



Caernarvon Freshwater Diversion Advisory Committee 2018 Meeting Wednesday, December 5, 2018





- INTRODUCTION
 - History
 - Features
 - Goals
 - Project map



- U.S. Congress -Flood Control Act of 1965
- Water Resources Development Act of 1974, 1986, and 1996
- Re-introduce freshwater, sediments, and nutrients into the marshes and bays of the Breton Sound estuary
- USACE constructed; CPRA operated with oversight and advice from Technical Work Group and Caernarvon Interagency Advisory Committee
- Located on the east bank of the Mississippi River (mile 81.5) in Plaquemines Parish
- Five, 15-ft gated box culverts
- 8,000 cfs
- Operations began August 1991



Caernarvon Outfall





DANGER
KEEP OFF

DW F 1
RQ 70V



- Enhancement of emergent marsh vegetation growth
- Reduction of marsh loss
- Increase significant commercial and recreational fisheries productivity
- Increase significant commercial and recreational wildlife productivity

Salinity Monitoring Stations and Isohalines in Breton Sound Basin

Legend

- Breton Sound Basin
- Post-Project Isohaline
- Gauge Location

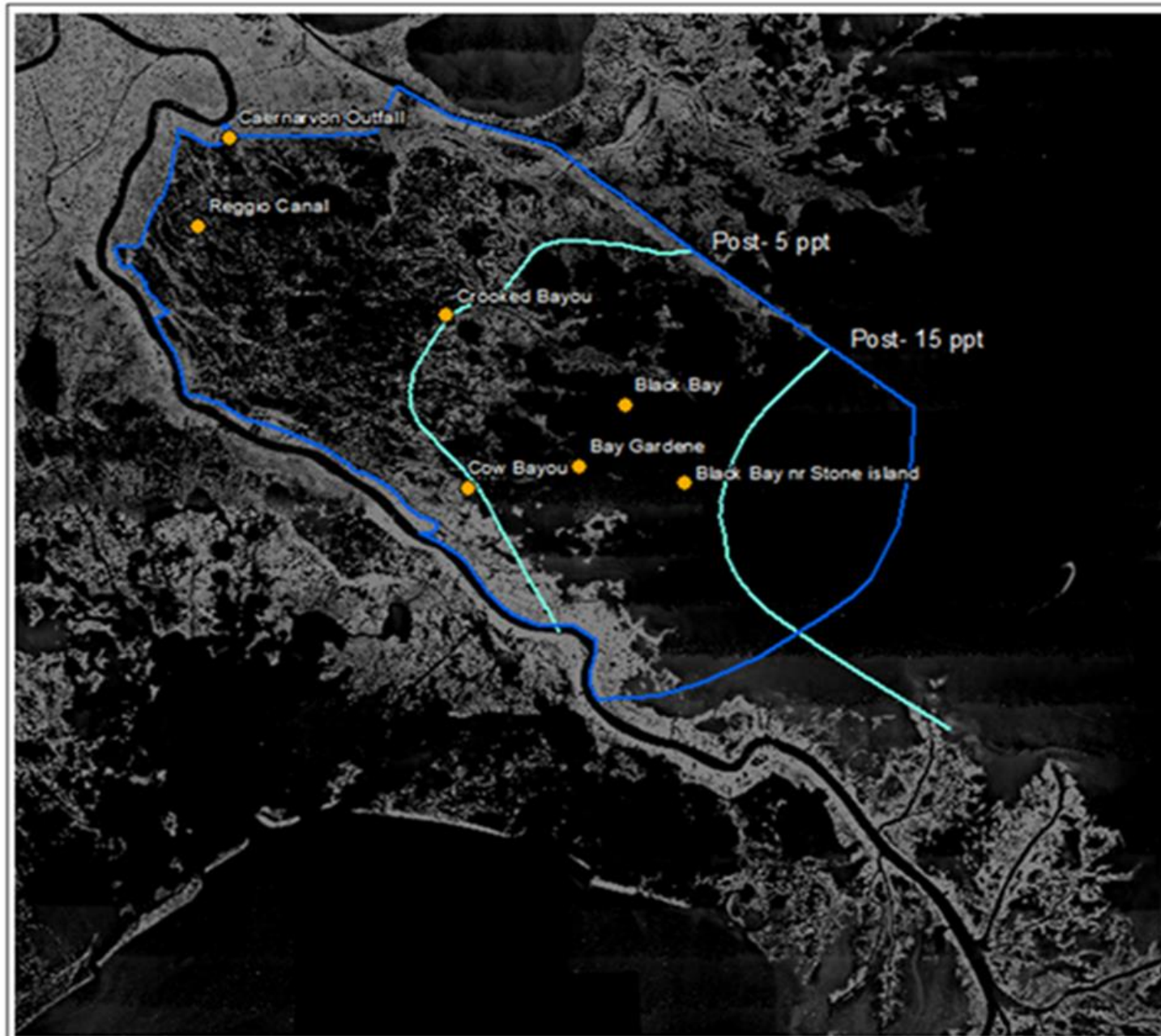
7 3.5 0 7 Miles



7 3.5 0 7 Kilometers



Source:
Coastal Protection and Restoration
Authority of Louisiana
Imagery:
2005 Landsat
Map Date:
February 25, 2014





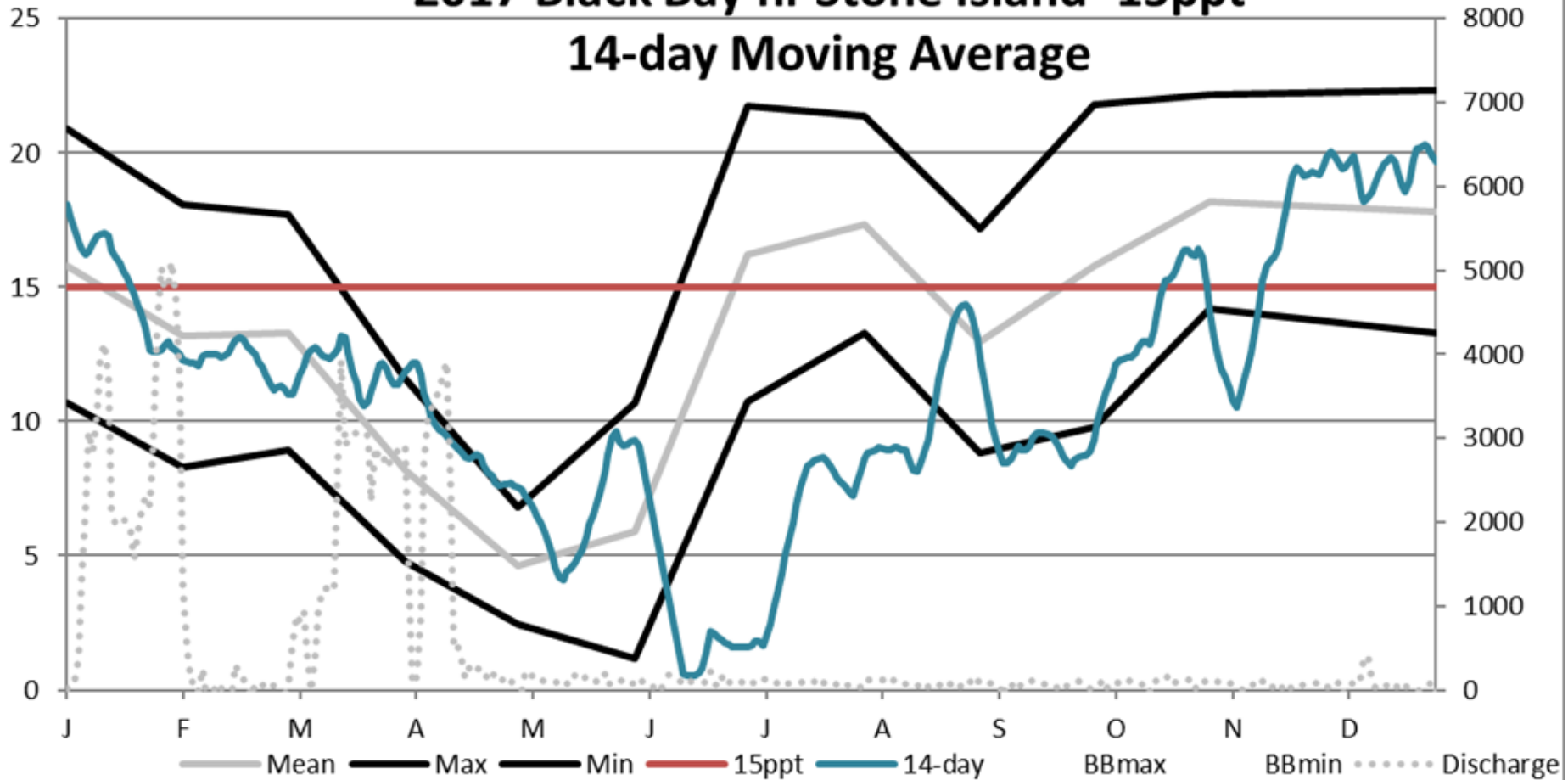
- 2017 Data Overview
 - 500 cfs evaluation
- 2018 Operations
- 2019 Proposed Operational Plan Discussion and Vote
- By-Laws Update Discussion



