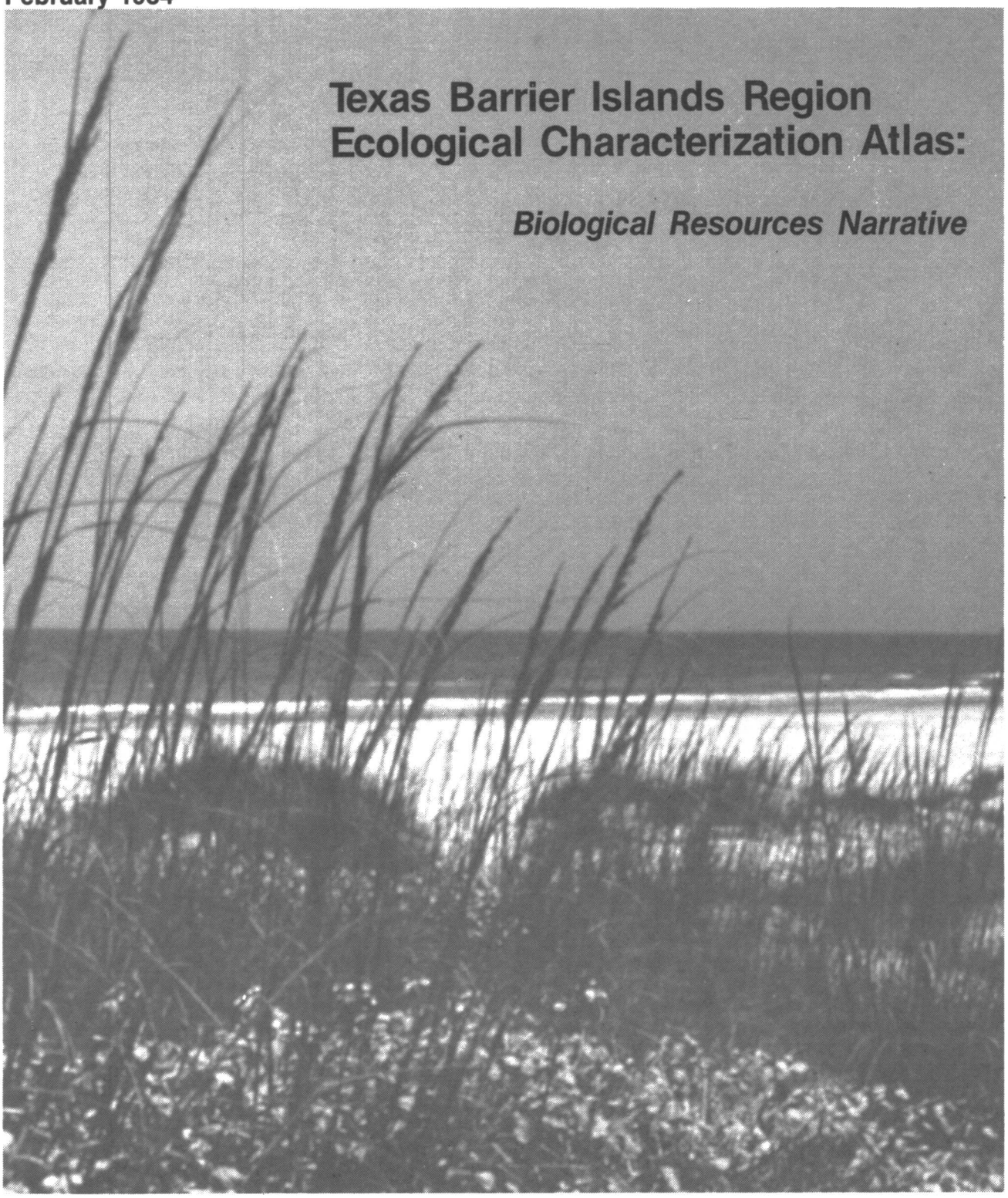
FWS/OBS–82/16
February 1984

MMS 84-0005



Texas Barrier Islands Region Ecological Characterization Atlas:

Biological Resources Narrative

Minerals Management Service
Fish and Wildlife Service

U.S. Department of the Interior

FWS/OBS-82/16
MMS 84-0005
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TEXAS BARRIER ISLANDS REGION ECOLOGICAL CHARACTERIZATION ATLAS:
Biological Resources Narrative

compiled by

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Washington, DC 20240

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PREFACE

The purpose of this study, begun in October 1979, is to cartographically render those known biological resources of the Texas coastal areas which might influence coastal land-use decisions. This narrative and its accompanying maps on biological resources are one set in a series of three constituting the Texas Barrier Islands Region Ecological Characterization Atlas. Other map sets and narratives available include Mineral Resources and Selected Oil and Gas Infrastructures (FWS/OBS-82/17) and Socioeconomic and Natural Features (FWS/OBS-82/15).

