CS-30

Perry Ridge West Bank Stabilization
Summary Data and Graphics

9/8/03

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Perry Ridge West
(CS-30)

Project Overview:

The Perry Ridge West project is comprised of 1,132 acres (458 ha) of fresh and intermediate marsh located in Calcasieu Parish, Louisiana. The project area is bounded to the south by the Gulf Intracoastal Waterway (GIWW) from Perry Ridge West to the Sabine River.

The GIWW is the dominant hydrologic influence in the project area, the construction of which has caused the area to become a tidal system. The use of double wide barges, allowed in the section of the GIWW adjacent to the project area, has accelerated wave-induced erosion of the remaining spoil bank and marsh vegetation. The pre-project estimate of the rate of shoreline erosion along the GIWW was 3.9 ft/yr (1.2 m/yr) (U.S. Department of Agriculture, Natural Resources Conservation Service [USDA-NRCS]1999). Amplification of the effects of meteorological events has occurred as well, as water levels can fluctuate as much as 2 ft (0.7 m) due to strong northerly winds and 10 ft (3 m) during a tropical storm or hurricane. This area has also exhibited tremendous wetland vegetation loss since 1956, as indicated by habitat change analysis.

Construction of the project was completed in August 2002 and included the following features:

1. A 12,000 linear ft (3,660 m) free-standing rock dike was constructed parallel to the existing shoreline approximately 60 ft (18.3 m) from the bank.

2. An earthen plug, approximately 350 ft (107 m) in length, was constructed to close a breach in the existing spoil bank of the GIWW adjacent to the project.

3. A total of 22,952 linear ft (6,996 m) of shallow water terraces were constructed in open water areas in the interior emergent marsh.

4. After construction, 9,400 trade-gallon size containers of *Schoenoplectus californicus* (California bullwhip) were planted along the perimeter of the constructed terraces.

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Project Goals:

1. Reduce erosion along the northern bank of the GIWW to protect interior marshes.
2. Create marsh habitat
3. Maintain submerged aquatic vegetation (SAV)

Project Strategies:

1. Use hard structures to break wave energy impacting the shoreline along the GIWW and Sabine River, and repair a large breach in the spoil bank to eliminate tidal exchange.
2. Construct earthen terraces in open water areas of interior emergent marshes to reduce fetch and wave energy, retain sediments, and maintain SAV habitat.
3. Use vegetation plantings to stabilize terraces and increase emergent marsh vegetative cover.

