PO-22
Bayou Chevee Shoreline Protection Summary Data and Graphics

6/23/2003

Carter, B. 2003. *PO-22 Bayou Chevee Shoreline Protection Summary Data and Graphics. Louisiana Department of Natural Resources, Coastal Restoration Division, Baton Rouge, Louisiana. 15pp.*

Bayou Chevee Shoreline Protection (PO-22)

Project Overview

- The Bayou Chevee Shoreline Protection Project is located on the southern shoreline of Lake Pontchartrain just west of Chef Menteur Pass, within the northern section of the Bayou Sauvage National Wildlife Refuge, approximately 10 miles northeast of New Orleans, Louisiana. (Figure 1.)
- The project area is divided into two areas, the north cove area and the south cove area.
- High wave energies associated with Lake Pontchartrain and Chef Menteur Pass have caused extensive shoreline erosion along the lake's shoreline that has been estimated to average 15 ft/yr (3.55 ac/yr) from 1958-1983.
- The purpose of this project is to provide shoreline protection across the north and south cove areas protecting the 54 and 21 acres of brackish marsh in those respective areas. The shore protection will allow for the enclosed shallow water areas to be colonized by a greater abundance of submerged aquatic vegetation (SAV).
- Construction completed on December 12, 2001
- Initial linear length of the rock dikes for the north and south coves was 5,690 ft combined, but was increased to 8,875 ft due to excess building material at the end of construction.