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CONTENTS

ACKNOWLEDGMENTS

The data compiled on the biological resources map came from a great variety of sources. Recent published compilations and unpublished file copies of Texas and Federal agencies facilitated the mapping effort. Additionally, the following individuals provided valuable comments and data for the maps:

A. U.S. Fish and Wildlife Service

Robert Baumann
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Floyd Potter
Leland Roberts
Don White

C. General Land Office of Texas

William Longley

Cartographic support for maps was provided by Larry Handley, Minerals Management Service; Fred Hendricks, Kenny White, and Clarissa Kimber, Texas A&M University; and Fred Sharp, Martel Laboratories, Inc.

INTRODUCTION

The study area for the Texas Barrier Islands Region Ecological Characterization Atlas extends from the eastern end of East Bay, Texas, to the Texas-Mexico border. The offshore boundary is the State-Federal demarcation line, and the inland boundary is about 65 km (40 mi) inland, including, among others, the coastal counties of Chambers, Galveston, Brazoria, Matagorda, Calhoun, Aransas, Refugio, San Patricio, Nueces, Kleberg, Kenedy, Willacy, and Cameron.

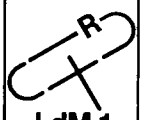
Three sets of maps were produced to display information that will assist land-use planners and coastal decision-makers. The three maps are 1) Socio-economic and Natural Features, 2) Mineral Resources and Selected Oil and Gas Infrastructures, and 3) Biological Resources.

This narrative addresses the map of "Biological Resources," which is composed of 1:100,000 base map overlays. The themes and legend used for the map series appear in Table 1.

All maps have been compiled from a variety of sources including published and unpublished maps and reports, personal files, aerial photographs, and field checks. The user should not rely on these maps for precise measurement of distances or areas.

The biological maps were compiled at a mesoscale (1:100,000) on United States Geological Survey (USGS) planimetric base maps printed on mylar. Theme data were plotted on diazo copies of the base maps, and the information was then transferred to mylar overlays which were punch registered with the USGS base maps. The names of the 16 base maps from northeast to south are: Anahuac Quadrangle (Houston northeast), Houston Quadrangle (Houston northwest), Galveston Quadrangle (Houston southeast), Angleton Quadrangle (Houston southwest), El Campo Quadrangle (Seguin southeast), Freeport Quadrangle (Bay City northwest), Port Lavaca Quadrangle (Beeville northeast), Goliad Quadrangle (Beeville northwest), San Antonio Bay Quadrangle (Beeville southeast), Allyns Bight Quadrangle (Corpus Christi northeast), Beeville Quadrangle (Beeville southwest), Corpus Christi Quadrangle (Corpus Christi northwest), Baffin Bay Quadrangle (Corpus Christi southwest), Port Mansfield Quadrangle (Brownsville north half of north half), Harlingen Quadrangle (Brownsville south half of north half), and finally Brownsville Quadrangle (Brownsville north half of south half). The quadrangles of the study area are shown in Figure 1.

Table 1. Biological resources on maps and their symbols.

Symbol	LEGEND Species Habitats and Areas Represented
A	Arctic Peregrine Falcon
B	Upland Game and Furbearer Concentration
C	Attwater's Prairie Chicken
D	White-winged Dove
E	Bald Eagle
F	Finfish Nursery
G	Seagrass Beds
H	Houston Toad
J	Oak Motte Woodlands
K	Wood Duck
L	Alligator
N	Rio Grande Subtropical Woodlands
O	Oyster Beds
P_3	Areas of Ecological Concern
Q	Whooping Crane Wintering Habitat
R	Colonial Waterbird Rookery
S	Shrimp Nursery
T	Rio Grande Turkey
U_2	Unique Wildlife Ecosystem
W	Waterfowl and Other Wetland Birds
X	Whooping Crane Wintering Habitat
Y	Virgin Brush Habitat
 I-dM-1	Species habitats are represented by dashed lines with the appropriate symbol reading to the inside of the area. Rookeries are also identified by an alphanumeric code as taken from the Texas Colonial Waterbird Census, 1973-1976 (FA Report Series No. 15, Texas Parks and Wildlife Department 1978).

