Virginia MARINE RESOURCE BULLETIN

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Virginia Sea Grant College Program – Virginia Institute of Marine Science – College of William and Mary

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BULLETIN

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The decline of the striped bass has challenged researchers to provide biological, environmental and fishery information sufficient and accurate enough for management decisions.

Twenty years ago, Virginia's coastal wetlands were in danger of being destroyed. Today, tidal wetlands and coastal dunes are protected by locally administered management plans.

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Sea Grant is a partnership of university, government and industry focusing on marine research, education and advisory service. Nationally, Sea Grant began in 1966 with passage of the Sea Grant Program and College Act.

Rockfish . . . Striped bass . . . Stripers . . .

different names same great fish

Striped bass are found along the Atlantic Coast from the St. Lawrence River in Canada to the St. Johns River in Florida and in some river systems along the Gulf of Mexico from western Florida to Lake Pontchartrain, Louisiana. It is a coastal fish, inhabiting nearshore ocean waters as well as adjacent bays, sounds and tidal rivers.

Morone saxatilis, its taxonomic name, is thought to form reproductively separate populations based on genetically imprinted spawning habits. According to scientists' beliefs at this time, spawning site is not completely fixed in striped bass as it is in salmon. Researchers do not know what percentage of striped bass end up spawning in a different system or how precise the tendency to home is – same locale? same river? same bay?

The actual spawning grounds, although usually in fresh water, may vary from low salinity estuarine rivers or streams like those along the eastern shore of Chesapeake Bay, to rocky, fresh water habitat such as the Roanoke River of North Carolina. Male striped bass may mature as early as two years, but the females do not begin to reach maturity until after four years of age.

Females from the Chesapeake Bay produce from 62,000 to 112,000 eggs per pound of body weight, with older fish producing more eggs than younger fish. After fertilization, the semi-buoyant eggs are transported downstream or, if spawned in slightly brackish water, moved back and forth by tidal circulation. Forty-eight hours after fertilization, the larvae begin to hatch. The larvae remain in fresh or slightly brackish water for about two weeks and then move in small schools toward shallow protected shorelines, where they remain until fall. In the winter, they concentrate in deep water of rivers. During their second summer, or when a year old, the young bass move down river from their parent river to low salinity bays or sounds. Generally, during their third year, the Chesapeake Bay stripers join the coastal migration.

Until 2 years, stripers live mostly in small groups. Thereafter and until they reach a size of about 10 pounds, they often congregate in large schools. Fish up to 20 pounds may also school, but the large fish, those over 30 pounds, are usually found alone or in small groups except when mating.

Stripers grow to great size. Several fish in excess of 100 lbs have been caught in North Carolina and Massachusetts.

In part from: **Biological and Fisheries Data on Striped Bass, *Morone saxatilis* (Walbaum)** by W. G. Smith and A. Wells. National Marine Fisheries Service, May 1977.

No Easy Answers

Researchers are expanding their efforts to provide managers with scientific information about the striped bass.

William W. Jenkins

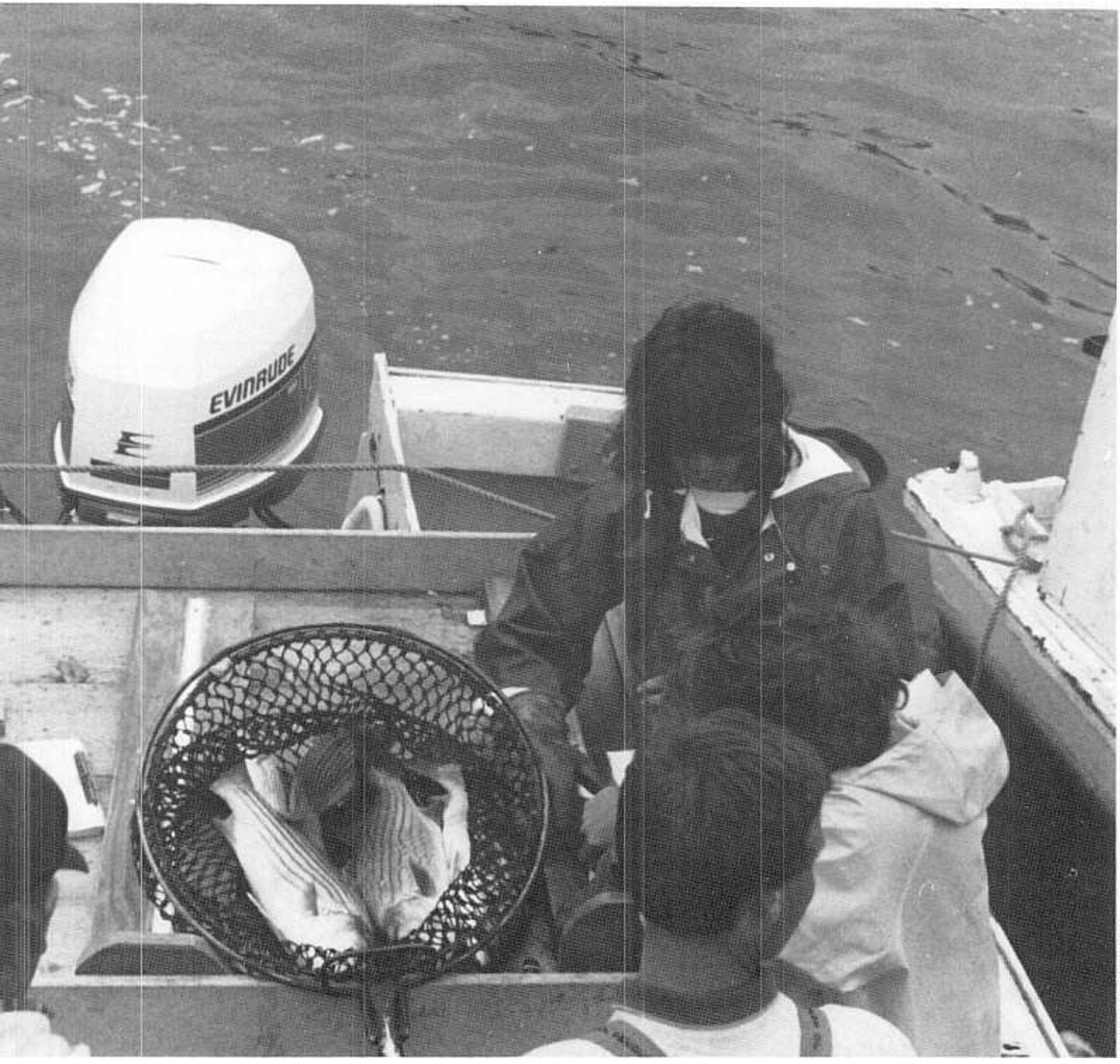
Dr. Joseph G. Loesch directs the anadromous fish programs at VIMS.

Striped bass constitute one of the most popular recreational and commercial fisheries in the eastern United States. In recent years, managing the fishery has resulted in major controversy. Everyone agrees that the population of striped bass has suffered a steady decline since 1974; and recently, it seems to researchers, everyone has an explanation. Overfishing, acid rain, pesticides, chemical runoff, changes in weather patterns, coastal development – all have been blamed as the primary cause for the decline in striped bass. Researchers are disturbed by this general belief that there must be a simple answer or even a singular answer.

At the Virginia Institute of Marine Science, Dr. Joseph G. Loesch heads the anadromous fish research program. He will tell you that there is no simple answer at present. "Just the natural fluctuations in populations of striped bass make it difficult to know what effect fishing or environmental concerns might have on the stock," says Loesch. "Until we have more basic information we don't, and we won't know."

Carol Furman, a graduate student at VIMS, has compiled a history of the striped bass landings statistics. According to Furman, "Earliest records for striped bass landings date back to 1887 when, according to reports at that time, the species was quite abundant. A steady decline in the stock is apparent from sketchy records of 1887 to 1929. In 1889 catches of almost 4 million pounds were reported, while in 1929 catches totalled only 2 million pounds. The decline in total catch continued after 1930 reaching the historic lowest point in 1934 when catches for the entire Atlantic Coast

VIMS' staff and students capture and tag striped bass in the James River during the spring of 1987.



Loisirene Blumberg

totalled a mere 1.1 million pounds. Afterward, the stock rebounded and followed an upward trend through 1970. Since the dominant year class of 1970 which produced huge landings totalling 14.8 million pounds in 1973, Atlantic Coast catch records reveal a gradual decline, with periodic upswings in the harvest of striped bass. By 1978 the catch had dropped to 4.4 million pounds representing a 69 percent decrease."

