

**CENSUS OF NESTING SNOWY AND WILSON'S PLOVER ON THE
TEXAS COAST, 2004**

by
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EXECUTIVE SUMMARY

The Texas Gulf Coast provides habitat for thousands of migrating and wintering shorebirds, but very few nest in the area. The western Snowy Plover (*Charadrius alexandrinus nivosus*) and Wilson's Plover (*C. wilsoni*) are two of the few shorebird species that nest in coastal habitats in Texas. Although historic data are limited, Snowy Plovers may have experienced regional population declines in the eastern and southeastern United States and their range appears to have contracted in Texas. A goal of the Lower Mississippi/Western Gulf Coast Regional Shorebird Plan is to ensure at least stable populations of breeding Snowy Plovers in the region. Because there are serious concerns about the conservation status of Snowy Plovers in the eastern U.S., Caribbean and Bahamas, systematic surveys and current population estimates are needed to meet this goal. There is very little data on Snowy or Wilson's plover nesting populations in Texas. This census was an attempt to determine numbers of pairs of both Snowy and Wilson's plovers on the entire Texas coast. The effort covered as much of the coast as possible and established a network of volunteers for future censuses.

The coast was divided into small areas that were feasible for individuals or small groups of surveyors to census. Areas were surveyed between 5 April 2004 and 17 June 2004. This survey window was much longer than originally planned due to heavy rains that occurred shortly after the census began. The census had to be extended by several weeks to allow flooding to recede and nesting to return to normal.

Volunteers surveyed their assigned areas on foot or with ATVs, boats or vehicles, and recorded the number of pairs and individuals of both snowy and Wilson's plovers on a uniform datasheet. Unpaired birds and young were also counted. Some surveyors included the numbers of pairs and individuals of two other members of the "flat-nesting" guild, Least Tern (*Sterna antillarum*) and Horned Lark (*Eremophila alpestris*). Pair criteria, such as courtship behavior, joint defensive behavior, pair at nest, pair with young, or birds located together, that were used to identify pairs were also recorded. Other information provided by surveyors included weather information, date and time, local name and county of the area surveyed, central GPS location, number of surveyors, mode of transportation, and habitat characteristics.

To summarize the data, the coast was divided into three sections: Upper – Galveston to Pass Cavallo, Middle – Pass Cavallo to Nine-Mile Hole (upper Laguna Madre), and Lower – just south of the Landcut to Mexico (Fig. 1). Some areas, such as the Bolivar Peninsula, San Jose Island and Landcut, were not surveyed due to lack of manpower, time, suitable habitat, and/or cooperation with private landowners.

A total of 456 Snowy Plover pairs and 35 individuals, 817 pairs of Wilson's Plovers and 66 individuals, 196 Least Tern pairs and 80 individuals, and 95 Horned Lark pairs and 12 individuals, not including young, were observed along the Texas coast from Galveston to Mexico (Least Terns and Horned larks were not counted south of Nine-Mile Hole). This represents a total of 947 snowy plover individuals and 491 possible pairs and 1700 Wilson's Plover individuals and 883 possible pairs.

No Snowy Plover pairs were found on the Upper coast; numbers increased from the Middle to Lower coast. Numbers of Wilson's Plover pairs were greatest in the Middle coast. At least twice as many Wilson's Plover pairs as Snowy Plover pairs were found in the Middle coast region; numbers of pairs of each species were similar on the Lower coast. The greatest number of unpaired individuals of both species (not including young) were found on the Middle coast with very few unpaired birds in either Upper or Lower regions. The majority of pairs of both Snowy and Wilson's plovers were found in the Laguna Madre.

The numbers of pairs and individuals (not including young) of each species in six general habitat types were also determined. The majority of pairs of both species were found on bayshore (barrier island and/or mainland) and dredge material island habitats. Neither salt flats nor tidal creeks supported many pairs.

Since this was the first attempt to organize a census of nesting Snowy and Wilson's plovers on the entire Texas coast, this information is a baseline that did not previously exist. However, due to the potential for error caused by extension of the census period, it may not be appropriate to use it as a benchmark to determine trends in the numbers of nesting pairs. It is important that this census becomes an integral part of efforts to evaluate and monitor nesting plover populations along the Texas coast.

We recommend the following:

- This census should be repeated for the next three consecutive years, or at least every other year for the next six years. Repeating the census will allow better estimates of nesting populations and will establish good comparable numbers between years that will eventually indicate the populations' health. In particular, more effort needs to be expended to determine the status of nesting on the Upper coast. When most suitable habitat and nesting areas are identified, they can become the focus of future censuses.
- Better habitat information needs to be provided by surveyors. Habitat information was missing, too general, or incomplete on many data sheets. To help make providing good habitat information easier for surveyors, data sheets need to be revised and made as simple as possible. Surveyors on the West Coast provide information on a very simple postcard that could be used as a model.
- May appears to be when nesting activity peaks on the Middle coast, so the census period may need to be adjusted to capture the peak. Differences in peak periods in the different regions of the coast may necessitate different or overlapping census periods ranging from somewhat earlier in the Lower region to somewhat later in the Upper region. Later census periods would also allow this census to be combined with the annual colonial waterbirds survey.
- More volunteers and more private landowner involvement are needed. Most of the largest gaps in this year's census were due to lack of access to private lands.
- Research on breeding season movements and the numbers of broods attempted are needed. More complete knowledge of the breeding ecology of both species in Texas will allow better interpretation of census results and better planning of monitoring efforts.
- Winter censuses and banding studies are also needed to help define the residency status of birds that nest in Texas.

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We would like to thank all the volunteers that participated in planning and executing the Texas coastal plover census. The U.S. Fish and Wildlife Service Ecological Services office in Corpus Christi Texas provided vehicles and allowed their employees time to participate in the census during regular work hours. In particular, Robyn Cobb at USFWS, was instrumental in getting the census planned and completed. The Center for Coastal Studies, Texas A&M University-Corpus Christi also provided logistical support. We offer a special thanks to Margo Zdravkovic for her work on the lower coast and help coordinating the census, as well as Padre Island National Seashore employees, Aransas National Wildlife Refuge employees, and National Audubon Society employees for their special effort in completing a large portion of the census. Texas Parks and Wildlife Department funded the study through a Conservation Action Grant to the Coastal Bend Bays and Estuaries Program, Inc. that was subcontracted to the Center for Coastal Studies, Texas A&M University-Corpus Christi.

INTRODUCTION

The Texas Gulf Coast provides habitat for thousands of migrating and wintering shorebirds, but very few nest in the area. The western Snowy Plover (*Charadrius alexandrinus nivosus*) and Wilson's Plover (*C. wilsoni*) are two of the few shorebird species that nest in coastal habitats in Texas. Snowy Plovers are considered highly imperiled (Brown et al. 2001; Donaldson et al. 2000; DUMAC no date). Although historic data are limited, Snowy Plovers may have experienced regional population declines in the eastern and southeastern United States and their range appears to have contracted in Texas (Gorman and Haig 2002). A goal of the Lower Mississippi/Western Gulf Coast Regional Shorebird Plan is to ensure at least stable populations of breeding Snowy Plovers in the region (Elliott and McKnight 2001). Because there are serious concerns about the conservation status of Snowy Plovers in the eastern U.S., Caribbean and Bahamas, systematic surveys and current population estimates are needed (Gorman and Haig 2002) to meet this goal.

Because shorebird populations depend on vanishing wetlands, they are susceptible to decline (Howe et al. 1989). The Snowy Plover, along with many other shorebird species, is thought to be declining, especially along the Pacific and Gulf coasts (Alsop 2001; Page et al. 1995). The rapid decline of the species along the Pacific Coast prompted the U.S. Fish and Wildlife Service to list the western population as threatened in March 1993 (USFWS 2001). The Snowy Plover is also listed as endangered by the states of Washington and Alabama. Oregon, Florida, and Puerto Rico have listed it as threatened. California classified the Snowy Plover as a "species of special concern" (USFWS 2001). The U.S. Shorebird Conservation Plan estimates a population size of 500 Snowy Plovers and 6,000 Wilson's Plovers in the Gulf and Caribbean (Brown et al. 2001). Only about 21,000 Snowy Plovers are thought to inhabit the entire United States (Page et al. 1995).

There is very little data on Snowy or Wilson's plover nesting populations in Texas. An estimate of 500-700 Snowy Plover pairs has been suggested (Gorman and Haig 2002). A census of the central Texas coast during the 2002 breeding season estimated 80-130 pairs between Pass Cavallo (Matagorda Island) and Baffin Bay (Newstead et al. 2002). In the lower Laguna Madre, 105 Snowy Plover pairs and 128 Wilson's Plover pairs were found during 2003 (Zdravkovic 2003). This census was an attempt to determine numbers of pairs of both Snowy and Wilson's plovers on the entire Texas coast. The effort covered as much of the coast as possible and established a network of volunteers for future censuses.

METHODS

A meeting of personnel from the U.S. Fish and Wildlife Service (USFWS), Coastal Bend Bays and Estuaries Program, Inc. (CBBEP), Padre Island National Seashore (PAIS), Aransas National Wildlife Refuge, National Audubon Society, Texas A & M University Corpus Christi Center for Coastal Studies (CCS), Houston Audubon, Texas Parks and Wildlife Department (TPWD), University of Texas Marine Science Institute (UTMSI), and representatives of privately owned lands was conducted on 26 February 2004. Census methodology was introduced, volunteers and potential volunteers were recruited, and

potential nesting areas were mapped. The meeting and census were co-coordinated with Margo Zdravkovic of the National Audubon Society.

