ATTENDANCE RECORD

DATE(S)	SPONSORING ORGANIZATION	LOCATION
September 14, 2016 9:30 A.M.	COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT	LA Department of Wildlife and Fisheries Louisiana Room 2000 Quail Drive Baton Rouge, Louisiana

PURPOSE **MEETING OF THE CWPPRA TECHNICAL COMMITTEE**

PARTICIPANT REGISTER

NAME	JOB TITLE AND ORGANIZATION	PHONE NUMBER
Darryl Clark	USFWS, Tech Comm Rep.	337-291-3111
Kevin Roy	USFWS	337-291-3120
Lane Carmer	CPRT	337-721-3600
Garvin Pittman	CPRA	225-229-3569
Robert Spears	Plaquemines Parish Gov. CZM	504-491-1607
Vincent Frelich	Plaquemines Parish Gov CZM	
Karen McCormick	EPA	214-665-8345
Dean Roberts	Stream Companies	337 433-1055
Michelle Fischer	USGS	225-578-7483
Sarai Piazza	USGS	225-578-7044
John Lane	St Bernard Parish	504 570-2173
Kent Ballfrass	CPRA	342.4733
Jamie Fontenot	CPRA	342-4119
Wes LeBlanc	CPRA	342-4127
Barry Herbert	LDWF	985 765 0233
Richard Leonhardt	PCS	504-371-9706
J. Karl Rhoeke	Atkins	225-931-8212
Taylor Stacy	CEI	225-383-7455
David Brunet	St. Tammany	985-898-2442
Quin Kinler	NRCS	2256654253
Nic LeBlanc	City of Mandeville	985-624-3104
Randy Moertle	PAF/Clovelly/McHenry	985-356-3630

LMV FORM 583-R
JAN 88

ATTENDANCE RECORD

DATE(S)	SPONSORING ORGANIZATION	LOCATION
September 14, 2016 9:30 A.M.	COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT	LA Department of Wildlife and Fisheries Louisiana Room 2000 Quail Drive Baton Rouge, Louisiana

PURPOSE **MEETING OF THE CWPPRA TECHNICAL COMMITTEE**

PARTICIPANT REGISTER

NAME	JOB TITLE AND ORGANIZATION	PHONE NUMBER
JOHN FORET	C.H FENSTERMAKER	337 237-2200
TODD FOLSE	CPRA	985-447-0991
R.J. BOUTTE	C.H. FENSTERMAKER	(337) 237-2200
Kylee Lewis	GeoEngineers	225-485-3067
Mirka Zaglotal	CWPPRA outreach	608-715-4688
Nikki Cavalier	CWPPRA Outreach	337-266-8626
DARRELL PONTIFF	CPRA	337 482-0683
Nedra Davis	Chenier Plain Authority	225 333 8234
STAN AUCOIN	CPRA	(337) 482-0681
Pat Landry	CPRA	(337) 482-0680
Tommal Barnes	USGS	337-266-8520
Leigh Anne Sharp	CPRA	337-482-0659
SUSAN WESTCOTT-BERGERON	BTNEP Director	985-447-0868
Scott Wilson	USGS	337 266 8644
David Tilley	Engineer, Geo Engineers	225 293 2460
Charles Sasser	LSU	225-578-6375
Todd Baker	LDWF	225 765 2814
Chad Courtelle	Miami Corporation	337.264.1695

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JAN 88

CWPPRA

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT
TECHNICAL COMMITTEE MEETING

AGENDA

September 14, 2016, 9:30 a.m.

Location:
LA Department of Wildlife and Fisheries
Louisiana Room
2000 Quail Drive
Baton Rouge, Louisiana

Documentation of Technical Committee meetings (including minutes, attendance records, PowerPoint Presentations, and meeting binders) may be found at:
http://www.mvn.usace.army.mil/Missions/Environmental/CWPPRA.aspx

Tab Number **Agenda Item**

1. **Meeting Initiation 9:30 a.m. to 9:40 a.m.**
   a. Introduction of Technical Committee or Alternates
   b. Opening remarks of Technical Committee Members
   c. Request for Agenda Changes/Additional Agenda Items/Adoption of Agenda

2. **Report: Status of CWPPRA Program Funds and Projects (Jernice Cheavis, USACE) 9:40 a.m. to 9:55 a.m.** Ms. Jernice Cheavis will provide an overview of the status of CWPPRA accounts and available funding in the Planning and Construction Programs.

3. **Report/Decision: Status of Unconstructed Projects (Sarah Bradley, USACE) 9:55 a.m. to 10:10 a.m.** The P&E Subcommittee will report on the status of unconstructed CWPPRA projects that have been experiencing project delays and considered "critical-watch" as well as projects recommended for deauthorization and inactivation.
   a. Critical watch unconstructed projects status and milestone updates: (Recommended Actions TBD by Technical Committee)

Project No.	Project Name	PPL	Agency
TE-32a	North Lake Boudreaux Freshwater Introduction and Hydrologic Management	6	FWS
TE-83	Terrebonne Bay Marsh Creation/Nourishment	20	FWS
TE-66	Central Terrebonne Freshwater Enhancement	18	NRCS

4. **Report/Decision: Upcoming 20-Year Life Projects (Sarah Bradley, USACE) 10:10 a.m. to 10:20 a.m.** The project sponsors will present recommended paths forward for projects nearing the end of their 20-year lives. The Technical Committee will vote on a recommendation to the Task Force on the path forward for the following projects.
    a. Projects requesting approval for 20-year extension and budget increases in the amount of $8,122,406 with incremental funding requests in the amount of $504,794.

Project No.	Project Name	Agency	20-Year Life Date	Fully Funded Cost	Incremental Funding Amount
CS-04a	Cameron-Creole Maintenance	NRCS	Sep 2017	$7,251,302	$504,794
CS-17	Cameron-Creole Plugs	FWS	Jan 2017	$871,104	$0

    b. Should both the Cameron Creole Maintenance (CS-04a) and Cameron Creole Plugs (CS-17) projects be recommended for 20 year life extensions, the FWS, NRCS, and CPRA project sponsors recommend that CS-17 be transferred, with all remaining funds, to the CS-04a project.

5. **Decision: Annual Request for Incremental Funding for FY19 Administrative Costs for Cash Flow Projects (Jernice Cheavis, USACE) 10:20 a.m. to 10:25 a.m.** The U.S. Army Corps of Engineers will request funding approval in the amount of $24,873 for administrative costs for cash flow projects beyond Increment 1. The Technical Committee will consider and vote to make a recommendation to the Task Force on the request for funds.

6. **Decision: Request for Funding for the CWPPRA Program's Technical Services (Michelle Fischer, USGS) 10:25 a.m. to 10:30 a.m.** The U.S. Geological Survey (USGS) and CPRA are requesting funding for technical services for the CWPPRA program in the amount of $171,410. The Technical Committee will consider and vote to make a recommendation to the Task Force to approve the request for budget increase and funding for technical services in the amount of $171,410.

7. **Decision: Request for Transfer of Funds from PPL2 Projects Atchafalaya Sediment Delivery (AT-02) and Big Island Mining (AT-03) Operations & Maintenance category into the Monitoring category to cover anticipated costs of scheduled 2016 monitoring activities. (Stuart Brown, CPRA) 10:30 a.m. to 10:40 a.m.** For the AT-02 and AT-03 projects - Atchafalaya Sediment Delivery and Big Island Mining, NOAA Fisheries and CPRA are proposing the repurposing of authorized funding from the Operations and Maintenance (O&M) activity to the Monitoring activity in the amount of $74,800 for AT-02 and $48,800 for AT-03 via Memorandum of Agreement between the two agencies. Activities will include elevation analysis, habitat maps, and final OM&M reports for these two projects. The elevation analysis will be completed using recently collected 2016 O&M channel and disposal area survey data and habitat maps will be created using 2016 aerial photographs. The data will allow for assessments of channel distributary potential, subaerial growth, and habitat succession at year 18 of the project lives and will evaluate the impacts of the substantial flood of 2011. These adjustments do

not cause the total project estimates to exceed the maximum total project cost as currently authorized by the CWPPRA Task Force.

8. **Decision: Request for Operation and Maintenance (O&M) Incremental Funding and Budget Increases (Stuart Brown, CPRA) 10:40 a.m. to 11:00 a.m.** The Technical Committee will consider and vote to make a recommendation to the Task Force to approve requests for total FY19 incremental funding in the amount of $11,043,342 and O&M budget increases totaling $6,029,189.
    a. PPL 9+ Projects requesting approval for FY19 incremental funding in the total amount of $4,713,606 for the following projects:
        - Black Bayou Culverts Hydrological Restoration (CS-29), PPL-9, NRCS
          Incremental funding amount: $353,698
        - Freshwater Introduction South of Highway 82 (ME-16), PPL-9, USFWS
          Incremental funding amount: $14,760
        - South Lake Decade Freshwater Introduction (TE-39), PPL-9, NRCS
          Incremental funding amount: $40,000
        - Four Mile Canal Terracing and Sediment Trapping (TV-18), PPL-9, NOAA Fisheries
          Incremental funding amount: $6,485
        - Little Lake Shoreline Protection (BA-37), PPL-11, NOAA Fisheries
          Incremental funding amount: $550,000
        - Raccoon Island Shoreline Protection/Marsh Creation (TE-48), PPL-11, NRCS
          Incremental funding amount: $26,216
        - Coastwide Nutria Control Program (LA-03b), PPL-11, NRCS
          Incremental funding amount (FY16): $2,119,813
        - Barataria Barrier Island Complex (BA-38), PPL-11, NOAA Fisheries
          Incremental funding amount: $161,168
        - Pass Chaland to Grand Bayou Pass Barrier Shoreline (BA-35), PPL-11, NOAA Fisheries
          Incremental funding amount: $6,627
        - South White Lake Shoreline Protection (ME-22), PPL-12, USACE
          Incremental funding amount: $8,481
        - East Marsh Island Marsh Creation (TV-21), PPL-14, EPA
          Incremental funding amount: $20,655
        - West Bell Pass Barrier Headland Restoration (TE-52), PPL-16, NOAA Fisheries
          Incremental funding amount: $7,435
        - Bayou Dupont Marsh and Ridge Creation (BA-48), PPL-17, NOAA Fisheries
          Incremental funding amount: $153,389
        - Grand Liard Marsh and Ridge Restoration (BA-68), PPL-18, NOAA Fisheries
          Incremental funding amount: $35,414
        - Coastwide Vegetative Planting (LA-39), PPL-20, NRCS
          Incremental funding amount: $1,209,465

b. PPL 1-8 Project requesting approval for FY-19 incremental funding in the total amount of $117,162:
    - Cameron-Creole Plugs (CS-17), PPL-1, USFWS
      Incremental funding amount: $36,660
    - Highway 384 Hydrologic Restoration (CS-21), PPL-2, NRCS
      Incremental funding amount: $25,085
    - Replace Sabine Refuge Water Control Structures at Headquarters Canal, West Cove Canal, and Hog Island Gully (CS-23), PPL-3, USFWS
      Incremental funding amount: $45,020
    - Lake Chapeau Sediment Input and Hydrologic Restoration (TE-26), PPL-3, NOAA Fisheries
      Incremental funding amount: $10,397

c. PPL 1-8 Projects requesting approval for a budget increase in the amount of $6,029,189 and FY19 incremental funding in the amount of $6,212,574 for the following projects:
    - Barataria Bay Waterway West Shoreline Protection (BA-23) PPL-4 NRCS
      Budget increase amount: $64,218
      Incremental funding amount: $62,727
    - Black Bayou Hydrologic Restoration (CS-27), PPL-6, NOAA Fisheries
      Budget increase amount: $5,964,971
      Incremental funding amount: $6,149,847

9. **Decision: Request for Monitoring Incremental Funding and Budget Increases (Stuart Brown, CPRA) 11:00 a.m. to 11:20 a.m.** The Technical Committee will consider and vote to make a recommendation to the Task Force to approve requests for monitoring budget increases totaling $803,435 and for FY19 incremental funding in the amount of $10,633,996.
    a. PPL 9+ Projects requesting approval for FY19 incremental funding in the total amount of $322,340 for the following projects:
        - Barataria Basin Landbridge Shoreline Protection (BA27c), PPL-9, NRCS
          Incremental funding amount: $4,844
        - GIWW – Perry Ridge West Bank Stabilization (CS-30), PPL-9, NRCS
          Incremental funding amount: $5,003
        - Freshwater Introduction South of Highway 82 (ME-16), PPL-9, USFWS
          Incremental funding amount: $11,000
        - West Lake Boudreaux Shoreline Protection and Marsh Creation (TE-46), PPL-11, USFWS
          Incremental funding amount: $64,456
        - Coastwide Nutria Control Program (LA-03b), PPL-11, NRCS
          Incremental funding amount (FY16): $119,431
        - Goose Point/Pointe Platte Marsh Creation (PO-33), PPL-13, USFWS
          Incremental funding amount: $36,704
        - Coastwide Vegetative Planting (LA-39), PPL-20, NRCS
          Incremental funding amount: $80,902

b. PPL 1-8 Project requesting approval for FY19 incremental funding in the total amount of $129,464:
   - Atchafalaya Sediment Delivery (AT-02), PPL 2, NOAA Fisheries
     Incremental funding amount: $74,800
   - Big Island Mining (AT-03), PPL 2, NOAA Fisheries
     Incremental funding amount: $48,800
   - Naomi Outfall Project (BA-03c), PPL-5, NRCS
     Incremental funding amount: $5,864

c. Coastwide Reference Monitoring System (CRMS) requesting approval for FY19 incremental funding in the total amount of $9,917,129:
   - Coastwide Reference Monitoring System (CRMS) (LA-30) USGS
     Incremental funding amount: $9,917,129

d. PPL 9+ Projects requesting approval for a budget increases in the amount of $803,435 and FY19 incremental funding in the total amount of $265,063 for the following projects:
   - Little Lake Shoreline Protection/Dedicated Dredging Near Round Lake (BA-37), PPL-11, NOAA Fisheries
     Budget increase amount: $74,320
     Incremental funding amount: $35,124
   - Lost Lake Marsh Creation and Hydrologic Restoration Project (TE-72), PPL-19, FWS
     Budget increase amount: $499,130
     Incremental funding amount: $126,941
   - Bayou Bonfouca Marsh Creation (PO-104), PPL-20, USFWS
     Budget increase amount: $229,985
     Incremental funding amount: $102,998

10. Additional Agenda Items (Brad Inman, USACE) 11:20 a.m. to 11:25 a.m.

11. Request for Public Comments (Brad Inman, USACE) 11:25 a.m. to 11:30 a.m.

12. Announcement: Dates of Upcoming CWPPRA Program Meeting (Brad Inman, USACE) 11:30 a.m. to 11:35 a.m. The Task Force meeting will be held October 19, 2016 at 9:30 a.m. at the U.S. Army Corps of Engineers, 7400 Leake Avenue, New Orleans, Louisiana.

13. Announcement: Scheduled Dates of Future Program Meetings (Brad Inman, USACE) 11:35 a.m. to 11:40 a.m.

October 19, 2016*	9:30 a.m.	Task Force	New Orleans
December 7, 2016	9:30 a.m.	Technical Committee	Baton Rouge
January 12, 2017	9:30 a.m.	Task Force	New Orleans
January 31, 2017	12:30 p.m.	Region IV RPT	Abbeville
February 1, 2017	9:30 a.m.	Region III RPT	Morgan City
February 2, 2017	10:00 a.m.	Region I&II RPT	Lacombe

*Dates are subject to change. Please check back with lacoast.gov for the latest calendar.

14. Decision: Adjourn

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

MEETING INITIATION

a. Introduction of Technical Committee or Alternates
b. Opening remarks of Technical Committee Members
c. Request for Agenda Changes/Additional Agenda Items/Adoption of Agenda

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

STATUS OF CWPPRA PROGRAM FUNDS AND PROJECTS

For Report:

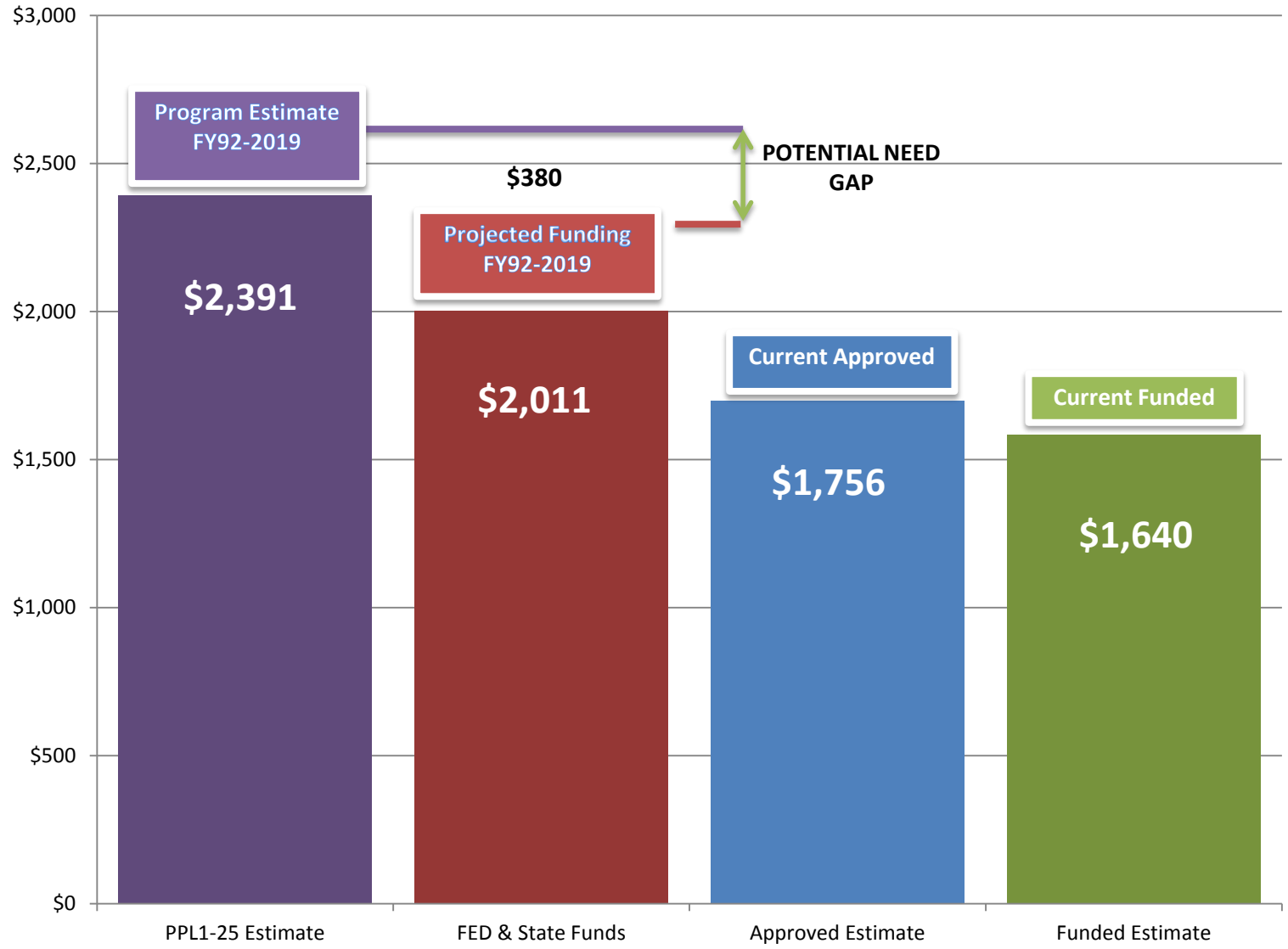
Ms. Jernice Cheavis will provide an overview of the status of CWPPRA accounts and available funding in the Planning and Construction Programs.

Status of CWPPRA Program Funds & Projects

Jernice P. Cheavis

14 September 2016

CWPPRA CONSTRUCTION PROGRAM



CWPPRA PROGRAM BUDGET INCREASES

Program Estimate (PPL 1-25)	**$2,391,396,254**
Decrease in Program Estimate	
TE-32a, TE-83, and TE-66	($38,746,470)
TOTAL:	**($38,746,470)**
Budget Increases	
Operation & Maintenance	$14,151,595
Monitoring	$803,435
TOTAL:	**$14,955,030**
Special Projects	
Construction Program Technical Services	$171,410
TOTAL:	**$171,410**
ESTIMATED REMAINING:	**$2,367,776,224**

CWPPRA POGRAM FUNDING REQUESTS

Available Funds		
Carried in From May Task Force Meeting		$9,432,685
FY17 DOI Funds Estimate		$76,884,571
	TOTAL:	**$86,317,256**

Return to Program		
TE-32a, TE-83, and TE-66		$22,114,026
	TOTAL:	**$22,114,026**

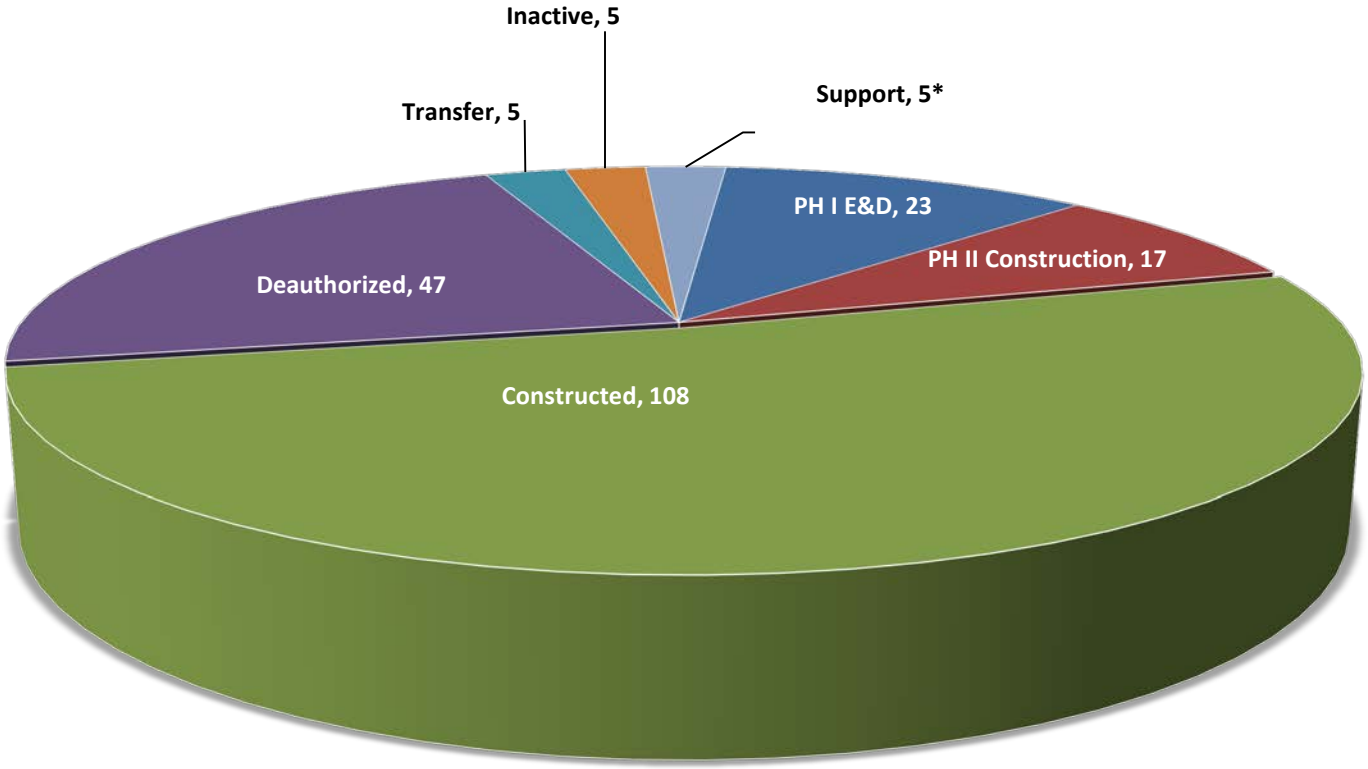
Total Requests		
20-Year-Life Extensions		($504,794)
Operation & Maintenance		($11,239,625)
Monitoring		($10,633,996)
	TOTAL:	**($22,378,415)**

ESTIMATED REMAINING: **$86,052,867**

CWPPRA PROJECT STATUS

TOTAL CWPPRA PROJECTS: 210

ACTIVE PROJECTS: 153



*(1) CRMS (2) Monitoring Contingency Fund (3) Storm Recovery Procedures (4) Construction Program Technical Support (5) Wetland Conservation Plan

Construction Program Funding Requests: TEC Recommendation September 2016

	Program Estimate	TC	FUNDING	TC	Fed	Non-Fed
1. Estimate/Funds Available:						
Approved Funded Estimate PPL 1-25	$2,391,396,254					
Carried in From May Task Force Meeting			$9,432,685			
FY17 DOI Funds Estimate			$76,884,571			
Total Program / Funds Available:	**$2,391,396,254**		**$86,317,256**			
2. Agenda Item 3: Status of Unconstructed Projects						
North Lake Boudreaux (TE-32a), PPL 6, FWS	($21,989,529)		($19,670,916)		($16,720,279)	($2,950,637)
Terrebonne Bay Marsh Creation (TE-83), PPL 20, FWS	($2,000,000)		($2,000,000)			
Central Terrebonne Freshwater Enhancement (TE-66), PPL 18, NRCS	($14,756,941)		($443,110)		($376,643)	($66,466)
Total	**($38,746,470)**		**($22,114,026)**		**($17,096,922)**	**($3,017,104)**
3. Agenda Item 4: Upcoming 20-Year Life Projects						
Cameron-Creole Maintenance (CS-04a), PPL 3, NRCS	$7,251,302		$504,794		$429,075	$75,719
Cameron-Creole Plugs (CS-17), PPL 1, FWS	$871,104		$0		$0	$0
Total	**$8,122,406**		**$504,794**		**$429,075**	**$75,719**
4. Agenda Item 5: COE Long-Term Admin, FY18 Incremental Funding Approval Request						
Funding for multiple projects			$24,873		$21,142	$3,731
Total	**$0**		**$24,873**		**$21,142**	**$3,731**
5. Agenda Item 6: Request for Funding for the CWPPRA Program's Technical Services						
Construction Program Technical Services	$171,410		$171,410		$145,699	$25,712
Total	**$171,410**		**$171,410**		**$145,699**	**$25,712**
6. Agenda Item 9a: O&M - PPL 9+ Projects Request Approval for FY19 Incremental Funding						
Black Bayou Culverts Hydrological Restoration (CS-29), PPL-9, NRCS			$353,698		$300,643	$53,055
Freshwater Introduction South of Highway 82 (ME-16), PPL-9, USFWS			$14,760		$12,546	$2,214
South Lake Decade Freshwater Introduction (TE-39), PPL-9, NRCS			$40,000		$34,000	$6,000
Four Mile Canal Terracing and Sediment Trapping (TV-18), PPL-9, NMFS			$6,485		$5,512	$973
Little Lake Shoreline Protection (BA-37), PPL-11, NMFS			$550,000		$467,500	$82,500
Raccoon Island Shoreline Protection/Marsh Creation (TE-48), PPL-11, NRCS			$26,216		$22,284	$3,932
Coastwide Nutria Control Program (LA-03b), PPL-11, NRCS			$2,119,813		$1,801,841	$317,972
Barataria Barrier Island Complex (BA-38), PPL-11, NMFS			$161,168		$136,993	$24,175
Pass Chaland to Grand Bayou Pass Barrier Shoreline (BA-35), PPL-11, NMFS			$6,627		$5,633	$994
South White Lake Shoreline Protection (ME-22), PPL-12, COE			$8,481		$7,209	$1,272
East Marsh Island Marsh Creation (TV-21), PPL-14, EPA			$20,655		$17,557	$3,098
West Belle Pass Barrier Headland Restoration (TE-52), PPL-16, NMFS			$7,435		$6,320	$1,115
Bayou Dupont Marsh and Ridge Creation (BA-48), PPL-17, NMFS			$153,389		$130,381	$23,008
Grand Liard Marsh and Ridge Restoration (BA-68), PPL-18, NMFS			$35,414		$30,102	$5,312
Coastwide Vegetative Planting (LA-39), PPL-20, NRCS			$1,209,465		$1,028,045	$181,420
Total	**$0**		**$4,713,606**		**$4,006,565**	**$707,041**

Construction Program Funding Requests: TEC Recommendation September 2016

	Program Estimate	TC	FUNDING	TC	Fed	Non-Fed
7. Agenda Item 9b: O&M - PPL 1-8 Project Request Approval for FY19 Incremental Funding						
Cameron-Creole Plugs (CS-17), PPL-1, USFWS			$36,660		$31,161	$5,499
Highway 384 Hydrologic Restoration (CS-21), PPL-2, NRCS			$25,085		$21,322	$3,763
Replace Sabine Refuge - Hog Island Gully (CS-23), PPL-3, USFWS			$45,020		$38,267	$6,753
Lake Chapeau Sediment Input & Hydrologic Restoration (TE-26), PPL-3, NMFS			$10,397		$8,837	$1,560
Total	**$0**		**$117,162**		**$99,588**	**$17,574**
8. Agenda Item 9c: O&M - PPL 1-8 Project Approval for Budget Increase & FY19 Incremental Funding						
Barataria Bay Waterway West Shoreline Protection (BA-23) PPL-4 NRCS	$64,218		$62,727		$53,318	$9,409
Black Bayou Hydrologic Restoration (CS-27), PPL-6, NOAA Fisheries	$5,964,971		$6,149,847		$5,227,370	$922,477
Total	**$6,029,189**		**$6,212,574**		**$5,280,688**	**$931,886**
9. Agenda Item 10a: Monitoring - PPL 9+ Projects Request Approval for FY19 Incremental Funding						
Barataria Basin Landbridge SP (BA27c), PPL-9 NRCS			$4,844		$4,117	$727
GIWW – Perry Ridge West Bank Stabilization (CS-30), PPL-9, NRCS			$5,003		$4,253	$750
Freshwater Introduction South of Highway 82 (ME-16), PPL-9, USFWS			$11,000		$9,350	$1,650
West Lake Boudreaux Shoreline Protection and Marsh Creation (TE-46)			$64,456		$54,788	$9,668
Coastwide Nutria Control Program (LA-03b), PPL-11, NRCS			$119,431		$101,516	$17,915
Goose Point/Pointe Platte Marsh Creation (PO-33), PPL-13, USFWS			$36,704		$31,198	$5,506
Coastwide Vegetative Planting (LA-39), PPL-20, NRCS			$80,902		$68,767	$12,135
Total	**$0**		**$322,340**		**$273,989**	**$48,351**
10. Agenda Item 10b: Monitoring - PPL 1-8 Project Request Approval for FY19 Incremental Funding						
Atchafalaya Sediment Delivery (AT-02), PPL 2, NMFS			$74,800		$63,580	$11,220
Big Island Mining (AT-03), PPL 2, NMFS			$48,800		$41,480	$7,320
Naomi Outfall Project (BA-03c), PPL-5, NRCS			$5,864		$4,984	$880
Total	**$0**		**$129,464**		**$110,044**	**$19,420**
11. Agenda Item 10c: Monitoring - CRMS FY19 Incremental Funding Approval Request						
Coastwide Reference Monitoring System (CRMS)			$9,917,129		$8,429,560	$1,487,569
Total	**$0**		**$9,917,129**		**$8,429,560**	**$1,487,569**
12. Agenda Item 10d: Monitoring - PPL 9+ Projects Request Approval for FY19 Budget increase and incremental Funding						
Little Lake Shoreline Prot/Dedicated Dredging (BA-37), PPL-11, NMFS	$74,320		$35,124		$29,855	$5,269
Lost Lake MC and Hydrologic Restoration Project (TE-72), PPL-19, FWS	$499,130		$126,941		$107,900	$19,041
Bayou Bonfouca Marsh Creation (PO-104), PPL-20, USFWS	$229,985		$102,998		$87,548	$15,450
Total	**$803,435**		**$265,063**		**$225,304**	**$39,759**
Estimate/Funds Available for Recommendations	**$2,391,396,254**		**$86,317,256**			
(2-10) Recommendations	**($23,620,030)**		**($264,389)**			
Program Amount/Available Funds Surplus/Shortage	**$2,367,776,224**		**$86,052,867**			

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

STATUS OF UNCONSTRUCTED PROJECTS

For Report/Decision:

The P&E Subcommittee will report on the status of unconstructed CWPPRA projects that have been experiencing project delays and considered "critical-watch" as well as projects recommended for deauthorization and inactivation.

a. Critical watch unconstructed projects status and milestone updates: (Recommended Actions TBD by Technical Committee)

Project No.	Project Name	PPL	Agency
TE-32a	North Lake Boudreaux Freshwater Introduction and Hydrologic Management	6	FWS
TE-83	Terrebonne Bay Marsh Creation/Nourishment	20	FWS
TE-66	Central Terrebonne Freshwater Enhancement	18	NRCS

The Technical Committee will make status recommendations to the Task Force for the critical watch unconstructed projects presented above.

2016 SOUP - Status Unconstructed Projects - PPL 1 - 21

Project Name	Project No.	Agency	PPL	Authorized Date/Phase I Approval	Construction/ Phase II Approval	30% Design Review Date*	95% Design Review Date*	Current Approved Economic Analsyis Date (Budget Estimate on Books)	Construct Start*	Construct Complete*	Current Approved Budget	Current Funded Budget	Expenditures	1st cost Unexpended	Monitoring Unexpended	O&M Unexpended	TOTAL Unexpended	TOTAL Unobligated	Current Total FF Cost Est . On Books	On Sched	Waiting on Phase II Funds	Proj Issue Delays	Prog Issue Delays	Recommend Transfer	Recommend Deauthorization	Recommend Inactivation	Inactive Projects	> $50 M
Grand Lake Shoreline Protection, Tebo Point & O&M Only [CIAP]	ME-21	NRCS	11	16-Jan-02	15-Feb-07	11-May-04	16-Aug-04	15-May-14	1-Sep-16	31-Jan-17	$10,055,616	$7,075,050	$999,601	$6,049,491	$14,559	$2,991,965	$9,056,015	$3,278,772	$10,055,616	X								
Bayou Bonfouca Marsh Creation	PO-104	FWS	20	19-Jan-11	24-Jan-13	25-Apr-12	31-Oct-12	14-Nov-12	1-Sep-16	1-Jul-17	$28,023,984	$27,577,363	$888,534	$26,519,573	$53,399	$562,478	$27,135,450	$26,979,563	$28,023,984	X								
South Grand Chenier Marsh Creation	ME-20	FWS	11	16-Jan-02	22-Jan-14	6-Aug-09	3-Nov-09	16-Jan-14	1-Oct-16	1-Aug-17	$22,623,346	$22,282,940	$1,973,332	$19,595,251	$173,720	$881,043	$20,650,014	$1,722,170	$22,623,346	X								
Lost Lake Marsh Creation and Hydrologic Restoration	TE-72	FWS	19	20-Jan-10	24-Jan-13	19-Jun-12	31-Oct-12	24-Jan-13	1-Oct-16	31-Oct-17	$34,626,728	$31,404,442	$1,286,547	$29,852,899	$281,401	$3,205,880	$33,340,180	$33,310,621	$34,626,728	X								
Oyster Bayou Marsh Restoration	CS-59	NMFS	21	19-Jan-12	22-Jan-15	2-Jul-14	30-Oct-14	17-Nov-14	1-Oct-16	1-Oct-17	$31,236,742	$30,722,419	$1,513,647	$28,613,090	$391,499	$718,506	$29,723,095	$2,781,043	$31,236,742	X								
Cameron-Creole Watershed Grand Bayou Marsh Creation	CS-54	FWS	20	19-Jan-11	22-Jan-15	27-Mar-13	24-Oct-13	22-Jan-15	1-Nov-16	30-Nov-17	$28,707,688	$28,122,302	$660,896	$27,041,916	$542,252	$462,624	$28,046,792	$28,022,225	$28,707,688	X								
Hydrologic Restoration & Vegetative Planting in the des Allemands Swamp	BA-34-2	EPA	10	10-Jan-01	22-Jan-16	23-Jul-15	31-Oct-15	23-Nov-15	1-Jan-17	1-Jun-17	$7,886,704	$5,220,448	$1,467,262	$3,482,074	$1,353,838	$1,583,560	$6,419,472	$3,213,197	$7,886,704	X								
Rockefeller Refuge Gulf Shoreline Stabilization	ME-18	NMFS	10	10-Jan-01	22-Jan-16	15-May-14	29-Sep-14	21-Oct-15	1-Apr-17	30-Jan-19	$34,330,523	$33,337,316	$1,754,133	$31,353,790	$615,045	$607,554	$32,576,389	$6,946,734	$34,330,523	X								
Cole's Bayou Marsh Restoration	TV-63	NMFS	21	19-Jan-12	22-Jan-16	15-Jul-15	8-Oct-15	12-Nov-15	1-Apr-17	31-Mar-18	$25,635,641	$24,169,491	$1,570,744	$22,109,684	$910,880	$1,044,333	$24,064,897	$4,259,381	$25,635,641	X								
Cameron-Creole Freshwater Introduction	CS-49	NRCS	18	21-Jan-09	1-Jan-16	10-Dec-14	1-Oct-15	17-Oct-08	1-Sep-17	30-Sep-18	$2,761,501	$2,604,603	$1,699,336	$374,273	$0	$687,892	$1,062,165	$817,259	$2,761,501	X								
Northwest Turtle Bay Marsh Creation	BA-125	FWS	21	19-Jan-12		27-Mar-14			1-Oct-17	1-Oct-18	$2,354,788	$2,354,788	$803,346	$1,551,442	$0	$0	$1,551,442	$1,551,048	$23,198,757	X								
Freshwater Bayou Marsh Creation	ME-31	NRCS	19	20-Jan-10	1-Jan-17	1-May-16	1-Aug-16	3-Nov-09	1-Sep-18	30-Sep-19	$2,425,997	$2,425,997	$1,298,081	$1,127,916	$0	$0	$1,127,916	$283,495	$25,523,755	X								
LaBranche East Marsh Creation	PO-75	NRCS	19	20-Jan-10	1-Jan-17	1-May-17	1-Aug-17	3-Nov-09	1-Sep-18	30-Sep-19	$2,571,273	$2,571,273	$2,234,062	$337,211	$0	$0	$337,211	$283,205	$32,323,291	X								
LaBranche Central Marsh Creation	PO-133	NRCS	21	19-Jan-12		1-May-17	1-Aug-17		1-Sep-18	30-Sep-19	$3,885,298	$3,885,298	$1,590,004	$2,295,294	$0	$0	$2,295,294	$251,497	$42,159,208	X								
**North Lake Boudreaux Basin Freshwater Intro and Hydro Mgt	TE-32a	FWS	6	NA	28-Oct-10	4-Aug-09	29-Jun-10	28-Oct-10	1-Apr-18	1-May-19	$25,766,765	$20,048,152	$3,355,905	$15,899,183	$1,189,728	$5,321,949	$22,410,860	$22,282,299	$25,766,765			X						
**Central Terrebonne Freshwater Enhancement	TE-66	NRCS	18	21-Jan-09	1-Jan-17	1-May-16	1-Aug-16	17-Oct-08	N/A	N/A	$2,326,289	$2,326,289	$1,255,246	$1,071,043	$0	$0	$1,071,043	$443,110	$16,640,120			X						
**Terrebonne Bay Marsh Creation Nourishment	TE-83	FWS	20	19-Jan-11				19-Jan-11			$2,901,750	$2,901,750	$556,462	$2,345,288	$0	$0	$2,345,288	$26,766,431	$27,414,401			X						
Freshwater Bayou Bank Stab - Belle Isle Canal to Lock	TV-11b	COE	9	11-Jan-00		17-Jun-02	22-Jan-04	11-Jan-00			$1,498,967	$1,498,967	$1,101,738	$283,328	$113,901	$0	$397,229	$397,229	$35,634,067								X	
Ship Shoal: Whiskey West Flank Restoration	TE-47	EPA	11	16-Jan-02	23-Jan-13	5-Oct-04	28-Sep-05	16-Jan-02	15-Jan-14	1-Oct-14	$3,742,053	$3,742,053	$2,298,822	$1,427,246	$15,985	$0	$1,443,231	$1,443,231	$67,562,826								X	
Venice Ponds Marsh Creation & Crevasses	MR-15	EPA	15	08-Feb-06	23-Jan-13	29-Jun-11	25-Oct-11	8-Feb-06	1-Sep-13	1-Sep-14	$1,074,522	$1,074,522	$634,027	$440,495	$0	$0	$440,495	$440,495	$22,156,292								X	
Madison Bay Marsh Creation and Terracing	TE-51	NMFS	16	18-Oct-06		23-Jul-13	24-Oct-13	18-Oct-06			$3,002,171	$3,002,171	$1,783,480	$1,218,691	$0	$0	$1,218,691	$1,218,691	$38,798,788								X	
Alligator Bend Marsh Restoration and Shoreline Protection	PO-34	NRCS	16	18-Oct-06	23-Jan-13	18-Aug-11	16-Nov-11	12-Nov-13			$1,660,985	$1,660,985	$1,364,230	$296,755	$0	$0	$296,755	$296,755	$40,326,244								X	

*Use actual or current schedule date for design review and construction schedules

**CRITICAL WATCH LIST PROJECT

***Preliminary Analysis of Consistency

na= Not applicable (Cash Flow, Complex, or PENDING DEAUTH)

		Current Approved Budget	Current Approved Funded Budget	Expenditures	1st cost Unexpended	Monitoring Unexpended	O&M Unexpended	TOTAL Unexpended	TOTAL Unobligated	Current Total FF Cost Est . On Books
On Schedule		$237,125,829	$223,753,730	$19,739,526	$200,303,903	$4,336,593	$12,745,835	$217,386,331	$113,700,209	$349,093,484
Waiting on Phase II $										
Project Issue Delays		$30,994,804	$25,276,191	$5,167,613	$19,315,514	$1,189,728	$5,321,949	$25,827,191	$49,491,840	$69,821,286
Program Issue Delays										
Rec. Transfer										
Rec. Deauthorization										
Rec. Inactivation		$10,978,698	$10,978,698	$7,182,297	$3,666,514	$129,886	$0	$3,796,400.70	$3,796,401	$204,478,217
Over $50 million										

Agency Key:

FWS
NMFS
EPA
COE
NRCS
Inactive Projects

Critical Watch List

Note: All projects on this tab will give a status report at the fall Technical Committee Meeting

Project Name	Project No.	Agency	PPL	Project Issue Delays	Near-term Milestones	Current Phase
North Lake Boudreaux Basin Freshwater Intro and Hydro Mgt	TE-32a	FWS	6	Permitting & Landrights	Several regulatory issues remain and still need to be resolved. It is estimated that a 404 permit could be issued by August 2017. Landrights for the conveyance channel were voided and could not be obtained by Terrebonne Parish. To pursue an alternate conveyance channel alignment, additional expenditures for engineering, construction, and landrights would be needed. An increase in the project cost must be approved by the Task Force.	II
Terrebonne Bay Marsh Creation	TE-83	FWS	20	Geotechnical Conditions and Design Issues	Due to poor geotechnical conditions, the constructability of this project is in question. All engineering and design is on hold. FWS and CPRA need to decide if this project should move to deauthorization or if another alternative is feasible.	I
Central Terrebonne Freshwater Enhancement	TE-66	NRCS	18	Complex Scope/ Modeling	Project features are being incorporated into the Restore Act Project: Bayou Dularge Ridge, Marsh, and Hydrologic Restoration.	I

North Lake Boudreaux Basin Project (TE-32a) Status Change to "Inactive"

September Technical Committee Agenda Item 3a (Status of Unconstructed Projects)

Decision: Request the North Lake Boudreaux Basin Freshwater Introduction Project (TE-32a) be placed in an inactive status. (Ronny Paille, Darryl Clark, FWS; Bren Haase, CPRA)**.** The North Lake Boudreaux Basin Freshwater Introduction Project (TE-32a) was authorized in 1997 on PPL6. This is a pre-cash flow project with a fully funded cost of $25,625,959. Phase II funding was approved by the Task Force and land rights was secured in 2010. Land rights had to be reissued due to initial land rights not following Federal requirements. Since then, land rights acquisition has been a problem. At the Task Force meeting in October 2015, the FWS sponsors requested that we be given until May 2016 to acquire the remaining project land rights. As land rights were not secured by the end of May 2016, the FWS along with our CPRA partners, recommends that the project be placed in an "Inactive" status, and that the balance of funding be returned to the program.

Status Review - Unconstructed CWPPRA Projects
June 13, 2016

1. Project Name (and number): North Lake Boudreaux Basin Freshwater Intro. (TE-32a)

2. SOUP Category: Project Issue Delays

3. PPL: 6

4. Federal Agency: FWS

5. Date of Construction Approval / Phase Two Approval: October 2010

6. Approved Total Budget: $25,766,765

7. Fully-Funded Cost: $25,766,765

8. Expenditures: $3,355,905

9. Unexpended Funds: $22,410,860

10. Estimate of anticipated funding increases, including O&M: $1.3M is a very rough and non-approved estimate

11. Potential changes to project benefits: Conveyance channel landrights could not be obtained again for the approved conveyance channel alignment, so a modification to re-align the channel onto the property of one willing landowner is being investigated. The only changes resulting from the approved project would be associated with the terminal end of the conveyance channel, and the addition of some outfall management features (spoil bank gapping) to facilitate freshwater flows. Also, the Type 1 water control structure formerly located along the north conveyance spoil bank would be omitted (there will be non-structured spoil bank openings along the conveyance channel instead of control structures).

12. Brief chronology of project development and issues affecting implementation:

- Jun 2007 – all landrights obtained for construction of the conveyance channel
- Aug 2009 – 30% design meeting conducted
- Jun 2010 – 95% design meeting conducted
- Oct 2010 – Task Force approved Phase II request
- April 2011 – Corps stated that fiscal law issue resolved
- Aug 2012 – Applied for DNR/Corps permits
- Nov 2012 – Received a Coastal Zone Consistency determination from the LDNR
- Aug 2014 – Final Design documents completed
- May 2015 – Conveyance channel landrights agreements voided
- May 2016 – landrights for approved conveyance channel could not be obtained again

13. Current status/remaining issues: To pursue the modified conveyance channel, additional expenditures for engineering, construction, and landrights would be needed. According to SOP, this cost and time increase must be approved by the Task Force.

14. Projected schedule:

DNR/Corps Permit issuance	- Aug 2017
Land Rights Complete	- Jan 2018
Bid Advertisement	- Jan 2018
Construction start	- Apr 2018
Construction completion	- May 2019

15. Preparer: Ronny Paille USFWS (337-291-3117) Ronald_Paille@FWS.GOV

Cost figures as of October 2003 August 2016

North Lake Boudreaux Basin Freshwater Introduction and Hydrologic Management (TE-32a)

Project Status

Approved Date: 1997 **Project Area:** 9,795 acres
Approved Funds: $20.0 M **Total Est. Cost:** $25.7 M
Net Benefit After 20 Years: 266 acres
Status: Construction
Project Type: Water Diversion
PPL #: 6

Location

The project is located in Terrebonne Parish, approximately 5 miles southwest of Chauvin, Louisiana.

Problems

The area is suffering from a lack of fresh water, increasing the negative effects of saltwater intrusion into the north Lake Boudreaux basin marshes.

Restoration Strategy

The purpose of the project is to reduce deterioration and loss of area marshes by seasonally introducing fresh water from the Houma Navigation Canal. This project includes the construction of a freshwater conveyance channel with water management gates and the installation of several outfall management structures to allow drainage and reduce ponding of water.

Progress to Date

The contracted Feasibility Study report has indicated that the project, as proposed, can introduce the originally projected volumes of fresh water. Prior to beginning engineering and design work, a landrights assessment is being conducted to better determine where the project's conveyance channel can be located.

This project is on Priority Project List 6.

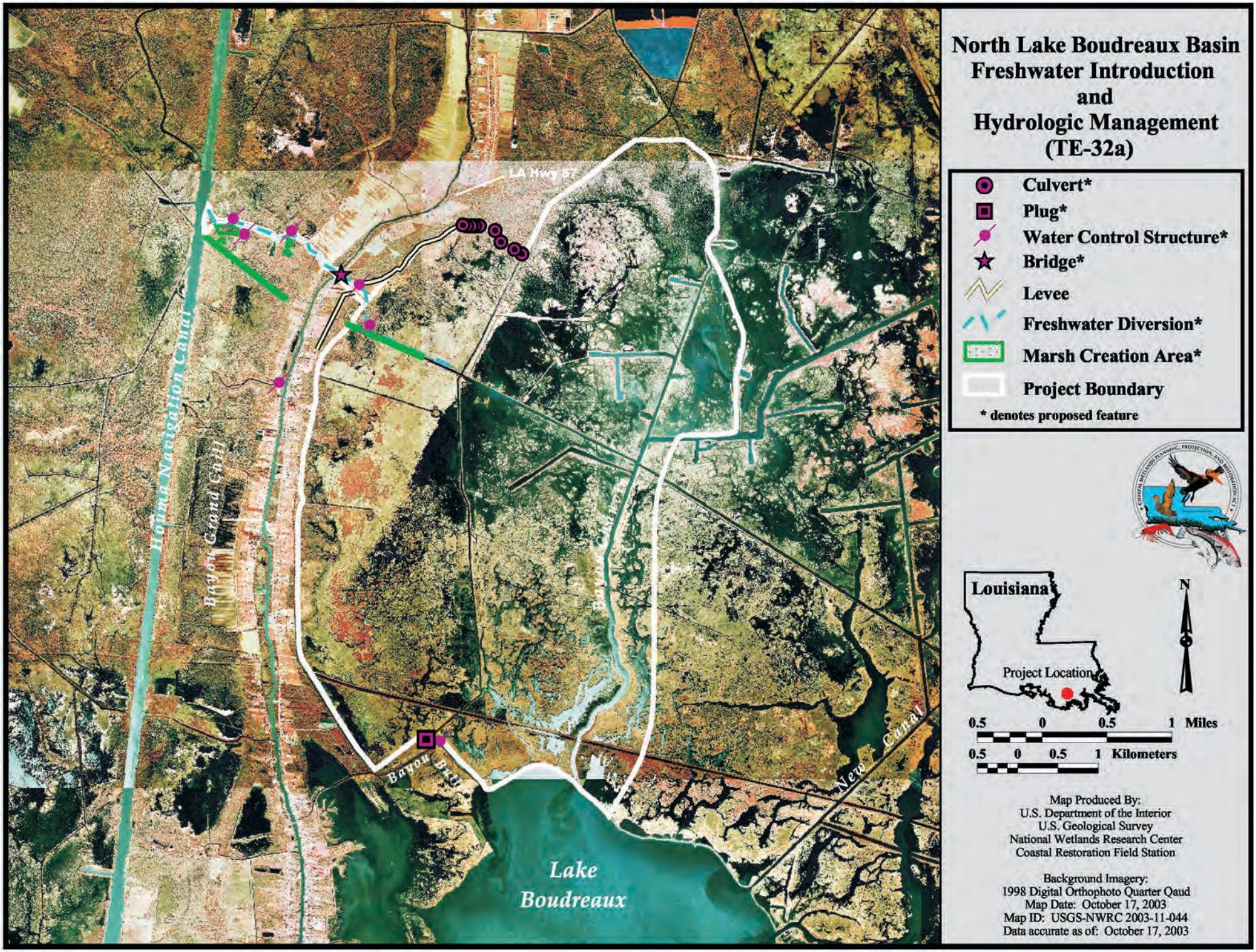
Dead cypress swamps in the northern part of the project area.

Aerial view of dead cypress swamps in the northern part of the project area.

For more information, please contact:

Federal Sponsor:
U.S. Fish and Wildlife Service
Lafayette, LA
(337) 291-3100

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4736



North Lake Boudreaux Basin Freshwater Introduction and Hydrologic Management (TE-32a)

- Culvert*
- Plug*
- Water Control Structure*
- Bridge*
- Levee
- Freshwater Diversion*
- Marsh Creation Area*
- Project Boundary

* denotes proposed feature

Louisiana

Project Location

N

0.5 0 0.5 1 Miles

0.5 0 0.5 1 Kilometers

Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

Background Imagery:
1998 Digital Orthophoto Quarter Qaud
Map Date: October 17, 2003
Map ID: USGS-NWRC 2003-11-044
Data accurate as of: October 17, 2003

Terrebonne Bay Marsh Creation and Nourishment Project (TE-83)

September Technical Committee Agenda Item 3a (Status of Unconstructed Projects)

Decision: Request Deauthorization of the Terrebonne Bay Marsh Creation and Nourishment Project (TE-83). (Darryl Clark, FWS; Bren Haase, CPRA). The Terrebonne Bay Marsh Creation and Nourishment project was approved by the Task Force in 2011 (PPL 20) with a Phase 1 budget of $2,901,750 and an estimated fully funded costs of $27,414,401. During engineering and design, the project team found unusually poor soil conditions in both the marsh creation and borrow areas. The poor soil conditions caused a significant increase in the projected project costs and raised uncertainty about the constructability of project features. The project team evaluated several alternatives, none of which were ultimately deemed suitable. FWS and CPRA request the Technical Committee initiate the deauthorization process for the Terrebonne Bay Marsh Creation and Nourishment project and that remaining E&D finds be returned to the program.

Status Review - Unconstructed CWPPRA Projects
June 17, 2016

1. Project Name (and number): Terrebonne Bay Marsh Creation – Nourishment (TE-83)

2. SOUP Category: Project Issue Delays

3. PPL: 20

4. Federal Agency: FWS

5. Date of Construction Approval / Phase Two Approval: None

6. Approved Total Budget (Current): $2,901,750

7. Fully-Funded Cost: $27,414,401

8. Expenditures: $556,462

9. Unexpended Funds: $2,345,288

10. Estimate of anticipated funding increases, including O&M: Unknown.

11. Potential changes to project benefits: None.

12. Brief chronology of project development and issues affecting implementation:

1/19/2011	Phase I E & D Task Force approval
4/2012	Geotechnical Report Completed
3/2014	Expanded Geotechnical Report Completed

Issues affecting implementation:

The project area has poor geotechnical conditions which make designing, constructing, and funding a project in this area challenging.

13. Current status/remaining issues:

All engineering and design is on hold. FWS and CPRA need to decide if this project should move to deauthorization or if another alternative is feasible.

14. Projected schedule:

Nothing scheduled.

