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ASSESSMENT OF THE POTENTIAL ENVIRONMENTAL EFFECTS OF THE PROPOSED MARINA AT YORK RIVER STATE PARK

by

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Summary

1. There are several public access sites to the York River between the George P. Coleman Bridge and the city of West Point. However, only one site, Croaker Landing, exists along the southern side of the river. In addition, there are no recreationally oriented marinas along this section of the York.

2. There are nearly 38,000 acres of wetlands in the York River drainage basin. The York River State Park contains 170 acres of marsh, 91 acres of which occur along Taskinas Creek.

3. There are seven distinct vegetative communities in the Taskinas Creek marsh. Based on extent, vegetative productivity and proximity to water courses the saltmarsh cordgrass community which dominates 53 percent of the areas is, ecologically, the most valuable community.

4. Taskinas Creek wetlands are comparable to other York River marshes in vegetative productivity. The marshes along the creek produce annually approximately 225 tons of vegetative material (dry weight). The area proposed for the marina complex, which represents 27 percent of the creek system produces 53 tons of vegetation per year or 23 percent of that produced in the total marsh.

5. Based on vegetative composition, total acreage, area flooded, and ratio of shoreline length to marsh acreage, the Taskinas Creek marsh is considered to be of primary ecological significance.

6. The Taskinas Creek marsh has significant potential as a teaching aid in the nature study program of the park. Within the creek system the wetlands grade from swamp at the headwaters through freshwater marshes and into saltmarshes near the mouth. Within a distance of a mile, park visitors

could see and gain a better interpretation of the dynamics and of the variety of wetlands of the Commonwealth.

The remnants of what appears to have been a corduroy road appears in the marsh along the creek about 1/4 mile upstream from the mouth. Though it is under nearly 2 feet of sediments and is exposed only at low tide, this historical artifact has significant education interest to warrant its preservation.

7. There are three broad categories of impacts that will develop as a result if the proposed marina is constructed. The primary impact will be the alteration of 27 acres of marsh, over 7 acres of river bottom, and the land used for spoil disposal. Secondary impacts will include the general loss of potential for oyster production in waters adjacent to the marina, reduction in quality of fish nursery grounds, and reduction in wildlife habitat. Tertiary impacts are considered to be those closely related to management practices such as refuse control and pollution abatement, and are therefore more easily regulated.

8. An alternative site for the proposed marina facility for Taskinas Creek was located. This site is the wetland proposed by the Corps of Engineers for disposal of dredge spoils. Located 1 mile downriver from Taskinas Creek, this 20 acre site has significant advantages over the proposed site. Less wetland area would be altered by its use, and deep water is located within 2,200 feet of shore as opposed to nearly 4,000 feet off Taskinas Creek. There appears to be sufficient space for disposal of most of the dredged material within the area or in nearby low-lying areas having little ecological significance. The use of this site would result in the preservation of the Taskinas Creek marsh which is ecologically more important than this unnamed marsh.

9. The suggested alternative to the proposed marina, which would incorporate dry land storage facilities (site not specified), could be constructed in a smaller space and require less basin and potentially less channel dredging. It would result in less damage to the environment than would the construction of the proposed Taskinas Creek marina.

10. The overall impacts of the total proposed park development including the marina complex relative to fish and shellfish production, wildlife habitat and to other aspects of the terrestrial and the aquatic environment, will be significant. It is believed, however, they will not be so significant that they outweigh the potential public benefits that would be derived by the construction and operation of the proposed facility.

11. The park complex including the proposed marina, if developed, must be constructed and operated in a manner which reflects the utmost in concern for the maintenance of the high quality of the natural environment of this tract of land, bordering properties, and the York River.

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Table of Contents

Table of Contents (continued)

Table of Contents (continued)

List of Tables and Figures

ASSESSMENT OF THE POTENTIAL ENVIRONMENTAL EFFECTS OF THE PROPOSED MARINA AT YORK RIVER STATE PARK

I. HISTORY

In 1968 the Division of Parks of the State Department of Conservation and Economic Development initiated research into the feasibility of a marina for the proposed York River State Park located near the town of Croaker in James City County. The services of the Corps of Engineers, Norfolk District, were solicited to prepare an economic assessment of the necessary navigation requirements for a marina and a report was submitted in February 1969.

Benefit-cost ratios indicated a marina was justifiable based on recreation boating in the Middle Peninsula region. Consenting reviews of the proposed marina by the Bureau of Sport Fisheries and Wildlife, the Virginia Marine Resources Commission, the Virginia Commission of Game and Inland Fisheries and the Virginia Institute of Marine Science (see Appendix A), provided impetus for more detailed development plans. Additional plans were provided by planning consultants, and a York River State Park Master Plan was compiled. In May 1972 the Division of Parks, concerned over the potential impact of the proposed marina on wetlands within the confines of the Park property as well as on the marine resources in the adjoining waters of the York River, requested assistance from the Virginia Institute of Marine Science to evaluate this impact. In recognition of the request, the Institute submitted a proposal outlining the information that could be provided and this is outlined as follows:

1. A map of the wetland areas within the park bounds including the limits of dominant vegetative species.
2. A standing crop estimate of the dominant vegetative species, an estimate of the seasonal productivity per unit area for each dominant form and an estimate of the total productivity of the marsh.
3. An estimate of the losses of vegetative productivity due to the construction of the marina and the resultant losses to the marine environment.
4. An estimate of the losses to the commercial fisheries in the vicinity of the park.
5. An overall evaluation of the environmental impact of the park and marina complex on the marine environment.
6. An evaluation of alternatives which might prove less damaging to the environment.

In August it was further requested of the Institute by the Division of Parks to comment on the following additional alternatives for a marina complex in the York River State Park:

1. Marina in York River without dredging and condemnation of as much of the oyster grounds as originally proposed.
2. Boat docking and landing facilities with dry land storages requiring less dredging.
3. Boat docking and landing facilities with no dry land storage.
4. A semi-circular marina complex developed from shore outward into the York River (dimensions not specified).

VIMS has addressed itself to the above outlined assessments and hereby submits its conclusions.

II. DESCRIPTION OF THE PROPOSED BOATING FACILITIES

A. MARINA AND CHANNEL TO DEEP WATER

The York River State Park Master Plan describes a 350-400 boat marina to be constructed within Taskinas Creek. The proposed marina would be constructed and operated such that fifty percent of the berths would be reserved for transient visitors and the remainder would be available for area residents to rent for long-term use. The facility would also contain four launching ramps, a boat service and supply building, and a snack bar-food supply center.

The complex would lie along the southern half of the Taskinas Creek marsh from its mouth, a distance of approximately 2,700 feet inland. Upon completion of the dredging of the marina basin, which would be about 400 feet wide by 2,300 feet long, the shoreline would be bulkheaded.

In addition to berthing spaces for boats, parking spaces for 816 cars would be provided. It is anticipated by the planners that the daily capacity of this facility would exceed 1,500 people.

The marina site is surrounded by 60-90 foot wooded hills on all sides except the north. However, approximately 400 feet of low-lying land (marshland at the present time) would afford protection from wind and wave action from that direction.

In addition to the marina, a channel measuring 80 feet wide, 6 feet deep and 5,300 feet long would be dredged from the basin to deep water in the York River.

B. CROAKER LANDING

In addition to the marina complex, another launching facility would be developed at the present access site, Croaker Landing, which lies about 1 mile upstream in the York River. Plans call for provisions to launch 2 to 4 boats at one time from this site. Parking for 30 cars and trailers would be provided. A small loading dock would be constructed to facilitate the launching of boats.

It was also planned that the commercial fishing activities presently centered at this site would be enhanced in order to provide a location where park visitors might purchase fresh seafood items.

III. METHODS OF POTENTIAL IMPACT ANALYSIS

The most apparent initial impact on the environment which the construction of the marina would create would be the loss of wetlands. Extensive amounts of marsh in Taskinas Creek would be dredged and filled to provide the required space for boats as well as for land facilities. Knowing that marshes are important to the marine environment primarily as a source of the food substrate, detritus, and that these wetlands are essential to certain mammals and waterfowl as habitat and feeding sites, and that these values accrue primarily from the plants growing there, it was apparent that the vegetative quality and productivity of Taskinas Creek marshes would have to be assessed in order to evaluate the magnitude of the potential impact of the proposed marina.

To accomplish this, a vegetative mapping program was initiated. Aerial photographs (1:60,000 scale, NASA, 1971), a 1:24,000 scale, U. S. Geological Survey topographic map (Gressitt Quadrangle), and plane table

mapping techniques were used to delineate the dominant forms of vegetation within Taskinas Creek.

Secondly, a random sampling program was conducted to assess the standing crops of the dominant forms of vegetation in the area of the proposed marina as well as elsewhere in the creek system. Vegetation was clipped from 1/4 m^2 circular quadrats at preselected locations throughout the areas. The sampling sites were determined in the laboratory by placing a grid over a map of the marsh and then selecting, by use of a random numbers table, a number of squares within which samples were to be taken.

After collection the grass samples were sorted to species, dried in ovens at 105°C for 48 hours, and then weighed to obtain estimates of standing crops.

Data on vegetation were compared with similar data obtained from nearby marsh systems located in Ware Creek about 4 miles upstream in the York River, in Purtan Island across the York from Taskinas Creek and in Carter Creek located about 10 miles downstream and across the river in Gloucester County.

For analyses of potential impacts on wildlife, personal observations were made of wildlife utilization of the area, and U. S. Fish and Wildlife Service information for the area was utilized (Appendix A).

The impact on marine life of the proposed channel dredging to deep water was evaluated by use of fishery reports and data concerning the York River that have been compiled by VIMS in earlier studies. In addition, personal observations on active fish nets, crab traps and oyster grounds were made. Consultation with other VIMS personnel provided additional information on potential damage to the environment through the development and operation of the proposed marina.

Information pertaining to channel dredging, estimated siltation rates and sediment composition as determined by Army Corps of Engineers were also used.

IV. EXISTING PUBLIC ACCESS FACILITIES ALONG THE YORK RIVER

The proposed marina would be the first public facility of this nature to be constructed along the southern shoreline of the York River above the George P. Coleman Bridge between Yorktown and Gloucester Point. At present only one public launching ramp, Croaker Landing, located within the park bounds and suitable only for trailered boats, exists along this shoreline between the bridge at Yorktown and the city of West Point.

There are several launch sites along the north shore of the York River, however. Three of these, Gloucester Point Landing, Tanyard Landing on the Poropotank River across the York from Taskinas Creek, and the West Point Landing near the mouth of the Mattaponi River are controlled by the Commission of Game and Inland Fisheries. Other access sites in Gloucester County are located at Capahosic, Claybank, Cedarbush Creek, and Timberneck Creek. These latter locations, which are upstream of the bridge, have very limited facilities and are usable only under optimum water conditions.

A small marina which caters primarily to commercial fishermen is located across the York River in Gloucester County about 4 miles downriver from Taskinas Creek. Because of its location, this facility as well as the launch sites identified above are not directly accessible to Middle Peninsula residents. Consequently the recreational potential of the York River is not being fully utilized.

Several marinas are located between the George P. Coleman Bridge and

the mouth of the York River. These facilities provide berths for several hundred boats. Though no polls were taken, it is believed that most of the boat owners using these marinas spend most of their time afloat near the mouth of the York River or in the Mobjack and Chesapeake Bays. (During the past two years very little recreational boating has been observed along a two mile section of the York River between Queens Creek near Williamsburg and Claybank in Gloucester County. This suggests that few boaters come from the lower York to use waters further upriver.

V. DESCRIPTION OF WETLANDS

A. LOCATION

Taskinas Creek enters the York River about 24 miles upstream from its mouth. The marshes of this creek, which lies wholly in James City County, in many ways typify the wetlands of the entire York River Basin. Whereas the head waters of Taskinas Creek drain swamps and freshwater marshes, so do the major tributaries of the York, the Pamunkey and the Mattaponi rivers. These two rivers which enter the York at West Point, about 9 miles above Taskinas Creek, together drain over 20,700 acres of swamp, freshwater, and low salinity marsh (Wass and Wright, 1969).

In the lower sections of Taskinas Creek saltwater marshes predominate just as they do along the shores and other smaller creeks and rivers entering the York. Approximately 17,600 acres of salt marsh occur along the York River between its mouth and West Point (Wass and Wright, 1969).

Numerous other creeks and marshes occur in the vicinity of Taskinas Creek. One of the larger ones on the south side of the York is Ware Creek. Over 520 acres of freshwater and low salinity marshes are found here.

Vegetatively, this area is quite similar to Taskinas Creek. Ware Creek has been one of the sites of intensive wetland studies during the past two years.

Terrapin Point marsh, about 4½ miles upstream from Taskinas Creek, consists of approximately 410 acres of wetlands. Since this marsh juts into the York River and is not influenced greatly by upland drainage it is comprised entirely of saltwater tolerant plants.

Across the river from Taskinas Creek, the Poropotank River enters the York. More than 1,000 acres of freshwater and low salinity marshes border this stream (Kerwin, 1966). Downstream from the Poropotank about 1 mile, Purtan Island occurs. This tract of vegetatively diversified marsh is presently managed privately for wildlife, especially waterfowl. The more than 780 acres of salt marsh in this tract have in excess of 16 miles of internal streams, 50 feet or more in width. These waterways provide an important interface across which the wetlands and the marine environment may interact.

B. YORK RIVER STATE PARK

There are approximately 170 acres of marsh within the park boundaries as determined by analysis of the U. S. Geological Survey topographic map, Gressitt Quadrangle. Nearly all of this system is of a low salinity type except in the upper reaches of Taskinas Creek where two small freshwater marshes exist.

There are several distinct vegetative communities within the park's wetlands (see Table 1).

Table 1. Vegetative Communities of the Taskinas Creek Marsh

Community	Percent of the Area	Vegetative Character
Saltmarsh Cordgrass	53	Saltmarsh Cordgrass
Saltmeadow	12	Saltmeadow Cordgrass-Saltgrass
Saltbush	9	Marsh Elder-Groundsel Tree
Freshwater	9	Cattail-Arrow Arum-Pickerel Weed-Sedge
Threesquare	7	Saltmarsh Bulrush-Olney Threesquare
Big Cordgrass	5	Big Cordgrass
Swamp	5	Maple-Gum-Oak-Ash

The saltmarsh cordgrass community as well as the threesquare and freshwater communities are found in the lower parts of the marsh and are regularly flooded at high tide. Slightly above this zone the big cordgrass community occurs. It is flooded generally by those tides which exceed the mean high water level. The saltmeadow and saltbush communities are also found above the mean high water elevation and are only flooded by spring tides and storm tides. The swamps, though flooded by extremely high tides, generally receive most of their dampness from upland and groundwater discharges.

The wetland areas of the park may be divided into several natural units; Taskinas Creek proper, two unnamed marsh areas, and a fringing marsh bordering the York River shoreline. These are discussed in more detail below.

C. TASKINAS CREEK

The Taskinas Creek marsh is the largest (91 acres) of the wetland units in the park. It is also the most diverse with respect to plant composition. At least 26 species (see Appendix B) of flowering plants are known to occur in the area. The maps at the end of the report illustrate the distribution of the dominant vegetative forms in the wetlands of the park.

1. VEGETATIVE COMMUNITIES

a) SALTMARSH CORDGRASS COMMUNITY

The saltmarsh cordgrass community, dominated by the species of the same name, occupies about 53 percent of the creek wetlands. In addition to its relative extent, this community is the most ecologically valuable of all the communities present for a variety of reasons including the relatively greater vegetative productivity of this community in comparison to other areas (to be discussed later), its proximity to water courses, the low elevation at which it is found, and the frequent washing by tidal action it receives.

b) SALTMEADOW COMMUNITY

The two most common species in the saltmeadow community are saltgrass and saltmeadow cordgrass. A third species, black needlerush, is occasionally found in this zone in Taskinas Creek.

The meadows have a characteristic appearance of a soft tufted mat of vegetation when viewed from a distance. The mat of grass is often thick and dense, and only a small portion of the detritus produced in this zone reaches the aquatic environment. The grass acts as an efficient

filter to water flowing through it, and little material is carried off by the receding tides.

c) SALTBUSH COMMUNITY

A third community, the saltbush community, is vegetatively quite similar to the meadows. However, in addition to the two common salt-meadow grasses being present, the shrubs marsh elder and groundsel tree are also found here.

The lower limit of this zone above mean low water is closely associated with the tide range throughout the coastal zone of Virginia. The lower limit generally occurs at an elevation about 1.4 times the mean tide range of a given locality, measured above mean low water (Marcellus, 1972). On this basis, though not precisely determined in Taskinas Creek, the lower limit of the saltbush zone would occur at the approximate elevation of 4.3 feet above mean low water. This zone continues upward and may extend to the fringe of upland woods.

Near the mouth of Taskinas Creek the impact on wetland vegetation of the increase in sea level relative to land level can be observed. Saltbushes, as observed on aerial photographs taken in 1961 (U.S.D.A.), had a much greater distribution than they have presently.

The sea level has risen, relative to the land, approximately one inch during the last ten years (Hicks, 1972). This increase in flooding may have been sufficient to cause the death of the saltbushes which are still standing in the lowest sections of the marsh. (Winter die-back frequently occurs among saltbushes. But, apparently a combination of factors other than just cold weather is responsible for this phenomenon as

those bushes occurring in the lower sections of the marsh are most severely affected, whereas those in the higher sections of the marsh appear healthy).

d) THREESQUARE COMMUNITY

The threesquare community comprised of saltmarsh bulrush and olney threesquare covers about seven percent of the marsh and is of significance both as a detritus producer and in food value to wildlife. The saltmarsh bulrush has large seeds which are excellent waterfowl food, and olney threesquare is eaten by muskrats and geese (Martin and Uhler, 1939).

The values of the threesquare communities scattered throughout the marsh appear to be underutilized by wildlife at the present time. Waterfowl generally prefer water in which to land and then swim into the areas to feed, but the threesquare communities of the marsh are somewhat removed from open water. Muskrats are present in the area but their population density is unknown. It is believed the density is low as there are few signs of extensive feeding activity, an easily recognized condition.

e) FRESHWATER COMMUNITY

The freshwater community provides the most diversified habitat in the entire Taskinas Creek marsh. The areas are flooded almost continuously and have a variety of plant species present. Arrow arum, pickerel weed, wildrice, narrowleaf cattail, soft stem bulrush, and various species of pondweed are abundant. The distribution of plant species in freshwater areas is heterogenous, and mapping such communities is an arduous task

with little long term benefit because the distribution of vegetation changes seasonally as the different species grow and die. During the winter the areas are often only open bodies of water with scattered stalks of various species of plants visible.

Muskrats are more abundant in these areas than in the more saline sections of the marsh located near the mouth of the creek. The freshwater marshes also appear to have fairly significant waterfowl values, yet only a few ducks were seen in these areas and none were seen on a regular basis. (Local ducks may have been attracted to Purtan Island across the York River where there is a privately operated waterfowl management area).

f) BIG CORDGRASS COMMUNITY

Another vegetative zone in Taskinas Creek is the big cordgrass community. The areas dominated by this species are easily recognized as this grass grows to nearly 8 feet in height, much taller than any other species present, with the possible exception of narrowleaf cattail growing under optimum conditions.

The big cordgrass community supplies detritus to the marine food chain, but at a slower rate than saltmarsh cordgrass. Big cordgrass is quite resistant to weathering. The stalks of the previous year's growth are very common and at times the stalks from two seasons past may be found. None-the-less the community is of significant value to wildlife as habitat and as a feeding area, and to the marine environment as well a producer of an important food substrate.

