

**BENEFICIAL USE OF DREDGED MATERIAL DISPOSAL HISTORY
CALCASIEU RIVER AND PASS, LA
2010 - 2018**

SABINE NATIONAL WILDLIFE REFUGE

2010

Background:

During the 2010 maintenance event (contract W912P8-09-C-0069: 7 September 2009 – 15 July 2011), dredged material from the Calcasieu River navigation channel was placed in the SNWR at the Sabine Refuge Marsh Creation CWPPRA project Cycle 2 site. The approximately 220-acre Cycle 2 site was composed of shallow open water and eroded marsh. The incremental cost (\$3,935,956 total = \$3,060,956 for dredging & pumping, \$875,000 for dike construction, \$350,000 for staging area preparation) to place dredged material at the Cycle 2 site was authorized and paid for by State surplus funds provided to the Corps as Contributed Funds through the project local sponsor (Lake Charles Harbor and Terminal District).

Dredged Material Placement Event:

From 1 April 2010 to 14 May 2010, the cutterhead dredge G.D. MORGAN placed approximately 1,080,686 cubic yards of dredged material removed from the Mile 8.5 to Mile 10.0 reach of the Calcasieu River navigation channel into the SNWR CWPPRA Cycle 2 marsh creation disposal site located west of the channel.

Approximately 32,050 feet of 30-inch discharge pipeline was used for this project. The dredge was assisted with a booster pump, which was positioned at the mouth of West Cove Canal. The dredge pipeline route consisted of 30-inch sub-line that ran down West Cove Canal to the water control structure, which was converted to 30-inch plastic pipe routed to the north of the water control structure and placed under the Highway 27 “Hog Island Gully” bridge. The pipeline was routed across the SNWR Unit 1A impoundment, across Brown’s Lake, and ending in the Cycle 2 site.

Containment and Access:

Approximately 13,350 feet of perimeter earthen retention dikes were constructed around the Cycle 2 site in 2007 in preparation for its use in 2009-2010. These perimeter retention dikes were constructed to a maximum height of about + 6.5 feet MLG, with a minimum of 1:3 side slopes, and with a 5-foot crown width. Due to erosion experienced since 2007, some portions of these previously constructed perimeter retention dikes required refurbishment prior to the discharge of dredged material into the Cycle 2 site. Borrow material for dike refurbishment came from shallow open water areas located within the Cycle 2 site.

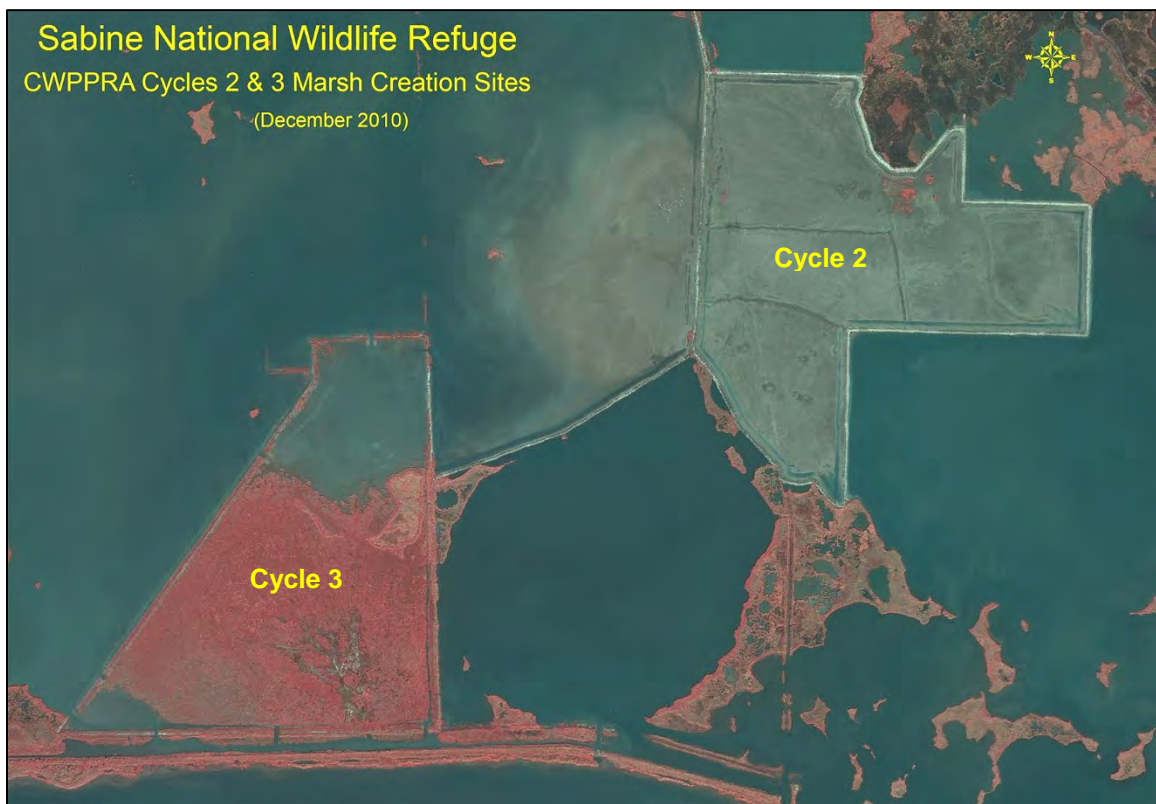
Approximately 2,850 feet of low level earthen dikes/weirs were constructed along the western boundary of the Cycle 2 site to a maximum height of about +3.5 to +4.0 feet MLG, with a minimum of 1:3 side slopes, and with a 5-foot crown width. This low level dike/weir allowed

dredged material to overflow from the Cycle 2 primary discharge site into the adjacent shallow open water secondary discharge site with the intention of creating a habitat mix of mud flats and emergent marsh. Borrow material for dike construction came from shallow open water areas located within the Cycle 2 site.

An additional 2,950-foot retention dike was constructed in shallow open water along the northeastern boundary of Brown's Lake to prevent dredged material from entering this water body. This retention dike was constructed to the same dimensions as the previously constructed earthen perimeter retention dike, and borrow material was taken from Brown's Lake.

Result:

Approximately 282 acres of marsh and mud flats were created in the SNWR as a result of this BU effort using about 1,080,686 cubic yards of dredged material.



SNWR BU Site: CWPPRA Cycles 2 & 3 Post-Placement (2010)



SNWR BU Site: CWPPRA Cycles 2 & 3 Post-Placement (2016)



SNWR BU Site: CWPPRA Cycle 2 (2019)

2014

Background

During the 2014 maintenance event (contract W912P8-13-C-0031: 16 August 2013 – 8 May 2014), as a demonstration project, previously placed dredged material excavated from existing Calcasieu River CDF 23 was excavated, transported, and placed into an approximately 55-acre shallow open water area of Calcasieu Lake located adjacent to CDF 23 for marsh creation purposes. The cost (\$650,000) for this marsh creation effort was authorized and paid for by State funds provided to the Corps as Contributed Funds through the project local sponsor (Lake Charles Harbor and Terminal District).