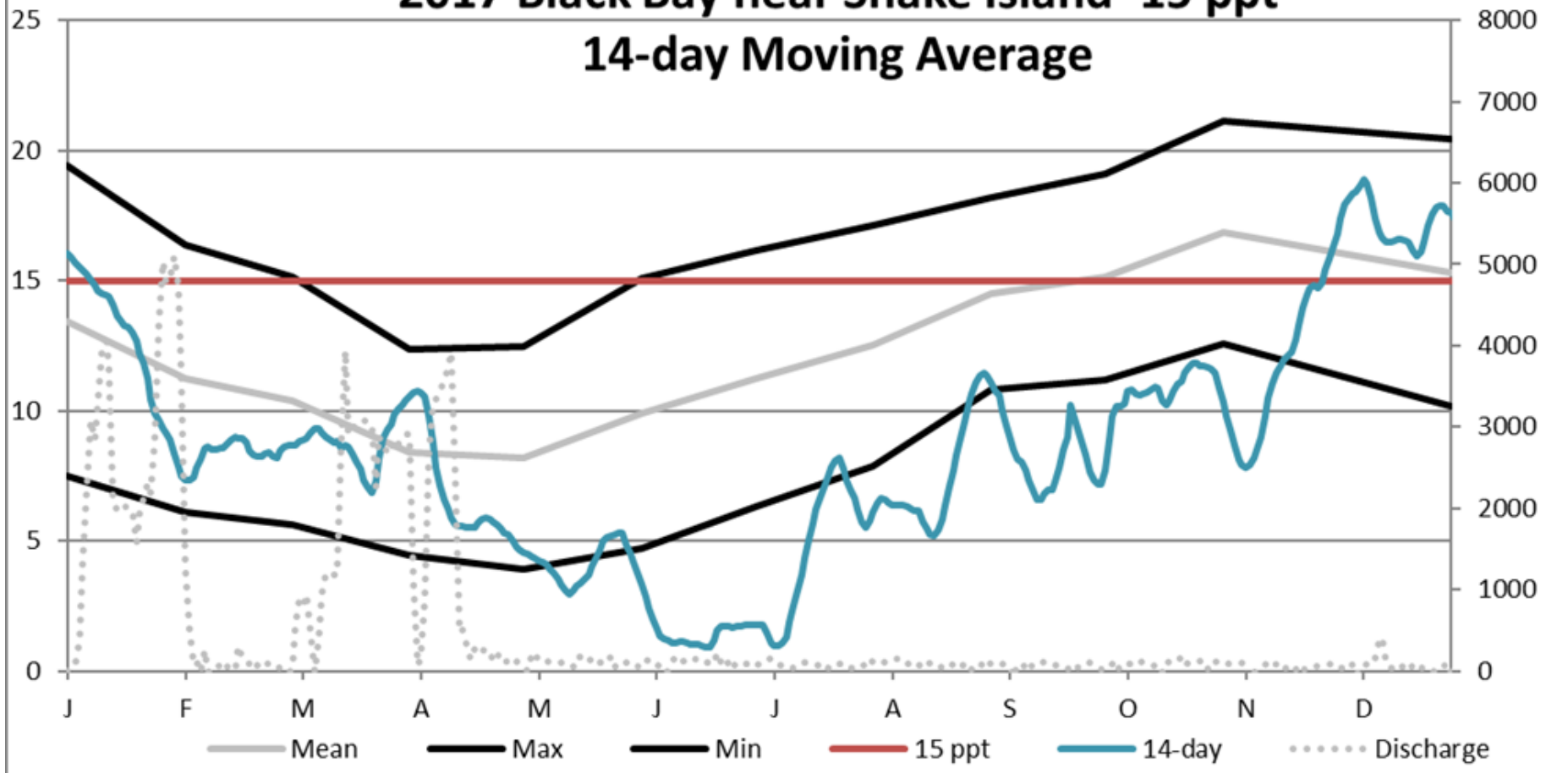
Data Results 2017

- Salinities depressed with rise in river
- Oysters continue to be of concern
- All other fisheries/wildlife evaluated are within historical ranges and consistent with natural variations

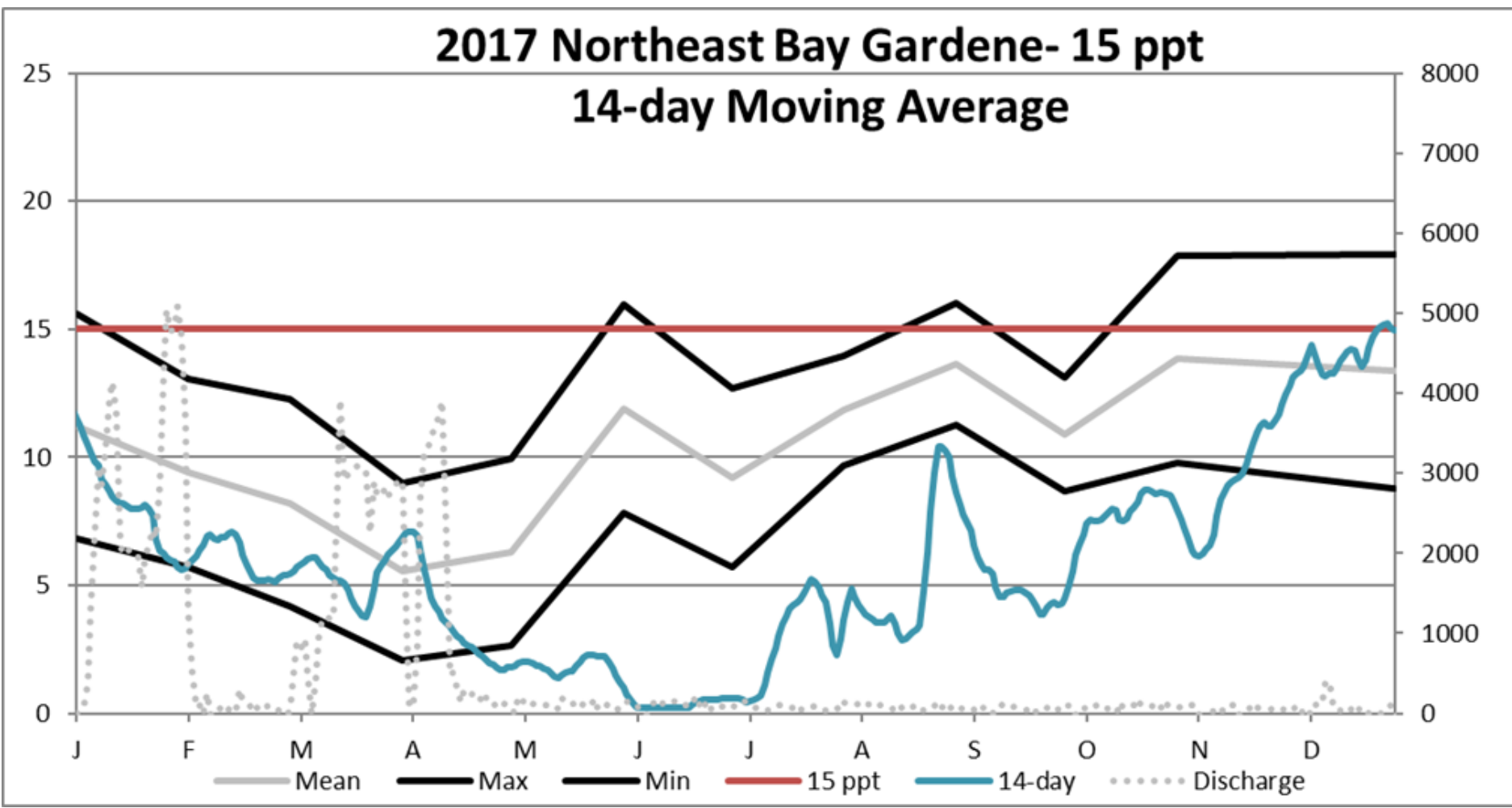
2017 Black Bay nr Stone Island- 15ppt 14-day Moving Average