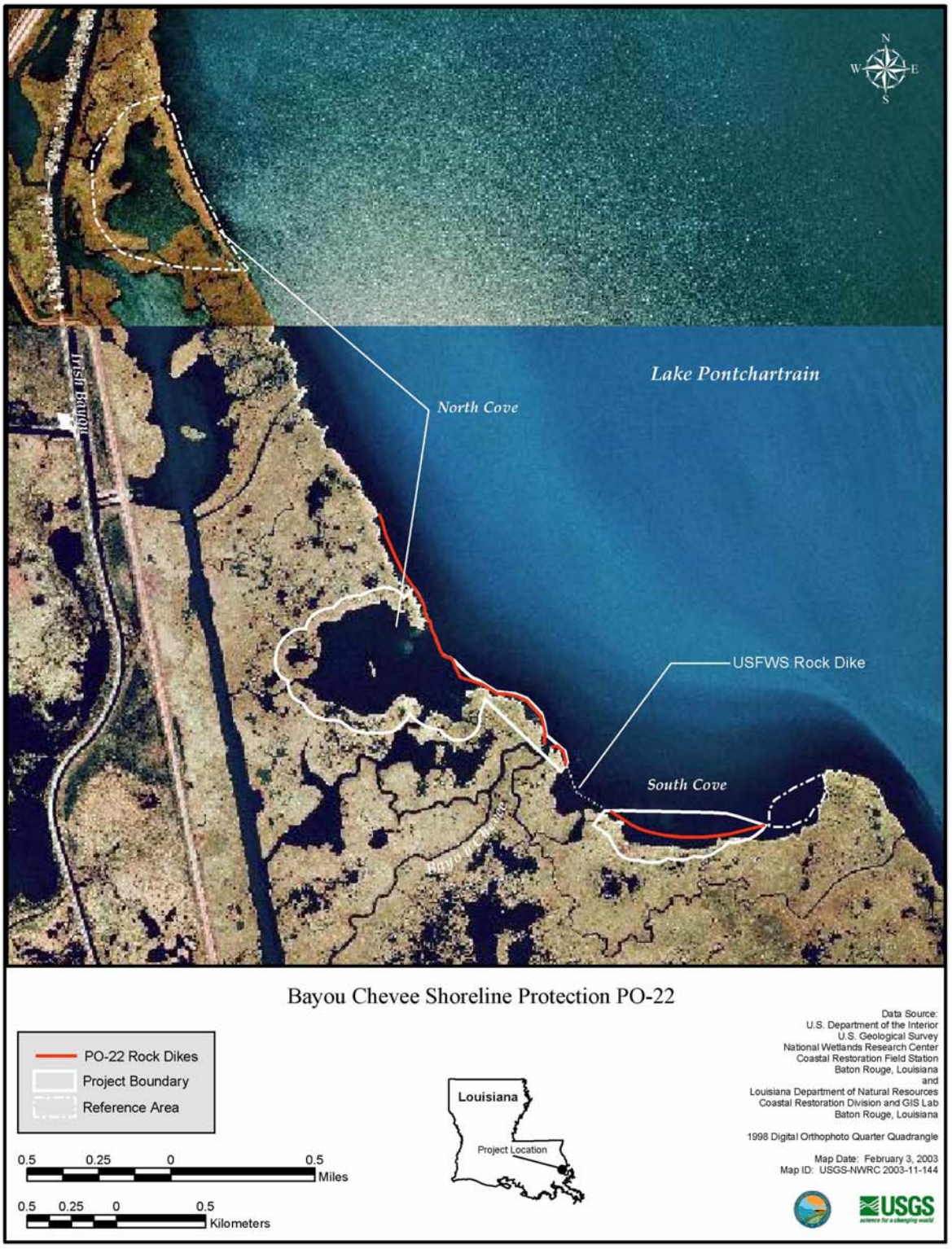

Figure 1. Location of Bayou Chevee Shoreline Protection project boundaries, features, and reference area.

Bayou Chevee Shoreline Protection (PO-22)

Project Objective

1. Provide shore protection for the north cove and south cove areas of the Bayou Sauvage National Wildlife Refuge and enhance the establishment of submerged aquatic vegetation in the south cove area while maintaining or enhancing their establishment in the north cove area

Specific Goals

The following goals will contribute to the evaluation of the above objective:

1. Decrease the mean rate of shoreline erosion in both the north and south cove areas through the use of a rock dike.
2. Maintain (north cove) or maintain/increase (south cove) mean abundance of submerged aquatic vegetation in the ponds behind the rock dikes.

Bayou Chevee Shoreline Protection (PO-22)

Monitoring Elements

Shoreline Change: Using GPS, shoreline position will be documented as-built in 2001, and in 2004, 2007, 2010, 2013, 2016, and 2019 post-construction to provide a template for mapping shoreline changes and movement over time. Shoreline erosion rates for the project areas will be compared to the shoreline erosion rates of the reference areas, and with historical rates of shoreline erosion collected by Gagliano et al. (1988).

Vegetation: The frequency of occurrence of submerged aquatic vegetation (SAV) was documented for pre-construction years 1998 and 2001, and will be collected in years 2004, 2007, 2010, 2013, 2016, and 2019 post-construction. Two transects were established in each the north and south cove project and reference area, and methods followed Nyman and Chabreck (1996).

Bayou Chevee Shoreline Protection (PO-22) Shoreline Change Data

The as-built shoreline position was documented in January of 2002. Once shoreline position is documented in 2004, the data will be analyzed and the shoreline change quantified.

- Figure 2. 2002 shoreline position displayed on a 1998 DOQQ. Map shows qualitatively the change of shoreline position from time of photo acquisition (1998) and shoreline survey (2002).