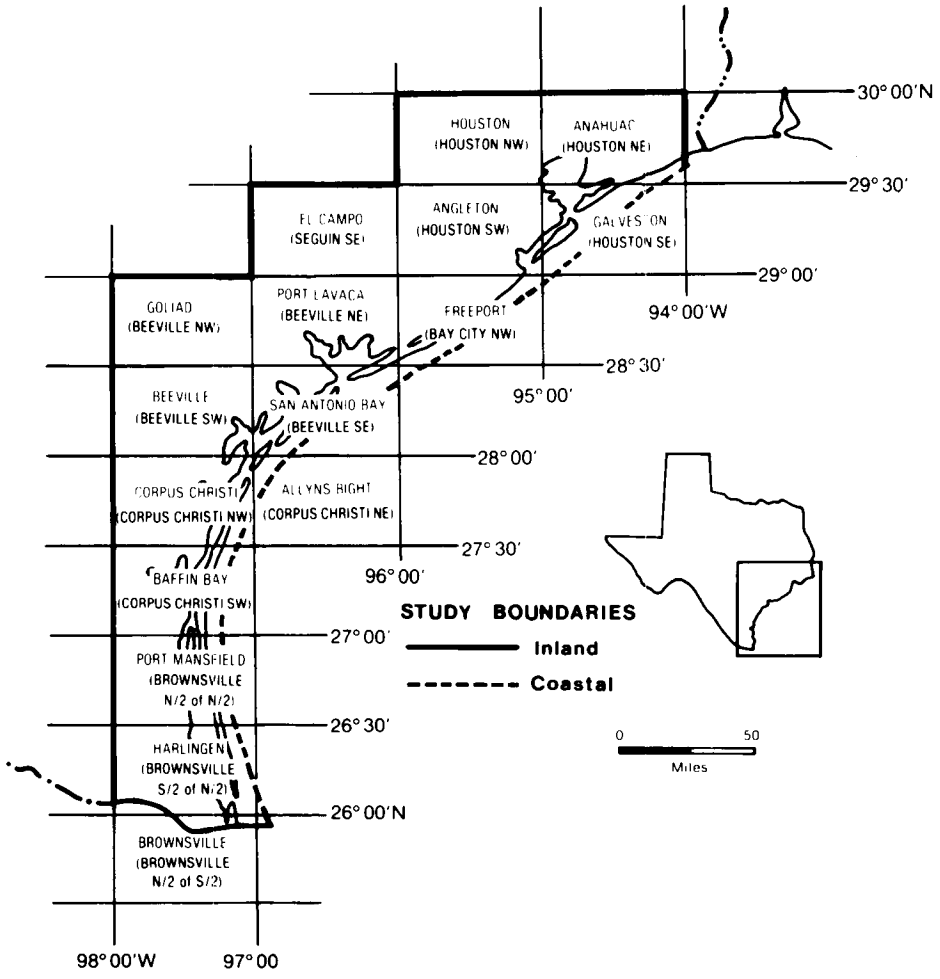


Figure 1. Study area of the Texas Barrier Islands Region Ecological Characterization Atlas: Biological Resources.

The following map narratives provide primary references (sources) used to prepare the map for each biological resource in Table 1. Data used for mapping these resources are primarily from 1976 to 1982 and include unpublished data sets from individuals listed in the acknowledgments, some of which are not cited as primary references.

ARCTIC PEREGRINE FALCON (Falco peregrinus tundrius)

The maps depict migration routes of this endangered (Federal and State) species. Known counties where this species has been recorded include: Jefferson, Chambers, Galveston, Brazoria, Matagorda, Calhoun, Aransas, Nueces, Kleberg, Kenedy, Willacy, and Cameron.

Reference

National Fish and Wildlife Laboratory. 1980. Selected vertebrate endangered species of the seacoast of the United States: Arctic peregrine falcon. Biological Services Program. FWS/OBS-80/01.51. March 1980. 9 pp.

UPLAND GAME AND FURBEARER CONCENTRATIONS

The areas on maps portray known boundaries of concentration areas for white-tailed deer, quail, and furbearers. Furbearers include beavers, mink, nutria, muskrat, and raccoon.

References

Cook, R.L., and W.F. Howell. 1979. Big game investigations: white-tailed deer population trends. Texas Parks Wildl. Dep. Fed. Aid Project. W-109-R-2, Job 1. Austin, Tex.

Davis, W.B. 1974. The mammals of Texas. Texas Parks Wildl. Dep. Bull. 41. Austin. 294 pp.

Lay, D. Unpublished. Personal communication. April 1980. Wildlife biologist. Nacogdoches, Tex.

Swepston, D. 1976. Nongame wildlife investigations. Status of the Mexican beaver in Texas. Texas Parks Wildl. Dep. Fed. Aid Project. W-109-R-2, Job 1. Austin.

