Marine Resource Bulletin
A Sea Grant Advisory Service

Vol. IX, No. 5 VIMS, September/October 1977

CRM SEEKS TO SOLVE SHORELINE PERMITTING HEADACHES

Why can't I find someone who can tell me what I need to do to build a bulkhead?

This shoreline permitting situation has really gotten out of hand! Rather than serving the people, our system has become a burden and headache to us all.

I can't understand how local, state, and federal government agencies can defend the existing permit process. It can cost the government more to process a project application than it will cost the person to complete the project.

These comments are typical of citizen concern voiced at recently held public hearings on Virginia's proposed Coastal Resources Management (CRM) program. Why does the shoreline permit process cause confusion, delays, inconvenience, and often additional cost to these individuals? The answer lies in overlapping local, state, and federal regulations and procedures.

A person who wants to begin a shoreline project immediately finds that there is no single place he can go to find out what permits he needs and how to get them. He must deal with a host of local, state, and federal agency personnel even before submitting his first application.

After the initial contacts, an applicant finds that as many as five permits may be required involving three levels of government and as many as 5 to 12 different agencies. Each level of government requires a site investigation and advisory opinions from associated agencies. Furthermore, each level of government applies its own policies and regulations, and waits until the next lower level has acted before making its decision. This overlapping of jurisdictions and lack of coordination among agencies often results in delays and additional expense to an applicant.

To the private landowner, the existing permit process is too cumbersome for his needs. Approximately 60 percent of all shoreline permit applications in Virginia between July 1972 and January 1976 involved small scale dredging, filling, bulkheading, pier construction, and erosion control projects associated with private shoreline residences. In most cases, the landowner must go through the same process to get his permits as a company would in proposing a large development. The delays which result seem inappropriate and are a source of frustration.

Will Virginia's proposed Coastal Resource Management Program do anything to make the shoreline permit process more effective and less of a burden to Tidewater citizens? Yes, if citizens support the program so that it can be implemented.

The CRM program is suggesting that funds be given to Tidewater localities to hire a local permit coordinator. This individual would be a central source on local, state, and federal permit procedures and requirements. This coordinator would help individuals prepare their permit applications, assist in routing the applications, and act as the applicant's continuing local contact on the status of the permit(s).

The CRM plan also recommends eventual consolidation of local, state, and federal permit applications. The permit coordinator and single application proposals would establish a "one stop" shoreline permitting process for the applicant. Time delays and processing costs would be significantly reduced.

Possibly the most important change proposed by the CRM program is expansion of the role of localities in the permit process. If implemented, localities would be allowed to administer portions of state and federal permit programs for certain small scale shoreline alterations. While appropriate state and federal agencies would continue to review local decisions and would be able to overturn them, permit processing time could be shortened considerably. Local administration should make the permit process more responsive to the needs of shoreline property owners.

Shoreline permitting is just one of many problems raised by citizens concerning the use and management of Tidewater's land and water resources. In an effort to do something about these problems, the Commonwealth has drafted its first

Cont. on Page 2

Cont. from Page 1

comprehensive coastal resources management plan. The recently published document, "Proposals for Coastal Resources Management", describes the state's coastal resources, delineates the issues unique to Virginia's coastal area, and offers solutions for managing these resources.

Public hearings on the document were held throughout the state in October. Comments and recommendations were solicited from government officials, special interest groups, businesses, and concerned citizens. A second series of hearings is scheduled for late November. This will ensure that everyone concerned with coastal land and water resources has had sufficient time to review the document and to make recommendations about the plan.

After public hearings are completed, a final plan will be prepared. The document will then be forwarded to the Governor and to the federal government for their review. It is also anticipated that legislation will be introduced into the 1978 session of the Virginia General Assembly to implement recommendations resulting from the draft.

Anyone wanting further information or copies of the public hearing draft should contact Mr. Don Budlong, Office of the Secretary of Commerce and Resources, 9th Street Office Building, Richmond, VA, 23219, (804) 786-7652.

CONTROLLED PURIFICATION MAY BOOST OYSTER PRODUCTION

Water pollution in portions of the Chesapeake Bay and its tributaries is a condition that pleases no one. For decades some areas have been sites of indiscriminate dumping, dredging, and filling by commercial and private interests alike. Recently enacted laws should reduce the amount of waste entering Bay area waters. But methods must also be devised to better utilize marine resources as they now exist.

