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THE MANAGEMENT OF VIRGINIA'S SEAFOOD RESOURCES¹

By J. L. McHUGH

*Lawmakers, enforcement officers, and scientists
co-operate to maintain an important industry*

(Commission photos by Kesteloo)

ACCORDING TO figures collected and published by the U. S. Fish and Wildlife Service, the annual seafood landings in Virginia since 1880 have averaged about 254,000,000 pounds. In recent years this catch has brought an annual income to the fishermen of close to \$20,000,000. Among the 48 states, Virginia is the third largest producer in weight of seafoods, and the fifth largest in terms of the landed value of the catch.

What Factors Affect the Supply of Seafoods?

Fishery resources can be exploited indefinitely under certain conditions without endangering the future supply. This supply is maintained by the spawning of adults, and by the survival and growth of their progeny. Many factors operate to alter the numbers of individuals and their rate of growth: eggs, young, and adults are destroyed by many other marine animals; parasites and diseases take their toll; competition for food causes many to weaken and perish; extremes of temperature and other physical and chemical conditions in the water influence survival and growth in many ways. But in spite of these destructive forces, the vast reproductive potential of most aquatic animals guards them against extinction. A single oyster or blue crab produces many millions of eggs, a shad or a croaker several hundred thousand. If all the requirements necessary for life were available, most of these should have a good chance to survive. However, most of the young that these eggs produce are doomed. If all survived, the problem would be the elimination of excess. This principle has been demonstrated clearly in certain lakes, where excessive numbers of fish lead to poor fishing.

Man's activities add to the perils that beset aquatic life: the dams that block many of our rivers prevent fish from reaching their former spawning grounds; industrial and domestic pollution deny other stretches of water to adults and produce conditions that are detrimental to developing eggs and young; careless forestry practices and bad land management affect runoff in the streams, block migration routes, and carry additional silt into the waters; thoughtless fishing methods may reduce the supply of spawners or the stocks of young to dangerously low levels.

The intervention of man in this system is usually looked upon as an additional source of mortality that tends to disturb the delicate balance achieved by nature. It is not certain, however, that man should consider himself as different from the other enemies that prey on marine life. By fishing, he may be utilizing food that otherwise

would be lost from some other cause. The great herring fisheries of the North Sea have been exploited heavily for several hundred years, yet have suffered no apparent harm. It has been shown for several important fisheries that when the numbers of individuals are reduced, the rates of growth and survival of the remainder increase.

Nevertheless, it must be recognized that the number of human predators is increasing rapidly, and that their efficiency in capturing marine organisms is increasing at an even greater rate. It also may be true that man can eliminate completely certain of the more vulnerable



The modern Virginia Fisheries Laboratory at Gloucester Point on the York River is designed to carry on research investigations relating to our important seafood resources



Laboratory director, Dr. J. L. McHugh (left) and educational assistant, Robert S. Bailey, discuss fish study project and means of getting management information over to the public

¹ Contributions from the Virginia Fisheries Laboratory, No. 38.



The *Virginia Lee*, a Laboratory research vessel, is used extensively in fisheries investigations



The Laboratory is gathering information toward an understanding of the fluctuations that characterize the commercial fisheries. The study of the important blue crab is only one of many activities



The dramatic decline of the croaker in the Chesapeake Bay area has spurred research on this important food fish

species. In general, this vulnerability increases as the animals are more intimately associated with shore. The shad, which congregates at spawning time in the restricted waters of coastal streams, might be destroyed completely by the simple expedient of blocking the rivers below the spawning areas. Similarly, the supply of spawning oysters might be removed entirely by intensive fishing. Perhaps complete annihilation would never occur as a result of fishing, because before the fishery reached this point it would become unprofitable to fish, and the fishermen would turn to other species or other occupations. But if a few operators continued to fish, this might constitute an effective barrier to recovery. The sturgeon seems to have suffered such a fate.

How is Virginia Attempting to Ensure the Future Prosperity of the Seafood Industry?

We should be concerned, therefore, over the future of our fisheries, and should be prepared to protect them against depletion. Fishery legislation has been enacted in Virginia since the seventeenth century, and for almost a hundred years the enforcement of these laws has been the responsibility of the Commission of Fisheries. The Commission consists of a chairman and four additional members, appointed by the Governor. Its permanent office, located in Newport News, is headquarters for the administrative and engineering staff, and inspectors. The Commission issues fishing licenses, surveys and records locations of oyster grounds, enforces fishing regulations, collects information on the condition of the industry, and plants shell in appropriate areas on the public oyster grounds. It maintains a fleet of fast, modern patrol vessels with permanent captains and crews, and a staff of inspectors and deputy inspectors.