Volunteer training, designed primarily for those that were not familiar with the birds, took place on 1 April 2004 at Sunset Lake, an area outside of Portland, Texas where both Wilson's and Snowy plovers nest. Volunteers learned to identify both species and were able to see nests, nesting behavior, and nesting habitat. All volunteers were supplied with a census guidance document compiled by the Coastal Bird conservation Program of the National Audubon Society (Appendix A). The majority of volunteers that did not attend volunteer training were those who already had the necessary expertise to be effective surveyors.

The coast was divided into small areas that were feasible for individuals or small groups of surveyors to census. Areas were surveyed between 5 April 2004 and 17 June 2004. This survey window was much longer than originally planned due to heavy rains that occurred shortly after the census began. The census had to be extended by several weeks to allow flooding to recede and nesting to return to normal.

Volunteers surveyed their assigned areas on foot or with ATVs, boats or vehicles, and recorded the number of pairs and individuals of both Snowy and Wilson's plovers on a uniform datasheet (Appendix B). Unpaired birds and young were also counted. Some surveyors included the numbers of pairs and individuals of two other members of the "flat-nesting" guild, Least Tern (*Sterna antillarum*) and Horned Lark (*Eremophila alpestris*). Pair criteria, such as courtship behavior, joint defensive behavior, pair at nest, pair with young, or birds located together, that were used to identify pairs were also recorded. Other information provided by surveyors included weather information, date and time, local name and county of the area surveyed, central GPS location, number of surveyors, mode of transportation, and habitat characteristics.

Datasheets were returned to Michelle Kolar at the Center for Coastal Studies. Numbers of pairs, numbers of individuals and possible number of pairs of each species were determined. Possible number of pairs was estimated by assuming that each individual was a member of a pair and adding the individual number to pair numbers. Numbers of pairs and numbers of individuals of each species were also determined for habitat types listed on the datasheet: bayshores (barrier island and mainland) and dredge material islands, Gulf beach, barrier island unspecified, salt flat, tidal creek, and man made (e.g., levees and impoundments not associated with dredge material islands).

RESULTS

Areas were surveyed between 5 April 2004 and 17 June 2004. A total of 456 Snowy Plover pairs and 35 individuals, 817 pairs of Wilson's Plovers and 66 individuals, 196 Least Tern pairs and 30 individuals, and 95 Horned Lark pairs and 12 individuals, not including young, were observed along the Texas coast from Galveston to Mexico (Least Terns and Horned larks were not counted south of Nine-Mile Hole). This represents a total of 947 Snowy

Plover individuals and 491 possible pairs and 1700 Wilson's Plover individuals and 883 possible pairs (Appendix C).

To summarize the data, the coast was divided into three sections: Upper – Galveston to Pass Cavallo, Middle – Pass Cavallo to Nine-Mile Hole (upper Laguna Madre), and Lower – just south of the Landcut to Mexico (Fig. 1). Some areas, such as the Bolivar Peninsula, San Jose Island and Landcut, were not surveyed due to lack of manpower, time, suitable habitat, and/or cooperation with private landowners (Appendix C).

No Snowy Plover pairs were found on the Upper coast; numbers increased from the Middle to Lower coast (Fig. 2). Numbers of Wilson's Plover pairs were greatest in the Middle coast. At least twice as many Wilson's Plover pairs as Snowy Plover pairs were found in the Middle coast region; numbers of pairs of each species were similar on the Lower coast. The greatest number of unpaired individuals of both species (not including young) were found on the Middle coast with very few unpaired birds in either Upper or Lower regions (Fig. 3). The possible number of pairs increased only slightly in both Upper and Lower regions (1-3 additional pairs of each species) with the greatest increase (190 to 221 Snowy Plover pairs; 488 to 551 Wilson's Plover pairs) in the Middle coast. The majority of pairs of both Snowy and Wilson's plovers were found in the Laguna Madre (Fig. 4). When pair criteria were reported, pairs were most commonly identified by "birds located together as a pair".

The numbers of pairs and individuals (not including young) of each species in six general habitat types were also determined (Fig. 5). The majority of pairs of both species were found on bayshore (barrier island and/or mainland) and dredge material island habitats. Neither salt flats nor tidal creeks supported many pairs. The majority of unpaired Wilson's Plovers were found on either the barrier island beach or bayshores and spoil islands whereas most unpaired Snowy Plovers were found on the beach. (Fig. 6)

DISCUSSION

More than 400 pairs of Snowy Plovers and 800 pairs of Wilson's Plovers nest along the Texas coast. The number of Snowy Plover pairs counted in this survey is very near Gorman and Haig's (2002) low range estimate of 500 pairs. These data show that the vast majority of nesting Snowy and Wilson's plovers were found in the Laguna Madre system during 2004 and on bayshores and/or dredge material islands. Interestingly, a few pairs were located on Gulf beaches. They nest on beaches in other parts of the U.S. and in Tamaulipas, Mexico (Zonick 1997) but had not been reported nesting on beaches in Texas.

More pairs will be found when a more complete census of the Texas coast is accomplished. Several large areas that were not surveyed may have caused inaccuracies in this year's census data. We were unable to gain access to large tracts of privately owned land along the Middle and Lower sections of the coast (e.g., San Jose Island, King Ranch and Landcut, Kenedy Ranch) and some areas, such as the Bolivar Peninsula on the Upper coast, were not surveyed due to lack of volunteers. These areas all contain suitable habitat and may have supported nesting Snowy and Wilson's plovers. In particular, the numbers of pairs that could be supported by habitat on San Jose Island may be substantial based on the number of pairs

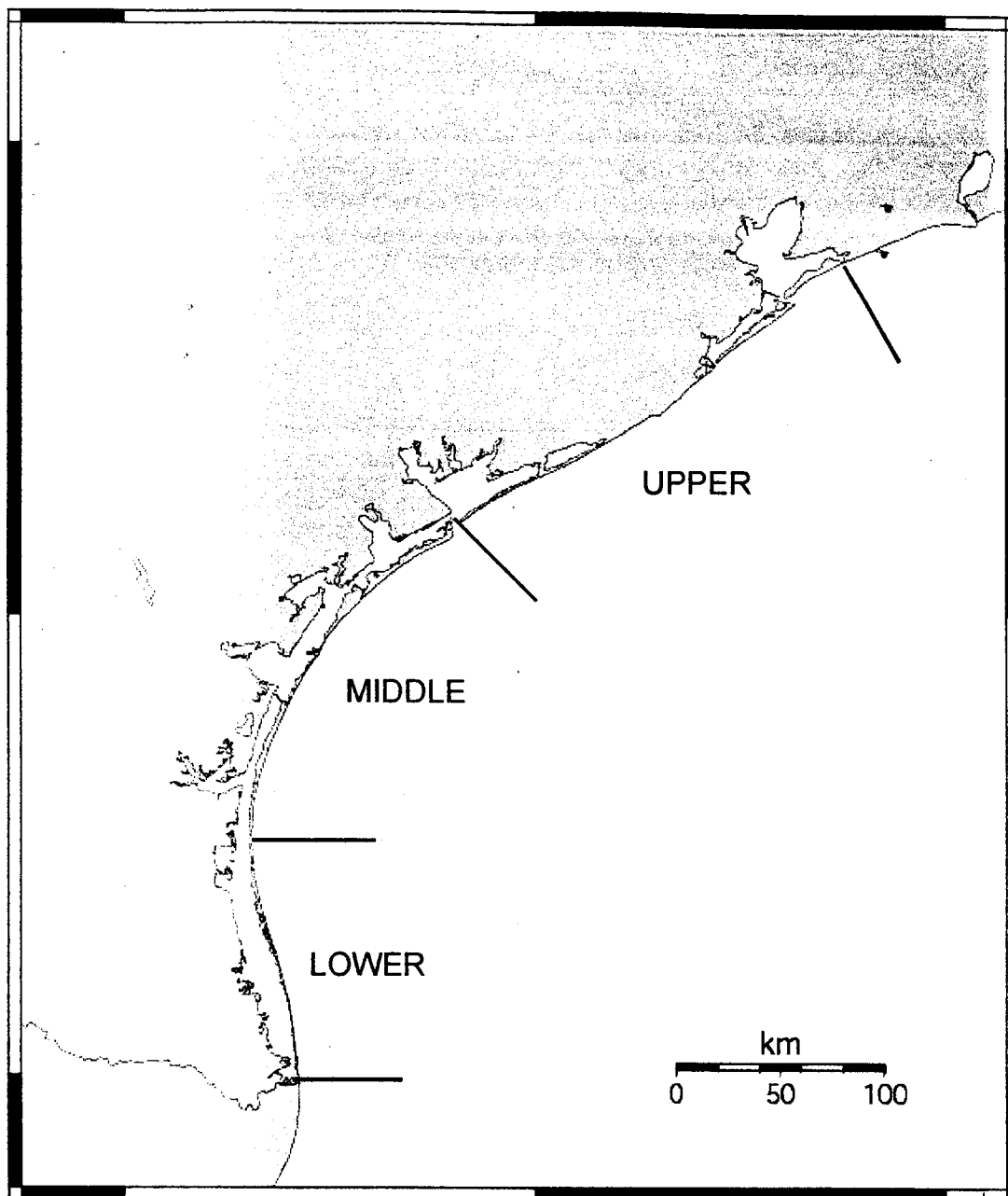


Fig. 1. Map of the Texas coast showing regions used for data summarization.

