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HISTORY AND CURRENT STATUS
JAMES RIVER NAVIGATION PROJECT

by

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Gloucester Point, Virginia

14 August 1962

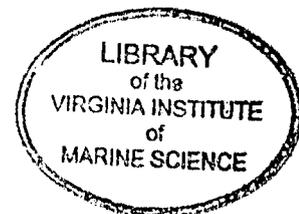
I. Introduction

The purposes of this report are: 1) to briefly recount the history of the James River Channel, or more properly--the James River Navigation Project; and, 2) to discuss the present situation pertaining to proposed changes in the river bed or channel in the critical estuarine area located between Hampton Roads and Jamestown Island.

For greater historical detail of certain aspects of this matter see the report of the District Engineer (1962).

II History to 1947

- A. Early dredging of part of the River was accomplished in 1854.
- B. Further James River Channel improvements were authorized in Rivers and Harbors Act of July 5, 1884.
- C. In 1928-30 the channel was dredged to 22 feet around Rocklanding Shoal.
- D. Most recent modifications to channel were made in 1947. The Channel is currently maintained at 25' depth (at mean low water) and 300' wide to Hopewell. Above Hopewell a 25' channel, 200' wide is maintained to Deepwater Terminal. Total project length is 90.8 miles. Several cutoffs and turning basins are incorporated. A chart showing the channel route and the proposed changes or improvements which was given in the several reports of the Office of River Basin Studies, U. S. Fish and Wildlife Service and of the Corps of Engineers has been included herein and may be consulted for details, see Figure 1.



III. Recent History

- A. 1949, September — Corps of Engineers held public meeting at Richmond -- Civic and industrial interests urged deepening entire channel to 35' to accomodate newer, deep-draft vessels.
- B. 1950, June — Norfolk District Engineer recommended that a feasibility study be made, requested \$157,000 for this purpose.
- C. 1955, August — Congress appropriated \$80,000 for study. (Col. Pickard, then the District Engineer, stated in October, 1958 that \$160,000 had eventually been expended in the Corps of Engineers study.)
- D. 1955, December — Meeting called by District Engineer in Richmond.

Results:

- 1. Civic and business leaders and the Virginia Ports Authority again urged the project as an improvement to commerce and industry of upper James Principally in the Petersburg, Hopewell, Richmond areas. Other points made were: Project would make more industrial sites available along entire stretch of channel and project would aid in national defence by permitting dispersion of industry to James area.
 - 2. A preliminary report by the Corps of Engineers which indicated a benefit-to-cost ratio of 2.16:1 for project was cited.
 - 3. Seventeen speakers were in favor of project. One participant spoke against it.
 - 4. Dr. J. L. McHugh, Director, Virginia Fisheries Laboratory (now Virginia Institute of Marine Science), reminded assemblage of necessity of considering possible effects of project on oyster seed beds.
- E. 1956 — Survey by Corps of Engineers and Fish and Wildlife Service was begun.
 - F. 1957, November — Survey Report entitled, "A Preliminary Report on the Considered Navigation Channel Improvements, James River, Virginia, in relation to Fish and Wildlife Resources" was completed by the Fish and Wildlife Service.

Results (paraphrased):

1. Valuable seed oyster areas might be harmed by silt and dredging, or mechanical, damage.
2. Dredging, spoil disposal, and siltation would eliminate some other biologically productive water and land areas.
3. Normal growth and reproduction of aquatic organisms would be adversely affected during period of construction, mostly by siltation.
4. Sixty-five (65) acres (of a total of 18,400) including about 30-35 acres of prime oyster rock would be dredged out or sloughed away.
5. Wildlife resources and marsh lands would be adversely affected by spoil disposal (essentially same as point 2 above).

Most of these adverse effects on fish and wildlife were noted as being relatively minor. The Fish and Wildlife Service recommended that dredging and spoil disposal be conducted in such a way as to avoid spawning periods of fish and oysters.

Report actually stated that other effects, for example, changes in salinity and current patterns, would be minor.