2. VEGETATION PRODUCTION

a) ESTIMATING POTENTIAL DETRITUS CONTRIBUTIONS

As mentioned earlier, an important aspect of wetlands is their contributions of detritus to the marine environment. The source of detritus is predominately the vegetation that grows in the area. Consequently the potential amount of detritus that can be contributed from an area is closely related to the total amount of vegetation produced.

Indirect estimates of this potential can be obtained by clipping vegetation from the marsh and determining its weight per unit area. Those area producing more vegetation per unit area, obviously, have greater potential supplies of detritus than do those areas producing less vegetation, and are therefore considered to be of more value to the marine environment.

One way of estimating the amount of vegetation produced annually in an area is to use the harvest method (Smalley, 1958), which entails periodically measuring changes in standing crop, the amount of vegetation present at a given time, throughout the growing season.

When it is not possible to do detailed season-long studies of vegetation growth, close approximations of annual production can be made by determining the weight of the standing crop shortly after maximum growth has occurred. This period occurs at the time of inflorescense or flowering.

The estimate of annual production as obtained from this harvest can be further refined by adjusting the data for leaf droppage prior to inflorescense, potential growth afterwards and partial consumption of vegetation by animals. This is done, however, only via experience gained from detailed study in comparable areas.

The primary production studies of Mendelssohn (In press) in Ware Creek and in Carter Creek marshes, wetlands similar in composition to Taskinas Creek marshes, permit the estimation of annual production in terms of standing crop during the period of inflorescense. Mendelssohn's data indicate that the standing crops in late August-September represent approximately 80 percent of the annual production in a marsh. This factor was used to adjust Taskinas Creek standing crop data to estimates of annual production.

b) TASKINAS CREEK MARSH VEGETATION PRODUCTION

The standing crop of vegetation in Taskinas Creek was estimated by clipping samples from 58 plots randomly selected throughout the marsh. The mean standing crop of vegetation in September was 1.96 tons of material per acre on a dry weight basis. Similar data from Purtan Island, directly across the river from the park, averaged 2.03 tons per acre. Vegetation standing crops in Ware Creek and Carter Creek for September, 1971, averaged 2.19 and 2.10 tons per acre, respectively.

These standing crop estimates indicate that the Taskinas Creek marsh is similar to other York River Basin wetlands in vegetation production characteristics.

In addition to the comparisons of Taskinas Creek with other wetlands, the standing crop of the marsh area in the proposed marina was compared with that in the marsh outside of the marina. Interestingly, the standing crop values in the marina are more than 3/4 ton per acre less than they are outside of it. The 30 samples collected within the marina had a mean value of 1.57 tons of vegetation per acre while the 28 samples collected outside of it had a mean value of 2.36 tons per acre.

The sampling was conducted near the peak of the growing season when maximum plant development had occurred. Usingthe factor calculated from Mendelssohn's data the Taskinas Creek data were adjusted to obtain productivity estimates. As a unit, the Taskinas Creek marsh produces annually approximately 2.35 tons of vegetation per acre. The area within the limits of the proposed marina produces approximately 1.88 tons of vegetation per acre per year whereas the marsh outside of the marina produces about 2.83 tons per acre per year.

Table 2 summarizes the vegetation standing crop and productivity data for the Taskinas Creek marsh. Also included are similar data obtained from the Ware Creek, Purtan Island and Carter Creek marshes. Individual species standing crop estimates for the Taskinas Creek marsh are tabulated in Appendix C.

Table 2. Estimated standing crop and productivity of vegetation in the Taskinas Creek marsh and in three other York River wetlands.

Location	Standing Crop dry wt. - tons/acre	Productivity dry wt. - tons/acre/year
Taskinas Creek		
marsh mean	1.96	2.35
inside marina	1.57	1.88
outside marina	2.36	2.83
Ware Creek	2.19	2.63
Purtan Island	2.03	2.42
Carter Creek	2.10	2.46

Based on these vegetation production estimates the total potential detritus contribution from Taskinas Creek is estimated to be 225 tons per

year. The area enclosed by the proposed marina, which occupies about 29 percent of the marsh along the creek, has an estimated potential contribution of 53 tons per year or about 23 percent of the creek total.

3. ASSESSMENT OF ECOLOGICAL SIGNIFICANCE

a) AVAILABILITY OF VEGETATION

The accessibility to the marine environment of the vegetation produced in a given wetland is dependent to a great extent on the degree of regular flooding and the relative length of shoreline of the area. Interaction with the aquatic environment is therefore dependent on the flooding of an area being extensive and that the ratio of the length of shoreline per unit area of marsh being large.

b) SIGNIFICANCE OF TASKINAS CREEK WETLANDS

Taskinas Creek was evaluated relative to the extent of flooding and the ratio of shoreline length to marsh acreage. Based on the distribution of saltmarsh cordgrass, threesquare and freshwater marsh, it was estimated that nearly 70 percent of the area is flooded at high tide. In addition there are over 28,000 feet of shoreline present in Taskinas Creek (as measurable on the U. S. G. S. topographic map, Gressitt Quadrangle). There are about 310 feet of shoreline per acre of marsh. This is somewhat larger than the 210 feet of shoreline per acre of marsh in Ware Creek, but considerably lower than the 497 feet per acre average for 210 wetland areas in Lancaster County, Virginia (Silberhorn and Marcellus, In press). The ratio of shoreline length to marsh acreage for Taskinas Creek indicates a potential for significant interaction with the marine environment, and con-

sequently the vegetation produced on these marshes has a significant opportunity to enter the water and be utilized in marine food webs.

4. EDUCATIONAL POTENTIAL OF TASKINAS CREEK

A special note about the wetlands of Taskinas Creek is appropriate here. Swampland occurs at the headwaters of the creek system. Just below this, freshwater marshes with their variety of plant species are found. Further downstream, saline waters from the river enter the marsh and the vegetation composition changes to species more tolerant of salt. These rather dramatic changes which all occur within about 1 mile could be featured in the ecology-education aspect of the park's function. Serious consideration might be given to this when final development plans are being formulated. It would be a mistake to destroy any one of these sections of the park, especially when the theme of the area may be described as the York River and the marine environment.

In addition, evidence of what appears to have been corduroy roads in the marsh of Taskinas Creek were found during the course of this study. One row of logs is visible at low tide just below the farm house overlooking the entrance to the creek (see Plate 1.A). Other sets of logs were found upstream in the vicinity of the forks in Taskinas Creek (see Map C, Taskinas Creek). These historical features should be preserved and made accessible for public display, especially the group of logs near the mouth of the creek which are the most striking of the sets seen and in addition are at the edge of the area to be dredged for the marina, placing them in eminent danger of being destroyed.

D. UNNAMED MARSH AREAS

Approximately one mile downriver from Taskinas Creek two unnamed streams in close proximity to one another enter the York. The marsh bordering these streams is dominated by saltmarsh cordgrass. Small stands of saltmeadow cordgrass, big cordgrass and narrowleaf cattail are also present. This marsh, about 20 acres in extent, is drained by two narrow shallow streams, the mouths of which ebb dry on very low tides. In spite of the smallness of the drainage system, there still remains nearly 310 feet of shoreline per acre of marsh.

Based on acreage, percent of the area flooded, the presence of extensive stands of saltmarsh cordgrass and big cordgrass, and the ratio of shoreline length to marsh acreage, the area does have significant ecological values.

This area was considered as a disposal site for dredge spoils by the Corps of Engineers. A dike would be constructed across the entrance to the marsh and the enclosed area would be filled. The area does have sufficient capacity for channel dredge spoils plus maintenance dredging spoils for the 50 year design life of the channel, according to the Army Engineers Report.

Near the southeast boundary of the park another unnamed stream enters the York River. The wetlands within the boundaries of the park along this stream total approximately 14 acres. This area is a relatively high marsh, supporting meadow, saltbush and big cordgrass communities. The York River frontage of the marsh is lined with dense stands of big cordgrass while further back saltbush and meadows occur. An extensive stand of cattails also may be found near the upland limits of this area. Only extreme high

tides flood this area. Consequently, large contributions of detritus are probably made only at irregular intervals.

E. FRINGING MARSHES

The remainder of the wetlands in the York River State Park are predominantly the fringing marshes found along the river. The dominant form of vegetation in these marshes is big cordgrass. It grows to a height in excess of 8 feet and in some areas nearly 10 feet. Between the big cordgrass and the river is a narrow stand of saltmarsh cordgrass.

The vegetation of the fringing marsh was sampled to determine its relative standing crop. The mean value for the 28 samples collected at randomly selected intervals along the entire length of the park frontage was 3.73 tons per acre. Much of the vegetation of this zone may reach the river during periods of very high tidal flows.

One of the significant values of this zone is the contribution it makes toward controlling the rate of shoreline erosion. The root systems of these grasses are extensive and complex. They effectively bind the sediments into a mass highly resistant to erosion by wave action. Though these shorelines do erode, they do so at much slower rates than do unvegetated shorelines.

An additional value of these marshes is their action as a filter to upland runoff. Silt and other sediments washing down from the upland areas are caught by the grasses and are prevented from entering the river. Shellfish and fish spawning and nursery grounds are protected by this action.

VI. POTENTIAL ENVIRONMENTAL IMPACT OF THE PROPOSED MARINA

A. GENERAL CONSIDERATIONS

The construction of the proposed marina will result in the following major detrimental impacts to the environment. There will be a permanent loss of about 27 acres of marsh (see Plate 1B) as determined by analysis of site maps included in the York River State Park Master Plan. The necessary channel from the marsh front to deep water, which will be about 4,000 feet long, 80 feet wide and 6 feet deep, will destroy the biota existing on the bottom across which it is cut. In addition, shellfish grounds on nearby bottoms will be endangered by the deposition of sediments suspended in the water column and transported by tidal currents during hydraulic dredging activities. The spoil materials removed from the boat basin and the channel will cover the biota of the site at which they are disposed. Any new biota which may subsequently occur in these areas would be upland in nature and of little value to the marine environment.

The construction of a marina and its operation in Taskinas Creek will have additional impacts on the surrounding wetlands as well as in other aspects of the marine environment. These include such things as oil and gasoline leakages into the water from boats and parking lot runoff, changes in water salinity due to increased surface runoff, domestic waste discharges, and interference with water flow across undisturbed wetlands through bulkheading.

B. THE WETLANDS ACT

The General Assembly of the Commonwealth of Virginia passed a Wetlands Act in 1972. This act called for the preservation of wetlands and the

prevention of their despoilation and destruction, and to accommodate necessary economic development in a manner consistent with wetlands preservation (62.1-13.1, Code of Virginia).

The Act also states "Wetlands of primary ecological significance shall not be altered so that the ecological systems are unreasonably disturbed." (62.1-13.3(1), Code of Virginia).

The Act further states that the Institute will evaluate wetlands by type and assist in the determination of the ecological value of each marsh (62.1-13.4, Code of Virginia).

In the process of assessing the potential environmental damage of the proposed marina, the Virginia Institute of Marine Science did evaluate the wetlands of Taskinas Creek. Based on the vegetational composition, relative productivity, acreage, length of marsh-water interface and regularity of tidal flooding, the Taskinas Creek wetlands were evaluated to be of primary ecological significance.

The Division of Parks, however, is excluded from regulatory actions pertaining to wetland uses [62.1-13.5(3.i), Code of Virginia]. This discussion is therefore intended to provide assistance towards the making of decisions concerning the proposed development of a marina in the park.

C. SIGNIFICANCE OF IMPACTS

1. MARINA SITE

a) ANIMALS

Though few sitings were made, several species of wildlife are present in the Taskinas Creek area. Great blue herons were the most frequently observed birds, and clapper rails were occasionally heard but

rarely observed due to their secretive habits. Muskrats or their signs were seen in all sections of the Taskinas Creek marshes, but most commonly in the upper freshwater areas. Raccoon tracks were abundant, and their habit of feeding on fiddler crabs was witnessed through the observation of shell fragments in scats. The presence of deer tracks indicated these animals entered the marsh from time to time. A doe was observed crossing the marsh in midday during the hunting season in December.

Fallen trees and a dam indicated that beavers had been active in the swamp at the head of the southeastern branch of Taskinas Creek at one time. Their presence now is questionable though. No fresh cuttings were observed, and the dam was in a state of disrepair (see Plate 2A).

Waterfowl were not abundant in the creek, though they were common in the York River in the late fall and winter. A Canada goose, however, was seen just below the farm house at the mouth of the creek on several occasions in August. Apparently it had strayed from a small flock of geese using the Purtan Island area across the York.

It was surprising that no ducks were found in the creek, especially in the freshwater sections on the days we visited these areas. The habitat and seclusion offered by the freshwater areas appeared to have definite potential for waterfowl usage.

A bald eagle was observed flying low over the trees adjacent to Taskinas Creek in February, 1973. According to Dr. Marvin Wass (personal communication), several eagles, including active nests, have been observed along the York River drainage basin this winter. It is not known whether this eagle had a nest in the area.

The abundance of fish and shellfish in Taskinas Creek was not

studied but the large numbers of crab traps and fish net stakes set along the York River shore and in the shallows adjacent to the park property suggested the area was utilized by these animals. A series of poles across the mouth of the creek (see Plate 2B) also suggested that a fish net had been placed there at one time, perhaps during spring spawning runs. Larger fish, believed to be herring, were observed in Taskinas Creek, and it is likely that they spawn in the upper sections of the stream.

Killifishes were abundant in the marsh creeks and even in the tidal pools on the marsh surface. These fish have little commercial value, yet are important ecologically as a link in the food web between the marsh itself and such animals as the herons and raccoons which might feed on them.

Fiddler crabs were abundant throughout the saline portions of the marsh. Armies of these crabs were observed marching across the mud banks at low tide. These detritus eaters provide important links in the marsh ecosystem food web as they are a source of food for several birds and raccoons.

In an earlier letter report to the Army Corps of Engineers, the U. S. Fish and Wilflife Service stated that the wildlife potential offered by the acreage within the proposed marina basin is low to moderate. We concur with this estimation. However, it is believed that the freshwater sections of Taskinas Creek do have significantly more wildlife potential. It is suggested that these areas be maintained in as natural a condition as possible to retain these potentials.

b) VEGETATION

The vegetative data collected in the area of the proposed marina

suggested that part of the marsh had a lower standing crop than did the other parts. The loss of the wetlands in the marina site, though amounting to 29 percent of the marsh acreage in Taskinas Creek, will constitute about 23 percent of the estimated total vegetative productivity of the system. This is considered a significant loss of production from one area. This potential wetlands loss will constitute the largest of the losses known to have occurred along the York River.

c) BULKHEADING IN THE MARINA BASIN

The Master Plan calls for the entire shoreline of the marina to be bulkheaded to reduce bank slumping and sediment deposition in the basin. A bulkhead in the proposed marina would effectively block tidal inundation of undisturbed marsh, causing these areas to degrade in quality. Marshes such as these found along Taskinas Creek require frequent tidal inundation to maintain their vigor and productivity. Blocking these areas from the water would cause their productivity to decrease and their composition to change to that which is more upland in nature. Their value as a detritus contributor to the marine environment would be greatly reduced if not lost completely by bulkheading their water frontages. Personal observations in other areas where wetland shorelines fronted marinas or heavily used navigation channels disclosed no serious erosion problems especially when boats did not create wakes. Therefore the need for such bulkheading is questionable.

d) WATER QUALITY

The water quality of the basin, provided that strict antipollution measures are taken during the operation of the marina, should remain comparable to the York River water quality.

It is unlikely that water will stagnate in the basin, a condition which frequently occurs when areas are dredged below naturally occurring depths. The 2.8 foot tidal amplitude in the area and the flow-through action that will occur when the remaining creek above the basin floods and ebbs on each tidal cycle will maintain a significant interchange and a constant mixing action within the basin, provided it is dredged to a depth not greater than approximately 8 feet below mean low water.

It must be realized that contaminants which enter the water in the marina will on the flood tide move into wetlands above the basin. Potential chronic pollution from the marina would gradually reduce the overall quality of these remaining marshes.

Fish passage through the basin should not be impaired by its presence, providing water quality conditions are not degraded. It is also reasonable to assume that blue crabs will also utilize this area as has been witnessed in other areas similar in nature, provided water quality is kept high.

e) REDUCTION IN WETLAND VALUES

The Taskinas Creek area is, as mentioned earlier, a wetland of primary ecological significance because of the shoreline length -- marsh acreage ratio, the extent of tidal flooding and the kinds of plants growing in it.

The dredging of the marina basin will alter approximately 8,000 feet or 28 percent of the present shoreline in the Creek. If the basin is bulkheaded, the alteration will significantly reduce not only the extent of shoreline, but also cut off from tidal action an additional 14 acres of

marsh to the north of the basin. This would reduce the overall ecological value of the area.

However, if the northerly edge of the basin is not bulkheaded, approximately 2,500 feet of marsh-water interface would be retained and the contributions of the 14 acres would be accessible to the marine environment. Whereas the development of the marina will have detrimental impacts on Taskinas Creek marshes the total impact could be materially lessened by deleting the bulkhead from the northern shore of the basin from just inside the creek mouth to the limits of upstream development.

2. CHANNEL TO DEEP WATER

a) DREDGING AND SEDIMENTATION

The immediate impact of the dredging will be the alteration of about 7.3 acres of bottom across which the channel will pass. Not only will the biota of this section of river bottom be destroyed, it is also doubtful that the species diversity or productivity will return to pre-dredging levels (Daiber, 1972). The impact of the dredging will also occur on both sides of the channel as it is cut. Sediments suspended during the dredging will be drifted over adjacent bottoms by tidal currents. The biota of these areas will be endangered when these materials settle out of suspension and blanket the bottom.

It is difficult to predict the distance of sediment transport during such operations. Sediment size and the strength of tidal currents are governing factors here. The Corps of Engineers report states the river bottom sediments consist primarily of soft silt and peat. These materials are light and could be carried several miles before settling out of suspension. Their organic nature, in addition, introduces the problem of oxygen

uptake when they are suspended in the water. Reduced oxygen concentrations will occur and these could cause extensive kills of benthic organisms, oysters included. (Methods of alleviating some of these dangers will be discussed later).

It is expected that the portions of river bottom that are only lightly covered by sediments will recover shortly after the dredging is completed. However, the Corps of Engineers report indicates that maintenance dredging will probably be necessary every four years. This maintenance work could cause a chronic degradation in the biota of the bottoms adjacent to the channel.

The suspension of sediments may continue to be a problem during the normal operation of the marina. Boat traffic, primarily deep-draft mechanically powered vessels, can stir up the sediments, especially during periods of low water, and tidal currents will wash these materials over adjacent bottoms.

b) FISHERIES

The completed channel should have no serious effect on fish or blue crabs using this section of the York River. However, the area acts, in part, as a nursery for striped bass as well as other fish and the loss of the 7.3 acres of bottom in the channel as well as the bottom receiving chronic silting will result in less production from this general area.

Oyster production would be seriously impaired in the vicinity of the channel by the expected frequent heavy loads of suspended sediments in the water. The critical problem in this respect is the smothering of the shellfish when the suspended materials settle. This section of the

York does have significant potential towards oyster production because it is far enough below the freshwater inflow and pollution from West Point, yet far enough upstream to be free from disease and drill depredation. The loss of potentially productive grounds will decrease the options for future oyster harvesting in the York River. This section of the river between mile 17 and mile 23 and through which the Taskinas Creek marina channel would pass is the only remaining profitably manageable oyster grounds in the York.

Though these grounds are capable of producing oysters through intensive management, the ability of this section of the York River to produce high quality oysters may be questioned. An index of quality, which measures meat weight relative to shell volume, has been formulated, and measurements have been made approximately at monthly intervals since December, 1969, on oysters caught in different sections of the James, York and Rappahannock Rivers. Oysters with an index value below 5.5 are considered poor while those with a value above 7.5 are considered high in quality. Those with values ranging from 5.5 and 7.5 are fair in quality.