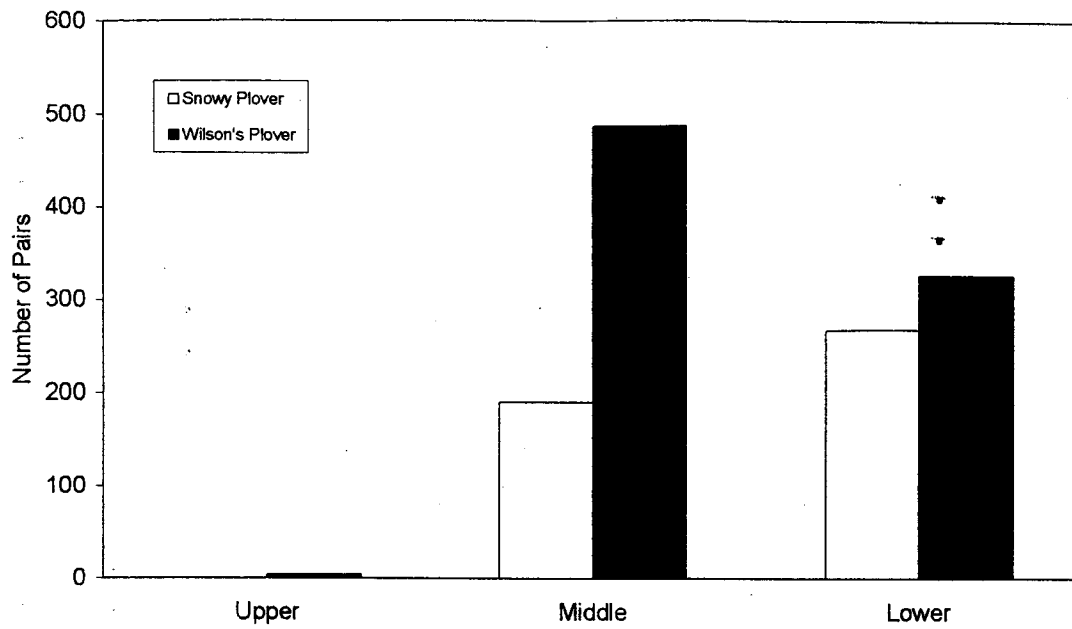


Fig. 2. Total numbers of pairs of Snowy and Wilson's plovers by region of the Texas coast, based on 2004 census.

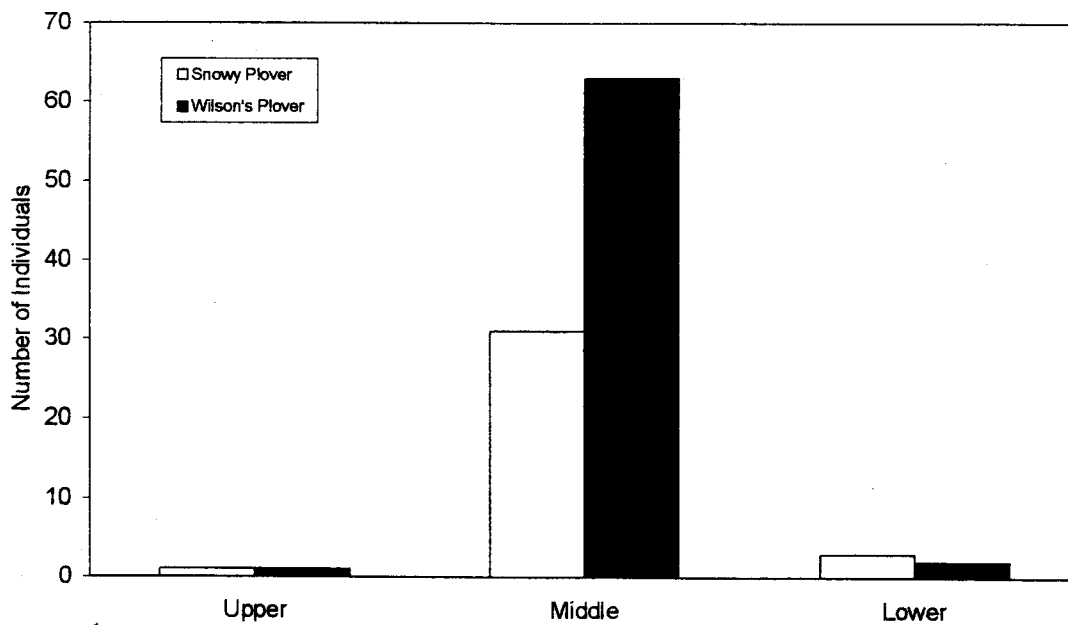


Fig. 3. Total numbers of unpaired Snowy and Wilson's plovers by region of the Texas coast, based on 2004 census.

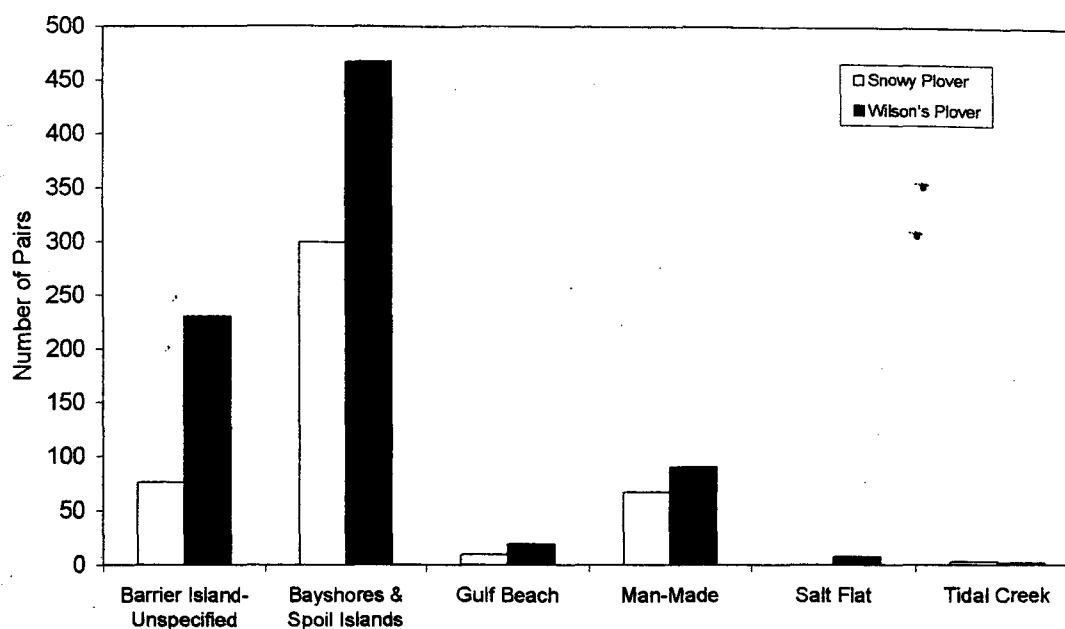


Fig. 4. Total numbers of Snowy and Wilson's plover pairs by habitat type based on the 2004 breeding census of the Texas coast.