In addition to using dredged material beneficially to create a marsh platform in the lake, it was anticipated that the marsh created adjacent to CDF 23 would also provide protection to the CDF's lakeside earthen retention dike from the wave-induced erosion typically experienced along this portion of the lake shoreline. Although dredged material has historically been placed here to upland elevations, continued wave-induced erosion along the lake side of CDF 23 has resulted in loss of sediments such that the CDF lake-side boundary has retreated several hundred feet west of its historical eastern boundary in Calcasieu Lake. Furthermore, the excavation and beneficial use of previously placed dredge material would increase the disposal capacity of CDF 23 (presently at full capacity) for future maintenance dredging events in the channel.

Dredged Material Placement Event

From 19 March 2014 to 8 May 2014, approximately 130,000 cubic yards of previously placed dredged material was excavated from within CDF 23, transported, and placed into the adjacent shallow, open water of Calcasieu Lake. Dredged material placed at this site was limited to a maximum initial placement height of approximately +4.5 feet MLG to facilitate the development of marsh habitat. Mechanical dredges (backhoes) and other construction equipment (e.g., dozer, front-end loader) were used to excavate previously placed dredged material from CDF 23 and place the material into the placement site at the desired elevation.

Containment and Access

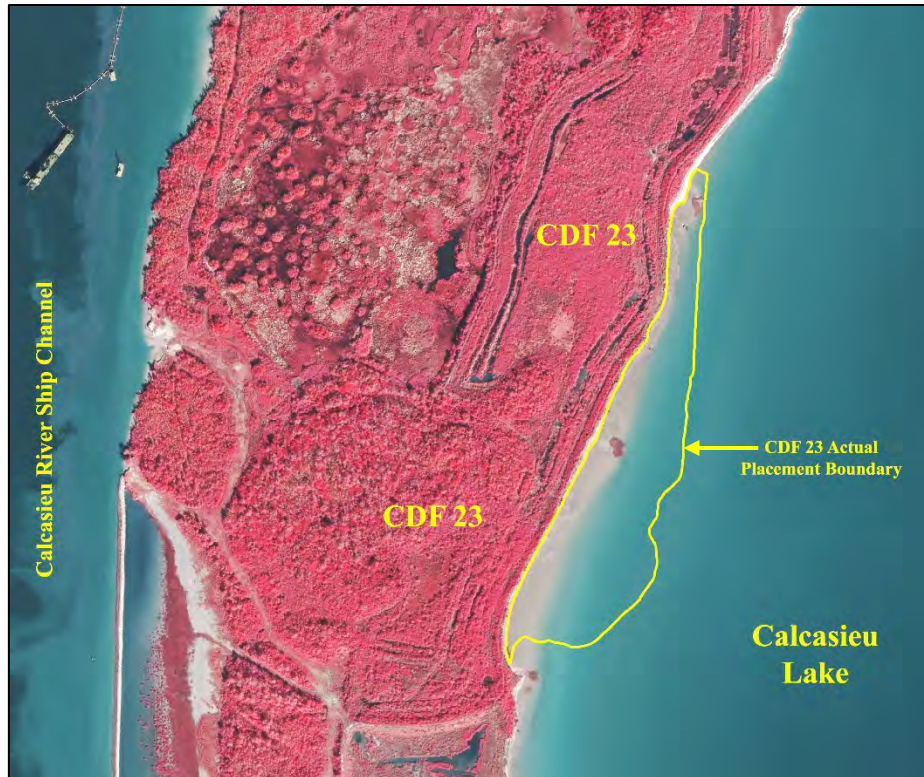
All dredged material was placed unconfined into the shallow open water site. All access for construction equipment used in this effort occurred within the boundaries of CDF 23.

Result

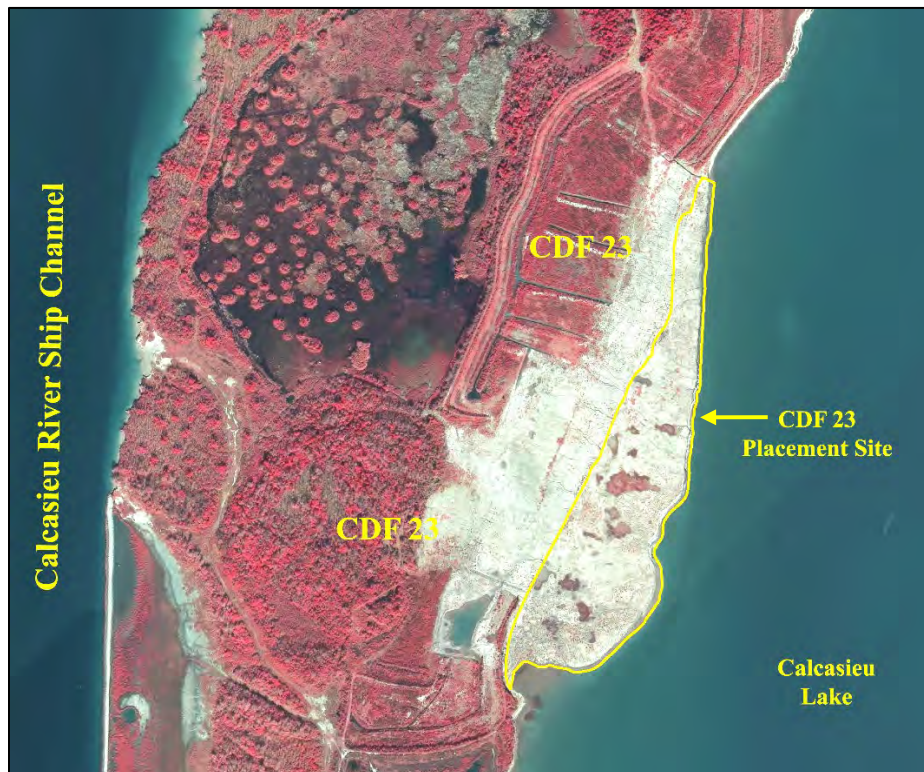
Approximately 16 acres of high marsh was created as a result of this BU effort using about 130,000 cubic yards of dredged material.

Much of the CDF 23 material was composed of fat clays that did not compact much following placement in lake waters. A 14 May 2014 post-placement survey of this site revealed that most of it was at an elevation of +5.0 MLG. As a result of the transported material's high clay content, this site is unlikely to achieve a settled lower elevation conducive to emergent marsh over the majority of its area. However, high marsh habitat should still provide an effective barrier to wave induced erosion at this site.

