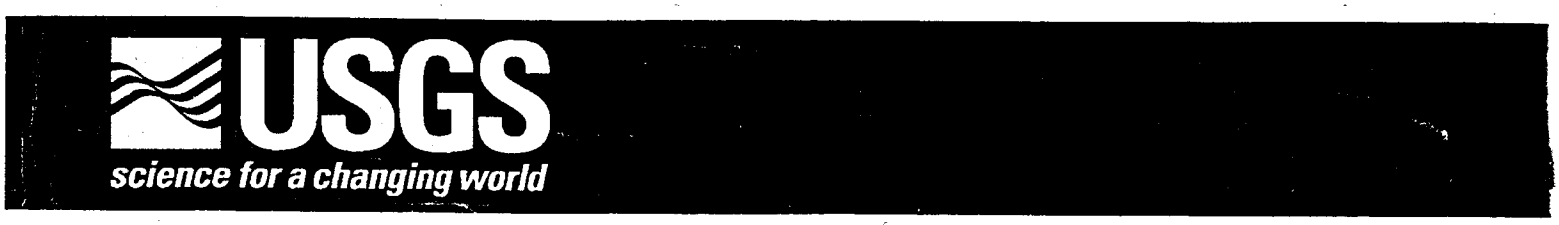
U.S. Department of the Interior
U.S. Geological Survey

Landcover Classification for Padre Island National Seashore

April 27, 1998



April 27, 1998

FINAL REPORT

prepared for
Padre Island National Seashore
National Park Service
9405 S.P.I.D.
Corpus Christi, TX 78418

Landcover Classification for Padre Island National Seashore

prepared by

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Introduction

Padre Island National Seashore encompasses 128,363.65 acres (per this report) of open water, uplands, extensive wetlands, and minor developments. These areas provide habitats and nursery grounds to many threatened and endangered species; however, they also contain oil and gas exploration and development activities. Consequently, Padre Island National Seashore, Big Thicket National Preserve, and Lake Meredith National Recreation Area are developing an Oil and Gas Management Plan. The plan's purpose is to improve resource management and assist oil and gas operators with understanding park regulations and procedures. A critical part of this plan is the ability to assess the location, extent, and contents of sensitive habitats that occur within the parks, preserves, and recreation areas. National Park Service (NPS) and U.S. Geological Survey (USGS) personnel have joined to address this assessment need. The classified map and collateral products contained and described in this report were generated by that collaboration.

Deliverables described in the original "Scope of Work" (included as part of this report) included the five created products.

1. A digital file in ERDAS format showing the vegetation classes for the park.
2. A hardcopy map of the vegetation classes for the park.
3. A hardcopy map of the Landsat Thematic Mapper (TM) imagery with the classification overlay.

4. A digital copy of the park's 1994 Landsat (TM) imagery on CD.
5. An ArcView 3 project file of the classified data.

These products have been transferred to NPS personnel. Products not listed, and therefore not required as part of this agreement, were also generated and have been transferred to NPS personnel, including:

1. In addition to the digital and hardcopy map of the entire park (Figure 1), three digital and three hardcopy maps showing the northern, central, and southern areas of the park (Figures 2, 3, and 4).
2. Metadata files required by the Federal Geographic Data Committee mandates. These files include: Padre.met -- raw and classified data, poster1.met -- "Padre Island National Seashore, Texas", poster2.met -- "Landcover Classification for Padre Island National Seashore, Map 1 of 3", poster3.met -- "Landcover Classification for Padre Island National Seashore, Map 2 of 3", poster4.met -- "Landcover Classification for Padre Island National Seashore, Map 3 of 3", and poster5.met -- "Padre Island National Seashore, Texas; Novillo Line Transect (May 12, 1992)".
3. A digital hyperlink file and hardcopy rendition of ground pictures linked to location points on a SPOT image backdrop (Figure 5).
4. An improved version of the normal depiction of classified data (Tables 1 and 2), based on NOAA's Coastal Change Analysis Program (C-CAP) and pertinent to the National Vegetation Classification System (NVCS).

5. A CD containing in addition to the 1994 Landsat (TM) image, all map files, scanned photography, text and line files, and the ArcView 3 project and associated files.
6. Two accuracy assessments, one based on 479 map points verified with 1:32,500 high-resolution color infrared photography, and another generated with 165 points collected from a helicopter survey of the park in April, 1998.

Methods and Product Description

Methods used to classify and interpret the accuracy of the classified map are based on protocols developed for gulf coast wetland and adjacent areas as part of the National Oceanic and Atmospheric Administration (NOAA) Coastal Change and Analysis Project (C-CAP) program. These standardized protocols are currently used by numerous federal, state, and local agencies and are the basis for the National Vegetation Classification System (NVCS) established by the Federal Geographic Data Committee. Map class descriptions fit the NVCS guidelines, and therefore, the created map follows widely used and accepted protocols for coastal landcover classification.

Along with the general class descriptions listed on the three-part map series (Figures 2, 3, and 4 and Table 1), all twelve classes were assigned to a physiognomic level (class, subclass, group, subgroup, formation) and a floristic level (alliance association) as required by NVCS convention (Table 2). Two accuracy assessments of the classification were performed. The first used a class-stratified, random-sample design to choose 479 points on the classified map of the park. Locations of these points were transferred to the February 11, 1994 high-resolution color infrared photography[1] (1:32,500) collected near the same time as the Landsat (TM) image used in the classification (Table 3, Reference Data refers to the interpreted photography class). Assessment with this method and these

[1] Photography was collected for the Coastal Barrier Resources Act of 1982 and resides at the National Wetlands Research Center in Lafayette, Louisiana. Contact: Larry Handley (larry_handley@usgs.gov).

data sources determined an overall 86.9% classification accuracy and a 0.86 Kappa Statistic. The second accuracy assessment method used 165 class-stratified, randomly selected points from the classified map and compared the points to observations obtained from a helicopter survey (Table 4). This comparison resulted in a 98% estimate of correct classification.

Finally, aerial estimates of each of the 12 classes within the park boundaries (Table 5) and within the classified area that included nonpark property (Table 6) were summarized. Within the Padre Island National Seashore, the largest coverages were associated with Laguna Madre waters (about 24%), wind tidal flats (about 22%), emergent vegetation (about 15%), and grassland (about 10%). The same classes dominated the larger classified area (Table 6), although Laguna Madre waters covered a proportionately larger percent of the area. The minimum mapping unit was estimated at 30 m.

Table 1. General Class Descriptions

1. **Inland Water** - Semipermanent areas of standing freshwater that are found parallel to the foredune ridge along the interior of the island. Depending on depth, vegetation may consist of species such as pennywort (*Hydrocotyle bonariensis*).

2. **Laguna Madre** – A hypersaline lagoon occurring between the Texas mainland and the barrier island. Several species of seagrasses occur in this habitat including Shoal Grass (*Halodule wrightii*), Manatee Grass (*Cymodocea filiformis*), and Widgeon Grass (*Ruppia maritima*).

3. **Gulf of Mexico** – Gulf of Mexico bordering the eastern edge of the barrier island.

4. **Wind Tidal Flat** - Expanses of fine sand/mud along the western edge of the barrier island. It is periodically inundated with salt water pushed ashore by northern winds. It is often vegetated with the blue-green algae (*Lyngbya confervoides*).

5. **Sparse Vegetation** - Sand dunes of varying height that are sparsely vegetated with seacoast bluestem (*Schizachyrium littorale*), sea oats (*Uniola paniculata*), bitter panicum (*Panicum amarum*), other grasses and forbs.

6. **Emergent Wetland** - Shallow depressions that are inundated with freshwater from rain events or saltwater from tropical storms. These areas are vegetated with bulrush (*Scirpus americanus*), cattails (*Typha domingensis*), black willow (*Salix nigra*), gulfdune paspalum (*Paspalum monostachyum*), and pennywort (*Hydrocotyle bonariensis*).

7. **Grassland** - Areas containing dune hummocks that are densely vegetated with grasses including seacoast bluestem (*Schizachyrium littorale*), cordgrass species (*Spartina* sp.), gulfdune paspalum (*Paspalum monostachyum*), bushy bluestem (*Andropogon glomeratus*), and others.

8. **Beach** - A thin area extending the entire length of the island adjacent to the Gulf of Mexico. It varies in width depending on the season and is made up of sand and shell fragments with no vegetation.

9. **Urban** - Developed areas including roadways, buildings, and visitor services.

10. **Sand Dunes** - Areas of unvegetated sand located immediately landward of the beach or along the western edge of the barrier island.

11. **Unconsolidated Shore** - Areas adjacent to washover channels and inland water areas consisting of fine sands with little to no vegetation. If vegetation is present, it is sparse with species such as cattails (*Typha domingensis*) or bulrush (*Scirpus americanus*)

Table 1. General Class Descriptions, con't

12. **Washover Channel** - Channels created by tropical storms that are cut perpendicular to the beach through the foredune ridge. These areas may contain water from rain events. If water is present, vegetation may consist of blue green algae such as *Lyngbya confervoides*.

Table 2. National Vegetation Classification Standards for Padre Island National Seashore Landcover Classes.

1. **Inland Water**

Division	Vegetated
Order	Herbaceous Dominated
Physiognomic Class	Herbaceous Vegetation
Physiognomic Subclass	Perennial graminoid
Physiognomic Group	Tropical or subtropical
Subgroup	Natural/Seminatural
Formation	Semipermanently flooded
Alliance	Hydrocotyle bonariensis Alliance
Association	Hydrocotyle bonariensis

2. **Laguna Madre**

Division	Vegetated
Order	Herbaceous Dominated
Physiognomic Class	Herbaceous Vegetation
Physiognomic Subclass	Hydromorphic rooted vegetation
Physiognomic Group	Tropical or subtropical
Subgroup	Natural/Seminatural
Formation	Permanently flooded
Alliance	Halodule wrightii Alliance
Association	Halodule wrightii / Cymodocea filiformis

3. **Gulf of Mexico**

Division	Non-Vegetated
Order	
Physiognomic Class	
Physiognomic Subclass	
Physiognomic Group	
Subgroup	
Formation	
Alliance	
Association	

Table 2. National Vegetation Classification Standards, con't

4. **Wind Tidal Flat**

Division	Vegetated
Order	Vegetation not dominate
Physiognomic Class	Sparse vegetation
Physiognomic Subclass	Unconsolidated material sand/mud
Physiognomic Group	Sparsely vegetated soil flats
Subgroup	Natural/seminatural
Formation	Tidal mud flats
Alliance	Lyngbya confervoides Alliance
Association	Lyngbya confervoides

5. **Sparse Vegetation**

Division	Vegetated
Order	Vegetation not dominate
Physiognomic Class	Sparse vegetation
Physiognomic Subclass	Unconsolidated material sand/mud
Physiognomic Group	Sparsely vegetated sand dunes
Subgroup	Natural/seminatural
Formation	Dunes with sparse herbaceous vegetation
Alliance	Schizachyrium littorale Alliance
Association	Seacoast bluestem, Schizachyrium littorale

6a. **Emergent Vegetation** (North end of park)

Division	Vegetated
Order	Herbaceous
Physiognomic Class	Herbaceous
Physiognomic Subclass	Perennial graminoid
Physiognomic Group	Tropical
Subgroup	Natural/seminatural
Formation	Seasonally flooded
Alliance	Typha domingensis Alliance
Association	Cattail, Typha domingensis

Table 2. National Vegetation Classification Standards, con't

6b. **Emergent Vegetation** (South end of park)

Division	Vegetated
Order	Herbaceous
Physiognomic Class	Herbaceous
Physiognomic Subclass	Perennial graminoid
Physiognomic Group	Tropical
Subgroup	Natural/seminatural
Formation	Seasonally flooded
Alliance	Scirpus americanus Alliance
Association	American Bulrush, Scirpus americanus

