DRAFT ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE PIPING PLOVER: WINTERING HABITAT

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August 2000

Draft - August 2000

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PREFACE

This report was prepared for the U.S. Fish and Wildlife Service (FWS) by Industrial Economics, Incorporated (IEc) to assess the economic impacts that may result from designation of critical habitat for the wintering piping plover. IEc worked closely with FWS personnel to ensure that both current and future land uses were appropriately identified and to begin assessing whether or not the designation of critical habitat would have any net economic effect in the regions containing the proposed critical habitat designations. To better understand the concerns of stakeholders, IEc solicited FWS opinion regarding what public comments might likely be, in the absence of a comment period. IEc also requested input from FWS officials concerning whether or not any of these projects would likely result in an adverse modification determination without an accompanying jeopardy opinion. It is important to note here that it would not have been appropriate for IEc to make such policy determinations. Identification of these land management/use actions provided IEc with a basis for evaluating the incremental economic impacts due to critical habitat designation for the wintering piping plover.

This report represents an initial characterization of possible economic impacts associated with the designation of critical habitat for the wintering piping plover. Because the rule had not yet been proposed at the time this report was drafted, detailed information on land uses and potential effects was not yet available. Due to time constraints in conducting this analysis, we do not provide rigorous estimates of economic impact. Rather, we identify significant categories of economic impact expected to be attributable to critical habitat designation. We then describe these categories qualitatively.

Our final analysis will provide, to the extent possible, more rigorous estimates of expected economic impacts. Thus, we solicit information that can be used to support such assessment, whether associated with the categories of impact highlighted in this report, or other economic effects of the critical habitat designation. Since the focus of this report is an assessment of incremental impacts of proposed critical habitat, we request information on the potential effects of the designation on current and future land uses, rather than on effects associated with the listing of the piping plover, or of other federal, state, or local requirements that influence land use.

EXECUTIVE SUMMARY

The purpose of this report is to identify and analyze the potential economic impacts that would result from the proposed critical habitat designation for the wintering population of the piping plover (*Charadrius melodus*). This report was initially prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service's (FWS) Division of Economics.

Section 4(b)(2) of the Endangered Species Act (ESA) requires FWS to base critical habitat proposals upon the best scientific and commercial data available, after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. FWS may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Proposed Critical Habitat

FWS has proposed 147 units of critical habitat for the piping plover where it winters. There are 18 units in North Carolina, 15 units in South Carolina, 16 units in Georgia, 36 units in Florida, 3 units in Alabama, 15 units in Mississippi, 7 units in Louisiana, and 37 units in Texas. The areal extent of the proposed units is 2,104,877 acres. Any existing areas within the critical habitat designation, such as roads and buildings, which do not contain the constituent elements necessary to support this species, are not considered critical habitat. Exhibit ES-1 displays how the 2,104,877 acres of critical habitat for the piping plover are distributed across Federal, state, and private landholders. As shown, state land represents the greatest share, about two-thirds of all the habitat proposed. Open waters (ocean, rivers, bays) within the units were considered state ownership. As discussed in Section 2, Federal and private land account for the majority of critical habitat when measured as linear shoreline. All the proposed units are considered occupied by piping plovers; as we discuss below, this has important implications for anticipated economic impacts.

Economic Impacts Considered

This analysis defines an impact of critical habitat designation to include any effect critical habitat designation has above and beyond the impacts associated with the listing of the piping plover. Section 9 of the ESA makes it illegal for any person to "take" a listed species, which is defined by the ESA to mean harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or the attempt to engage in any such conduct.[1] To evaluate the *increment* of economic impacts attributable

[1] 15 U.S.C. 1531 et seq.

to the critical habitat designation for the piping plover, above and beyond the ESA listing, the analysis assumes a "without critical habitat" baseline and compares it to a "with critical habitat" scenario. The difference between the two is a measurement of the net change in economic activity that may result from the designation of critical habitat for the piping plover.

Exhibit ES-1

SUMMARY OF LOCATION AND OWNERSHIP FOR PROPOSED CRITICAL HABITAT UNITS FOR THE PIPING PLOVER WINTERING POPULATION

Total Area of Units Expressed in Acres

	Federal	State	Private	TOTAL
North	16,504	39,331	6,511	62,346
South	3,917	17,660	3,427	25,004
Georgia	6,081	25,592	5,819	37,492
Florida	44,058	140,520	4,191	188,769
Alabama	415	2,565	3,857	6,837
Mississippi	70,083	45,756	6,299	122,138
Louisiana	127,207	955,660	201,268	1,284,135
Texas	145,192	171,529	61,435	378,156
Total	413,457	1,398,613	292,807	2,104,877

The "without critical habitat" baseline represents current and expected economic activity under all existing modifications prior to critical habitat designation. These include the take restrictions that result from the ESA listing as well as other Federal, state, and local requirements that may limit economic activities in the regions containing the proposed critical habitat units. For example, the U.S. Army Corp of Engineers (ACOE) will still need to consult with FWS on wetland development projects that may affect a listed species to ensure the proposed activities do not jeopardize the continued existence of the species, regardless of the critical habitat status of the parcel. While there may be both current and future impacts attributable to the listing of the piping plover, such impacts are not the subject of this analysis.

To estimate the incremental effect that critical habitat designation would have on existing and planned activities, IEc used the following approach:

- We first collected information on current and planned land uses in proposed critical habitat areas for the piping plover;
- We then identified whether a Federal nexus to these activities exists; and
- Finally, we requested FWS opinion on: (1) whether each identified land use might be subject to modifications under the ESA listing for the piping plover; and (2) whether additional modifications might be imposed under the critical habitat designation.[2]

Although critical habitat designation is not expected to require any further project modifications beyond those required by the listing of the piping plover, government and private landowners may nonetheless incur *direct* costs resulting from critical habitat designation above and beyond those attributable to the listing of the piping plover as a threatened species. These costs include: (1) the value of time spent in conducting Section 7 consultations beyond those associated with the listing of the piping plover, and (2) delays in implementing public and private development activities, which may result in losses to individuals and society.

FWS has recognized that there are alternative scenarios associated with the designation of critical habitat that could trigger additional consultation costs: (1) some consultations that have already been "completed" may need to be reinitiated to address critical habitat if the project is not completed; and (2) consultations taking place after critical habitat designation may take longer because critical habitat issues will need to be addressed.

In addition, this analysis evaluates the possibility of *indirect* economic impacts due to the critical habitat designation. Specifically, the analysis considers whether the public's uncertainty about particular parcels being subject to the designation, and the perception that project modifications result from the critical habitat designation, could in turn lead to real reductions in property values and increased costs to landowners. Although originating in perceived changes, these are real economic effects of critical habitat designation. They may occur even in cases in which additional project modifications on land uses within critical habitat are unlikely to be imposed.

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[2] To assess the incremental economic impacts of critical habitat designation for the piping plover, IEc requires policy direction from FWS on what potential project modifications would be imposed as a result of critical habitat designation over and above those associated with the listing. It is important to note here that it would not be appropriate for IEc to make such a policy determination. IEc requests that FWS consider what land management/use within the proposed critical habitat designation for the piping plover might result in a determination of adverse modification (critical habitat effects) without an accompanying jeopardy opinion (listing effects). Identifying these land management/use actions provides IEc with a basis for evaluating the incremental economic impacts due to critical habitat designation for the piping plover.

Moreover, the designation of critical habitat may result in economic benefits. Resource preservation or enhancement, which is aided by designation of critical habitat, may constitute an increase in non-recreational values provided directly by the species and indirectly by its habitat. Categories of potential benefits for the piping plover include enhancement wildlife viewing, increased biodiversity and ecosystem health, and intrinsic (passive use) values.[3]

Due to the limited availability of time and economic data to conduct the analysis, we do not provide quantitative estimates of economic impact. Rather, we describe qualitatively the significant categories of economic impact expected to be attributable to critical habitat designation. To the extent possible, the final version of this analysis will include quantitative estimates of expected economic impacts. As such, we solicit information that can be used to support such an assessment, i.e., data describing the categories of impact highlighted in this report, or other incremental economic effects of the critical habitat designation.

Similarly, data on small businesses and communities were not obtainable for this analysis in the given time frame; however, as noted previously, FWS guidance suggests that critical habitat designation is not expected to impose significant additional modifications above and beyond the modifications that already exist under the ESA listing. Nonetheless, as indicated above, critical habitat designation may create costs for some small businesses or communities operating within the boundaries of the critical habitat area. These costs are associated with additional Section 7 consultations and losses resulting from delays in project implementation. In addition, any small businesses and communities within the piping plover critical habitat area may incur indirect costs and property value losses associated with (1) mitigating uncertainty about whether their property constitutes critical habitat; and (2) the perception of additional modifications from critical habitat designation. As is the case for other categories of impact, we solicit additional information that can be used for an assessment of the incremental impacts of proposed critical habitat on small businesses and communities.

Preliminary Findings

- The large set of state agencies owning and managing land included in the proposal makes it difficult to generalize regarding potential economic impacts. FWS is soliciting comment from state land owners on the possible economic impacts of the critical habitat designation.

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[3] Intrinsic values, also referred to as passive use values, include categories of economic benefits such as existence value, i.e., knowledge of continued existence of a resource or species; and bequest value, i.e., preserving the resource or species for future generations.

- Development of shoreline areas along the Gulf Coast is considered one of the biggest threats to the piping plover's critical habitat. FWS is concerned about the cumulative impact of developing small parcels for residential homes, as well as pier installation, bulkheads, and other stabilization along the coast. This type of construction often requires that private landowners and the Corps of Engineers perform consultation with FWS in order to minimize impacts to the piping plover. This is a current requirement under Section 7 of the ESA due to the listing, not because of the proposed critical habitat designations.

INTRODUCTION SECTION 1

On December 11, 1985, following a review of information and public comments received on the rule, FWS elected to list the piping plover as endangered in the Great Lakes watershed (50 FR 50726). On December 4, 1996, Defenders of Wildlife filed a lawsuit (Defenders of Wildlife and Piping Plover v. Babbitt, Case No. 96CV02965) against the U.S. Department of Interior (DOI) and the FWS for failure to designate critical habitat for the Great Lakes breeding population of the piping plover. Defenders filed a similar suit for the Northern Great Plains plover population in 1997. On February 7, 2000, the U.S. District Court for the District of Columbia issued an order directing FWS to propose critical habitat for both the nesting and wintering areas of the Great Lakes breeding population of the piping plover. The order requires that the critical habitat proposal be issued by June 30, 2000 and finalized by April 30, 2001.

The wintering population of piping plovers is listed as a threatened species while the breeding population is endangered. Since FWS cannot distinguish the Great Lakes and Great Plains birds on their wintering grounds, they felt it was appropriate to propose critical habitat for all U.S.-wintering piping plovers collectively. Further, they determined that the appropriate course of action would be to propose critical habitat for all U.S.-wintering piping plovers on the same schedule required for the Great Lakes breeding population.

Critical habitat designation can help focus conservation activities for a listed species by identifying areas, both "occupied" and "unoccupied", that contain essential critical habitat features. The ESA defines occupied critical habitat as areas that contain the physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection. By contrast, the ESA defines unoccupied critical habitat as those areas that fall outside the geographical area occupied by the species, but that may meet the definition of critical habitat upon determination that they are essential for the conservation of the species. Unoccupied lands proposed as critical habitat frequently include areas inhabited by the species at some point in the past. This rule proposes to designate occupied habitat only.

Critical habitat designation contributes to Federal land management agencies' and the public's awareness of the importance of these areas. However, the designation of critical habitat has no effect

on private actions on private lands unless a Federal connection (or "nexus") to a land use or management action exists, such as funding, permit authorization, or other Federal actions. In addition to its informational role, the designation of critical habitat may provide protection where significant threats to the species have been identified. This protection derives from ESA Section 7, which requires Federal agencies to ensure that activities they fund, authorize, or carry out are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT

Section 7(a)(2) of the ESA requires Federal agencies to consult with FWS whenever activities they fund, authorize, or carry out may affect listed species or designated critical habitat. Section 7 consultation with FWS is designed to ensure that any current or future Federal actions do not appreciably diminish the value of the critical habitat for the survival and recovery of the species. Activities on land owned by individuals, organizations, states, local and Tribal governments only require consultation with FWS if their actions occur on Federal lands; require a Federal permit, license, or other authorization; or involve Federal funding. Federal actions not affecting the species or its critical habitat, as well as actions on non-Federal lands that are not Federally funded, authorized, or permitted, will not require Section 7 consultation.