An important responsibility of the Commissioner is the conduct of investigations relating to the migrations, habits, and propagation of fish and shellfish in the tidal waters of the state. To assist him in this function, the Legislature authorized in 1940 the establishment of the Virginia Fisheries Laboratory. Located at Gloucester Point, on the York River, the Laboratory is operated jointly by the Commission of Fisheries and the College of William and Mary, represented by a Board of Administration consisting of two representatives from each agency. Contact with the industry has been maintained through a nine-man Advisory Group.

In the past, many laws enacted for the protection of the fisheries have been based on opinions rather than facts. Unfortunately, this is still true to some extent. The incentive for many laws has been the fear that unrestricted fishing would lead to depletion, or the opinion that apparent scarcities had come about mainly through fishing operations.

The Virginia Fisheries Laboratory is gathering information gradually toward an understanding of the fluctuations that characterize the commercial fisheries. Although the total annual landings have remained relatively constant over a long period of time, the catches of many species within the Chesapeake Bay, notably croaker and shad, have exhibited dramatic declines, and the relatively

young and growing trawl fishery in the ocean outside the capes has served to maintain the level of production. Similarly, in recent years, the take of market oysters from the public grounds has decreased, and the supply has been maintained by increased private production.

What are Some of the Problems that Face the Industry?

Measures to halt the dwindling supply of shad have consisted of certain restrictions on fishing, and the artificial propagation of young in hatcheries. Recently the shad catches have been improving, and this spring the largest run in many years ascended the York River. This improvement has been credited by many to the hatchery program, but the available information lends little support to this belief. Credit might be given equally well to a happy combination of natural factors, at present unknown, that have favored the survival of fish from recent spawnings.

The spectacular disappearance of the croaker has brought great hardship to many fishermen. Among the reasons that have been advanced to explain this disappearance perhaps the most serious criticism has been levelled at the North Carolina shrimp industry, which kills large numbers of young croakers in its trawls. A research program was inaugurated at the Laboratory in 1950 to study the status of the croaker stocks, and while it is yet too early to assess the results of this work, there is some reason to believe that the decline may have been caused by natural forces.

Of all the problems that plague the oyster industry in Virginia the management of the public rocks is perhaps the most difficult. Large numbers of oysters are removed from these grounds each year, and little or nothing has been returned in the form of cultch on which the newly-hatched young must strike. In 1928 the Commission of Fisheries commenced planting shell on the public grounds. In 1952 the General Assembly passed a law requiring the shuckers to hold 20 per cent of their shell for the Commission, and provided the Commission with additional funds for purchase and planting.

A further danger threatens the James River seed beds, the only public grounds from which it is permitted to take oysters less than three inches in length, in that the intense fishing may deplete the brood stock. In this event, the only possible source of oyster larvae for the maintenance of seed production will be the adults on private grounds. It is perhaps fortunate that ground is available for private leasing in the vicinity of the public rocks. The situation is even more acute in the Rappa-



Oyster studies are moving ahead rapidly. The 1952 General Assembly passed a law requiring shuckers to hold 20 per cent of their shell for the Commission, and provided the Commission with additional funds for purchase and planting

hannock River, where the production of market oysters on public grounds has declined, and the annual strike of spat is less dependable than in the James. The public grounds might be in much poorer condition if they were entirely self-sustaining.

The history of the blue crab fishery illustrates the magnitude of the fluctuations to which a marine population in the Chesapeake Bay may be subject. The available figures show that from 1880 to 1890 inclusive, less than 10,000,000 pounds were landed annually, but the catch increased rather regularly until 1915, when a total catch of over 50,000,000 pounds was recorded. Thereafter, the annual landings have fluctuated rather widely, reaching low points in 1920, 1934,

and 1941, and high points in 1930, 1939, 1948, and the season just past. While it is almost useless to draw conclusions concerning abundance from records of the total catch, the reports of the Commission of Fisheries contain references to periods of scarcity and abundance, and indicate that in the periods when catches were small alarm was expressed over the future of the fishery. In recent years egg-bearing females have been protected within an extensive sanctuary near the mouth of the Chesapeake Bay. In the opinion of many, this sanctuary has been the chief factor in the gradual recovery of the fishery in the last decade. There is other evidence, however, that the success of reproduction may be dependent on the salinity of the water in the lower part of the Bay. If this is true, the sanctuary can hardly have much effect in maintaining production. In other words, there is no proof as yet that the abundance of crabs has been sustained by management.

It is encouraging that certain of our fisheries return periodically to former high levels of production. The ideal that is sought by all those connected with the industry: a maximum yield that can be attained without exception year after year, is hardly to be expected. Even in agriculture, where a greater degree of control is possible, this goal has not been reached. Fortunately, economic factors tend to stabilize the fishermen's income over poor years and good. This has been demonstrated very recently in both the crab and the shad fisheries; the continued high production of crabs in the winter dredge fishery of 1951-52, and the phenomenal runs of shad in the James and York Rivers in the spring of 1952 brought prices down to a very low level. In times of low availability, on the other hand, the continued demand supports the price; consequently, the value of the catch is apt to fluctuate less widely than the catch itself.