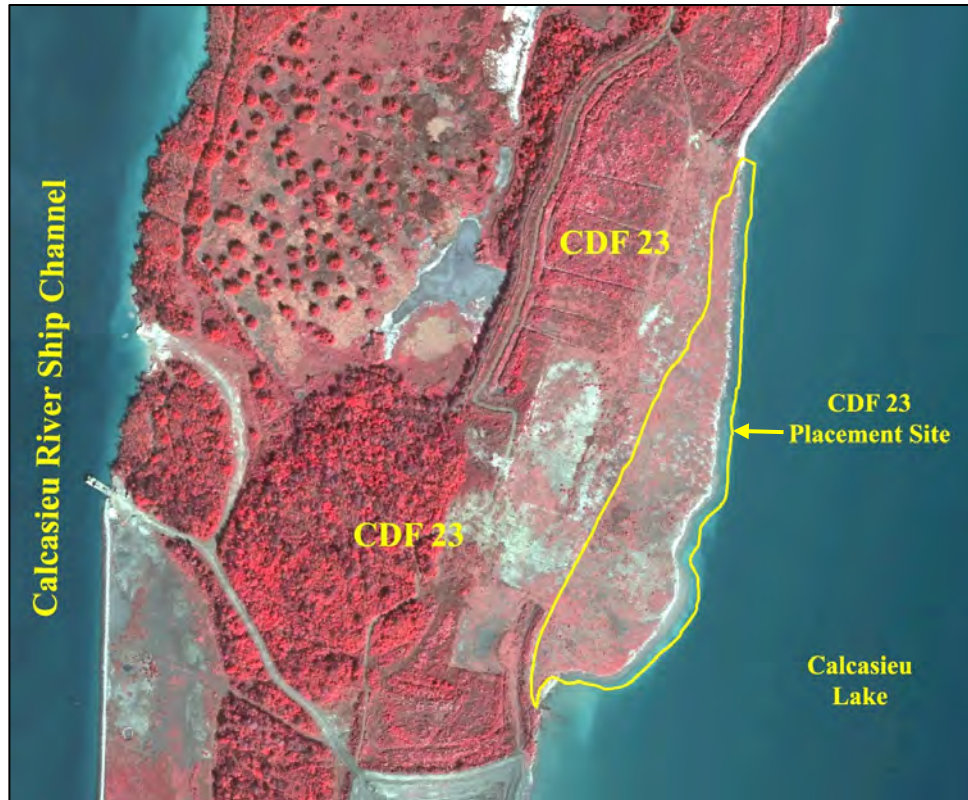
As of January 2020, approximately 5 acres of this site had been lost to wave erosion from the lake.



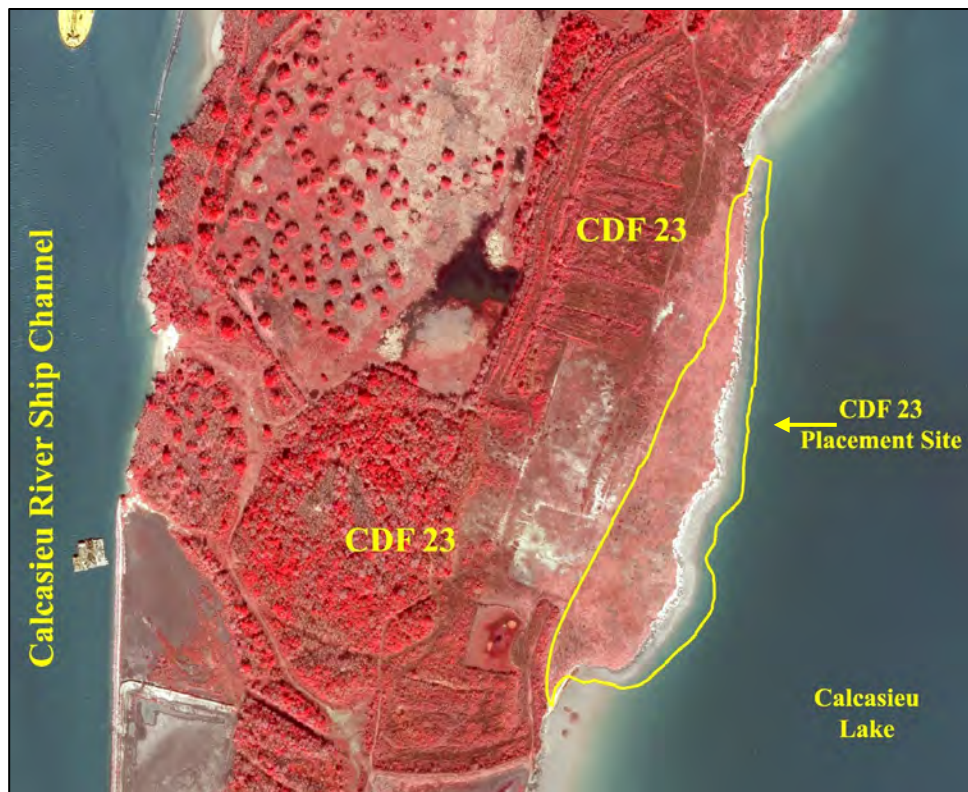
Calcasieu CDF 23 Marsh Creation Demo Project Site: Pre-Placement (December 2013)



Calcasieu CDF 23 Marsh Creation Demo Project Site: Post-Placement (November 2014)



Calcasieu River CDF 23 Marsh Creation Demo Project Site: Post-Placement (November 2016)



Calcasieu River CDF 23 Marsh Creation Demo Project Site: Post-Placement (January 2020)

2015

Background

During the 2015 maintenance event (contract W912P8-14-C-0047: 22 September 2014 – 23 July 2015), the cutterhead dredge DREDGE 32 placed dredged material from the Calcasieu River navigation channel in the SNWR at the Sabine Refuge Marsh Creation CWPPRA project **Cycle 4, Cycle 5, Unit 1A, and Unit 1B** sites. All 4 sites were composed of shallow open water and eroded marsh. The incremental cost (\$7,185,093) to place dredged material at these sites was authorized and paid for by a combination of CWPPRA funds and State surplus funds provided to the Corps as Contributed Funds through the project local sponsor (Lake Charles Harbor and Terminal District).

Dredged Material Placement Event

1. **SNWR Unit 1A:** From 22 September 2014 to 21 November 2014, approximately 1,060,996 cubic yards of dredged material removed from the Mile 8.5 to Mile 10.5 reach of the Calcasieu River navigation channel was placed into the **SNWR Unit 1A** marsh creation disposal site (approximately 250 acres in size) located west of the channel. Dredged material was discharged to a maximum initial elevation of approximately +4.5 feet MLG with an expected target elevation following dewatering and compaction of approximately +2.5 feet MLG. Dredged material slurry was allowed to overflow the low-level weir forming the western and southern boundaries of this site for the purpose of forming marsh and mud flat habitat on the outside of the contained area.
2. **SNWR Unit 1B:** From 2 April 2015 to 29 May 2015, approximately 1,091,431 cubic yards of dredged material removed from the Mile 5.5 to Mile 8.5 reach of the Calcasieu River navigation channel was placed into the **SNWR Unit 1B** marsh creation disposal site (approximately 194 acres in size) located west of the channel. Dredged material was discharged to a maximum initial elevation of approximately +4.5 feet MLG with an expected target elevation following dewatering and compaction of approximately +2.5 feet MLG. Dredged material slurry was allowed to overflow the low-level weir forming the northwestern boundary of this site for the purpose of forming marsh and mud flat habitat on the outside of the contained area.
3. **SNWR Cycle 4:** From 27 November 2014 to 15 January 2015, approximately 1,002,519 cubic yards of dredged material removed from the Mile 12.2 to Mile 15.0 reach of the Calcasieu River navigation channel was placed into the **SNWR Cycle 4** marsh creation disposal site (approximately 217 acres in size) located west of the channel. Dredged material was discharged to a maximum initial elevation of approximately +4.5 feet MLG with an expected target elevation following dewatering and compaction of approximately +2.5 feet MLG. Dredged material slurry was allowed to overflow the low-level weir forming the southern and eastern boundaries of this site for the purpose of forming marsh and mud flat habitat on the outside of the contained area.
4. **SNWR Cycle 5:** From 15 January 2015 to 1 March 2015, approximately 813,097 cubic yards of dredged material removed from the Mile 10.5 to Mile 12.2 reach of the Calcasieu River navigation channel was placed into the **SNWR Cycle 5** marsh creation

disposal site (approximately 223 acres in size) located west of the channel. Dredged material was discharged to a maximum initial elevation of approximately +4.5 feet MLG with an expected target elevation following dewatering and compaction of approximately +2.5 feet MLG. Dredged material slurry was allowed to overflow the low-level weir forming the western boundary of this site for the purpose of forming marsh and mud flat habitat on the outside of the contained area.