For consultations concerning activities on Federal lands, the relevant Federal agency consults with FWS. Where the consultation involves an activity proposed by a state or local government or a private entity (the "applicant"), the Federal agency with the nexus to the activity (the "Action agency") serves as the liaison with FWS. The consultation process may involve both informal and formal consultation with FWS.

Informal Section 7 consultation is designed to assist the Federal agency and any applicant in identifying and resolving potential conflicts at an early stage in the planning process. Informal consultation consists of informal discussions between FWS and the agency concerning an action that may affect a listed species or its designated critical habitat. In preparation for an informal consultation, the applicant must compile all biological, technical, and legal information necessary to analyze the scope of the activity and discuss strategies to avoid, minimize, or otherwise affect

impacts to listed species or critical habitat.[4] During the informal consultation, FWS makes advisory recommendations, if appropriate, on ways to minimize or avoid adverse effects. If agreement can be reached, FWS will concur in writing that the action, as revised, is not likely to adversely affect listed species or critical habitat. Informal consultation may be initiated via a phone call or letter from the Action agency, or a meeting between the Action agency and FWS.

A formal consultation is required if the proposed action is likely to adversely affect listed species or designated critical habitat in ways that cannot be avoided through informal consultation. Formal consultations determine whether a proposed agency action is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat. Determination of whether an activity will result in jeopardy to a species or adverse modification of its critical habitat is dependent on a number of variables, including type of project, size, location, and duration. If FWS finds, in their biological opinion, that a proposed agency action is likely to jeopardize the continued existence of a listed species and/or destroy or adversely modify the critical habitat, FWS may identify reasonable and prudent alternatives that are designed to avoid such adverse effects to the listed species or critical habitat.

Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that FWS believes would avoid jeopardizing the species or destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing reasonable and prudent alternatives vary accordingly. FWS indicates, however, that costs attributable to reasonable and prudent alternatives resulting from the Section 7 consultation process would normally be associated with the listing of a species, as it is unlikely that FWS would conclude that an action would destroy or adversely modify critical habitat without also jeopardizing the continued existence of a listed species.

Federal agencies are also required to evaluate their actions with respect to any species that is proposed as endangered or threatened and with respect to its proposed or designated critical habitat. Regulations implementing the interagency cooperation provisions of the ESA are codified

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[4] Many applicants incur costs to prepare analysis as part of the consultation package. These costs vary greatly depending on the specifics of the project. Major construction activities, as referred to in the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.), require that a biological assessment be completed prior to informal consultation. In most cases, these costs are attributable to the fact that a species has been added to the list of threatened and endangered species rather than the designation of critical habitat.

at 50 CFR part 402. Section 7(a)(4) of the ESA and regulations at 50 CFR 402.10 require Federal agencies to confer with the FWS on any action that is likely to jeopardize the continued existence of a proposed species or to result in destruction or adverse modification of proposed critical habitat.

PURPOSE AND APPROACH OF REPORT

Under Section 4(b)(2) of the ESA, the Secretary of the Interior is required to designate critical habitat on the basis of the best scientific and commercial data available and to consider the economic and other relevant impacts of designating a particular area as critical habitat. The Secretary may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat.

The purpose of this report is to identify and analyze the potential economic impacts that would result from the proposed critical habitat designation for the piping plover. The analysis was conducted by assessing how critical habitat designation for the piping plover may affect current and planned land uses and activities on Federal and other government-held land as well as privately-held land. For Federally-managed land, designation of critical habitat may modify land uses, activities, and other actions that threaten to adversely modify habitat. For land held or managed by other governments or private entities subject to critical habitat designation, modifications on land uses and activities can only be imposed when a "Federal nexus" exists (i.e., the activities or land uses of concern involve Federal permits, Federal funding, or other Federal actions). Activities on state and private land that do not involve a Federal nexus are not restricted by critical habitat designation.

In addition to determining whether a Federal nexus exists, the analysis must distinguish between economic impacts caused by the ESA listing of the piping plover and those additional effects that would be caused by the proposed critical habitat designation. *The analysis only evaluates economic impacts resulting from additional modifications under the proposed critical habitat designation that are above and beyond impacts caused by existing modifications under the ESA listing of the piping plover.* Finally, in the event that a land use or activity would be limited or prohibited by another existing statute, regulation, or policy, the economic impacts associated with those limitations or prohibitions would not be attributable to critical habitat designation.

To evaluate the increment of economic impacts attributable to the designation of critical habitat, above and beyond the ESA listing, the analysis assumes a "without critical habitat" baseline and compares it to a "with critical habitat" scenario, measuring the net change in economic activity. The "without critical habitat" baseline represents current and expected economic activity under all existing modifications prior to the designation of critical habitat. Only those actions that may be affected by modifications and costs due to critical habitat designation, above and beyond existing modifications, are considered in this economic analysis. Moreover, actions must be "reasonably foreseeable," defined as activities which are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public.

At this stage, IEc's research has focused on coordinating with FWS on defining the critical habitat units and ownership patterns. Because the critical habitat area is extensive and the land uses diverse and complex, no systematic research (e.g., contacts with landowners) has yet been performed to gauge impacts on specific shoreline reaches. Through collaboration with FWS, IEc:

- Collected information on current and planned land uses in proposed critical habitat areas for the piping plover;
- Identified whether a Federal nexus to these activities exists; and
- Requested FWS opinion on: (1) whether each identified land use might be subject to modifications required by the ESA listing for the piping plover; and (2) whether additional modifications might be required under the critical habitat designation.

The preliminary findings will be revised based on public comments on the proposal and this draft economic analysis.

STRUCTURE OF REPORT

The remainder of this report is organized as follows:

- **Section 2: Description of Species and Proposed Critical Habitat Areas** - Provides general information on the species and a brief description of proposed critical habitat areas.
- **Section 3: Framework for Analysis** - Describes the framework and methodology for the economic analysis; highlights sources of information for the report.
- **Section 4: Impacts of Critical Habitat Designation on Land Use: Federal, State, and Local Government and Private Land -** Identifies and assesses potential economic and other relevant impacts from the proposed critical habitat designation.
- **Section 5: Impacts Due to Uncertainty and Public Perception** - Characterizes the potential impacts which may result from public perception that critical habitat designation will impose additional modifications above and beyond those existing modifications under the ESA listing.

- **Appendix A: Unit Description by State** - Provides a brief description of each of the proposed critical habitat units.

- **Appendix B: Maps of Critical Habitat Areas** - Provides maps of the proposed critical habitat units.

DESCRIPTION OF SPECIES AND PROPOSED CRITICAL HABITAT AREAS[5] SECTION 2

SPECIES DESCRIPTION

The piping plover (*Charadrius melodus*), named for its melodic mating call, is a small, pale-colored North American shorebird. It weighs 43 to 63 grams (1.5 to 2.5 ounces) and is 17 to 18 centimeters (6 to 7 inches) long. Its light, sand-colored plumage blends in well with its primary sandy beach habitat. During the breeding season the legs are bright orange and the short, stout bill is orange with a black tip. There are two single dark bands, one around the neck and one across the forehead between the eyes. Plumage and leg color help distinguish this bird from other plover species. The females' neck band is often incomplete and is usually thinner than the males' neck band. In winter, the bill turns black, the legs fade to pale orange, and the black plumage bands on the head are lost. Chicks have speckled gray, buff, and brown down, black beaks, pale orange legs, and a white collar around the neck. Juveniles resemble wintering adults and obtain their adult plumage the spring after they fledge.

Piping plovers winter in coastal areas of the United States from North Carolina to Texas. They also winter along the coast of eastern Mexico and on Caribbean islands from Barbados to Cuba and the Bahamas. The international piping plover winter censuses of 1991 and 1996 located only 63 percent and 42 percent of the estimated number of breeding birds, respectively. Of the birds located on the wintering grounds during these two censuses, 89 percent were found on the Gulf Coast of the United States and 8 percent were found on the Atlantic Coast of the United States.

[5] The information on the wintering piping plover and its habitat included in this section was obtained from the *Proposed Determination of Critical Habitat for the Wintering Piping Plover*, June 2000.

Information from observation of color-banded piping plovers indicates that the winter range of the breeding populations overlap to a significant degree. Therefore, the source breeding population of a given wintering individual cannot be determined in the field unless it has been banded or otherwise marked.

Piping plovers begin arriving on the wintering grounds in July, with some late-nesting birds arriving in September. A few individuals can be found on the wintering grounds throughout the year, but sightings are rare in late May, June and early July. Migration is poorly understood, but most piping plovers probably migrate non-stop from interior breeding areas to wintering grounds. However, concentrations of spring and fall migrants have been observed along the Atlantic Coast.

Behavioral observations of piping plovers on the wintering grounds suggest that they spend the majority of their time foraging. Primary prey for wintering piping plovers includes polychaete marine worms, various crustaceans, insects, and occasionally bivalve mollusks which they peck from the substrate surface or from just beneath the substrate surface. Foraging usually takes place on moist or wet substrate of sand, mud, or fine shell. In some cases, this substrate may be covered by a mat of blue-green algae. When not foraging, piping plovers undertake various maintenance activities including roosting, preening, bathing, aggressive encounters (with other piping plovers and other species) and moving among available habitat locations.

The habitats used by wintering birds include beaches, mud flats, sand flats, algal flats, and washover passes (areas where breaks in the sand dunes result in an inlet). Individual piping plovers tend to return to the same wintering sites year after year. Wintering piping plovers are dependant on a mosaic of habitat patches, and move among these patches depending on local weather and tidal conditions. One study of 48 wintering piping plovers in south Texas found a mean home range size (based on a 95 percent distribution) of 3,117 acres, with a mean distance moved per individual (averaged across seasons) of more than 2 miles.

Beginning in late February, most piping plovers begin leaving the wintering grounds to migrate back to breeding sites. Northward migration peaks in late March, and by late May most birds have left the wintering grounds.

CONSTITUENT ELEMENTS OF CRITICAL HABITAT AND POTENTIAL DISTURBANCES

The primary constituent elements essential for the conservation of wintering piping plovers are those habitat components which support foraging, roosting, and sheltering, or have the capacity, through natural processes, to develop those habitat components. The primary constituent elements are found in geologically dynamic coastal areas that support or have the potential to support intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide. Important components of intertidal flats include sand and/or mud flats with no or very sparse emergent vegetation. In some cases, these flats may be

covered or partially covered by a mat of blue-green algae.

Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting piping plovers. Such sites may have debris, detritus (decaying organic matter), or micro-topographic relief (less than 50 cm above substrate surface) offering refuge from high winds and cold weather. Important components of the beach/dune ecosystem include surf-cast algae, sparsely vegetated backbeach (beach area above mean high tide seaward of the dune line, or in cases where no dunes exist, seaward of a delineating feature such as a vegetation line, structure, or road), spits, and washover areas. Washover areas are broad, unvegetated zones with little or no topographic relief, that are formed and maintained by the action of hurricanes, storm surge, or other extreme wave action. Several of these components (sparse vegetation, little or no topographic relief) are mimicked in artificial habitat types used less commonly by piping plovers (e.g., dredge spoil sites).

These constituent elements are a result of the dynamic geological processes that dominate coastal landforms throughout the wintering range of piping plovers. The integrity of the primary constituent elements depends upon daily tidal events, regular sediment transport processes, as well as the episodic, high-magnitude storm events, all of which are associated with the formation and movement of barrier islands, inlets, and other coastal landforms. By their nature, these features are in a constant state of change, and are therefore difficult to accurately delineate in perpetuity on a static map. Given that piping plovers evolved in this dynamic system, and that they are dependent upon the ever-changing features within broad areas for their continued survival and eventual recovery, critical habitat boundaries may include broader areas than those currently used by wintering piping plovers in order to capture sites which may develop appropriate habitat components in the future.

