

CHAPTER 7

ISLAND HABITATS

7-1. General.

a. One hundred years of active dredging operations by the CE, state agencies, and private industry has resulted in the creation, by placement of dredged material, of over 2,000 man-made islands throughout U.S. coastal, Great Lakes, and riverine waterways (item 40) (Figure 7-1). These islands are of varying sizes and characteristics and presently range in age from newly formed ones to those estimated to be 50 years old. Although the majority of the islands were made by the CE, many are owned or managed by other Federal agencies, state governments, conservation organizations, or private citizens. The CE continues to maintain an interest in these man-made islands because of its responsibility in using environmentally acceptable disposal methods and sites, the continuing need for disposal sites, the need for wildlife habitats in waterway areas, and the islands' recreation potential (item 51). The rapid increase in the U.S. population and the corresponding demand on natural resources have helped to cause a gradual change in the use of the islands by wildlife and a need for reassessment of their role as habitats. Natural sites have been altered and occupied by man through industrial, housing, and recreational development to such a large extent that some areas of the United States no longer have coastal islands that are still suitable wildlife habitat. Dredged material islands have provided this vital habitat in many areas.

b. The primary wildlife species needing dredged material islands as part of their life requirements are 37 species of colonial-nesting waterbirds: pelicans, cormorants, anhingas, herons, egrets, ibises, spoonbills, gulls, terns, and skimmers. Several of these species are rare, threatened, or endangered throughout large parts of their ranges (Figure 7-2). An estimated 2 million are nesting on over 700 of these dredged material islands in U.S. waterways, especially along the Atlantic and Gulf coasts from Long Island to Mexico. Islands can offer these birds protection from ground predators, seclusion from man, and nesting substrates similar to those found in traditional nesting sites. The birds are especially vulnerable during the nesting season when they concentrate for several months in colonies and remain in them until their chicks have fledged. These waterbirds are protected by Federal laws since they are migratory species. These laws make destruction, harassment, or disruption of nesting colonies of birds illegal, including those on dredged material sites. State laws often back up these Federal regulations in offering protection to nongame species.

c. In general, the correlation between increases in human populations and decreases in waterbird populations holds true. The only exceptions exist when alternate habitats such as dredged material islands become available. Huge declines in waterbird numbers have stabilized somewhat, partly as a result of the creation of islands, and without which waterbird populations

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Figure 7-1. A dredged material island in Florida typical of those built in the U.S. Intracoastal Waterway



Figure 7-2. Endangered brown pelicans nesting on Gaillard Island CDF, their first nesting in Alabama in over 80 years

would be 50 percent or less of present levels (item 73). Detailed research and discussion on islands built of dredged material are presented in items 40 and 73. Guidance for selection of island development as a disposal alternative is presented in Figure 7-3, and details for the selection process are presented in item 72.

7-2. Island Development and Management. Although many colonies of birds presently are nesting on dredged material islands, there are numerous characteristics of these islands that could be improved by management to enhance the available habitat, and there are several ways dredging operations can be altered to benefit the numerous sea and wading birds and other wildlife on dredged material islands. Development and management of dredged material islands for avian wildlife will also usually provide essential habitat for smaller mammals and rodents that use the islands, and covers a broad spectrum of techniques. In some cases, small mammals may act as bird predators, so their colonization should not be encouraged.

a. Habitat Changes.

(1) Basically, development/management of an island for colonial sea and wading birds is concerned with habitat manipulation, habitat establishment, and habitat protection. Manipulation of habitats, by far the most likely technique to be used by engineers, would include proper placement of dredged material to maintain or reestablish habitats, increase the size of existing islands, and/or change configuration, elevation, vegetation, and other features for more desirable habitats. Manipulation of habitats would include, for the biologist, establishment of new vegetation and management of existing vegetation on islands through various agronomic and horticultural techniques.

