



**State of Louisiana**

**Coastal Protection and Restoration Authority  
of Louisiana (CPRA)**

## **2019 Operations, Maintenance, and Monitoring Report**

for

### **LAKE PORTAGE LAND BRIDGE PROJECT (TV-0017)**

State Project Number TV-17  
Priority Project List 8

November 2019  
Vermilion Parish

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Lake Portage Land Bridge (TV-0017)

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## Preface

The Operations, Maintenance, and Monitoring (OM&M) Report format is a streamlined approach which combines the most recent Operations and Maintenance (O&M) inspection report with the Monitoring data and analyses on a project-specific basis. This is the second in a series of OM&M reports for the Lake Portage Land Bridge (TV-0017) project. TV-0017 is a Coastal Wetland Planning Protection and Restoration Plan project from Priority Project List 8 and federally sponsored by USDA-Natural Resources Conservation Service.

### I. Introduction

TV-0017 is a canal backfill/marsh creation project comprised of 1,540 acres (623 ha) located in Vermilion Parish, Louisiana. The project area is bounded to the south by the Gulf of Mexico and to the north by the Hell Hole of Vermilion Bay, and surrounds Lake Portage within the Paul J. Rainey Wildlife Sanctuary and the Louisiana State Wildlife Refuge, west of Southwest Pass (figure 1).

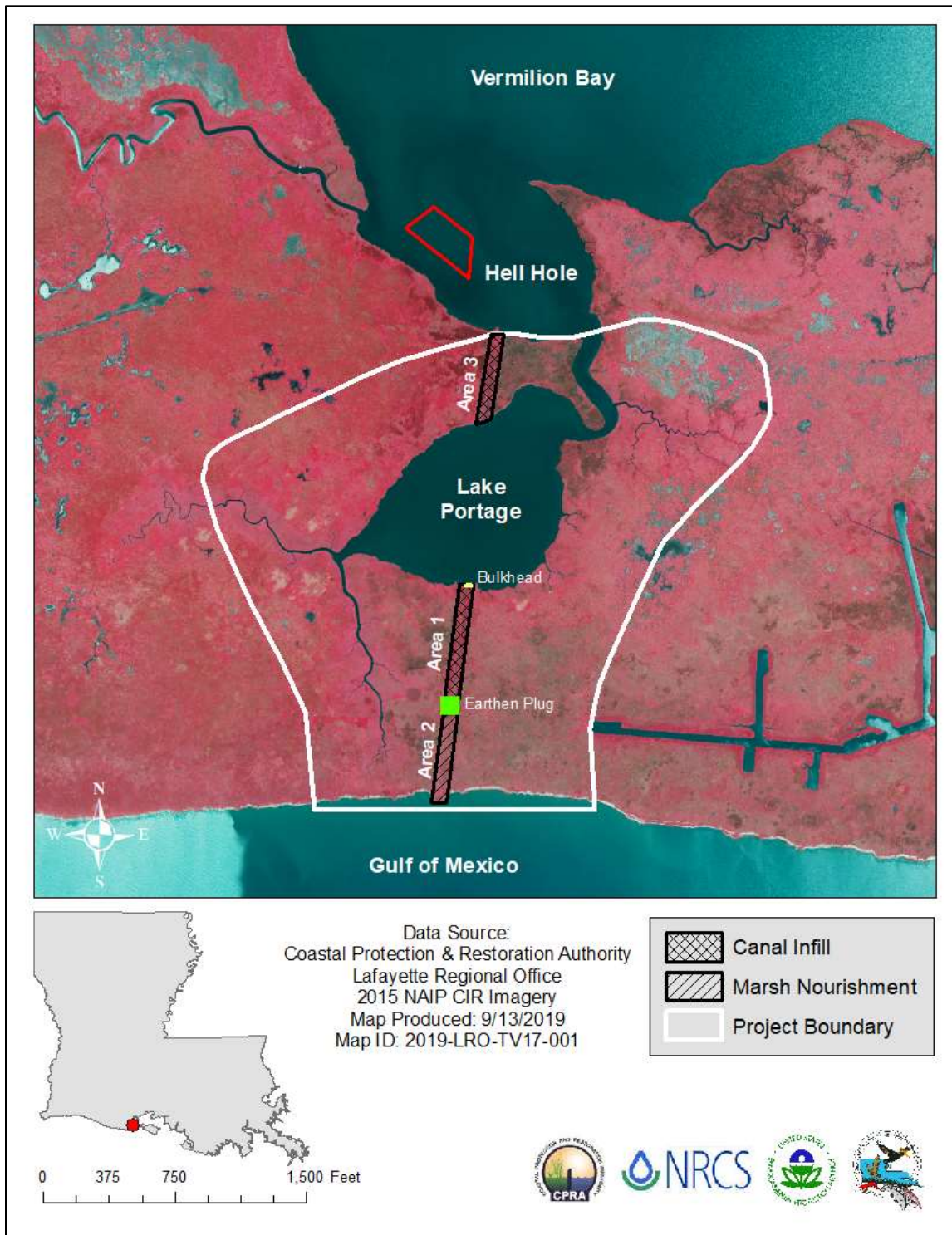
Prior to construction, the marsh area is characterized as brackish, with vegetation dominated by *Spartina patens* (marshhay cordgrass), *Schoenoplectus robustus* (leafy three-square bulrush), *Schoenoplectus americanus* (three-corner bulrush), and *Juncus roemerianus* (black needlerush). Spoilbank vegetation is dominated by *Sesbania drummondii* (rattlebox) and *Baccharis halimifolia* (saltbush). Vegetation occurring adjacent to the shoreline is characterized by *Distichlis spicata* (saltgrass), *Borrchia frutescens* (bushy seaside tansy), *Spartina alterniflora* (smooth cordgrass), *Schoenoplectus pungens* (common three-square), and *Fimbristylis castanea* (marsh fimbry) (USDA-NRCS 2002). The soil type is Banker muck on the west side and Scatlake mucky clay on the east side of the project area (Soil Survey Staff, USDA-NRCS 2019).