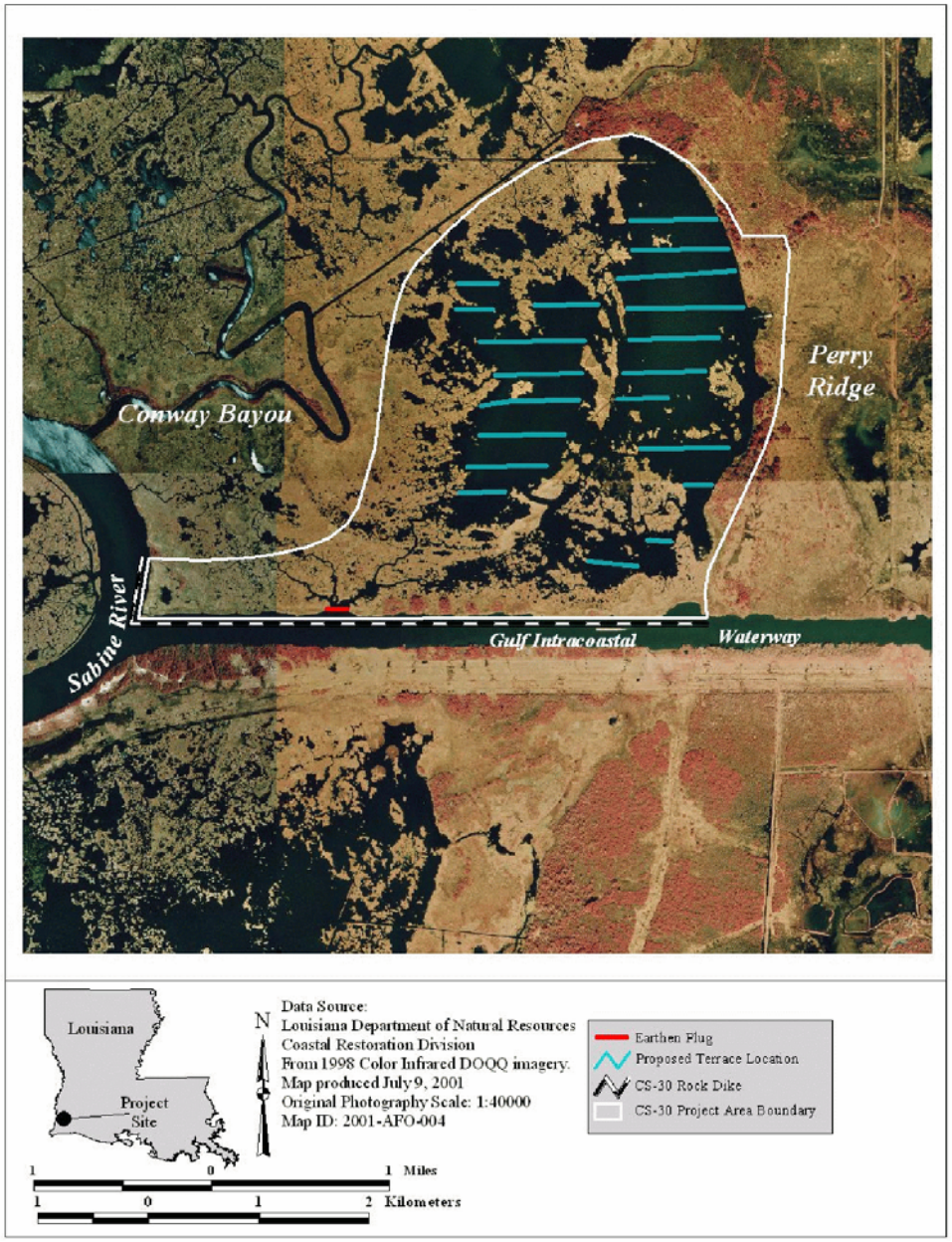

Figure 1. Perry Ridge West (CS-30) project boundaries

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Monitoring Elements

Aerial Photography: In order to evaluate shoreline movement and the extent of interior emergent marsh creation (direct and indirect) in both the project and reference areas, near-vertical, color-infrared aerial photography (1:12,000 scale) was obtained once prior to construction in 2001, and will be obtained post-construction in years 2005, and 2010. The photography will be georectified using standard operating procedures described in Steyer et al. (1995, revised 2000), and shoreline position and land/water ratios will be determined.

Submerged Aquatic Vegetation: To evaluate the effects of earthen terraces on SAV habitat, a modification of the rake method (Chabreck and Hoffpauir 1962) will be used to estimate SAV occurrence. The project and reference areas will each be monitored along 6 transects divided equally among 3 representative shallow ponds. Each transect will have a minimum of 25 sampling stations and will be oriented toward the prevailing wind. At each station, aquatic vegetation will be sampled by dragging a garden rake on the pond bottom for about 1 second. The presence of vegetation will be recorded to determine the frequency of aquatic plant occurrence (frequency = number of occurrences/number of stations x 100). When vegetation is present, the species present will be recorded in order to determine the frequencies of individual species (Nyman and Chabreck 1996). SAV abundance was sampled in 2000 (pre-construction), and will be sampled postconstruction in 2003, 2005, 2008, 2015, and 2020.