(2) Establishment of new habitats is desirable when nesting habitat is lacking and new islands must be created, with the resulting need for vegetation establishment; when nesting habitat is expanded by an addition to an existing island which must be established with vegetation; or when undesirable nesting habitats (vegetation) occurring on islands must be cleared out and desirable habitats established in their place.

(3) Habitat protection may be accomplished by island posting or fencing for isolation. Most bird species are already protected by law, but their habitats are not protected except during the time they are occupied by the nesting birds. Year-round protection to prevent destruction of habitat from year to year and seasonal protection to prevent nesting colony disruption by humans and predators are necessary.

(4) Management of existing islands has been demonstrated to be an effective disposal technique and wildlife management practice. Considerable potential exists for the disposal of dredged material and the creation or improvement of avian habitat. Management of existing dredged material islands is most desirable because the potential environmental impacts of disposing on an existing site are less than those of developing new islands.

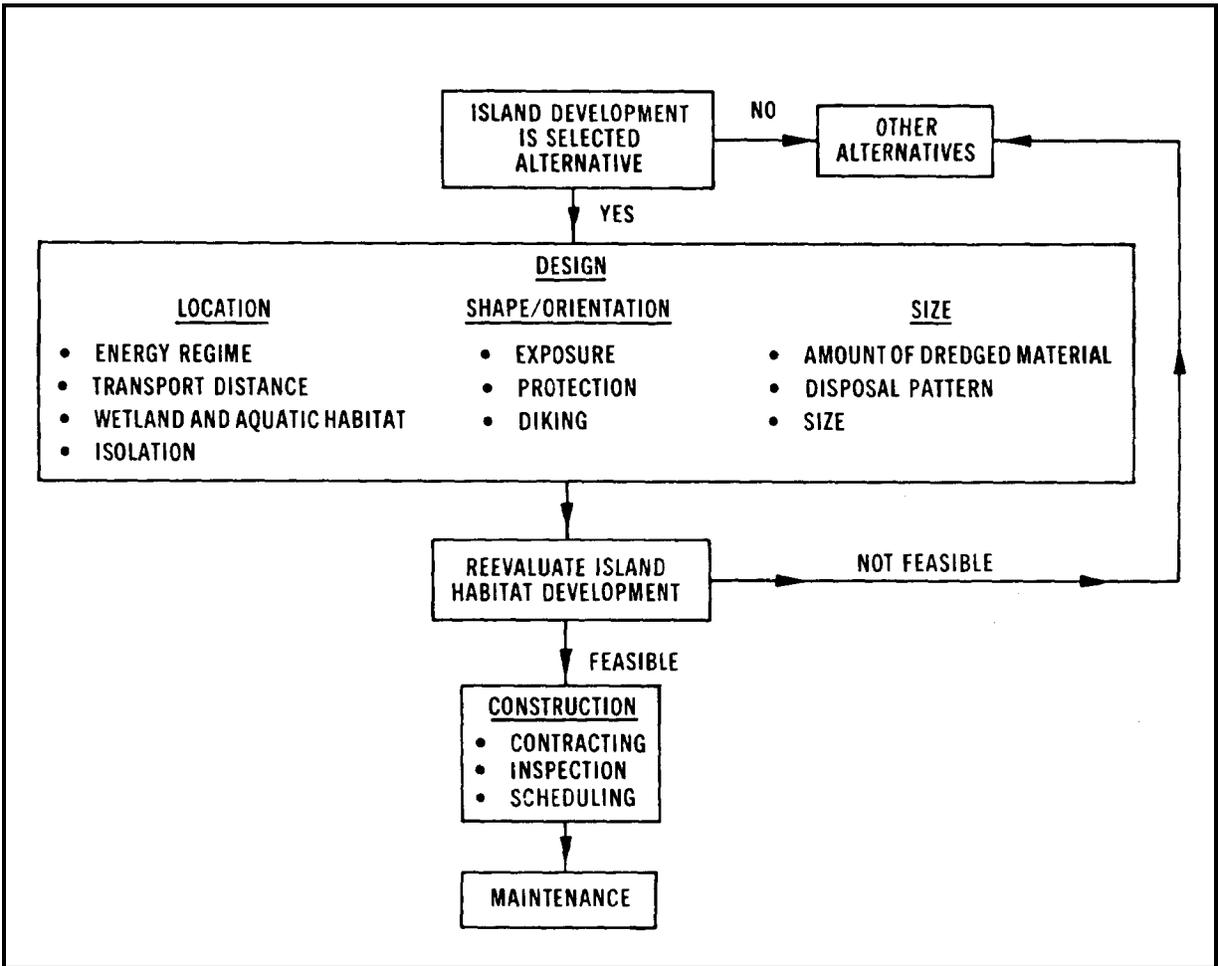


Figure 7-3. Procedural guidelines for selection of island habitat development

b. Use of Dredging Operations on Existing Islands.

(1) The CE has provided habitat incidental to project purpose since the agency first created dredged material islands. Since that time, islands have been kept in various stages of plant succession through dredged material deposition from channel maintenance operations. These operations can have a significant positive impact on waterbird breeding populations (Figure 7-4). Through proper planning the positive impact of regular maintenance dredging could be increased. Since past dredging operations have been carried out with little or no regard for nesting birds, many areas do not have adequate diversity of nesting habitats. Some areas lack ground nesting habitats while others lack woody habitats. Item 73 reports habitat needs that could be satisfied by dredging operations in all the regions studied. Needs for bare ground nesting areas and more tree/shrub habitats exist on almost every part of the U.S. coast. The rate at which various habitats appear on an island after receiving dredged material and an estimate of their longevity have been determined (items 40 and 73).

