MARINE RESOURCE INFORMATION BULLETIN
A SEA GRANT ADVISORY SERVICE
Virginia Institute of Marine Science, Gloucester Point, Virginia 23062

Education Program Answers Your Questions

"What is red tide?"

"Why are marshes so valuable?"

"What animals should I put in my marine aquarium?"

These are the sort of questions answered daily as a part of the VIMS education program, an effort to help Virginians better understand the value and problems of their marine environment.

Traditionally associated with the education program at VIMS are presentations to school and civic groups, advice and assistance to teachers, field trips to beaches and marshes, responses to mail and telephone questions, and use of the media to provide marine science information to the public. The goal of the education program is a well-informed public equipped with the necessary understanding to decide the issues surrounding present and future uses of the Commonwealth's valuable marine resources.

Although Jim Lanier heads this program which deals mostly with school groups, other VIMS units have overlapping and related tasks. Advisory Services has specialists who can be called on for services relating to coastal zone management, the seafood industry, marine recreation and economics. The wetlands section is also heavily involved in public education, while the Marine Environment and Resources Research and Management System (MERRMS) and the VIMS library provide sources of technical and semi-technical information.

Jim Lanier displays a lined seahorse, one of the many unusual species collected from VIMS beach.

Educational Activities

Although the energy crisis cut the number of visitors to VIMS in 1974 to one-half the 1973 level, presentations around the Commonwealth by VIMS staff members increased. A slide program on VIMS activities was most often requested, but information was also presented on Virginia's aquatic animals, saltwater aquaria, development of the outer continental shelf, tropical storm Agnes, ecological problems of the coastal zone, wetlands, and other marine topics.

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VIMS vessels are available for charter when they are not being used for research. Ten school groups were able to take advantage of this service in 1974. Trawling for fishes and invertebrates appeared to be the most interesting collecting method because of the great variety of animals which can be taken. Oyster toadfish, spot, croaker, spotted hake, blue crabs, mud crabs, sponges, shrimp, pipefish, and many other species are caught routinely. Collecting on the VIMS York River beach usually results in catches which are smaller but no less interesting.

Assistance to Teachers

Many VIMS services are available to aid Virginia teachers who wish to include marine science in their courses. Two-day marine life sessions are taught by Lanier as part of a summer course offered for credit to teachers by the Virginia Resource-Use Education Council. They are presented each summer at Virginia Polytechnic Institute & State University, Blacksburg and Reston; Virginia State College, Petersburg; and the College of William and Mary, Williamsburg.

Educational publications, marine science curricula and advice on additional sources of materials are available during these sessions and they may be acquired from the VIMS Department of Information and Education. Workshop sessions on such topics as saltwater aquaria have been presented at the State Science Teachers Conference and other such meetings throughout the Commonwealth.

Teaching aids available from VIMS include films, film loops, slides, filmstrips and color posters of marine life and phenomena. These materials are available for presentation at VIMS or elsewhere, or can be mailed on free loan. Subject matter from biological, chemical, physical and geological oceanography is included. During 1974, almost 300 loans of educational aids were made.

Use of the Media

The VIMS staff also cooperates in the production of films and television shows on marine science. Part of the BBC production Billion Dollar Marsh was filmed in Virginia. Several VIMS scientists and graduate students helped in the work and appear in some film scenes. Television programs featuring VIMS have recently been produced for both commercial and educational channels in Norfolk, Richmond and Roanoke.

Although VIMS is best known for its scientific and technical publications, the list of pamphlets which are of use to the general public is long and growing rapidly. Favorites such as Careers in Marine Science, Adventures of Little Oyster and Let's Be Oyster Farmers are being joined by such works as the third interim report on the Coastal Wetlands of Virginia which has an extensive illustrated identification guide to the marsh plants.

Seawater Aquaria has been extensively revised and expanded, and is nearly ready to go to the printer. A colorful chart of the Bathymetry of the Virginian Sea, available from the VIMS library, can be used to enhance discussions of the outer continental shelf of Virginia.

The emphasis in the VIMS education program is on service to citizens of the Commonwealth. Every attempt is made to fill requests for information, for presentations, or for advice. Since facilities for visitors are limited and often inadequate for the heavy demand during the warmer months, educators and civic leaders are encouraged to organize workshops and programs at their own institutions using VIMS' assistance. There is a great deal available at VIMS and inquiries are invited.

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DAVID GARTEN ..... EDITOR
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Environmental Study

No Evidence Outboard Motors Harm Water

Environmental Protection Agency (EPA) scientists have completed a comprehensive 2½ year, $750,000 environmental study and found no evidence that outboard motors harm water or its life system, according to Matt J. Kaufman, the project director.