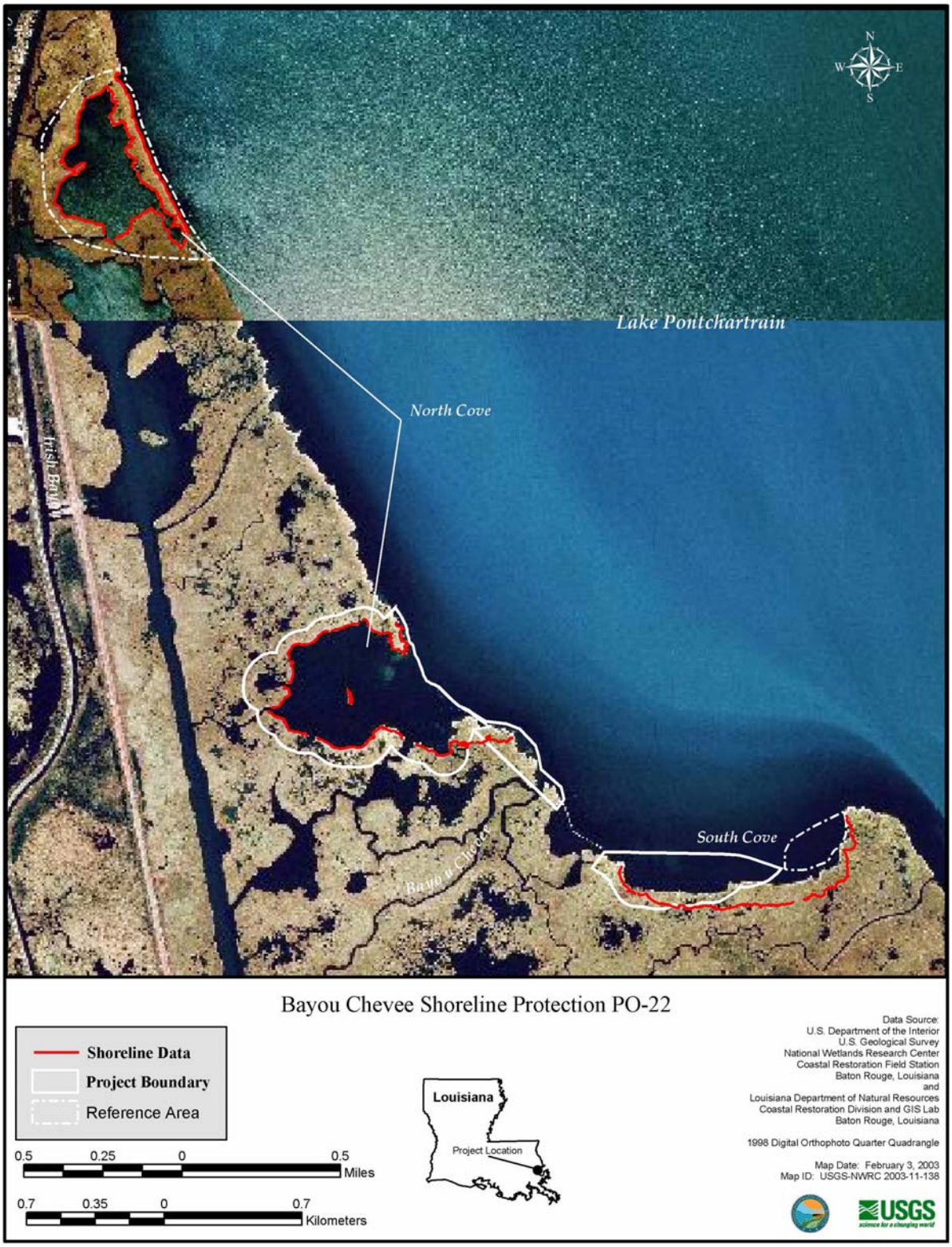

Figure 2. 2002 Shoreline position overlaid on 1998 DOQQ image for the Bayou Chevee Shoreline Protection (PO-22) Project.

Bayou Chevee Shoreline Protection (PO-22) SAV Data

Submerged Aquatic Vegetation (SAV) surveys were collected in pre-construction years 1998 and 2001.

- SAV Transect Location Map (transects established during 2001 survey) (Figure 3.)
- Relative Frequency of Occurrence of SAV's (Figures 4 – 7 and Tables 2 – 5.)

Table 1. Common and scientific names of species documented during Submerged Aquatic Vegetation (SAV) sampling for the Bayou Chevee Shoreline Protection Project (PO-22).

Scientific Name	Common Name
Alga	Alga
Ceratophyllum demersum	Coontail
Myriophyllum spicatum	Eurasian Watermilfoil
Najas guadalupensis	Southern Naiad
Ruppia maritima	Widgeon Grass
Vallisneria americana	Wild Celery