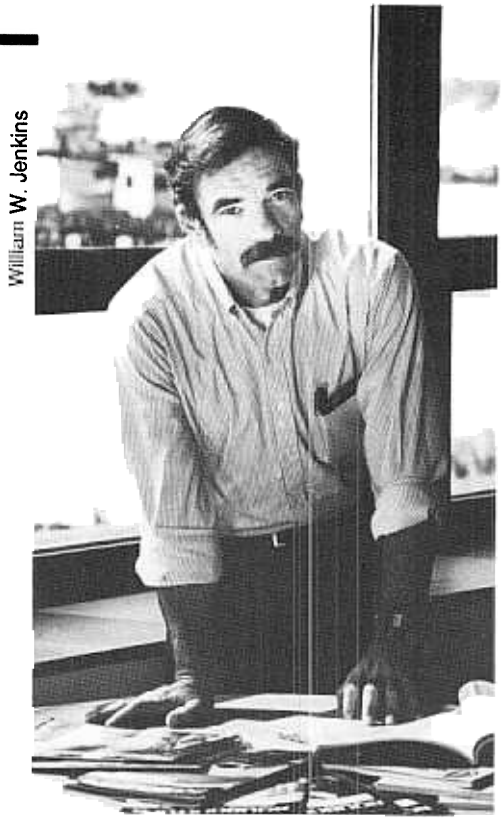
Catches for the past few years primarily reflect management regulations which are strictly enforced. Virginia commercial landings according to VMRC in recent years: 1984 - 508,167 pounds; 1985 - 240,876 pounds; 1986 - 22,750 pounds. Atlantic coast catch in 1984 was 2.7 million pounds.

Part of the controversy involving striped bass fishery management is the accuracy of population abundance surveys. How many fish are actually available for fishing and how many mature adults are available to spawn and assure a continued abundance? Obviously, it is impossible to count every striped bass in the Bay and in the ocean. Scientists provide managers with estimates of populations based on surveys of fish at different ages, in different locations and at varied times of the year.

Dr. James R. Colvocoresses has worked for three years to improve statistics of juvenile recruitment – the number of first year fish which have survived the egg and larval stages. Present management programs are strongly linked to the numbers of first year fish present

Dr. James R. Colvocoresses

William W. Jenkins



William W. Jenkins

Dr. Herbert M. Austin

during beach seine surveys taken in Maryland each year, but Maryland and Virginia scientists are seeking ways of improving on the validity of those surveys.

Population surveying, according to Colvocoresses, is one of the most labor-intensive in marine science, particularly with species that are highly mobile and widely distributed. However, the accuracy of the estimates obtained varies proportionally with the amount of effort.

Dr. Colvocoresses also believes that more accurate figures could be derived if surveys were made based on habitat. "Juvenile striped bass hug the shoreline during the summer months," he explains, "And you know how varied our shoreline is. I'd like to see periodic surveys taken in among tree stumps, vegetated areas, along rocky shores and around piers."

Each year, millions of striped bass eggs are released by the fish; but at present no model has been developed which can accurately relate the success of spawning to the success of juvenile fish which would eventually mature and reproduce. In 1979, Congress passed an amendment to the Anadromous Fish Conservation Act calling for an Emergency Striped Bass Study to examine the status of the stocks, identify causes for declines in their production and perform an analysis of the economic impact of the decline in harvest. As a result of that Congressional Amendment, research funds became available through both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for basic research. The anadromous fish research program at VIMS is almost totally funded through this national initiative. "The ultimate goal of all federal and state agencies concerned with anadromous fishes," says Loesch, "Is the development and implementation of rational management plans to restore and enhance anadromous fish stocks. Toward this end, the major goal of the monitoring and research projects at VIMS is to develop stock assessment models that will give fishery managers state-of-the-art quantitative tools."

In addition to surveying juvenile striped bass each year, VIMS also takes part in a number of tagging programs to survey adults. Occasionally, tagged Chesapeake Bay striped bass show up in the Hudson River or as far north as Nova Scotia. The migratory adults are only in the Bay during the late winter and early spring spawning season. The rest of the year they are off the coasts north of Virginia. The pre-migratory adults and juveniles are throughout the Bay and its tributaries during the warmer months, but move to deep waters in the lower rivers and Bay during the winter.

In 1937, Daniel Merriman, a fisheries biologist with the U.S. Fish and Wildlife Service stated: "Regulations intended for the conservation of the striped bass should be based on facts. If they are based on inadequate knowledge . . . they will be guess-work and in all probability futile."

William H. Kriete, a marine scientist who has been involved with VIMS' tagging programs since 1967, functions as Field Chief for the striped bass program. Part of Kriete's responsibility is to know where to send boats and crews in order to find the fish.

"Normally," he says, "You expect to find spawning adults in the southern rivers of the Chesapeake Bay first because of the warmer water temperature. This year there was so much run-off coming down from the mountains to the estuaries that the spawning appears to have occurred in the

Rappahannock earlier than in the James."

In 1985, when Dr. Colvocoresses was attempting to survey the year class in the Rappahannock River, he initially found very few young fish. Then he extended the sampling further upriver in the estuary because he knew the drought that year had moved the saltwedge further upriver. Sure enough, the young-of-the-year had moved to the less saline areas.

Dr. Herb Austin has been studying the relationship between weather events and finfish for over 16 years. "Spawning success and migration are triggered by water temperature and photoperiod.," Austin says. "Studies of Potomac River striped bass have suggested that good year classes are produced after cold winters and cool wet springs. The theory is as follows: During a cold winter ice scours the freshwater wetlands, grinding up the dead plants which are washed down river in the spring. A cool spring is theorized to allow the females to move further up river before spawning which increases the 'size' of the spawning ground. A wet spring, one with increased river runoff, transports detritus – the ice-ground plants – down river where it is consumed by a copepod (a small crustacean, the size of a grain of rice). The more the copepods consume, the more eggs they produce. The more eggs they produce, the more larval copepods ... and consequently, the more food for larval striped bass. Not only must the above occur, but it must all happen at the right time. If the spring is warm and spawning of striped bass occurs early, the larval fish may start feeding before the copepod larvae are in sufficient abundance. Further, timing of the spring runoff is important. If it is too early or too late the timing is off for the feeding copepods. In short, it is not only what happens that is important, but when. All the above events must fall into place at the right time or an average or poor year class is produced.

"Droughts, during the spawning season, can shrink the spawning grounds and crowd the spawning females. Newly hatched and feeding larvae are then crowded and must compete for food.

"Once the initial year class size is set, conditions on the nursery ground also determine the strength of the year class. Dry or wet summers can move the nursery grounds miles up or down river, shrinking or expanding the area, and protecting or exposing the fry to predators. For example, during a drought bluefish may move further up river."

Austin has represented Virginia striped bass research and fisheries interests since 1977 with The Atlantic States Marine Fisheries Commission (ASMFC). The Commission, in existance since 1942, was charged in 1972 with developing Fisheries Management Plans (FMP's) for coastal migratory stocks. A

The ultimate goal is restoration and enhancement of stocks.

Scientific and Statistics Committee (S&S) was created by ASMFC in the fall of 1977 to initiate development of a striped bass interstate Fisheries Management Plan. Member states on the S&S Committee included Maine through North Carolina.

The Plan was approved by the ASMFC in the fall of 1981, and Virginia implemented the plan in 1982 in time to protect the spawning season. Virginia was one of the first states to implement the plan. Since 1982 there have been three amendments designed to protect females until they reach spawning age. As of the 1987 spawning, Virginia's tributaries to the Chesapeake Bay have shown a steady recovery since 1981.

This year, Loesch and Kriete will also be capturing striped bass broodstock as part of a pilot program with the U.S. Fish and Wildlife Service and the Virginia Game and Inland Fisheries Commission. The ultimate objective of the broodstock study is to determine if hatchery-grown juveniles will survive in sufficient numbers to enhance stock abundance.

A coastal tagging and recapture program now implemented is designed to evaluate exploitation, assess coastal migrating patterns, assess the degree of fidelity to spawning areas, and contribute to other ongoing research concerned with striped bass growth rates.

In order to accurately assess stocks and understand what increasing or declining numbers in any given region mean, scientists must first understand the physiology and biochemistry of the fish in their various stages – from egg to larvae to juvenile to adult – and the environment in which they live.

Concern is so great for the survival of the striped bass as an active commercial and recreational fishery that the U.S. Congress passed the Atlantic Striped Bass Conservation Management Plan six years ago which requires all states to comply with a federal management plan.