Wetland loss in the project area has mainly occurred in the form of conversion of beach and brackish marsh along the shoreline to open water. The high energy of the Gulf of Mexico has accelerated wave-induced erosion of the southern shoreline. The Barrier Island Comprehensive Monitoring Program (BICM) found the mean shoreline retreat rate for the Rainey Refuge reach (from Cheniere au Tigre to Southwest Pass) of the eastern Chenier Plain to be 7.1 ft/yr (2.2 m/yr) from the 1950s to 1998 while shoreline within the TV-0017 project area retreated > 10 ft/yr (3.0 m/yr). BICM found the mean shoreline retreat rate for the Hell Hole Bayou reach along southwest Vermilion Bay to be 6.3 ft/yr (1.9 m/yr) (Byrnes et al. 2018). Marsh between the Hell Hole of Vermilion Bay and the Gulf of Mexico was removed for the construction of the 36" Sea Robin Pipeline in 1971. The resulting canal was approximately 5,976 ft (1,821 m) long, 90 feet (27 m) wide, and 3 feet (0.9 m) deep with approximately 75 ft (23 m) spoil banks on both sides. The canal was buffered from the Gulf by approximately 1,800 ft (548.6 m) of marsh except during high tides by a small trennase approximately 4 ft (1.2 m) wide and 2 ft (0.61 m) deep.

The objective of TV-0017 was to infill the pipeline canal and nourish the buffer zone with sediment using approximately 44,000 yd<sup>3</sup> (33,640 m<sup>3</sup>) of dedicated dredge material from the Hell Hole. Refurbishment of portions of the east levee of the canal was required in order to allow



for marsh creation to a sufficient elevation. Construction was completed in December, 2004.



**Figure 1.** Lake Portage Land Bridge (TV-0017) project area.



## **II. Maintenance Activity**

### **a. Project Feature Inspection Procedures**

The purpose of the annual inspection of the Lake Portage Land Bridge Project (TV-17) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, LDNR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs. The annual inspection report also contains a summary of maintenance projects which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. Photographs taken as part of the inspection are presented in Appendix A. The three-year projected operation and maintenance budget is shown in Appendix B.

An inspection of the Lake Portage Land Bridge Project (TV-17) was held on June 16, 2016 under cloudy skies and warm temperatures. In attendance were Dion Broussard and Mark Mouledous from CPRA; Brandon Samson from NRCS; and Tyson Crouch representing LDWF. The annual inspection began at approximately 10:00 a.m. at the Southern end of Area 2 and ended at approximately 11:00 a.m. at the Northern end of Area 1.

The field inspection included a complete visual inspection of most of the project features. Photographs were taken at each project feature (see Appendix A) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix C).