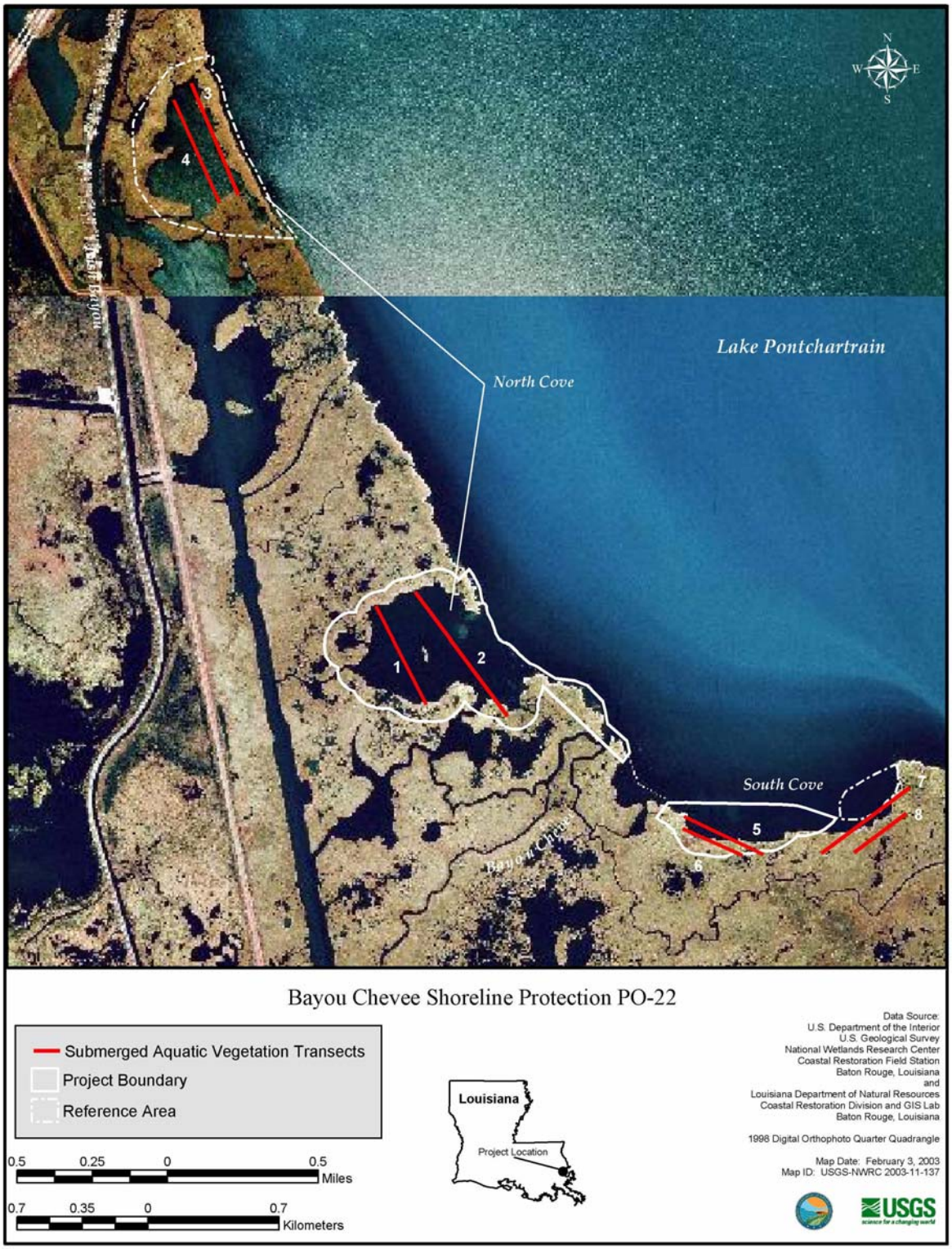

Figure 3. Location of Bayou Chevee Shoreline Protection (PO-22) submerged aquatic vegetation transects.