In most areas, wintering piping plovers are dependant on a mosaic of sites distributed throughout the landscape. Availability of habitat patches within this coastal landscape is dependent on local weather and tidal conditions. A single piping plover may leave a site if it becomes inundated by a high tide or storm event, or if high winds or cold temperatures make the site unsuitable for foraging or roosting. This displaced individual will seek out patches within the landscape mosaic which have become available as tides recede, which provide refuge from inclement weather conditions, or which simply provide a roosting site until conditions become favorable to resume foraging.

PROPOSED CRITICAL HABITAT UNITS

At this time, the proposed critical habitat areas contained within the conservation units discussed below constitute the best evaluation by FWS of areas needed for the conservation of the piping plover on its wintering grounds. Proposed critical habitat may be revised should new information become available prior to the final rule, and existing critical habitat may be revised if new information becomes available after the final rule.

Lands proposed as critical habitat have been divided into 147 critical habitat conservation units that contain areas with the primary constituent elements for the piping plover in the wintering range of the species. These units are found in all eight states where the piping plover winters. Appendix A describes each unit in terms of its location, size, and ownership. FWS considers all of the proposed critical habitat to be occupied by piping plovers.

Exhibit 2-1 provides a summary of the land ownership and linear shoreline distances proposed as critical habitat. Exhibit 2-2 provides land ownership on an areal basis. As shown, Texas dominates proposed habitat measured as shoreline while Louisiana has the most critical habitat in areal terms. Similarly, while Federal and private ownership dominate shoreline habitat, the greatest area of habitat is state-owned, including state waters. Estimates reflect the total area within critical habitat conservation unit boundaries, without regard to the presence of primary constituent elements. As many of these boundaries have been drawn to encompass critical habitat, the actual critical habitat areas may be less than the area indicated in the exhibits. For example, only about 2.5 percent of the Mississippi River Delta map unit contains the primary constituent elements.

Exhibit 2-1

SUMMARY OF LOCATION AND OWNERSHIP FOR PROPOSED CRITICAL HABITAT UNITS FOR THE PIPING PLOVER WINTERING POPULATION

Linear Shoreline Measured in Miles

	Federal	State	Private	TOTAL
North Carolina	73	40	40	153
South Carolina	14	31	24	69
Georgia	33	47	19	99
Florida	66	93	49	208
Alabama	9	14	37	60
Mississippi	61		70	131
Louisiana	62	105	175	342
Texas	285	53	272	610
Total	603	383	686	1,672

Exhibit 2-2

SUMMARY OF LOCATION AND OWNERSHIP FOR PROPOSED CRITICAL HABITAT UNITS FOR THE PIPING PLOVER WINTERING POPULATION
Total Area of Units Expressed in Acres

	Federal	State	Private	TOTAL
North Carolina	16,504	39,331	6,511	62,346
South Carolina	3,917	17,660	3,427	25,004
Georgia	6,081	25,592	5,819	37,492
Florida	44,058	140,520	4,191	188,769
Alabama	415	2,565	3,857	6,837
Mississippi	70,083	45,756	6,299	122,138
Louisiana	127,207	955,660	201,268	1,284,135
Texas	145,192	171,529	61,435	378,156
Total	413,457	1,398,613	292,807	2,104,877

Socioeconomic Profile of the Critical Habitat Areas

The proposed critical habitat units cover 56 counties and parishes in eight states. The areas included range greatly in terms of the type and degree of economic activity present, thereby affecting the potential for effects from the designation of critical habitat. Some habitat is in or near urban areas with extensive shoreline development for commercial, industrial, and residential use; other areas are sparsely populated, undeveloped, and part of existing conservation areas.

As such, it is difficult to present a concise overview of the socioeconomic characteristics of the affected areas. To illustrate the diversity of areas present, we can contrast two counties, each of which has substantial shoreline reaches proposed as critical habitat. Exhibit 2-3 contrasts Nueces County, Texas and Vermilion Parish, Louisiana. As shown, Nueces County, which includes the city of Corpus Christi, is significantly more populous and has a greater degree of economic activity as measured by the number of business establishments and annual payroll. Consistently, the number of new housing units, a crude indicator of development pressure, is greater in Nueces County as well. In contrast, the Louisiana Gulf Coast is, in most areas, sparsely populated with no major metropolitan areas. These two counties highlight the diversity of the affected areas and demonstrate why broad conclusions regarding the likelihood of economic impacts from the critical habitat designation are difficult to make.

Exhibit 2-3

COMPARISON OF NUECES COUNTY (TX) AND VERMILION PARISH (LA)

	Nueces County	**Vermilion Parish**
Population	317,474	51,693
Business Establishments (non-farm)	7,943	926
Annual Payroll	$2.65 billion	$0.20 billion
New Housing Units	1,650	182

Sources: U.S. Census Bureau, 1997 County Business Patterns (obtained on-line); U.S. Census Bureau, USA Counties 1999 (1997 data, obtained on-line).

FRAMEWORK FOR ANALYSIS SECTION 3

This section provides an overview of the framework for analysis, including a description of the methodology used to determine potential economic impacts from the proposed designation of critical habitat for the wintering piping plover. In addition, we describe the primary sources of information used to develop this report.

FRAMEWORK FOR ANALYSIS

This economic analysis examines the impacts of restricting specific land uses or activities within areas designated as critical habitat. The analysis evaluates impacts in a "with" critical habitat designation versus a "without" critical habitat designation framework, measuring the net change in economic activity. The "without" critical habitat designation scenario, which represents the baseline for analysis, includes all protection already accorded to the piping plover under state and Federal laws, such as the National Environmental Policy Act and the Clean Water Act. The ESA listing supplemented this protection via its listing provisions. The focus of this economic analysis is to determine the impacts on land use modifications and activities from the designation of critical habitat that are above and beyond the impacts due to existing required modifications under Federal, state, and local laws.

Steps to Identify Potential Impacts from Critical Habitat Designation

Listed below are the four questions that were posed to identify economic impacts from the proposed critical habitat designation:

1. **What land uses and activities within the proposed critical habitat designation may be affected?** As noted above, potential impacts on critical habitat lands will be identified through phone conversations with FWS staff, state and local land management agency staff, and private citizens. In addition to considering direct impacts on lands, the analysis considers the

potential for indirect impacts that may affect lands (see Question 4).

2. **Does the land use or activity involve a "Federal nexus"?** Critical habitat designation can only affect land uses and activities undertaken by state and other governments and private parties when a "Federal nexus" exists (i.e., the activities or land uses of concern involve Federal permits, Federal funding, or other Federal action). Activities on the part of state and other governments as well as private entities that do not involve a Federal nexus are not affected by critical habitat designation. For federally-managed land, critical habitat designation may restrict land uses and other actions that may adversely modify habitat.

3. **Would the land use or activity face *additional* modifications or costs under the proposed critical habitat designation, above and beyond existing modifications or costs under the ESA listing of the piping plover?** As noted above, the baseline for analysis includes all modifications on land use existing prior to the designation of critical habitat, including listing modifications. Only impacts from modifications above and beyond this baseline are considered. Determinations of whether a land use or activity would face additional modifications or costs under the proposed critical habitat designation are based on discussions with FWS. Those land uses and activities that would be subject to additional modifications under the proposed critical habitat designation are evaluated to determine the potential national economic efficiency effects and regional economic impacts. While FWS anticipates recommending no further modifications to land use activities above those that may be required as a result of the listing of the piping plover, it is possible that some land owners could incur additional costs resulting from reinitiating consultations with FWS to address piping plover concerns.

4. **Would the land use or activity be subject to other indirect effects under the proposed critical habitat designation, based on perceptions of potential modifications rather than actual modifications on planned activity?** FWS does not expect the designation of critical habitat to place any further modifications on land uses and activities above and beyond those modifications extant under the ESA listing. Although actual modifications may be identical for lands within the boundaries of critical habitat and lands outside designated critical habitat, landowners and land managers may perceive or expect that additional modifications will arise from the delineation of critical habitat boundaries. Land managers may modify their activities based on the heightened awareness of the species and the importance of the habitat for that species. This may have a variety of indirect economic effects. In addition, landowners and managers with property

within critical habitat boundaries may be uncertain about whether their property constitutes critical habitat. These perceptions may result in losses in economic value and may cause increased costs to property owners to mitigate these losses during the period following critical habitat designation, before markets incorporate information regarding actual modifications on activities. For example, the value of property within the extant boundary of the critical habitat designation may be lower (or higher) than properties outside the boundaries of the designation.

5. **Would the changes in land use affect the regional economy?** If the potential for changes in land uses exists, we examine what regional economic effects are possible. This involves characterizing the structure of the regional economy, identifying significant sectors affected by the designation, and estimating the impact of the designation on key industries. For example, to the extent that construction of residential and commercial buildings is affected by the designation, we would characterize the significance of the construction sector (e.g., share of regional employment) and the degree to which construction may be affected.

Benefits of Critical Habitat Designation

Critical habitat designation may also result in economic benefits by aiding the preservation or enhancement of values provided directly by the species and indirectly by its habitat. Categories of potential benefits for the piping plover include wildlife observation, biodiversity, ecosystem, and intrinsic (passive use) values. These benefits may result because society, species, and ecosystems are spared adverse and irreversible effects of habitat loss and species extinction. In this analysis, however, values for potential benefits of critical habitat designation have not been estimated.

INFORMATION SOURCES

Because the rule designating critical habitat is currently being released for public review, no public comments on the proposal exist. Therefore, this preliminary analysis relies on telephone conversations with staff at FWS rather than on written comments or public hearing testimony. As our research progresses, we intend to rely on public comments and possibly phone interviews with

stakeholders to identify potentially affected activities and land uses and to obtain data on possible economic impacts. Relevant contacts will be identified in coordination with FWS regional and field staff to ensure that the most relevant and knowledgeable parties are consulted.

IMPACTS OF CRITICAL HABITAT DESIGNATION ON LAND USE: FEDERAL, STATE, LOCAL, AND PRIVATE LANDS SECTION 4

The proposed designation of critical habitat for the piping plover includes Federal, state, and private lands. Critical habitat designation may modify land uses, activities, and other actions on federally-managed land that threaten to adversely modify habitat. For activities and land uses on state, and private lands to be affected by critical habitat designation, a Federal nexus must exist (i.e., the activities or land uses involve a Federal permit, Federal funding, or require Federal actions). Activities on state and private lands that do not involve a Federal nexus are not affected by the designation of critical habitat.

In this section, we first discuss the types of impacts that potentially could be incurred by Federal, state, and private land owners and managers as a result of the critical habitat designation for the piping plover. To the extent that available information allows, we discuss examples of actual activities in which these entities are involved, and describe qualitatively whether they are likely to experience these impacts. As noted elsewhere, this report represents only a preliminary assessment of potential economic impacts. Because the rule had not yet been proposed at the time this report was drafted, detailed information on land uses and potential effects was not yet available. FWS anticipates developing a more detailed analysis of economic impacts once comments on the proposed critical habitat are received.

POTENTIAL IMPACTS OF CRITICAL HABITAT DESIGNATION

As noted previously, FWS staff cannot foresee, for the piping plover critical habitat designation, any actions that would result in an adverse modification determination without an accompanying jeopardy determination. In other words, critical habitat designation for the piping plover is not expected to require modifications to land uses and activities above and beyond modifications that are already required under the ESA listing of the piping plover. However,

governments and private landowners may nonetheless incur direct costs resulting from the designation that are not attributable to the listing of the piping plover as a threatened species. These costs include:

- The value of time and other costs incurred in conducting Section 7 consultations beyond those associated with the listing of the piping plover, and;

- Delays in implementing public and private development activities which result in losses to individuals and society.

Below we discuss each aspect in more detail.