7a. **Grassland** (North end of Park)

Division	Vegetated
Order	Herbaceous
Physiognomic Class	Herbaceous
Physiognomic Subclass	Perennial graminoid
Physiognomic Group	Tropical
Subgroup	Natural/seminatural
Formation	Medium-tall bunch
Alliance	Schizachyrium littorale Alliance
Association	Seacoast bluestem, Schizachyrium littorale

7b. **Grassland** (South end of Park)

Division	Vegetated
Order	Herbaceous
Physiognomic Class	Herbaceous
Physiognomic Subclass	Perennial graminoid
Physiognomic Group	Tropical
Subgroup	Natural/seminatural
Formation	Medium-tall bunch
Alliance	Paspalum monostachyum Alliance
Association	Seacoast bluestem, Schizachyrium littorale Gulfdune paspalum, Paspalum monostachyum

Table 2. National Vegetation Classification Standards, con't

8. **Beach**

Division	Nonvegetated
Order	Vegetation not dominate
Physiognomic Class	Sparse vegetation
Physiognomic Subclass	Unconsolidated sand
Physiognomic Group	Sparsely vegetated sand flats
Subgroup	Natural/seminatural
Formation	Intermittently flooded sand beach
Alliance	
Association	

9. **Urban**

Division	Nonvegetated
Order	
Physiognomic Class	
Physiognomic Subclass	
Physiognomic Group	
Subgroup	
Formation	
Alliance	
Association	

10. **Sand Dune**

Division	Nonvegetated
Order	
Physiognomic Class	
Physiognomic Subclass	
Physiognomic Group	
Subgroup	
Formation	
Alliance	
Association	

Table 2. National Vegetation Classification Standards, con't

11. **Unconsolidated Shore**

Division	Vegetated
Order	Vegetation not dominate
Physiognomic Class	Sparse vegetation
Physiognomic Subclass	Unconsolidated material sand/mud
Physiognomic Group	Sparsely vegetated soil flats
Subgroup	Natural/seminatural
Formation	Seasonally/temporarily flooded mud flats
Alliance	Blue green algae sp. Alliance
Association	Blue green algae sp.

12. **Washover Channel**

Division	Vegetated
Order	Vegetation not dominate
Physiognomic Class	Sparse vegetation
Physiognomic Subclass	Unconsolidated material sand/mud
Physiognomic Group	Sparsely vegetated soil flats
Subgroup	Natural/seminatural
Formation	Intermittently flooded mud flats
Alliance	Lyngbya confervoides Alliance
Association	Lyngbya confervoides

Table 3. Accuracy Assessment Matrix
Comparison to High Resolution Color Infrared Photography

Classified Data	Reference Data 1	2	3	4	5	6	7	8	9	10	11	12	
1. Inland Water	29	0	0	0	0	1	0	0	0	0	1	0	31
2. Laguna Madre	0	38	0	0	0	0	0	0	0	0	2	0	40
3. Gulf of Mexico	0	0	45	0	0	0	0	4	0	0	1	0	50
4. Wind Tidal Flats	0	0	0	45	3	2	0	0	0	5	3	0	58
5. Sparse Veg.	0	0	0	0	32	0	0	1	0	0	3	2	38
6. Emergent Veg.	2	0	0	0	2	68	4	0	1	0	1	0	78
7. Grassland	0	0	0	0	3	7	36	0	0	0	0	0	46
8. Beach/Sand	0	0	0	0	2	0	0	32	0	0	0	0	34
9. Urban	0	0	0	0	0	0	0	0	7	0	0	0	7
10. Sand Dunes	0	0	0	0	0	0	0	0	0	33	0	0	33
11. Uncons. Shore	0	0	0	1	5	0	1	0	0	0	31	0	38
12. Washover Chn.	0	0	0	0	1	2	0	0	0	0	2	21	26
	31	38	45	46	48	80	41	37	8	38	44	23	479

Overall Accuracy : 86.875%
Overall Kappa Statistic : 0.855

Table 4. Accuracy Assessment Matrix
Comparison to Helicopter Survey

Classified	Reference Data												
Data	1	2	3	4	5	6	7	8	9	10	11	12	
1. Inland Water	14	0	0	0	0	0	0	0	0	0	0	0	14
2. Laguna Madre	0	14	0	0	0	0	0	0	0	0	0	0	14
3. Gulf of Mexico	0	0	13	0	0	0	0	0	0	0	0	0	13
4. Wind Tidal Flats	0	0	0	15	0	0	0	0	0	0	0	0	15
5. Sparse Veg.	0	0	0	0	13	0	0	0	0	0	0	0	13
6. Emergent Veg.	0	0	0	0	0	13	1	0	0	0	0	0	14
7. Grassland	0	0	0	0	0	1	14	0	0	0	0	0	15
8. Beach/Sand	0	0	0	0	0	0	0	14	0	0	0	0	14
9. Urban	0	0	0	0	0	0	0	0	14	0	0	0	14
10. Sand Dunes	0	0	0	0	0	0	0	0	0	13	0	0	13
11. Uncons. Shore	0	1	0	0	0	0	0	0	0	0	10	0	11
12. Washover Chn.	0	0	0	0	0	0	0	0	0	0	0	15	15
	14	15	13	15	13	14	15	14	14	13	10	15	165

Overall Accuracy : 98.181%
Overall Kappa Statistic : 0.980

Table 5. Acreage for Padre Island National Seashore

Class	Acres	% Park Area
Inland Water	2,339.53	1.82
Laguna Madre	30,007.71	23.38
Gulf of Mexico	12,634.55	9.84
Wind Tidal Flats	27,918.40	21.75
Sparse Vegetation	5,835.50	4.55
Emergent Vegetation	18,987.38	14.79
Grassland	13,235.87	10.31
Beach / Sand	3,191.97	2.49
Urban	420.44	0.33
Sand Dunes	5,985.94	4.66
Unconsolidated Shore	6,457.27	5.03
Washover Channels	1,145.10	0.89
Spoil Islands	203.99	0.16
TOTAL	128,363.65	100.00

Note: See Figure 1. for Authorized Seashore Boundary.

Table 6. Acreage for Classified Thematic Mapper Area

Class	Acres	% TM Area
Inland Water	2,406.20	0.74
Laguna Madre	137,951.56	42.44
Gulf of Mexico	18,714.71	5.76
Wind Tidal Flats	96,160.86	29.58
Sparse Vegetation	7,280.37	2.24
Emergent Vegetation	20,324.92	6.25
Grassland	14,704.30	4.52
Beach / Sand	4,146.18	1.28
Urban	462.44	0.14
Sand Dunes	6,973.71	2.15
Unconsolidated Shore	10,035.01	3.09
Washover Channels	1,333.54	0.41
Spoil Islands	4,558.18	1.40
TOTAL	325,051.98	100.00

Note: Acreage includes area inside and outside Authorized Seashore Boundary (Figure 1).

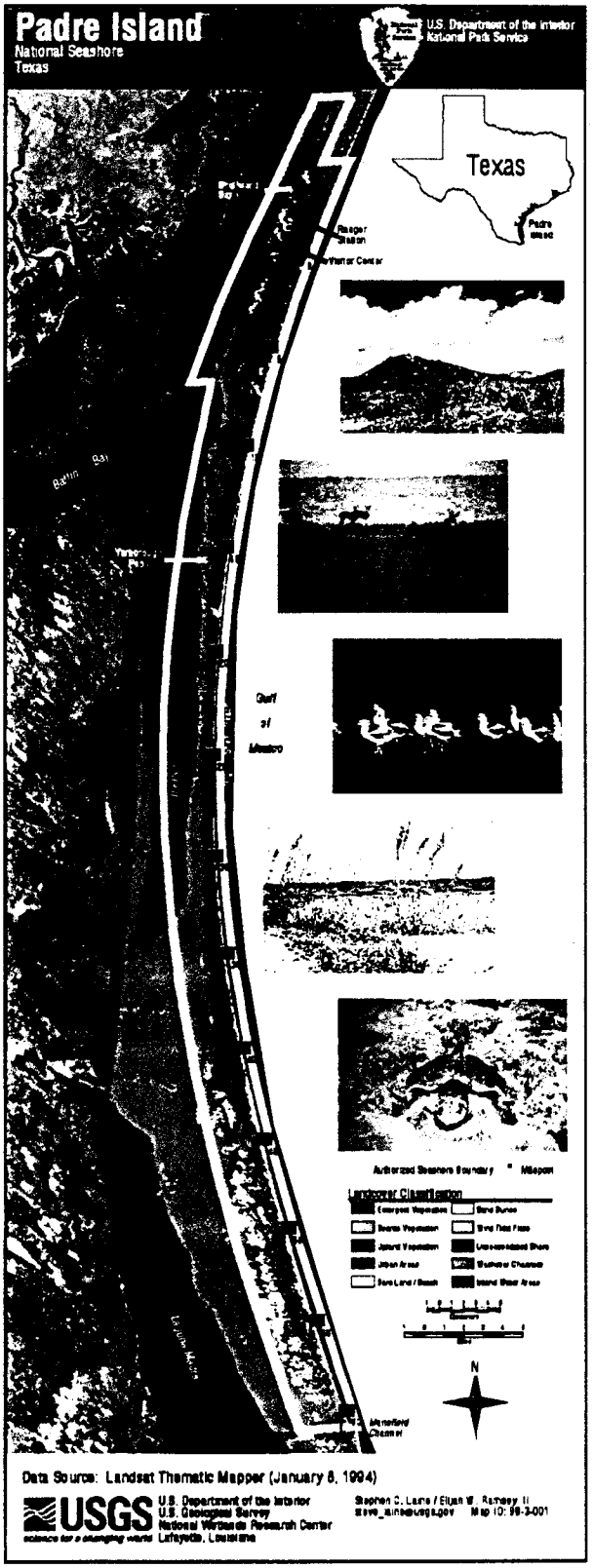

Padre Island
National Seashore
Texas
U.S. Department of the Interior
National Park Service
Texas
Gulf of Mexico
Data Source: Landsat Thematic Mapper (January 8, 1994)
USGS
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Lafayette, Louisiana