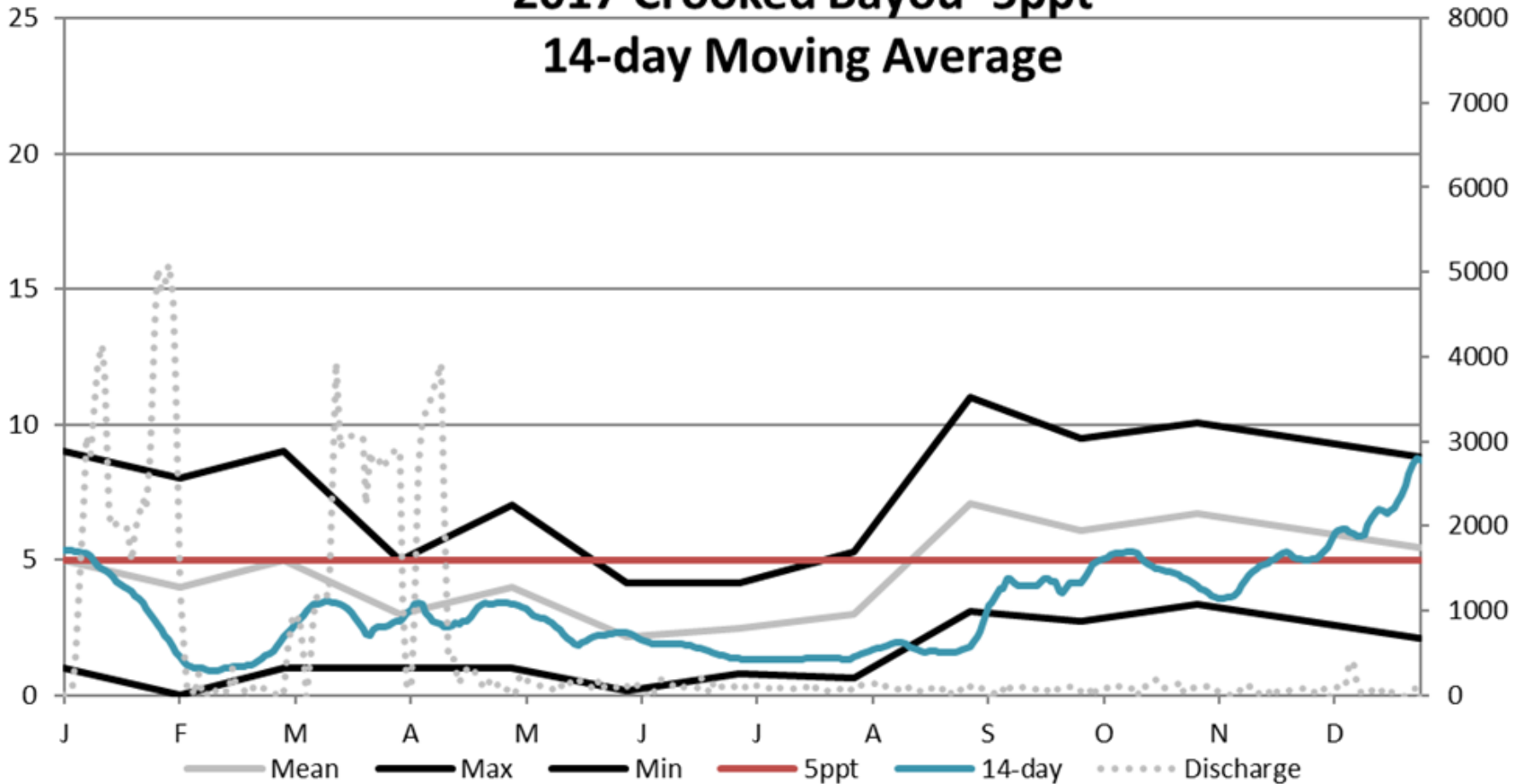
2017 Black Bay near Snake Island- 15 ppt 14-day Moving Average



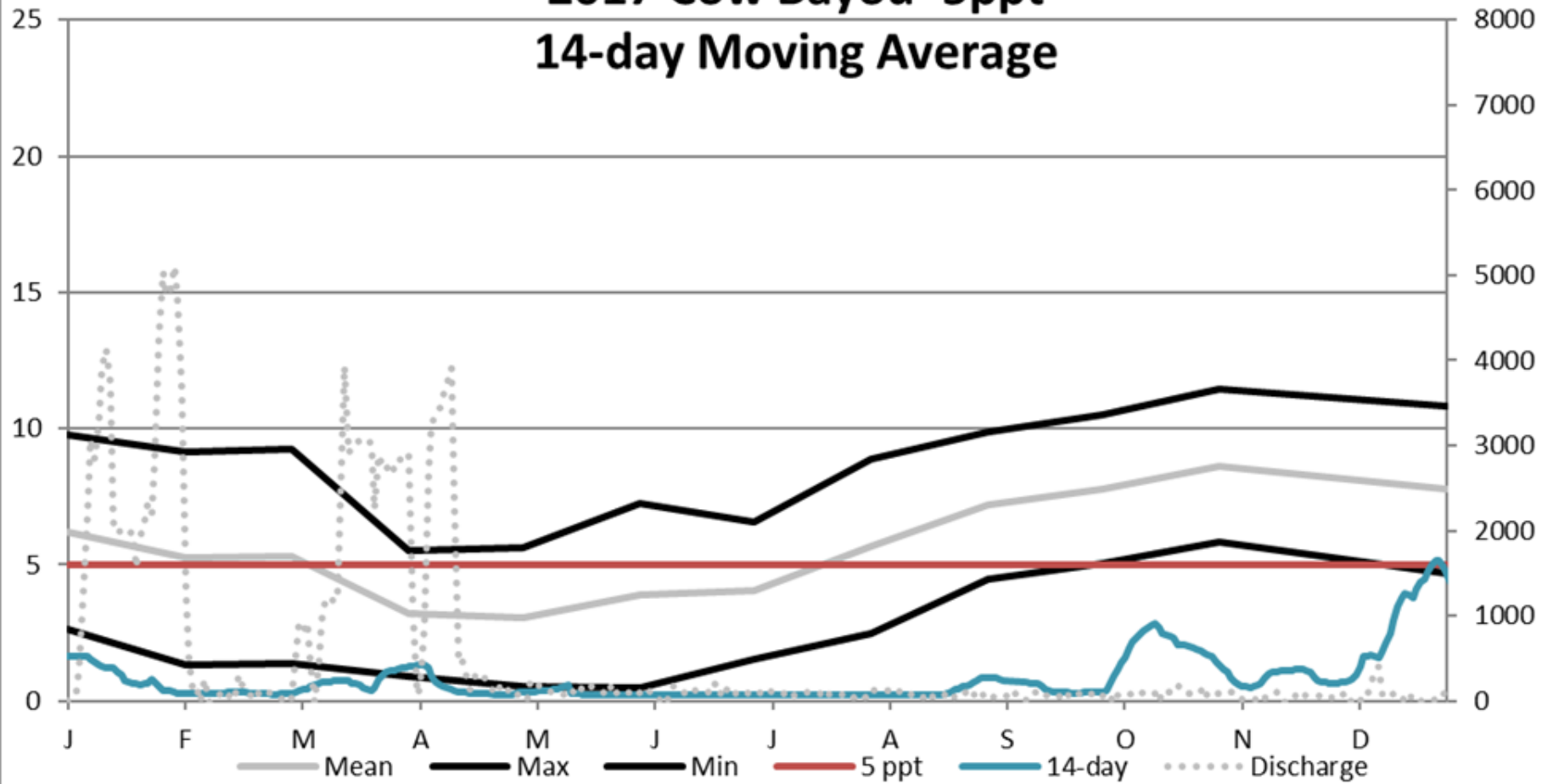
2017 Northeast Bay Gardene- 15 ppt 14-day Moving Average