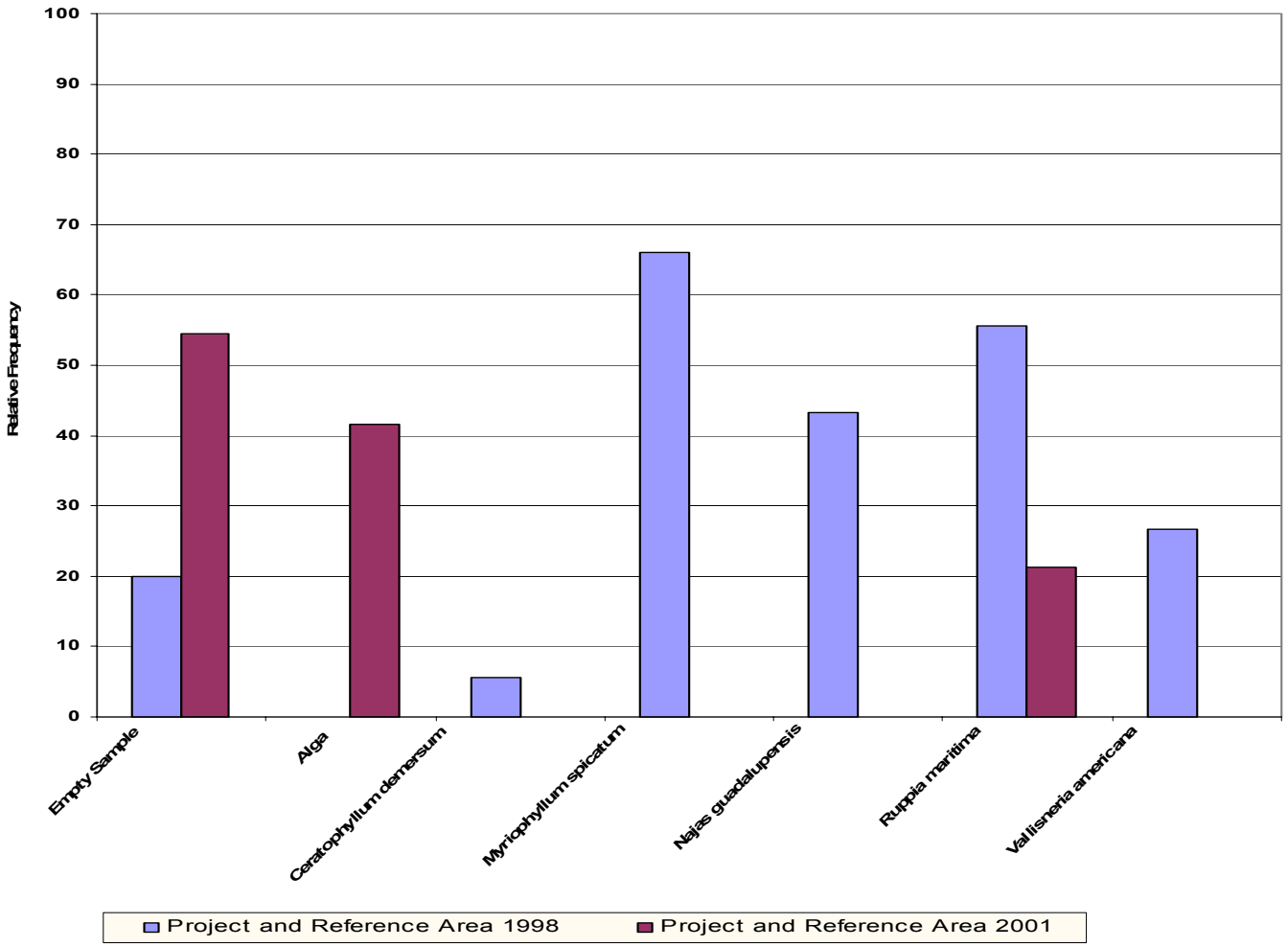

Figure 4. Relative frequency of submerged aquatic vegetation species for project and reference area July 1998 and April 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Table 2. Relative frequency of submerged aquatic vegetation species for project and reference area July 1998 and April 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Scientific Name	Project and Reference Area 1998	Project and Reference Area 2001
Empty Sample	20	54.46
Alga	--	41.53
Ceratophyllum demersum	5.56	--
Myriophyllum spicatum	66.11	--
Najas guadalupensis	43.33	--
Ruppia maritima	55.56	21.23
Vallisneria americana	26.67	--