ATTWATER'S PRAIRIE CHICKEN (Tympanuchus cupido attwateri)

The boundaries on maps depict the present range of this Federal and State endangered species native to the coastal prairie of Texas.

References

National Fish and Wildlife Laboratory. 1980. Selected vertebrate endangered species of the seacoast of the United States: Attwater's greater prairie chicken. Biological Services Program. FWS/OBS-80/01.10. March 1980. 5 pp.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

WHITE-WINGED DOVE (Zenaida asiatica)

This species is found in the lower Rio Grande Valley, although it extends inland to the Edwards Plateau,

and up to the central Texas coast (Oberholser et al. 1974). The clearing of brushland has reduced the preferred habitat, and presently most of the population has adapted to mature citrus groves. Boundaries on maps depict areas of concentration for species.

References

Lard, C.T. Unpublished. Personal communication. March 1980. U.S. Fish and Wildlife Service. Victoria, Tex.

Oberholser, H.C., L.A. Fuertes, and E.B. Kincaid, Jr. 1974. The bird life of Texas. The University of Texas Press, Austin. 2 Vols.

BALD EAGLE (*Haliaeetus leucocephalus*)

Known or reported nesting areas of the southern bald eagle (Federal and State endangered species) are plotted on maps as generalized locations.

References

National Fish and Wildlife Laboratory. 1980. Selected vertebrate endangered species of the seacoast of the United States: Attwater's greater prairie chicken, Biological Services Program. FWS/OBS-80/01.10. March 1980. 5 pp.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

FINFISH NURSERY

Areas are delineated that have been reported as known nursery areas for various species of finfish, such as red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscion nebulosus*), black drum (*Pogonias cromis*), sheepshead (*Archosargus probatocephalus*), and southern flounder (*Paralichthys lethostigma*). The majority of mapped areas are adjacent to seagrass beds and marshes.

References

Henley, D.E., and D.G. Rauschuber. 1978. Studies of freshwater needs of fish and wildlife resources in Nueces-Corpus Christi Bay area, Texas. Presented to U.S. Dept. Interior, Fish and Wildlife Service by Henningson, Durham and Richardsons, Inc. of Texas in association with North Texas State University Contract 14-16-0009-77-074. 2 vols.

Texas Parks and Wildlife Department. 1975a. Fishery resources of the Corpus Christi Bay system and factors relating to their viability. Coastal Fisheries Branch, Austin. 38 pp.

Texas Parks and Wildlife Department. 1975b. Fishery resources of the Lavaca-Matagorda Bay system and factors relating to their viability. Coastal Fisheries Branch, Austin. 57 pp.

Texas Parks and Wildlife Department. 1975c. Fishery resources of the Aransas Bay system and factors

relating to their viability. Coastal Fisheries Branch, Austin.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

SEAGRASS BEDS

Submerged aquatic plants, frequently called seagrass beds, along the Texas coast are dominated by shoalgrass (Halodule beaudettei), widgeongrass (Ruppia maritima), manatee grass (Cymodocea filiformis), and turtlegrass (Thalassia testudinum) (Shew et al. 1981). The maps depict known seagrass beds. There has been no attempt to delineate species types found in a particular area or density of beds.

References

Brown, L.F., Jr., J.L. Brewton, J.H. McGowen, T.J. Evans, W.L. Fisher, and C.G. Groat. 1976. Environmental geologic atlas of the Texas coastal zone - Corpus Christi area. The University of Texas, Bureau of Economic Geology, Austin. 124 pp.

Brown, L.F., Jr., J.L. Brewton, T.J. Evans, J.H. McGowen, W.A. White, C.G. Groat, and W.L. Fisher. 1980. Environmental geologic atlas of the Texas coastal zone-Brownsville-Harlingen area. The University of Texas, Bureau of Economic Geology, Austin. 139 pp.

Fisher, W.L., J.H. McGowen, L.F. Brown, Jr., and C.G. Groat. 1972. Environmental geologic atlas of the Texas coastal zone-Galveston-Houston area. The University of Texas, Bureau of Economic Geology, Austin. 91 pp.

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McGowen, J.H., L.F. Brown, Jr., T.J. Evans, W.L. Fisher, and C.G. Groat. 1976. Environmental geologic atlas of the Texas coastal zone Bay City - Freeport area. The University of Texas, Bureau of Economic Geology, Austin. 98 pp.

Merkord, G. Unpublished. The distribution and abundance of seagrasses in the Laguna-Madre of Texas. M.S. Thesis. Texas A&I University, Kingsville.

