

Environmental Management

Management of Cumulative Impacts in Virginia: Identifying the Issues and Assessing the Opportunities

This study, conducted by the Institute for Environmental Negotiation at the University of Virginia, explores both the concept and practice of cumulative impact management. It focuses on the definition of cumulative impacts, obstacles which make their assessment and management a difficult challenge, current practices in Virginia as well as other states, and proposed strategies for advancing cumulative impact management. This report also includes a section on selected cumulative impact management approaches in the other states, and a reference section containing titles of reports and documents pertaining to cumulative impact issues available in these other states.

*Virginia Department of Environmental Quality
Contact: Laura McKay, Virginia
Coastal Program, 804.698.4323
December 1991
1990 Task 13*



Business and Industry Guide to Environmental Permits in Virginia

This comprehensive guide to environmental permits was produced by the Virginia Department of Environmental Quality in cooperation with the Virginia Marine Resources Commission and the Virginia Department of Agriculture and Consumer Services. It provides company owners, plant operators, local economic development officials and the general public a convenient, concise source of basic information on state environmental and permit programs. The main focus of this guide is on those actions which must be taken before an individual or business can construct or start up a facility or process that will result in emissions to the air, water or land. Comments about this guide and suggestions for improving it are welcome.

*Virginia Department of Environmental Quality
Contact: Bill Hayden, 804.698.4447
February 1993, Reprinted July 1996
1991 Task 4*



Department of Environmental Quality
Regional Offices

A General Guide to Environmental Regulations in Virginia

This booklet is a general guide to environmental laws, regulations, and the permits necessary for land development and the establishment of businesses in Virginia. It is designed to assist local officials, small businesses, developers, and citizens in understanding the purposes and procedures of Virginia's environmental regulatory programs.

*Virginia Department of Environmental Quality
Contact: Bill Hayden, 804.698.4447
January 1992
1990 Task 4*



Environmental Management

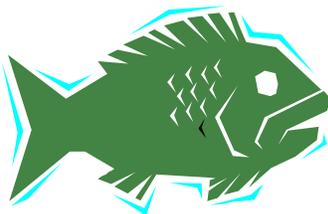
Bioaccumulation Initiative - Phase III

The Virginia Water Control Board (now the Department of Environmental Quality) initiated its Toxic Fingerprinting/Bioaccumulation (TFP/BA) Program in response to increasing concerns by the Board and the EPA about the human health aspects of environmental protection. In Phase I, the TFP/BA Program screened over 200 sites statewide for the presence of bioaccumulative compounds in their discharges. In Phase II, 32 sites from Phase I, which contained higher-than-average numbers of bioaccumulative compounds, were resampled to identify the most prevalent bioaccumulative compounds entering Virginia's waters. In Phase III, which was funded by the Virginia Coastal Program, samples of receiving-stream sediment, fish and/or shellfish were collected from selected Phase II sites and other industrial sites with similar effluent compositions. The final report includes a list of these sites, and the study's findings.

Phase II and Phase III data indicate that relatively few bioaccumulative compounds are currently being released through point and nonpoint source discharges. However, significant exceptions were identified. Data further indicate that sediments in Virginia's coastal zone represent a potentially substantial source of bioaccumulative compounds, apparently due to historical and/or episodic releases. Tissue data indicate sediment-related compounds are accumulating in indigenous fish and shellfish to an extent which may increase human health risks. These data suggest that bioaccumulation of sediment compounds through the food chain is a more immediate problem with regard to human health risk than water-borne compounds.

These studies have contributed to initiating environmental remediation at several of the sites investigated. An analysis of sediment toxicity in the Chesapeake Bay is currently underway as of summer 1997. (1995 Task 11)

Virginia Department of Environmental Quality
Contact: David Grimes, 804.698.4203
March 1994
1992 Task 19



Energy Facilities Inventory

This inventory provides the location, fuel, and energy capacity or output of various energy facilities in Tidewater Virginia. It details the proximity of energy facilities to population centers, transportation corridors, and natural resources.

Virginia Department of Environmental Quality
Contact: Virginia Witmer, Virginia Coastal Program,
804.698.4320
December 1991
1990 Task 11



Permit Compliance and Inspection Program: Findings and Guidance Document

A survey was designed to investigate and gauge the effectiveness of the various compliance monitoring programs being used by VMRC and local wetlands boards. The intent of the survey was to identify existing compliance shortcomings, and to ascertain effective compliance monitoring techniques in order to develop concise recommendations to enhance monitoring programs.