Costs Associated with Conducting Section 7 Consultations on Critical Habitat

Parties involved in Section 7 consultations include FWS and the Federal agency involved in the proposed activity. In cases where the consultation involves an activity proposed by a state or local government or a private entity (the "applicant"), the Federal agency with the nexus to the activity serves as the liaison with FWS.

To initiate a formal consultation, the relevant Federal agency submits to FWS a consultation request with an accompanying biological analysis of the effects of the proposed activity. This biological analysis may be prepared by the relevant Federal agency, the state, county, or municipal entity whose action requires a consultation, or an outside party hired by the agency or landowner. Once FWS determines that these documents contain sufficient detail to enable an FWS assessment, FWS has 135 days to consult with the relevant Federal agency and render its biological opinion. During the consultation, parties discuss the extent of the impacts on critical habitat and propose ways to avoid and minimize impacts.[6]

FWS expects that any potential economic costs and benefits from critical habitat designation incremental to the listing will occur predominately on unoccupied lands and this proposal does not include unoccupied lands. However, ongoing or planned activities on occupied lands may trigger re-initiations of previous consultations conducted under the listing, or in select cases, new consultations that would not have taken place under the listing. While it is certainly more plausible

[6] Many applicants incur costs to prepare analyses as part of the consultation package. These costs vary greatly depending on the specifics of the project. In most cases, these costs are attributable to the fact that a species has been added to the list of threatened and endangered species rather than the designation of critical habitat.

that new or re-initiated consultations will be associated with activities on unoccupied lands, this analysis considers the possibility that some new consultations may be triggered by activities on occupied lands.

As noted, this analysis recognizes potential benefits resulting from the designation of critical habitat, above and beyond those attributable to existing regulations or the ESA listing of the species. Similarly, incremental benefits are expected to occur primarily on unoccupied lands, but in select cases may also be found to occur on occupied lands as well.

Cost Associated with Project Delays from Section 7 Consultations on Critical Habitat

Both public and private entities may experience delays in projects and other activities due to critical habitat designation. Regardless of funding (i.e., private or public), projects and activities are generally undertaken only when the benefits exceed the costs, given an expected project schedule. If costs increase, benefits decrease, or the schedule is delayed, a project or activity may no longer have positive benefits, or it may be less attractive to the entity funding the project. For example, if a private entity undertaking a residential development must delay groundbreaking as result of an unresolved Section 7 consultation attributable to the designation of critical habitat, the developer may incur additional financing costs. Delays in public projects, such as construction of a new park, may impose costs in the form of lost recreational opportunities. The magnitude of these costs of delay will depend on the specific attributes of the project, and the seriousness of the delay. However, it is likely any such delays will be attributable to the effects of listing of the species and not the designation of critical habitat.[7]

IMPACTS OF CRITICAL HABITAT ON FEDERAL LAND

The areas proposed for designation as critical habitat for the piping plover includes property held or managed by the U.S. National Park Service, the U.S. Air Force, the U.S. Marine Corps, and FWS. Of the total linear shoreline (1,672 miles) of proposed critical habitat, roughly 36 percent (603 miles) is held or managed by these Federal agencies. Of the total area of units (2,104,879 acres), about 20 percent (413,459 acres) is held by these Federal agencies.

[7] Developers will likely be aware of the potential impact of critical habitat designation on project scheduling.

At this point, no additional effects on agency actions are anticipated to result from critical habitat designation. Federal agency comments on the critical habitat proposal may reveal additional potential for economic impacts. Because of the potential for impacts on other Federal agency actions, FWS will continue to review this proposed action for any inconsistencies with other Federal agency actions.

IMPACTS OF CRITICAL HABITAT ON STATE LAND

The areas proposed for designation as critical habitat for the piping plover include property held by each of the states except Mississippi. Of the total linear shoreline (1,672 miles) of proposed critical habitat, roughly 23 percent (383 miles) is held by the states. Of the total area of units (2,104,879 acres), about 66 percent (1,398,613 acres) is held by the states. These state lands are diverse and include conservation areas, recreational facilities, historical sites, and other types of state land.

The large set of state agencies owning and managing land included in the proposal makes it difficult to generalize regarding potential economic impacts. For example, the Department of Environmental Protection (DEP) and the Florida Park Service in Florida manages coastline that is heavily utilized for beach recreation. The DEP would like to work with FWS to provide as much protection as possible while still allowing beach access.[8] Another major state agency that may potentially be affected by the designation is the Texas General Land Office (GLO), which holds title to all submerged lands in Texas (including tidal flats).

FWS is soliciting comments from potentially affected state landowners on the possible economic impacts of the critical habitat designation. Comments on the proposal will provide a better foundation for assessing what, if any, economic impacts would result above and beyond those impacts attributable to the listing of the wintering piping plover.

IMPACTS OF CRITICAL HABITAT ON PRIVATE LAND

The areas proposed as critical habitat include 686 miles of privately owned shoreline, roughly 41 percent of the total land proposed. Most of this private land is located in Texas and Louisiana.

FWS considers development of shoreline areas to be the biggest threat to the piping plover's critical habitat, especially along the Texas Coast. FWS is most concerned about the cumulative impact of developing small parcels for residential homes, with installation of piers, bulkheads and other shoreline stabilization along the coast. As a result, FWS believes that the U.S. Army Corps of Engineers (ACOE) will be a major participant in consultation related to coastal lands, particularly

[8] Letter from the Department of Environmental Protection, State of Florida, May 15, 2000.

with respect to new residential development. Other ACOE permitted or funded projects include inlet stabilization and beach restoration at various points along the coastal areas. Because ACOE's influence is so important to this species, and because impacts from even small projects can add up over time, FWS would like ACOE to consult programmatically on impacts on piping plover habitat, instead of consulting on individual land parcels.[9]

Likewise, the Federal Emergency Management Agency (FEMA), through the National Flood Insurance Program (NFIP), may play a role in the Carolinas and in Gulf Coast states other than Texas. Some coastal construction will be insured by NFIP, forming a Federal nexus. However, in general, if building is taking place in a region covered under the Coastal Barrier Resources Act, then there is probably not a nexus with FEMA because funds for properties protected under this Act are not available through NFIP.[10]

OTHER POTENTIAL IMPACTS

A key issue that may create costs associated with designation of critical habitat for piping plovers is the spoil associated with dredging for navigation. FWS may require that dredge spoils from ACOE dredging activities be pumped on beaches farther away to avoid disposal on piping plover habitat. Such a change may create additional costs. FWS may also consult with ACOE regarding their practice of "side-cast" emergency dredging in maybe a half-dozen cases where this practice cuts sand bars on shoals that are used by piping plovers.[11]

Other activities in proposed critical habitat with a Federal nexus have been identified as potential concerns including:

- Pipeline installation (oil and natural gas);
- Off-shore drilling;
- Road and bridge construction;
- Beach driving on Federal lands;

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[9] Kickoff meeting for piping plover critical habitat economic analysis, Corpus Christi, Texas, May 3, 2000.

[10] Kickoff meeting for piping plover critical habitat economic analysis, Corpus Christi, Texas, May 3, 2000.

[11] Kickoff meeting for piping plover critical habitat economic analysis, Corpus Christi, Texas, May 3, 2000.

- Marina, boat ramp, and pier construction;
- Recreational activities.

All of these activities are considered under the Section 7 consultation process for listed species.

IMPACTS DUE TO UNCERTAINTY AND PUBLIC PERCEPTION SECTION 5

As noted throughout this report, no additional project modifications associated with land use activities are expected above and beyond those resulting from the ESA listing of the piping plover. Because of the presence of the piping plover, any modifications to land use will most likely be similar for similar types of activities on lands within the critical habitat designation as for land outside of the designation. Lands within the critical habitat units may be subject to two types of *indirect* economic impacts. First, uncertainty with the critical habitat designation process could prompt some landowners or managers to undertake steps to reduce that uncertainty, thereby incurring costs. Second, while FWS believes that, in most cases, the critical habitat designation for the piping plover will require no further changes to proposed or existing land use activities beyond those experienced due to the listing, the public may *perceive* the risk of additional modifications. This perception may result in real reductions in land values and real estate transactions. Below, we describe each of these indirect economic effects in more detail.

COSTS ASSOCIATED WITH UNCERTAINTY OF CRITICAL HABITAT IMPACTS

The proposed rule designating critical habitat for the piping plover excludes certain lands within the borders of the critical habitat units. Specifically, those parcels featuring existing structures and/or lacking primary constituent elements are not subject to the requirements associated with designation.

Some land owners may elect to retain or consult counsel, surveyors, and other specialists to determine whether specific parcels lie within critical habitat boundaries, and/or whether the primary constituent elements are present on parcels. Thus, uncertainty over the critical habitat status of lands has the potential to create real economic losses as land owners incur costs to reduce and/or mitigate the effects of this uncertainty.

COSTS ASSOCIATED WITH PUBLIC PERCEPTION OF CRITICAL HABITAT IMPACTS

Public comments suggest the perception of additional restrictions due to critical habitat designation, even when restrictions are not imposed. This perception may result in real reductions in land values and real estate transactions. Over time, as the public awareness grows that critical habitat will not result in additional modifications, the impact of designation of critical habitat on property markets can be expected to decrease to reflect the level of impacts associated with listing modifications and the potential costs of additional consultations associated with designation of critical habitat, as discussed in Section 4 of this report.

To explain property market impacts due to public perception of the critical habitat designation, it is necessary to examine key events associated with the listing and the critical habitat designation for the piping plover: (1) ESA listing; (2) proposal of critical habitat.

1. **ESA listing** — The initial impact of the piping plover listing on property markets may have been limited because FWS guidance, in the form of a map indicating which areas were subject to listing modifications, was unavailable. The public also may not have been fully aware of how listing modifications would affect land uses and activities. Therefore, it is likely that the potential effects of the listing on property markets were only partially felt at the time of the listing (December 11, 1985).

2. **Proposed Critical Habitat** — The proposal of critical habitat may cause two types of effects that would result in impacts to property markets:

   - **Greater Public Awareness of Areas Subject to Modifications:** The proposal of critical habitat included the issuance of maps designating 147 units of land as potential critical habitat areas. Although all of these units, as well as other areas, were already subject to listing modifications, no map was issued with the listing. Therefore, the critical habitat designation maps likely increase public awareness of areas subject to modifications, thereby increasing listing impacts that may not have been fully felt at the time of the piping plover listing.

   - **Public Perception that Critical Habitat Designation Will Result in Additional Modifications:** Public perception that critical habitat designation might involve additional modifications, above and beyond existing modifications under the ESA listing, also may negatively affect property markets. This public perception may result in economic impacts to property markets above and beyond those caused by listing modifications. Over time, as public awareness grows that critical habitat designation will not result in additional modifications, the impact of critical habitat designation on property markets can be expected to subside. Those impacts associated with

listing modifications will remain, as will the effects from the costs of any additional consultations associated with critical habitat designation. The scale of these effects depends on how great the initial impacts of public perception are on property markets and the length of time it takes for the perceptions to diminish as public awareness grows that designation of critical habitat will not result in additional modifications. Furthermore, effects are only realized to the extent that property transactions occur during this period of uncertainty.

SOCIAL AND COMMUNITY IMPACTS SECTION 6

Under the Regulatory Flexibility Act (as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996) whenever a Federal agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).[12] However, no regulatory flexibility analysis is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. This section addresses the potential impacts to small entities and communities located within the proposed critical habitat designation.

This rule is not expected to have a significant economic impact on a substantial number of small entities because it imposes very little, if any, additional impacts on land use activities beyond those that may be required as a result of the listing of the piping plover. Because the piping plover is a Federally protected species, landowners are prohibited from taking the species, which is defined under the ESA to include such activities that would harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. As a result, any future consultations with FWS are likely to occur to avoid any such activities that would result in an incidental take of the piping plover. Therefore, proposed modifications to such activities recommended by FWS would be attributable to the presence of the piping plover on a landowner's property and not due to the presence of critical habitat.

[12] 5 U.S.C. 601 et seq.