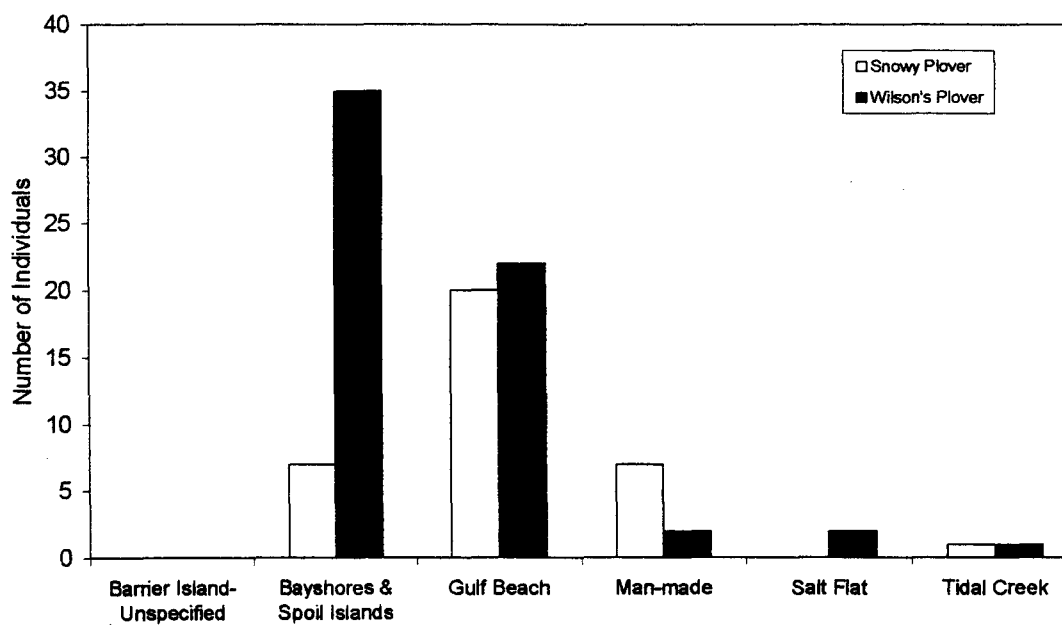
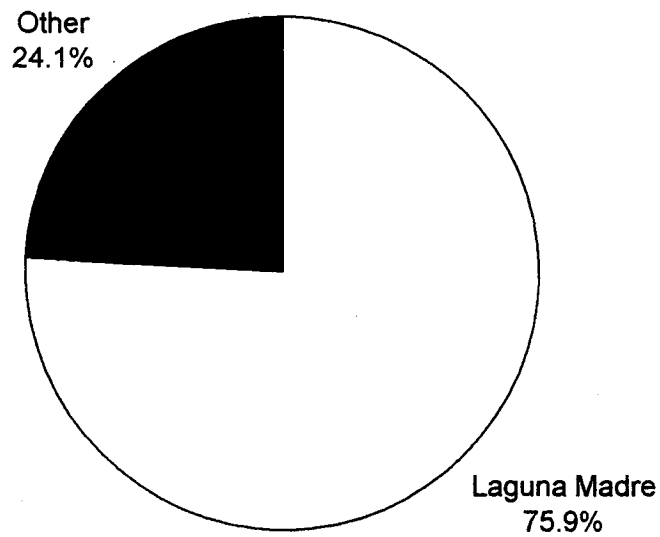
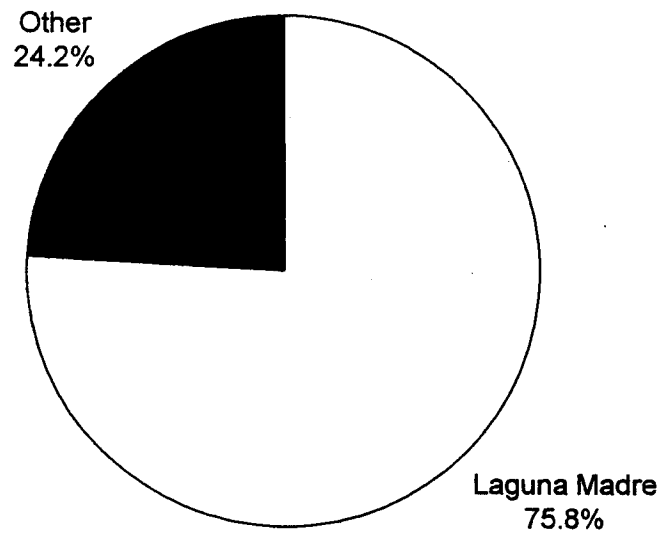


Fig. 5. Total numbers of unpaired Snowy and Wilson's plovers by habitat type based on the 2004 breeding census of the Texas coast.



Snowy Plover



Wilson's Plover

Fig. 6. Percentage of Snowy Plovers and Wilson's plovers in the Laguna Madre and other bay systems on the Texas coast based on the 2004 breeding census.

found on Matagorda Island (43 Snowy Plover pairs) and Padre Island (231 Snowy Plover pairs).

Nesting Snowy and Wilson's plovers are extremely susceptible to water level changes during the nesting season (Espie et al. 1998). This year, unusually high amounts of rain fell during the proposed census period, 19 April 2004 to 12 May 2004 (more than 400% above normal; Texas Climatic Bulletin 2004). These rains flooded nesting areas and made them inaccessible to surveyors. Surveyors had to wait until the flooding receded and the birds returned to their normal nesting habitats; therefore the survey was extended to 17 June 2004. The rainfall events prolonged the census by approximately one month. The rainfall and resulting extension of the census period may have introduced error into our counts due to renesting and/or dispersal of birds into areas that were not flooded.

Since Snowy Plovers are known for double and even triple brooding, the census was designed to count pairs initiating the first nest of the nesting season. However, because the census period encompassed about nine weeks instead of the planned four weeks, some pairs may have been counted twice because the females left flooded areas and moved into unflooded areas or initiated second broods. Snowy Plovers, particularly females, often move to new locations within a breeding season (Stenzel et al. 1994). A long breeding season, double-brooding, and sequentially polygamous mating means that female Snowy Plovers often disperse into new areas and initiate a new clutch with another mate after the first clutch is hatched (Stenzel et al. 1994; Page et al. 1995). The ability to move into new areas during "normal" or good conditions means dispersal in response to less than optimal conditions is both possible and probable. Environmental factors have been identified as common reasons for bird dispersal (Greenwood and Harvey 1982; Haig and Oring 1988). On the other hand, the long census period may have allowed some pairs to be counted that would not have been counted during the original census window because they had not yet migrated from wintering or staging areas.

In the Middle coast, numbers of Snowy Plover pairs were greater than those reported from the 2002 census (estimated 80-130 pairs [Newstead et al. 2002] vs 190 pairs in this survey). This increase is probably mostly due to better coverage of the area. Surveys of the Middle coast in 2004 probably covered 70-80% of suitable habitat whereas the 2002 survey was much more limited in scope. For example, only a small portion of Matagorda Island. High water levels and flooding were also encountered during 2002, however, these conditions occurred later than the earliest nesting dates. On the Lower coast, both Snowy and Wilson's plover pairs increased from 2003 (Zdravkovic 2003) to 2004 (105 to 266 Snowy Plover pairs; 128 to 325 Wilson's Plover pairs). Flooding on the Middle and Upper coasts may have forced some birds south, but better coverage of the area may be the primary reasons for the increase.

Snowy and Wilson's plover populations are thought to be declining due to habitat degradation, development, and human recreational use of nesting areas (Gorman and Haig 2002; Page et al. 1995). The sudden decline of Snowy Plovers along the U.S. Pacific Coast resulted in listing of the population as threatened under the Endangered Species Act in 1993 (Federal Register 1993). The breeding range of the Snowy Plover along the Gulf coast is

shrinking and becoming more fragmented. It has been suggested that Snowy Plovers no longer nest in Texas north of Matagorda County (Page et al. 1995). However, coverage of the Upper coast in this census was particularly sparse and no Snowy Plover pairs and only one Wilson's Plover pair were found. Although there is less suitable habitat on the Upper coast, it seems unlikely that no birds that nest in the region, but this census was unable to answer that question. Despite the fact that Snowy Plovers were not recorded during a year long study of shorebird habitat use on the Bolivar Peninsula in the late 1970s (Leavens 1979), it seems likely that a few birds nest along the Upper coast and some pairs were found during 2003 (R. Cobb, pers. comm.). This year, they may have been missed due to a lack of manpower or the fact that rainfall and flooding were very heavy in the region. The few areas that were surveyed were visited during the last week of April or first week of May when little time had passed since rains had ceased. The Middle and Lower coastal regions appear to support large numbers of pairs. However, additional censuses over the next 3-5 years coupled with more research into the breeding ecology and movements of both species are needed to determine the actual size of the nesting populations. The length of the census and the propensity for double or triple brooding, particularly by Snowy Plovers, means that this census may have overestimated the numbers of pairs nesting on the Texas coast.

RECOMMENDATIONS

Since this was the first attempt to organize a census of nesting Snowy and Wilson's plovers on the entire Texas coast, this information is a baseline that did not previously exist. However, due to the potential for error caused by extension of the census period, it may not be appropriate to use it as a benchmark to determine trends in the numbers of nesting pairs. It is important that this census becomes an integral part of efforts to evaluate and monitor nesting plover populations along the Texas coast. Proper monitoring and evaluation of populations can indicate if a species is in danger of decline, is declining, or stable and management actions can be taken if necessary. California's first breeding Snowy Plover censuses took place between 1977 and 1980 (Page and Stenzel 1981). Shortly thereafter, sharp population declines in were noticed and the Snowy Plover was listed as threatened. Snowy Plover research and monitoring along the West Coast should be closely examined and used as an example. We recommend the following:

- This census should be repeated for the next three consecutive years, or at least every other year for the next six years. Repeating the census will allow better estimates of nesting populations and will establish good comparable numbers between years that will eventually indicate the populations' health. In particular, more effort needs to be expended to determine the status of nesting on the Upper coast. When most suitable habitat and nesting areas are identified, they can become the focus of future censuses.
- Better habitat information needs to be provided by surveyors. Habitat information was missing, too general, or incomplete on many data sheets. To help make providing good habitat information easier for surveyors, data sheets need to be revised and made as simple as possible. Surveyors on the West Coast provide information on a very simple postcard that could be used as a model (Fig. 7).

- May appears to be when nesting activity peaks on the Middle coast (M. Kolar, pers. obs.), so the census period may need to be adjusted to capture the peak. was surveyed in 2002, whereas the majority of suitable habitat was surveyed during 2004. Snowy Plovers initiate nesting activity as early as late February in the Lower coast (Rupert 1997; Zdravkovic 2003) and mid-March in Middle coast (M. Kolar, pers. comm.). Differences in peak periods in the different regions of the coast may necessitate different or overlapping census periods ranging from somewhat earlier in the Lower region to somewhat later in the Upper region. Later census periods would also allow this census to be combined with the annual colonial waterbirds survey.
- More volunteers and more private landowner involvement are needed. Most of the largest gaps in this year's census were due to lack of access to private lands.
- Research on breeding season movements and the numbers of broods attempted are needed. More complete knowledge of the breeding ecology of both species in Texas will allow better interpretation of census results and better planning of monitoring efforts.
- Winter censuses and banding studies are also needed to help define the residency status of birds that nest in Texas.