In 1991 the report entitled **Permit Compliance and Inspection Program: Findings and Guidance** documented the results of this survey and provides recommendations for implementation of effective compliance monitoring techniques. These recommendations have been implemented since 1992. The Virginia Marine Resources Commission continues to evaluate the effectiveness of its Permit Compliance and Inspection Program, monitoring techniques and recommending changes as appropriate.

A Permit Compliance and Inspection Program report has been prepared each year since 1992. This report compares compliance data compiled for new projects and compliance data for projects permitted prior to 1991, when recommendations in the 1991 guidance document were implemented. In 1992 a standardized, comprehensive permit compliance and inspection program was instituted, and a computer tracking system set up.

Virginia Marine Resources Commission
Contact: Bob Grabb, 804.247.2200
December 1991
1990 Task 13



See Also: Coastal Technical Assistance, page 4:
Virginia Marine Resources Commission

Environmental Management

Best Management Practices: An Assessment of the Barrier Island Policy and the Coastal Primary Sand Dune Act

This report focuses on Accomack County and Northampton County and evaluates the effectiveness of the revised Barrier Island Policy in reducing the environmental impacts associated with man's increased activities on Virginia's barrier islands. It recommends the best management practices for shoreline development activities which encroach in, on, or over Virginia's tidal wetlands coastal primary sand dunes, beaches, and submerged lands.

*Virginia Marine Resources Commission
Contact: Tony Watkinson, 804.247.2200
March 1993
1991 Task 17*



Subaqueous Guidelines

"Tidewater Virginia" as defined in the Code of Virginia encompasses approximately 5,000 miles of shoreline. There are roughly 2,300 square miles, or approximately 1,472,000 acres, of tidally influenced submerged lands. This is an area larger than the state of Delaware and represents major responsibility for State government. Increasing developmental pressures along our shorelines affect these submerged lands. The **Subaqueous Guidelines Handbook** was developed and issued by the Virginia Marine Resources Commission in 1976 and revised in 1986. It includes a set of criteria by which to evaluate projects in the Coastal Zone to assure consistency of decisions, and to inform applicants regarding the degree of acceptability of project proposals affecting subaqueous lands.

*Virginia Marine Resources Commission
Contact: Tony Watkinson, 804.247.2200
published 1976, revised March 1986,
reprinted September 1993
1992 Task 9*



Risk Assessment at Cheatham Annex

This study of Cheatham Annex focuses on questions regarding hydrology and contamination of the site by organic compounds and metals stored there since the 1940s. The study evaluates hydrological factors which may be important in the transportation of contaminants and provides a preliminary characterization of organic and heavy metal contamination in areas believed to be sensitive or indicative of the general status of the site as a whole.

*Virginia Department of Environmental Quality
Contact: K. C. Das, 804.698.4184
November 1990
1989 Task 10*



Environmental Management

Natural Heritage Resource Maps, Information and Technical Assistance

Virginia's Coastal Zone is home to an impressive array of rare plant and animal species and natural communities - "natural heritage resources." In order to sustain the region's economic growth without sacrificing its biodiversity, local and regional planners and decision-makers must have access to accurate, scientific information about natural heritage resources. This project produced 11" x 17" color maps showing the general location of natural heritage resources in relation to major roads and water bodies for each county and city in the coastal zone. These maps were distributed to planners in each county, city, and Planning District Commission in the Coastal Zone. The maps streamline project planning and facilitate responsible growth, because they inform planners about those areas in which proposed activities and developments are less likely to impact documented natural heritage resources. The maps also alert planners to areas in which additional information will be needed to ensure that projects can be designed to avoid impacts.

In 1994, in order to increase the availability and utility of natural heritage resources data, a Locality Liaison was funded to work with planners in Coastal Zone counties, cities, and Planning District Commissions. The Liaison informs the planners about the data and services of the DCR-Division of Natural Heritage, provides them with updated maps, reports and digital data, and provides prompt, detailed responses to requests for project reviews and natural heritage information. The Locality Liaison also works with other natural resource agencies, including the Army Corps of Engineers, the Chesapeake Bay Local Assistance Department and the Department of Game and Inland Fisheries, to facilitate access to more comprehensive information early in planning processes. This project will be continued into 1997 with additional map and data updates, increased emphasis on presentations, and pilot assistance to localities in the identification of habitat restoration opportunities.