It is possible that some small entities and communities may incur direct costs resulting from the designation of critical habitat above and beyond those attributable to the listing of the wintering piping plover as a threatened species. Such costs as a result of critical habitat may include: (1) the value of time spent in conducting Section 7 consultations beyond those associated with the listing of the piping plover, and (2) delays in implementing public and private development projects losses, which may result in losses to individuals and society. While some small businesses and communities could suffer some losses under the second scenario, this impact is unlikely to cause a significant impact on a substantial number of small entities because entities would only be affected to the extent that: (1) property transactions take place during this time of uncertainty; and (2) that the price of such property undergoing a transaction reflects such a concern by the buyer.

While time did not allow a quantitative assessment of these potential impacts on small businesses and communities, we solicit additional information that would inform such an assessment of incremental impacts of proposed critical habitat.

REFERENCES

Letter from US Marine Corps to FWS, Raleigh Field Office (May 22, 2000).

Letter from the Department of Environmental Protection, State of Florida (May 15, 2000).

U.S. Fish and Wildlife Service Draft "Endangered and Threatened Wildlife and Plants; Proposed Determination of Critical Habitat for Wintering Piping Plovers (June 2000).

APPENDIX A:

DESCRIPTION OF CRITICAL HABITAT UNITS

North Carolina

Unit NC-1: Oregon Inlet. 11.8 km (7.3 mi) of shoreline in Dare County.
This unit is surrounded by Cape Hatteras National Seashore and Pea Island National Wildlife Refuge, but is mostly privately owned. This unit includes lands on either side of Oregon Inlet.

Unit NC-2: Cape Hatteras Point. 13.0 km (8.1 mi) of shoreline in Dare County.
The majority of the unit is within Cape Hatteras National Seashore. This unit extends from the Cape Hatteras Lighthouse to the Fish Dump.

Unit NC-3: Clam Shoals. 4.5 km (2.8 mi) of shoreline in Dare County.
The entire unit is owned by the State. This unit includes several islands in Pamlico Sound known as Bird Islands.

Unit NC-4: Hatteras Inlet. 19.8 km (12.4 mi) of shoreline in Dare and Hyde Counties.
The majority of the unit is surrounded by Cape Hatteras National Seashore, but is privately owned. This unit includes lands from the end of Highway 12 to Green Island on either side of Hatteras Inlet and all of "Old DOT" spoil island.

Unit NC-5: Ocracoke Island. 5.9 km (3.7 mi) of shoreline in Hyde County.
The majority of the unit is within Cape Hatteras National Seashore. This unit extends from Ocracoke Island Airport to Ocracoke Inlet.

Unit NC-6: Portsmouth Island-Cape Lookout. 54.6 km (33.9 mi) of shoreline in Carteret County.
The entire unit is within Cape Lookout National Seashore. This unit extends southwest from Ocracoke Inlet, and includes Atlantic shoreline to the west sides of islands on Pamlico Sound. Islands include Casey, Sheep, Portsmouth, Whalebone, Kathryne Jane, and Merkle Hammock Islands. This unit also extends from Old Drum Inlet west to New Drum Inlet and from New Drum Inlet west 1.6 km (1.0 mi).

Unit NC-7: South Core Banks . 17.3 km (10.8 mi) of shoreline in Carteret County.
The entire unit is within Cape Lookout National Seashore. This unit extends from Cape Lookout Lighthouse and includes all of Cape Point.

Unit NC-8: Shackleford Banks. 15.7 km (9.8 mi) of shoreline in Carteret County.
The entire unit is within Cape Lookout National Seashore. This unit is in two parts--the eastern 2.4 km (1.5 mi) of Shackleford Banks, including the islands, and the western-most 3.2 km (2.0 mi) of Shackleford Banks.

Unit NC-9: Rachel Carson. 12.6 km (7.8 mi) of shoreline in Carteret County.
The entire unit is within the Rachel Carson National Estuarine Research Reserve. This unit includes islands south of Beaufort including Horse Island, Carrot Island, and Lennox Point.

Unit NC-10: Bogue Inlet. 6.4 km (4.0 mi) of shoreline in Carteret and Onslow Counties.
The majority of the unit is privately owned, with the remainder falling within Hammocks Beach State Park. This unit extends from the roadless areas on the western end of Bogue Banks, including the sandy shoal islands, to Bogue Inlet and the eastern tip of Bear Island, 1.6 km (1.0 mi) from Bogue Inlet west.

Unit NC-11: Topsail. 13.2 km (8.2 mi) of shoreline in Pender County and Hanover County.
This entire area is privately owned. This unit extends from the east tip (0.4 km (.25 mi)) of Figure Eight Island, northeast to the west tip (0.4 km (.25 mi)) of Topsail Beach. It includes both Rich Inlet and New Topsail Inlet.

Unit NC-12: Figure Eight Island. 6.5 km (4.0 mi) of shoreline in New Hanover County.
The majority of the unit is privately owned. This unit includes the west tip of Figure Eight Island (0.8 km (0.5 mi)), including mudflats northwest of Mason Inlet.

Unit NC-13: Masonboro. 3.3 km (2.1 mi) of shoreline in New Hanover County.
The entire unit is within the NC National Estuarine Research Reserve. This unit includes the northern tip of Masonboro Island.

Unit NC-14: Carolina Beach Inlet. 10.3 km (6.4 mi) of shoreline in New Hanover County.
The majority of the unit is within Crowe Sound on Masonboro Island and is owned by the NC National Estuarine Research Reserve. This unit extends approximately 3.2 km (2.0 mi) north of the inlet to 1.2 km (0.75 mi) south of the inlet.

Unit NC-15: Ft. Fisher. 32.9 km (20.4 mi) of shoreline in New Hanover and Brunswick Counties.
The majority of the unit is within Ft. Fisher State Recreation Area. This unit extends from the Ft. Fisher Islands to south of Old Corn Cake Inlet approximately 0.8 km (0.5 mi) on Smith Island.

Unit NC-16: Lockwood Folly Inlet. 1.8 km (1.1 mi) of shoreline in Brunswick County.
The entire unit is on Oak Island and privately owned. This unit extends from the end of West Beach Drive, west to Lockwood Folly Inlet.

Unit NC-17: Shallotte Inlet. 9.5 km (5.9 mi) of shoreline in Brunswick County.
The entire unit is privately owned. This unit extends from Shallotte Inlet and runs east approximately 2.1 km (1.3 mi) on Atlantic Ocean shoreline and Intracoastal waterway side. The island south of Shallotte Inlet is also included.

Unit NC-18: Mad Inlet. 7.9 km (5.0 mi) of shoreline in Brunswick County.

The entire unit is privately owned. This unit extends from the western end of Main Street to Bird Island and includes the marsh areas north of Sunset Beach.

South Carolina

Unit SC-1: Waites Island-North. 4.0 km (2.5 mi) of shoreline in Horry County.
This unit includes the northern end of Waites Island, and the majority of the unit is privately owned.

Unit SC-2: Waites Island-South. 2.4 km (1.2 mi) of shoreline in Horry County.
This unit includes the southern end of Waites Island and is mostly privately owned.

Unit SC-3: Murrells Inlet/Huntington Beach. 6.5 km (4.0 mi) of shoreline in Georgetown County.
The majority of the unit is within Huntington Beach State Park. This unit extends from the groins north of Murrells Inlet and south to the northern edge of North Litchfield Beach.

Unit SC-4: Litchfield. 0.9 km (0.6 mi) of shoreline in Georgetown County.
This unit includes the southern tip of Litchfield Beach and is mostly privately owned.

Unit SC-5: North Inlet. 5.8 km (3.7 mi) of shoreline in Georgetown County.
The majority of the unit is within Tom Yawley Wildlife Center Heritage Preserve (HP). This unit extends to the north of the inlet on Debidue Beach and to the south of the inlet on North Island.

Unit SC-6: North Santee Bay Inlet. 13.8 km (8.7 mi) of shoreline in Georgetown County.
The majority of the unit is within the Tom Yawley Wildlife Center HP and the Santee-Delta Wildlife Management Area. This unit is at the North Santee Bay inlet and includes lands of South Island, Santee Point, Cedar Island, and all of North Santee Sandbar.

Unit SC-7: Cape Romain. 24.9 km (15.5 mi) of shoreline in Charleston County.
The majority of the unit is within Cape Romain National Wildlife Refuge. This unit includes the southern portion of Cape Island, the southernmost portion of Lighthouse Island, and the southern side of the far eastern tip of Raccoon Key.

Unit SC-8: Bull Island. 7.7 km (5.0 mi) of shoreline in Charleston County.
The majority of the unit is within Cape Romain National Wildlife Refuge and land owned by the South Carolina Department of Natural Resources. This unit is the southern portion of Bull Island at the inlet and northeast tip of Capers Island HP at the inlet.

Unit SC-9: Stono Inlet. 16.0 km (9.9 mi) of shoreline in Charleston County.
Most of this unit is privately owned. A portion of the unit is Bird Key-Stono HP.

Unit SC-10: Seabrook Island. 3.5 km (2.5 mi) of shoreline in Charleston County.
This unit extends from Captain Sams Inlet to the southwest approximately 3.5 km (2.5 mi). Most of this unit is privately owned.

Unit SC-11: Deveaux Bank. 6.1 km (3.7 mi) of shoreline in Charleston County.
The entire unit is within Deveaux Bank HP. This unit includes all of Deveaux island.

Unit SC-12: Otter Island. 4.1 km (2.5 mi) of shoreline in Colleton County.
The majority of the unit is within St. Helena Sound HP. This unit includes the southern portion of Otter Island.

Unit SC-13: Harbor Island. 3.9 km (2.5 mi) of shoreline in Beaufort County.
The majority of the unit is State-owned. This unit extends from the northeastern tip of Harbor Island and includes all of Harbor Spit.

Unit SC-14: Caper's Island. 5.7 km (3.7 mi) of shoreline in Beaufort County.
Most of this unit is privately owned. This unit includes the entire Atlantic Coast shoreline of Caper's Island.

Unit SC-15: Hilton Head. 6.0 km (3.7 mi) of shoreline in Beaufort County.
The majority of this unit is State-owned. This unit includes the northeastern tip (Atlantic Ocean side) of Hilton Head Island and all of Joiner Bank.

Georgia

Unit GA-1: Tybee Island. 3.4 km (2.1 mi) of shoreline in Chatham County.
The majority of the unit is privately owned. This unit extends along the northern tip of Tybee Island starting from 0.8 km (.5 mi) northeast from the intersection of Crab Creek and Highway 80 to 0.7 km (.41 mi) northeast from the intersection of Highway 80 and Horse Pen Creek.

Unit GA-2: Little Tybee Island. 12.3 km (7.6 mi) of shoreline in Chatham County.
The majority of the unit is within Little Tybee Island State Heritage Preserve. This unit extends just south of the first inlet to Wassaw Sound along the Atlantic Ocean coastline.

Unit GA-3: North Wassaw Island. 4.0 km (2.5 mi) of shoreline in Chatham County.
The entire unit is within Wassaw National Wildlife Refuge. This unit extends from Wassaw Sound south along the Atlantic Coastline approximately 1.6 km (1.0 mi).

Unit GA-4: South Wassaw Island. 3.3 km (2.0 mi) of shoreline in Chatham County.
The entire unit is within Wassaw National Wildlife Refuge. This unit extends from the last southern 1.6 km (1.0 mi.), around the southern tip of Wassaw Island, up to the first inlet.

Unit GA-5: Ossabaw Island. 15.1 km (9.4 mi) of shoreline in Chatham County.
The entire unit is within Ossabaw Island State HP. This unit includes the northeastern tip (Camp Creek then east) and 12 km (7.5 mi) south along the Atlantic Ocean shoreline to a point 2.8 km (1.75 mi) past the center inlet.

Unit GA-6: St. Catherine's Island Bar. 6.6 km (4.1 mi) of shoreline in Liberty County.
The entire unit is State owned and located east-northeast of St. Catherine's Island. This unit includes the entire St. Catherine's Island Bar.