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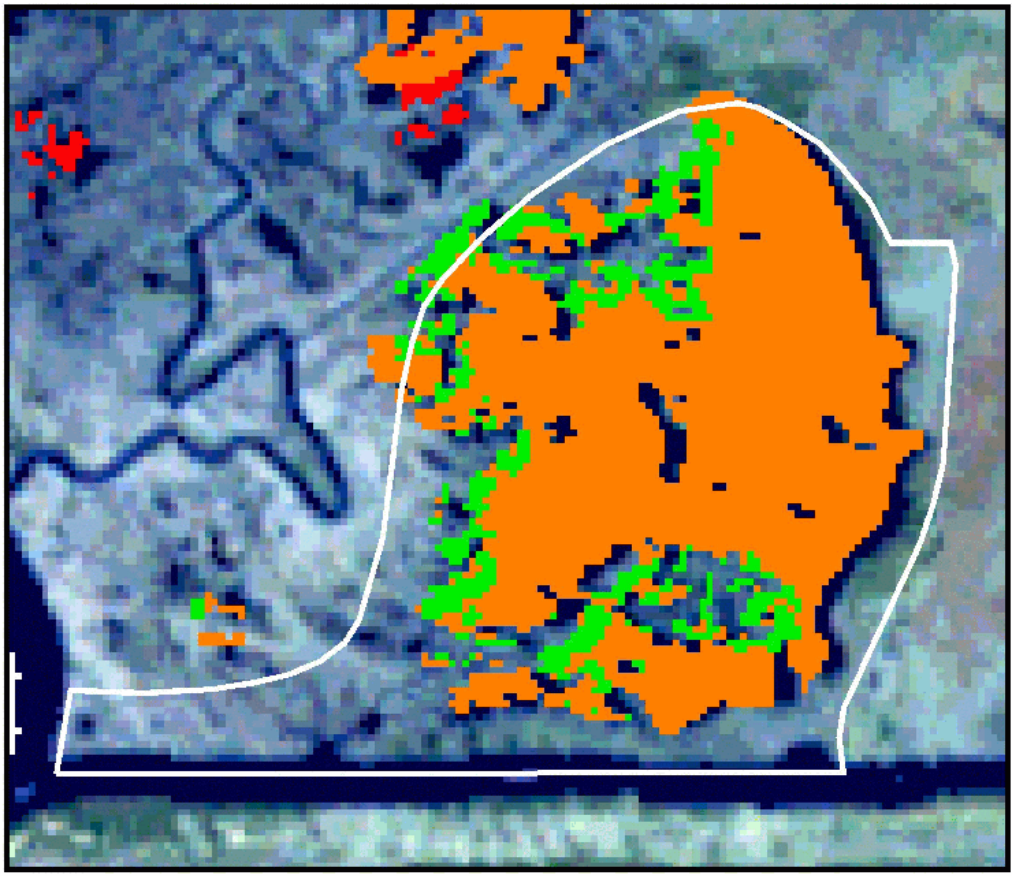
Spatial Analysis

Aerial photography was collected in Nov 2001. It will also be collected in 2005 and 2010. The 2001 photography is currently being processed.

Figures:

- **Figure 2.** Perry Ridge West (CS-30) project land loss/gain analysis from satellite imagery for the period 1956-1990.
- **Figure 3.** Perry Ridge West (CS-30) project 1993 land/water analysis from satellite imagery.
- **Figure 4.** View of the Perry Ridge West rock dike taken October 21, 2003. The photograph is facing west.
- **Figure 5.** Views of the terraces and *Schoenoplectus californicus* plantings taken July 2002. The photograph on the left is facing southwest , and on the right is facing south.



1956 - 1990 Loss/Gain Analysis				
Color	Class	Acres	Hectares	Percent
	1956 - 1978 Loss	-659.93	-267.06	48.89
	1956 - 1978 Gain			
	1978 - 1990 Loss	96.22	38.94	48.89
	1978 - 1990 Gain			
	Totals	-563.71	-228.13	

Data Source:
U.S. Geologic Survey
National Wetlands Research Center
Coastal Restoration Field Station
Louisiana Department of Natural Resources
Coastal Restoration Division and GIS Lab
1956-1990 Loss/Gain Analysis
1993 TM Satellite Imagery
Map Date: September 19, 2001
Map ID: 2001-4-568

Figure 2. Perry Ridge West (CS-30) project land loss/gain analysis for the period 1956-1990.

1993 Land/Water Analysis				
Color	Class	Acres	Hectares	Percent
	1993 Water	533.59	215.94	46.28
	1993 Land	619.31	250.63	53.72
	No Data Available	0.00	0.00	0.00
	Totals	1152.9	466.56	100.00

Figure 3. Perry Ridge West (CS-30) project 1993 land/water analysis.

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Figure 4. View of the Perry Ridge West rock dike taken October 21, 2003. The photograph is facing west.

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Figure 5. Views of the terraces and *Schoenoplectus californicus* plantings taken July 2002. The photograph on the left is facing southwest , and on the right is facing south.

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SAV

SAV frequency data were collected in November 2000.

Figures:

- **Figure 6.** Location of SAV transects at Perry Ridge West (CS-30) project.
- **Figure 7.** Perry Ridge West (CS-30) preconstruction SAV data

Tables:

- **Table 1.** List of scientific and common names for vegetation species collected.