Shew, D.M., R.H. Baumann, T.H. Fritts, and L.S. Dunn. 1981. Texas Barrier Islands Region ecological characterization: environmental synthesis papers. U.S. Fish and Wildlife Service, Biological Services Program. Washington, D.C. FWS/OBS-81/32. 413 pp.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast. Prepared for the General Land Office of Texas. Austin.

The University of Texas, Austin. Unpublished. Biological assemblage maps. Prepared by the Bureau of Economic Geology for the Texas

General Land Office. Approximate data base 1969-1972.

U.S. Fish and Wildlife Service. 1979. National wetland inventory and land-use maps of the Texas Barrier Islands Region. 303 - 1:24,000 quadrangles. Prepared by Texas A&M University, College Station, and U.S. Fish and Wildlife Service, St. Petersburg, Fla.

HOUSTON TOAD (Bufo boustonenis)

Present-day (known) distribution of the Federal and State endangered Houston Toad is depicted.

Reference

National Fish and Wildlife Laboratory. 1980. Selected vertebrate endangered species of the seacoast of the United States: Houston toad. Biological Services Program. Washington, D.C. FWS/OBS-80/01.38. March 1980. 5 pp.

OAK MOTTE WOODLANDS

Oak mottes, live oak (Quercus virginiana), along with scrub, are considered by Johnston (1955) the climax communities of the sandy ridges in the South Texas Coastal Plain. The maps portray known oak motte woodlands. Oak mottes are important areas for wildlife, such as the endangered ocelot and jagarundi, passerine birds, and various duck species.

References

Brown, L.F., Jr., J.H. McGowen, T.J. Evans, C.G. Groat, and W.L. Fisher. 1977. Environmental geologic atlas of the Texas coastal zone - Kingsville area. The University of Texas, Bureau of Economic Geology, Austin. 131 pp.

Brown, L.F., Jr., J.L. Brewton, T.J. Evans, J.H. McGowen, W.A. White, C.G. Groat, and W.L. Fisher. 1980. Environmental geologic atlas of the Texas coastal zone-Brownsville-Harlingen area. The University of Texas, Bureau of Economic Geology, Austin. 139 pp.

Johnston, M.C. 1955. Vegetation of the eolian plain and associated coastal features of southern Texas. Ph.D. Dissertation. The University of Texas, Austin.

U.S. Fish and Wildlife Service. 1979. National wetland inventory and land-use maps of the Texas Barrier Islands Region. 303 - 1:24,000 quadrangles. Prepared by Texas A&M University, College Station, and U.S. Fish and Wildlife Service, St. Petersburg, Fla.

WOOD DUCK (Aix sponsa)

Because of flooded bottomland hardwoods, southeastern Texas has sustained populations of native wood ducks for many years. Known concentration areas are depicted.

References

Lard, C. T. Unpublished. Personal communication. March 1980. U.S. Fish and Wildlife Service, Victoria, Tex.

Lay, D. Unpublished. Personal Communication. April 1980. Wildlife biologist. Nacogdoches, Tex.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

ALLIGATOR (*Alligator mississippiensis*)

Known concentration areas for this protected species are shown.

References

National Fish and Wildlife Laboratory. 1980. Selected vertebrate endangered species of the seacoast of the United States: American alligator. Biological Services Program. FWS/OBS-80/01.39. March 1980. 9 pp.

Texas Natural Areas Survey. n.d. The natural areas of Texas (preliminary listing). Student Council on Pollution and Environment. Austin. 286 pp.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

RIO GRANDE SUBTROPICAL WOODLANDS

These subtropical woodlands are presently restricted to the Rio Grande River and support wildlife, such as the endangered jagarundi and ocelot, and numerous bird species. Areas where these woodlands are found are delineated.

References

Brown, L.F., Jr., J.L. Brewton, T.J. Evans, J.H. McGowen, W.A. White, C.G. Groat, and W.L. Fisher. 1980. Environmental geologic atlas of the Texas coastal zone-Brownsville-Harlingen area. The University of Texas, Bureau of Economic Geology, Austin. 139 pp.

U.S. Fish and Wildlife Service. 1979. National wetland inventory and land-use maps of the Texas Barrier Islands Region. 303 - 1:24,000 quadrangles. Prepared by Texas A&M University, College Station, and U.S. Fish and Wildlife Service, St. Petersburg, Fla.

OYSTER BEDS

Known beds for the American oyster (*Crassostrea virginica*) are plotted. The Galveston Bay and Matagorda Bay areas rank one and two in harvest, respectively, in coastal Texas.

