FINAL PRODUCT FY '94 Task 22
VMRC Permit Compliance & Inspection

Final Report: Development of Internet Access

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Submitted by:

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Background

The Marine Resources Commission has broad responsibility for managing natural resources in Virginia's coastal zone. The Commission has been working for a number of years to develop geographic information system (GIS) and other automated information systems to manage data related to marine resource management. Automation projects have often been supported by federal grant programs such as the Virginia Coastal Resource Management Program. The Commission's GIS and habitat management permit tracking work in particular has been planned to allow close cooperation with the Virginia Institute of Marine Science. Programs at both VMRC and VIMS have the ability of shared computer information by exchanging electronic media; however, it is more desirable and would better serve the management/resource assessment process if exchange of computerized information could be done online.

To pursue this, the Commission established a dial-up TCP/IP connection to the Commonwealth's Telecommunication Network (CTN) in late 1994; this is an Internet service managed by the Department of Information Technology that connects State agencies. By using an Internet connection, the Commission could develop more automated means of exchanging E-mail, data files, and other computerized resource information with the Virginia Institute of Marine Science as well as other State agencies and organizations with access to the Internet.

The purpose of this grant work was to request funds to continue support of the dial-up connection service, upgrade the type of connection later in 1995, and establish a SMTP (Simple Mail Transfer Protocol; Internet Compliant E-mail) mail gateway to allow VMRC to exchange E-mail with VIMS resource management staff and potentially other resource management agencies. The connection has obvious benefits for improved communication and information sharing which should help the resource management process and promote closer development of automated systems that can be shared between VIMS and VMRC and other interested agencies.

Scope of Work

The Commission will procure and install hardware and software to allow exchange of Internet E-mail and other computerized data files. We will also arrange service agreements with DIT or other vendors concerning telecommunication to allow information transfer via the TCP/IP protocol.

Results

The Commission upgraded to TCP/IP CTN service in July 1995. The new service is provided by the Department of Information Technology. The dedicated connection is on a 56Kb circuit connected through Norfolk to Richmond. The hardware installed is a AT&T DSU/CSU and a 2501 Cisco Router. The current plan is to replace the Commission's existing 9.6Kb dedicated line with the new line. The new line will allow both SNA and TCP/IP traffic; the old line will be phased out to help cover the annual costs of the new connection.

The Commission's internal Novell LAN has been configured to route TCP/IP. A Class C Internet address license has been established for the Commission. Basic access filters have been established on the router to protect the internal LAN. Because all critical applications reside in the Novell environment, threats from the external TCP/IP network are minimal.

As planned, a SMTP mail gateway was established to allow E-mail users on our LAN to exchange mail

and attachments with outside organizations that have internet mail access. The mail gateway has been tested with VIMS and numerous other state, federal, and private organizations. The Commission mail system is Microsoft mail; to reach the Commission staff via internet mail use the persons first initial and first 9 letters of the last name as the user name, and address to mrc.state.va.us (e.g. ebarth @ mrc.state.va.us).

In addition to the E-mail gateway, we have re-established a FTP account with VIMS to allow electronic exchange of larger files. We also have installed Web browsers on PC's throughout our LAN to allow access to internet home pages. We have used freeware (Windows for Workgroups TCP/IP and Mosaic) for our Web and FTP tools.

