

FINAL DETERMINATION OF THE ASSISTANT ADMINISTRATOR  
FOR EXTERNAL AFFAIRS CONCERNING THE  
JACK MAYBANK SITE ON JEHOSEE ISLAND, SOUTH CAROLINA  
PURSUANT TO SECTION 404(c) OF THE CLEAN WATER ACT

I. Introduction

Under Section 404(c) of the Clean Water Act (CWA, 33 U.S.C. 1251 et seq), the Administrator of the Environmental Protection Agency (EPA) is authorized to prohibit the specification (including withdrawal of specification) of any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area for specification (including the withdrawal of specification) as a disposal site, whenever he determines, after notice and opportunity for public hearing, that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such a determination, the Administrator shall consult with the Chief of Engineers, the landowner, and the applicant in cases where there has been application for a Section 404 permit. The Administrator has delegated this authority to make a Final Determination under Section 404(c) to the Assistant Administrator for External Affairs, who is EPA's national Section 404 program manager.

Mr. Jack Maybank has proposed to construct approximately 47,000 linear feet (8.9 miles) of earthen dikes in tidal wetlands on Jehossee Island, Charleston County, South Carolina. The purpose of this proposed discharge of fill material is to create two separate impoundments containing a total of 900 acres (collectively referred to herein as the "Maybank Site") to facilitate duck hunting and aquaculture.

After careful consideration of the record in this case including public comments, the public hearing record, comments from the Office of the Chief of Engineers and after consultation with Mr. Jack Maybank and his representatives, I have determined that the discharge of fill material for the purpose of impounding wetlands at the Maybank Site will have unacceptable adverse effects on fishery areas (including spawning and breeding areas), and recreational areas, as described more fully below. My findings and reasons for this determination are also set out below.

## II. Background and History

Under Section 404 of the CWA, any person who wishes to discharge dredged or fill material into waters of the United States, including wetlands, must first obtain a permit from the Secretary of the Army, acting through the Chief of Engineers, or where a State program has been approved by EPA, from the State. The Corps of Engineers is responsible for processing the Section 404 permit application for the Maybank Site.

The Corps of Engineers' Charleston District issued two public notices on December 6, 1982, of permit applications by Mr. Maybank. These applications were for the same general area. One application proposed placing dikes around most of the tidal creeks at the project site, and the other proposed diking across most of them. Construction of these proposed dikes would have resulted in impoundments encompassing approximately 2,000 acres of existing wetlands.

During the permit evaluation period, review agencies including EPA, the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS), objected to issuance of the Corps' permits to fill wetlands at the proposed project site. The basis for these objections was concern over the anticipated significant adverse effects associated with the proposed project. These impacts included: the alteration of wetlands in an area where the cumulative alteration of tidal wetlands for impoundments has been significant; adverse effects on fish and wildlife; and the loss of water exchange and filtration benefits provided by the existing wetlands. EPA also expressed its view that the project did not comply with requirements of the Section 404(b)(1) Guidelines (40 CFR Part 230).

On April 11, 1983, the South Carolina Coastal Council issued a State permit which limited the impoundment size to a total of 900 acres. On October 14, 1983, the Corps notified EPA that the applicant had modified his proposal to conform with the State permit for 900 acres of impoundments approved by the South Carolina Coastal Council. As modified, the proposed project consists of constructing approximately 47,000 feet (8.9 miles) of earthen dikes atop the remnants of old rice field embankments at two sites (one approximately 700 acres and one approximately 200 acres) on Jehossee Island. The proposed impoundments would be managed to attract waterfowl and leased for hunting purposes. Mr. Maybank has also stated he intends to manage the impoundments for aquaculture, primarily shrimp farming. The old embankments have not been maintained since the decline of rice culture during the first decade of this century. As a result of subsidence, erosion, and rising sea level, the remnant dikes are now covered primarily by wetland vegetation and no longer act as a barrier to tidal flooding of the interior wetlands.

The applicant has proposed that the new dikes extend 3.3 feet above mean high water. If dikes were constructed to that height, the diking would directly destroy approximately 22 acres of existing wetlands. South Carolina Wildlife and Marine Resources Department personnel who reviewed the project have stated that the diking should be constructed to 4.5 feet above mean high water to adequately protect the dikes from overtopping during storm tides. Such higher impoundment dikes would require a larger base and would result in the destruction of approximately 32 acres of wetlands.

After Mr. Maybank modified the proposal, EPA, USFWS, and NMFS in written comments to the Corps continued to object to issuance of the permit on the grounds stated above for the original proposals. The USFWS notified the Corps that the most significant impacts of the proposed project could be mitigated by limiting the impoundment to a single 160 acre site on the highest, most infrequently inundated portion of Jehossee Island. The applicant rejected this proposal on the basis that it would not satisfy project needs. In EPA's comment letters to the Corps, EPA stated that action under Sections 404(q) and 404(c) would be considered if the proposed permit were not denied.