(2) Once site-specific needs are known, nesting habitat management can easily become a part of the regular maintenance dredging process. To maintain target habitat diversity for certain bird species, islands in any given area would have to be selected to receive periodic depositions of dredged material. Restrictions against dredged material deposition on all or parts of some islands may be necessary in order to allow habitats for tree nesting birds to develop or to preserve existing tree habitats (Figure 7-5). The feasibility of these management recommendations has already been demonstrated by the Wilmington District. They have been practicing such management on a local, annual basis for several years and have developed a long-range colonial sea and wading bird management plan for the lower Cape Fear River estuary which includes maintenance dredging and placement and timing of dredged material depositions on existing islands.

c. Building New Islands.

(1) Construction of new islands would be desirable under some conditions. If it has been demonstrated that there is a need for nesting habitat in an area lacking suitable islands, and if the benefits for the birds will exceed any negative effects of construction of an island to benthic organisms and current flow, then an island could be built. However, islands should not be placed in areas where they would be used for recreational purposes during the breeding season, thus eliminating or severely reducing their wildlife value.

(2) In most areas there is no need for more islands for colonial nesting birds or other forms of wildlife. Management of existing islands should be given first priority. There are areas, however, where additional nesting habitats would be beneficial and existing dredged material and natural islands are not available to fulfill that need. Establishment of need should be

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Figure 7-4. Royal and sandwich terns nesting on dredged material islands in North Carolina, where successional vegetation stages are deliberately set back with disposal operations to maintain tern nesting habitat



Figure 7-5. Woody habitat on Little Pelican Island, a dredged material island in Galveston Bay, Texas, which is not often disturbed by disposal, and continues as a heron, egret, spoonbill and ibis nesting colony

determined by consultation with knowledgeable wildlife biologists or by field studies. Generally, construction of new islands for wildlife will not be feasible unless it can be demonstrated that the anticipated positive impacts on the target species will outweigh any negative impacts on the environment. However, it would be desirable to construct a limited number of new islands in various regions of the United States for study purposes and to obtain baseline data. As more natural sites are taken over by man, strategic placement of new sites may become more valuable as a management tool. The present knowledge of bird utilization is based primarily on empirical observations of existing dredged material islands, and more baseline data are needed.