COMPLETE SUMMER WINDOW SURVEYS BETWEEN 24 MAY AND 7 JUNE. RETURN REPORT CARD BEFORE 31 JULY.
COMPLETE WINTER WINDOW SURVEYS BETWEEN 1 DECEMBER AND 31 JANUARY. RETURN REPORT CARD BEFORE 28 FEBRUARY.

Site No. _____ Site Name _____

Survey Date _____ Time _____ Tide ^H _____ Time _____ Wind _____
DD - MM - YYYY 24-HR FORMAT L 24-HR FORMAT BEAUFORT

No. ☐ No. ☐ No. ☐ No. ☐ No. ☐ No. ☐ TOTAL ☐
males females unsexed young unknown

COORDINATOR OBSERVERS

NAME _____
 ADDRESS _____
 ADDRESS _____
 CITY, STATE, ZIP _____
 PHONE, EMAIL _____

☐ To list additional observers or provide comments on the survey, check here and write on reverse.



Please provide your comments here.

☐

SNOWY PLOVER SURVEYS

Fig. 7. Postcard census data form used by surveyors on the West Coast (USFWS 2001).

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APPENDIX A

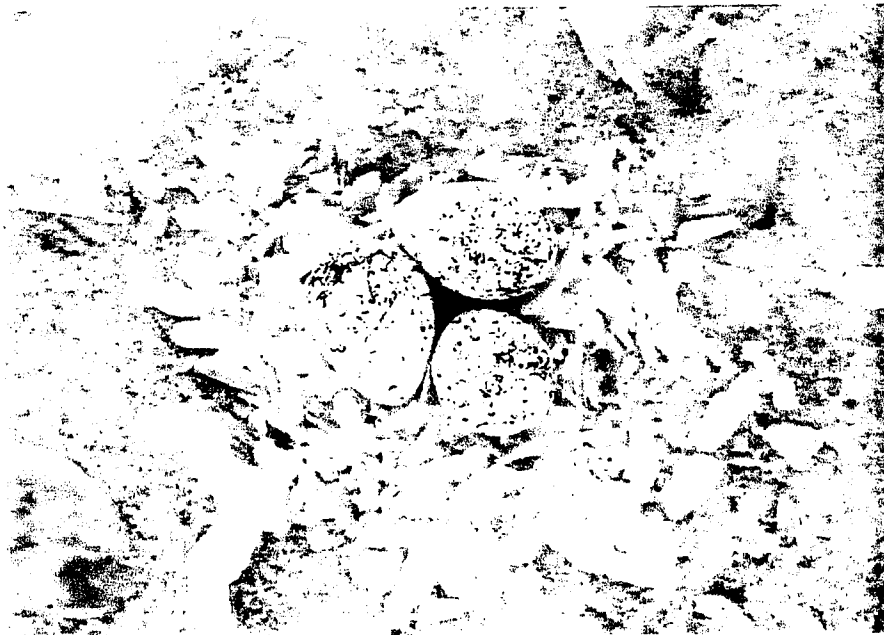


National Audubon Society

Coastal Bird Conservation Program

**Locating Breeding Snowy and
Wilson's Plovers
Guidelines for the Texas 2004 Census**

DRAFT



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Locating Breeding Snowy and Wilson's Plovers: Guidelines for the Texas 2004 Census

This text is intended to provide basic information on Snowy and Wilson's Plover natural history, breeding biology, and preferred nesting habitats. It offers guidelines for counting breeding pairs of plovers when a count of every nest is not possible. A careful count of plover pairs taken at the peak of the breeding season should yield a fairly accurate pair number for those areas surveyed.

Conservation Status of Snowy and Wilson's Plovers

Snowy Plover (*Charadrius alexandrinus*) The total U.S. population is approximately 18,000 individuals. The U.S. interior population (*nivosus*) is approximately 13,200 individuals. The Pacific Coast population, designated as federally threatened, is 2000 individuals and the Gulf of Mexico and Caribbean population (*tenuirostris*) is estimated at 2,200 – 2,800 individuals. The US Shorebird Conservation Plan lists this species as Category 5 (highly imperiled). The Audubon WatchList and BirdLife International list the Snowy Plover in the Red Category (globally threatened) and Partners in Flight classify it nationally as Extremely High Priority. The Snowy Plover is state-listed as Endangered in Alabama and Washington, Threatened in Florida, Oregon and Puerto Rico, and a Species of Special Concern in California.

Wilson's Plover (*Charadrius wilsonia*) The total world population estimate stands at approximately 6000 individuals, however, low confidence is placed in this estimate. This species is listed in the US Shorebird Conservation Plan as category 4 (species of high concern) based on the relative abundance of threats on its breeding grounds, non breeding grounds, and limited breeding distribution. The Audubon WatchList and Partners in Flight list the Wilson's Plover in the Yellow Category (moderately high-priority species). The Wilson's Plover has no specific federal protection status. It is state-listed as Endangered in Virginia and Maryland, Threatened in South Carolina, Rare in Georgia, and State-Protected in Alabama. The Wilson's Plover has not been the focus of comprehensive research in more than fifteen years.

United States Migratory Bird Treaty Act

The nests, eggs, young, and adults of Snowy and Wilson's Plovers are protected by the federal law — the Migratory Bird Treaty Act of 1918 (18USC 703-712). Activities prohibited by this act include pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting such conduct toward migratory birds.

Human activities represent the major persistent threat to Snowy and Wilson's Plover populations. Increased development and recreational use of beaches has resulted in the destruction of breeding and wintering habitat for both of these beach-nesting species. Increased recreational off-road-vehicle use, pets, camping, horseback riding, and beach-raking machines have further disturbed and impacted nesting plovers. Snowy Plover nesting in the U.S. interior has also been affected by dams that alter the hydrology of rivers and by water impoundments that flood their salt flat nesting habitat.

U.S. Distribution and Range – Snowy Plover

There are at least five separate races of Snowy Plover throughout the world. The North American races have a relatively small population size that has declined over much of its range. The Snowy Plover is found along the U.S. Pacific Coast from Washington to Baja California and along the Gulf Coast from Florida to the Yucatan Peninsula. It nests on barren to sparsely vegetated sandy beaches, barrier islands, dry salt flats on lagoons, dredge spoil sites, levees, and the flats of salt evaporation ponds and inland salt lakes. Interior populations breed in Oregon, Nevada, Colorado, New Mexico, Kansas, Oklahoma, California, Texas and Utah. The Snowy Plover's breeding season varies with geographic location, starting earlier in warmer climates. The breeding period ranges from January to September.

U.S. Distribution and Range – Wilson's Plover

Wilson's Plovers breed along the U.S. Atlantic Coast from Virginia to Florida, and on the Gulf Coast from Florida to south Texas. The Wilson's Plover also winters in Florida and on the Gulf Coast and it is a permanent resident throughout much of the Caribbean, along both coasts of Central America, and along the northern coast of South America. Wilson's Plovers nest on sandy

beaches, barrier islands, coastal bays, algal flats, and edges of mangrove lagoons and inland salt lakes. The Wilson's Plover breeding season runs from February through July.

Snowy Plover - description

The Snowy Plover is a small, light-colored shorebird about 6.25 inches in length. It has dark gray legs and feet. Its bill is thin, pointed, and all black. In breeding plumage, adult Snowy Plovers have blackish brown patches on either side of their breast, like an open collar, not a full breast band like many plover species. They have a small dark plumage bar on the fore crown and dark ear coverts and lores. The pale gray-brown plumage of their upper parts is similar to that of the Piping Plover, but much lighter than other closely related plover species such as the Wilson's Plover and Semipalmated Plover. Sexes are very similar in appearance except that the female's breeding plumage is slightly drabber. The female's dark breast and fore crown markings usually appear dark brown, rather than black.

Wilson's Plover - description

The Wilson's Plover is a medium-sized plover about 7.75 inches in length with a single breast band. It has flesh-colored legs and feet. It has a long, heavy bill that is black in all plumages. Its upperparts are generally grayish brown, while its under parts are white, with a white collar separating the back from the head. In breeding plumage, Wilson's Plovers have a complete breast band that is brownish to black in color. Both sexes are very similar in appearance, except that females are duller. The male's breast band, lores, and fore crown appear blacker and the female's appear brown. The Semipalmated Plover is similar in general appearance, but it is smaller and has a stubbier two-toned orange and black bill, and orange-yellow legs. The Killdeer is larger than the Wilson's Plover and has a very distinct double breast band.

Snowy and Wilson's Plover Breeding Biology

The **Snowy Plover** breeding season begins when plovers start to defend nesting territories and choose mates, which in the U.S. starts as early as mid-January in the southernmost latitudes of Florida and Texas. Egg-laying begins in early February and hatching may occur as late mid-September in some areas. Snowy Plover pair bonds will vary with geographic location. Gulf Coast and Great Plains birds form seasonally monogamous pair bonds, while Snowy Plover

females on the West Coast often desert mates and young chicks to start second clutches with different males.

Wilson's Plovers start pair formation by mid-February and the last hatchings occur in late July. Wilson's Plovers form monogamous seasonal pair bonds.

Nests

Snowy and Wilson's Plover nests are shallow depressions in the sand, excavated by the male during courtship. The male makes several scrapes and the female chooses one to lay her eggs in. The female will lay one egg approximately every other day. It generally takes 5 to 6 days to complete a clutch. The normal clutch size is 3 eggs, but occasionally a nest will have only 2 eggs. Snowy and Wilson's Plovers do not incubate full time, but regular incubation begins with the laying of the last egg. During incubation, both sexes incubate the eggs, switching off periodically to forage for food. Pairs that repeatedly lose clutches will re-nest several times. Re-nests may be initiated as soon as 4 to 6 days after nest loss.

