SB = Southern Bayshore
- YR = York River

Figure 5

## WATERSHED

AC = Atlantic Coast  
BBN = Back Bay/North Landing River  
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PB = Peninsula Bayshore  
PR = Potomac River  
RR = Rappahannock River  
SB = Southern Bayshore  
YR = York River

*Shoreline alterations permitted during 1994 in tidal Virginia by locality.*

<b>LOCALITY</b>	<b>BULKHEAD (linear ft)</b>	<b>RIPRAP (linear ft)</b>	<b>TOTAL</b>
Accomack County	2422	1542	3964
Arlington	0	0	0
Caroline	0	0	0
Charles City County	0	155	155
Chesterfield County	281	1535	1816
Chesapeake	623	730	1353
Colonial Heights	0	0	0
Essex County	200	651	851
Fairfax County	0	25	25
Fredericksburg	0	0	0
Gloucester County	1589	1879	3468
Hampton	522	1338	1860
Henrico	0	0	0
Hopewell	0	0	0
Isle of Wight County	0	1181	1181
James City County	581	427	1008
King George County	600	445	1045
King and Queen County	279	0	279
King William County	331	30	361
Lancaster County	1503	8384	9887
Mathews County	2019	2228	4247
Middlesex County	1257	6110	7367
Northampton County	570	1750	2320
New Kent County	625	385	1010
Newport News	95	150	245
Norfolk	858	1698	2556
Northumberland County	3949	9346	13295
City of Petersburg	0	30	30
Prince George	620	0	620
Poquoson	40	2033	2073
Portsmouth	175	143	318
Prince William County	152	0	152
Richmond City	0	0	0
Richmond County	305	6623	6928
Spotsylvania County	0	0	0
Stafford County	500	823	1323
Suffolk County	0	90	90
Surry County	140	0	140

Figure 7

Virginia Beach	5146	5856	11002
Westmoreland County	2252	4256	6508
Williamsburg	0	0	0
West Point	0	0	0
York County	458	1432	1890
<b>TOTAL</b>	28092	61275	89367