Containment and Access

1. **SNWR Unit 1A:** This placement site was originally intended to be a semi-confined shallow, open water marsh creation site. Previously constructed earthen dikes formed the northern and eastern boundaries of this site. Additional funding was subsequently acquired to allow the construction of an approximately 4,700 foot low-level earthen weir that served as a retention dike around the western and southern boundaries of this site. The low-level earthen weir was built to an elevation of about +4.0 feet MLG with side slopes of 1V:3H. Weir borrow material came from within the placement site. Approximately 15,000 feet of 30-inch discharge pipeline was used to reach this disposal site. The dredge pipeline route consisted of 30-inch sub-line that ran down West Cove Canal, around the water control structure, under the Highway 27 “Hog Island Gully” bridge, and routed into the placement site.
2. **SNWR Unit 1B:** A previously constructed earthen dike formed the eastern boundary for this site. Robust marsh vegetation served to contain dredged material along the majority of the site boundary. An approximately 1,000-foot shallow open water gap along the site’s northwestern boundary was closed off by construction of an approximately 1,000 foot low-level earthen weir. The low-level earthen weir was built to an elevation of about +4.0 feet MLG with side slopes of 1V:3H. Weir borrow material came from within the placement site. Approximately 38,000 feet of discharge pipeline was used to reach this disposal site following the same route as for the **SNWR Unit 1A** site.
3. **SNWR Cycle 4:** An earthen retention dike was constructed along the western, northern, and eastern boundaries of this site to contain the dredged material. The retention dike was constructed to an elevation of +6.5 feet MLG, with a side slope of about 1V:2H, and with a crown width of about 5 feet. Along the southern boundary a low level earthen weir was constructed to an elevation of +4.0 feet MLG to allow dredged material to overflow onto adjacent shallow open water areas. All borrow material was obtained from within the placement site.

Approximately 34,300 feet of discharge pipeline was used to reach this disposal site. Of this pipeline length, approximately 25,592 feet was comprised of the CWPPRA SNWR Permanent Pipeline located at about Mile 13.5. This disposal effort marked the first time the Permanent Pipeline had been used to placed dredged material on the SNWR.

4. **SNWR Cycle 5:** An earthen retention dike was constructed along the northern, southern, and eastern boundaries of this site to contain the dredged material. The retention dike was constructed to an elevation of +6.5 feet MLG, with a side slope of about 1V:2H, and with a crown width of about 5 feet. Along the western boundary a low level earthen weir

was constructed to an elevation of +4.0 feet MLG to allow dredged material to overflow onto adjacent shallow open water areas. All borrow material was obtained from within the placement site.

The same pipeline setup used for **SNWR Cycle 4** was used for **SNWR Cycle 5**.

Result

1. **SNWR Unit 1A:** Approximately 359 acres of marsh and mud flats were created in the SNWR as a result of this BU effort using about 1,060,996 cubic yards of dredged material.
2. **SNWR Unit 1B:** Approximately 238 acres of marsh and mud flats were created in the SNWR as a result of this BU effort using about 1,091,431 cubic yards of dredged material.
3. **SNWR Cycle 4:** Approximately 116 acres of marsh and mud flats were created in the SNWR as a result of this BU effort using about 1,002,519 cubic yards of dredged material.
4. **SNWR Cycle 5:** Approximately 149 acres of marsh and mud flats were created in the SNWR as a result of this BU effort using about 813,097 cubic yards of dredged material.



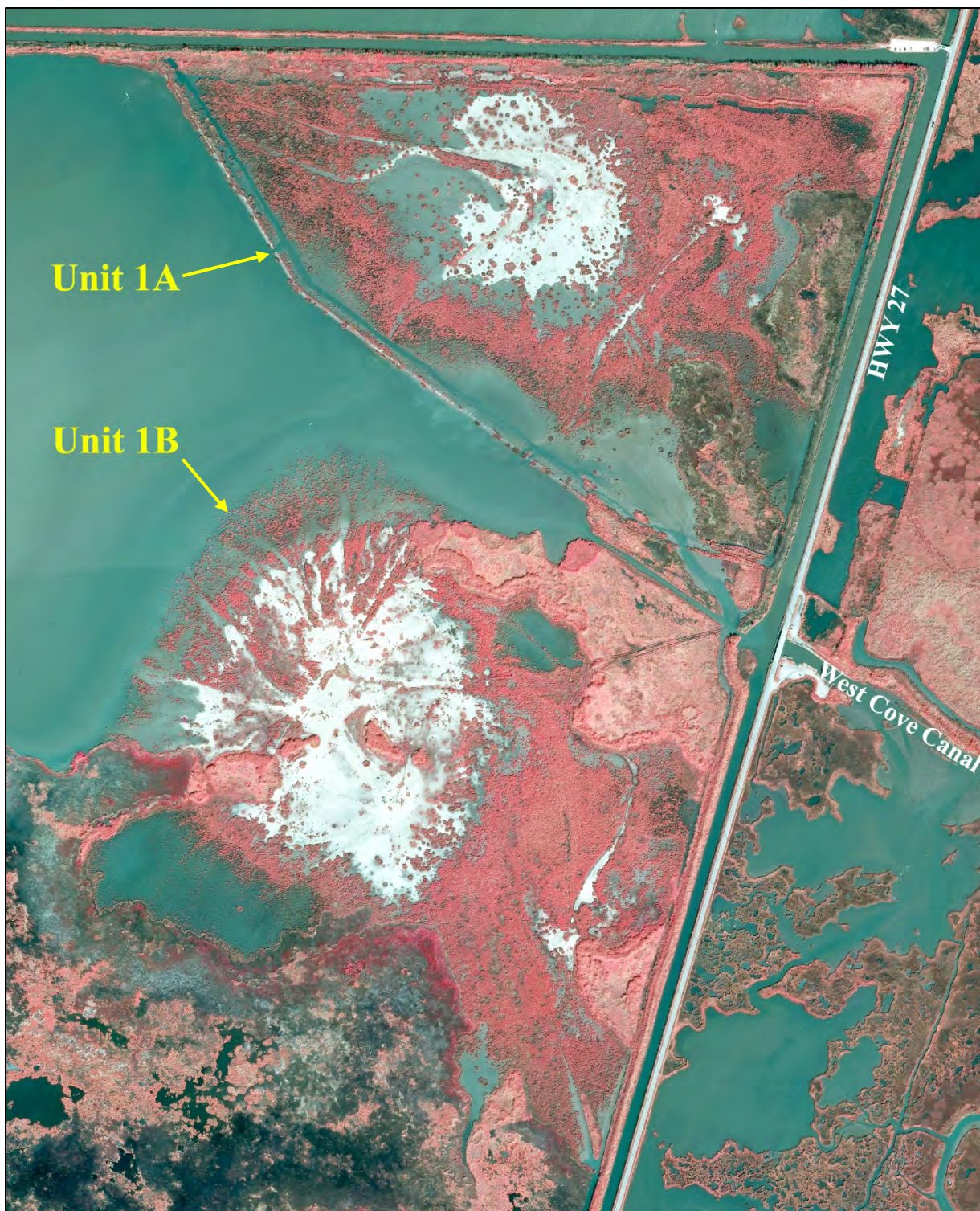
SNWR BU Site: Post-Placement CWPPRA Unit 1A (November 2014)