In an April 11, 1984 letter, Lieutenant Colonel F. Lee Smith, Charleston District Engineer, advised EPA that he intended to issue a Section 404 permit to Mr. Maybank for the discharge as proposed. Upon receipt of the District Engineer's Notice of Intent to issue a permit, EPA decided to initiate a request under Section 404(q) for elevated review of the District Engineer's permit decision and to begin procedures under Section 404(c) to consider prohibiting the use of the Maybank Site for the discharge of fill material. On April 15, 1984, EPA notified the Charleston District Engineer and the applicant of EPA's intent to invoke Section 404(c) procedures.

Pursuant to the Section 404(q) Memorandum of Agreement between EPA and the Department of the Army, EPA wrote to Mr. Robert K. Dawson, Acting Assistant Secretary of the Army (Civil Works) on May 9, 1984, describing in detail why EPA believed this proposal failed to comply with requirements of the Section 404(b)(1) Guidelines, and requested a review of the District Engineer's permitting decision. Mr. Dawson thereafter declined referral of the application, concluding that EPA's objections constituted a technical disagreement between the Corps and EPA, not an issue of national importance requiring his consideration. In declining the referral, Mr. Dawson noted that EPA had the Section 404(c) procedures available to further pursue this issue.

During May 1984, scientists from EPA's Athens, Georgia Laboratory and Region IV conducted an ecological study of the Maybank Site. The study was carried out to collect data necessary to determine the nature and extent of potential impacts associated with the proposed impoundment. The results of the study are discussed below.

On May 31, 1984, I met with Mr. Maybank in Washington, D.C. at his request to discuss the proposed impoundment. During this meeting, Mr. Maybank explained that the Attorney General of South Carolina had officially recognized Mr. Maybank's ownership of the proposed site and that Mr. Maybank believed impoundment would not result in significant adverse impacts to the environment.

On July 26, 1984, Region IV Administrator Mr. Charles Jeter published in the Federal Register a Proposed Determination to prohibit, deny, or restrict the specification, or the use for specification of the Maybank Site for the discharge of dredged or fill material. A public hearing on the Proposed Determination was held in Charleston, South Carolina on September 6, 1984. Comments supporting EPA's Proposed Determination were provided by EPA, USFWS and NMFS, conservation groups, and others. Mr. Maybank, Lt. Col. Smith and several citizens spoke and provided written comments in support of the proposed project. At the applicant's request, the post-hearing comment period was extended through October 30, 1984, to provide the opportunity for Mr. Maybank to prepare a rebuttal of technical information provided by EPA during the hearing. The comment period was later extended through January 10, 1985, to provide EPA with the opportunity to fully consider the applicant's rebuttal data and to develop information regarding potential alternative impoundment configurations.

On December 6, 1984, I toured the proposed impoundment site with Jack Maybank, his brother David and other EPA representatives. The visit included a trip by boat around the proposed site and several stops that provided the opportunity to observe the site on foot, as well as an overflight by helicopter. I discussed the proposed project with Mr. Maybank during the site tour and met with him further the following day.

At the request of Senator Strom Thurmond's office, a meeting was held on January 8, 1985, at EPA Headquarters in Washington, D.C. to discuss the status of EPA's action under Section 404(c) in this case. Participants at the meeting included principally Mr. David Maybank and me. During the meeting, Mr. Maybank reiterated the applicant's position regarding demonstration of ownership and the belief that the proposed project would not adversely impact the environment.

On January 10, 1985, Assistant Regional Administrator Mr. Howard Zeller met with Mr. Jack Maybank in Charleston, South Carolina to discuss potential alternatives to the proposed project. After several site visits by EPA representatives to evaluate upland areas owned by Mr. Maybank, EPA Region IV developed an alternative impoundment configuration which included the use of a large area of upland and a smaller area of infrequently inundated high marsh (wetlands above mean high tide) on Jehossee Island.

Mr. Maybank rejected the Region's suggested alternative on the grounds that the alternative as proposed would not satisfy project requirements. A more detailed discussion of potential alternatives is provided below.

After the close of the comment period, the Regional Administrator submitted to me a Recommended Determination to prohibit specification of the proposed site for the discharge of fill material. The determination is based on findings that show the proposed discharge will have an unacceptable adverse effect on fishery areas (including spawning and breeding areas), wildlife and recreational areas. The Recommended Determination is dated January 18, 1985, and was received at EPA Headquarters on January 22, 1985.

EPA subsequently notified Mr. Jack Maybank by letter dated February 1, 1985, and General John Wall, Director of Civil Works, Corps of Engineers, by letter dated February 20, 1985, of the Recommended Determination and of their opportunity for consultation in compliance with the Section 404(c) regulations.