Virginia closed striped bass fishing from December 1 through May 31 and limits catch in the Bay to a 24-inch minimum and 30-inch minimum in coastal waters. Other states imposed similar restrictions in order to comply with the federal management plan. Have the restrictions brought about an increase in the number of fish? Have more juveniles survived because there were more adults available to spawn, or was it just a year when environmental conditions favored survival? Answers to these questions will take time to derive.

The commercial and recreational fishermen want to fish for striped bass which they see as being abundant again. Fisheries managers want to be assured that the striped bass has a future as a species. Scientists want to understand the fish and its environment and hope that their research will lead to answers that will help both the fishermen and the managers.

William W. Jenkins

Graduate student Carol Furman will be examining the genetic structure of striped bass within the Rappahannock River. Her research is one of six priority research areas outlined by the Chesapeake Bay Stock Assessment Committee in order to identify striped bass stocks that are dependent on the Chesapeake Bay and its tributaries.

VIMS Tagging Program

by William H. Kriete

There are three tagging projects either presently ongoing or that will be underway in the near future as part of the VIMS' anadromous fish program. In the spring of 1987, approximately 2,000 external anchor tags were placed on striped bass in the James River. This work was funded by the National Marine Fisheries Service.

In the fall of 1987 and spring of 1988, funded by the U.S. Fish and Wildlife Service through the VMRC, approximately 10,000 tagged striped bass with external anchor tags will be released in the Rappahannock River.

The fish targeted in the spring will be the larger fish which join the coastal migration once spawning is completed. Results will help determine what portion of the population actually joins the offshore migration and to what extent the Chesapeake Bay striped bass contribute to the offshore pool on the northern feeding grounds. Data gleaned from these studies will be incorporated into a coastal management plan for striped bass.

The third tagging program is a multi-phase, multi-agency, experimental program involving the Virginia Institute of Marine Science, the Virginia Marine Resources Commission, The Commission of Game and Inland Fisheries and the U.S. Fish and Wildlife Service. VIMS' initial commitment is to capture adult striped bass in pre-spawning condition from the Pamunkey River. The chosen fish will then be transported to holding tanks on shore to await immediate shipment to the GIF hatchery at Brookneal, Virginia, for the actual spawning process. Upon completion of spawning, the 48-hour fry will then be flown to USFWS rearing ponds across the eastern half of the U.S. where they will be kept until fall when they are 6-10". At this point, a small magnetic wire tag will be implanted in the cheek muscle of each fish. The fish will be released in the river of origin; the Pamunkey, in this case. Since there is no external identification of the tagged fish, it will be the responsibility of VIMS to capture and test all striped bass found in the size range of the tagged fish with a magnetometer to determine if a tag is present. Data collected will be used to determine movements and mixing of the hatchery and wild stocks and to determine if this wild stock can be augmented and/or enhanced by such a hatchery program.

Hannah McKee

Marine Scientist William Kriete coordinates striped bass and other fisheries surveys for the anadromous programs. His years of experience and contacts with local fishermen enable him to locate the fish for surveying, tagging and recapture programs.

How the juvenile index is derived

The relative abundance of juveniles present in any year is estimated by dividing the total number of fish surveyed in that year class by the number of times nets are hauled during the survey. During 1985, a total of 322 young-of-the-year were collected from 142 seine hauls from selected areas of the James, York and Rappahannock River systems in Virginia.

Field sampling is conducted annually during four tri-weekly sampling periods from July through mid-September. Eighteen fixed stations along the shores of the James, York and Rappahannock River systems are visited during each sampling period.

Two seine hauls are made at each station using a 100 foot long by 4 foot deep, 1/4 inch mesh minnow seine set perpendicular to the shoreline and swept to the shoreline by pivoting the deep end of the net downcurrent around the onshore seine pole. After the deep end pole is brought into shore, the net is hauled up onto the beach and the fish removed.

Striped bass, along with any other fish collected in the net, are identified, counted and measured. Salinity, air and water temperature are measured. Sampling time, tidal stage and weather conditions are recorded also.

Making some adjustments for mathematical purposes, the adjusted overall mean catch per seine haul (CPUE) was 2.41 for the 1984 year class. If more fish are caught in each seine haul in a given year, the index of recruitment for fish spawned that year will rise; if fewer overall fish are caught, the index goes down.

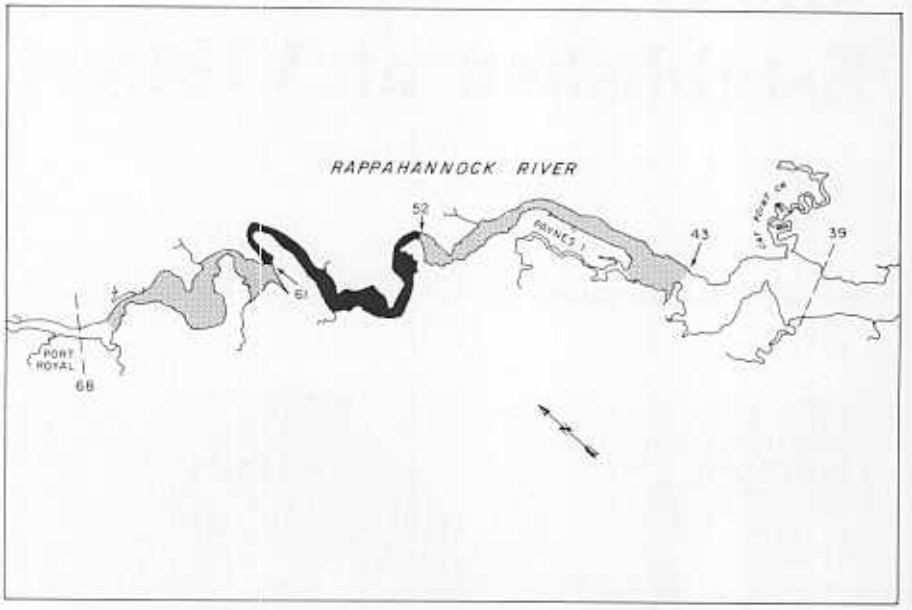
Spawning areas and Predators

Scientists with the VIMS Division of Physical Oceanography (Plankton Processes Section) have spent several years identifying and mapping the locations where striped bass spawn in Virginia estuaries. The information is essential for management of the stocks and for fisheries biologists who use the locations to sample for juveniles and spawning adults. Dr. George C. Grant and John E. Olney also have been able to make estimates of the abundance of eggs in the Virginia rivers which will assist other researchers in correlating the numbers of eggs produced each year with survival rates to maturity.

In 1983, Grant and Olney took part in a joint project with Maryland's Chesapeake Bay Laboratory to examine the efficacy of two independent but complementary techniques for identifying stocks. The Sea Grant funded project enabled both groups of scientists to more closely examine larval striped bass; particularly for differences which might be environmentally induced.

Although the results were inconclusive, the study helped develop laboratory analytical techniques for larval studies.

Presently, graduate student Jack McGovern is furthering the research of Olney and Grant in a study of predators which consume striped bass eggs and larvae. As scientists examine each factor related to the striped bass, it is important that they be able to differentiate natural predation from environmentally caused losses.



Spatial extent of striped bass eggs, Rappahannock River, spring 1982. Darkest areas represent 80% of striped bass eggs in that particular year. Cross-hatched areas contained the remaining 20%.

William W. Jenkins

Dr. George C. Grant is a Planktologist who studies striped bass spawning and the survival rates of eggs and larvae in Chesapeake Bay estuaries.

Studying Growth

Graduate student Lisa L. Kline is studying growth in young-of-the-year striped bass. Using the foundation knowledge of previous research, Kline is specifically looking at the otoliths within the juveniles. These small bones within the inner ear of the fish help sense pressure, and sound to a certain extent. The growth of the otoliths is proportional to the growth of the fish throughout its life, with increments being deposited on an annual as well as a daily basis. These daily increments will be used by Kline to estimate the age in days and growth rate of first year striped bass.

