Coastal Protection and Restoration Authority of Louisiana

State of Louisiana
Coastal Protection and Restoration Authority

2024 Operations, Maintenance, and Monitoring Report

for

Bayou Chevee Shoreline Protection (PO-22)

State Project Number PO-22
Priority Project List 5

July 2025
Orleans Parish

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Suggested Citation:

Gossman, B. and B. Richard 2024. *2024 Operations, Maintenance, and Monitoring Report for Bayou Chevee Shoreline Protection (PO-22),* Coastal Protection and Restoration Authority of Louisiana. 17 pp, and Appendices.

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Preface

The Bayou Chevee Shoreline Protection (PO-22) project is funded through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) with the United States Army Corps of Engineers (USACE) as the federal sponsor and the Coastal Protection and Restoration Authority of Louisiana (CPRA) as the state sponsor. This project was included on the 5th Priority Project List (PPL 5). This report includes monitoring data collected through November 2020, and Annual Maintenance Inspections through February 2024. The 2024 Operations, Maintenance, & Monitoring (OM&M) Report is the sixth in a series of reports. The 2024 OM&M Report will serve as the closeout report for PO-22 since the project has reached the end of its designated 20-yr lifespan. These reports, along with other documents and data pertaining to PO-22 can be accessed through CPRA's Coastal Information Management System (CIMS) website at http://cims.coastal.louisiana.gov/

I. Introduction

The Bayou Chevee Shoreline Protection project is located 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 located on the southern shoreline of Lake Pontchartrain and is divided into two areas, the north cove area and the south cove area. The North Cove project area, comprising 164 acres, is located just north and west of Bayou Chevee. It extends 300 ft into the marsh from the existing shoreline of a 110-acre pond of open-water and includes 54 acres of brackish marsh. The South Cove area, consisting of 48 acres, is located southeast of Bayou Chevee and northwest of Chef Menteur Pass. It extends 300 ft into the marsh from the existing shoreline around a 27-acre cove and includes 21 acres of brackish marsh. Project and reference area marshes are dominated by *Spartina patens* (marshhay cordgrass) with *Spartina alterniflora* (smooth cordgrass), *Pluchea spp.,* and *Cyperus spp*. present.

High wave and current energies associated with Lake Pontchartrain and Chef Menteur Pass have caused extensive shoreline erosion along the Lake Pontchartrain shoreline that has been estimated to average 15 ft/yr, or approximately 3.55 ac/yr from 1958-1983 (U.S. Army Corps of Engineers [USACE] 1997). Over the twenty year life of the project, the shoreline would be expected to erode 300 feet without project implementation. Shoreline erosion was not a measurable problem for the interior pond of the north cove prior to 1997 when the pond was separated from Lake Pontchartrain by a 250-ft strip of marsh. However, by early 1997 this marsh had disappeared leaving the interior shoreline exposed to the wave energies of Lake Pontchartrain.

The PO-22 project consists of approximately 8,875 linear feet of rock bankline protection along the shoreline of Lake Pontchartrain, extending north and south from Bayou Chevee. Construction was completed on December 12, 2001. In addition to reducing shoreline erosion, the bankline protection feature was anticipated to create conditions allowing for the enclosed shallow water areas to be colonized by a greater abundance of submerged aquatic vegetation (SAV).

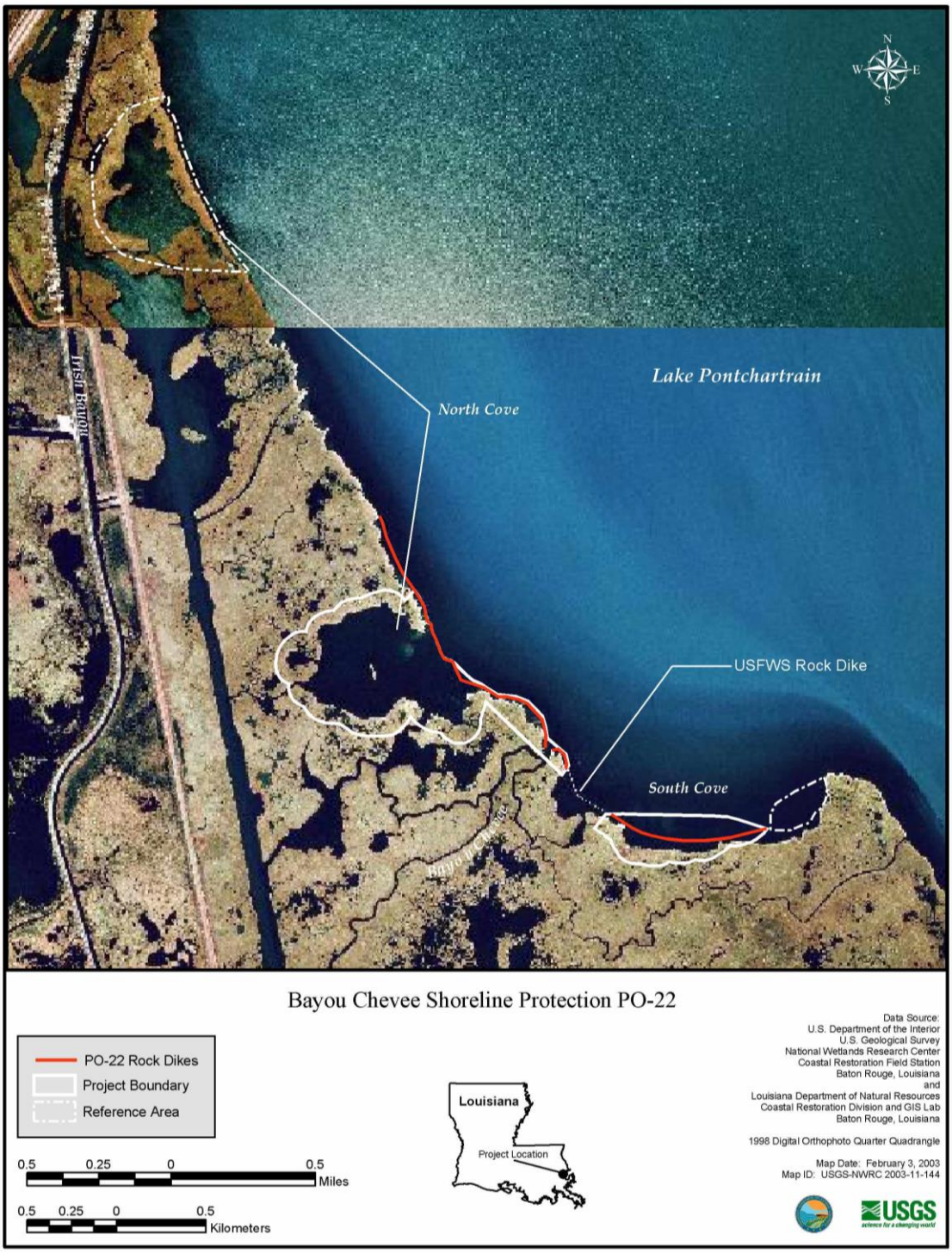

Figure 1. Bayou Chevee Shoreline Protection (PO-22) project location and features.