-- *Not documented in sample*

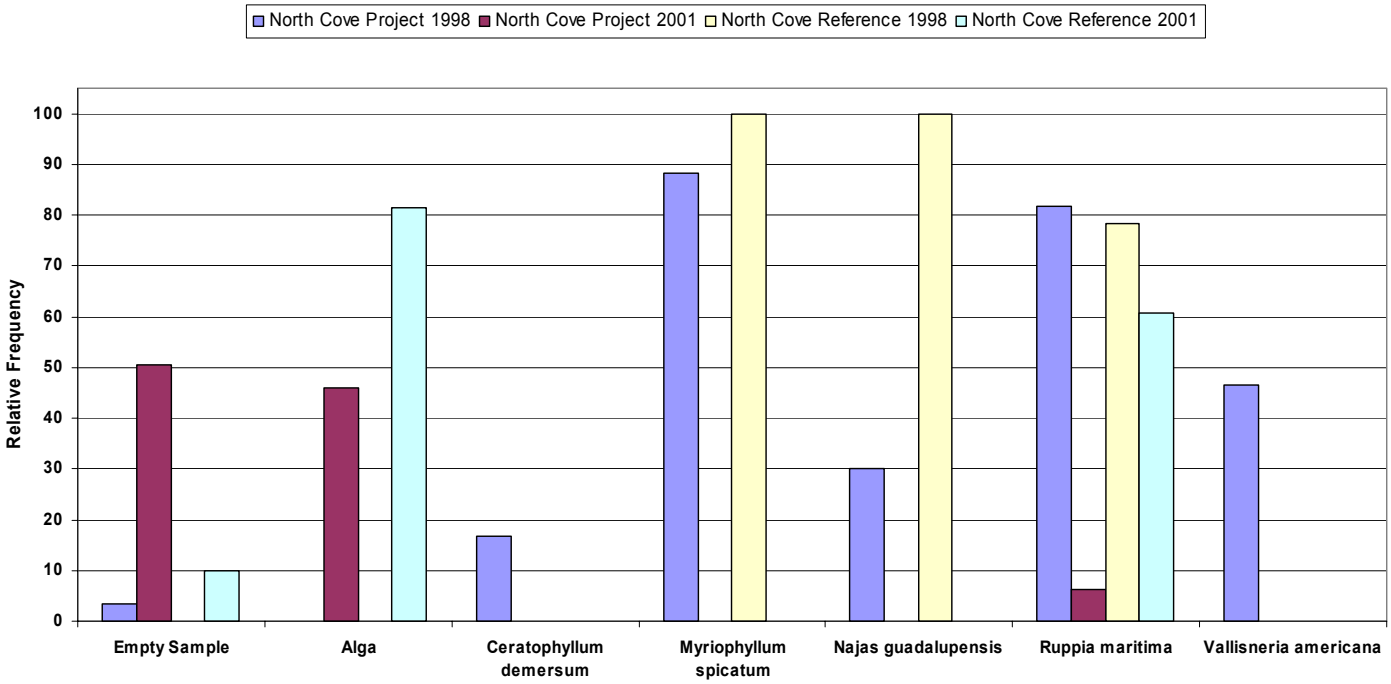

Figure 5. Relative frequency of submerged aquatic vegetation species for North cove project and reference area during pre-construction years 1998 and 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Table 3. Relative frequency of submerged aquatic vegetation species for north cove project and reference area during pre-construction years 1998 and 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Scientific Name	North Cove Project 1998	North Cove Project 2001	North Cove Reference 1998	North Cove Reference 2001
Empty Sample	3.33	50.44	--	9.80
Alga	--	46.02	--	81.37
Ceratophyllum demersum	16.67	--	--	--
Myriophyllum spicatum	88.33	--	100	--
Najas guadalupensis	30.00	--	100	--
Ruppia maritima	81.67	6.19	78.33	60.78
Vallisneria americana	46.67	--	--	--