(3) In addition to establishment of need, the feasibility of new island construction will be dependent on the concerns of Federal and state agencies and the private sector. These concerns vary considerably among the regions of the country. However, it has been proven that construction of new islands for birds and other forms of wildlife is feasible. The Wilmington District constructed two islands in Core Sound, North Carolina (Figure 7-6), and the US Army Engineer Waterways Experiment Station (WES) has built or modified several islands for habitat development. The two North Carolina islands were unique in that they were the first to be constructed and placed in a manner to deliberately create habitat for colonial sea birds and aquatic life, and they were retained by the use of large nylon sand-filled bags. The sites were designed so that during future maintenance dredging of the nearby navigation channel, material could be added to them within the existing sandbag retainers, and more sandbags may be added to create higher retention dikes. The kidney shape of the islands formed a small cove where it is expected that a marsh will develop and benthic organisms will thrive. Marsh around the island was given a boost by the planting of smooth cordgrass and saltmeadow cordgrass around the perimeter. The islands were placed in an area with adequate shallow water and food resources but with a scarcity of bare ground nesting habitat. Gull-billed terns, common terns, least terns, and black skimmers nested on the islands during the first breeding season after construction. A number of islands have now been built in Florida, Alabama, Texas, Louisiana, and the Great Lakes with waterbird habitat development as a secondary project goal.

(4) Site location of an island should be worked out with knowledgeable wildlife biologists and concerned agencies to establish the best location. Building an island in an area that does not conform to the biological and engineering specifications outlined herein would fail to produce the desired wildlife habitat. The islands must be placed where the birds will be isolated from predators and human disturbances, unless the islands are going to be actively protected by wardens. With active protection, colonies of sea and wading birds have been successful close to human activities and have provided tourist attractions that could be observed from outside the colony (item 40).

(5) Timing of island development is important. Ideally, an island should be built during the fall or winter preceding the initiation of the next breeding season. The birds generally do not use a site until after the

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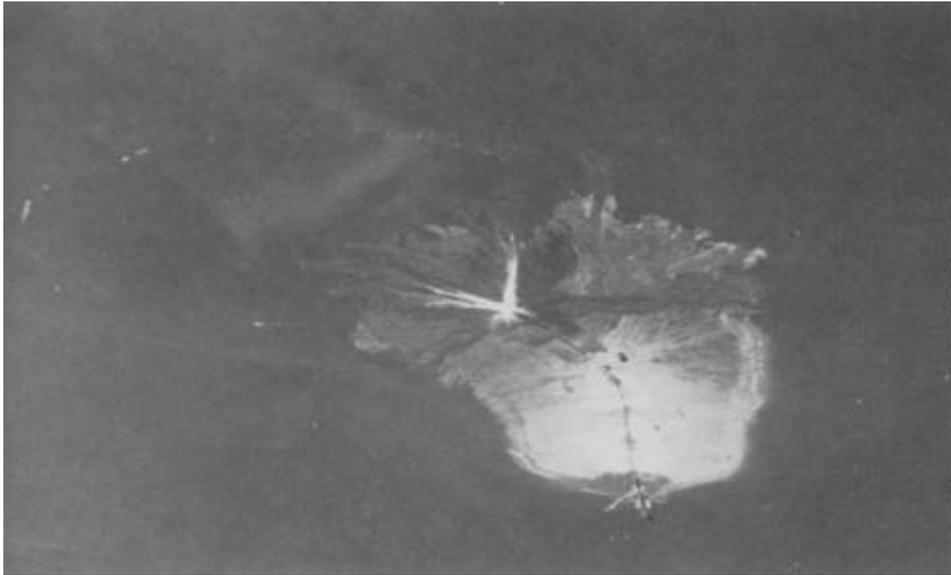


Figure 7-6. A new dredged material island built by Wilmington District in Core Sound in 1977 for seabird nesting habitat. The island is still being used for disposal, and is also a very successful nesting site.