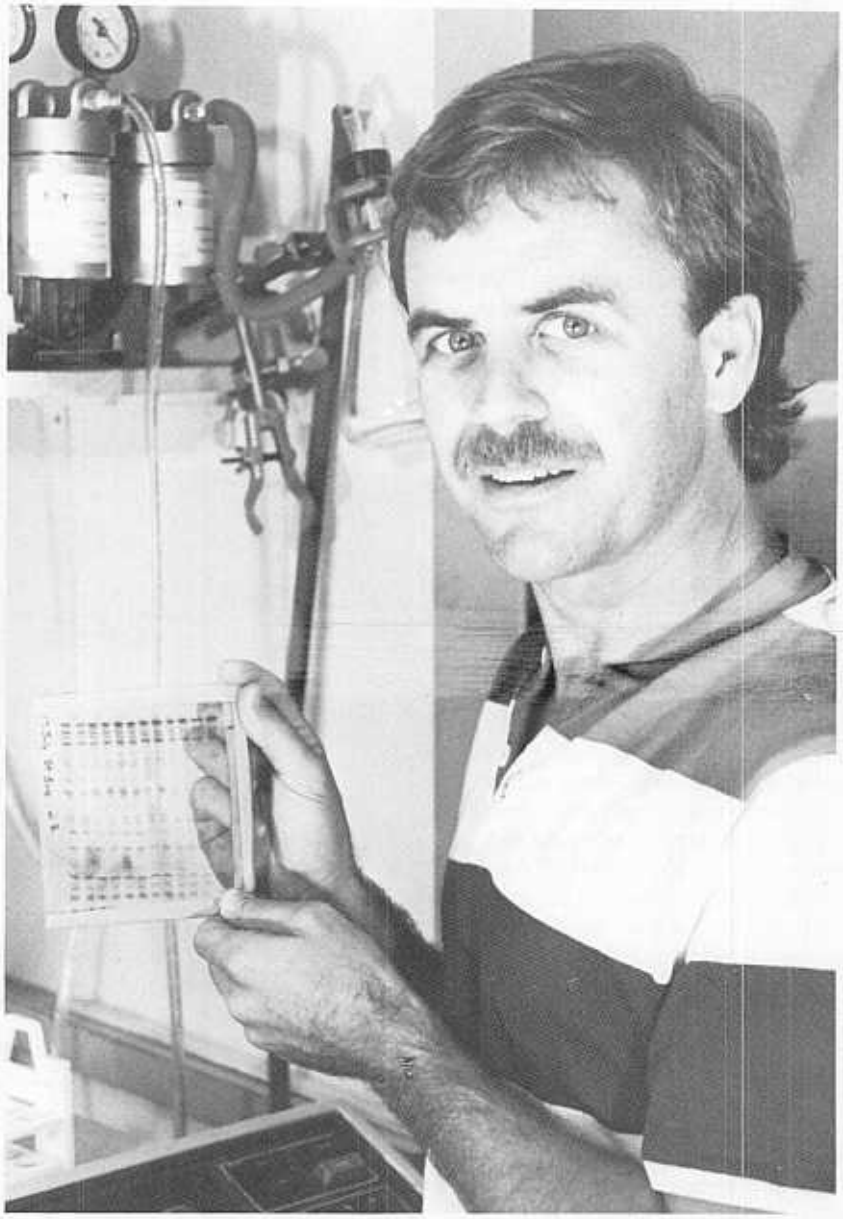
The overall objective of her study is to determine whether growth rates vary between fish spawned in different rivers or at different times of the spawning season. The research may also identify environmental factors, such as temperature, salinity, and food availability that affect the growth rate. If Kline can isolate the factors affecting the growth rate of the juveniles, additional research may enable scientists to identify an "ideal" environment for striped bass, and managers will know what changes or degradation in an estuary may be damaging to the young fish.

Hannah McKee

Lisa Kline

Stock Assessment Laboratory Established at VIMS

by Dr. Brian Meehan



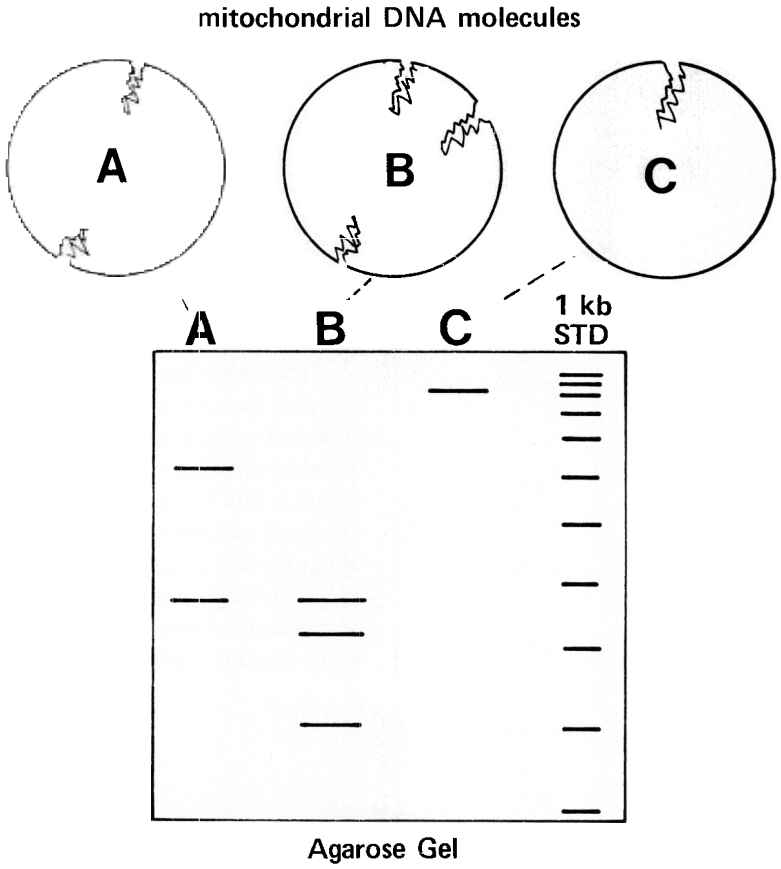
William W. Jenkins

Dr. Meehan holding an isoelectric focusing plate containing eye lens proteins (bands) from twelve striped bass (lanes). Twenty-five eye lens proteins have been identified by their isoelectric points on this plate.

Stock identification and knowledge of stock movements and mixing are essential prerequisites for assessment and management programs of both commercial and recreational fisheries. This has been recognized by the Chesapeake Bay Stock Assessment Committee (CBSAC) of the National Oceanic and Atmospheric Administration (NOAA) and, with funds provided by the Committee, a laboratory devoted to biochemical techniques for stock identification has been established at the Virginia Institute of Marine Science. The laboratory is designed for conducting analyses of biomolecules to identify fisheries stocks; it may be the most sophisticated laboratory of its type.

The initial two years of funding received from CBSAC were devoted to the construction and implementation of the laboratory, and development of techniques that would allow large numbers of diverse samples to be efficiently processed. Biochemical techniques that were adopted by this laboratory were originally developed for clinical and evolution studies. In this lab, as many as 100 samples (a minimal number for stock identification studies) can be processed for mitochondrial DNA, restriction fragment analysis, qualitative and quantitative protein analyses and isoenzyme analysis on a routine basis.

The ability to secure tissues from large numbers of fish in an expedient fashion is a requirement dictated by existing fisheries



Closed circular mtDNA molecules isolated from three different fish (A, B and C) and cut with a restriction enzyme that is specific to the base pair sequence (gene code) TAATCA. The subsequent linear fragments are identified and compared on an agarose gel against a l kilobase(kb) molecular weight standard. The mtDNA molecule from fishes B and C differ from that of A by the gain and loss of the sequence TAATCA, respectively.

sampling strategies in which fish are captured in large lots. Because the laboratory coordinates sampling schedules and specimens with a number of ongoing fisheries projects, it is not uncommon to receive 100 or more fish for analyses in one day.

Two of the ongoing research projects in the new lab are designed to determine whether striped bass stocks can be identified genetically. In one experiment the structure of mitochondrial DNA (mtDNA) molecules is being examined using restriction enzymes. The mtDNA are closed, circular molecules located within the mitochondria of cells. They contain the same type of genetic information as nuclear DNA but are slightly less complicated and easier to work with. After the mtDNA is isolated in purified form, it is cut at specific sites using restriction enzymes.

The restriction enzymes cleave the circular mt DNA molecule at specific sites creating linear fragments of DNA. The size and number of fragments created are indicative of the gene sequence of the molecule, and this information is used to characterize specific fish stocks.

In another experiment, eye lenses of the striped bass have been collected from 117 Rappahannock River fish. Additional lenses have been obtained from fish collected in ocean waters of the upper Bay of Fundy, Nova Scotia. Early indications are that proteins may vary among stocks. As many as 35 different eye lens proteins have been identified in the striped bass and preliminary studies are aimed at quantifying the relative amount of each protein.

The prospect of eye lens proteins as indicators of striped bass stocks seems promising, especially in conjunction with mitochondrial DNA restriction fragment analysis. By comparing the two laboratory techniques, scientists will have a double check system for verifying stock differentiation of individual striped bass stocks.

