Supplemental Map Information

Project ID: R02Y10P07

Project Title or Area: Aransas SLAMM Pilot

Source Imagery: 2008 NAIP 4-Band County mosaics, Aransas, Calhoun and Refugio Counties.

Collateral Data: USGS NHD, USGS DRG, NWI digital data (previously mapped, 1990's era), Submerged Lands of Texas, Port Lavaca Area, University of Texas (see references for further information).

Inventory Method: Update mapping was performed in a heads-up environment, using ArcGIS (9.3). Digital delineations were done on-screen at a relative scale of 1:10,000 using the digital NAIP county mosaics. Feature Analyst (Automated feature extraction software) was also used in parts of the work area to delineate complex shoreline and wetland areas. All wetland interpretations were performed by the Conservation Management Institute at Virginia Tech University.

Classification:
Wetland Definition and Classification

The Service uses the Cowardin *et al.* (1979) definition of a wetland. This definition is the Service's official standard for classifying and mapping wetlands. It has also been adapted as the national standard for wetland mapping, monitoring and data reporting as determined by the Federal Geographic Data Committee. It is a two-part definition as indicated below:

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

For purposes of this classification wetlands must have one or more of the following three attributes: 1) at least periodically, the land supports predominantly hydrophytes; 2) the substrate is predominantly undrained hydric soil; and 3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year

Data Limitations: National Wetlands Inventory digital data were derived from stereoscopic analysis of high altitude aerial photographs. Wetlands and riparian areas were identified based on vegetation, visible hydrology and geography in accordance with **Classification of Wetlands and Deepwater Habitats of the United States** (FWS/OBS – 79/31 December 1979) & **A System for Mapping Riparian Areas in the Western United States** (FWS 1998). There is a margin of error inherent in the use of aerial photos. Age, scale and emulsion of the aerial photos, as well as seasonal and climatic variations at the time of aerial photo acquisition may affect the way in which wetlands and riparian areas are identified.

General description of the Project Area: The project area falls along the cental Texas Gulf

Coast, within the Western Gulf Coastal Plain-Bay and Estuary Systems (Omernik), in the Subumid Climate Zone (Thornwaite, 1948).

- **Geography:** The project area includes the large bay-estuary-lagoon system comprised of the Aransas, St. Charles, San Antonio, Espiritu Santo, and Matagorda Bays, separated from the Gulf of Mexico and the inner shelf by a modern barrier-island complex, composed of Matagorda Peninsula and Matagorda and San Jose Islands. The bays are fed by the large alluvial systems of Guadalupe-San Antonio and Lavaca-Navidad river systems. Astronomical tidal range (mean) is 1.4 ft. (U.S. Department of Commerce, 1978) on the gulf shoreline and 0.7 ft. bayside. Mean annual precipitation is 32-39 inches/yr. (Fisher and others, 1972). Hurricane frequency in this area is 9% in any one year (Simpson and Lawrence, 1971). Wetlands in this area may be affected by several physical processes including, eolian activity, subsidence, faulting and sea-level rise.

- **Land use/Land Cover, Soils:** This nearly level part of the coastal plain is moderately developed with agriculture as the dominant land use. There are also elements of the chemical and shrimping industries in this area. The Aransas National Wildlife Refuge occupies 115,000 acres of the Blackjack Peninsula and Matagorda Island. The growing season averages 305days a year. Cattle production/pastures are the main agricultural enterprise. Other crop production includes rice, sorghum, soybean, corn and pecans. Inland soils poorly to moderately well drained alluvial loams, underlain with clayey subsoils. Closer to the coast and on the Islands, deep loose shell sand Gulf-deposited soil complexes reside on top of tidal flats.

Description of wetland habitats: Almost all major wetland/Cowardin types are represented in this project area. Inland systems are dominated by large tidally and non-tidally flooded alluvial systems. Areas closer to the coast have transitional tidal/fresh water wetland complexes. And the barrier islands and lands adjacent the bays have a variety of tidally inundated wetland complexes. Areas of the shallow bays are occupied with subaqueous marine grasses.

NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI Code	Cowardin Description	Common Description	Common Vegetation
Marine Features			
M1UB (L)	Marine subtidal, unconsolidated bottom	Open ocean/gulf	none
M2US (M, N, P)	Marine intertidal, unconsolidated shore	Beaches, sandbar	none
Estuarine Features			
E1UB (L)	Estuarine subtidal, unconsolidated bottom	Estuaries, bays, waterways	none
E1AB3 (L)	Estuarine subtidal, aquatic bed	Seagrasses	*Halodule beaudettei* (shoalgrass)