The project was funded jointly by EPA and the Boating Industry Association. In addition, EPA scientists established all testing and sampling guidelines and closely monitored all phases of the program.

According to Kaufman, scientists found no evidence of short-term or long-term effects on the quality of the water or its biological communities. "Growth and reproduction of representative plant and animal species remained virtually constant in the test lakes -- with or without outboard motors," he said.

Kaufman added that "the conclusions are preliminary, subject to review by EPA and additional statistical analysis, but the scientists tell me there is no reason to believe that the basic findings will change."

He said the laboratory phase of the study, conducted by the civil and mechanical engineering departments of the University of Michigan at Ann Arbor, was aimed at identifying and quantifying the major components of submerged outboard engine exhaust and its effect on the plants and animals in natural waters.

The field studies involved prolonged operation of outboard motors on small, natural lakes near Saline, Michigan and Archer, Florida.

"None of the lakes had ever been subjected to boating activity, nor did they receive pollutional inputs other than from stressing from outboard engines," Kaufman explained. "The cold-water Michigan lakes were divided into two stress sections and two control sections. The stressing ceased there during the winter months to simulate the 'rest' period northern lakes get when they are frozen. Two of the three Florida lakes were stressed 12 months a year, since boating is normally a year-round activity in warm climates."

Leaded and non-leaded fuel were used on the Michigan lakes, and all engines were of the newer, drainless type. Biological and chemical sampling and analysis were done on a "paired" basis between stressed and control sections.

Kaufman noted that one of the Florida lakes was stressed with drainless engines, and the other with older motors which drained unburned fuel into the water. The third lake served as a control.

The test lakes were stressed at three times the rate that scientists agreed would constitute "saturation boating" -- a situation where one boat would have to leave the water before another could enter, Kaufman said.

Among other things, researchers found that only a miniscule amount of nonvolatile hydrocarbon is not removed from the water by evaporation, and the aromatic hydrocarbons remaining in the water were so low that they were barely detectable. "Quick evaporation and biodegradation probably explain the small variations found between stressed and control lakes," Kaufman observed.

"The scientists wouldn't even speculate how many boats would have to be operating on a body of water to cause ecological damage, but one thing is certain -- the figure would have to be many times the number that would physically fit there," Kaufman said.

EPA will publish the full report after completing its final review and analysis.

A VIMS educational service

marine mailbag

Q. I am a fourteen year old boy and a member of a Boy Scout Troop. I am working on my merit badges in order to earn the rank of Eagle Scout. At the present time I need some information so that I can complete my badge for oceanography.

If you could give me the following information, it would be very helpful:

1. Five branches of oceanography
2. Effect of currents on weather and climate
3. How air and ocean currents are are alike; different
4. Definition: storm, surge, tsunami
5. What is seamount, guyot, deep, rift valley, canyon, trench.
6. What is Dittmar's Principle?

M.B.
Susan, Virginia 23163

A. 1. The five "branches" are biological, geological, chemical, physical, and meteorlogical oceanography. These marine sciences are not really distinct from the other sciences but are actually specialties. If, for example, a biologist happens to study organisms which live in the sea, then he can be called a marine biologist or biological oceanographer.

2. Major currents like the Gulf Stream, which have a flow greater than any of the world's rivers, have some amazing effects on climate. The Scilly Isles, off the southwest tip of England, are famous for their daffodils, which bloom in January. And yet these islands are further north than the frigid Grand Banks of Newfoundland. The Gulf Stream brings warm waters from the south to bathe the coast of England, moderating the climate.

Not so beneficial is the current which is called El Nino, the Child, because it usually occurs around Christmas time. A warm current from the northwest Pacific coast of South America, El Nino in some years breaks through the normal cold current patterns. This disrupts the upwelling which brings nutrients so essential to the fisheries of the area. But the economic disaster is not confined to marine industries since the invading current also brings so much precipitation to the normally arid areas of the coast that crops are ruined and roads and bridges are washed away.

Not all ocean currents have such dramatic effects but their influence is nonetheless widespread and important.

3. Air and ocean currents are alike in that a major cause of both is uneven heating by the sun. They are different because the water is moved by the wind, and yet the water cannot follow everywhere since it is blocked in many places by the continents. Only around Antarctica are the currents free to follow the wind completely around the earth.

4. While storm surges are rises in sea level which are associated with cyclonic storms such as hurricanes, tsunamis are caused by seismic occurrences in or on the sea floor, such as earthquakes, landslides or avalanches. Tsunamis are often called tidal waves, but this is a poor name since they are not caused by tidal action. Tsunami means "large waves in harbors" which is still not a perfect description.