### III. Description of the Site

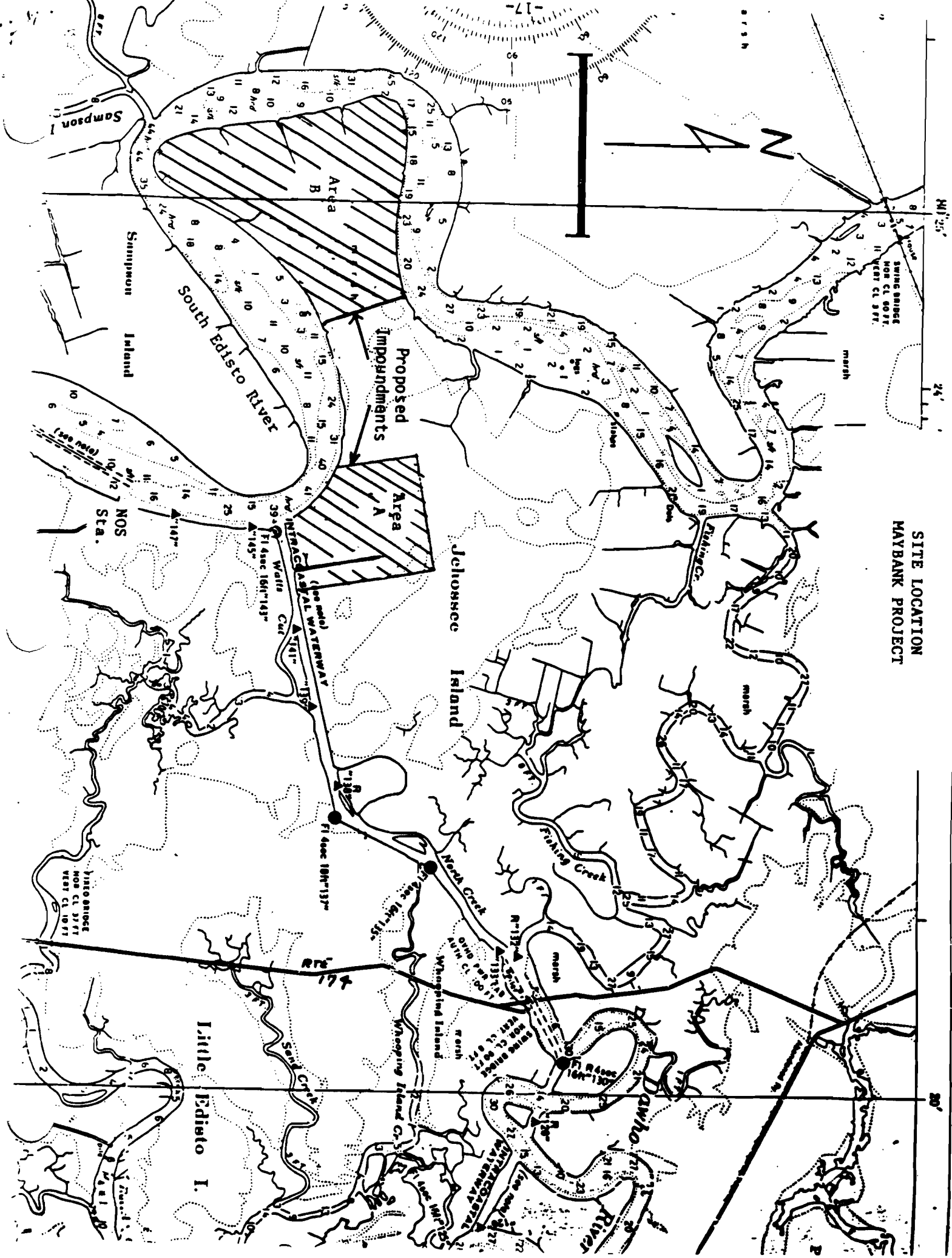
The Maybank Site is located in Charleston County, approximately 30 miles southwest of the city of Charleston, South Carolina. The site consists of approximately 900 acres of coastal wetlands adjacent to the South Edisto River and is part of the St. Helena Sound estuarine system. Twenty-two percent (26,000 acres) of the wetlands of the St. Helena Sound estuarine system are currently impounded, 12,000 acres of which are located within a three mile radius of the proposed project site. Mr. Maybank currently owns a 278 acre impoundment on Jehossee Island.

The two proposed impoundment areas comprising the Maybank Site (Area A and Area B on the Attachment) are characterized by brackish marsh communities recurrently flooded by tidal action. This structural characterization is based upon field observations of water movement, soil type, and vegetation. The vegetation at the 700-acre site (Area B on the Attachment) is dominated by giant cordgrass (Spartina cynosuroides), saltmarsh bulrush (Scirpus robustus), and Olney three-square (Scirpus olneyi). These plants are used as a food source by many species of waterfowl. The nearby 200-acre site (Area A on the Attachment) which is adjacent to Watts Cut and the South Edisto River is an irregularly flooded marsh area vegetated principally by black needlerush (Juncus roemerianus).

The subject marshes probably had fewer tidal creeks prior to being diked for rice culture in the 1700's or early 1800's. Miles of ditches and dikes were constructed in the transformation of this natural habitat to rice cultivation. Although the dikes have largely disappeared since rice culture and maintenance were abandoned in the early 1900's, a vigorous tidal action, coupled with a rise in sea level of approximately one foot since that time, have kept most of the ditches open. Additional channels have developed which now interconnect many of the old abandoned ditches. The 700-acre area, often referred to as the "fishtail site," contains approximately 97,485 feet (18.4 miles) of water channels that fill with water at each high tide. The 200-acre area has two channelized connections, and an additional 4,875 feet (0.9 miles) of channels which also fill with water at each high tide. Together, the two marshes have approximately 19.3 miles of water channels that flood at each high tide.