Snowy Plover eggs are oval in shape, light buff-colored, smooth and non-glossy. They are lightly to moderately covered with very small dark brown and gray-brown spots and scrawls. The density of spots increases toward the larger end of the egg. The eggs are approximately 1 and 1/8 inches (30 mm) long. The incubation period for Snowy Plovers varies with location and season, but the average incubation period is 26-28 days. The range is 23 to 32 days.

Wilson's Plover eggs are oval to short oval in shape, cream to buff-colored, and smooth and non-glossy. They are heavily spotted and speckled, blotched and scrawled with dark brown and gray. Wilson's Plover eggs are larger than Snowy eggs at 1 and 3/8 inches (35 mm) in length. The average incubation period for Wilson's Plover nests is 25 to 27 days, while the range is 23 to 29 days.

Hatching

Snowy and Wilson's Plover chicks are precocial and can walk within hours of hatching. The parents remove the empty eggshells from the scrape after each chick hatches. Hatching usually takes place over 24 to 36 hours, during which time the hatched chicks will usually remain in or near the scrape unless disturbed. Sometimes one egg will take longer to hatch and the parents will continue to tend it for a day or two before abandoning it. Snowy and Wilson's plover chicks are well camouflaged and blend in with their surrounding habitats. Both species are completely down-covered. They have a white "egg tooth" on

their bill tip that will fall off within 1 to 2 days after hatching. The chicks of both species blend in perfectly with their sandy or muddy microhabitats.

Snowy Plover chicks have pale-buff to creamy-buff upper parts mixed with light gray and some light reddish brown. Their crown, back, rump, and wings are distinctly speckled with brown and black and their under parts are pure white. They have a white collar around the neck and back of head.

Wilson's Plover chicks are slightly darker in color on their upperparts than Snowy chicks. Their crown, back, and rump are mottled with dark brown, black and reddish brown. Their under parts are white and they also have a white collar around the neck and back of head.

Parental Care of Chicks

After the last chick of a brood has hatched, the plover family will move to nearby vegetation, providing more cover and food for the chicks. They do not return to the nest scrape again. If a plover family is disturbed or if the food supply is inadequate for the chicks, the adults may lead their young a mile or more in any direction as soon as one day after hatching. Plovers do not feed their young. The chicks must forage on their own, searching for small insects and invertebrates. The parents will continue to brood the chicks during the first week after hatching no matter how far from the original nest site that they move them. They will also act as sentinels, warning the chicks of approaching danger by giving alarm calls. When the alarm call is given, young chicks (up to approximately 3 weeks old) will lie flat and motionless, their camouflaged plumage protecting them. The adults will employ distraction displays to confront predators, pets, and people near their broods, attempting to lead them away from the area.

Description of Plover Breeding Habitats –Texas

Snowy and Wilson's Plover nests in Coastal Texas are located in the same macro habitats; baysides of barrier islands, coastal bays, hyper-saline lagoons and coastal lakes, inland salt lakes, and man-made dredge spoil sites. However, each of these species usually selects different microhabitats for nesting.

Snowy Plovers prefer flat, open habitat with sandy, shelly or gravel substrates, with little or no vegetation. **Wilson's Plovers** will choose from a variety of habitats with vegetation ranging from none to dense. It is not uncommon to find

both Snowy and Wilson's Plover microhabitat within the larger macrohabitat, so that both species will nest in close proximity to each other.

Barrier Island and associated habitats

Snowy and Wilson's Plover nests have been located exclusively on the bay or Laguna Madre side of barrier islands in South Texas. However, both species use the front beach areas prior to nesting and after fledging young. Wilson's Plover pairs were found on the gulf side in early spring before nesting began. Snowy and Wilson's Plovers and Least Terns, all with fledged young, were found on the gulf side by late June. For the most part, their nesting microhabitats are located behind the primary fore dunes on the bay/laguna side of barrier islands and are described as follows:

Hurricane washover fan - sandy, shelly, open expanses with little or no vegetation, provide Snowy and Wilson's Plover nesting habitat

Low back dune edges - sparse to moderately vegetated, low, back dune edges and small dune mound edges provide nesting habitat for Wilson's Plovers

Algal mud flat - firm mud and algal surface interspersed with low, vegetated, dune mounds, provides Wilson's Plover nesting habitat

Coastal mangrove bay - mud flats and mangrove edges with vegetation ranging from sparse to dense, provide nesting habitat for Wilson's Plovers

Lagoon and River Mouth Habitats

Subtropical hypersaline lagoon w/mangroves - **mud flats and mangrove edges with vegetation ranging from sparse to dense, provide nesting habitat for Wilson's Plovers**

High sand/mud flats- **sparsely vegetated, dry, chipped clay- mud substrate , provides nesting habitat for Snowy Plovers**

River mouth opening directly to gulf w/no significant delta - mud flats and mangrove edges with vegetation ranging from sparse to dense, provide nesting habitat for Wilson's Plovers

Saline Lake Habitats

Coastal salt lake - salty, clay shorelines with little or no vegetation, provide nesting habitat for Snowy and Wilson's Plovers

Inland hypersaline lakes - salty, clay shorelines and man-made limestone gravel causeways with little or no vegetation, provide nesting habitat for Snowy and Wilson's Plovers

Human-made Habitats

Salt evaporation ponds, cooling ponds, and dredge spoil sites - loose sand and gravel substrates, with little or no vegetation, provide nesting habitat for Snowy and Wilson's Plovers

Locating and Censusing Breeding Plovers

If you are not very familiar with Snowy and Wilson's Plovers, or even if you haven't seen them since the prior year's breeding season, it is helpful to study their distinguishing characteristics before going into the field. Review field guides, photos of plovers and nests and listen to recorded calls. This will give you an initial "plover search image" that you will build upon when you get into the field. Also, become familiar with all plover species that you may see, both throughout the breeding season and during migration. A few of them are similar in appearance to Snowy and Wilson's Plovers, and the Killdeer sometimes nests in similar habitat.

A census window should be established for your area. Ideally this will be a 12-day period during peak nesting, when most plover nests have been established, and the first nests are about to hatch. By this time, migrating plovers have moved out of breeding territories and the remaining plover pairs are local breeding adults. The pairs counted in the week prior to or following the census window period are also generally accepted in the total count. The goal is to accurately count all the breeding pairs in each nesting area.

For the purpose of a census the Breeding pairs will include all:

- Paired adults
- Pairs exhibiting courtship behavior
- Pairs engaging in group defense or territorial behavior
- Pairs with nests
- Pairs with young

Guidelines for Locating Breeding Plover Pairs:

NOTE: Always move with care through plover nesting habitat. Be aware of where you are stepping at all times. Remember you are surveying in areas where nests and young chicks are present and can easily be stepped upon.

The two keys to successfully locating breeding plover pairs are:

- 1. Identify plover nesting habitat**
- 2. Recognize plover breeding behavior**

- The most efficient way to locate plover pairs and nests is to move slowly through suitable nesting habitat, watching and listening for territorial and/or incubating birds that will react to your presence.
- Plovers do not nest linearly, so it is helpful for two or more people to spread out over an area. First use a scope to scan the habitat, especially in large, open areas.
- Try to maintain visual contact with each other to minimize missed areas. Two-way radios or cell phones are also very useful for communication while searching.
- Spend at least 10-15 minutes searching an area. In warmer climates, Snowy and Wilson's Plovers do not incubate their eggs constantly. It is often your presence in their territory that brings the plovers back to the nesting site.
- Watch for plovers exhibiting territorial behavior – calling, crouching low while running, and appearing generally agitated by your presence.
- Recognize plover group defense behavior. Often, but not always, your presence will alert several pairs of birds, so that you may have 2-3 pairs of plovers calling and running about in the same area. This is called "group defense of territory". Snowy and Wilson's Plovers use this behavior to distract predators that enter their nesting area.
- When observing group defense behavior in either plover species, try to keep track of the number of pairs that you are seeing. This will tell you how many plover pairs are nesting in that immediate area.

- If you witness either species performing “broken wing display,” this indicates that there is a nest or chicks in the area. However, you cannot depend on this behavior because some birds may not exhibit this behavior consistently.
- Remember that these are only general guidelines. Plover behavior can be variable. Some plover pairs will not return to their nesting sites for long periods of time.

Recording Nest and Pair Locations by GPS

If your site is not very large, say 5 to 10 miles long, you may want to attempt to locate all plover nests. Then you can **record the location of each nest by GPS**. If your site is vast or you are working exclusively on censusing plover pairs and you will not be locating nests, then you should **count the plover pairs that you find in each nesting area and record the coordinates of that area by GPS**. For example, if your entire site is 20 miles long, start at one end and move through the plover habitat until you locate one or more pairs of birds. It is very likely that you will be approached by several territorial pairs of plovers all defending the same nesting area. Observe the sex of each bird. Count the number of pairs and then record the area by GPS. Enter into the GPS unit the species and total pair number for that spot. For example your entry may read: WIPL-4pr – for Wilson’s Plovers, 4 pairs. Move on to the next area until you sight more plover pairs. **Spend at least 10-15 minutes searching each area.** Remember, your presence at a nesting site often stimulates the birds to return to their territory. The plovers in the previous area will often follow you for a distance and may even fly ahead of you, but they will eventually return to their nesting site. This can be confusing, so you will need to pay close attention to where the birds are moving so that you don’t count the same pair more than once. Continue to survey the entire site in this manner. If your site is vast, be sure to note the GPS coordinates of the area where you finish surveying each day, so that it will be easy to locate your starting point when you return again. **It is important not to count plovers in the same area more than once.**

Plover Pair Census Data Form

A Plover Pair Census Data Form is provided to help you keep a record of plover pairs as you locate them. Use the habitat information in this text to identify and describe the habitats where you locate breeding plovers.