Oysters collected from the Bells Rock sampling station, which is about 5 miles up river from Taskinas Creek, have had quality index values that ranged from 5.9 to 12.4. The mean index value is 7.3, suggesting these oysters are about borderline between being fair to high in quality. The average value for all sampling stations in the York River is 7.2. This compares with an oyster quality index value of 6.0 for the James River and a value of 10.1 for Rappahannock River oysters (Marine Resources Information Bulletin). York River oysters are generally good, but seldom are they very high in quality.

An additional factor must be considered in regard to shellfish harvesting in the vicinity of Taskinas Creek. State health laws require the condemnation of grounds within one half mile of marinas having a boat capacity in excess of 100 vessels. This closure is due to potential contamination of shellfish with domestic wastes emanating from the marina. This regulation would force the closing of more than 250 acres of potentially productive bottom outside the mouth of Taskinas Creek.

Though it is doubtful the marina or channel would harm them, it is interesting to note that blue crab catches for this section of the York River averaged higher than they did in any other section of the river during a 12 year study (Van Engel and Joseph, 1968).

In addition, one individual was fishing no fewer than a dozen crab traps along the shore of the York River State Park in 1972 (Mr. John Maury, personal communication).

c) JETTY ALONG CHANNEL

A jetty along the navigation channel, which was discussed in the Corps of Engineers report as a possible aid to minimize sediment deposition in the channel if such became a critical problem, would very possibly cause shoaling on the upstream and nearshore section of the structure. This would destroy additional river bottom and no doubt prevent it from being a viable fish nursery area. The jetty would also probably augment the erosion of the shoreline below Taskinas Creek due to changes in wave, current, and sediment transport patterns. It is believed the jetty would not pose a serious problem to the migration of commercially important fish. Research done in other waters has shown herrings and striped bass generally

move along the shoulder of deep channels and the jetty would end near this point in the York River.

However, many other species, particularly the smaller forage fishes, seem to prefer shoal water and often travel near shore. Their dispersal would be blocked by a jetty extending 4,000 feet out from the mouth of Taskinas Creek.

3. SPOIL DISPOSAL

a) THE PROPOSED SITES

Two areas were evaluated for the disposal of materials dredged from the proposed channel to deep water and from the marina basin. The first area, an unnamed marsh approximately one mile downstream from Taskinas Creek was suggested for spoil disposal for the navigation channel dredging in the Army Engineer's report. This area (see Plate 3A) is approximately 20 acres in extent. It would be dammed near the mouths of the small creeks draining it, and would subsequently provide a basin for spoils, including maintenance work, for the 50 year design life of the channel.

The second area was not precisely described but was construed to be located in the marshes along the upper reaches of Taskinas Creek. The spoil materials deposited in this area would be utilized to assist in developing a grade for access across the marsh.

The Army Engineers reported that utilization of the fingers of marsh in the headwaters of Taskinas Creek would be inadvisable in that drainage problems would occur, and that this would also interfere with plans for a freshwater lake in this area.

They also rejected the possibility of using the spoils to create a beach along the shore just downriver from Taskinas Creek because the silt and peat soils to be dredged were not suitable for a beach (see Appendix A).

Consideration had also been given to spoil deposition on high land sites in the park. Though these areas were not rejected, it was pointed out that extensive diking would be necessary to contain the spoil (see Appendix A).

b) INFLUENCE OF SPOILS

The possible deposition of dredged spoils in any of the proposed areas in the marsh or adjacent waters will destroy the existing biota and transform the area into one more upland in nature. The ecological significance of the low-lying areas to the marine environment will be greatly reduced and may even become detrimental if spoil containment is inadequate. The utilization of the upland site will have no significant impact on the aquatic ecosystem, provided adequate dikes are provided and maintained to retain the spoils and that the effluent water during dredging operations does not cause erosion of the land over which it flows.

Observations made elsewhere have found that spoil areas revegetate slowly by natural means, thus leaving the areas barren and susceptible to erosion by natural forces. Wildlife usage of these areas is greatly reduced because of a lack of vegetative cover and a lack of food items.

It is ecologically unsound to use wetland areas for spoil disposal simply because of their convenience. This is particularly true with respect to the proposed wetland spoil site downriver from Taskinas Creek.

In addition the use of this site, especially at the frequency demanded for channel maintenance work, would result in the area being only sparsely vegetated or even barren, leaving an unsightly condition in an important section of the proposed park. Though artificial methods of vegetating the spoil area after each use could and should be used, the success of such a program will be reduced if the area is to be subjected to spoil disposal every four or five years.

The ecological problems that would be associated with spoil deposition along the upper reaches of Taskinas Creek are twofold. The first problem to consider is the transportation of the materials from the dredge site to the spoil site. Using hydraulic dredging techniques, the most practical for this project, a pipeline would have to be constructed across the marsh. This would cause considerable damage to the continuity of the marsh surface when the necessary heavy equipment moved pipe sections into position. Then, serious leaks or breaks and maintenance work on the line would further damage the marsh vegetation and its associated biota. In addition, the marsh would probably not recover by the time maintenance work on the navigation channel required a new pipeline across the marsh for spoil transport.

The second problem associated with spoil disposal in the upper sections of Taskinas Creek is the reduction in brackish water marsh. Several species of plants occur here, and their presence contributes to the overall ecological diversity of this area. The reduced salinity of the water coupled with the variety of plants makes this area more amenable to a greater variety of animals than the sections of the marsh closer to the York River. This section, important for nature studies, would be seriously degraded in quality if spoils were deposited here.

c) ALTERNATIVES

Several other potential spoil disposal sites could be utilized. Dredged materials could be transported to highland sites within the park, even though extensive dikes are needed for spoil retention. Provided adequate measures were taken to control the erosion of the materials including that caused by the discharge of supernatant, the use of such locations for spoil disposal would have no significant impact on the marine ecosystem.

A second possibility for disposal of dredged materials would be to transport them to areas such as Craney Island in Hampton Roads or to offshore disposal sites. Hopper dredges or barges could possibly be utilized for this purpose.

A third possibility for spoil disposal would be the creation of a wetland area at some nearby location in the York River by constructing an island or peninsula with the waste materials. Such a measure would offset the loss of marshes utilized for marina facilities and would alleviate the need for other low lands for spoil disposal. In addition, the new wetland could be designed to provide adequate storage space for materials removed from the channel and basin during maintenance operations.

Several factors must be considered prior to proceeding with the development of a spoil island. Some of the major details which must be studied are:

1. Composition of the sediments to be deposited, their grain size and susceptibility to erosion by wind generated waves and natural currents. (The sediment composition of the navigation channel is apparently fine silts and organic materials. These are easily

eroded and would not be very suitable for a spoil island. Sandy materials would be most feasible for a project of this nature).

2. The organic content of the sediments and the potential degradation of water quality. (Less damage would occur if dredging were conducted during the cold seasons of the year as the degradation of water quality by organic material is closely related to water temperature).
3. The extent of populations or organisms of economic importance that are dependent on the area to be filled. (A disposal site would have to be located in an unproductive section of river bottom. Fish and shellfish populations should be minimal in the area. Consideration must be given to a buffer zone about the disposal area as there will be some damages to adjacent bottoms).
4. River flow patterns and current velocities particularly during periods of maximum volume movement. (The disposal site should be isolated from sections of the river where current velocities are high. The site should also afford some protection from wave action which would probably be the major cause of erosion of the disposal pile. It is essential that the spoil pile does not alter water currents, resulting in the movement of existing channels).
5. Vegetation species, growth requirements and planting techniques to provide cover to control erosion and stabilize the spoil pile. (Species such as saltmarsh cordgrass, saltmeadow cordgrass,

big cordgrass and reedgrass could be used to vegetate the spoil area. Details of planting density and growth requirements are partially known. Full-scale operations, including sources of vegetative material, should be worked out in detail before the operation begins. It should be seasonally timed to occur when growth potential is greatest).

6. Potential hazards of the spoil area to navigation. (Care should be taken to prevent the spoil area from interfering with existing or potential navigation routes. This includes the loss of sediments from the pile and their deposition in navigation channels).
7. Potential damages and liability if the project fails. (Since private property could be influenced by the erosion and displacement of the spoil pile, the damages that could be caused should be thoroughly investigated and the responsibilities of the State relative to restitution should be examined).

The idea of creating wetlands with dredge spoils is relatively new in Virginia, but active work is in progress in other localities such as Louisiana. The concept might be presented to other interested agencies such as the Marine Resources Commission, Commission of Game and Inland Fisheries, the Water Control Board, and U. S. Army Engineers.

d) MARINA COMPLEX, PARKING FACILITIES

A considerable amount of dredge spoils could be placed in the area of the roadway, parking, and building complex of the proposed marina, provided the materials have adequate load bearing capacity. The land to be

used for the marina complex must be raised in elevation to prevent flooding during storms, and the material in the basin could supply the bulk of the necessary fill. By using these materials for this purpose the overall damage to the environment would be reduced in two ways. First, a smaller area would be adequate for disposal of the excess spoil, reducing the extent of damages caused by its deposition elsewhere.

Second, upland areas would not have to be cut and graded in order to obtain the necessary fill. These areas could be left in their natural state and would greatly enhance the environmental setting of the marina.

VII. CROAKER LANDING

Croaker Landing, located approximately one mile upriver from Taskinas Creek, is another proposed site for a boat launching facility. This site is currently used for launching trailerable boats. Several commercial fishermen working from skiffs also use this landing on a regular basis.

The York River State Park Master Plan calls for the expansion of Croaker Landing to accommodate up to 4 vehicles launching boats at one time. In addition, turn around and parking facilities for 30 cars and trailers would be provided.

Though a 100 foot wide fringing marsh borders each side of Croaker Landing, it is doubtful that in the development of this site encroachment on these fringing marshes would be extensive. The ecological significance of the approximately one acre of land at Croaker Landing is minimal at the present time due to vehicular traffic and human activity including minor boat maintenance and some refuse disposal in the area.

VIII. ANALYSES OF SUGGESTED ALTERNATIVES TO THE PROPOSED MARINA

A. MARINA ON THE YORK RIVER WITHOUT DREDGING AND CONDEMNATION OF AS MUCH OYSTER GROUND AS ORIGINALLY PROPOSED

Access to nearshore waters along the entire frontage of the proposed York River State Park during low tide is limited to very shallow draft boats. Navigation charts (C. and G.S. chart number 495) indicate that within approximately 500 yards of the shoreline there is less than 2 feet of water at low tide. The development of a marina in this area without dredging to provide adequate water at low tide would limit the availability of the facility to many boaters. In addition, few people would desire to moor a large vessel in an area where it would settle into the mud at low tide. The small shallow draft boats that could use the marina, on the other hand could also be easily stored on trailers, precluding the need for a marina.

Furthermore, a marina extending from the shoreline would need extensive breakwaters outside the facility in order to protect boats from wind and waves. This type of structure, depending on its design could act as a jetty and cause unwanted shoaling on the upriver side and erosion on the downriver side.

The Bureau of Shellfish Sanitation of the State Department of Health has the authority to close shellfish grounds adjacent to marinas because of potential contamination from domestic wastes emanating from vessels using such facilities. Current standards require that all grounds within $\frac{1}{2}$ mile be closed to shellfish harvesting when adjacent to marinas having a capacity in excess of 100 boats. These condemnations become effective April 1st each year and extend through October 31st.

Consequently, a marina of this nature does not appear to be justifiable because of the shallowness of the water, exposure to wind and wave action, and potential erosion and sedimentation problems. Shellfish grounds would be closed in the York River regardless of where a marina were placed along the river frontage. (The limits of shellfish closures extend from the limits of the marina. For example, a marina located near the freshwater marsh section of Taskinas Creek would not result in shellfish ground closure in the York River because the marina would be more than $\frac{1}{2}$ mile from the river).

B. BOAT DOCKING AND LANDING FACILITIES WITH DRY LAND STORAGE REQUIRING LESS DREDGING

A marina which provided dry land storage as an alternative to mooring slips could operate in a much smaller space, depending on the storage system used, e.g., vertical versus horizontal stacking, than a conventional marina of similar capacity. The construction of such a facility would significantly reduce the land space over what is currently needed for the proposed marina, and therefore would result in less environmental alteration.

However, several acres of low-lying (but above the limits of flood waters) land for marina buildings, storage facilities, parking and roadways, in addition to several acres of water for day use and transient visitors would be needed. Dredging and filling would therefore be needed. The design of the complex would dictate the amount of space needed. A channel to deep water would still be required.

C. BOAT DOCKING AND LANDING FACILITIES WITH NO DRY LAND STORAGE

The provision of a pier and launching site would be about the minimum

development that would provide access for boats to the York River. This alternative is comparable to the type of development that is proposed for Croaker Landing.

Whereas these types of facilities are desirable, they can only be used by small, shallow-draft trailerable boats. Larger boats could use the piers at these sites but only during the few hours near the time of high tide. Longer visits would leave them stranded on the bottom when the tide receded.

D. A SEMICIRCULAR MARINA COMPLEX DEVELOPED FROM THE SHORE OUTWARD INTO THE YORK RIVER

A semicircular marina complex extending into the York River from the shoreline would reduce the amount of wetland that would be lost by construction of the facility proposed in the Master Plan. Several acres of low-lying land would be necessary though for parking space, roadway and building sites, and very likely a section of fringing marsh would be filled for this purpose.

It would also be necessary to dredge a basin near the shore, around which the marina would be constructed. Though no dimensions were specified it is believed that a basin several acres in extent would have to be dredged. This basin would probably be smaller than that which is proposed for the Taskinas Creek area, however. In addition, a channel to deep water would be necessary.

Several problems could arise from the construction of a facility of this nature. This type of structure could function as a jetty and cause shoaling on the upriver side and erosion of the shoreline on the downriver side.

Maintenance dredging, as predicted would be necessary in the navigation channel, may also be necessary in the marina basin. Depending on the design of the structure, sediment removal from among the mooring slips could be a difficult and very disruptive task.

The nature of the sediments pose another problem. The U. S. Army Engineers in their discussion of a jetty along the channel to deep water, indicate the sediments are very soft and that a firm substrate is not found at 35 feet below the surface. This would no doubt create serious construction problems and considerable expense for the development of a marina jutting into the York.

IX. RECOMMENDATIONS

A. FEASIBILITY OF A MARINA IN THE YORK RIVER STATE PARK

In respect to the estimated growth in population throughout the Middle Peninsula region of Virginia (U. S. Army Engineers Taskinas Creek study; State Division of Planning, 1967) and the need for recreational lands on which people may enjoy the natural environment, the concept of the York River State Park is very timely. The potential needs of the public have been estimated by the Division of Parks and their proposed recreation area is strategically located in close proximity to major population centers and to existing major highway systems serving these centers (Highway 60 and Interstate Highway 64 pass within 3 miles of the park). The more than 2,500 acres of woods, fields, and wetlands in the park are high in esthetic quality, and this alone should guarantee its development for recreation a success.

The park contains more than $3\frac{1}{2}$ miles of shoreline along the York River, offering significant potential for access development to a currently

underutilized recreational resource. The upper sections of the York River receive little usage by boaters, possibly because of a lack of support facilities. For example, there are few places along the river above Yorktown where fuel can be purchased, and these places are not widely advertised. In addition, there are few locations readily accessible to Middle Peninsula residents where large trailerable boats can be launched.

The Virginia Institute of Marine Science recognizes the marine environment as a natural resource with potentials for recreational as well as commercial uses. VIMS also recognizes that facilities are necessary for access to the waters of the Commonwealth, not only for commercial ventures but also for recreational purposes. It is further recognized that no significant boating facilities, catering primarily to recreational needs, exists along the York River between the George P. Coleman Bridge and West Point.

It is believed that recreational boating could be expanded in the upper sections of the York without causing serious interferences with commercial fishing activities occurring there. It is further believed that the York River State Park, in respect to its proximity to population centers, major highways, its central location along the York River, and the absence of other major public boating facilities in the area, represents a geographically suitable location for a marina.

In an assessment of the ecological influences of the proposed marina the Institute has identified three categories of impacts. Primary impacts include the loss of wetlands of primary ecological significance as well as the alteration of the river bottom.

Secondary impacts include the loss of oyster grounds, the potential

reduction in quality of fish nursery grounds, the alteration of areas through spoil disposal, and the loss of wildlife habitat offered by wetlands.

Tertiary impacts will accrue through the utilization of the proposed marina and park. While the potential impacts within this category are numerous and highly diversified they are for the most part associated with management practices and therefore are subject to easier control.

The Institute believes that if the decision is made to construct a marina in the York River State Park, though the primary and secondary impacts will be significant, the public benefits to be derived from it will offset the loss of wetlands, wildlife habitat, potentially productive oyster ground, and the potential reduction in general biological quality of the river bottom adjacent to the navigation channel.

B. MARINA SITING

Based on the assumption that the public benefits to be derived from the provision of a marina in the York River State Park will offset the environmental alterations which will result as a consequence of its development, it is concluded that Taskinas Creek would be an adequate location for the facility.

Another area with significant potential as a marina site also exists in the park, though. This is the proposed spoil area located one mile downriver from Taskinas Creek (see Plate 3A). There are two significant features about this site which make it worthy of consideration.

First, deep water (greater than 6 feet at mean low tide) occurs within 2,200 feet of shore at this location in contrast to deep water being nearly 4,000 feet offshore from Taskinas Creek (see Figure 1). It is obvious that

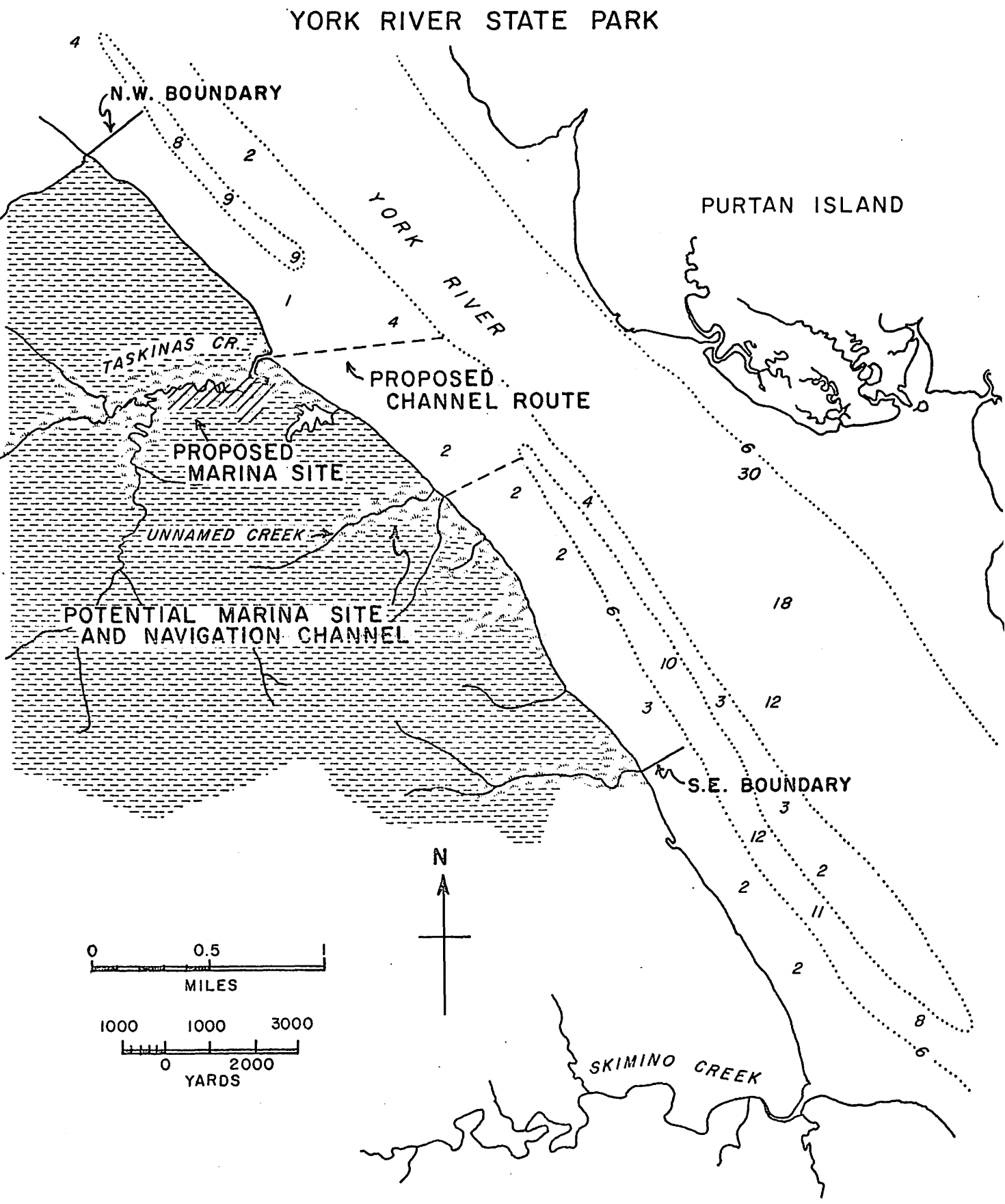

Figure 1. Proximity of six-foot depth contour to the York River State Park shoreline.

the extent of dredging for a navigation channel would be about halved by using this site, and this would yield several benefits. One is that much less river bottom and its associated biota would be disturbed here in comparison to the Taskinas Creek site. Another is a smaller area would be required for spoil disposal resulting in less environmental alteration in this aspect, and an additional factor is a significant reduction in costs of initial as well as maintenance dredging in comparison to those projected for the Taskinas Creek site.