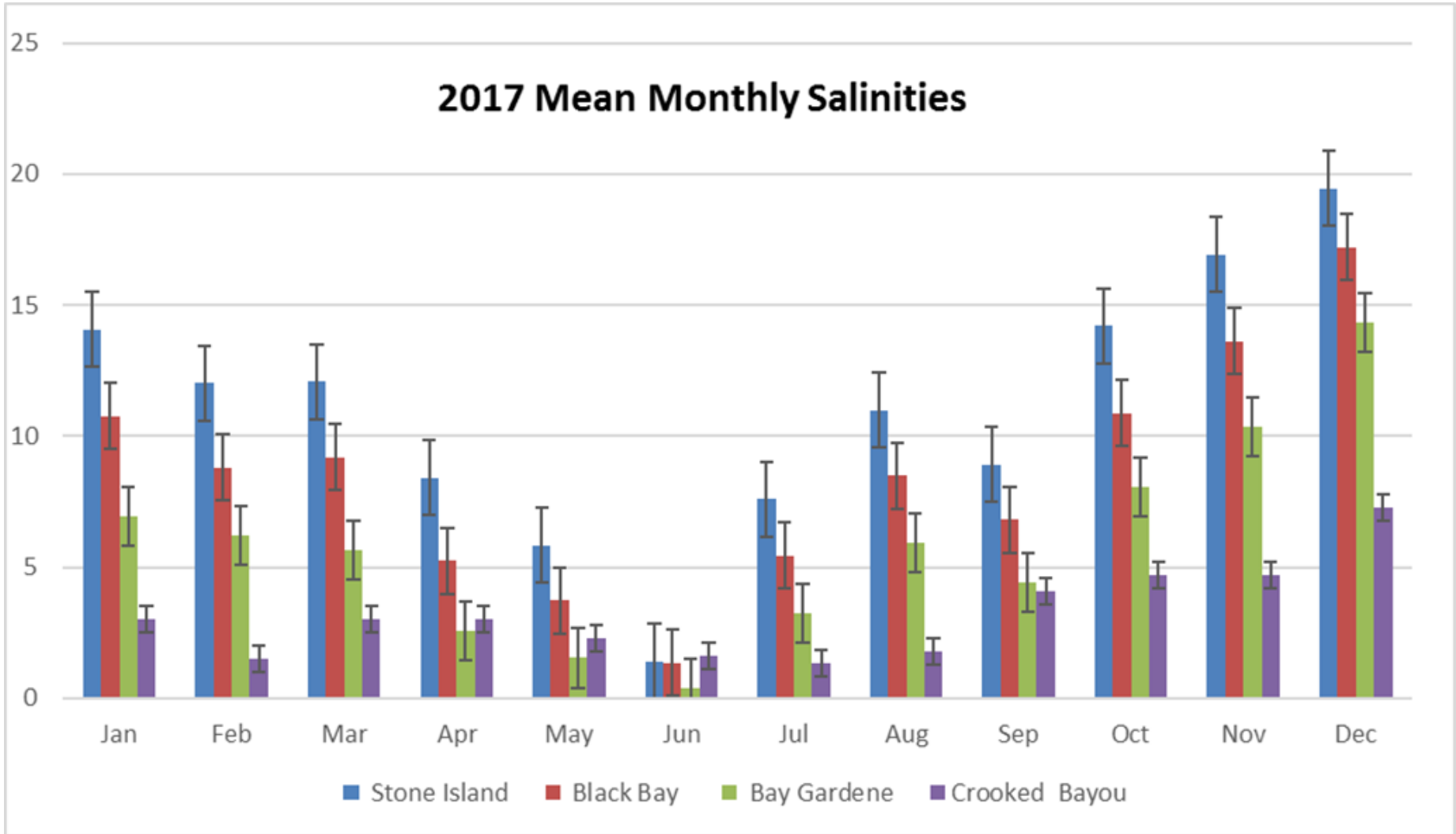
2017 Crooked Bayou- 5ppt 14-day Moving Average



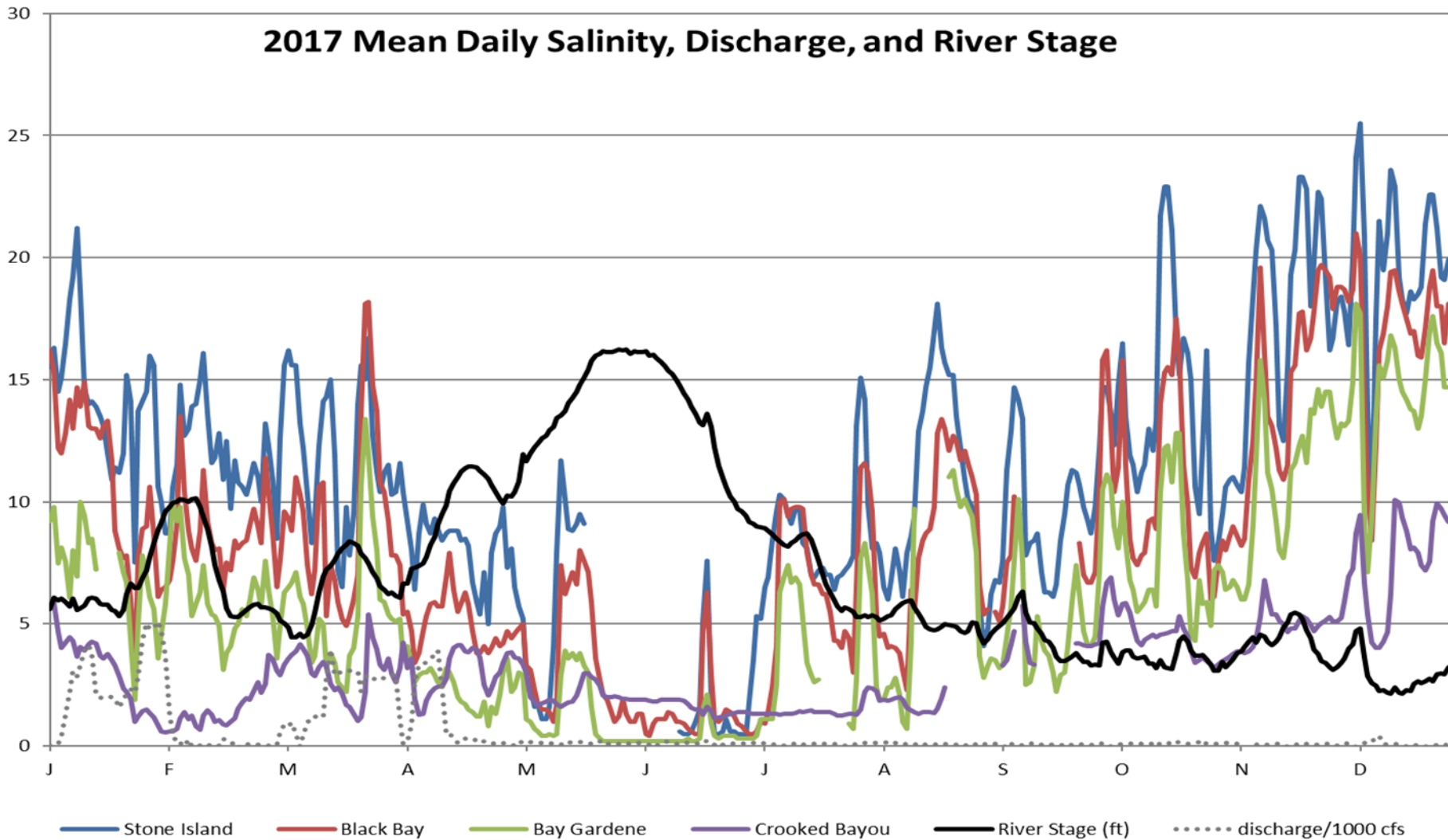
2017 Cow Bayou- 5ppt 14-day Moving Average