Conclusions

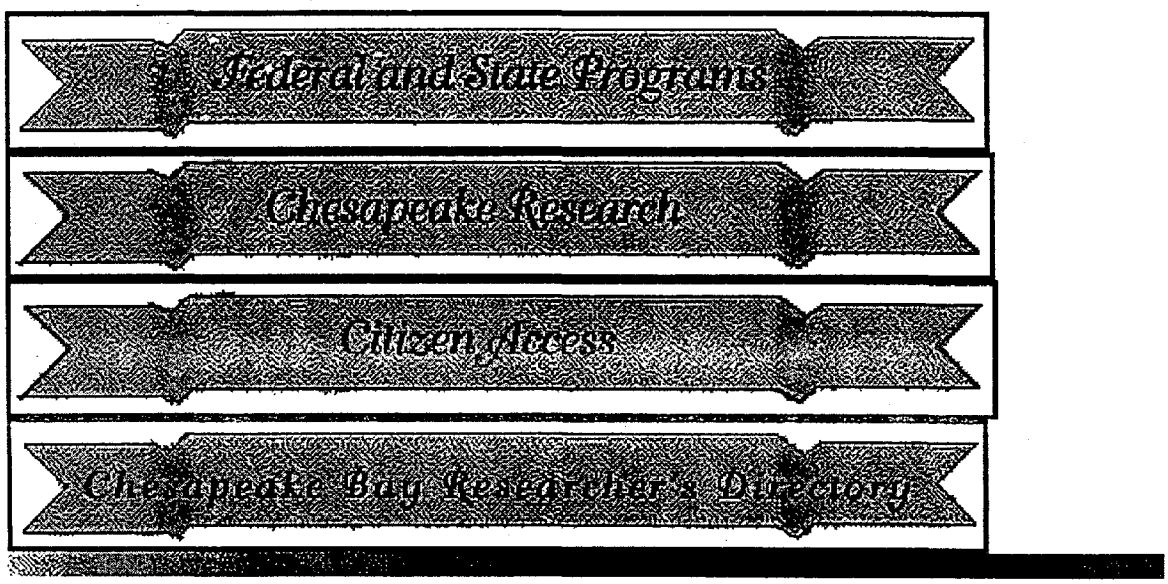
All indications are that this connection will be a significant enhancement to our communication abilities. E-mail has already proved to be popular with staff and is being used to coordinate activities outside of the Agency in both the Fisheries and Habitat Management programs.

Web browsing looks to be a promising environment for developing automated systems with other organizations. The versatility of a standardized, easy method of retrieving information from internet participants brings the potential for developing inter-agency applications much closer. We have already used Web browsing to retrieve state data such as legislation and trawl survey fish indices, as well as dynamic queries for marine recreational fishery statistics from the National Marine Fisheries Service.

Plans are underway to create a Commission home page by the end of the Summer of 1996. Initially, we will provide static data such as regulations and various public information documents; eventually we will add procedures to query our internal databases where possible and necessary.

Chesapeake Bay Information Network

The Chesapeake Bay Information Network serves as a gateway to Internet resources on and about the Chesapake Bay.



If you have any questions or comments about the Chesapeake Bay Information Network please use our Comments Page. Statistics for this site are available. Last update: *02 April 1996.*

http://www.chesapeake.org

Marine Recreational Fisheries

In Memory of Dave Deuel, 1939-1995

Do you want to know why we monitor marine recreational fishing?

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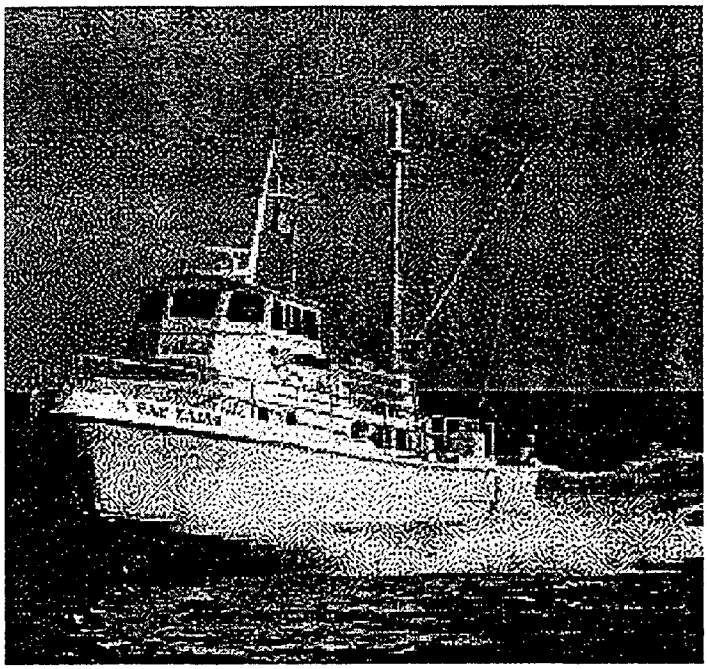
- **Link to other ongoing marine recreational fishing surveys.**
- **Read about new NOAA contracts for the collection of recreational fisheries data**

Your escape back to the NMFS Statistics homepage is only a mouse click away.