			Ruppia maritime (widgeongrass) *Thalassia testudinum* (turtlegrass) *Cymodocea filifomis* (matatee grass)
E2US (M, N, P)	Estuarine intertidal, unconsolidated shore	Sandbars, flats	none
E2AB (M, N)	Estuarine intertidal, aquatic bed	Seagrasses	*Halodule beaudettei* (shoalgrass) *Ruppia maritime* (widgeongrass) *Thalassia testudinum* (turtlegrass) *Cymodocea filifomis* (matatee grass)
E2SS3 (N, P)	Estuarine intertidal, Scrub-shrub, broad-leaved evergreen	Tidal marsh, mangroves	*Avicinnia germinans* (black mangrove)
E2EM1 (N, P)	Estuarine intertidal, emergent, persistent	Tidal marsh, emergent	*Spartina alteriflora* (smooth cordgrass) *Spartina spartinae* (gulf cordgrass) *Spartina patens* (marshhay cordgrass) *Batis maritima* (saltwort) *Salicornia sp.* (glasswort) *Distichlis spicata* (saltgrass) *Borrichia frutescens* (sea ox-eye) *Monanthachloe littoralis* (shoregrass) *Suaeda sp.* (seablite) *Iva sp.* (sumpweed)
Lacustrine Features			
L1UB (H, K, V)	Lacustrine, limnetic, unconsolidated bottom	Lakes, reservoirs deeper than 6 meters	none
L2UB (F)	Lacustrine, littoral, unconsolidated bottom	Lakes, reservoirs less than 6 m. deep	none
L2US (C, A, J)	Lacustrine, littoral, unconsolidated shore	Shallow lakes, reservoirs, shore, flats	none
Riverine Features			
R1UB (V)	Riverine, tidal,	Tidally influenced	none

	unconsolidated bottom	river, low gradient	
R1US (S, R)	Riverine, tidal, unconsolidated shore	Tidally influenced sandbar	none
R2UB (H)	Riverine, lower perennial, unconsolidated bottom	River	none
R2US (C, A)	Riverine, lower perennial, unconsolidated shore	Sand bar	none
Palustrine Features			
PUB (H, F, K)	Palustrine, unconsolidated bottom	Ponds, basins, natural/manmade	none
PAB3 (H, F, K)	Palustrine, rooted aquatic bed	Ponds, basins, natural/manmade	*Sagittaria spp.* (arrowhead) *Nuphar spp.* (spatterdock)
PAB4 (H, F, K)	Palustrine, floating aquatic bed	Ponds, basins, natural/manmade	*Lemna spp.* *Eichornia crassipes* (water hyacinth)
PUS (C, A)	Palustrine, unconsolidated shore	Flats, shallow basins, shore, natural, man made	none
PEM1 (F, C, A, J, K) (T, S, R - Tidally influenced)	Palustrine, emergent	Marsh, prairie, basin, depression, natural/ manmade	*Typha latifolia* (cattail) *Cyperus spp.* (flatsedge) *Spartina spartinae* (gulf cordgrass) *Spartina patens* (marshhay cordgrass) *Scirpus spp.* (bulrush) *Juncus spp.* (rush) *Eleocharis spp.* (spikerush) *Sporobolus spp.* (dropseed) *Polygonum spp.* (knotweed) *Distichlis spicata* (saltgrass) *Iva spp.* (sumpweed) *Borrichia frutescens* (sea ox-eye) *Paspalum lividum* (longtom) *Aster spinosus* (spiny aster) *Panicum spp.* *Andropogon virginicus*

			(broomsedge bluestem) *Helianthus Spp.* (sunflower) *Sorghum halepense* (Johnsongrass) *Croton spp.* (doveweed)
PSS1 (F, C, A, J) (T, S, R - Tidally influenced)	Palustrine, scrub-shrub, broad-leaved deciduous	Shrub swamp, flood-plain, bottomland	*Salix nigra* (black willow) *Cephalanthus occidentalis* (buttonbush) *Sapium sebiferum* (Chinese tallow) *Parkinsonia aculeate* (retama) *Acacia farnesiana* (huisache) *Celtis spp.* (hackberry) *Ilex vomitoria* (yaupon)
PSS2 (F, C, A, J) (T, S, R - Tidally influenced)	Palustrine, scrub-shrub, needle-leaved deciduous	Shrub swamp, flood-plain, bottomland	*Tamarix sp.* (salt cedar) *Taxodium distichum* (bald cypress)
PFO1 (F, C, A) (T, S, R - Tidally influenced)	Palustrine, forest, broad-leaved deciduous	Forested swamp, floodplain, bottomland	*Salix nigra* (black willow) *Fraxinus spp.* (ash) *Ulmus crassifolia* (cedar elm) *Celtis spp.* (hackberry/sugarberry) *Liquidamber styraciflua* (sweetgum) *Sapium sebiferum* (Chinese tallow) *Quercus aquatic* (water oak) *Planera aquatica* (waterelm) *Carya aquatic* (water hickory) *Ulmus Americana* (American elm) *Carya illinoensis* (pecan) *Quercus spp.* (oak)

PFO2 (C, F)	Palustrine, forest, needle-leaved deciduous	Forested swamp, floodplain, bottomland	*Taxodium distichum* (bald cypress)
(T, R - Tidally influenced)			
PFO4 (C, A, J)	Palustrine, forest, needle-leaved evergreen	Forested swamp, floodplain, bottomland	*Pinus taeda* (loblolly pine)

List of wetland plant species with indicator status: Detailed information on plant species indicator status can be found at; http://plants.usda.gov/wetinfo.html

Regional specialized conventions/Other discussion of mapping issues:
The 2008 4_band NAIP imagery was of high quality with excellent spatial resolution. The imagery was acquired during mid-growing season, so differentiation of tree and shrub species was difficult. Interpreters relied on information obtained from previous NWI efforts in this area.

