

STRIPED BASS (MORONE SAXATILIS) IN VIRGINIAN WATERS

July 1978

Prepared for the Scientific and Statistics

Committee on Striped Bass of

The

Atlantic States Marine Fisheries Commission

H. M. Austin, VIMS

Editor

VMRR# 78-2

2. Summary

The striped bass, Morone saxatilis is a species of considerable economic and ecological importance to the state of Virginia. It is considered to be one of the most valuable commercial food species during years of abundance and is by far the most prized inshore recreational species.

The Chesapeake Bay is the major spawning ground for the Atlantic Coast stock and Virginia's Chesapeake Bay tributaries contribute a large fraction to this spawning stock. Several of these riverine systems support good water quality but all exhibit some degree of reduced water quality due to man's influence. Ironically, the closing of the entire James River to fishing due to Kepone may be an aid in rebuilding the stock.

Virginia commercial fishermen take bass primarily by pound net and gill net. Haul seine and otter trawl (in the ocean) are also used. The recreational effort is primarily by small boat and shore fishing using peeler crabs and artificial lures.

Management of the stock, while in Virginian waters, is by the Virginia Marine Resources Commission. Laws and regulations are designed to protect the juvenile fish and large very fecund individuals.

3. Table of Contents	
2. Summary	i
4. Introduction (Herbert Austin, VIMS)	1
5. Description of stocks (Joseph Loesch) (VIMS)	2
6. Description of habitat (William Kriete) (VIMS)	8
7. Fishery management jurisdiction, laws and policies (Herbert Austin & John Merriner) (VIMS)	12
8. Description of fishing activities effecting the stock(s) comprising the management unit (Clarence Richards and Jim Zaborski, VIMS)	20
9. Description of economic characteristics of the fishery (Ron Clayton, VPI-SU)	25
10. Description of the businesses, markets, and organizations associated with the fishery	26
11. Description of social and cultural framework of domestic fishermen and their communities (Victor Liguori, College of William & Mary)	27
12. Determination of optimum yield	35
13. Measures, requirments, conditions, or restrictions specified to attain management objectives	36
14. Specification and source of pertinent fishery data (James Wallace, VMRC).	38
15. Relationship of the recommended measures to existing applicable laws and policies	41
16. Council review and monitoring of the plan	42
17. References	43

4. Introduction

This report was prepared for the Atlantic States Marine Fisheries Commission striped bass Scientific and Statistics Committee by the staff of the Virginia Institute of Marine Science, Division of Fisheries Science and Services, staff at the Virginia Marine Resources Commission, and faculty of the Virginia Polytechnical Institute/State University, and College of William and Mary, Sociology Department.

It contains extant data and information on the biology, environment, fishery, management and market for the striped bass in the waters of the Commonwealth of Virginia.

Several subject areas are not detailed in this report as the data are non-existent or not available in the proper format, these are principally the socio-economic data and a realistic determination of either M.S.Y. or O.Y.

The object of this document is to identify the extant and absent information preliminary to the development of an interstate management plan.

5. Description of the stock(s) comprising the management unit.

(i) Species or groups of species and their distribution.

The striped bass is a member of the family Percichthyidae in the order Perciformes. Coloration is olive green varying to bluish above, paling on the sides, and silvery on the belly (Bigelow and Schroeder 1953). Detailed descriptions of the striped bass are given by Jordan and Evermann (1896), Bigelow and Welsh (1925), Hildebrand and Schroeder (1928), and Merriman (1941).

Striped bass on the Atlantic Coast range from the St. Lawrence River to the St. Johns River in northern Florida and in the Gulf of Mexico from western Florida to Louisiana. It was also introduced in the Pacific in the late 19th century and now occurs from southern California to the Columbia River, Oregon (Raney 1952).

(ii) Abundance and present condition.

The commercial catch of striped bass in Virginia ranged from about 0.4 million lb to over 2.5 million lb in the years 1930 through 1970 (Figure 1). In 1975 1.3 million pounds were landed, the lowest since 1958. Landings have continued to decrease and only 0.8 million lb were landed in 1977; Maryland landings have exhibited a similar decline (Table 1).

Grant et al. (1970) reported that the large 1966 year-class constituted 80% of the 1969 and 1970 gill net catches in the Rappahannock River. Merriner and Hoagman (1973) found that although the 1970 year-class was successful relative to the three previous