Figure 1

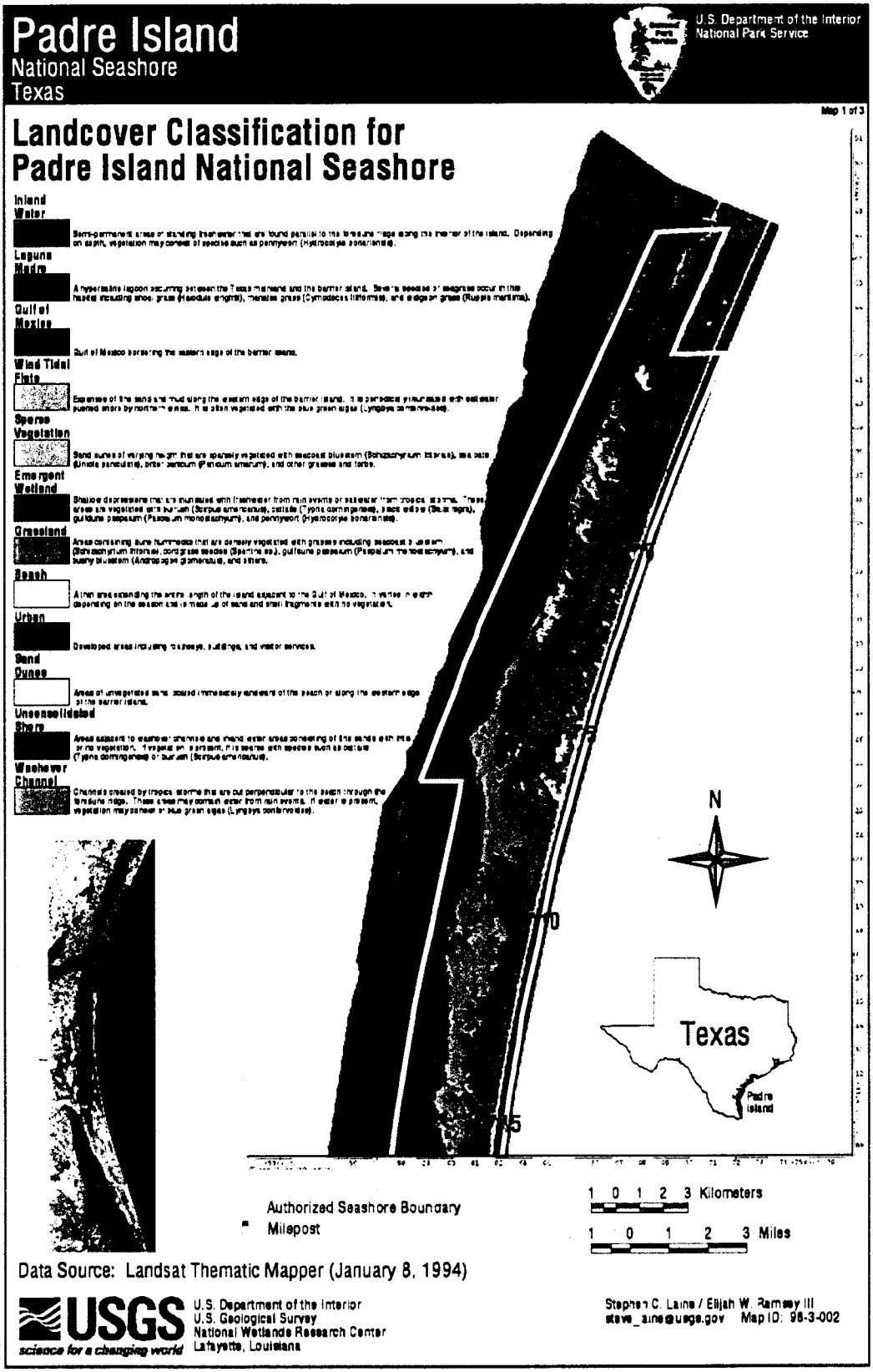

Padre Island
National Seashore
Texas
U.S. Department of the Interior
National Park Service
Map 1 of 3
Landcover Classification for
Padre Island National Seashore
Inland Water
Laguna Madre
Gulf of Mexico
Wind Tidal Flats
Sparse Vegetation
Emergent Wetland
Grassland
Beach
Urban
Sand Dunes
Unconsolidated Shore
Washover Channel
N
Texas
Padre Island
Authorized Seashore Boundary
Milepost
1 0 1 2 3 Kilometers
1 0 1 2 3 Miles
Data Source: Landsat Thematic Mapper (January 8, 1994)
USGS
science for a changing world
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Lafayette, Louisiana
Stephen C. Laine / Elijah W. Ramsey III
steve_laine@usgs.gov Map ID: 98-3-002

Figure 2

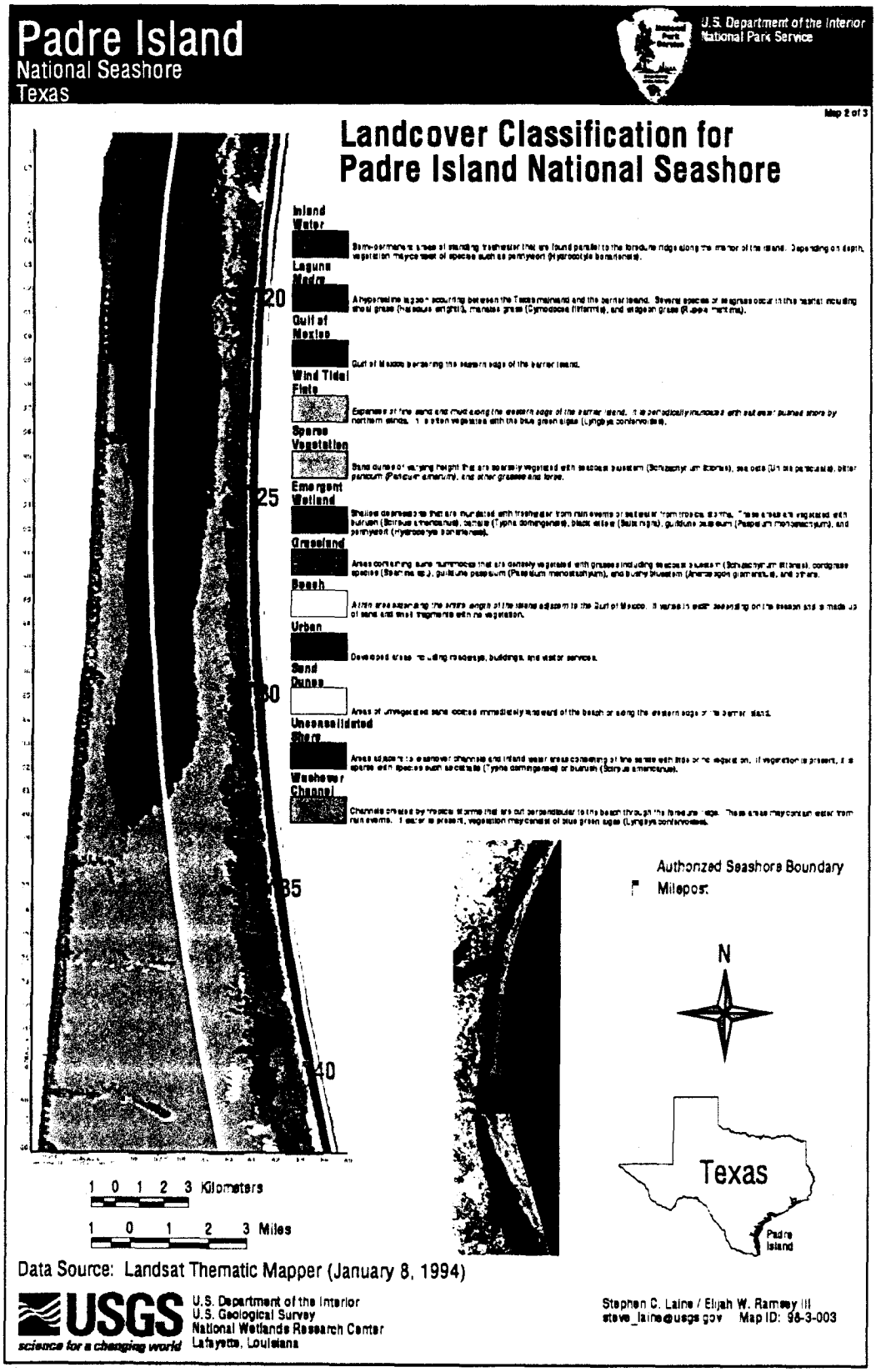

Padre Island
National Seashore
Texas
U.S. Department of the Interior
National Park Service
Map 2 of 3
Landcover Classification for
Padre Island National Seashore
Inland Water
Laguna Madre
Gulf of Mexico
Wind Tidal Flats
Sparse Vegetation
Emergent Wetland
Grassland
Beach
Urban
Sand Dunes
Unconsolidated Shore
Washover Channel
Authorized Seashore Boundary
Milepost
N
Texas
Padre Island
1 0 1 2 3 Kilometers
1 0 1 2 3 Miles
Data Source: Landsat Thematic Mapper (January 8, 1994)
USGS
science for a changing world
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Lafayette, Louisiana
Stephen C. Laine / Elijah W. Ramsey III
steve_laine@usgs.gov Map ID: 96-3-003

Figure 3

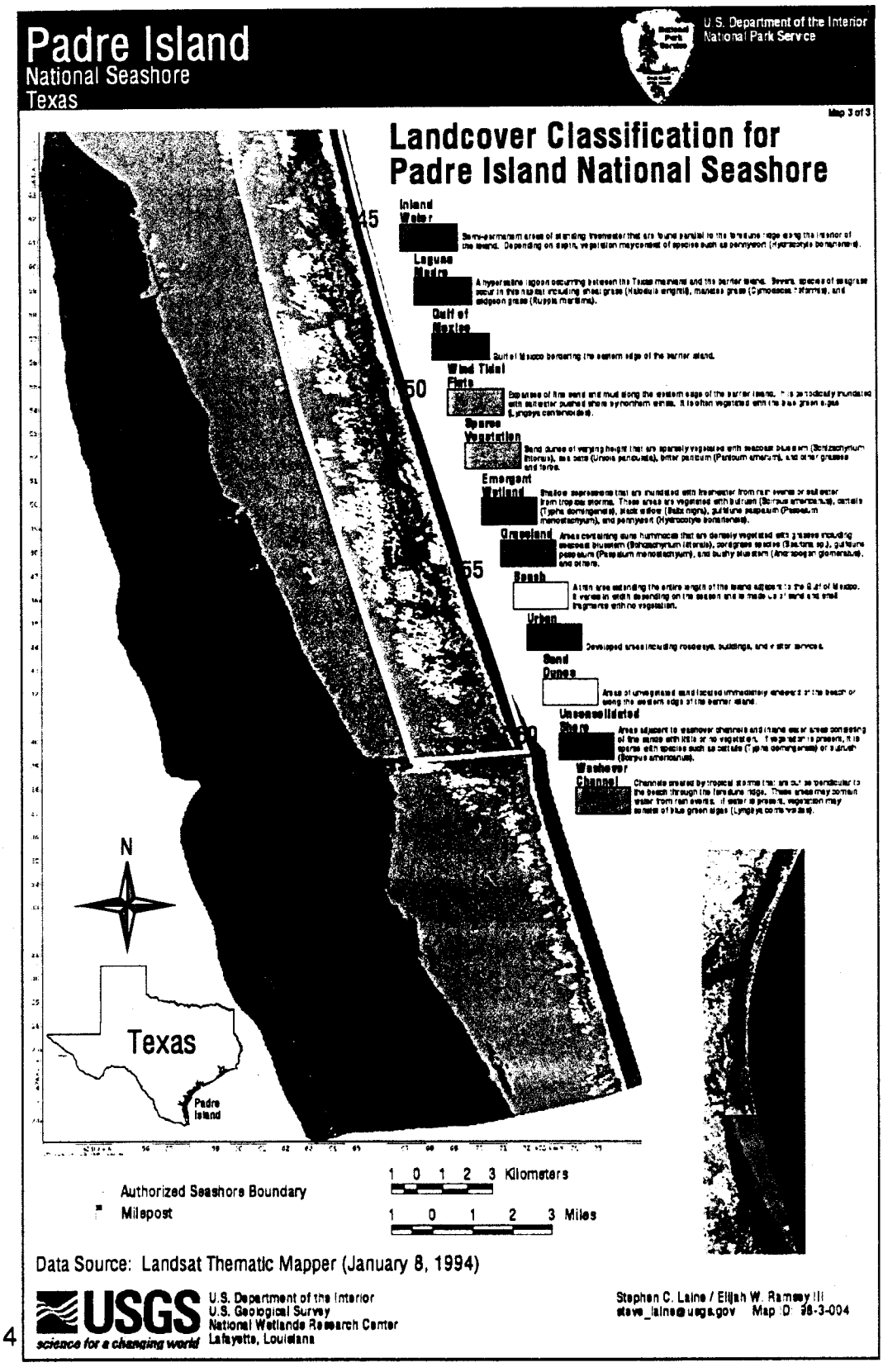

Padre Island
National Seashore
Texas
U.S. Department of the Interior
National Park Service
Map 3 of 3
Landcover Classification for
Padre Island National Seashore
Inland Water
Lagoon Marsh
Gulf of Mexico
Wind Tidal Flats
Sparse Vegetation
Emergent Wetland
Grassland
Beach
Urban
Sand Dunes
Unconsolidated Shore
Washover Channel
N
Texas
Padre Island
Authorized Seashore Boundary
Milepost
1 0 1 2 3 Kilometers
1 0 1 2 3 Miles
Data Source: Landsat Thematic Mapper (January 8, 1994)
USGS
science for a changing world
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Lafayette, Louisiana
Stephen C. Laine / Elijah W. Ramsey III
steve_laine@usgs.gov
Map ID: 98-3-004