### **b. Inspection Results**

#### **Area 1 (Station 0+00 to 22+99, between Lake Portage and Earthen Plug)**

Area 1 is in good condition and vegetation has continued to expand from the containment banks moving towards the center of the channel and is 100 per cent vegetated. As a result of the inspection of Area 1, CPRA and NRCS agree that no corrective actions will be required this year. (Photos: Appendix A, Photo 1).



**Area 2 (Station 0+00 to 18+26, between Earthen Plug and Gulf of Mexico)**

Area 2 is also in good condition and is fully vegetated. Some erosion at the ends of the concrete mats along the Gulf shoreline has occurred over time and part of the mat system is showing signs of failure. Although the concrete mat system is not a feature to be maintained as part of this project, this area is experiencing erosion that may threaten the integrity of the overall project. Therefore, CPRA and NRCS agree that maintenance may be required at some time in the future. With that said, there are no remaining funds in the O&M budget, and the CWPPRA Task Force decided that monitoring of the shoreline should continue but opted not to take any action to address the erosion. (Photos: Appendix A, Photos 2 & 3).

**Area 3 (Station 0+00 to 18+06, between Vermilion Bay and Lake Portage)**

Not inspected due to weather conditions. As of May 29, 2012, CPRA and NRCS agreed that Area 3 is in good condition and no maintenance will be required at this time. (Photos: Appendix A, Photos 2, 5 & 6).

**c. Maintenance Recommendations**

**i. Immediate/ Emergency Repairs**

None

**ii. Programmatic/ Routine Repairs**

None

**d. Maintenance History**

There has been no required maintenance on this project.

**III. Operation Activity**

**a. Operation Plan**

There are no water control structures associated with this project, therefore no Structural Operation Plan is required.

**b. Actual Operations**

There are no water control structures associated with this project, therefore no Structural Operation Plan is required.



## **IV. Monitoring Activity**

### **a. Monitoring Goals**

The objective of the Lake Portage Land Bridge Project is to infill a pipeline canal to prevent the formation of a tidal channel/connection between Lake Portage-Vermilion Bay and the Gulf of Mexico.

The following monitoring goals will contribute to the evaluation of the above objectives:

1. Assess the type and condition of emergent vegetation in the canal infill area.
2. Evaluate land/water ratios within the project area.

### **b. Monitoring Elements**

#### **As-Built Elevation Survey**

Preconstruction elevation surveys were conducted in 06/2002 and approved in 08/2002. Dredge placement was completed in Area 3 on 04/29/2003 and in Areas 1 and 2 on 05/3/2004. As-built elevation surveys were conducted on 11 months after placement 3/26/2004 in Area 3 and about a week after placement completion on 5/11/2004 in Areas 1 and 2. All vertical coordinates were in datum NAVD88 (USDA-NRCS and LDNR 2004). Canals were in-filled with dredge material from Hell Hole of Vermilion Bay to an elevation of 3.5 ft NAVD88 in the Area 1 and 3 pipeline canals and to 2.0 ft NAVD88 in the Area 2 trennase/marsh nourishment. The final consolidated target elevation (FCTE) for the Areas 1 and 3 canal infills was 2.0 ft NAVD88 (Appendix D).

#### **Emergent Vegetation**

A time series of aerial imagery obtained from GoogleEarth was used qualitatively to describe the marsh landscape during preconstruction, soon after construction, and 15 years post construction. Aerial oblique photographs, acquired by the Louisiana Department of Wildlife and Fisheries (LDWF), and ground-level photographs, acquired by CPRA staff during O&M inspections, of the infilled pipeline canal and associated project area was used to assess the type and condition of the emergent vegetation present.

#### **Land Change**

Satellite imagery (coarse, 30-m<sup>2</sup> resolution) from Landsat Thematic Mapper (TM) (1985–2010) and Landsat Operational Land Imager (OLI) (2013–2016) was analyzed to determine land and water areas for the entire coast by the USGS-Wetland and Aquatic Research Center from 1985 – 2016. A hyper-temporal analyses compared land change rates in theTV-0017 project area before and including the project life to describe the potential effect of the project on land change. Linear





regressions calculated through the 70 data points for the time periods limits variation of the various sources of environmental variance (such as water level) or classification error (Couvillion et al. 2017). Shoreline change information from BICM is used to explain much of the land change (Byrnes et al. 2018).