Unit GA-7: McQueen's Inlet. 27.2 km (16.9 mi) of shoreline in Liberty County.
The majority of the unit is private land along the eastern-central coastline on St. Catherine's Island. This unit extends from McQueen's Inlet north approximately 3.5 km (2.2 mi) and south approximately 1.6 km (1.0 mi).

Unit GA-8: St. Catherine's Island. 3.5 km (2.2 mi) of shoreline in Liberty County.
The majority of the unit is private land on the southern tip of St. Catherine's Island. This unit starts 1.2 km (0.75 mi) north of Sapelo Sound and stops inland at Brunsen Creek.

Unit GA-9: Blackbeard Island. 6.1 km (3.8 mi) of shoreline in McIntosh County.
The entire unit is within the Blackbeard Island National Wildlife Refuge. This unit includes the northeastern portion of the island.

Unit GA-10: Sapelo Island. 2.4 km (1.5 mi) of shoreline in McIntosh County.
The entire unit is within a State Wildlife Management Unit within Sapelo Island. The unit extends south of Cabretta tip approximately 1.6 km (1.0 mi).

Unit GA-11: Wolf Island. 12.3 km (7.7 mi) of shoreline in McIntosh County.
The majority of the unit is within Wolf Island National Wildlife Refuge and private lands just north of the Refuge. The unit includes the eastern half of Wolf Island.

Unit GA-12: Egg Island Bar. 3.8 km (2.4 mi) of shoreline in McIntosh County.
This unit is State owned and includes all of Egg Island Bar.

Unit GA-13: Little St. Simon's Island. 15.1 km (9.4 mi) of shoreline in Glynn County.
The majority of the unit is private land on Little St. Simon's Island. This unit includes the entire eastern coastline along Little St. Simon's Island.

Unit GA-14: Sea/St. Simon's Island. 3.9 km (2.4 mi) of shoreline in Glynn County.
The majority of the unit is private land on the south tip of Sea Island and on the east beach of St. Simon's Island. This unit extends north of Gould's Inlet (Sea Island) and south of Gould's Inlet (St. Simon's Island).

Unit GA-15: Jekyll Island. 2.8 km (1.7 mi) of shoreline in Glynn County.
The majority of the unit is within State lands on Jekyll Island. This unit includes the southern region of Jekyll Island.

Unit GA-16: Cumberland Island. 36.6 km (22.7) of shoreline in Camden County.
The majority of the unit is along Cumberland Island Wilderness Area and Cumberland Island National Seashore. This unit includes the majority of the eastern Atlantic Ocean shoreline of Cumberland Island.

Florida

Unit FL-1: Big Lagoon. 1.4 km (0.9 mi) of shoreline in Escambia County.
The majority of the unit is within Big Lagoon State Recreation Area. This unit includes the peninsula areas and islands of the State lands.

Unit FL-2: Big Sabine. 6.7 km (4.2 mi) of shoreline in Escambia County.
The majority of the unit is within Gulf Islands National Seashore. This unit includes areas adjacent to Santa Rosa Sound of Big Sabine Point and adjacent embayment.

Unit FL-3: Navarre Beach. 2.9 km (1.8 mi) of shoreline in Escambia and Santa Rosa Counties.
The majority of the unit is within lands owned by Gulf Islands National Seashore and managed by the Santa Rosa Island Authority. This unit includes lands adjacent to Santa Rosa Island.

Unit FL-4: Marifarms. 12.5 km (7.8 mi) of shoreline in Bay County.
The majority of the unit is a mixture of State and private lands. This unit extends just east of Cedar Point and ends on far east side of the southeastern-most Marifarms impoundment.

Unit FL-5: Shell/Crooked Islands. 46.8 km (29.0 mi) of shoreline in Bay County.
The entire unit is within Tyndall Air Force Base. This unit includes all of Shell Island, Crooked Island West, and Crooked Island East.

Unit FL-6: Upper St. Joe Peninsula. 8.2 km (5.1 mi) of shoreline in Gulf County.
The majority of the unit is within St. Joseph State Park. This unit includes the northern portion of the peninsula.

Unit FL-7: Cape San Blas. 5.1 km (3.2 mi) of shoreline in Gulf County.

The majority of the unit is within Eglin Air Force Base. This unit includes the area known as the Cape.

Unit FL-8: St. Vincent Island. 11.6 km (7.2 mi) of shoreline in Franklin County.
The majority of the unit is within St. Vincent National Wildlife Refuge. This unit includes the western end of St. Vincent Island and areas adjacent to West Pass, the eastern end of St. Vincent Island, and the western portion of Little St. George Island.

Unit FL-9: East St. George Island. 27.8 km (17.3 mi) of shoreline in Franklin County.
The majority of the unit is within St. George State Park. This unit includes the State lands on the eastern portion of St. George Island.

Unit FL-10: Yent Bayou. 4.7 km (2.9 mi) of shoreline in Franklin County.
The majority of the unit is State owned. This unit is adjacent to the area known as Royal Bluff.

Unit FL-11: Carabelle Beach. 4.1 km (2.5 mi) of shoreline in Franklin County.
The area within this unit is privately owned. This unit is the peninsula created by Boggy Jordon Bayou.

Unit FL-12: Lanark Reef. 8.8 km (5.5 mi) of shoreline in Franklin County.
The entire unit is State owned. This unit includes the entire island.

Unit FL-13: Phipps Preserve. 4.3 km (2.7 mi) of shoreline in Franklin County.
The majority of the unit is within Phipps Preserve. This unit includes the western portion of Alligator Point.

Unit FL-14: Hagens Cove. 20.3 km (12.6 mi) of shoreline in Taylor County.
The majority of the unit is within Big Bend Wildlife Management Area. This unit extends from Sponge Point to Piney Point.

Unit FL-15: Anclote Keys. 10.4 km (6.4 mi) of shoreline in Pasco and Pinellas Counties.
The majority of the unit is within Anclote Key State Preserve. This unit extends from North Anclote Key to the lighthouse.

Unit FL-16: Three Rooker Island. 7.0 km (4.3 mi) of shoreline in Pinellas County.
The majority of the unit is within Anclote Key State Preserve. This unit includes all the islands of this complex.

Unit FL-17: North Honeymoon Island. 4.6 km (2.9 mi) of shoreline in Pinellas County.
The majority of the unit is within Honeymoon Island State Recreation Area. This unit extends from North Point to the midpoint of Honeymoon Island.

Unit FL-18: South Honeymoon Island. 3.0 km (1.9 mi) of shoreline in Pinellas County.
The majority of the unit is private land. This unit is at the southern end of Honeymoon Island and encompasses the far southeastern tip.

Unit FL-19: Caladesi Island. 4.9 km (3.0 mi) of shoreline in Pinellas County.
The majority of the unit is within Caladesi Island State Park. This unit extends from Hurricane Pass to Dunedin Pass on the Gulf of Mexico side.

Unit FL-20: Shell Key and Mullet Key. 14.9 km (9.2 mi) of shoreline in Pinellas County.
The majority of the unit is within Fort Desoto Park. This unit includes the Shell Key Island complex and the northwest portion of Mullet Key.

Unit FL-21: Egmont Key. 6.8 km (4.2 mi) of shoreline in Hillsborough County.
The majority of the unit is within Egmont Key National Wildlife Refuge. This unit includes the entire island.

Unit FL-22: Cayo Costa. 5.6 km (3.5 mi) of shoreline in Lee County.
The majority of the unit is within Cayo Costa State Park, and much of the remaining area is in the Cayo Costa Florida Conservation and Recreation Lands (CARL) acquisition project. This unit extends near the north end of the island and includes Murdock Point.

Unit FL-23: North Captiva Island. 2.9 km (1.8 mi) of shoreline in Lee County.
The unit is within the Cayo Costa CARL land purchase project. This unit extends from Captiva pass at the north to approximately Foster Bay at the south.

Unit FL-24: Captiva Island and Sanibel Island. 2.9 km (1.8 mi) of shoreline in Lee County.
The unit spans the Wulfert Channel that separates Captiva from Sanibel to the south. The large majority of the unit is on Sanibel, extending south to include Bowmans Beach County Park.

Unit FL-25: Bunch Beach. 7.0 km (4.4 mi) of shoreline in Lee County.
This unit is mostly within a CARL Estero Bay acquisition project. It lies along San Carlos Bay, on the mainland between Sanibel Island and Estero Island (Fort Myers Beach). It includes Bunch Beach at the end of John Morris Road on the mainland and the western tip of Estero Island (Bodwitch Point).

Unit FL-26: Estero Island. 4.3 km (2.7 mi) of shoreline in Lee County.
The majority of the unit is privately owned. The unit consists of approximately the southern third of the island's Gulf-facing shoreline (excluding south-facing shoreline at the south end of the island that faces Big Carlos Pass rather than the Gulf).

Unit FL-27: Marco Island. 10.6 km (6.5 mi) of shoreline in Collier County.
The unit is mostly privately owned, except for the Sand Dollar Key area at Tigertail Beach. The unit extends from uninhabited islands on the north side of Big Marco Pass through Sand Dollar Island and Tigertail Beach at the north end of the island, to Marco Island's south end at Caxambas Pass. The islands north of Big Marco Pass are within the Rookery Bay CARL acquisition project.

Unit FL-28: Marquesas Keys. 20.5 km (12.7 mi) of shoreline in Monroe County.
The unit comprises the roughly circular atoll that encloses Mooney Harbor, including Gull Keys and Mooney Harbor Key. The entire unit is within Key West National Wildlife Refuge.

Unit FL-29: Boca Grande/Woman/Ballast Keys. 8.8 km (5.5 mi) of shoreline in Monroe County.
Boca Grande and Woman Keys, east of the Marquesas Keys, are within Key West National Wildlife Refuge. Ballast Key is privately owned.

Unit FL-30: Bahia Honda/Ohio Keys. 12.1 km (7.5 mi) of shoreline in Monroe County.
This unit comprises Bahia Key (including a small island off its southwest shore), which is almost entirely owned by Bahia Honda State Park, plus Ohio Key, which is privately owned.

Unit FL-31: Lower Matecumbe Key. 3.4 km (2.1 mi) of shoreline in Monroe County.
Part of the unit is at Sea Oats Beach, owned by the Village of Islamorada. The remaining is at Ann's Beach.

Unit FL-32: Sandy Key/Carl Ross Key. 2.5 km (1.6 mi) of shoreline in Monroe County.
This unit consists of two adjoining islands in Florida Bay, roughly south of Flamingo in Everglades National Park. The entire area is owned and managed by the National Park Service.

Unit FL-33: St. Lucie Inlet. 4.1 km (2.6 mi) of shoreline in Martin County.
The unit includes a small area on the north shore of St. Lucie Inlet. The great majority of the unit is on the inlet's south side, including Saint Lucie Inlet State Preserve, which is administered by Jonathan Dickinson State Park.

Unit FL-34: Ponce de Leon Inlet. 3.4 km (2.2 mi) of shoreline in Volusia County.
The majority of the unit is within Smyrna Dunes Park and Lighthouse Point Park. This unit extends on either side of the inlet.

Unit FL-35: Huguenot. 25.1 km (15.5 mi) of shoreline in Nassau and Duval Counties.

The majority of the unit is within Big Talbot Island State Park, Little Talbot Island State Park, and the Tinucuan Ecological and Historical Preserve. This unit extends from the Simpson Creek inlet to the inlet of the St. Johns River.

Unit FL-36: Tiger Islands. 4.8 km (3.0 mi) of shoreline in Nassau County.

The entire unit is privately owned. This unit extends the northern tip of Tiger Island running southeast along the Cumberland Sound side of Tiger and Little Tiger Islands including the mouth of Tiger Creek.

Alabama

Unit AL-1: Isle Aux Herbes. 13.3 km (8.3 mi) of shoreline in Mobile County.

This unit includes Mississippi Sound shoreline on Isle Aux Herbes and is state-owned.

Unit AL-2: Dauphin, Little Dauphin, and Pelican Islands. 77.8 km (48.3 mi) of shoreline in Mobile County.