- G. During subsequent consultations between Virginia Fisheries Laboratory (VIMS) and other estuarine hydrographers (physical oceanographers) and marine scientists it developed that previous views of the possible effects of channel dredging were far too simple.
- H. 1958, February, General Assembly Hearing, Richmond -- Dr. Donald W. Pritchard, Physical Oceanographer and Director, Chesapeake Bay Institute, Johns Hopkins University, a foremost expert on estuarine circulation and Consultant to the Tidal Hydraulics Committee of the Corps of Engineers and to the Waterways Experiment Station; Dr. Paul Galtsoff, Senior Oyster Biologist, U. S. Fish and Wildlife Service Laboratory, Woods Hole, Massachusetts; and Dr. J. L. McHugh, Director, Virginia Fisheries Laboratory (VIMS), pointed out that deepening of the Channel by 10 feet would alter the cross section of the river bed in the immediate vicinity of the channel which, in turn, would:

1. Result in stronger upriver flow of high salinity (saltier) bottom waters from Bay, i.e., that more salt water would go further upriver on bottom; and
 2. Result in a change in the "level of no net motion" and other circulation phenomena which might materially affect setting of oysters. A model study of James was urged by Drs. Pritchard and Galtsoff in order that physical changes would be determined. Mr. David H. Wallace, Director of the Oyster Institute of North America, opposed the channel deepening on grounds that most of Virginia's oyster industry would be jeopardized because setting might be adversely affected. He pointed out that most of the marketable oysters produced in Virginia ultimately came from the James River seed area.
- I. October 1958, Meeting, Office of District Engineers, Norfolk — Discussed model study proposed in previous meeting. In addition to Drs. McHugh, Pritchard and Raymond V. Long, the Director of Virginia Department of Conservation and Economic Development; Messrs. Lankford, then Commissioner of Fisheries of Virginia; and, H. B. Simmons, Hydraulic Engineer, U. S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi, plus others were in attendance.

It was agreed by Dr. Pritchard and Mr. Simmons, the physical oceanographer and the hydraulic model experts respectively, that channel dredging would change the circulation pattern, and that water of higher salinity would intrude further up river on the bottom and that there would be a change in the "level of no net motion".

Drs. McHugh and Pritchard stated that the change in circulation pattern could upset the oyster seeding and setting procedure that is now working so well. They further stated that, should the salinity over the oyster beds change significantly, diseases, i.e., Dermocystidium marinum—the fungus, (and now—1962, MSX) and oyster drills, which were, and are, active in the oyster beds in the vicinity of James River Bridge could invade the most productive areas immediately upstream and cause damage to the young oysters thus partially destroying or eliminating the source of seed for Virginia's oyster industry.

All scientists agreed that a model test would afford an opportunity to get some answers to the physical questions at hand.

Col. Pickard, then District Engineer, Norfolk, indicated, on terminating the meeting, that he was not convinced that an evaluation of the model study would actually permit estimation of the monetary loss to oyster production and that he would be reluctant to recommend that the model be built at Federal expense.

J. 1958, November — Letter from Fish and Wildlife Service, Branch of River Basin Studies to the Norfolk District Engineer in form of Amendment to Fish and Wildlife Service Report of November 1957.

1. The letter called attention to the fact that since the November 1957 report several hydrographers and marine biologists have considered and pointed up "the very definite probability that deepening the navigation channel could cause extensive damage to the seed oyster potential of James River."
2. It was further stated that, "It is the consensus that channel deepening would result in increase in salinity over the seed oyster beds. In view of this, and the foregoing discussion, we agree with you that a model study of James River need not be conducted at this time."
"We conclude that an increase in salinity will favor encroachment into the seed area of oyster destroying organisms that could result in significant reduction in seed oyster production. Construction of this project would be in the nature of a gamble with the odds weighed heavily against the oyster industry."