### c. Preliminary Monitoring Results and Discussion

#### **As-Built Elevation Survey**

Prior to infilling, the Area 3 pipeline canal was shallower on the northern 500 ft than the rest of the canal as the bottom elevation started at ~ 3.0 ft NAVD88 from an earthen plug behind a wooden bulkhead and tapered down to ~ 1.0 ft NAVD88. Thereafter, the bottom elevation of the canal was 0.0 ft NAVD88. Eleven months after dredge placement to 3.5 ft NAVD88, settlement patterns followed the initial contour; new surfaces elevations tapered from 3.5 ft NAVD88 (0 settlement) to 2.5 ft NAVD88 (~1 ft settlement) in the northern 500 ft of pipeline, and the remaining, deeper section of the canal to the south settled to 2.0 - 1.6 ft NAVD88 (1.5 – 1.9 ft settlement) (USDA-NRCS and LDNR 2004).

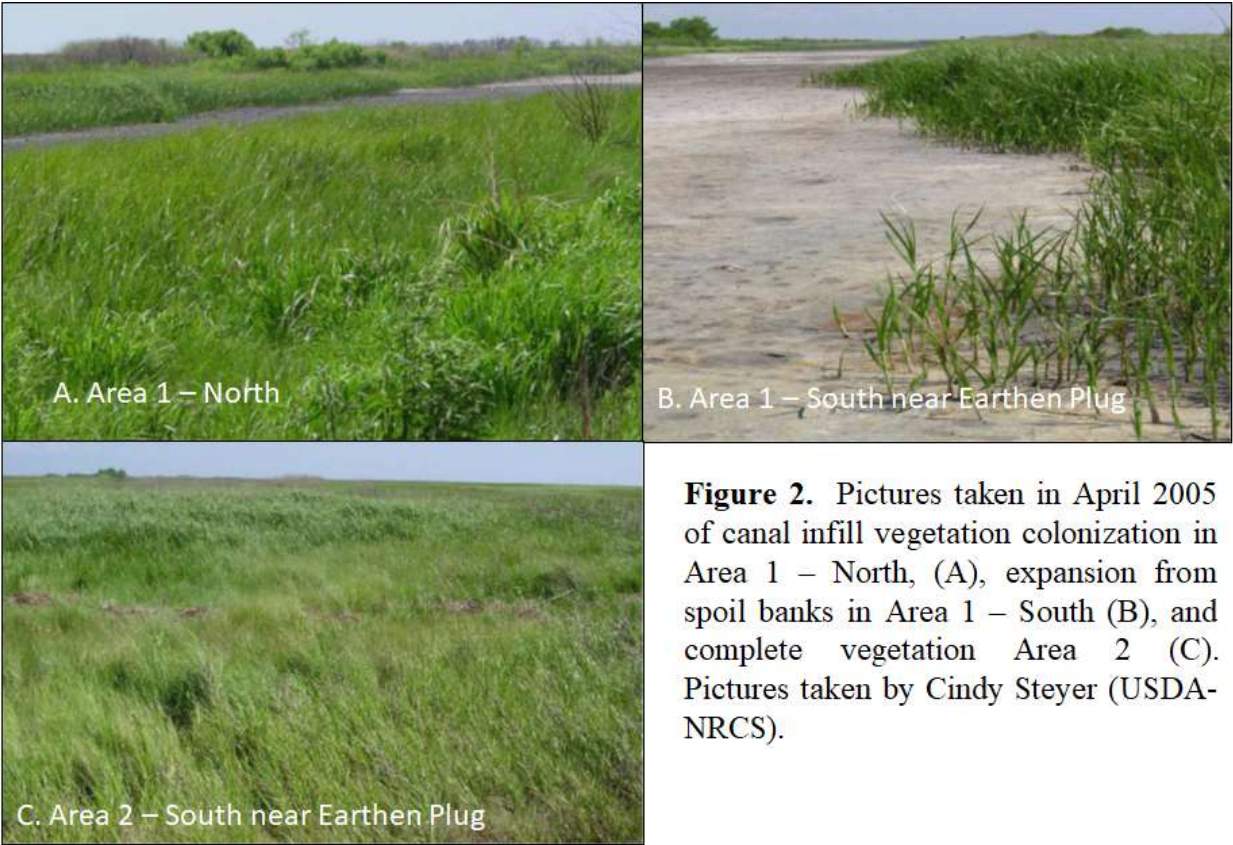
The as-built survey was conducted within a month after infilling the Area 1 pipeline canal and Area 2 trennase. Very little settlement occurred over this short amount of time except for the northern end of the Area 1 adjacent to Lake Portage. The northern end was much lower (3-4 ft NAVD88) than the rest of the canal (0-1 ft NAVD88); the northern end elevation was 3.0 ft NAVD (0.5 ft settlement) one month after completion. Area 2 elevation was 1.9 – 2.0 ft NAVD88 for the as-built survey (USDA-NRCS and LDNR 2004).