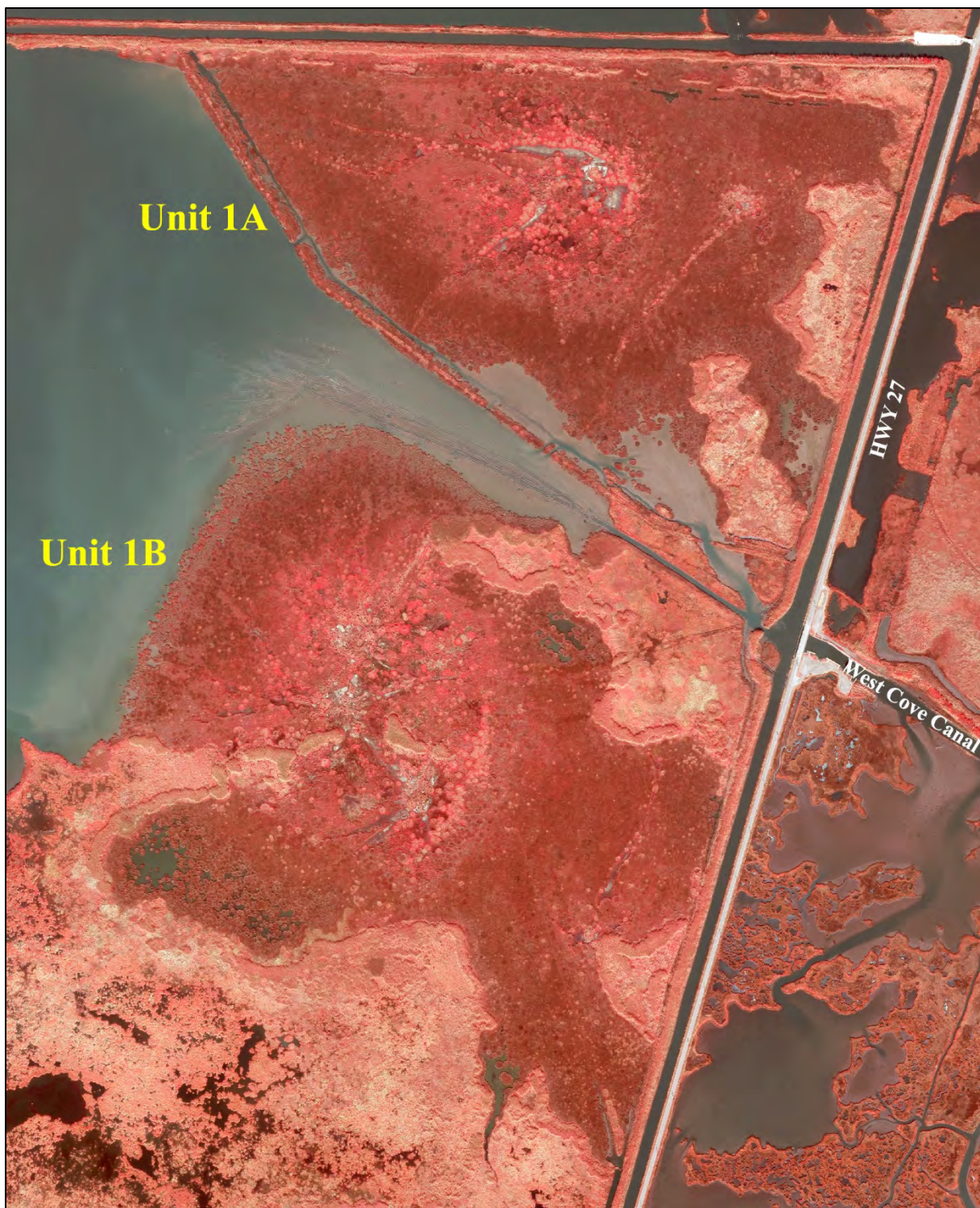
SNWR BU Sites: Post-Placement CWPRRA Unit 1A & Unit 1B (November 2015)



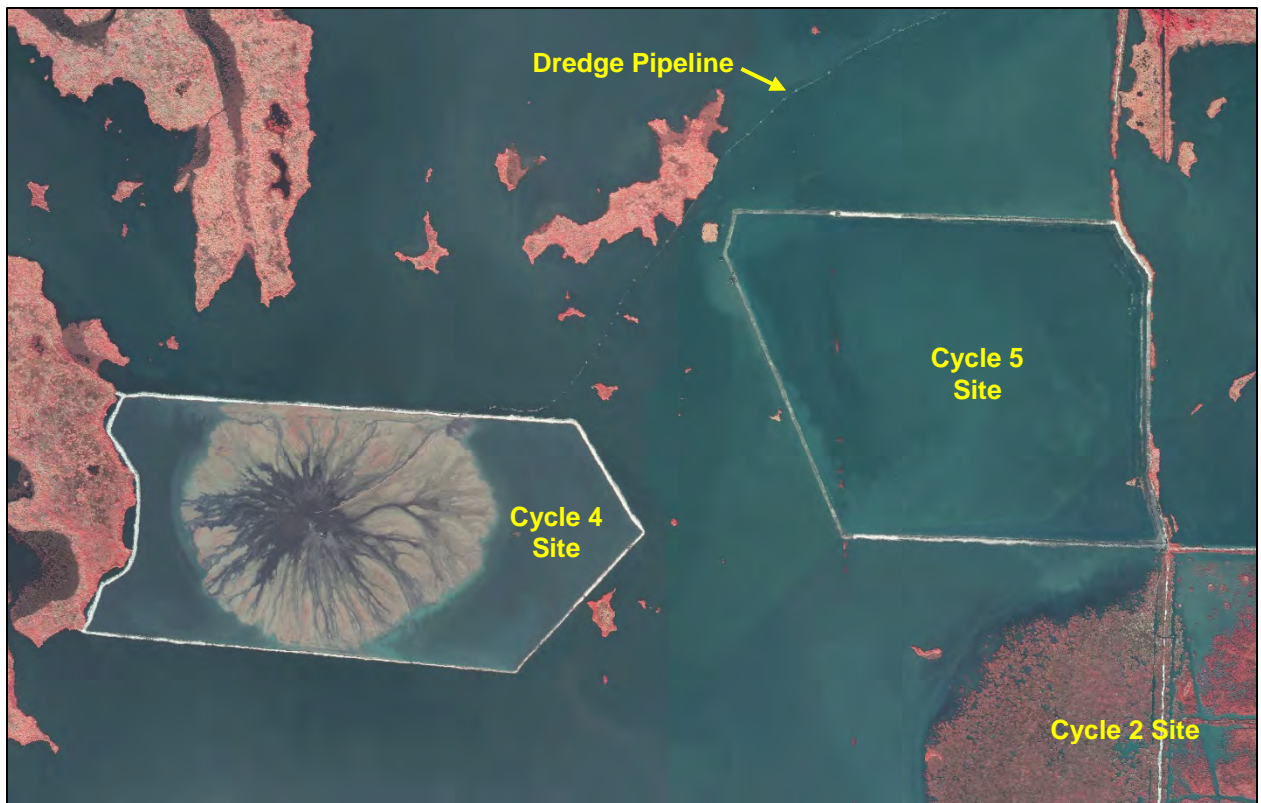
SNWR BU Sites: Post-Placement CWPPRA Unit 1A & Unit 1B (November 2016)