Except for remnant dikes, there is little vertical relief at the proposed impoundment site. The elevation of the marsh floor at representative locations within the 200 acre and 700 acre Maybank parcels averages 6.9 and 7.0 feet (MLW) respectively. At these elevations, they will be flooded by 22 per cent and 18 per cent respectively of all high tides. Frequency of flooding at the two study sites appears typical of the project area.

SITE LOCATION  
MAYBANK PROJECT



N 25'

24'

30'

#### IV. Ecological Values Associated With The Site

The record, including biological and hydrological studies of the site conducted by EPA's technical staff, shows that the project site is a productive wetland, typical of other unimpounded brackish marshes in the area. In its present state, it contributes organic material for the nutritional needs of fish and shellfish communities in the adjacent estuary, provides valuable habitat for fish and wildlife, and acts as a pollutant-filtering mechanism helping to reduce degradation of water quality in the adjacent open water system. A significant source of pollutants to the estuary is water released from currently impounded wetlands. These releases may violate water quality standards for pH, dissolved oxygen and fecal coliforms.

##### A. Contribution to the St. Helena Sound Estuary

The project area is comprised of a variety of brackish water macrophytes. Three distinct vegetation community types were sampled at the Maybank Site by EPA scientists for standing crop biomass; values ranged from 452 to 1041 g/m<sup>2</sup> dry weight. These values fall within standing crop estimates reported in the literature for typical intertidal marshes sampled during the spring of the year. The annual net primary production of the marshes at the Maybank Site is projected to be approximately 600 to 1100 g/m<sup>2</sup> (2.7 to 4.9 tons/acre) dry weight. This plant biomass is significant because it serves both as an important direct food source for numerous species of fish and wildlife that live on or visit the project site, and as a source of detritus (i.e. plant and animal material in various stages of decay by bacteria and fungi) for downstream estuarine food webs, leading eventually to recreational and commercial fish and shellfish resources.

The ability of a marsh to contribute nutrients to the estuarine food web is directly related to water exchange across the marsh surface. Marshes located higher in the tidal zone have a less frequent opportunity for regular flushing of nutrients. EPA conducted dye tracer studies which confirm that tidal exchange is rapid and effectively link the benefits of primary production and detritus formation at the marshes on the Maybank Site to the adjacent estuary. Within 48 hours, labelled water which originated from the marsh sites was present along a 4 mile reach of the South Edisto River and Watts Cut. The marsh area, therefore, was shown to serve as processor and exporter of nutrients and a source of detritus to the estuary. During one tidal cycle an acre of marsh provided a net export of from 4 to 9 pounds of total organic carbon (TOC). The scientific literature verifies that this TOC export is comparable to the export regimens of other intertidal marshes.



Detrital material constitutes a large fraction of the diet of fishes and invertebrates. It is a major organic component of the diet of polychaetes, bivalves, gastropods, amphipods, nematodes, copepods, shrimp and fish. Recent work has demonstrated that amorphous aggregates as well as particulate detrital matter derived from decayed marsh plants is directly utilized as a food source by higher level consumers. Through these processes, as well as assimilation into lower trophic levels, organic materials exported from wetlands at the Maybank Site represent an important component of the estuarine food web of the St. Helena Sound.

#### B. Fishery Values

EPA scientists identified nineteen species of fish and shellfish from samples obtained at two tidal creeks within the Maybank Site. The combined standing crop of fish and shellfish from the two streams was 1406 animals with a biomass of 1.5 kg (3.3 lbs). The principal components of the fish sample were forage species that utilize the marsh surface and adjacent streams year round. However, the young of six species of sport and commercial fishes that utilize the marsh surface and adjacent streams for feeding and nursery areas during parts of the year were also taken.

The EPA sample catch is likely to be conservative with respect to the total number and diversity of aquatic species that utilize the extensive network of creeks and canals as well as the marsh surface itself because the area was sampled at only one time of the year. Numerous studies of South Carolina and other marshes have shown that there is a continual cycling of nursery area use by different species during the year. For example, outward movement of juvenile menhaden from the marsh area may be occurring at the same time juvenile brown shrimp are making maximum use of the nursery and inward movement of post-larval white shrimp has just begun. The project marsh is also likely to provide valuable spawning, nursery and foraging habitat for resident and transient species including shrimp, blue crab, croaker, red drum, bass, crappie, bream, redbreast, warmouth, pickerel and catfishes. Extensive habitat is also provided for forage fish and trophically important invertebrates such as grass shrimp, which provide an essential biological link to the species of recreational and commercial importance listed above.

#### C. Wildlife Values

The project site marsh and ditch complex in its present state also provides valuable habitat for waterfowl, nongame wading birds, small mammals and numerous reptiles including the threatened American alligator. The seaside sparrow and clapper rail, both species of USFWS regional special emphasis due to habitat loss, have also been observed to utilize the open marshes of the project area.