This unit includes areas of Mississippi Sound, Mobile Bay, and Gulf of Mexico shoreline on Dauphin, Little Dauphin, and Pelican Islands. The area is mostly privately owned but includes State and Federal lands.

Unit AL-3: Fort Morgan. 2.82 km (1.7 mi) of shoreline in Baldwin County.

This area includes Mobile Bay and Gulf of Mexico shorelines within Bon Secour National Wildlife Refuge, Fort Morgan Unit. This unit extends from the west side of the pier on the northwest point of the peninsula, following the shoreline southwest around the tip of the peninsula, then east to the terminus of the beach access road. The area is State-owned but is leased by the Federal Government.

Mississippi

Unit MS-1: Lakeshore through Bay St. Louis. 14.6 km (9.1 mi) of shoreline in Hancock County.

This unit extends from the north side of Bryan Bayou outlet and includes the shore of the Mississippi Sound following the shoreline northeast to the southeast side of the Bay Waveland Yacht Club. The shoreline of this unit is privately owned.

Unit MS-2: Henderson Point. 4.3 km (2.7 mi) of shoreline in Harrison County.

This unit extends from 0.2 km (0.13 mi) west of the intersection of 3rd Avenue and Front Street and includes the shore of the Mississippi Sound following the shoreline northeast to the west side of Pass Christian Harbor. The shoreline of this unit is privately owned.

Unit MS-3: Pass Christian. 10.6 km (6.6 mi) of shoreline in Harrison County.

This unit extends from the east side of Pass Christian Harbor and includes the shore of the Mississippi Sound following the shoreline northeast to the west side of Long Beach Pier and Harbor. The shoreline of this unit is privately owned.

Unit MS-4: Long Beach. 4.4 km (2.7 mi) of shoreline in Harrison County.
This unit extends from the east side of Long Beach Pier and Harbor and includes the shore of the Mississippi Sound following the shoreline northeast to the west side of Gulfport Harbor. The shoreline of this unit is privately owned.

Unit MS-5: Gulfport. 4.3 km (2.7 mi) of shoreline in Harrison County.
This unit extends from the east side of Gulfport Harbor and includes the shore of the Mississippi Sound following the shoreline northeast to the west side of the groin at the southern terminus of Courthouse Road, Mississippi City, MS. The shoreline of this unit is privately owned.

Unit MS-6: Mississippi City. 8.1 km (5.0 mi) of shoreline in Harrison County.
This unit extends from the east side of the groin at the southern terminus of Courthouse Road, Mississippi City, MS, and includes the shore of the Mississippi Sound following the shoreline northeast to the west side of President Casino. The shoreline of this unit is privately owned.

Unit MS-7: Beauvoir. 0.6 km (0.4 mi) of shoreline in Harrison County.
This unit extends from the east side of President Casino Broadwater and includes the shore of the Mississippi Sound following the shoreline eastward to the west side of Treasure Bay Casino Resort. The shoreline of this unit is privately owned.

Unit MS-8: Biloxi West. 5.9 km (3.7 mi) of shoreline in Harrison County.
This unit extends from the east side of Treasure Bay Casino Resort and includes the shore of the Mississippi Sound following the shoreline east to the intersection of Interstate 110 and U.S. 90. The shoreline of this unit is privately owned.

Unit MS-9: Biloxi East. 1.5 km (0.9 mi) of shoreline in Harrison County.
This unit extends from the east side of Biloxi Harbor and includes the shore of the Mississippi Sound following the shoreline east to 0.1 km west of the intersection of Oak Street and Beach Boulevard. The shoreline of this unit is privately owned.

Unit MS-10: Ocean Springs West. 1.9 km (1.2 mi) of shoreline in Jackson County.
This unit extends from U.S. 90 and includes the shore of Biloxi Bay following the shoreline southeast to the Ocean Springs Harbor inlet The shoreline of this unit is privately owned.

Unit MS-11: Ocean Springs East. 2.6 km (1.6 mi) of shoreline in Jackson County.

This unit extends from Weeks Bayou and includes the shore of Biloxi Bay following the shoreline southeast to Halstead Bayou. The shoreline of this unit is privately owned.

Unit MS-12: Deer Island. 14.6 km (9.1 mi) of shoreline in Harrison County.

The entire unit is on Deer Island. This unit includes privately owned Mississippi Sound shoreline.

Unit MS-13: Round Island. 2.6 km (1.6 mi) of shoreline in Jackson County.

This unit includes privately owned Mississippi Sound shoreline.

Unit MS-14: Mississippi Barrier Islands. 130.5 km (81.1 mi) of shoreline in Harrison and Jackson Counties.

This unit includes shoreline of the Mississippi Sound and Gulf of Mexico on Cat, East and West Ship, Horn, Spoil and Petit Bois Islands. Approximately 39.9 km (24.8 mi) are privately owned, and 95.6 km (59.4 mi) are part of Gulf Islands National Seashore.

Unit MS-15: North and South Rigolets. 5.9 km (3.7 mi) of shoreline in Jackson County, MS, and Mobile County, AL.

This unit extends from the southwestern tip of South Rigolets Island and includes the shore of Point Aux Chenes Bay, the Mississippi Sound, and Grand Bay following the shoreline east around the western tip, then north to the South Rigolets Bayou; then from the southeastern corner of North Rigolets Island north to the northeastern most point of the island. Approximately 4.3 km (2.7 mi) are in Mississippi and 1.6 km (1.0 mi) are in AL. Almost half the Mississippi shoreline length is in the Grand Bay National Wildlife Refuge.

Louisiana

Unit LA-1: Texas/Louisiana border to eastern Vermilion Parish line.186.9 km (116.1 mi) of shoreline in Cameron and Vermilion Parishes.

This unit extends from the Texas/Louisiana border and includes the shore of the Gulf of Mexico following the shoreline east to the eastern Vermilion Parish line. Approximately 144.8 km (90.0 mi) are privately owned, and 50.7 km (31.5 mi) are part of the state-owned Rockefeller Wildlife Refuge and Cheniere au' Tigre.

Unit LA-2: Wax Lake Outlet and Atchafalaya River Deltas. 35,178 ha (86,927 ac) in St. Mary Parish, LA.

Approximately 78 percent of this unit is part of the state-owned Atchafalaya Delta Wildlife Management Area, with the rest in private ownership. This unit contains various habitats

including open water, mudflat, marsh, scrub-shrub, and forest. However, it only contains approximately 1,728 hectares (4,270 acres) with the primary constituent elements for wintering piping plovers.

Unit LA-3: Point Au Fer Island. 36.7 km (22.8 mi) of shoreline in Terrebonne Parish.

This unit extends from the small island at the northwest tip of Point Au Fer Island, follows the shoreline of Point Au Fer Island southeast, and includes the shore of the Gulf of Mexico following the shoreline southeast to the western side of East Bay Junop. This entire unit is privately owned.

Unit LA-4: Isles Dernieres. 60.7 km (37.7 mi) of shoreline in Terrebonne Parish.

This unit comprises Caillou Bay, Lake Pelto, and Gulf of Mexico shoreline on the state-owned Isles Dernieres chain.

Unit LA-5: Timbalier Islands to Grand Terre Islands. 134.1 km (83.3 mi) of shoreline in Lafourche, Jefferson, and Plaquemines Parishes.

This unit includes 108.8 km (67.6 mi) of privately owned shoreline along West and East Timbalier Islands, from Belle Pass to Cheniere Caminada, Grand Isle, and Grand Terre Island; and 25.3 km (15.7 mi) of state-owned shoreline along West Timbalier, Grand Isle State Park, and Grand Terre Islands. Shoreline includes that of Caillou Bay, Lake Pelto, and the Gulf of Mexico.

Unit LA-6: Mississippi River Delta. 262,730 ha (649,220 ac) in Plaquemines Parish, LA.

This area contains various habitats including open water, mudflat, marsh, scrub-shrub, and forest. The Federally owned Delta National Wildlife Refuge and state-owned Pass A Loutre Wildlife Management Area comprise 81 percent of this unit. However, it only contains approximately 1,728 hectares (4,270 acres) with the primary constituent elements for wintering piping plovers. The area with the primary constituent elements is approximately evenly divided among Federal, state, and private ownership.

Unit LA-7: Breton Islands and Chandeleur Island Chain. 132.9 km (82.6 mi) of shoreline in Plaquemines and St. Bernard Parishes, LA.

This unit includes shoreline of Breton Sound, Chandeleur Sound, and Gulf of Mexico on the Breton Islands and Chandeleur Island chain. A total of 100.4 km (62.4 mi) of shoreline are included in the Breton National Wildlife Refuge, and 32.5 km (20.2 mi) of shoreline is owned by the State.

Texas

Unit TX-1: South Bay and Boca Chica. 7,810 ha (9,575 ac) in Cameron County.

Approximately 3,875 ha (4,448 ac) of the unit are owned and managed by the Lower Rio Grande Valley National Wildlife Refuge. Approximately 1, 375 ha (3,398 ac) of the unit falls within the South Bay Coastal Preserve, leased by the Texas General Land Office (TGLO) to Texas Parks and Wildlife Department for management to protect this unique coastal area. In addition, the Texas Parks and Wildlife Department owns and manages 425 ha (1,050 ac) at Boca Chica State Park. The remaining 2,135 ha (5,275 ac) is privately owned and managed. Beaches within the unit reach from the mouth of the Rio Grande northward to Brazos Santiago Pass, south of South Padre Island. The unit includes areas from the Gulf of Mexico at the Rio Grande, west to near Loma de las Vacas, north to the Brownsville Ship Channel near Loma Ochoa, and east to the Gulf of Mexico along the Brownsville Ship Channel.

Unit TX-2: Queen Isabella Causeway. 37 ha (91 ac) in Cameron County.

The area extends along the Laguna Madre west of the city of South Padre Island and is privately owned.

Unit TX-3: Padre Island. 104,550 ha (258,339 ac) in Cameron, Willacy, Kenedy, and Kleberg Counties.

This unit is the largest in Texas. Approximately 45 percent (46,450 ha (114,776 ac)) of the unit is owned and managed by Padre Island National Seashore (PAIS). The TGLO owns and manages about 48 percent (48,900 ha (120,830 ac)), although boundaries between the state-owned lands and private lands are not always well-demarcated. The remaining 9,200 ha (22,733 ac) is privately owned with a significant portion of that area being owned and managed by The Nature Conservancy on South Padre Island. The unit spans the breadth of the island from the north end of the City of South Padre Island to mile marker 30 on PAIS where the unit splits to include only bayside flats and beach. This unit probably harbors the single largest number of wintering piping plovers.

Unit TX-4: Lower Laguna Madre Mainland. 15,555 ha (38,436 ac) in Cameron and Willacy, Counties.

This unit constitutes important habitat when flats on Unit TX-3 are inundated. It is a unit with approximately 3,930 ha (9,711 ac) within the Laguna Atascosa National Wildlife Refuge. Approximately 3,855 ha (9,526 ac) is privately owned, with the remaining 7,770 ha (19,199 ac) owned and managed by the TGLO. The unit constitutes a system of mainland flats reaching from El Realito Peninsula to an area south of the City of Port Mansfield.

Unit TX-5: Upper Laguna Madre. 1,245 ha (3,076 ac) in Kleberg County.

This unit includes 170 hectares (420 acres) of PAIS and consists of a series of small flats along the bayside of Padre Island in the Upper Laguna Madre. The remainder of the area is privately owned with adjacent state-owned submerged lands. The unit stretches from just

south of the northern boundary of PAIS to the Kleberg/Nueces County line and includes the area from just gulfward of the Gulf Intercoastal Waterway to uplands on Padre Island.

Unit TX-6: Mollie Beattie Coastal Habitat. 935 ha (2,310 ac) in Nueces County.