FIGURE 1

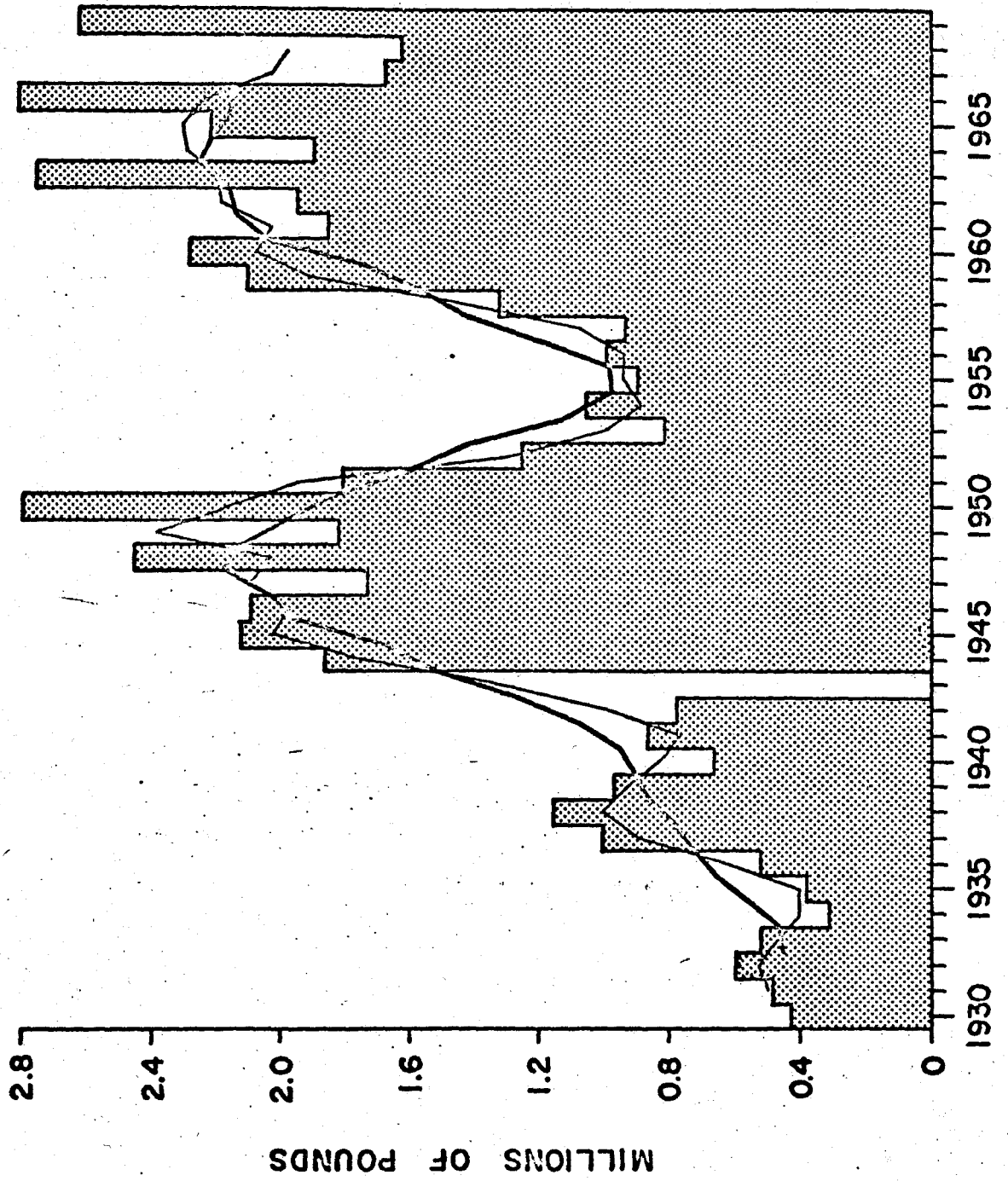


Table 1. Commercial catch of striped bass for Maryland and Virginia from 1958 to 1977, in thousands of pounds and dollars.

Year	Maryland		Virginia		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
1977	1,727	1,019	828	443	2,555	1,462
1976	1,875	1,038	954	487	2,829	1,525
1975	2,764	1,084	1,331	642	4,095	1,726
1974	3,503	919	2,564	613	6,067	1,532
1973	4,976	1,554	2,888	770	7,864	2,324
1972	3,175	917	2,604	555	5,779	1,472
1971	2,743	862	1,183	280	3,926	1,142
1970	4,017	878	1,787	372	5,804	1,250
1969	5,088	910	2,671	517	7,759	1,427
1968	4,532	922	1,614	293	6,146	1,215
1967	4,150	675	1,677	260	5,827	935
1966	3,347	604	2,803	526	6,150	1,130
1965	2,949	542	2,213	433	5,162	975
1964	3,300	538	1,889	301	5,189	839
1963	3,749	534	2,747	356	6,496	890
1962	3,979	642	1,944	279	5,932	921
1961	5,408	612	1,854	290	7,262	902
1960	4,409	675	2,278	316	6,687	991

years it was not strongly represented in the Virginia landings 3-5 years later. The reason for the recruitment failure of the 1970 year class is not known but, possibly, it was severely cropped at sea. Striped bass catches were up in 1973 from 1972 in the coastal fisheries of the New England and Mid-Atlantic states. Catches from the New England states then declined from about 2.0 million lb in 1973 to 0.2 million lb in 1976; similarly, the catches in the Mid-Atlantic states declined from about 3.1 million lb in 1973 to 0.8 million lb in 1976. Thus, the recent decline in striped bass abundance is coast-wide. Tagging data also gives supporting evidence for a heavy cropping of the 1970 year-class. Tag returns from the 1972 VIMS tagging program showed that a greater percentage of the 1970 year-class moved out of the rivers in which they were tagged than in other years of tagging (1968-1973). During the six year period of striped bass tagging, the 1970 year-class represented 22% of the fished tagged, yet they accounted for 75% of the tag returns from the New England states and 60% of the returns from the Mid-Atlantic states. Of these 1970 year-class returns, about 92% were tagged in 1972.

(iii) Ecological relationships.

Striped bass feed on a variety of smaller fishes and invertebrates. Small bass feed primarily on crustaceans and marine worms but upon attaining a size of about 75-80 mm other fishes became the primary prey (Raney 1952). Hollis (1952) reported seasonal and regional variation in feeding by striped bass in Chesapeake Bay.

River herring and white perch were the most common items in their diet in spring and early summer, anchovy and Atlantic menhaden dominated in summer and fall while spot and croaker were most often consumed in the winter. In the uppermost part of the bay, their diet consisted of freshwater organisms. Feeding was reduced during their spawning period in late May and early June. Manooch (1971) identified 25 specific groups of food organisms, 15 species of fish and 10 taxa of invertebrates, for striped bass in Albemarle Sound, North Carolina. He also reported seasonal and regional variation in striped bass diet. Atlantic menhaden, river herring, and bay anchovy were the predominant fish prey while invertebrate prey consisted mainly of blue crabs, penaeid shrimp, and gammarid amphipods. Cannibalism was rare, about 1%, and apparently limited to yearling striped bass.

Bigelow and Schroeder (1953) reported that striped bass feed more actively at night and suggested that at least in estuaries this behavior may be associated with the nocturnal activity of one taxa of prey, the sea worms Nereis.

(iv) Estimate of MSY.

Data are not available to estimate the MSY for striped bass in Virginia waters.

(v) Probable future condition.

There has been no active striped bass research program at VIMS since 1973, thus data concerning the populations are limited. However, winter trawl data of 1974, 1975, and 1976 indicated poor

year-class success in 1973, 1974 and 1975, therefore, there is little hope for a recovery in landings through 1979 or 1980. Preliminary observations in 1977 indicated a slight recovery in the striped bass population in all of the major Virginia rivers; a more definitive assessment will be determined from the 1978 winter trawl data.