Although the proposed impoundment would serve as an attractant (primarily due to increased availability of preferred foods) to certain species of wildlife such as waterfowl and wading birds, the USFWS has concluded that sufficient overwintering habitat is available in South Carolina and additional impoundments would not contribute to increased production of the species. At the same time it would displace habitat for other wildlife such as marsh rabbits, clapper rails and seaside sparrows which require open marsh habitat.

#### D. Pollution Filtering

Numerous studies by EPA and others have demonstrated that wetlands act as a filter for dissolved and particulate pollutants. As the tide floods the marsh surface, the vegetation and sediments trap and assimilate pesticides, fecal coliform bacteria and eutrophication nutrients including phosphorous and nitrogen generated in waterfowl impoundments. Open marshes subject to the ebb and flow of the tide provide effective treatment of polluted waters that might otherwise be a source of chemical and biological stress to the remainder of the estuary. The pollution filtering value of the remaining open wetlands in the St. Helena Sound is particularly important in light of the 26,000 acres of existing waterfowl impoundments that regularly release waters with elevated nutrient and fecal coliform levels.

## V. Alternatives to the Proposed Action

In evaluating what is an unacceptable adverse effect, the Section 404(c) regulations at 40 CFR 231.2(e) indicate that consideration should be given to relevant portions of the Section 404(b)(1) Guidelines. Therefore, those portions of the Guidelines relating to, among other things, alternative sites may be considered in evaluating the unacceptability of the environmental impacts. For example, if alternative sites were available so that wetland loss is an avoidable consequence of undertaking the project, these may be taken into account in assessing the unacceptability of the loss (see 40 CFR 230.10).

The proposed project site is located on Jehossee Island, a 4700 acre island owned by Mr. Jack Maybank and his family. The island is characterized by areas of wetlands, pine forests, open fields and mixed wetland and upland areas. Mr. Maybank has stated he intends to develop Jehossee Island as a hunting preserve utilizing the proposed impoundments for waterfowl hunting and the upland areas for upland game bird hunting.

EPA representatives visited Jehossee Island on December 13, 1984, with Mr. David Maybank to evaluate potential alternative impoundment sites in upland areas of the island. Upland impoundments are not uncommon in the Southeast but they are often found to be more expensive to operate. Instead of relying on the tides, large volumes of water must be pumped into and out of the impoundment. Water is exchanged in the impoundment with large pumps powered by diesel engines which are expensive to purchase and operate. The principal advantage of upland impoundments in terms of expense is that dike construction and maintenance costs tend to be smaller. Although the overall costs are somewhat higher, upland impoundments provide equivalent waterfowl hunting habitat as impoundments constructed in wetlands.

During a January 10, 1985, meeting with Mr. Jack Maybank, EPA requested that an alternative impoundment site on Jehossee Island be considered. EPA specifically suggested a site which included approximately 300 acres of uplands and 100 acres of infrequently flooded wetlands. After considering the proposal, Mr. Maybank decided against upland alternatives at Jehossee Island on the following bases:

- (1) higher costs associated with upland impoundments,
- (2) logistical problems in obtaining additional permits for wetland portions of the EPA proposed alternative, and
- (3) loss of upland area would eliminate upland game bird hunting sites and valuable softwood stands.

The Section 404(b)(1) Guidelines define "practicable" as available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. It appears that an alternative to the proposed project is available by constructing an impoundment on Mr. Maybank's upland property on Jehossee Island. However, important questions remain regarding cost and acquiring necessary permits for this alternative. As a result, the record does not provide a conclusive demonstration regarding the practicability of this or other alternatives to impounding 900 acres of wetlands on Jehossee Island and, therefore, out of an abundance of caution, I have not considered the proposed alternative as a substantive criterion in reaching a decision in this case.

VI. Evaluation of the Applicant's Position Regarding  
Potential Impacts of the Proposed Project

The applicant's position on potential impacts of the proposed project is provided in a report entitled, "An Ecological Study of the Jehossee Island Impoundment Site." A complete report and EPA analysis of its main conclusions have been made part of the record. This section provides a summary of my findings regarding the principal observations and conclusions reached in the applicant's report.

The applicant's report provides an analysis of data collected during an August, 1983, study conducted on Jehossee Island by scientists from the University of South Carolina. Faunal, floral and water quality parameters were measured at study stations located within the Maybank Site and compared to similar parameters measured at Mr. Maybank's existing 278 acre impoundment on Jehossee Island.

The applicant's report compares primary productivity in the existing impoundment with an equivalent sized open marsh area at the Maybank Site by sampling organic carbon levels at the mouths of the tidal creeks during flood tides. This data does not accurately measure carbon concentrations of water coming off the marsh surface but rather reflects carbon concentrations in the adjoining riverine environment. As a result these data underestimate the carbon being produced in the marsh and subsequently made available to the estuarine food web by the action of receding tides.