# AMOUNT OF HARDENED SHORELINE - 1996

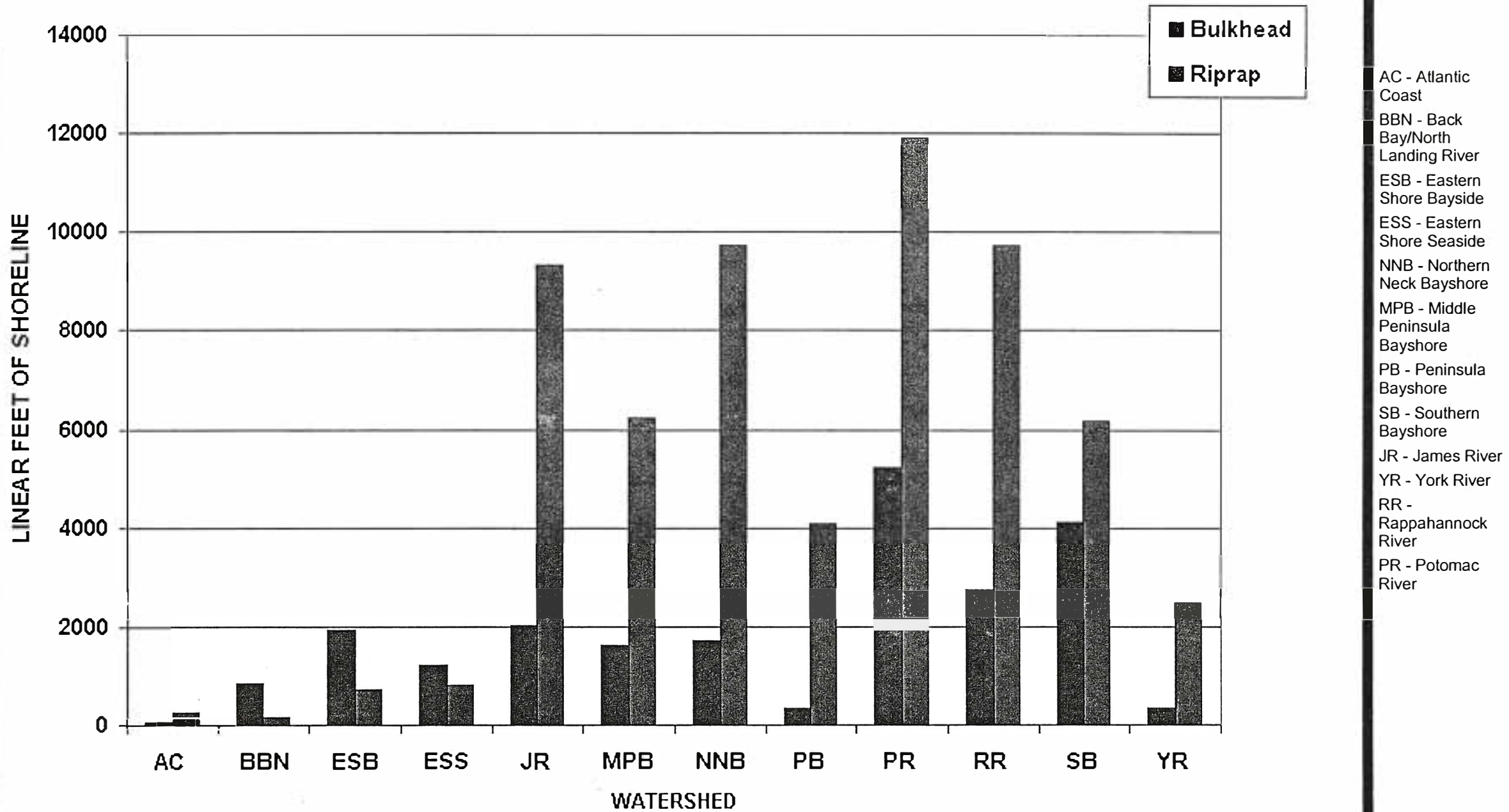


Figure 8

# TIDAL WETLAND IMPACTS - 1995

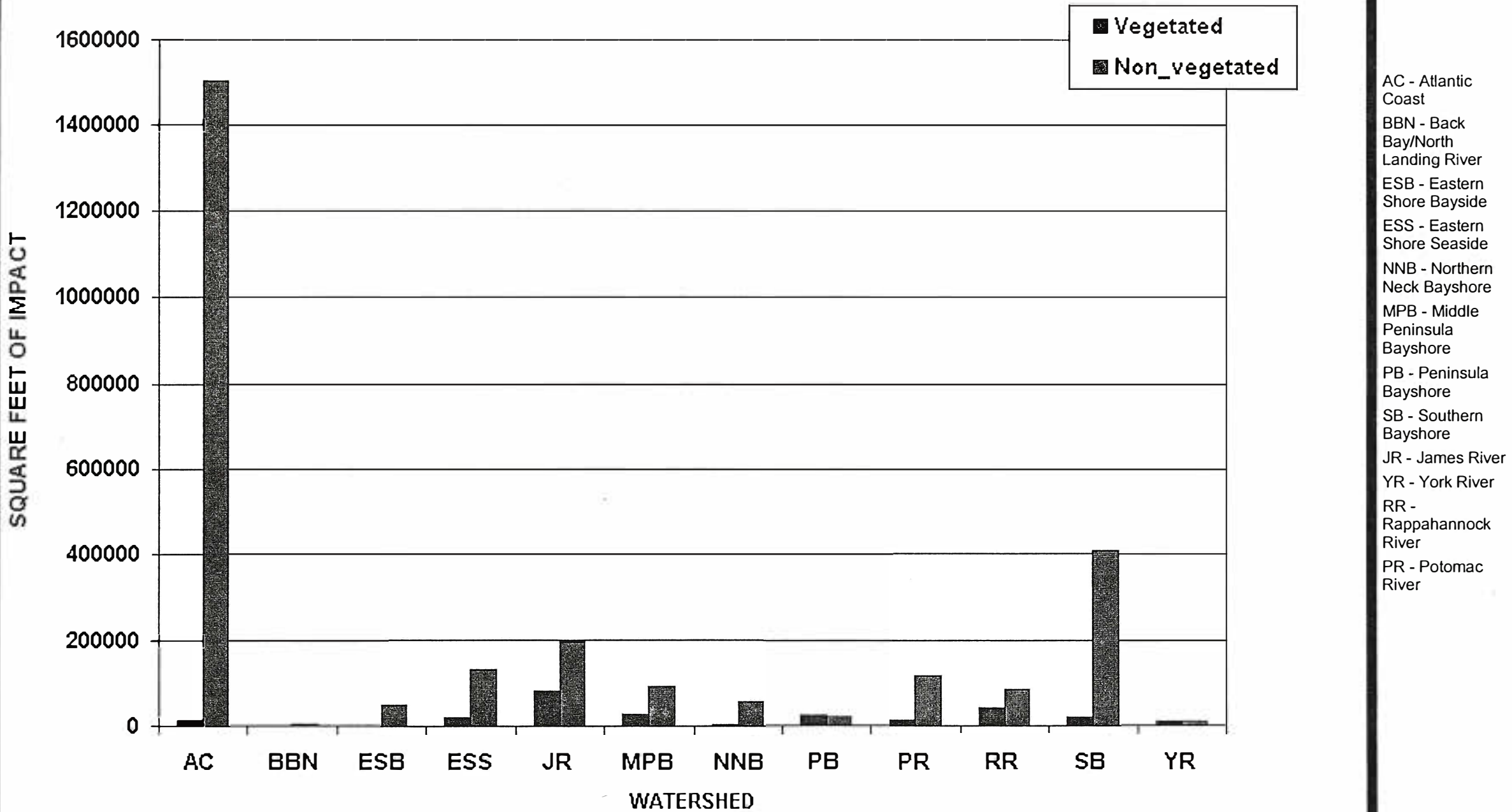


Figure 9



# Tidal Wetlands Impacts Data Query Design Page 1988-1992

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Select a year