6. Description of habitat of the stock(s) comprising the management unit.

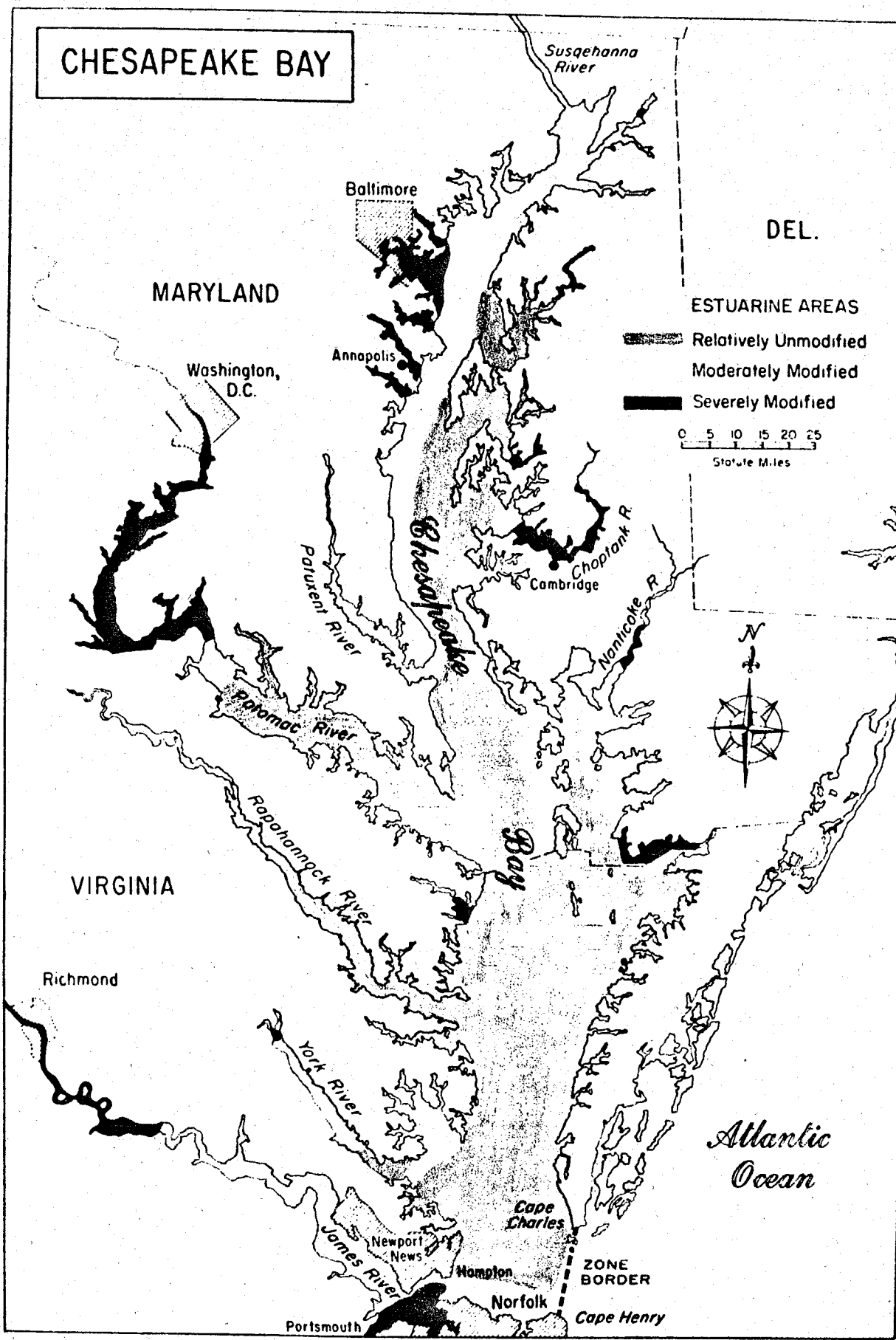
The Virginia portion of the Chesapeake Bay and three river estuaries (James, York, and Rappahannock) are considered the management area. The three river systems comprise the bulk of the area and have been the most intensively studied.

Striped bass (Morone saxatilis) spawn in the fresh water portion of the estuaries. Larvae, postlarvae, and some juveniles utilize the same area as nursery grounds. As the juveniles grow, they move downriver into brackish water (5-15 o/oo) where they remain for 2-3 years. Upon maturing, most fish move out of the river estuary and Bay and become seasonal migrants along the east coast.

(i) Condition of the habitat

Information concerning water quality was condensed from a Water Quality Inventory (305 b Report) prepared by the Virginia State Water Control Board. Figure 2, prepared by the U. S. Army Corps of Engineers, shows degrees of modification of water quality by area.

James River - According to the Virginia State Water Control Board the James River water quality is good except for certain localized areas. Most parameters measured showed improving trends; however, orthophosphates exhibited a worsening trend. The River was closed in 1975 from the fall line to the mouth for the taking of shellfish and most finfish (including striped bass) due to the



presence of KEPONE. In June 1978 this ban was extended until January 1979.

York River - Western headwaters appear to be of excellent quality while the Pamunkey, Mattaponi and York rivers show some water quality problems. Again orthophosphates exhibited a worsening trend.

Rappahannock River - Water quality is very good, except for the Fredericksburg area. Orthophosphates, nitrites and nitrates have shown worsening trends in some areas.

(ii) Habitat areas of particular concern

James River - Tresselt (1952) identified the area from Jamestown Island upriver to Turkey Island cutoff as striped bass spawning grounds. Areas below Jamestown Island are utilized by older fish.

York River (Pamunkey-Mattaponi) - Tresselt (1952) identified spawning in the York system as being approximately 17 miles above West Point on the Pamunkey River and from 8 to 19 miles above West Point on the Mattaponi. Rinaldo (1971) agrees as to spawning area in the Pamunkey although he identifies a larger area.

Most water quality problems in the upper York-Pamunkey-Mattaponi area are caused by the city of West Point and the Chesapeake Corporation, a Kraft pulp mill located there. The lower York River is affected by a VEPCO power station and an Amoco Oil Refinery.

Rappahannock River - Spawning takes place above

Tappahannock. Tresselt (1952) could not identify the center of the spawning area due to scarcity of eggs and larvae in his samples, however, eggs were collected from mile 50 to mile 65.