Rockfish memories...

...Pamunkey River Style

It's late summer on the Pamunkey, but already there's fall-type conversation in the Riverside Fish Market just outside of West Point. Owner, Ed Inge is advising a steady stream of customers. "Very few softshells left," Inge tells one man, "I can call around for you, but I'll tell you what; when the trout come in, the softshells are just about gone."

This is the kind of information which can only be acquired by listening to experienced fishermen, and when Bob Windsor arrives at the market, everyone wants to talk fishing. Bob started "serious" recreational fishing when he was about 12, which he says was "a year or so ago." He began commercial fishing when his weekend avocation began earning him more than his regular job. Bob fished commercially for many years and owned a fish market. Conversations with Bob in the fall bring to mind his favorite fishing – recreational or commercial – rockfish.

Striped bass, called rockfish or stripers, have always been his favorite, and they were abundant on the Pamunkey until the early 1970s.

For stripers, Bob used drift nets which he says is the "laziest type of fishing there is." He and a companion used a small row boat, locally called an "Indian boat" with a 3 hp engine. The nets were long and narrow, usually 600 feet long by 12-15 feet deep, with a fine mesh. Today commercial nets are made of a fine monofilament line which is even more difficult for the fish to see. Two or three nets are played out across the river about

Courtesy of Bob Windsor

In 1972, Bob Windsor combined commercial and recreational fishing for striped bass on the Pamunkey River.

an hour before the tide turns and then left to drift on the tide. Rock and shad, moving with the tide, get completely tangled in the nets, Bob says, and the fishermen just pluck them off the surface. Half-an-hour after the tide turns, the fishing's over. Bob figures they averaged about 20 good-sized fish per net per tide up to the 1970s.

The best time to fish for stripers is dawn and dusk when the fish are more active. The fisherman likes to tell the story about the first year state agency representatives asked for his help in catching stripers. "They wanted to fish from 8 in the morning until 4 in the afternoon," he says. "I told them the fish just find a deep hole with a pleasing temperature and stay still during the day,

"The best time to fish for stripers is dawn and dusk."

that they needed to be here at dawn for the best catch. Well they didn't have any information that that was fact, so for a while we went out from 8 to 4. After a few days of not catching any fish they started coming out before dawn. And you know what? We caught all the fish they needed."

Someone once said that scientific fact is the result of a great deal of time and money spent proving that what most people already know from common sense and observation is true. A lot of Bob's observations about striped bass have become fact over the years, and he's still trying to save the state and federal governments money by sharing his experience with researchers from VIMS, Game and Inland Fisheries and the U.S. Fish and Wildlife Service.

One of Bob's observations changed perch net fishing on the Pamunkey once he convinced other commercial fishermen he could catch more fish. Perch nets are thirty foot sections of 3 1/4 inch mesh net stretched between poles, which are sunk in the river. The method is called "staked net fishing." Bob noticed that the perch and rock he wanted wouldn't come near the traditional nets if they could sense a barrier; so in the early '60s he started hanging nets with plenty of free water around the poles and above and below the nets. The perch and rock followed the smaller fish which freely moved around the open spaces and it wasn't unusual for him to catch 100 lbs of perch and 130 lbs of rockfish at one time.

Courtesy of Bob Windsor

Bob Windsor and associates unload commercial striped bass catch at his pier on the Pamunkey in 1972.

Another thing Bob has made note of over the years is how larger fish will line up behind staked net poles or columns on a bridge to ride out the tide change. One of his favorite places for recreational fishing was near the James River Bridge. "One day three of us caught 50 rockfish just casting behind the columns of that bridge. That's a funny place, though; it's either bonanza or complete bust down there and it's very rough."

Bob and his wife, Rose, live on the Pamunkey River and spend most of their weekends fishing. "We used to have a big family fish fry on the 4th of July each year, and we were so sure of the fishing around here we'd go out on the 3rd to catch fish for the 4th. Never failed; and we usually had about 42 people!"

Sport fishing for the Windsor's begins in July and continues until really cold weather sets in. They have some favorite spots around the Bay they've fished for years. Generally when fishing for rock they use a shad rig, two lines from a single ring attached to the pole line. "We used to fish off a lighthouse where you'd always get a big one on one line and a small one on the other." There have been some years, Bob swears, when they've

caught more fish with a hook and line than they have with a net.

Commercial and recreational fishermen follow the fall migration of rockfish out of the Bay. "That's the best fishing time," Bob says. "After the crab and minnows have begun moving out to the Bay; I figure there's a shortage of food and the stripers go for bait."

Bob believes so much in the striped bass management programs being coordinated through state and federal agencies that he's allowed fish tanks to be set up in his front yard for striped bass spawning experiments being conducted by the U.S. Fish and Wildlife Service. "I know the rockfish go in cycles because I've seen it over the years. It seems to me, recently though, that they're spawning as many eggs; the eggs just don't seem to hatch and the real young fish don't survive like they used to." (Recent research into the effects of deteriorated water quality on the eggs and larvae may prove Bob right again.)

Mr. Windsor would like to see the hatcheries put fairly good-sized juveniles back into the rivers, so they'll have a chance for survival. He's also fascinated by the U.S. Fish and Wildlife hatchery at Brookneal. "The two fellas who run that place, Dale Rutlage and Steve Author, can examine a fish and tell you within two hours when it's going to spawn. They've had tremendous success for the past ten years at Brookneal."

"I know the rockfish go in cycles because I've seen it over the years."

Bob doesn't fish commercially any longer, so he does even more recreational fishing, particularly with his grandson, Steven. Every few minutes, someone comes by to ask him a fishing question while he's at the Riverside. His grandson checks by several times about bait and other necessities for a weekend of gill netting in Mathews.

Jim Owens, field coordinator between scientists at VIMS and Tidewater fishermen, says Bob Windsor has kept the most complete records and observations of both commercial and recreational catches Owens has ever seen. Bob has been sharing his data with scientists for years. The information he supplies helps increase the overall amount of raw data available to the scientists for their studies.

Before he can get away from the Riverside Market, one last customer stops by and takes the opportunity to ask Bob when he's going fishing next and what he's going after and would he take an extra person along. Windsor smiles and agrees to take the young man along. Like a gardener with a green thumb, Bob Windsor seems to have an affinity for fish. Or maybe it's just that he knows more about fishing than anyone else. Whichever the answer, recreational and commercial fishermen and a number of fisheries researchers, know where to go when they're looking for fish.

Courtesy of Bob Windsor

Mr. James F. Martin, now deceased, fished with the Windsors for striped bass. This one weighed about 25-30 pounds.

Regulating marine resources . . .
How the VMRC Works

An interview with Jack Travelstead, Acting Deputy Director of the VMRC.

C. Plummer

(left to right) W. Tayloe Murphy, Jr., Attorney, Dr. Scott Newton of Virginia State University and Jack Travelstead confer before a VMRC meeting.

MRB: *WHAT IS THE BASIC PURPOSE OF THE VIRGINIA MARINE RESOURCES COMMISSION?*

Travelstead: The basic purpose of the VMRC is to manage, regulate, and develop the state's marine fishery resources and to protect and preserve the marine habitat, including wetlands, submerged bottomlands, and coastal primary sand dunes, through a project review and permitting system. Enforcement of the various marine resources conservation laws and regulations is also a mission of the agency.

MRB: *HOW DO VMRC FISHERY REGULATIONS COME ABOUT?*

Travelstead: Regulations may be initiated from a number of sources: VMRC fisheries staff, industry or citizens, by Commission board members, and at times as the result of multi-state attempts to manage a coast-wide fishery.

Regulatory proposals are brought before the Commission at a regularly scheduled meeting; these meetings are open to the public and are held on the first Tuesday of each month at Newport News City Council Chambers. The meetings start at 9:30 a.m.

Once heard by the Commission, regulatory proposals are generally advertised for public review and comments. Public hearings are held around Tidewater and at the following monthly Commission meeting. After a review of the proposal and public comment the Commission takes action.

MRB: *WHAT IS THE DIFFERENCE BETWEEN A VIRGINIA STATE LAW AND A VMRC REGULATION?*

Travelstead: There is no difference between laws and regulations in terms of their force and effect. The differences are found in their adoption procedures. Laws are adopted by the General Assembly, signed by the Governor and are generally effective on July 2 following the Legislative Session. Regulations are adopted by the Marine Resources Commission following a public review and comment period and are generally effective upon adoption.