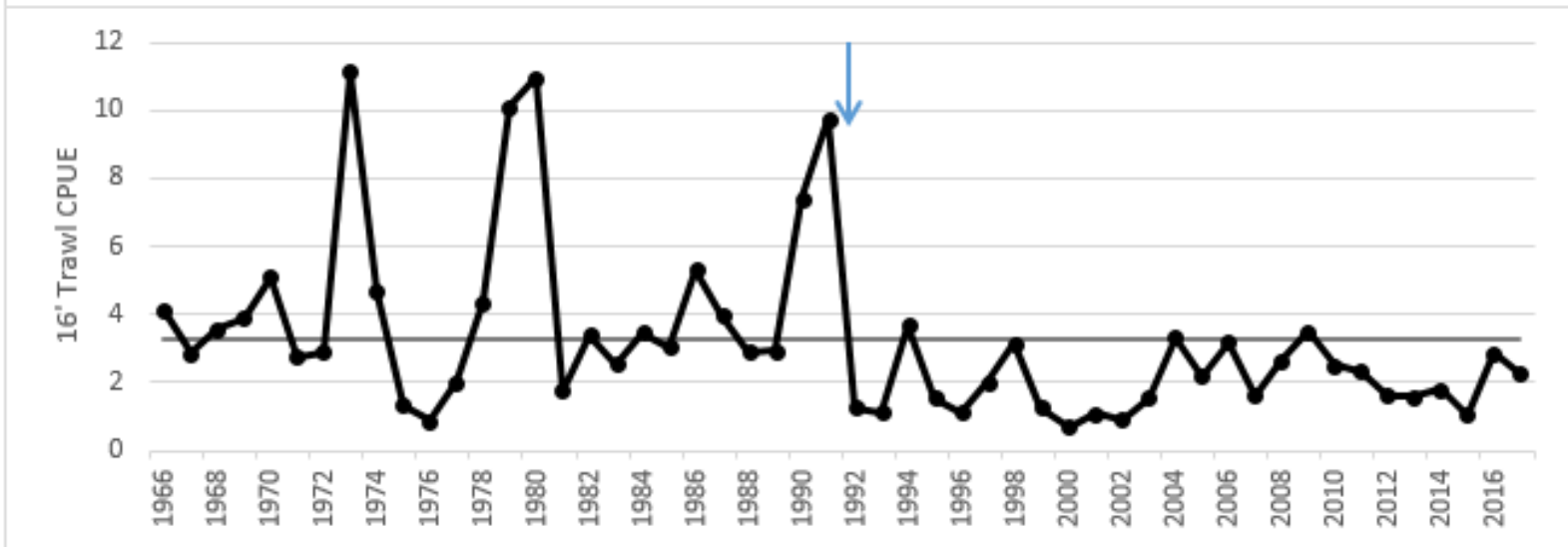
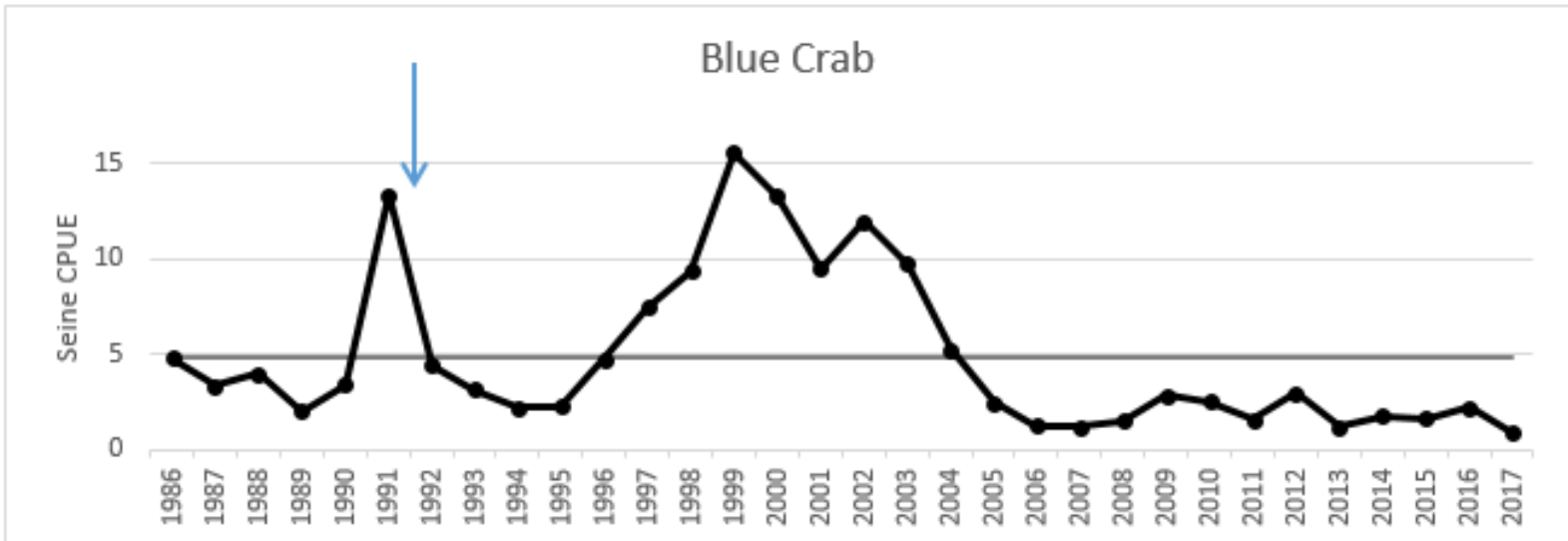


2017 Mean Monthly Salinities

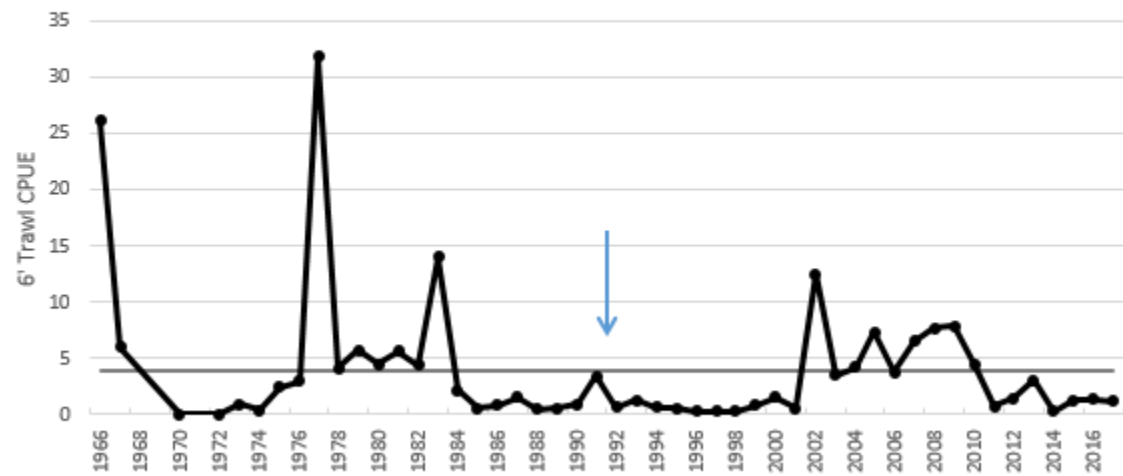
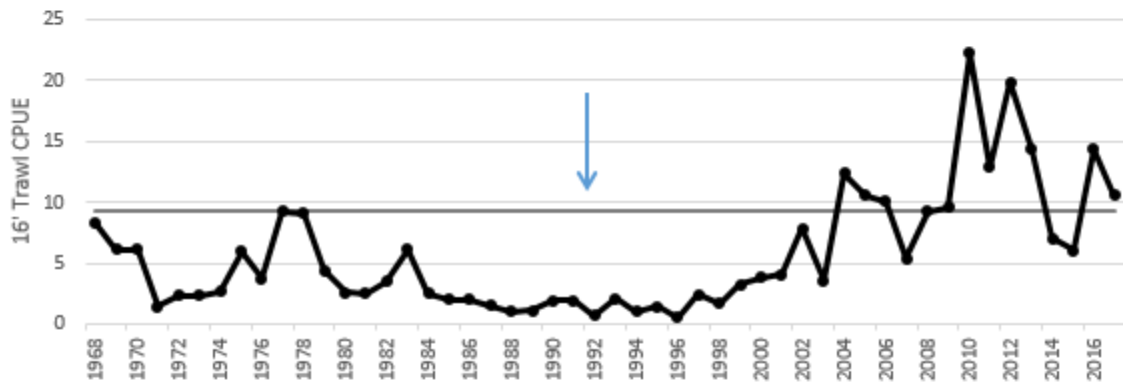
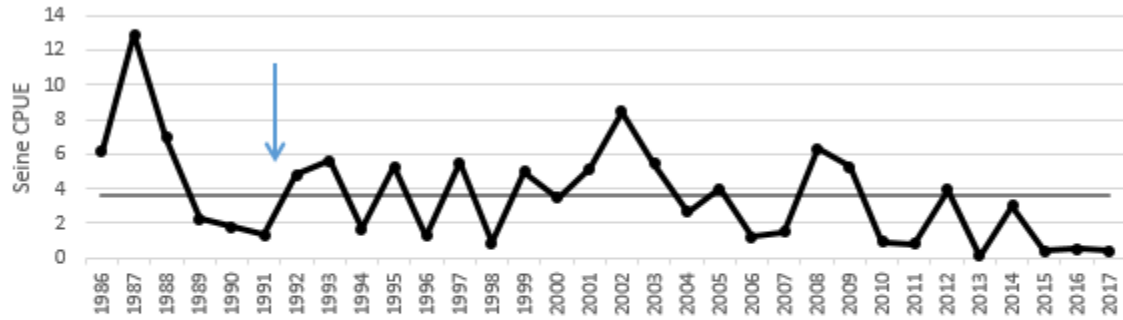