II. Maintenance Activity

a. Inspection Purpose and Procedures

The 2024 PO-22 inspection is the final O&M inspection prior to project close-out. The purpose of this inspection is to evaluate and document the condition of the constructed project features and to recommend further corrective maintenance actions, if needed. This is a visual inspection conducted by boat to determine if the project features are in an acceptable condition to remain in place after the 20-year project life has ended. Should it be determined that corrective actions are needed, CPRA shall provide a detailed cost estimate for engineering, design, supervision, inspection, construction contingencies, and an assessment of the urgency of such repairs (LDNR 2004).

The final inspection of the Bayou Chevee Shoreline Protection Project (PO-22) was held on February 23, 2024. Representatives in attendance included: Connor Hannan, CPRA. Based on historical online data at the time of the inspection, the water level at the Chef Pass near Hwy 90 staff gauge was -0.38 feet NAVD88. A three (3) year projected operation and maintenance budget is not necessary as this is the final project inspection prior to project close-out. Photographs from the inspection are included in Appendix A and Field Inspection Notes are included in Appendix B.

b. Summary of Past Operation and Maintenance Projects

A final maintenance event to install lighted aids to navigation was completed in February 2024. The US Coast Guard required fifteen (15) lighted aids to navigation to be installed along the length of the project alerting boaters to the presence of the rock structure. The work was accepted on February 23, 2024 as complete and functional.

c. Inspection Results

<u>Rock Rip Rap</u>

A majority of the rock dikes have settled below the acceptable grade of +1.0 ft NAVD88. The rock structure has maintained its shape although some sections were beneath the water surface. No mud waves or loose geotextile were noticed. The settlement plates at each fish dip have corroded away and are no longer visible or functional.

III. Operation Activity

a. Operation Plan

There are no water control structures associated with this project; therefore a Structure Operation Plan was not required.

b. Actual Operations

There are no water control structures associated with this project; therefore, there are no required structure operations.

IV. Monitoring Activity

a. Monitoring Goals

The objectives of the Bayou Chevee Shoreline Protection project are to provide shore protection for the north cove and south cove areas of the Bayou Sauvage National Wildlife Refuge and to enhance the establishment of submerged aquatic vegetation in the south cove area while maintaining or enhancing their establishment in the north cove area.

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.

2. Maintain (north cove) or maintain/increase (south cove) mean abundance of submerged aquatic vegetation in the ponds behind the rock dikes.

b. Monitoring Elements

The following monitoring elements provide the information necessary to evaluate the specific goals listed above:

Shoreline Change

To evaluate change in shoreline position, a sub-meter Differential Global Positioning Satellite (DGPS) system was used to document the position of the vegetated marsh edge. As-built shoreline position was documented in early 2002, and post-construction position was documented in January 2005, May 2008, May 2011, September 2014, August 2017, and November 2020. Shoreline position data were then analyzed using the Digital Shoreline Analysis System (DSAS version 5.0) extension for ArcGIS® (Himmelstoss et al. 2018). DSAS uses a measurement baseline method to calculate rate-of-change statistics for a time series of shorelines. A baseline is constructed from which regularly spaced transects are cast. The transects intersect each shoreline at the measurement points used to calculate shoreline-change rates. Shoreline erosion rates for the project areas were compared to the shoreline erosion rates of the reference areas, and with historical rates of shoreline erosion collected by Gagliano et al. (1988).

Submerged Aquatic Vegetation (SAV)

The line-intercept method described in Nyman and Chabreck (1996) was used to determine the frequency of occurrence of SAV along two transects established in each of the north and south cove project and reference areas (Fig. 2). Transects in the North Cove area had 50 equally spaced sampling stations and transects in the South Cove area had 25 equally spaced sampling stations. Transects were traversed by airboat and at each sampling station a garden rake was dragged along the bottom to collect any SAV present. The presence or absence of SAV was recorded at each station to determine frequency of occurrence. When SAV was present it was identified to species to determine frequency of individual species. SAV was sampled in pre-construction years 1998 and 2001, and in post-construction years 2004, 2008, 2011, 2014, 2017, and 2020.

Figure 2. Yellow lines indicate the location of submerged aquatic vegetation transects for the Bayou Chevee Shoreline Protection (PO-22) project.

c. Monitoring Results and Discussion

Shoreline Change

All areas have experienced some shoreline retreat since the previous survey in 2017. For the period of time from 2017 to 2020 the North Cove project area experienced an average rate of shoreline retreat of 3.3 ft/yr (Table 1) and an average net shoreline loss of 10.5 ft (Table 2). Similar to the trend observed in previous surveys, the majority of the shoreline retreat in the North Cove project area occurred on the north facing bank along the southeastern shoreline (Figure 3).

The North Cove reference area is divided into 2 sub-areas: 1.) an interior pond protected by a narrow strip of marsh from the wave action of Lake Pontchartrain, and 2.) a northeast-facing segment of Lake Pontchartrain shoreline (Figure 4). For the 2017 – 2020 time period the pond portion of the North Cove reference area experienced an average rate of shoreline retreat of 0.9 ft/yr (Table 1). The Lake Pontchartrain shoreline portion of the North Cove reference area experienced an average rate of shoreline retreat of 3.3 ft/yr (Table 1), and an average net shoreline loss of 10.7 ft (Table 2). The shoreline has retreated along the entire surveyed length of the Lake Pontchartrain shoreline at a fairly uniform rate. At some point between the 2008 and 2011 surveys, the narrow strip of marsh separating the interior pond from the lake breached at the southern end, just below southern extent of the surveyed area, creating a connection between the two. This breach has expanded since then, and an additional breach has formed just to the north. Additionally, there are several other locations north of these breaches where the strip of marsh separating the interior pond from Lake Pontchartrain is approximately 40-ft wide and in danger of breaching in the near future (Figure 4).