15. Preparer: Robert Dubois, FWS (337-291-3127)

January 2011
Cost figures as of: August 2016

Terrebonne Bay Marsh Creation-Nourishment (TE-83)

Project Status

Approved Date: 2011 **Project Area:** 664 acres
Approved Funds: $2.90 M **Total Est. Cost:** $27.4 M
Net Benefit After 20 Years: 353 acres
Status: Engineering and Design
Project Type: Marsh Creation
PPL #: 20

Location

This project is located in Region 3, Terrebonne Basin, Terrebonne Parish, along the northern shoreline of Lake Barre/Terrebonne Bay near Bayou Terrebonne continuing east a short distance past Bayou Chitique.

Problems

Emergent marshes north of Terrebonne Bay have been eroding as fast or faster than almost any other marshes along coastal Louisiana. As these marshes convert to shallow open water, the tidal prism will increase which will in turn increase the frequency and duration of tides north of Terrebonne Bay. This increasing tidal prism is likely to increase the future interior marsh loss rates for those marshes directly north of Terrebonne Bay. These marshes are important for their habitat values as well as serving to slow the progress of highly saline waters that threaten the lower salinity marshes north and west of Madison Bay and in the Lake Boudreaux basin. The
continued loss of these marshes has directly contributed to the ongoing flooding problems of many communities along Bayou Terrebonne including the town of Montegut.

This picture shows the broken marsh in Terrebonne Bay.

Restoration Strategy

The primary goal of this project is to fill shallow open water areas and nourish marshes north of Terrebonne Bay/Lake Barre thereby reducing the tidal prism north of Terrebonne Bay and
interior land loss from tidal scouring. Specific Goals: 1) Create 365 acres of intertidal marsh in shallow open water and nourish 299 acres of fragmented marsh within the project area reducing
water exchange between Terrebonne Bay and interior lakes during tidal and small storm events. 2) Reduce erosion along 16,000 ft of the northern Terrebonne Bay shoreline.

The proposed features of this project consist of filling approximately 365 acres of shallow open water and nourishing approximately 299 acres of very low or fragmented marsh with material hydraulically dredged from Terrebonne Bay/Lake Barre. Containment dikes will be degraded/gapped within 3 years of construction to allow for greater tidal and estuarine organism access. This project could be one part of a phased comprehensive plan to protect the northern shoreline of Terrebonne Bay and the interior marshes from further erosion and reduce the tidal prism.

The project would result in approximately 353 net acres of marsh over the 20-year project life.

Progress to Date

This project is on Priority Project List 20. Phase 1 funding approval for engineering and design was given by the Task Force in January 2011.

For more project information, please contact:

Federal Sponsor:
U.S. Fish and Wildlife Service
Lafayette, LA
(337) 291-3100

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4736

Terrebonne Bay Marsh Creation/ Nourishment (TE-83)

Marsh Creation *

Project Boundary

*denotes proposed features

USGS science for a changing world

N

0.2 0 0.2 0.4 Kilometers

0.2 0 0.2 0.4 Miles

Map Produced by:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station
Baton Rouge, La.

Background Imagery:
2008 Digital Orthophoto Quarter Quadrangle

Map Date: January 24, 2011
Map ID: USGS-NWRC 2011-11-0013
Data accurate as of: January 3, 2011

Status Review - Unconstructed CWPPRA Projects
June 15, 2016

1. **Project Name (and number):** Central Terrebonne Freshwater Enhancement Project (TE-66)

2. **SOUP Category:** Project Delayed by Project Team Delivery Issues

3. **PPL:** 18

4. **Federal Agency:** NRCS

5. **Date of Construction Approval / Phase Two Approval:** N/A

6. **Approved Total Budget:** $2,326,289

7. **Fully Funded Cost Estimate:** $16,640,120

8. **Expenditures:** $1,255,246

9. **Unexpended Funds:** $1,071,043

10. **Estimate of anticipated funding increases, including O&M:** N/A at this time

11. **Potential changes to project benefits:** N/A at this time

12. **Brief chronology of project development and issues affecting implementation:**

2009	Approved (Phase I)
2010	Initiation of hydrodynamic model
2011	Hydrodynamic model surveys and monitoring
2012	Hydrodyamic model calibration and initial scenarios
2013	Hydrodynamic model draft report (March 2013) and design scenario model runs. Initiation of Design/Geotechnical/Surveys
2014	Modeling Phase completed. Design Phase was scheduled to begin but CPRA halted all work on project pending decision to move project to a state only project under a different program. Project Team decision is pending.
2015-16	Project features are being incorporated into the Restore Act Project: Bayou Dularge Ridge, Marsh, and Hydrologic Restoration

13. **Current status/remaining issues:** Project features are being incorporated into the Restore Act Project: Bayou Dularge Ridge, Marsh, and Hydrologic Restoration.

14. **Projected schedule:** N/A

15. **Preparer:** Updated (4/3/13): Ron Boustany, NRCS, (337) 291-3067
Updated (6/21/13): John Jurgensen, NRCS (318) 473-7694
Updated (6/17/14): John Jurgensen, NRCS, (318) 473-7694
Updated (6/19/15): John Jurgensen, NRCS, (318) 473-7694
Updated (6/15/2016): Quin Kinler, NRCS (225) 665-4253 ext 110

September 2009
Cost figures as of: August 2016

Central Terrebonne Freshwater Enhancement (TE-66)

Project Status

Approved Date: 2009 **Project Area:** 48,446 acres
Approved Funds: $2.32 M **Total Est. Cost:** $16.6 M
Net Benefit After 20 Years: 233 acres
Status: Planning and Design
Project Type: Hydrologic Restoration
PPL #: 18

Location

The project area is located in Terrebonne Parish in the Terrebonne Basin.

Problems

The Bayou Dularge Ridge historically restricted the Gulf marine influence into Central Terrebonne marshes forming a diagonal restriction extending from northeast to southwest, where the Atchafalaya influence is prominent. The Grand Pass is currently a 900 ft wide artificial cut through the Bayou Dularge Ridge south of Lake Mechant. The pass is mainly used by commercial and recreational fisherman as a shortcut to the gulf and has greatly eroded to a point of approximately 36 feet deep that well exceeds optimal utility. The expansion of the pass to its current size has allowed for a substantial alteration of historic salinity and hydrology and consequently a broad area of the Central Terrebonne marshes are currently suffering some of the highest loss rates in the state.

Restoration Strategy

The project will reestablish historic hydrologic and salinity conditions by reducing the artificial intrusion of Gulf marine waters via the Grand Pass into the Central Terrebonne marshes while enhancing the influence of the Atchafalaya River waters into the area. A structure consisting of rock barge bay would be constructed to reduce the size of the opening by up to 90% to 150' wide and 15' deep. The project would reestablish the historic ridge function of Bayou Dularge that separated Lake Mechant from the gulf and moderate salinities that have greatly impacted the marshes to the north of Lake Mechant. The project will also increase the Atchafalaya influence in the area by modifying the current structure located in Liners Canal north of Lake Decade to increase freshwater introduction to Lake Decade by an estimated 500 cfs and provide maintenance dredging at Minors Canal to maintain optimal freshwater conveyance from the GIWW into Lake Decade.

Progress to Date

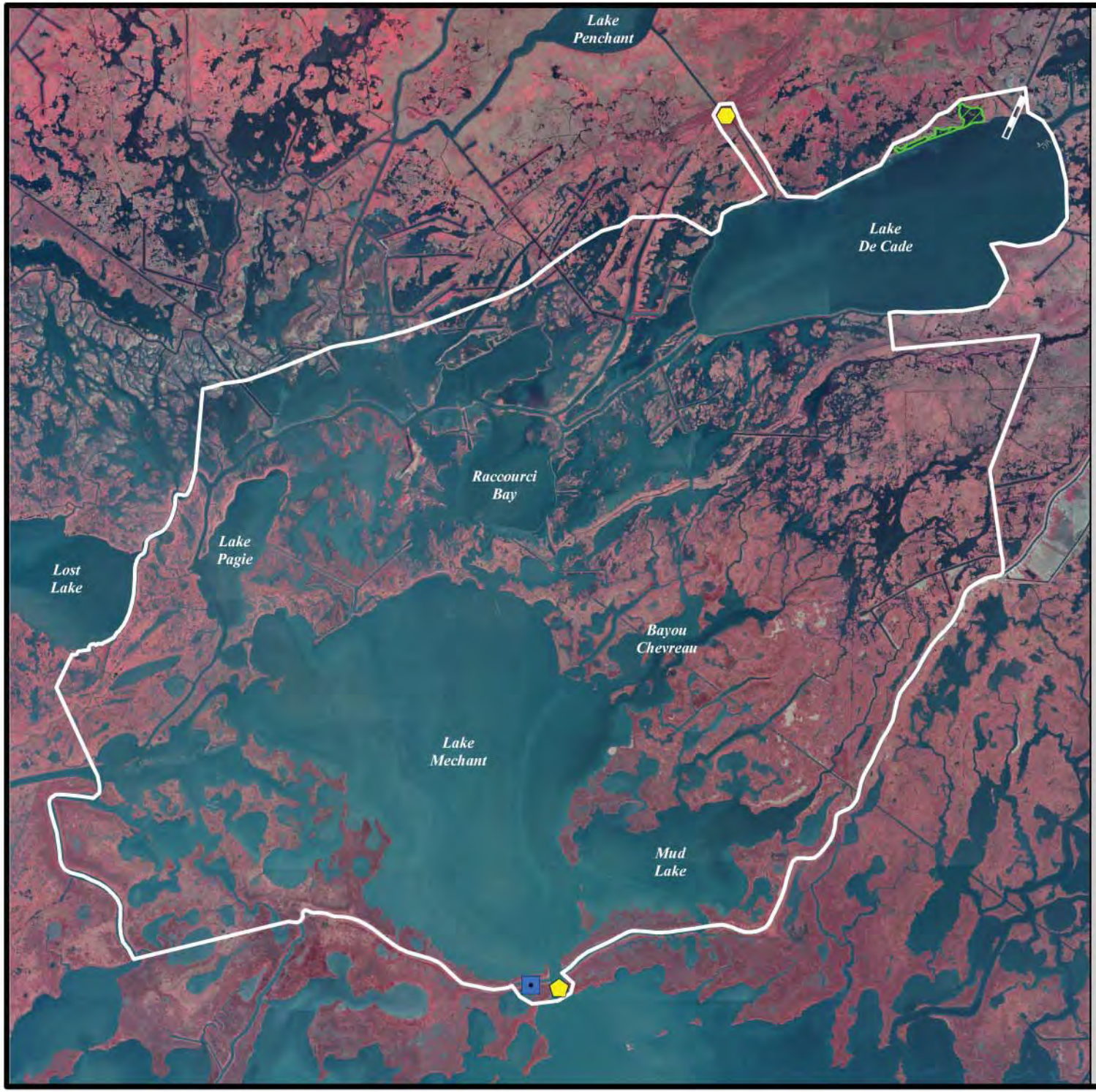
Project is currently in the Planning and Design Phase. Project Team is developing surveying, geotechnical investigations, and modeling requirements necessary to proceed to 30% design review. Project is scheduled to request Phase II funding at the January 2012 Task Force meeting.

This project is on Priority Project List 18.

For more project information, please contact:

Federal Sponsor:
Natural Resources Conservation Service
Alexandria, LA
(318) 473-7756

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4736



Central Terrebonne Freshwater Enhancement (TE-66)

- Flapgate With Boat Bay *
- Rock Barge Bay *
- Plug *
- Channel Maintenance *
- Marsh Creation *
- Project Boundary

*denotes proposed features

USGS science for a changing world

N

0.6 0 0.6 1.2 Kilometers

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Map Produced by:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station
Baton Rouge, La.

Background Imagery:
2008 Digital Orthophoto Quarter Quadrangle

Map Date: August 27, 2009
Map ID: USGS-NWRC 2009-11-0386
Data accurate as of: August 26, 2009

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

UPCOMING 20-YEAR LIFE PROJECTS

For Report/Decision:

The project sponsors will present recommended paths forward for projects nearing the end of their 20-year lives.

a. Projects requesting approval for 20-year extension and budget increases in the amount of $8,122,406 with incremental funding requests in the amount of $504,794.

Project No.	Project Name	Sponsor	20-Year Life Date	Fully Funded Cost	Incremental Funding Amount
CS-04a	Cameron-Creole Maintenance	NRCS	Sep 2017	$7,251,302	$504,794
CS-17	Cameron-Creole Plugs	FWS	Jan 2017	$871,104	$0

The Technical Committee will vote to make a recommendation on the paths forward for the above projects.

CWPPRA

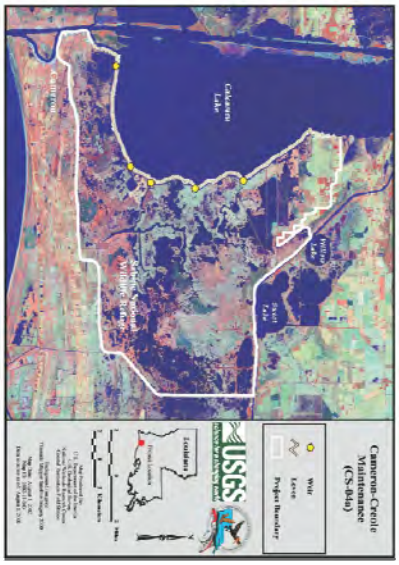
20YL Path Forward Report

Project: Cameron-Creole Maintenance (CS-04a)

Federal Sponsor: NRCS

20YL Date: September 2017

Project Location: Cal/Sab Basin Cameron Parish, east of Calcasieu Lake. It encompasses approximately 64,000 ac. of fresh-to-saline marsh and open water.



Project Features:
CS-04a project was established to maintain the Cameron-Creole Watershed Management Project. A fund was created to provide for the operations and maintenance of the project for the 20 years (1998-2017).

CWPPRA

20YL Path Forward Report

CWPPRA Maintenance Events:

- 2004 – Structure vandalism $38,525
- 2007 – Structure storm damage $365,279
- 2013 – Structure vandalism $115,372
- 2016 – Rock armoring repair (Grand, Mangrove, and Peconi) $1,900,000 (estimated)

Total: 2,419,176

Additional Maintenance Events funded by other sources:

- 2008 – Breach closure (Rita) $4,044,921
- 2010 – Levee repair (FEMA phase 1) $1,120,071
- 2011 – Levee repair (FEMA phase 2) $14,045,436

Total: $19,210,428

CWPPRA

20YL Path Forward Report

CWPPRA Remaining Operation Costs:

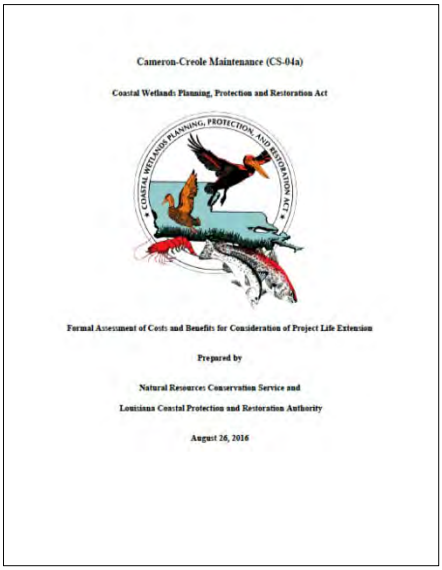
- 2016 – $115,000
- 2017 – $125,000

CWPPRA Fully Funded Cost:
$4,644,371

CWPPRA Funds Remaining: approximately $2,154,000 minus estimated remaining maintenance and operation cost of $2,140,000) will leave an estimated $14,000 in the project budget.

CWPPRA

20YL Path Forward Report



Cameron-Creole Maintenance (CS-04a)

Coastal Wetlands Planning, Protection and Restoration Act

Formal Assessment of Costs and Benefits for Consideration of Project Life Extension

Prepared by

Natural Resources Conservation Service and

Louisiana Coastal Protection and Restoration Authority

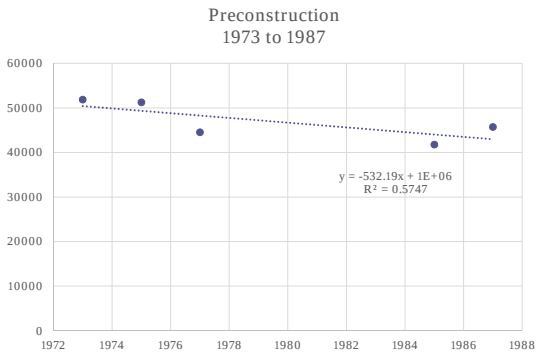
August 26, 2016

CWPPRA

20YL Path Forward Report

Preconstruction Land Loss

Land:Water Data



Rate = -1.02652 % / year

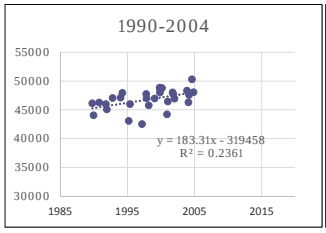
CWPPRA

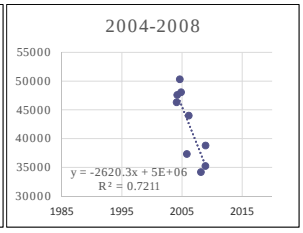
20YL Path Forward Report

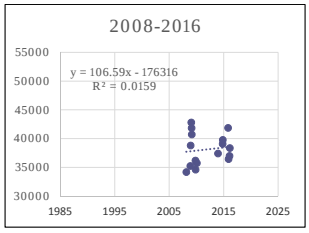
Project Performance

Hypertemporal Data

Years	Description	Rate
1990-2004	Pre-Storms	0.406
2005-2008	Storm Impact Period	-4.95
2009-2016	Post-Storm	0.295







CWPPRA

20YL Path Forward Report

Project Performance

Land:Water Data

"Reference" Comparisons

Location	1973-1987 Rate	1990-2004 Rate	2004-2010 Rate	1990-2010 (all) Rate	1990-2010 (2008 and 2009 excluded) Rate
CS-04a Project Area	-1.03	0.22	-4.33	-1.25	-0.62
Cal-Sab Basin minus CS-04a	-0.52	-0.13	-1.39	-0.34	-0.17
Oyster Bayou "Reference"	-0.76	-0.04	-2.44	-0.72	-0.40
West Cove "Reference"	-1.31	0.13	-3.68	-1.12	-0.96

CWPPRA

20YL Path Forward Report

Project Performance

Land:Water Data

CRMS Stations Comparisons

Location	1973-1987 Rate	1990-2004 Rate	2004-2010 Rate	1990-2010 (all) Rate	1990-2010 (2008 and 2009 excluded) Rate
Average of CRMS Inside CS-04a Project Area	-0.90	0.03	-4.75	-1.37	-0.78
Average of CRMS Outside CS-04a Project Area	-0.67	-0.02	-4.05	-1.02	-0.52

CWPPRA

20YL Path Forward Report

Project Performance

- CS-04a area is considerably different from these references regarding hydrology, salinity, size, and, perhaps most importantly, soils.

CWPPRA

20YL Path Forward Report

Project Performance

- Approximately 45% of the CS-04a project area is classified as Clovelly Muck or Allemands Muck, which are highly fluid organic soils, compared to 13% the entire Basin minus CS-04a, 0% of Oyster Bayou reference, and 0% of West Cove reference.

- By comparison, only 54% of the CS-04a project area has the more mineralized soils, compared to 80% the entire Basin minus CS-04a, 93% of Oyster Bayou reference, and 100% of West Cove reference. (The more mineralized soils referred to include Bancker, Creole, Edgerly, Ged, Gentilly, Hackberry, Larose, Mermentau, Mowata, and Scatlake.

CWPPRA

20YL Path Forward Report

Benefits of the 20 year project (1997-2017)

- Future Without Project (FWOP) scenario is based on the pre-construction land loss rate (-1.03) derived from 1973-1987 land:water data.
- Four approaches were used for Future With Project scenarios
  - Land:water (1990-2010, 2008 and 2009 excluded)
  - Hypertemporal (1989-2016, except 2006)
  - Interval - land:water and hypertemporal
  - Interval - hypertemporal

CWPPRA

20YL Path Forward Report

Benefits of the 20 year project (1997-2017)

Data Used for FWP	Net Acres	Cost Effectiveness (Cost/Net Acre)
Land:water (1990-2010, 2008 and 2009 excluded)	2,992	$1,552
Hypertemporal (1989-2016, except 2006)	1,415	$3,282
Interval - land:water and hypertemporal	2,534	$1,833
Interval - hypertemporal	2,231	$2,082
Average	2,293	$2,025

CWPPRA

20YL Path Forward Report

Benefits of an Additional 20 Years (2018-2037)

- Without extension of CWPPRA Program involvement and no alternative funding source in place, it is likely that the structures will be left in an open position, and the structures and levee will deteriorate over time.
- With continued CWPPRA Program involvement by extension of the Cameron Creole Maintenance CS-04a, the project would continue to be maintained and operated, allowing it to function as designed and permitted.

CWPPRA

20YL Path Forward Report

Benefits of an Additional 20 Years (2018-2037)

- Future With Project Extension scenario is based on regression of hypertemporal data for the last 27 years (1989-2016, except 2006) that the project has been in place, which is a rate of -0.83.
- The Future Without Project Extension scenario begins with this same rate, with a uniform increase in the land loss rate until it reaches the pre-project rate of -1.03 at project year 40.

CWPPRA

20YL Path Forward Report

Benefits of an Additional 20 Years (2018-2037)

- This increase in land loss rate is predicted due to non-operation of structures (lack of salinity and water level control), and deterioration of structures and levee
- This analysis would suggest that extension of CWPPRA involvement for an additional 20 years would result in 601 net acres.

CWPPRA

20YL Path Forward Report

Cost of an Additional 20 Years (2018-2037)

- Annual O&M Inspections
- Annual structure operations contract
- Two general maintenance and/or vandalism assumed (including engineering and design, mobilization/demobilization, administration)
- Land:water data acquisition and analysis in Years 21, 31, and 38
- Data analysis and reports in Year 22, 32, and 39
- Monitoring management
- Fully –funded estimate is $7,251,302
- First Increment (Years 2018 and 2019) is $504,794 (Monitoring $184,562; State O&M $297,176; Fed O&M $20,539; COE Admin $2,517)

CWPPRA

20YL Path Forward Report

Projects	Cost/ Net Acre
CS-04a Years 1-20 (FWP = Land:water (1990-2010, 2008 and 2009 excluded)	$1,552
CS-04a Years 1-20 (FWP = Hypertemporal (1989-2016, except 2006)	$3,282
CS-04a Years 1-20 (FWP = Land:water (1990-2010, 2008 and 2009 excluded)	$1,833
CS-04a Years 1-20 (FWP = Land:water (1990-2010, 2008 and 2009 excluded)	$2,082
CS-04a Years 1-20 (Average of Above)	$2,025
CS-04a Years 21-40	$12,065
PPL18 Average	46,822
PPL19 Average	88,656
PPL20 Average	50,682
PPL21 Average	60,622
PPL22 Average	89,578
PPL23 Average	132,661
PPL24 Average	85,088
PPL25 Average	101,566
OVERALL AVG PPL18-25	81,616
2009 Phase II Approvals Average	120,303
2010 Phase II Approvals Average	140,462
2011 Phase II Approvals Average	206,094
2012 Phase II Approvals Average	70,429
2013 Phase II Approvals Average	67,618
2014 Phase II Approvals Average	54,646
2015 Phase II Approvals Average	62,095
2016 Phase II Approvals Average	104,752
OVERALL AVG PHASE II APPROVALS 2009-2016	103,190
AVERAGE ALL PPL AND PHASE II APPROVALS 2009-2016	89,607

20YL Recommendation

NRCS and CPRA recommend project extension.

Cameron-Creole Maintenance (CS-04a)

Coastal Wetlands Planning, Protection and Restoration Act

Formal Assessment of Costs and Benefits for Consideration of Project Life Extension

Prepared by

Natural Resources Conservation Service and

Louisiana Coastal Protection and Restoration Authority

August 26, 2016

Project Name
Cameron-Creole Maintenance (CS-04a)

Project Sponsors
Natural Resources Conservation Service (NRCS) and State of Louisiana / Coastal Protection and Restoration Authority (CPRA)

Project Location
Calcasieu-Sabin Basin, Cameron Parish, about 6 miles northeast of Cameron, Louisiana. The project is bordered on the west by the eastern shore of Calcasieu Lake, on the north by the Gulf Intracoastal Waterway, and to the east and south by Louisiana Highway 27 (Figure 1). It encompasses approximately 64,000 acres of fresh-to-saline marsh and open water.

Project Description / Project Features
The Cameron-Creole Watershed Management Project was constructed under the USDA Small Watershed Program (PL 566) and consists of five large control structures and a 19-mile levee along the eastern rim of Calcasieu Lake. Levee construction began in 1981 and construction of the five structures began in 1987. In 1989, construction of all project features were competed and management began.

In 1998, the Cameron-Creole Maintenance (CS-04a) project was established to maintain the Cameron-Creole Watershed Management Project. A fund was created to provide for the operations and maintenance of the project for the next 20 years.

Maintenance events are summarized as follows

2004:	Structures	
	-Vandalism	$38,525.00
2007:	Structures	
	-Storms	$365,278.78
2008:	Breach Closures	$4,044,920.50
2010:	Levee	
	-Phase 1	$1,120,070.90
2011:	Levee	
	-Phase 2	$14,045,436.12
2013:	Structures	
	-Vandalism	$115,372.19
	Total (above)	$19,729,603.49

The maintenance event expenses above far exceed the current Fully-Funded Cost because approximately $15 million was reimbursed by the Federal Emergency Management Agency (FEMA) for repairs to damages related to Hurricanes Rita and Ike (2005 and 2008). In 2009, an additional $2.8 million was reimbursed to the project by a State funding decrease.

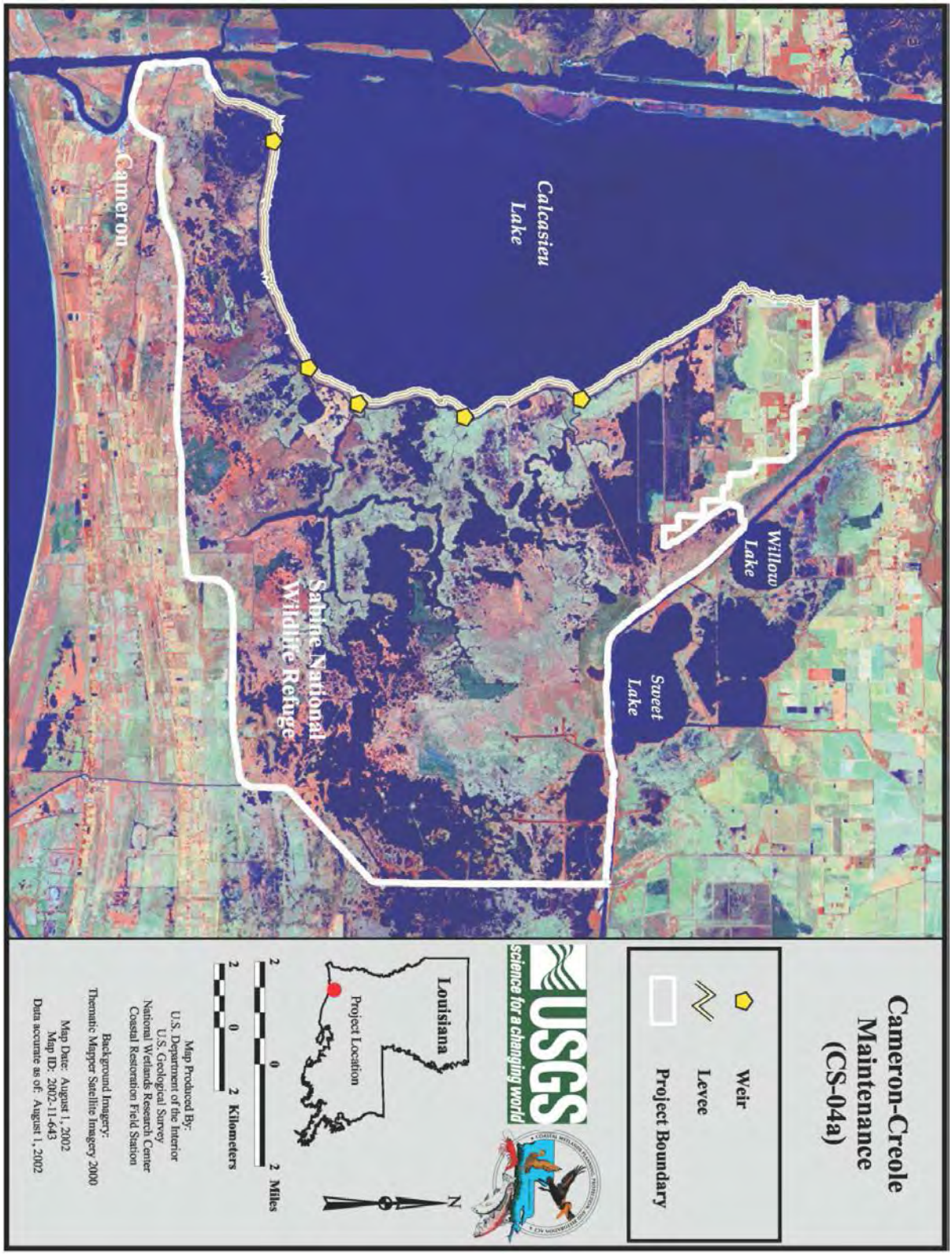


Figure 1: Project map

Approximately $2.49 million has been spent from the current Fully Funded cost leaving approximately $2.15 million in the project budget. The spending schedule for maintenance through year 20 of the project includes approximately $1.9 million for rock and structure repair/maintenance to begin in 2016 and approximately $250K for operations and maintenance in 2016 and 2017.

Current Status
CS-04a will reach the end of its initial 20 year project life in September 2017. The CWPPRA Task Force has approved pursuit of a project life extension prompting formal assessment of costs and benefits of both the initial 20 year period and a potential project extension.

Cost of Initial 20 Year Period
The current fully funded cost of CS-04a is $4,644,371.

Benefits of Initial 20 Year Period

The Cameron Creole Watershed Project was constructed prior to CWPPRA (1981 thru 1989). The CWPPRA Program assumed operation and maintenance of the project in 1998 as the CS-04a project. CWPPRA has not implemented a monitoring plan for this project, so there is no existing analysis or assessment of the project as a whole. The age, nature, and size of the project provide significant challenges to performing an assessment of the project.

In an earlier version of this document, NRCS presented various pre-construction versus post-construction analyses in an attempt to estimate the benefits of the project. Some of the major comment topics and how this current analysis was revised to address such comment topics are as follows:

- The project area should be compared to "reference" or "unmanaged" area or areas. Several "reference" approaches are presented below, including Calcasieu-Sabine Basin, Custom Polygons, and CRMS stations. More detailed explanation is provided below.
- For pre-construction versus post-construction type analyses, the time frame and data source to be used for each received different comments from different reviewers. Initially, NRCS proposed to use 1956-1987 land:water to establish the pre-construction land change rate. The EnvWG expressed concerns that the early (1950s-1970) loss of land may have stabilized prior to construction. Consideration was also given to using multi-temporal type analysis, similar to contemporary land change analyses; however this data is available only back to 1984, which would not provide a sufficiently long-enough time frame to produce a valid pre-project rate for Cameron Creole Watershed Project with construction completion in 1989. Consideration was also given to "mixing" 1973, 1975, and 1977 land:water data (60 meter resolution) with satellite data (30 meter resolution)

for 1984 -1989. USGS opined that such mixing is problematic because the lower resolution data will tend to yield "less" land, so rate calculations would be skewed and invalid. Based on this, the best available pre-construction data to be used in this analysis is land:water data for the period is 1973-1987. For various post-construction analyses below, 1990-2010 land:water and/or 1989-2016 hypertemporal data is used. Additional explanation is provided below, including the separation of the post-construction period into smaller intervals. It should be specifically noted that benefits attributable to CWPPRA Program involvement are limited to the CWPPRA project life, beginning in 1998.

Reference / Unmanaged Site Analyses

Comparison to Other Portions of Calcasieu Basin

Various reference approaches were used to compare the CS-04a project area to other portions of the Calcasieu-Sabin Basin, including a) the entire Basin minus CS-04a project area; b) the Oyster Bayou "reference" area (Figure 2), and c) the West Cove "reference" area (Figure 3).

It is important to note that CS-04a area is considerably different from these references regarding hydrology, salinity, size, and, perhaps most importantly, soils. Approximately 45% of the CS-04a project area is classified as Clovelly Muck or Allemands Muck, which are highly fluid organic soils, compared to 13% the entire Basin minus CS-04a, 0% of Oyster Bayou reference, and 0% of West Cove reference. By comparison, only 54% of the CS-04a project area has the more mineralized soils, compared to 80% the entire Basin minus CS-04a, 93% of Oyster Bayou reference, and 100% of West Cove reference. (The more mineralized soils referred to include Bancker, Creole, Edgerly, Ged, Gentilly, Hackberry, Larose, Mermentau, Mowata, and Scatlake. Soils map and descriptions are provided in Appendix A).

Several intervals of project significance were analyzed including pre-construction (1973-1987), post-construction before storm impacts (1990-2004); post-construction after storm impacts (2004-2010); post-construction all years (1990-2010), post-construction excluding hurricane impacted years (1990-2010 excluding 2008 and 2009). Regression analyses were performed and results are presented in Tables 1 and 2. Each regression is provided in Appendix B.

Table 1.

Location	1973-1987 Rate	1990-2004 Rate	Diff (%/y)	2004-2010 Rate	Diff (%/y)
CS-04a Project Area	-1.03	0.22	-1.24	-4.33	3.30
Cal-Sab Basin minus CS-04a	-0.52	-0.13	-0.38	-1.39	0.87
Oyster Bayou "Reference"	-0.76	-0.04	-0.72	-2.44	1.68
West Cove "Reference"	-1.31	0.13	-1.43	-3.68	2.37

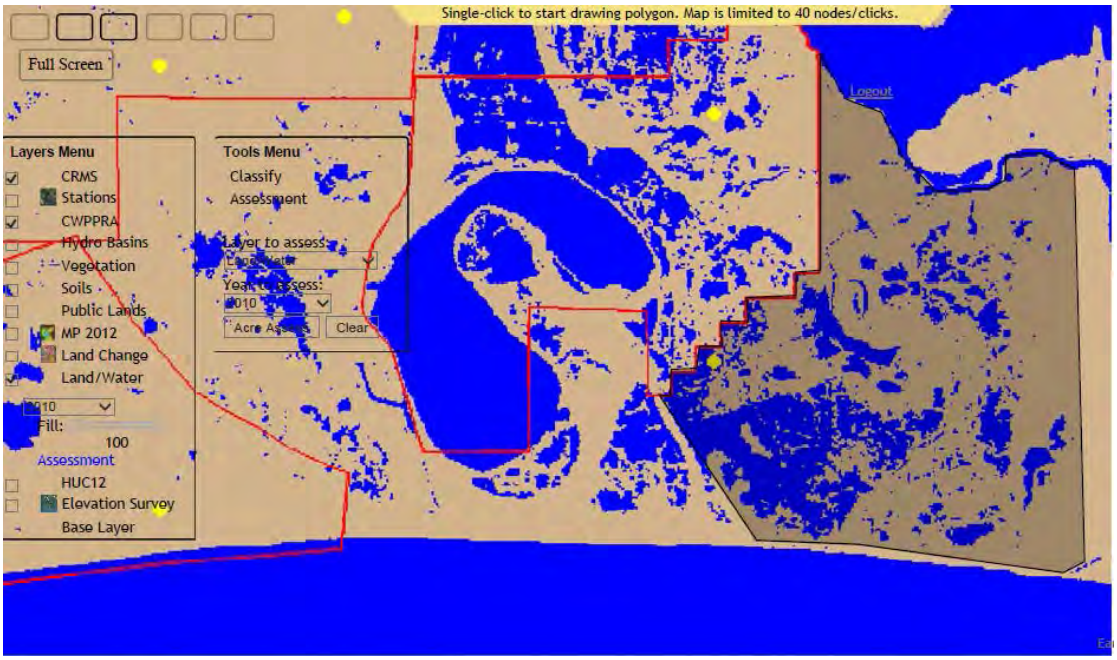


Figure 2: Oyster Bayou Custom Polygon reference area.

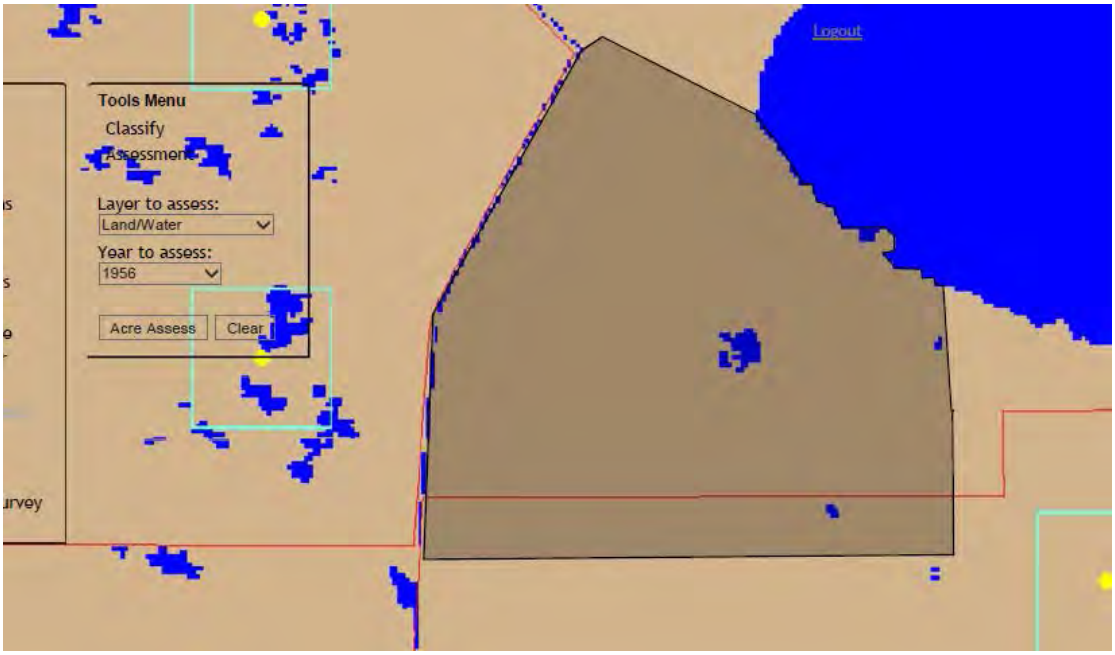


Figure 3: West Cove Custom Polygon reference area.

In the first 14 years after construction (1990-2004), the CS-04a project area responded with a reversal of land loss to land gain at a slightly higher rate than the West Cove "reference", while Calcasieu-Sabine Basin minus CS-04a area and Oyster Bayou "reference" continued to experience land loss.

Since the storms (2004-2010), all the areas have experienced greater land loss, with loss in CS-04a being the most pronounced. Following the storms and through May 2008, the CS-04a

perimeter levee was breached. Operations based on salinity and water level data and targets did not resume until January 2012. While recent hypertemporal data (Figure 4) gives an indication that the area has begun to recover, land:water data is available only through 2010. It will be very interesting to see what 2016 land:water data will reveal.

Table 2.

Location	1973-1987 Rate	1990-2010 (all) Rate	Diff (%/y)	1990-2010 (2008 and 2009 excluded) Rate	Diff (%/y)
CS-04a Project Area	-1.03	-1.25	0.23	-0.62	-0.41
Cal-Sab Basin minus CS-04a	-0.52	-0.34	-0.18	-0.17	-0.35
Oyster Bayou "Reference"	-0.76	-0.72	-0.04	-0.40	-0.37
West Cove "Reference"	-1.31	-1.12	-0.18	-0.96	-0.34

For the entire post-construction period, including the storm impact years, the CS-04 project area is the only of the areas to have seen an overall increase in land loss. However, if the land:water data from the storm impact years (2008-2009) is excluded, the CS-04a project area has experienced the greatest reduction in land loss.

This is not meant to imply that storm impacts are not real or that they should be ignored. These analyses do show that CS-04a is highly susceptible to storm impacts. With the significant area of highly organic soils, it is NRCS' and CPRA monitoring/operations manager's contention that the CS-04a structures and proper operation give the area its best opportunity to recover from inevitable storm impacts.

Comparison of CRMS Stations Inside vs. Outside CS-04 Project Area

There are seven CRMS stations within the CS-04a project area (644, 645, 648, 650, 1738, 1743, and 2418). Thirteen Calcasieu-Sabine Basin CRMS stations from outside the CS-04 project area were selected for comparison (641, 655, 656, 660, 663, 669, 683, 684, 685, 687, 1205, 2154, and 2189).

As with the previously discussed "reference" areas, there is considerable variability among the CRMS stations regarding hydrology, salinity and soils. Again, approximately 45% of the CS-04a project area is classified as Clovelly Muck or Allemands Muck, compared to only 13% the remaining basin. Much of the remaining basin (80%) has more mineralized soils. (Soils map and descriptions are provided in Appendix A). Salinities on the western side of the basin are more influenced by the Sabine River/Lake and these tend to be quite a bit lower than the Calcasieu system. With the construction of the Calcasieu Ship Channel, there tends to be frequent spikes within the Calcasieu Lake that impact the CS-04a project area.

Regression analyses were performed for all CRMS stations listed above for the same intervals mentioned in the previous section: pre-construction (1973-1987), post-construction before storm impacts (1990-2004); post-construction after storm impacts (2004-2010); post-construction all years (1990-2010), post-construction excluding hurricane impacted years (1990-2010 excluding

2008 and 2009). The resulting land change rates were averaged to allow comparison of CRMS stations inside vs. outside CS-04 project area. Results are presented in Tables 3 and 4. Each regression is provided in Appendix C.

Table 3.

Location	1973-1987 Rate	1990-2004 Rate	Diff (%/y)	2004-2010 Rate	Diff (%/y)
Average of CRMS Inside CS-04a Project Area	-0.90	0.03	-0.93	-4.75	3.85
Average of CRMS Outside CS-04a Project Area	-0.67	-0.02	-0.65	-4.05	3.39

Table 4.

Location	1973-1987 Rate	1990-2010 (all) Rate	Diff (%/y)	1990-2010 (2008 and 2009 excluded) Rate	Diff (%/y)
Average of CRMS Inside CS-04a Project Area	-0.90	-1.37	0.47	-0.78	-0.12
Average of CRMS Outside CS-04a Project Area	-0.67	-1.02	0.35	-0.52	-0.14

Despite the differences regarding hydrology, salinity and soils, there is very little difference in loss rate changes between stations inside vs. outside the project area. For the post-construction period excluding 2008 and 2009, the project area CRMS locations combined experienced a -0.12%/y reduction in loss rate and the CMRS locations outside similarly experienced -0.14%/y reduction, collectively. There were similar changes observed in all intervals.

CS-04a Pre-construction versus Post-construction Analyses

As stated above, the best available pre-construction data to be used in this analysis is land:water data for the period 1973-1987. For post-construction, 1990-2010 land:water and/or 1997-2016 hypertemporal data is used. Several post-construction intervals were analyzed: post-construction before storm impacts (1990-2004); post-construction after storm impacts (2004-2010); post-construction all years (1990-2010), post-construction excluding hurricane impacted years (1990-2010 excluding 2008 and 2009)

CS-04a Pre-construction Land:Water Data vs. Post-construction Land:Water Data

Regression analyses for the CS-04a project area were performed for various combinations of 1990, 1995, 1998, 1999, 2002, 2004, 2006, 2008, 2009, and 2010 land water data. Results are presented in Table 5. Each regression is provided in Appendix B.

Table 5.

Period	Rate	Diff (%/y) vs. Pre-construction
Pre-construction (1987-1990)	-1.03	N/A
1990-2004	0.22	-1.24
2004-2010	-4.33	3.30
1990-2010 (2008 and 2009 excluded)	-0.62	-0.41
1990-2010 (all)	-1.25	0.23

In the first 14 years after construction (1990-2004), the CS-04a project area responded with a reversal of land loss. Since the storms (2004-2010), the project area has experienced greater land loss. Following the storms and through May 2008, the CS-04a perimeter levee was breached. Operations based on salinity and water level data and targets did not resume until January 2012. While recent hypertemporal data (Figure 4) gives an indication that the area has begun to recover, land:water data is available only through 2010. It will be very interesting to see what 2016 land:water data will reveal.

For the entire post-construction period, including the storm impact years, the CS-04 project area has seen an overall increase in land loss. However, if the land:water data from the storm impact years (2008-2009) is excluded, the CS-04a project area has experienced a reduction in land loss compared to the pre-project period.

This is not meant to imply that storm impacts are not real or that they should be ignored. These analyses do show that CS-04a is highly susceptible to storm impacts. With the significant area of highly organic soils, it is NRCS' and CPRA monitoring/operations manager's contention that the CS-04a structures and proper operation give the area its best opportunity to recover from inevitable storm impacts

CS-04a Pre-construction Land:Water Data vs. Post-construction Hypertemporal Data

USGS conducted a regression analyses using post-construction hypertemporal data. Results are presented in Table 6 and Figure 4.

Table 6.

Period	Rate
Pre-construction (1987-1990)	-1.03
Post-construction Pre-Storms (1989-2004)	0.40
Post-construction Post-Storms (2005-2016	-0.11
Post-construction (1989-2016, except 2006)	-0.83

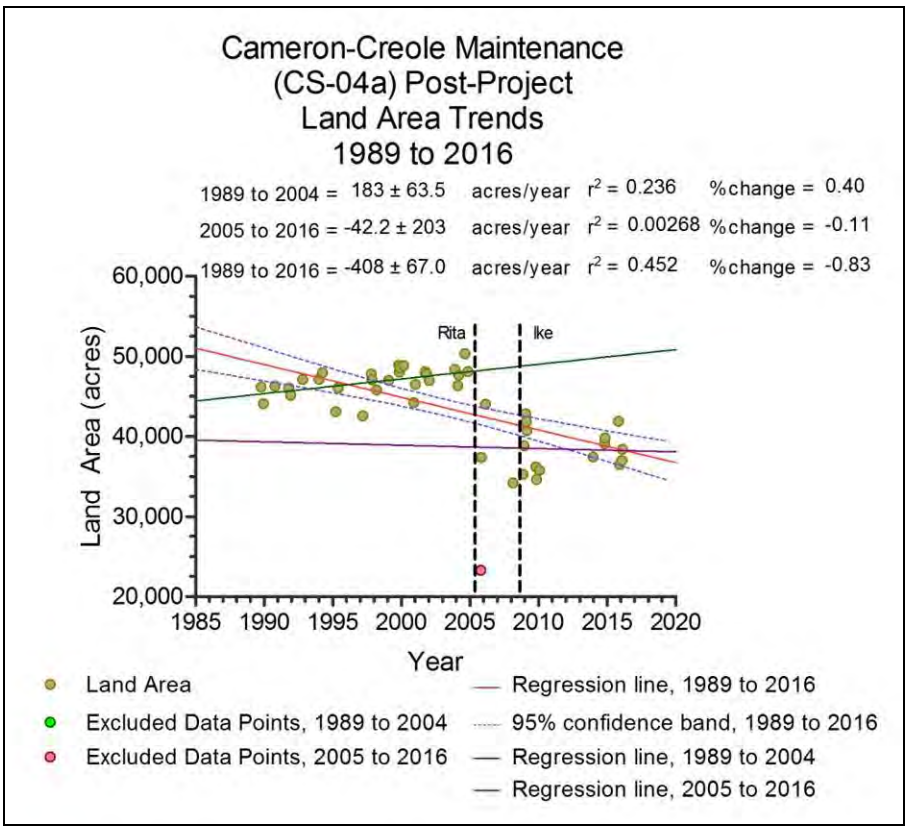


Figure 4. USGS CS-04a hypertemporal regression analysis.

This data indicates that in the first 14 years after construction (1989-2004), the CS-04a project area responded with a reversal of land loss. Since the storms (2005-2016) and for the entire post-construction period (1989-2016), the project area has experienced land loss, but at a reduced rate compared to pre-construction.

Attempt to Quantify Benefits of Initial 20 Year Period

With all of the above analyses, there is no obvious "clear cut" way to quantify the benefits for the initial 20 year period of CWPPRA Program involvement of CS-04.

Four applications of the land loss spreadsheet approach are presented in this document (spreadsheets area provided in Appendix D). Other parties are welcome to utilize their own applications of the land loss spreadsheet for their own purposes. In all four applications presented in this document, the Future Without Project (FWOP) scenario is based on the pre-construction land loss rate (-1.03) derived from 1987-1990 land:water data.

For Future With Project, one application of the land loss spreadsheet uses the land:water data for 1990-2010 (2008 and 2009 excluded), which is a rate of -0.62. This analysis would suggest that over the 20 years of CWPPRA involvement, CS-04a has resulted in 2,992 net acres.

In the second application, the land loss spreadsheet uses the hypertemporal data for (1989-2016, except 2006), which is a rate of -0.83, for Future With Project. This analysis would suggest that over the 20 years of CWPPRA involvement, CS-04a has resulted in 1,415 net acres.

In the third application, the Future With Project scenario uses four separate land change regression rates to reflect land change trends relative to impacts of the storms and based on data availability. The project was on a positive land change trajectory through 2004. However, the hurricanes of 2005 and 2008 had a dramatic effect on land area. After the storms, land:water data seems to reflect some recovery, but because of lack of land:water data beyond 2010, the fourth interval represented uses hypertemporal data (Table 7). The analysis using this data would suggest that over the 20 years of CWPPRA involvement, CS-04a has resulted in 2,534 net acres.

Table 7.

Years	Description	Data Source	Rate
1990-2004	Pre-Storms	Land:water	0.2175
2005-2008	Storm Impact Period	Land:water	-6.797
2009-2010	Post-Storm	Land:water	5.612
2011-2016	Post Storm	Hypertemporal	0.295

In the fourth application, the Future With Project scenario also reflects land change trends relative to impacts of the storms, but because all the data is hypertemporal, there are only three separate regression rates. The project was on positive land change trajectory through 2004; the hurricanes of 2005 and 2008 had a dramatic effect on land area; and after the storms, the data seems to reflect recovery (Table 8). The analysis using this data would suggest that over the 20 years of CWPPRA involvement, CS-04a has resulted in 2,231 net acres.

Table 8.

Years	Description	Data Source	Rate
1990-2004	Pre-Storms	Hypertemporal	0.406
2005-2008	Storm Impact Period	Hypertemporal	-4.95
2009-2016	Post-Storm	Hypertemporal	0.295

These four analyses indicate that the project effect is between 1,415 and 2,992 net acres. The average of all four analyses is 2,293 net acres.

Cost Effectiveness of Initial 20 Year Period

With a Fully-Funded cost of $4,644,371, the cost effectiveness of the initial 20 years of CWPPRA involvement in CS-04a based on the four applications of the land loss spreadsheet is presented in Table 9.

Table 9.

Data Used for FWP	Net Acres	Cost Effectiveness (Cost/Net Acre)
Land:water (1990-2010, 2008 and 2009 excluded)	2,992	$1,552
Hypertemporal (1989-2016, except 2006)	1,415	$3,282
Interval - land:water and hypertemporal	2,534	$1,833
Interval - hypertemporal	2,231	$2,082
Average	2,293	$2,025

Cost of a Potential Additional 20 Year Period
Operation, Maintenance, and Monitoring cost assumptions over a potential additional 20 year period for CS-04a would be as follows:

- Annual O&M Inspections
- Annual structure operations contract
- Two general maintenance and/or vandalism assumed (including engineering and design, mobilization/demobilization, administration)
- Land:water data acquisition and analysis in Years 21, 31, and 38
- Data analysis and reports in Year 22, 32, and 39
- Monitoring management

The estimated fully funded cost of operation, maintenance, and monitoring for a potential additional 20 year period for CS-04a is $7,321,391 (subject to minor changes with final review) with additional detail provided in Appendix E.

Benefits of a Potential Additional 20 Year Period

The Cameron-Creole Watershed project structures were built under a cooperative watershed protection project between United States Department of Agriculture – Natural Resource Conservation Service, The Gulf Coast Soil and Water Conservation District, That Cameron Parish Police Jury, and the Cameron Parish Gravity Drainage Districts Number 3 and 4.

Without extension of CWPPRA Program involvement and no alternative funding source in place, it is likely that the structures will be left in an open position, and the structures and levee will deteriorate over time.

With continued CWPPRA Program involvement by extension of the Cameron Creole Maintenance CS-04a, the project would continue to be maintained and operated, allowing it to function as designed and permitted.

For the purpose of estimating benefits, the Future With Project Extension scenario is based on regression of hypertemporal data for the last 27 years (1989-2016, except 2006) that the project has been in place, which is a rate of -0.83 for project years 21-40. The Future Without Project Extension scenario begins with this same rate, with a uniform increase in the land loss rate until it reaches the pre-project rate of -1.03 at project year 40. This increase in land loss rate is predicted due to non-operation of structures (lack of salinity and water level control), and deterioration of structures and levee. See the land loss spreadsheet in Appendix D. This analysis would suggest that extension of CWPPRA involvement for an additional 20 years would result in 601 net acres.

Cost Effectiveness of a Potential Additional 20 Year Period

Based on this analysis, the cost effectiveness of a potential additional 20 year period of CS-04a can be estimated to be $12,182 ($7,321,391/601 net acres).

The cost effectiveness of CS-04a, potential CS-04a extension and recently approved CWPPRA projects is presented in Table 10.