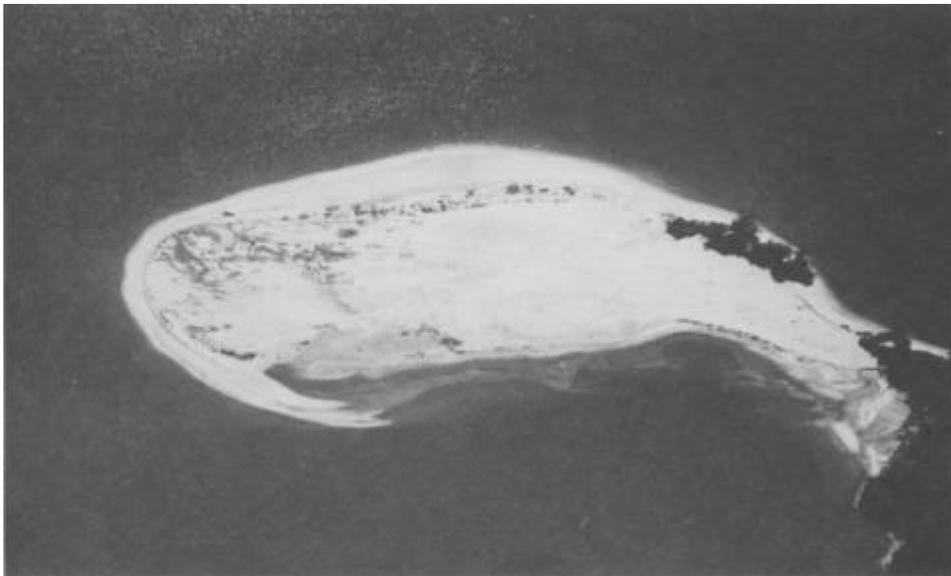


Figure 7-7. An addition built by Jacksonville District to Sunken Island in Hillsborough Bay, Florida, during maintenance dredging operations. It was built as seabird nesting habitat in cooperation with the National Audubon Society.

initial sorting of fine materials by wind and water. If it is built in the spring, this sorting will not have had time to take place, and any colony of birds trying to nest there may not be successful. Their eggs may be covered by drifting fine material. In addition, they cannot use a site until it has had adequate time to dewater.

(6) The physical design of an island is important. In general, islands must be permanently emergent at high water levels; birds have been found nesting on all sizes and shapes of islands as long as they met this crucial breeding requirement. However, observations of hundreds of bird colonies on dredged material islands and the kinds of islands they select has led to four categories of recommendations: size, configuration, substrate, and elevation (item 40). Whether an island is diked or undiked can make a significant difference in bird use.

(a) Ideally, new islands should be no smaller than 5 acres and no larger than 50 acres; however, birds have been found nesting on both smaller and larger islands, and this is a highly site- and species-specific feature. Islands larger than 50 acres would generally be difficult to manage and would also be more likely to support predator populations such as coyotes, snakes, foxes, feral cats and dogs, rats, and raccoons. Islands between the two extremes can be more easily managed, and considerable habitat diversity could be achieved on them. Generally, the greater the amount of habitat diversity to be maintained for wildlife populations, the larger the island should be.

(b) The configuration of an island will depend on the target wildlife species. Steep slopes such as those found on dikes should be avoided for all species. A slope no greater than a 3-foot rise per 100 feet has been recommended (item 73). Substrate configurations for the ground nesting species are given in item 73. Many bare ground nesters must have gentle slopes to prevent their eggs from rolling from nest scrapes. There is also evidence that the formation of a bay or pond with the island makes it more attractive to nesting birds (item 40).