-- *Not documented in sample*

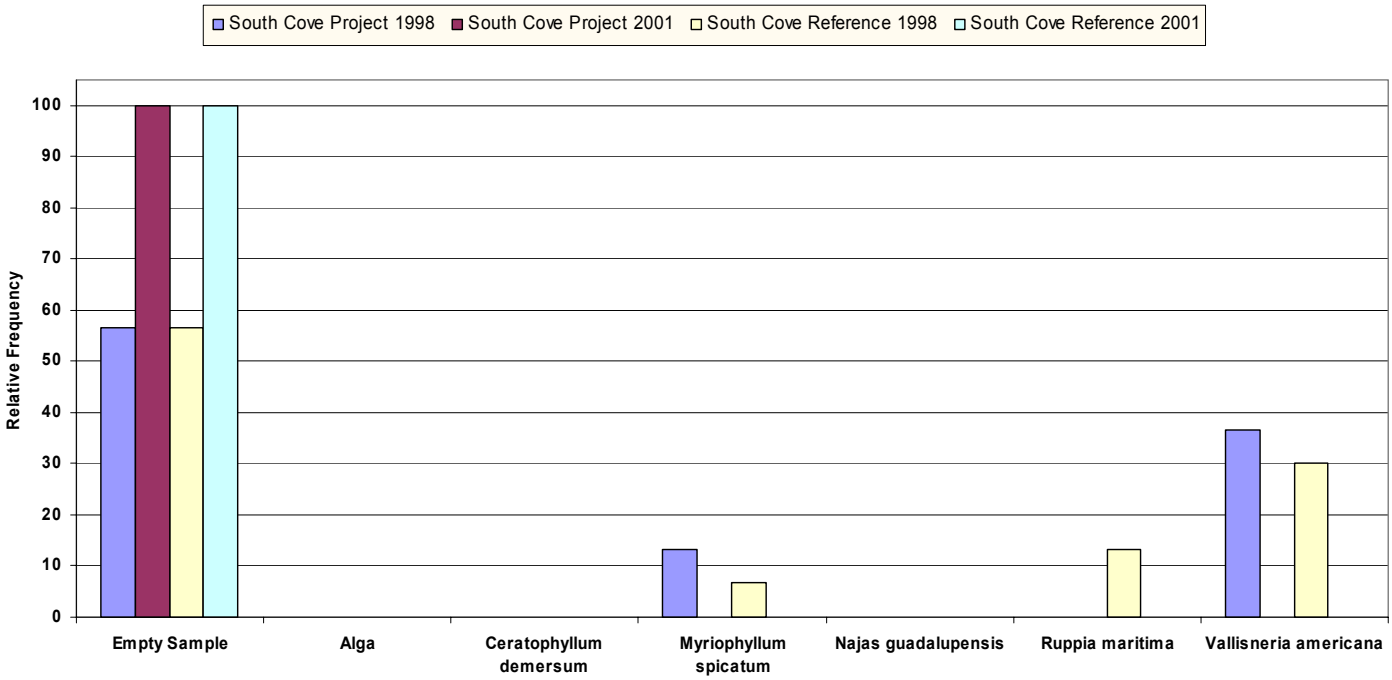

Figure 6. Relative frequency of submerged aquatic vegetation species for South cove project and reference area during pre-construction years 1998 and 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Table 4. Relative frequency of submerged aquatic vegetation species for south cove project and reference area during pre-construction years 1998 and 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Scientific Name	South Cove Project 1998	South Cove Project 2001	South Cove Reference 1998	South Cove Reference 2001
Empty Sample	56.67	100	56.67	100
Alga	--	--	--	--
Ceratophyllum demersum	--	--	--	--
Myriophyllum spicatum	13.33	--	6.67	--
Najas guadalupensis	--	--	--	--
Ruppia maritima	--	--	13.33	--
Vallisneria americana	36.67	--	30	--