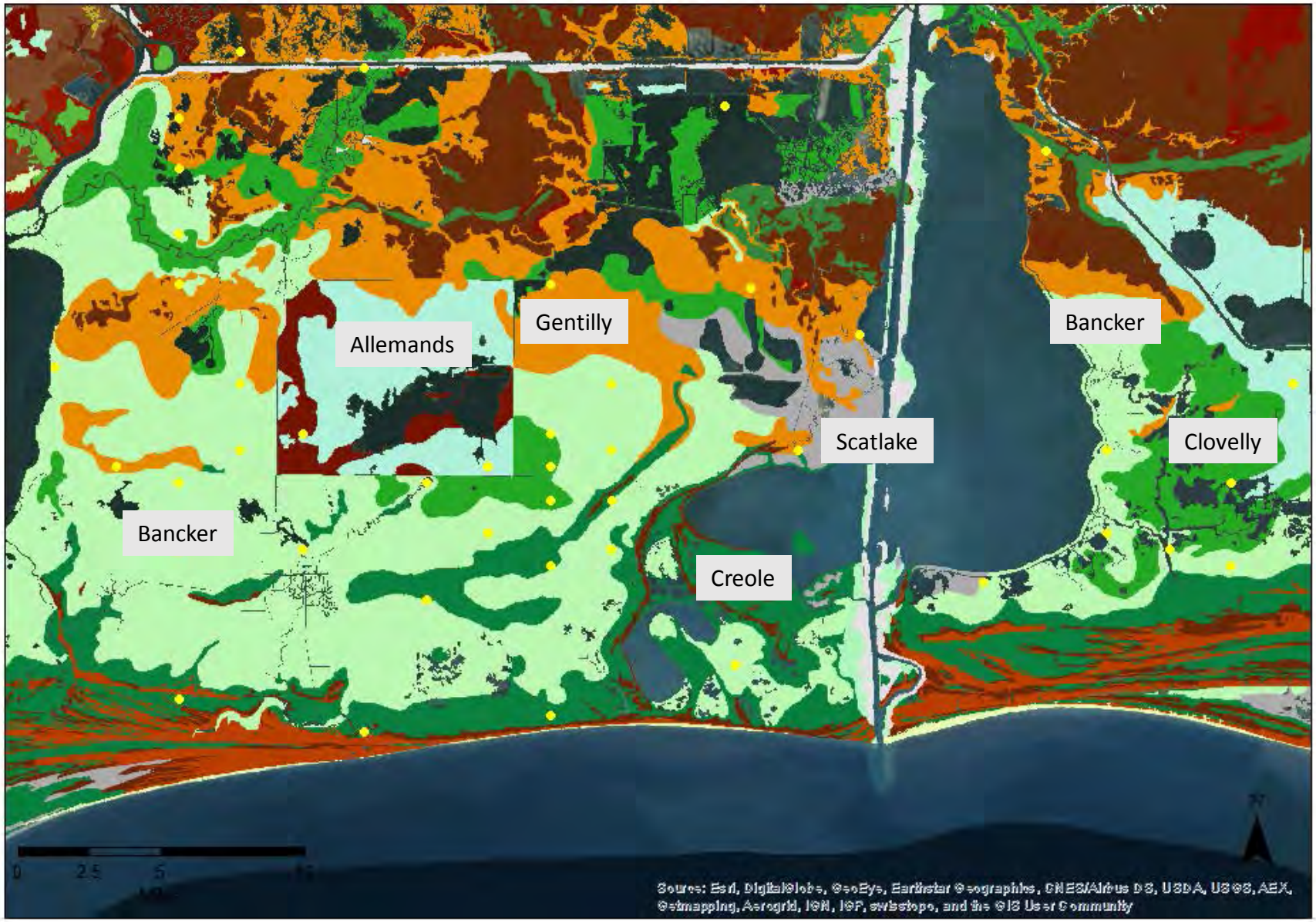
Table 10.

Projects	Cost/ Net Acre
CS-04a Years 1-20 (FWP = Land:water (1990-2010, 2008 and 2009 excluded)	$1,552
CS-04a Years 1-20 (FWP = Hypertemporal (1989-2016, except 2006)	$3,282
CS-04a Years 1-20 (FWP = Land:water (1990-2010, 2008 and 2009 excluded)	$1,833
CS-04a Years 1-20 (FWP = Land:water (1990-2010, 2008 and 2009 excluded)	$2,082
CS-04a Years 1-20 (Average of Above)	$2,025
CS-04a Years 21-40	$12,182
PPL18 Average	46,822
PPL19 Average	88,656
PPL20 Average	50,682
PPL21 Average	60,622
PPL22 Average	89,578
PPL23 Average	132,661
PPL24 Average	85,088
PPL25 Average	101,566
OVERALL AVG PPL18-25	81,616
2009 Phase II Approvals Average	120,303
2010 Phase II Approvals Average	140,462
2011 Phase II Approvals Average	206,094
2012 Phase II Approvals Average	70,429
2013 Phase II Approvals Average	67,618
2014 Phase II Approvals Average	54,646
2015 Phase II Approvals Average	62,095
2016 Phase II Approvals Average	104,752
OVERALL AVG PHASE II APPROVALS 2009-2016	103,190
AVERAGE ALL PPL AND PHASE II APPROVALS 2009-2016	89,607

APPENDIX A

Soils Map and Descriptions

Soils Map


Allemands
Gentilly
Bancker
Scatlake
Clovelly
Bancker
Creole
0
2.5
5
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

LOCATION BANCKER LA+TX

Established Series
Rev. KEM-CTM-CLN
08/2000

BANCKER SERIES

The Bancker series consists of very deep, very poorly drained, very slowly permeable soils. These soils formed in very fluid clayey and organic sediments in intermediate or brackish coastal marshes. The sediments have been deposited under water and never air-dried and or consolidated. Slope ranges from 0 to 0.2 percent.

TAXONOMIC CLASS: Very-fine, smectitic, nonacid, hyperthermic Sodic Hydraquents

TYPICAL PEDON: Bancker muck--on broad, level, brackish marsh.
(Colors are for wet soil.)

Oa--0 to 4 inches; very dark grayish brown (10YR 3/2) muck; massive; about 40 percent fiber, 5 percent rubbed; about 60 percent mineral; very fluid, flows easily between fingers when squeezed leaving mainly roots in hand; many fine roots; neutral; clear smooth boundary. (0 to 15 inches thick)

Ag--4 to 10 inches; black (10YR 2/1) mucky clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; many fine roots; slightly alkaline; clear smooth boundary. (4 to 12 inches thick)

Cg1--10 to 22 inches; dark gray (5Y 4/1) clay; few thin (one-inch) strata of black mucky clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; few fine roots; moderately alkaline; clear smooth boundary.

Cg2--22 to 38 inches; dark greenish gray (5Y 5/1) clay; fine faint olive brown iron accumulations; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; few fine roots; moderately alkaline; clear smooth boundary.

Cg3--38 to 50 inches; dark greenish gray (5GY 4/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; moderately alkaline; clear smooth boundary.

Cg4--50 to 72 inches; greenish gray (5GY 5/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; moderately alkaline. (combined thickness of the Cg horizon is 55 to 76 inches.)

TYPE LOCATION: Vermilion Parish, Louisiana; 7.0 miles southeast of Pecan Island; 300 feet west of LA State Highway 147; 0.5 mile south of drawbridge; NE, SE, Sec. 35, R. 1 E., T. 16 S.

RANGE IN CHARACTERISTICS: These soils are continuously saturated with brackish water. The electrical conductivity of the saturation extract ranges from 4 to 8 dS/m. All mineral horizons above a depth of 60 inches have an n-value of 0.7 to 1 or more. Clay content of the particle-size control section ranges from 60 to 85 percent. Reaction ranges form strongly acid to slightly alkaline in the Oa layers

and from moderately acid to moderately alkaline in the Ag and Cg horizons.

The Oa horizon, where present, has hue of 7.5YR or 10YR, value of 2 or 4, and chroma of 1 or 2. This horizon is muck or peat.

The Ag horizon, where present, has hue of 10YR to 5Y, or N, value of 2 to 4, and chroma of 2 or less. Texture is clay, silty clay, or mucky clay.

The Cg horizon has hue of 10YR to 5Y, 5GY or 5BG, value of 4 to 6, and chroma of 1, or is neutral. Masses of iron accumulation are in shades of olive or brown. Texture is mainly clay or mucky clay with thin layers of silty clay. Some pedons have thin organic layers.

COMPETING SERIES: This is the Scatlake series in the same family and the Barbary, Barnett, Capers, Creole, Gentilly, Harris, Ijam, Larose, Leerco, Placedo, and Tatlum series in related families. Scatlake soils have EC of more than 8 dS/m and are in coastal salt water marshes. Barbary soils have logs and other woody material in the lower layers. Barnett soils have n-value less than 0.7 in the upper 20 to 40 inches. Gentilly soils have lower horizons with n-value of less than 0.7 and have less than 60 percent clay in the particle-size control section. Larose soils have EC of less than 2 dS/m in the control section. Capers soils have 0.6 to 2.0 percent sulfides in the upper 20 inches of the solum. Creole and Leerco soils have n-value ranging from 0.7 to 1.0 to a depth of 8 to 40 inches. Harris, Ijam, and Placedo soils have n-value less than 0.7 in all horizons. Tatlum soils have a fine-silty particle-size control section.

GEOGRAPHIC SETTING: Bancker soils are on low Gulf Coastal intermediate or brackish marshes at elevations of 2 feet or less. These soils are flooded with intermediate or brackish water during storms and high tides and also with freshwater from torrential rains. These soils formed in clayey sediments. Slopes range from 0 to 0.2 percent. The mean air temperature is 70 degrees F and the mean annual rainfall is about 59 inches near the type location. Elevation is 0 to 2 feet above sea level. Frost-free days range from 270 to 300 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Creole and Scatlake series and the Clovelly series. Creole soils are on similar positions and have a fine particle-size control section. Scatlake soils are more saline throughout and are in adjacent saline marshes. Clovelly soils have organic layers 16 to 51 inches thick.

DRAINAGE AND PERMEABILITY: Bancker soils are very poorly drained. Permeability is very slow. Runoff is neglegible. The water level is continuously at depths of 1 foot above to 0.5 foot below the soil surface. During tropical storms, tidal floodwater is 4 feet deep or more.

USE AND VEGETATION: Used mainly for wildlife habitat. The vegetation is mainly marshhay cordgrass, seashore saltgrass, olney bulrush, coastal water hyssop, saltmarsh bulrush and seashore paspalum in brackish marshes. In addition to most of the brackish marsh plants, widgeongrass, sawgrass, giant bulrush, alligatorweed, common duckweed, roseau, smartweed, bulltongue, and cattail are found in intermediate marshes.

DISTRIBUTION AND EXTENT: The Gulf Coastal marshes of Louisiana, Texas (MLRA 151) and possibly Mississippi. The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: Vermilion Parish, Louisiana; 1985. Name is derived from the name of a community in southern Vermilion Parish.

REMARKS: These soils were formerly included in the Scatlake series.

Diagnostic horizons and features recognized in this pedon are:

n-value more than 1.0 from 4 to 72 inches.

Ecological Site: Brackish Fluid Mineral Marsh or Intermediate Fluid Mineral Marsh.

ADDITIONAL DATA: Louisiana Agricultural Experiment Station LSU data (S85LA-113-002) Vermilion Parish and (S97LA-009-001) Avoyelles Parish.

TAXONOMIC VERSION: Soil Taxonomy, Second Edition,1999.

National Cooperative Soil Survey
U.S.A.

LOCATION CLOVELLY LA

Established Series
Rev. WLC-SDM-JLD-CLN
08/2000

CLOVELLY SERIES

The Clovelly series consists of very deep, very poorly drained, very slowly permeable soils. These soils formed in moderately thick accumulations of herbaceous organic material overlying very fluid clayey alluvial sediments. These soils are on broad coastal marshes that are nearly continuously flooded with brackish water. Slope ranges from 0 to 0.2 percent.

TAXONOMIC CLASS: Clayey, smectitic, euic, hyperthermic Terric Haplosaprists

TYPICAL PEDON: Clovelly muck--on broad level brackish marsh.
(Colors are for wet soil.)

Oa1--0 to 12 inches; very dark grayish brown (10YR 3/2) muck; about 20 percent fiber; 5 percent rubbed; about 60 percent mineral; massive; many medium and coarse roots and stems; very fluid, flows easily between fingers leaving only fiber and roots in hand; moderately alkaline; clear smooth boundary.

Oa2--12 to 36 inches; black (10YR 2/1) muck; same color pressed and rubbed; about 10 percent fiber, 2 percent rubbed; about 60 percent mineral; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; few medium and fine roots; moderately alkaline; abrupt smooth boundary. (combined thickness of the Oa horizons ranges from 16 to 51 inches)

Cg1--36 to 74 inches; gray (5Y 5/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; moderately alkaline; clear smooth boundary. (10 to 40 inches thick)

Cg2--74 to 84 inches; dark gray (5Y 4/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; moderately alkaline.

TYPE LOCATION: Lafourche Parish, Louisiana; 3.75 miles east of Golden Meadow at the end of Yankee Canal; 150 feet north of shell dam.

RANGE IN CHARACTERISTICS: Thickness of the organic horizons ranges from 16 to 51 inches. The organic fraction is dominantly herbaceous sapric materials but some pedons have layers, particularly surface layers, that are hemic or fibric materials, but their cumulative thickness is less than one half the total thickness of the organic horizons. Reaction ranges from neutral to moderately alkaline throughout the profile. In drained pedons, reaction ranges from very strongly acid to neutral. Salinity, or electrical conductivity of the saturation extract, ranges from 4 to 8 dS/m in at least 1 layer within a depth of 40 inches.

The organic layers have hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 or less. Mineral content ranges from 40 to 70 percent.

Where present, the Ag horizon has hue of 10YR to 5Y, value of 2 to 4, and chroma of 2 or less. Texture

is mucky clay, clay, or silty clay. The n-value ranges from 0.7 to more than 1.0.

The Cg horizon has hue of 10YR to 5Y, 5BG, 5GY, or 5G, value of 4 to 6, and chroma of 1 or less. Texture is mucky clay, clay, or silty clay. The n-value ranges from 0.7 to more than 1.0 to a depth of 60 inches and deeper.

COMPETING SERIES: These are Allemands, Bellpass, and Bessie series in the same family, and Carlin, Kenner, Lafitte, Maurepas, and Tomoka series. Allemands soils have a salinity content of less than 3 dS/m in the control section and are in fresh water marshes. Bellpass and Bessie soils have EC, or salinity, of more than 8 dS/m in the control section and are in coastal salt water marshes. Tomoka soils are more acid. Carlin, Kenner, Lafitte, and Maurepas soils have more than 51 inches of organic materials.

GEOGRAPHIC SETTING: Clovelly soils are on intermediate or brackish marshes that border saline bays, saline marshes, or open Gulf waters. They flood frequently or very frequently with intermediate or brackish water during high tides. Slope ranges from 0 to 0.2 percent. Near the type location the average annual rainfall is about 67 inches and the mean annual temperature is about 70 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Allemands, Bellpass, and Lafitte series and the Scatlake series. Scatlake soils are at slightly higher elevations and are saline mineral soils.

DRAINAGE AND PERMEABILITY: Clovelly soils are very poorly drained. Runoff is negligble or ponded. Permeability is very slow. The water table is at 0.5 foot below to 1 foot above the soil surface most of the year.

USE AND VEGETATION: Used mainly for wildlife habitat and recreation. This soil is associated with many small areas of open water. The vegetation is mainly marshhay cordgrass, seashore saltgrass, olney bulrush, coastal water hyssop, saltmarsh bulrush, and seashore paspalum in brackish marsh. In addition to these plants, widgeongrass, sawgrass, giant bulrush, alligatorweed, common duckweed, roseau, smartweed, bulltongue, and cattail are found in intermediate marshes.

DISTRIBUTION AND EXTENT: Gulf Coast Marshes (MLRA 151) of Louisiana and possibly Mississippi and Texas. The extent is large.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas.

SERIES ESTABLISHED: Lafourche Parish, Louisiana, 1981.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Sapric soil materials--0 to 36 inches (Oa horizons).

Ecological Site: Intermediate Organic Marsh or Brackish Organic Marsh.

ADDITIONAL DATA: LSU data from Terrebonne Parish (S94LA-109-007, 008, 017, 027).

TAXONOMIC VERSION: Soil Taxonomy, Second Edition, 1999.

National Cooperative Soil Survey
U.S.A.

LOCATION ALLEMANDS LA+TX

Established Series
Rev. WLC-CLN
02/2004

ALLEMANDS SERIES

The Allemands series consists of very deep, very poorly drained, soils that are rapidly permeable in the organic materials and very slowly permeable in the underlying clay horizons. These soils are on the landward side of low coastal freshwater marshes and formed in decomposed herbaceous material over alluvial sediments. Slope ranges from 0 to 0.2 percent.

TAXONOMIC CLASS: Clayey, smectitic, euic, hyperthermic Terric Haplosaprists

TYPICAL PEDON: Allemands mucky peat--freshwater marsh. (Colors are for wet soil unless otherwise stated.)

Oa1--0 to 2 inches; brown (10YR 4/3), muck; structureless, massive; nonsticky, nonplastic; 40 percent fiber, unrubbed; 15 percent fiber, rubbed; many fine roots throughout; moderately alkaline; clear smooth boundary.

Oa2--2 to 4 inches; dark grayish brown (10YR 4/2) muck; structureless, massive; nonsticky, nonplastic; 30 percent fiber, unrubbed; 10 percent fiber, rubbed; many fine roots throughout; moderately alkaline; clear smooth boundary.

Oa3--4 to 32 inches; very dark gray (10YR 3/1) muck; structureless, massive; nonsticky, nonplastic; 30 percent fiber, unrubbed; 10 percent fiber, rubbed; many fine roots throughout; moderately alkaline; gradual wavy boundary (combined thickness of the organic layers is 16 to 51 inches).

Cg1--32 to 65 inches; gray (5Y 5/1) clay; structureless, massive; very sticky, moderately plastic; moderately alkaline; diffuse boundary.

Cg2--65 to 80 inches; dark gray (N 4/) very fine sandy loam; structureless, massive; nonsticky, nonplastic; moderately alkaline.

TYPE LOCATION: St. John the Baptist Parish, Louisiana; located 0.3 mile west of Lac Des Allemands on Bayou Lassene, then 1,500 feet southwest on canal, and 100 feet due north of canal; Latitude 29 degrees, 57 minutes, 5.37 seconds N.; Longitude 90 degrees, 37 minutes, 53.43 seconds W., Lower Vacherie, Louisiana USGS 7.5 Minute Quadrangle.

RANGE IN CHARACTERISTICS:
Solum thickness: Organic material thickness is 16 to 51 inches
Redoximorphic features: Gleyed matrix in the mineral layers
Other distinctive soil features: The organic materials are dominantly from herbaceous materials.
Concentrated minerals: Electrical conductivity (EC) ranges mainly from 0 to about 2 dS/m in the upper 20 inches and 0 to 4 dS/m from 20 to 80 inches in most years. The EC varies lower or higher during periods of excess rainfall or extended droughts.

Surface tier of the Oa horizon:
Color--Hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3; or is neutral with value of 3 or 4.
Redoximorphic features-- None
Texture--Muck; the mineral content ranges from 15 to 40 percent and it is dominantly clay, but includes thin strata of loamy material in some pedons. A thin clayey overwash is on the surface of some drained pedons.
Other features--After rubbing, the surface tier has a fiber content ranging from less than 1/10 to more than 4/10 of the organic volume, where there is no mineral horizon more than 16 inches thick with an upper boundary in the 12 to 36 inch zone. Where a mineral layer has an upper boundary in the 16 to 36 inch zone, the fiber content of the 12 inch surface layer is such that a dominant part of the organic portion of the profile will have fiber content of less than 1/10 the organic volume.
Reaction--Strongly acid to moderately alkaline under natural conditions; or extremely acid to slightly acid under drained conditions.
Thickness--12 inches

Subsurface tier of the Oa horizon:
Color--Hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3.
Redoximorphic features--None
Texture--Muck; some pedons have thin mineral layers in this tier.
Other features--The dominant layers of the subsurface tier have a fiber content of less than 1/10 the organic volume. Mineral content ranges from 20 to 50 percent.
Reaction--Strongly acid to moderately alkaline under natural conditions; or extremely acid to slightly acid under drained conditions.
Thickness--4 to 24 inches

Bottom tier of the Oa horizon: (where present)
Color--Hue of 5YR to 10YR, value of 2 to 4, and chroma of 1 to 3.
Redoximorphic features--None
Texture--Muck; some pedons have thin mineral layers in this tier.
Other features--The dominant layers of the bottom tier have a fiber content of less than 1/10 the organic volume. Mineral content ranges from 20 to 50 percent.
Reaction--Strongly acid to moderately alkaline under natural conditions; or extremely acid to moderately alkaline under drained conditions.
Thickness--0 to 14 inches

Ag horizon: (where present)
Color--Hue of 10YR, 2.5Y, or 5Y, value of 2 to 5, and chroma of 1
Redoximorphic features--Gleyed matrix
Texture--Clay or mucky clay containing from 60 to 95 percent clay.
Other features--None
Reaction--Slightly acid to moderately alkaline under natural conditions; or extremely acid to slightly alkaline under drained conditions.
Thickness--0 to 20 inches

Cg horizon:
Color--Hue of 10YR to 5Y, 5G, or 5GY, value of 3 to 6, and chroma of 1 or 2; or is neutral with value of 3 to 6
Redoximorphic features--Gleyed matrix
Texture--Clay or mucky clay to fine sandy loam or mucky sandy loam
Other features--Calcium carbonate concretions range from none to few. Iron-manganese concentrations range from none to few.

Reaction--Slightly acid to moderately alkaline under natural conditions; or extremely acid to moderately alkaline under drained conditions.

COMPETING SERIES: These are Bellpass, Bessie, Carlin, and Clovelly series in the same family, and the Barbary, Belhaven, Dare, Dorovan, Gentilly, Harris, Kenner, Lafitte, Larose, Mattamuskeet, Maurepas, Pamlico, Ponzer, and Pungo series in closely related families. Bellpass, Bessie, and Clovelly soils have salinity of more than 3 dS/m in the control section. Carlin soils have a water layer at least 6 inches thick below the surface tier. Barbary, Gentilly, Harris, and Larose soils are mineral soils. Belhaven, Dare, Dorovan, Mattamuskeet, Pamlico, Ponzer, and Pungo soils have pH value less than 5.5 in all parts of the control section. Dare, Dorovan, Kenner, Lafitte, Maurepas, and Pungo soils have organic materials with a combined thickness of more than 51 inches. Also, Pungo soils have horizons in the subsurface layer with less decomposed fiber. Belhaven, Matamuskeet, Pamlico, and Ponzer soils have coarser textured mineral horizons underlying the organic material.

GEOGRAPHIC SETTING: Allemands soils occur on the landward side of the low coastal freshwater marshes. They are almost continuously flooded unless drained. The soil formed in 16 to 51 inches of well-decomposed organic material overlying clays. The climate is humid subtropical. The mean annual air temperature ranges from 70 to 72 degrees F., and the mean annual precipitation is about 64 inches near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Carlin soils; the closely related Barbary, Harris, Kenner, Larose soils; and also Caplin, Ged, Gentilly, Maurepas, and Zummo soils. Caplin and Maurepas soils have surface organic materials more than 51 inches thick. Ged soils are Aqualfs. Gentilly and Zummo soils have an organic surface less than 16 inches thick.

DRAINAGE AND PERMEABILITY: Very poorly drained. Internal drainage is none and permeability is rapid in the organic material and very slow in the underlying clay horizons. The water level is 1 foot above the surface to 0.5 foot below the surface. During tropical storms, floodwaters are up to 4 feet deep or more. In drained areas, the water table is regulated by a system of levees and pumps and averages 1 to 4 feet below the surface.

USE AND VEGETATION: These soils are used for wildlife habitat. Some areas are drained and used for grazing and crop production. The vegetation consists dominantly of maidencane, bulltongue, cattail, bulrush, cutgrass, and longtom.

DISTRIBUTION AND EXTENT: Coast Marsh (MLRA 151) area of Louisiana, southeast Texas, and possibly Alabama and Mississippi. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: St. John the Baptist Parish, Louisiana; 1971.

REMARKS: The type location pedon was moved to a more representative location in St. John the Baptist Parish in 2004 based on data from the updated survey. Diagnostic horizons and features recognized in this pedon are:
Histic epipedon - 0 to 32 inches (Oa horizons).
Aquic conditions - Saturated organic soil materials throughout the upper part, and gleyed matrix in the mineral soil materials below that.
Ecological Site: Fresh Organic Marsh.

ADDITIONAL DATA: Louisiana State University lab data (S94LA-109-020, 024, and 030) from Terrebonne Parish.

TAXONOMIC VERSION: Keys to Soil Taxonomy, Ninth Edition, 2003.

National Cooperative Soil Survey
U.S.A.

LOCATION CREOLE LA+TX

Established Series
Rev. AJR-WLC-CLN
12/2001

CREOLE SERIES

The Creole series consists of very deep, very poorly drained, very slowly permeable soils that formed in unconsolidated fluid clayey coastal sediments. They have slightly fluid clayey layers over very fluid clays. These soils are on broad coastal brackish marshes. Slopes range from 0 to 1 percent.

TAXONOMIC CLASS: Fine, smectitic, nonacid, hyperthermic Typic Hydraquents

TYPICAL PEDON: Creole mucky clay on broad level brackish marsh. (Colors are for moist soil.)

A1--0 to 3 inches; dark gray (10YR 4/1) mucky clay; massive; very fluid, flows easily between fingers when squeezed leaving small residue; many fine and medium roots; very strongly acid; abrupt smooth boundary. (0 to 6 inches thick)

A2--3 to 17 inches; very dark gray (10YR 3/1) clay; massive; slightly sticky, plastic, slightly fluid, flows with difficulty between fingers when squeezed leaving small residue; many fine roots; common distinct strong brown (7.5YR 5/6) masses of iron accumulation along root channels; moderately acid; clear wavy boundary. (7 to 28 inches thick)

Cg1--17 to 27 inches; gray (5Y 5/1) clay; massive; slightly sticky, plastic, slightly fluid, flows with difficulty between fingers when squeezed leaving large residue; common fine roots; many medium prominent strong brown (7.5YR 5/6) masses of iron accumulation with diffuse and clear boundaries in the matrix and along root channels; neutral; gradual wavy boundary. (0 to 22 inches thick)

Cg2--27 to 48 inches; gray (5Y 5/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving small residue; few fine roots; common medium prominent olive (5Y 5/6) masses of iron accumulation with diffuse and clear boundaries in the matrix and along root channels; neutral; abrupt smooth boundary. (10 to 30 inches thick)

2Cg3--48 to 52 inches; gray (5Y 5/1) loamy fine sand; massive; very fluid, flows easily between fingers when squeezed leaving small residue; neutral; abrupt smooth boundary. (0 to 5 inches thick)

3Cg4--52 to 72 inches; gray (N 5/0) clay loam; massive; very fluid, flows easily between fingers when squeezed leaving small residue; common root channels; slightly alkaline; gradual wavy boundary. (0 to 24 inches thick)

3Cg5--72 to 80 inches; gray (N 5/0) clay; massive; very fluid, flows easily between fingers when squeezed leaving small residue; common root channels; few fine shell fragments; few sand lenses and sand pockets in lower part of horizon; moderately alkaline.

TYPE LOCATION: Cameron Parish, Louisiana; 0.8 mile south of Creole; 300 feet east of Louisiana Highway 27; 200 feet south of oil field road; T. 14S., R. 7 W.

RANGE IN CHARACTERISTICS: Except for thin surface layers n-values range from 0.7 to 1.0 to depths of 29 to 40 inches. Below this depth the n-value is 1 or more. The electrical conductivity of the saturation extract ranges from 4 to 16 mmhos/cm in at least 1 layer within a depth of 40 inches. The particle-size control section contains 35 to 60 percent clay, though subhorizons within the 10 to 40 inch control section, may contain less than 35 percent or more than 60 percent clay. Some pedons have an organic surface layer 2 to 8 inches thick.

The A horizon has hue of 10YR to 5Y, value of 2 to 6, and chroma of 1, or it is neutral and has value of 3 or 4. Texture is silty clay, clay, or mucky clay. Reaction ranges from very strongly acid to slightly alkaline.

The Cg horizon has hue of 10YR to 5BG, value of 4 to 6, and chroma of 1, or is neutral and has value of 4 or 5. Masses of iron accumulation are in shades of olive brown or yellowish brown. Texture is silty clay or clay. Reaction ranges from slightly acid to moderately alkaline.

The 2Cg and 3Cg horizons, where present, have the same color range as the Cg horizon. The texture of the 2Cg horizon is sandy loam, loamy fine sand or very fine sandy loam. The 3Cg horizon is clay loam, silty clay, or clay. Reaction of the 2Cg and 3Cg horizons ranges from neutral to moderately alkaline.

COMPETING SERIES: These are the Caplen, Gentilly, Leerco, McKee and Riomar series. Caplen soils have n-values of 1 or more to a depth of 40 inches or more. Gentilly soils have lower horizons with n-value of less than 0.7. Leerco soils have EC of less than 4 mmhos/cm in the upper 10 inches. McKee and Riomar soils has EC of more than 16 mmhos/cm throughout. In addition, Riomar soils are underlain with limestone bedrock. Barbary, Harris, Larose, Placedo, and Scatlake series are in similar families. Barbary and Larose soils have EC of less than 3 mmhos/cm in the particle-size control section. Harris and Placedo soils have n-values of less than 0.7 in all horizons. Scatlake soils have more than 60 percent clay in the 10 to 40 inch particle-size control section and have n-values of more than 1 in all horizons.

GEOGRAPHIC SETTING: Creole soils are on low Gulf Coastal brackish marshes at elevations of 2 feet or less. They are flooded with brackish water during storms and high tides. They are also flooded with fresh water from torrential rains. They formed in clayey sediments. Slopes range from 0 to 1 percent. The mean annual precipitation ranges from 54 to 60 inches. The mean annual temperature ranges from 70 to 72 degrees F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Bancker and Scatlake series on slightly lower elevations and the Hackberry, Mermentau, and Peveto series. Hackberry soils are on low ridges and have a sandy particle size control section. Leerco soils are slightly higher in the landscape and are less saline in the upper part. Mermentau soils are on higher positions than the Creole soils and have a clayey over loamy particle size control section. Peveto soils are on ridges and have a sandy particle size control section.

DRAINAGE AND PERMEABILITY: Creole soils are very poorly drained; runoff is very slow; permeability is very slow. The water level is continuously at depths of 1 foot above to 1 foot below the soil surface.

USE AND VEGETATION: Used mainly for rangeland and wildlife habitat. The vegetation consists dominantly of marshhay cordgrass, seashore saltgrass, olney bulrush, coastal waterhyssop, saltmarsh bulrush, and seashore paspalum.

DISTRIBUTION AND EXTENT: Along the Gulf Coastal marshes (MLRA 151) of Louisiana, Texas, and possibly Mississippi. The soils of this series are of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: Cameron Parish, Louisiana; l983.

REMARKS: Creole soils formerly were included in the Harris series. Although these soils are classified as Hydraquents, they are firm enough to support cattle for grazing.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - 0 to 17 inches (A1 and A2 horizons)
N-values of 0.7 to 1.0 - 3 to 27 inches (A2 and Cg1 horizons)
N-values more than 1.0 - 27 to 96 inches (Cg2, 2Cg3, 3Cg4 and 3Cg5 horizons)
Permanent saturation of water

ADDITIONAL DATA: Louisiana Agricultural Experiment Station Lab Sample No. S80LA-23-10.

TAXONOMIC VERSION: Soil Taxonomy, Second Edition, 1999

National Cooperative Soil Survey
U.S.A.

LOCATION EDGERLY LA

Tentative Series
GJT, WJG, RM
03/2016

EDGERLY SERIES

The Edgerly series consists of very deep, poorly drained, slowly permeable soils that formed in loamy and clayey alluvium of late Pleistocene age. These soils are on broad flats on terraces of the Gulf Coast Prairies. Slopes range from 0 to 1 percent.

TAXONOMIC CLASS: Fine-silty, siliceous, superactive, thermic Typic Argiaquolls

TYPICAL PEDON: Edgerly loam, on a northeastern-facing, flat, 0.2 percent slope in pastureland at an elevation of 4.9 meters (16 ft). (Colors are for moist soil)

Ap--0 to 19 cm (0 to 7 in); very dark grayish brown (10YR 3/2) loam; weak medium granular structure; friable; many very fine roots and few fine roots; common fine and few medium pores; 1 percent patchy prominent light brownish gray (10YR 6/2) sand coats on vertical faces of peds; 1 percent medium prominent yellowish red (5YR 5/8) irregular masses of oxidized iron with diffuse boundaries in matrix; 1 percent fine prominent strong brown (7.5YR 5/8) masses of oxidized iron along root channels; moderately acid (pH 5.7); clear smooth boundary. (Combined thickness of the Ap horizon is 10 to 40 cm [4 to 16 in].)

Bt1--19 to 44 cm (7 to 17 in); very dark gray (10YR 3/1) loam; moderate coarse prismatic structure parts to weak medium subangular blocky; firm; common very fine and few fine roots; few fine pores; 75 percent continuous faint black (10YR 2/1), moist, clay films on all faces of peds; 1 percent patchy distinct light brownish gray (10YR 6/2) sand coats on vertical faces of peds; 1 percent medium prominent strong brown (7.5YR 4/6) masses of oxidized iron with diffuse boundaries in matrix; 1 percent fine prominent yellowish red (5YR 4/6) masses of oxidized iron with clear boundaries in matrix; moderately acid (pH 5.9); gradual wavy boundary.

Bt2--44 to 57 cm (17 to 22 in); very dark gray (10YR 3/1) loam; moderate medium prismatic structure parts to weak medium subangular blocky; firm; common very fine and few fine roots; common fine pores; 50 percent continuous faint very dark gray (10YR 3/1), moist, clay films on all faces of peds; 1 percent patchy distinct light brownish gray (10YR 6/2) sand coats on vertical faces of peds; 1 percent fine prominent brown (7.5YR 4/4) masses of oxidized iron with diffuse boundaries in matrix; 1 percent fine yellowish red (5YR 4/6) masses of oxidized iron with clear boundaries in matrix; moderately acid (pH 5.9); gradual wavy boundary.

Bt3--57 to 78 cm (22 to 31 in); very dark grayish brown (10YR 3/2) loam; moderate medium prismatic structure parts to weak medium subangular blocky; firm; common very fine and few fine roots; many fine pores; 50 percent continuous faint very dark gray (10YR 3/1), moist, clay films on all faces of peds; 1 percent patchy distinct light brownish gray (10YR 6/2) sand coats on vertical faces of peds; 1 percent fine black (10YR 2/1) manganese masses in matrix; 5 percent fine prominent dark yellowish brown (10YR 4/6) irregular masses of oxidized iron with diffuse boundaries in matrix; moderately acid (pH 5.9); gradual wavy boundary. (Combined thickness of the Bt horizons is 0 to 80 cm. [0 to 31 in].)

Btg1--78 to 108 cm (31 to 43 in); grayish brown (10YR 5/2) clay loam; strong coarse prismatic structure parts to weak medium subangular blocky; very firm; few very fine roots; many fine pores; 80 percent continuous distinct very dark grayish brown (10YR 3/2) organoargillans on faces of peds; 1 percent medium black (10YR 2/1) iron-manganese nodules and 3 percent coarse black (10YR 2/1) manganese masses; 2 percent fine and 5 percent medium prominent strong brown (7.5YR 5/8) masses of oxidized iron with diffuse boundaries in matrix; 1 percent fine distinct barite masses on faces of peds; slightly acid (pH 6.3); gradual wavy boundary.

Btg2--108 to 130 cm (43 to 51 in); grayish brown (2.5Y 5/2) clay loam; strong coarse prismatic structure parts to weak medium subangular blocky; very firm; few very fine roots; common fine pores; 1 percent patchy distinct light brownish gray (10YR 6/2) sand coats and 65 percent continuous distinct dark gray (10YR 4/1) organoargillans on faces of peds; 1 percent medium black (10YR 2/1) manganese masses; 8 percent medium prominent strong brown (7.5YR 5/8) masses of oxidized iron with diffuse boundaries in matrix; 2 percent crayfish krotovinas 5 to 10 cm. wide filled with very dark gray (10YR 3/1) loam; 1 percent fine distinct barite masses between peds; moderately acid (pH 6.0); gradual wavy boundary.

Btg3--130 to 172 cm (51 to 68 in); gray (2.5Y 6/1) clay loam; strong coarse prismatic structure parts to moderate medium subangular blocky; very firm; common fine roots; common fine pores; 5 percent continuous prominent very dark gray (10YR 3/1) organoargillans in root channels and on faces of peds; 1 percent fine black (10YR 2/1) manganese masses; 3 percent medium and 5 percent coarse prominent brownish yellow (10YR 6/8) masses of oxidized iron with diffuse boundaries in matrix; 3 percent crayfish krotovinas 5 to 10 cm. wide filled with very dark gray (10YR 3/1) loam; 1 percent fine distinct barite masses between peds; slightly acid (pH 6.1); gradual wavy boundary.

Btg4--172 to 205 cm (68 to 81 in); gray (2.5Y 6/1) clay loam; moderate coarse prismatic structure parts to moderate medium subangular blocky; firm; common very fine roots; common very fine pores; 5 percent patchy distinct dark gray (10YR 4/1) clay films on faces of peds and in root channels; 2 percent medium and 3 percent coarse black (10YR 2/1) manganese masses; 20 percent coarse prominent yellowish red (5YR 5/8) masses of oxidized iron in matrix; slightly acid (pH 6.4). (Combined thickness of the Btg horizons is 20 to 185 cm {8 to 73 in].)

TYPE LOCATION: Calcasieu Parish, Louisiana, 7.5 miles west of Sulphur; from the intersection of US Highway 90 and Fabacher Road, 0.55 miles east on U.S. Highway 90, 1500 feet south in pasture. (Sulphur, LA USGS topographic quadrangle: Latitude 30 13' 25" N.; Longitude 93 30' 1" W. NAD83.)

RANGE IN CHARACTERISTICS: Solum thickness is 152 to more than 200 cm (60 to more than 80 inches). The mollic epipedon is 20 to 50 cm thick (8 to 19 inches). Pedons such as this typical pedon that meet the color requirements for a mollic epipedon below 20 to 50 cm (8 to 19 inches) do not meet the organic carbon requirement. Mineralogy is siliceous. Depth to carbonates is more than 50 cm. SAR is 2 to 3 to 203 cm.
Particle size control section (weighted average)
20 to 35 percent clay, 25 to 50 percent silt, 15 to 40 percent sand of which there is less than 15 percent fine sand or coarser.

Ap or A horizon:
Hue: 10YR or 2.5Y
Value: 2 to 4
Chroma: 1 or 2
Texture: loam, silt loam or silty clay loam.

Redox Concentrations: amount- few to common, shades-yellow, brown, or red
Irrigation for rice production, on a 3 to 5 year rotation, ponds these soils for 2 to 5 months. During this period iron accumulations and iron depletions range from common to many in shades of brown, yellow, red, gray, and green. These temporary redox features persist for about 1 to 3 years following rice production.
Reaction: strongly acid to neutral.

BA or AB horizon (where present):
Hue: 10YR, value 2 to 4
Chroma: 1 to 2.
Texture: loam, clay loam, silt loam or silty clay loam.
Redox concentrations: amount- few to common, Shades- brown, yellow, and red
Redox depletions: amount- few to common, Shades- gray
Reaction ranges from strongly acid to slightly alkaline.

Bt horizon:
Hue: 10YR or 2.5Y
Value: 3 to 4
Chroma: of 1 or 2
Texture: loam, clay loam, silt loam or silty clay loam.
Redox concentrations: amount- few to common, Shades- brown, yellow, and red
Redox depletions: amount- few to common, Shades- gray
Reaction ranges from moderately acid to moderately alkaline.

Btg horizon:
Hue: 10YR to 5Y
Value: 4 to 6
Chroma: of 1 or 2
Texture: loam, clay loam, silty clay loam, clay or silty clay.
Redox concentrations: amount- few to common, Shades- brown, yellow, and red
Redox depletions: amount- few to common, Shades- gray
Reaction ranges from strongly acid to moderately alkaline.

Btkg horizon (where present):
Hue: 10YR to 5Y
Value: 4 to 6
Chroma: 1 or 2
Texture is silty clay loam, silty clay, clay, or clay loam.
Redox concentrations: amount- few to many, Shades- brown, yellow, and red
Redox depletions: amount- few to many, Shades- gray
Identifiable secondary carbonate: 1 to 10 percent
Effervescence: very slight to strong.
Reaction ranges from slightly alkaline to moderately alkaline.

BCg horizon (where present)
Hue: 10YR to 5Y
Value: 6 or 7
Chroma: 1 or 2
Texture: clay loam, loam, silty clay loam or silty clay.
Redox concentrations: amount- few to many, Shades- brown, yellow, and red
Redox depletions: amount- few to many, Shades- gray

Reaction ranges from moderately acid to moderately alkaline.

COMPETING SERIES: There are no other series in this family. Closely similar soils include Andry (LA), Jeanerette (LA), Meaton (TX), Morey (TX), and Spindletop (TX) series.
Andry soils: are hyperthermic, developed from loess, and have a histic epipedon.
Jeanerette soils: developed in loess and have mixed mineralogy.
Meaton and Morey: soils are hyperthermic. Spindletop soils are hyperthermic and have a fine particle-size control section.

GEOGRAPHIC SETTING:
Parent material: loamy and clayey alluvium of Pleistocene age
Landscape: coastal plain
Landform: flats
Slope: 0 to 1 percent but mainly less than 0.5 percent
Mean annual precipitation: 1397 to 1651 mm (55 to 65 in)
Precipitation Pattern: uniform throughout the year
Mean annual air temperature: 20 to 21.1 degrees C (68 to 70 degrees F)
Frost-free period: 280 to 350 days
Elevation: 0 to 7 m (0 to 23 ft)

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Crowley (LA), Ged (LA), Gueydan (LA), Judice (LA), Kaplan (LA), Kinder (LA), Prairieland (LA), Midland (LA), Mowata (LA), and Vidrine (LA) series.
Crowley and Kaplan soils: somewhat poorly drained and are on higher positions on convex ridges.
Ged and Gueydan soils:Ged and Gueydan soils have a clayey argillic horizon; Ged soils have an ochric; Gueydan soils have a muck surface horizon; Gueydan soils on lower positions located on the landward side of marshes.
Judice and Midland soils: on lower landscape positions; a fine control section.
Kinder soils: on higher landscape positions; a glossic horizon.
Prairieland soils: on lower landscape positions; have a glossic horizon.
Mowata soils: on similar landscape positions; a fine control section; a glossic horizon.
Vidrine soils:have a clayey subsoil and an ochric epipedon; located on low mounds or smoothed mound areas.

DRAINAGE AND PERMEABILITY: Edgerly soils are poorly drained and slowly permeable. Runoff is medium. Edgerly soils at elevations up to about 10 feet may be subject to tidal surge flooding caused by hurricane surge or other storm events. These soil have a seasonal water table starting at 46 to 76 cm (18 to 30 in) from the surface during the winter and early spring months.

USE AND VEGETATION: This soil is used mainly for pasture or rice and soybean production, rotated with pasture and crawfish aquaculture. Tall grasses and sedges are the dominant native vegetation.

DISTRIBUTION AND EXTENT: Southwest Louisiana; MLRA 150A Gulf Coast Prairies; LRR -T. The soils of this series are extensive; their total extent is about 116,000 acres.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: Calcasieu Parish, Louisiana; 2011.

REMARKS: These soils were previously included in the Morey Series. Based on the Thermic-Hyperthermic Soil Temperature Study completed in 2004, it was determined that the soils on the Coastal

Prairie (150A) in Louisiana were in the thermic soil temperature class.
Diagnostic horizons and features recognized in this pedon are:
Particle Size Control Section for this pedon: 19 to 69 cm
Mollic Epipedon - 0 to 44 cm (Ap and Bt1 horizons)
Argillic Horizon - 19 to 205 cm (all of the Bt and Btg horizons)

ADDITIONAL DATA: NSSL data Calcasieu Parish, LA Project C2011USLA004, Site ID S2010LA019-048, Pedon No. 11N0007; Louisiana State University lab data (S73LA-19-1, S84LA-23-12, S84LA113-013, S87LA-53-5).

Taxonomic Version: Keys to Soil Taxonomy, Twelfth Edition, 2014

National Cooperative Soil Survey
U.S.A.

LOCATION GED LA

Established Series
Rev. AJR-JLD-CLN
11/2000

GED SERIES

The Ged series consists of very deep, very poorly drained, very slowly permeable soils that formed in recent very fluid and slightly fluid clayey sediments over firm clayey deposits. These soils are on the landward side of freshwater marshes that have encroached on low coastal prairies. Slope is less than 1 percent.

TAXONOMIC CLASS: Very-fine, mixed, active, hyperthermic Typic Endoaqualfs

TYPICAL PEDON: Ged clay--on broad, level freshwater marsh.
(Colors are for moist soil.)

A1--0 to 5 inches; dark gray (10YR 4/1) clay; massive; very fluid, n-value 1.5; many fine roots; slightly acid; abrupt wavy boundary. (4 to 18 inches thick).

A2--5 to 9 inches; dark gray (10YR 4/1) clay; massive; sticky, slightly fluid, n-value 0.5; many fine roots; slightly alkaline; clear wavy boundary. (3 to 10 inches thick)

Btg1--9 to 24 inches; gray (5Y 5/1) clay; moderate medium and coarse subangular blocky structure; very firm, plastic and sticky; few faint clay films on surfaces of peds; many medium distinct olive (5Y 5/4) iron concentrations; slightly alkaline; gradual wavy boundary. (12 to 22 inches thick)

Btg2--24 to 48 inches; gray (5Y 5/1) clay; moderate medium and coarse subangular blocky structure; very firm, plastic and sticky; many distinct clay films on surfaces of peds; many medium distinct olive (5Y 5/4) iron concentrations; neutral; gradual wavy boundary. (8 to 28 inches thick)

Cgy--48 to 60 inches; gray (5Y 6/1) clay; massive; very firm, plastic and sticky; many medium distinct light yellowish brown (2.5Y 6/4) iron concentrations; common medium gypsum crystals; neutral.

TYPE LOCATION: Calcasieu Parish, Louisiana, 3.75 miles south of Toomey; SW1/4SE1/4, sec. 13, T. 11 S., R. 13 W.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 45 to 80 inches. Thickness of surface layers with n-value greater than 0.7 ranges from 4 to 18 inches.

The A1 horizon has hue of 10YR or 5Y, value of 2 to 4, and chroma of 2 or less. Texture is silty clay loam, clay, or mucky clay. Reaction ranges from very strongly acid to slightly alkaline. N-value ranges from 0.7 to 2.0.

The A2 horizon has the same color and reaction range as the A1 horizon. Texture is silty clay, clay, or mucky clay. N-value ranges is less than 0.7.

The B and C horizons have hue of 10YR to 5GY, value of 4 to 6, and chroma of 1 or less. Iron concentrations are in shades of olive, olive brown, or yellowish brown. Texture is silty clay or clay. Reaction ranges from slightly acid to moderately alkaline. N-values are less that 0.5.

COMPETING SERIES: There are no other series in this family. Baldwin, Forestdale, Mayhew, and Midland series are in related families. None of these soils have a surface layer that has an n-value more than 0.7. In addition, Baldwin and Mayhew soils dry and form cracks to a depth of 20 inches or more in most years. Forestdale and Midland soils have less than 60 percent clay in the upper 20 inches of the argillic horizon and have smectitic mineralogy.

GEOGRAPHIC SETTING: Ged soils are on the landward side of low freshwater marshes. These soils are at elevations of less than two feet and are almost continuously flooded or ponded. The soils formed in a thin layer of recent clayey alluvium over subsided terrace soils formed in Prairie age deposits. Slope is less than 1 percent. Mean annual temperature ranges from about 69 to 70 degrees F. Average annual rainfall ranges from about 50 to 62 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Midland series and Allemands, Judice, Morey, Mowata, and Vidrine series. Allemands soils are on slightly lower positions and have organic surface layers more than 16 inches thick. Judice and Morey soils are on higher positions and have a mollic epipedon. Mowata soils are on higher positions and have a glossic horizon. Vidrine soils are on low mounds and have higher chroma.

DRAINAGE AND PERMEABILITY: Very poorly drained; runoff is negligible; permeability is very slow. The water level fluctuates between 0 to 1 foot above the soil surface throughout the year.

USE AND VEGETATION: Used mainly for wildlife habitat and range. The vegetation consists dominantly of bulltongue, alligatorweed, cattail, and fresh water rushes. Other common plants are California bulrush and marshhay cordgrass.

DISTRIBUTION AND EXTENT: Southwest Louisiana and possibly southeast Texas (MLRA 151). The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: Calcasieu Parish, Louisiana; 1983.

REMARKS: These soils have been mapped as Harris Variant in previous surveys. The argillic horizon of the Ged soils is considered to have formed before the soils were submerged. Classification including the presence of an argillic horizon confirmed by LA Agricultural Experiment Station laboratory data from pedon S81LA-19-1.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon.....0 to 9 inches (A1,A2)
Argillic horizon.....9 to 48 inches (Btg1,Bt2)
Aquic moisture regime

ADDITIONAL DATA: LSU data form Calcasieu Parish (S81LA-19-1).

TAXONOMIC VERSION: Soil Taxonomy, Second Edition, 1999.

National Cooperative Soil Survey
U.S.A.

LOCATION GENTILLY LA+TX

Established Series
Rev. JLD-CLN
12/98

GENTILLY SERIES

The Gentilly series consists of very deep, very poorly drained, very slowly permeable slightly to moderately saline soils. These soils formed in thin accumulations of herbaceous plant remains and semifluid clayey alluvium over consolidated clayey deposits. Slopes are less than 1 percent.

TAXONOMIC CLASS: Fine, smectitic, nonacid, hyperthermic Typic Hydraquents

TYPICAL PEDON: Gentilly muck--slightly saline marsh.
(Colors are for moist soil unless otherwise stated.)

Oa1--0 to 4 inches; dark gray (10YR 4/1) muck; massive; nonsticky, very fluid, flows easily between fingers when squeezed leaving small residue; about 18 percent fiber, 8 percent rubbed; about 70 percent mineral; slightly acid; abrupt smooth boundary. (4 to 16 inches thick)

Oa2--4 to 10 inches; very dark gray (10YR 3/1) muck; massive; nonsticky, very fluid, flows easily between fingers when squeezed leaving small residue; about 12 percent fiber, 5 percent rubbed; about 65 percent mineral; many coarse yellowish brown herbaceous plant stems and roots; slightly acid; abrupt smooth boundary. (0 to 12 inches thick)

Cg1--10 to 20 inches; gray (5Y 5/1) clay; very fluid, flows with slight difficulty between fingers when squeezed leaving small residue; common medium prominent dark yellowish brown (10YR 3/4) iron concentrations; neutral.

Cg2--20 to 40 inches; gray (5Y 5/1) clay; very fluid, flows easily between fingers when squeezed leaving small residue; common medium prominent dark brown (7.5YR 4/4) and yellowish brown (10YR 5/6) iron concentrations; neutral.

Cg3--40 to 80 inches; greenish gray (5GY 5/1) clay; massive; very sticky, very plastic, (will not flow between fingers when squeezed); common medium distinct olive (5Y 4/4) iron concentrations; slightly alkaline.

TYPE LOCATION: Orleans Parish, Louisiana; about 14 miles northeast of New Orleans; 1 mile north of U. S. Highway 90; 270 feet west of U. S. Highway 11. Spanish Land Grant 1, T 11S, R.13E.

RANGE IN CHARACTERISTICS: Soil salinity (EC) ranges from 4 to 16 dS/m. COLE is estimated to be more than 0.09 in mineral horizons, but because the soil is continuously saturated it does not crack to a depth of 20 inches. All layers at depths of 8 to 20 inches below the mineral surface have an n-value of more than 0.7. The mineral layer within the 10- to 40-inch control section has 35 to 60 percent clay content.

The Oa horizon is 4 to 16 inches thick and consists of muck, mucky peat, peaty muck, or peat. Color is

in hue of 7,5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. Reaction ranges from moderately acid to slightly alkaline, but it becomes strongly acid or very strongly acid after drainage.

The Cg horizon has hue of 10YR, 5Y, or 5GY, value of 4 or 5, and chroma of 1 or it is neutral with value of 4 or 5. Texture is clay or silty clay. Iron concentrations are brownish and/or olive in color. Reaction is neutral or slightly alkaline, but it becomes moderately acid to very strongly acid in the upper part after drainage. Depth to underlying layers with n-values of 0.7 or less ranges from 20 to 40 inches below the mineral surface.

COMPETING SERIES: These are the Caplen, Creole, Leerco, Mckee, and Riomar series. Caplen and Creole soils have n-value of more than 1.0 throughout. Leerco soils have EC of less than 4 dS/m. Mckee and Riomar soils have EC more than 16dS/m in the upper 60 inches.

GEOGRAPHIC SETTING: Gentilly soils are in marshlands in the lower Mississippi River delta and coastal areas that are dominantly slightly to moderately saline. Typically they occur on subsiding distributaries of the Mississippi River. The underlying firm clays probably consolidated before subsidence. Mean annual precipitation is about 65 inches and the mean annual temperature is about 68 degrees F. near the type location. Slope is less than 1 percent.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Allemands, Barbary, Fausse, Lafitte, Maurepas, and Sharkey soils. Allemands, Lafitte, and Maurepas soils have organic layers more than 16 inches thick. Fausse soils have n-value of less than 0.7 in th e 8 to 20 inch section. Sharkey soils are Vertisols.

DRAINAGE AND PERMEABILITY: Gentilly soils are very poorly drained. The water table is at the surface most of the time. Internal drainage is very slow to none. Permeability is very slow.

USE AND VEGETATION: The main use of these soils is wildlife habitat. Some areas have been diked and drained for development to urban uses. The dominant native vegetation is cattail, cutgrass, marshay cordgrass, big cordgrass, and seashore saltgrass.

DISTRIBUTION AND EXTENT: Gulf Coast Marshes (MLRA 151) of Louisiana Texas. Extent is moderate.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas.

SERIES ESTABLISHED: Orleans Parish, Louisiana; 1972.

REMARKS:

Diagnostic horizons and features

Histic epipedon - 0 to 10 inches

High n-values. n-values are greater than 0.7 10 to 40 inches

National Cooperative Soil Survey
U.S.A.

LOCATION HACKBERRY LA

Established Series
Rev. CTM-JLD-CLN
11/2000

HACKBERRY SERIES

The Hackberry series consists of very deep, somewhat poorly drained, moderately permeable soils that formed in sandy and loamy beach deposits. These soils are on the toe slopes of low ridges that are generally parallel to the gulf coast shoreline. Slopes range from 0 to 3 percent.

TAXONOMIC CLASS: Sandy, mixed, hyperthermic Aeric Endoaquepts

TYPICAL PEDON: Hackberry loamy fine sand, on a nearly level ridge--cropland.
(Colors are for moist soil unless otherwise stated).