References

Brown, L.F., Jr. J.L. Brewton, J.H. McGowen, T.J. Evans, W.L. Fisher, and C.G. Groat. 1976. Environmental geologic atlas of the Texas coastal zone - Corpus Christi area. The University of Texas, Bureau of Economic Geology, Austin. 124 pp.

Brown, L.F., Jr., J.H. McGowen, T.J. Evans, C.G. Groat, and W.L. Fisher. 1977. Environmental geologic atlas of the Texas coastal zone - Kingsville area. The University of Texas, Bureau of Economic Geology, Austin. 131 pp.

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1980. Environmental geologic atlas of the Texas coastal zone, Brownsville-Harligen area. The University of Texas, Bureau of Economic Geology, Austin. 139 pp.

Fisher, W.L., J.H. McGowen, L.F. Brown, Jr., and C.G. Groat. 1972. Environmental geologic atlas of the Texas coastal zone-Galveston-Houston area. The University of Texas, Bureau of Economic Geology, Austin. 91 pp.

McGowen, J.H., C.V. Proctor, Jr., L.F. Brown, Jr., T.J. Evans, W.L. Fisher, and C.G. Groat. 1976. Environmental geological atlas of the Texas coastal zone - Port Lavaca area. The University of Texas, Bureau of Economic Geology, Austin. 107 pp.

McGowen, J.H., L.F. Brown, Jr., T.J. Evans, W.L. Fisher, and C.G. Groat. 1976. Environmental geologic atlas of the Texas coastal zone - Bay City - Freeport area. The University of Texas, Bureau of Economic Geology, Austin. 98 pp.

Texas Parks and Wildlife Department. 1975a. Fishery resources of the Lavaca-Matagorda Bay system and factors relating to their viability. Coastal Fisheries Branch, Austin. 57 pp.

Texas Parks and Wildlife Department. 1975b. San Antonio Bay System. Map plate. Austin, Texas. Federal Aid Project. 2-160-R.

Texas Parks and Wildlife Department. n.d. The oyster reefs of Galveston Bay. Coastal Fisheries Branch, Austin, Texas, in cooperation with the U.S. Dep. Commerce, Natl. Oceanic and Atmos. Admin., Natl. Marine Fish. Serv.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

U.S. Army Corps of Engineers. 1980. Flood control and major drainage improvement in Willacy and Hidalgo Counties, Texas. Full environmental impact statement. Galveston, Texas.

U.S. Fish and Wildlife Service. 1979. National wetland inventory and land-use maps of the Texas Barrier Islands Region. 303 - 1:24,000 quadrangles. Prepared by Texas A&M University, College Station, and U.S. Fish and Wildlife Service, St. Petersburg, Fla.

AREAS OF ECOLOGICAL CONCERN

These areas are defined by the U.S. Fish and Wildlife Service (1977) as "areas having high quality natural breeding and wintering habitat of current demonstrated importance to waterfowl, and where a current or an anticipated threat to the habitat exists." The following list correlates number on map to name of area:

P_1-McFaddin
P_2-Oyster Bayou
P_3-Robinson Bayou
P_4-Lake Surprise
P_5-Halls Bayou
P_6-Haskins Mound
P_7-Slop Bowl
P_8-Perry Marsh
P_9-Smith Marsh
P_{14}-Guadalupe River
P_{15}-Welder Flats
P_{16}-San Jose Island
P_{17}-Port Bay and McCampbell Slough
P_{18}-Nueces River

P_{10}-Big Bogg
P_{11}-Mad Island
P_{12}-Buttermilk
P_{13}-Swan Lakes
P_{19}-King Ranch
P_{20}-Laguna Madre
P_{21}-West Laguna
P_{22}-Redhead Ridge

References

U.S. Department of the Interior, Fish and Wildlife Service. 1977. Wetlands preservation program. Texas Gulf Coast Category 8. Albuquerque, N.M.

WHOOPING CRANE WINTERING HABITAT (Q)

Over 90 percent of the world population of wild whooping cranes (Grus americana) winter in the Copano-Aransas and San Antonio Bay areas. These areas are shown.

References

National Fish and Wildlife Laboratory. 1980. Selected vertebrate endangered species of the seacoast of the United States: whooping crane. Biological Services Program. FWS/OBS-80/01.3. March 1980. 10 pp.

Texas Parks and Wildlife Department. 1978. Nongame wildlife investigations. Species status evaluation. Special report, wintering whooping crane populations and human activities on the central Texas coast. Austin, Texas. Federal Aid Project. W-103-R-4. Job 1.