VIMS researchers have recently completed a three-year study for the U.S. Food and Drug Administration on controlled purification of oysters in the Bay region. Oysters feed by filtering small organisms from the water, and when active they pump large volumes of water. If the surrounding water is polluted, the shellfish accumulate bacteria or other contaminants in their systems.

In clean water, these molluscs can cleanse themselves of the material which they have taken in. This natural purification process is called depuration. Oyster harvesters have traditionally employed depuration in "relaying", where oysters from a polluted area are moved to an acceptable area long enough for depuration to take place. For example, in Virginia oysters may be harvested at certain seasons after 15 days in approved waters of above 50° F. The relaying is supervised by an inspector from the Virginia Marine Resources Commission. Relaying of oysters is not economical; the cost of harvest is doubled and only 60-70% of the crop can be reharvested.

The VIMS study was undertaken in an attempt to arrive at a more practical and economical solution to using oysters grown in polluted waters. The $187,000 grant allowed researchers to study the engineering and biological aspects of controlled depuration of oysters in the Bay region. Specifically, researchers studied the reliable elimination of coliform bacteria from the oyster within a certain time period.

In controlled purification, oysters are processed through depuration plants. Water meeting shellfish growing standards is taken from a nearby estuary, sterilized by ultraviolet light, flowed through a tank and returned to the estuary. Similarly, oysters are taken from polluted growing areas, washed and culled, and placed in the depuration tank. The VIMS study showed that oysters can be reliably freed from unacceptable levels of coliform bacteria in 48 hours, providing that conditions such as temperature and salinity are within prescribed limits. Research also should be conducted to determine how reliably shellfish depurate other contaminants under controlled conditions.

Controlled depuration is not new. In England there are plants to remove sand and grit from mussels, and six facilities are operating in New England for hard and soft clams. This is the first time the system has been studied using conditions found in the Chesapeake Bay, however.

VIMS scientists have submitted their data to FDA officials, who along with state health specialists will consider whether or not to establish guidelines for the construction of depuration plants.

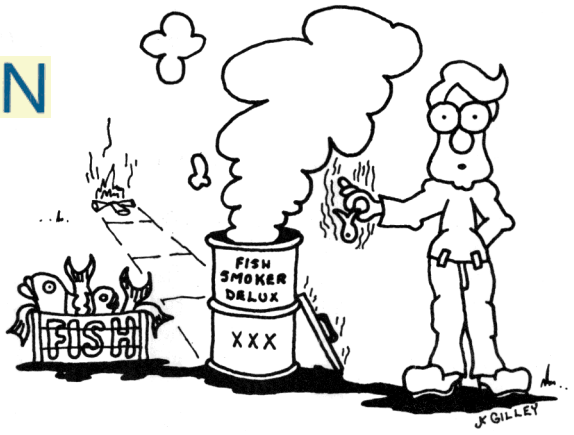
Marine Resource Bulletin
A Sea Grant Advisory Service

ANN GREER ..... EDITOR

Marine Resource Bulletins are produced by the Virginia Institute of Marine Science as a Sea Grant Advisory Services project. Subscriptions are available without charge on written request to the editor.

William J. Hargis, Jr. ..... Director

THE FISH HOUSE KITCHEN



As Americans relearn the virtue of thrift, the ancient art of fish smoking is again becoming a popular backyard pastime.

Bluefish, mackerel, butterfish, and weak fish are just a few of the less expensive species that can be smoked to produce a real treat. And a surplus of freshly caught fish can be preserved by smoking to keep up to a month in the refrigerator and even longer in the freezer.

Fish smokers can be bought or homemade, large or small, plain or fancy. Old refrigerators, though not exactly an adornment to the patio, adapt well for the job. For small lots of fish, a barrel with both ends knocked out, set over a hole in the ground slightly smaller than its diameter (the smokehouse pit), which is connected to another hole (the fire pit) by a 12-foot covered trench, is the simplest version.

The fish are hung on sticks or laid on racks that fit inside the barrel, and a loose fitting lid is put on the barrel during smoking. Heat can come from wood, charcoal briquets, an electric element or gas. Gas needs less attention than a wood fire and is not expensive -- a 100-pound tank lasts for over half a ton of fish. The chips or sawdust that are burned to produce smoke need not be hickory; any hard wood gives satisfactory smoke and an equally good flavor. Stay away from resinous woods like pine or spruce, though. The chips or sawdust should be wet down to burn more slowly and produce more smoke.