The basis for the decisions by the District Engineer and the River Basins Study Group of the FWS against the model study is not clear at this time. Past recorded testimony by marine scientists does not seem to support such a conclusion. (See Dr. Pritchard's letter - Appendix I)
W. J. H., Jr. - 1962

K. The model was not built.

1. Considering the present situation it is unfortunate that it was not. It is now obvious that a model would have answered questions about possible alternate channel routes through the critical seed area. It also would have informed us of the physical effects to be expected. This last feature would have assisted in understanding possible biological effects.

2. It was obvious to all concerned in the 1958 discussion that accompanying biological studies in the field (ecology) and laboratory (physiology) were necessary and that they would have to accompany the model study in order for it to be fully meaningful. It is unfortunate that neither the model studies nor these detailed biological studies were carried out. However, some additional information is now available to both estuarine hydrography and marine biology as a result of research since 1958.

IV. Current Situation

- A. In 1958, the General Assembly placed in the hands of the Commission of Fisheries an important part of the responsibility for approval or disapproval of the proposed James River Navigation Project where it remains until this time.
- B. Twice, in 1960 and 1962, it has been suggested by various members of the General Assembly and others that the Commission be relieved of this responsibility.
- C. In 1962, the Corps of Engineers released its most recent study of this project recommending its approval by Virginia. Also in 1962 the memorandum and history of the proposed project which has been made available to the Commission was prepared by Dr. Hargis of the Virginia Institute of Marine Science, at the request of the responsible subcommittee of the General Assembly.
- D. Most recently, the General Assembly of 1962 approved Senate Joint Resolution Number 36 creating the present Commission.

V. Latest Economic and Scientific Information

- A. It is more properly within the province of groups other than the Virginia Institute of Marine Science to comment upon the overall economic and sociological situation, i.e., the likely industrial growth and increase in shipping and other business results of the channel deepening; therefore, this phase will not be considered. Certain aspects of the economic picture have been treated in detail in the 1962 report of the District Engineer. In passing, however, it seems pertinent to point out that several recently emerging factors must be considered in making an up-to-date, realistic economic study.

One is the proposed petroleum pipeline which may pass through the Richmond area and the other is the question of how long a 35' channel will be sufficient for vessel operations of the magnitude desired, envisioned and/or likely to develop. All economic and sociological benefits and losses should be thoroughly and dispassionately investigated. If there is to be an element of chance involved in this, or any other project, it is well to know the magnitude of all the stakes as precisely as possible and to recognize the percentages involved.

In order to facilitate considerations of the economic value of the oyster industry, one of the economic segments involved in this marine resource--use project, Appendix II, has been prepared from various sources. In Appendix II it can be seen that in terms of landed value (\$10,743,000) and retail value (\$30-32 million) the capitalized value of this self-renewing resource which is at once the raw and finished product is well over \$100,000,000. This does not include the capital value of plants, vessels and other equipment of the industry.

1. It must be mentioned that fishery statistics are not precise figures. Usually they are too low or conservative. This results from the reluctance of fishermen and dealers to give accurate figures to government personnel, particularly when high catches have occurred, because of their fear that market prices would be affected adversely. Inaccurate industry reports are prompted by other motives. In addition some catches are not reported at all.

B. Hydrographic knowledge has changed little since the 1958 hearings and discussions. However, several newer reports pertaining to recent field and model studies are available. It seems fitting to review the early findings of hydrographers and bring them up-to-date.

1. Hydrography

The essential details of circulation of the James River and similar estuaries are discussed in the brief description provided in the accompanying special report to the Commission. The salient features described therein provide a more detailed background for the following abbreviated presentation.

All available hydrographic information indicates strongly that a change in the cross section of the estuary, such as would be produced by deepening the channel with accompanying widening at the top, would cause changes in salinity and current patterns in the

estuary. The questions of how significantly the current and salinity patterns would be altered and how far up into the seed beds these changes would be felt are as yet unanswered.