In any event, tsunamis are very long waves which move almost as rapidly as a jet plane while in the open ocean. Tsunamis at sea may be only a foot or two high, so that they may not be noticeable. A tsunami like the one in "Poseidon Adventure" is probably best described as an imaginative fabrication. Wind

driven waves at sea can be huge, however, and capable of destroying the largest ship.

As tsunamis approach shore, they slow down and increase in height. They may be 100 feet high by the time they crash on the shore. Both tsunamis and storm surges have caused major disasters ashore.

5. A seamount is an elevation rising 500 fathoms or more from the sea floor with steep slopes and a small summit area (an undersea mountain).

A guyot, or table mount, is a seamount with a flat top.

A deep is the deepest point of a depression and must be deeper than 3,000 fathoms.

Rift valleys are found under the sea in the upper portions of some oceanic ridges, such as the Mid-Atlantic Ridge.

Undersea canyons are huge clefts in the continental slopes, some of which are larger than the Grand Canyon of the Colorado River. Geologists thought for years that these canyons had been carved by the rivers which are often found near their heads. It now seems clear that sea level has never been low enough to have allowed cutting to the enormous depths of these canyons (12,000 feet or more). Swift undersea flows of mud, called turbidity currents, are now thought to have been an important cause.

Trenches are long, steep-sided and narrow depressions in the sea floor, while troughs are broader.

6. In 1884 a chemist, Wilhelm Dittmar, analyzed 77 samples of seawater which had been collected at various depths and locations around the world during the voyage of H.M.S. Challenger (1872-1876). He measured amounts of chloride, bromide, sulfate, sodium, calcium, magnesium, and potassium. Although the absolute amounts of these chemicals varied from one place to another, the relative abundance was nearly constant. The word "nearly" was ignored by chemical oceanographers for years, however, and Dittmar's findings came to be known as the "Law of relative proportions." This "law" states that "Regardless of the absolute concentration of total solids, the ratios between the most abundant substances are virtually constant."

Modern chemists are again emphasizing Dittmar's assertion that this is only "nearly" or "approximately" so.

NAEBM Says Recourse Possible

Washington counsel for the National Association of Engine & Boat Manufacturers (NAEBM) have again reminded members that marina operators and manufacturers who had big increases in workmen's compensation rates because of their carriers' interpretation of the Longshoreman's and Harbor Workers' Compensation Act have an opportunity to seek relief.

Individual manufacturers of pleasure craft and marina operators who feel that their carriers have exceeded the intent of the law in applying the standards of the Act to their companies may write to the Department of Labor for an interpretation. For help in preparing your letter, contact Gordon Arbuckle of Patton, Boggs and Blow, 1200 17th Street NW, Washington, DC 20036, requesting a copy of counsel's brief on this subject.

Letters presenting a case for exemption should be addressed to Cornelius Donoghue, Deputy Associate Solicitor (Div. of Employee Benefits) Department of Labor, Room 2441, 14th St. and Constitution Ave. NW, Washington, DC 20210.

Guidelines 'Clear and Simple'

Further clarification of the Federal oil pollution prevention regulation as applied to pleasure boat owners has been issued by the Coast Guard, Office of Boating Safety.

The Federal Water Pollution Control Act, as amended in October 1972, prohibits the discharge of oil in harmful quantities into or upon the waters of the United States. A harmful quantity of oil is defined in Federal Regulations as any quantity which causes a sheen or discoloration on the surface of the water.

The regulations require owners of U.S. vessels 26 feet and longer to post a placard at least 5 by 8 inches, made of durable material, in the vicinity of the bilge control station.

Anyone found to be in violation of that portion of the FWPCA which prohibits the discharge of oil is subject to a civil penalty as high as $5,000.

According to Boating Safety Circular 2-74, the Commandant's guidelines for enforcement of this requirement are "clear and simple." First, the placard is not required for any outboard boat, nor for inboard boats less than 26 feet long. It is required on boats 26 feet long and up that have enclosed machinery spaces (engine boxes, compartments or rooms) where greasy and oily wastes can collect and drain into the bilges.

The recreational boatman is usually very concerned with the appearance of his boats. Therefore, posting the placard at the control station is not mandatory for him, but it must be posted where he will see the warning before he starts to empty the bilges. Inside the engine cover may be a suitable location. Under the lid of the deck locker that gives access to the bilge pump may be another good location.

Agents of the Traveler's and Aetna Insurance Companies reportedly have a small supply of free placards. Further, several mail order marine hardware stores sell them. Check the ads in boating magazines.

Supply of Maps Limited

A limited supply of Bathymetry of the Virginian Sea, a detailed multicolored map of the depths of the sea floor of the Chesapeake Bight extending from Cape Henlopen to Cape Hatteras is still available from VIMS.