Before the cleaned fish goes into the smoker either whole or filleted, it must be soaked in a brine solution for six to ten hours. A gallon of brine will cover about four pounds of fish and a glass or plastic container is recommended. A suggested brine solution is two cups of salt to a gallon of cold water, plus garlic, onion and half to three quarters of a cup brown sugar. You can also add bay leaves, ginger, peppercorns, Worchestershire sauce or other favorite flavorings. Rinse and dry the fish before it goes into the smoker. A thin, shiny film, called a pellicle, should form on the surface as it dries.

Temperature is the crucial element in the smoking process. It must be high enough to inhibit bacterial action but not so high that it dries the outside of the fish and leaves the inside mushy. Try maintaining a temperature of about 135° in the smoker and leaving fillets in it for 12 hours. When they are done they are a dark golden brown, considerably smaller than when they went in to the smoker, having lost close to a quarter of their moisture -- but immeasureably more delicious.

CHESAPEAKE BAY MAP

A detailed, four-color map of Chesapeake Bay from the fall line to the Bay mouth was recently completed by VIMS geological oceanographers and illustrators. It documents the bathymetry of the Bay, that is, the depths of water in the Bay and adjoining rivers.

The map, which is 33 inches by 56 inches, was based on 60,000 soundings in the Bay and 5,000 soundings in rivers flowing into the Bay. These soundings depict the bathymetry at 6-foot intervals for depths less than 42 feet and at 12-foot intervals for depths greater than 42 feet. The map also locates 17 rivers flowing into the Bay and 24 cities and towns.

The map shows channels with depths up to 150 feet. Scientists believe they were formed approximately 16,000 years ago during a period of lower sea level when the Chesapeake Bay was an extended part of the Susquehanna River.

You may order the map, VIMS Special Report in Applied Marine Science and Ocean Engineering No. 105, from the VIMS Library, Gloucester Point, VA, 23062. Folded copies are $5.00 each and rolled copies $6.00 each.

A CLOSER LOOK . . .

at the DEPARTMENT OF MALACOLOGY

Nearly a century of experience and research can be attributed to the five individuals working in the Department of Malacology at VIMS. The Department itself, headed by Dr. J. D. Andrews, has been active at the Institute for 31 years.

Malacology is the study of hard-shelled mollusks, including such bivalves as clams, oysters, mussels, and scallops. According to Dr. Andrews, the major focus of the Department's research has been on the practical application of oyster culture.

Members of the Department have been involved in the investigation of diseases of oysters, predators of oyster beds, scattering or dispersion of oyster larvae, and management of public oyster beds. Other ongoing projects include the development of oyster supplies suitable for transplanting known as seed oysters, and the study of fouling of oyster cultch, the materials placed on oyster grounds to furnish attachment surfaces for the young oysters.

Since 1950 Dr. Andrews has been doing research on three organisms that cause oyster diseases. Results of the investigation of these three organisms, *Minchinia nelsoni* (MSX), *Minchinia costalis* (SSO), and *Dermocystidium marinum* (Dermo), have been the subject of numerous scientific papers authored by Dr. Andrews. Also, diseases in several thousand stained cross-sections of oysters are being diagnosed every year by staff members.

Chemical treatment of diseases of oysters in the tidal waters of Virginia is neither feasible nor appropriate. Therefore, Dr. Andrews explained, resistant strains of oysters must be bred or oysters must be isolated, harvested early, or manipulated in some other way to avoid the diseases.

Isolation of oysters from the disease caused by MSX is virtually impossible. The infective particles of the disease organism (pathogen) are carried tens of miles by tidal waters in one season, infecting oyster beds along the way. Only a small percentage of oysters survive. By taking these few survivors and breeding them in the laboratories at VIMS, resistant strains were obtained in several generations. Brood oysters of these resistant strains are now available for hatcheries when this becomes economically feasible.

The warm-season disease caused by Dermo is also transmitted by water; but unlike MSX, it slowly spreads short distances from oyster to oyster. Because resistant strains have not been developed, effective controls such as isolation of beds and avoidance of infected seed oysters must be taken to prevent the spread of this pathogen. Also, before planting disease-free seed, oyster beds should be cleaned thoroughly of all old oysters.

The Department of Malacology also monitors predators such as oyster drills and fouling organisms that prevent setting of young oysters (spat) on shells or cultch.