Figure 4

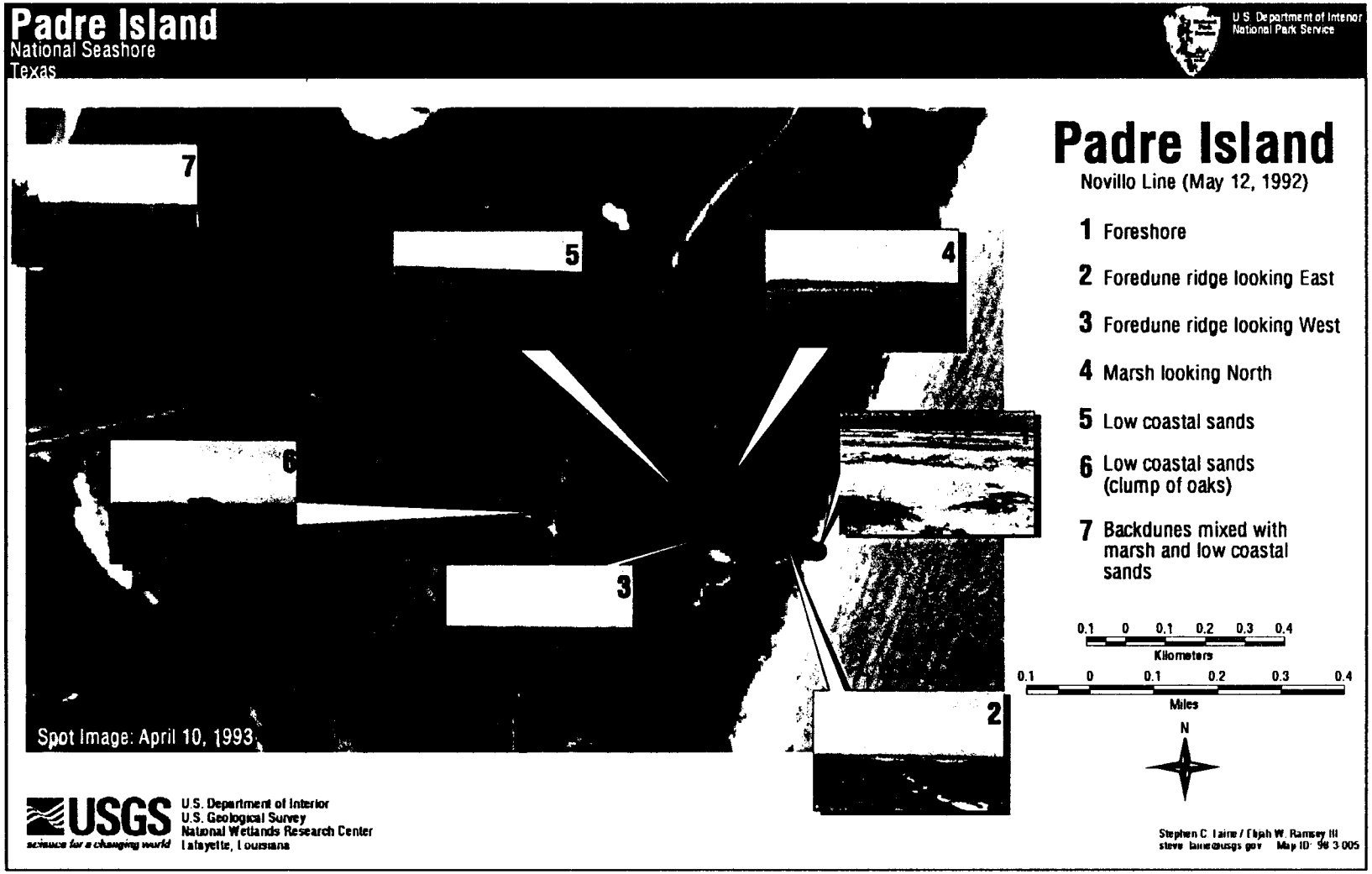

Padre Island
National Seashore
Texas
U.S. Department of Interior
National Park Service
7
5
4
6
3
2
Spot Image: April 10, 1993
Padre Island
Novillo Line (May 12, 1992)
1 Foreshore
2 Foredune ridge looking East
3 Foredune ridge looking West
4 Marsh looking North
5 Low coastal sands
6 Low coastal sands (clump of oaks)
7 Backdunes mixed with marsh and low coastal sands
0.1 0 0.1 0.2 0.3 0.4
Kilometers
0.1 0 0.1 0.2 0.3 0.4
Miles
N
USGS
science for a changing world
U.S. Department of Interior
U.S. Geological Survey
National Wetlands Research Center
Lafayette, Louisiana
Stephen C. Laine / Elijah W. Ramsey III
steve_laine@usgs.gov
May ID: 96 3 005

Figure 5

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THIS METADATA USES THE NBII CONTENT STANDARD, DEC.1995 DRAFT VERSION
(which is directly developed the U. S. Federal Geographic Data Committee's Content Standards for Digital Geospatial Metadata, June 8, 1994 version.)

This is an explanatory header block (between the dotted lines) meant to make immediate use of this information easier for users unfamiliar with the NBII Content Standard. The following is the primary layout for the standard:

SECTION 0

0. Metadata, in NBII Content Standard, Dec. 1995 draft version :
   1. IDENTIFICATION INFORMATION
   2. DATA QUALITY INFORMATION
   3. SPATIAL DATA ORGANIZATION INFORMATION
   4. SPATIAL REFERENCE INFORMATION
   5. ENTITY AND ATTRIBUTE INFORMATION
   6. DISTRIBUTION INFORMATION
   7. METADATA REFERENCE SECTION

The following three sections of the content standard are not included as separate sections, since they are never used alone.

   8. CITATION INFORMATION
   9. TIME PERIOD INFORMATION
   10. CONTACT INFORMATION

Some lines of the standard do not contain information, but are an important part of presenting the information contained in the standard in a complete and interpretable format using the

outline structure of the NBII Content Standard.
Some sections may contain similar information, as some sections overlap with respect to accuracy statements, source citations, etc. This programmed redundancy is present to insure complete understanding of source comments, disclaimer, etc. for the various types of users who will use this document.

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SECTION 1
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1. IDENTIFICATION INFORMATION
1.1. CITATION (uses Citation Info, section 8)
1.1.1. ORIGINATOR: National Biological Service's National Wetlands Research Center (in October 1996 became USGS BRD National Wetlands Research Center.).
1.1.2. PUBLICATION DATE: April 27, 1998
1.1.3. (Publication Time:)
1.1.4. TITLE: Vegetation Classification for Padre Island National Seashore
1.1.5. Edition:
1.1.6. Geospatial Data Presentation Form: Remote Sensing Imagery
1.1.7. Series Information: none
1.1.8. PUBLICATION INFORMATION
1.1.8.1. PUBLICATION PLACE: Lafayette, Louisiana, United States.
1.1.8.2. PUBLISHER: National Biological Service's National Wetlands Research Center (In October 1996 became USGS BRD National Wetlands Research Center.).
1.1.9. Other Citation Details:
1.1.10. (Online Linkage:) Online information will be determined by National Park Service at Padre Island National Seashore.
1.1.11. Larger Work Citation: This product is a vegetation classification of Padre Island National Seashore.
1.2. DESCRIPTION
1.2.1. ABSTRACT: This data set consists of one Thematic Mapper scene which was analyzed according to protocals defined by the NOAA Coastal Change Analysis Program (C-CAP) Guidelines to determine land cover, one SPOT scene, and 9 ArcView coverages.
1.2.2. PURPOSE: To provide a vegetative cover map that provides accurate information on the types, locations, and extents of all habitat types within the park.
1.2.3. (Supplemental Information:)
1.3. TIME PERIOD OF CONTENT
1.3.1. TIME PERIOD INFORMATION
1.3.1.1. SINGLE DATE/TIME
1.3.1.1.1. CALENDAR DATE: Thematic Mapper: January 8, 1994
SPOT : April 10, 1993
1.3.2. CURRENTNESS REFERENCE: Date of the Thematic Mapper scene and SPOT scene.
1.4. STATUS
1.4.1. PROGRESS: Complete
1.4.2. MAINTENANCE AND UPDATE FREQUENCY: None planned
1.5. SPATIAL DOMAIN
1.5.1. BOUNDING COORDINATES
1.5.1.1. WEST BOUNDING COORDINATE: -97.46345 longitude.
1.5.1.2. EAST BOUNDING COORDINATE: -97.22522 longitude.
1.5.1.3. NORTH BOUNDING COORDINATE: 27.57620 latitude.
1.5.1.4. SOUTH BOUNDING COORDINATE: 27.41467 latitude.
1.5.2. Detailed Boundary (Data Set G-Polygon)
1.6. KEYWORDS
1.6.1. THEME
1.6.1.1. THEME KEYWORD THESAURUS: None

1.6.1.2. THEME KEYWORD: land cover analysis
THEME KEYWORD: satellite image
THEME KEYWORD: remote sensing image
THEME KEYWORD: land cover
1.6.2. PLACE
1.6.2.1. PLACE KEYWORD THESAURUS: None
1.6.2.2. PLACE KEYWORD: Padre Island National Seashore
PLACE KEYWORD: Padre Island
PLACE KEYWORD: Texas
PLACE KEYWORD: Gulf of Mexico Coast
1.6.3. (Stratum)
1.6.4. (Temporal)
1.7. Taxonomy
1.8. ACCESS CONSTRAINTS:

NWRC Standard Data Liability Disclaimer (April 1997):
Although these data have been processed successfully on a computer system at the Biological Resource Division, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly recommended that these data are directly acquired from a Biological Resource Division server, and not indirectly through other sources which may have changed the data in some way. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data. The Biological Resource Division shall not be held liable for improper or incorrect use of the data described and/or contained herein.
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Review section 1.9 Use Contraints and section 6 Distribution Information for other related information.

1.9. USE CONSTRAINTS:

Acknowledgment of the National Wetlands Research Center as a data source would be appreciated in products developed from these data, and such acknowledgment as is standard for citation and legal practices for data sources is expected by users of this data. Sharing new data layers developed directly from these data would also be appreciated by NWRC staff (contact staff cited in section 6 Distribution Information). These are not enforceable constraints, but are highly desired or expected by the National Wetlands Research Center in exchange for the access and use of NWRC data sets.

These data are not legal documents and are not to be used as such. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Users should be aware that comparison with other data sets for the same area from other time periods may be inaccurate due to inconsistencies resulting from changes in photo-interpretation and mapping conventions over time.

NWRC Standard Data Liability Disclaimer (April 1997): Although these data have been processed successfully on a computer system at the Biological Resource Division, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly recommended that these data are directly acquired from a Biological Resource Division server, and not indirectly through other sources which may have changed the data in some way. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data. The Biological Resource Division shall not be held liable for improper or incorrect use of the data described and/or contained herein.
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Be aware, as is possible in all government situations, other constraints may have been required and added since the compilation and completion of this metadata file.