Ap--0 to 6 inches; dark brown (10YR 4/3) loamy fine sand; weak medium subangular blocky structure parting to weak fine granular; very friable; many fine and medium roots; common yellowish brown (10YR 5/8) oxidation stains along root channels; neutral; abrupt smooth boundary. (3 to 12 inches thick)

Bw1--6 to 13 inches; brown (10YR 5/3) very fine sandy loam; moderate coarse prismatic structure parting to moderate coarse subangular blocky; friable; many fine and medium roots; common fine distinct yellowish brown (10YR 5/6) and few fine faint grayish brown iron concentrations; very dark gray (10YR 3/1) coatings on peds; common soft black accumulations; black coatings on walls of root channels; neutral; abrupt smooth boundary. (6 to 13 inches thick)

Bw2--13 to 17 inches; grayish brown (2.5Y 5/2) very fine sandy loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; moist, very friable; many fine and medium roots; few fine distinct yellowish brown (10YR 5/6) iron concentrations; very dark grayish brown (10YR 3/2) coatings on surface of peds; few brown masses; strongly alkaline; abrupt smooth boundary. (3 to 10 inches thick)

Bw3--17 to 28 inches; brown (10YR 5/3) loamy fine sand; weak coarse subangular blocky structure; friable; common fine and medium roots; common medium distinct yellowish brown (10YR 5/6) and common medium faint grayish brown (10YR 5/2) iron accumulations; few brown masses, black coatings in root channels; strongly alkaline; abrupt smooth boundary. (0 to 12 inches thick)

BC--28 to 37 inches; pale brown (10YR 6/3) gravelly fine sand; single grained; loose; few fine and medium roots; common coarse distinct dark yellowish brown (10YR 4/6) and few fine faint light gray redox features; common black masses; shell fragments and shells ranging to as much as 25 mm in diameter comprise about 40 percent of the horizon; very strongly alkaline; abrupt smooth boundary. (7 to 23 inches tick)

BCg--37 to 40 inches; gray (10YR 6/1) fine sandy loam; moderate medium subangular blocky; friable; few fine roots; few fine distinct yellowish brown (10YR 5/6) iron accumulations; common brown masses; black stains along root channels; strongly alkaline; abrupt smooth boundary. (0 to 6 inches thick)

BC'--40 to 61 inches; brown (10YR 5/3) wet; fine sand; single grained; loose; common medium distinct dark yellowish brown (10YR 4/6) iron concentrations; shell fragments and shells ranging up to about 30 mm in diameter comprise about 15 percent of the horizon; many black streaks; very strongly alkaline.

TYPE LOCATION: Cameron Parish, Louisiana; 3 miles east of Cameron, 300 feet north of LA Highway 27, 250 feet east of parish road, NW 1/4NE1/4 sec. 27, T 15 S, R 9 W.

RANGE IN CHARACTERISTICS: The solum typically is more than 80 inches thick. Content of shell fragments is variable throughout the profile, but ranges from 2 to 15 percent (weighted average) in the 10- to 40-inch particle size control section.

The A or Ap horizon has hue of 10YR to 5Y, value of 3 or 4, and chroma of 1 to 3. Texture is fine sandy loam or loamy fine sand, or is sandy clay loam, sandy clay, or clay in overwash phases. Shell fragments range from none to 15 percent. Reaction of the A horizon ranges from slightly acid to slightly alkaline.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 to 5, and chroma of 1 to 3 and has iron concentrations in shades of brown. Subhorizons of the Bw horizon have chroma of 1 or 2 within a depth of 20 inches of the soil surface. The Bw horizon is dominantly loamy fine sand, very fine sandy loam, or sand, but at least 1 subhorizon below a depth of 10 inches is very fine sandy loam. Reaction ranges from neutral to strongly alkaline.

The BC and BCg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3 and have iron concentrations in shades of brown. Texture is fine sand, loamy fine sand, or fine sandy loam. Reaction ranges from neutral to very strongly alkaline.

COMPETING SERIES: These are no other series in the same family. Similar soils are the Dianola, Felicity, Mustang, and Peveto series. All of these soils do not have a cambic horizon. In addition, Felicity soils have a higher salt content and Peveto soils are better drained.

GEOGRAPHIC SETTING: Hackberry soils are on low ridges generally parallel to the coast, at a elevation of 4 to 7 feet above sea level. They formed in sandy and loamy beach deposits. Slopes range from 0 to 3 percent. The mean air temperature is 60 degrees F, and the mean annual rainfall is about 53 inches near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Bancker, Creole, Mermentau, and Scatlake series and the competing Peveto series. Bancker and Scatlake soils are on lower positions and have a very-fine particle-size control section. Creole soils are on lower positions and have a fine particle-size control section. Mermentau soils are on lower positions and have a clayey over sandy particle-size control section.

DRAINAGE AND PERMEABILITY: Hackberry soils are somewhat poorly drained; runoff is slow; permeability is moderate. The water table fluctuates between a depth of 1/2 to 4 feet below the surface throughout the year.

USE AND VEGETATION: Mostly utilized for pasture and homesites. Some areas are used for gardens and orchards. Native vegetation is common bermudagrass, carpetgrass, smutgrass, palmetto, sugarberry trees, and huisache.

DISTRIBUTION AND EXTENT: Along the gulf coast of Louisiana and possibly Texas (MLRA 151). The series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas.

SERIES ESTABLISHED: Cameron Parish, Louisiana; 1984. Name is derived from the name of a small town in Cameron Parish.

REMARKS: These soils were formerly mapped as Palm Beach soils. Some data indicate these soils may marginally classify in a Fluvaquentic subgroup.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - 0 to 6 inches
Cambic horizon - 6 to 28 inches.
Aquic Conditions - periodic saturation and reduction from 13 to 61 inches.

ADDITIONAL DATA: LSU data from Cameron Parish (S84LA-023-001).

TAXONOMIC VERSION: Soil Taxonomy, Second Edition, 1999.

National Cooperative Soil Survey
U.S.A.

LOCATION LAROSE LA

Established Series
Rev. WLC-SDM-CLN
12/2001

LAROSE SERIES

The Larose series consists of very deep, very poorly drained, very slowly permeable soils that formed in fluid clayey sediments in fresh water coastal marshes. The sediments were deposited under water and have never air-dried and consolidated. Slope ranges from 0 to 0.2 percent. These soils are subject to flooding by runoff and tides.

TAXONOMIC CLASS: Very-fine, smectitic, nonacid, hyperthermic Typic Hydraquents

TYPICAL PEDON: Larose muck--freshwater marsh. (Colors are for wet soil.)

Oa--0 to 5 inches; very dark gray (10YR 3/1) muck; massive; 20 percent fiber, 5 percent rubbed; 70 percent mineral; massive, flows easily between fingers when squeezed leaving only roots and fiber in hand; many fine roots; moderately acid; clear smooth boundary. (0 to 15 inches thick)

A--5 to 15 inches; dark gray (5Y 4/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; many fine roots; few fine prominent yellowish brown (10YR 5/6) masses of iron accumulation with clear sharp boundaries in matrix; slightly acid; clear wavy boundary. (4 to 12 inches thick)

Cg1--15 to 36 inches; gray (5Y 5/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; few fine roots; few medium prominent strong brown (7.5YR 5/6) masses of iron accumulation along root channels; neutral; abrupt smooth boundary.

Cg2--36 to 47 inches; dark gray (N 4/0) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; 10 percent fine fiber evenly distributed throughout the matrix; common fine distinct olive (5Y 4/4) masses of iron accumulation with diffuse and clear boundaries; slightly alkaline; clear wavy boundary.

Cg3--47 to 60 inches; greenish gray (5GY 5/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; few fine faint olive (5Y 4/4) masses of iron accumulation with diffuse and clear boundaries; moderately alkaline; clear wavy boundary.

Cg4--60 to 80 inches; gray (5Y 5/1) clay; massive; very fluid, flows easily between fingers when squeezed leaving hand empty; moderately alkaline. (Combined thickness of the Cg horizons is 35 to more than 60 inches.)

TYPE LOCATION: Lafourche Parish, Louisiana; 2 miles west of Raceland; 0.75 miles north of old U.S. Highway 90 on west side of McMahon Canal.

RANGE IN CHARACTERISTICS: Larose soils are continuously saturated with fresh water. All of the mineral horizons above a depth of 60 inches have an n-value of 0.7 to 1 or more. The reaction ranges

from strongly acid to slightly alkaline in the O and A horizons and slightly acid to moderately alkaline in the Cg horizons. Electrical conductivity (EC) is less than 2 dS/m throughout. Weighted average clay content of the particle-size control section is more than 60 percent.

The Oa horizon, where present, has hue of 7.5YR or 10YR, value of 2 or 4, and chroma of 1 or 2. Texture is muck or mucky peat.

The A horizon has hue of 10YR to 5Y, value of 2 to 4, and chroma of 2 or less. Texture is clay, silty clay, or mucky clay.

The Cg horizon has hue of 10YR to 5BG, or neutral, value of 3 to 5, and chroma of 2 or less. Texture is clay, silty clay, or mucky clay. Iron and iron-manganese accumulations range from none to few in shades of brown. Iron depletions, in various stages of reduction, range from none to few in shades of gray. Some pedons have thin organic layers within the C horizon. Also, some pedons have fine sand or loamy sand Cg horizons below a depth of 40 inches.

COMPETING SERIES: These are the Bancker, Barbary, Gentilly, and Scatlake series in the same family. Similar soils are the Allemands, Arat, Capers, Fausse, Harris, Ijam, Placedo, and Tatlum series. Bancker soils have 4 to 8 ds/m in upper 40 inches and are continuously saturated with brackish water. Barbary soils have logs and wood in the lower layers. Gentilly soils have lower horizons with n-value of less than 0.7. Scatlake soils have more than 20 percent extractable sodium in some part of the 10 to 40 inch particle-size control section. Allemands soils have an organic surface layer thicker than 16 inches. Arat and Tatlum soils have a fine-silty particle-size control section. Capers soils have 0.6 to 2.0 percent sulfides in the upper 20 inches of the solum. Fausse, Harris, Ijam, and Placedo soils have n-value less that 0.7 in all horizons.

GEOGRAPHIC SETTING: Larose soils are on the fringes of level fresh water marshes adjacent to distributary natural leeves of rivers. Elevation is less than 3 feet. These soils are nearly continuously flooded. Slopes range from 0 to 0.2 percent. Near the type location the average annual rainfall is about 67 inches and the mean annual temperature is 70 to 72 F.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Allemands and Barbary series, and the Fausse, Kenner and Sharkey series. Fausse and Sharkey soils are at higher elevations and have n-value of less than 0.7 in all horizons. Kenner soils have organic layers more than 51 inches thick.

DRAINAGE AND PERMEABILITY: Very poorly drained. Runoff is negligible. Permeability is very slow. During tropical storms that produce high amounts of rainfall, floodwater covers the soil 4 feet or more with fresh water. Water level fluctuates between 1 feet above and 0.5 foot below the soil surface throughout the year. These soils have never air-dried and consolidated, therefore remain fluid.

USE AND VEGETATION: Used mainly for wildlife and recreation. Vegetation is fresh water plants including maidencane, bulltongue, alligatorweed, cattail, giant cutgrass, pickerelweed, swamp smartweed, and common rush.

DISTRIBUTION AND EXTENT: Gulf Coast Marshes (MLRA 151) along upper boundary of the freshwater marsh area of Louisiana, Texas and possibly in Mississippi. This series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas.

SERIES ESTABLISHED: Lafourche Parish, Louisiana; 1981.

REMARKS: These soils have been mapped as miscellaneous land types of the freshwater marshes in previous surveys and as Allemands Variant in soil surveys of the New Orleans area.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon--0 to 15 inches (Oa and A horizons).

Ecological Site: Fresh Fluid Mineral Marsh.

ADDITIONAL DATA: Louisiana State University lab data (S94LA-109-021,025,032) from Terrebonne Parish.

TAXONOMIC VESION: Soil Taxonomy, Second Edition, 1999.

National Cooperative Soil Survey
U.S.A.

LOCATION MERMENTAU LA

Established Series
Rev. CM-WLC-CLN
12/2000

MERMENTAU SERIES

The Mermentau series consists of very deep, poorly drained, very slowly permeable soils that formed in clayey over loamy coastal sediments. These soils are on low ridges on broad coastal brackish marshes. Slope is less than 1 percent.

TAXONOMIC CLASS: Clayey over loamy, smectitic over mixed, superactive, nonacid, hyperthermic Typic Endoaquepts

TYPICAL PEDON: Mermentau clay--on level brackish marsh.
(Colors are for moist soil)

A--0 to 6 inches; black (10YR 2/1) clay; moderate medium angular blocky structure; firm; many fine and medium roots; slightly alkaline; gradual wavy boundary. (4 to 12 inches thick)

Bg--6 to 19 inches; gray (5Y 5/1) clay; weak coarse prismatic structure parting to moderate medium angular blocky; firm; common fine roots; few fine pores; few fine faint dark yellowish brown (10YR 4/4) iron concentrations; dark gray (10YR 4/1) shiny ped surfaces; moderately alkaline; abrupt wavy boundary. (5 to 18 inches thick)

2Cg1--19 to 42 inches; grayish brown (10YR 5/2) very fine sandy loam; weak coarse subangular blocky structure; friable; few fine roots; many medium distinct yellowish brown (10YR 5/6) iron accumulations; few black accumulations; common crawfish channels; horizontal band of gray (10YR 5/1) silty clay loam 2 inches thick at a depth of 31 to 33 inches; moderately alkaline; gradual wavy boundary. (11 to 37 inches thick)

2Cg2--42 to 48 inches; gray (10YR 5/1) very fine sandy loam; massive; friable; few fine roots; common medium distinct dark yellowish brown (10YR 4/6) iron concentrations; many fine shell fragments; few black iron-manganese accumulations; common crawfish channels; moderately alkaline; gradual wavy boundary.

2Cg3--48 to 59 inches; gray (N 5/) very fine sandy loam; massive; friable; few fine faint yellowish brown iron concentrations; few fine shell fragments; common crawfish channels; moderately alkaline; clear smooth boundary. (0 to 22 inches thick)

3Cg4--59 to 69 inches; greenish gray (5GY 5/1) sandy clay; massive; very fluid, flows easily between fingers when squeezed leaving small residue; few fine roots; few fine faint yellowish brown (10YR 5/4) iron concentrations; few black iron-manganese accumulations; moderately alkaline.

TYPE LOCATION: Cameron Parish, Louisiana, 0.5 mile north of Grand Chenier; 250 feet northeast of Mermentau River; 75 feet northwest of REA pole number 25; SW1/4 SW1/4 sec. 2, T. 15 S., R. 6 W.

RANGE IN CHARACTERISTICS: Thickness of solum ranges from 10 to 30 inches. Reaction ranges from neutral to moderately alkaline throughout. The electrical conductivity of the saturation extract (dS/m) ranges from 7 to 23.

The A horizon has hue of 10YR to 5Y, value of 2 to 4, and chroma of 1 or 2. A horizons with a color value of 2 or 3 are 4 to 7 inches thick. Texture is silty clay or clay.

The Bwg horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or it is neutral. Texture is silty clay or clay.

Dominant subhorizons of the 2Cg horizon have hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2, or they are N/4 - N/6. The 2Cg horizon is very fine sandy loam, fine sandy loam, or loam. Sand size shell fragments range from none to common.

The 3Cg horizon, where present, has hue of 10YR to 5GY, value of 5 or 6, and chroma of 1 or it is neutral. It is sandy clay, silty clay, or clay. N-values range from 0.7 to more than 1. Sand size shell fragments range from none to few.

COMPETING SERIES: There are no other series in this family. Alligator, Perry, Sharkey, Solier and Tunica are in similar families. Alligator, Perry, and Sharkey soils have more than 60 percent clay in the 10-to 40-inch control section and develop cracks to a depth of 20 inches or more in most years. Solier soils have Bw2 horizons with dominant hue of 5YR and clayey over fine-silty particle-size control sections.

GEOGRAPHIC SETTING: Mermentau soils are on low ridges in the Gulf coast marshes at elevations of 2 to 4 feet above sea level. They are flooded with brackish water during storms and high tides. They are also flooded with fresh water during heavy rains. They formed in clayey over loamy sediments. Slopes range less than 1 percent. The mean air temperature is 68 degrees F, and the mean annual rainfall is about 53 inches near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Creole, Hackberry, Peveto, and Scatlake series. Creole soils are on lower positions and have a fine particle-size control section. Hackberry soils are on higher positions and have a sandy particle-size control section. Peveto soils are on higher ridges and are sandy throughout. Scatlake soils have more than 60 percent clay in the 10-to 40-inch control section and have an n-value of more than 1 in all horizons.

DRAINAGE AND PERMEABILITY: Mermentau soils are poorly drained; runoff is negiligble; permeability is very slow. The water level fluctuates between a depth of 0 to 3.5 feet below the surface throughout the year.

USE AND VEGETATION: Used mainly for rangeland and wildlife habitat. The vegetation consists dominantly of gulf cordgrass, marshhay cordgrass, seashore saltgrass, and seashore paspalum.

DISTRIBUTION AND EXTENT: Along the Gulf coast brackish marshes of Louisiana and Texas (MLRA 151). The soils of this series are not extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas

SERIES ESTABLISHED: Cameron Parish, Louisiana; 1983.

REMARKS: Mermentau soils were formerly included with the Harris series. The 2 chroma colors in the 2Cg horizon are interpreted to be inherited from a drier moisture regime prior to subsidence. The exchangeable sodium exceeds 15 percent in the A and Bg horizons. The exchangeable sodium decreases with depth to 48 inches, then increases. This pedon fails the criteria for Halaquepts because of the increase. In this pedon the exchangeable sodium ranges from 10 to 33 percent and the exchangeable magnesium ranges from 27 to 50 percent. Some data indicate that these soils may marginally classify in a Fluvaquentic subgroup.

Diagnostic Horizons and Features:

Ochric Epipedon - 0 to 6 inches
Cambic horizon - 6 to 19 inches

ADDITIONAL DATA: LSU data from Cameron Parish, LA (S81LA-23-1).

TAXONOMIC VERSION: Soil Taxonomy, Second Edition, 1999.

National Cooperative Soil Survey
U.S.A.

LOCATION MOWATA LA+TX

Established Series
DRM-JKW-RM
05/2014

MOWATA SERIES

The Mowata series consists of very deep, poorly drained, very slowly permeable soils that formed in loamy and clayey fluviomarine deposits of late Pleistocene age. These nearly level soils occur on broad flats along drainageways. Slope ranges from 0 to 1 percent. Mean annual precipitation is about 1549 mm (61 in), and mean annual air temperature is about 22 degrees C (71 degrees F).

TAXONOMIC CLASS: Fine, smectitic, thermic Typic Glossaqualfs

TYPICAL PEDON: Mowata silt loam--in a cultivated rice field. (Colors are for moist soils unless otherwise stated.)

Ap--0 to 13 cm (0 to 5 in); dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many very fine and fine roots; common fine distinct dark yellowish brown (10YR 4/6) masses of iron accumulation with clear boundaries along roots; strongly acid; clear smooth boundary. (10 to 20 cm [4 to 8 in] thick)

Eg--13 to 36 cm (5 to 14 in); grayish brown (10YR 5/2) silt loam; weak fine subangular blocky structure; friable; many very fine and fine roots; common fine distinct dark yellowish brown (10YR 4/6) masses of iron accumulation with clear boundaries along roots; strongly acid; gradual irregular boundary. (15 to 51 cm [6 to 20 in] thick)

Btg/Eg--36 to 56 cm (14 to 22 in); about 70 percent dark grayish brown (10YR 4/2) silty clay loam (Btg), about 30 percent tongues of grayish brown (10YR 5/2) silt loam E material; moderate medium subangular blocky structure; firm; few fine and very fine roots; common distinct dark gray (10YR 4/1) clay films and coatings on surfaces of peds; common medium and coarse distinct dark yellowish brown (10YR 4/6) masses of iron accumulation; very strongly acid; gradual wavy boundary. (15 to 51 cm [6 to 20 in] thick)

Btgl--56 to 86 cm (22 to 34 in); grayish brown (10YR 5/2) silty clay; moderate medium subangular blocky structure; firm; many distinct very dark grayish brown (10YR 3/2) clay films and coatings on surfaces of peds; many medium and coarse distinct dark yellowish brown (10YR 4/6) masses of iron accumulation; very strongly acid; gradual wavy boundary.

Btg2--86 to 114 cm (34 to 45 in); gray (10YR 5/1) silty clay; moderate medium subangular blocky structure; firm; many faint dark gray (10YR 4/1) clay films and coatings on surfaces of peds; many medium and coarse prominent dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) masses of iron accumulation; moderately acid; gradual wavy boundary.

Btg3--114 to 130 cm (45 to 51 in); gray (2.5Y 6/1) silty clay; moderate medium subangular blocky structure; firm; few prominent dark gray (10YR 4/1) clay films and coatings on surfaces of peds; many medium and coarse prominent light olive brown (2.5Y 5/6) masses of iron accumulation; slightly acid; gradual wavy boundary. (Combined thickness of the Btg horizons ranges from 71 to 127 cm [28 to 50

in])

BCssg--130 to 157 cm (51 to 62 in); gray (5Y 5/1) silty clay; weak medium subangular blocky structure; firm; common distinct slickensides; common medium moderately cemented black and brownish iron-manganese concretions; many medium and coarse prominent light olive brown (2.5Y 5/6) masses of iron accumulation; neutral; gradual wavy boundary. (25 to 51 cm [10 to 20 in])

Ckssg--157 to 229 cm (62 to 90 in); gray (5Y 6/1) silty clay; massive; firm: common distinct slickensides; many medium moderately cemented black and brownish iron-manganese concretions; many coarse prominent yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) and few fine prominent strong brown (7.5YR 5/6) masses of iron accumulation; common fine and medium calcium carbonate concretions; slightly alkaline; gradual wavy boundary.

TYPE LOCATION: Acadia Parish, Louisiana; 1.7 miles northwest of Crowley; 900 feet north and 75 feet east of the southwest corner of sec. 19, T. 9 S., R. 1 E.; USGS Crowley West, LA. topographic quadrangle; Lat. 30 degrees, 14 minutes, 52 seconds N; Long. 92 degrees, 24 minutes, 47 seconds W; NAD 83.

RANGE IN CHARACTERISTICS:

Soil Moisture: An aquic soil moisture regime.
Thickness of the solum ranges from 152 to 203 cm (60 to 80 in) or more.
Glossic materials of silt loam texture in the Btg/Eg horizon range from 1 cm to 3 cm (1/2 inch to 1 in) in width.
Slickensides are within 152 cm (60 in) of the soil surface.

Mean annual soil temperature: 19.9 to 21.7 degrees C (68 to 71 degrees F)

Particle-size control section (weighted average)
Clay content: 35 to 50 percent

Ap or A Horizon
Hue: 10YR
Value: 3 to 5 (Where value is 3 the A or Ap horizon is less than 15 cm [6 in] thick)
Chroma: 1 or 2
Texture: silt loam
Redox concentrations: amount-none to common, shades-brown
Reaction(pH): strongly acid to neutral.

Eg Horizon
Hue: 10YR
Value: 4 to 6
Chroma: 1 or 2
Texture: silt loam
Redox concentrations: amount-none to common, shades- brown or black
Reaction(pH): strongly acid to neutral

Btg/Eg, Btg, and BCssg Horizons
Hue: 10YR to 5Y
Value: 4 to 6
Chroma: 1 or 2

Texture: silty clay loam, clay loam, or silty clay
Slickensides: amount-none to common; distinctness-faint or distinct (Slickensides are common in BCssg horizon)
Ped coatings: amount-none to common; color dark gray or very dark gray, location-faces of peds
Redox concentrations: amount-few to many, shades-brown or black
Redox depletions: amount-none to common, shades-gray
Identifiable secondary carbonate: amount-none to many, kind-concretions, location-mostly in BCssg horizon
Exchangeable Sodium Percentage: 8 to 15
Reaction(pH): very strongly acid to moderately acid in the upper horizons, and from moderately acid to moderately alkaline in the lower horizons.

Cg, Cssg, or Ckssg Horizons
Hue: 10YR to 5Y or N
Value: 5 to 7
Chroma: 1 to 5
Texture: silty clay loam, clay loam, silty clay or clay
Slickensides: amount-none to common; distinctness-faint or distinct (Slickensides are common in Cssg or Csskg horizons)
Redox concentrations: amount-few to many, shades-brown or black
Identifiable secondary carbonate: amount-none to many, kind-concretions,
Reaction(pH): slightly alkaline or moderately alkaline

COMPETING SERIES: These are the Derly (TX) and Encrow (LA) series in the same family. Similar soils are Aris (TX) and Wrightsville (AR) series.
Derly soils: do not have slickensides and have exchangeable sodium less than 8 in the lower B horizons
Encrow soils: have a lithological discontinuity in the subsoil
Aris soils: are not alkaline in the lower horizons; have red redox concentrations in the argillic horizon.
Wrighstville soils: mixed mineralogy

GEOGRAPHIC SETTING:
Parent material: loamy fluviomarine deposits of late Pleistocene age
Landscape: coastal plains
Landform: broad flats along drainageways
Slope: 0 to 1 percent
Mean annual precipitation: 1499 to 1670 mm (59 to 66 in)
Precipitation Pattern: Precipitation is generally uniform with slight peaks during the spring and fall months.
Mean annual air temperature: 19.3 to 22 degrees C (67 to 72 degrees F)
Frost-free period: 245 to 304 days
Elevation: 2 to 24 m (6.6 to 79 ft)

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Crowley (LA), Edgerly (LA), Judice (LA), Kaplan (LA), Midland (LA), and Vidrine (LA) series.
Crowley and Kaplan soils: are on slightly higher convex shaped surfaces surrounding Mowata soils; do not have a glossic horizon; have red masses of iron accumulation in the subsoil.
Edgerly soils: have a mollic epipedon; are on a slightly higher landform
Judice and Midland soils: are on a similar landform; do not have a glossic horizon; are clayey throughout.
Vidrine soils: are on circular convex mounds; have chroma of 3 or more in the upper subsoil.

DRAINAGE AND PERMEABILITY: Poorly drained. Runoff is negligible. Very slow permeability. A water table is at a depth of 0 to 2 feet below the surface during the months of December through April. Rare to occasional flooding.

USE AND VEGETATION: Native vegetation was tall prairie grasses. Most of the soils are used for rice, soybeans, and grain sorghum, rotated with crayfish aquaculture and pasture.

DISTRIBUTION AND EXTENT: Southwest Louisiana and southeast Texas (MLRA 150A, LRR T). The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas.

SERIES ESTABLISHED: Evangeline Parish, Louisiana; 1970.

REMARKS: This soil was formerly included in the Midland series.
Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon--from a depth of 0 to 36 cm (0 to 14 in) (Ap and Eg horizons).
Albic horizon--from a depth of 13 to 36 cm (5 to 14 in) (Eg horizon).
Argillic horizon--from a depth of 36 to 130 cm (14 to 51 in) (Btg/Eg, Btgl, Btg2, and Btg3 horizons).
Glossic horizon--from a depth of 36 to 56 cm (14 to 22 in) (Btg/E horizon).
Slickensides--at a depth of 130 to 229 cm (51 to 90 in) (Btssg and Ckssg horizons).
Aquic moisture regime.

ADDITIONAL DATA: Laboratory data on the typifying pedon from Louisiana Agriculture Experiment Station, sample number S96LA-001-1.

Taxonomic Version: Keys to Soil Taxonomy, Eleventh Edition, 2010.

National Cooperative Soil Survey
U.S.A.

LOCATION SCATLAKE LA

Established Series
Rev. HLC-JLD-CLN
08/2000

SCATLAKE SERIES

The Scatlake series consists of very deep, very poorly drained, very slowly permeable fluid mineral soils. These soils formed in unconsolidated saline clayey and organic sediments. These soils are in saline marsh areas along the Gulf Coast. Slope ranges from 0 to 0.2 percent.

TAXONOMIC CLASS: Very-fine, smectitic, nonacid, hyperthermic Sodic Hydraquents

TYPICAL PEDON: Scatlake peat--saltwater marsh wildlife refuge.
(Colors are for moist soil unless otherwise stated.)

Oa--0 to 6 inches; very dark gray (10YR 3/1) peat; about 75 percent fiber, about 50 percent rubbed; about 50 percent mineral; many live roots; moderately saline; moderately alkaline; gradual smooth boundary. (0 to 15 inches thick)

A--6 to 12 inches; very dark gray (5Y 3/1) mucky clay; massive; about 25 percent coarse fibers and roots; very fluid, flows easily between fingers and leaves small residue in hand; moderately saline; moderately alkaline; gradual smooth boundary. (6 to 12 inches thick)

Cg1--12 to 16 inches; dark gray (5Y 4/1) clay, about 5 percent roots and coarse fiber, massive; very fluid, flows easily between fingers and leaves hand empty; moderately saline; moderately alkaline; abrupt smooth boundary.

Cg2--16 to 18 inches; black N 2.5/ muck and gray (5Y 5/1) clay; massive; very fluid, flows easily between fingers and leaves hand empty; moderately saline; moderately alkaline; abrupt smooth boundary.

Cg3--18 to 21 inches; gray (5Y 5/1) clay, massive; very fluid, flows easily between fingers and leaves hand empty; moderately saline; moderately alkaline; abrupt smooth boundary.

Cg4--21 to 80 inches; greenish gray (5GY 6/1) clay, layer less than 1 inch thick of black N 2.5/ muck present; massive; very fluid, flows easily between fingers and leaves hand empty; moderately saline; moderately alkaline. (combined thickness of the Cg horizons is 60 to 75 inches)

TYPE LOCATION: Iberia Parish, Louisiana, Marsh Island; 0.5 mile northwest of Oyster Lake; 200 feet southwest of canal; SW1/4NE1/4 sec. 30 T. 17 S., R. 6 E.

RANGE IN CHARACTERISTICS: Scatlake soils are continuously saturated with saline water. Soil salinity, or electrical conductivity, is 8 to more than 16 ds/m in more than half of the upper 50 cm. The n-value of all mineral horizons is 1 or more. Extractable sodium averages more than 20 percent in some horizons of the 10- to 40-inch particle-size control section. Most pedons have an organic surface layer 2 to 10 inches thick.

The Oa horizon, where present, has color with hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 or less. Texture is muck or peat. Reaction ranges from slightly acid to moderately alkaline.

The A horizon has color with hue of 10YR to 5BG, or N, value of 2 to 5, and chroma of 2 or less. Texture is clay, mucky clay, or mucky silty clay loam. Reaction ranges from slightly acid to moderately alkaline.

The Cg horizons have color with hue of 10YR to 5BG, or N, value of 4 to 6, and chroma of 1 or less. Masses of iron accumulation range none to few in shades of brown. Texture is clay that is very fluid. Some pedons have thin layers of black muck. Reaction ranges from slightly acid to moderately alkaline.

COMPETING SERIES: These are the Bancker, Barbary, and Larose series in the same family. Similar soils are the Capers, Fausse, Gentilly, Harris, Ijam, and Placedo series. Bancker soils have n-value or 0.7 or more in the upper 20 inches. Barbary and Larose soils have less than 20 percent extractable sodium in the particle-size control section. In addition, Larose soils are continuously saturated with fresh water. Capers soils have 0.6 to 2.0 percent sulfides in the upper 20 inches of the solum. Fausse, Harris, Ijam, and Placedo soils have n-value less than 0.7 in all horizons. Gentilly soils have lower horizons with n-value of less than 0.7.

GEOGRAPHIC SETTING: Gulf Coast Marsh, about 1 foot above sea level. These soils are formed in unconsolidated saline clayey and organic sediments that are too soft for cattle to graze. The climate is warm and humid. Mean annual precipitation is about 58 inches. Mean annual temperature is about 70 degrees F. near type location.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Harris, Ijam, and Placedo series and the Kenner series, which has organic layers more than 51 inches thick.

DRAINAGE AND PERMEABILITY: Very poorly drained; very slow runoff; very slowly permeable. Gulf storms and normal tides flood the area with salt water. The water level fluctuates between 1 foot above and 1/2 foot below the soil surface throughout the year. During tropical storms, tide floodwater is 4 feet deep or more.

USE AND VEGETATION: Wetland wildlife habitat. Vegetation is saltwater marsh plant species, such as marshhay cordgrass, big cordgrass, smooth cordgrass, seashore saltgrass, olney bulrush, saltmarsh bulrush, and needlegrass rush.

DISTRIBUTION AND EXTENT: In the saltwater marsh areas of Louisiana, Texas, and possibly Mississippi (MLRA 151). The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Temple, Texas.

SERIES ESTABLISHED: Iberia Parish, Louisiana; 1973.

REMARKS: These soils were mapped Sharkey clay and Tidal Marsh on the 1911 soil survey of Iberia Parish. Mineral horizons turn black on air-drying. If drained, the classification changes.

Diagnostic horizons and features recognized in this pedon are:

Histic epipedon - 0 to 6 inches (Oa horizon)

n-value is 1 or more - 6 to 80 inches (A, Cg1, Cg2, Cg3, and Cg4 horizons)

Ecological Site: Saline Fluid Mineral Marsh.

ADDITIONAL DATA: Lousiana State University lab data (S94LA-109-005,011,013) from Terrebonne Parish.

TAXONOMIC VERSION: Soil Taxonomy, Second Edition,1999.

National Cooperative Soil Survey
U.S.A.

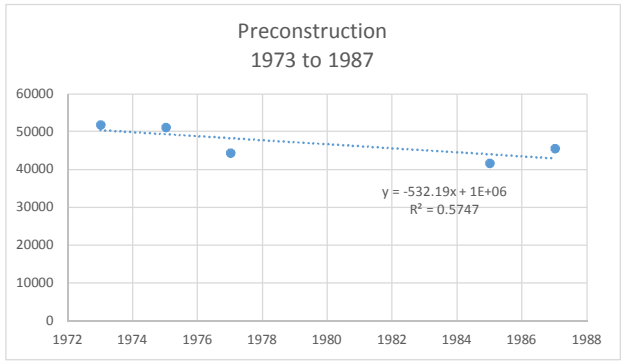
APPENDIX B

Project/Basin/Reference Areas Regressions

CS-04a

Date	land	water	%land	%water
1932	61784.62	2179.69	96.59	3.41
1956	59066.51	4897.8	92.34	7.66
1973	51844.02	12120.3	81.05	18.95
1975	51245.11	12719.21	80.12	19.88
1977	44519.89	19444.43	69.6	30.4
1985	41780.21	22184.11	65.32	34.68
1987	45731.94	18232.37	71.5	28.5
1990	44075.54	19888.77	68.91	31.09
1995	43447.95	20516	67.93	32.07
1998	42999.38	20964.94	67.22	32.78
1999	44798.33	19165.99	70.04	29.96
2002	44158.94	19805.37	69.04	30.96
2004	45598.95	18365.37	71.29	28.71
2006	40496.99	23467.33	63.31	36.69
2008	33201.55	30762.77	51.91	48.09
2009	31242.69	32721.62	48.84	51.16
2010	63'963	27035.87	57.73	42.27

1990	44075.54	19888.77	68.91	31.09
1995	43447.95	20516	67.93	32.07
1998	42999.38	20964.94	67.22	32.78
1999	44798.33	19165.99	70.04	29.96
2002	44158.94	19805.37	69.04	30.96
2004	45598.95	18365.37	71.29	28.71
2006	40496.99	23467.33	63.31	36.69
2008		30762.77	51.91	48.09
2009		32721.62	48.84	51.16
2010	36928.44	27035.87	57.73	42.27



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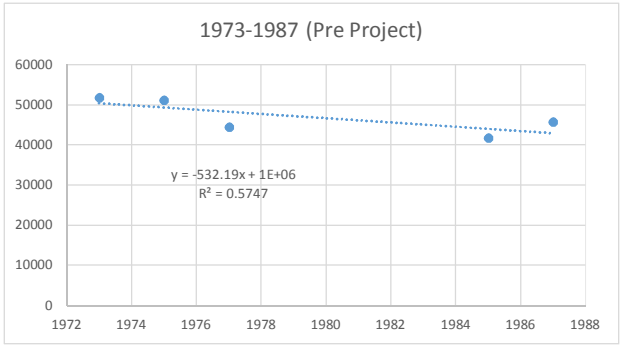

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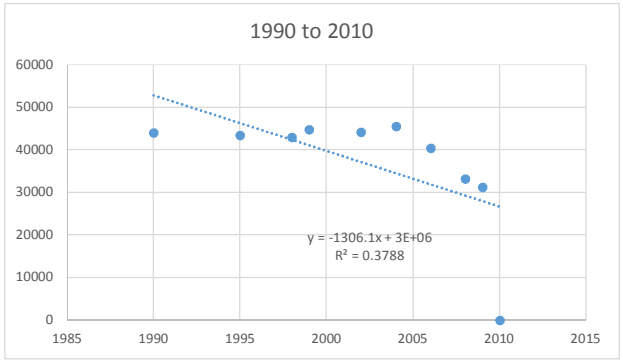

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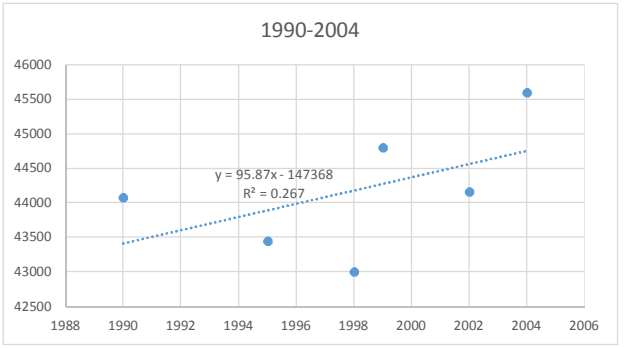

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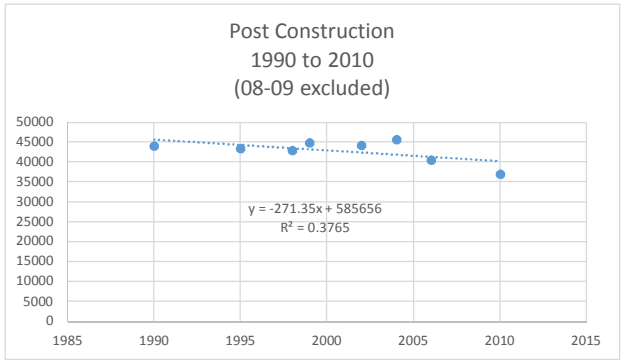

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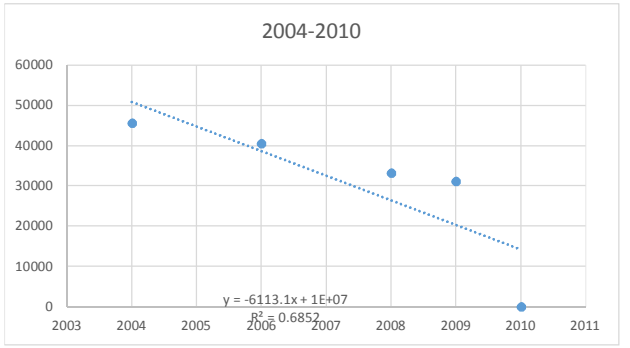


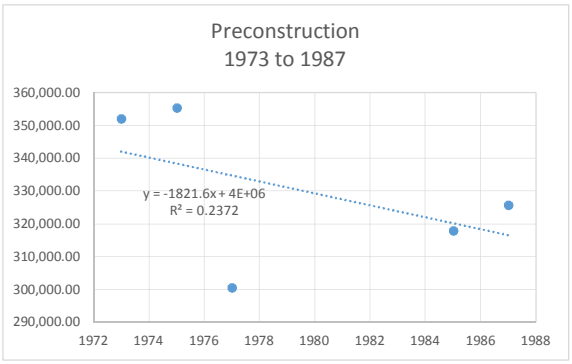
-4.33014

Regression analysis for Basin minus CS-04a

ENTIRE CS BASIN					
Date	land	water	%land	%water	
1932					
1956					total
1973	403,967.11	277,400.43	0.59	0.41	681,367.54
1975	406,804.65	274,559.78	0.60	0.40	681,364.43
1977	345,058.72	336,305.70	0.51	0.49	681,364.42
1985	359,833.30	321,530.90	0.53	0.47	681,364.20
1987	371,459.66	309,896.54	0.55	0.45	681,356.20
1990	385,756.09	295,608.34	0.57	0.43	681,364.43
1995	373,195.89	308,168.53	0.55	0.45	681,364.42
1998	348,441.79	332,922.63	0.51	0.49	681,364.42
1999	377,160.30	304,181.88	0.55	0.45	681,342.18
2002	368,969.95	312,394.48	0.54	0.46	681,364.43
2004	384,555.38	296,807.93	0.56	0.44	681,363.31
2006	366,163.10	315,201.32	0.54	0.46	681,364.42
2008	340,799.41	340,565.01	0.50	0.50	681,364.42
2009	334,132.68	347,231.74	0.49	0.51	681,364.42
2010	356,122.42	325,242.01	0.52	0.48	681,364.43

CS-04a					
Date	land	water	%land	%water	total ac
1932	61784.62	2179.69	96.59	3.41	63964.31
1956	59066.51	4897.8	92.34	7.66	63964.31
1973	51844.02	12120.3	81.05	18.95	63964.32
1975	51245.11	12719.21	80.12	19.88	63964.32
1977	44519.89	19444.43	69.6	30.4	63964.32
1985	41780.21	22184.11	65.32	34.68	63964.32
1987	45731.94	18232.37	71.5	28.5	63964.31
1990	44075.54	19888.77	68.91	31.09	63964.31
1995	43447.95	20516	67.93	32.07	63963.95
1998	42999.38	20964.94	67.22	32.78	63964.32
1999	44798.33	19165.99	70.04	29.96	63964.32
2002	44158.94	19805.37	69.04	30.96	63964.31
2004	45598.95	18365.37	71.29	28.71	63964.32
2006	40496.99	23467.33	63.31	36.69	63964.32
2008	33201.55	30762.77	51.91	48.09	63964.32
2009	31242.69	32721.62	48.84	51.16	63964.31
2010	36928.44	27035.87	57.73	42.27	63964.31

BASIN minus CS-04a	
1973	352,123.09
1975	355,559.54
1977	300,538.83
1985	318,053.09
1987	325,727.72
1990	341,680.55
1995	329,747.94
1998	305,442.41
1999	332,361.97
2002	324,811.01
2004	338,956.43
2006	325,666.11
2008	307,597.86
2009	302,889.99
2010	319,193.98



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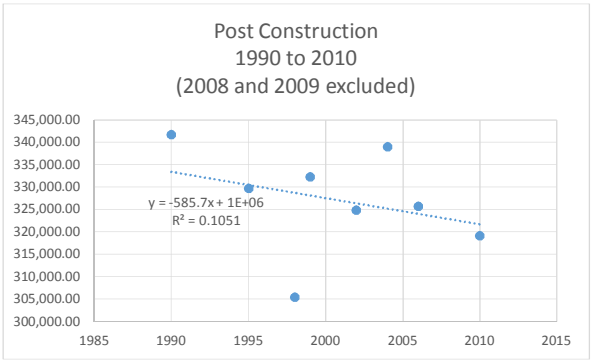

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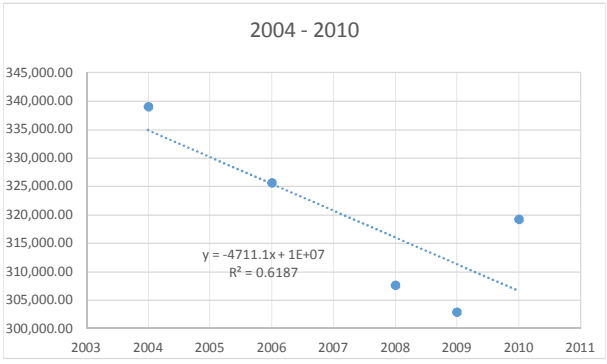

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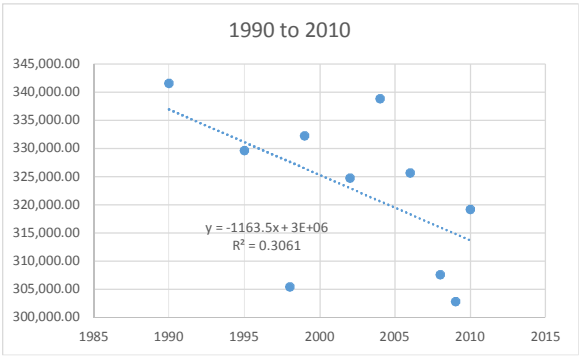

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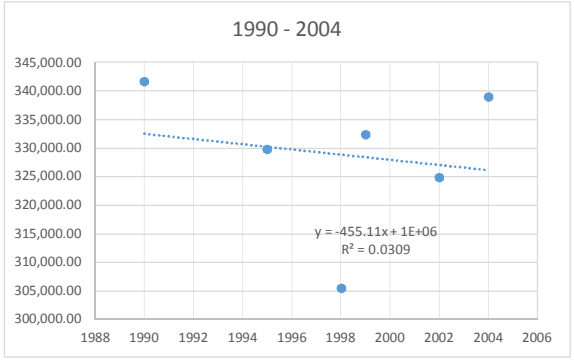
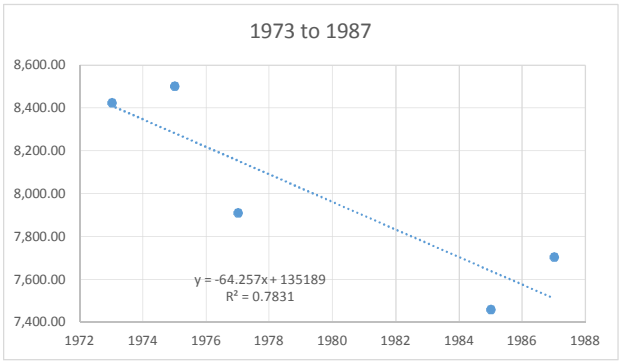


-0.133198

Oyster Bayou Reference Area

Date	land	water	%land	%water	total ac
1932					
1956	8,436.55	330.48	96.23042	3.769578	8,767.03
1973	8,424.32	342.71	96.09092	3.909078	8,767.03
1975	8,500.60	266.43	96.961	3.039	8,767.03
1977	7,909.47	857.56	90.21835	9.781648	8,767.03
1985	7,459.47	1,307.56	85.08549	14.91451	8,767.03
1987	7,704.65	1,062.38	87.8821	12.1179	8,767.03
1990	7,547.86	1,219.17	86.09369	13.90631	8,767.03
1995	6,604.01	2,163.02	75.32779	24.67221	8,767.03
1998	7,390.18	1,376.85	84.29514	15.70486	8,767.03
1999	7,188.69	1,578.34	81.99687	18.00313	8,767.03
2002	7,519.84	1,247.19	85.77409	14.22591	8,767.03
2004	7,092.39	1,674.64	80.89843	19.10157	8,767.03
2006	7,142.88	1,624.15	81.47434	18.52566	8,767.03
2008	6,203.48	2,563.55	70.7592	29.2408	8,767.03
2009	6,062.04	2,704.99	69.14588	30.85412	8,767.03
2010	6,415.42	2,351.61	73.17666	26.82334	8,767.03



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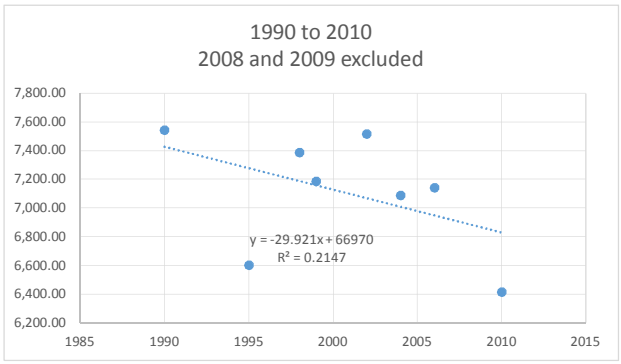

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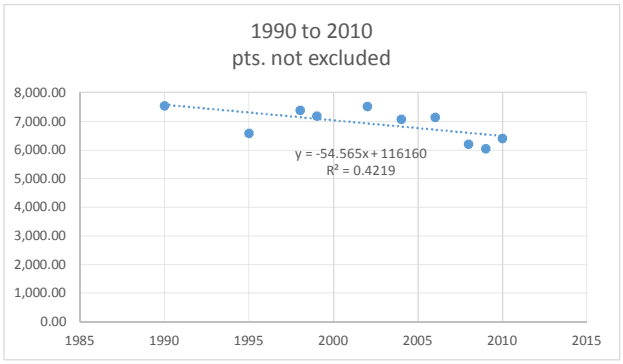

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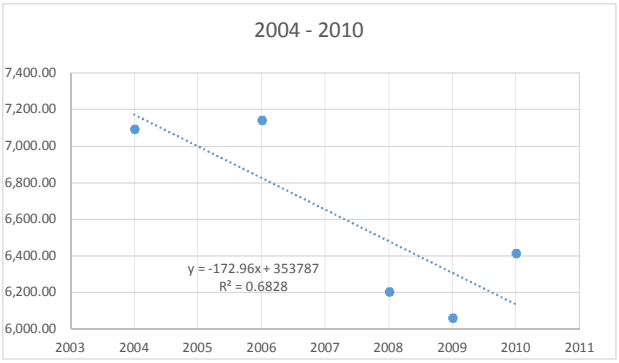

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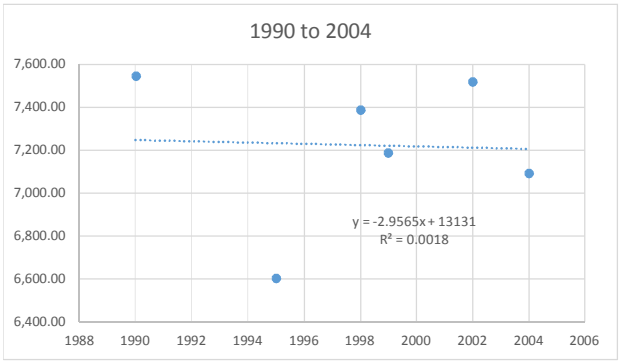
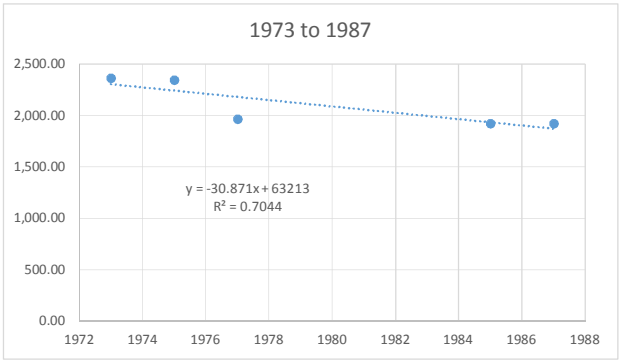


-0.03917

West Cove Reference Area

Date	land	water	%land	%water	total ac
1932					
1956	2,589.79	20.68	99.20781	0.792195	2,610.47
1973	2,364.72	245.75	90.58599	9.414014	2,610.47
1975	2,348.49	261.98	89.96426	10.03574	2,610.47
1977	1,969.97	640.50	75.46419	24.53581	2,610.47
1985	1,925.72	684.75	73.76909	26.23091	2,610.47
1987	1,923.72	686.75	73.69248	26.30752	2,610.47
1990	2,045.59	564.88	78.36098	21.63902	2,610.47
1995	1,572.33	1,038.14	60.23168	39.76832	2,610.47
1998	1,911.93	698.54	73.24083	26.75917	2,610.47
1999	1,811.41	799.06	69.39019	30.60981	2,610.47
2002	1,948.18	662.29	74.62947	25.37053	2,610.47
2004	1,858.11	752.36	71.17914	28.82086	2,610.47
2006	1,647.50	962.97	63.11124	36.88876	2,610.47
2008	1,537.42	1,073.05	58.89438	41.10562	2,610.47
2009	1,504.28	1,106.19	57.62487	42.37513	2,610.47
2010	1,426.44	1,184.03	54.64303	45.35697	2,610.47



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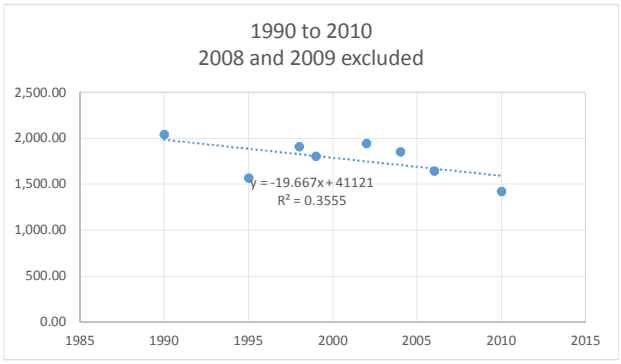

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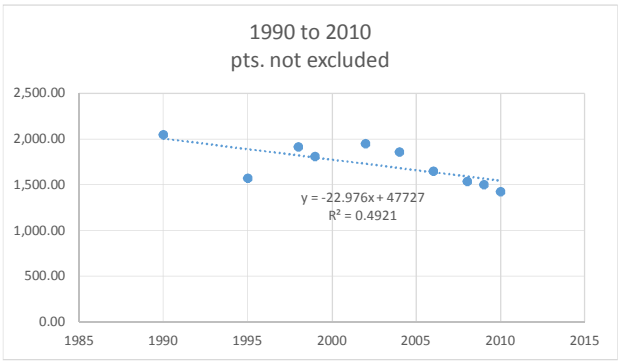

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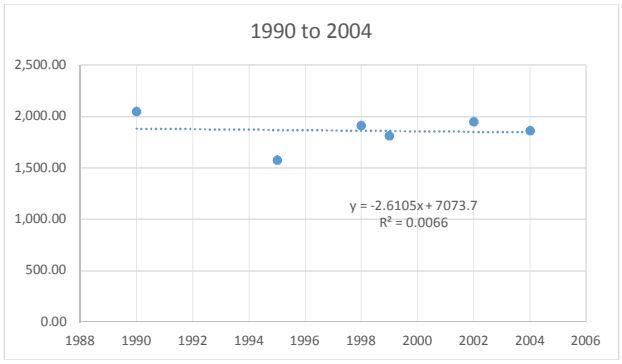

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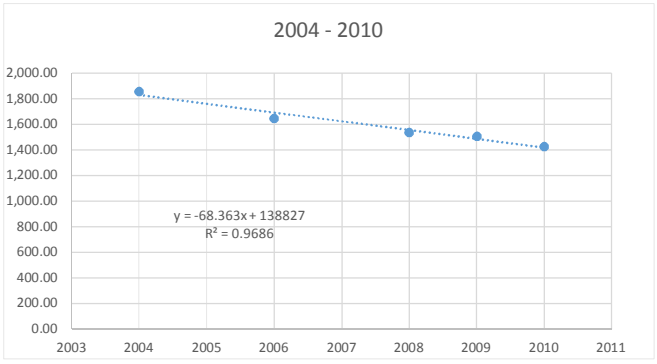