Rates of shoreline retreat in the North Cove project area have been greater than the reference area's interior pond in all time periods since construction, and greater than the reference area's Lake Pontchartrain shoreline in 2 of the 5 periods since construction (Table 1). Much of the shoreline retreat in the North Cove project area is concentrated along the southeastern shoreline. One explanation for the greater rate in the project area is the large extent of the open water area behind the rock structure in the North Cove. The open water area is as much as 2100 ft. across measured north to south. It is likely that waves which are broken by the structure are able to re-form behind the structure and impact the shoreline. Another possibility is that the subsidence of the rock structure in the North Cove project area has reduced its effectiveness in reducing wave energy.

For the 2017 – 2020 time period, the South Cove project area experienced an average rate of shoreline retreat of 10.8 ft/yr (Table 1), and an average net shoreline loss of 34.7 ft (Table 2). The island created directly behind the rocks from the placement of spoil during construction remains intact, although it has decreased in size with each successive survey (Figure 5). Since construction, shoreline retreat along the eastern end of the South Cove project area has been greater than the western end. This phenomenon can be explained by the termination of the rock structure offshore rather than on land. Waves approaching from

the northeast are not broken by the rocks and therefore are able to impact the shoreline behind the structure.

Table 1. Rate of shoreline change (fy/yr) for north and south cove project and reference areas for the PO-22 project. Rates shown are the average of all transects for the given area and time period. Negative values indicate shoreline retreat.

Time Period	PO-22 Shoreline Change Rate (ft/yr)				
	North Cove Project	North Cove Reference	North Cove Reference - LP Shoreline	South Cove Project	South Cove Reference
2002 - 2005	-2.2	0.0	-0.3	-4.2	-34.7
2005 - 2008	-26.4	-1.6	-3.0	-74.9	-160.6
2008 - 2011	-6.0	-2.3	-6.7	-7.2	-31.2
2011 - 2014	-0.7	0.3	-3.9	-3.2	-10.2
2014 - 2017	-4.1	-1.8	-4.7	-3.2	-8.7
2017 - 2020	-3.3	-0.9	-3.3	-10.8	-10.1
2002 - 2020	-6.4	-1.0	-3.6	-17.8	-47.3

Table 2. Net shoreline change (ft) for north and south cove project and reference areas for the PO-22 project. Values shown are the average of all transects for the given area and time period. Negative values indicate shoreline retreat.

Time Period	PO-22 Net Shoreline Change (ft)				
	North Cove Project	North Cove Reference	North Cove Reference - LP Shoreline	South Cove Project	South Cove Reference
2002 - 2005	-6.6	-0.1	-0.9	-12.7	-104.1
2005 - 2008	-88.8	-5.5	-10.1	-252.0	-540.2
2008 - 2011	-18.1	-6.9	-20.4	-21.8	-94.7
2011 - 2014	-2.2	1.0	-13.0	-10.5	-33.7
2014 - 2017	-11.9	-5.2	-13.5	-9.1	-24.9
2017 - 2020	-10.5	-2.9	-10.7	-34.7	-32.6
2002 - 2020	-120.6	-18.5	-68.6	-334.1	-890.3

The South Cove reference area has experienced an average rate of shoreline retreat of 10.1 ft/yr (Table 1), and an average net shoreline loss of 32.6 ft (Table 2) for the time period from 2017-2020. Although these rates are lower than the long-term average for the South

Cove reference area, this area continues to experience high rates of shoreline retreat. Although shoreline retreat has occurred along the entire length of South Cove reference area shoreline, much of the retreat has occurred along the eastern and western ends of the shoreline reach (Figure 5). The section of shoreline in the center of the South Cove reference area has retreated to the natural levee created by a bayou that parallels the shoreline here. The marsh in this area is likely more resilient and resistant to erosion than the surrounding marsh, thus accounting for the slightly lower rate of shoreline retreat here.

For the entire monitoring period (2002 – 2020), the North Cove project area experienced an average net shoreline loss of 120.6 ft. (Table 2). It is noteworthy that during the 2005 – 2008 period, which included the passage of Hurricane Katrina, the average net shoreline loss rate was 88.8 ft. in the North Cove project area. Similarly, in the South Cove project area the average net shoreline loss for 2002 – 2020 was 334.1 ft., of which 252.0 ft. occurred during the 2005 – 2008 time period (Table 2). In the North and South Cove project areas, the time period which included Hurricane Katrina respectively accounted for approximately 73.6% and 75.4% of the net land loss for the entire monitoring period.

A comparison of the two reference areas along the Lake Pontchartrain shoreline reveals distinct differences. In the North Cove reference area, the Lake Pontchartrain shoreline segment retreated at an average 3.6 ft/yr (Table 1) for a net shoreline change of -68.6 ft. (Table 2) over the entire monitoring period. In contrast, the South Cove reference area retreated at an average of 47.3 ft/yr for a net shoreline change of -890.3 ft. for the same period. The South Cove reference area shoreline retreated at a 13 times greater rate than the North. A likely explanation for the different result is the spatial orientation of the shoreline in the reference areas. In the South Cove, the majority of the shoreline is north-facing. In the North Cove reference area, the Lake Pontchartrain shoreline faces east-northeast. A north-facing shoreline in an area with high fetch such as the South Cove is vulnerable to wind generated waves from the north, such as those associated with the passage of winter cold fronts. The east-northeast facing shoreline of the North Cove reference area is less affected by north winds. This area also has less fetch from this direction as a result of a protrusion of land to the north near Irish Bayou at the western end of the Interstate 10 bridge. This phenomenon would also explain the pattern of shoreline retreat within the North Cove project area, where most of the shoreline retreat was concentrated in a section of north-facing shoreline in the southeast portion of the cove (Figure 3).