(In this regard the views expressed by Dr. Pritchard in his letter of 7 February 1962 are pertinent. (A copy is included.) It is interesting to note that as a result of recently conducted studies of proposed and experimental channel deepenings in other estuaries one new fact has emerged. It has been learned from these studies that there appears to be a "threshold depth or cross section" which is characteristic for each estuary. Deepening to this "threshold depth" will produce changes in circulation and salinity patterns, but beyond - no changes will result. The precise nature of this phenomenon is not understood as yet but it is a factor which could be considered in our deliberations. In other words, it may be that James River has already been dredged to this depth and that deepening the channel would have no effect. On the contrary, it may be that the "threshold depth or cross section" has not yet been reached and that changes will result from dredging. Only actual deepening of the River, with detailed before and after hydrographic studies, or a model study will disclose this depth.)

2. Biology

Various persons have stated that previous dredgings in the estuarine portion of the James have not harmed seed oyster production, some have actually claimed improvement. Still others claim that damage has occurred. Actual seed production figures by year, back to 1920, have been included in Part B of Appendix II for your consideration. It seems clear that the data do not support either view.

The essential point is that if the circulation of the estuarine portion of James River is altered significantly, correspondingly significant changes, possibly detrimental, in oyster setting would probably occur.

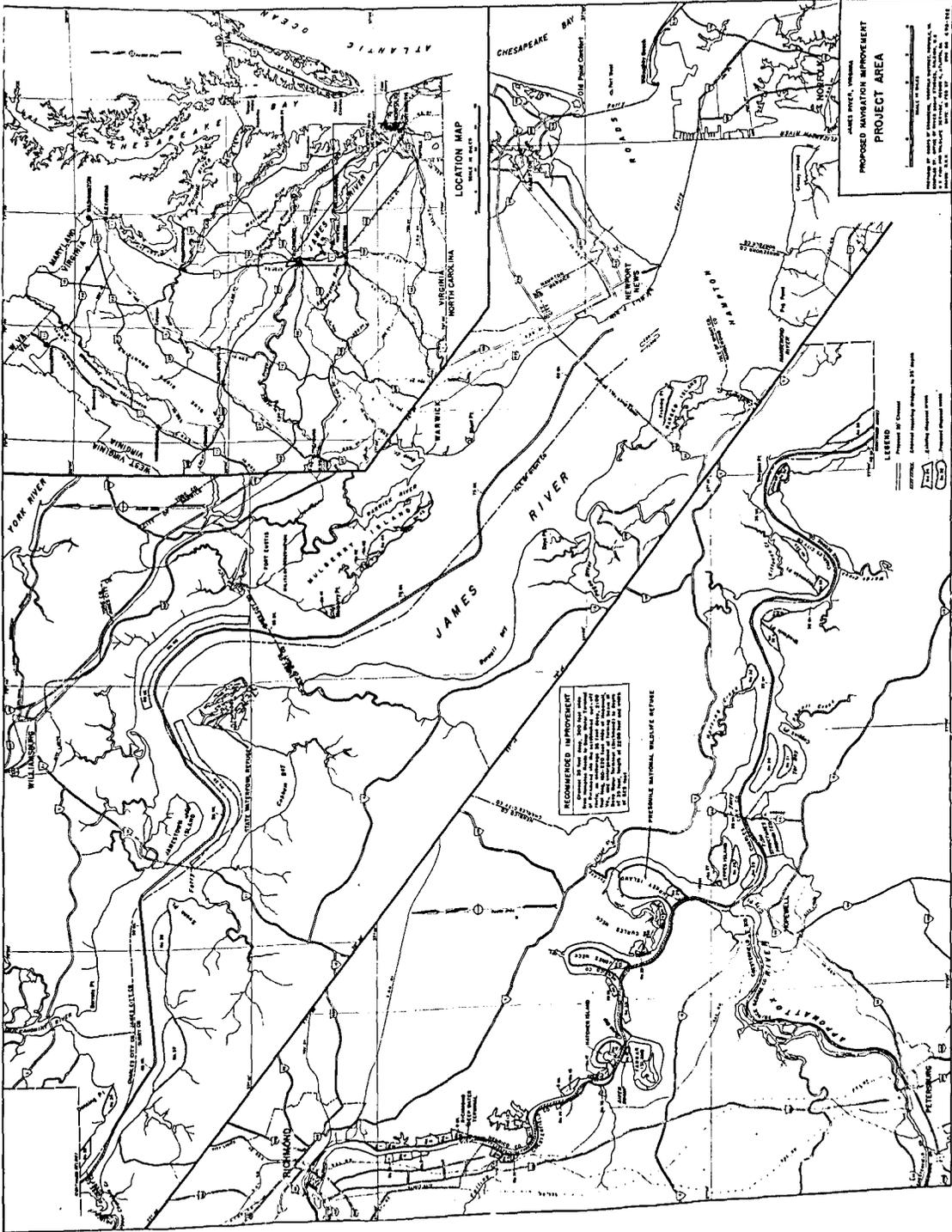
It is definite that among the biological factors contributing to the continuing success of the James River Seed Beds the most significant is the absence of predators, for example, the oyster drill, Urosalpinx cinerea and Eupleura caudata, and diseases, for example, the oyster fungus, Dermocystidium marinum, and the protozoan parasite--MSX. All three are found immediately down-river of those seed beds which are still productive. A chart showing this is included in the summary of hydrographic and biological facts which you have. Were these organisms to move