Virginia Department of Conservation & Recreation

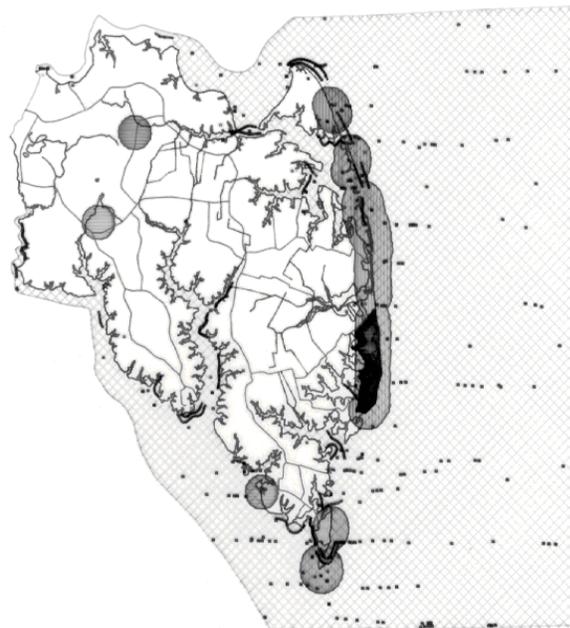
Contact: Steven Carter Lovejoy, 804.786.7951

October 1997 (current maps)

1993 Task 23, 1994 Task 11a, 1995 Task 16, 1996 Task 11



Virginia Beach



Gloucester County

Environmental Management

Natural Resource Mapping for Coastal Zone Management Planning

As the primary wildlife and freshwater fish management agency in the Commonwealth, the Virginia Department of Game and Inland Fisheries has developed comprehensive and reliable interrelated statewide computer information systems containing thousands of records about fauna and associated habitats. The agency has selected particular categories of wildlife and habitat resources for mapping because of their economic, recreational, or ecological importance within the coastal zone.

Several major species groups were selected for mapping, and various state and federal agencies were contacted to collect information relevant to the species groups. The information mapped includes anadromous fish upper extent migration areas and upstream use areas, marine mammal and sea turtle live observations and use areas, winter waterfowl concentrations, nesting waterfowl areas, colonial nesting bird colonies, federal and state endangered and threatened animal locations, and wildlife viewing areas. Digitization was performed on "1:100,000" scale maps using an ArcInfo geographic information system to define the natural resource information gathered. Data were verified by the species experts during initial definition and positioning on DeLorme Gazetteer maps. County maps were prepared which display the distribution of the various resources.

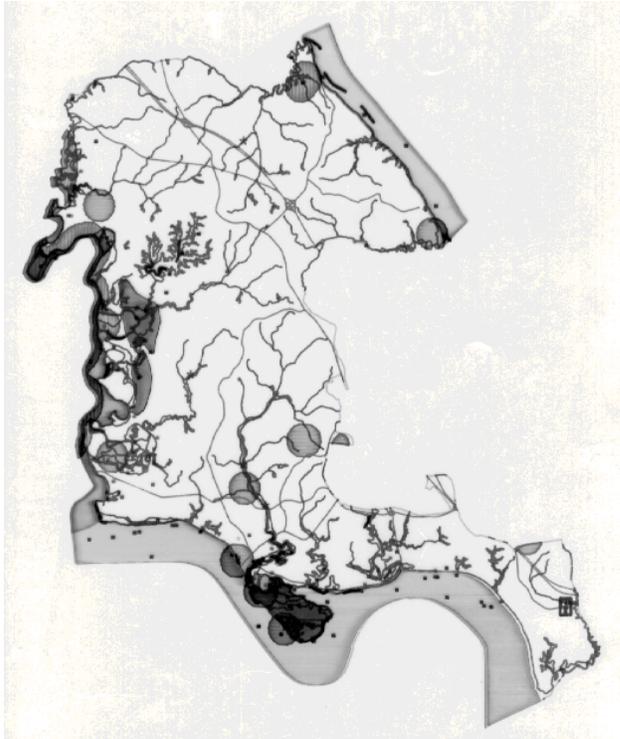
The data and maps produced should be useful in the protection of natural resources; the management of coastal development, the prioritization of coastal-dependent uses; the development or enhancement of recreational opportunities and corresponding economic interests; comprehensive planning; and improved coordination among local, regional, state and federal agencies. The report produced includes general information on the specific map layers, as well as detailed information for each Planning District Commission (PDC) and county/city in Virginia's coastal zone. The appendices provide additional contacts, references, and species information not detailed in the PDC/County resource lists.