COLONIAL WATERBIRD ROOKERY

Individual rookeries found in the Texas Colonial Waterbird Census taken from 1973 to 1976 are plotted. For additional information on population estimates and types of waterbirds found, please refer to publication cited below.

References

Blacklock, G.W., D.R. Blankenship, S. Kennedy, K.A. King, R.T. Paul, R.D. Slock, J.D. Smith, and R.C. Telfair. 1978. Texas colonial waterbird census, 1973-1976. Texas Parks and Wildlife Dep., Austin. F.A. Rep. Ser. 15.

SHRIMP NURSERY

White shrimp (Penaeus setiferus) ranks first in harvest for coastal Texas, followed by brown (Penaeus aztecus) and pink (Penaeus duorarum) shrimp. Primary nursery areas for the various bays in Texas are shown.

References

Henley, D.E., and D.G. Rauschuber. 1978. Studies of freshwater needs of fish and wildlife resources in Nueces-Corpus Christi Bay area, Texas. Presented to U.S. Department Interior, Fish and Wildlife Service by Henningson, Durham and Richardsons, Inc. of Texas in association with North Texas State University. Contract 14-16-0009-77-074. 2 vols.

Texas Parks and Wildlife Department. 1975a. Fishery resources of the Corpus Christi Bay system and factors relating to their viability. Coastal Fisheries Branch, Austin. 38 pp.

Texas Parks and Wildlife Service. 1975b. Fishery resources of the Lavaca-Matagorda Bay system and

factors relating to their viability. Coastal Fisheries Branch, Austin. 57 pp.

Texas Parks and Wildlife Service. 1975c. Fishery resources of the Aransas Bay system and factors relating to their viability. Coastal Fisheries Branch, Austin.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

RIO GRANDE TURKEY (*Meleagris gallopavo intermedia*)

Known concentration areas, primarily floodplain and upland brush, for the species are depicted.

References

Lard, C. T. Unpublished. Personal communication. March 1980. U.S. Fish and Wildlife Service, Victoria, Tex.

Texas Parks and Wildlife Department. 1978. Upland game investigations. Upland game harvest recommendations. Austin, Texas. Federal Aid Project. W-108-R-1, Job 1.

UNIQUE WILDLIFE ECOSYSTEM

These areas contain key habitats for fish and wildlife resources as defined in the publication, "Concept plan-unique wildlife ecosystems, Texas," produced by U.S. Fish and Wildlife Service. The following list correlates number on map to name of area:

U_1 - Smith Woods
U_2 - Matagorda Island (Wynne Tract)
U_3 - Welder Flats
U_4 - Lamar Peninsula
U_5 - Southmost Ranch

References

U.S. Dept. of the Interior, Fish and Wildlife Service. 1979. Concept plan - unique wildlife ecosystems, Texas. Albuquerque, N.M. 164 pp.

WATERFOWL AND OTHER WETLAND BIRDS

Known concentration areas for these birds are delineated.

References

Clapp, R.B., R.C. Banks, D. Morgan-Jacobs, and W.A. Hoffman. 1982. Marine birds of the Southeastern United States and Gulf of Mexico. Part I. Gaviiformes through Pelecaniformes. U.S. Fish and Wildlife Service, Division of Biological Services, Washington, D.C. FWS/OBS-82/01. 637 pp.

Clapp, R.B., D. Morgan-Jacobs, and R.C. Banks. 1982. Marine birds of the Southeastern United States and Gulf of Mexico. Part II: Anseriformes. U.S. Fish and Wildlife Service, Division of Biological Services, Washington, D.C. FWS/OBS-82/20. 492 pp.

Clapp, R.B., D. Morgan-Jacobs, and R.C. Banks. 1983. Marine birds of the Southeastern United States and Gulf of Mexico. Part III: Charadriiformes. U.S. Fish and Wildlife Service, Division of

Biological Services, Washington, D.C. FWS/OBS-83/30. 853 pp.

Texas Natural Area Survey. n.d. The natural areas of Texas (preliminary listing). Student Council on Pollution and Environment. 286 pp.

Texas Parks and Wildlife Department. Unpublished. Biological resource maps along the Texas coast (1976). Prepared for the General Land Office of Texas. Austin.

WHOOPING CRANE WINTERING HABITAT (X)

An area defined by the U.S. Fish and Wildlife Service in the Federal Register, Vol. 43, No. 94, page 20942, is depicted as the primary wintering ground for the Federal and State endangered whooping crane (Grus americana).