(c) The general nesting substrate requirements of colonial bird species are given in item 73. Generally, coarser materials such as sand or cobble make better nesting substrates due to greater stability. Fine materials such as silts and clays are subject to wind and rain erosion, and usually have desiccation cracks, settling, and ponding. A mixture of sand and shell material makes good nesting substrate for most of the ground nesting birds which prefer sandy beach areas. These bird species historically nested on sandy beaches before being forced off by human use. Fine, unstable dredged material may be stabilized to form suitable nesting substrate by adding coarse materials such as shells over its surface or by planting a ground cover on the material to provide vegetation for those species which prefer that kind of habitat, such as the Forster's tern or laughing gull. Tree nesting species obviously prefer woody vegetation, and these trees and shrubs often colonize best on silty, more fertile substrates. Selected plant species of shrubs and trees which are discussed in item 73 may be planted on the sites since there

are several plant species which seem to be preferred over others by tree nesting birds. If plant propagation is to be a part of a management scheme, these species should be given first consideration.

(d) Elevations of constructed islands should be high enough to prevent flooding of the areas that could be used by waterbirds for nesting. However, elevations do not need to be so high that the substrate will not become stabilized due to wind erosion. Generally, the optimal elevation for an island is between 3 and 10 feet above mean high water. The desirable elevation to be achieved will depend on texture of the exposed dredged material, wind exposure, and the habitat objectives or target species. Coarser materials may stabilize at higher elevations than finer materials. If islands could be constructed of coarser material for ground nesting birds, then it would be acceptable in some cases to exceed the recommended elevation. In general, the higher the elevation, the slower the island will be colonized by plants. Therefore, lower elevations to achieve plant cover for some ground nesting species and all tree nesting species should be considered where those are the target wildlife species and where substrates are of fine-textured material. It should be remembered that given the proper substrates and vegetation for nesting, none of the species using dredged material islands for nesting choose one elevation over another as long as they are above the tide or flood lines.

d. Dredged Material Island Additions, Additions to islands may be a useful management tool if valuable nesting sites are altered by erosion until they have to be eventually abandoned. Additions to such islands will prolong their usefulness as nesting habitats. Additions to islands which are covered with vegetation will increase habitat diversity by providing some bare ground habitat, at least temporarily, for those forms of wildlife requiring bare ground (Figure 7-7). In south Florida, additions may be done in such a manner that encourages growth of mangroves, an excellent nesting substrate for tree nesting birds. Colonies have responded favorably to island additions, especially bare ground nesting species along the gulf and Atlantic coasts.

e. Confined Disposal Facilities (CDFs). In the Great Lakes and a number of ports along the eastern and gulf coasts, CE Districts have constructed large, permanent, diked islands for maintenance dredging. These islands are sometimes over 1,000 acres in size, often well-armored, and in most cases designed for permanent containment of contaminated sediments, especially along the mid-Atlantic to New York coast and in the Great Lakes. These islands are located up to 3 miles from shorelines and are relatively isolated. From the time of their construction, they have been used more and more by nesting and loafing seabirds. Jacksonville, Mobile, Detroit, Wilmington, and other CE Districts considered seabird use in design and management on newer CDFs, and the seabird colonization has been spectacular in several cases. Management on CDFs generally consists of continued protective isolation, wildlife monitoring, and posting. Vegetation management has not yet become a problem on any of these relatively new islands.

f. Protection of Bird Colonies.

(1) Since the primary users of dredged material islands are the sea and wading birds which nest in colonies, and the lack of isolation and protection is one of the primary problems these birds face, this species group would be greatly benefited by the provision of protection of colonies and nesting areas. They are already protected by Federal law and regulation as migratory species. Since this does not protect habitat unless the migratory animal is present, it can sometimes be detrimental for long-term protection purposes. In addition, some states have laws and regulations designed to give protection. A number of endangered or threatened species nest in colonies on dredged material islands. It has been shown repeatedly throughout North America that, in general, protected colonies are successful and unprotected colonies are not. Every Federal and state agency and individual has the responsibility to see that its actions are not in violation of laws which protect wildlife. To ensure compliance with the law, maintenance operations involving placement of dredged material should be conducted in a manner which will not disturb the bird colonies. Management should include proper care during placement of dredged material, surveying, and dike construction.