Any downloading and use of these data signifies a user's agreement to comprehension and compliance with all stated constraints in this metadata. Insure all portions of metadata are read and clearly understood before using these data in order to protect both user and NWRC interests.

1.9.1. CONTACT PERSON PRIMARY
(Regarding data development. For metadata and data requests, see the Metadata Contact Person Primary or Data Distribution Contact in section 7.4)

1.9.1.1. CONTACT PERSON: Elijah W. Ramsey III
1.9.1.2. (Contact Organization:) USGS
National Wetlands Research Center

OR

1.9.2. CONTACT ORGANIZATION PRIMARY
1.9.1.1. (Contact Organization:) USGS
National Wetlands Research Center
1.9.3. (Contact Position:) Oceanographer and Principle Investigator.
1.9.4. CONTACT ADDRESS
1.9.4.1. ADDRESS TYPE: Mailing
1.9.4.2. Address: National Wetlands Research Center,
700 Cajun Dome Blvd.
1.9.4.3. CITY: Lafayette
1.9.4.4. STATE OR PROVINCE: LA
1.9.4.5. POSTAL CODE: 70506
1.9.4.6. (Country:) USA
1.9.5. CONTACT VOICE TELEPHONE: 318-266-8575
1.9.6. (Contact TDD/TTY Telephone:)
1.9.7. (Contact Facsimile Telephone:) 318-266-8513
1.9.8. (Contact Electronic Mail Address:) elijah_ramsey@usgs.gov
1.9.9. (Hours Of Service:) 9:00 AM to 4:00 PM CST for phone calls.
Any hours for E-mail or fax transmit.

1.9.1. CONTACT PERSON SECONDARY
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1.9.1.1. CONTACT PERSON: Stephen C. Laine

1.9.1.2. (Contact Organization:) USGS
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National Wetlands Research Center
1.9.3. (Contact Position:) Geographer
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1.9.6. (Contact TDD/TTY Telephone:)
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Any hours for E-mail or fax transmit.
1.9.1. CONTACT PERSON SECONDARY
(Regarding data development. For metadata and data requests, see the Metadata Contact Person Primary or Data Distribution Contact in section 7.4)
1.9.1.1. CONTACT PERSON: Darrell Echols
1.9.1.2. (Contact Organization:) NPS
Padre Island National Seashore

OR

1.9.2. CONTACT ORGANIZATION PRIMARY
1.9.1.1. (Contact Organization:) NPS
Padre Island National Seashore
1.9.3. (Contact Position:)
1.9.4. CONTACT ADDRESS
1.9.4.1. ADDRESS TYPE: Mailing
1.9.4.2. Address: Padre Island National Seashore
9405 S. Padre Island Drive
1.9.4.3. CITY: Corpus Christi
1.9.4.4. STATE OR PROVINCE: TX
1.9.4.5. POSTAL CODE: 78418
1.9.4.6. (Country:) USA
1.9.5. CONTACT VOICE TELEPHONE: 512-949-8173 ext. 223
1.9.6. (Contact TDD/TTY Telephone:)
1.9.7. (Contact Facsimile Telephone:) 512-949-8023
1.9.8. (Contact Electronic Mail Address:) pais_gis@nps.gov
1.9.9. (Hours Of Service:) 9:00 AM to 4:00 PM CST for phone calls.
Any hours for E-mail or fax transmit.
1.9.10. (Contact Instructions:)
1.11. (Browse Graphic)
1.12. (Data Set Credit:)
1.13. (Security Information)
1.14. (Native Data Set Environment:)
PCI Version 6.1 on SUN SPARCstation-20 using Solaris 2.4 operating system.
1.15 (Cross Reference)
1.16. Analytical Tool

SECTION 2

2. Data Quality Information
2.1. Attribute Accuracy
2.1.1. ATTRIBUTE ACCURACY REPORT:
Formal procedures for accuracy assessment recommended in remote sensing literature are effective for positional accuracy

and precision of identifiable, stable features and categorical accuracy at the interior of class polygons. But they neglect the fuzzy nature of land cover categorically (eg. the class boundary between grass and marsh), spatially (eg. the polygon boundary between water and marsh), and temporally (eg. land cover change over time often existing in a transitional state that cannot be discretely placed in either category). There is an overriding assumption that a ground "truth" exists and that investigators can see it if they get close enough to the ground. Yet, different investigatiors "see" different land covers, especially troublesome when the area is large enough to require multiple teams. Current procedures also introduce delay due to field verification activities after the classification is complete.

Two accuracy assessments of the classification were performed. First used a class stratified, random sample design to choose 479 points located within the classified image. Locations of these points were transferred for verification to high resolution color infared photography collected near the same time as the Thematic Mapper scene. The second used a class stratified, random sample design to select 165 points from the classified image with only 3x3 homogenous areas located within the authorized boundary of the national seashore being selected. A team of field investigators particapated in data verification of the 165 points on April 20, 1998 helicopter flight. Data validation teams consisted of personel from National Wetlands Research Center and Padre Island National Seashore.

2.1.2. Quantitative Attribute Accuracy Report

2.1.2.1 Attribute Accuracy Value: Overall accuracy for the method using high resolution color infared color photography was 86.9% with a kappa statistic of 0.86. Using the field verification method the overall accuracy for only the area within the authorized seashore boundary was 98%.

2.1.2.2 Attribute Accuracy Explanation:

2.2. Logical Consistency Report:

Tests for logical consistency indicate that all row and column positions in the selected latitude/longitude window contain data. Conversion and integration with vector files indicates that all positions are consistent with earth coordinates covering the same area.

2.3. COMPLETENESS REPORT:

The classification scheme comprehensively includes all anticipated land covers, and all pixels have been classified.

Other sections contain related information to the completeness of the data. For details on attribute completeness, review sections 2.1. Attribute Accuracy, 2.2. Logical Consistency Report, 2.4. Positional Accuracy, and 2.5. Lineage. For details on the horizontal positions, review sections 2.4.1 Horizontal Positional Accuracy.

2.4. Positional Accuracy

2.4.1. Horizontal Positional Accuracy

2.4.1.1. HORIZONTAL POSITIONAL ACCURACY REPORT:

The georeferenced SPOT scene that was received from the SPOT Image Corp. was not as accurate as needed for the NPS needs. Therefore, the image was georeferenced to GPS road coverages collected by NPS personnel at the Padre Island National Seashore. The Landsat Thematic Mapper scene was then registered to the SPOT scene to produce a database with UTM Zone 14, Datum NAD83 coordinates.

2.4.1.2. (Quantitative Horizontal Positional Accuracy Assessment)

2.4.1.2.1. HORIZONTAL POSITIONAL ACCURACY VALUE:

GPS road coverage RMSE +/- 3 meters
SPOT to road coverage RMSE +/- 4 meters
TM to SPOT RMSE +/- 8.75 meters

Review section 2.4.1.1. Horizontal Positional Accuracy Report for details on the positional accuracy.

2.4.1.2.2. HORIZONTAL POSITIONAL ACCURACY EXPLANATION:

Explanatory information for the horizontal positional accuracy is provided in the Horizontal Positional Accuracy Report in section 2.4.1.1. Review this section for those details on the positional accuracy.

2.4.2. Vertical Positional Accuracy
2.4.2.1 VERTICAL POSITIONAL ACCURACY REPORT:
2.5. LINEAGE
2.5.1. Methodology
2.5.1.1. METHODOLOGY TYPE: Classification of remote sensing image
2.5.1.2. (Methodology Identifier)
2.5.1.2.1. METHODOLOGY KEYWORD THESAURUS: None
2.5.1.2.2. METHODOLOGY KEYWORD:
clustering, progressive clustering, classification, image processing, remote sensing, Texas, Padre Island, Padre Island National Seashore, vegetation mapping
2.5.1.3. METHODOLOGY DESCRIPTION: Review source citation and processing steps described in the remainder of the section 2.5 for details.
2.5.1.4. Methodology Citation: Review source citation and processing steps described in the remainder of the section 2.5 for details.
2.5.2. Source Information - no. 1 of 4
2.5.2.1. SOURCE CITATION (uses Citation Info, section 8)
2.5.2.1.1. ORIGINATOR: Padre Island National Seashore
2.5.2.1.2. PUBLICATION DATE: Unknown
2.5.2.1.3. (Publication Time:)
2.5.2.1.4. TITLE: GPS Road coverage
2.5.2.1.5. Edition:
2.5.2.1.6. Geospatial Data Presentation Form: ArcView Shape file
2.5.2.1.7. Series Information:
2.5.2.1.8. Publication Information
2.5.2.1.9. Other Citation Details:
2.5.2.1.10. (Online Linkage:)
2.5.2.1.11. Larger Work Citation
2.5.2.2. Source Scale Denominator:
2.5.2.3. TYPE OF SOURCE MEDIA: GPS point data
2.5.2.4. Source Time Period Of Content
2.5.2.4.1. TIME PERIOD INFORMATION *
2.5.2.4.1.1. SINGLE DATE/TIME
2.5.2.4.1.1.1. CALENDAR DATE: 1997
2.5.2.4.1.1.2. (Time Of Day:)
2.5.2.4.2. SOURCE CURRENTNESS REFERENCE: *
2.5.2.5. (Source Citation Abbreviation): GPS Roads
2.5.2.6. SOURCE CONTRIBUTION: Georeference information for SPOT scene.

2.5.2. Source Information - no. 2 of 4
2.5.2.1. SOURCE CITATION (uses Citation Info, section 8)
2.5.2.1.1. ORIGINATOR: SPOT Image Corp.
2.5.2.1.4. TITLE: SPOT Image
2.5.2.1.6. GEOSPATIAL DATA PRESENTATION FORM: Remote sensing image
2.5.2.1.8. PUBLICATION INFORMATION
2.5.2.1.8.1. PUBLICATION PLACE: Reston, VA, US
2.5.2.1.8.2. PUBLISHER: SPOT Image Corp.
2.5.2.2. SOURCE SCALE DENOMINATOR: N/A
2.5.2.3. TYPE OF SOURCE MEDIA: CD
2.5.2.4. SOURCE TIME PERIOD OF CONTENT
2.5.2.4.1. TIME PERIOD INFORMATION
2.5.2.4.1.1. SINGLE DATE/TIME
2.5.2.4.1.1.1. CALENDAR DATE: April 10, 1993
2.5.2.4.2. SOURCE CURRENTNESS REFERENCE: Source image date.
2.5.2.5. SOURCE CITATION ABBREVIATION: SPOT
2.5.2.6. SOURCE CONTRIBUTION: Serves as base map for georefence information.

2.5.2. Source Information - no. 3 of 4

2.5.2.1. SOURCE CITATION (uses Citation Info, section 8)
2.5.2.1.1. ORIGINATOR: Earth Observation Satellite Company
2.5.2.1.4. TITLE: Landsat Thematic Mapper
2.5.2.1.6. GEOSPATIAL DATA PRESENTATION FORM: Remote sensing image
2.5.2.1.8. PUBLICATION INFORMATION
2.5.2.1.8.1. PUBLICATION PLACE: Sioux Falls, SD, US
2.5.2.1.8.2. PUBLISHER: EROS Data Center
2.5.2.2. SOURCE SCALE DENOMINATOR: N/A
2.5.2.3. TYPE OF SOURCE MEDIA: 3 9track tapes
2.5.2.4. SOURCE TIME PERIOD OF CONTENT
2.5.2.4.1. TIME PERIOD INFORMATION
2.5.2.4.1.1. SINGLE DATE/TIME
2.5.2.4.1.1.1. CALENDAR DATE: January 8, 1994
2.5.2.4.2. SOURCE CURRENTNESS REFERENCE: Source image date.
2.5.2.5. SOURCE CITATION ABBREVIATION: TM
2.5.2.6. SOURCE CONTRIBUTION: Input source data for landcover classification image.