Virginia Department of Game and Inland Fisheries

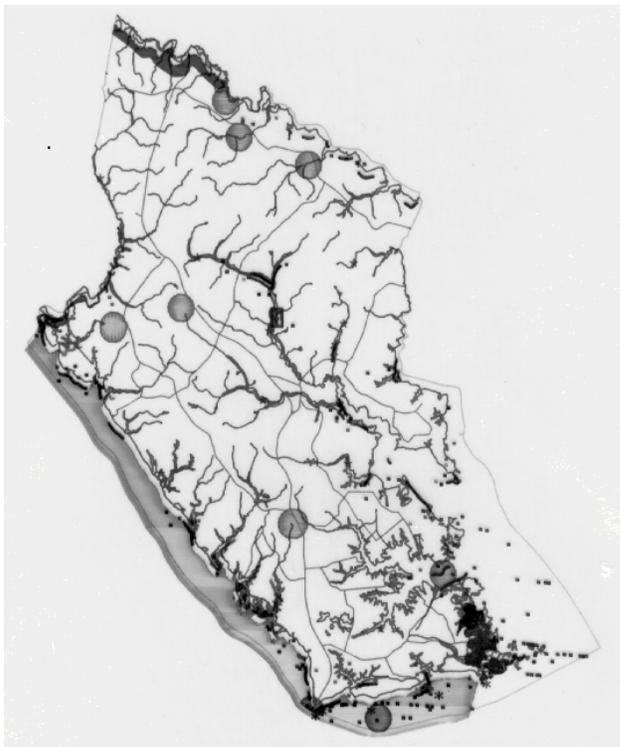
Contact: Rebecca Wajda, 804.367.8351

March 1996

1994 Task 11b



James City County



Mathews County

Environmental Management

Coastal Historic Resources Inventory Program - Phase I

In an effort to more easily identify regions of historic significance and divert development from these areas, the Geographic Information System database for all Historic Landmark Register Sites and historic easements in Virginia's coastal zone was initiated. This geographic-based tool presents a methodology for formatting information found on USGS quadrangle maps to a GIS database.

Virginia Department of Historic Resources
Contact: Robert Carter, 804.722.3428
March 1992
1990 Task 5.4



Geographic Information System Database to Manage Virginia's Underwater Archaeological Resources

This project converted an existing underwater archaeological database from the relational database Paradox to the spatial database ArcInfo. This conversion makes it possible for users to expand their research and monitoring activities to include: spatially-oriented risk assessment models, predictive models for the identification of new sites, and enhanced management planning. Products produced during this project include a map portfolio, a series of large-format color maps displaying the distribution of underwater archaeological resources within the Virginia portion of the Chesapeake Bay and the Virginia Coastal Plain, and an ArcInfo database.

Virginia Institute of Marine Science
Contact: Marcia Berman, 804.642.7188
November 1995
1994 Task 2.3



Coastal Historic Resources Inventory Program - Phase II

Developed for use by the Virginia Department of Historic Resources, the final product is a Geographic Information System database of nearly 1700 historic districts, buildings and sites. All properties in the database are either on the National Register of Historic Places or the Virginia Historic Landmark Register. Information for each property includes: the property name, the U.S. Park Service identification number, National Historic Landmark status, the Virginia Historic Resources file number, and an indication of whether the state holds an easement on the property.

Virginia Department of Historic Resources
Contact: Robert Carter, 804.722.3428
September 1993
1992 Task 5.1



Comprehensive Coastal Inventory Program and the Tidal Rivers Inventory Project

The primary objective of the Comprehensive Coastal Inventory was to develop, update, and maintain an inventory of the Virginia tidal shoreline using a geographical information system (GIS). The focus of the project was the delineation of environmentally sensitive zones for shoreline management programs. The system can be queried for quantitative assessments of shoreline conditions.