The area below Fredericksburg is the most seriously affected area. However, several point sources of pollution downstream, mostly areas near municipalities, and non-point source pesticide-herbicide runoff from farmland pose potential problems.

(iii) Habitat protection programs

1. Closure of the James River.
2. Permits for dredging and deposition of dredge spoil.
3. Wetlands Act.
4. Coast Guard regulations restricting dumping of wastes from boats.
5. Coastal Zone Management program.

7. Fishery management jurisdiction, laws, and policies -

(i) Management institutions

Section 28.1-3 Code of Virginia

"The jurisdiction of the Marine Resources Commission shall extend to the fall line of all tidal rivers and streams and the Commission shall have jurisdiction over all commercial fishing all marine fish, marine shellfish, and marine organisms below said fall line on all tidal waters of the Commonwealth.

Section 28.1-23 Authority to make regulations and establish licences; penalty for violation of regulations.

"The Commission shall have authority to make such regulations as it deems necessary to promote the general welfare of the seafood industry and to conserve and promote the seafood and marine resources of the State.

Section 28.1-203 (Potomac River Fisheries Commission)

ARTICLE III, Fish and Seafood -

"The Commission (P.R.F.C.) may by regulation prescribe the type, size, and description of all species of finfish which may be taken or caught within its jurisdiction (the Potomac River).

Section 29-11 General Powers of the Commission (Game and
Inland Fish Commission)

"In addition to the specific authority elsewhere herein
conferred the Commission shall have general power and
authority to conduct and carry on such
operations for the preservation and propagation of
..... fish and other wildlife....."

Section 29-2.1 Definitions

(j) "Gamefish" means and includes.....rockfish or
striped bass where found above tidal waters or in
streams which are blocked from access from tidewaters
by dams"

(ii) Treaties or International Agreements

A treaty wick applies to fishing by the Pamunkey and
Mattaponi Indian Reservations on the Pamunkey and Mattaponi
Rivers.

FIRST AMERICAN LEGISLATION LICENSING TAKING OF OYSTERS AND FISH

A copy of the first legislation passed in America licensing the
taking of oysters and fish. Copied by W. W. Rowell, former Clerk
to Commission of Fisheries of Virginia, March 9, 1928, from the
only known record in existence.

Catalogue of all the
Public Acts of Assembly in Force and Use

June 11, 1751

Printed at Williamsburg, Va. 1752

by William Hunt

Second Printer to Virginia Gazette

Acts from 1661 to 1751

Acts of Assembly of Virginia

His Majesties Royal College of William

and Mary A. D. 1705

An Act for Prevention of Misunderstanding between the Tributary
Indiand, and other Her Majesty's Subjects of this Colony and
Dominion; and for a free and open Trade with all Indians
whatsoever

* * * * *

VIII AND be it firther Enacted, by the Authority aforesaid, and
it is hereby Enacted, That the Indiand Tributary to this
Government, shall have and enjoy their wonted Conveniences of
Oistering, and Fishing, and of gathering on the lands belonging
to the English, Tuckhoe, Cutetnemons, Wild Oats, Rushes, Puckoon,
and other Things, not useful to the English, upon License first
had from a Justice of the Peace of the County where they come for
those purposes: And if any Englishman take from any of the said
Indians, any Goods, or kill, wound, or maim any One of them, as
they come in, while they tarry, or as they return, he shall be
punished, and suffer, as if he had done the same thing to an

Englishman.

IX PROVIDED always, and it is hereby meant and intended, That the said Indians shall not bring with them any Guns, Ammunition, or other offensive Weapons, but Tools only for their Use; that they shall not presume to oister, fish and gather Tuckhoe, or other Things, as aforesaid, without a License first had from a Justice of Peace, as aforesaid; that the Justice, in his License, shall limit the Time of the Indians Stay; and that it shall not be lawful for the Indians to tarry beyond the Time limited.

* * * * *

Signed - EDWARD NOTT, ESQ.,

GOVERNOR.

BENJAMIN HARRISON,

SPEAKER.

(iii) Federal laws, regulations, and policies

16 USC 851-856 Regulation of Interstate Transportation of
Black Bass and Other Fish

Impact: Prevents the sale of striped bass taken in states other than Virginia less than 14 "(28.1-49.1) or the possession of more than two over 40" (28.1-50) in the State of Virginia.

(iv) State laws, regulations, and policies

28.1-49.1. Size of fish that may be caught in tidal waters;
purchase or possession of undersized fish

"It shall be unlawful for any person to take or catch and retain possession of any striped bass (rockfish) which is less than 14 inches in total length ("nose to tip of tail").....unless obviously injured or dead.

28.1-50. Taking, etc., channel bass and rockfish;
confiscation of such fish illegally taken.

"It shall be unlawful for any person, firm or corporation to take, catch and/or have in possession, offer for sale or transport during any one day.....more than two rockfish (striped bass) over forty inches in length."

"Any person, catching more than.....two rockfish over forty inches in length shall immediately release return such fish to the water.....,
(28.1-49.1).

Impact: Prevents the capture or sale of undersized and large fish. The impact of which is to protect young fish and the most fecund spawners.

The phrase ".....unless obviously injured

or dead" allows the capture and sale of undersized fish which can account for large percentages of the total.

28.1-51 Size of mesh and length and depth of certain nets; pound nets, haul seine and shallow water defined. "It shall be unlawful.....to use a pound net, head, or picket (under 200 yds long) having a mesh less than two inches, stretch mess. Nor shall any haul seine.....be longer than 1000 yards in length, and if over 200 yards long, shall not have mesh less than 3 inches, stretched measure....."

28.1-51.1 Use of certain fishing devices in certain waters. "It shall be unlawful for any person to use a sunken gill net, snatch hook, grab hook or gang hook for the purpose of taking fish in the Rappahannock River.....between the first day of January and the 15th day of March....." (this is specifically to protect bass).

28.1-51.2 Use of haul seine
It shall be unlawful for any person to use a haul seine in excess of three hundred feet in length for the purpose of taking fish in the James River

28.1-67 Trolls, trawl nets and drag nets prohibited.