#### **Emergent Vegetation**

From an April 2005 vegetation survey (pers. comm. Cindy Steyer, USDA-NRCS), the northern portion of Area 1 was colonized predominantly by leafy three-square bulrush with trace *Calystegia sepium* (hedge bindweed) (Fig.2). The middle section of Area 1 was further along in succession and was slightly more diverse with leafy three-square bulrush sharing dominance with marshhay cordgrass and smooth cordgrass; saltgrass, morning glory, *Iva frutescens* (big leaf sumpweed), salt bush, and *Amaranthus* sp. also occurred in small to trace amounts. The higher portion of Area 1 approaching the earthen plug was slower to colonize (Fig. 2B). By April 2008, about 4 years after dredge placement, the Area 1 canal infill was 100 % vegetated as plants expanded naturally from the containment levees towards the center of the former pipeline canal (Fig. 3) (Pontiff 2008). Vegetation has remained intact as of 2018 (Fig. 2C).

Area 2 was almost completely vegetated by April 2005, with leafy three-square and smooth cordgrass found to be the dominant species, with marshhay cordgrass and big cordgrass co-dominant. *Phragmites australis* (Roseau cane) and salt bush were also present in small amounts. Some isolated ponding near the earthen plug separating Areas 1 and 2 was apparent in 2013 (Fig. 4) and was mostly vegetated by 2018 (Fig. 2C).