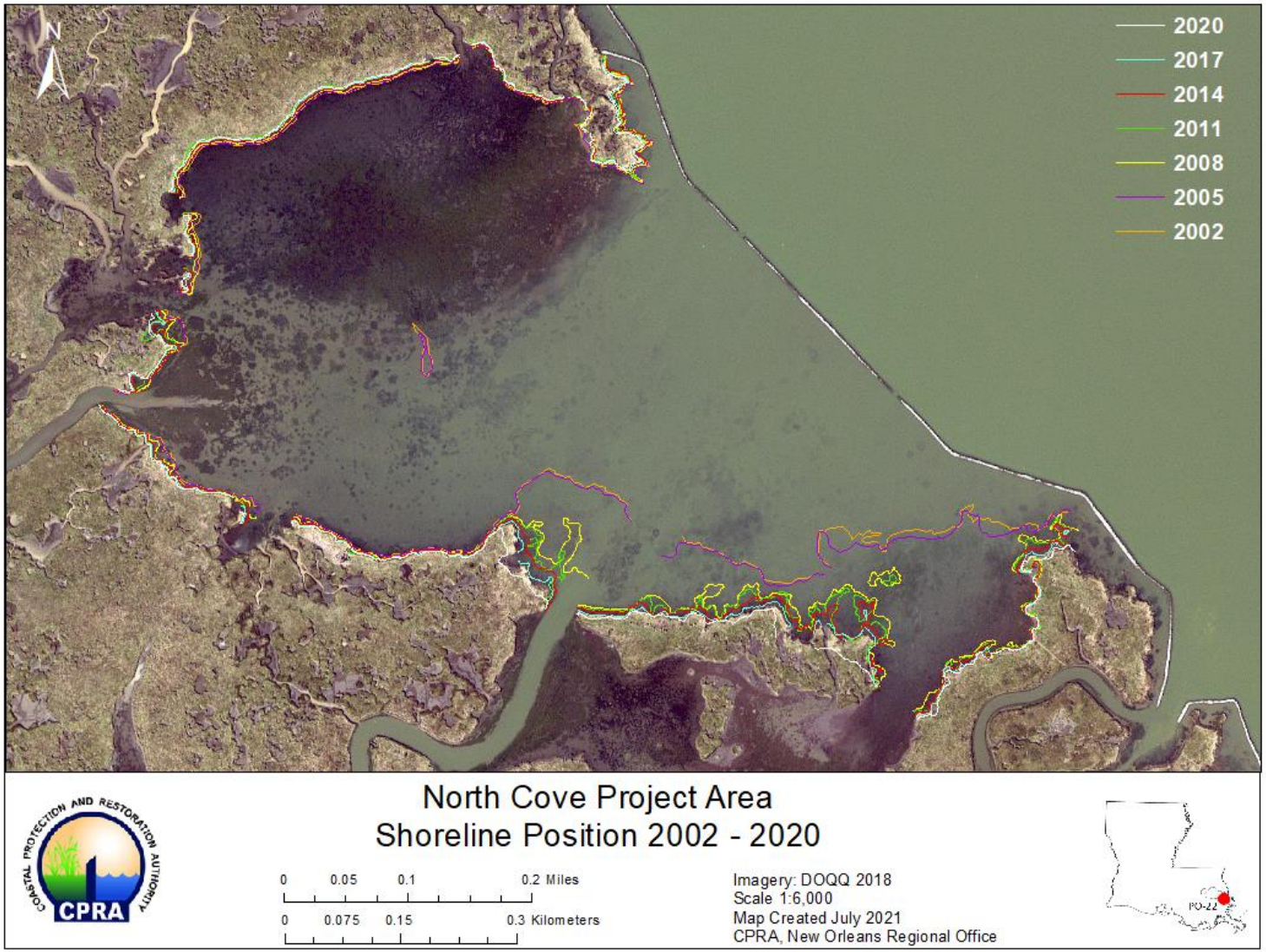

Figure 3. Results of 7 shoreline position surveys from 2002 – 2020 for the North Cove project area of the Bayou Chevee Shoreline Protection (PO-22) project.

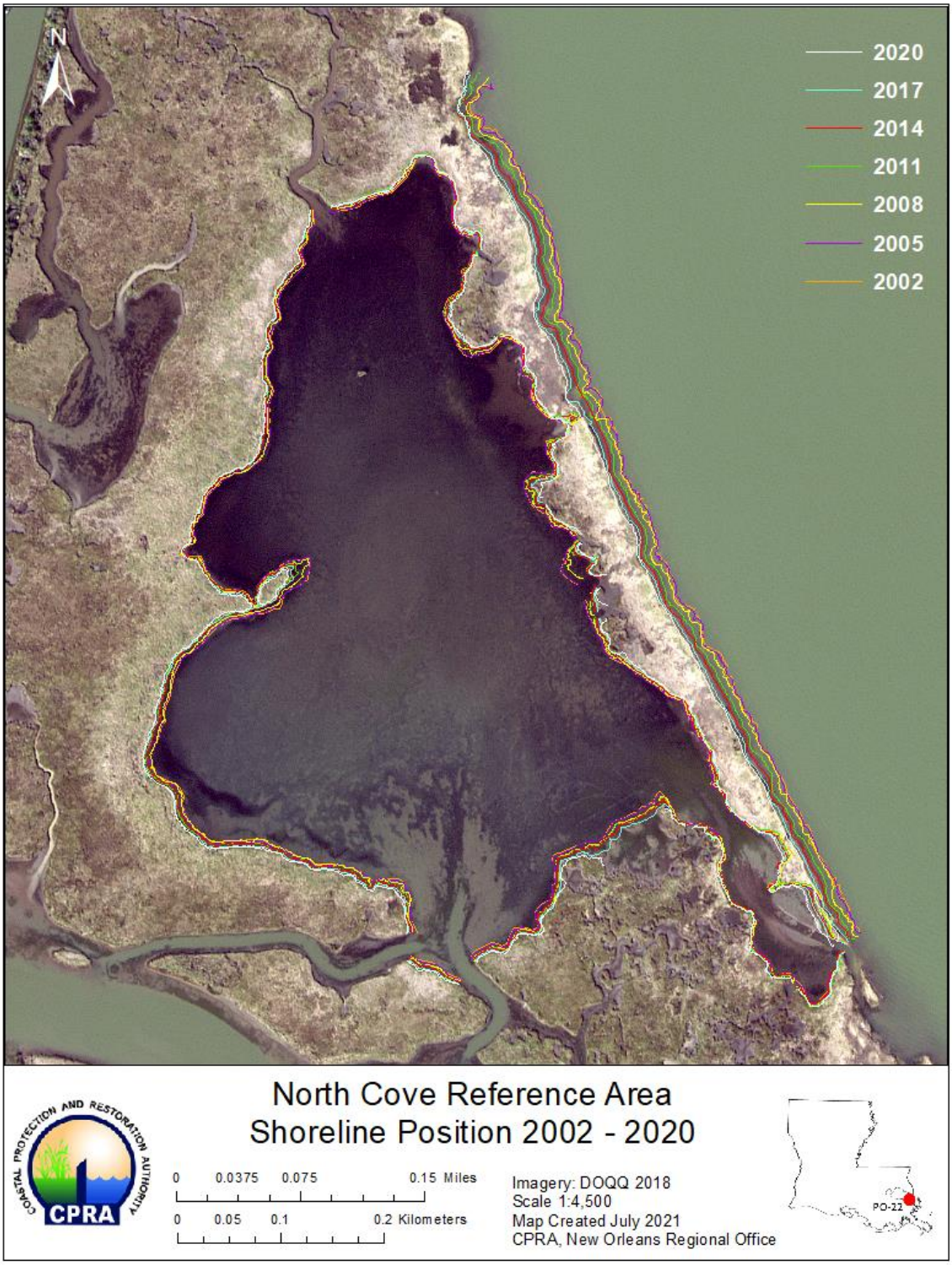

Figure 4. Results of 7 shoreline position surveys from 2002 - 2020 for the North Cove reference area of the Bayou Chevee Shoreline Protection (PO-22) project.