This unit is primarily composed of submerged land owned and managed by the TGLO. Much of the unit falls within two state tracts that have been designated under a Memorandum of Understanding between the U.S. Fish and Wildlife Service and the TGLO as an Adopt-a-Habitat site. The unit reaches from uplands on Mustang Island, near State Highway 361, to just gulfward of the Gulf Intercoastal Waterway, and from Packery Channel on the south to just north of Corpus Christi Pass on the north. Approximately 54 ha (133 ac) is owned by Nueces County. Approximately 117 ha (289 ac) of uplands are privately owned, and the remaining 764 ha (1,888 ac) are owned and managed by the TGLO.

Unit TX-7: Newport Pass/Corpus Christi Pass Beach. 200 ha (494 ac) in Nueces County.

This unit is along a stretch of Gulf beach approximately 8.5 km (5.3 mi) long. Approximately 5.75 km (3.6 mi) are managed by the Texas Parks and Wildlife Department as part of Mustang Island State Park. The remaining 2.75 km (1.7 mi) are leased from the TGLO by Nueces County. The unit stretches from near the entrance of Zahn Road onto the beach to Fish Pass to the north.

Unit TX-8: Mustang Island Beach. 19.5 km (12.1 mi) in Nueces County.

This is a stretch of Gulf beach between Fish Pass in Mustang Island State Park to the City of Port Arnasas, TX. Approximately 2.5 km (1.5 mi) fall within the State Park, and the remaining 17 km (10.6 mi) are managed by Port Aransas and Nueces County.

Unit TX-9: Fish Pass Lagoons. 175 ha (432 ac) in Nueces County.

This unit is a system of interior lagoons on Mustang Island, within Mustang Island State Park. This system of lagoons falls along either side of Fish Pass and runs northeast to southwest along an axis parallel to the main axis of Mustang Island. The unit encompasses flats approximately 1.0 km (0.6 mi) either side of Fish Pass.

Unit TX-10: Shamrock Island and Adjacent Mustang Island Flats. 880 ha (2,174 ac) in Nueces County.

This unit is made up of privately owned land and adjacent State-owned submerged lands. The Nature Conservancy is the primary private landowner in the unit. The unit encompasses Shamrock Island and includes property gulfward to the entrance of Wilson's Cut, then southwest approximately 3.5 km (2.2 mi). It also includes flats along the margin of lagoons interior to Mustang Island, but adjacent and parallel to Corpus Christi Bay.

Unit TX-11: Blind Oso. 31 ha (77 ac) in Nueces County.

This unit occurs on flats of Oso Bay, from Hans and Pat Suter Wildlife Refuge (owned and managed by the City of Corpus Christi) northeast to Corpus Christi Bay and then southeast along the edge of Texas A&M University - Corpus Christi. The entire unit falls within state-owned submerged lands, but is bordered on all sides by private property.

Unit TX-12: Adjacent to Naval Air Station-Corpus Christi. 88 ha (217 ac) in Nueces County.

This unit also occurs within Oso Bay on flats bordered by Naval Air Station-Corpus Christ on the east. This unit consists of flats near the entrance of Oso Bay to Corpus Christi Bay. The unit occurs within state-owned submerged lands, but is bordered by Federal lands owned and managed by the U. S. Navy.

Unit TX-13: Sunset Lake. 370 ha (914 ac) in San Patricio County.

This unit is owned and managed by the City of Portland within a system of city parks. Some of the described area falls within the jurisdiction of the TGLO. It includes two city park units referred to as Indian Point and Sunset Lake. Much of the unit is a recent acquisition by the city, and management considerations for the park include the area's importance as a site for wintering and resident shorebirds. The area is bordered on the northwest by State Highway 181 and on the southeast by Corpus Christi Bay. To the north, the unit is bordered by the City of Portland and includes the remainder of the peninsula, which follows along State Highway 181.

Unit TX-14: East Flats. 520 ha (1,284 ac) in Nueces County.

About 240 ha (593 ac) of the west end of this unit falls within State-owned (TGLO) submerged lands. The remainder of the unit is privately owned. It is bordered on the north by dredge placement areas bordering the Corpus Christi Ship Channel, on the west by Corpus Christi Bay, and on the east by the City of Port Aransas. It is bisected by a navigation channel.

Unit TX-15: North Pass. 710 ha (1,754 ac) in Aransas County.

This unit is a washover system, primarily on the privately owned San Jose Island. The unit is bordered on the west by Aransas Bay, just south of Mud Island, and it abuts the beach unit TX-16 to the east. The unit borders TX-16 for approximately 2.0 km (1.2 mi) and stretches landward (to the north and west) to Aransas Bay.

Unit TX-16: San Jose Beach. 32.0 km (19.9 mi) of shoreline in Aransas County.

This unit occupies a stretch of beach on the privately owned island of San Jose. The unit stretches from the jetties on the south end of San Jose Island, just north of Port Aransas, to Cedar Bayou, where San Jose Island is adjacent to Matagorda Island.

Unit TX-17: Allyn's Bight. 109 ha (269 ac) in Aransas County.

This unit is adjacent to and bordered on the east by San Jose Island. It occurs south of a section of the San Jose Island shoreline known as Allyn's Bight, at the northeast end of Mud Island along the east margin of Aransas Bay.

Unit TX-18: Cedar Bayou/Vinson Slough. 3,645 ha (9,007 ac) in Aransas County.

This unit abuts unit TX-17 on San Jose Island and unit TX-19 on Matagorda Island. It includes the highly dynamic area of Cedar Bayou, the pass that separates San Jose Island and Matagorda Island. This area includes a small section of Matagorda Island National Wildlife Refuge (approximately 43 ha (106 acres)) with much of the remaining 3,602 ha (8,154 ac) occurring on the privately owned island of San Jose. The unit is a band adjacent to Aransas Bay, averaging approximately 3.0 km (1.9 mi) wide and stretching from Cedar Bayou to a point about 4.0 km (2.5 mi) south of Long Reef.

Unit TX-19: Matagorda Island Beach. 69.0 km (43.0 mi) of shoreline in Calhoun County.

This stretch of beach on Matagorda Island extends from Cedar Bayou on the southwest (where it abuts TX-18), to Pass Cavallo on the northeast. The unit falls entirely within the boundary of the Matagorda Island National Wildlife Refuge.

Unit TX-20: Ayres Point. 590 hectares (1,458 acres) in Calhoun County.

This unit includes marsh and flats at Ayres Point on Matagorda Island National Wildlife Refuge. The unit is on Ayres Point between Shell Reef Bayou and Big Brundrett Lake.

Unit TX-21: Panther Point to Pringle Lake. 2,629 ha (6,496 ac) in Calhoun County.

This unit represents a narrow band of habitats about 1.0 km (0.6 mi) wide that stretches from Panther Point to the northwest end of Pringle Lake. The unit is entirely within Matagorda Island National Wildlife Refuge.

Unit TX-22: Decros Point. 905 ha (2,236 ac) at the Matagorda/Calhoun County line.

This unit includes about 7.0 km (4.3 mi) of Gulf beach habitat along the tip of Matagorda Peninsula southwest of the Matagorda Ship Channel. The adjacent upland is privately owned.

Unit TX-23: West Matagorda Peninsula Beach. 40.0 km (24.8 mi) of shoreline in Matagorda County.

This unit extends from the jetties at the Matagorda Ship Channel to the old Colorado River channel. This beach is along private lands.

Unit TX-24: West Matagorda Bay/Western Peninsula Flats. 1,165 ha (2,879 ac) in Matagorda County.

This unit is a series of flats, exposed at low tide, along the bayside of Matagorda Peninsula on the margin of West Matagorda Bay. The peninsula is privately owned, and this unit is one of two bayside flats that have been identified on the peninsula. This is the western most of the two West Matagorda Bay units.

Unit TX-25: West Matagorda Bay/Eastern Peninsula Flats 430 ha (1,062 ac) in Matagorda County.

This unit is the eastern-most of two units on the bayside of West Matagorda Bay along Matagorda Peninsula. The peninsula along which this unit is located is privately owned.

Unit TX-26: Colorado River Diversion Delta. 455 ha (1,124 ac) in Matagorda County.

This unit consists of flats that have formed in the northeast corner of West Matagorda Bay where the Colorado River empties into the bay. It is state-owned.

Unit TX-27: East Matagorda Bay/Matagorda Peninsula Beach West. 22.0 km (13.7 mi) of shoreline in Matagorda County.

This unit is along Gulf beach on the Matagorda Peninsula southeast of East Matagorda Bay. It stretches from the old Colorado River channel northeast along the peninsula.

Unit TX-28: East Matagorda Bay/Matagorda Peninsula Beach East. 9.5 km (5.9 mi) of shoreline in Matagorda County.

This unit runs along the Gulf beach on the northeast end of Matagorda Peninsula from southeast of Brown Cedar Cut to a point on the beach southeast of Carancahua Bend. It is a beach adjacent to private land.

Unit TX-29: Brown Cedar Cut. 270 ha (667 ac) in Matagorda County.

This is a unit on the bayside of Matagorda Peninsula in East Matagorda Bay. It occurs along privately owned land. It encompasses the flats associated with Brown Cedar Cut and abuts unit TX-28 to the southeast.

Unit TX-30: Northeast Corner East Matagorda Bay. 245 ha (605 ac) in Matagorda County.

This is a unit in the northeast corner of East Matagorda Bay. It is a system of flats associated with tidal channels near the Intracoastal Waterway. It abuts unit TX-28 to the southeast.

Unit TX-31: San Bernard NWR Beach. 14.0 km (8.7 mi) of shoreline in Matagorda and Brazoria Counties.

This is a unit composed of Gulf beach, 8.0 km (5.0 mi) of which lies within San Bernard National Wildlife Refuge. The unit stretches from the mouth of the San Bernard River to a point along the beach approximately 14.0 km (8.7 mi) to the southwest.

Unit TX-32: Gulf Beach Between Brazos and San Bernard Rivers. 9.0 km (5.6 mi) of shoreline in Brazoria County

This unit is a stretch of Gulf beach between the Brazos River and the San Bernard River.

Unit TX-33: Bryan Beach and Adjacent Beach. 6.0 km (3.7 mi) of shoreline in Brazoria County. Part of this unit of Gulf beach lies within the Bryan Beach unit of the Peach Point Wildlife Management Area and is owned and managed by the Texas Parks and Wildlife Department.

Unit TX-34: San Luis Pass. 6.0 km (3.7 mi) of shoreline near the Brazoria/Galveston County line. This unit is associated with the floodtide delta at San Luis Pass and includes Gulf beach and extensive sand flats associated with the pass. Approximately 57 percent of the unit includes flats in the floodtide delta, which are state-owned and managed by the TGLO. Much of the remainder of the unit is owned by the TGLO, but managed by local government. The unit includes the floodtide delta northwest of the causeway, as well as a 6.0-km (3.7-mi) stretch of beach starting at the causeway and running northeast along the Gulf.

Unit TX-35: Big Reef. 3.0 km (1.9 mi) of shoreline in Galveston County.

This unit is on the southwest side of Bolivar Roads, on the north end of the City of Galveston. It is made up of approximately 85 ha (210 ac) of beach along the inlet and associated sand flats. The area is currently managed by the City of Galveston, and much of the site is under a conservation agreement to further protection of the resources at the site.

Unit TX-36: Bolivar Flats. 670 ha (1,655 ac) in Galveston County.

This unit of flats was formed by accretion behind the jetties at Bolivar Roads near the tip of Bolivar Peninsula. The unit stretches from the jetties on the southwest to a point on the Gulf beach just north of Beacon Bayou. It includes almost 5.0 km of Gulf shoreline. The area is leased from TGLO by Houston Audubon Society and managed for its important avian resources. This unit also includes one of two Western Hemisphere Shorebird Reserve Network sites in Texas.

Unit TX-37: Rollover Pass. 290 ha (717 ac) in Galveston County.

This unit is on the bayside of Rollover Bay on Bolivar Peninsula. It includes flats on State-owned land managed by the TGLO.

APPENDIX B:

CRITICAL HABITAT UNIT MAPS

Please View the Appendix B Pages in an Interactive Slide Show at
http://ifw2es.fws.gov/CorpusChristiTexas/PipingPlogerEA/AppendixB.htm