SNWR BU Sites: CWPPRA Unit 1A & Unit 1B (November 2017)



SNWR BU Sites: CWPPRA Unit 1A & Unit 1B (December 2019)



SNWR BU Site: CWPPRA Cycles 4 & 5 Placement Event (November 2014)



SNWR BU Site: CWPPRA Cycles 4 & 5 Post-Placement Event (November 2015)



SNWR BU Site: CWPPRA Cycles 4 & 5 Post-Placement Event (January 2020)

2019

Background

During the 2019 maintenance event (contract W912P8-18-C-0049: 7 November 2018 – 30 September 2019), the cutterhead dredge DREDGE 32 placed dredged material from the Calcasieu River navigation channel in the SNWR at the **Unit 1E** and **Unit 1D** sites. Both sites were composed of shallow open water and eroded marsh. The incremental cost (\$6,108,615) to place dredged material at these sites was authorized and paid for by the Louisiana Coastal Area Beneficial Use of Dredged Material program.

Dredged Material Placement Event

1. **SNWR Unit 1E:** From 19 June 2019 to 12 August 2019, approximately 1,043,646 cubic yards of dredged material removed from the Mile 8.0 to Mile 11.0 reach of the Calcasieu River navigation channel was placed into the **SNWR Unit 1E** marsh creation disposal site (approximately 300 acres in size) located west of the channel. Dredged material was discharged to a maximum initial elevation of approximately +4.5 feet MLG with an expected target elevation following dewatering and compaction of approximately +2.5 feet MLG. Dredged material slurry was allowed to overflow the low-level weir forming the northern boundary of this site for the purpose of forming marsh and mud flat habitat on the outside of the contained area.
2. **SNWR Unit 1D:** From 13 August 2019 to 30 September 2019, approximately 729,441 cubic yards of dredged material removed from the Mile 6.5 to Mile 10.5 reach of the Calcasieu River navigation channel was placed into the **SNWR Unit 1D** marsh creation

disposal site (approximately 229 acres in size) located west of the channel. Dredged material was discharged to a maximum initial elevation of approximately +4.5 feet MLG with an expected target elevation following dewatering and compaction of approximately +2.5 feet MLG. Dredged material slurry was allowed to overflow the low-level weir forming the western, southern, and eastern boundaries of this site for the purpose of forming marsh and mud flat habitat on the outside of the contained area.

Containment and Access

1. **SNWR Unit 1E:** An approximately 7,300-foot low-level earthen weir was constructed along the northern boundary of this site. The low-level earthen weir was built to an elevation of about +4.0 feet MLG with side slopes of 1V:3H. Weir borrow material came from within the placement site. Existing marsh was utilized as the retention feature for the remainder of this site.

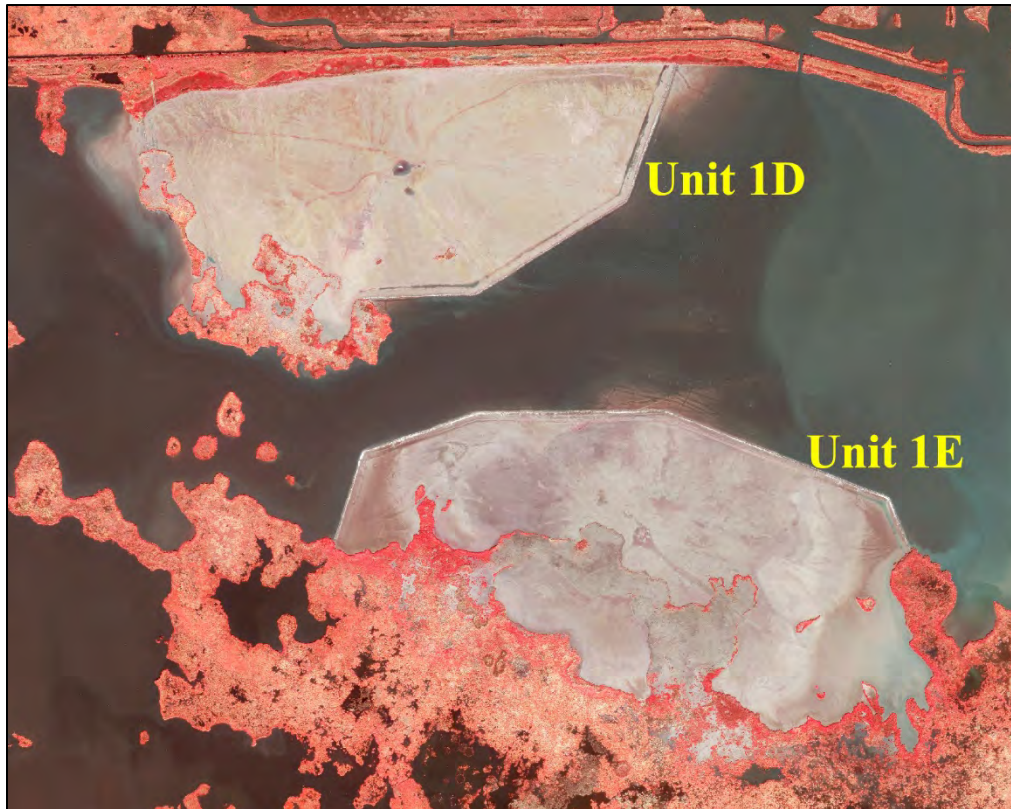
The West Cove Canal pipeline access route used for previous SNWR placement events was used for this work. Dredge pipeline was routed from the Calcasieu River channel down West Cove Canal, around the water control structure, under the Highway 27 “Hog Island Gully” bridge, and into the placement site.