(Continued on page 23)

FUN ON A BIRD WALK

(Continued from page 20)

The red spruce, with its short, sharp, four-sided needles grows here and is one of the rarest trees in the park. Other than in the "Limberlost" area, Stony Man and Hawksbill mountains are the only places in the Shenandoah Park where this tree is found.

A rare evergreen shrub is the Canada yew, which produces red berries instead of cones. In the park it is found in only two places, on Stony Man and on the White Oak Trail.

Some in the party wanted to go down to a scenic waterfall. Mr. J. R. Sydnor of Richmond, his daughters, and Bruce McCartney kept on the trail which leads to the falls and Mr. Favour led the rest of us along an old mountain road through what had once been an orchard. Wild crab apple trees were in full blossom. Goldfinches, indigo buntings, juncos, the Maryland yellow-throat, with his "witchery, witchery," were easily seen. Bird's-foot violets with their yellow centers and mountain pinks and anemones grew abundantly. Chats and field sparrows were undisturbed by our presence.

Mr. Favour pointed out some deer tracks and showed us the dusting places of the ruffed grouse. There are bobcats too in the Shenandoah, so we were informed. On the top of a dead apple tree a hummingbird sat as if intent on spending the rest of the day there. Naturalist Favour said that the hummingbirds nest regularly in this tree.

As we approached the end of our walk and the highway came into sight, we sat down beside the path and counted the birds we'd seen on the walks. Some forty were named and marked on the check list.

Soon after we reached the cars, Mr. Sydnor, the girls, and Bruce McCartney joined us. They were full of excitement, having seen a hooded warbler and a spotted sandpiper down at the falls. The sandpiper had not been recorded before for this area. So they added a new bird to the park's list of about 200 species.

There was to be another walk in the afternoon, but we had to get back to Charlottesville and so we said good-bye to our friends.

Yes, a bird walk can be fun. In the company of an interested group of people, it is not only a sociable get-together, but also a rich ornithological experience.

THE MANAGEMENT OF VIRGINIA'S SEAFOOD RESOURCES

(Continued from page 12)

Does the Present Program Hold Promise for the Future?

Virginia has recognized the need for management by providing a Commission of Fisheries to enforce the laws, and a Fisheries Laboratory to conduct scientific investigations. This program has cost the state relatively little: in the fiscal year 1950-51 the operation of the Commission and the Laboratory cost only about two per cent of the total landed value of seafoods in the state,

and a much smaller proportion of the total income of the industry. The work of the Laboratory in establishing a firm scientific basis for the management of Virginia's seafood resources has just begun.

Rule-of-thumb management of the fisheries is not efficient management. The penalties are wasted time, effort, and expense, a false feeling of security, and sometimes actual interference with the fisherman's source of income. We do not know at present which of our laws are good and which are useless; we lack much of the knowledge that is necessary for intelligent management. Much patient investigation will be required before the basic principles are established.

SMALLMOUTHS FROM THE BIG JAMES

(Continued from page 9)

seventh rush upstream and jumping easily a dozen times, the great lunker eased up the struggle. I scooped him up onto a rock with both hands and pounced on him. Chuck nearly fell into the water from exhaustion.

With fishermen's eyes we both measured the whopper—a six-pounder easily. A granddaddy smallmouth and hard as the rock we were standing on!

It took a while for us to get back to reality. Seven pounds of dynamite is not something you get over right away. The water rose around our toes and reminded us it was time to go.

Slowly we gathered ourselves together, Chuck dragging the big fish, and edged into the swift water looking toward shore. Chuck broke the spell finally: "After this . . . we should be able to take anything this James can throw at us. What say?"

"Yeah," I came back, "even though it looks like we're going to have to swim our way all the way down to Richmond. Let's go!"

FOUR \$1,000 SCHOLARSHIPS IN CONSERVATION TRAINING ANNOUNCED

The National Wildlife Federation has announced four grants of \$1,000 each for college fellowships in advanced conservation training or research. Designated as "J. N. (Ding) Darling Fellowships" in honor of the famous newspaper cartoonist and conservation leader who organized the Wildlife Federation in 1936, the 1952 grants went to the following institutions:

Long Beach State College of California—For research expected to come up with a practical program of conservation education for city school children.

Cornell University—Research into and demonstration of tape recordings as a medium of conservation education.

Boston University—Graduate study of the organization and aims of conservation education.

University of Wyoming—Development of instructional units for teaching conservation in high schools.