The sea floor bathymetry is based on approximately 100,000 depths from 66 original hydrographic sounding sheets and other data, contoured at 12-foot intervals out to 496 feet and 100-foot intervals out to 1,000 feet. Covering an area of over 20,000 square miles, the map resulted from the most detailed compilation of depth information yet attempted for the Virginia continental shelf.

Copies of the map are available for $4 from the Virginia Institute of Marine Science Library, Gloucester Point, VA 23062.

Safety Afloat

If your boat should capsize or swamp, take this word of advice from the U.S. Coast Guard: Don't attempt to swim ashore; it is probably much farther than it looks; stay with the boat. Most pleasure craft will stay afloat even when capsized or filled with water. Just hang on and wait for help to arrive.

Little Change Expected In Oyster Meat Quality

In the James River the oyster meat quality index ranged from average to below average with a low of 4.3 at Horse Head and a high of 6.7 on the shallow part of Wreck Shoals. On the average these values were only slightly lower than those recorded for October. Indices in 1974 were about the same in the lower river as they were in 1973. However, they are much lower at upriver stations than they were during the same period in 1973.

Indices were not taken in the York River in December, but values for the month are expected to be average or above average as they were in November. In all instances the 1974 indices were higher than they were a year ago.

In the Rappahannock River indices were above average at all stations and ranged from 8.3 to 10.9. In most instances values in December were lower than they were a year ago.

Oysters do not feed during the winter. Therefore, condition indices in all these river systems is expected to remain stable or decline slightly from the December values as the winter progresses.

KEY TO INDEX NUMBER

4.0 TO 5.9 ..... BELOW AVERAGE
6.0 TO 7.5 ..... AVERAGE
7.6 AND UP ..... ABOVE AVERAGE

	October		November		December	
JAMES RIVER	1973	1974	1973	1974	1973	1974
White Shoals	6.3	6.3	5.0	-	6.1	6.0
Wreck Shoals						
deep	7.0	5.0	6.0	-	6.0	5.9
shallow	5.3	6.8	5.7	-	5.2	6.7
Point of Shoals	7.7	6.9	7.5	-	7.6	6.6
Horse Head	6.3	4.7	7.5	-	7.3	4.3
YORK RIVER						
Green Rock	6.8	7.1	6.0	7.4	-	-
Pages Rock	5.8	7.0	6.9	8.0	-	-
Aberdeen Rock	6.7	7.2	6.5	8.0	-	-
Bells Rock	6.3	7.6	7.1	-	-	-
RAPPAHANNOCK RIVER						
Urbanna	9.2	9.1	10.3	-	10.9	10.8
Smokey Point						
shallow	9.9	8.7	10.2	-	10.8	9.7
deep	8.8	7.5	10.4	-	10.4	8.3
Morattico	9.4	9.9	10.1	-	9.8	9.8
Bowlers Rock	9.3	9.3	10.9	-	12.7	10.9

Youth Corps Applications Being Accepted

Applications are now being accepted for the 1975 Virginia Youth Conservation Corps program, a work-study environmental science program sponsored by federal and state agencies for boys and girls, ages 15 to 18. The program will run from June 22 through August 16, 1975, at camps located in the national forests and in national and state parks.

Participants will study ecology and conservation under the direction of competent instructional and resource personnel. They will investigate the conditions that will help to determine the wise use of natural resources and will engage in work projects designed to provide a valuable service to the sponsoring agency and important training for themselves. Work projects will include trail building, erosion control, brush cutting, stream improvement, recreational and camping area development and planting of wildlife feeding areas.

The program will be balanced with both recreational and cultural activities. Guest speakers, field trips and films will be scheduled into the program.

The students will receive full subsistance (meals and lodging), $300 for the work program, and a recommendation to receive one unit of credit in Environmental Science.

Application forms may be obtained from secondary school principals or the state recruiter. In Virginia the state recruiter is Franklin D. Kizer, Supervisor of Science, State Department of Education, Richmond VA 23216 (804/770-2672).

Completed applications should be returned to Kizer no later than January 15, 1975.

Blue Crab Advisory Available

A summary of the problems common to the soft crab industry and suggested guidelines for the installation of seawater systems for holding and shedding blue crabs are available in a new VIMS publication, "Methods of Handling and Shedding Blue Crabs, Callinectes sapidus", by Paul A. Haefner, Jr., and David Garten.

Published as Marine Resources Advisory Series No. 8, the report is available upon request to the Sea Grant Publications Office, Virginia Institute of Marine Science, Gloucester Point, VA 23062.

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Gloucester Point, Virginia 23062

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