2017 Mean Daily Salinity, Discharge, and River Stage

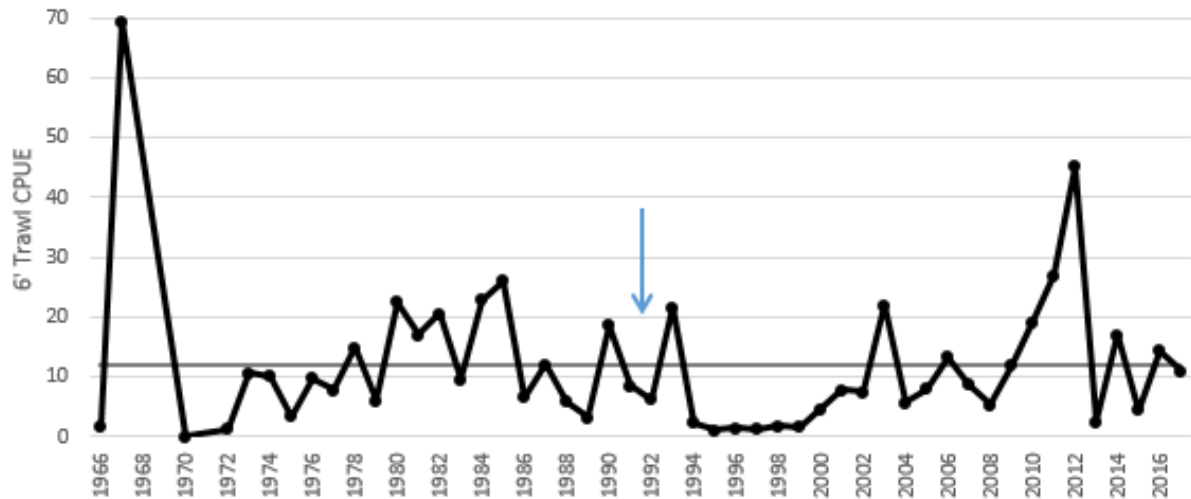
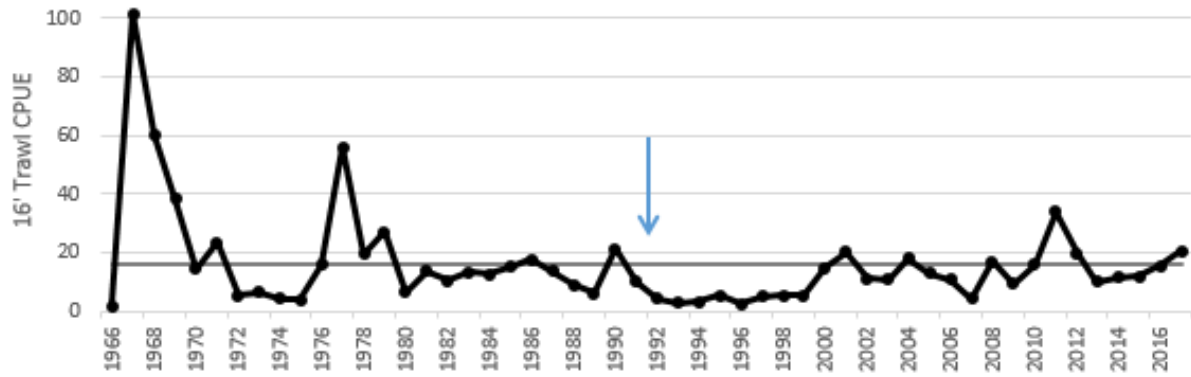
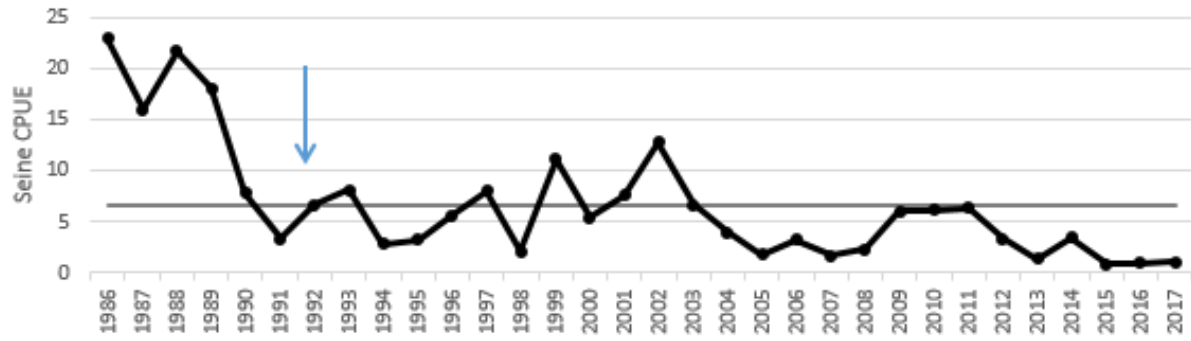




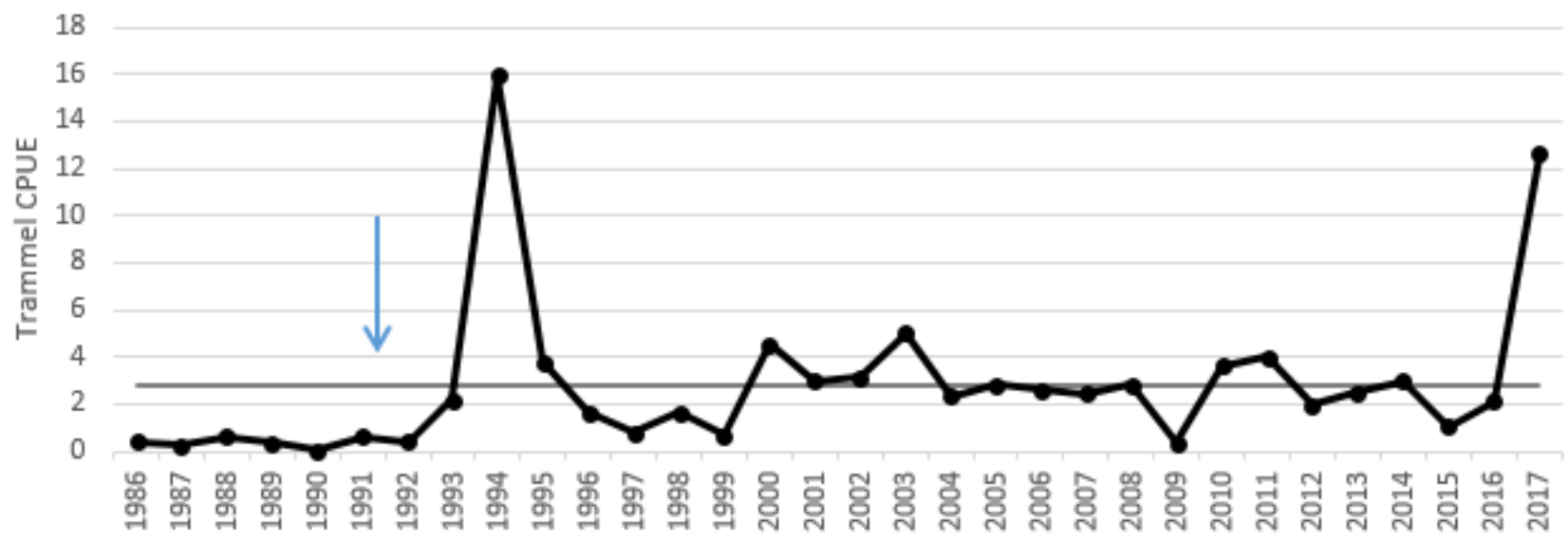
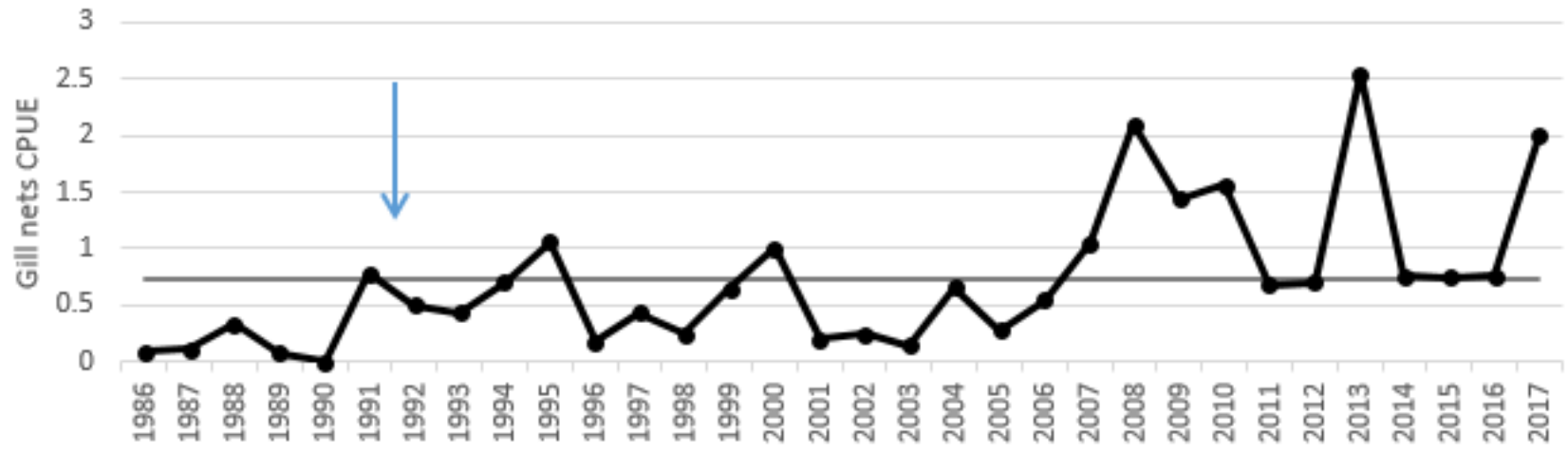
White Shrimp