"It shall be unlawful for any person, firm or corporation to operate, for the purpose of taking or catching fish, a troll or trawl net, drag net, or similar device drawn through the waters by a vessel, boat, or other craft in the waters of the Commonwealth....."

28.1-203 Potomac River Compact

".....Maryland and Virginia have agreed that the necessary conservation and improvement of the Tidewater portion of the Potomac fishery resources can be best achieved by a Commission.....of both Maryland and Virginia, charged with the establishment and maintenance of a program to conserve and improve these resources....."

Impact: see Impact, part (v)

(v) Local and other applicable laws, regulations and policies

Potomac River Fisheries Commission Regulations

Regulation III, Sec. 10

Sizes of Mesh

"It shall be unlawful to take finfish on the Potomac River with any net whose size of stretch mesh is less than.....pound net 1 1/2 inches, haul seine 2 1/2 inches, fyke or hoop net 2 inches and gill net 2 1/2

inches....."

Section 11 Sizes of Commercial Fish

"No person shall commercially catch on the Potomac River.....(e) any rock, otherwise known as striped bass, less than 12 inches in length or weighing more than 15 pounds....."

Impact: Prevents the taking of striped bass less than 14 inches (T.L.) both by actual size limitation and by minimum mesh sizes. Prevents the taking of large fish (15 pounds on the Potomac or 40 inches state wide). Size limitations are to protect juvenile fish and large ("cow") fecund females. Resultant impact may be significant on juveniles but not on large adults viable fecundity vs biomass estimates show total viable egg biomass production by "cows" to be low.

8. Description of fishing activities affecting the stock(s) comprising the management unit.

(i) History of exploitation - Fishing practices for catching striped bass have changed for sport fishermen with the improvement in boats, outboard engines, and fishing tackle. The general fishing practices have remained basically the same: deep trolling with weighted lures utilizing wire or lead core line to use of diving planes. Light weight monofilament line allows spincast jigging of "feathers" and other small "bucktail" lines. Night fishing under lights with live baitfish or "feathers" and bait casting from shore or boat with "peeler crab" is a standard technique used from shore or nearshore at high tides during day or night.

Sport techniques have become refined with better equipment and perhaps a more educated fisherman who watches temperatures, tides and bait preferences.

(ii) Domestic Commercial & Recreational Fishing Activities

A. Participating user groups: The coastal Virginia fishery for striped bass is scattered and diverse. It includes trawlers, pound nets, fyke nets, and haul seines, gill nets and sport-fishing gear.

B. Vessels and Fishing Gear: In the commercial fishery, pound nets are fished at permanent locations and are most consistently in use. They are lifted only during brief periods for cleaning, to prevent possible ice damage or because of nuisance factors such as abundant

jellyfish. Fyke nets, hung and fished much like small pound nets in Virginia waters, are usually located farther upriver than the pound nets. Catches are relatively small and the gear is employed more sporadically than pound nets. Trawlers are limited to offshore fishing by law. Therefore, striped bass are available to this gear only in winter months, when they are migrating along the coast. Striped bass availability to trawlers increases during severe winters when the river populations migrate to the warmer coastal waters (Grant et al., 1970). Gill net mesh size and manner of fishing vary with the season in the striped bass fishery. Small mesh "spot and perch nets" (2 7/8"-3 1/2" stretch mesh) are anchored in the summer and staked from late fall to winter. Large mesh "shad nets" (5 1/2" stretch mesh) are staked or drifted in late winter and spring. Haul seines are used sporadically throughout the warmer months, but most effectively in the spring.

Sport fishing for striped bass is intensive in the lower Chesapeake Bay, especially along the Chesapeake Bay Bridge-Tunnel in spring and fall. The sport fishery extends from the mouth of the bay to the freshwater regions of major river systems from March through December.

Attraction of small striped bass to the numerous lighted piers extends sport fishing well beyond daylight hours. Trolling or casting lures and flies; bait fishing with live "minnows" (Menidia and Membras species) or "peeler" crabs at night or during the day at high tides

are all sportfishing techniques for catching striped bass in Virginia.

C. Employment in Recreational and Commercial Sectors

Sport fishing for striped bass has not been evaluated for numbers of people involved or for the dollar value generated. It is suspected that the numbers of people would be on the order of tens of thousands and that the overall monetary value generated would be in the range of 200 thousand to over a million, depending upon the availability of striped bass.

D. Fishing and Landing Areas Utilized

1. Fishing areas

Commercial and Recreational: Inlet and ocean beach areas, Chesapeake Bay and estuarine river systems to fresh water.

2. Landing Areas

Sport: Norfolk - (Little Creek, Lynnhaven), Cape Charles City, Hampton, and many sites on the various river systems in Virginia.

Commercial: Northumberland and Westmoreland Counties, Norfolk, Hampton, Cape Charles City, Chincoteague, New Point, and Perrin. Northumberland and Westmoreland Counties on the Potomac River account for 32% of Virginia's Landings.

E. Conflicts between user groups: There are a few areas of conflict

between user groups operating in Virginia waters. One exists between the State and illegal trawling within one mile of the shore along ocean beaches. Another exists between gill netters and sport fishermen as both fish adjacent to bridge abutments. In general, sportfishing interests decry any massive catch of larger striped bass by haul seines, otter trawls and gill nets.

The development of nylon monofilament gill nets has probably increased the potential for conflict between gill netters and commercial operators of various other gear as well as with sportfishermen. The anchored or set gill net snags trolled lures and terminal tackle of sportfishermen. The gill net has become a most efficient commercial gear in Virginia for harvesting striped bass. Minimal cost, effort and portability make this gear efficient and controversial in terms of catch apportionment and its potential for selectively catching portions of the population by manipulating mesh size.

F. Landings: Commercial landings of striped bass in Virginia for the 40-year period 1930-1969 show a ninefold increase from a low of 0.3 million pounds in 1934 to 2.8 million pounds in 1966 (Fig. 2). The overall trend in landings (and striped bass populations) has been rising during this period. Two definite peaks of abundance are evident, one in the late 1940's and the other in the 1960's. Not included in these landings are sport catches, which have increased to as much as 50 percent of the total catch in certain areas (Grant,

unpublished data). Averaged commercial landings in the most recent years have declined; continuation or reversal of this decline depends on contributions to subsequent catches by successful year classes such as those of 1966 and 1970 (Grant and Joseph, 1969; Grant, Burrell and Kriete, 1971). The average catch per sportfishing trip declined from 28.0 in 1971 to 14.4 in 1972; 3.8 in 1973 and 0.1 striped bass in 1974 (Richards, unpublished data).