The second feature is that the basin, a wetland of significant value but with only very small streams draining it, thus limiting its value as a detritus contributor to the marine environment, appears to have sufficient space for a very sizable marina. Depending on layout, it is believed that a 300 boat facility could be constructed in this area. One side of the basin could be designed for day use and transient visitors, and the other side could be used for long-term slip leasing.

It is also believed that the unnamed area has space sufficient for a considerable amount of dredge spoils that would be removed from the basin as well as from the navigation channels. Part of the material could be used to raise the land elevation to provide parking facilities, building sites and roadways. Additional material could be deposited in diked areas on the marsh fronting the river for the purpose of providing greater protection from wind and from storm driven waves. Material could also be deposited near the head of the area to provide access roads to the opposite side of the basin.

In addition, a small low-lying area exists about 1/3 mile downriver from the basin, and this area would also offer space for spoils.

It is realized that the 20 acres of marsh in the unnamed wetland would no doubt all be incorporated into the marina. However, this acreage is less than the 27 acres that would be altered in Taskinas Creek. In addition, this area is confined by hills with no streams flowing through it into nearby wetlands. Consequently adjacent wetlands would not be as susceptible to possible contaminates emanating from the basin as would occur in the marshes further upstream in Taskinas Creek.

It is ecologically more feasible to use this unnamed wetland as a marina site than it is to use a portion of the Taskinas Creek marsh (see Plate 3B). The Taskinas Creek marsh area has significantly greater value to fish, wildlife and the marine environment because of its greater extent, its relatively large creek compared to the creek in the unnamed marsh, and because of the highly diversified habitats within its system but which are not found in the unnamed marsh.

Whereas the theme of the proposed park is the York River, the preservation of Taskinas Creek marshes and the use of the unnamed marsh for a marina site is significant from an educational viewpoint. The dynamics and the relationships of wetlands to the marine environment may be readily grasped by observing Taskinas Creek and its marshes, and it will be much easier to illustrate these to the public by using this area as an example, (and it is an excellent one) than by using any other wetland unit in the park. The important features of Taskinas Creek that are readily apparent to the untrained eye include a large creek channel, significant tidal exchange of water, and expansive tracts of various types of wetland plants which portray the influence of salinity on the vegetation composition of marshes. These are not as readily apparent in any other segment of marsh in the park.

C. MINIMIZING ENVIRONMENTAL IMPACTS

If the decision is made to develop a marina in the York River State Park, several factors relative to reducing damage to the environment during its construction as well as its operation should be considered. It is essential that this proposed facility reflect the standards proposed or established for marinas by appropriate federal and state agencies. This marina, by being the ultimate in design, construction, and operation, will establish precedents that will indicate man's interests in living compatibly with nature.

1. DREDGING

a) MARINA BASIN

The marina basin could be dredged by use of the dragline and bucket method as opposed to the hydraulic technique, assuming spoils are to be disposed in the area to be developed for parking facilities adjacent to the marina. Hydraulic dredges suspend much more sediment material in the water than do dragline dredges, and with suspended sediments being the primary factor damaging adjacent areas as well as degrading water quality in dredging operations, they should be controlled as much as possible.

Suspended sediments escaping to the York River could be further controlled by dredging on flood tides only. Suspended materials would have a longer retention time in creek water and therefore have a greater opportunity to settle to the bottom before that water is discharged to the river on the ebb tide.

By dredging during the low water stages of the tide, more soil is exposed and much material can be removed "dry" without water spilling from

the bucket as it is lifted. The suspension of sediments in the water is greatly reduced by this method.

Another technique for minimizing the amount of suspended sediments discharged to the York River is to suspend a silt screen across the channel inside the mouth of the creek. This screen, made of heavy canvas about three feet wide and as long as the channel is wide, weighted on one edge and outfitted with floats on the opposite edge, causes suspended materials to settle to the bottom sooner than if their position in the water column was unobstructed.

b) CHANNEL TO DEEP WATER

It would be possible to dragline dredge a channel to deep water. However, two factors must be considered. First, a barge must be used to transport spoils to the disposal area and second, the sediments may be so fine and soft that they are washed out of the bucket as it is drawn from the water. The second problem could seriously reduce the efficiency of the dredging operation, and cause a greater period of time to be spent in the construction of the channel.

Any benefits that might have accrued by using a less environmentally degrading technique may be negated by extending the operation over an excessive period to time, particularly if the work is planned to coincide with minimum biological activity in the area.

Assuming a hydraulic dredge is used to form the channel, it should be operated at maximum efficiency. The cutter head should not turn so rapidly that it creates excessive turbidity nor should it cut so deeply that the exposed face slumps into the channel. The channel sides should also be sloped adequately to prevent slumping.

The discharge pipeline from the dredge to the spoil area should be floated above the water so that breaks or serious leaks are easily detected.

The dredging should be conducted during the cold months of the year when biological activity in the area is minimal. November through mid-March would be the preferred time. Spring, summer and early fall dredging should be avoided as this is the period when fish are migrating through the area as well as using it as a nursery area, and shellfish are spawning and developing at this time.

2. SPOIL DISPOSAL

All spoil disposal areas should be designed to prevent deposited materials from being washed out as a result of the dredging operation itself or by flood water or rain. These areas should be adequately diked, using upland materials for dike construction. The dike should have side slopes not less than 3 feet horizontal to 1 vertical, the top should be at least 3 feet above the upper limit of spring tides and no less than 1 foot above the maximum elevation of sediment-laden water to be impounded. The width of the top of the dike should be at least 3 feet.

The spoil pipeline should be positioned as far from the dike spillway as possible in order to maximize water retention time. The spillway should have a horizontal lip of appropriate width such that the discharge across it does not exceed $1\frac{1}{2}$ inches in depth.

The diked area should have sufficient volume such that near the completion of the dredging operations quality standards of the discharge water are still met.

The dikes of the spoil area should be seeded as soon as possible to prevent erosion. The surface of the disposed material should also be vegetated as soon as possible after the dredging is completed.

3. BULKHEADING

Bulkheading within the marina basin is necessary, primarily at the entrance, and along the shoreline where land facilities are situated. These sections should be bulkheaded with materials that will provide the maximum design life with a minimum of maintenance. They must be constructed to prevent erosion of backfill. (It will be necessary to have at least temporary spoil retention structures in place prior to work in the marina basin if it is dredged by bucket. These should remain in place until permanent bulkheads are constructed).

X. THE PARK COMPLEX - INFLUENCE ON THE MARINE ENVIRONMENT

In addition to the influences of the proposed marina construction and its utilization upon the marine environment, the park complex in its function will have other influences on the coastal zone.

The aspect of foremost importance to recognize is that many more people will be able to easily utilize the natural resources of the area than have been able to in the past. The main interaction that the majority of these individuals will have with the marine environment will be through esthetic enjoyment of the vistas from the hills fronting the York River. This form of utilization represents the utmost in compatibility with nature in that it is neither consumptive, nor degrading.

Other more adventurous people will develop closer ties with the

coastal zone by hiking along the proposed trails beside the marshes. Some individuals may even traverse the wetlands, perhaps out of curiosity or just to get closer to the water. It is important that paths do not become beaten across the marsh as the grasses which cover it will be destroyed and the protection from the erosive force of water will be lost. Foot bridges and elevated walkways out over the marshes in key locations would be advantageous in this respect as they would provide opportunities for people to obtain a close-up view of the wetlands, but the natural contour and the dynamics of the systems would not be significantly altered.

Elsewhere in the park, centers of concentrated activity may reduce natural vegetative cover to a condition under which it can no longer control surface runoff and erosion. North-facing hillsides are especially susceptible to human disturbances as these slopes tend to remain in the shadows of the sun, be damp and have shallow-rooted plants. If these areas lose their vegetative cover the soil can be easily eroded and may eventually reach the waters of York River. Close surveillance must be maintained to locate damaged areas in order to institute corrective measures before severe erosion occurs.

Many people will make direct contact with the marine ecosystem through some form of boating activity. While boating can be considered a compatible usage of the water, the individuals participating should be reminded that wastes and refuse must be stored for proper disposal on land. The York River is high in quality and this must be maintained.

The York River in the general vicinity of the proposed park currently supports seasonal fisheries. In the spring, gill netters attempt to intercept migrating herring and shad. During the summer blue crabs are harvested

and in the fall other minor fishing activities are in progress. During the winter oysters are tonged. Though these activities occur on public waters they represent the commercial ventures of many citizens. Park visitors should be reminded that stakes, nets and floats they see in the river are important markers as well as private property, and that these signs of commercial fishing activities must not be disturbed.

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A. Corduroy road in Taskinas Creek marsh below farmhouse.

B. Section of Taskinas Creek marsh to be incorporated in the proposed marina.

Plate 1

A. Beaver dam at head of Taskinas Creek.

B. Poles at mouth of Taskinas Creek.

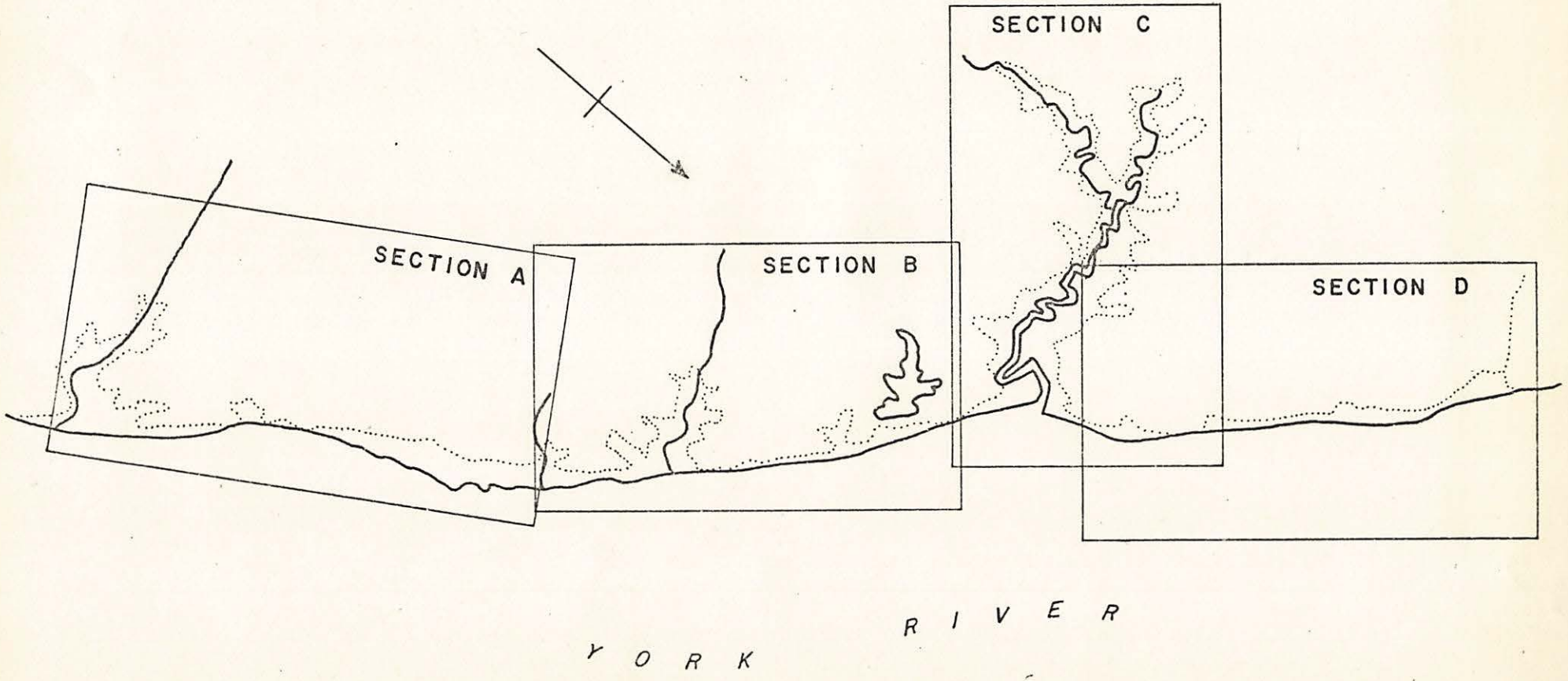
Plate 2

A. Unnamed marsh one mile downriver from Taskinas Creek -- an alternative site for a marina.

B. View of Taskinas Creek.

INDEX MAP

MARSHES OF YORK RIVER STATE PARK



YORK RIVER STATE PARK

SECTION A

SOUTHEASTERN SHORELINE

VEGETATION CODE

- SALTMARSH CORDGRASS *(Spartina alterniflora)*
- SALTMEADOW HAY *(Spartina patens)*
- GIANT CORDGRASS *(Spartina cynosuroides)*
- SALTGRASS *(Distichlis spicata)*
- SALTBUSH *(Iva frutescens - Baccharis halimifolia)*
- OLNEY THREE SQUARE *(Scirpus olneyi)*
- SALTMARSH BULRUSH *(Scirpus robustus)*
- MUD
- CATTAIL *(Typha angustifolia)*
- BLACK NEEDLERUSH *(Juncus roemerianus)*
- MARSH HIBISCUS *(Hibiscus moscheutos)*
- SWAMP ASTER *(Aster tenuifolia)*
- WR WILD RICE *(Zizania aquatica)*
- DEAD TREES
- FRESH WATER MARSH