(2) Public education concerning the vulnerability of colonial-nesting birds has the potential of being a valuable management tool. Through various public affairs channels, the general public could be made aware of the value of dredged material islands to colonial birds. At the same time they could be informed that the continued disposal of dredged material may be a viable management option.

(3) Other protective measures for colonies which are valuable management tools include posting of colonies with signs such as those used by Mobile and Portland Districts, fencing, designation of certain colonies as sanctuaries, limiting of scientific study (and thus disturbance of the birds by constant observation and measurements), and control of wildlife predators such as raccoons, foxes, and feral animals.

g. Vegetation on Dredged Material Islands.

(1) A number of suitable plant species could be planted on islands that would increase the islands' attractiveness to wildlife and especially to colonies of nesting sea and wading birds (items 39 and 73). Depending upon the wildlife species specific requirements, a variety of suitable plants could be used in a management plan for islands. No plantings would be necessary for ground nesting species in most cases, although some of these species use sparse herbs and grasses for nesting. Since tree nesting species require tree/shrub habitat, planting of this vegetation type on islands would hasten wildlife use by more quickly providing suitable habitat. Woody habitat will require 5 to 30 years to develop, depending upon the region and climatic conditions.

(2) Another aspect of vegetation on islands is that sometimes it must be controlled in order to provide the proper or desired habitat for target wildlife species. Vegetation control would be necessary if habitat for ground nesting species was scarce and there was an abundance of other habitats or if the wrong species of trees were growing on an island that precluded nesting or other wildlife use. Some of the control methods that have been successfully tried on dredged material islands are mechanical removal (tractors, tillers, chain saws, axes), hand removal (pulling up plants by their roots), controlled burning, and applications of herbicides. Controlled burning is not very successful because new growth will begin immediately. Herbicides should be carefully applied according to directions; they have been found to be extremely effective on islands in North Carolina.

7-3. Development and Management Problems.

a. Numerous potential problems may be encountered in building and/or managing dredged material islands. A key to success in the early planning stages is cooperation and coordination with Federal, state, and local agencies with regulatory authorities. Many obstacles to project success could be removed by correct planning and public awareness efforts before the project actually begins.

b. The development of specifications for dredged material disposal to develop islands for habitat and simultaneously satisfy the need to dispose of a given amount of dredged material requires considerable care. Specifications should include: exact locations, time of disposal, size of deposit, elevation of deposit, and movement of disposal pipes to ensure that habitat plans are carried out. Onsite monitoring is highly desirable and is necessary when disposal is onto an island with an existing bird colony or population of vulnerable wildlife.

c. Silt curtains (effective only in certain parts of United States under certain soil conditions) or temporary dikes sometimes may be required in disposal activities, and if a dike is built on an existing island and filled, the dike should usually be at least partially removed or breached to allow ground access to water by young birds. This will require return to the site by earth-moving equipment. Dikes do not need to be erected until just prior to disposal use for best use by wildlife. Periodic monitoring to determine aftereffects of disposal will provide useful information for future disposal efforts.

d. The public is seldom aware of wildlife needs. Severe damage can be inflicted on a colony by simply fishing or boating adjacent to an island during the nesting season through disturbance of young and adults. Surveying and dike construction activities could also disrupt nesting birds. Education of both the general public and dredging personnel is needed. An information program should be a part of every ongoing or planned dredging operation. Positive public opinion regarding disposal operations of dredged material in North America may improve public acceptance and understanding of dredged

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material disposal operations, and allow more of this resource to be developed for the benefit of North American wildlife.