G. & E.

Assessment of and specification of the U.S. harvesting capacity is set at 100% of the O.S.Y. however much it might be.

(iii) Foreign Fishing Activities: Since the species is habitually within the 3 mile limit during nearly all of its life, then there need be no allocation to foreign offshore fishermen. There are minimal or no foreign fishing activities affecting this species in Virginia's waters.

9. Description of economic characteristics of the fishery.

(i) Domestic harvesting sector.

Preliminary statistics from NOAA show the following volume and ex-vessel price for fresh round striped bass in Virginia January-March, 1978:

185,212 pounds, \$193,914

\$1.04/pound

as compared to

January-March, 1977

304,778 pounds, \$213,428

\$0.70/pound

Further economic description is not available.

(ii) Domestic processing sector

These data are not generally available. The wholesale products are fresh round fish.

(iii) International trade

There is no international trade at present in Virginia.

10. Description of the businesses, markets, and organizations associated with the fishery

(i) Relationship among harvesting, brokering, and processing sectors

No information available

(ii) Fishery cooperatives or associations

Harvesters: Virginia Watermens Association

Processors/Wholesalers: Virginia Seafood Council

(iii) Labor organizations

No information available

(iv) Foreign investment

No apparent foreign investment (depends upon definition of Seafood International....the Unification Church)

11. Description of the social and cultural framework of domestic fishery participants and their communities.

Striped Bass - The commercial fishery

Striped bass caught commercially in Virginia waters are taken primarily through the use of gill and pound nets, and to a lesser extent in haul seines and by trawl. Participants in the commercial striped bass fishery pursue the above-stated technologies on a full time professional or a seasonal basis. As such any socio-cultural research on such fishermen must be organized around technology (and possibly by county, ports of departure, or community) and not species per se. As such, there is no extant sociological/anthropological study of commercial striped bass fishermen of Virginia.

The following is a recommended sociological study.

(i) Numbers of participants by category of participation

(a) Full time

The number of full time fishermen who gain a significant portion of their livelihood from fishing year-round.

(b) Seasonal

The number of people who catch striped bass for particular, seasonal segments of the year, but who substantially supplement their income from other activities on a regular basis.

(ii) Location

(a) Residence

The primary residence of those engaged in a given

activity. This may be general (State) or specific (County, city, or specified location) as necessary for proper description.

(b) Home Port

The formal point of registry of a vessel, or the location where the shoreside portion of the fishing operation is based.

(iii) Spatial and temporal characteristics of the fishing/work activity

This would describe the actual location where the activity takes place, and would include such factors as the location of the fishing grounds, the migratory pattern of vessels or labor force through-out the year, trip length and timing, absence from home or home port, etc.

(a) Age

The age of the direct participants in the striped bass fishery.

(b) Education/training

This set of data should include not only formal academic education, but also the level of technical or mechanical training which fishery participants possess and the availability of such training to participants.

(iv) Tenure

The length of time over which an individual has been involved in striped bass related activities. Occupational alternatives in and near the areas of residence from which commercial

fishery participants.

Fishing related - exploitation of other seafood species with the same gear (spot, trout, bluefish, croakers, etc.)

Seafood exploitation with alternative gear (crabbing with pots; clamming with tongs, rakes).

Shore work in fishery support facilities: work in local seafood processing plants; packing and transporting seafood.

Other maritime: menhaden fishery, tugging, maintenance of boats, gear, employment in local marinas, etc.

Realistic non-maritime occupational. Alternatives - construction (carpentry, earth moving, land clearing), maintenance (painting).

Special skills and training.

(v) Ethnic Characteristics and Ethnicity

The ethnic identity of the participants. This may refer loosely to race; nationality, culture, some sort of regional identity. It might include some particular language. The term "ethnicity" is generally used to express some form of commitment to a group, a commitment which contributes to an individual's identity or self-image as well as to the activities of the group (e.g. a Guineaman). It is certain to involve some important sense of "we-ness".

Beyond identifying ethnic identity how and in what ways does ethnicity operate as an important, dynamic process in fishery-related activities.

For example, ethnicity is often crucial to understanding patterns of recruitment and long-term commitment to fishing activities.

(vi) The income level of the participants

- 1) Factors blocking the determination of average compensation per year of striped bass fishing.
- 2) Best possible determination of annual earnings for harvesters.
- 3) Income from other sources
 - a. Importance of income from other sources.
 - b. Multiple breadwinners.

Material style of life. What sorts of people catch striped bass commercially?

- 1) Indices of longer term economic well being.
- 2) Other indices of material style of life of family-in-residence.

(vii) Other descriptions

- 1) Regional composition of fishery participants
- 2) Labor intensity vs. capital intensity of striped bass fishing enterprises.

Crew organization and composition. The structural and interactional setting within which striped bass fishing actually takes place: a) gill netting, b) pound net companies, c) haul seines. This involves discussion of partnerships, family enterprises, extended kinship and friends, large or small groups, etc.

(viii) Political orientations toward commercial and recreational fishing of striped bass and related activities:

- 1) Fishery-related organizations
 - a) Commercially oriented
 - b) Sportsfishing

(ix) Recreational Fishing

The recreational striped bass fishery ranges from individuals with little invested in gear who fish from piers or beaches to those involved full time professionally in striped bass related activities.

- 1) Numbers
 - a) Full time
 - b) Seasonal
- 2) Distribution
 - a. Residence
 - b. Geographic areas of actual fishery

participation

- 3) The type and level of participation: Individual

users w/wo boats, party boats, charter boats. Differing degrees of participation in the recreational fishery. The nature of fishery oriented investment: marinas, bait and tackle shope. The nature of travel to pursue striped bass fishing.

4) User profile

a. Age

b. Socio-economic characteristics

c. Material type of life - for example as studied in Hal Lyman's Saltwater Sportsman questionnaire.