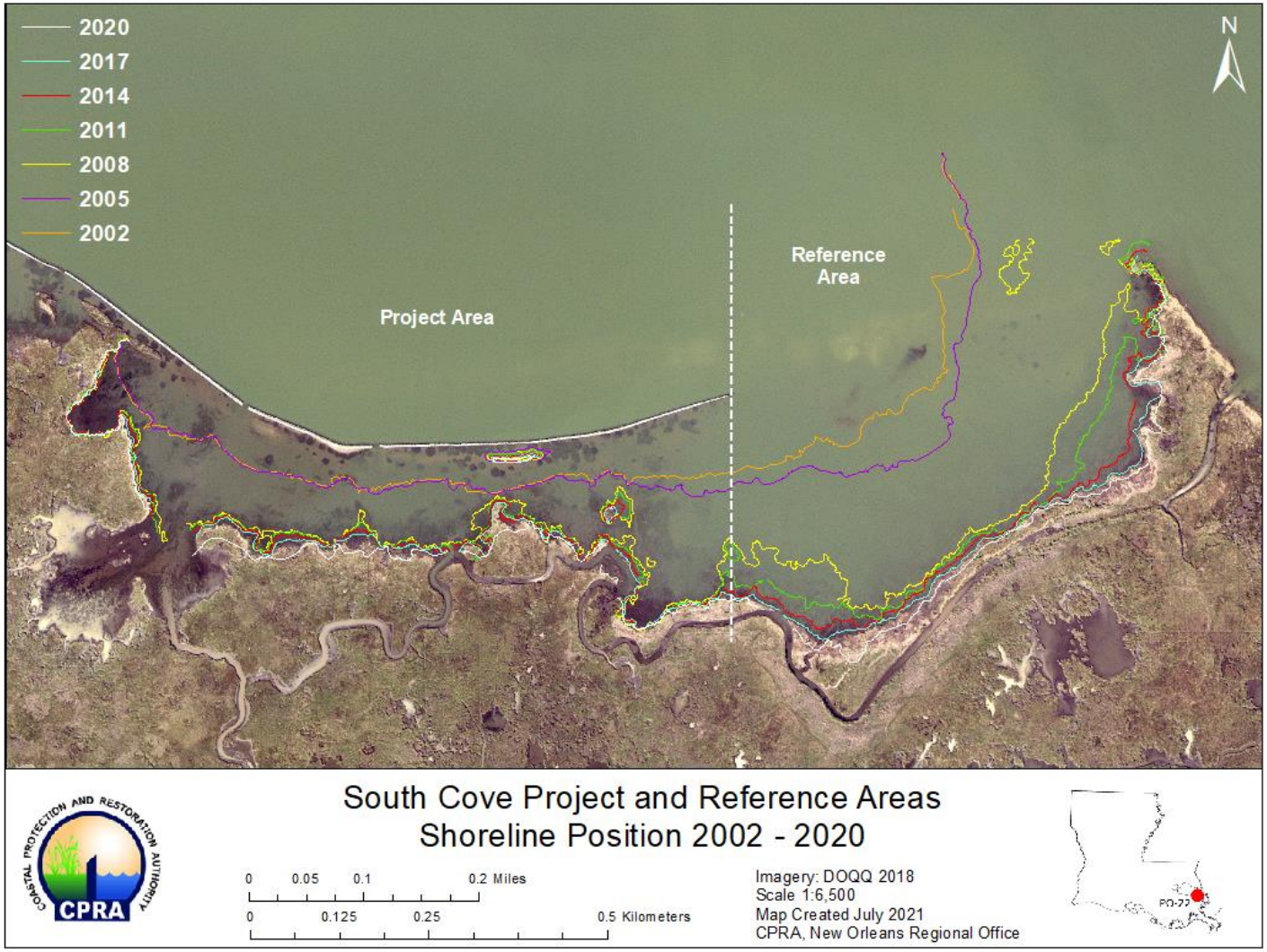

Figure 5. Results of 7 shoreline position surveys from 2002 – 2020 for the South Cove project and reference areas of the Bayou Chevee Shoreline Protection (PO-22) project. The dashed line indicates the boundary between project and reference areas.

Vegetation (SAV)

The pre-construction surveys for overall SAV frequency (% of occurrence within rake pulls) for the North Cove showed inconsistent results. The project and reference areas showed very similar frequencies (96.8% and 100%, respectively) in the 1998 survey; however in 2001 SAV frequency in the project area had fallen to 6.2% versus 60.8% in the reference area (Figure 6). The post-construction surveys show higher SAV frequency in the project area in 2004 and 2011, with the 2008, 2014, 2017, and 2020 surveys showing higher frequency in the reference area. Post-construction surveys indicate greater similarity between project and reference areas. Mean SAV frequency was 76.7% in the project area and 80.4% in the reference area for the six post-construction surveys.