Prior to 1984, the public regulatory review process lasted about six months. This process has been shortened to about 30 days to allow the Commission to respond to changes in the fisheries and the needs of the commercial and recreational fisheries.

MRB: *HOW ARE MANAGEMENT DECISIONS SUCH AS THE MANAGEMENT OF STRIPED BASS DERIVED?*

Travelstead: Management options are derived from a review of the information collected by the fisheries management staff, input from the fisheries scientists at VIMS and other institutions, and public comment. A Fisheries Management Advisory Committee, consisting of 19 representatives of commercial and recreational fishing, processing, and the scientific and academic community, provide technical advice and focus public awareness on management decisions.

In the case of the striped bass, the U.S. Congress passed the Atlantic Striped Bass Conservation Act in October, 1985, which forced the states to adopt certain regulations to protect the broodstock to spawning age. The penalty for non-compliance was a federally-imposed moratorium.

MRB: *WHAT, NORMALLY, IS STATE JURISDICTION AND WHAT IS FEDERAL?*

Travelstead: The jurisdiction of the Marine Resources Commission begins at the fall line of the rivers and extends downstreams, through Chesapeake Bay, and seaward to the state boundary, 3 miles offshore. Federal fisheries jurisdiction begins at the 3 mile line and extends to the 200 mile line.

MRB: *WHAT OTHER AGENCIES OR GROUPS HELP REGULATE FISHERIES?*

Travelstead: The federal government,

(continued on page 19)

A Description of a

Tidal Marsh

Story and photos by
Hannah McKee

From saline to freshwater, Virginia's tidal wetlands offer dynamic diversity and unexcelled beauty.

Virginia's wetlands, at the boundary between water and land, serve as a staging ground for a complex web of ecological interactions. Seaside grass-based communities provide tons of detritus, similar to the decay of forest litter, per year. This material is broken and washed down through the intertidal flats. With the protein level increased by bacteria and other microorganisms, the minute particles of decayed plants feed small invertebrates in the marsh which nourish small fish which are in turn eaten by larger sport fish and commercial species. The marshes play an important role in the cycle of the blue crab, providing habitat for the juvenile crabs through the winter season. The upper marsh plants of rushes and water hemp may produce up to a quart of seeds per plant, feeding the waterfowl as well as providing protected nesting areas.

The wetlands form a natural barrier against erosion from the storms and waves which batter our coastline. The smaller root hairs of saltmarsh cordgrass bind together to create a well-matted substrate, a fine net to catch and hold soil particles. The foliage of the marsh plants acts as a baffle to diminish wave action before it strikes the toe of the slope.

To help standardize an ecological evaluation of the wetlands, the VMRC joined VIMS to create **The Wetlands Guidelines.** The role and value of different tidal communities is evaluated by relative plant productivity, provision of wildlife habitat, erosion and flood control and, finally, water filtration. The non-vegetated wetland communities are defined by substrata: intertidal flats, beach, dune or oyster reef. The vegetated communities

are defined by the dominant plants of each community.

The communities of marsh plants extend from the saline-compatible saltmarsh cordgrass growing at mean sea level along with the marsh meadows of saltmeadow hay, black needlerush, sea lavender and giant cordgrass up through the cattail communities found in upland pockets where the salinity in the marsh soils is much lower. Further up the estuary, out of the extreme salinity, but still subject to seasonal and daily flooding by tidal fresh water, the diversity of plants in the marsh expands. Found here are the softer-textured, large-leafed plants such as pickerel weed, arrowhead and the yellow pond lily which blooms throughout most of the summer. Also found in these communities of the upper basin is the ubiquitous *Phragmites australis*, or reed grass, whose underground root system spreads quickly through disturbed soil often marking the site of dredging, borrow pits or old spoil deposits. In the pond areas at the head of small creeks are the communities of heavy seed plants such as wildrice, which are an important food source for waterfowl. Finally, at the head of the estuary the tidal wetlands community is characterized by the forest canopy of the swamps. These relatively poorly understood habitats are receiving more attention today from researchers.

The beauty of Virginia's wetlands lies in the raw power of its providence. Formed where the sea hits the land, the wetlands stand like a nursery in the house of a difficult marriage. It provides for the children of both sea and land, offering shelter to the juvenile finfish, waterfowl, small mammals and amphipods. It acts as a buffer to both, protecting the upland from erosion and flooding, and safeguarding the saltbays from siltation and pollution. The bounty of the wetland plants draws wildlife from both water and land, endlessly supporting and affecting cycles of life deep in the sea or high in sunlit forests. The wetlands are the edge of two worlds and its protection is primal to both.

Additional reading:

Marine Schoolhouse Series, Nos. 5, 6, and 7, **Tidal Wetlands,** by Dr. Gene Silberhorn. Free: Advisory Services, VIMS, Gloucester Point, VA 23062.

Common Plants of the Mid-Atlantic Coast, Gene M. Silberhorn, Illustrated by Mary Warinner, The Johns Hopkins University Press, 701 West 40th Street, Suite 275, Baltimore, MD 21211, $26.50 hardcover, $8.95 paperback.

The Wetlands Guidelines. Free. VMRC, Habitat Division, P. O. Box 756, Newport News, VA 23067.

VIMS' **Wetlands Inventories** are available for each Tidewater County and City. These are detailed descriptions of constituent vegetation for each locality designed to help landowners and managers. VIMS Library, Gloucester Point, VA 23062, $2.00.

Story and photos by
Hannah McKee

Managing Virginia's Wetlands

Virginia's local Wetlands Boards have been arbitrating development and conservation needs in the coastal areas for 15 years.

Tom Barnard stares thoughtfully across the channel of water which is the lifelink between the Virginia State Department of Transportation's "created" marsh and the tidal Goose Creek. He explains that this marsh, planted with a variety of plant species in an old borrow pit, acts as a Wetlands Bank. For every quarter acre of shoreland destroyed, a quarter acre is subtracted, symbolically, from the 8-acre deposit at Goose Creek. He stresses that, "This is just one way of addressing the effect of the many little losses that occur when there is no alternative but to build a roadway across wetlands."

To Tom Barnard, a marine wetlands scientist at the Virginia Institute of Marine Science (VIMS), what he sees across the 60 feet of water channel and 8 acres of created marsh is a microcosm of vegetated marine wetlands. This marsh represents not only other marshes throughout the estuary system, but is representative as well of increased private and public sensitivity to the importance of the wetlands and their ecological role to marine and upland wildlife.

Public concern for the marine wetlands developed in the 1960's reflected an emerging national trend toward the conservation of natural resources. The Virginia General Assembly created the Virginia Marine Resources Study Commission (VMRSC) in 1966. The purpose of the commission was to evaluate the adequacy of existing conservation and preservation practices for marine resources and to study methods for "resolving conflicts between commercial and recreational uses." (House Joint Resolution 59 of the 1966 Session of the Assembly.)

The VMRSC advocated an inventory and study of the shoreland by the scientists at VIMS. The state assembly adopted and funded this proposal in 1968. An interim report, published by VIMS in December 1969, recognized the productivity, fragility and complexity of the wetlands. The VIMS report concluded that unchecked development was irreparably damaging the ecologically critical marshes of the state. The report recommended immediate protective legislation.

In 1970 the interrelated issues, mandates and alignments of the politics between the Virginia state legislature and the local governments were as complex as any ecological web between the wetlands and adjacent environments. It took several years for the State Assembly to find its way through the complex constitutional issues surrounding personal property laws versus the conservation of the public's natural resources. Hastily written bills introduced in the 1970 Session of the Assembly were to give the Virginia Marine Resource Commission (VMRC), a state agency, dredge and fill authority over the wetlands, but the bills failed to be reported out of Committee due to their incomplete nature. The following year a more complete bill was drafted by the Conservation Council of Virginia, a powerful lobby group. Although no legislation was introduced at the 1971 Session, the assembly did set up a Wetlands Study Commission (WSC).

At public meetings throughout

Eastern Virginia, the WSC took the temper of the times. Although no one voice spoke out against protection legislation, there was a strong consensus away from a central permit authority. The majority deeply felt that a state-level permit process would develop into a tangle of time-consuming paperwork, administered by a bureaucracy, unfamiliar and unsympathetic with the special needs of each locality. The WSC strongly recommended that any wetlands protection legislation be administered by a local board, composed of court-appointed citizens, led by paid staff educated in environmental sciences and overseen by a central authority, the VMRC. A Wetlands Bill which followed this policy of local initiative passed the Assembly in 1972 and the local Wetlands Boards were formed. This same act charged VIMS with conducting and maintaining an inventory of the tidal marshes.