5) Motivational factors - Are you fishing for a certain species? Why do you fish for striped bass? Can other species of finfish substitute as well? When fish are running there is a striped bass fishing fraternity.

6) Recreational fishing organizations - Angling clubs, Conservation Council of Virginia Angling Clubs. Mr. Carl Herring, President of Council, Newport News, (804-380-3236) Table 2 .

(x) Context of the broader community

1. Interatction among striped bass fishing users; between users and the large community.

2. Economic dependence on commercial or recreational fishing and related activities, including section on tourism, economic alternatives and levels of unemployment.

SALTWATER SPORTFISHING ASSOCIATIONS AND RELATED ORGANIZATIONS

Cape Charles Anglers Club
Mr. Ben Walls
Kings Creek Marina
Box 283
Cape Charles, VA 23310

Cape Henry Billfish Club
Mr. Fred Rushin
1513 Lake Christopher Dr.
Virginia Beach, VA 23462

Conservation Council of
Virginia Angling Clubs
3405 Mac Donald Rd.
Virginia Beach, VA 23462

Dolphinets
Mrs. Brenda Callis
P.O. Box 1172
Portsmouth, VA 23705

Eastern Shore of Virginia
Anglers Club
Mr. Joe Sparrow
15 Kerr Street
Onancock, VA 23417

Norfolk County Anglers
Mr. Bill Callis
P.O. Box 1172
Portsmouth, VA 23705

Northern Neck Charter
Boat Association
Captain Bob Stoner
P.O. Box 97
Kinsale, VA 22488

Peninsula Saltwater Sport-
fishing Association
Mr. Jim McHugh
20 Research Dr.
P.O. Box 7033
Hampton, VA 23666

Seaside Sportsfishing
Improvement Association
Mr. Phillip McCaleb, Jr.
P.O. Box 2
Belle Haven, VA 23306

Tidewater Anglers Club
Mr. Jim White
Box 5566 Parcel Post
Annex
Norfolk, VA 23516

Tidewater Artificial
Reef Assoc. of Virginia
Mr. Dave Stormont, III
Smith and Welton, Inc.
300 Granby Street
Norfolk, VA 23510

Tidewater Charter
Boat Association
Captain Charlie Ward
2332 Bayville Street
Virginia Beach, VA 23455

Virginia Anglers Club
Mr. Jack Brightwell
P.O. Box 4945
Richmond, VA 23229

Virginia Beach Anglers Club
Mr. Allan Paschall
2137 E. Admiral Dr.
Virginia Beach, VA 23451

Virginia Beach Sand Witches
Mrs. Mabel McDonald
5628 Lawson Hall Rd.
Virginia Beach, VA 23455

Portsmouth Anglers Club
Dr. John Kostinaf
P.O. Box 921
Portsmouth, VA 23705

Virginia Bluewater
Gamefish Association
Mr. Charlie Johnson
P.O. Box 325
Norfolk, VA 23510

Virginia Saltwater
Fishing Tournament
Mr. Claude Rogers
25th & Pacific Ave.
Virginia Beach, VA 23451

Virginia Wildlife Federation
Mr. Walter Leveridge
P.O. Box 3609
Norfolk, VA 23514

Wachapreague Guides
Association
Mr. Sam Parker
Wachapreague, VA 23480

Virginia Anglers Club
Mr. Jerry Hammer
901 W. Ocean View Ave.
Norfolk, VA 23503

Virginia Beach Anglers Club
Mr. Doug Wehner
3308 Barcelona La.
Virginia Beach, VA 23452

Virginia Beach Shakers
Mr. Joe Wise
2244 Reuben Street
Virginia Beach, VA 23454

Portsmouth Anglers Club
Mr. Domanic Ullom
2119 Armada Dr. S.
Chesapeake, VA 23321

(xi) Management Objectives - Striped Bass Fishery of Virginia

Generalized Goal:

To achieve optimal utilization and fair allocation of the resource among commercial and recreational users.

Major objectives:

A. Recreational Fishery

1. Improve economic impact upon support facilities.
2. Improve user days.
3. Improve user satisfaction.
4. Improve utilization of catch.
5. Minimize adverse environmental impacts.
6. Reduce conflicts between users, including non-consumptive users.
7. Improve conservation practices of users.

B. Commercial Fishery

1. Provide the opportunity for a fair economic return to all sectors.
2. Increase consumer satisfaction.
3. Increase the opportunity for employment.
4. Reduce conflicts between users, including non-consumptive users.
5. Optimize food production.
6. Improve utilization of catch.
7. Minimize adverse environmental impacts.
8. Improve conservation practices of participants.

12. Determination of optimum yield

(i) Specific management objectives

28.1-23 Laws of Virginia

".....to promote the general welfare of the seafood industry and to conserve and promote the seafood and marine resources of the State,"

(ii) Description of alternatives

None at this time

(iii) Analysis of beneficial and adverse impacts of potential management options

Not available

(iv) Tradeoffs between the beneficial and adverse impacts of the preferred or optimal management options

(v) Specification of optimum yield

Not available

13. Measures, requirements, conditions, or restrictions specified to attain management objectives.

Not considered at this time

14. Specification and source of pertinent fishery data

(i) General

The following requirements are recommended in order for the National Marine Fisheries Service and respective states to acquire accurate data on the Striped Bass (Morone saxatilis) catch, disposition of the catch, and effort in the fishery. These data reporting requirements are necessary to manage the fishery for the maximum benefit of the United States.