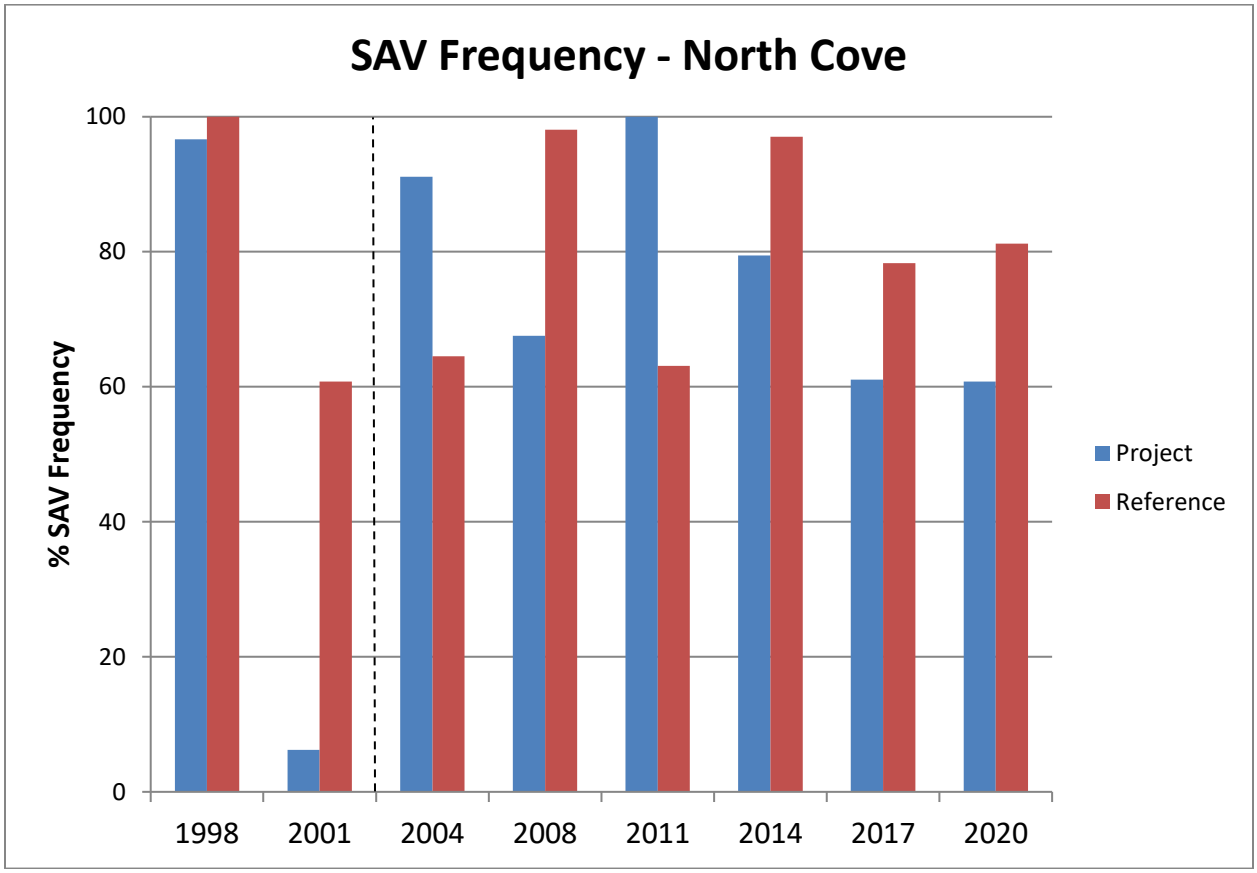

Figure 6. Frequency of occurrence of submerged aquatic vegetation (all species) in samples for North Cove project and reference areas for survey years 1998 – 2020 for the Bayou Chevee Shoreline Protection (PO-22) project. Dashed line indicates project construction.

In the 2020 survey, eelgrass (*Vallisneria Americana)* was the dominant species in the North Cove project area (Figure 7, Table 3), followed by Eurasian watermilfoil (*Myriophyllum spicatum).* In the reference area, *Myriophyllum spicatum* was dominant. Coontail (*Ceratophyllum demersum*), widgeongrass (*Ruppia maritima)*, and southern naiad (*Najas guadalupensis)*, were present in both project and reference areas, but less abundant than previous years. Similar to previous surveys American eelgrass, *Vallisneria americana,* was observed in the project area but not the reference area. The relative frequency of eelgrass has increased in the 3 most recent surveys, becoming the

dominant species in the 2020 survey. A large eelgrass bed was observed in the northeastern portion of the project area.

Table 3. Relative % frequency of submerged aquatic vegetation species for North Cove project and reference area during pre-construction years 1998 and 2001, and post-construction years 2004, 2008, 2011, 2014, 2017 and 2020. Values represent percentage of samples that contained a particular species. The symbol (.) denotes the species was not observed in that area.

Species	North Cove Project								North Cove Reference							
	1998	2001	2004	2008	2011	2014	2017	2020	1998	2001	2004	2008	2011	2014	2017	2020
Empty Sample	3.3	50.4	5.7	30.6	.	20.6	38.9	39.2	.	9.8	29.8	1.9	36.9	2.9	21.7	18.8
Algae	.	46.0	58.1	14.4	15.0	51.4	34.5	.	.	81.4	27.4	18.3	14.6	50.0	11.3	.
Ceratophyllum demersum	16.7	.	12.1	.	.	0.9	28.3	22.5	.	.	11.3	.	.	16.7	74.5	33.7
Myriophyllum spicatum	88.3	.	66.1	31.5	97.0	72.0	18.6	30.4	100.0	.	21.0	45.2	50.5	75.5	7.5	77.2
Najas guadalupensis	30.0	.	49.2	.	.	1.9	1.8	10.8	100.0	.	38.7	80.8	47.9	24.5	23.6	5.0
Potamogeton pusillus	.	.	.	56.8	.	.	.	.	.	.	.	26.9	.	.	.	.
Ruppia maritima	81.7	6.2	17.7	53.2	8.0	.	0.9	2.9	78.3	60.8	33.9	92.3	11.7	79.4	7.5	4.0
Vallisneria americana	46.7	.	.	3.6	3.0	15.9	23.9	52.0	.	.	.	.	.	.	.	.