Virginia Institute of Marine Science
Contact: Carl Hershner, 804.642.7387
February 1993
1991 Task 5.1



Yorktown Shipwreck Plan Views

An Assessment of Virginia's Underwater Cultural Resources

An assessment was made of known underwater cultural resources in an effort to determine their educational value and how best to manage them. A total of 283 underwater sites are recorded in the files of the Virginia Department of Historic Resources. These consist of 181 sites with historic components and 90 with prehistoric components; 14 others have not been dated. 46 of the historic sites are "wrecks." Only three of the prehistoric sites appear to be fully submerged, as most are eroding along shorelines. These statistics give a clear measure of how under-represented underwater historic resources are in official records. Locational models and historical records target sensitive areas for unidentified submerged sites. Future priorities should include surveys to inventory representative areas, commitments to the preservation and management of important known sites, and a program of information exchange with watermen. This assessment was prepared through a contractual agreement between the Virginia Department of Historic Resources and the College of William and Mary Center for Archaeological Research. Management recommendations and strategies for sensitive historic sites are proposed.

Virginia Department of Historic Resources

Contact: Catherine Slusser, 804.786.3143

November 1994

1993 Task 11



See Also: Public Education, page 68 -

History Under Water: Exploring Virginia's Underwater Historic Resources

Environmental Management

Distribution of Submerged Aquatic Vegetation in the Chesapeake Bay

This on-going project recognizes that the monitoring of submerged aquatic vegetation (SAV) is necessary to assess the success of the Chesapeake Bay cleanup efforts. The Bay's SAV, or underwater grasses, are an important nursery ground for fish and crabs. Scientists have found that 30% more young crabs are found in areas with bay grass beds than in those areas without. These bay grasses also produce oxygen, reduce wave action, absorb the nutrient pollutants phosphorus and nitrogen, and trap sediments. In 1995, bay grasses shrank by 8% or 5,500 acres. This was a second annual decline for this important indicator of Bay health. A possible cause for the losses may be increased sediments and nutrient pollution loads due to spring floods in 1993 and 1994. Yet, overall, acres of grasses are up 60% from their historic low in 1984. As of 1995, grasses covered almost 60,000 acres. In 1993, the Chesapeake Bay Program partners, including Virginia, agreed to restore grasses to the historic levels of the 1970's, about 114,000 acres.

In the latest annual report (published 1996), the distribution of submerged aquatic vegetation in the Chesapeake Bay, its tributaries, and Chincoteague Bay is mapped at a scale of 1:24,000 using black and white aerial photography. Appropriate ground observations are used to substantiate presence or absence of SAV in particular areas. SAV bed perimeter information is digitized and stored in a computerized data base.

Virginia Institute of Marine Sciences

Contact: Bob Orth, 804.642.7332

July 1996

*1986 Task 9, 1987 Task 14, 1988 Task 17, 1989 Task 9,
1990 Task 7, 1991 Task 7, 1992 Task 7, 1993 Task 12,
1994 Task 15, 1995 Task 10*



Environmental Management

A Remote Sensing and GIS Investigation of the Williamsburg Area Using High Altitude Aerial Photography and the AVIRIS Multiple Band

This project produced a remote sensing analysis of the Williamsburg area using high altitude aircraft. The aircraft was deployed with two different types of remote sensing devices to compare the spacial and spectral resolution of 1) aerial photographic cameras and 2) a new generation of digital scanner (AVIRIS). The ability of AVIRIS to clearly delineate land classes was "most encouraging." Fine differences in marsh categories and very accurate classification of different forest types was possible with the AVIRIS sensor.

It was found that the AVIRIS scanner had some of the most powerful capabilities for GIS modeling due to the numerous band combinations that could be called upon to differentiate subtle shades in classifications and "fingerprinting" of spectral patterns. It was recommended that future work should be done in three areas: existing land use/land classifications; detection of disease and man-induced stresses on the environment; and exploration of advanced image processing and classification techniques for GIS modeling.

*University of Virginia
Department of Environmental Sciences
Contact: Herman Shugart, 804.924.0561
March 1992
1990 Task 5.1*



Automated Mapping and Leasing System

This report describes the existing Engineering/Surveying Oyster Leasing System. It briefly covers the steps taken to create ARC/INFO coverages of four maps used in the VMRC, Fisheries Management Division, Engineering / Surveying's Oyster Leasing program. Sample maps of oyster lease grants are provided.

*Virginia Marine Resources Commission
Contact: Gerald Showalter, 804.247.2270
January 1992
1990 Task 19*



Development of a Buffer Zone Evaluation Model/Procedure

A procedure was developed for evaluating the impacts of proposed vegetative buffer modifications on buffer effectiveness. The procedure is based on modified hydraulic and detention models developed by Phillips for evaluating buffer effectiveness. The modified models consider the effect of concentrated flow and vegetative uptake on buffer performance.