(ii) Domestic and foreign fishermen

(a) Commercial Fishermen

1. Current Data Collection - The following agencies or organizations collect data on the catch of striped bass on a regular basis:

a. National Marine Fisheries Service: Commercial catch data is collected monthly from cooperative dealers and harvesters. Data collected includes pounds landed, dockside value, area and method of capture and county landed. Landings data is incomplete and does not include catch-per-unit of effort (CPE). National Marine Fisheries Service has developed plans and is in the process of letting contracts for a standardized creel survey on the harvest of marine finfish, including striped bass by sportsfishermen. This survey is anticipated being more reliable than previous surveys conducted by NMFS or U. S. Census Bureau.

b. Potomac River Fisheries Commission: Commercial harvesters

licensed to fish in the Potomac River are required to file monthly reports. Reports itemized, by day of capture, species caught, pounds landed, gear employed, area of capture and effort expended. Harvesters cannot be relicensed for the following year unless all reports for the previous year have been filed. No attempt is made to verify accuracy of reports.

c. Virginia Marine Resources Commission: Current data collection program is being expanded to include finfish caught commercially within State territorial waters and will replace the National Marine Fisheries Service program effective January 1, 1979. Collection methodology will be census on main methods of capture - pound net, stake gill nets, haul seines and random sampling on other gears. Data to be collected includes: pounds landed, ex-vessel value, method and area of capture, county landed, effort expended. Length frequency and scale sampling will be employed. Lateral surveys will determine various socio-economic data among commercial harvesters, disposition of the catch, and pricing structure at subsequent market levels. Data will be collected and tabulated monthly and available for distribution thirty-five (35) days after the close of each month.

d. Virginia Game and Inland Fisheries Commission: Conducts creel surveys during summer months on the sports catch of land locked Striped Bass in major ponds and reservoirs. No program underway or planned to gather similar data on the catch in

freshwater rivers and streams.

2. Needed Data Collection. In the case of domestic commercial fishermen taking Striped Bass either directly or indirectly, the following information should be gathered: date of capture, type and size of gear used, locality fished, duration of fishing time, length of tow (where appropriate), and the number and estimated aggregate weight of the catch. Such data shall be gathered on a monthly basis by the respective States or by National Marine Fisheries Services. Data gathering systems may include, but not be limited to, mandatory reporting via logbooks and random sampling.

All data received under this section would be kept strictly confidential and shall be released in aggregate statistical form only without individual identification as to its source.

(b) Sports Fishermen

1. Current Data Collection. None, except for Virginia Saltwater Tournament Citations.

2. Needed Data Collection. Data on the catch of Striped Bass by sportsfishermen shall be gathered by National Marine Fisheries Service or its agents utilizing standard statistical survey techniques.

(c) Foreign Fishermen

Foreign fishermen will be subject to the reporting and record-keeping requirements set forth in part 611.50(d) of 50 CFR.

(iii) Processors

1. All persons, individuals, firms, corporations, or business associates, at any port or place in the U.S. that buy and/or receive Striped Bass shall keep accurate records of all transactions involving Striped Bass on forms supplied by the Atlantic States Marine Fisheries Commission. These records shall be submitted quarterly to the ASMFC or its designated agents, within one month after such calendar quarter ends. Records will show the name of the harvester or common carrier Striped Bass was received from, date of transaction, poundage received (broken down by market sizes if lot is presorted), and price paid.

2. Sales by harvesters directly to the retail or restaurant trade will be determined by random interviews among the harvesters and calculated using standard statistical methods.

15. Relationship of the recommended measures to existing applicable laws and policies

Cannot be determined at this time

16. Council review and monitoring of the plan
not appropriate

17. References

- Bigelow, H. B. and W. C. Schroeder. 1953. Fishes of the Gulf of Maine. U. S. Fish and Wildl. Serv., Fish. Bull. 74. 577 pp.
- Bigelow, H. B. and W. W. Welsh. 1925. Fishes of the Gulf of Maine. Bull. of the U.S. Bur. of Fish. 40:567 pp.
- Grant, G. C. 1973. The age composition of striped bass catches in Virginia rivers, 1967-1971, and a description of the fishery. Fish. Bull. 72(1):193-199.
- Grant, G. C., G. Burrell, Jr., and W. H. Kriete, Jr. 1970. Age composition and magnitude of striped bass winter gill-net catches in the Rappahannock River 1967-1970. Proc. 24th Ann. Conf. S.E. Assoc. Game and Fish Commissioners, 1970. pp. 659-667.
- Grant, G. C., V. G. Burrell, Jr., C. E. Richards, E. B. Joseph. 1970. Preliminary results from striped bass tagging in Va., 1968-69. Proc. 23rd Ann. Conf. S.E. Assoc. Game and Fish Commissioners. pp. 558-570.
- Grant, G. C. and E. B. Joseph. 1969. Comparative strength of the 1966 year class of striped bass, Roccus saxatilis (Walbaum) in three Virginia rivers. Proc. 22nd Ann. Conf. S.E. Assoc. Game and Fish Commissioners. pp. 501-509.
- Hildebrand, S. F. and W. C. Schroeder. 1928. Fishes of Chesapeake Bay. Bull. U. S. Bur. Fish. 43(1):247-250.

- Hollis, E. H. 1952. Variations in the feeding habits of the striped bass, Roccus saxatilis (Walbaum) in Chesapeake Bay. Bull. Bingham Oceanogr. Coll. 14(1):111-131.
- Jordan, D. S. and B. W. Evermann. 1896. The fishes of North and Middle America. Bull. U. S. Nat. Mus., Bull. 47(1). 1240 pp.
- Manooch, C. S. 1971. Food habits of yearling and adult striped bass, Morone saxatilis (Walbaum), from Albemarle Sound, North Carolina. Ches. Sci. 14(2):73-86.
- Merriman, D. 1941. Studies on the striped bass (Roccus saxatilis) of the Atlantic Coast. Fish. Bull. U.S. Fish and Wildl. Serv. 50(35):1-77.
- Merriner, J. V. and W. J. Hoagman. 1973. Feasibility of increasing striped bass populations by stocking of underutilized nursery grounds. Completion Report AFS 6-3.
- Raney, E. C. 1952. The life history of the striped bass, Roccus saxatilis (Walbaum). Bull. Bingham Oceanogr. Coll. 14(1):5-97.
- Rinaldo, R. G. 1971. Analysis of Morone saxatilis and Morone americanus spawning and nursery area in the York-Pamunkey River, Virginia. Masters Thesis. College of William and Mary. 55 pp.
- Tresselt, E. F. 1952. Spawning grounds of the striped bass or rock, Rocuss saxatilis (Walbaum) in Virginia. Bull. Bingham Oceanogr. Coll. 14(1):98-110.

Virginia State Water Control Board. 1976. Water Quality Inventory
(305(b) Report) Virginia. 1976 Report to EPA Administrator and
Congress. Inf. Bull. 526. Chap. VIII-XI, XX.