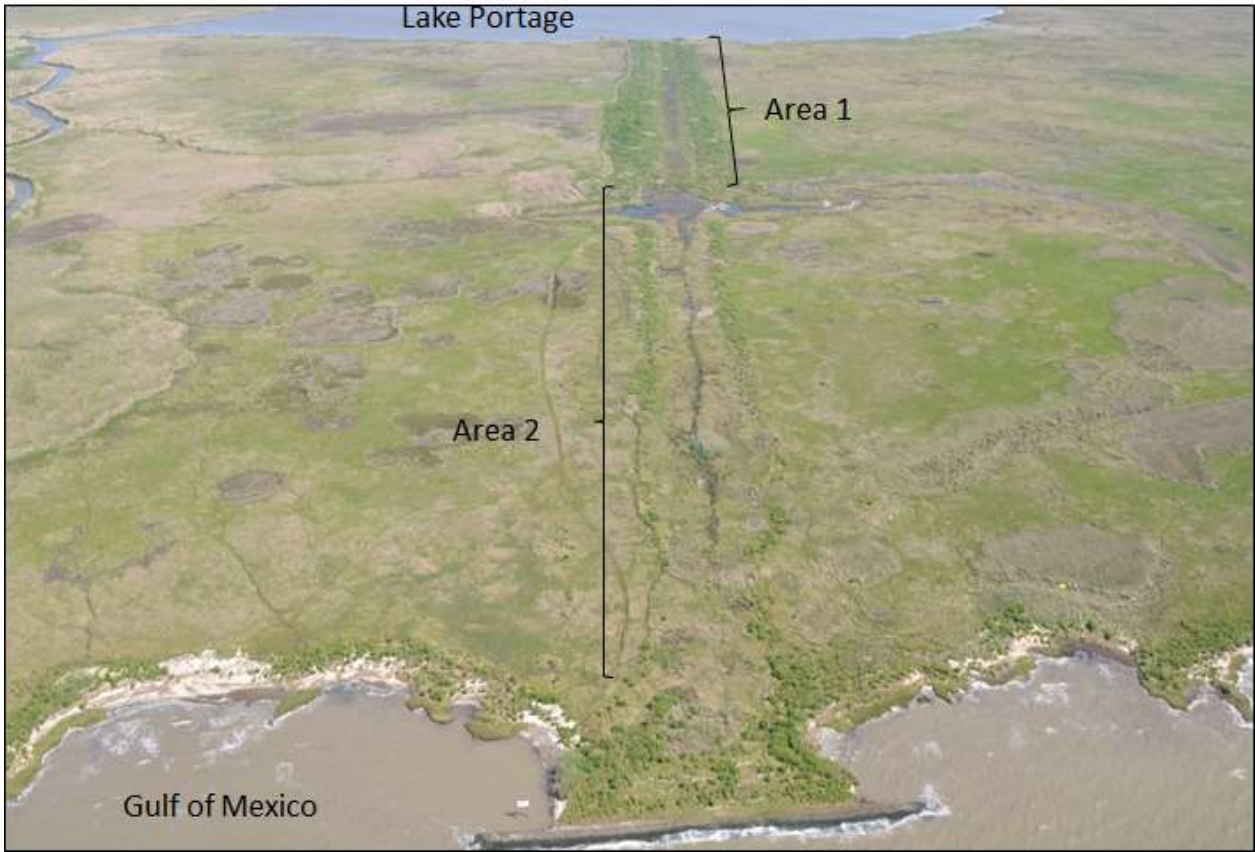




**Figure 2.** Pictures taken in April 2005 of canal infill vegetation colonization in Area 1 – North, (A), expansion from spoil banks in Area 1 – South (B), and complete vegetation Area 2 (C). Pictures taken by Cindy Steyer (USDA-NRCS).



**Figure 3.** A time series of aerial imagery of TV-0017 Areas 1 and 2 from 6 years preconstruction to 14 years post construction was obtained from GoogleEarth. The images show pre-existing features of the pipeline in white and the TV-0017 in-fill (Area 1) and nourishment (Area 2) areas.



**Figure 4.** Oblique aerial photograph of Areas 1 and 2 in 2013. The picture is oriented with north at the top. Photograph courtesy of Louisiana Department of Wildlife and Fisheries.



By April 2005, Area 3 had vegetated (Fig. 5) with very a robust community of smooth cordgrass, leafy three-square, and Roseau cane (Fig. 6). The northern portion of the Area 3 closer to the Hell Hole, which overtopped a pre-existing earthen plug and was higher vegetation, still had a bare patch by 2005 that completely vegetated by 2007 (Fig. 5). By 2013, Area 3 was completely vegetated aside from a small trennase connected to Lake Portage (Figs. 5 and 7).



**Figure 5.** A time series of aerial imagery of TV-0017 Area 3 from 5 years preconstruction to 15 years post construction was obtained from GoogleEarth. The images show pre-existing features of the pipeline and in white and TV-0017 in-fill area.