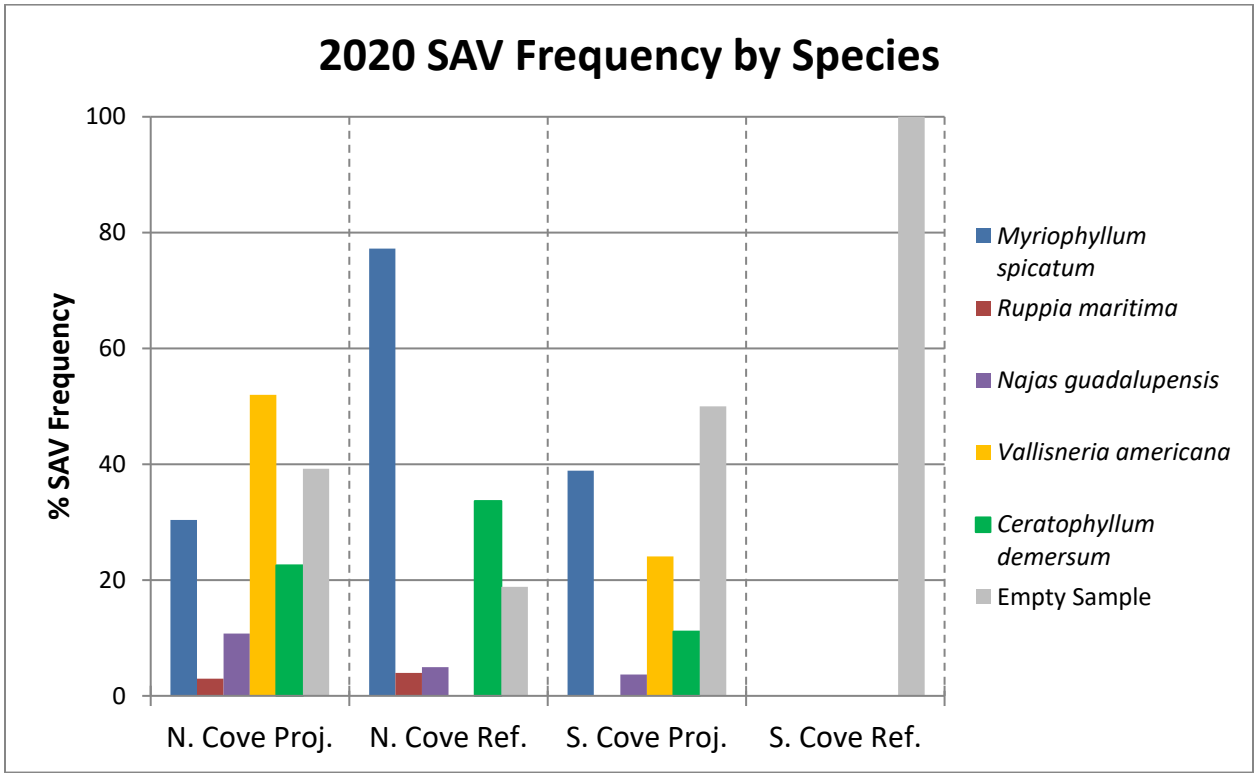

Figure 7. Frequency of occurrence of submerged aquatic vegetation in samples for North and South cove project and reference areas during the 2020 survey for Bayou Chevee Shoreline Protection (PO-22).

In the South Cove, both pre-construction surveys for overall SAV frequency of occurrence showed similar results for project and reference areas. In 1998, both areas had frequencies of 43.3%. In 2001, no SAV was measured in either area. However, post-construction surveys show consistently higher SAV frequency in the project area than in the reference area (Figure 8). Mean SAV frequency for the six post-construction surveys was 64.4% in the project area and 9.2% in the reference area.

SAV frequency increased slightly in the South Cove Project area, from 47.2% in 2017 to 50.0% in 2020 (Figure 8). Similar to previous surveys, *Myriophyllum spicatum* was the most frequently observed species. The number of samples with *Vallisneria americana* increased to 24.1%. *Najas guadalupensis* and *Ceratophyllum demersum* were also present, but in low numbers. The South Cove reference area was entirely devoid of SAV in 2020; the second instance of 0% SAV frequency since project construction.

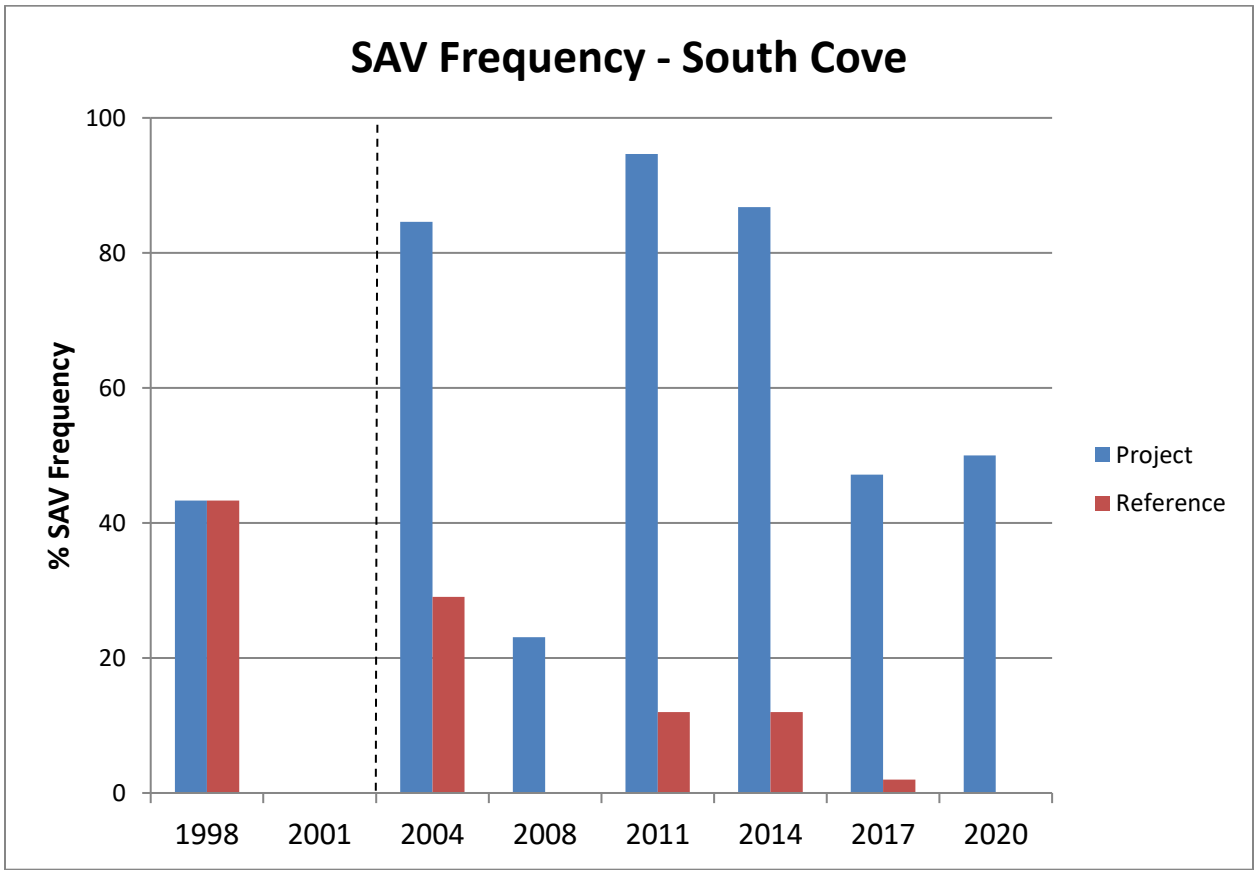

Figure 8. Frequency of occurrence of submerged aquatic vegetation (all species) in samples for South Cove project and reference areas for survey years 1998 – 2020 for the Bayou Chevee Shoreline Protection (PO-22) project. Dashed line indicates project construction.