-3.67917

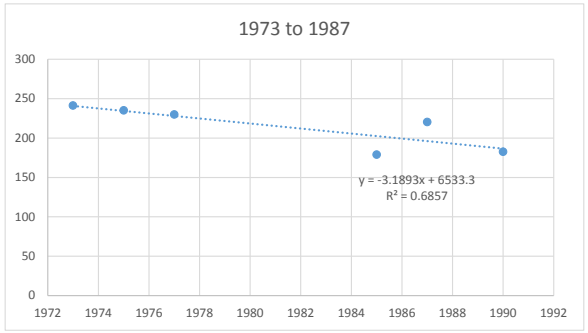
APPENDIX C

CRMS Regressions

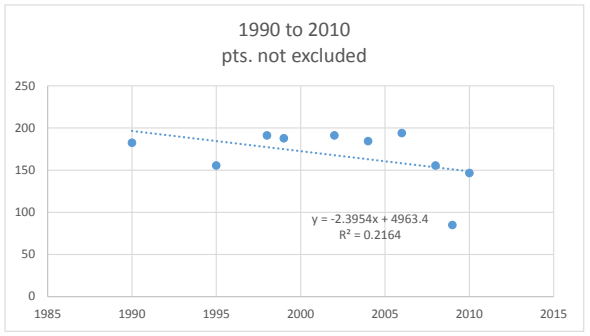
Date	land	water	%land	%water
1932	242.19	0	100	0
1956	242.19	0	100	0
1973	241.3	0.89	99.63	0.37
1975	235.07	7.12	97.06	2.94
1977	229.96	12.23	94.95	5.05
1985	179.03	63.16	73.92	26.08
1987	220.39	21.79	91	9
1990	182.59	59.6	75.39	24.61
1995	155.68	86.51	64.28	35.72
1998	191.26	50.93	78.97	21.03
1999	187.92	54.26	77.59	22.4
2002	191.26	50.93	78.97	21.03
2004	184.59	57.6	76.22	23.78
2006	194.15	48.04	80.16	19.84
2008	155.68	86.51	64.28	35.72
2009	85.18	157.01	35.17	64.83
2010	146.78	95.41	60.61	39.39

1990	182.59	59.6	75.39	24.61
1995	155.68	86.51	64.28	35.72
1998	191.26	50.93	78.97	21.03
1999	187.92	54.26	77.59	22.4
2002	191.26	50.93	78.97	21.03
2004	184.59	57.6	76.22	23.78
2006	194.15	48.04	80.16	19.84
2008		86.51	64.28	35.72
2009		157.01	35.17	64.83
2010	146.78	95.41	60.61	39.39

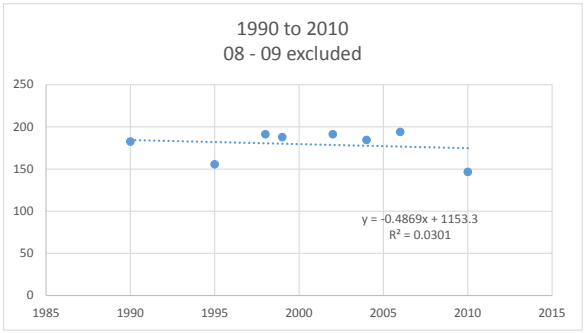
644 - Inside CS-04a (SE - Saline area)



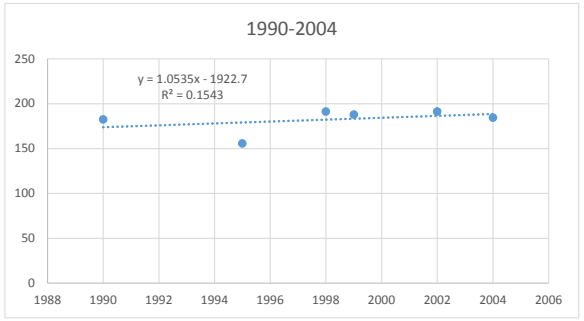
-1.32159



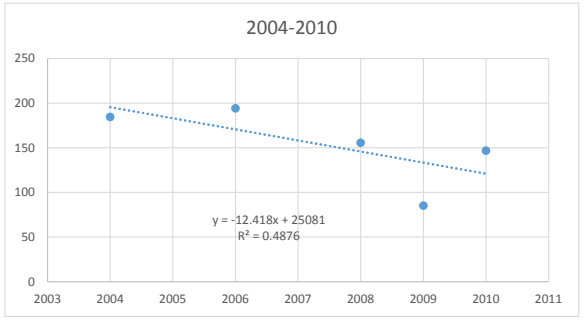
-1.3119 1%



-0.26666 80%



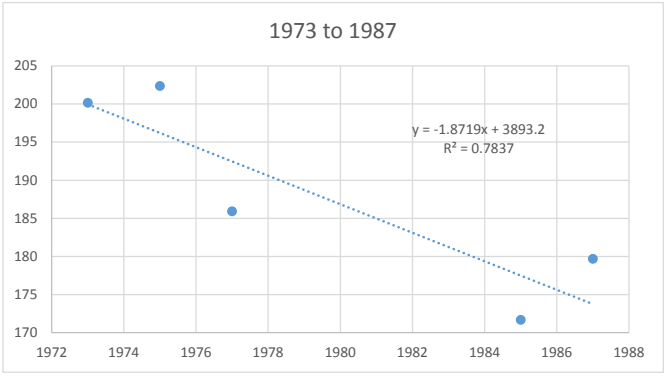
Land Change Rate 0.57698 Diff 144%



Land Change Rate -6.72734 Diff -409%

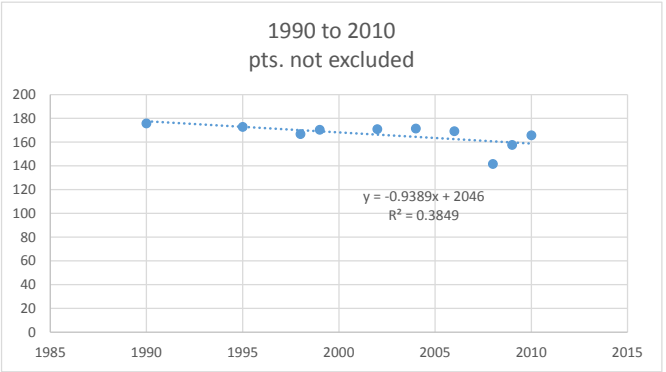
Date	Land
1973	200.16
1975	202.38
1977	185.92
1985	171.69
1987	179.7
1990	175.69
1995	172.8
1998	166.8
1999	170.35
2002	171.02
2004	171.47
2006	169.24
2008	141.67
2009	157.68
2010	165.68

1738 - Inside CS-04a (East near structures - saline area)

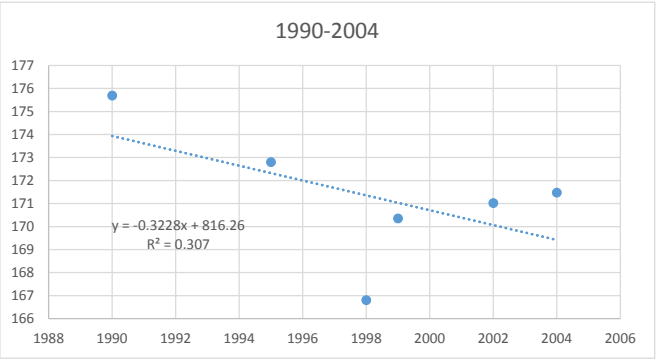


-0.9352

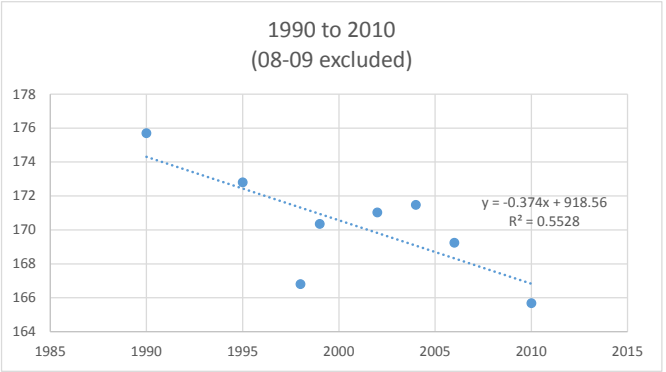
1990	175.69
1995	172.8
1998	166.8
1999	170.35
2002	171.02
2004	171.47
2006	169.24
2008	
2009	
2010	165.68



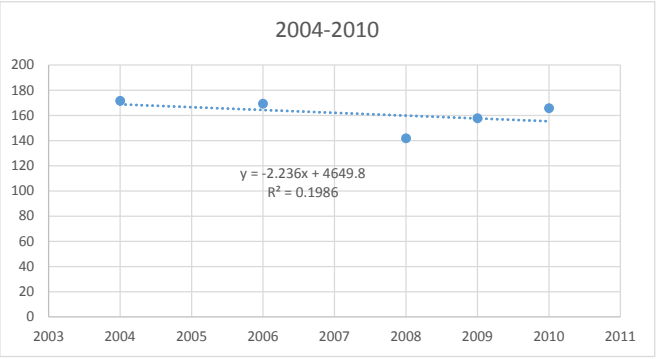
-0.53441 43%



Land Change Rate -0.18373 Diff 80%



-0.21287 77%

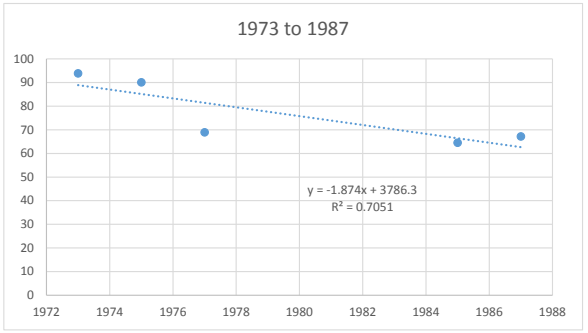


Land Change Rate -1.30402 Diff -39%

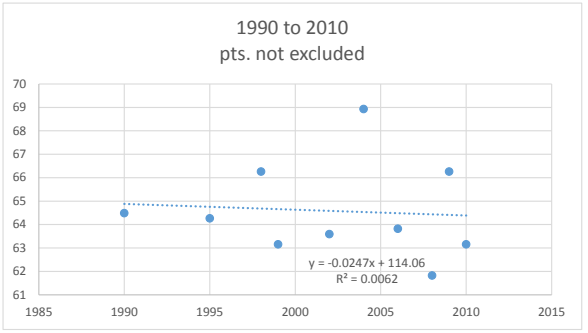
Date	land	water	%land	%water
1932	242.19	0	100	0
1956	242.19	0	100	0
1973	93.85	148.34	38.75	61.25
1975	90.07	152.12	37.19	62.81
1977	68.94	173.25	28.47	71.54
1985	64.49	177.69	26.63	73.37
1987	67.16	175.02	27.73	72.27
1990	64.49	177.69	26.63	73.37
1995	64.27	177.92	26.54	73.46
1998	66.27	175.91	27.36	72.63
1999	63.16	179.03	26.08	73.92
2002	63.6	178.58	26.26	73.74
2004	68.94	173.25	28.47	71.54
2006	63.83	178.36	26.36	73.65
2008	61.83	180.36	25.53	74.47
2009	66.27	175.91	27.36	72.63
2010	63.16	179.03	26.08	73.92

1990	64.49	177.69	26.63	73.37
1995	64.27	177.92	26.54	73.46
1998	66.27	175.91	27.36	72.63
1999	63.16	179.03	26.08	73.92
2002	63.6	178.58	26.26	73.74
2004	68.94	173.25	28.47	71.54
2006	63.83	178.36	26.36	73.65
2008		180.36	25.53	74.47
2009		175.91	27.36	72.63
2010	63.16	179.03	26.08	73.92

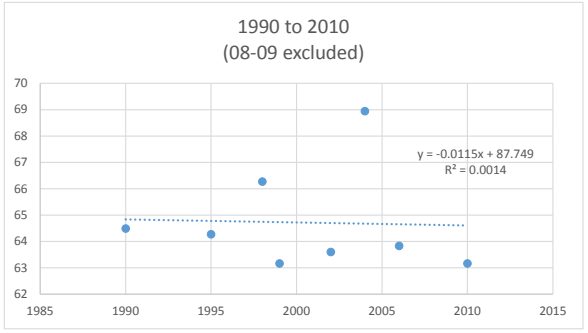
2418 - Inside CS-04a (saline area)



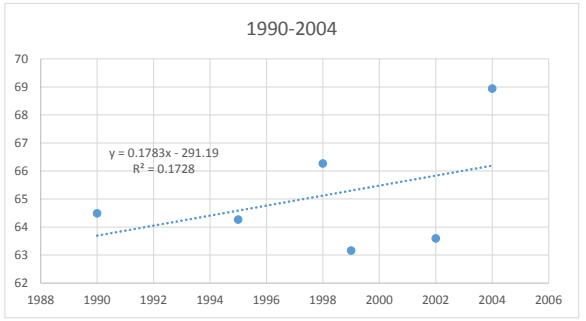
-1.9968



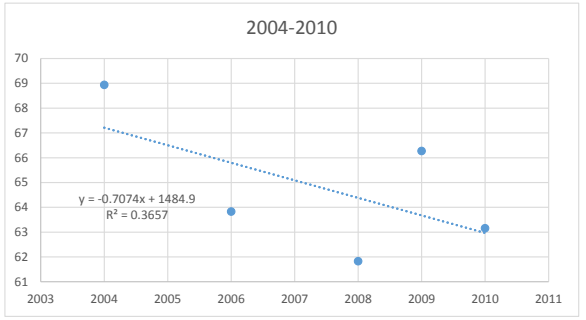
-0.0383 98%



-0.01783 99%



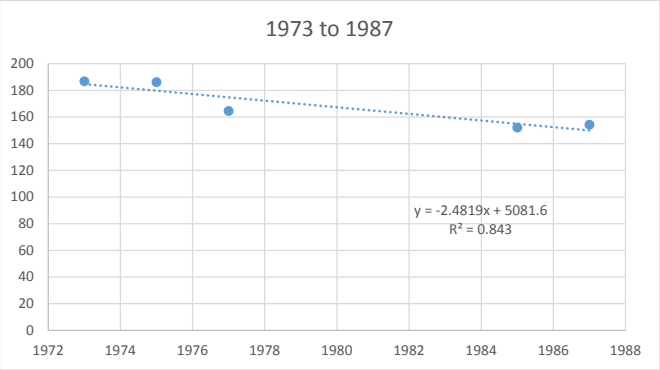
Land Change Rate 0.27648 Diff 114%



Land Change Rate -1.02611 Diff 49%

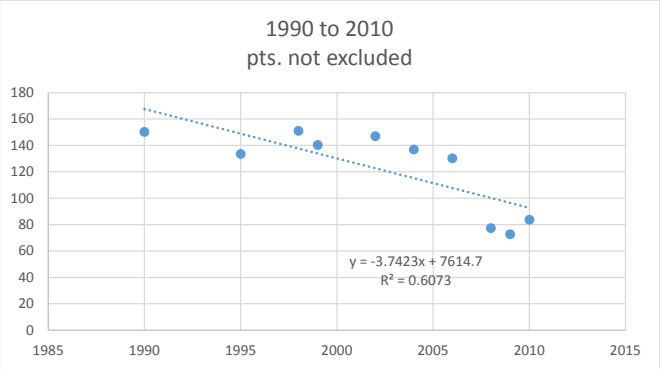
645 - Inside CS-04a (off of Hog Bayou in brackish area)

Date	Land
1973	186.81
1975	186.25
1977	164.57
1985	152.12
1987	154.34
1990	150.34
1995	133.44
1998	151.01
1999	140.33
2002	147.00
2004	137.00
2006	130.32
2008	77.39
2009	72.72
2010	83.62

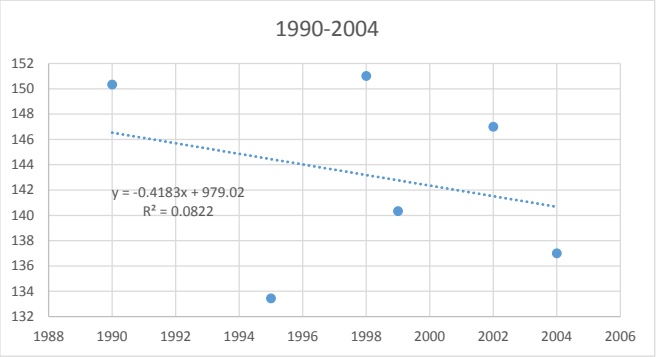


-1.32857

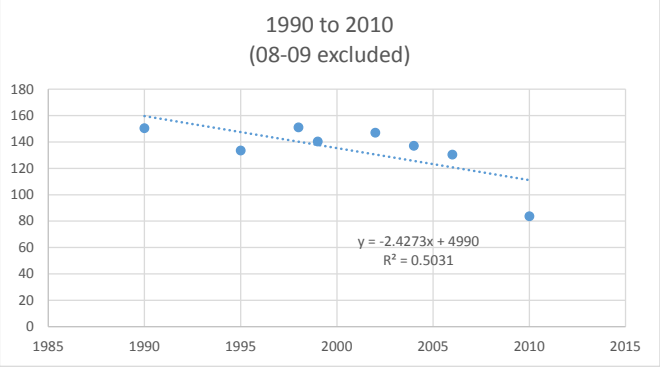
1990	150.34
1995	133.44
1998	151.01
1999	140.33
2002	147.00
2004	137.00
2006	130.32
2008	
2009	
2010	83.62



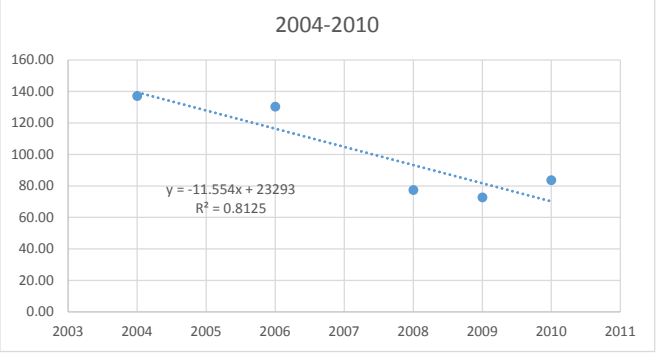
-2.48922 -87%



Land Change Rate -0.27824 Diff 79%



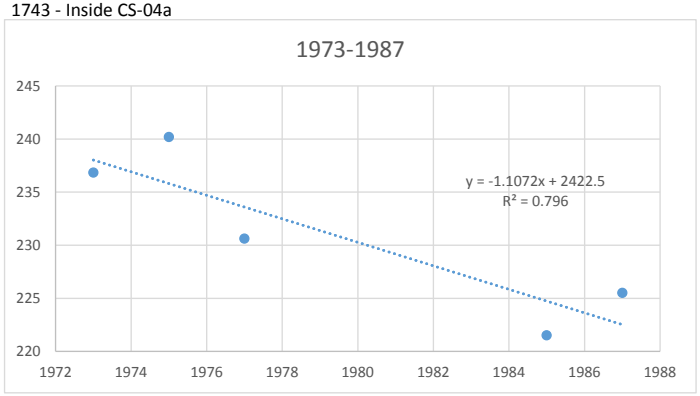
-1.61454 -22%



Land Change Rate -8.43358 Diff -535%

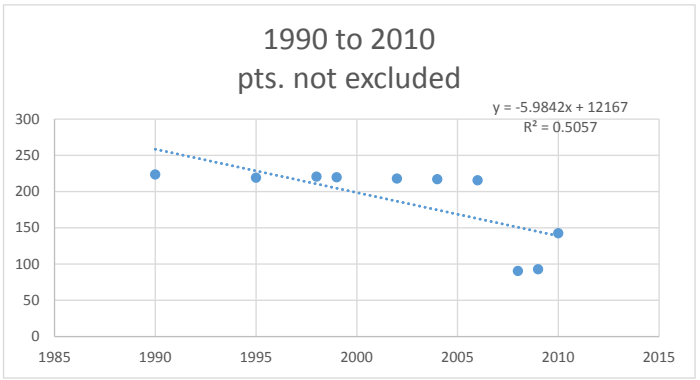
Date	Land
1973	236.85
1975	240.19
1977	230.62
1985	221.51
1987	225.51
1990	223.73
1995	219.28
1998	220.84
1999	219.73
2002	218.17
2004	217.28
2006	215.72
2008	90.74
2009	92.96
2010	142.56

1743 - Inside CS-04a

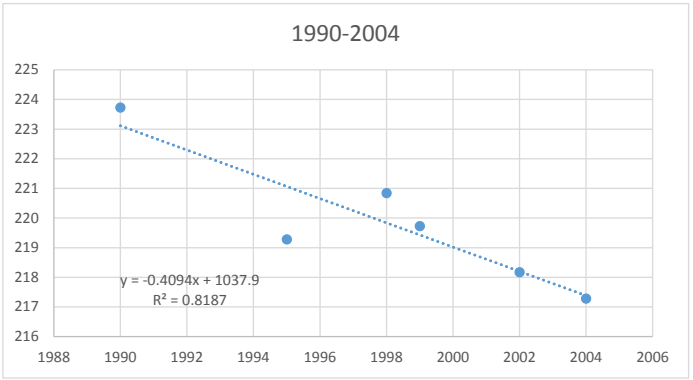


-0.46747

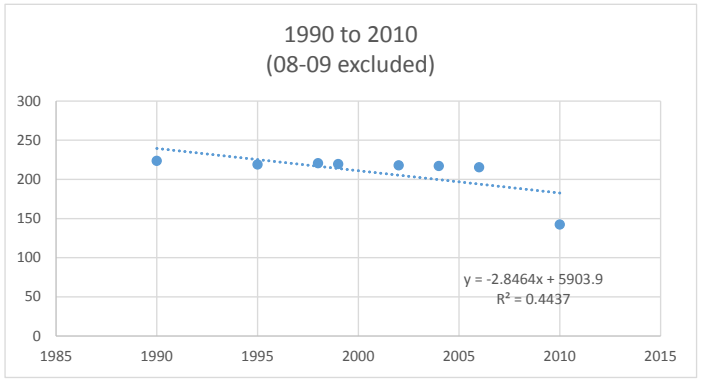
1990	223.73
1995	219.28
1998	220.84
1999	219.73
2002	218.17
2004	217.28
2006	215.72
2008	
2009	
2010	142.56



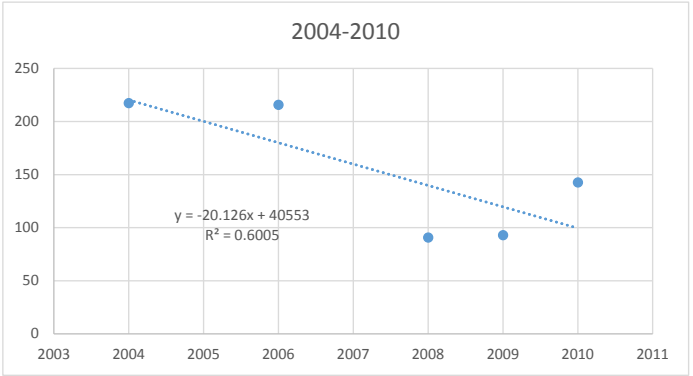
-2.67474 -472%



Land Change Rate -0.18299 Diff 61%



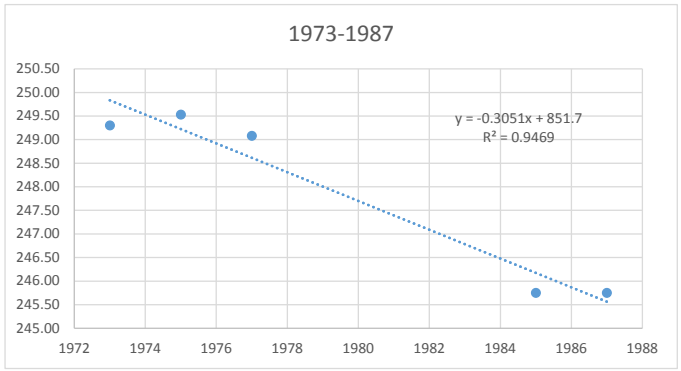
-1.27225 -172%



Land Change Rate -9.26270 Diff -1881%

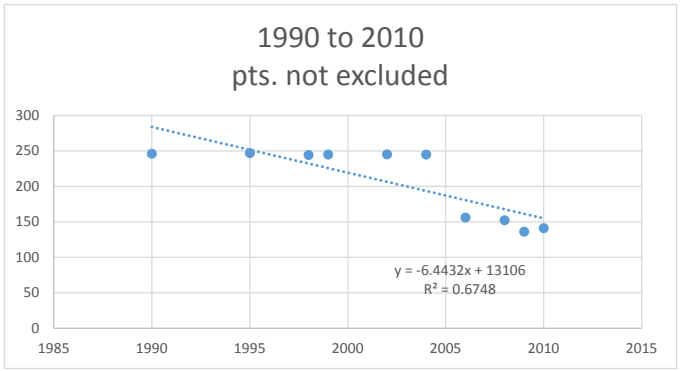
Date	Land
1973	249.30
1975	249.53
1977	249.08
1985	245.75
1987	245.75
1990	246.19
1995	247.08
1998	244.41
1999	244.86
2002	245.08
2004	244.86
2006	156.12
2008	152.34
2009	136.11
2010	141

648-Inside CS-04a

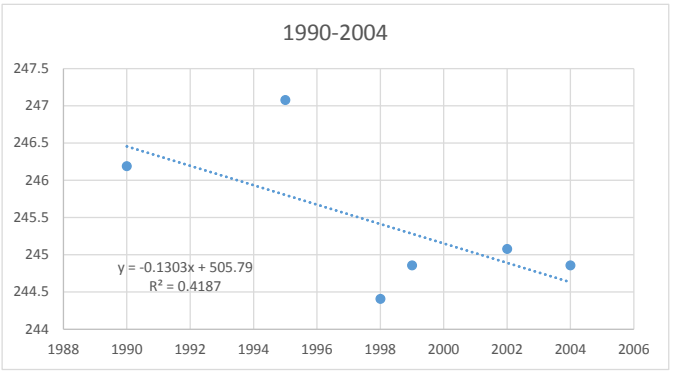


-0.122383

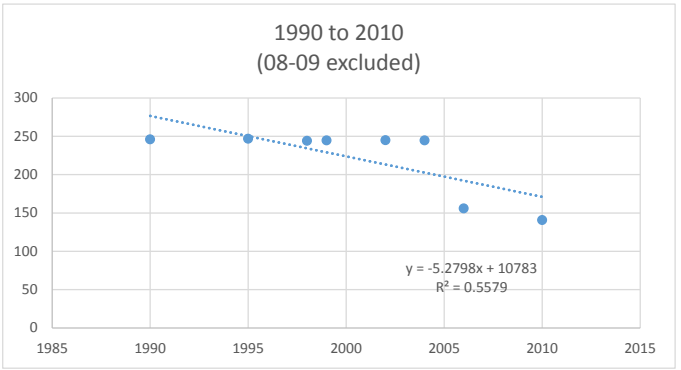
1990	246.19
1995	247.08
1998	244.41
1999	244.86
2002	245.08
2004	244.86
2006	156.12
2008	
2009	
2010	141



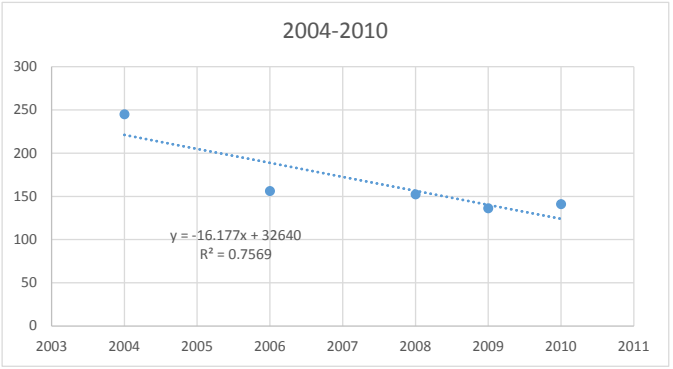
-2.617166 -2039%



Land Change Rate -0.05293 Diff 57%



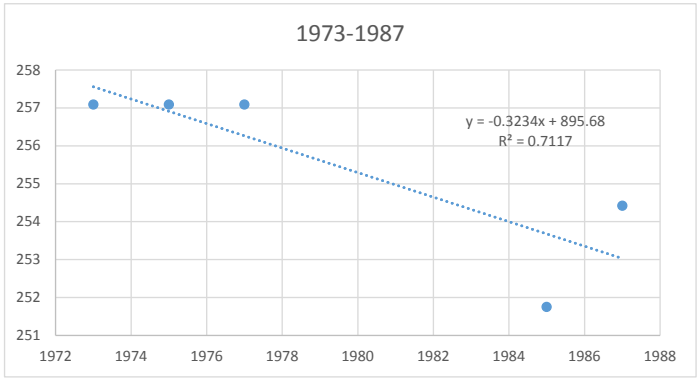
-2.144604 -1652%



Land Change Rate -6.60688 Diff -5299%

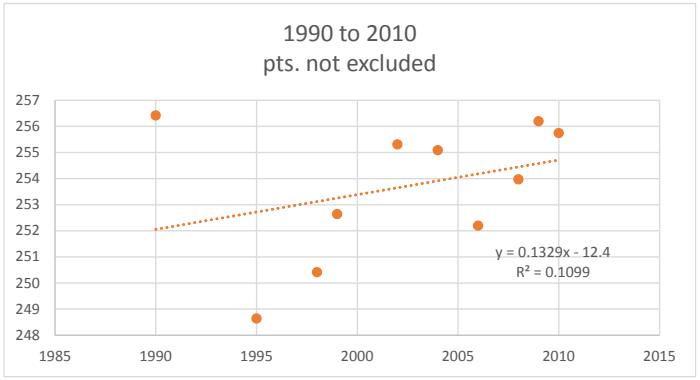
650-Inside CS-04a

Date	Land
1973	257.09
1975	257.09
1977	257.09
1985	251.75
1987	254.42
1990	256.42
1995	248.64
1998	250.42
1999	252.64
2002	255.31
2004	255.09
2006	252.2
2008	253.97
2009	256.2
2010	255.75

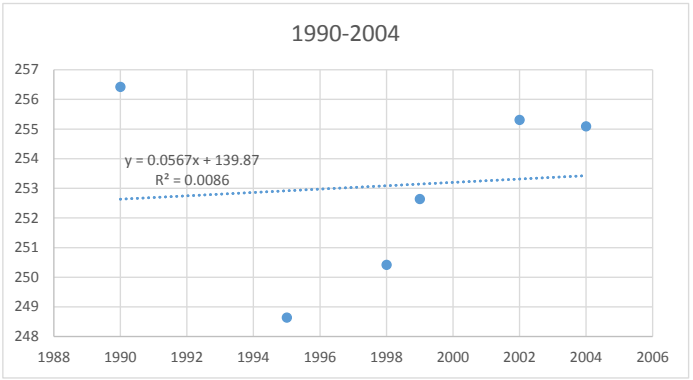


-0.12579

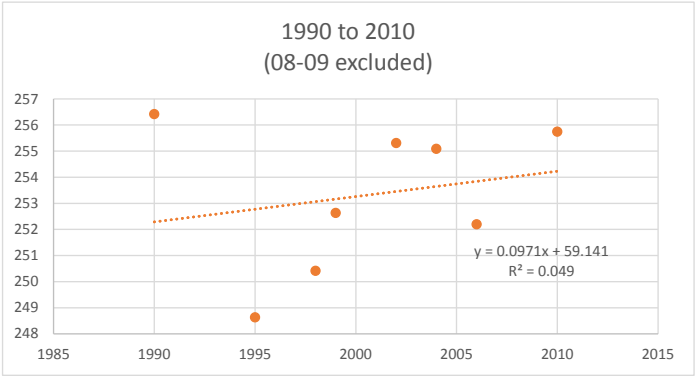
1990	256.42
1995	248.64
1998	250.42
1999	252.64
2002	255.31
2004	255.09
2006	252.2
2008	
2009	
2010	255.75



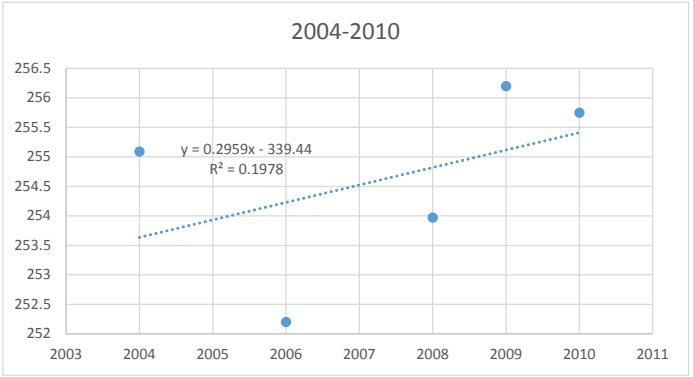
0.054286 143%



Land Change Rate 0.02211 Diff 118%



0.037868 130%

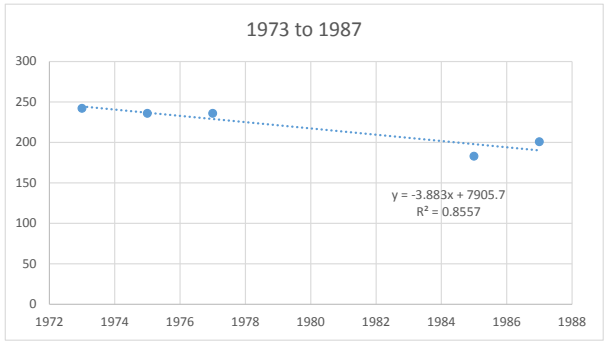


Land Change Rate 0.11600 Diff 192%

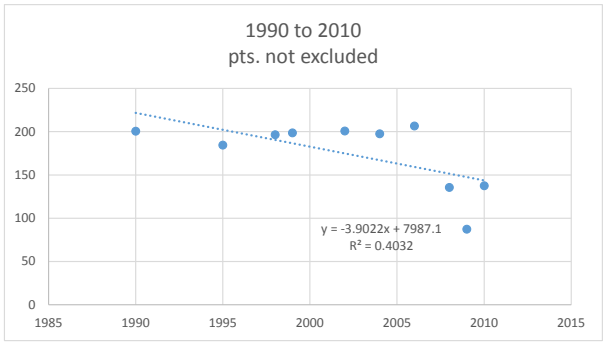
Date	land	water	%land	%water
1932	242.19	0	100	0
1956	241.52	0.67	99.72	0.28
1973	242.19	0	100	0
1975	236.18	6	97.52	2.48
1977	235.96	6.23	97.43	2.57
1985	183.03	59.16	75.57	24.43
1987	201.04	41.14	83.01	16.99
1990	200.6	41.59	82.83	17.17
1995	184.37	57.82	76.19	23.87
1998	196.37	45.81	81.08	18.92
1999	198.6	43.59	82	18
2002	200.82	41.37	82.92	17.08
2004	197.49	44.7	81.54	18.46
2006	206.6	35.58	85.31	14.69
2008	135.44	106.75	55.92	44.08
2009	87.18	155.01	36	64
2010	137.44	104.75	56.75	43.25

1990	200.6	41.59	82.83	17.17
1995	184.37	57.82	76.19	23.87
1998	196.37	45.81	81.08	18.92
1999	198.6	43.59	82	18
2002	200.82	41.37	82.92	17.08
2004	197.49	44.7	81.54	18.46
2006	206.6	35.58	85.31	14.69
2008		106.75	55.92	44.08
2009		155.01	36	64
2010	137.44	104.75	56.75	43.25

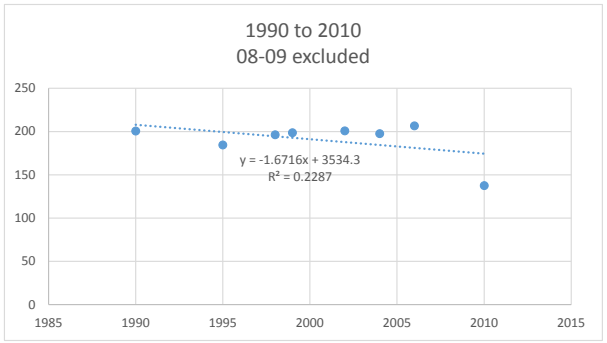
655 - East of Mud Lake



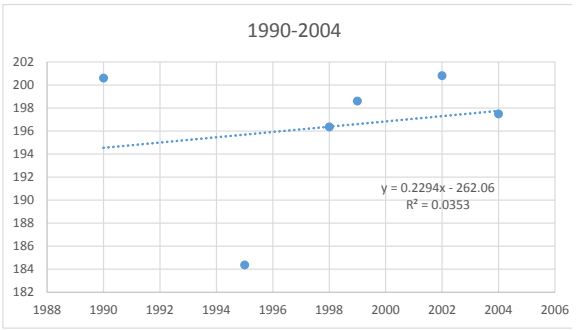
-1.60329



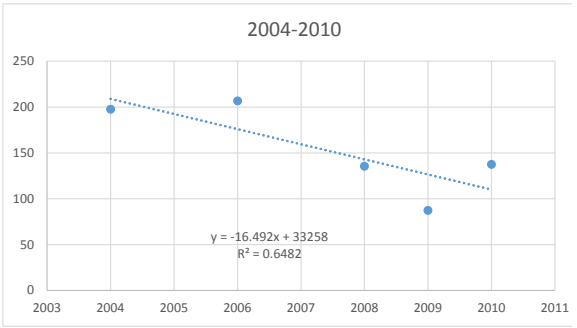
Land Change Rate -1.94526 Diff -21%



Land Change Rate -0.8325 Diff -212%



Land Change Rate 0.11436 Diff 107%



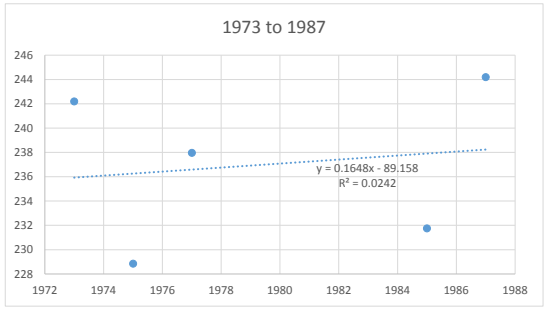
Land Change Rate -8.35080 Diff -421%

Date	land	water	%land	%water
1932	242.86	6.67	97.33	2.67
1956	243.08	6.45	97.42	2.58
1973	242.19	7.34	97.06	2.94
1975	228.84	20.68	91.71	8.29
1977	237.96	11.56	95.36	4.63
1985	231.74	17.79	92.87	7.13
1987	244.19	5.34	97.86	2.14
1990	230.62	18.9	92.42	7.57
1995	220.62	28.91	88.42	11.59
1998	238.41	11.12	95.54	4.46
1999	233.07	16.46	93.4	6.6
2002	240.85	8.67	96.52	3.47
2004	232.4	17.12	93.14	6.86
2006	234.85	14.68	94.12	5.88
2008	236.41	13.12	94.74	5.26
2009	237.52	12.01	95.19	4.81
2010	239.74	9.79	96.08	3.92

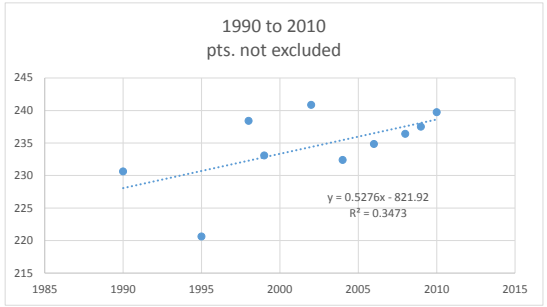
1987	244.19	5.34	97.86	2.14
1990	230.62	18.9	92.42	7.57
1995	220.62	28.91	88.42	11.59
1998	238.41	11.12	95.54	4.46
1999	233.07	16.46	93.4	6.6
2002	240.85	8.67	96.52	3.47
2004	232.4	17.12	93.14	6.86
2006	234.85	14.68	94.12	5.88
2008		13.12	94.74	5.26
2009		12.01	95.19	4.81
2010	239.74	9.79	96.08	3.92

gain rate = 0.486919

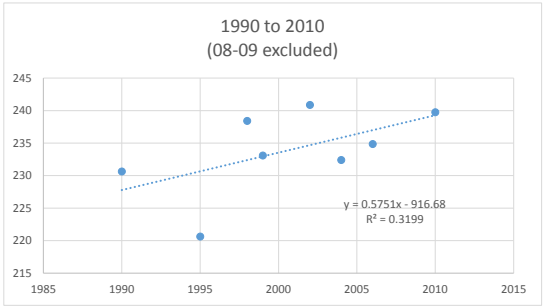
656-South of CS-21



change rate 0.068046

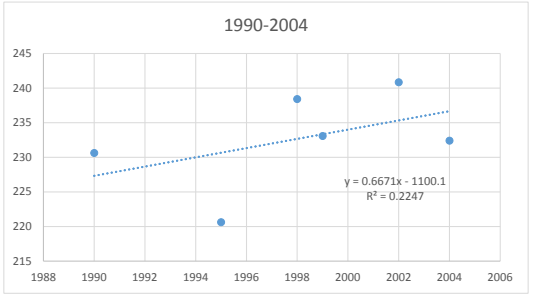


0.228775 70%

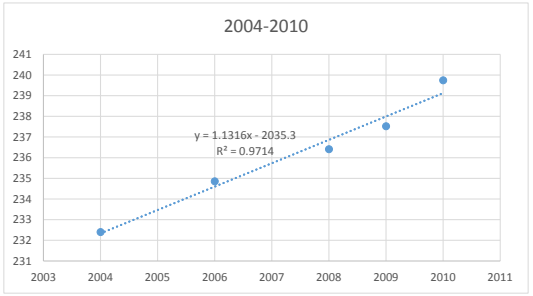


0.249328 73%

gain rate = 0.289264



Land Change Rate 0.28926 Diff -325%

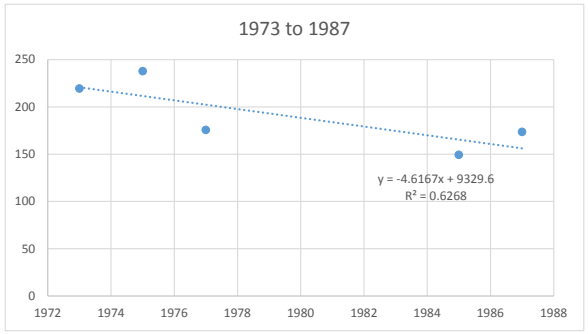


Land Change Rate 0.48692 Diff -616%

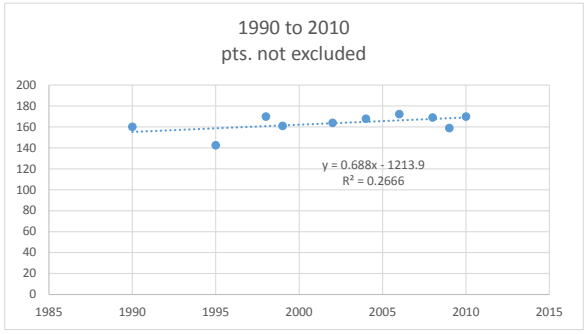
Date	land	water	%land	%water
1932	249.53	0	100	0
1956	249.53	0	100	0
1973	219.5	30.02	87.97	12.03
1975	237.96	11.56	95.36	4.63
1977	175.69	73.84	70.41	29.59
1985	149.45	100.08	59.89	40.11
1987	173.69	75.84	69.61	30.39
1990	160.12	89.4	64.17	35.83
1995	142.56	106.97	57.13	42.87
1998	169.91	79.62	68.09	31.91
1999	161.01	88.51	64.53	35.47
2002	163.9	85.62	65.68	34.31
2004	167.91	81.62	67.29	32.71
2006	172.36	77.17	69.07	30.93
2008	169.02	80.51	67.74	32.27
2009	159.02	90.51	63.72	36.27
2010	169.91	79.62	68.09	31.91

1990	160.12	89.4	64.17	35.83
1995	142.56	106.97	57.13	42.87
1998	169.91	79.62	68.09	31.91
1999	161.01	88.51	64.53	35.47
2002	163.9	85.62	65.68	34.31
2004	167.91	81.62	67.29	32.71
2006	172.36	77.17	69.07	30.93
2008		80.51	67.74	32.27
2009		90.51	63.72	36.27
2010	169.91	79.62	68.09	31.91

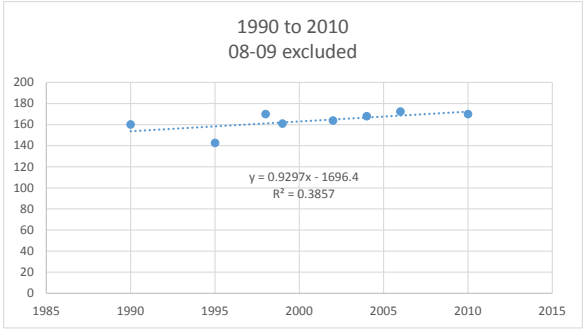
672-In CS-20



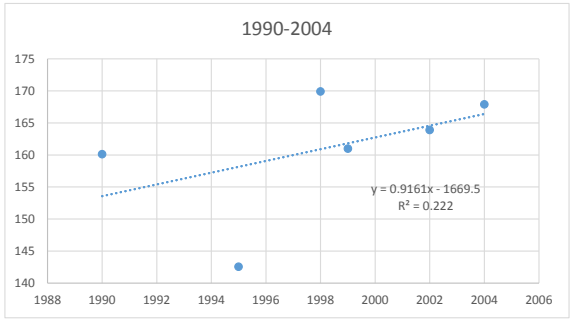
change rate -2.10328



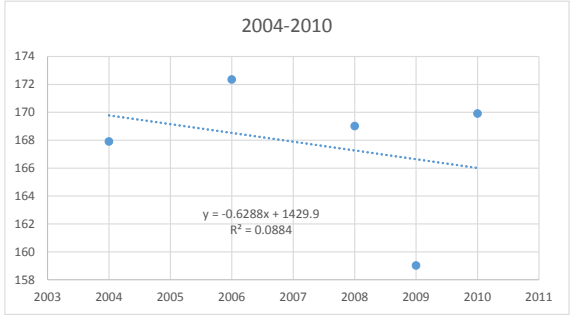
change rate 0.430927 120%



change rate 0.580627 128%



Land Change Rate 0.57213 Diff 127%



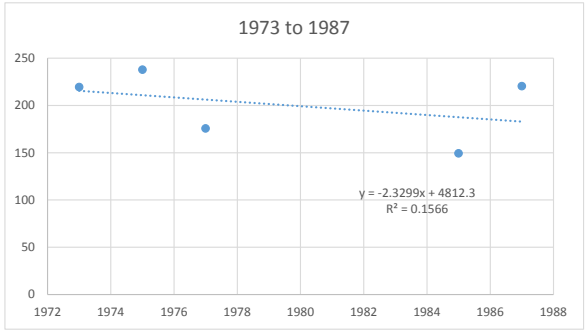
Land Change Rate -0.37449 Diff 82%

Date	land	water	%land	%water	T-correct
1932	249.53	0	100	0	249.53
1956	249.53	0	100	0	249.53
1973	219.5	30.02	87.97	12.03	219.5
1975	237.96	11.56	95.36	4.63	237.96
1977	175.69	73.84	70.41	29.59	175.69
1985	149.45	100.08	59.89	40.11	149.45
1987	220.39	21.79	91	9	220.39
1990	160.12	89.4	64.17	35.83	160.12
1995	142.56	106.97	57.13	42.87	142.56
1998	169.91	79.62	68.09	31.91	149.91
1999	161.01	88.51	64.53	35.47	141.01
2002	163.9	85.62	65.68	34.31	143.9
2004	167.91	81.62	67.29	32.71	147.91
2006	172.36	77.17	69.07	30.93	152.36
2008	135.44	80.51	67.74	32.27	115.44
2009	87.18	90.51	63.72	36.27	67.18
2010	169.91	79.62	68.09	31.91	149.91

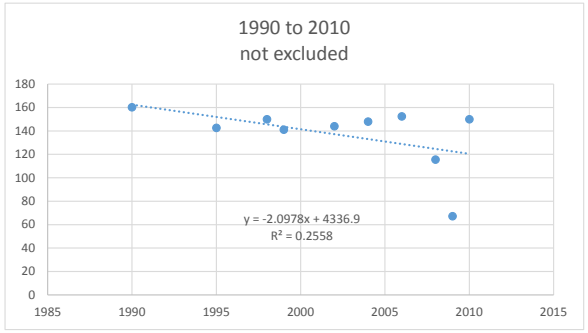
1990	160.12	89.4	64.17	35.83	160.12
1995	142.56	106.97	57.13	42.87	142.56
1998	169.91	79.62	68.09	31.91	149.91
1999	161.01	88.51	64.53	35.47	141.01
2002	163.9	85.62	65.68	34.31	143.9
2004	167.91	81.62	67.29	32.71	147.91
2006	172.36	77.17	69.07	30.93	152.36
2008		80.51	67.74	32.27	
2009		90.51	63.72	36.27	
2010	169.91	79.62	68.09	31.91	149.91

Indicates corrected for terraces. Removed 20 acres from total acres.