The pea crab is a parasite that lives on gills of oysters. A particularly severe infestation of pea crabs occurred in the fall of 1976, often with a dozen or more early-stage crabs found in each oyster. Investigators in the Department became aware of the infestation when oyster growth had virtually stopped. Although only one female crab survives in an oyster, infestations of the early-stage tiny swimming crabs may cause stunted growth, damage to gills and other organs, and deaths may occur when up to 25 tiny crabs infest the gill chambers of oysters. Experimental oysters are being treated with Sevin, an insecticide, to remove the crabs. Such treatment, however, is not possible of planted beds.

Although tradition has dictated that oysters should be eaten during months containing the letter "r", Dr. Andrews states that this is not true. Oysters can be eaten during all months. Warm weather spoilage of oysters due to lack of refrigeration facilities or improper refrigeration was one cause of the rapid spread of this myth. This type of spoilage, however, has been virtually eliminated by advanced refrigeration capabilities and careful refrigeration techniques. Another explanation of the oyster-eating tradition involves the spawning of the mollusk. Oysters spawn during the summer months and expend all of their stored energy or glycogen producing eggs. Therefore, the oyster itself lacks glycogen which gives the excellent taste to this marine resource.

VIMS HOSTS INTERNATIONAL SYMPOSIUM

Specialists on oyster disease from England, France, Australia, and the United States met at VIMS recently to share and discuss their research on MSX *(Minchinia nelsoni)* and MSX-like organisms. MSX-infested oysters have been a costly problem for Chesapeake Bay watermen.

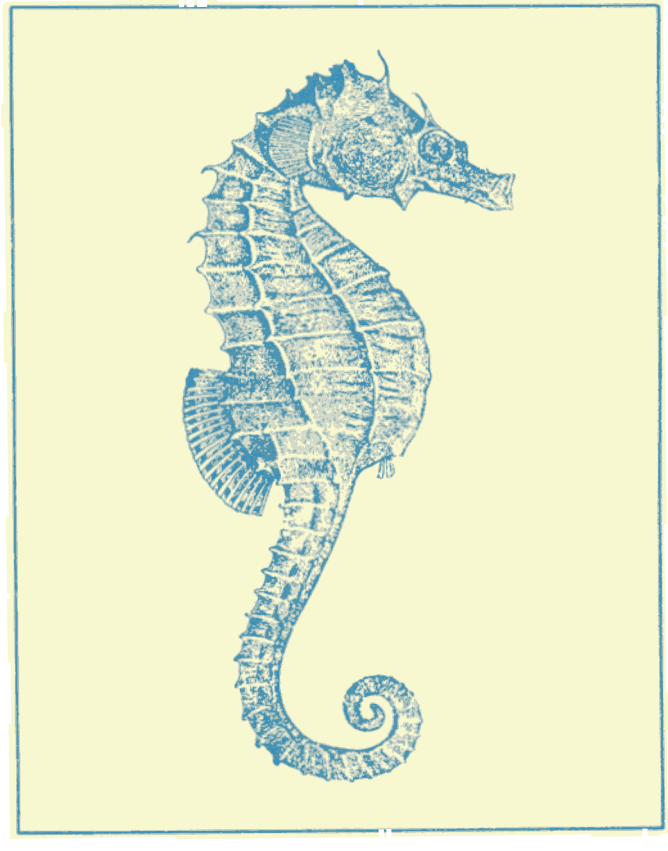
The 13 invited participants came from universities and government agencies which funded their trip to VIMS. United States representatives included specialists from the Chesapeake Biological Laboratory, Rutgers University, the National Marine Fisheries Service, and Batelle Laboratories, along with VIMS scientists. The two-day symposium was organzied by Dr. Frank Perkins, head of the Institute's Division of Biological Oceanography.

Cont. on Page 5

Tidings
A VIMS Educational Service

The seahorse -- a strange combination of horse's head, monkey's tail, kangaroo's pouch, and fish's gills. This fish has no scales or stomach, and the pregnant ones are males. One species of this special marine animal, the common American seahorse *(Hippocampus hudsonius)*, is found in the Chesapeake Bay.

This seahorse, which is found from Massachusetts to South Carolina, is a poor swimmer but is seldom caught because they are small (adults are two to six inches long) and blend well with seaweed. Each summer, however, several are taken on the beach adjoining the Institute using a beach seine or minnow net.