VIRGIN BRUSH HABITAT

The brush habitat is dominated by mesquite with spiny hackberry (Celtis pallida), white thorn (Zizyphus obtusifolia), and lime prickly ash (Xanthoxylum fagara) being common (Johnston 1955). This habitat was extensive along the higher elevations of the Rio Grande floodplain before large-scale clearing (Bogusch 1952; Johnston 1955), and furnishes habitat for deer, white-winged dove, chachalaca, and the endangered ocelot and jaguarundi.

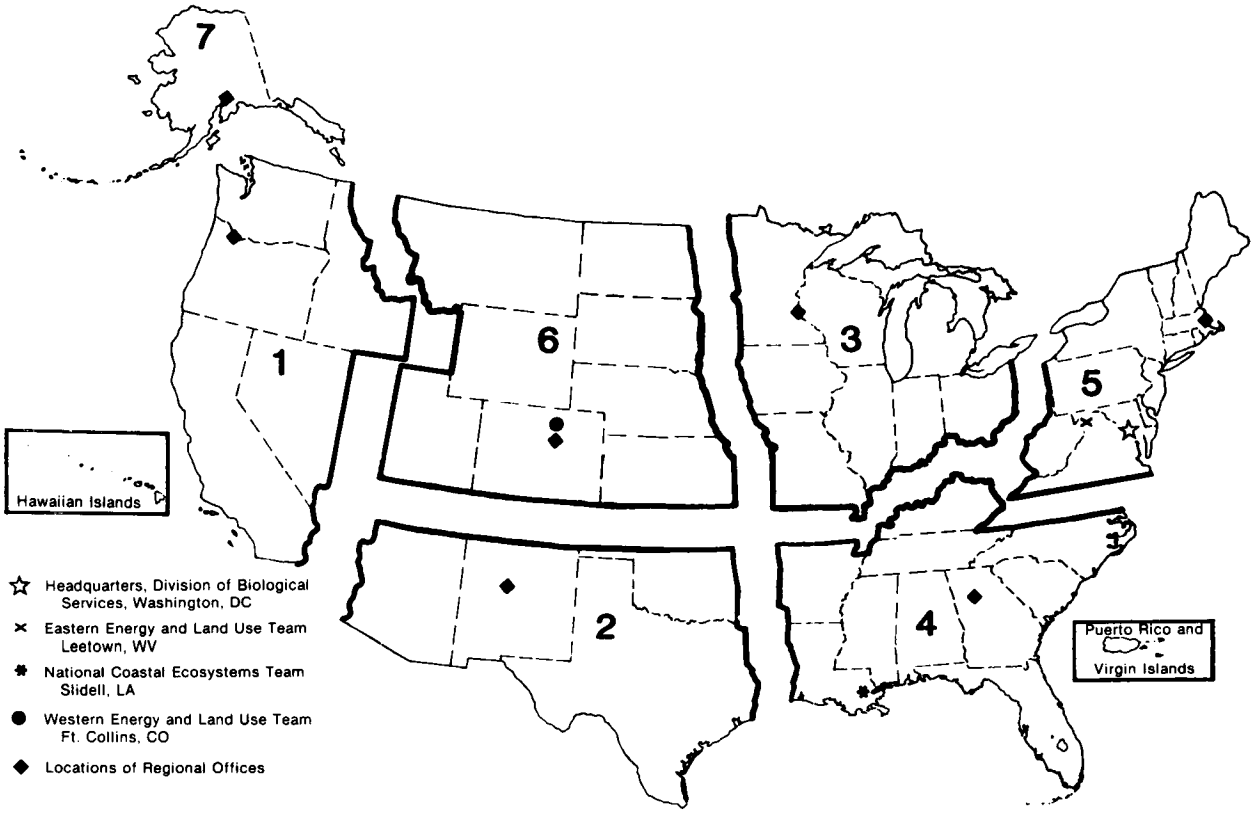
References

Bogusch, E. R. 1952. Brush invasion in the Rio Grande Plain of Texas. Tex. J. Sci. 4(1):85-91.

Johnston, M. C. 1955. Vegetation of the eolian plain and associated coastal features of southern Texas. Ph.D. Dissertation. The University of Texas, Austin.

University of Texas, Austin. Unpublished. Biological assemblage maps. Prepared by the Bureau of Economic Geology for the Texas General Land Office. Approximate data base 1969-1972.

U. S. Fish and Wildlife Service. 1979. National wetland inventory and land-use maps of the Texas Barrier Islands Region. 303 - 1:24,000 quadrangles. Prepared by Texas A&M University, College Station, and U. S. Fish ad Wildlife Service, St. Petersburg, Fla.



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Twin Cities, Minnesota 55111

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U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, Colorado 80225

REGION 7
Regional Director
U.S. Fish and Wildlife Service
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DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.