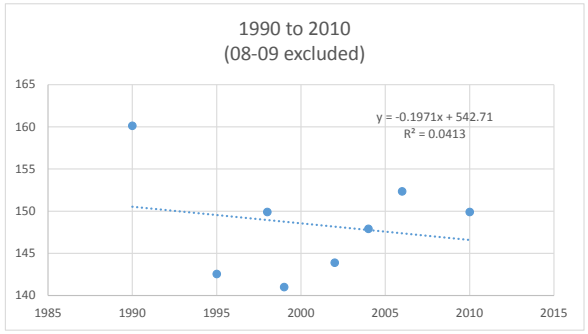
685 - W of Calcasieu Ship Channel (wo terraces)



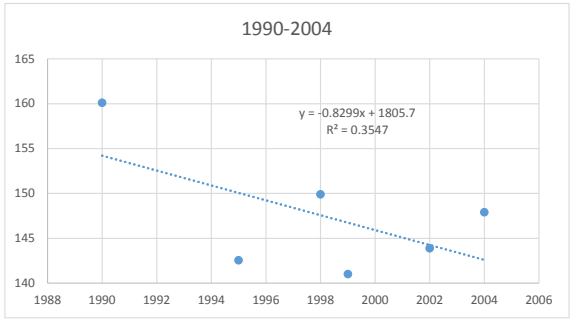
-1.06146



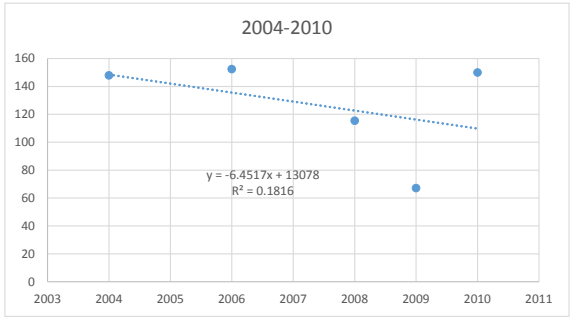
-1.31113 -24%



-0.1231 88%



Land Change Rate -0.51830 Diff 51%

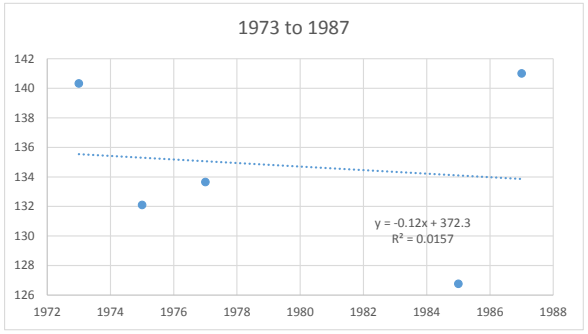


Land Change Rate -4.36191 Diff -311%

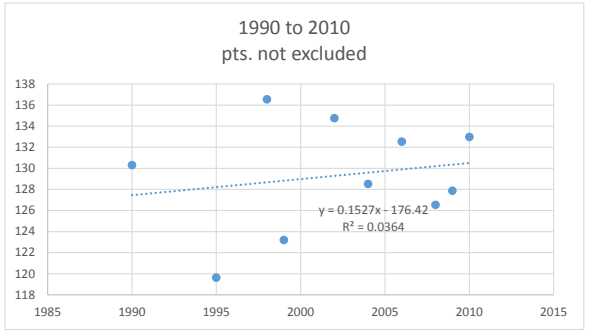
Date	land	water	%land	%water
1932	140.33	109.2	56.24	43.76
1956	129.43	120.09	51.87	48.13
1973	140.33	109.2	56.24	43.76
1975	132.1	117.42	52.94	47.06
1977	133.66	115.87	53.57	46.44
1985	126.77	122.76	50.8	49.2
1987	141	108.53	56.51	43.49
1990	130.32	119.2	52.23	47.77
1995	119.65	129.88	47.95	52.05
1998	136.55	112.98	54.72	45.28
1999	123.21	126.32	49.38	50.62
2002	134.77	114.76	54.01	45.99
2004	128.54	120.98	51.51	48.48
2006	132.55	116.98	53.12	46.88
2008	126.54	122.98	50.71	49.29
2009	127.88	121.65	51.25	48.75
2010	132.99	116.53	53.3	46.7

1990	130.32	119.2	52.23	47.77
1995	119.65	129.88	47.95	52.05
1998	136.55	112.98	54.72	45.28
1999	123.21	126.32	49.38	50.62
2002	134.77	114.76	54.01	45.99
2004	128.54	120.98	51.51	48.48
2006	132.55	116.98	53.12	46.88
2008		122.98	50.71	49.29
2009		121.65	51.25	48.75
2010	132.99	116.53	53.3	46.7

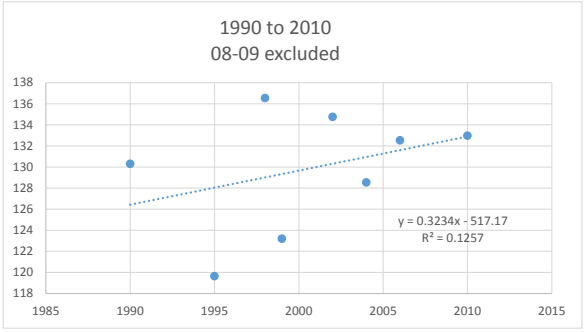
687 - West of C Ship Channel



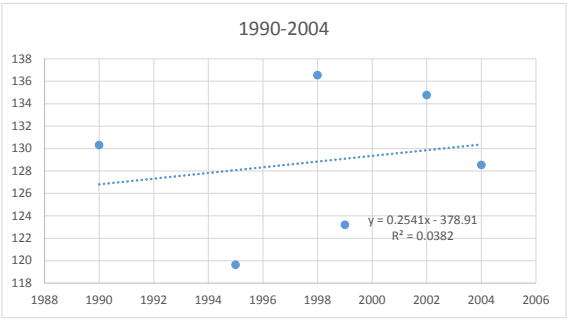
-0.08551



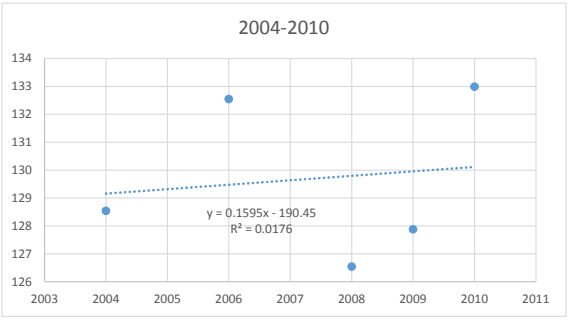
0.117173 237%



0.248158 390%



Land Change Rate 0.19498 Diff 328%

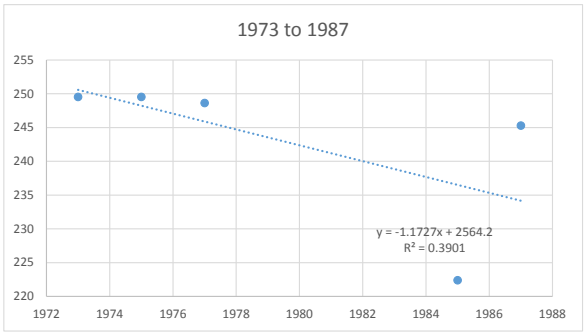


Land Change Rate 0.12409 Diff 245%

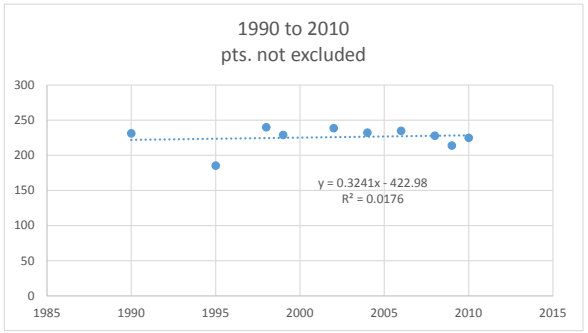
Date	land	water	%land	%water
1932	249.08	0.44	99.82	0.18
1956	248.86	0.67	99.73	0.27
1973	249.53	0	100	0
1975	249.53	0	100	0
1977	248.64	0.89	99.64	0.36
1985	222.39	27.13	89.12	10.87
1987	245.3	4.23	98.31	1.7
1990	231.29	18.24	92.69	7.31
1995	185.48	64.05	74.33	25.67
1998	239.96	9.56	96.17	3.83
1999	229.07	20.46	91.8	8.2
2002	238.85	10.67	95.72	4.28
2004	232.4	17.12	93.14	6.86
2006	235.07	14.46	94.21	5.79
2008	228.18	21.35	91.44	8.56
2009	213.94	35.58	85.74	14.26
2010	225.06	24.46	90.19	9.8

1990	231.29	18.24	92.69	7.31
1995	185.48	64.05	74.33	25.67
1998	239.96	9.56	96.17	3.83
1999	229.07	20.46	91.8	8.2
2002	238.85	10.67	95.72	4.28
2004	232.4	17.12	93.14	6.86
2006	235.07	14.46	94.21	5.79
2008		21.35	91.44	8.56
2009		35.58	85.74	14.26
2010	225.06	24.46	90.19	9.8

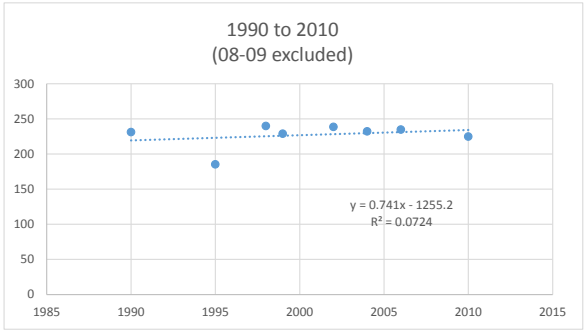
684 - SE of Sabine Lake



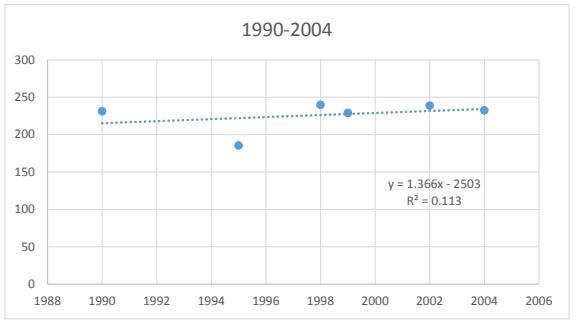
-0.46996



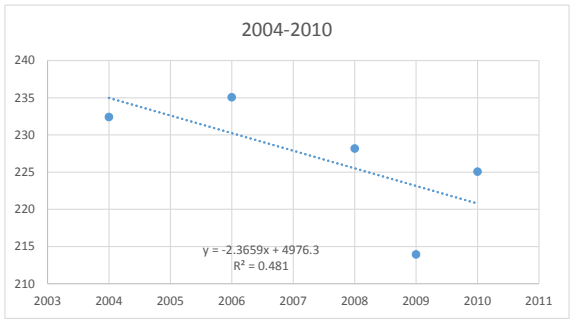
0.140127 130%



0.320377 168%



Land Change Rate 0.59060 Diff 226%

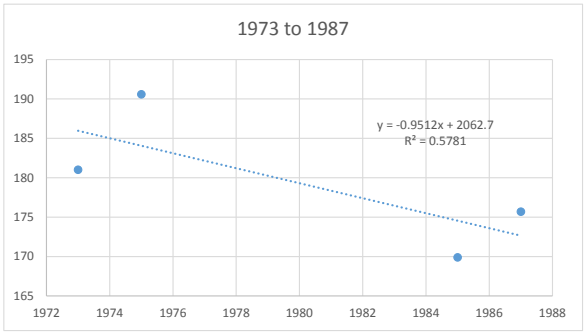


Land Change Rate -1.01803 Diff -117%

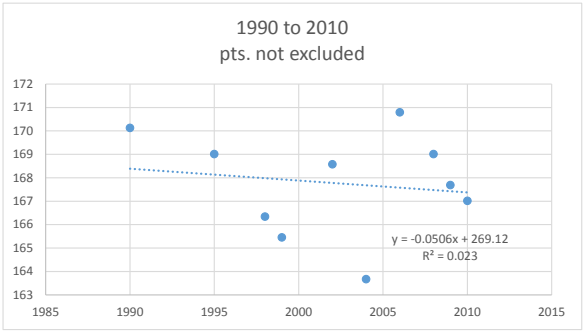
Date	land	water	%land	%water
1932	179.47	62.72	74.1	25.9
1956	178.81	63.38	73.83	26.17
1973	181.03	61.16	74.75	25.25
1975	190.59	51.6	78.69	21.31
1977		154.12	36.36	63.64
1985	169.91	72.28	70.16	29.84
1987	175.69	66.5	72.54	27.46
1990	170.13	72.06	70.25	29.75
1995	169.02	73.17	69.79	30.21
1998	166.35	75.84	68.69	31.31
1999	165.46	76.73	68.32	31.68
2002	168.58	73.61	69.61	30.39
2004	163.68	78.51	67.58	32.42
2006	170.8	71.39	70.52	29.48
2008	169.02	73.17	69.79	30.21
2009	167.69	74.5	69.24	30.76
2010	167.02	75.17	68.96	31.04

1990	170.13	72.06	70.25	29.75
1995	169.02	73.17	69.79	30.21
1998	166.35	75.84	68.69	31.31
1999	165.46	76.73	68.32	31.68
2002	168.58	73.61	69.61	30.39
2004	163.68	78.51	67.58	32.42
2006	170.8	71.39	70.52	29.48
2008		73.17	69.79	30.21
2009		74.5	69.24	30.76
2010	167.02	75.17	68.96	31.04

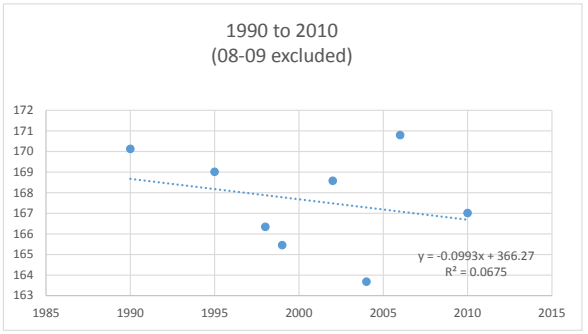
2189 - E of Sabine Lake



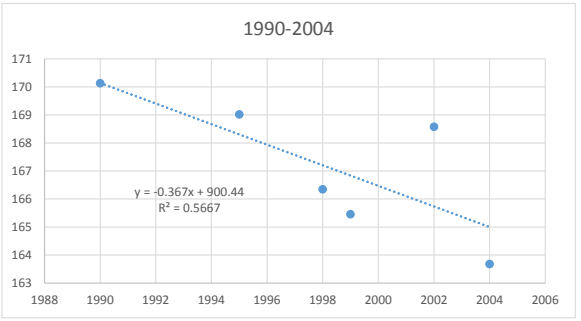
-0.52544



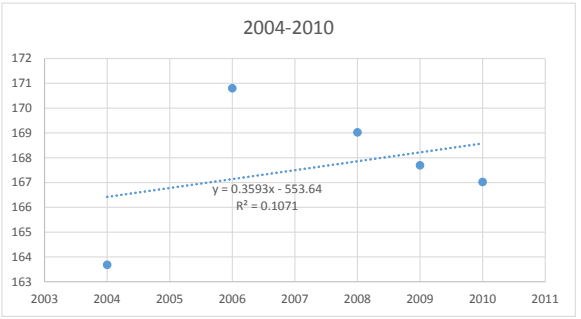
-0.29742 43%



-0.05837 89%



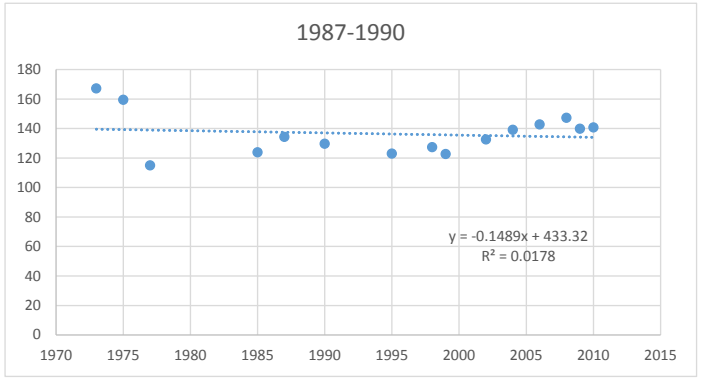
Land Change Rate -0.21572 Diff 59%



Land Change Rate 0.21951 Diff 142%

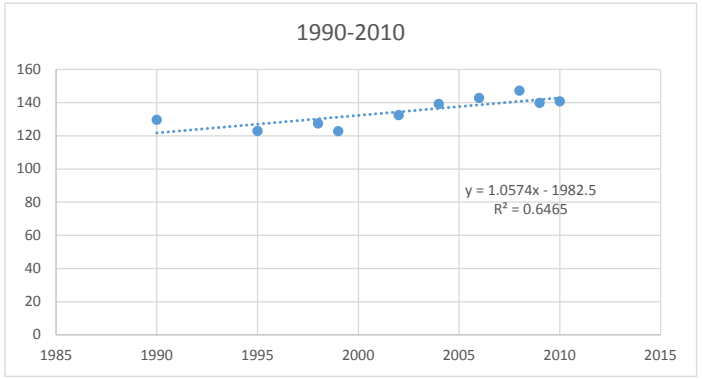
Date	Land
1973	167.24
1975	159.46
1977	114.98
1985	123.87
1987	134.33
1990	129.66
1995	122.98
1998	127.43
1999	122.76
2002	132.55
2004	139.22
2006	142.78
2008	147.23
2009	139.89
2010	140.78

CRMS 660 - Sabine Area

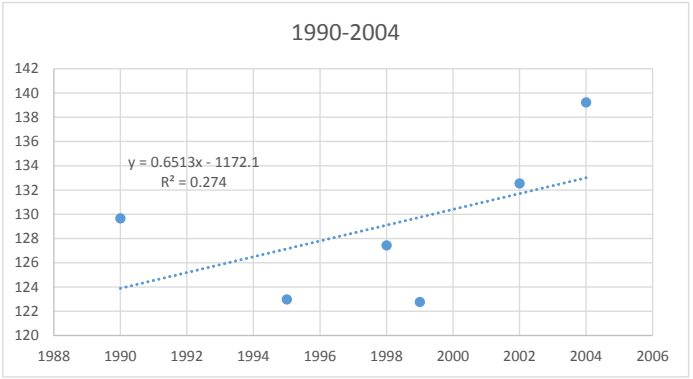


-0.08903

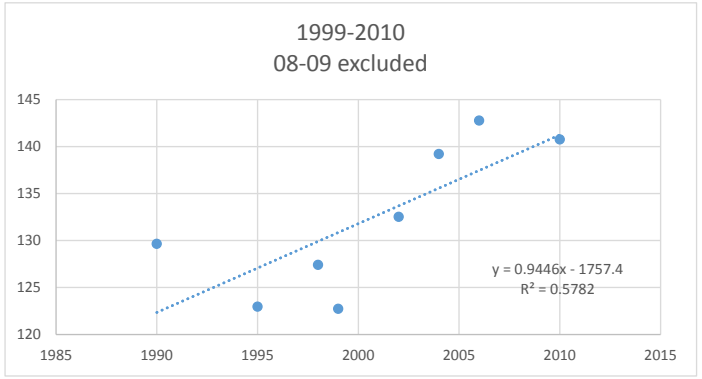
1990	129.66
1995	122.98
1998	127.43
1999	122.76
2002	132.55
2004	139.22
2006	142.78
2008	
2009	
2010	140.78



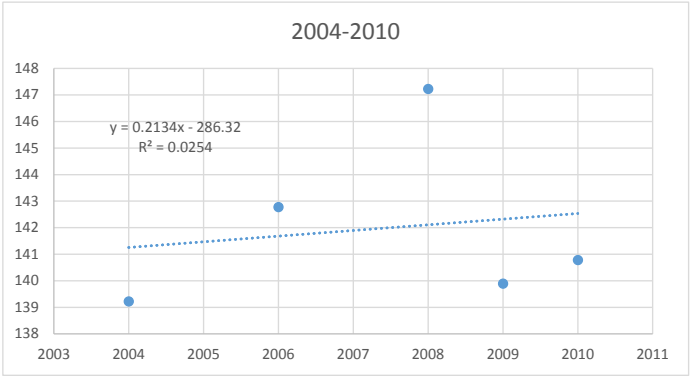
0.815518



Land Change Rate 0.50231 Diff 664%



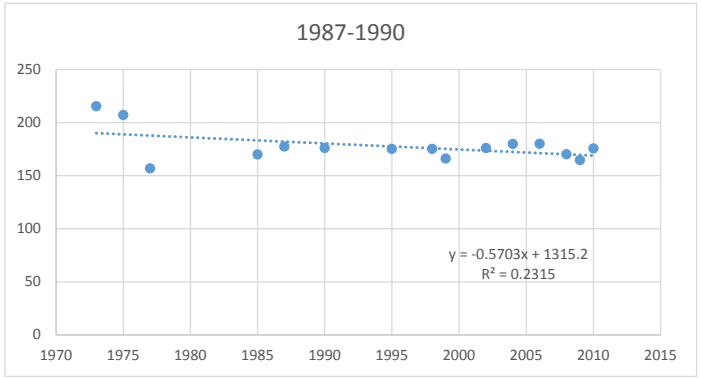
0.728521



Land Change Rate 0.15328 Diff 272%

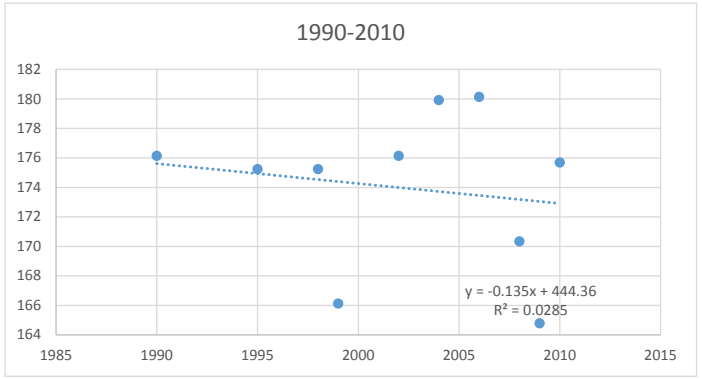
Date	Land
1973	215.5
1975	207.27
1977	157.01
1985	170.13
1987	177.47
1990	176.14
1995	175.25
1998	175.25
1999	166.13
2002	176.14
2004	179.92
2006	180.14
2008	170.35
2009	164.79
2010	175.69

CRMS 683 - Sabine Area

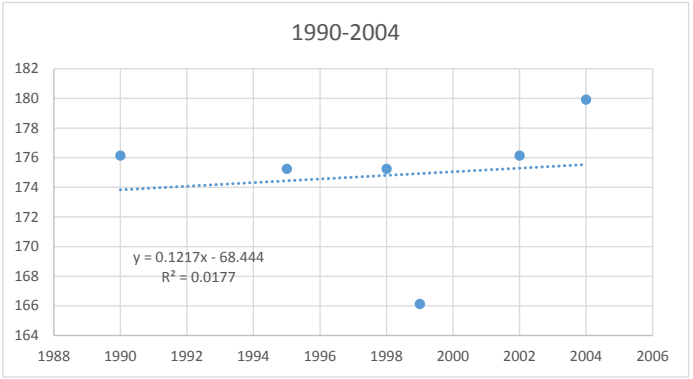


-0.26464

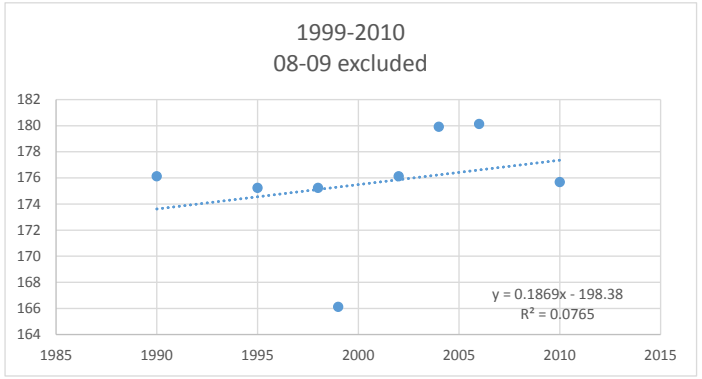
1990	176.14
1995	175.25
1998	175.25
1999	166.13
2002	176.14
2004	179.92
2006	180.14
2008	
2009	
2010	175.69



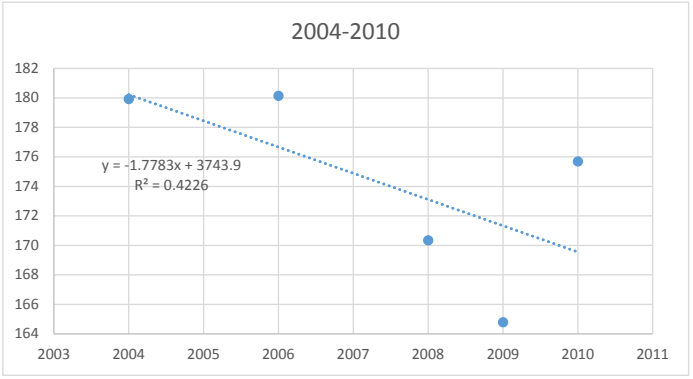
-0.07664



Land Change Rate 0.06909 Diff 126%



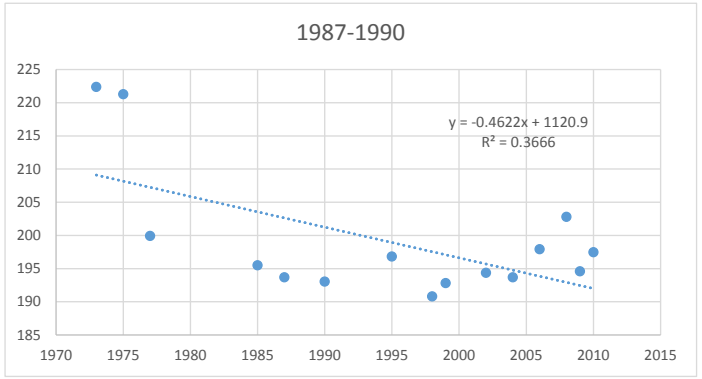
0.106109



Land Change Rate -0.98838 Diff -273%

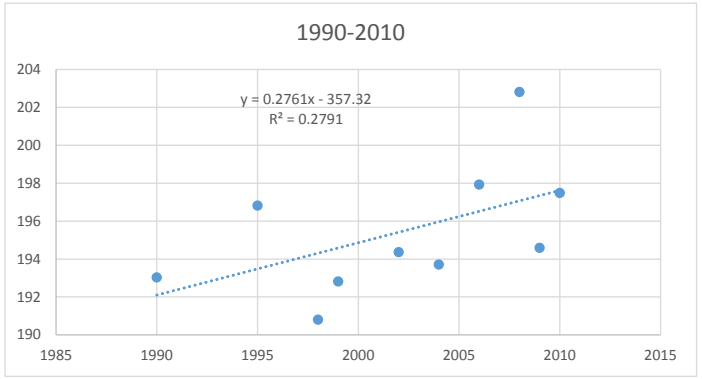
CRMS 669 - Sabine Area

Date	Land
1973	222.39
1975	221.28
1977	199.93
1985	195.49
1987	193.71
1990	193.04
1995	196.82
1998	190.81
1999	192.82
2002	194.37
2004	193.71
2006	197.93
2008	202.82
2009	194.6
2010	197.49



-0.20783

1990	193.04
1995	196.82
1998	190.81
1999	192.82
2002	194.37
2004	193.71
2006	197.93
2008	
2009	
2010	197.49



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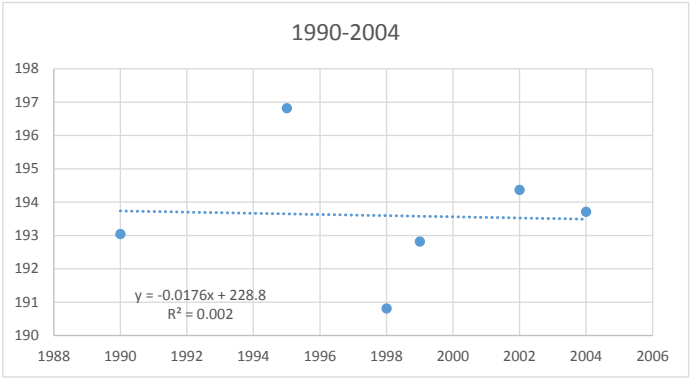
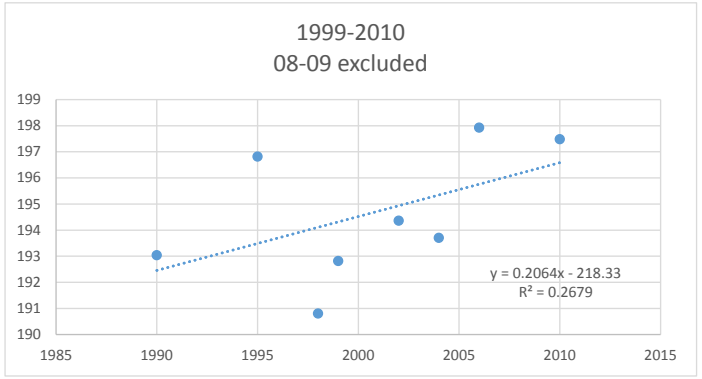


Land Change Rate -0.00912 Diff 96%



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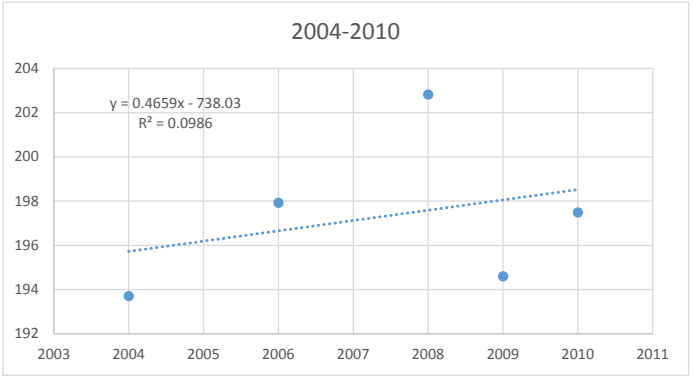
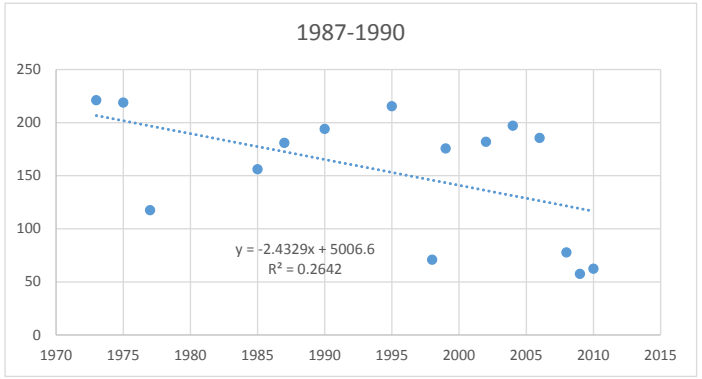


Land Change Rate 0.24051 Diff 216%

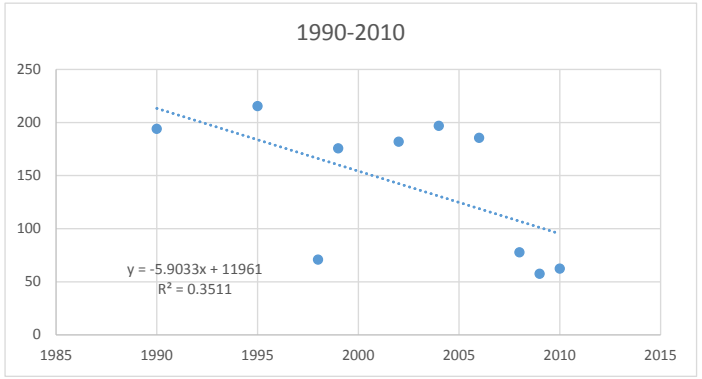
CRMS 2154 - Sabine Area

Date	Land
1973	221.06
1975	218.84
1977	117.65
1985	156.12
1987	181.03
1990	194.15
1995	215.5
1998	70.94
1999	175.69
2002	181.92
2004	197.04
2006	185.7
2008	77.84
2009	57.6
2010	62.49

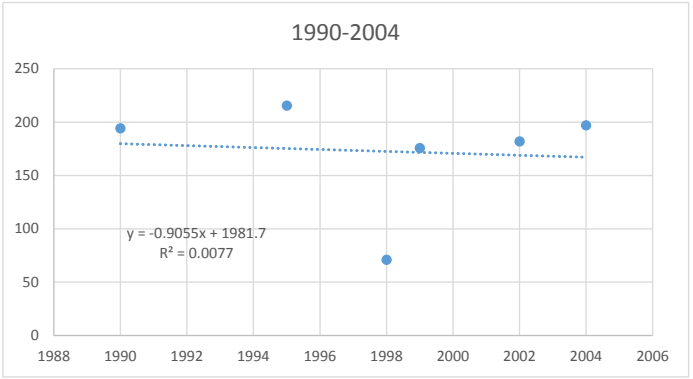


-1.10056

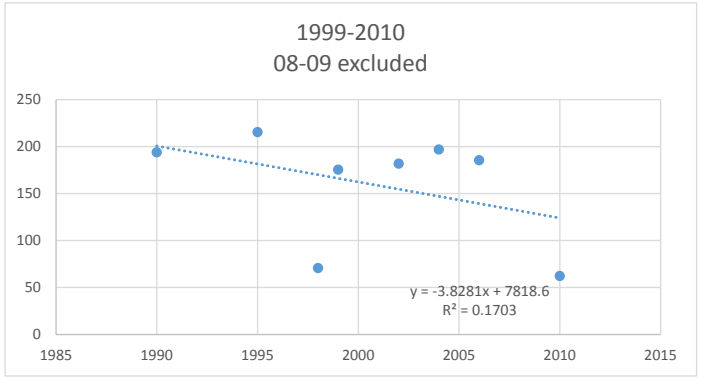
1990	194.15
1995	215.5
1998	70.94
1999	175.69
2002	181.92
2004	197.04
2006	185.7
2008	
2009	
2010	62.49



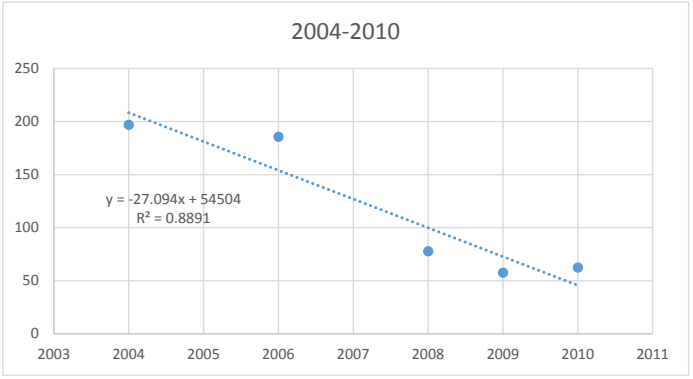
-3.04059



Land Change Rate -0.46639 Diff 58%



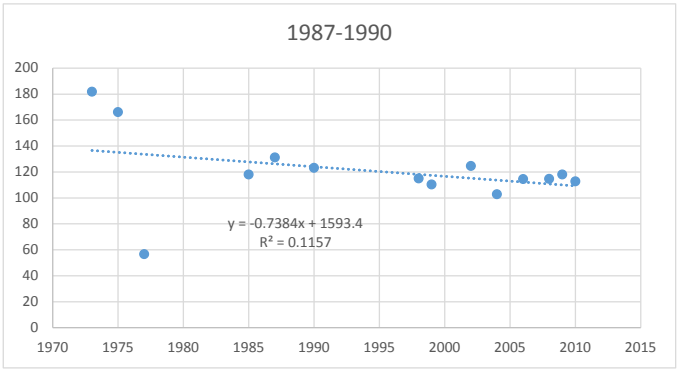
-1.97172



Land Change Rate -13.75051 Diff -1149%

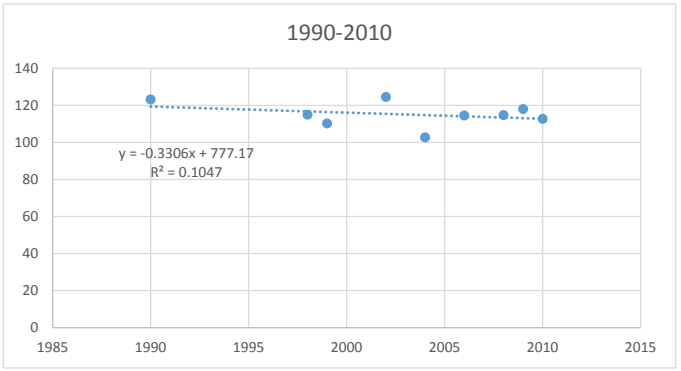
CRMS 663 - Sabine Area

Date	Land
1973	181.92
1975	166.13
1977	56.71
1985	118.09
1987	131.21
1990	123.21
1995	
1998	114.98
1999	110.31
2002	124.54
2004	102.75
2006	114.53
2008	114.76
2009	118.09
2010	112.75

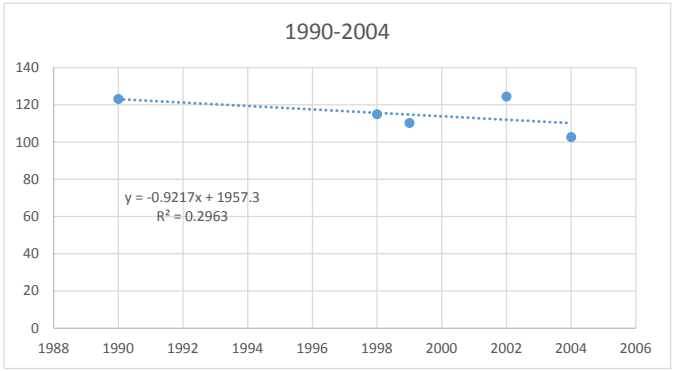


-0.405893

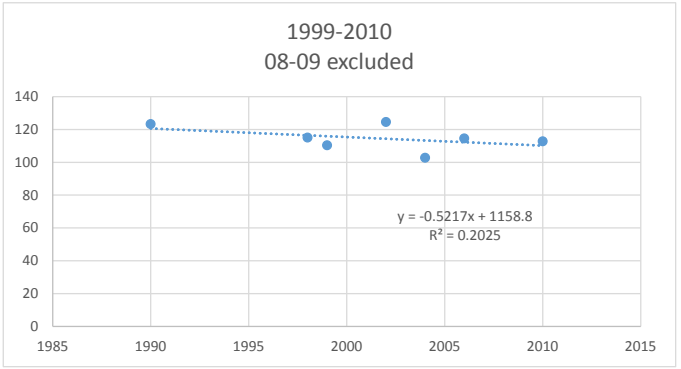
1990	123.21
1995	
1998	114.98
1999	110.31
2002	124.54
2004	102.75
2006	114.53
2008	
2009	
2010	112.75



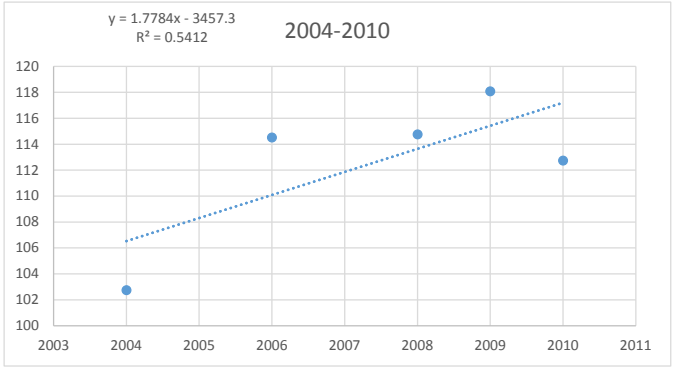
-0.268322



Land Change Rate -0.74807 Diff -84%



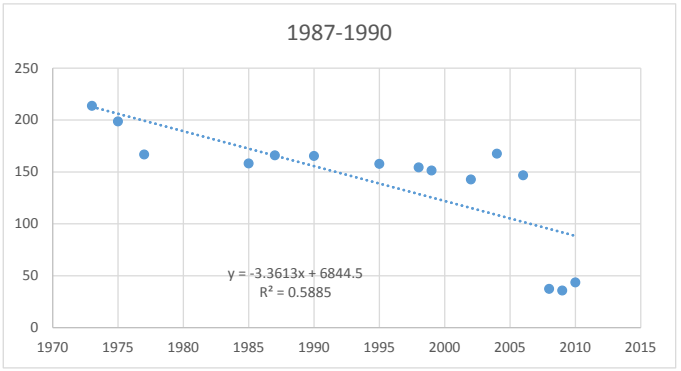
-0.423423



Land Change Rate 1.73080 Diff 526%

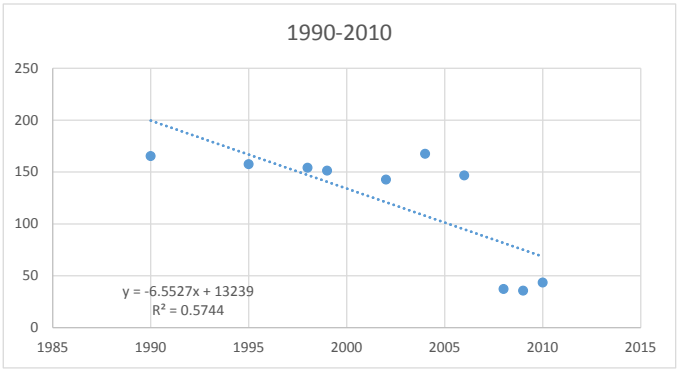
Date	Land
1973	213.72
1975	198.6
1977	166.76
1985	158.12
1987	165.91
1990	165.46
1995	157.68
1998	154.34
1999	151.45
2002	142.78
2004	167.69
2006	146.78
2008	37.36
2009	35.81
2010	43.59

CRMS 1205 - Sabine Area

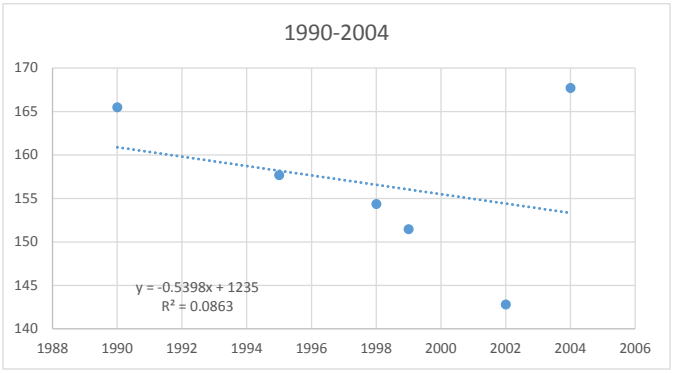


-1.572759

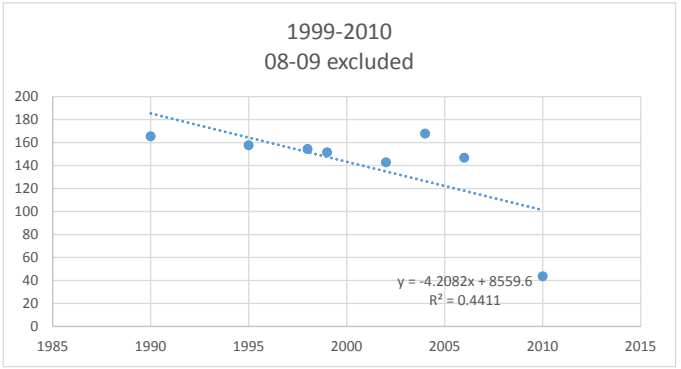
1990	165.46
1995	157.68
1998	154.34
1999	151.45
2002	142.78
2004	167.69
2006	146.78
2008	
2009	
2010	43.59



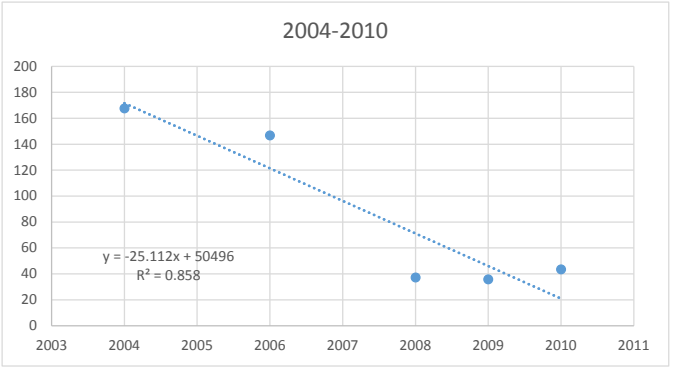
-3.960293



Land Change Rate -0.32624 Diff 79%



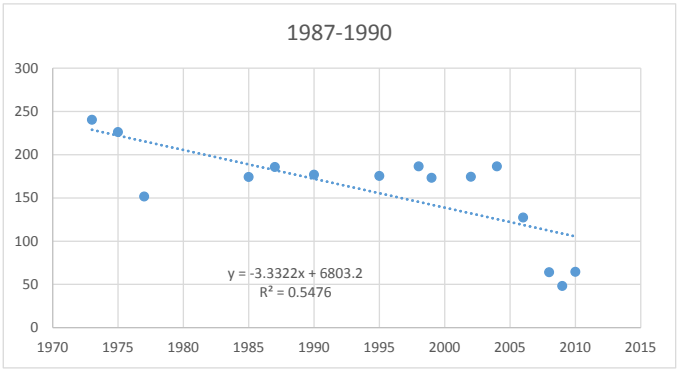
-2.543334



Land Change Rate -14.97525 Diff -852%

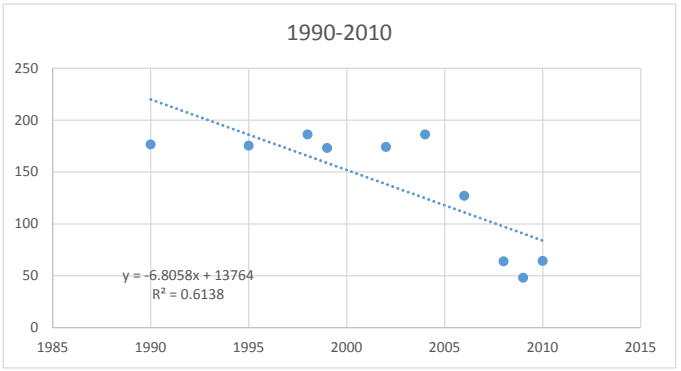
Date	Land
1973	240.41
1975	226.18
1977	151.67
1985	174.14
1987	185.7
1990	176.8
1995	175.47
1998	186.37
1999	173.25
2002	174.36
2004	186.37
2006	127.21
2008	64.05
2009	48.26
2010	64.49

CRMS 641 - Sabine Area

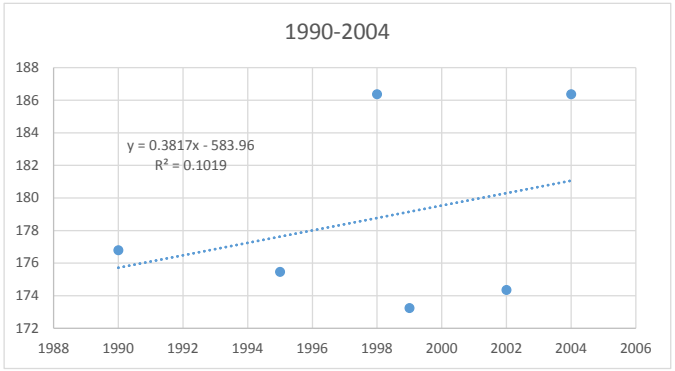


-1.386049

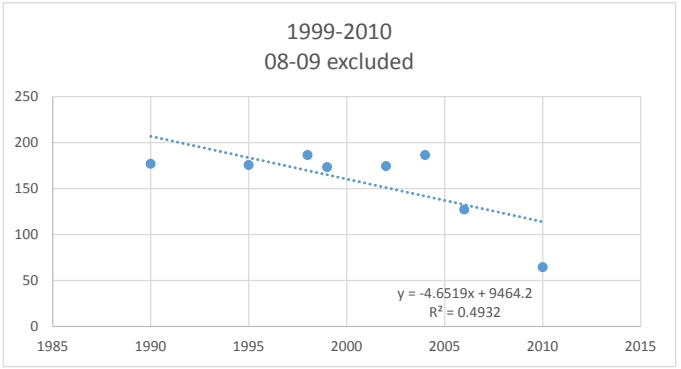
1990	176.8
1995	175.47
1998	186.37
1999	173.25
2002	174.36
2004	186.37
2006	127.21
2008	
2009	
2010	64.49



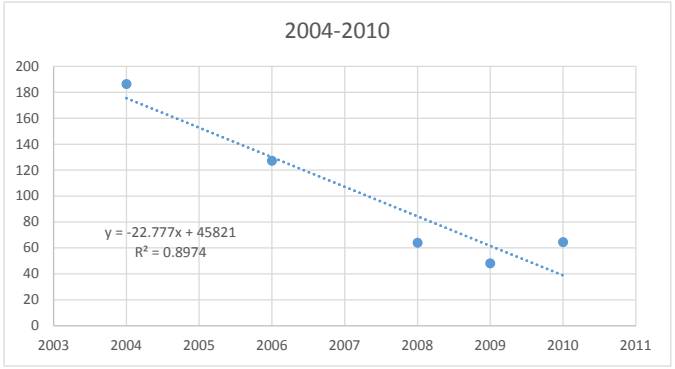
-3.849434



Land Change Rate 0.21589 Diff 116%



-2.631165



Land Change Rate -12.22139 Diff -782%

APPENDIX D

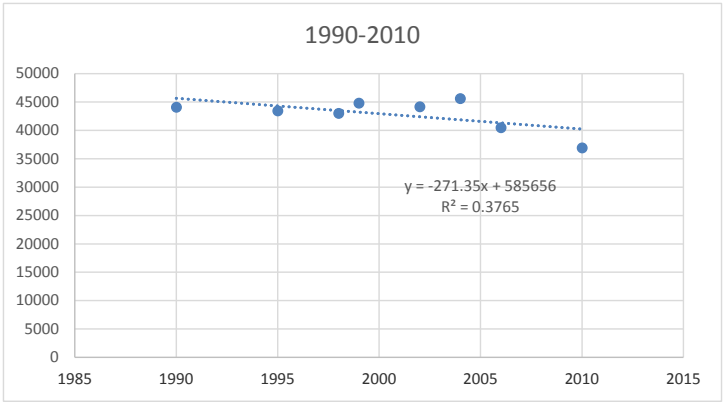
Land Loss Spreadsheets

Land Loss Spreadsheet

Project:	CS-04a Land/Water- Interval Analysis (TY1-TY20)			Loss Rate (%/yr)
Total Acres	Year	Marsh Acres	Water Acres	-1.0265
63,964	1997	43,057	20,907	
63,964	1998	42,615	20,903	

1973-1987 Pre-construction loss rate

	FWOP				FWP				
TY	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Net Acres of Marsh
1997		43,057	67%	20,907					
1998	-0.01027	42,615	67%	21,349	-0.0062	42,790	67%	21,174	175
1999	-0.01027	42,178	66%	21,786	-0.0062	42,525	66%	21,439	347
2000	-0.01027	41,745	65%	22,219	-0.0062	42,261	66%	21,703	516
2001	-0.01027	41,316	65%	22,648	-0.0062	41,999	66%	21,965	683
2002	-0.01027	40,892	64%	23,072	-0.0062	41,739	65%	22,225	847
2003	-0.01027	40,472	63%	23,492	-0.0062	41,480	65%	22,484	1,008
2004	-0.01027	40,057	63%	23,907	-0.0062	41,223	64%	22,741	1,166
2005	-0.01027	39,646	62%	24,318	-0.0062	40,967	64%	22,997	1,322
2006	-0.01027	39,239	61%	24,725	-0.0062	40,713	64%	23,251	1,474
2007	-0.01027	38,836	61%	25,128	-0.0062	40,461	63%	23,503	1,625
2008	-0.01027	38,437	60%	25,527	-0.0062	40,210	63%	23,754	1,773
2009	-0.01027	38,043	59%	25,921	-0.0062	39,961	62%	24,003	1,918
2010	-0.01027	37,652	59%	26,312	-0.0062	39,713	62%	24,251	2,061
2011	-0.01027	37,266	58%	26,698	-0.0062	39,467	62%	24,497	2,201
2012	-0.01027	36,883	58%	27,081	-0.0062	39,222	61%	24,742	2,339
2013	-0.01027	36,505	57%	27,459	-0.0062	38,979	61%	24,985	2,474
2014	-0.01027	36,130	56%	27,834	-0.0062	38,737	61%	25,227	2,607
2015	-0.01027	35,759	56%	28,205	-0.0062	38,497	60%	25,467	2,738
2016	-0.01027	35,392	55%	28,572	-0.0062	38,258	60%	25,706	2,866
2017	-0.01027	35,029	55%	28,935	-0.0062	38,021	59%	25,943	**2,992**



-0.62%

Noninterval Analysis - Land/Water

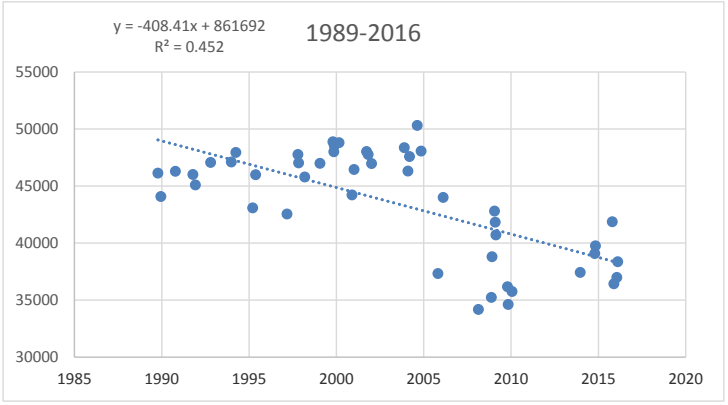
The pre-construction rate is the 1973-1987 rate of -1.02%/y. The post construction rate was determined from the land/water data from 1990 to 2010 (excluding 2008 and 2009) and applied to the 1997 to 2017 project time period. The TY20 net acres is 2,992 acres.

Land Loss Spreadsheet

Project:	CS-04a Land/Water- Interval Analysis (TY1-TY20)			Loss Rate (%/yr)
Total Acres	Year	Marsh Acres	Water Acres	-1.0265
63,964	1997	42,975	20,989	
63,964	1998	42,534	21,430	

1973-1987 Pre-construction loss rate

	FWOP				FWP				
TY	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Net Acres of Marsh
1997		42,975	67%	20,989					
1998	-0.01027	42,534	66%	21,430	-0.0083	42,618	67%	21,346	84
1999	-0.01027	42,097	66%	21,867	-0.0083	42,265	66%	21,699	167
2000	-0.01027	41,665	65%	22,299	-0.0083	41,914	66%	22,050	249
2001	-0.01027	41,237	64%	22,727	-0.0083	41,566	65%	22,398	328
2002	-0.01027	40,814	64%	23,150	-0.0083	41,221	64%	22,743	407
2003	-0.01027	40,395	63%	23,569	-0.0083	40,879	64%	23,085	484
2004	-0.01027	39,981	63%	23,983	-0.0083	40,539	63%	23,425	559
2005	-0.01027	39,570	62%	24,394	-0.0083	40,203	63%	23,761	633
2006	-0.01027	39,164	61%	24,800	-0.0083	39,869	62%	24,095	705
2007	-0.01027	38,762	61%	25,202	-0.0083	39,538	62%	24,426	776
2008	-0.01027	38,364	60%	25,600	-0.0083	39,210	61%	24,754	846
2009	-0.01027	37,970	59%	25,994	-0.0083	38,885	61%	25,079	915
2010	-0.01027	37,580	59%	26,384	-0.0083	38,562	60%	25,402	982
2011	-0.01027	37,195	58%	26,769	-0.0083	38,242	60%	25,722	1,047
2012	-0.01027	36,813	58%	27,151	-0.0083	37,925	59%	26,039	1,112
2013	-0.01027	36,435	57%	27,529	-0.0083	37,610	59%	26,354	1,175
2014	-0.01027	36,061	56%	27,903	-0.0083	37,298	58%	26,666	1,237
2015	-0.01027	35,691	56%	28,273	-0.0083	36,988	58%	26,976	1,297
2016	-0.01027	35,324	55%	28,640	-0.0083	36,681	57%	27,283	1,357
2017	-0.01027	34,962	55%	29,002	-0.0083	36,377	57%	27,587	**1,415**



-0.83%

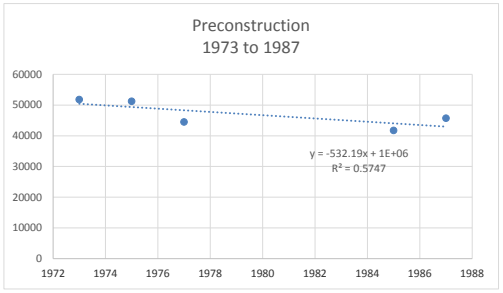
Noninterval Analysis - Hypertemporal

The pre-construction rate is the 1973-1987 rate of -1.02%/y. The post construction rate was determined from the hypertemporal data from 1989 to 2016 and applied to the 1997 to 2017 project time period. The TY20 net acres is 1,415 acres.

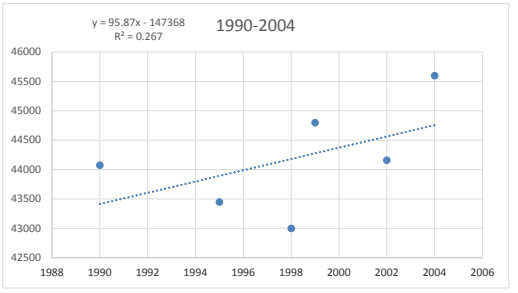
Land Loss Spreadsheet

Project:	CS-04a Land/Water- Interval Analysis (TY1-TY20)			Loss Rate (%/yr)	
Total Acres	Year	Marsh Acres	Water Acres	-1.0265	1973-1987 Pre-construction loss rate
63,960	1997	43,057	20,903		
63,960	1998	42,615	20,903		

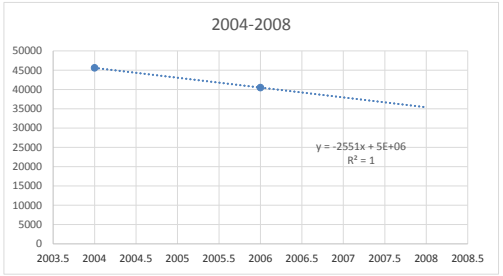
	FWOP				FWP				
TY	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Net Acres of Marsh
1997		43,057	67%	20,903					
1998	-0.01027	42,615	67%	21,345	0.002175	43,151	67%	20,809	536
1999	-0.01027	42,178	66%	21,782	0.002175	43,245	68%	20,715	1,067
2000	-0.01027	41,745	65%	22,215	0.002175	43,339	68%	20,621	1,594
2001	-0.01027	41,316	65%	22,644	0.002175	43,433	68%	20,527	2,117
2002	-0.01027	40,892	64%	23,068	0.002175	43,527	68%	20,433	2,635
2003	-0.01027	40,472	63%	23,488	0.002175	43,622	68%	20,338	3,150
2004	-0.01027	40,057	63%	23,903	0.002175	43,717	68%	20,243	3,660
2005	-0.01027	39,646	62%	24,314	-0.06797	40,745	64%	23,215	1,100
2006	-0.01027	39,239	61%	24,721	-0.06797	37,976	59%	25,984	-1,263
2007	-0.01027	38,836	61%	25,124	-0.06797	35,395	55%	28,565	-3,441
2008	-0.01027	38,437	60%	25,523	-0.06797	32,989	52%	30,971	-5,448
2009	-0.01027	38,043	59%	25,917	0.05612	34,840	54%	29,120	-3,202
2010	-0.01027	37,652	59%	26,308	0.05612	36,796	58%	27,164	-857
2011	-0.01027	37,266	58%	26,694	0.00295	36,904	58%	27,056	-362
2012	-0.01027	36,883	58%	27,077	0.00295	37,013	58%	26,947	130
2013	-0.01027	36,505	57%	27,455	0.00295	37,122	58%	26,838	618
2014	-0.01027	36,130	56%	27,830	0.00295	37,232	58%	26,728	1,102
2015	-0.01027	35,759	56%	28,201	0.00295	37,341	58%	26,619	1,583
2016	-0.01027	35,392	55%	28,568	0.00295	37,452	59%	26,508	2,060
2017	-0.01027	35,029	55%	28,931	0.00295	37,562	59%	26,398	**2,534**



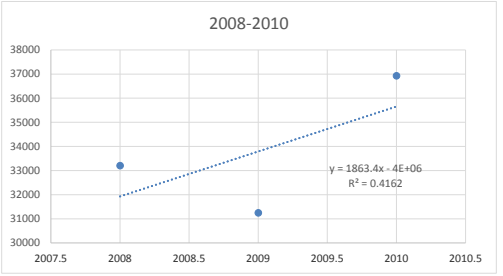
-1.0265%



0.2175%



-6.797%



5.612%

Loss Rate	Interval	Source Data
-1.0265	Pre Project Rate 1973-1987	Land/Water
0.2175	Pre Hurricane (1990-2004)	Land/Water
-6.7970	Post Hurricane (2004-2008)	Land/Water
5.6120	Post Hurricane (2008-2010)	Land/Water
0.2950	Present (2011-2017)	Hypertemporal

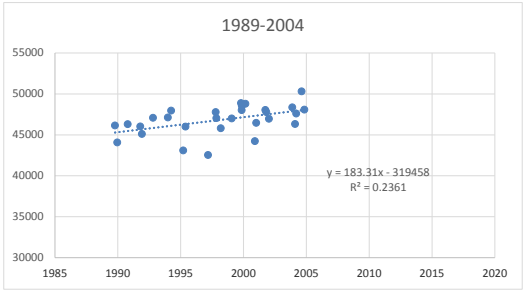
Slope Interval Analysis - Land/Water Data:
FWOP - The pre-project loss rate is determined from the land/water data available from 1973 - 1987. The rate is -1.027 %/y
FWP - Because of the large-scale effects of the hurricanes in 2005 and 2008, the line is broken up into different intervals and the slopes for each interval, which represent the loss rates, are used to determine the change in land area.