Farmed Rice: In previous mapping efforts in this area, farmed rice on top of hydric soils were identified as a farmed wetland (PEMf). This method led to several mapping inaccuracies;

a. Soils mapping: Much of this area was mapped by NRCS using soils complexes with hydric components. These hydric components were not distinguished from the other components of these complexes. So even though the rice fields is sitting on a hydric complex, it may or may not actually be on the hydric component.
b. Identification of rice vs. other practices: Laser-leveling of fields is easy to identify, but not all rice fields are laser-leveled making identification difficult.
c. Rotation of rice: Many fallow rice fields not exhibiting wetland characteristics were previously mapped as farmed wetland, and active rice fields exhibiting wetland characteristics, not on hydric soils were left out. Also, fields do change crop types based on current markets.

In this current mapping effort, the mapping of rice was simplified to identifiable rice fields exhibiting wetland characteristics (flooded with vegetation), whether on hydric soil complexes or not. Since the flooding is controlled and the field may or may not be on the hydric component, that criterion was dropped for this effort. All mapped rice will be attributed as Pf.

Common to this area are complex wetland/upland environments typically characterized by small, numerous round upland mounds (pimple mounds) surrounded by lower wetter areas that support marshes and transitional vegetation. Similar environments occur adjacent to the coast with tidal flats or brackish marshes occupying the lower areas. In some of these areas, with the high resolution imagery and, at times, the use of Feature Analyst, delineations of just the lower wet areas were possible. Most of the time, some upland mounds were included within larger wetland polygons. Or, very small/narrow wetland features were not mapped.

Broad-leaved evergreen shrub (PSS3) species such as *Baccharis spp*. are common in this area, but difficult to distinguish form broad-leaved deciduous (PSS1) due to the mid-growing season timeframe that the aerial imagery was acquired.

Areas mapped as mangroves E2SS3 (N, P) may contain substantial emergent habitat as well. The

distinction between the two was difficult on both eras of photography.

All submerged (subtidal) rooted AB will be identified as E1AB3L. Aquatic bed in shallower margins may be identified as E2ABM/E2ABN

Many of the shallow open water bodies within the estuarine marsh were identified as E2USM. Most of these were labeled E1UBL on the old NWI data. It is assumed, for this update, that these areas are shallow and not necessarily subtidal.

Freshwater tidal water regimes will only be applied where large riverine systems and the upper estuary systems interface. Due to the layout of the project boundary, few tidally-flooded freshwater wetlands were mapped. Non-tidally flooded wetlands on the high side of tidal wetlands will use standard non-tidal water regimes.

It was difficult, in areas, to distinguish between rooted AB and US in some of the deeper water flats. Some areas exhibiting AB-type signatures were identified on the previous NWI data and the UT BEG maps as US. Until field surveys can be conducted, the collateral data will be used to make the decision.

References:

Carr, J. T.,1967, The climate and physiography of Texas: Texas Water Development Board Report 53, 27 p.

Cowardin, L.M., V. Carter, F.C., Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31

Thornwaite, C. W., 1948, An approach toward a rational classification of climate: Geographical Review, v. 38, no. 1, p. 55-94.

White, W. A., Calnan, T. R., Morton, R. A., Kimble, R. S., Littleton, T. G., McGowen, J. H., Nance, H. S., and Schmedes, K. E., Preface by Fisher, W. L. 1989, Submerged Lands Of Texas, Port Lavaca Area: Sediments, Geochemistry, Benthic Macroinvertebrates, And Associated Wetlands. Bureau of Economic Geology, University of Texas, Austin, 145 p.

Wetlands Quality Review Certification

Work Area/Project Title: R02Y10P07 Aransas SLAMM Pilot

Location (state and city, counties, watershed, or area): Coastal Texas, Corpus Christi area.

Size of Work Area: 684,000 acres 18 quads

Quality Control during Interpretation (QCI) Performed by:

Names and Affiliations: Conservation Management Institute, Virginia Tech Univ.
Percent of Area reviewed: 100%
Dates of Review: 5/10 – 6/10

Regional QC of Final Submission (QCF) Performed by:
Name: Jim Dick
Affiliation: USFWS, Regional Wetlands Coordinator
Percent of Area reviewed: 100%
Dates of Review: 7/10
Date(s) of Spot Check by Regional Wetlands Coordinator: N/A

National QA Review (QA) Performed by:
Name: Jim Dick/Audrey Wilson
Affiliation: USFWS, Regional Wetlands Coordinator
Percent of Area reviewed: 20%
Dates of Review: 8/10

The Region certifies that the wetlands geospatial data submission listed above has gone through all Regional quality review steps and meets NWI data requirements for completeness and quality.

Regional Wetland Coordinator:
Jim Dick, Region 2 (Certified)

Region :2 Regional Certification Control Number:_____ Date: 8/4/10

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