0 200 400 600 800 1000

SCALE IN FEET

TREES

TREES

TREES

2

2

2

2

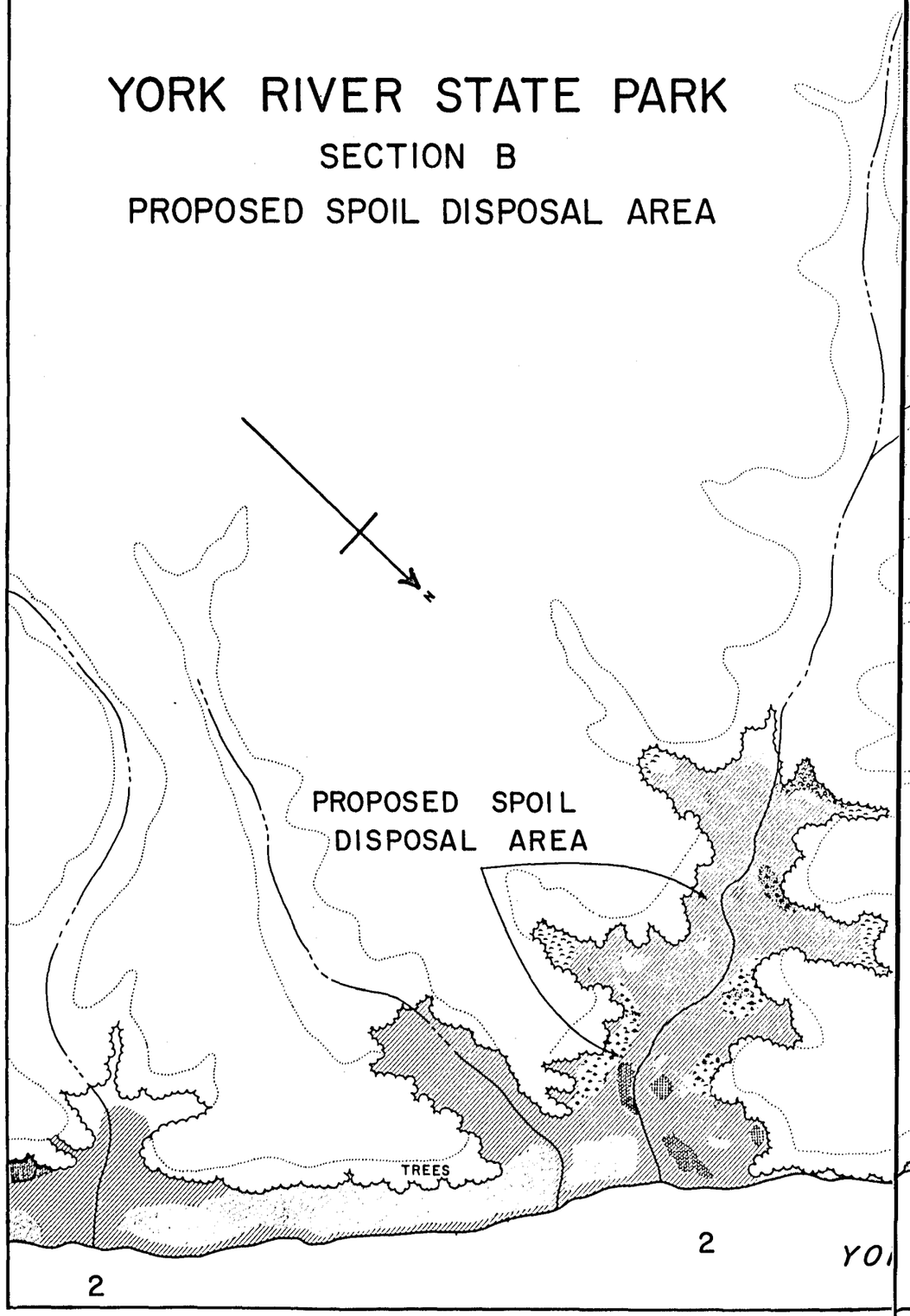
2

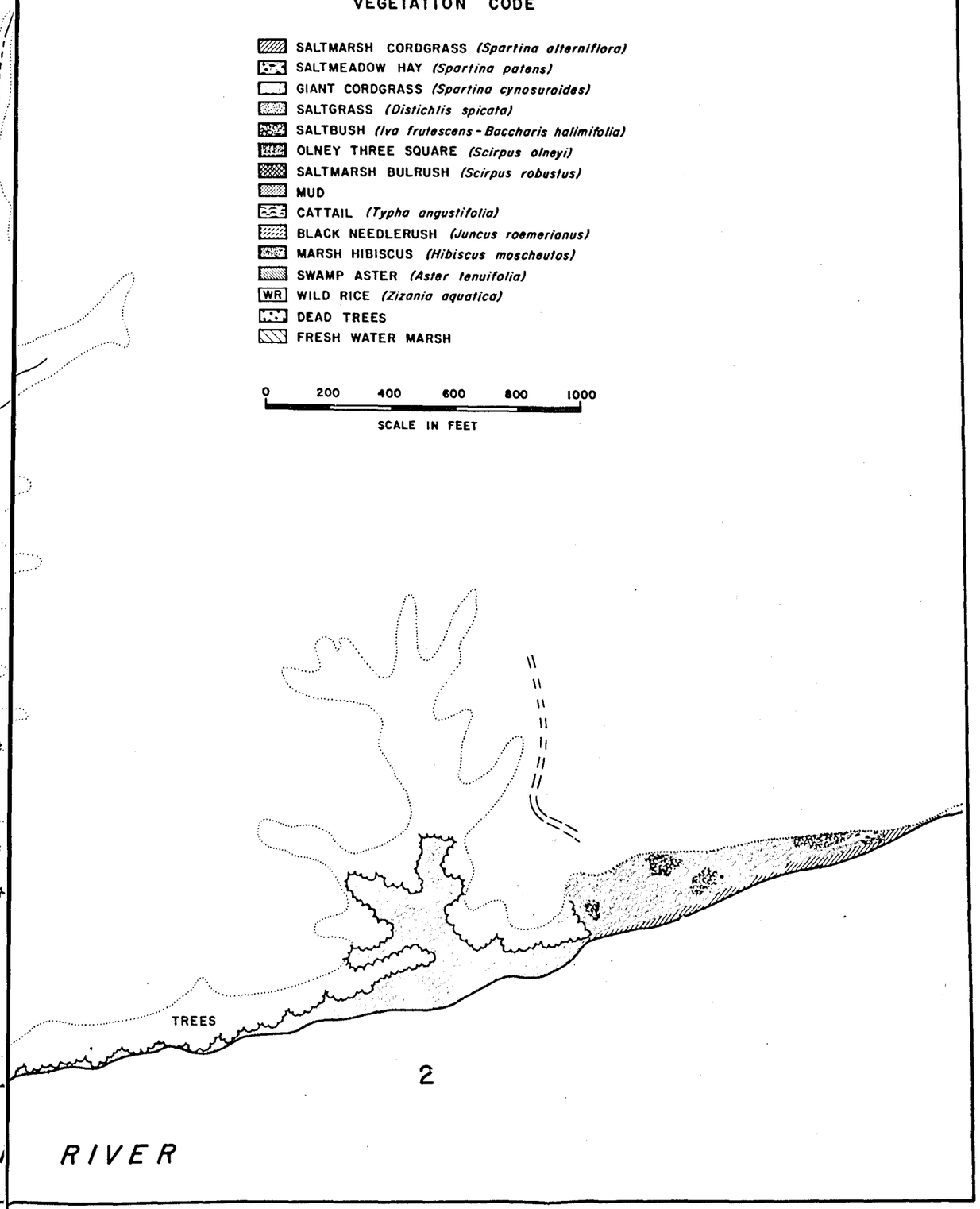
ORK RIVER

YORK RIVER STATE PARK

SECTION B

PROPOSED SPOIL DISPOSAL AREA

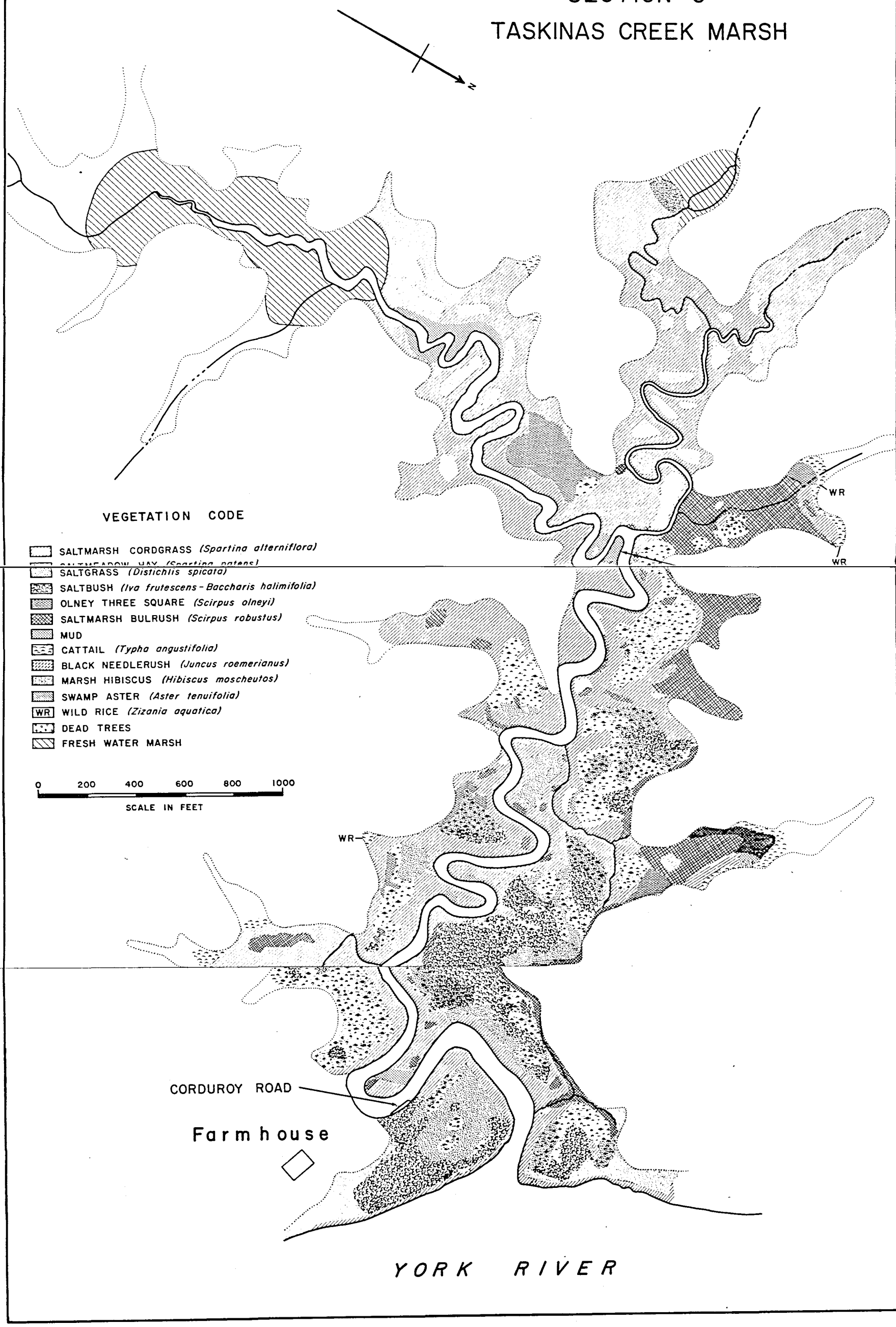




YORK RIVER STATE PARK

SECTION C

TASKINAS CREEK MARSH



YORK RIVER STATE PARK

SECTION D

CROAKER LANDING

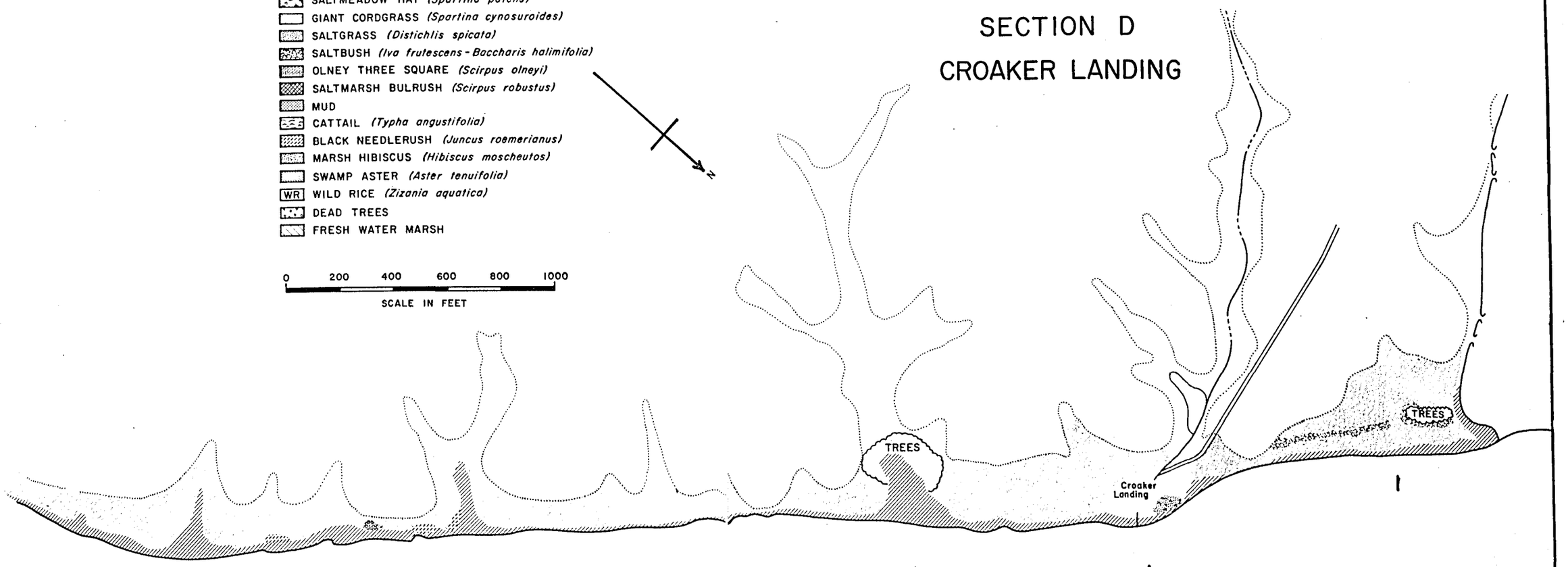
VEGETATION CODE

- SALTMARSH CORDGRASS *(Spartina alterniflora)*
- SALTMEADOW HAY *(Spartina patens)*
- GIANT CORDGRASS *(Spartina cynosuroides)*
- SALTGRASS *(Distichlis spicata)*
- SALTBUSH *(Iva frutescens - Baccharis halimifolia)*
- OLNEY THREE SQUARE *(Scirpus olneyi)*
- SALTMARSH BULRUSH *(Scirpus robustus)*
- MUD
- CATTAIL *(Typha angustifolia)*
- BLACK NEEDLERUSH *(Juncus roemerianus)*
- MARSH HIBISCUS *(Hibiscus moscheutos)*
- SWAMP ASTER *(Aster tenuifolia)*
- WR WILD RICE *(Zizania aquatica)*
- DEAD TREES
- FRESH WATER MARSH

N

0 200 400 600 800 1000

SCALE IN FEET



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YORK /ER

Appendix A

TASKINAS CREEK
VIRGINIA

U. S. Army Engineer Study

(Letters Included)

Marcelley

TASKINAS CREEK
VIRGINIA

U.S. ARMY ENGINEER DISTRICT, NORFOLK
CORPS OF ENGINEERS
NORFOLK, VIRGINIA

17 FEBRUARY 1969

TABLE OF CONTENTS

LIST OF TABLES

LIST OF PLATES

TABLE OF CONTENTS (Cont'd)

LIST OF APPENDICES

TASKINAS CREEK, VIRGINIA

1. Taskinas Creek lies completely in James City County, Virginia, as shown on Plate 1. The creek flows into York River about 20 miles upstream from its mouth at Chesapeake Bay. Taskinas Creek has its source near the small town of Croaker and flows in a northeasterly direction to the York River, a distance of about 3 miles. The Town of Croaker is located about 6 miles north of the City of Williamsburg.

2. There are no vessels presently based in Taskinas Creek since the depth of water at the mouth of the creek is only one foot or less. The proposed navigation project would be an integral part of the development of a 2,400 acre tract of land, fronting 3.5 miles on York River, into a State Park. The project would consist of boat launching ramps and parking areas for outboard boats on trailers and a large marina at the mouth of Taskinas Creek for inboard boats. The marina would accommodate about 200 boats, mostly transient. The entrance channel would be dredged in the marshland at the mouth of Taskinas Creek, and would be 80 feet wide and 6 feet deep. It would extend to the 6-foot contour in York River, a distance of about 5,300 feet.

3. The following paragraphs discuss the plans studies to determine the most feasible and economical method of constructing a channel from deep water in York River to the marina, and the criteria used in formulating the navigation project.

FACTORS TO BE CONSIDERED IN PLANNING A NAVIGATION CHANNEL

4. Any plan to develop marina facilities in Taskinas State Park would involve consideration of the following important factors:

a. Depth and width of an appropriate channel.

b. Disposal of dredged material.

c. Design of docking facilities, access roads, and parking area

d. Land requirements.

5. DEPTH AND WIDTH OF CHANNELS

Interviews with marina and yacht club owners and operators in the area indicate that the average pleasure cruiser has a draft of between 2 and 3 feet. The following table shows various drafts of some typical recreational craft.

Table 1. DIMENSIONS OF SOME 1967 RECREATIONAL CRAFT

	Dimensions, in feet			
Cruiser	Draft	Beam	Length	Height
A	28"	7' 7"	18'7"	4' 8"
B	24"	9' 1"	25'0"	7'10"
C	26"	10' 8"	30'0"	9' 4"
D	38"	13' 0"	48'0"	15' 2"
E	44"	15' 0"	57'3"	15' 0"
F	50"	16'10"	65'0"	15' 9"

6. Boats moving to and from the harbor require a certain minimum channel width to permit safe operation under all conditions. The width of the entrance channel should be not less than sixty feet or four times the beam of the widest boats berthed therein. The largest recreational craft presently registered in the surrounding counties and urban areas have beams of about 15 feet and the national trend in recreation boats is toward the wider catamarans and house boats.

7. Boats moving to and from the marina require a certain minimum width of entrance channel to provide for such unfavorable conditions as darkness, fog, and storms. Frequently, sailing craft which are brought within the harbor, with sails set, require considerably more maneuvering space than is indicated by their beam widths. Since many operators of recreational craft are inexperienced, it is believed that a minimum width of 80 feet should be provided in the entrance channel.

8. Some clearance under the keel of a boat is required for maneuverability. In addition, clearance is required to provide for wave action in the channel; otherwise, the deeper-draft boats would endanger themselves by striking bottom in rough or stormy weather. In this connection, the following is quoted from data furnished by the Chris-Craft Corporation:

> "Depth of water required in channels will vary greatly with the local conditions affecting the height of waves which might be encountered there but as a rough generalization we believe a minimum of 3 feet under the keel should be provided for boats having a draft up to 2 feet and this should be increased proportionately as the draft increases."

9. A six-foot draft would provide two feet of clearance under the keel of the largest boats expected to use the channel and is considered adequate from a safety standpoint.

10. DISPOSAL OF DREDGED MATERIAL

Consideration was given to the use of ravines at the headwaters of Taskinas Creek as possible dredge disposal areas. However, this would create a drainage problem. Furthermore, this would conflict with long-range plans of the state to develop a fresh water lake for future recreational activities. To deposit the material near the mouth would interfere with the creation of the proposed marina.

11. Consideration also was given to the possibility of depositing the material along the shore just south of Taskinas Creek with the hope of creating a sandy beach. However, eight probings in the channel area indicated that the material to be dredged is organic silt and peat soils, and would not be suitable for a beach.

12. The area now proposed for disposal of the dredged material is a ravine about one mile downstream from Taskinas Creek. The location is shown on exhibit 1.

13. DESIGN OF DOCKS, ACCESS ROAD, AND PARKING AREAS

Careful consideration will have to be given to the design of piers and docks, complete with sanitary facilities, to accommodate both day use and overnight visitors. Consideration should also be

given to insuring adequate parking areas and access roads to accommodate the owners, and their guests, of the 200 or more yachts which will be moored at the marina. The owners of the numerous outboard boats on trailers which will use the marina facilities for day use and the park facilities for overnight camping must also be considered. Exhibit 1 shows a farm road which could be improved to serve as an access road from Virginia Secondary Highway 606 to the marina, a distance of about 2 miles. The cost of these items to the State are considered to be self liquidating and are not included in the economic analysis of the project.

14. LAND REQUIREMENT

It will be necessary for the State to furnish without cost to the United States all lands, rights-of-way and easements for the construction of the project. The State will also have to obtain releases from the lessees of oyster grounds which might be affected by dredging operations or the disposal of dredged materials. Since it will be necessary for the Federal Government to continue to maintain and dredge the project in future years after it is completed, it will be necessary for the State to insure that the lands required for disposal of dredged material continue to be available for this purpose.

15. COST

The estimate of first cost for the considered improvement is shown in Table 2. The non-Federal first cost will be at 50 percent of the dredging cost. The determination of this percentage is included in Table 2. The cost of oyster grounds releases are shown preliminary and should be reviewed and evaluated by the State. The estimated dredging cost is based on current price levels with the work to be accomplished by contract with a 16-inch hydraulic pipeline dredge and attendant plant. In estimating costs, consideration was given to the length of pipeline required, the nature and quantity of material to be dredged, and the location of the disposal area.

16. ANNUAL CHARGES

The annual charges for the improvement as shown in Table 2 have been computed on the basis of a 50-year project life. An interest rate of 4-5/8% has been taken for both Federal and non-Federal investments. The annual charges include an estimate for maintenance of the improvement based on dredging the improved channel at intervals of four years throughout the life of the project and a rate of shoaling of 0.5 foot per year. Table 2 summarizes the benefits that will result from development of the marina.

Table 2. ECONOMICS OF PROVIDING CHANNEL TO TASKINAS STATE PARK

	Estimated Cost					
	Without Jetty			With Jetty		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total
A. Project Data						
Size of channel proposed	5,300' long x 80' wide x 6' deep					
B. Construction Costs						
Dredging channel	$70,000	$70,000	$140,000	$ 70,000	$ 70,000	$140,0
Aids to navigation	300	0	300	300	0	3
Spillway and dikes	0	4,900	4,900	0	4,900	4,9
Oyster releases	0	5,000	5,000	0	5,000	5,0
Deferred jetty construction	0	0	0	300,000	300,000	600,0
Total	$70,300	$79,900	$150,200	$370,300	$379,900	$750,2
C. Investment						
Initial	$70,300	$79,900	$150,200	$ 70,300	$ 79,900	$150,2
Deferred(a)	0	0	0	209,000	209,000	418,0
Total	$70,300	$79,900	$150,200	$279,300	$288,900	$568,2
D. Annual Charges						
Interest at 4-5/8%	$ 3,250	$ 3,700	$ 6,950	$ 12,920	$ 13,360	$ 26,2
Amortization at .538%	380	430	810	1,500	1,550	3,0
Annual Maint. of channel	12,500	0	12,500	1,000	0	1,0
Aids to navigation	50	0	50	50	0	
Maintenance of levees and spillways	0	500	500	0	500	5
Maintenance of jetty	0	0	0	3,000	0	3,0
Major replacement(b)	0	0	0	5,550	0	5,5
Total	$16,180	$ 4,630	$ 20,810	$ 24,020	$ 15,410	$ 39,4
E. Average Annual Benefits						
Recreational boating						
Future fleet						
Inboards	$30,000	$30,000	$ 60,000	$ 30,000	$ 30,000	$ 60,0
Outboards	10,800	10,800	21,600	10,800	10,800	21,6
Total	$40,800	$40,800	$ 81,600	$ 40,800	$ 40,800	$ 81,6
F. Economic Ratio						
Benefits/Cost		3.9 to 1.0			2.1 to 1.0	

(a) For economic analysis it is assumed that jetty would be built 8 years following project construction.
(b) Jetty would be replaced 30 years after being built.