 ▼

Select a wetland  
community type

 ▼

Select a watershed

 ▼

[More  
Watershed  
Info](#)

or

a locality

 ▼

[More  
Locality  
Info](#)

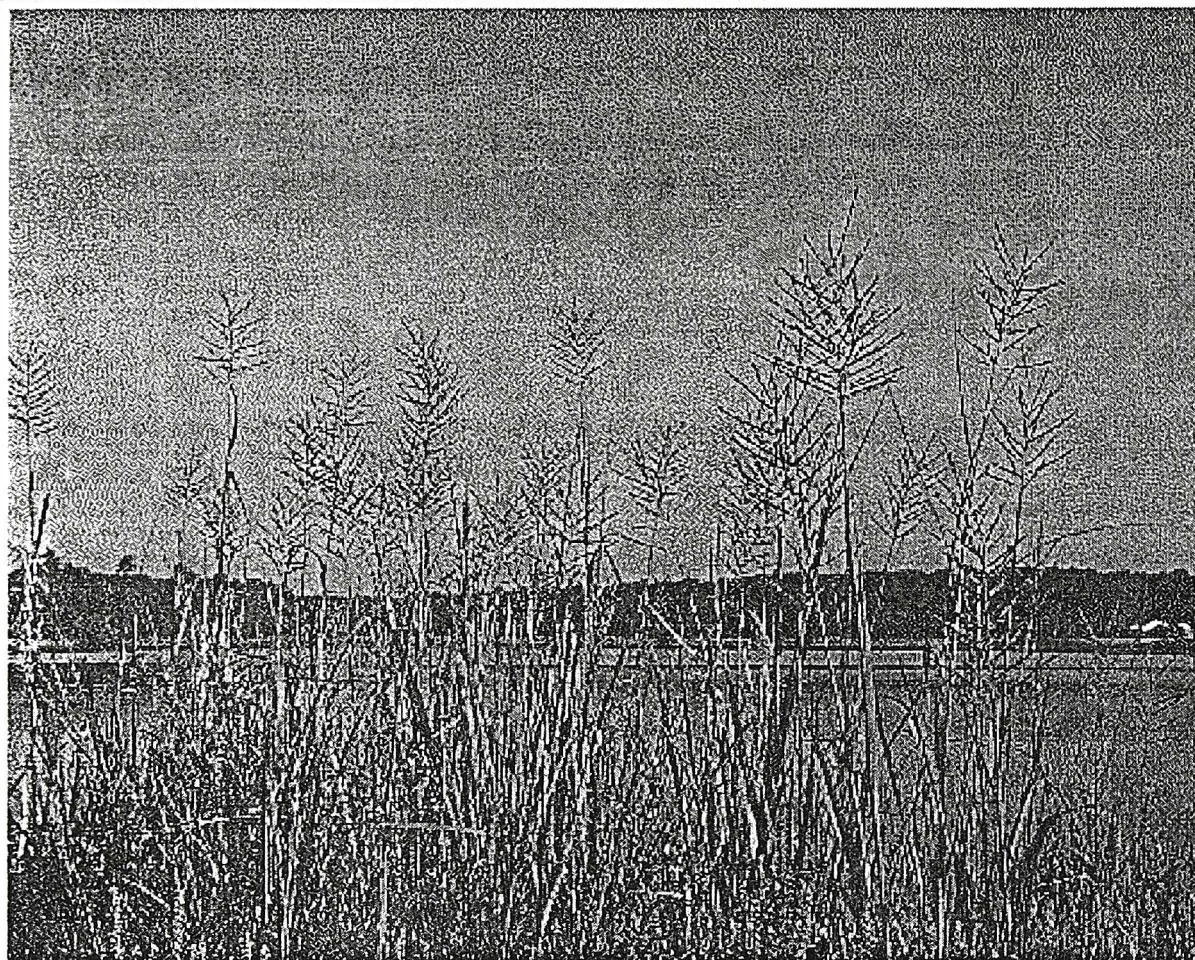
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Return to [Tidal Wetlands Impacts Home Page](#)