2.5.2. Source Information - no. 4 of 4
2.5.2.1. SOURCE CITATION (uses Citation Info, section 8)
2.5.2.1.1. ORIGINATOR: National Park Service's Padre Island National Seashore
2.5.2.1.4. TITLE: "Verbal Expertise of park personnel"
2.5.2.1.6. GEOSPATIAL DATA PRESENTATION FORM: N/A
2.5.2.1.8. PUBLICATION INFORMATION
2.5.2.1.8.1. PUBLICATION PLACE: N/A
2.5.2.1.8.2. PUBLISHER: N/A
2.5.2.2. SOURCE SCALE DENOMINATOR: N/A
2.5.2.3. TYPE OF SOURCE MEDIA: N/A
2.5.2.4. SOURCE TIME PERIOD OF CONTENT
2.5.2.4.1. TIME PERIOD INFORMATION
2.5.2.4.1.1. SINGLE DATE/TIME
2.5.2.4.1.1.1. CALENDAR DATE: N/A
2.5.2.4.1.1.2. (Time Of Day:) N/A
2.5.2.4.2. SOURCE CURRENTNESS REFERENCE: N/A
2.5.2.5. SOURCE CITATION ABBREVIATION: Verbal
2.5.2.6. SOURCE CONTRIBUTION: Provide expertise for assisting in final landcover classification.

2.5.3. PROCESS STEP - no. 1 of 2
2.5.3.1. PROCESS DESCRIPTION:
SPOT scene was georeferenced to GPS road coverage. TM was then georeferneced to SPOT scene.
2.5.3.2. Source Used Citation Abbreviation: GPS Roads, SPOT, TM
2.5.3.3. (Process Date:) 1998
2.5.3.4. (Process Time:)
2.5.3.5. Source Produced Citation Abbreviation: SPOT, TM
2.5.3.6. (Process Contact) (uses Contact Info, section 10)
(Regarding data development. For metadata and data requests, see the Metadata Contact Person Primary or Data Distribution Contact in section 7.4)
2.5.3.6.1. CONTACT PERSON PRIMARY: Elijah W. Ramsey III
2.5.3.6.2. (Contact Organization:) USGS
National Wetlands Research Center
2.5.3.6.3. (Contact Position:) Oceanographer and Principle Investigator.
2.5.3.6.4. CONTACT ADDRESS
2.5.3.6.4.1. ADDRESS TYPE: Mailing
2.5.3.6.4.2. Address: National Wetlands Research Center,
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2.5.3.6.4.3. CITY: Lafayette
2.5.3.6.4.4. STATE OR PROVINCE: LA
2.5.3.6.4.5. POSTAL CODE: 70506
2.5.3.6.4.6. (Country:) USA
2.5.3.6.5. CONTACT VOICE TELEPHONE: 318-266-8575
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2.5.3.6.7. (Contact Facsimile Telephone:) 318-266-8513

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2.5.3.6.9. (Hours Of Service:) 9:00 AM to 4:00 PM CST for phone calls.
Any hours for E-mail or fax transmit.
2.5.3.6.10. (Contact Instructions:)

2.5.2. PROCESS STEP - step no. 2 of 2
2.5.2.1. PROCESS DESCRIPTION:
A progressive clustering technique was used to develop the landcover classification.
2.5.2.2. SOURCE USED CITATION ABBREVIATION: TM, Verbal
2.5.2.3. PROCESS DATE: 1993.
2.5.2.6. (Process Contact) (uses Contact Info, section 10)
(Regarding data development. For metadata and data requests, see the Metadata Contact Person Primary or Data Distribution Contact in section 7.4)
2.5.3.6.1. CONTACT PERSON PRIMARY: Elijah W. Ramsey III
2.5.3.6.2. (Contact Organization:) USGS
National Wetlands Research Center
2.5.3.6.3. (Contact Position:) Oceanographer and Principle Investigator.
2.5.3.6.4. CONTACT ADDRESS
2.5.3.6.4.1. ADDRESS TYPE: Mailing
2.5.3.6.4.2. Address: National Wetlands Research Center,
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2.5.3.6.4.3. CITY: Lafayette
2.5.3.6.4.4. STATE OR PROVINCE: LA
2.5.3.6.4.5. POSTAL CODE: 70506
2.5.3.6.4.6. (Country:) USA
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2.5.3.6.7. (Contact Facsimile Telephone:) 318-266-8513
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2.5.3.6.9. (Hours Of Service:) 9:00 AM to 4:00 PM CST for phone calls.
Any hours for E-mail or fax transmit.
2.5.3.6.10. (Contact Instructions:)
2.6. (Cloud Cover:)
2.7. Taxonomy System
2.7.1. CLASSIFICATION SYSTEM AND AUTHORITY:
NOAA Coastal Change Analysis Program (C-CAP)
2.7.1.1. CLASSIFICATION SYSTEM CITATION
2.7.1.1.1. (Citation Section): NOAA C-CAP
2.7.1.2. CLASSIFICATION SYSTEM MODIFICATIONS:
NPS requested that unconsolidated shore be modified into two classes: unconsolidated shore and washover channels. Bare land / sand class was converted into two classes for NPS: Bare/sand and sand dunes.
2.7.2. IDENTIFICATION REFERENCE
2.7.2.1. (Citation Section) Darrell Echols (Section 1.9)
2.7.3. IDENTIFIER
2.7.3.1. (Citation Section) Darrell Echols (Section 1.9)
2.7.4. TAXONOMIC PROCEDURES: Classification fits the C-CAP protocal which is the basis for the National Vegetation Classification System (NVCS) established by the Federal Geographic Data Committee.
2.7.5. TAXONOMIC COMPLETENESS: N/A, no samples used, just regional flora information.
2.7.6. VOUCHERS: N/A

SECTION 3
---
3. Spatial Data Organization Information
3.1. Indirect Spatial Reference:
Direct Spatial Reference *
3.2. DIRECT SPATIAL REFERENCE METHOD: Raster
(Spatial Object Information) *
3.3. POINT AND VECTOR OBJECT INFORMATION
OR

3.4. RASTER OBJECT INFORMATION

SECTION 4

4. Spatial Reference Information
4.1. Horizontal Coordinate System Definition
4.1.1. GEOGRAPHIC
OR
4.1.2. PLANAR
4.1.2.1. MAP PROJECTION
OR
4.1.2.2. GRID COORDINATE SYSTEM
4.1.2.2.1. GRID COORDINATE SYSTEM NAME: Universal Transverse Mercator
4.1.2.2.2. UNIVERSAL TRANSVERSE MERCATOR (UTM)
4.1.2.2.2.1. UTM ZONE NUMBER: 14
4.1.2.2.2.2. TRANSVERSE MERCATOR PARAMETERS *
SCALE FACTOR AT CENTRAL MERIDIAN: 0.9996
LONGITUDE OF CENTRAL MERIDIAN: -99.0
LATITUDE OF PROJECTION ORIGIN: 0.0
FALSE EASTING: 500,000.00
FALSE NORTHING: 0.0
OR
4.1.2.2.3. UNIVERSAL POLAR STEREOGRAPHIC (UPS)
4.1.2.2.4. STATE PLANE COORDINATE SYSTEM (SPCS)
4.1.2.2.5. ARC COORDINATE SYSTEM
4.1.2.2.6. OTHER GRID SYSTEM'S DEFINITION:
OR
4.1.2.3. LOCAL PLANAR
4.1.2.4. PLANAR COORDINATE INFORMATION
4.1.2.4.1. PLANAR COORDINATE ENCODING METHOD: row and column
4.1.2.4.2. COORDINATE REPRESENTATION
4.1.2.4.2.1. ABSCISSA RESOLUTION: 10 meters (SPOT), 30 meters (TM)
4.1.2.4.2.2. ORDINATE RESOLUTION: 10 meters (SPOT), 30 meters (TM)
OR
4.1.2.4.3. DISTANCE AND BEARING REPRESENTATION
4.1.2.4.4. PLANAR DISTANCE UNITS: meters
OR
4.1.3. LOCAL
4.1.4. Geodetic Model
4.1.4.1. Horizontal Datum Name: North American Datum of 1983 (NAD83)
4.1.4.2. ELLIPSOID NAME: Clarke 1866
4.1.4.3. SEMI-MAJOR AXIS: 6378206.4
4.1.4.4. DENOMINATOR OF FLATTENING RATIO: 294.9787
4.2. Vertical Coordinate System Definition

SECTION 5

5. Entity And Attribute Information
5.1. DETAILED DESCRIPTION
5.1.1. ENTITY TYPE: Satellite image (data set)
5.1.1.1. ENTITY TYPE LABEL: Padre Island National Seashore
5.1.1.2. ENTITY TYPE DEFINITION:
5.1.1.3. ENTITY TYPE DEFINITION SOURCE:
5.1.2. Attribute: Land Cover
5.1.2.1. ATTRIBUTE LABEL:
5.1.2.2. ATTRIBUTE DEFINITION:
5.1.2.3. ATTRIBUTE DEFINITION SOURCE:
5.1.2.4. ATTRIBUTE DOMAIN VALUES
5.1.2.4.1. ENUMERATED DOMAIN
5.1.2.4.1.1.1 ENUMERATED DOMAIN VALUE: 1 (Inland Water)
5.1.2.4.1.2.1 ENUMERATED DOMAIN VALUE DEFINITION: Semi-permanent areas of standing freshwater that are found parallel to the foredune ridge along the interior of the island. Depending on depth, vegetation may consist of species such as pennywort (Hydrocotyle bonariensis).
5.1.2.4.1.3.1 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)

5.1.2.4.1.1.2 ENUMERATED DOMAIN VALUE: 2 (Laguna Madre)
5.1.2.4.1.2.2 ENUMERATED DOMAIN VALUE DEFINITION: A hypersaline lagoon occurring between the Texas mainland and the barrier island. Several species of seagrasses occur in this habitat including Shoal Grass (Halodule wrightii), Manatee Grass (Cymodocea filiformis), and Widgeon Grass (Ruppia maritima).
5.1.2.4.1.3.2 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.3 ENUMERATED DOMAIN VALUE: 3 (Gulf of Mexico)
5.1.2.4.1.2.3 ENUMERATED DOMAIN VALUE DEFINITION: Gulf of Mexico bordering the eastern edge of the barrier island.
5.1.2.4.1.3.3 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.4 ENUMERATED DOMAIN VALUE: 4 (Wind Tidal Flats)
5.1.2.4.1.2.4 ENUMERATED DOMAIN VALUE DEFINITION: Expanses of fine sand/mud along the western edge of the barrier island. It is periodically inundated with saltwater pushed shore by northern winds. It is often vegetated with the blue green algae (Lyngbya confervoides).
5.1.2.4.1.3.4 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.5 ENUMERATED DOMAIN VALUE: 5 (Sparse Vegetation)
5.1.2.4.1.2.5 ENUMERATED DOMAIN VALUE DEFINITION: Sand dunes of varying height that are sparsely vegetated with seacoast bluestem (Schizachyrium littorale), sea oats (Uniola paniculata), bitter panicum (Panicum amarum), other grasses, and forbs.
5.1.2.4.1.3.5 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.6 ENUMERATED DOMAIN VALUE: 6 (Emergent Vegetation)
5.1.2.4.1.2.6 ENUMERATED DOMAIN VALUE DEFINITION: Shallow depressions that are inundated with freshwater from rain events or saltwater from tropical storms. These areas are vegetated with bulrush (Scirpus americanus), cattails (Typha domingensis), black willow (Salix nigra), gulfdune paspalum (Paspalum monostachyum), and pennywort (Hydrocotyle bonariensis).
5.1.2.4.1.3.6 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.7 ENUMERATED DOMAIN VALUE: 7 (Grassland)
5.1.2.4.1.2.7 ENUMERATED DOMAIN VALUE DEFINITION: Areas containing dune hummocks that are densely vegetated with grasses including seacoast bluestem (Schizachyrium littorale), cordgrass species (Spartina sp.), gulf dune paspalum (Paspalum monostachyum), and bushy bluestem (Andropogon glomeratus) and others.
5.1.2.4.1.3.7 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.8 ENUMERATED DOMAIN VALUE: 8 (Bare Land/Beach)
5.1.2.4.1.2.8 ENUMERATED DOMAIN VALUE DEFINITION: A thin area extending the entire length of the island adjacent to the Gulf of Mexico. It varies in width depending on the season and is made up of sand and shell fragments with no vegetation.
5.1.2.4.1.3.8 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.9 ENUMERATED DOMAIN VALUE: 9 (Urban)
5.1.2.4.1.2.9 ENUMERATED DOMAIN VALUE DEFINITION: Developed areas including roadways, buildings, and visitor services.
5.1.2.4.1.3.9 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.10 ENUMERATED DOMAIN VALUE: 10 (Sand Dunes)
5.1.2.4.1.2.10 ENUMERATED DOMAIN VALUE DEFINITION: Areas of unvegetated sand located immediately landward of the beach or along the western edge of the barrier island.
5.1.2.4.1.3.10 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)
5.1.2.4.1.1.11 ENUMERATED DOMAIN VALUE: 11 (Unconsolidated Shore)
5.1.2.4.1.2.11 ENUMERATED DOMAIN VALUE DEFINITION: Areas adjacent to washover channels and inland water areas consisting of fine sands with little to no vegetation. If vegetation is present, it is sparse