17. PROTECTION BY JETTY

Because of the uncertainties associated with estimating the annual rate of fill which might be expected to occur Taskinas Creek, consideration was given to the construction of a timber jetty on the upstream side of the entrance channel to minimize shoaling in the channel. Selection of the upstream side for location of the jetty was made because an inspection of a number of tributary streams and downstream structures indicates that practically all of the littoral material moves in a downstream direction. Such a jetty would have to extend from the high water line on the shore to the 6-foot depth contour in the York River, a distance of about 4,000 feet. Preliminary cost estimates indicate that the jetty would require periodic maintenance and replacement at the end of about 30 years.

18. The interest and amortization of the cost and maintenance of the jetty would approximate $40,000 annually. A comparison of the estimated annual charges for the jetty with the estimated annual cost of maintaining the channel by dredging alone, indicates that the shoaling rate in the channel would have to exceed 18 inches annually over its entire width and length before a jetty would be economically feasible. This compares with the 6 inches per year estimated to occur naturally. Accordingly, the jetty has not been included in the design. If the annual maintenance exceeds 18 inches following construction, then further consideration will be given at that time to the construction of a jetty.

PRELIMINARY ECONOMIC EVALUATION

19. Following is a comparison of benefits and costs for the proposed improvement:

Average annual benefits	$81,600
Annual charges	$39,430
Benefit-Cost ratio (with jetty)	2.1 to 1.0

PROPOSED LOCAL COOPERATION

20. In the event that the proposed channel is provided, the Commonwealth of Virginia would be required to:

a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil, and also necessary retaining dikes, bulkheads, and embankments therefor or the costs of such retaining works.

b. Make a cash contribution equal in amount to 50 percent of the first cost of dredging. This contribution is presently estimated at $70,000.

c. Deferred construction of a jetty from deep water in the York River to the mouth of Taskinas Creek is provided for in the event that experience shows that the average annual cost of maintenance

dredging exceeds the annual charges for the jetty, the cost of which is presently estimated at $600,000. The Commonwealth of Virginia would be required to contribute at least 50 percent of the cost of the jetty, the actual amount to be determined if and when the jetty is required. (See item i).

d. Provide and maintain at local expense a 200 boat marina with necessary mooring facilities; utilities, and adequate parking area for automobiles and boat trailers. This includes a minimum of 100 docking spaces for transient yachts, open to all on equal terms.

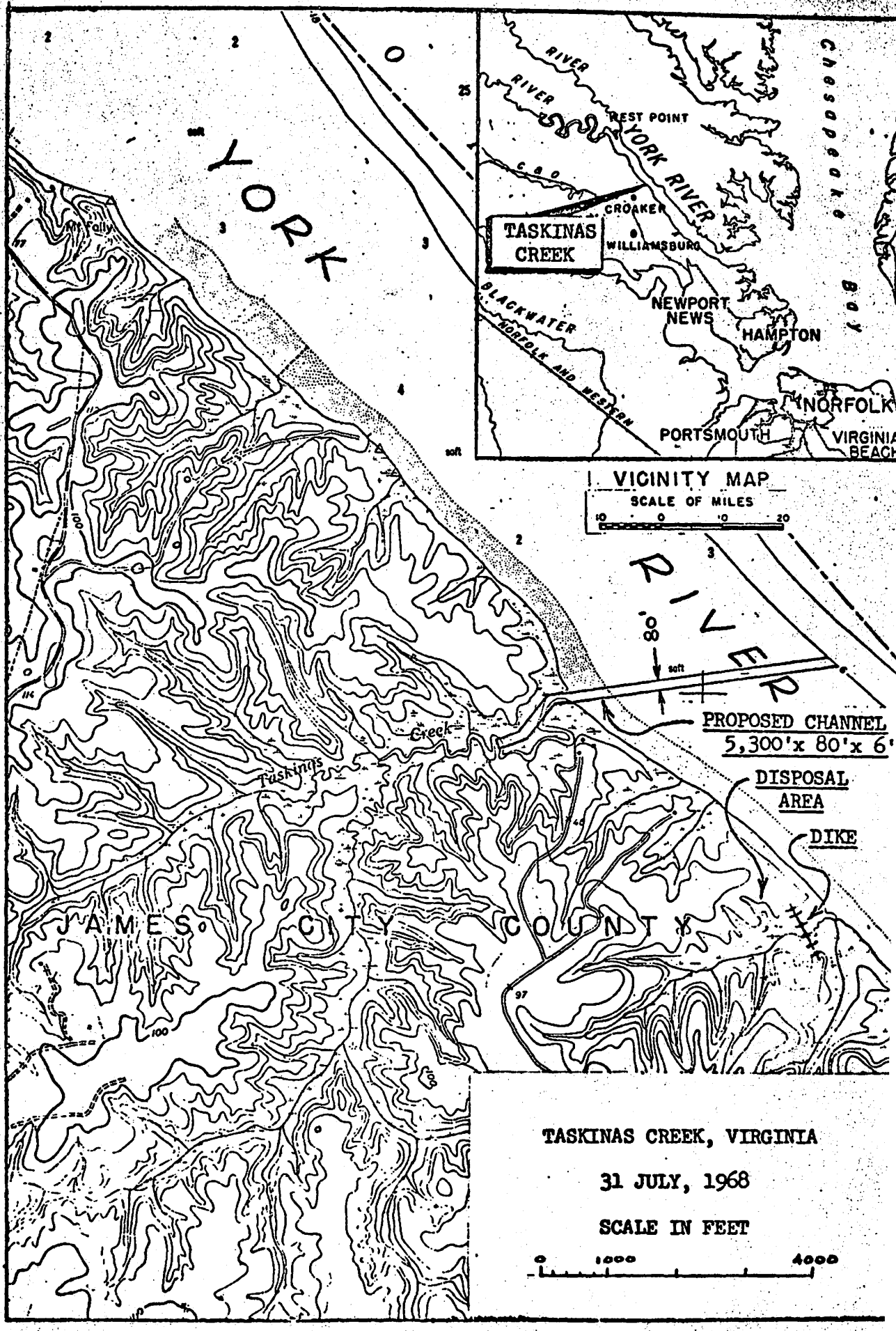
e. Provide adequate shore sanitary facilities in the interest of preventing pollution of the surrounding area.

f. Construct and maintain bulkheads or otherwise stabilize the banks on either side of the basin to prevent erosion and shoaling.

g. Furnish releases from the lessees of oyster grounds which might be affected by the disposal of dredged material.

h. Furnish assurance of compliance with the Department of Defense directive under Title VI of the Civil Rights Act of 1964 which states that no person in the United States shall on the ground of race, color, or national origin be excluded from participation in, or be denied the benefits of this project.

i. Assume full responsibility for all project costs in excess of the Federal cost limitation of $500,000.



TASKINAS CREEK, VIRGINIA

31 JULY, 1968

SCALE IN FEET

0 1000 4000

PLATE

TASKINAS CREEK

APPENDIX A - ECONOMIC BASE STUDY

TABLE OF CONTENTS

LIST OF TABLES

ECONOMIC BASE STUDY
TASKINAS STATE PARK AREA OF INFLUENCE

1. GENERAL

Taskinas State Park will be located along Taskinas Creek in James City County. It will comprise an area of approximately 2,000 acres. Contained within the park will be picnic areas, camping grounds, and a marina site with facilities to accommodate approximately 200 boats.

2. The park will incorporate an area of influence consisting primarily of part of the Richmond [(a)] and all of the Newport News - Hampton Metropolitan Areas. It also includes the counties of New Kent, Charles City, and King William. This zone, which has an area of 1,962 square miles, shows good economic potential and is expected to grow very rapidly during the next 50 years.

3. The area of influence is traversed by Interstate Highway 64 which connects the densely populated areas of Newport News - Hampton with Richmond. The proposed state park, located a short distance from Interstate Highway 64, is about 40 miles east of Richmond and 30 miles northwest of Newport News. Interstate Highway 95; U. S. highways number 60, 33, 301, 1 and 17; and numerous state and secondary routes traverse the area, providing easy and fast access. Plate A-1 shows the area of influence.

(a) Includes the city of Richmond and the counties of Hanover and Henrico.

4. POPULATION

The estimated 1967 population of this zone is 736,000, which represents an increase of 18 percent over 1960. The projected population for the period 1960-2020 is presented in the following table:

Table A-1. POPULATION ESTIMATES 1960-2020(a)

Area	1960	1980	2000	2020
Charles City	5,492	8,000	20,700	66,300
Hanover	27,550	45,800	134,700	257,500
Henrico	117,339	148,500	183,200	233,400
James City	10,449	22,800	23,100	24,500
King William	7,563	8,000	7,800	16,100
New Kent	4,504	6,100	7,600	17,800
York	21,143	31,900	48,400	118,800
Hampton	89,258	127,300	148,200	157,500
Newport News	113,662	144,600	192,100	287,400
Richmond	219,958	278,400	343,300	437,500
Williamsburg	8,362	12,600	19,200	47,000
Totals	625,280	834,000	1,128,300	1,663,800

(a) Based on Economic Base Study, Chesapeake Bay Drainage Basins, National Planning Association, Feb 1967.

5. EMPLOYMENT

The total employment in 1960 for this area was 232,750 which produced a labor participation ratio of .372. This ratio is high due to the Richmond - Henrico area, which had a combined ratio of .412 and accounted for 60 percent of the total employment of the area. The projected employment for the period 1960-2020 is presented in the following table:

Table A-2. EMPLOYMENT ESTIMATES 1960-2020.(a)

Area	1960	1980	2000	2020
Charles City	1,553	2,500	6,700	22,300
Hanover	10,339	18,700	57,400	114,800
Henrico	47,349	65,200	83,900	111,900
James City	3,883	9,200	9,700	10,800
King William	2,711	3,100	3,200	6,900
New Kent	1,511	2,200	2,900	7,100
York	6,402	10,500	16,700	42,700
Hampton	27,487	42,600	51,900	57,600
Newport News	37,483	51,900	71,900	112,500
Richmond	91,622	126,100	162,400	216,400
Williamsburg	2,410	4,000	6,300	16,000
Totals	232,750	336,000	473,000	719,000

(a) Based on Economic Base Study, Chesapeake Bay Drainage National Planning Association, Feb 1967.

6. In 1960, the three major categories of total employment were manufacturing services, and trade (wholesale and retail combined). These three categories accounted for 69 percent of the total employment in 1960. They are projected to account for approximately the same percentage of total employment in 1980, 2000, and 2020.

7. Manufacturing represented 25 percent of total employment in 1960. This is projected to decrease steadily until it reaches 14 percent in 2020. This projected decline results from the area's manufacturing mix which is heavily weighed with relatively slow-growing industries as food and kindred products, tobacco manufacturers, lumber and related products, and apparel. The relative importance of such

recent fast-growing manufacturing industries as chemicals, publishing, and shipbuilding and ship repair is not expected to offset the dampening effect of the old, well-established industries.

8. Services accounted for 24 percent of total employment in 1960 and is projected to increase to 36 percent of the total by 2020. This increase is influenced strongly by rising per capita income and an increased rate of urbanization.

9. The employment in trade was 20 percent of total employment in 1960. This is projected to remain almost static through the year 2020.

10. Table 3 shows the area's total employment broken down into individual categories for the period 1960-2020.

Table A-3. EMPLOYMENT BY SECTORS - 1960-2020

Item	1960	1980	2000	2020
Total Employment	232,750	336,000	473,000	719,000
Agriculture	4,233	3,100	3,000	3,100
Construction	16,130	30,800	50,000	82,000
Mining	144	200	200	200
Manufacturing	57,030	70,400	81,400	100,000
Transportation	18,688	23,100	29,600	40,300
Trade	46,537	65,700	88,900	130,300
Finance	12,876	20,300	33,700	59,200
Services	56,092	99,300	156,400	257,100
Public Administration	21,020	23,100	29,800	45,800

11. INCOME

The area had a per capita income of $2,199 in 1960. This figure is 19 percent greater than the state average for the same year. The area's per capita income is projected to grow at a relatively rapid rate to the year 2020. This rapid growth is due to the greatly accelerated growth of employment and the large percentage of employment in industries with a high level of productivity. The following table shows the area's total personal and per capita incomes for the period 1960 - 2020.

Table A-4. ESTIMATED TOTAL PERSONAL AND PER CAPITA INCOMES 1960 - 2020

Item	1960	1980	2000	2020
Total Personal Income (Millions of 1960 dollars)	1,375	3,480	8,100	19,800
Per Capita Income (1960 dollars)	2,199	4,170	7,180	11,900

12. SUMMARY

As indicated by the preceding paragraphs, the study area shows substantial potential future growth in population and employment. Per capita income within the area presently exceeds the state average and is projected to continue to do so. The metropolitan areas of Richmond and Newport News-Hampton located at the western and eastern ends of the study area, respectively, exert major economic influence

over the area. Economics activity within these two population centers is expected to increase significantly in the future. In summary, continued increase in population, employment, and income within the study area combined with greater leisure time indicate an increasing rate of participation in pleasure boating. This increased participation rate will exert continued and increasing demand on existing and future recreational boating facilities.

TASKINAS CREEK

APPENDIX B - BENEFITS

TABLE OF CONTENTS

LIST OF TABLES

BENEFITS

1. SCOPE

This appendix presents the derivation of benefits which would accrue through the provision of a marina facility and appropriate channels in Taskinas Creek adjacent to the proposed Taskinas State Park. Average annual benefits of $82,000 are attributable to the plan of improvement under consideration. These benefits would result entirely from recreational boating activity.

2. EXISTING RECREATIONAL CRAFT

The number of pleasure boats owned by residents of the study area was estimated from the 1967 Virginia Boat Register for the cities and counties within the study area. The Virginia Boat Register is prepared by the Commission of Game and Inland Fisheries and lists the make, class, year built, length, and country (county?) or city of use for all pleasure boats in the State of Virginia. Data obtained from this source were verified and supplemented by the publication entitled "U. S. Boating Industry", published by Conover Mast, January 1963, 1965, and 1967 issues; navigation reports of this office; and continuous and detailed surveys of yacht clubs, marinas, and boat basins within the area.

3. Based on the above sources, it is estimated that about 1,250 inboard boats, 1,100 sailboats, and 12,500 outboard boats, or a total of 14,850 pleasure boats are owned by residents of the study area.

4. Most of the existing pleasure boats are used and based on the Rappahannock, York, James, and tributaries of these rivers, and in Hampton Roads. A large number of owners base their craft, principally inboard boats, at marinas located outside of the study area. Relatively few marina-type facilities are located within the study area at present, with the exception of the Newport News-Hampton area. These existing marinas are generally used to maximum capacity. Many of the outboard boats are based at the owner's residence and transported by trailer to the area of use.

5. PROSPECTIVE RECREATIONAL BOATING

As population, leisure time, and income increase, participation in all types of outdoor recreation, including pleasure boating, will show significant increases. In recent years, participation in outdoor recreation activities has shown tremendous gains.

a. Outboard Boats - During the period 1950 to 1966 the number of outboards in the United States increased from about 2 million to 4.7 million, or 4.5 times greater than the corresponding population increase. During this period, the number of outboards per 1,000 population in the Nation increased from 13 to 24. No precise statistical data are available on the number of outboard pleasure boats owned within the study area in 1950. However, based on navigation reports of this office, interviews with operators of local marinas, yacht clubs, and others knowledgeable in the pleasure boating field, it is evident that a similar increase has been experienced within

the study area. The prospective number of outboard boats in the study area has been estimated based on the projected population for the area and a rate of increase in the number of outboard boats per 1,000 population. It is assumed that the number of outboards per 1,000 population within the study area would approach the existing National average of 24 by 1980, and would increase at a rate thereafter based on the National average rate of increase experienced during the 10-year period, 1956-1966. The estimated number of outboard boats for the years 1970, 1980, 2000, and 2020 is shown in table B-1.

b. Inboard Boats - In 1966 there were an estimated 600,000 inboard boats in the United States, or about three boats per 1,000 population; in the study area there were about 1,250 inboard boats or about 1.7 per 1,000 population. Although statistical data are not available indicating the number of inboard boats in the study area in 1950, it is apparent that a substantial increase has been experienced since that time. The prospective number of inboard pleasure boats has been conservatively estimated based on the projected population increase for the study area, a rate of increase in the number of inboards approaching the existing U. S average number of three per 1,000 population by 1980, and a rate of increase after 1980 equal to the rate of growth projected for outboard recreational boating. An estimate of the future number of inboards owned by residents of the study area is shown in table B-1.

c. Sailboats - In 1966 there were an estimated 1,100 sailboats within the study area, or about 1.5 per 1,000 population. The future increase in sailboating is estimated on the same basis as inboard boats and is shown in table B-1.

d. Summary - Although some slackening of the growth rate in pleasure boating may be forthcoming in the future, it is expected that the increase in the number of recreational craft in the Nation, state, and study area will continue to show substantial gains. The following table shows the prospective number of pleasure boats within the study area for the period 1970-2020.

Table B-1. PROSPECTIVE PLEASURE BOATING IN STUDY AREA, 1970-2020

Year	Outboards per 1,000 population	Inboards per 1,000 population	Sailboats per 1,000 population	Population in study area(a)	Outboards in study area	Inboards in study area	Sailboats in study area	Total Recreation boats in study area
1970	19	2.0	1.8	729,600	13,900	1,500	1,300	16,700
1980	24	3.0	2.7	834,000	20,000	2,500	2,300	24,800
2000	36	4.6	4.1	1,128,000	40,600	5,200	4,600	50,400
2020	49	6.1	5.5	1,664,000	81,500	10,100	9,200	100,800

(a) See Section A of Appendix Table A-1.

6. PROSPECTIVE BENEFITS

The above estimate of the number of existing and prospective recreational boats within the study area indicates a substantial potential for pleasure boating activity within and surrounding the study area. Marina facilities within the study area at present are insufficient to accommodate existing boats within the area. The transportation network within the area is conducive to easy and fast access to the proposed Taskinas State Park from the metropolitan areas of Richmond and Newport News-Hampton. Interstate 64 passes through the center of the study area connecting Richmond with Newport News-Hampton. Taskinas State Park will be located only a few miles from Interstate 64.

7. The marina facility as proposed will provide slips for about 200 boats, of which 120 would be for inboard boats including auxiliary sailboats, and the remaining 80 would be for outboard boats. Launching ramps will also be provided. It is anticipated that considerable use will be made of the facility by transient boats, although a number of pleasure craft will be based permanently at the proposed marina. It is anticipated that about 50 percent or 100 slips will be reserved for the use of transient boats whose owners desire to visit the proposed state park and nearby historical points of interests such as colonial Williamsburg, Jamestown, Yorktown, and other tourist attractions in the area.

8. A survey of existing marina facilities within the area indicates that most available slips are used to capacity. When new marinas are constructed and existing marinas expanded, owners indicate they experience little difficulty in renting the new spaces. Many marinas in the area currently have waiting lists of persons desiring berthing spaces.