-- *Not documented in sample*

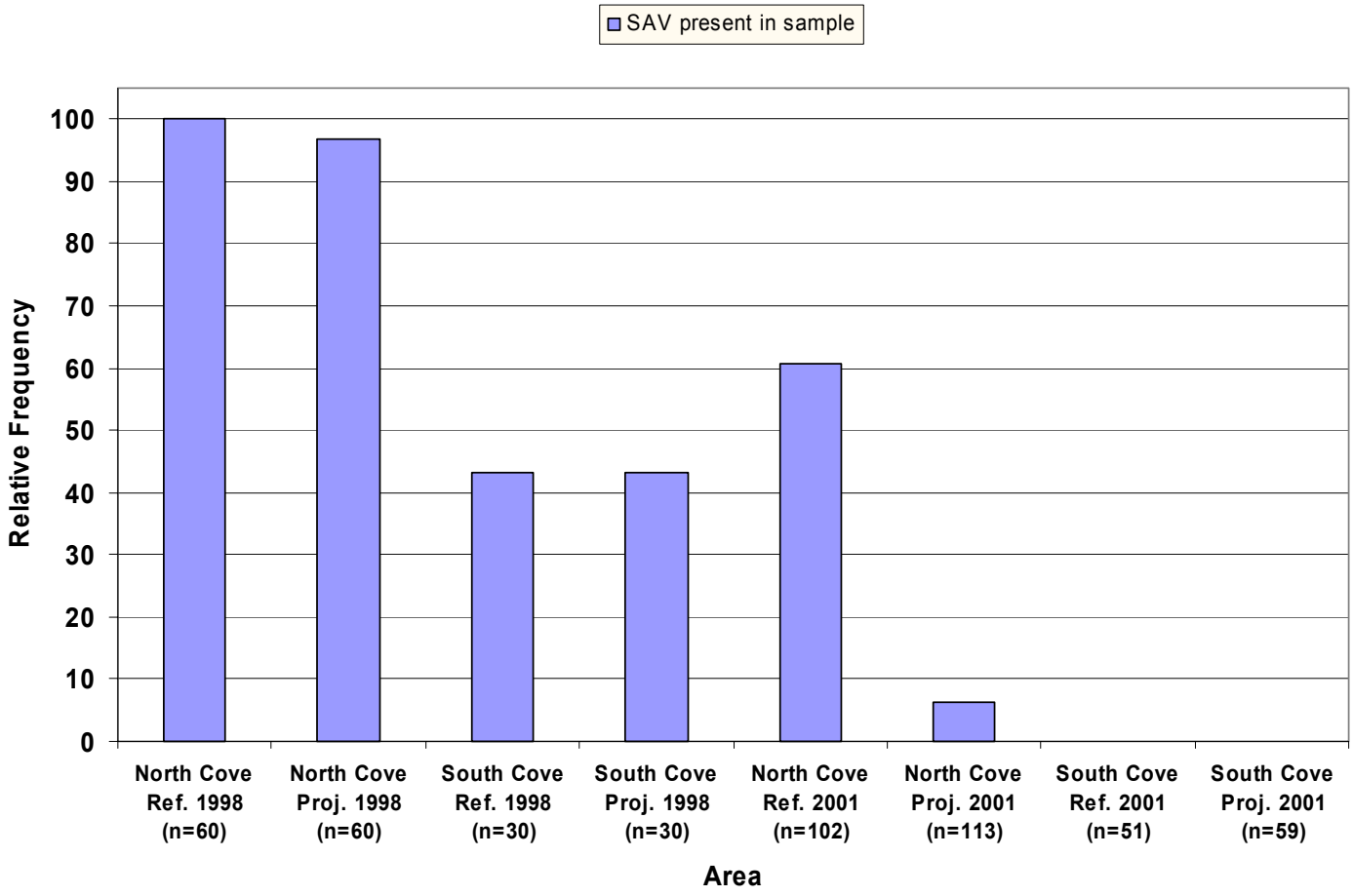

Figure 7. Frequency of submerged aquatic vegetation in samples for North and South cove project and reference areas 1998 and 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Table 5. Frequency of submerged aquatic vegetation in samples for North and South cove project and reference areas 1998 and 2001 for the Bayou Chevee Shoreline Protection Project (PO-22).

Area	SAV Present In Sample (%)
North Cove Ref. 1998 (n=60)	100.00
North Cove Proj. 1998 (n=60)	96.67
South Cove Ref. 1998 (n=30)	43.33
South Cove Proj. 1998 (n=30)	43.33
North Cove Ref. 2001 (n=102)	60.78
North Cove Proj. 2001 (n=113)	6.19
South Cove Ref. 2001 (n=51)	0.00
South Cove Proj. 2001 (n=59)	0.00

Bayou Chevee Shoreline Protection (PO-22)

Preliminary Findings

Shoreline Position:

- As-built shoreline position was documented in 2002, however the first post-construction shoreline survey will not be conducted until 2004. After the 2004 shoreline position is documented, the rate of shoreline movement during the first 2 years post-construction will be calculated from the project and reference areas to determine the project's effectiveness at addressing shoreline erosion.
- As determined by overlay of 2002 shoreline data over 1998 DOQQ image, shoreline position has retreated considerably since 1998. In the South Cove project area, shoreline position has retreated past the original project boundary. The three-year delay in project construction has cost the project in terms of shoreline loss.

Vegetation:

- In 1998 *Vallisneria americana*, *Myriophyllum spicatum*, and *Ruppia maritima* (south cove reference only) occurred at an average frequency of 33%, 10%, and 13% respectively, within the south cove area. The survey of 2001 found the south cove project and reference areas completely devoid of submerged aquatic vegetation (SAV).
- The north cove project area had a high abundance and diversity of SAV in 1998. By 2001 the area had lost all SAV's, with the exception of a small localized stand of *Ruppia maritima*, and had a 46% frequency of occurrence of Alga which had not been identified in the area during the 1998 survey.

Bayou Chevee Shoreline Protection (PO-22)

Preliminary Findings cont.

- The north cove reference area showed a high occurrence of *Alga sp.* (81%) and *Ruppia maritima* (61%) in 2001, but had lost the diversity and overall abundance of SAV species recorded during the 1998 sampling.
- Overall, a significant decline in SAV occurrence was realized across all areas between the 1998 and 2001 SAV surveys.
- This loss was most likely due to drought conditions that prevailed during the 2000 growing season.
- During the drought salinities likely exceeded the tolerance levels of *Ceratophyllum demersum, Myriophyllum spicatum, Najas guadalupensis,* and *Vallisneria americana.*
- *Ruppia maritima*, which can withstand a broad range of salinity levels, was the only plant species observed during the 2001 sampling.