The most relevant issue regarding marsh production and its significance to the secondary productivity (utilization by animals) of the estuary is a function of the carbon's availability. Plant-derived organic carbon is critical to the health of the estuary not only in terms of the total amount produced but also in terms of the form it is in and when it becomes available for export to the estuarine food web.

Impoundments have been reported to be capable of higher primary production than open systems. However, Odum et al (1983) compared annual net primary production for the same species of marsh grass in adjacent impounded and open marshes and found 38 percent greater production in the tidal marsh. The high levels of primary production reported for impoundments may be an overestimate which results from the fact that impoundments are characteristically closed systems functioning as nutrient sinks. That is, there is little or no net export of nutrient material from the impoundment and therefore the nutrients are unavailable for recycling.

In contrast, Teal (1962) has reported that diurnal tidal flushing daily removes 45 percent of available nutrient material from open marsh systems, thus recycling essential nutrients to a wide variety of estuarine organisms. In large part the high productivity of a tidal marsh can be traced to the regular tidal pulse (Odum, et al, 1984). Productivity is enhanced due to the work performed by the tides flushing out wastes and introducing required nutrients, which along with the energy of the sun, represent the major driving forces of tidal wetland systems (Odum, 1981).

Two points become clear. First, impounding wetlands physically eliminates the energy provided to the system by tidal action thus changing the character of the area. Moreover, elimination of regular tidal pulses results in a loss of the regular export of nutrient materials from the wetlands into the adjacent estuarine system.

According to a tidal survey conducted by the Corps of Engineers on July 12, 1983, approximately 75 percent of the project area is inundated by tidal waters approximately 189 times a year. This represents a conservative estimate because it is based on National Oceanic and Atmospheric Administration tide tables that do not account for the recent rise in sea level. The absence of organic litter build-up throughout the marsh bed of the Maybank site verifies that these beds are well flushed by tidal action.

Water exchange from impoundments is timed to a management plan that is designed to optimize growth of certain plants to attract waterfowl during the fall hunting season. Consequently, long periods of time may pass between releases of impounded water to the estuary, depending on such variables as salinity, weather conditions, time of year and oxygen levels. This irregularity in water exchange make impoundments an undependable source of nutrients which in turn may be limiting to estuarine organisms. Heinle et al (1977) traced a simple food chain in the Chesapeake Bay estuary and discovered direct relationships between timely export of pulsed detritus from the marsh and the occurrence of anadromous fish larvae in the estuary. This work strongly suggests that the timing of export of marsh-derived detrital material is critical to complex organism cycles in estuaries. Dame (1982) reports that in South Carolina the period of greatest saltmarsh detritus availability is the summer through fall when, according to the management plan for the proposed impoundment, only minimal water release and export would occur.

Critical to this discussion is the consideration that impoundments cannot be successfully managed for waterfowl while concurrently attempting to fully mitigate their adverse impacts on the adjacent estuary. Impoundments are diked for the purpose of isolating wetlands from the effects of the tides to create conditions within the pond that are different from the

surrounding area. Impacts resulting from impounding wetlands are inherent to the closed nature of these systems. Attempts to mitigate impacts by increasing exchange frequency and improving access by estuarine organisms serve to defeat the efforts of the impoundment manager to grow the vegetation and establish the conditions that attract waterfowl. Management techniques required for successful aquaculture impoundments are even more restrictive than those for waterfowl impoundments and, as a result, opportunities for opening the impoundment are further reduced.

From these data, it appears that the applicant report's conclusion of no significant adverse impacts to the environment based on comparisons of impoundment and open marsh primary production is unsubstantiated. Similarly, report conclusions regarding comparisons of the use of impoundments and open marsh by fish and shellfish are based on assumptions of regular exchange and open access to impoundments. In fact, impoundments eliminate or severely disrupt access to nursery, feeding and spawning habitats by numerous species of fish and shellfish. Organism access to impoundments is restricted to times when water is being brought into the ponds and limited to entry through small control structures rather than across the marsh surface. These restrictions are complicated by differences in individual species requirements in terms of variations in seasonal use of the marsh, diurnal movements and differences in vertical location in the water column. These factors combine to severely limit impoundment access by various life stages of fish and shellfish.

In summary, technical evaluations of the applicant's report contained in the record suggest that conclusions reached in that report rely on restricted data, incorrect assumptions regarding water exchange frequency between impoundments and the adjacent estuary, and an inappropriate study design. Consequently, findings in the applicant's report that purport no significant adverse impacts to the environment will result from the impoundment of marshes on Jehossee Island appear unsubstantiated. In fact, studies by EPA and others documented in the record indicate that existing impoundments do adversely impact the aquatic environment by reducing the availability of marsh-derived organic carbon to the estuary and by limiting access by numerous species of fish and shellfish to required breeding, feeding and nursery habitat.