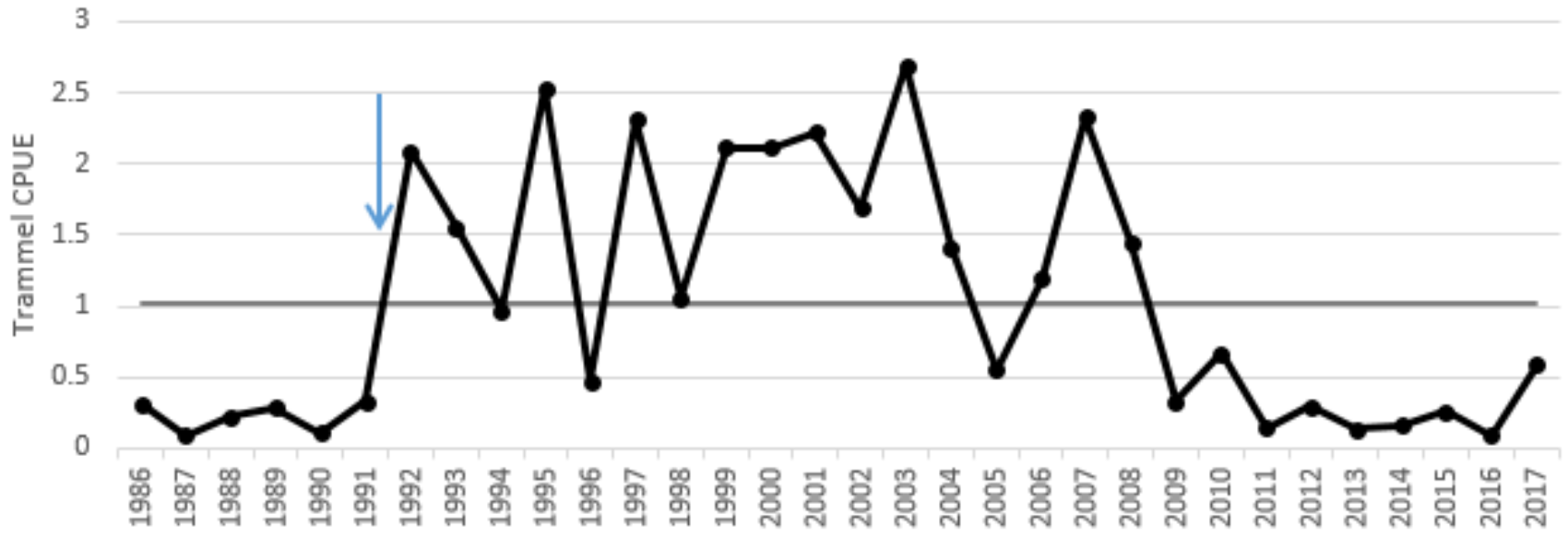
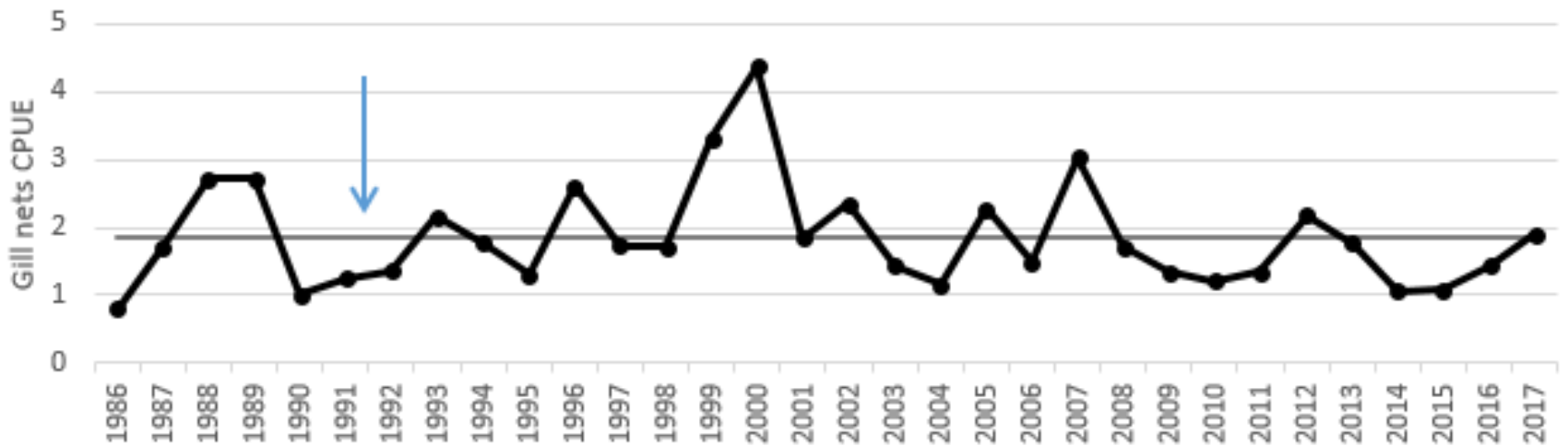
Brown Shrimp

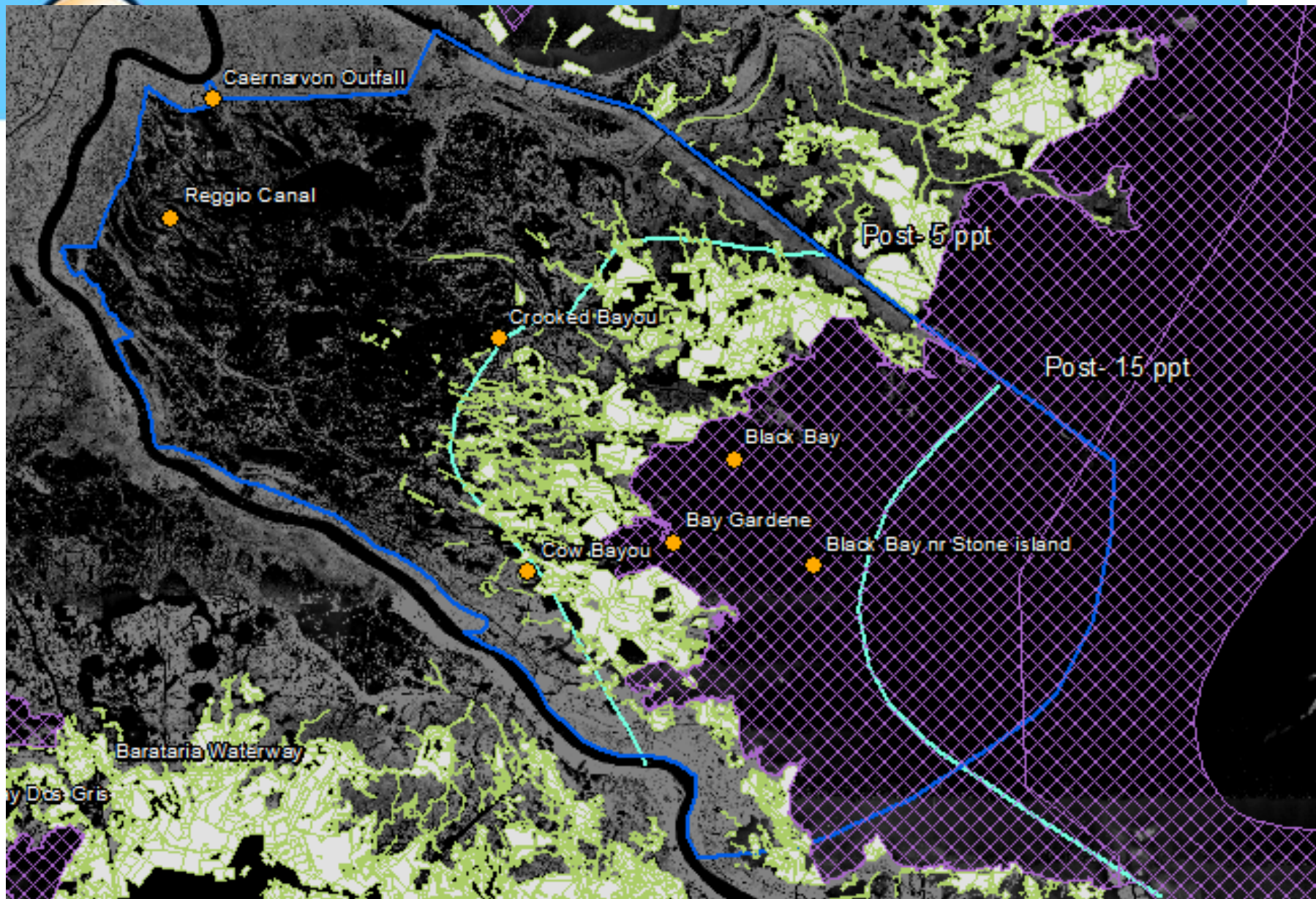


Red Drum



Spotted Seatrout





CSA 1 – South

(Black Bay, Bay Gardene, Lake Fortuna, etc.)