onto the seed beds seed production would be seriously disrupted. The factor or factors most responsible for keeping drills, the fungus and MSX out of the producing seed beds permanently are directly associated with low salinity. It is for this reason that oyster biologists and oyster producers fear any changes in the pattern of movement and distribution of bottom waters which would result in higher salinities over the seed beds.

The actual destruction of producing seed beds by mechanical action of dredging would be appreciable and determinable, but not serious as compared to the possibilities mentioned above.

Possible changes in the upriver distribution of other organisms such as fish, barnacles, shipworms, crabs, etc., are unknown. Some would doubtless occur.

It is regrettable that more definite scientific knowledge is not at hand. As pointed out elsewhere, marine science would know more about these natural phenomena, and our resource-use decisions would be correspondingly less difficult had the recommendations made by the marine scientists concerned in 1958 been carried out.



JAMES RIVER, VIRGINIA
 PROPOSED NAVIGATION IMPROVEMENT
 PROJECT AREA
 SCALE: 1" = 1 MILE
 DATE: 1954

RECOMMENDED IMPROVEMENT
 The proposed improvements consist of widening and deepening the river channel, the construction of locks and dams, and the installation of navigational aids. The project is designed to increase the river's capacity to handle larger vessels and to improve the reliability of the waterway.

PROJECT NO. 100
 PREPARED BY THE
 U.S. ARMY
 CORPS OF ENGINEERS
 WASHINGTON, D.C.

APPENDIX II⁽¹⁾

Certain Economic Statistics Pertinent to the Virginia Oyster Industry

A. Yearly value of Virginia Oyster Industry (1951-61)

<u>Year</u>	<u>No. Bushels landed</u> ⁽²⁾	<u>Market value at landing</u>	
1951	3,276,000	\$ 5,277,000	Average value(1951-61)
1952	3,998,000	7,713,000	\$9,947,000
1953	4,293,000	7,652,000	
1954	4,474,000	9,840,000	Average value(1957-61)
1955	5,126,000	10,016,000	\$11,795,000
1956	4,600,000	9,900,000	
1957	4,468,000	9,847,000	
1958	5,696,000	14,126,000	
1959	5,204,000	13,374,000	
1960	4,746,000	10,883,000	
1961	3,171,000	10,743,000	