## VII. Unacceptable Adverse Impacts

The Section 404(c) regulations define unacceptable adverse effect as follows: "Impact on an aquatic or wetland ecosystem which is likely to result in a significant degradation of municipal water supplies (including surface or ground water) or significant loss of or damage to fisheries, shellfishing, or wildlife habitat, or recreation areas. In evaluating the unacceptability of such impacts, consideration should be given to the relevant portions of the Section 404(b)(1) Guidelines." Of the statutory criteria that the Assistant Administrator can consider in determining whether a proposed discharge of dredged or fill material will have an unacceptable adverse effect upon the waters of the United States, I find that fishery and recreational areas are applicable to the Maybank case. The following specific adverse impacts are likely to result from the proposed discharge of fill to create 900 acres of impoundments at the Maybank Site.

### A. Impairment of Nursery Value

The extensive network of canals and creeks interlacing the Maybank Site provides valuable spawning, nursery, and foraging habitat for resident and transient species, many of which are of recreational and commercial importance, including: red drum, crappie, bass, bream, Atlantic croaker, blue gill, channel cat, blue crab, and shrimp. Habitat is also provided for forage fish which are important to the species of recreational and commercial importance listed above. These tidal channels would be blocked by the proposed dikes. Entrance to the proposed impoundments would be restricted to nine trunk openings (water exchange points) as specified by the Coastal Council. The extensive dikes with few exchange points would seriously limit the ingress and egress of both larval and adult fish and invertebrates. Therefore, the nursery value of the area would be severely impaired by impoundment.

### B. Diminished Tidal Exchange

The elevation of the marsh floor at the 200 acre site averaged 6.9 feet (MLW) and the marsh floor at the 700 acre site averaged 7.0 feet (MLW). At these elevations 22 to 18 percent respectively of all high tides flood the marsh areas.

The impoundments would be managed in accordance with procedures developed by the South Carolina Wildlife and Marine Resources Department. Using such procedures, impounded areas are drained in late February of each year and kept semi-dry until spring. They are then re-flooded, initially to a depth of six inches. Water addition in increments of six inches per month is then continued until, by late summer, the water level within the impoundment has been raised to two feet above the marsh floor.



According to EPA's analysis of 26 years of data applicable to the Maybank Site from the National Ocean Survey, such water level management would nearly eliminate significant water exchange by tidal action between the impoundment areas and the South Edisto River. Given that the marsh floor itself is elevated at approximately seven feet (MLW), the initial six-inch increment achieved by this management would put the impoundment water level at 7.5 feet; this is higher than all but eight percent of the high tides experienced annually in that area. The next six-inch increment would raise the impoundment water level a total of one foot over the marsh floor elevation to a total elevation of eight feet (MLW), a level exceeding all but about two percent of annual high tides. As management continues to raise water levels in further six-inch increments, virtually no high tides would occur in sufficient heights to cause water exchange between the impounded area and the adjacent estuary. Consequently, the biological benefits of frequent tidal flushing, which include nutrient exchange and open access by aquatic organisms, would be almost eliminated in the impounded area for the greatest portion of the year, including the periods when most estuarine fish and invertebrates are most dependent upon tidal marsh exchanges.

#### C. Export of Marsh Production

EPA studies reveal that the Maybank Site is highly productive in its present state and a significant portion of this productivity is exported to the South Edisto River and Watts Cut. Such export of plant material is essential to the maintenance of the fisheries of coastal South Carolina. The impoundments themselves may provide an environment for attracting waterfowl (although there would be no gain in the population of waterfowl in the area), however, there would be little regular export of nutrients and detrital production from the impoundments to the adjacent estuary. Consequently, impoundment of tidal marshes would have an unacceptable adverse impact on the export of marsh production necessary to support estuarine food webs.

#### D. Water Quality Impacts

Impoundments in South Carolina often experience water quality problems. The subject impoundment site and the proposed management scheme place severe constraints on the frequency of water exchange between the impoundments and the estuary. It is highly probable that low dissolved oxygen levels in the proposed Maybank impoundments would often be lethal to fish and invertebrates living in the impoundment. This problem would be most severe during the hot summer months when a reduced tidal range exists in the South Edisto River and thermal conditions in the impoundments are conducive to rapid oxygen depletion. During the summer, low dissolved oxygen concentrations in the impoundments would likely result in violations of State water quality standards. Winter fish kills due to temperature extremes exceeding thermal tolerances have also been observed in the shallow waters of impoundments.

In addition, conversion of 900 acres of open marsh to impoundments will eliminate the water treatment capacity of the marsh and replace it with a source likely to further contribute to reduced water quality in the estuary. Juvenile marine fish using the estuary tend to show greater susceptibility to reduced water quality because of osmotic stresses they experience due to variations in estuarine salinity. It is important to the health of these species in particular to maintain estuarine water quality.

#### E. Public Recreational Activities

If this project were permitted, sport fishermen, hunters, outdoor photography enthusiasts, and recreational boaters would be excluded from many miles of water channels that are below MHW and to which the public under Federal law now has a right of access as a recreation area. The Maybank Site provides food and habitat for numerous fish which migrate from the marshes and are caught by recreational fishermen in the rivers and estuaries of coastal South Carolina. Recreational benefits to those who were able to rent duck blinds in the impoundments would be enhanced, but this would not compensate for the recreational benefits lost to the general public.