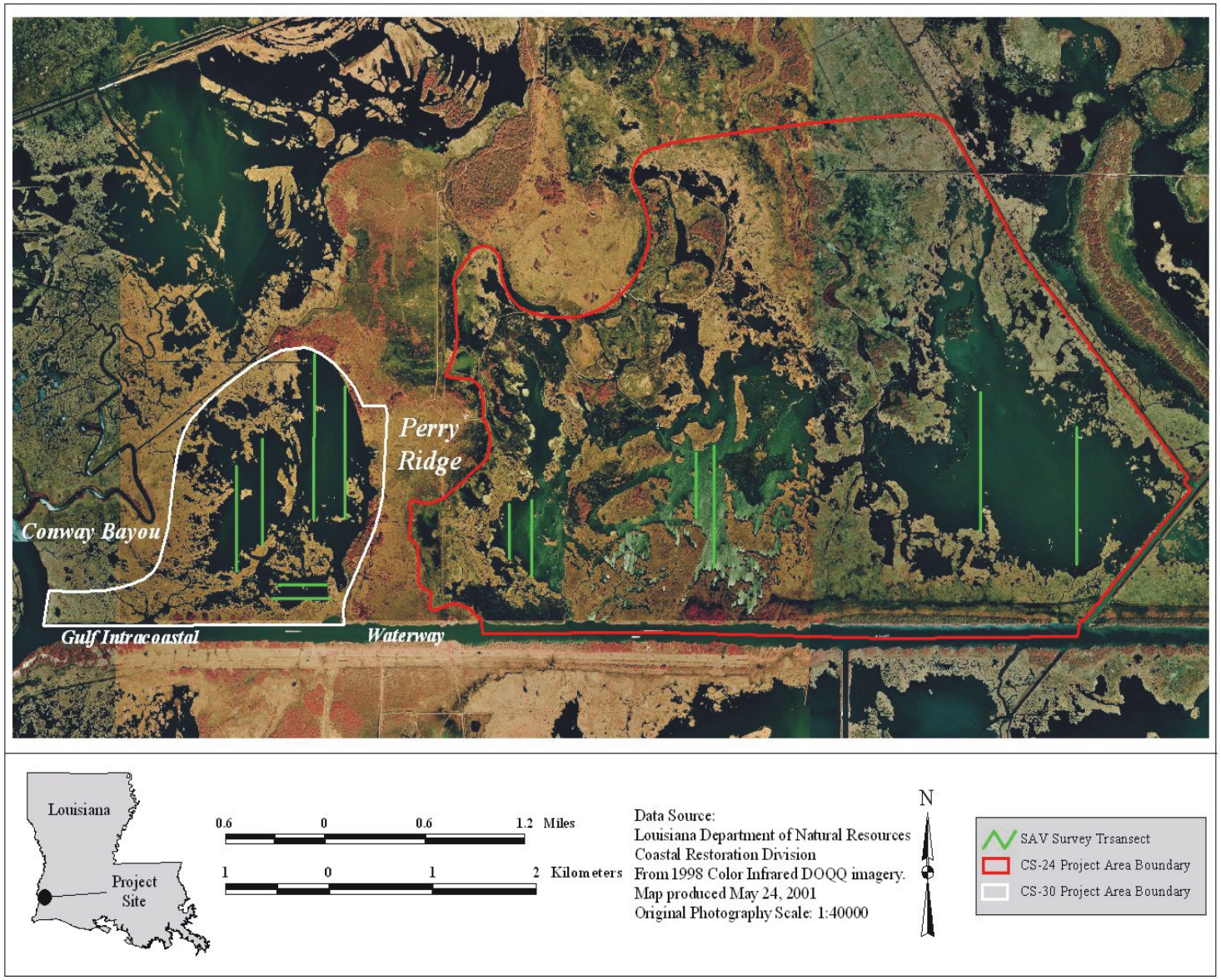

Figure 6. Location of SAV transects at Perry Ridge West (CS-30) project.

Table 1. List of scientific and common names for vegetation species collected.

Scientific Name	Common Name
Potamogeton sp.	Pondweed
Myriophyllum spicatum	Eurasian Watermilfoil
Ruppia maritima	Widgeon Grass
Vallisneria americana	Wild Celery
Ceratophyllum demersum	Coontail
Chara sp.	Green Algae
Alga	Alga