**Figure 6.** Pictures taken of Area 3, one (A) and two (B) years after infilling.

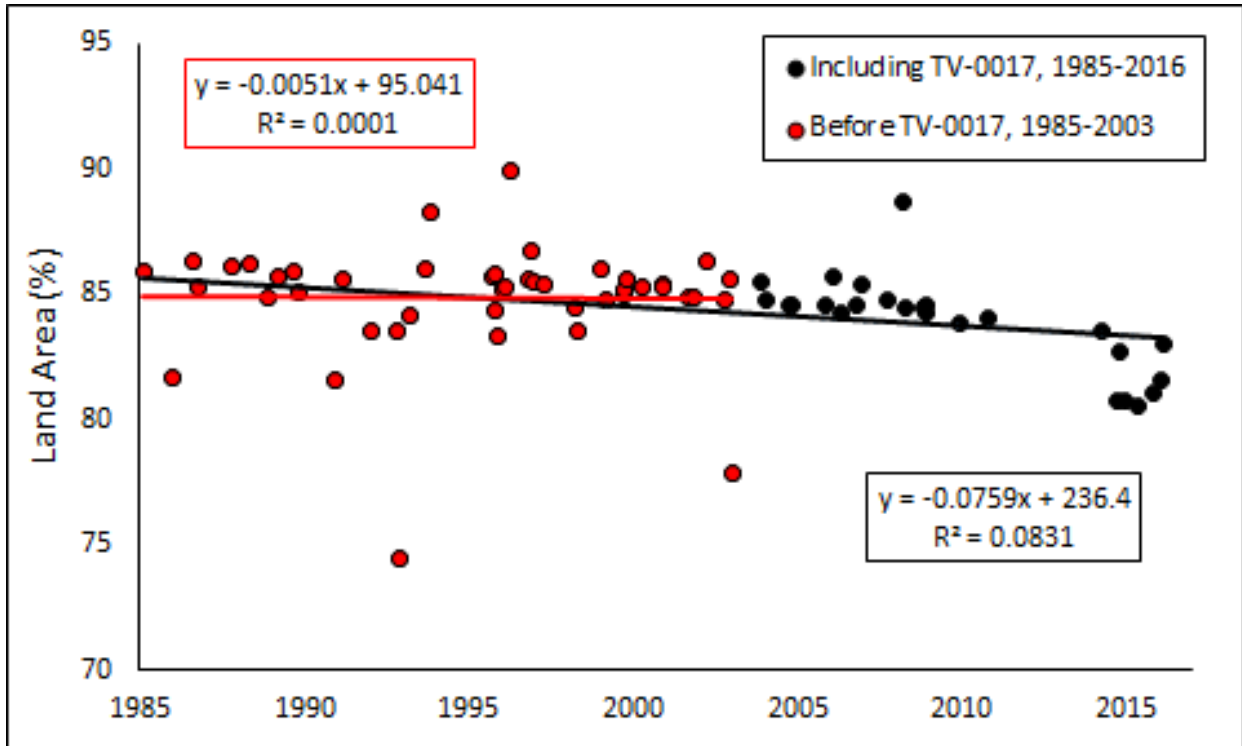


**Figure 7.** Oblique aerial photograph of Areas 3 (foreground) and 1 and 2 (background) in 2013. The picture is oriented by south at the top. Photograph courtesy of Louisiana Department of Wildlife and Fisheries.

### **Land Change**

Although the infilled pipeline canal area completely vegetated within a few years after construction, land loss in the TV-0017 project area was 0.07 %/yr greater during the entire period of record (1985-2016) than prior to project construction (1985-2003) (Fig. 8). Much of the land change occurred along the shorelines. Based on a BICM report, the major shorelines along the north (Hell Hole) and south (Gulf of Mexico) of TV-0017 eroded 6.4 – 8.2 ft/yr, respectively, from 1998 – 2015 and 6.9 – 7.1 ft/yr, respectively from 2004 – 2012 with localized shoreline losses up to 20 ft/yr (Byrnes et al. 2018). In addition, Lake Portage and associated bayous have expanded into the marsh during the project life.





**Figure 8.** Hyper-temporal analysis of land area from satellite imagery for TV-0017. Time periods include TV-0017 (1985-2016, black symbols and linear regression line) and before TV-0017 (red symbols and linear regression line) (CPRA 2019; <http://cims.coastal.louisiana.gov>. Accessed 22 July 2019).

## V. Conclusions

### a. Project Effectiveness

Through 2018, 14 years into the 20-year project life, the Lake Portage Land Bridge Project (TV-0017) is in good condition and functioning as designed. The pipeline canal infill area naturally vegetated quickly with similar vegetation as outside of the pipeline corridor and has maintained vegetated coverage. Most of the land loss within the project area resulted from shoreline erosion along the Gulf of Mexico, north and south shorelines of Lake Portage, and the Hell Hole of Vermilion Bay.

### b. Recommended Improvements

Although the concrete gobi-mat system at the southern end of the project along the Gulf of Mexico is not a project feature, this area is experiencing erosion that may threaten the integrity of the overall project and may need to be addressed. Preliminary survey work to develop an accurate estimate of costs was performed in 2008 and a subsequent request was made to CWPPRA for additional funds. The CWPPRA Task Force decided that monitoring of the shoreline should continue, but opted not to take any action to address the erosion. The gobi-mat system is a pre-existing feature to TV-0017 and is the responsibility of the pipeline owner.

### c. Lessons Learned

Differences in elevation prior to construction, whether higher elevation from an earthen plug or lower elevation from a small trennase, tend to be conserved after filling with dredge material as differences in settlement develop from the different thickness of infill material.