In addition, the waterfowl wintering habitat provided by the impoundment is not limiting in the project area, or indeed anywhere on the South Carolina coast. Figures released by the USFWS show a 67 percent decrease in the numbers of ducks that came to South Carolina between 1967 and 1982 relating to a decline in breeding habitat elsewhere, climatic conditions, and possibly shortstopping in more northern States. The USFWS has concluded that although good wintering habitat can be related to hatching success on northern breeding grounds, there is little indication that the quantity or quality of wintering habitat is or has ever been limiting to ducks and other migratory waterfowl. To increase wintering habitat by impounding additional coastal marsh acreage in South Carolina would only result in shifting ducks from one impoundment to another. Equally important, additional impoundments would not result in the addition of any new individuals to the migratory waterfowl population.

#### F. Direct Wetland Loss

Direct wetland loss from the placement of fill material to construct proposed impoundment dikes at the Maybank Site is estimated to be 20 to 35 acres. Adverse impacts will result from the loss of wetland values described above currently being performed by this portion of the marsh at the Maybank Site.

### G. Cumulative Impacts

Direct wetland loss and associated impacts on fish, shellfish, and wildlife resulting from the proposed project are magnified when considered in the context of previous wetland alteration in the area of the Maybank Site. The South Edisto estuary is a part of the St. Helena Sound system which has already experienced the impoundment of 26,000 acres (22 percent) of its coastal marshes; 12,000 acres of impoundments are located within a three mile radius of the proposed project. The loss of these areas as a source of habitat and food may have, according to figures provided by NMFS, contributed to the long-term reduction of fishery resources in the South Edisto River. Additional loss of the values provided by 900 acres of productive open marsh at the Maybank Site is likely to further impact the fishery and wildlife resources of the area.

Moreover, approximately 140,000 acres of coastal wetlands in South Carolina were at one time impounded for rice culture. Of these 140,000 acres, approximately half are currently impounded, with the remaining half presently subject to the ebb and flood of tides. This latter acreage, of which the project area represents a typical portion, would become vulnerable to re-impoundment as a result of the precedent set by this case. Between 1967 and 1981, there have been over twenty Federal permit applications for private waterfowl impoundments in South Carolina, representing alteration of over 3,000 acres of tidal wetlands. The majority of these applications have either been denied or withdrawn (others are pending). However, permitting of this impoundment would provide an important impetus for re-application to impound these 3,000 acres as well as an incentive for new proposals.

### H. Section 404(b)(1) Guidelines

As discussed in Section V, the 404(c) regulations indicate that I should give consideration to relevant portions of the Section 404(b)(1) Guidelines in assessing what is an unacceptable adverse effect including, for example, an evaluation of practicable alternatives at 230.10(a) and a determination of what constitutes significant degradation as described at 230.10(c). Section 230.10(c) of the Guidelines describes the criteria which should be considered in assessing the adverse effects of a discharge which contribute to significant degradation of the aquatic environment. These include consideration of impacts on life stages of aquatic life and other wildlife dependent upon aquatic ecosystems, effects on ecosystem diversity, productivity and stability, including loss of habitat, or loss of the capacity of a wetland to purify water, and impacts on recreational and aesthetic values.

The status of available alternatives to the proposed project has not provided a substantive criterion for my decision in this case. Pursuant to requirements of the Section 404(c) regulations and criteria described at Section 230.10(c) of the Guidelines, the nature and extent of adverse impacts resulting from the proposed project are themselves clear and significant enough to establish an appropriate basis for my determination that unacceptable adverse impacts to fishery and recreation areas will occur.

VIII. Restriction on Use of the Jack Maybank Site  
for Specification as a Disposal Site

Section 404(c) authorizes different limitations on discharges which EPA may effect through its actions on disposal site specifications. Where the facts warrant it, I may recommend that any defined area be prohibited from specification as a disposal site pursuant to Sections 404(a) and (b). If I should determine that the discharge of certain materials will have significantly less damaging effects than others, or that limiting discharges by amount, method, and/or location will reduce the likelihood of unacceptable adverse effects, I may recommend that the use of a specified site merely be restricted in some manner and/or that only a portion of the area under consideration be made the "defined area" subject to prohibition on specification.

In the present case, my finding of unacceptable adverse effects stems largely from the substitution of an impoundment for the open, free flushing tidal marsh currently in place. While the Regional Recommended Determination would have totally prohibited any discharge, I do not find such a total prohibition necessary based on the record before me. It may well be that small fills for boat docks or similar projects could be placed without serious impacts, through imposition of appropriate conditions during the regular permitting process. Therefore, I have determined that it would be appropriate to restrict the use of the Maybank Site as a disposal site for dredged or fill material in the form of dikes or other structures which would have the purpose or effect of impounding the project site marsh or parts thereof.

Suzanne S. Cooper  
ASSISTANT ADMINISTRATOR FOR  
EXTERNAL AFFAIRS, U.S. ENVIRONMENTAL  
PROTECTION AGENCY

APR 5 1985  
DATE