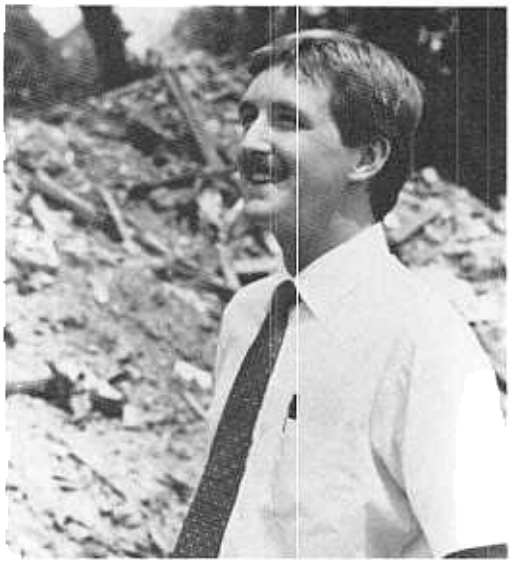
It is a hot midday at the end of July when Peter McClintock drives a Norfolk city car out to the best and the worst possible wetlands scenarios. We drive down a side lane and park behind a car junkyard. We are on a level, desolate plateau of fill dirt, scrap wood and trash. "We're parked on top of marsh wetlands," he says. He points to a high embankment which borders the end of the plateau. "That's the city landfill." We get out of the car and see the remains of the tidal creek which used to flow between the embankment and the junkyard. "This fill was put down here without a permit three years ago," McClintock explains. "Recently, we brought a city back-hoe to dig a trench through the fill and identify the remains of the buried marsh vegetation. That information will be used as evidence when the case goes to court in the fall."

We climb back in the car and drive down back streets and quiet residential neighborhoods. Although McClintock works as an environmental planner, his official title is Waterfront Officer for the City of Norfolk. He and Lee Rosenberg are the two staff assigned to Norfolk's seven-member Wetlands Board. Aided by Walt Priest, a scientist from VIMS, and **The Wetlands Guidelines**, which establishes an ecological hierarchy for valuing the various wetland communities, the board meets once a month. During meetings they review the applications that Rosenberg has researched and the violations that McClintock has uncovered during his patrols by boat and car around Norfolk's waterfront.

(continued)

(above) This canal was widened by the Riverside Development Company to create a compensation marsh four times the original marsh destroyed by construction. A silt fence holds the newly-planted bank.

Fill dirt, scrap wood and trash illegally dumped on a marsh in Norfolk.



Peter McClintock, Waterfront Officer for Norfolk's Environmental Services Office, surveys the damage to a marsh buried under six feet of soil.

We pass older homes, deeply shaded by tall established trees, and park at the end of a cul-de-sac. Across the cul-de-sac we can see freshly graded acres of the new Riverside Development site. McClintock points to a recently widened canal. On one side of the canal are the riprap embankments and docks of the older homes; on the other side is newly graded marshland, protected by a silt fence and planted with a community of *Spartina alterniflora*, or saltmarsh cordgrass. Saltmarsh cordgrass is the dominant plant of the Type I Community. According to **The Wetlands Guidelines**, the Type I Community is one of the most ecologically valued of the plant communities.

The Riverside Development Joint Ventures company was well aware of the legislation protecting wetlands, but a necessary parking lot could only be built on 5,000 square feet of tidal creek. Lee Rosenberg reviewed the site, photographing and characterizing the plant communities to be displaced. Norfolk's Wetlands Board reviewed the case and came to an understanding with the developers. If a Type I Community could be created to compensate for any destroyed wetland, then the Board would approve the application. The Riverside Development responded by creating 19,500 square feet of marshland, nearly four times the original area damaged.

Staring across the 8 acres of created marsh at the Wetlands Bank at Goose Creek, Tom Barnard would be the first to explain the problems and questions regarding the creation of compensation marshes. "How do we know," he asks, "if a 3-year-old marsh is really the same as a 3,000-year-old marsh? How long does it take to reach parity?"

He would be, as well, the first to commend the developer and Norfolk's Wetlands Board for reaching an acceptable solution, one requiring both sides to come to a compromise between development and the protection of the public trust. In the words of Rudy Simpson, a member of the Norfolk's Wetlands Board, "Until the Wetlands Boards were established, we could just push a dune down and build right into the bay."

Our Virginia "Sea Sources" Abound in the Fall

Donna Soul
Extension Specialist
Seafood Utilization

The variety of local fish available in the autumn months is "mouth-watering"! This time of the year we can enjoy summer species that have not moved on to other locations and winter species that are beginning to migrate into the Virginia waters. Some of these species include bluefish, butterfish, croaker, flounder, fluke, monkfish, porgy, gray seatrout and whiting.

Oven frying is an ideal way to get the good taste of a light breading without all the calories. Try this oven fried fish recipe with mustard sauce on your favorite fish.

Oven Fried Fish with Mustard Sauce

1 1/2 pounds fish (fillets, steaks or pan-dressed)
1 egg
1 tablespoon milk
1/4 teaspoon salt
1/2 cup each flour and corn meal
2 teaspoons dried parsley

Preheat oven to 500°; place a large shallow baking pan in the oven to preheat.

Rinse fish and drain on paper towels.

Beat together the egg, milk and salt in a shallow bowl. Combine the dry ingredients and spread them on a shallow pan or waxed paper.

Roll each piece of fish in the flour mixture, then dip in the egg mixture and back into the flour mixture. Allow 2 or 3 tablespoons of margarine to melt in the baking pan, then place the fish in the pan in a single layer. Bake uncovered until fish is done. For a 1-inch thick piece of fish (measured in the thickest portion), allow 10 minutes total cooking time; turn half-way through the cooking time.

Garnish with Mustard Sauce. Makes about 4 servings.

Mustard Sauce

2 tablespoons Dijon mustard
1 tablespoon white wine vinegar
1/8 teaspoon ground nutmeg
dash white pepper
dash sugar
3 tablespoons each, margarine, melted, and vegetable oil

In a food processor or blender, combine mustard, vinegar, pepper, sugar and nutmeg. With motor running, gradually add oil and margarine in a thin stream; process until mixture is blended and slightly thickened. Serve at room temperature with steamed or baked fish. Makes about 1/2 cup.

Or try this simple recipe for broiled fish for a quick but tasty meal.

(VMRC continued from page 13)

through the regional fishery management councils and the National Marine Fisheries Service, manages the fisheries in the "200 mile zone", now called the Exclusive Economic Zone. The Mid-Atlantic Fishery Management Council is responsible for the fisheries off Virginia's Coast. Its jurisdiction ranges from New York through Virginia. The Council has 19 voting members. Virginia has three representatives on the Council: William A. Pruitt, the VMRC Commissioner; James F. McHugh, a sportfishing and environmental advocate; and H. R. Humphreys, President of Standard Products Co., a fish meal and oil processing firm.

The Council manages a number of species including: squid, mackerel, butterfish, surf clams, and ocean quahogs. The Council is currently working on management plans for summer flounder and bluefish.

The Atlantic States Marine Fisheries Commission is also involved in the management of Virginia's fisheries. This Commission, however, has no regulatory authority of its own and must rely upon the states to adopt its recommended course of fisheries management. Virginia again has three representatives to this Commission: William A. Pruitt, Delegate; Wallace S. Stieffen, Chairman of the House Committee on the Chesapeake and its Tributaries; and Daniel Cook, with Standard Products Co.

MRB: *WHAT ARE THE BENEFITS OF THESE REGIONAL MANAGEMENT GROUPS?*

Travelstead: The single greatest benefit of these groups is the ability they provide toward managing a species on a coastwide basis. Most of the important species migrate from Chesapeake Bay and spend part of their life in other state jurisdictions along the Atlantic Coast, out of the control of Virginia fishery managers. The regional councils and interstate commissions provide for a cooperative management approach involving all of the interested states.

Editor's Note

VMRC has just printed their 1987 Annual Report. If you are interested in learning more about VMRC and the 1986 catch statistics for Virginia, you may request a copy by writing to VMRC, P. O. Box 756, Newport News, VA 23067.