Our program helps to *build sustainable fisheries* **by** *assessing the status of marine recreational fisheries resources* **and** *advancing fisheries prediction capabilities.*

500 Visitors Since 4/16/96

http://remora.ssp.nmfs.gov/mrfss/index.html



Virginia Institute of Marine Science

School of Marine Science
College of William and Mary

Gloucester Point, Virginia 23062

This is the Home Page for the **Virginia Institute of Marine Science** and the **School of Marine Science, College of William and Mary**.

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VIMS Juvenile Fish & Blue Crab Trawl Survey

- INTRODUCTION
- TRAWL SURVEY HISTORY
- SURVEY GOAL
- DATA HANDLING
- SURVEY RESULTS
- JUVENILE INDICES
- PICTURES FROM THE SURVEY

INTRODUCTION

The Virginia Institute of Marine Science (VIMS) has conducted a trawl survey since 1955. The primary objective of the survey is to monitor trends in abundance of juvenile fish of about twenty recreationally, commercially, and ecologically important finfish and invertebrates. Currently, the survey samples waters from the mouth of the Chesapeake Bay

up to the freshwater interface of the James, York, and Rappahannock Rivers. Samples from about 60 stations are collected every month of the year from the 28-foot research vessel Fish Hawk. At each station, a 30 foot wide shrimp trawl is towed for five minutes. Once on board, the catch is sorted by species, the number of fish of each species is counted, and a large proportion of the fish are measured. Each month, 20 to 50 thousand fish, crabs, and other invertebrates are processed. About 70 species are commonly caught though 223 have been identified over the last 40 years.

The regularly scheduled nature of the survey provides an opportunity for other researchers to collect samples and conduct related research. Numerous student master's theses, doctoral dissertations, research reports, and scholarly papers have been written as a result of work from the VIMS Trawl Survey.

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TRAWL SURVEY HISTORY

In April 1955, the survey began with a series of stations sampled in the mid-river channel, at approximately five mile intervals, from the mouth of the York River up to West Point (where the Pamunkey and the Mattaponi Rivers converge to form the York). Stations were sampled irregularly for the rest of that year. Since April 1956, these stations have been sampled almost continuously, at least for the months of April through November. Two or three stations in the lower part of the Chesapeake Bay, in the deep waters of the Chesapeake Channel, were also regularly sampled for several years, along with samples farther up into the Pamunkey River.

In 1962, sampling of stations on the Rappahannock River commenced (though somewhat irregularly), and in 1964 stations on the James River were added. During some periods, samples were taken from the Potomac River, Mobjack Bay, and several smaller tributaries. Sporadically, the Chesapeake Bay was sampled semi-annually until in 1988 regular sampling of the entire Virginia portion of the Chesapeake Bay began.

Funding sources, and therefore the survey goals and methods, have changed several times over forty years. At times the primary target species have been sciaenids (spot, croaker, weakfish), anadromous species (shad, river herring, striped bass, white perch), and blue crabs. During some years and general monitoring has been the focus.

The trawl gear has been modified several times, affecting the kind and size of fish captured. Originally, the gear did not have a small mesh liner so smaller species such as bay anchovy, and small individuals of other species were not caught. In 1973, a "tickler chain," which stirs up and increases the catch of bottom-dwelling species (such as blue crabs and flatfish), was added. The liner was added in 1979. The gear has been essentially unchanged since then, except that the "doors" (wings which pull the mouth of the net open as it travels through the water) were changed in 1991. This change did not significantly alter the catch. Recently, extensive sampling has been done using these various gear configurations to standardize the

catch rate associated with each gear combination.

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SURVEY GOAL

The current primary goal of the survey is to develop "indices of abundance" for a number of recreationally, commercially, and otherwise ecologically important species. These indices measure the relative size of each "year class" for each target species. Calculation of the index is basically an average catch-per-tow computation, after the data are statistically treated to minimize the effect of extremely high and low catches.