B. Yearly value of seed oysters

<u>Year</u>	<u>No. Bushels landed</u> ⁽²⁾	<u>Value to tongers</u>
1920-21	1,030,000	\$ 181,000
1924-25	1,982,000	361,000
1929	1,678,000	356,000
1930	2,248,000	406,000
1931	2,133,000	232,000
1932	2,050,000	158,000
1933	2,070,000	166,000
1934	2,910,000	307,000
1935	2,553,000	318,000
1936	1,180,000	204,000
1937	1,112,000	199,000
1938	1,234,000	232,000
1939	1,142,000	163,000
1940	1,289,000	240,000
1941	1,241,000	267,000
1942	981,000	245,000
1944	1,645,000	671,000
1945	1,498,000	
1946	1,455,000	
1947	1,104,000	
1948	1,932,000	
1949	2,248,000	
1950	2,541,000	
1951	2,866,000	
1952	2,682,000	

<u>Year</u>	<u>No. Bushels landed</u>	<u>Value to tongers</u>
1953	4,077,000	
1954	2,900,000	
1955	2,785,000	
1956	3,809,000	\$ 2,708,000
1957	3,708,000	3,350,000
1958	2,564,000	2,589,000
1959	3,401,000	2,479,000
1960	2,993,000	2,115,000
1961	2,057,000	1,379,000

Notes:

- 1) Except where noted all figures given above and below are from United States Fish and Wildlife Service, Fishery Statistics of the U.S.
- 2) U. S. Standard Bushel (2150.4 cu. in.)

James River seed are not separated from those secured from other sources. James Wharton says (telephone conversation, July 19, 1962) that the average yield from James River is close to 2,000,000 Va. bu. or 2,606,000 U. S. Standard Bushels. During season ending in 1961 there was a slump in actual landings of seed oysters from the public grounds in James River from the depressing effect of MSX, but last season showed a return to near normal production.

C. Percentage of Virginia Seed Coming from James River.

From the figures given below it appears that about 89% of all seed oysters from public grounds came from the James River Beds. (These most recent figures are subject to revision as later data become available.)

- 1) Messrs. Miles and Ballard of Norfolk (personal communications) have harvested about 1,534,000 Va. bushels (1,999,283 U. S. Standard bu.) from shells planted on rented grounds in James River during the ten year period 1952-61. This is an average of nearly 200,000 bushels per year which has not been included in the above figures.
- 2) Mr. James Wharton, Weems, Virginia, (of the FWS Statistical Group) reports 2,208,300 Va. Bu. (2,877,415 U. S. Standard bu.)

of seed oysters harvested last year. Of these 1,961,000 Va. bu. (2,555,965 U. S. Standard bu.) were tonged from public grounds in James River. This means that 88.83% of all seed oysters from public grounds in the State came from James River.

D. Percentage of total Virginia market oysters dependent on James River seed.

No one will venture a firm estimate on the percentage of total market oysters harvested in Virginia that are dependent upon James River seed; however, except for a few fortunate Bay-area planters who secure an adequate set on shells, seed from Eastern Shore, and seed imported to Eastern Shore from South Carolina--and elsewhere, most Virginia planters are dependent on James River seed. It is safe to estimate that between 70 and 85 per cent of all market oysters produced in Virginia come from James River seed.

E. Number of people involved in Virginia Cyster Industry.

1. Number of operating units (U.S.F.W.S. Statistical Report 1959)

Oyster dredges	686
Oyster tongs	3,078
Oyster rakes	52

(From telephone conversation with Mr. James Wharton, July 10, 1962:)

2. About 105 shucking houses employ 3,600 people

3. Tongers on James River

1959	1,213
1960	1,229
1961	1,011

F. Leased oyster grounds in Virginia (Com. of Fisheries Report for 1960-61)

1909	35,500 acres	1941	67,500 acres
1911	46,000 acres	1951	106,000 acres
1921	47,000 acres	1961	132,500 acres
1931	62,000 acres		

G. Seed oyster production for regions along the Atlantic seaboard, 1960

	<u>U. S. bu.</u>	<u>Value</u>
New England	30,842	\$ 145,285
Middle Atlantic	3,000	9,000
Chesapeake *	2,999,824	2,121,959
South Atlantic	56,000	17,360

*Maryland 7,031 bu. valued at \$6,750

Virginia 2,992,793 bu. valued at \$2,115,209