# Query Results

The results for 1990, Big Cordgrass Community (Type V) ,

Year	Watershed	Amount Permitted (sq ft)
1990	Virginia Totals	195



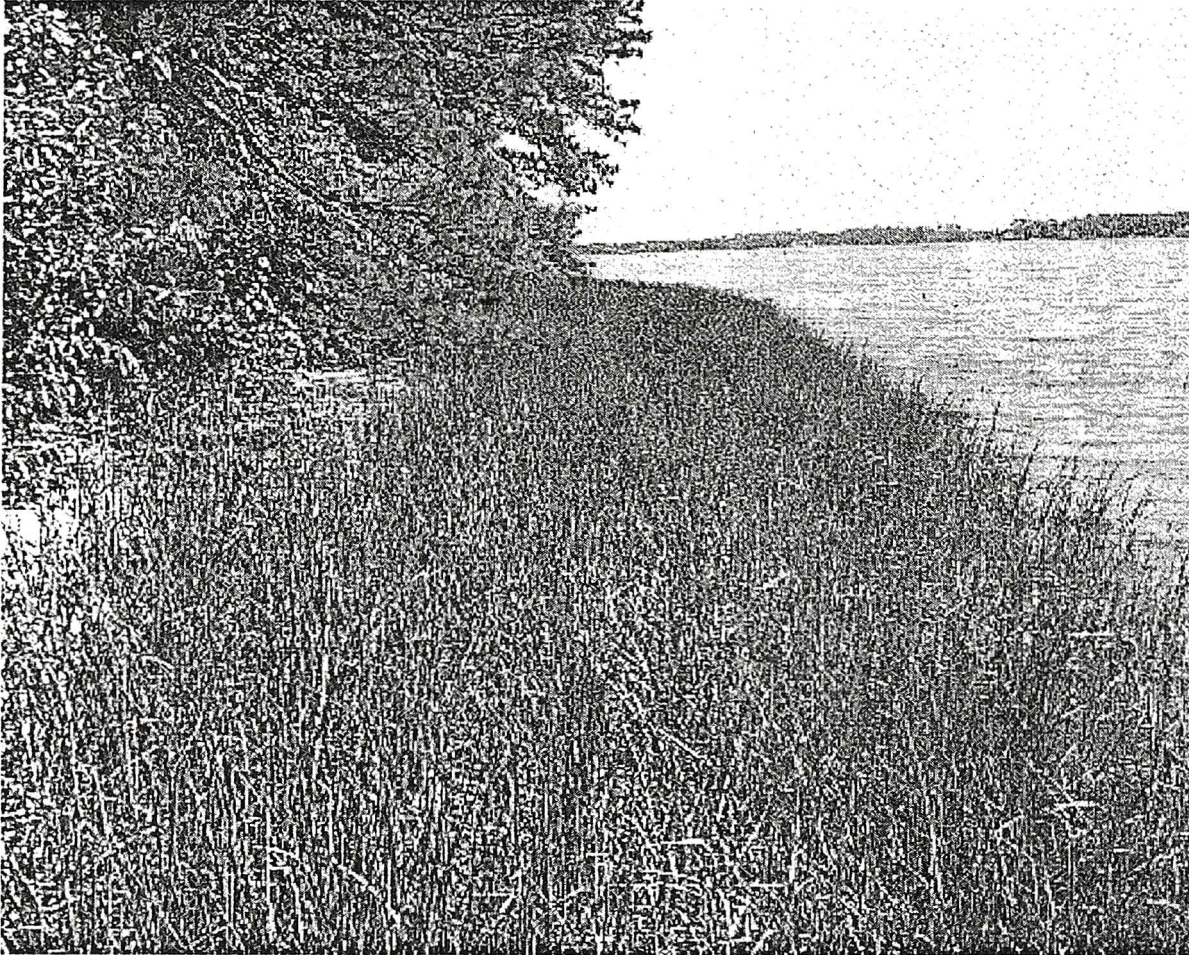
[Return to Query Design Page](#)

[Return to HomePage](#)

# Query Results

The results for 1992, Saltmarsh Cordgrass Community (Type I) , Gloucester County

Year	Locality	Amount Permitted (sq ft)
1992	Gloucester County	3702



[Return to Query Design Page](#)

[Return to HomePage](#)

# Tidal Wetlands Impacts Data Query Design Page 1993-1997

---

Select a year:

 ▾

Select an activity  
category:

 ▾

Select a watershed:

 ▾ [More Watershed  
Info](#) 

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[Return to Tidal Wetlands Impacts Home Page](#)

# Query Results

The results for 1993, Riprap , Northern Neck Bayshore

Year	Wetlands Type	Amount Permitted (sq ft)
1993	Vegetated	4350
1993	Non-Vegetated	53256
1993	Subaqueous	8436



[Return to Query Design Page](#)

[Return to Tidal Wetlands Impacts Home Page](#)