Most species targeted by this survey are available to the survey nets for a limited amount of time during the year, because of seasonal abundance. Further, many species have a limited geographic range within the Bay and its tributaries. For each species then, only the three or four months of highest abundance are used in computation of the index; and only the areas in which each species is most plentiful are included for the index. For some species this is all river and Bay segments, for others only the Bay or subsections of the Bay are used, and for still others only the rivers or river segments are used.

For most target species, individuals become susceptible to, or can be caught by, the survey nets several months after hatching, when they are referred to as Age 0 or "juvenile" fish. Some species are also (or exclusively) caught as older individuals. For some species this group of older fish is only one year class and for other species it is several. Indices are also calculated for these older groups. Where these indices clearly represent only one year class they are labeled as "Age 1"; where they include several year classes they are referred to as "Age 1+".

The utility of juvenile indices is that they provide a snapshot of the size of each year class and can be used to forecast the *relative* number of adult fish one to several years later. When combined with other surveys which sample adult fish, a comprehensive picture of the relative condition of a fish population can be compiled. Indeed, the VIMS Trawl Survey is just one element of a VIMS comprehensive fish monitoring program which includes beach seine surveys targeting striped bass, white perch, and bluefish; surveys which sample juvenile shad much farther upriver than the Trawl Survey; and pound net and gill net surveys which sample adult fish of several species. Because most of these species are migratory, the VIMS surveys are elements of multi-state monitoring efforts which support interstate fishery management plans.

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DATA HANDLING

Every month, scientists working on the VIMS Juvenile Fish and Blue Crab Trawl Survey handle 20 to 50 thousand fish. Twenty to thirty percent (forty to fifty percent of fish other than bay anchovy) of these fish are individually measured. How does all of that data make its way into the historical data base?

Until 1987, as one scientist measured a fish its length was called out, another person would record the data, and later someone else would enter the data into a computer data base. Usually, most fish would have to be preserved in the field, brought back to the lab, and then processed. So much effort was required gathering and entering data that there was little time for subsequent analyses.

In 1988, two years of development work came to fruition when use of electronic fish measuring boards began in the field. These boards are connected to a computer running a data base program. As each fish is placed on the board, the operator touches a magnetic wand to the end of the fish's tail, and the length is electronically recorded. Using these devices, almost all data are now entered directly in a computer data base, on board the research vessel, and few fish are ever brought back to the lab. Data are available for analysis within a couple of days of the field work.

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SURVEY RESULTS

The attached graphs give survey results for the past 15 years for 28 species. Data for the years prior to 1979 are not presented because we are currently evaluating conversion factors to standardize the various gear modifications which were described earlier.

The horizontal axis for each graph represents the 'year class' year for that species. For some species, we measure year class strength in the calendar year following the year of hatching; therefore, there is no 1994 data for those species.

Indices for Atlantic croaker (*Micropogonias undulatus*), striped bass (*Morone saxatilis*), alewife (*Alosa pseudoharengus*), and American shad (*Alosa sapidissima*) are based on only river samples and are presented for only one year class. Computations for windowpane (*Scophthalmus aquosus*), smallmouth flounder (*Etropus microstomus*), striped anchovy (*Anchoa hepsetus*), Atlantic silverside (*Menidia menidia*), scup (*Stenotomus chrysops*), butterfish (*Peprilus triacanthus*), harvestfish (*Peprilus alepidotus*), northern puffer (*Sphoeroides maculatus*), inshore lizardfish (*Synodus foetens*), and northern searobin (*Prionotus carolinus*) are based on only Chesapeake Bay samples so only one index is presented and with data only from 1988 to the present.

For some species more than one index is shown. There are three situations where this occurs:

- For spot (*Leiostomus xanthurus*), weakfish (*Cynoscion regalis*), silver perch (*Bairdiella chrysoura*), summer flounder or fluke (*Paralichthys dentatus*), bay

anchovy (*Anchoa mitchilli*), spotted hake (*Urophycis regia*), and black seabass (*Centropristis striata*), the most reliable index is based on both Chesapeake Bay and river samples. However, since the Bay stations have only been regularly sampled under the present format since 1988, a "Rivers Only" index is also presented in order to give the longest possible view of the data.