Table 4. Relative % frequency of submerged aquatic vegetation species for South Cove project and reference area during pre-construction years 1998 and 2001, and post-construction years 2004, 2008, 2011, 2014, 2017, and 2020. Values represent percentage of samples that contained a particular species. The symbol (.) denotes the species was not documented in that area.

Species	South Cove Project								South Cove Reference							
	1998	2001	2004	2008	2011	2014	2017	2020	1998	2001	2004	2008	2011	2014	2017	2020
Empty Sample	56.7	100.0	.	63.5	5.4	13.2	52.8	50.0	56.7	100.0	64.5	90.0	88.0	88.0	98.0	100.0
Algae	.	.	26.9	19.2	51.8	84.9	13.2	.	.	.	6.5	10.0	4.0	6.0	.	.
Ceratophyllum demersum	.	.	28.9	.	.	.	5.7	11.1	.	.	.	.	.	.	.	.
Myriophyllum spicatum	13.3	.	82.7	19.2	89.3	71.7	35.8	38.9	6.7	.	25.8	.	12.0	10.0	.	.
Najas guadalupensis	.	.	5.8	13.5	.	.	1.9	3.7	.	.	1.6	.	.	.	.	.
Ruppia maritima	.	.	21.2	11.5	1.8	.	.	.	13.3	.	4.8	.	2.0	.	.	.
Vallisneria americana	36.7	.	.	.	.	.	9.4	24.1	30.0	.	.	.	.	.	2.0	.

V. Conclusions

a. Project Effectiveness

For the most part, the project has been effective in achieving the goal of reducing the rate of shoreline erosion in the North and South Cove areas. However, as evidenced by the large amount of shoreline retreat between 2005 and 2008, the capacity of the rock structure to prevent erosion was overcome by the effects of Hurricane Katrina in 2005. For the period of time that included Hurricane Katrina (2005 – 2008), the rates of shoreline retreat in the North and South cove project areas were 4.3 and 6.9 times higher, respectively, than the next highest rates of retreat in any other time period. Regardless, the significantly higher rate of shoreline erosion observed in the South Cove Reference Area over the life of the project indicates that the shoreline protection features were effective in reducing shoreline erosion within the project.

The project has clearly been effective in achieving the goal of maintaining SAV abundance in the North Cove and maintaining/increasing abundance in the South Cove project areas. Frequency of occurrence of SAV in both the North Cove project and reference areas has been high since construction of the rock dike. In the South Cove, SAV frequency has been consistently higher behind the shoreline protection in the project area than in the reference area.

b. Recommended Improvements

Prior to the end of the 20-year project life, the project team developed scenarios for the future of the project. It was determined at that time that the recommended course of action would be to

leave the project features in place. All parties were in agreement and the process to implement this action began. In order to safely leave the project features in place, it was determined that lighted aids to navigation were necessary to warn the public of the presence of the rock dike if it were to be submerged. Funds were requested and granted to supplement the remaining O&M Budget and the aids to navigation were installed. Project close-out was then initiated to return any remaining funds to the CWPPRA Program.

Elevation surveys of the foreshore rock dike were not included as part of the monitoring plan or budget. However, it is apparent from O&M inspections during the latter part of the project life that much of the dike has settled below the acceptable grade of +1.0 ft NAVD88. While the project is providing shoreline protection, the lower elevation of the dike will likely result in reduced effectiveness in dampening waves during high water conditions. Funding was not available for a rock lift of the dike during the PO-22 project life, however lifting the dike back to its design elevation would likely improve effectiveness in the long term.

Additional shoreline protection is needed in order to reduce the high rate of shoreline retreat between the southern terminus of the rock structure and Chef Menteur Pass, as evidenced by the high erosion rates measured in the South Cove reference area. Although this is outside the scope of PO-22, it will be addressed with a future CWPPRA project, St. Catherine Island Marsh Creation and Shoreline Protection (PO-179). This project was approved for funding under PPL 26. The PO-179 project includes shoreline protection in the form of marine mattresses that will be placed along the shoreline, originating behind the PO-22 rock dike and extending around the point at the mouth of Chef Menteur Pass. Construction of PO-179 is anticipated to begin in 2026.

c. Lessons Learned

This project shows how dynamic and vulnerable wetlands are. The high rate of shoreline retreat between 2005 and 2008 illustrates the destructive power of hurricanes. Efforts should be taken in the future to minimize construction delays. As a result of construction delays of the PO-22 project, the high rate of erosion along the south cove shoreline resulted in the rock structure terminating offshore rather than on land. Rock structures should terminate on land to prevent the “erosional shadow” created by having the rock structure end in open water. Heavy erosion along north facing shorelines shows the need to consider prevailing wind direction and wave angles in project design.

VI. References

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Appendix A

Inspection Photographs

Photo #1 – Terminus of Southern Reach.

Photo #2 – Installed Nav Aid.

Photo #3 – Northern Reach (Nav Aid Installation).

Photo #4 – Terminus of Northern Reach.

Appendix B

2024 Field Inspection Notes

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: **PO-22 Bayou Chevee Shoreline Protection**

Date of Inspection: 2/23/2024 Time: 9:30 am

Structure No. no number assigned

Inspector(s): Hannan

Structure Description: Foreshore Rock Dike

Water Level Inside: -0.38' Outside: -0.38'

Type of Inspection: Final

Weater Conditions: Clear, light wind

Item	Condition	Pysical Damage	Corrosion	Photo #	Observations and Remarks
Foreshore					
Rock Dike	Fair	Settling	None	3, 4	North end looking good. South end settling below acceptable grade.
North Cove					
Foreshore					
Rock Dike	Poor	Settling	None	1, 2	Settling below acceptable grade.
South Cove					
USFWS Dike					
Segment	Poor	Settling	None		Settled below acceptable grade.
Exposed Shore		Inundated/			
South of Dike	Poor	Washed Away	N/A		Needs protection.
Nav Aids	Excelent	None	None	2	Recently installed.