Unlike most fish, seahorses hold themselves perpendicular to the bottom. In this position they propel themselves slowly through the water by rapidly flapping their pectoral or side fins, used by most fishes for steering only. When they become tired, they wrap their tails around an object and rest upright, swaying gently in the water.

Fins are the seahorse's exclusive means of locomotion. They move in a manner that resembles the sculling of a boat. The eye cannot follow the speed of the wave motions that go through the back fins of seahorses, but they have been measured by a high-speed camera at about ten per second. Yet for all this expenditure of energy it takes a seahorse about five minutes to cross a bathtub.

Because seahorses move slowly, they have special adaptations for protection. They change color to become almost invisible against backgrounds ranging through many shades of green and brown. A coat of bony plates protects their bodies like a suit of armor. And because these fish can see in two directions at once, it is hard for predators to sneak up on a seahorse. Other fishes possess this characteristic, but seahorses have an unusually wide range of vision.

Seahorses usually feed on very small swimming organisms, frequently tiny crustaceans, by sucking them into their tube-like mouths. They make loud snapping or popping noises when they eat which can sometimes be heard outside an aquarium. Young develop in a pouch located under the male's abdomen. One or more females fill this pouch with eggs. After four or five weeks, the eggs hatch and miniature versions of the adult emerge from the pouch.

Seahorses require special treatment as pets. A salt water aquarium is needed for this marine fish. They are particular about the food they eat, and will starve without proper live food. Because their mouths are small, tiny organisms such as brine shrimp are preferred. Eggs and instructions for culture of brine shrimp are available at most pet stores. Hungry seahorses will attack larger animals such as grass shrimp, sucking their meat through the shell. Further information is available from the VIMS/Sea Grant Marine Education Center at (804) 642-2111, ext. 111.

Cont. from Page 4

Formal and informal discussions focused on biological characteristics of the diseases and the host-disease relationships. Papers were presented in two sessions, the first on classification and structure of disease organisms and the second on ecology and life cycles. A third session summarized future research needs, life cycle considerations, possible reservoirs of infective elements, disease control, and international and interstate shipment of oysters.

The same group of diseases occurs worldwide, so scientists from coastal countries can work together on measures to control or avoid diseases. Possibilities for disease control discussed during the symposium included the positioning of oysters at a certain depth in the water column with varying periods of exposure out of water, and using chemicals on diseased oysters in a restricted environment.

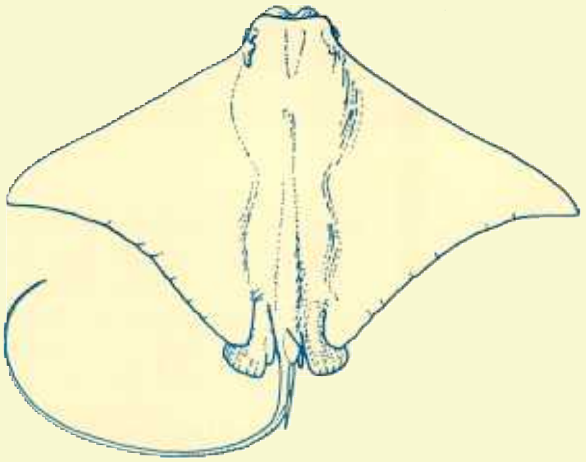
A report of the symposium will be published in the *Marine Fisheries Review* in 1978.

RAY ADVISORY

For several months each year, a variety of rays called the Chesapeake Bay area home. But many fishermen and beach goers know little about this relative of the shark.

VIMS Sea Grant has recently published a Marine Resource Advisory on rays. It contains general biology and anatomy of the animals, first aid for stingray wounds, and a recipe for ray meat. The Advisory also contains a bit of American history with the story of how Virginia's Stingray Point got its name.

A single copy of this Advisory, Number 14 in the series, may be ordered from the Sea Grant Publications Office, VIMS, Gloucester Point, VA, 23062. Multiple copies are 25 cents each.



The cownose ray (Rhinoptera bonasus) *is one of the most abundant rays to enter the Bay. The species commonly occurs from May through October and is often seen in shallow water. Clams and oysters are its preferred food. An average adult measures 36 inches across and weighs 30 pounds.*

Marine Resource Bulletin
A Sea Grant Advisory Service

VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia 23062

ADDRESS CORRECTION REQUESTED

BULK RATE
U S POSTAGE
PAID
Gloucester Point, Va.
PERMIT NO. 6