2. **SNWR Unit 1D:** Approximately 4,900 feet of a discontinuous low-level earthen weir was constructed along the western, southern, and eastern boundaries of this site. An existing earthen dike (the Back Ridge Canal Dike) was used as the northern retention feature, and existing marsh served to contain dredged material along the southwestern boundary of this site. The low-level earthen weir was built to an elevation of about +4.0 feet MLG with side slopes of 1V:3H. Weir borrow material came from within the placement site.

The West Cove Canal pipeline access route used for previous SNWR placement events was used for this work.

Result

1. **SNWR Unit 1E:** Approximately 318 acres of marsh and mud flats were created in the SNWR as a result of this BU effort using about 1,043,646 cubic yards of dredged material.
2. **SNWR Unit 1D:** Approximately 277 acres of marsh and mud flats were created in the SNWR as a result of this BU effort using about 729,441 cubic yards of dredged material.



SNWR BU Site: Post-Placement Unit 1D & 1E (December 2019)

Black Lake

Background:

During the 2010 maintenance event (contract W912P8-09-C-0069: 7 September 2009 – 15 July 2011), dredged material removed from the Mile 18.2 to Mile 14.0 reach of the Calcasieu River navigation channel were deposited by the cutterhead dredge G.D. MORGAN into the **Black Lake** marsh creation disposal site located west of the channel. The approximately 440-acre **Black Lake** site was composed of shallow open water and eroded marsh. The incremental cost (\$15,920,415 total = \$14,170,415 for dredging & pumping; \$1,750,000 for dike construction) to place dredged material at the **Black Lake** site was authorized and paid for by a combination of State surplus funds and Coastal Impact Assistance Programs funds provided to the Corps as Contributed Funds through the project local sponsor (Lake Charles Harbor and Terminal District).

Dredged Material Placement Event:

From 5 July 2010 through 25 October 2010, the cutterhead dredge G.D. MORGAN placed about 3,159,825 cubic yards of dredged material into the **Black Lake** marsh creation placement site. Dredged material slurry was pumped into the **Black Lake** site to a maximum initial elevation of about +4.5 feet North American Vertical Datum of 1988 (NAVD 88) with an expected target elevation following dewatering and compaction of approximately +2.5 feet NAVD 88. The **Black Lake** site was divided into 2 disposal cells of approximately 330 and 110 acres in size.

The 330-acre cell was designated as the primary disposal cell to receive dredged material from the Mile 14.0 to Mile 17.0 dredging reach for this marsh restoration project. Construction of the 110-acre secondary cell resulted from increasing the dredging reach targeted for placement of material in the **Black Lake** site to include the Mile 17.0 to Mile 18.2 reach.

The dredge G.D. MORGAN utilized a maximum of about 56,000 feet of 30-inch dredge pipeline to reach this placement site. A booster pump, stationed at the mouth of Black Lake Bayou, was utilized to assist in pumping dredged material this distance.

Containment and Access:

About 13,500 feet of earthen perimeter dikes were constructed around the primary cell south and east boundaries to a maximum elevation of about +6.5 feet NAVD 88, a crown width of about 10 feet, and side slopes of about 1V:3H on the south side and side slopes of about 1V:2H on the east side. About 13,500 feet of existing earthen dikes along the north and west boundaries of the **Black Lake** site were refurbished as necessary to achieve a maximum elevation of about +6.5 feet NAVD 88, a crown width of about 5 feet, and side slopes of about 1V:2H. Borrow material for earthen perimeter dikes came from within the **Black Lake** site. Following completion of disposal activities, project plans called for the earthen dikes to remain until the dredged material became stabilized by emergent vegetation. Following vegetative colonization, any dikes remaining would be breached or degraded as necessary to allow fisheries access into the restored wetland area.

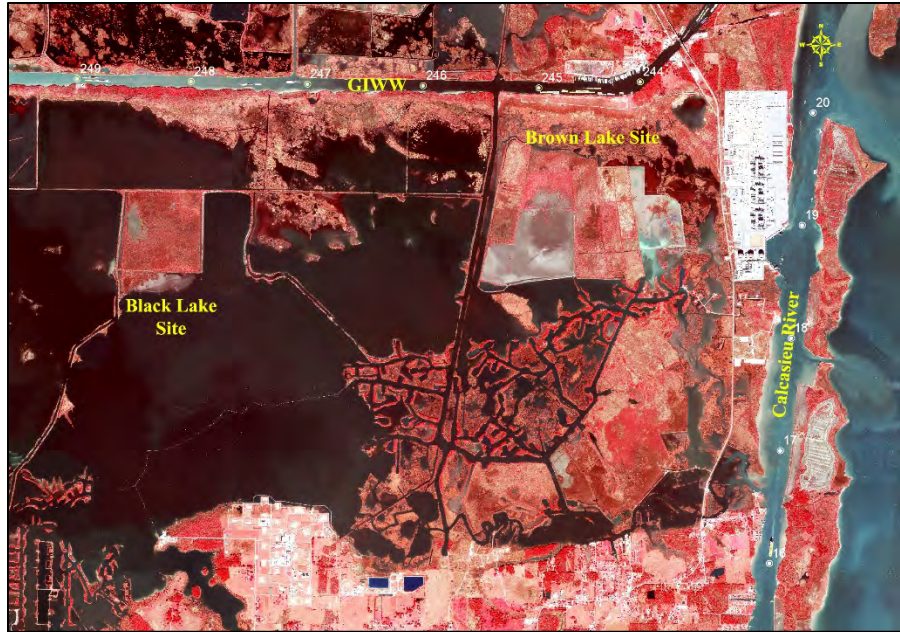
A low level interior earthen weir was constructed in the primary cell aligned in a southwest-to-northeast direction to facilitate flow of the dredged material slurry towards the western side of the cell. Drainage of the dredged material effluent was controlled by a spill box weir placed in the southwest corner of the primary cell such that no effluent entered the historic boundaries of Black Lake.

This secondary cell was constructed to contain material that exceeded the capacity of the primary cell. To facilitate the flow of excess material from the primary cell into the secondary cell, the 4,000-foot earthen perimeter dike that comprised the primary cell southern boundary was constructed to an elevation of about +3.5 to +4.0 feet NAVD 88 to maximize the retention of dredged material in the primary cell while allowing excess material to overflow into the secondary cell. The remaining secondary cell perimeter dikes were constructed to an elevation of +6.5 feet NAVD 88 to prevent dredged material slurry from escaping and entering the adjacent shallow open water areas comprising the historic boundaries of Black Lake.

The dredge pipeline route from the Calcasieu River navigation channel followed Black Lake Bayou westward from its mouth to under the Highway 27 swing bridge, along existing petroleum industry canals, across Alkali Ditch, and finally across a shallow open water area to reach the **Black Lake** disposal site.