- For blackcheek tonguefish (*Symphurus plagiusa*), hogchoker (*Trinectes maculatus*), channel catfish (*Ictalurus punctatus*), white catfish (*Ictalurus catus*), blue catfish (*Ictalurus furcatus*), and white perch (*Morone americana*), both Age 0 and Age 1(+) indices are shown.
- For blue crabs, both an index for "juvenile" (up to about 65mm or 2½") crabs which will enter the fishery several months later, and one for "recruits" (those either just under or already at legal size) are presented.

The methods we use to calculate indices of abundance from the VIMS Trawl Survey data sets are constantly under review. The "cut-off lengths" used to separate young-of-year from older fish, along with the geographic and temporal data limits used for each species, may change as more study is done. Therefore, though we are confident that any trends seen in the abundance graphs are real, the actual index of abundance values may change somewhat as our methods are improved.

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TO VIEW DATA ON JUVENILE INDICES, CLICK BELOW...

Sciaenids (Drums)

Pleuronectiforms (flounders & soles)

Blue Crabs

Ictalurids

Anadromous Species

Forage Fish

Coastal Species

Miscellaneous Species

Sciaenids (Drums)

Spot (Leistomus xanthurus)

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Graph of Indices

Species Information

Croaker (Micropogonias undulatus)

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Species Information

Weakfish (Cynoscion regalis)

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Species Information

Silver Perch (Bairdiella chrysoura)

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Pleuronectiforms (flounders & soles)

Summer Flounder (Paralychthys dentatus)

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Species Information

Blackcheek Tonguefish (Symphurus plagiusa)

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Species Information

Hogchoker (Trinectes maculatus)

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Species Information

Windowpane (Scophthalmus aquosus)

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Species Information

Smallmouth Flounder (Etropus microstomus)

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Blue Crabs (Calinectes sapidus)

Juveniles (Age 0)

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Species Information

Recruits (Age 1+)

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Species Information

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Ictalurids (Catfish)

Channel Catfish (Ictalurus punctatus)

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Graph of Indices

Species Information

White Catfish (Ictalurus catus)

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Graph of Indices

Species Information

Blue Catfish (Ictalurus furcatus)

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Anadromous Species

Striped Bass (Morone saxatilis)

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Species Information

White Perch (Morone americana)

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Species Information

Alewife (Alosa pseudoharengus)

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Species Information

American Shad (Alosa sapidissima)

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Forage Fish

Bay Anchovy (Anchoa mitchilli)

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Striped Anchovy (Anchoa hepsetus)

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Species Information

Atlantic Silverside (Menidia menidia)

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Species Information

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Coastal Species

Scup (Stenotomus chrysops)

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Species Information

Butterfish (Peprilus triacanthus)

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Harvestfish (Peprilus alepidotus)

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Species Information

Spotted Hake (Urophycis regia)

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Miscellaneous Species

Black Seabass (Centropristis striata)

(Image) Table of Indices

(Image) Graph of Indices

Species Information

Northern Puffer (Sphoeroides maculatus)

(Image) Table of Indices

(Image) Graph of Indices

Species Information

Inshore Lizardfish (Synodus foetens)

(Image) Table of Indices

(Image) Graph of Indices

Species Information

Northern Searobin (Prinotus carolinus)

(Image) Table of Indices

(Image) Graph of Indices

Species Information

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A FEW SELECTED PICTURES

- Captain Estes - Can I check your oil too ma'am?
- Captain Gerdes - With an atypical catch.
- Pat Geer - Taking water quality data.
- Joy Dameron - At the measuring board.
- Todd Mathes - Which one is Todd?
- Mike Land - How many have I measured today?
- Dave Hata - We need more comparison tows!
- Pat Geer and Mark Terwilliger with another atypical catch.
- Mike Seebo and a friend.
- Al Curry and Pat Geer at the cull table.
- Three Men and a Turtle.
- Four at the cull table.

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- The Fish Hawk.
- The Fish Hawk again.
- And again.
- Hauling the net in.
- Sort through this for every bay anchovy.!?X{&%?
- Sponge Crabs.
- A selection of weakfish from a single tow.
- The start of a cold day.
- Broken down again?
- Trawl Survey Pinball.

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