with species such as cattails (Typha domingensis) or bulrush (Scirpus americanus).

5.1.2.4.1.3.11 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)

5.1.2.4.1.1.12 ENUMERATED DOMAIN VALUE: 12 (Washover Channel)

5.1.2.4.1.2.12 ENUMERATED DOMAIN VALUE DEFINITION: Channels created by tropical storms that are cut perpendicular to the beach through the foredune ridge. These areas may contain water from rain events. If water is present, vegetation may consist of blue green algae such as Lyngbya confervoides.

5.1.2.4.1.3.12 ENUMERATED DOMAIN VALUE DEFINITION SOURCE: Darrell Echols (Section 1.9)

OR

5.1.2.4.2. RANGE DOMAIN

5.1.2.4.2.1. RANGE DOMAIN MINIMUM:

5.1.2.4.2.2. RANGE DOMAIN MAXIMUM:

5.1.2.4.2.3. Attribute *

5.1.2.4.3. CODESET DOMAIN

5.1.2.4.3.1. CODESET NAME: Modified version NOAA C-CAP

5.1.2.4.3.2. CODESET SOURCE:

Can be cross-referenced Dobson, J. et al, NOAA Coastal Change Analysis Program (C-CAP): Guidance for Regional Implementation, Version 1.0, NOAA Technical Report 123, Sept. 1994. U.S. Dept. of Commerce, Seattle, WA.

5.1.2.4.4. UNREPRESENTABLE DOMAIN:

5.1.2.5. Attribute Units Of Measure:

Attributes are character labels according to classification using alpha-numeric system (see section 5.1.2.4.1).

5.1.2.6. (Attribute Measurement Resolution:)

(Attribute Time Period Of Content) *

5.1.2.7. BEGINNING DATE OF ATTRIBUTE VALUES: 1994

5.1.2.8. Ending Date Of Attribute Values: 1994

5.1.2.9. (Attribute Value Accuracy Information)

5.1.9.1. ATTRIBUTE VALUE ACCURACY: (Section 2.1.2.1)

5.1.9.2. ATTRIBUTE VALUE ACCURACY EXPLANATION:

Review discussions on attributes and completeness contained in section 2 Data Quality Information.

5.1.2.10. (Attribute Measurement Frequency:)

AND/OR

5.2. OVERVIEW DESCRIPTION

5.2.1. ENTITY AND ATTRIBUTE OVERVIEW:

5.2.2. ENTITY AND ATTRIBUTE DETAIL CITATION

SECTION 6

---

6. Distribution Information

6.1. DISTRIBUTOR

6.1.1. CONTACT PERSON PRIMARY:

6.1.1.1. CONTACT PERSON PRIMARY: Darrell Echols

6.1.1.2. (Contact Organization:) National Park Service / Padre Island National Seashore

OR

6.1.2. CONTACT ORGANIZATION PRIMARY

6.1.2.1. CONTACT ORGANIZATION: *

National Park Service / Padre Island National Seashore

6.1.2.2. (Contact Person:) *

6.1.3. (Contact Position:)

6.1.4. CONTACT ADDRESS: Refer to Section 1.9 for contact information

6.1.4.1. ADDRESS TYPE: Mailing

6.1.4.2. Address:

6.1.4.3. CITY:

6.1.4.4. STATE OR PROVINCE:

6.1.4.5. POSTAL CODE:

6.1.4.6. (Country:)

6.1.5. CONTACT VOICE TELEPHONE:

6.1.6. (Contact TDD/TTY Telephone:)

6.1.7. (Contact Facsimile Telephone:)
6.1.8. (Contact Electronic Mail Address:)
6.1.9. (Hours Of Service:)
6.1.10. (Contact Instructions:)

6.2. Resource Description:
6.3. DISTRIBUTION LIABILITY:

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Users should be aware that comparison with other data sets for the same area from other time periods may be inaccurate due to inconsistencies resulting from changes in photo-interpretation and mapping conventions over time.

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6.4. Standard Order Process
6.4.1. NON-DIGITAL FORM: Maps are possibly available upon request - discuss with the contact for information when requesting. Maps may require other procedures, fees, etc. and maps might be unavailable due to difficulties with out-of-print, legacy datasets being unprintable, or other difficulties.

OR
6.4.2. DIGITAL FORM
6.4.2.1. DIGITAL TRANSFER INFORMATION
6.4.2.1.1. FORMAT NAME:
(Format Details) *
6.4.2.1.2. FORMAT VERSION NUMBER:
OR
6.4.2.1.3. FORMAT VERSION DATE:

6.4.2.1.4. (Format Specifications)
6.4.2.1.5. (Format Information Content:)
6.4.2.1.6. File Decompression Technique:
6.4.2.1.7. (Transfer Size:)
6.4.2.2. DIGITAL TRANSFER OPTION
6.4.2.2.1. ONLINE OPTIONS
6.4.2.2.1.1. COMPUTER CONTACT INFORMATION
6.4.2.2.1.1.1. NETWORK ADDRESS
6.4.2.2.1.1.1.1. NETWORK RESOURCE NAME:
OR
6.4.2.2.1.1.2. DIALUP INSTRUCTIONS
6.4.2.2.1.2. (Access Instructions:)
6.4.2.2.1.3. (Online Computer And Operating System:)
OR
6.4.2.2.2. OFFLINE OPTION
6.4.2.2.2.1. OFFLINE MEDIA:
6.4.2.2.2.2. Recording Capacity
6.4.2.2.2.2.1. RECORDING DENSITY:
6.4.2.2.2.2.2. RECORDING DENSITY UNITS:
6.4.2.2.2.3. RECORDING FORMAT:
6.4.2.2.2.4. Compatibility Information:
6.4.3. FEES:
6.4.4. (Ordering Instructions:)
6.4.5. (Turnaround:)
6.5. Custom Order Process:
6.6. (Technical Prerequisites:)
6.7. (Available Time Period) (uses Time Period info, section 9)
6.7.1. SINGLE DATE/TIME
6.7.1.1. CALENDAR DATE:

SECTION 7
---
7. METADATA REFERENCE INFORMATION
7.1. METADATA DATE: 6 May 1998, with revision to NBII 24 March 1997.
(Metadata Review Plans)
7.2. METADATA REVIEW DATE:
7.3. (Metadata Future Review Date:)
7.4. METADATA CONTACT (uses Contact Info, section 10)
7.4.1. CONTACT PERSON PRIMARY:
7.4.1.1. CONTACT PERSON PRIMARY: Darrell Echols: refer to Section 1.9
7.4.1.2. (Contact Organization:)
OR
7.4.2. CONTACT ORGANIZATION PRIMARY
7.4.2.1. CONTACT ORGANIZATION: *
National Park Service
7.4.2.2. (Contact Person:) *
7.4.3. (Contact Position:)
7.4.4. CONTACT ADDRESS
7.4.4.1. ADDRESS TYPE: Mailing
7.4.4.2. Address:
7.4.4.3. CITY:
7.4.4.4. STATE OR PROVINCE:
7.4.4.5. POSTAL CODE:
7.4.4.6. (Country:)
7.4.5. CONTACT VOICE TELEPHONE:
7.4.6. (Contact TDD/TTY Telephone:)
7.4.7. (Contact Facsimile Telephone:)
7.4.8. (Contact Electronic Mail Address:)
7.4.9. (Hours Of Service:) 9
7.4.10. (Contact Instructions:)
7.5. METADATA STANDARD NAME:
The NBII Content Standard, December 1995 draft version,
from the National Biological Service (which in October 1996
became the Biological Resources Division (BRD) of the
United States Geological Survey (USGS)).
The NBII standard is based on the Federal Geographic Data

Committee's Content Standards for Digital Spatial Metadata, 8 June 1994 version.

7.6. METADATA STANDARD VERSION: June 8, 1994

7.7. Metadata Time Convention: universal time

7.8. (Metadata Access Constraints:)

Similar to section 1.8. ACCESS CONSTRAINTS, so review 1.8.

7.9. (Metadata Use Constraints:)

Similar to section 1.9. USAGE Constraints, so review 1.9.

7.10. (Metadata Security Information)

7.10.1. METADATA SECURITY CLASSIFICATION SYSTEM: none

7.10.2. METADATA SECURITY CLASSIFICATION: unclassified

7.10.3. METADATA SECURITY HANDLING DESCRIPTION: none

<!==>
<! Document: poster1.met   >
<! Title: GILS format metadata for   >
<!   "Padre Island National Seashore, Texas"   >
<! This file from: National Wetlands Research Center,   >
<!   700 Cajundome Blvd., Lafayette, LA, 70506 USA.   >
<! This file date: 6 May 1998   >
<! Type: ASCII text.   >
<!   >
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The required elements are in NARA-Recommended Preferred Display Order,
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.....

GILS Core Elements:
---

1. Title: Padre Island National Seashore, Texas

2. Originator: Department/Agency Name: Department of the Interior
Major Organizational Subdivision: United States Geological Survey
Minor Organizational Subdivision: Biological Resources Division
Name of Unit: National Wetlands Research Center.

5. Abstract: Landcover classification for Padre Island National Seashore.

6. Purpose: This product was created for a presentation to show landcover
classification of the entire Padre Island National Seashore.

7. Agency Program:

8. Spatial Reference:
Geographic Name:
Geographic Keyword Name (GNIS): United States
Geographic Keyword Type (GNIS): Texas
Geographic Keyword Type (GNIS): Padre Island
Geographic Keyword Type (GNIS): Padre Island National Seashore

9. Time Period of Content

Time Period- Structured:

10. Availability:
Distributor:
Name: Darrell Echols
Organization: NPS - Padre Island National Seashore
Street Address: 9405 S. Padre Island Drive
City: Corpus Christi
State: TX
Zip Code: 78418
Country: USA
Network Address: pais_gis@nps.gov
Hours of Service: 8:30 a.m. - 4:30 p.m. CST
Telephone: 512-949-8173
Fax: 512-949-8023
Resource Description: (see abstract above).
Order Process:
Available Linkage:

11. Sources of Data: Landsat Thematic Mapper

13. Access Constraints:
Documentation: NWRC Data Liability Disclaimer,
which is accessible when download data and strongly
suggested reading for all users downloading data.