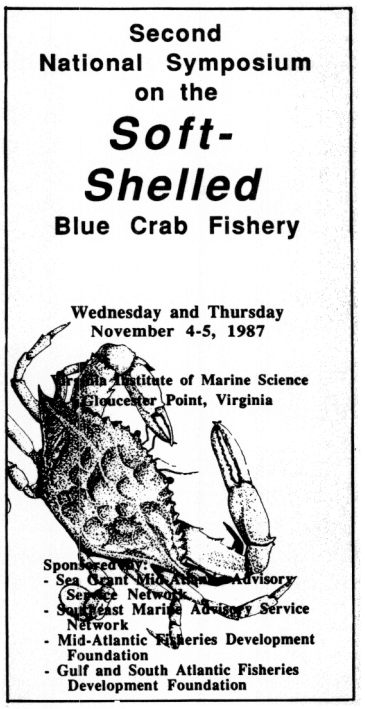
Marine Notes

CRAB SYMPOSIUM REMINDER

The second national crab symposium on the soft-shelled blue crab fishery will take place on Wednesday and Thursday, November 4-5, 1987, at the Virginia Institute of Marine Science.

The Sea Grant Marine Advisory Service of the Mid-Atlantic and Southeast, in cooperation with each region's Fisheries Development Foundations, is sponsoring this second national symposium devoted to furthering understanding of the soft-shelled crab fishery. Topics for the symposium will include a mix of research and industry-oriented activities with potential areas of interest in production system design, biological aspects of molting, quality control, and marketing of the soft-shelled crab.

This symposium is open to the public and is designed for anyone interested in shedding blue crabs. For more information, contact Michael J. Oesterling, Virginia Institute of Marine Science, College of William and Mary, Gloucester Point, VA 23062 (804-642-7165).



Two New Teachers for Bay Team

The Bay Team, the Virginia Institute of Marine Science's traveling teaching program about the Chesapeake Bay, has hired two new teachers for the 1987-88 school year. Now in its third year, the Bay Team has evolved from one teacher providing teaching services throughout the state, to two teachers separating the state into two educational zones. Ms. Lindy Millman, who previously served as the educational director at the Virginia Marine Science Museum, plans to travel throughout the southeastern section of Virginia. Mr. William Douglas, an educator and present owner of an inn that provides Bay recreation, will be teaching in the northern and western parts of the state. According to Lee Lawrence, Sea Grant Education Coordinator and Administrator of the Bay Team Program, both Ms. Millman and Mr. Douglas have "extensive teaching and environmental education experience." Both teachers will spend a month, starting August 17, preparing lessons and organizing hands-on exhibits to be taken on the road. Actual teaching will begin in mid-September.

The Bay Team provides an educational opportunity for students and teachers who are not familiar with the Chesapeake. Serving grades K-12, each Bay Team member teaches four classes per day at the particular school visited. In each class, information such as the habitat and conservation of the Bay is taught, with emphasis on teaching something useful for a cleaner environment. Lessons correspond with Virginia Standards of Learning and are designed for the particular age group that is being taught. With classes of thirty students or less, hands-on activities and/or discussion periods provide educational opportunities for many students who may never experience the Bay themselves. Large group lessons are also available, as well as after-school seminars for teachers who are interested in furthering their knowledge for future teaching about the Bay. There is no cost to the classroom teacher, and participating teachers receive packets of information about the Bay. According to Lee Lawrence, the Bay Team is a "foot in the door" in bringing water resources education into Virginia's curriculum.

The Bay Team has achieved national recognition from the Environmental Protection Agency (EPA) as one of eight outstanding environmental education programs. The Bay Team is administered by the Virginia Institute of Marine Science through a grant from Virginia's Council on the Environment. For more information or to request an in-school visit, write to: The Bay Team, Virginia Institute of Marine Science, Gloucester Point, VA 23062.

New Artificial Reef Site for Virginia Fishermen


Bob Gammisch

Virginia's artificial reef program recently expanded fishing opportunities for recreational fishermen in the lower Chesapeake Bay. Coordinated by the Virginia Marine Resources Commission (VMRC), the reef program used "Wallop-Breaux" Sport Fish Restoration Funds to establish its third bay reef site in July. Consisting of forty concrete igloo structures and designated as the East Ocean View

Reef, the buoyed site is located 2,500 yards west of the entrance to Little Creek off the Ocean View area in Norfolk (site is shown on NOAA Charts No. 12220, 12221, 12256).

The new reef is located on the site of an earlier experimental reef project initiated in the late 1960's by Old Dominion University (ODU) and local recreational fishing interests. Approximately one hundred wrecked car bodies and at least one menhaden vessel were initially placed on the site. Prior to deployment of the igloos, a side-scan sonar survey of the site was conducted by the Virginia Institute of Marine Science (VIMS). ODU researchers dove on the site to take sediment samples and to help verify the sonar survey results. As expected, only portions of the original materials remained in the area. By fall the site is expected to begin attracting sea bass and tautog. Spot, croaker and trout may also be attracted to the reef.

The design of the concrete igloos is the result of a three-year study conducted on test reefs established by ODU under contract to VMRC. These 11,000-pound, dome-shaped structures, approximately twelve feet in diameter at the base and seven feet high, have proven to be stable, staying in place on test reef sites in the Bay off Gwynn's Island and Cape Charles, as well as off Parramore Island on the Eastern Shore. "The redevelopment of this site is especially significant in that the concrete igloos were specifically developed for use as artificial reef structures," according to Mr. Mike Meier, fisheries reef manager for VMRC.

As part of an ongoing Wallop-Breaux funded study of fishing success rates on the state's artificial reefs, VIMS' researchers are seeking to identify fishermen using the East Ocean View Reef.

The VIMS study, beginning in the late fall of 1986, has to date obtained fishing information from over two hundred boat owners who fish the state reefs. Through random telephone interviews, VIMS' scientists are seeking to learn which reef sites are producing the most successful fishing trips. The telephone interviews are brief, no longer than 5 to 7 minutes, and are designed to gain information on fishing trips made to any reef site during the two-week period preceeding the call. Interviewers ask questions such as how long the reef site was fished, how many rods were used, what was caught, the state of the tide and current, water temperature and depth of the water. Also, researchers are interested in learning which part of the reef was fished: Were catches made directly over the reef structure or around the perimeter of the reef?

VIMS needs to broaden its existing list of identified boat owners fishing reef sites both in the Bay as well as those offshore (the Light Tower, Triangle Wreck, and Parramore Reefs). The study requires information from a large cross-section of reef/wreck fishermen to adequately document how the reefs are performing. "The VIMS' study is designed to take advantage of fishermen's knowledge and fishing experience," says the study's coordinator, Mr. Jon Lucy. "By permitting VIMS' researchers to contact them about reef fishing trips, recreational fishermen are contributing to future improvements in the artificial reef program."

If not already contacted by Lucy or graduate assistant, Charles Barr, boat owners periodically fishing the Bay or offshore artificial reef sites are requested to get in touch with the VIMS' researchers. Charts with Loran coordinates of the reef sites, as well as locations of major wrecks and obstructions found out to 30 miles offshore of Virginia Beach, can be obtained by contacting: Artificial Reef Study, Sea Grant Advisory Services, Virginia Institute of Marine Science, Gloucester Point, VA 23062, (804) 642-7166.

For more information about the reef program, contact Mr. Mike Meier, Fisheries Reef Manager for VMRC, P. O. Box 756, Newport News, VA 23607, (804) 247-2263.

Nancy Chartier

VIMS at Hampton Bay Days

The Virginia Institute of Marine Science's Advisory Services took part in Hampton Bay Days on September 11th, 12th, and 13th. Such exhibits as the Chesapeake Bay tank and miniature crab shedding system proved to be big crowd favorites and also made more people aware of the importance of the Bay. Joe Choromanski, Aquarium Curator and organizer of VIMS' participation in the Bay Days, was pleased with interest generated by the VIMS presentations. "We hope that our exhibits fostered a better awareness, understanding, and appreciation of marine life in the Chesapeake Bay."

Hampton Bay Days, sponsored by the City of Hampton and the Citizens Program for the Chesapeake Bay, this year tried to revolve its theme around the Bay and its importance to the people of Hampton Roads.

Choromanski set up a two hundred gallon Chesapeake Bay aquarium with such aquatic life as spadefish, seastars, seahorses, spider crabs, snails, and turtles.

A miniature crab shedding tank set up by Sea Grant Commercial Fisheries Specialist, Mike Oesterling, showed how the blue crab "sheds" into a soft-shelled crab. This process is important to many because the Bay is a major source for soft-shelled crabs.

Richard Bohn, VIMS Aquaculture Specialist, also brought some oyster larvae and oyster spat on shell from the oyster hatchery program set up at VIMS.

Cover photo:
Tagging striped bass during the 1950s at the Virginia Fisheries Laboratory, precursor to VIMS. VIMS archives photo.

Winter issue:
Crab and oyster research at Virginia's Sea Grant Colleges

Sea Grant Communications
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

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