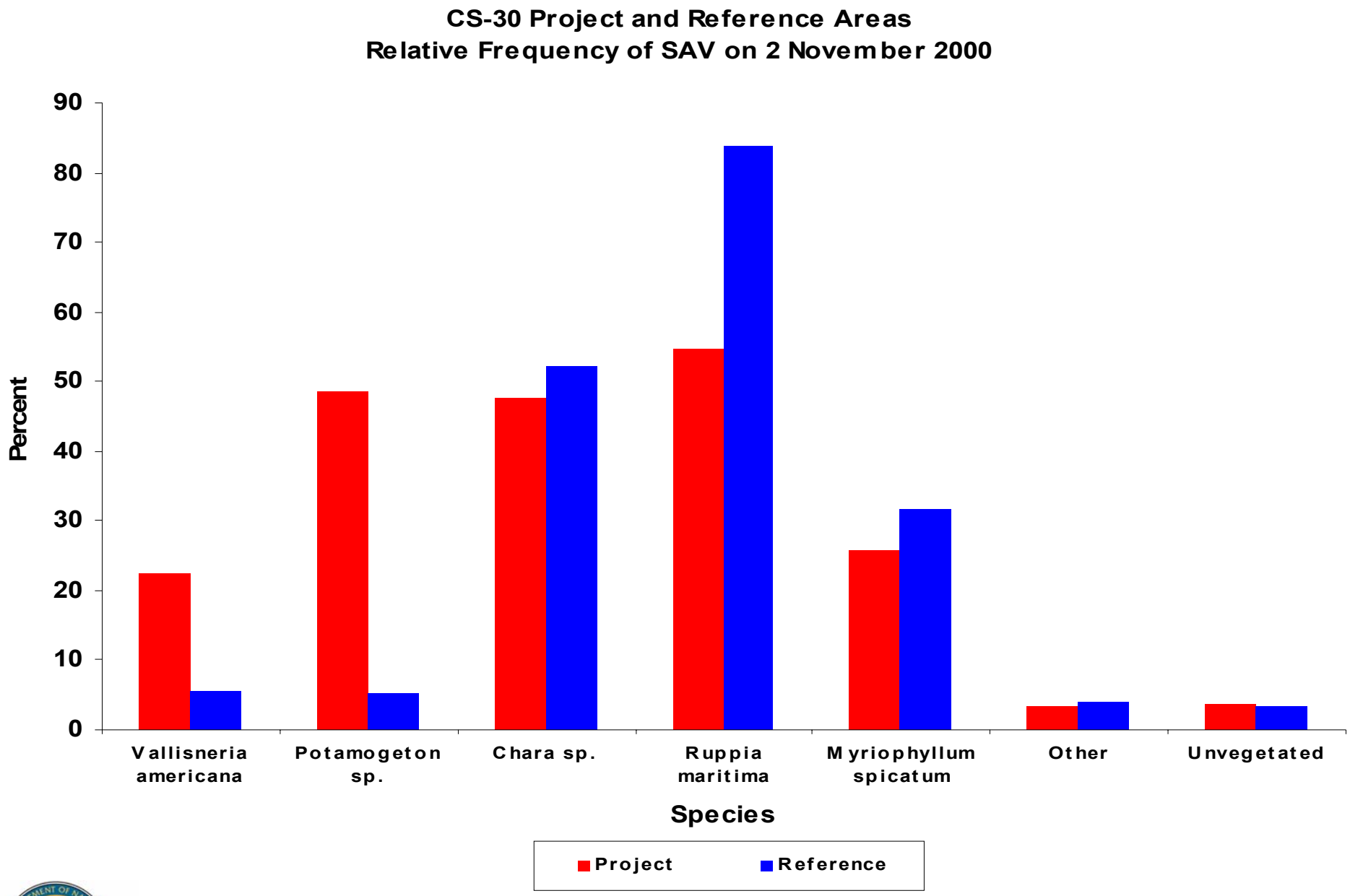

Figure 7. Perry Ridge West (CS-30) preconstruction SAV data

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Preliminary Findings

Spatial Data:

- Pre-construction (1993) land:water classification of satellite imagery indicated 53.72% land and 46.28% water within the project area. Approximately 47% of the project area was classified as intermediate marsh.
- 2001 aerial photography was collected on November 17, 2001 and is currently being processed by NWRC.

Submerged Aquatic Vegetation:

- On the pre-construction survey, the project area showed a slightly higher frequency of SAV than the reference area. Dominant species in the reference area include *Ruppia maritima* (Widgeon Grass), *Chara sp.* (chara), and *Myriophyllum spicatum* (Eurasian Watermilfoil), while dominant species in the project area include *R. maritima*, *Chara*, and *Potomogeton sp* (pondweed).
- Next survey scheduled for Oct 2003.

Shoreline movement:

- Aerial photography will be used to monitor shoreline movement. As mentioned above, the photography from the 2001 flight is still being processed. However, direct shoreline measurements on the adjacent CS-24 project, which has similar hydrologic conditions, have shown that the project has been effective in preventing erosion at most project area stations, while the reference area continued to retreat.