## VI. REFERENCES

- Byrnes, M.R., J.L. Berlinghoff, S.F. Griffee, and D.M. Lee. 2018. Louisiana Barrier Island Comprehensive Monitoring Program (BICM): Phase 2 – Updated Shoreline Compilation and Change Assessment, 1880s to 2015. Prepared for Louisiana Coastal Protection and Restoration Authority (CPRA) by Applied Coastal Research and Engineering, Mashpee, MA and Metairie, LA, 46 p. plus appendices.
- Coastal Protection and Restoration Authority (CPRA) of Louisiana. 2019. Coastwide Reference Monitoring System-Wetlands Monitoring Data. Retrieved from Coastal Information Management System (CIMS) database. <http://cims.coastal.louisiana.gov>. Accessed 22 July 2019.
- Couvillion, B.R., H. Beck, D. Schoolmaster, and M. Fischer. 2017. Land area change in coastal Louisiana 1932 to 2016: U.S. Geological Survey Scientific Investigations Map 3381, 16 p. pamphlet, <https://doi.org/10.3133/sim3381>.
- Pontiff, D.J. 2008. 2007/2008 Annual Inspection Report for Lake Portage Land Bridge Project (TV-17). Coastal Protection and Restoration Authority (CPRA) of Louisiana, Operations Division. Lafayette, LA. 4 pp plus Appendices.
- Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture (USDA-NRCS). 2019. Web Soil Survey. Available online at <https://websoilsurvey.nrcs.usda.gov/>. Accessed on September 13, 2019.
- U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) 2002. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA. State of Louisiana PLANTS list downloaded August 1, 2002.
- U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) and Louisiana Department of Natural Resources (LDNR). 2004. Lake Portage Land Bridge Project TV-17 (AS-BUILT). December 16, 2004. 19 Sheets. Accessed from <https://cims.coastal.la.gov/RecordDetail.aspx?Root=0&sid=971> on September 18, 2019.





**Appendix A**  
**(Inspection Photographs)**





Photo 1- Timber Bulkhead on Hell Hole



Photo 2- East side –Revetment of Gulf Shoreline



Photo 3—Area 2, Revetment on gulf shoreline



Photo 4—Area 3, vegetation on north canal (looking north)



Photo 5—Area 3, 15-in. drain pipe on southern plug of north canal



**Appendix B  
(Three-Year Budget  
Projection)**



**LAKE PORTAGE/ TV-17 / PPL 8**  
**Three-Year Operations & Maintenance Budgets 07/01/2018 - 06/30/2021**

<u>Project Manager</u> Pat Landry	<u>O &amp; M Manager</u> Dion Broussard	<u>Federal Sponsor</u> NRCS	<u>Prepared By</u> Dion Broussard
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	2018/2019 (-15)	2019/2020 (-16)	2020/2021 (-17)
<b>Maintenance Inspection</b>			
<b>Structure Operation</b>			
<b>State Administration</b>		\$ -	\$ -
<b>Federal Administration</b>		\$ -	\$ -
<b>Maintenance/Rehabilitation</b>			

**17/18 Description:**

E&D	
Construction	
Construction Oversight	
Sub Total - Maint. And Rehab.	\$ -

**18/19 Description:**

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

**19/20 Description:**

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

	2018/2019 (-15)	2019/2020 (-16)	2020/2021 (-17)
<b>Total O&amp;M Budgets</b>	\$ -	\$ -	\$ -

<b>O &amp; M Budget (3 yr Total)</b>	\$	-	
<b>Unexpended O &amp; M Budget</b>	\$	-	
<b>Remaining O &amp; M Budget (Projected)</b>	\$	-	No Funds Remaining



**Appendix C**  
**(Field Inspection Notes)**



**MAINTENANCE INSPECTION REPORT CHECK SHEET**

Project No. / Name: TV-17 Lake Portage Landbridge Date of Inspection: June 16, 2016 Time: 10:00 a.m.

Structure No. N/A Inspector(s): Dion Broussard, Mark Mouledous (CPRA)  
Brandon Samson (NRCS), Tyson Crouch (LDWF),

Structure Description: Shoreline Protection

Water Level N/A

Type of Inspection: Annual

Weather Conditions: Cloudy and Warm

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Timber Bulkhead / Caps	Good				
Steel Grating	N/A				
Salinity Readings					
Concrete Mats	Good			2 & 3	Some erosion each side of concrete mats along Gulf shoreline.
Timber Piles	Good				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Vegetation	Good			1	Area 1 has solid vegetation.
Signage / Supports	Good				
Rip Rap (fill)	N/A				
Earthen Embankment	Good				
Dredge Spoil	Good				

What are the conditions of the existing levees? Good  
 Are there any noticeable breaches? No  
 Settlement of rock plugs and rock weirs? N/A  
 Position of stoplogs at the time of the inspection? N/A  
 Are there any signs of vandalism? No