The TY20 net acres = 2,534 acres

Land Loss Spreadsheet

Project:	CS-04a Land/Water- Interval Analysis (TY1-TY20)			Loss Rate (%/yr)
Total Acres	Year	Marsh Acres	Water Acres	-1.0265 (1973-1987 Pre-construction loss rate)
63,964	1997	45,786	18,178	
63,964	1998	45,316	18,178	

	FWOP				FWP				
TY	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Net Acres of Marsh
1997		45,786	72%	18,178					
1998	-0.01027	45,316	71%	18,648	0.00406	45,972	72%	17,992	656
1999	-0.01027	44,851	70%	19,113	0.00406	46,159	72%	17,805	1,308
2000	-0.01027	44,390	69%	19,574	0.00406	46,346	72%	17,618	1,955
2001	-0.01027	43,935	69%	20,029	0.00406	46,534	73%	17,430	2,599
2002	-0.01027	43,484	68%	20,480	0.00406	46,723	73%	17,241	3,239
2003	-0.01027	43,037	67%	20,927	0.00406	46,913	73%	17,051	3,875
2004	-0.01027	42,596	67%	21,368	0.00406	47,103	74%	16,861	4,508
2005	-0.01027	42,158	66%	21,806	-0.0495	44,772	70%	19,192	2,613
2006	-0.01027	41,726	65%	22,238	-0.0495	42,555	67%	21,409	830
2007	-0.01027	41,297	65%	22,667	-0.0495	40,449	63%	23,515	-848
2008	-0.01027	40,873	64%	23,091	-0.0495	38,447	60%	25,517	-2,427
2009	-0.01027	40,454	63%	23,510	0.00295	38,560	60%	25,404	-1,894
2010	-0.01027	40,039	63%	23,925	0.00295	38,674	60%	25,290	-1,365
2011	-0.01027	39,628	62%	24,336	0.00295	38,788	61%	25,176	-840
2012	-0.01027	39,221	61%	24,743	0.00295	38,902	61%	25,062	-318
2013	-0.01027	38,818	61%	25,146	0.00295	39,017	61%	24,947	199
2014	-0.01027	38,420	60%	25,544	0.00295	39,132	61%	24,832	712
2015	-0.01027	38,025	59%	25,939	0.00295	39,248	61%	24,716	1,222
2016	-0.01027	37,635	59%	26,329	0.00295	39,363	62%	24,601	1,728
2017	-0.01027	37,249	58%	26,715	0.00295	39,480	62%	24,484	**2,231**



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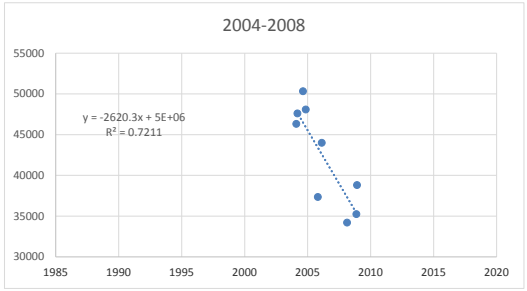
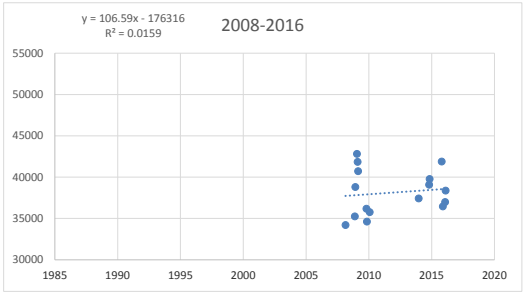


-4.950%



0.2954%

Loss Rate	Interval	Source Data
-0.8401	Pre Project Rate 1973-1987	Land/Water
0.4063	Pre Hurricane (1987-2004)	Hypertemporal
-4.9500	Post Hurricane (2004-2008)	Hypertemporal
0.29500	Post Hurricane (2008-2016)	Hypertemporal

Slope Interval Analysis - Hypertemporal Data:
FWOP - The pre-project loss rate is determined from the land/water data available from 1973 - 1987. The rate is -1.027 %/y
FWP - Because of the large-scale effects of the hurricanes in 2005 and 2008, the post construction period is broken up into different intervals and the slopes for each interval, which represent the loss rates, are used to determine the change in land area.

The TY 20 net acres = 2,231 acres

Land Loss Spreadsheet

Project:	CS-04a Land/Water- Interval Analysis (TY18-TY37)			Loss Rate (%/yr)	
Total Acres	**Year**	**Marsh Acres**	**Water Acres**	-0.83	1989-2016 Hypertemporal Rate
63,964	2016	37,680	26,285		
63,964	2017	37,367	26,597		

	FWOP				FWP				
Year	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Loss Rate	Marsh (acres)	% Marsh (V1)	Water (acres)	Net Acres of Marsh
2017		37,367	58%	26,597					
2018	-0.0083	37,057	58%	26,907	-0.0083	37,057	58%	26,907	0
2019	-0.0084	36,745	57%	27,219	-0.0083	36,749	57%	27,215	4
2020	-0.0085	36,433	57%	27,531	-0.0083	36,444	57%	27,520	11
2021	-0.0086	36,120	56%	27,844	-0.0083	36,142	57%	27,822	22
2022	-0.0087	35,805	56%	28,159	-0.0083	35,842	56%	28,122	36
2023	-0.0088	35,490	55%	28,474	-0.0083	35,544	56%	28,420	54
2024	-0.0089	35,174	55%	28,790	-0.0083	35,249	55%	28,715	75
2025	-0.009	34,858	54%	29,106	-0.0083	34,957	55%	29,007	99
2026	-0.0091	34,541	54%	29,423	-0.0083	34,666	54%	29,298	126
2027	-0.0092	34,223	54%	29,741	-0.0083	34,379	54%	29,585	156
2028	-0.0093	33,905	53%	30,059	-0.0083	34,093	53%	29,871	189
2029	-0.0094	33,586	53%	30,378	-0.0083	33,810	53%	30,154	224
2030	-0.0095	33,267	52%	30,697	-0.0083	33,530	52%	30,434	263
2031	-0.0096	32,948	52%	31,016	-0.0083	33,251	52%	30,713	304
2032	-0.0097	32,628	51%	31,336	-0.0083	32,975	52%	30,989	347
2033	-0.0098	32,308	51%	31,656	-0.0083	32,702	51%	31,262	394
2034	-0.0099	31,988	50%	31,976	-0.0083	32,430	51%	31,534	442
2035	-0.01	31,668	50%	32,296	-0.0083	32,161	50%	31,803	493
2036	-0.0101	31,349	49%	32,615	-0.0083	31,894	50%	32,070	546
2037	-0.0102	31,029	49%	32,935	-0.0083	31,629	49%	32,335	**601**

APPENDIX E

Fully Funded Operation, Maintenance, and Monitoring Costs for Potential CS-04a Project Extension

rev. February 2008
Cost figures as of: August 2016

Cameron-Creole Maintenance (CS-04a)

Project Status

Approved Date: 1993 **Project Area:** 54,076 acres
Approved Funds: $4.64 M **Total Est. Cost:** $4.64 M
Net Benefit After 20 Years: 2,602 acres
Status: Completed July 1998
Project Type: Hydrologic Restoration
PPL #: 3

Location

This project is located about 6 miles northeast of Cameron, Louisiana, in Cameron Parish. It is bordered on the west by the eastern shore of Calcasieu Lake, on the north by the Gulf Intracoastal Waterway, and to the east and south by Louisiana Highway 27. It encompasses approximately 54,076 acres of fresh-to-saline marsh and open water.

Problems

Saltwater intrusion and increased tidal activity from the Calcasieu Ship Channel have caused marsh loss within the project area.

Restoration Strategy

The Cameron-Creole Watershed Management Project, a Natural Resources Conservation Service project completed in 1974, consists of five large control structures and a 19-mile levee along the eastern rim of Calcasieu Lake. The project has reduced salinities and increased marsh productivity; however, funding for maintenance of the project was not included in the original construction costs.

The current project, Cameron-Creole Maintenance (CS-04a), involves establishment of a fund to provide for the maintenance of the Cameron-Creole Watershed for the next 20 years. Funds set aside for the maintenance work total approximately $4 million.

Almost 1,500 acres of wetlands will be created or restored, and an additional 1,071 acres will be protected.

Progress to Date

The first three contracts updating the operating mechanisms are complete. The project provides for maintenance on an as-needed basis. Hurricane Rita repairs are ongoing.

This project is on Priority Project List 3.

Structures such as this one help regulate the amount of salt water that enters the marsh, improving the health of wetland vegetation.

The salty environment of the project area leads to severe corrosion of unprotected pipes, fittings, and valves. This corrosion can eventually leave the water control structures inoperable.

For more project information, please contact:

Federal Sponsor:
Natural Resources Conservation Service
Alexandria, LA
(318) 473-7756

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4736

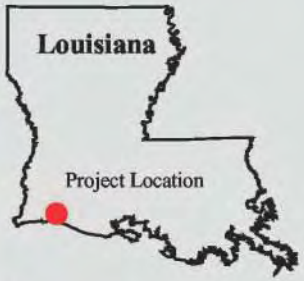
Cameron-Creole Maintenance (CS-04a)

Weir

Levee

Project Boundary

USGS science for a changing world



N

2 0 2 Miles

2 0 2 Kilometers

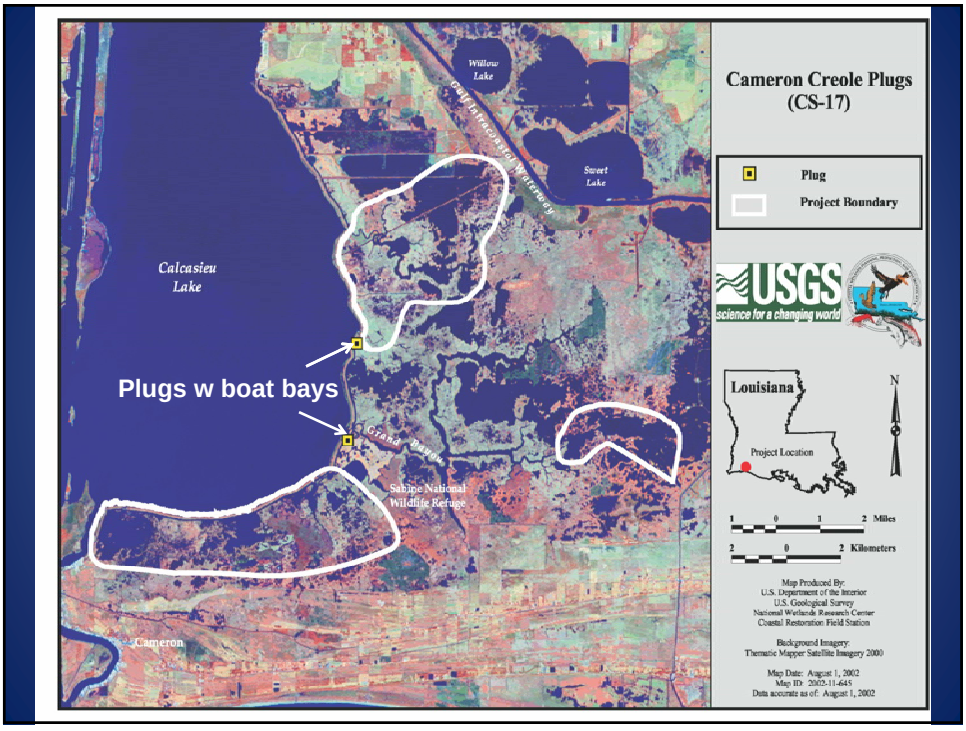
Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

Background Imagery:
Thematic Mapper Satellite Imagery 2000

Map Date: August 1, 2002
Map ID: 2002-11-643
Data accurate as of: August 1, 2002

Cameron Creole Plugs (CS-17)

- Two sheet pile plugs w boat bays on Cameron Prairie NWR & Miami Corporation
- Controls borrow canal hydrology; reduces north-south movement & circulation of high-salinity water
- Fully-funded Cost = $1,258,101
- Constructed in 1997
- 20-Year Life ends in January 2017
- Estimated O&M balance - $83,432 (to 7-2016)
- Monitoring Balance = $22,268
- Total O&M + Monitoring balance = $105,700



Cameron Creole Plugs (CS-17)

Mangrove Bayou Plug

Grand Bayou Plug Showing Public Use

O&M History & 20-Year Life Recommendation

- 2005 – Replaced handrails & 1 boat-guide - $77,910
- 2009 – Boat guides & rock rip-rap - $212,892
- 2012 – Replaced boat guides & 1 hand rail - $4,450
- It is recommended that the project be extended for 20 years with a $871,104 budget increase.
- If approved, it is further recommended to be transferred to the NRCS-sponsored Cameron-Creole Maintenance Project (CS-04a).

Cameron Creole Plugs
20-Year Life Extension

- **Justification for Project Life Extension**
  Maintain benefits of reducing water flow/circulation in the borrow canal. Structure maintenance of signs, railings, & boat guides is needed for boating public in this area of high public use. Project extension with the existing budget balance of $105,700 plus $765,404 for a total 20-year life budget of $871,104.

- **Does monitoring data indicate project is performing?**
  ". . It was not possible to differentiate ecological responses due to the project plugs & the pre-existing water control structures. Due to these complications, we have been unable to document significant ecological responses to the project design." (2003 & 2007 Monitoring Reports).

- **Does Project require maintenance?**
  Yes. Approximately $381,619 has been expended to maintain boat guides, railings, & rock revetment ($20,105/year).

- **Is Landowner, NGO or another willing to accept transfer?**
  Neither Cameron Prairie NWR nor Miami Corp. are willing to accept project transfer at this time.

Cameron Creole Plugs
20-Year Life Options

	Option 1 Project Extension (Year 21-Year 40)	Option 2 Project Closeout Without Removal	Option 3 Project Transfer w/n CWPPRA (To the CS-04a CWPPRA project)	Option 4 Project Closeout With Removal
Cost to CWPPRA	$871,104 ($765,404 needed) ($871,104 - $105,700 = $765,404) ($43,555/year)	$25,000 (w/n existing budget)	$871,104 ($765,404 needed) ($871,104 - $105,700 = $765,404) ($43,555/year)	$400,000 to $550,000 (additional funds would have to be approved)
Benefits (net acres)	865 acres	<865 acres	865 acres	0 acres
Cost Effectiveness ($/acre)	$1,007/acre	?	$1,007/acre	Negative Impact; water circulation to resume
"Pros"	• Benefits continue • Structures maintained for boating public (signs, guide rails, boat guides)	• Benefits continue at reduced rate with possible future plug failure • No added cost to CWPPRA	• More efficient management under CWPPRA because the project becomes a feature of a larger CWPPRA project.	• Relieves CWPPRA of responsibility
"Cons"	• CWPPRA retains responsibility • Landrights agreement(s) would need to be extended, but would not be a problem • Some additional costs	• CWPPRA retains current responsibility • Benefits would be reduced by Year 40	• CWPPRA retains responsibility because the features would be part of CS-04a.	• Total Expenditure of $1.6M w/o benefits beyond Year 20 • Loss rate resumes to pre-project level • By Year 40 the marsh preserved through Year 20 may be lost

20-YEAR LIFE INFORMATION PACKAGE
August 17, 2016

Project Name
Cameron-Creole Plugs (CS-17)

Project Sponsors
U. S. Fish and Wildlife Service (FWS) and Louisiana Coastal Protection and Restoration Authority (CPRA)

Project Location
Calcasieu-Sabine Basin, Cameron Parish, Cameron-Creole Watershed, Lakeshore Borrow Canal (see map)

Primary Project Goal
Moderate water circulation and flow in the Cameron-Creole Watershed borrow canal; specifically, 1) reduce flooding duration in the southern project area, 2) reduce higher salinity water flow from south to north through the borrow canal, 3) increase marsh vegetative cover in the north and south project areas, and 4) increase submerged aquatic vegetation (SAV) in the eastern project area (2007 CPRA Monitoring Report).

Constructed Feature(s)
Two navigable sheet pile plugs with boat bays were installed in the Cameron-Creole Watershed lakeshore borrow canal, one each south of Grand and Mangrove Bayous to isolate management areas and improve hydrologic control. The plug south of Mangrove Bayou, set at 1.5 feet NGVD, benefits 2,500 acres in the northern project area. The plug south of Grand Bayou, set at 1.0 foot NGVD, will allow separate operation of the Grand Bayou and Lambert Bayou structures, affecting 8,000 acres of brackish marsh in the southern project area (2012/2013 CPRA O&M Inspection Report).

May 14, 2015 Task Force Motion to Pursue 20-Year Life Extension

The Task Force approved pursing 20-year life extension at its May 14, 2015, meeting.

"Mr. Honker made a motion to accept the Technical Committee recommendation to allow two projects (CS-04a & CS-17) to pursue project extension through a formal evaluation. Mr. Weller seconded. The motion was passed by the Task Force."

Construction Date / 20-Year Life Date
January 1997 / January 2017

Maintenance Events
Repair/ replacement of boat guides, one railing, and placement of added rip rap on structure wing walls after Hurricanes Rita and Ike.

Date	Maintenance Activity	Cost
2005	Removal and replacement of existing handrails with hot dipped galvanized handrails, and installation of a boat guide in the existing boat bay; completed in May 2006	$77,911
2009	Installation of a boat guide in the existing boat bay for Mangrove and Grand Bayou and placement of 513 tons of 30# Class rock at Grand Bayou and 366 tons of 30# Class rock at Mangrove Bayou; completed in March 2009 (2012/2013 CPRA O&M Inspection Report)	$212,892
2012	Replacement of boat guides at Grand Bayou Plug (2012/2013 CPRA O&M Inspection Report)	$6,267
2014	Railing replacement	$4,450
	Subtotal O&M Maintenance Costs	$301,520
	Subtotal O&M Personnel Costs (FY 2016 estimated)	$80,099
	Total O&M Costs	**$381,619**

Current Fully Funded Cost
$1,258,101

Current O&M Budget Balance
O&M Budget $465,051; 2015 actual O&M Balance = $93,432; $83,432 estimated O&M balance to 7-2016.
Monitoring budget balance = $22,268; Total Budget Balance (Mont. + O&M) $83,432 + $22,268 = $105,700 (Note: The $105,700 balance can be subtracted from our 20-year life budget increase of $871,104 to yield a net request of $765,404.)

20-Year Life Decision Matrix

Matrix Box 1: Project Reaches Year 15

Project reaches Year 20 in January 2017.

Matrix Box 2: Does the project team think there is sufficient justification for a project life extension?

Yes. We propose to extend the project for another 20 years with maintenance (repair sheet pile weirs with rip-rap, rip-rap wing walls; replace signs, railings, and boat guides). FWS and CPRA plan to transfer the CS-17 features to the NRCS-CPRA sponsored Cameron-Creole Maintenance project (CS-04a) after extension and budget increase approvals.

Project Benefits Through Year 20 Based on Monitoring Data: 865 Net Acres (Note see Box 3 - Monitoring data cannot corroborate benefits)

Cost Effectiveness: $1,454 per net acre. The project benefits extend over a 20,392-acre project area in the western portion of the Cameron–Creole Watershed.

Note: Project effectiveness estimates for projects approved 2004-2008: $85,651
Note: Project effectiveness estimates for projects approved 2009-2014: $89,192

Matrix Box 3: Does monitoring data indicate that the project is performing well?

Inconclusive. Difficult to determine because CS-17 is inside the Cameron-Creole Watershed Project control structures and benefits overlap. Because CS-17 features are a project-within-a-project, CS-17 monitoring ceased in 2007.

The response of emergent and submerged aquatic vegetation, duration of flooding, and salinity to hydrologic alterations in the Calcasieu/Sabine Basin were evaluated at the Cameron Creole Plugs project area and reported in 2003 and 2007.

The 2003 CPRA monitoring report concluded that, ". . . It was not possible to differentiate ecological responses due to the project plugs and the pre-existing water control structures, and it may not be possible to duplicate conditions for measurement of water level, salinity, and water flow because preconstruction samples were taken during the worst drought in 20 years. Therefore, we recommend that monitoring for this project as written in the monitoring plan be discontinued and future monitoring of the Cameron-Creole Watershed and the Calcasieu Basin be conducted through CRMS-*Wetlands* monitoring approach. . . .(2003 CPRA CS-17 Monitoring Report).

The 2007 CPRA O&M and Monitoring report concluded that, ". . . It was not possible to differentiate ecological responses due to the project plugs and the preexisting water control structures. Due to these complications, we have been unable to document significant ecological responses to the project design. The reference areas for vegetation and SAV have been deemed inappropriate for the project areas because they are not independent of any possible effects of the plugs on vegetation and hydrology. . . ." (2007 CPRA CS-17 Monitoring Report)

Matrix Box 4: Does the project require maintenance beyond 20 years for benefits to continue?

Yes. During the 19-year project life approximately $382,000 has been expended for O&M, averaging $20,105 per year. It is anticipated that future O&M could be from $35,000 to $40,000/year (including replacement of both plugs). We propose future maintenance to include – repair/replacement of sheet pile weirs with rip-rap, rip-rap wing wall maintenance; and replacement of signs, railings, and boat guides

Matrix Box 5. Is landowner, NGO, or another entity willing to accept project transfer?

The project is on Cameron Prairie National Wildlife Refuge and Miami Corporation property. Neither the refuge, nor Miami Corporation, is willing at this time to accept project transfer.

Matrix Box C-1. C-1. Project Team evaluates all four Project Life options, considering:

a) cost/benefit of 20 year project;
b) preliminary assessment of cost/benefit of project extension;
c) preliminary assessment of risk, liability, and impacts of extending project, abandoning

features in place, and of removing features;
d) preliminary cost estimate of removing features, etc.

Do project sponsors wish to pursue project extension?

Yes. For project benefits to continue, we propose extension with an O&M cost increase to include maintenance and to transfer CS-17 to the NRCS-CPRA CS-04a project as a feature of that project. Transfer to CS-04a would allow future O&M to be more efficient.

Cameron-Creole Plugs (CS-17)

	Option 1 Project Extension (Year 21-Year 40)	Option 2 Project Closeout Without Removal	Option 3 Project Transfer w/n CWPPRA (To the CS-04a CWPPRA project)	Option 4 Project Closeout With Removal
Cost to CWPPRA	$871,104 ($765,404 needed O&M Budget Increase) ($871,104 - $105,700 = $765,404) ($43,555/year)	$25,000 (> than existing budget)	$871,104 ($765,404 needed O&M budget increase) ($871,104 - $105,700 = $765,404)	$400,000 to $550,000 (additional funds would have to be approved)
Benefits (net acres)	865 acres	<865 acres	865 acres	0 acres
Cost Effectiveness ($/acre)	$1,007/acre	?	$1,007/acre	Negative Impact; water circulation (So. to No. salinity flow) resumes
"Pros"	• Benefits continue • Structures maintained for boating public (weirs, wing walls, signs, guide rails, boat guides)	• Benefits continue at reduced rate with possible future plug failure • Few added costs to CWPPRA	• More efficient management under CWPPRA because the project becomes a feature of a larger CWPPRA project. • Separate CS-17/CS-04a inspections not needed.	• Relieves CWPPRA of responsibility
"Cons"	• CWPPRA retains responsibility • Landrights agreement(s) would need to be extended, but should not be a problem • Some additional costs	• CWPPRA retains current responsibility • Benefits would be eliminated by Year 40	• CWPPRA retains responsibility because features would be part of CS-04a.	• Total Expenditure of $1.6M w/o benefits beyond Year 20 • Loss rate resumes to pre-project level • By Year 40 the marsh preserved through Year 20 may be lost

dc 8-17-2016

October 2002
Cost figures as of: January 2016

Cameron-Creole Plugs (CS-17)

Project Status

Approved Date: 1991 **Project Area:** 20,392 acres
Approved Funds: $1.14 M **Total Est. Cost:** $1.25 M
Net Benefit After 20 Years: 865 acres
Status: Completed January 1997
Project Type: Hydrologic Restoration
PPL #: 1

Location

This project is located approximately 6 miles northeast of Cameron in Cameron Parish, Louisiana. It encompasses 14,471 acres of intermediate-to-brackish marsh dominated by marshhay cordgrass (*Spartina patens*).

Problems

High rates of marsh loss have resulted from saltwater intrusion from the Gulf of Mexico via the Calcasieu Ship Channel and Calcasieu Lake.

Excessive salt water pooling from hydrologic alterations in the southern end of the project area has caused vegetation death.

Shoreline erosion from wind-driven wave action threatens fragile, broken marsh in the eastern project area.

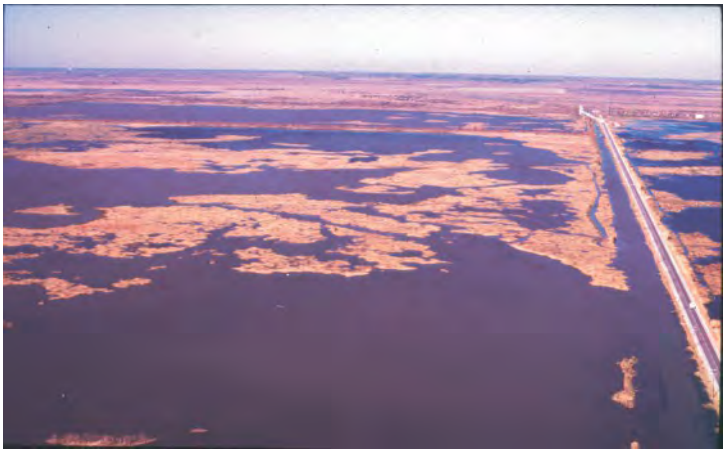
Restoration Strategy

In 1989, a levee and five water control structures were constructed along the east shore of Calcasieu Lake as part of the Cameron-Creole Watershed Management Project. In the current project (CS-17), two plugs were installed in the Lakeshore Borrow Canal to moderate water circulation and flow, as well as reduce the duration of inundation in the southern project area.

Project effectiveness will be determined by monitoring salinity, water flow, water level, and vegetation in the project area and reference area.

Progress to Date

Based on emergent vegetation surveys, the total percent of vegetative cover was highest in the reference area at 96% in 1996, increasing to 98% in 1997 and to 99% in 2000. Cover in the northern project area increased from 95% in 1996 to 96% in 1997 before decreasing slightly to 92% in 2000. The southern project area experienced a slight decrease in cover from 83% in 1996 to 78% in 1997, followed by a slight increase to 81% in 2000.



The northeastern portion of the Cameron Creole watershed is bordered by Louisiana Highway 27.

The frequency of occurrence of submerged aquatic vegetation decreased dramatically in both the project and reference areas. In the project area, it declined from 69% in 1996 to 18% in 2000; in the reference area, the frequency decline was from 86% to 23% across the same period. There was a change in species composition over all three sampling years (1996, 1997, and 2000) caused by drought-induced changes in water level and salinity. Widgeongrass (*Ruppia maritima*) dominated in 1996 and 2000 when lowered water level increased salinities; however, watercelery (*Vallisneria americana*) dominated in 1997 when water levels were higher and salinities remained low.

The project and reference areas are within the boundaries of the Cameron-Creole Watershed Management Project, which was funded by the Natural Resources Conservation Service's Small Watershed Program.

This project is on Priority Project List 1.

For more project information, please contact:

Federal Sponsor:
U.S. Fish and Wildlife Service
Lafayette, LA
(337) 291-3100

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4736

Cameron Creole Plugs (CS-17)

Plug

Project Boundary

USGS science for a changing world

Louisiana

Project Location

N

1 0 1 2 Miles

2 0 2 Kilometers

Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

Background Imagery:
Thematic Mapper Satellite Imagery 2000

Map Date: August 1, 2002
Map ID: 2002-11-645
Data accurate as of: August 1, 2002

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

ANNUAL REQUEST FOR INCREMENTAL FUNDING FOR FY19 ADMINISTRATIVE COSTS FOR CASH FLOW PROJECTS

For Decision:

The U.S. Army Corps of Engineers will request funding approval in the amount of $24,873 for administrative costs for cash flow projects beyond Increment 1.

The Technical Committee will consider and vote to make a recommendation to the Task Force on the request for funds.

ANNUAL REQUEST FOR INCREMENTAL FUNDING FOR FY19 ADMINISTRATIVE COSTS FOR CASH FLOW PROJECTS

For Decision:

The U.S. Army Corps of Engineers will request funding approval in the amount of $24,873 for administrative costs for cash flow projects beyond Increment 1. The Technical Committee will consider and vote to make a recommendation to the Task Force on the request for funds for the following projects:

- Coastwide Reference Monitoring System (CRMS)
  Incremental Funding amount: $2,000

- Brady Canal Hydrologic Restoration, (TE-28), PPL-3, NRCS
  Incremental Funding amount: $2,371

- Sabine Refuge Structure – Hog Island (CS-23), PPL-3, FWS
  Incremental Funding amount: $2,000

- Four Mile Canal (TV-18), PPL-9, NMFS
  Incremental Funding amount: $2,011

- South Lake DeCade (TE-39), PPL-9, NRCS
  Incremental Funding amount: $1,720

- Barataria Basin Landbridge Shoreline Protection Phase 4, (BA-27d), PPL-11, NRCS
  Incremental Funding amount: $1,133

- Dedicated Dredge BB Landbridge (BA-36), PPL-11, FWS
  Incremental Funding amount: $1,708

- Little Lake Shoreline Protection/Dedicated Dredging, (BA-37), PPL-11, NMFS
  Incremental Funding amount: $1,169

- West Lake Boudreaux Shoreline Protection and Marsh Creation, (TE-46), PPL-11, FWS
  Incremental Funding amount: $1,046

- South White Lake Shoreline Protection (ME-22), PPL 12, COE
  Incremental funding amount: $1,337

- Whiskey Island BB (TE-50), PPL-13, NRCS
  Incremental Funding amount: $910

- South Shore of the Pen (BA-41), PPL-14, NRCS
  Incremental Funding amount: $1,720

- West Belle Pass Barrier Headland Restoration, (TE-52), PPL-16, NMFS
  Incremental Funding amount: $1,398

- Bayou Dupont Ridge Creation and MR (BA-48), PPL-18, NMFS
  Incremental Funding amount: $1,347

- South Lake Lery Marsh Creation and Shoreline Protection (BS-16), PPL-17, FWS
  Incremental Funding amount $1,668

- Grand Liard Marsh and Ridge Restoration (BA-68), PPL-18, NMFS
  Incremental Funding amount: $1,335

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

REQUEST FOR FUNDING FOR CWPPRA PROGRAM'S TECHNICAL SERVICES

For Decision:

The U.S. Geological Survey (USGS) and CPRA are requesting a budget increase for technical services for the CWPPRA program in the amount of $171,410.

The Technical Committee will consider and vote to make a recommendation to the Task Force to approve the request for a budget increase for technical services in the amount of $171,410.

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
BIOLOGICAL RESOURCES DIVISION

Wetland and Aquatic Research Center

April 04, 2016

Scope of Work

Technical Services to the CWPPRA Program

Accurate and timely information is critical to large, interagency programs such as CWPPRA for project planning and interacting with the general public. Due to the spatial extent of the CWPPRA program, the number of stakeholders involved, and the amount of Federal and State dollars associated with the program, the continued maintenance of project, GIS, and website data are necessary to ensure the most up to date and accurate data are available. It is the goal of USGS to provide the CWPPRA partners and the public with timely and accurate information about the program and the constructed projects, as well as, aid project managers during project reevaluation.

Project Information Database Maintenance Task Description:

WARC has created and maintains a real-time, interactive, internet-based data management system, which provides consistent, current programmatic information. This system comprised of several synchronized database components deployed in various locations which serve specific tasks at their respective location ranging from tracking project costs to progress milestones. This information system is currently working with several CWPPRA databases including: Outreach Committee's standardized public project fact sheets, CWPPRA budget analyst reports and databases, the WVA working group spreadsheets, and the USGS CWPPRA project mapping effort. Additionally, the presence of this system allows staff to "database enable" the CWPPRA fact sheets thus allowing the inclusion of real-time information which directly addresses the conflicting information problem.

As security requirements governing federal systems change, there is a need to ensure that the CWPPRA project information database complies with current with information exchange policies wherever a database component is deployed.

As the primary mechanism for integrating databases across the five Task Force agencies and the State of Louisiana, this system is critical to ensure consistent, accurate information exchange and dissemination between the many moving parts of CWPPRA and ensures resources are available to address any problems or user needs in a timely manner.

CWPPRA Website (www.LACoast.gov) Maintenance Task Description:

The CWPPRA website currently provides a continuous online presence for federal/state partners and the general public to access the latest information on CWPPRA, its projects, partners, and other pertinent information related to Louisiana's coastal wetlands conservation and restoration. The LaCoast.gov website is an interface between the public and the program. WARC utilizes web server hardware and software, and performs system management, backup and recovery

maintenance, and programming efforts for the www.LaCoast.gov website. This task includes storing and distributing WaterMarks, fact sheets, videos, legislative links, and educational materials, as well as, daily maintenance and update of text and links.

GIS Task Description:

During Phase I of a CWPPRA project it may be necessary to reevaluate that project to facilitate a scope change. In addition, early projects are approaching their end of project life. Post-project analyses that aid in determining a path forward for the project may be needed. WARC provides the project manager with GIS support that consists of spatial data analyses, maps, graphics, and technical support utilizing the most recent spatial data sets available. Providing these products and services to CWPPRA agencies requires a standardized GIS data management environment and a good deal of coordination with those project managers.

Technical Services for FY17

Description	Cost
Project Information Database Maintenance - USGS	$41,710
CWPPRA Website (www.LACoast.gov) Maintenance	$55,000
GIS Support for CWPPRA Constructed Project Activities	$74,700
TOTAL	$171,410

Deliverables:

Project Information Database Maintenance Task

- Programming and database administration
- Data enabling fact sheets
- Federal security review

CWPPRA Website Maintenance Task

- Active and updated CWPPRA website maintained on daily basis
- Summary of CWPPRA website activities (Three times per year at Task Force meetings)

GIS Task

- Updated WVA analysis for In Phase projects
- Fact Sheet maps for In Phase and newly selected PPL projects
- Miscellaneous requests for CWPPRA agencies

Points of Contact:

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USGS – Wetland and Aquatic Research Center, Coastal Restoration Assessment Branch
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Lafayette, LA 70506
work: 337-266-8842
Email: conzelmannc@usgs.gov

Michelle Fischer, Geographer
USGS - Wetland and Aquatic Research Center, Coastal Restoration Assessment Branch
c/o Livestock Show Office, Parker Coliseum, LSU
Baton Rouge, LA 70803
Ph: 225-578-7483
Email: fischerm@usgs.gov

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

REQUEST FOR TRANSFER OF FUNDS FROM PPL2 PROJECTS ATCHAFALAYA SEDIMENT DELIVERY (AT-02) AND BIG ISLAND MINING (AT-03) OPERATIONS AND MAINTENANCE CATEGORY INTO THE MONITORING CATEGORY TO COVER ANTICIPATED COSTS OF SCHEDULED 2016 MONITORING ACTIVITIES

For Decision:

For the AT-02 and AT-03 projects - Atchafalaya Sediment Delivery and Big Island Mining, NOAA Fisheries and CPRA are proposing the repurposing of authorized funding from the Operations and Maintenance (O&M) activity to the Monitoring activity in the amount of $74,800 for AT-02 and $48,800 for AT-03 via Memorandum of Agreement between the two agencies. Activities will include elevation analysis, habitat maps, and final OM&M reports for these two projects. The elevation analysis will be completed using recently collected 2016 O&M channel and disposal area survey data and habitat maps will be created using 2016 aerial photographs. The data will allow for assessments of channel distributary potential, subaerial growth, and habitat succession at year 18 of the project lives and will evaluate the impacts of the substantial flood of 2011. These adjustments do not cause the total project estimates to exceed the maximum total project cost as currently authorized by the CWPPRA Task Force.

The Technical Committee will vote to make a recommendation to the Task Force on the requested transfer of funds from maintenance to monitoring.

Request to Transfer Funding from O&M to Monitoring for Additional Analysis and Final Reporting for
AT-02 Atchafalaya Sediment Delivery

1) Project History

a. Description

The project is located within the Atchafalaya Delta Wildlife Management Area in the southeast corner of St. Mary Parish, LA. The project area is positioned in the northwestern region of the Atchafalaya Delta and is bounded by East Pass to the northwest, Atchafalaya Bay to the south and southeast, and Mile Island to the northeast. All project activities were completed by March 1998 and the project is expected to have its final OM&M report by September 2017.

Natal Channel (NC) was reestablished by dredging a 6,000 ft channel over its former watercourse. The mouth the channel was bifurcated into two 1,500 ft branches. Castille Pass was reestablished by dredging a 2,000 ft channel (CPC) at the head of the pass removing a subaqueous bar. The channels were dredged to a depth of -10 ft NGVD 29. The materials dredged from these channels were placed into five contained disposal areas creating wetland habitats.

b. Monitoring Completed to Date

Three types of monitoring data have been collected to assess the performance of this restoration project, elevation, habitat mapping, and vegetation data. Pre-construction elevation data were collected in March 1998 and post-construction surveys were conducted in May 1998, May 2008, and May 2016 (O&M Survey). Spatial analyses were performed using the 1998 and 2008 data to estimate elevation and volume changes over time. Although the 2016 data has been collected, the data have not been analyzed to date. Pre-construction habitat mapping data were collected in December 1994 and November 1997 while post-construction habitat data were collected in November 1998, November 2000, and October 2007. Pre-construction and post-construction habitats were delineated, habitat changes over time were calculated, and subaerial and subaqueous growth in the project area was qualitatively defined using the habitat data. Post-construction vegetation data were collected in October of 1998, 2000, and 2007. Relative cover and importance value (IV) were calculated to summarize vegetation data and comparisons were made to historical Atchafalaya Delta vegetation data. OM&M reports were written in 2001 and 2010 using the aforementioned data.

c. Original Project Budget

The original approved CWPPRA monitoring budget was $212,750.00

d. Previous Monitoring Funding Increases

There have been no previous monitoring funding increases.

2) **Increase Request**

a. **Monitoring Increment Increase Being Requested**

Total Increase for 20-year Project Life
$74,800.00

3-year Incremental Request
$74,800.00

b. **Fully Funded Cost Estimate**
$287,550.00

c. **Description of Proposed Monitoring Events to Be Accomplished With the Requested Funding**
The requested funding would be used to fund the following items

- Elevation Analysis
- Habitat Maps
- Monitoring Reports

3) **Monitoring Fund Increase Justification**

a. **Summary of Project Performance**
The elevation, habitat, and vegetation data collected to date show that the project is successfully attaining or is on a trajectory to realize its goals by the end of the project life. The elevation data show that NC is elongating and CPC is widening while the disposal area elevation data show that the disposal areas with containment dikes obtained a higher elevation than those without. The habitat mapping data show that marsh, forested, and mudflat habitats are expanding. These maps also show that subaerial growth is occurring within the project area. Vegetation data show that similar vegetation communities inhabit the disposal areas while the historical reference area community is different. All the disposal areas experienced increases in species diversity and mean cover since 1998.

b. **Summary of Project Deficiency**
Currently there is no deficiency in the type monitoring data collected. The reason for the fund transfer is assess the outcome of this sediment diversion projects at the end of the project life. The large flood that occurred in 2011 aggraded the Atchafalaya Delta and likely enhanced the distributary potential and subaerial growth within the project area. In addition, an O&M survey of the dredged channels and disposal areas were recently completed in May of 2016 and will provide information on the distributary channels and the rate of subsidence of the disposal areas at year 18 of the project life. The additional habitat data will show the project area habitats at the end of the project life. This data will also allow for assessing the subaerial growth within the project area since 2007, a period which includes the large flood of 2011. Moreover, the data collected from this type of additional sampling could be used to not only foresee changes in the project area but also could be used to design more sustainable sediment diversion projects.

c. Reasons for Requested Increase

- The addition of analyses of future O&M elevation surveys (Years 18) will address the project distributary channel (Goal #1) and disposal area (Goal #2) goals through year 18 of the project. Elevation surveys will be useful in determining if the channels elongated over time and will determine if the disposal areas are subsiding at a sustainable rate.
- The addition of future habitat maps (Years 18) will address disposal area (Goal #2) and the increase the rate of subaerial delta growth (Goal #3) project goals. Habitat maps will aid in assessing the subaerial growth and habitat change within the project area at year 18 of the project life.
- One final OM&M report at the end of the project life would enhance sediment diversion knowledge and determine if re-dredging former distributary channels can be effective in enhancing Atchafalaya Delta growth and show if this technique is sustainable.

Table. 1. Available AT-02 Operations and Maintenance (O&M) Funding and Remaining O&M Funding if Monitoring Transfer is Approved by the CWPPRA Task Force.

Project	*Available O&M Funding*	*Proposed Monitoring Transfer*	*Remaining O&M Funding*
AT-02	$278,452.00	$74,800.00	$203,652.00

rev. September 2010
Cost figures as of: September 2016

Atchafalaya Sediment Delivery (AT-02)

Project Status

Approved Date: 1992 **Project Area:** 4,248 acres
Approved Funds: $2.45 M **Total Est. Cost:** $2.45 M
Net Benefit After 20 Years: 2,232 acres
Status: Completed March 1998
Project Type: Dredged Material/Marsh Creation and Hydrologic Restoration
PPL #: 2

Location

The project is located east of the lower Atchafalaya River navigation channel in the Atchafalaya River Delta, approximately 19 miles southwest of Morgan City, Louisiana, in St. Mary Parish.

Problems

Growth of the lower Atchafalaya Delta has been reduced as a result of maintenance of the Atchafalaya River navigation channel. Delta development in the shallow waters of Atchafalaya Bay is dependent on distributary flows and the diversion of sediments into over-bank areas through crevasse channels.

Because of the placement of material dredged from the navigation channel and sediment accumulation within the channels that decrease flow efficiency, the open crevasse channels are frequently short-lived. As riverflow through a crevasse channel is reduced, the amount of sediment that can be deposited in the delta is likewise reduced, resulting in decreased marsh development.

Restoration Strategy

The purpose of this project is to promote natural delta development by reopening two silted-in channels and using those dredged sediments to create new wetlands. Approximately 720,000 cubic yards of sediment were dredged from Natal Channel and Castille Pass in 1998. Over 12,000 feet of channel were reopened, and more than 280 acres of new habitat were created by the strategic placement of the dredged channels' sediments. By reestablishing water and sediment flow into the eastern part of the Atchafalaya Delta, an additional 1,200 acres of new habitat are expected to be naturally created over the life of the project.

A bucket dredge is shown removing sediment from a shoaled-in channel in order to help reestablish water and sediment flow within the Atchafalaya Delta.

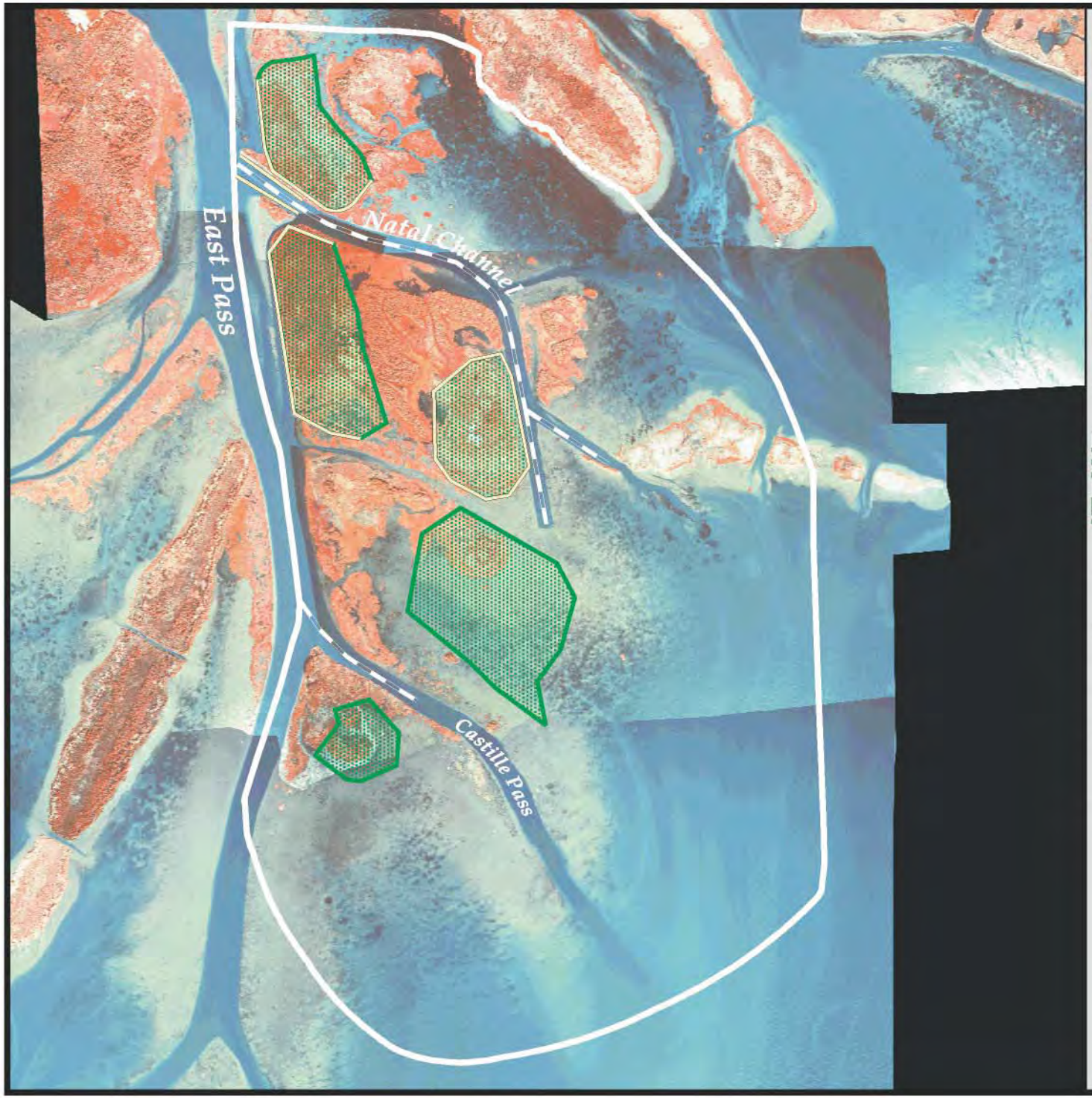
Progress to Date

Construction was completed in 1998. A pre- versus post-construction habitat analysis using aerial photography indicated that, while there was an increase in land of 78.4 acres, the majority of the habitat created was represented by forested wetland (50.1 acres), while fresh marsh and upland barren habitats accounted for 14 acres gain each. Although many of the dominant plant species are present in both created and reference areas, the created areas contained different plant communities when compared to any time period in the development of a natural crevasse splay that served as a reference area for this project. Although the long-term effects on submerged aquatic vegetation (SAV) are unclear, habitat mapping indicated an increase in SAV habitat of 221.5 acres from 1997 to 1998, but this is very close to the increases that were reported in the project area pre-construction. Satellite imagery indicates that there have been significant increases in emergent acreage from 1998 to 2008 This project is on Priority Project List 2.

For more project information, please contact:

Federal Sponsor:
National Marine Fisheries Service
Baton Rouge, LA
(225) 389-0508

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4736



Atchafalaya Sediment Delivery (AT-02)

- Dredge Channel
- Containment Dike
- Marsh Creation Area
- Project Boundary

USGS science for a changing world

0.25 0 0.25 Miles

0.25 0 0.25 0.5 Kilometers

Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

Background Imagery:
Color Infrared Aerial Photography 2000
Map Date: June 03. 2002
Map ID: 2002-11-439
*Data accurate as of: June 03, 2002

Request to Transfer Funding from O&M to Monitoring for Additional Analysis and Final Reporting for
AT-03 Big Island Mining

1) Project History

a. Description

The project lies within the Louisiana Department of Wildlife and Fisheries (LDWF) administered Atchafalaya Delta Wildlife Management Area (WMA) and is positioned approximately 16 mi south of Morgan City in St. Mary Parish, Louisiana. The AT-03 project is situated directly across the Atchafalaya River from the Atchafalaya Sediment Delivery (AT-02) project and was placed between Big and Shell Islands. Shell Island Pass is located north of the project area and Ameranda Pass is sited to its south. All project activities were completed by October 1998 and the project is expected to have its final OM&M report by September 2017.

The project will attempt to enhance sediment transport and delta growth in the northwestern delta by construction of a distributary network of channels and dredged material islands. One secondary [Channel A (CA)] and five tertiary channels [Channel B (CB), Channel C (CC), Channel D (CD), Channel E (CE), and Channel F (CF) were constructed for the AT-03 project. The channels were dredged to a depth of -10 ft NGVD 29 and the corresponding lengths CA 21,000 ft, CB 5,500 ft, CC 2,000 ft, CD 4,000 ft, CE 4,200 ft, and CF 2,200 ft. The materials dredged from these channels were placed into five contained disposal areas creating wetland habitats. The disposal areas were built to elevations ranging from 2 to 4 ft NGVD 29.

b. Monitoring Completed to Date

Three types of monitoring data have been collected to assess the performance of this restoration project: elevation, habitat mapping, and vegetation data. Pre-construction elevation data were collected in July 1998 and post-construction surveys were conducted in November 1998, May 2008, and May 2016 (O&M Survey). Spatial analyses were performed using the 1998 and 2008 data to estimate elevation and volume changes over time. Although the 2016 data has been collected, the data have not been analyzed to date. Pre-construction habitat mapping data were collected in December 1994 and November 1997 while post-construction habitat data were collected in November 1998, November 2000, and October 2007. Pre-construction and post-construction habitats were delineated, habitat changes over time were calculated, and subaerial and subaqueous growth in the project area was qualitatively defined using the habitat data. Post-construction vegetation data were collected in October of 1999, 2002, and 2007. Relative cover and importance value (IV) were calculated to summarize vegetation data and comparisons were made to historical Atchafalaya Delta vegetation data. OM&M reports were written in 2003 and 2010 using the aforementioned data.

c. Original Project Budget

The original approved CWPPRA monitoring budget was $205,993.00

d. Previous Monitoring Funding Increases
There have been no previous monitoring funding increases.

2) Increase Request

a. Monitoring Increment Increase Being Requested

Total Increase for 20-year Project Life
$48,800.00

3-year Incremental Request
$48,800.00

b. Fully Funded Cost Estimate
$ 254,793.00

c. Description of Proposed Monitoring Events to Be Accomplished With the Requested Funding
The requested funding would be used to fund the following items:

- Elevation Analysis
- Habitat Maps
- Monitoring Reports

3) Monitoring Fund Increase Justification

a. Summary of Project Performance
The elevation, habitat, and vegetation data collected as of 2008 show that the project has met the goal of increasing the rate of subaerial growth in the project area but has not met the goals of effective distributary channel establishment and has not (yet) met its wetland acreage creation goal. The elevation data show that the constructed channels are experiencing channel narrowing and modifications to their channel morphology. The elevation data also show that DA1 is consolidating at a sustainable rate while DA5 is experiencing aggradation. The habitat mapping data show that marsh and forested habitats are expanding. These maps also show that subaerial growth is occurring within the project area. Vegetation data show that similar vegetation communities inhabit the disposal areas while the historical reference area community is different. All the disposal areas experienced increases in species diversity and mean cover since 1999. While colonization of the disposal areas continued to expand over time, the project fell 210 acres short of its acreage goal. However, additional subaerial land will probably be created in the project area before the end of the project life, and the 850 acre goal could still be realized.

b. Summary of Project Deficiency
Currently there is no deficiency in the type monitoring data collected. The reason for the fund transfer is assess the outcome of this sediment diversion projects at the end of the project life. The large flood that occurred in 2011 aggraded the Atchafalaya Delta and likely enhanced the distributary potential and subaerial growth within the project area. In addition, an O&M survey of the dredged channels and disposal areas were recently

completed in May of 2016 and will provide information on the distributary channels and the rate of subsidence of the disposal areas at year 18 of the project life. The additional habitat data will show the project area habitats at the end of the project life. This data will also allow for assessing the subaerial growth within the project area since 2007, a period which includes the large flood of 2011. Moreover, the data collected from this type of additional sampling could be used to not only foresee changes in the project area but also could be used to design more sustainable sediment diversion projects.

c. Reasons for Requested Increase

- The addition of analyses of future O&M elevation surveys (Year 18) will address the project delta-building potential (Goal #1) and disposal area (Goal #2) goals through year 18 of the project. Elevation surveys will be useful in determining if the channels continue to aggrade over time and will determine if the disposal areas continue to accrete (DA5) or to subside at a sustainable rate (DA1).
- The addition of future habitat maps (Year 18) will address disposal area (Goal #2) and the increase the rate of subaerial delta growth (Goal #3) project goals. Habitat maps will aid in assessing the subaerial growth and habitat change within the project area at year 18 of the project life.
- One final OM&M report at the end of the project life would enhance sediment diversion knowledge and determine if construction of a distributary network of channels can be effective in enhancing Atchafalaya Delta growth and show if this technique is sustainable.