*Virginia Department of Agricultural Engineering
Virginia Polytechnic Institute and State University
Contact: Theo Dillaha, VA Tech, 703.231.6813
December 1992
1991 Task 11*



Geographically Referencing Natural Resource Inventory Data for York River State Park

Existing data layers were integrated with additional park-specific natural resource information to demonstrate the applicability of DCR's Arc/Info database as a coastal resource management tool for York River State Park.

*Virginia Department of Conservation and Recreation
Contact: John Davy, 804.786.1119
January 1992
1990 Task 5.3*



King William County Real Property Identification Map

This map of King William County was prepared by the Information Support Systems Lab of the Virginia Tech Agricultural Engineering Department in Blacksburg, Virginia. The County's tax maps were digitized and indicate various environmental factors such as wetlands, highly erodible and highly permeable soils, steep slope, and floodplains.

*King William County
Contact: Dennis Carney, 804.769.4933
November 1992
1991 Task 58*



Environmental Management

H W m

The Hampton Roads region faces a critical water supply shortage. Existing reservoirs in the urban areas are particularly suffering from the effects of inadequately managed development. It is critical that a proactive approach is taken to manage and protect the region's limited potable water supply. This project funded the development of a Watershed Management Resource Manual for use by the region's localities. It documents current watershed management strategies and provides localities with a set of tools which can be used to protect water supplies. The Comprehensive Regional Watershed Management Program also involved the development of a set of principles, the "Principles for Management of Water Supply Watershed", to guide cooperative relationships between water supply purveyors and water supply host communities.

An Interim Comprehensive Regional Watershed Management Program report is available which documents the current status of the program. It includes major portions of the Watershed Management Resource Manual. Local government program chapters are being reviewed by the affected localities, as are the state and federal program chapters.

The region's localities have committed additional local resources to maintain the Comprehensive Regional Watershed Management Program.

Hampton Roads Planning District Commission
Contact: John Carlock, 757.420.8300
March 1997
1994 Task 67



Elizabeth River Restoration: A Watershed Action Plan to Restore the Elizabeth River

The Elizabeth River Project was founded "to form a *partnership* among the communities and all who earn their living from the river, to raise *appreciation* of its economic, ecological and recreational importance, and to *restore the Elizabeth River system* to the highest practical level of environmental quality" (mission statement 1993). A 120-member team of stakeholders, the Watershed Action Team, representing business, government, citizen and scientific concerns, drafted recommendations for reducing the environmental degradation of the Elizabeth River. The resulting *Watershed Action Plan to Restore the Elizabeth River* addresses 1) loss of habitat and aquatic life, 2) sediment contamination, 3) point source water pollution and 4) nonpoint source water pollution, and outlines an 18 point Action Agenda. The Elizabeth River Project has formed a partnership with the Commonwealth of Virginia to reduce toxics in the river, an important tributary of the Chesapeake Bay.

A public conference to launch the Elizabeth River Watershed Action Plan was held in June of 1996, and attended by prominent national figures and a large audience from all segments of society.

Elizabeth River Project
Contact: Marjorie Mayfield, 757.625.3648
April 1996
1994 Task 27

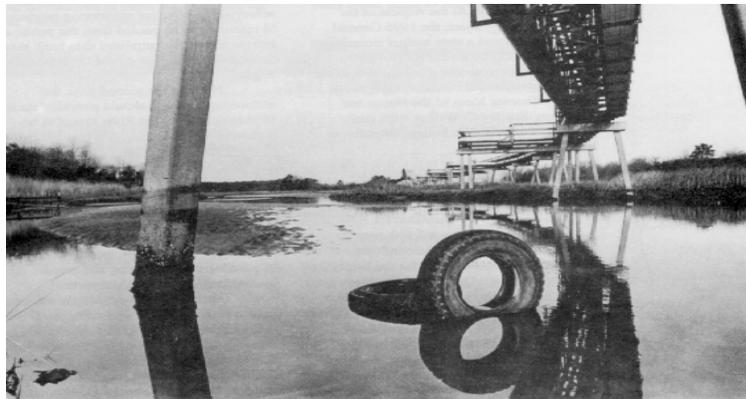


Photo courtesy of the Elizabeth River Project

The plan to restore the Elizabeth River includes the removal of hundreds, perhaps thousands of old tires.