Breeding Plover Census: Equipment Needed

- **Binoculars and Spotting Scope-** for locating and observing birds.
- **GPS Unit (handheld)-** When you locate a plover pair or pairs or a nest, you will need to record the location by GPS. This is very important because the GPS coordinates will become part of the larger plover breeding site map for your area and your state.
- **Audubon Plover Census Guidelines and data forms-** State census form and Snowy and Wilson's Plover Pair Census Forms
- **Cell phone-** if you are working in a remote area, a cell phone is a "must have" piece of equipment for communication and safety reasons.
- **Other Personal Items-** Sunscreen, sunglasses, wide-brimmed hat or visor, field guide (to I.D. other birds), insect repellent, watch, food, plenty of drinking water, and a basic first aid kit.

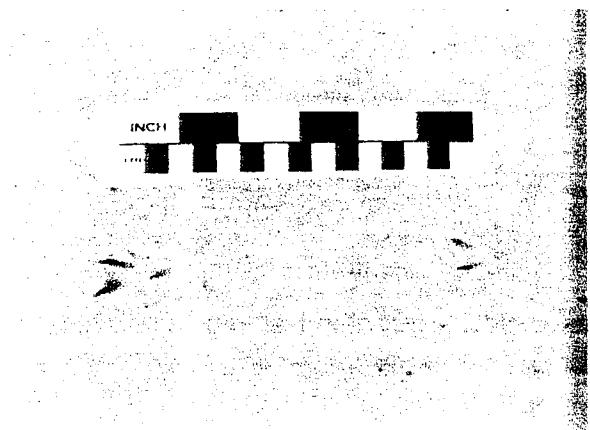
Photographs



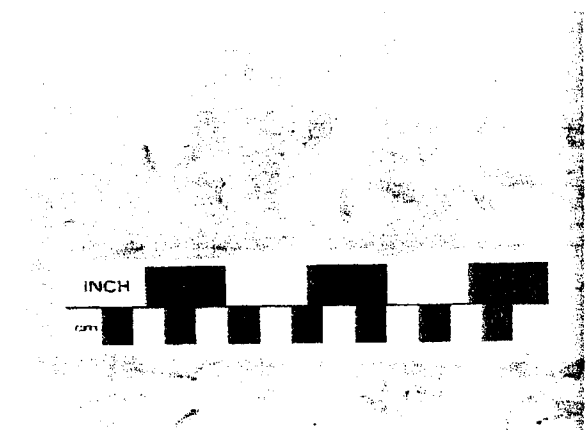
Male Snowy Plover At Nest



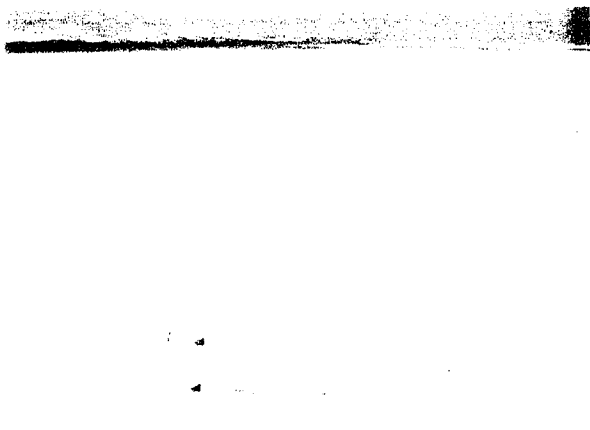
Male Wilson's Plover at Nest



Snowy Plover Tracks



Wilson's Plover Tracks

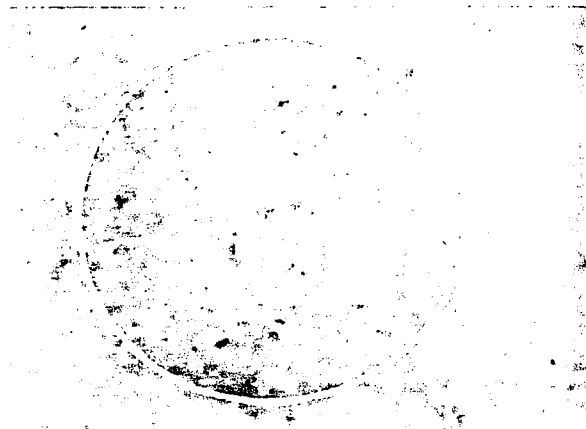


Typical Snowy Nesting Macrohabitat

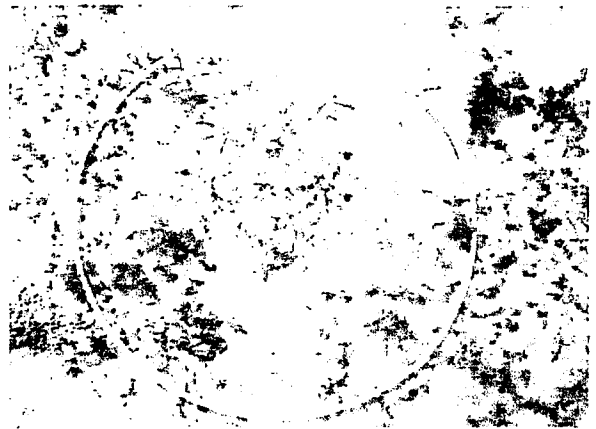


Typical Wilson's Nesting Macrohabitat

Photographs



Typical Snowy Nesting Microhabitat



Typical Wilson's Nesting Microhabitat



Snowy Plover Nest



Wilson's Plover Nest



2 Day Old Snowy Plover Chick



1 Day Old Wilson's Plover Chick

Plover Pair Census Data – Texas 2004 – Region _____

[illegible]

Pair Criteria: (list all that apply)

- A - courtship behavior
B - joint or group defensive behavior
C - pair at nest
D - pair with young
E - birds located together as pair
F - other (describe)

*Please make copies of all forms and
return to:*

Margo Zdravkovic
National Audubon Society
Coastal Bird Conservation Program
22883 Ocelot Rd, Los Fresnos, TX
78566

* Record other beach nesting species pairs if located- Oystercatcher, Least Tern, etc.

References:

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Photo credits:

All photos by Margo Zdravkovic

***For use of information and/or photos contained in this text, please contact:
Margo Zdravkovic, National Audubon Society, Coastal Bird Conservation
Program- Field Coordinator at mzdravkovic@audubon.org.**

APPENDIX B

2004 TEXAS SNOWY PLOVER BREEDING CENSUS
Individual Census Report

Please complete this form as thoroughly as possible for each location surveyed even if Snowy Plovers or other members of the flat-nesting guild (Wilson's Plovers, Least Terns, Horned Larks) are not found. Attach a map showing the approximate locations and numbers of each species and provide a detailed description of the area censused, including latitude and longitude of the survey area (approximate site center). Also feel free to attach additional comments. These forms should be mailed to Michelle Kolar by 20 May 2004 (address on last page).

1. Area Information	
Date/Time	
Area (county/local name)	
Lat/long (approx. site center)	
# of people censusing	
# sq. mi. covered	
Mode of transportation (foot, vehicle, etc)	
Habitat Characteristics-list all that apply from below	

Habitat Characteristics (attach sheet with descriptions of habitats not covered below)				
Body of water	Ocean (O)	Bay or lagoon (B)	Tidal Creek (T)	Other
Shoreline	Mainland (m)	Barrier Island (b)	Spoil Island (s)	
Substrate	Sandy Beach (1)	Sandflat (2)	Mudflat (3)	Algal flat (4)
	Vegetated (5)	Levee (6)	Other manmade (7)	

2. Weather Conditions	
Weather (sunny, partly cloudy, overcast, rain, fog, etc)	
Approx. air temp (F)	
Approx. wind speed/direction	

3. Census Information		
Total # paired adults	#	Pair Criteria (list all that apply)
Snowy Plovers		
Least Terns		
Wilson's Plovers		
Horned Larks		
Total # unpaired adults	# with nest/young	# with no nest/young
Snowy Plovers		
Least Terns		
Wilson's Plovers		
Horned Larks		

Pair Criteria: A – Courtship behavior C – Pair at nest E – Birds located together
 B – Joint defensive behavior D – Pair with young F – Other (describe)

Complete total # Snowy Plovers (young and adults)	
Total # nests	
Total # young	

5. Habitats where birds were found (use abbreviations found in # 1, e.g., Bb4, Ob1 etc.)	
Snowy Plovers	
Least Terns	
Wilson's Plovers	
Horned Larks	

6. Were there any circumstances that may have affected census results (e.g., weather, human disturbance, etc.)?

7. Band combinations of any marked birds (R leg: L leg from top to bottom, note colors, flags, or bands, etc.)

8. Describe any apparent injuries of banded or unbanded birds.

9. Contact information for censusers (Names, affiliation, phone number, email address; attach additional sheet if necessary).