Result:

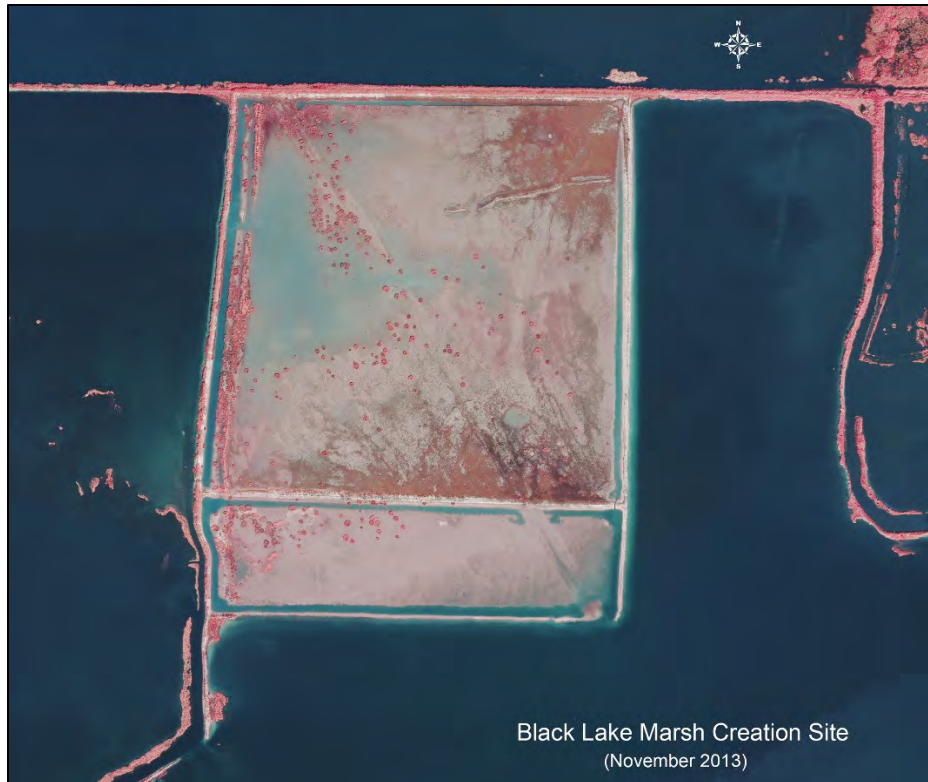
Approximately 430 acres of marsh and mud flats were created as a result of this BU effort using about 3,159,825 cubic yards of dredged material.



Overview Calcasieu River BU Sites: Black Lake & Brown Lake



Calcasieu River BU Site: Black Lake Post-Placement (2010)



Calcasieu River BU Site: Black Lake Post-Placement (2013)

Foreshore Rock

Background

During the 2017 maintenance event (contract W912P8-16-C-0052: 31 January 2017 – 22 August 2017), the cutterhead dredge DREDGE 32 placed dredged material removed from the Calcasieu River Mile 5.0 to Mile 15.0 dredging reach in an approximately 27-acre foreshore rock dike cell located along the channel side of CDF E.

Dredged Material Placement Event

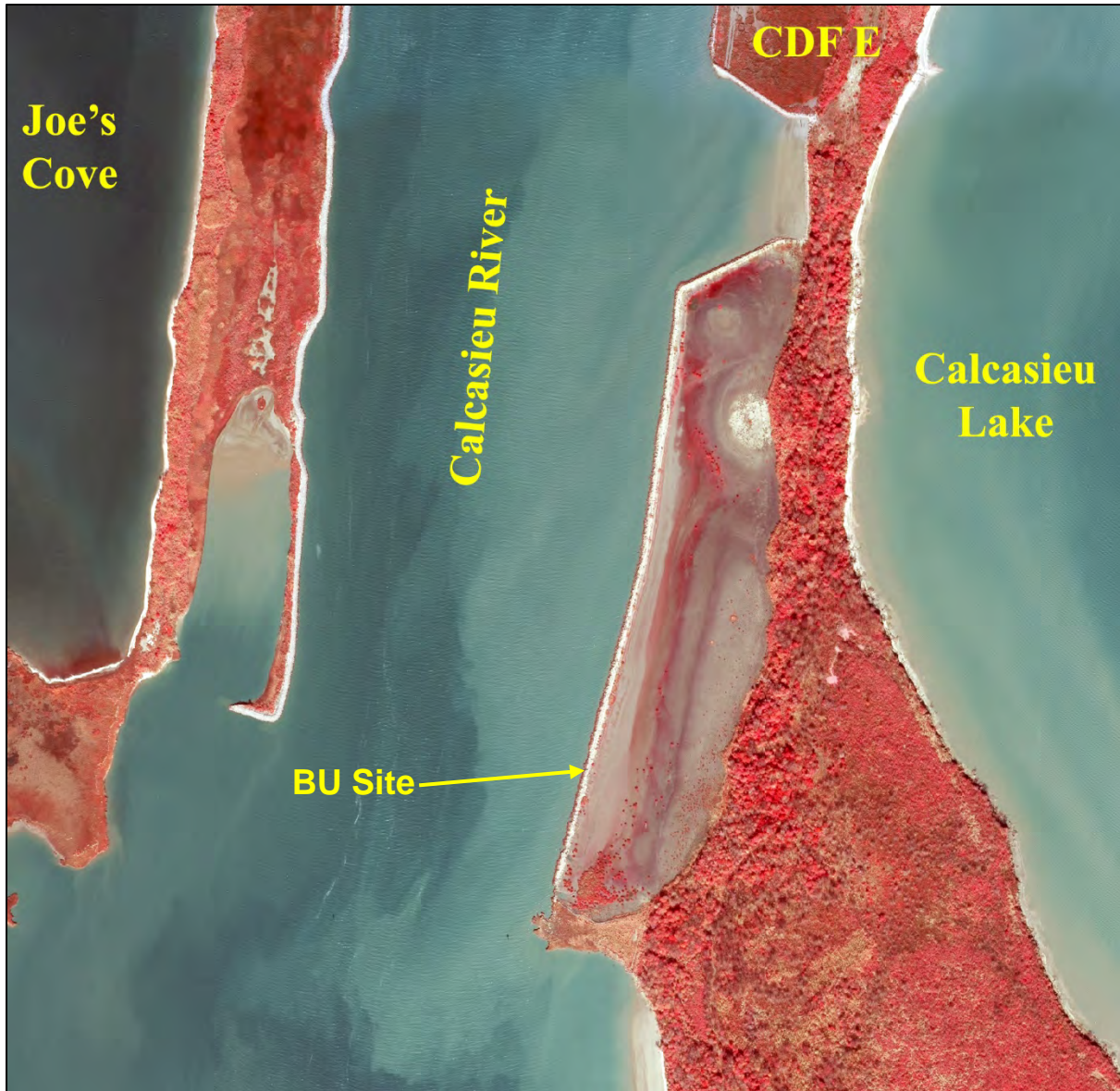
From 17 May 2017 to 21 May 2017, approximately 151,781 cubic yards of dredged material were placed in this rock cell to an elevation of about +5.0 feet MLG.

Containment and Access

This placement site is bounded by rock dike along its northern, western, and southern boundaries. The eastern boundary is formed by previously placed dredged material at CDFs F and E that have become heavily vegetated over time. The discharge pipeline was simply placed over the rock dikes and dredged material was pumped into the shallow open water located behind the rock dikes.

Result

Approximately 14 acres of marsh and mud flat habitat were created as a result of this BU effort using about 151,781 cubic yards of dredged material.



Calcasieu River BU Site: CDF E Foreshore Rock Cell (December 2019)