9. Based on the foregoing discussion, it is believed that the 100 slips set aside for permanently based boats will be completely occupied within three years following completion of the facilities. The 100 slips reserved for transient boats are expected to be used to almost a maximum on weekends a few years after completion of the state park and accompanying marina development. Over the entire summer boating season, an average of 70 percent use is expected for the transient boat slips. In addition, about 150 outboards are expected to make use of the launching facilities, principally on weekends.

10. Transient boats and outboards launched from the ramps have been converted to equivalent permanently based craft based on the number of boat days enjoyed by the permanently based fleet. The following table presents an estimate of the number of boats expected to use the proposed facility.

Table B-2. ESTIMATED NUMBER OF BOATS TO USE PROPOSED MARINA FACILITIES

	Permanently based	Transient(a)	Launched(a)	Total
Inboards (b)	60	40	-	100
Outboards	40	30	20	90
Totals	100	70	20	190

(a) Converted to permanently based craft.
(b) Includes auxiliary sailboats.

11. Detailed surveys of yacht clubs, marinas, and boat owners within the Hampton Roads area indicate that the average depreciated value of inboard boats is from $5,000 to $15,000, and the average depreciated value of outboard boats is from $2,000 to $3,000. However, based on previous navigation studies of this office, data from pleasure boat manufacturers, and surveys of marinas and yacht clubs outside of the Hampton Roads area, it is believed that the average depreciated value of pleasure boats within the entire study area is lower than those in Hampton Roads. Therefore, average depreciated values of $6,000 for inboards and $2,000 for outboards are considered realistic estimates of pleasure boat values within the study area.

12. The following table shows the average annual benefits attributable to the proposed plan of improvement. Benefits for harbors designed for anticipated establishment of a recreational boating fleet are estimated in accordance with the method outlined

below. The method assumes that such benefits cannot be evaluated with mathematical precision, but that reasonable and representative percentages reflecting the net return on the depreciated investment in a for-hire fleet of small boats also are reasonable gages of the recreational navigation benefits to the boat users or recreationists. The net return above net costs to the owner in a for-hire operation is also the user's evaluation of the minimum benefit above costs placed on the availability of the boat and water area involved. In studies of boating practices in several parts of the country, this has been found to vary between 6 and 15 percent. By types of vessel, the appropriate range of percentage returns is approximately as follows:

Outboards, 10-15 percent.
Sailboats, 8-12 percent.
Inboards, 8-12 percent.
Cruisers, 6-9 percent.
Auxiliary sailboats, 6-9 percent.

For the computation in the following table, a percent of net annual return representing the middle of the respective range was used.

Table B-3. AVERAGE ANNUAL BENEFITS

Type	Average depreciated value $	Number	Total value $	Percent of net annual return	Average annual benefit
Inboards	6,000	100	600,000	10	60,000
Outboards	2,000	90	180,000	12	21,600
Total					81,600
Rounded					82,000

TASKINAS CREEK

APPENDIX C - DESIGN AND COST ESTIMATES

TABLE OF CONTENTS

LIST OF TABLES

DESIGN AND COST ESTIMATES

1. SCOPE

This section of the appendix discusses the plans studied to determine the most feasible and economical method for dredging and maintaining a channel from a marina to be constructed inside the mouth of Taskinas Creek to deep water in York River.

2. The plan of improvement considered consists of an entrance channel 5,300 feet long into Taskinas Creek, 80 feet wide, and 6 feet deep, to a point just upstream of the marina facilities to be constructed within the creek, as shown on exhibit 1 of the main report. The selected plan is in accordance with the desires of the Virginia Division of Parks, the principal sponsoring agency.

3. TURNING BASIN

The plan of improvement does not contemplate the provision of a turning basin inside Taskinas Creek since it is believed that the width (a) provided by the channel and (b) to be left between the channel and the marina facilities will be adequate for boats entering and leaving the creek. No facilities will be constructed within 30 feet on each side of the channel. Accordingly, a width of 140 feet will be available for boats entering and departing the marina facilities. Since speeds within the creek proper will be limited, such a width is considered sufficient for efficient and safe maneuverability

of the boats using the facility. All dredging outside of the channel prism will be accomplished by the State of Virginia. The omission of a turning basin inside the creek is in accordance with the desires of the sponsoring State agency.

CHANNEL COST

4. DREDGING QUANTITIES

Construction of the channel would be by conventional hydraulic pipeline dredge. The material to be dredged, as determined by probings, consists principally of soft organic silt and peat. The following table summarizes the quantity of material to be dredged:

Table C-1. DREDGING QUANTITY

	Quantity of material, cubic yards			
	6-foot depth	1-foot required overdepth	1-foot allowable overdepth	Total
A. Estimated pay yardage: Entrance and inner channels, 5,300 feet long, 80 feet wide by 6 feet deep	90,000	22,000	23,000	135,000
B. Non-pay overdepth and overwidth dredging				40,000
C. Total estimated yardage to be removed				175,000

5. DISPOSAL AREA

Material to be dredged from the channel will be placed hydraulically in a marsh area approximately 5,000 feet east (downstream) of the mouth

of Taskinas Creek. The selected disposal area is the nearest suitable location to the site of the dredging. It is adequate to retain all material expected to be dredged over the 50-year life of the project.

6. COST

The estimated cost is based on August 1968 price levels by contract with a 16-inch hydraulic pipeline dredge and attendant plant. In estimating costs, consideration was given to length of pipeline required, nature and quantity of material to be dredged, and location of disposal area. The following table summarizes the cost:

Table C-2. ESTIMATED COST OF IMPROVEMENT

CHANNELS		
Dredging channel by hydraulic method		
a. Quantity to be dredged		175,000 cu. yds
b. Output of plant and time allowed for completion of work:		
(1) Amount dredged per day		8,000 cu. yds
(2) Effective time per month		25 days
(3) Time allowed to complete work		27 days
c. Estimated cost:		
(1) Total cost of plant (16" dredge)	$84,100	
(2) Laying and removal of 6,400 L.F. of shore and submerged pipeline.	9,500	
(3) Mobilization and demobilization of dredge, attendant plant, and equipment.	15,500	
(4) Total estimated contract cost		$109,100
(5) Contingencies, 15%		16,400
(6) Engineering and design		
(a) Surveying & mapping	$ 3,000	
(b) Design and cost estimates	1,500	
(c) Subsurface investigations	500	$ 5,000
(7) Supervision and administration		
(a) Inspection and supervision	$ 2,000	
(b) Surveys and layouts	4,500	
(c) District overhead	2,500	9,000
Sub-Total		139,500(a)
d. Aids to navigation by Coast Guard		300
e. Construction of retaining levees	$ 2,700	
f. Construction of spillway	2,200	
g. Oyster releases	5,000	9,900
Total project cost		$149,700(b)

(a) Rounded to $140,000 in table 2 of main report.
(b) Does not include cost of preauthorization studies.

10. MAINTENANCE

The estimate of annual cost of maintenance is based on current price levels and on accomplishing the work with a 16-inch hydraulic pipeline dredge on an average of once every four years throughout the 50-year life of the project. The estimate of cost is further based on an estimated annual rate of shoaling of one-half foot throughout the project. However, it is anticipated that the rate of shoaling will be more rapid in some sections of the channel than others. It is proposed to compensate for this by overdepth and overwidth dredging as required to minimize the frequency of dredging. The estimated cost of annual maintenance of the project is as follows:

Table C-3. ESTIMATED COST OF ANNUAL MAINTENANCE

FEDERAL COST	
Maintenance:	
Removal of minor shoals in channel 5,000 cu. yds. at $2.10	$10,500
Annual condition survey	2,000
Maintenance of aids to navigation (U. S. Coast Guard)	50
FEDERAL MAINTENANCE COST	$12,550
NON-FEDERAL COST	
Maintenance of levees and spillway	500
TOTAL ANNUAL MAINTENANCE	13,050
Rounded	13,100

11. PROJECT ANNUAL CHARGES

The following summarizes the average annual charges attributable to the navigation project.

Table C-4. TOTAL ANNUAL CHARGES

Item	Average Annual Charges
First Cost (investment) = $149,700	
Interest @ 4-5/8%	$ 6,900
Amortization (50 years)	800
Average annual maintenance	13,100
TOTAL	$20,800

ALTERNATE TO MAINTAINING TASKINAS CHANNEL BY DREDGING ONLY

12. Since there are no nearby comparable navigation projects on the York River in the vicinity of Taskinas Creek, it is difficult to estimate the annual shoaling rate that may be expected to take place with reasonable accuracy. In the absence of such a project, the shoaling rate experienced in the channel across the bar at the mouth of Aberdeen Creek has been used as an index to the rate which might be expected to occur in the entrance channel to Taskinas Creek. Aberdeen Creek lies on the opposite side of the river and approximately 8.5 miles downstream of Taskinas Creek. The project depth of Aberdeen Creek is the same as that proposed for Taskinas Creek, i. e., 6 feet.

The entrance channel into Aberdeen Creek is 2,600 feet long and that at Taskinas Creek would be 4,000 feet long. The shoaling rate at Aberdeen Creek is about 0.5 foot per year, and this rate has been assumed for the channel leading into Taskinas Creek.

13. Because of the uncertainties associated with estimating the annual rate of fill which might be expected to occur in Taskinas Creek, consideration was given to the construction of a treated sheet-pile timber jetty on the upstream side of the entrance channel to minimize shoaling in the channel. Hand probings along the proposed alignment of the jetty to a depth of 35 feet did not indicate firm subsurface conditions. Because of this unstable condition, the piles and sheeting in the jetty would have to be longer than those normally used in structures of this nature. Such a jetty would have to extend from the high water line on shore to the 6-foot depth contour in the York River, a distance of 4,000 feet. The top of the jetty would be at 4 feet above mean low water to provide for visibility during all stages of the tide under normal conditions. Standard aids to navigation would be installed on the jetty to mark it.

14. An inspection of a number of tributary streams and downstream structures indicates that there is very little upstream movement of material due to littoral forces or tidal currents. In practically all instances observed, the littoral material moves in a downstream

direction. This also holds true for suspended and bed-load material moved by tidal currents. Accordingly, it was concluded that a jetty would not be required on the downstream side of Taskinas Creek.

15. Preliminary estimates indicate that the jetty would have an initial cost of approximately $600,000. Interest and amortization of the cost and replacement and maintenance of the jetty would approximate $39,000 annually. This includes its replacement in 30 years. Some nominal channel maintenance would be required, possibly of the order of $1,000 annually. Therefore, the 4,000 foot jetty on the upstream side of the proposed channel and channel maintenance would cost about $40,000 annually. This compares with an estimated annual charge of only about $21,000 for maintaining the channel without a jetty. A comparison of the estimated annual charges for the considered jetty on the upstream side of Taskinas Creek and the estimated annual cost of maintaining the channel by dredging alone, indicates that the shoaling rate in the channel would have to exceed 18 inches over its entire width and length before a jetty would be less expensive.

16. Because of the uncertainties associated with estimating the annual rate of field which might occur, a plan requiring the construction of a timber jetty on the upstream side of the entrance has been formulated. This jetty is provided in the event that experience

shows that the average annual cost of maintenance dredging without the jetty, exceeds the annual charges for the project with the jetty. At that time, consideration will be given toward the construction of the jetty.

TASKINAS CREEK

APPENDIX D - PERTINENT CORRESPONDENCE

TABLE OF CONTENTS

Letters, similar to the one written to the FWPCA has been forwarded to:

Virginia Department of Health
Virginia State Water Control Board

To date, no reply has been received from these Agencies.

NAOEN-R 1 August 1968

Mr. Lloyd W. Gebhard
Regional Director
Federal Water Pollution Control Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

Dear Mr. Gebhard:

This office is engaged in a study to determine the feasibility of constructing a navigation channel into Taskinas Creek, an estuary of York River, located in James City County, Virginia. This study is being undertaken under provision of Section 107 of the River and Harbor Act of 14 July 1960.

The report will consider a channel 6 feet deep and 80 feet wide from the 6-foot contour in York River into the mouth of Taskinas Creek, a distance of about 5,300 feet. The channel will be dredged to a dept of 6 feet with the dredged material being deposited in the disposal area shown on the inclosed map. A short dike and spillway may be necessary to utilize the marshland being considered for the disposal area. Construction of the channel, if recommended, would require ab one month. The material to be dredged is expected to be very soft organic silt and peat soils. Approximately 135,000 cubic yards of t material will be dredged initially. The estimated maintenance of th project would require the removal of an average of 5,000 cubic yards annually and it would be dredged at approximately 4-year intervals.

The proposed channel will serve as a waterway access to a large mari which is being planned as an integral part of Taskinas State Park no under consideration by the State of Virginia. The park will incorpo an area of influence comprised of the cities of Richmond, Newport Ne and Hampton. It also includes the counties of New Kent, Charles Cit and King William. This zone, which has an area of 1,962 square mile shows good economic potential and is expected to grow very rapidly during the next 50 years.

NAOEN-R 1 August 1968
Mr. Lloyd W. Gebhard

Justification of the project will be based entirely on recreational boating. Preliminary estimates indicate the project to be economically feasible.

Your comments are desired on the effect, if any, the proposed project would have on the water quality of the inland and coastal waters.

Very sincerely yours,

C. J. ROBIN
Chief, Engineering Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

October 8, 1968

Mr. C. J. Robin
Chief, Engineering Division
U. S. Army Engineer District, Norfolk
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510

Dear Mr. Robin:

In response to your letter of August 1, 1968, we have reviewed plans for the proposed navigation channel into Taskinas Creek, James City County, Virginia. Information contained in that letter indicates that the proposed plan of development will consist of a channel six feet deep and eighty feet wide from the six foot contour in the York River into the mouth of Taskinas Creek, a distance of about one mile. It is estimated that channel maintenance will be required at approximately 4-year intervals. Spoil material, consisting primarily of organic silt and peat will be deposited in a diked marsh area located downstream from the proposed channel.

Through coordination with interested State and Federal agencies, we have learned that there are leased oyster grounds in the general vicinity of the channel which will be taken out of production either by physical destruction of the beds or by sedimentation, resulting from initial project dredging. It is our understanding that restitution will be made for proj incurred losses to oyster grounds. However, to reduce damages to oyster resources, it is recommended that (1) dredging be conducted in a manner which will minimize turbidities in the channel area, and (2) precautions be taken to assure containment of spoil in the diked marsh area.

We appreciate the opportunity to provide you with these comments.

Sincerely yours,

J. Gary Gardner
Director, Technical Programs

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
PEACHTREE-SEVENTH BUILDING
ATLANTA, GEORGIA 30323

September 3, 1968

Mr. Milton T. Hickman
Commissioner, Virginia Commission on
Marine Resources
P.O. Box 756
Newport News, Virginia 23607

Dear Mr. Hickman:

We are enclosing for your review and comment a copy of our proposed report on Taskinas Creek project, James City County, Virginia. Your letter of comment or concurrence will be attached to our final report.

In order to meet our scheduled release date, we would appreciate receiving your reply by September 17, 1968. However, if your review will require additional time, please advise.

Sincerely yours,

Ernest C. Martin

Ernest C. Martin
Assistant Regional Director

Enclosure

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
PEACHTREE-SEVENTH BUILDING
ATLANTA, GEORGIA 30323

November 4, 1968

District Engineer
U.S. Army, Corps of Engineers
Norfolk, Virginia

Dear Sir:

In response to your letter of August 1, 1968, the Bureau of Sport Fisheries and Wildlife, in cooperation with the Virginia Marine Resources Commission, the Virginia Institute of Marine Science, and the Virginia Commission of Game and Inland Fish, has reviewed proposed plans for the Taskinas Creek project, James City County, Virginia, to determine project effects on fish and wildlife resources. Authority for your study is contained in Section 107 of the River and Harbor Act of July 14, 1960. This letter constitutes our report on this project and is prepared and submitted in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The proposed project consists of an 80 by 6 foot channel about 1 mile long which will serve a marina being planned as an integral part of Taskinas State Park, now under consideration by the State of Virginia. Approximately 135,000 cubic yards of spoil will be dredged initially and placed on a diked spoil area which lies on a small marsh about 4,500 feet south of the channel alignment. Maintenance of the project will require the removal of an estimated 20,000 cubic yards of spoil about every 4 years.

There are significant shellfish grounds located in the shallow water areas of the York River at the mouth of Taskinas Creek and in adjacent areas. Therefore, damages to this resource are inherent in any channel passing from Taskinas Creek to the York River. About 10 acres of leased oyster grounds will be destroyed as a result of proposed channel dredging, while associated siltation and turbidity will cause additional damage to oyster resources.

Although losses caused by channel construction are not expected to be significant in terms of total oyster resources of the area, such losses would have a significant effect on the operators of these grounds. In view of the commercial fishing interests involved, the appropriate lease holders should be contacted and their views in this matter solicited. We feel that appropriate compensation to affected lease holders should be included in the Corps' benefit-cost analysis.

As planning for this project progresses, the Virginia Marine Resources Commission, the Virginia Department of Health, and the Federal Water Pollution Control Administration should be kept advised of latest project data. Care must also be taken to insure that spoil material is contained within the boundaries of the disposal area so as not to damage nearby oyster areas. Other fish and wildlife resources in the project area are low to moderate in value, and significant damages to these resources are not expected to result from proposed project works.

This report has been reviewed and concurred in by the Bureau of Commercial Fisheries, Virginia Commission of Game and Inland Fish, and Virginia Marine Resources Commission. Copies of letters from Messrs. Hoffman and Hickman are attached. We invite your particular attention to Mr. Hickman's comments.

We appreciate the opportunity to comment on project plans and ask that you notify us of any project changes so that we can provide you with additional comments if necessary.

Sincerely yours,

C. Edward Carlson

C. Edward Carlson
Regional Director

Attachments 2

COMMONWEALTH OF VIRGINIA

COMMISSION OF GAME AND INLAND FISHERIES
Box 1642
RICHMOND, 23213

CHESTER F. PHELPS, EXECUTIVE S
SEVEN NORTH SECOND STREE
BOX 1642
RICHMOND, 23213

September 23, 1968

Mr. Ernest C. Martin
Assistant Regional Director
Bureau of Sport Fisheries and Wildlife
Peachtree-Seventh Building
Atlanta, Georgia 30323

Dear Mr. Martin:

We have reviewed your proposed report to the U. S. Army, Corps of Engineers concerning the Taskinas Creek Project, James City County, Virginia and concur in this report.

Sincerely

Jack M. Hoffman
Chief, Fish Division

G

COMMONWEALTH OF VIRGINIA

MARINE RESOURCES COMMISSION
P. O. BOX 756
NEWPORT NEWS, VIRGINIA 23607

September 6, 1968

Mr. Ernest C. Martin
Assistant Regional Director
Bureau of Sport Fisheries and Wildlife
Peachtree-Seventh Building
Atlanta, Georgia 30323

Dear Mr. Martin:

We have reviewed your comments on the proposed report on Taskinas Creek project, James City County, Virginia.

We concur in your report and wish to emphasize again the potential damage to certain oyster ground in the area and the potential damage to oyster grounds in the adjoining areas. We deem it wise for the Virginia Institute of Marine Science to approve the proposed dredging operations and the location of spoil areas.

We are very much concerned about the potential pollution which may result from the construction of the marina. We urge that the construction of the marina and its facilities be approved by the Department of Health and the State Water Control Board.

Sincerely yours,

Milton T. Hickman
Commissioner

MTH/emc

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510

IN REPLY REFER TO

NAOEN-R

12 February 1969

Dr. W. J. Hargis, Jr.
Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

Dear Dr. Hargis:

Inclosed is a copy of my letter of 8 November 1968 regarding the feasibility of constructing a navigation channel into Taskinas Creek to a large marina which is being planned as an integral part of a State Park by the State of Virginia. Since we are rapidly approaching completion of our report, an early reply would be greatly appreciated.