10. Additional information or comments.

Mail to: Michelle Kolar, Center for Coastal Studies
6300 Ocean Dr., NRC 3200
Corpus Christi, TX 78412

APPENDIX C

Table C-1. Locations and dates of surveys for the Texas 2004 breeding census of Snowy and Wilson's plovers.

Area	Center Latitude	Center Longitude	Date
Redfish Bay			23-Apr-2004
Matagorda Island	N 28.20919°	W 96.68659°	22-Apr-2004
Matagorda Island, Cedar Bayou	N 28.06716°	W 96.84667°	2-Jun-2004
Matagorda Island, TPWD hq	N 28.32975°	W 96.46833°	22-Apr-2004
Matagorda Island	N 28.24315°	W 96.63113°	22-Apr-2004
Matagorda Island J Hook	N 98.35762°	W 96.40440°	22-Apr-2004
Matagorda Isl.	N 28.16219°	W 96.77365°	21-Apr-2004
Matagorda Island J Hook	N 28.36811°	W 96.39750°	21-Apr-2004
Matagorda Island, Middle Rd.	N 28.24514°	W 96.67988°	21-Apr-2004
Matagorda Isl.	N 28° 10.001'	W 96° 48.618'	21-Apr-2004
Espiritu Santo Bay	N 28° 23.919'	W 96° 24.821'	5-Apr-2004
Matagorda Island	N 28° 10.427'	W 96° 46.628'	20-Apr-2004
Francine Cohn Preserve	N 27° 43.9	W 97° 9.8	26-May-2004
Mustang Island, Vinson Slough	N 28° 3.49'	W 96° 51.40'	19-Apr-2004
	N 28° 5.31'	W 96° 55.12'	19-Apr-2004
Mustang Island, LaConcha Bayside	N 27° 42.6	W 97° 10.36'	26-May-2004
ANWR, Whitemire	N 28.50552°	W 96.53293°	30-Apr-2004
Mad Island WMA	N 28° 40.811'	W 96° 03.745'	28-Apr-2004
Welder Flats	N 28° 20.734'	W 96° 38.994'	4-May-2004
Magic Ridge	N 28° 32.11	W 96° 31.2'	4-May-2004
Copano Bay/Mission Rr.	N 28° 4.881'	W 97° 14.025'	28-Apr-2004
Point of Mustang			9-May-2004
Laguna Shores Rd.	N 27° 38.841'	W 97° 16.900'	21-Apr-2004
Oso Parkway	N 27° 39.623'	W 97° 24.153'	21-Apr-2004
Ella Barnes Wetland	N 27° 39.58'	W 97° 20.38'	29-May-2004
UNMAPPED SITE, Nueces Co.			20-May-2004
UNMAPPED SITE, Nueces Co.			27-May-2004
Sunset Lake	N 27° 51.919'	W 97° 20.081'	22-Apr-2004
UNMAPPED SITE, Nueces Co.			23-Apr-2004
Matagorda Island, gulf beach	N 28.23616°	W 96.60823°	20-Apr-2004
Matagorda Island, gulf beach	N 28° 18.277'	W 96° 28.153'	19-Apr-2004
Matagorda Island, gulf beach	N 28.07220°	W 96.83938°	19-Apr-2004
Bryan beach, gulf beach	N 28.8990°	W 95.3517°	9-May-2004
Follet's Island, gulf beach	N 29.0163°	W 95.2033°	9-May-2004
False live oak point	N 28° 14.014'	W 96° 47.134'	2-Jun-2004
Mollie Beattie	N 27° 37' 57"	W 97° 37' 57"	11-May-2004
Upper LM, spoil islands			17-Jun-2004
<i>(Robyn's write in on ULM spoil)</i>			
Padre Island National Seashore			
Lower LM region			
LLM spoil islands			

Table C-2. Locations and habitat type of areas surveyed during Texas 2004 breeding census of Snowy and Wilson's plovers.

Area	Habitat type
Redfish Bay	Bay shore/spoil islands
Matagorda Island	Barrier island bay side
Matagorda Island, Cedar Bayou	Barrier island bay side
Matagorda Island, TPWD hq	Barrier island bay side
Matagorda Island	Barrier island bay side
Matagorda Island J Hook	Barrier island bay side
Matagorda Isl.	Barrier island bay side
Matagorda Island J Hook	Barrier island bay side
Matagorda Island, Middle Rd.	Barrier island bay side
Matagorda Isl.	Barrier island bay side
Espiritu Santo Bay	Bay shore
Matagorda Island	Barrier island bay side
Francine Cohn Preserve	Barrier island bay side
Mustang Island, Vinson Slough	Barrier island bay side
	Barrier island bay side
Mustang Island, LaConcha Bayside	Barrier island bay side
ANWR, Whitemire	Bayshore sand flat
Mad Island WMA	Salt flat
Welder Flats	Salt flat
Magic Ridge	Salt flat
Copano Bay/Mission Rr.	bay shore
Point of Mustang	Bay shore, spoil island
Laguna Shores Rd.	bay shore
Oso Parkway	tidal creek
Ella Barnes Wetland	tidal creek
UNMAPPED SITE, Nueces Co.	man made levee
UNMAPPED SITE, Nueces Co.	impounded water
Sunset Lake	man made lake
UNMAPPED SITE, Nueces Co.	man made lake
Matagorda Island, gulf beach	Barrier island gulf beach
Matagorda Island, gulf beach	Barrier island gulf beach
Matagorda Island, gulf beach	Barrier island gulf beach
Bryan beach, gulf beach	Gulf beach
Follet's Island, gulf beach	Gulf beach
False live oak point	Spoil island in bay
Mollie Beattie	tidal flat/washover pass
Upper LM, spoil islands	spoil island in bay
(Robyn's write in on ULM spoil)	Spoil island in bay
Padre Island National Seashore	barrier island
Lower LM region	all
LLM spoil islands	Spoil island in bay

Table C-3. Census data (2004) for breeding Snowy Plover (SNPL) and Wilson's Plover (WIPL).

Area	WIPL Pairs	Pair criteria	WIPL individuals	SNPL pairs	Pair Criteria	SNPL individuals
Redfish Bay	12	E	1	0	0	0
	2	E	0	0	0	0
	4	C	0	0	0	0
	0	0	1	0	0	0
	4	E	1	0	0	0
	2	E	1	0	0	0
Matagorda Island	4	E,C	2	0	0	0
Matagorda Island, Cedar Bayou	1D-3 YOUNG		0	0	0	0
Matagorda Island, TPWD hq	3	C,E	0	0	0	0
Matagorda Island	2	C,E	1	0	0	0
Matagorda Island J Hook	5	E,B	5	0	0	0
Matagorda Isl.	2	E	3	1	E	1
Matagorda Island J Hook	6	E, B, F	1	0	0	0
Matagorda Island, Middle Rd.	0	0	0	0	0	0
Matagorda Isl.	2	E	3	0	0	0
Espiritu Santo Bay	4	E	2	0	0	0
Matagorda Island	1	E	8	3	E	1
Francine Cohn Preserve	2	E	0	0	0	0
Mustang Island, Vinson Slough	0	0	0	0	0	0
	11	E	0	25	E	0
Mustang Island, LaConcha Bayside	1	E	0	1	E	0
ANWR, Whitemire	1	E	0	0	0	0
Mad Island WMA	2	E,C	0	0	0	0
Welder Flats	2	E	1	0	0	0
Magic Ridge	3	C,E	1	0	0	0
Copano Bay/Mission Rr.	2	E	0	0	0	0
Point of Mustang	5	E,D	4	0	0	0
Laguna Shores Rd.	0	0	0	0	0	0
Oso Parkway	2	C,E	0	0	0	0
Ella Barnes Wetland	0	0	1	3	E	1
UNMAPPED SITE, Nueces Co.	56	E	0	52	E	1 YOUNG
UNMAPPED SITE, Nueces Co.	18	E	1	2	E	0
Sunset Lake	9	C,B,E	1	6	E,C	5
UNMAPPED SITE, Nueces Co.	7	E,B	0	7	C,B,A,E	2
Matagorda Island, gulf beach	8	E,B	5	1	E,B	2
Matagorda Island, gulf beach	4	E	1	0	0	1
Matagorda Island, gulf beach	5	E,F	15	9	E	16
Bryan beach, gulf beach	2	E	1	0	0	0
Follet's Island, gulf beach	0	0	0	0	0	1
False live oak point	4	B,C,D,F	4 (young?)	0	0	1
Mollie Beattie	3	B	0	3	C,B	0
Upper LM, spoil islands	17	B,D,E	young	0	0	0
(Robyn's write in on ULM spoil)	43		2 young	1		1
Padre Island National Seashore	231			76		
Lower LM region	275			263		
LLM spoil islands	50		2	3		3

Table C-4. Areas of the coast that were not covered during the 2004 Snowy and Wilson's plover breeding census and reasons.

Areas not Covered	REASON
Galveston Island	Lack of suitable habitat
Matagorda Peninsula (most of)	Lack of surveyors, time
Lavaca Bay	Lack of surveyors
Matagorda Bay	Lack of surveyors
San Antonio Bay	Lack of surveyors
Mesquite Bay	Lack of time
St. Joseph's Island	Private ownership-lack of cooperation
Baffin Bay	Lack of surveyors
King Ranch	Private ownership-lack of cooperation
Kenedy Ranch	Private ownership-lack of cooperation