Table. 1. Available AT-03 Operations and Maintenance (O&M) Funding and Remaining O&M Funding if Monitoring Transfer is Approved by the CWPPRA Task Force.

Project	*Available O&M Funding*	*Proposed Monitoring Transfer*	*Remaining O&M Funding*
AT-03	$244,773.00	$48,800.00	$195,973.00

October 2002
Cost figures as of: September 2016

Big Island Mining (AT-03)

Project Status

Approved Date: 1992 **Project Area:** 3,400 acres
Approved Funds: $7.00 M **Total Est. Cost:** $7.00 M
Net Benefit After 20 Years: 1,560 acres
Status: Completed October 1998
Project Type: Dredged Material/Marsh Creation and Hydrologic Restoration
PPL #: 2

Location

The project is located west of the lower Atchafalaya River navigation channel in the Atchafalaya River Delta, northwest of Big Island and approximately 19 miles southwest of Morgan City, Louisiana, in St. Mary Parish.

Problems

In the newly emergent Atchafalaya Delta, navigation channel development and maintenance created the large spoil island known as Big Island along the upper west bank of the Atchafalaya River Delta channel. Big Island's elevation of more than 20 feet above mean sea level is not conducive to the formation of marsh habitat and consequently has adversely affected delta growth.

Restoration Strategy

The project was an opportunity to increase marsh habitat in the northwestern portion of the Atchafalaya Delta. In 1998, over 3.4 million cubic yards of sediment north of Big Island were dredged to create several distributary channels that reestablished water and sediment flows into shallow water areas in the delta. The sediment was strategically placed to mimic natural delta lobe formation at an elevation suitable for marsh growth. Over 922 acres of new habitat were directly created by construction, and the reestablished water and sediment flows are expected to add an additional 2,000 acres over the life of the project.

A hydraulic dredge pumps sediment to create new wetland habitat in the project area south of Morgan City.

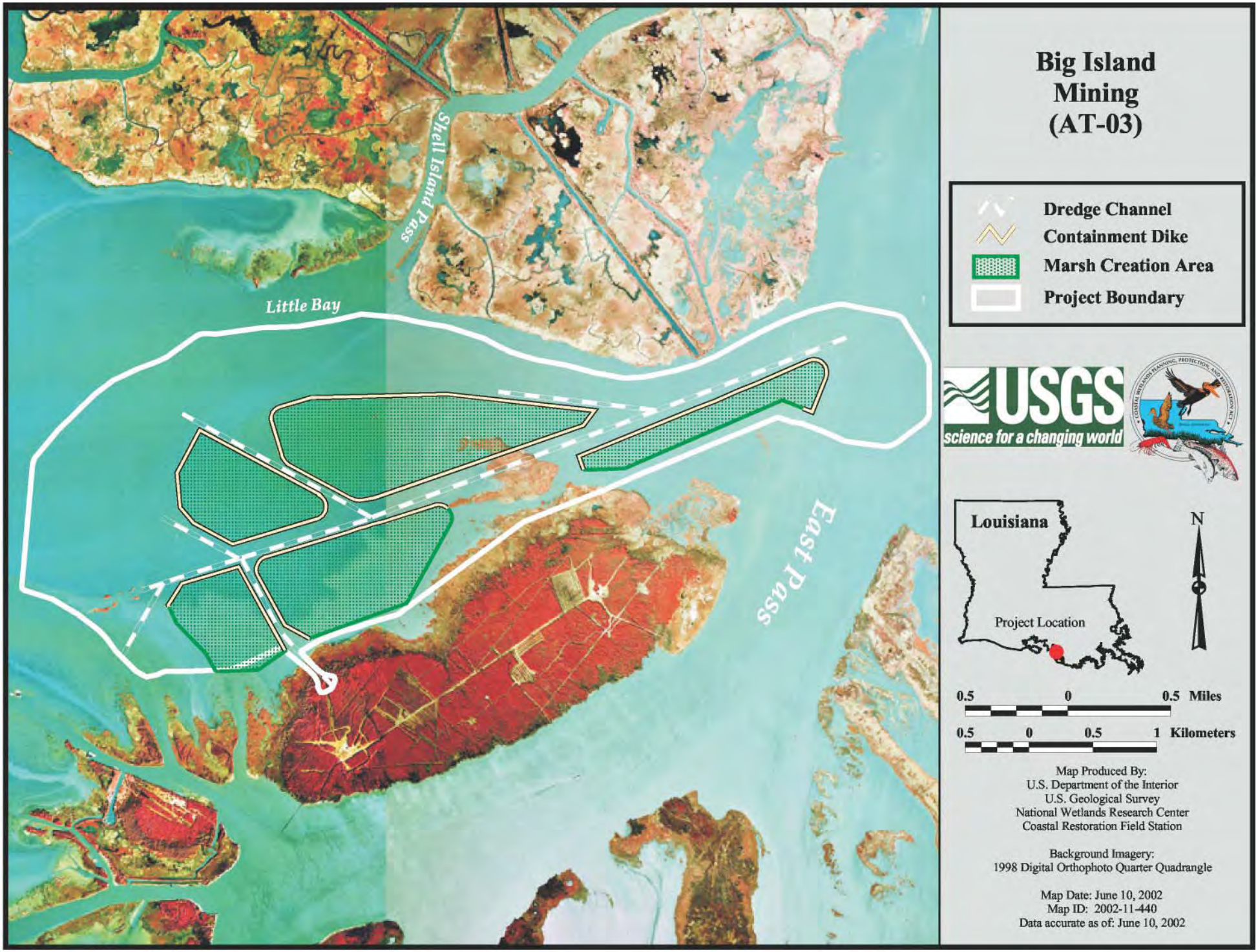
Progress to Date

Construction was completed in 1998. Monitoring indicates the channels are maintaining adequate depth and still delivering sediments into the delta. Visual inspection indicates that these sediments are settling in the constructed disposal areas. It also suggests that a forthcoming vegetative survey will show a significant increase in emergent marsh habitat. This project is on Priority Project List 2.

For more project information, please contact:

Federal Sponsor:
National Marine Fisheries Service
Baton Rouge, LA
(225) 389-0508

Local Sponsor:
Coastal Protection and Restoration Authority
Baton Rouge, LA
(225) 342-4736



Big Island Mining (AT-03)

- Dredge Channel
- Containment Dike
- Marsh Creation Area
- Project Boundary

USGS science for a changing world

Louisiana

Project Location

N

0.5 0 0.5 Miles

0.5 0 0.5 1 Kilometers

Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
National Wetlands Research Center
Coastal Restoration Field Station

Background Imagery:
1998 Digital Orthophoto Quarter Quadrangle

Map Date: June 10, 2002
Map ID: 2002-11-440
Data accurate as of: June 10, 2002

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

REQUEST FOR OPERATION AND MAINTENANCE (O&M) INCREMENTAL FUNDING AND BUDGET INCREASES

For Decision:

The Technical Committee will consider and vote to make a recommendation to the Task Force to approve requests for total FY19 incremental funding in the amount of $11,043,342 and O&M budget increases totaling $6,029,189.

a. PPL 9+ Projects requesting approval for FY19 incremental funding in the total amount of $4,713,606 for the following projects:

- Black Bayou Culverts Hydrological Restoration (CS-29), PPL-9, NRCS
  Incremental funding amount: $353,698
- Freshwater Introduction South of Highway 82 (ME-16), PPL-9, USFWS
  Incremental funding amount: $14,760
- South Lake Decade Freshwater Introduction (TE-39), PPL-9, NRCS
  Incremental funding amount: $40,000
- Four Mile Canal Terracing and Sediment Trapping (TV-18), PPL-9, NOAA Fisheries
  Incremental funding amount: $6,485
- Little Lake Shoreline Protection (BA-37), PPL-11, NOAA Fisheries
  Incremental funding amount: $550,000
- Raccoon Island Shoreline Protection/Marsh Creation (TE-48), PPL-11, NRCS
  Incremental funding amount: $26,216
- Coastwide Nutria Control Program (LA-03b), PPL-11, NRCS
  Incremental funding amount (FY16): $2,119,813
- Barataria Barrier Island Complex (BA-38), PPL-11, NOAA Fisheries
  Incremental funding amount: $161,168
- Pass Chaland to Grand Bayou Pass Barrier Shoreline (BA-35), PPL-11, NOAA Fisheries
  Incremental funding amount: $6,627
- South White Lake Shoreline Protection (ME-22), PPL-12, USACE
  Incremental funding amount: $8,481
- East Marsh Island Marsh Creation (TV-21), PPL-14, EPA
  Incremental funding amount: $20,655
- West Bell Pass Barrier Headland Restoration (TE-52), PPL-16, NOAA Fisheries

Incremental funding amount: $7,435

- Bayou Dupont Marsh and Ridge Creation (BA-48), PPL-17, NOAA Fisheries
  Incremental funding amount: $153,389
- Grand Liard Marsh and Ridge Restoration (BA-68), PPL-18, NOAA Fisheries
  Incremental funding amount: $35,414
- Coastwide Vegetative Planting (LA-39), PPL-20, NRCS
  Incremental funding amount: $1,209,465

b. PPL 1-8 Project requesting approval for FY-19 incremental funding in the total amount of $117,162:

- Cameron-Creole Plugs (CS-17), PPL-1, USFWS
  Incremental funding amount: $36,660
- Highway 384 Hydrologic Restoration (CS-21), PPL-2, NRCS
  Incremental funding amount: $25,085
- Replace Sabine Refuge Water Control Structures at Headquarters Canal, West Cove Canal, and Hog Island Gully (CS-23), PPL-3, USFWS
  Incremental funding amount: $45,020
- Lake Chapeau Sediment Input and Hydrologic Restoration (TE-26), PPL-3, NOAA Fisheries
  Incremental funding amount: $10,397

c. PPL 1-8 Projects requesting approval for a budget increase in the amount of $6,029,189 and FY19 incremental funding in the amount of $6,212,574 for the following projects:

- Barataria Bay Waterway West Shoreline Protection (BA-23) PPL-4 NRCS
  Budget increase amount: $64,218
  Incremental funding amount: $62,727
- Black Bayou Hydrologic Restoration (CS-27), PPL-6, NOAA Fisheries
  Budget increase amount: $5,964,971
  Incremental funding amount: $6,149,847

O&M Funding Increase Request Beyond the Approved 20-Year Budget
for
BA-23 Barataria Bay Waterway West Bank Protection Project

1) Project History

a. Description

The Barataria Bay Waterway West Bank Protection Project (BA-23) is located in Jefferson Parish, Louisiana approximately 4.5 mi (7.2 km) south of Lafitte on the west side of the Dupre Cut portion of the Barataria Bay Waterway (BBW). The project area is east of Bayou Rigolettes, north of the Lafitte Oil and Gas Field, and southwest of The Pen. Principal project components include 9,900 linear feet of rock shoreline protection along the west bank of the BBW and a water control structure on an abandoned oilfield access canal which intersects the waterway. The purpose of the foreshore rock dike is to protect the existing adjacent marsh from excessive water exchange, wave action, and subsequent erosion. The water control structure, comprised of a weir and two 48-inch diameter culverts, was intended to manage the water levels in the protected marsh behind the dike for enhancement of wildlife habitat. Construction was completed in November 2000.

b. O&M Completed to Date:

- In 2005, a contract was awarded to cap the rock shoreline protection structure with 5,143 tons of rip-rap on the settled sections to bring them up to design elevation. This work was completed in 2006.
- The access channel leading to the water control structure was dredged in 2007 to improve flow. 4,400 cubic yards of material was excavated and placed beneficially adjacent to the channel.
- Vandalism of the weir in 2015 led to the replacement of several stoplogs and miscellaneous hardware.
- In 2015, 100 sandbags were purchased and installed along eroded areas of the water control structure berm to stabilize the bank line until a maintenance contract could be awarded.
- A contract to repair the water control structure was awarded in 2015. Two 36"-diameter HDPE liners were installed and grouted within the annular space of the deteriorated 48" culverts. Approximately 191 cubic yards of earth fill was placed to repair erosion damage, and 284 square yards of geotextile fabric and riprap were installed to help prevent further erosion on the marsh side of the structure. Work was completed in 2016.

c. Original Project Budget

$746,260

d. Previous O&M Funding Increases

An O&M budget increase of $291,423 was approved in 2015 to enable maintenance repairs to proceed on the water control structure.

2) **Increase Request**

a. **O&M Increment Increase Being Requested**

Total Increase for Remainder of 20-year Project Life
$64,218

3-year Incremental Request
$50,312

- FY17 - $35,961 for annual inspection, 2 structure operation events, and closeout of maintenance repair contracts.
- FY18 - $13,211 for annual inspection and 2 structure operation events.
- FY19 - $13,555 for annual inspection and 2 structure operation events.

b. **Fully Funded Cost Estimate**
$1,101,900

c. **Description of Proposed O&M Events to Be Accomplished With the Requested Funding**
The requested funding would be used to fund the following items:

- Structure operations for the remaining 4 years of the 20-year project life.
- Annual O&M inspections and reports for the same time period.

3) **Increase Justification**

a. **Summary of Project Performance**
The monitoring results indicate that the project has been effective in meeting the objective of re-establishing a hydrologic barrier to protect the marsh and open water in the project area from excessive wave energy, water level fluctuations, and saltwater intrusion from the Barataria Waterway. The water control structure has been effective in retaining water during winter months, increasing available habitat for wintering waterfowl.

b. **Summary of Project Deficiency**
The original fully-funded cost estimate did not account for the indirect labor costs (IDC) associated with CPRA's maintenance activities and twice-yearly structure operations.

c. **Reason for Requested Increase**

- The rates for structure operations and maintenance administration have increased due to recent increases in CPRA's indirect costs. 4 years of scheduled operations remain to be completed in the 20-year life of the project.
- Labor and material costs necessary to correct a vandalism incident last year were not included in the previous O&M budget estimate.

Black Bayou Hydrologic Restoration (CS-27)

September 14, 2016

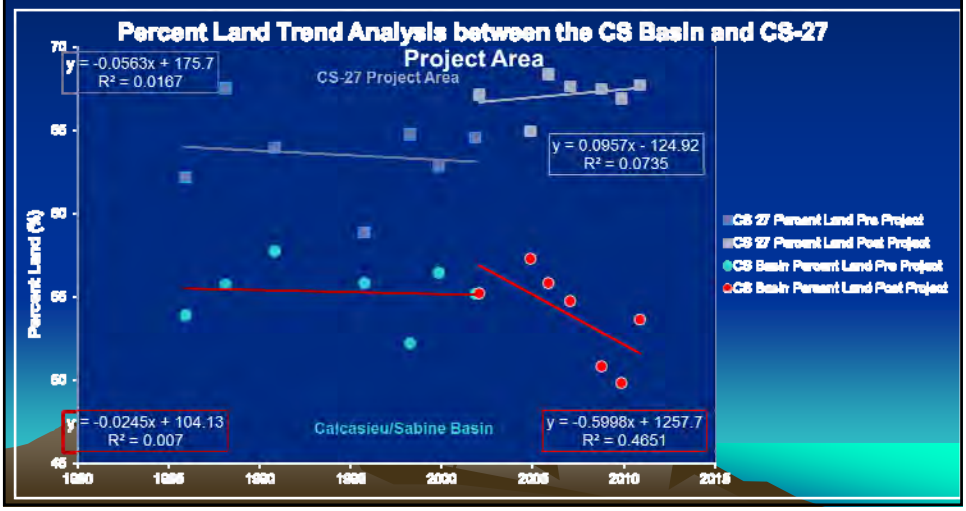
CPRA
Coastal Protection and Restoration Authority of Louisiana

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

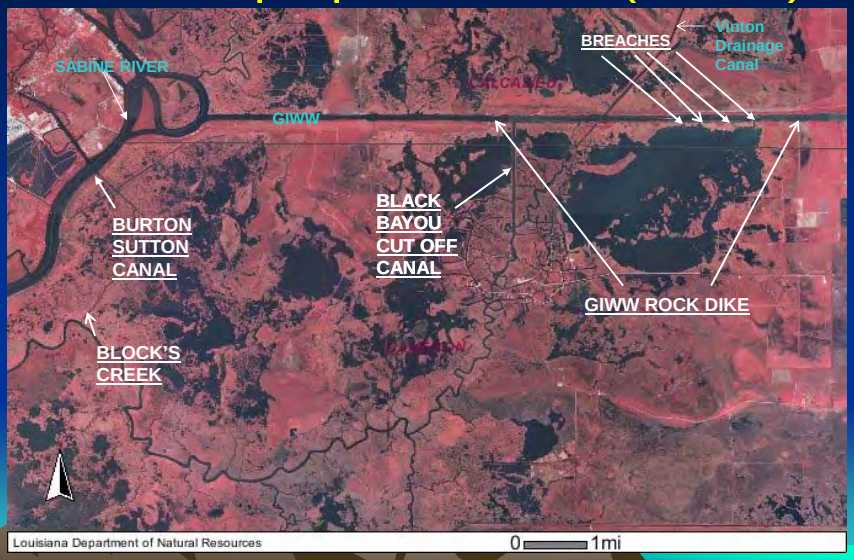
Historical Information

- The Black Bayou Hydrologic Restoration Project is located approximately 18 miles WNW of Hackberry, LA in NW Cameron and SW Calcasieu Parishes. Total project area is approximately 25,529 acres.
- The objective of the Black Bayou Hydrologic Restoration Project is to allow freshwater from the GIWW into the wetlands to the south and to create a hydrologic head that increases freshwater retention time and reduces salt water intrusion into the Black Bayou watershed.
- The project was funded on the CWPPRA PPL 6 list.
- Initial construction was completed in 2001. Adjustments to the original construction were completed in 2003. Other maintenance events were completed in 2006 & 2009.

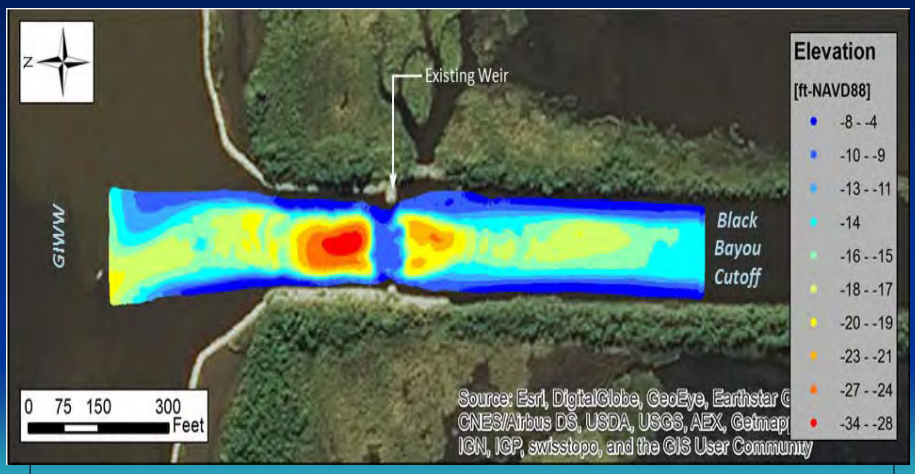
- Before the construction of CS-27 the project area and the CS basin shared a very similar trajectory of slow negative land loss annually as seen in the pre project slopes (-0.056 and -0.024).
- After project construction the CS-27 project area has gained land while the CS basin has an accelerated rate of land loss (+0.096 and -0.599).
- Data source: Couvillion et al. 2011



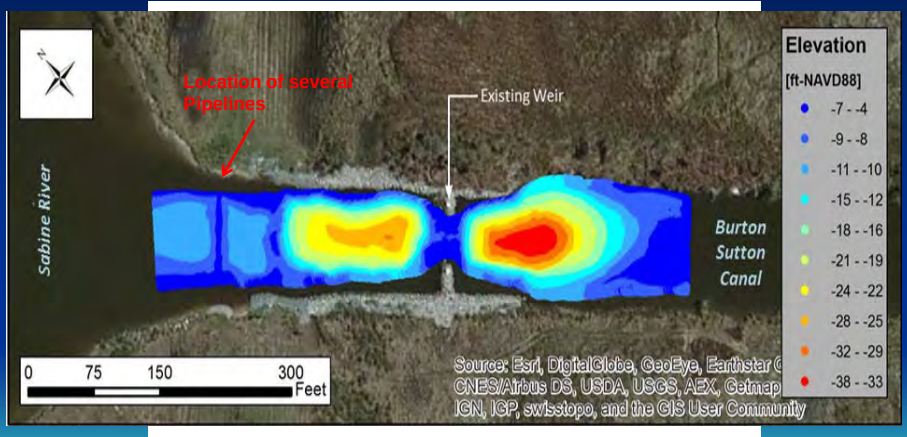
Areas of proposed work (CS-27)



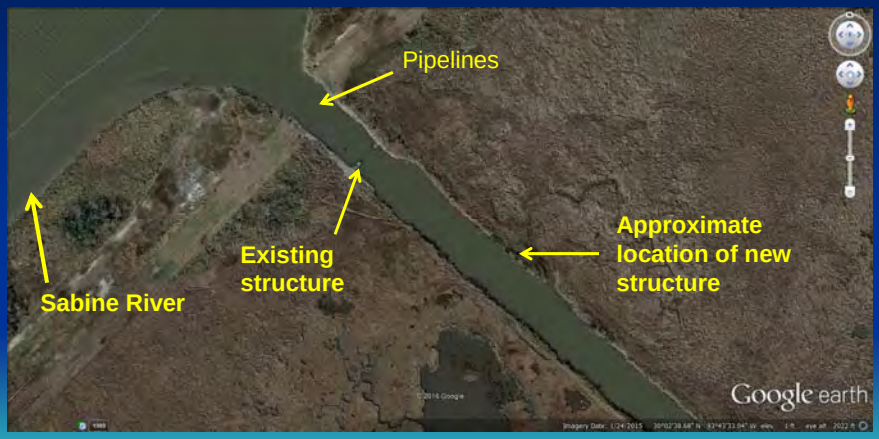
Scour around Black Bayou Cut Off Canal Structure



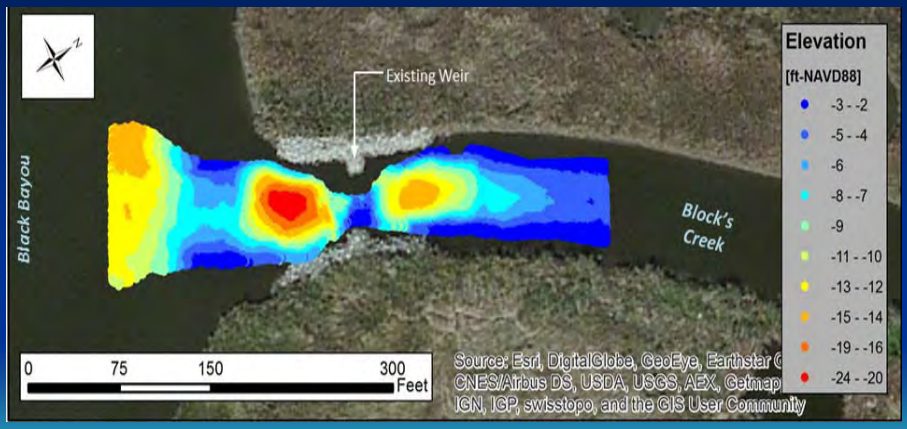
Scour around Burton Sutton Canal Structure



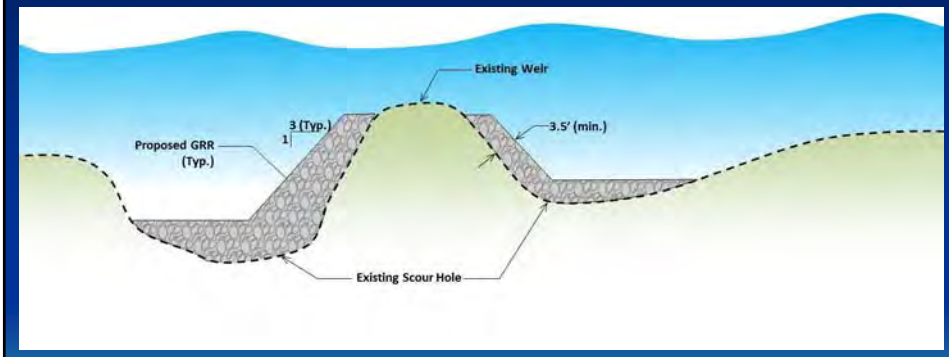
Potential Relocation of Burton Sutton Canal Structure



Scour around Block's Creek Structure



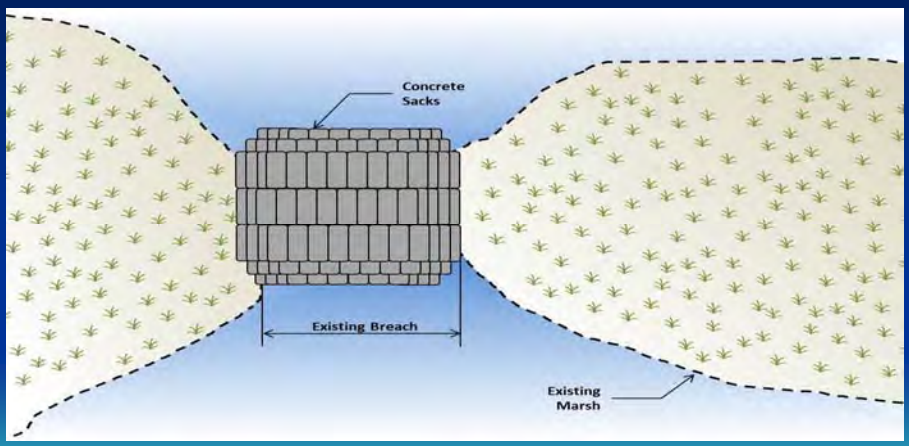
Typical Repair Around Weirs



Location of Breaches behind GIWW Rock Dike

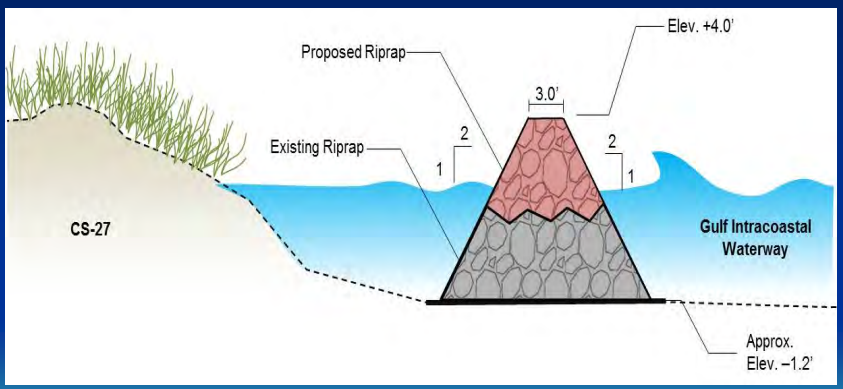
Example Breach Behind GIWW Rock Dike

Typical Repair Around Breaches



Example Damage to GIWW Rock Dike

Typical Repair to GIWW Rock Dike



Estimate of Probable Construction Costs

ITEM	QUANTITY	UNIT	UNIT PRICE	EXTENSION
Mob/Demob	1	LS	$250,000	$250,000
Haz Survey	1	LS	$25,000	$25,000
Topo/Bath Survey	1	LS	$120,000	$120,000
GIWW Rock	500	TONS	$75	$37,500
Block's (scour)	2,000	TONS	$75	$150,000
Black Bayou (scour)	10,500	TONS	$75	$787,500
Burton (scour)	10,500	TONS	$75	$787,500
Burton relocation	17,800	TONS	$75	$1,335,000
Earthwork (Burton)	500	CY	$10	$5,000
Cont. for P/L Protection	4,500	TONS	$75	$337,500
Concrete Sacks	1,200	CY	$420	$504,000
Geo Fabric	11,500	SY	$6	$69,000
Subtotal				$4,408,000
Contingencies (25%)				$1,102,000
TOTAL				**$5,510,000**

Recommended CS-27 Maintenance Request

- FY 16/17 Projected Budget: $ 330,367
- FY 17/18 Projected Budget: $ 5,798,452
- FY 18/19 Projected Budget: $ 21,028
- 3 YEAR BUDGET ESTIMATE: $ 6,149,847

- REMAINING O&M FUNDS: $ 184,876
- ADDN. FUNDS REQUESTED: $ 5,964,971

Information obtained from a previous NRCS presentation

PROJECTS	COST/ NET ACRE
PPL18 Average	$46,822
PPL19 Average	$88,656
PPL20 Average	$50,682
PPL21 Average	$60,622
PPL22 Average	$89,578
PPL23 Average	$132,661
PPL24 Average	$85,088
OVERALL AVG PPL18-24	**$78,177**
2009 Phase II Approvals Average	$120,303
2010 Phase II Approvals Average	$140,462
2011 Phase II Approvals Average	$206,094
2012 Phase II Approvals Average	$70,429
2013 Phase II Approvals Average	$67,618
2014 Phase II Approvals Average	$54,646
2015 Phase II Approvals Average	$62,095
OVERALL AVG PHASE II APPROVALS 2009-2015	**$103,017**
AVERAGE ALL PPL AND PHASE II APPROVALS 2009-2015	**$87,690**

CS-27 COST/ NET ACRE	
ORIGINAL COST EFFECTIVENESS	$1,808
REVISED COST EFFECTIVENESS	$3,533

Questions/Answers

Request for CWPPRA Project O&M Funding Increase
Project Costs and Benefits Reevaluation
Fact Sheet
September 14, 2016

Project Name: Black Bayou Hydrologic Restoration Project (CS-27)
PPL: 6
Federal Sponsor: NMFS
Construction Completion Date: December 2003
Projected Project Close-out Date: December 2023
Project Description: A 22,600 linear foot rock dike was placed on the southern spoil bank of the GIWW. A barge bay weir (70-foot bottom width) was constructed in Black Bayou Cutoff Canal. Weirs with boat bays (10-foot bottom widths) were constructed in Burton Canal and Block's Creek. A collapsed weir was plugged and replaced with an SRT gate and adjacent rock plug. Spoil material was deposited in nearby marsh and 55,000 vegetative plants were installed over two planting seasons.

Construction changes from the approved project: Navigational warning signs were placed at two locations along the GIWW to warn local boaters of the newly constructed rock dike. A boat barrier was added to the SRT gate location to prevent possible vandalism and a railing added for public safety. "C" type stone was placed in several locations along the GIWW where there existed "water" connections between the marsh and the GIWW. This work was paid for with O&M monies.

Explain why O&M funding increase is needed: Large scour holes have developed at the interior and exterior of the three rock weir locations, Block's Creek, Burton Sutton Canal and Black Bayou Cutoff Canal. The Burton Sutton Canal exterior scour hole is very near multiple pipelines that parallel the Sabine River and is of great concern. The "C" type stone locations have developed small breaches again in several areas and are in need of repair, as well as a few low areas on the rock dike along the GIWW.

Detail O&M work conducted to date: Navigational lights were repaired at Black Bayou Cut-Off Canal in October 2003. After Hurricane RITA, navigational lights were repaired at Black Bayou Cut-Off Canal, Block's Creek and Burton Canal in May 2006. The cross sectional area at the SRT gate was reduced by adding a flap to the railing. Two 30" flapgated culverts were also added along the southern boundary in January 2006. The SRT flap gate and two flap gated culverts have now become features to be maintained as part of this project. Navigational lights at Burton Canal, Black Bayou Cut-Off Canal and Block's Creek were repaired again in January 2007. In 2009, general repairs made to the SRT gate along with repairs to the "C" type stone locations using concrete bags. Low areas along the rock dike on the GIWW were also repaired with concrete bags. The landowners in the area, under their own construction contract repaired two of the four plugs behind the rock dike. The navigational lights and signs are routinely inspected quarterly and repaired as necessary.

Detail and date of next O&M work to be completed: Recommend placing rip rap in all of the scour holes (interior and exterior) at the three rock weir locations. Consideration is being given to re-locate the Burton Sutton Canal weir further inland to provide a greater distance from the existing pipelines. Recommend placing rock to elevate low areas along the GIWW dike. Also, place bags of sack concrete at four breach locations behind the rock dike. This work should be complete by early 2018.

Detail of future O&M work to be completed: None anticipated.

Originally approved fully funded project cost estimate: $6,500,707

Originally approved O&M budget: $592,986

Approved O&M Budget Increases (2007): $53,508; (2008): $134,223; (2014): $365,764

Total O&M obligations to date: $961,605

Remaining available O&M budget funds: $184,876

Current Incremental Funding Request: $5,964,971

Revised fully funded cost estimate: $12,698,222

Total Project Life Budget Increase: $6,197,515

Requested Revised fully funded O&M estimate: $7,343,996

Percent total project cost increase of proposed revised budget over original budget plus net budget changes: 95.34%

Original net benefits based on WVA prepared when project was approved: 3594 acres

Estimate of cumulative project wetland acres to date (from quantitative and/or qualitative analysis): 3594 acres

Revised estimate of project benefits in net acres through 20 year project life based on the project with and without continued O&M (include description of method used to determine estimate): No anticipated change in estimated net benefits, project is performing as expected.

Original plus net budget changes and revised cost effectiveness (cost/net acre) and percent change:

Original CE = $1,809/acre
Revised CE = $3,533/acre 95.34%

Request for CWPPRA Project O&M Funding Increase
Project Performance Synopsis
June 28th, 2016

Black Bayou Hydrologic Restoration (CS-27)

The CS-27 project has been successful at meeting its goals. The salinity control component of the project has successfully reduced the salinity over that of the reference area (Figure 1). Though the salinity reduction is limited during times of prolonged drought, as the project impoundment did exchange water with the GIWW to the north until repaired in August of 2011. As a result of better salinity control in the project area the submerged aquatic vegetation community has remained healthy and robust through hurricanes and a prolonged drought. While the same environmental stimulus that affected the project area almost eliminated the SAV population in the reference area by 2012, but the reference area did show a slight rebound in 2014. Overall the project area contained at least three times more SAV than the reference area after the 2005 hurricane season through 2014 (Figure 2). The land water analysis has shown that the project area marshes are very stable in the face of extreme environmental events, losing only 10.3 acres from 2000-2010. This is in stark contrast to the reference area that lost 783.7 acres of land since project construction in 2000 (Table 1). This land stability is in part due to the salinity reduction in the project and its effect on the plant community.

Overall the project features have effectively meet the goals of the project, and the loss of the rock weirs would expedite salinity increases in the project area ponds and marshes which in turn would have a negative consequence on the overall land area, prevalence of SAV , and emergent marsh percent and community type.

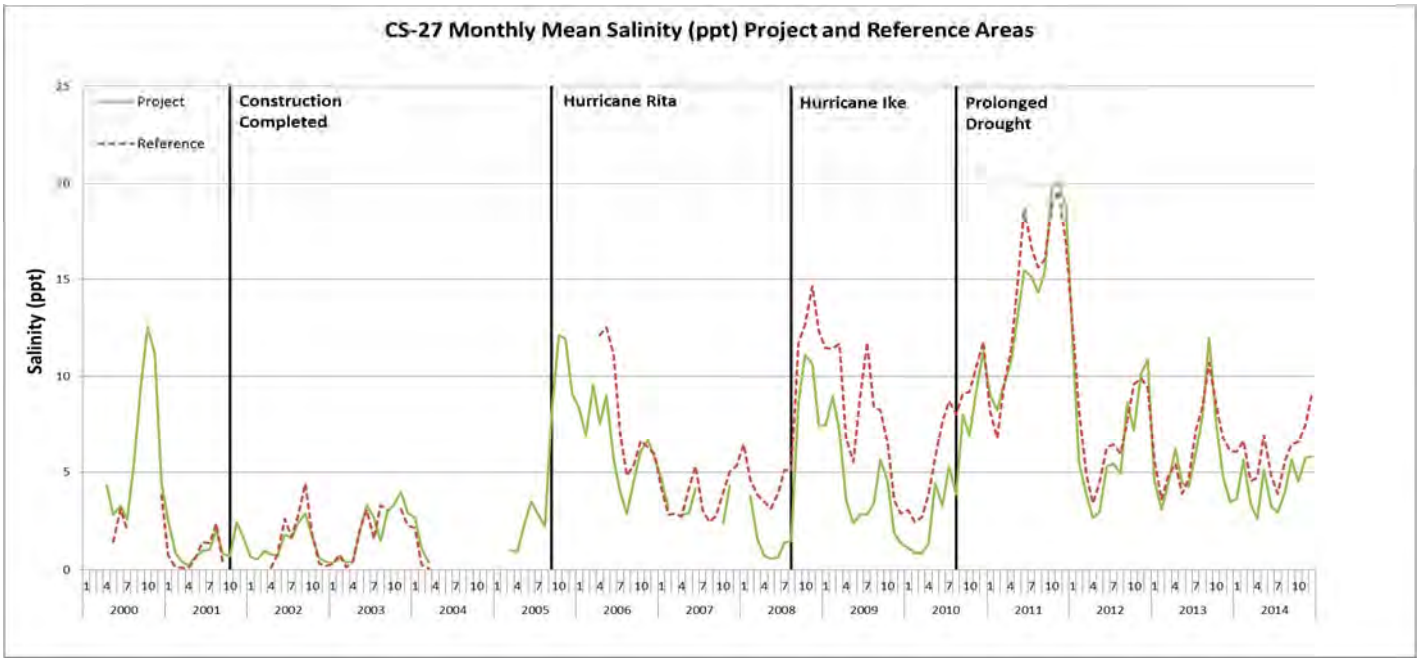


Figure 1. Monthly means of continuous salinity collected at stations in the project (CS27-25, 658, 662, 663) and reference (660, 665, and 2189) areas from 2000-2014. Construction of structures to control water flow into the project area and to create the impoundment was completed in November 2001.

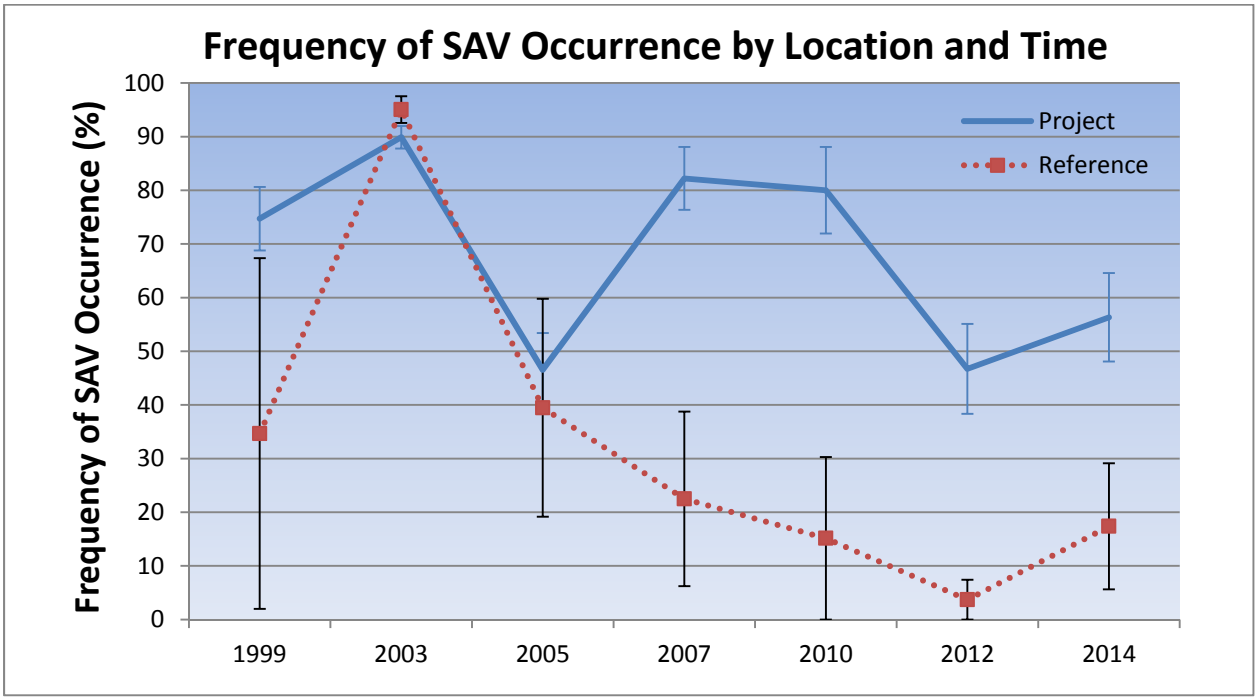


Figure 2. Mean and standared errors for SAV frequency of occurrence in the project and reference areas from pre-project in 1999 to 2014.

Table 1. Land area and change rates compiled from high resolution imagery (1:24,000) collected by the USGS-National Wetlands Research Center pre- (2000) and post-construction (2004, 2010) in CS-27.

	2000		2004		2010	
	acres	%	acres	%	acres	%
Project	16,247.3	58.1	16,400.0	58.7	16,237.0	58.1
Reference	11,009.7	56.3	11,394.0	58.3	10,226.0	52.3

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

REQUEST FOR MONITORING INCREMENTAL FUNDING AND BUDGET INCREASES

For Decision:

The Technical Committee will consider and vote to make a recommendation to the Task Force to approve requests for total FY19 incremental funding in the amount of $803,435 and monitoring budget increases totaling $10,633,996.

a. PPL 9+ Projects requesting approval for FY19 incremental funding in the total amount of $322,340 for the following projects:
   - Barataria Basin Landbridge Shoreline Protection (BA27c), PPL-9, NRCS
     Incremental funding amount: $4,844
   - GIWW – Perry Ridge West Bank Stabilization (CS-30), PPL-9, NRCS
     Incremental funding amount: $5,003
   - Freshwater Introduction South of Highway 82 (ME-16), PPL-9, USFWS
     Incremental funding amount: $11,000
   - West Lake Boudreaux Shoreline Protection and Marsh Creation (TE-46), PPL-11, USFWS
     Incremental funding amount: $64,456
   - Coastwide Nutria Control Program (LA-03b), PPL-11, NRCS
     Incremental funding amount (FY16): $119,431
   - Goose Point/Pointe Platte Marsh Creation (PO-33), PPL-13, USFWS
     Incremental funding amounf: $36,704
   - Coastwide Vegetative Planting (LA-39), PPL-20, NRCS
     Incremental funding amount: $80,902

b. PPL 1-8 Project requesting approval for FY19 incremental funding in the total amount of $129,464:
   - Atchafalaya Sediment Delivery (AT-02), PPL 2, NOAA Fisheries
     Incremental funding amount: $74,800
   - Big Island Mining (AT-03), PPL 2, NOAA Fisheries
     Incremental funding amount: $48,800
   - Naomi Outfall Project (BA-03c), PPL-5, NRCS
     Incremental funding amount: $5,864

c. Coastwide Reference Monitoring System (CRMS) requesting approval for FY19 incremental funding in the total amount of $9,917,129:
   - Coastwide Reference Monitoring System (CRMS) (LA-30) USGS
     Incremental funding amount: $9,917,129

d. PPL 9+ Projects requesting approval for a budget increases in the amount of $803,435 and FY19 incremental funding in the total amount of $265,063 for the following projects:
    - Little Lake Shoreline Protection/Dedicated Dredging Near Round Lake (BA-37), PPL-11, NOAA Fisheries
      Budget increase amount: $74,320
      Incremental funding amount: $35,124
    - Lost Lake Marsh Creation and Hydrologic Restoration Project (TE-72), PPL-19, FWS
      Budget increase amount: $499,130
      Incremental funding amount: $126,941
    - Bayou Bonfouca Marsh Creation (PO-104), PPL-20, USFWS
      Budget increase amount: $229,985
      Incremental funding amount: $102,998

Monitoring Funding Increase Request Beyond the Approved 20-Year Budget
for
BA-37 Little Lake Shoreline Protection/Dedicated Dredging Near Round Lake

1) Project History

a. Description

The Little Lake Shoreline Protection/Dedicated Dredging Near Round Lake (BA-37) project is located in the southwestern portion of the Barataria Basin in Lafourche Parish, LA. Specifically, the project is positioned along the southern lake rim of Little and Round Lakes in Galliano, LA. Its purpose is to create and nourish critical acres of marsh in the project area that are converting to open water because of subsidence and erosion and to protect the shoreline of Little Lake from erosion between Lake Brusle and John the Fool Bayou.

BA-37 is a shoreline protection, marsh creation, and marsh nourishment restoration project. A 25,976 ft foreshore rock dike was constructed along the -2 ft NAVD 88 contour of Little and Round Lakes. Approximately, 175,290 tons of rocks were used to construct this shoreline protection structure. Sediments dredged from Little Lake were pumped into the marsh creation and nourishment disposal area. Earthen containment dikes were constructed along the perimeter of the disposal area to an elevation of 3.5 ft NAVD 88 to elevate the constructed marshes. Approximately, 920 acres of marsh platform were created and nourished during construction. These constructed marshes were raised to a 2.36 ft NAVD 88 elevation. Project construction was completed in March of 2007.

b. Monitoring Completed to Date

Two types of monitoring data have been collected to assess the performance of this restoration project, elevation and shoreline position data. Pre-construction elevation data were collected in 2005 and post-construction O&M surveys were conducted in 2006, 2007, 2008, 2009, 2010, and 2011. Spatial analyses were performed using this data to estimate elevation and volume changes over time. Pre-construction shoreline position data were collected in 1998, 2003, 2005 and 2005 while post-construction position data were collected in 2007, 2008, 2010, and 2012. Pre-construction and post-construction shoreline change rates were calculated using the position data. Additionally, a CRMS-Wetlands site, CRMS6303, was situated within the project area in 2008 and was used to characterize the structure of the project area marshes. OM&M reports were written in 2010 and 2012 using the aforementioned data.

c. Original Project Budget

The original approved Phase I CWPPRA monitoring budget was $23,816.

d. Previous Monitoring Funding Increases

There have been no previous monitoring funding increases.

2) **Increase Request**

a. **Monitoring Increment Increase Being Requested**

Total Increase for 20-year Project Life
$74,320.00

3-year Incremental Request
$35,124.00

b. **Fully Funded Cost Estimate**
$98,136.00

c. **Description of Proposed Monitoring Events to Be Accomplished With the Requested Funding**
The requested funding would be used to fund the following items

- Elevation Analysis
- Shoreline Position Surveys
- Monitoring Reports

3) **Monitoring Fund Increase Justification**

a. **Summary of Project Performance**
The shoreline and elevation data collected to date show that the project is successfully attaining or is on a trajectory to realize its goals by the end of the project life. The elevation data show that the marsh creation and nourishment area is subsiding with its predicted settlement curve while the rock dike is settling at a sustainable rate. The shoreline position data show the shorelines fronting the marsh creation and lake rim areas have incurred reduced shoreline erosion rates since 2008. These data also show that the lake rim is transgressing at a faster rate than the marsh creation area shoreline. The disparities between the marsh creation and lake rim erosion rates are probably related to differences in fetch and sediment additions to the marsh creation area shoreline. The input of mineral sediments may have strengthened the marsh creation area shoreline facilitating a stable and perhaps sustainable shoreline position.

b. **Summary of Project Deficiency**
Currently there is no deficiency in the monitoring data type or frequency. The problem is funding. This project did not receive any Phase II CWPPRA funding due to the advent of CRMS-Wetlands. The original $23,816 monitoring budget is for pre-construction monitoring (Phase I CWPPRA funding). Moreover, additional O&M elevation surveys will be funded in year 10 and 15 of the project, and shoreline position data can be extracted from available aerial photography rather inexpensively. Therefore, the monitoring budget increase would fund the analyses of future elevation and shoreline position data events and finance two future OM&M reports. This would provide performance measures to year 15 of the project life in accordance with project goal #4, maintain 799 acres (323 ha) of emergent marsh at the end of the 20 year project life.

c. Reasons for Requested Increase

- The addition of future shoreline position surveys (Years 10 and 15) will address the project goal to reduce marsh edge erosion (Goal #1). Shoreline position surveys will aid in assessing the integrity of the restored marsh creation and lake rim shorelines and in determining the rates of shoreline change continue to be sustainable.
- The addition of analyses of future O&M elevation surveys (Years 10 and 15) will address the project marsh creation (Goal #2), nourishment (Goal #3), and sustainability (Goal #4) goals through year 15 of the project. Elevation surveys will be useful in determining if the marsh creation area continues to subside with its settlement curve and will verify if the foreshore rock dike continues to settle at a sustainable rate.
- The original monitoring budget ($23,816) was for pre-construction monitoring (CWPPRA Phase I). Phase II of the BA-37 project was not funded.
-

Monitoring Funding Increase Request Beyond the Approved 20-Year Budget
For

Lost Lake Marsh Creation and Hydrologic Restoration Project (TE-72)

1) Project History

a. Description

The Lost Lake Marsh Creation and Hydrologic Restoration Project (TE-72) is located in Terrebonne Parish, Louisiana in the vicinity of Lost Lake. The project encompasses approximately 7,312 acres, including 3,646 acres of intermediate marsh and 3,666 acres of open water.

The TE-72 project will restore an important feature of the structural framework between Lake Pagie and Bayou Decade, preventing the joining of these two water bodies. It will increase the delivery of fresh water, sediment, and nutrients into marshes north and west of Lost Lake, and reduce fetch in open water areas via construction of a terrace field. Marshes to the north, east, and west of Lost Lake serve an important function as an intermediate zone buffering fresh marshes to the north from the higher salinities to the south. Project construction is estimated to start in spring of 2017 and is anticipated to be complete in the summer of 2018.

b. Monitoring Completed to Date

Project is currently out for bid. No monitoring has taken place to date.

c. Original Monitoring Project Budget

The original approved monitoring budget was $284,348.

d. Previous Monitoring Funding Increases

There have been no previous monitoring funding increases.

2) Increase Request

a. Monitoring Increment Increase Being Requested

Total Increase for 20-year Project Life
$499,130

3-year Incremental Request (FY18–FY20):
$126,941

b. Fully Funded Cost Estimate

$783,478

c. Description of Proposed Monitoring Events to Be Accomplished With the Requested Funding

The requested funding would be used to fund the following items

- 3 Elevation Surveys
- 3 Land Water Analyses
- 3 Monitoring Reports
- Annual Monitoring Inspections
- Funding was added for monitoring administration, which includes data management and analysis, managing monitoring contracts, financial accounting, site visits, project meetings, internal review of OM&M reports, etc.

3) Monitoring Fund Increase Justification

a. Summary of Project Performance

N/A, The project has not been constructed.

b. Summary of Project Deficiency

The currently funded monitoring cost was developed prior to the development of CPRA's IDC plan and did not include costs for managing, accounting and project management.

c. Reasons for Requested Increase

- The original monitoring budget did not account for the cost of IDC, supervision and administration, annual inspections, inflation cost of monitoring reports, and the close-out cost needed at the end of project life.

Monitoring Funding Increase Request Beyond the Approved 20-Year Budget
for
PO-104 Bayou Bonfouca Marsh Creation

1) Project History

a. Description

The Bayou Bonfouca Marsh Creation project is located within Pontchartrain hydrologic basin in St. Tammany Parish, Louisiana, on the north shore of Lake Pontchartrain near the city of Slidell. The primary goal of the project is to re-create and nourish low salinity brackish marsh in open waters adjacent to Bayou Bonfouca with sediment dredged from Lake Pontchartrain.

The poor condition of the marsh is due to a combination of subsidence, hurricane induced ponding, and shoreline erosion. Although the shoreline erosion rates are relatively low, only a narrow strip of shoreline currently exists between Lake Pontchartrain and the interior ponds. Several breaches exist along the shoreline, allowing high tidal energy to affect the interior ponds of the project area. Restoration of the marsh adjacent to Lake Pontchartrain will provide vital protection to the interior marsh to the north.

This project will create approximately 639 acres of marsh by dredging material from Lake Pontchartrain and placing it in 4 marsh creation units. Additional acreage of broken marsh and shallow open water will be nourished through uncontained placement of dredged material.

b. Monitoring Completed to Date

Project is currently under construction. No monitoring has taken place to date.

c. Original Project Budget

The original approved monitoring budget was $144,997.

d. Previous Monitoring Funding Increases

There have been no previous monitoring funding increases.

2) Increase Request

a. Monitoring Increment Increase Being Requested

Total Increase for 20-year Project Life
$229,985

3-year Incremental Request
$102,998

b. Fully Funded Cost Estimate

$374,982

c. Description of Proposed Monitoring Events to Be Accomplished With the Requested Funding

The requested funding would be used to fund the following items

- Borrow Area Dissolved Oxygen and water quality monitoring
- Borrow Area Bathymetric Surveys
- Operations, Maintenance & Monitoring Reports
- Monitoring Administration

3) Monitoring Fund Increase Justification

a. Summary of Project Performance

N/A. The project is still under construction.

b. Summary of Project Deficiency

N/A. The project is still under construction.

c. Reasons for Requested Increase

- The addition of borrow area dissolved oxygen and water quality monitoring will help determine whether the modified borrow area design of this project helped alleviate hypoxia issues often seen in borrow areas. This is important for this project due to the location of the borrow area in Gulf Sturgeon critical habitat.
- The addition of borrow area bathymetric surveys will be used to determine the rate of infilling of the borrow area.
- The costs associated with preparation of OM&M reports has increased since the original monitoring budget was developed.
- The original monitoring budget did not account for Monitoring Administrative costs.

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

ADDITIONAL AGENDA ITEMS

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

REQUEST FOR PUBLIC COMMENTS

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

DATE OF UPCOMING CWPPRA PROGRAM MEETING

For Announcement:

The Task Force Meeting will be held October 19, 2016 at 9:30 a.m. at the U.S. Army Corps of Engineers, 7400 Leake Avenue, New Orleans, Louisiana.

COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT

TECHNICAL COMMITTEE MEETING

SEPTEMBER 14, 2016

SCHEDULED DATES OF FUTURE PROGRAM MEETINGS

For Announcement:

October 19, 2016*	9:30 a.m.	Task Force	New Orleans
December 7, 2016	9:30 a.m.	Technical Committee	Baton Rouge
January 12, 2017	9:30 a.m.	Task Force	New Orleans
January 31, 2017	12:30 p.m.	Region IV RPT	Abbeville
February 1, 2017	9:30 a.m.	Region III RPT	Morgan City
February 2, 2017	10:00 a.m.	Region I&II RPT	Lacombe

*Dates are subject to change.