14. Use Constraints:

15. Point of Contact: Refer to Availability Section (10)

16. Supplemental Information: None

18. Schedule Number: Not scheduled

19. Control Identifier: None

20. Record Source: Department/Agency Name: Department of the Interior
Major Organizational Subdivision: United States Geological Survey
Minor Organizational Subdivision: Biological Resources Division
Name of Unit: National Wetlands Research Center

22. Date of Last Modification: 6 May 1998

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<! ==========>
<! end-of-file>

<!==>
<! Document: poster2.met   >
<! Title: GILS format metadata for   >
<!   "Land Cover for Padre Island National Seashore"   >
<!   Map 1 of 3   >
<! This file from: National Wetlands Research Center,   >
<!   700 Cajundome Blvd., Lafayette, LA, 70506 USA.   >
<! This file date: 6 May 1998   >
<! Type: ASCII text.   >
<!   >
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and format for those elements is not understood.
The required elements are in NARA-Recommended Preferred Display Order,
and ommitted or missing numbered elements are not required and may not
be applicable to the data resource described in this metadata.

.....

GILS Core Elements:
---

1. Title: Landcover Classificaiton for Padre Island National Seashore
Map 1 of 3

2. Originator: Department/Agency Name: Department of the Interior
Major Organizational Subdivision: United States Geological Survey
Minor Organizational Subdivision: Biological Resources Division
Name of Unit: National Wetlands Research Center.

5. Abstract: Landcover classification for Padre Island National Seashore.

6. Purpose: This product was created for a presentation to show the landcover
classification of the northern section of Padre Island
National Seashore.

7. Agency Program:

8. Spatial Reference:
Geographic Name:
Geographic Keyword Name (GNIS): United States
Geographic Keyword Type (GNIS): Texas
Geographic Keyword Type (GNIS): Padre Island

Geographic Keyword Type (GNIS): Padre Island National Seashore

9. Time Period of Content
   Time Period- Structured:

10. Availability:
   Distributor:
      Name: Darrell Echols
      Organization: NPS - Padre Island National Seashore
      Street Address: 9405 S. Padre Island Drive
      City: Corpus Christi
      State: TX
      Zip Code: 78418
      Country: USA
      Network Address: pais_gis@nps.gov
      Hours of Service: 8:30 a.m. - 4:30 p.m. CST
      Telephone: 512-949-8173
      Fax: 512-949-8023
      Resource Description: (see abstract above).
   Order Process:
   Available Linkage:

11. Sources of Data: Landsat Thematic Mapper

13. Access Constraints:
   Documentation: NWRC Data Liability Disclaimer,
   which is accessible when download data and strongly
   suggested reading for all users downloading data.

14. Use Constraints:

15. Point of Contact: Refer to Availability Section (10)

16. Supplemental Information: None

18. Schedule Number: Not scheduled

19. Control Identifier: None

20. Record Source: Department/Agency Name: Department of the Interior
   Major Organizational Subdivision: United States Geological Survey
   Minor Organizational Subdivision: Biological Resources Division
   Name of Unit: National Wetlands Research Center

22. Date of Last Modification: 6 May 1998

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<! ==>
<! end-of-file>

```
<!=========================================================================>
<! Document:          poster3.met                                          >
<! Title:             GILS format metadata for                             >
<!                    "Land Cover for Padre Island National Seashore"      >
<!                    Map 2 of 3                                           >
<! This file from:    National Wetlands Research Center,                   >
<!                       700 Cajundome Blvd., Lafayette, LA, 70506 USA.    >
<! This file date:    6 May 1998                                           >
<! Type:              ASCII text.                                          >
<!                                                                         >
<! Important:         Any downloading and use of these data signifies a    >
<!                    user's agreement to comprehension and compliance     >
<!                    with all stated constraints in this metadata.        >
<!                    Insure all portions of metadata are read and clearly>
<!                    understood before using these data in order to       >
<!                    protect both user and NWRC interests.                >
<!                    Be aware, as is possible in all government           >
<!                    situations, other constraints may have been          >
<!                    required and added since the compilation and         >
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 and format for those elements is not understood.
 The required elements are in NARA-Recommended Preferred Display Order,
 and ommitted or missing numbered elements are not required and may not
 be applicable to the data resource described in this metadata.

.............................................................................

 GILS Core Elements:
 -------------------

1. Title: Landcover Classificaiton for Padre Island National Seashore
               Map 2 of 3

2. Originator: Department/Agency Name: Department of the Interior
               Major Organizational Subdivision: United States Geological Survey
               Minor Organizational Subdivision: Biological Resources Division
               Name of Unit: National Wetlands Research Center.

5. Abstract:  Landcover classification for Padre Island National Seashore.

6. Purpose: This product was created for a presentation to show the landcover
               classification of the mid section of Padre Island
               National Seashore.

7. Agency Program:

8. Spatial Reference:
     Geographic Name:
          Geographic Keyword Name (GNIS): United States
          Geographic Keyword Type (GNIS): Texas
          Geographic Keyword Type (GNIS): Padre Island
```

Geographic Keyword Type (GNIS): Padre Island National Seashore

9. Time Period of Content
   Time Period- Structured:

10. Availability:
   Distributor:
      Name: Darrell Echols
      Organization: NPS - Padre Island National Seashore
      Street Address: 9405 S. Padre Island Drive
      City: Corpus Christi
      State: TX
      Zip Code: 78418
      Country: USA
      Network Address: pais_gis@nps.gov
      Hours of Service: 8:30 a.m. - 4:30 p.m. CST
      Telephone: 512-949-8173
      Fax: 512-949-8023
      Resource Description: (see abstract above).
   Order Process:
   Available Linkage:

11. Sources of Data: Landsat Thematic Mapper

13. Access Constraints:
   Documentation: NWRC Data Liability Disclaimer,
   which is accessible when download data and strongly
   suggested reading for all users downloading data.

14. Use Constraints:

15. Point of Contact: Refer to Availability Section (10)

16. Supplemental Information: None

18. Schedule Number: Not scheduled

19. Control Identifier: None

20. Record Source: Department/Agency Name: Department of the Interior
   Major Organizational Subdivision: United States Geological Survey
   Minor Organizational Subdivision: Biological Resources Division
   Name of Unit: National Wetlands Research Center

22. Date of Last Modification: 6 May 1998

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<!==>
<! Document: poster4.met >
<! Title: GILS format metadata for >
<! "Land Cover for Padre Island National Seashore" >
<! Map 3 of 3 >
<! This file from: National Wetlands Research Center, >
<! 700 Cajundome Blvd., Lafayette, LA, 70506 USA. >
<! This file date: 6 May 1998 >
<! Type: ASCII text. >
<! >
<! Important: Any downloading and use of these data signifies a >
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<! with all stated constraints in this metadata. >
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<! situations, other constraints may have been >
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(as introduced in OMB BULLETIN NO. 95-01, and available
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The required elements are in NARA-Recommended Preferred Display Order,
and ommitted or missing numbered elements are not required and may not
be applicable to the data resource described in this metadata.

.....

GILS Core Elements:
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1. Title: Landcover Classificaiton for Padre Island National Seashore
Map 3 of 3

2. Originator: Department/Agency Name: Department of the Interior
Major Organizational Subdivision: United States Geological Survey
Minor Organizational Subdivision: Biological Resources Division
Name of Unit: National Wetlands Research Center.

5. Abstract: Landcover classification for Padre Island National Seashore.

6. Purpose: This product was created for a presentation to show the landcover
classification of the southern section of Padre Island
National Seashore.

7. Agency Program:

8. Spatial Reference:
Geographic Name:
Geographic Keyword Name (GNIS): United States
Geographic Keyword Type (GNIS): Texas
Geographic Keyword Type (GNIS): Padre Island

Geographic Keyword Type (GNIS): Padre Island National Seashore

9. Time Period of Content
   Time Period- Structured:

10. Availability:
   Distributor:
      Name: Darrell Echols
      Organization: NPS - Padre Island National Seashore
      Street Address: 9405 S. Padre Island Drive
      City: Corpus Christi
      State: TX
      Zip Code: 78418
      Country: USA
      Network Address: pais_gis@nps.gov
      Hours of Service: 8:30 a.m. - 4:30 p.m. CST
      Telephone: 512-949-8173
      Fax: 512-949-8023
      Resource Description: (see abstract above).
   Order Process:
   Available Linkage:

11. Sources of Data: Landsat Thematic Mapper

13. Access Constraints:
   Documentation: NWRC Data Liability Disclaimer,
   which is accessible when download data and strongly
   suggested reading for all users downloading data.

14. Use Constraints:

15. Point of Contact: Refer to Availability Section (10)

16. Supplemental Information: None

18. Schedule Number: Not scheduled

19. Control Identifier: None

20. Record Source: Department/Agency Name: Department of the Interior
   Major Organizational Subdivision: United States Geological Survey
   Minor Organizational Subdivision: Biological Resources Division
   Name of Unit: National Wetlands Research Center

22. Date of Last Modification: 6 May 1998

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<!==>
<! Document: poster5.met >
<! Title: GILS format metadata for >
<! "Padre Island National Seashore, Texas >
<! Novillo Line Transect (May 12, 1992)" >
<! This file from: National Wetlands Research Center, >
<! 700 Cajundome Blvd., Lafayette, LA, 70506 USA. >
<! This file date: 6 May 1998 >
<! Type: ASCII text. >
<! >
<! Important: Any downloading and use of these data signifies a >
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The required elements are in NARA-Recommended Preferred Display Order,
and ommitted or missing numbered elements are not required and may not
be applicable to the data resource described in this metadata.

.....

GILS Core Elements:
---

1. Title: Padre Island National Seashore, Texas
Novillo Line

2. Originator: Department/Agency Name: Department of the Interior
Major Organizational Subdivision: United States Geological Survey
Minor Organizational Subdivision: Biological Resources Division
Name of Unit: National Wetlands Research Center.

5. Abstract: Vegetation photographs overlaid on a SPOT Image.

6. Purpose: This product was created to show the location of the Novillo Line
transect (May 12, 1992).

7. Agency Program:

8. Spatial Reference:
Geographic Name:
Geographic Keyword Name (GNIS): United States
Geographic Keyword Type (GNIS): Texas
Geographic Keyword Type (GNIS): Padre Island
Geographic Keyword Type (GNIS): Padre Island National Seashore

9. Time Period of Content
   Time Period- Structured:

10. Availability:
   Distributor:
      Name: Darrell Echols
      Organization: NPS - Padre Island National Seashore
      Street Address: 9405 S. Padre Island Drive
      City: Corpus Christi
      State: TX
      Zip Code: 78418
      Country: USA
      Network Address: pais_gis@nps.gov
      Hours of Service: 8:30 a.m. - 4:30 p.m. CST
      Telephone: 512-949-8173
      Fax: 512-949-8023
      Resource Description: (see abstract above).
   Order Process:
   Available Linkage:

11. Sources of Data: Landsat Thematic Mapper

13. Access Constraints:
   Documentation: NWRC Data Liability Disclaimer,
   which is accessible when download data and strongly
   suggested reading for all users downloading data.

14. Use Constraints:

15. Point of Contact: Refer to Availability Section (10)

16. Supplemental Information: None

18. Schedule Number: Not scheduled

19. Control Identifier: None

20. Record Source: Department/Agency Name: Department of the Interior
   Major Organizational Subdivision: United States Geological Survey
   Minor Organizational Subdivision: Biological Resources Division
   Name of Unit: National Wetlands Research Center

22. Date of Last Modification: 6 May 1998

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