Very sincerely yours,

1 Incl
As stated

C. J. ROBIN
Chief, Engineering Division

COMMONWEALTH OF VIRGINIA

VIRGINIA INSTITUTE OF MARINE SCIENCE
GLOUCESTER POINT, VIRGINIA 23062

February 14, 1969

Re: NADEN-R

Mr. C. J. Robin, Chief
Engineering Division
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510

Dear Mr. Robin:

We have reviewed the proposed Taskinas Creek channel project in detail and have discussed the modifications to the immediate environme that would result if the project were initiated with staff members fro other state agencies at an inter-agency meeting in Richmond. We concu with the statement transmitted to the District by letter of November 4 1968, by the Bureau of Sport Fisheries and Wildlife, U.S.F. & W.S.

In addition, we suggest that the District consider definitely incorporating a dike and spillway at the mouth of the disposal area to minimize the loss of fine particles from the site. Some adverse effects on existing shellfish resources may be anticipated adjacent tc the mouth of the small marsh.

Please do not hesitate to contact us if we can supply information pertinent to the proposed project.

Sincerely yours,

Morris L. Brehmer, Ph.D.
Assistant Director

MLB:br

cc: Dr. Hargis

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510

IN REPLY REFER TO

NAOEN-R

21 October 1970

SEE LIST OF ADDRESSEES

Gentlemen:

As you know, the National Environmental Policy Act of 1969 requires the preparation of "5-point" statements for all public works projects having a potential significant impact upon man's environment and which have been submitted for authorization and for funding. An important aspect of the statements is the past and present interagency coordination initiated by the action agency. Results of this coordination should accompany submission of each 5-point statement.

Inclosed for your review is a copy of the statement for Taskinas Creek, Virginia and a location map. Your comments not later than 15 December 1970 would be appreciated.

Sincerely yours,

C. J. ROBIN
Chief, Engineering Division

2 Incl
1. 5-Point Environmental Statement, Taskinas Creek, Va., 2 Jul 70
2. Map, Taskinas Creek, Va., 31 Jul 68

York River State Park

LIST OF ADDRESSEES

Mr. Roy K. Wood
Regional Director
Bureau of Outdoor Recreation
810 New Walton Building
Atlanta, Georgia 30303

Mr. C. Edward Carlson
Regional Director
U. S. Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Peachtree-Seventh Building
Atlanta, Georgia 30323

Cy furnished:
Mr. Edward Bradley
Bureau of Sport Fisheries
& Wildlife
2104 Hillsborough Street
Raleigh, North Carolina 27606

Mr. Leonard Volz
Regional Director
Region One
National Park Service
P. O. Box 10008
Richmond, Virginia 23240

Regional Director
Federal Water Quality Administration
918 Emmet Street
Charlottesville, Virginia 22901

Mr. J. M. Alexander
Commissioner
Division of Water Resources
Department of Conservation and
Economic Development
911 East Broad Street
Richmond, Virginia 23219

Mr. Robert T. Dennis
President
Conservation Council of Virginia, Inc.
4221 West Ox Road
Fairfax, Virginia 22030

Mr. Elbert Cox
Director
Virginia Commission of Outdoor
Recreation
9th Street Office Building
9th and Grace Streets
Richmond, Virginia 23219

Mr. A. H. Paessler
Executive Secretary
State Water Control Board
P. O. Box 11143
Richmond, Virginia 23230

Mr. Chester F. Phelps
Executive Director
Commission of Game and Inland
P. O. Box 11104
Richmond, Virginia 23230

Dr. W. J. Hargis
Director
Virginia Institute of Marine S
Gloucester Point, Virginia 23

Mr. Clarence S. Lorentzson
U. S. Department of the Inter
404 Financial Services Buildi
148 Cain Street, N. E.
Atlanta, Georgia 30303

Mr. Gerald P. McCarthy
Executive Director
Governor's Environmental Coun
8th Street Office Building
Richmond, Virginia 23219

TASKINAS CREEK

ENVIRONMENTAL STATEMENT

1. Project Description. The proposed project is designed to improve navigation in Taskinas Creek and is located near the mouth of the creek which flows into the York River about 20 miles upstream from the river's confluence with Chesapeake Bay. The major water resource problem at this site is the lack of an adequate navigation channel for recreational craft desiring to use the waterway.

2. Environmental Setting Without the Project. Taskinas Creek lies completely in James City County, Virginia, and has its source near the small town of Croaker. The creek flows in a northeasterly direction to the York River, a distance of about three miles. The existing terrain adjacent to the creek is hilly and densely forested. Federal and State interests have not placed any significant environmental value on the marine life found in or immediately adjacent to the creek. The depth of water at the mouth of the creek is only about one foot. The area selected for spoil disposal is a marshy zone approximately 5,000 feet east (downstream) of the mouth of Taskinas Creek.

3. Impact Statement. The following information is furnished in response to Section 102 (2)(C) of the National Environmental Policy Act of 1969.

a. Identify "the environmental impacts of the proposed action." The project would entail dredging an entrance channel through the marshland at the mouth of Taskinas Creek, 80 feet wide and 6 feet deep. It would extend to the 6-foot depth contour in the York River, a distance of about 5,300 feet.

The basic environmental impacts associated with this navigation improvement relate to the ecology of marine life in the immediate and

adjacent area of dredging and the environment in the area where dredged material is to be deposited. Marine organisms inhabiting the zone selected for channel construction will be destroyed. Turbidity, resulting from the dredging could adversely affect other marine life in the immediate area. However, the creek is almost completely land-locked by a silt and mud accumulation near its mouth -- the entrance into York River. Continued filling, particularly at the mouth of the creek, will not only eliminate its use by watermen, but will, in time, so choke the mouth that tidal flow into and out of the creek will be seriously impeded and the quality of water within will deteriorate. An apparent decrease of marine life in the creek will likewise occur.

The loss of organisms associated with channel construction is considered to be minor when weighed against the improved environmental conditions provided by the channel. The dredged material will be contained on low-lying marshland in such a manner that none of it will be permitted to return to the creek.

b. Identify "any adverse environmental effects which cannot be avoided should the plan be implemented." With project implementation, marine benthos inhabiting the bottom in the dredging zone will be destroyed. Increased turbidity, brought about by disturbing the bottom sediments, could detrimentally affect meritic plankton and nekton in the immediate vicinity. A small tract of marshland selected for the disposal area will be lost.

c. Identify "alternatives to the proposed action." One alternative to the proposed action would be to forego the improvement of this waterway. However, since the undesirable environmental effects are relatively

minor and are more than balanced by the environmental assets provided by channel construction, there is no basis for the "no improvement" alternative.

d. Discuss "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity." It is anticipated that construction of a channel into Taskinas Creek and the disposal of dredged spoil will have no detrimental effect on long-term biological productivity in the creek or surrounding waters.

e. Identify "any irreversible or irretrievable commitment of resources which would be involved in the proposed action should it be implemented." None are foreseen.

Norfolk District, Corps of Engineers
Norfolk, Va. 23510
2 Jul 70

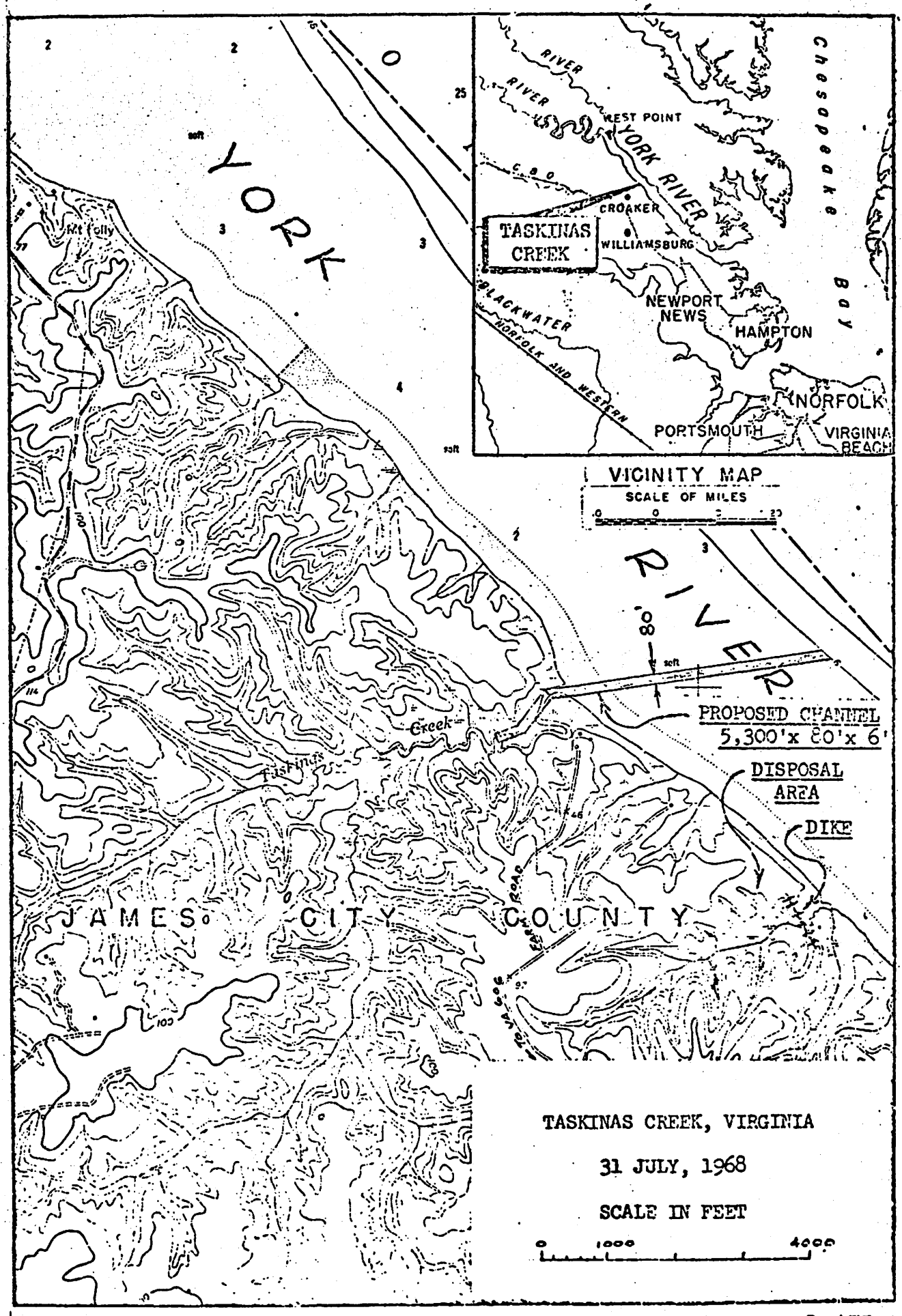

YORK
RIVER
JAMES CITY COUNTY
Mt Folly
Fishings
Creek
WEST POINT
YORK RIVER
CROAKER
TASKINAS CREEK
WILLIAMSBURG
BLACKWATER
NORFOLK AND WESTERN
NEWPORT NEWS
HAMPTON
NORFOLK
PORTSMOUTH
VIRGINIA BEACH
Chesapeake Bay
VICINITY MAP
SCALE OF MILES
PROPOSED CHANNEL
5,300'x 80'x 6'
DISPOSAL AREA
DIKE
TASKINAS CREEK, VIRGINIA
31 JULY, 1968
SCALE IN FEET
1000
4000

PLATE I

COMMONWEALTH OF VIRGINIA **STATE WATER CONTROL BOARD**

EXECUTIVE SECRETARY
A. H. PAESSLER

P. O. BOX 11143 - RICHMOND, VIRGINIA 23230 - (703) 770-2241

October 4, 1968

Mr. J. Gary Gardner
Director Technical Programs
Federal Water Pollution Control Administration
Middle Atlantic Region
918 Emmet Street
Charlottesville, Virginia 22901

Dear Mr. Gardner:

SUBJECT: TASKINAS CREEK - YORK RIVER BASIN - CORPS OF ENGINEERS PROPOSAL FOR CHANNEL DREDGING

On August 28, 1968, we received from your office an informational copy of the Corps of Engineers proposal to dredge a 5300 foot channel from the 6 foot contour of the York River into Taskinas Creek. The channel dredging is proposed in order to facilitate the construction of a marina in conjunction with the State park to be established in the area.

Subsequent to receipt of the Corps' proposal, we conferred with all interested State agencies and it was the consensus that the public interest would dictate the establishing of a State park in the area and that the Corps' proposal for dredging was a necessity even though shellfish beds would be lost due to sedimentation resulting from the dredging. However, this activity does not constitute "pollution" as defined by the Water Control Law and under the terms of the Corps' contract, restitution will have to be made for loss of the shellfish beds. We will take whatever action is necessary in cooperation with other State agencies to minimize the effect of the return of liquid to the River from the spoil disposal area.

On the basis of the information discussed at the conference with other State agencies, this is to advise you that we have no adverse comments to make regarding the proposed dredging.

Very truly yours,

Original Signed by A. W. HADDER

A. W. Hadder, Director
ENFORCEMENT DIVISION

AWH/scc

cc: Mr. Ben H. Bolen - Commissioner - Division of Parks

COMMONWEALTH OF VIRGINIA **STATE WATER CONTROL BOARD**

EXECUTIVE SECRETA
A. H. PAESSLER

P. O. BOX 11143 - RICHMOND, VIRGINIA 23230 - (703) 770-2241

September 20, 1968

Mr. Lewis King
Chief of Planning
Division of Parks
Department of Conservation and Economic Development
Southern States Building
7th and Main Streets
Richmond, Virginia

RECD SEP 23 1968

SUBJECT: PROPOSED STATE PARK - TASKINAS CREEK - YORK RIVER BASIN

Dear Mr. King:

This will confirm our conference relative to the above subject beginning at 10:00 A. M. on September 27, 1968, at the Water Control Board offices, 4010 West Broad Street, Richmond, Virginia.

We are certain that the information you provide for discussion by the other interested agencies will be of great value.

Copy of this letter to the agencies listed below will serve as their notice of confirmation of the conference.

Very Truly yours,

A. W. Hadder

A. W. Hadder, Director
ENFORCEMENT DIVISION

AWH/acc

cc: Dr. Morris H. Brehmer - Virginia Institute of Marine Science
Mr. Elbert Cox - Commission of Outdoor Recreation
Mr. Dale F. Jones - Division of Water Resources
Mr. Cloyde Wiley - State Dept. of Health - Bureau of Shellfish Sa
Mr. Jeff Sinclair - Marine Resources Commission

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510

IN REPLY REFER TO
NAOEN-R

9 May 1972

Mr. Richard Gibbons
Landscape Architect
Virginia Division of State Parks
501 Southern States Building
7th and Main Streets
Richmond, Virginia 23219

Dear Mr. Gibbons:

Reference is made to the Reconnaissance Report, Taskinas Creek, 16 May 1969, and the plan of improvement recommended therein. This plan of improvement provides for an entrance channel 80 feet wide and 6 feet deep from the 6-foot contour in York River to a point just downstream of the proposed marina facilities within the creek, a distance of about 5,300 feet. It also provides for construction of a jetty from deep water in the York River to the mouth of Taskinas Creek in the event experience shows that the average annual cost of maintenance dredging exceeds the annual charges for the jetty.

As shown on the inclosed map, the disposal area considered at that time was south of the proposed channel. The estimated total first cost for dredging the improvement at the time the report was prepared, was $140,000 plus the State of Virginia's costs for provision of spillways, dikes, and oyster releases. The State will bear one-half of the first cost for dredging, estimated at about $70,000, plus an additional $10,000 for the spillways, dikes, and oyster releases.

Based on the same plan as presented in the referenced report, our current estimate for the proposed improvement is the same as presented above.

We understand you are considering changing the spoil disposal area to the top of the hill south of the proposed channel into Taskinas Creek. This would increase the current cost estimate of dredging about $20,000. Construction of the levees on top of the hill would be a major problem. Furthermore, the height of the levees may vary from 30 to 40 feet. A very rough estimate for the cost of the levees is about $100,000. All of these costs would have to be borne by the State of Virginia.

It is requested that this office be advised (1) whether the Division of State Parks wishes to change the location of the disposal area at the increased cost indicated above and (2) when it is planned to fund the project.

NAOEN-R 9 May 1972

Mr. Richard Gibbons

As requested, a log of the borings taken in Taskinas Creek along the proposed channel is inclosed.

Sincerely yours,

for W. H. TAMM
Chief, Engineering Division

2 Incls
1. Map-Taskinas Creek, Va., 31 Jul 68
2. Borings

625-820

Appendix B

List of Wetland Plants Recorded

Common Name	Scientific Name	Index of Abundance*
Saltmarsh cordgrass	Spartina alterniflora	A
Saltmeadow cordgrass	Spartina patens	A
Big cordgrass (Giant)	Spartina cynosuroides	A
Saltgrass	Distichlis spicata	A
Saltmarsh bullrush	Scirpus robustus	F
Olney threesquare	Scirpus olneyi	F
Narrowleaf cattail	Typha angustifolia	O
Arrow arum	Peltandra virginica	O
Pickerel weed	Pontederia cordata	O
Marsh hibiscus	Hibiscus moscheutos	F
Water smartweed	Polygonum densiflorum	O
Wild rice	Zizania aquatica	R
Water millet	Echinochloa walteri	R
Water dock	Rumex verticillatus	O
Swamp loosestrife	Decodon verticillatus	O
Marsh aster	Aster tenuifolius	O
Marsh fleabane	Pluchea purpurascens	O
Marsh mallow	Kosteletzkya virginica	O
Sea lavender	Limonium vulgare	R
Water pennywort	Hydrocotyle verticillata	R
Marsh elder	Iva frutescens	A
Groundsel tree	Baccharis halimifolia	O
Black needlerush	Juncus roemerianus	O
Softstem bulrush	Scirpus validus	R
Saltmarsh loosestrife	Lythrum lineare	R

Appendix B (continued)

Common Name	Scientific Name	Index of Abundance*
Sea oxeye	Borrichia frutescens	R
Little sea-pink	Sabatia stellaris	R
Saltmarsh fimbristylis	Fimbristylis spadicea	O
Wax myrtle	Myrica cerifera	O

* Abundant = A

Frequent = F

Occasional = O

Rare = R

Appendix C

Vegetation Standing Crop Dry Weight (Tons/acre) August-September, 1972

Species	Inside Marina mean	Inside Marina range	Outside Marina mean	Outside Marina range	York River Frontage mean	York River Frontage range
Saltmarsh cordgrass	1.27	.16 - 2.13	1.47	.11 - 2.91	1.40	.11 - 1.91
Saltmeadow hay	.88	.07 - 2.07	.75	.07 - 2.22	.26	.01 - .67
Saltgrass	.61	.07 - 2.04	.76	.01 - 2.63	.83	.02 - 1.98
Saltmarsh bulrush	.12	.01 - .53	.02	.01 - .03	.10	.05 - .13
Olney threesquare	.33	.02 - 1.22	.33	.04 - .79	.12	--
Narrowleaf cattail	.58	.38 - .78	3.54	3.30 - 3.77	--	--
Big cordgrass	.65	--	1.39	.13 - 4.96	4.58	.11 - 9.38
Marsh aster	.04	.02 - .08	--	--	.17	.06 - .33
Softstem bulrush	--	--	1.70	--	--	--
Pickerel weed	--	--	3.66	--	--	--
Black needlerush	--	--	3.74	--	--	--
Smartweed	--	--	--	--	.08	.04 - .12
Mint	--	--	--	--	.21	.19 - .24