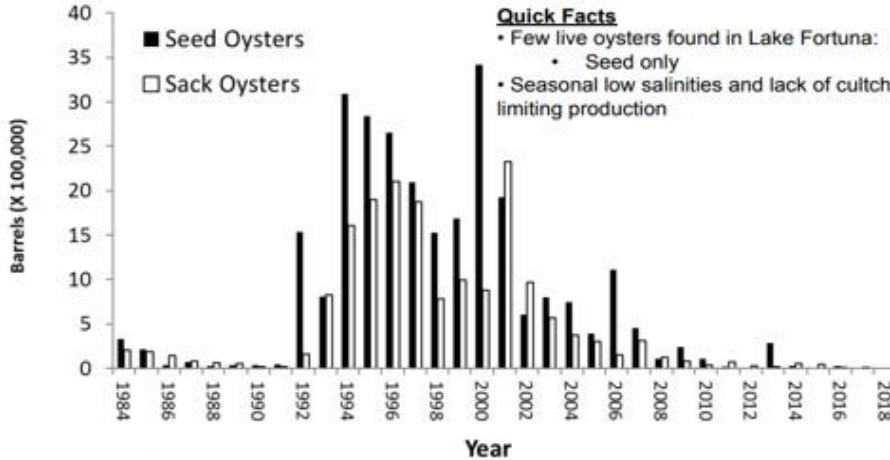


2018

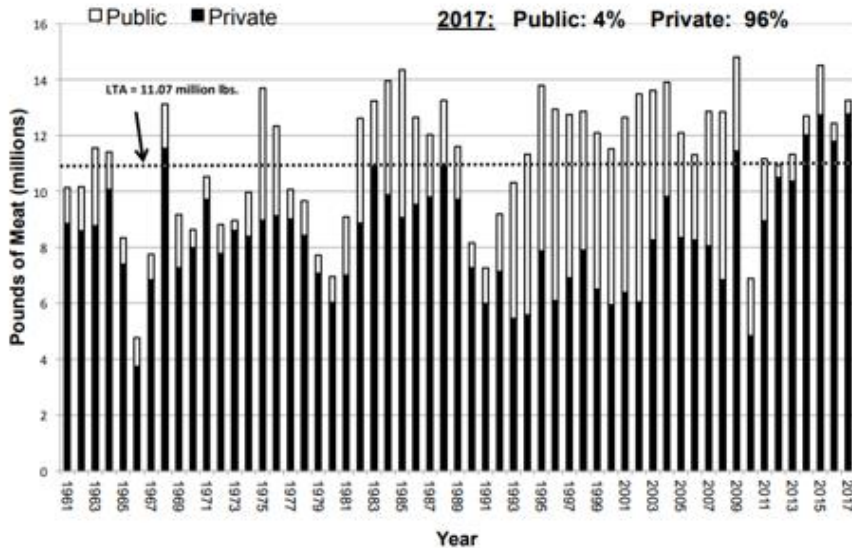
0% seed
-100% sack
-90% total

Quick Facts

- Few live oysters found in Lake Fortuna:
 - Seed only
 - Seasonal low salinities and lack of cultch limiting production



Historical Louisiana Oyster Landings



Area	Seed	Seed %	Sack	Sack %	Total	Total %
1N	49,320.8	-34.4%	30,663.5	+4.7%	79,984	-23%
1S	674	0%	0	-100%	674	-90%
3	7,275	+105%	1,983	-63%	9258	-4%
5E	452	-35%	0	0%	452	-35%
5W	48,358	-34%	22,146	+46%	70,507	-20%
Calcasieu	30,458	+35%	81,245	+56%	111,703	+50%
Total	136,539	-22%	136,038	+26%	272,577	-4%

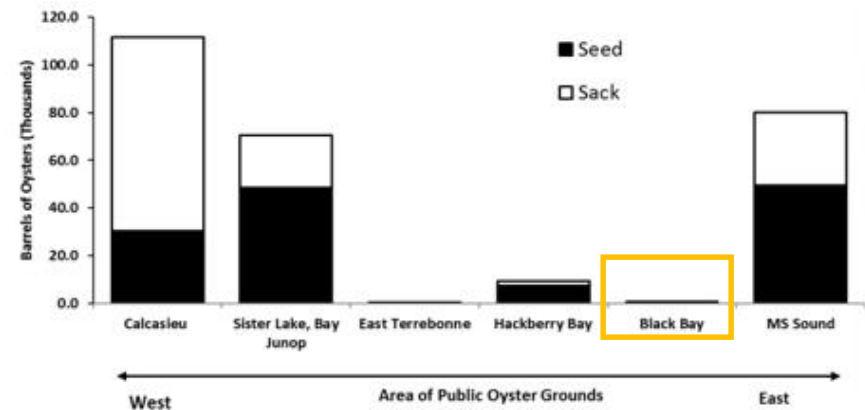
All data excludes Sabine Lake

GREEN indicates increases over 2017 levels; **RED** indicates decreases
Availability in barrels (1 barrel = 2 sacks)

2018 Statewide Oyster Availability

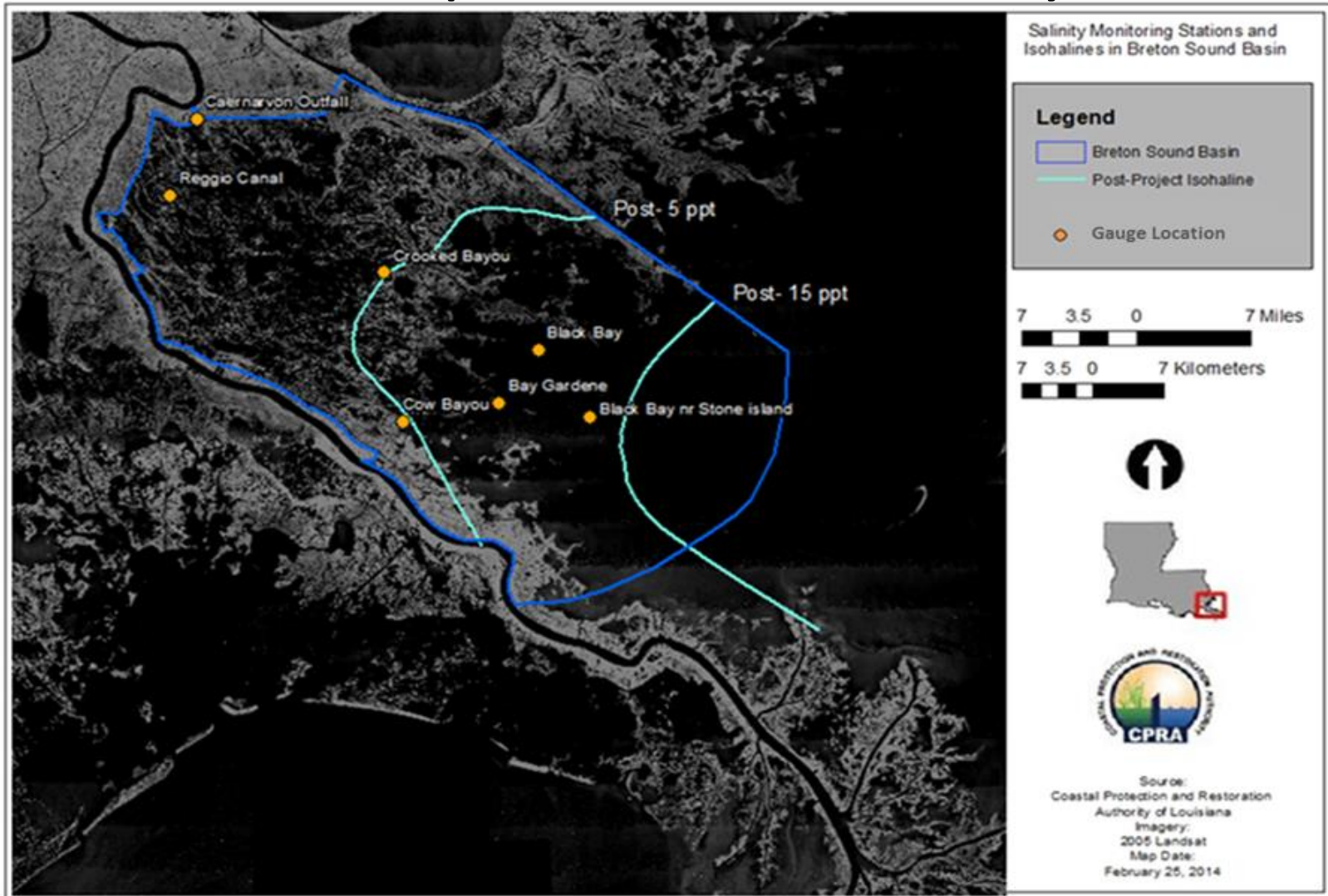
2018 Stock Assessment Quick Facts

- Lowest stock size ever recorded in Louisiana
- Most Reefs degraded/lost in most areas open to seed harvest





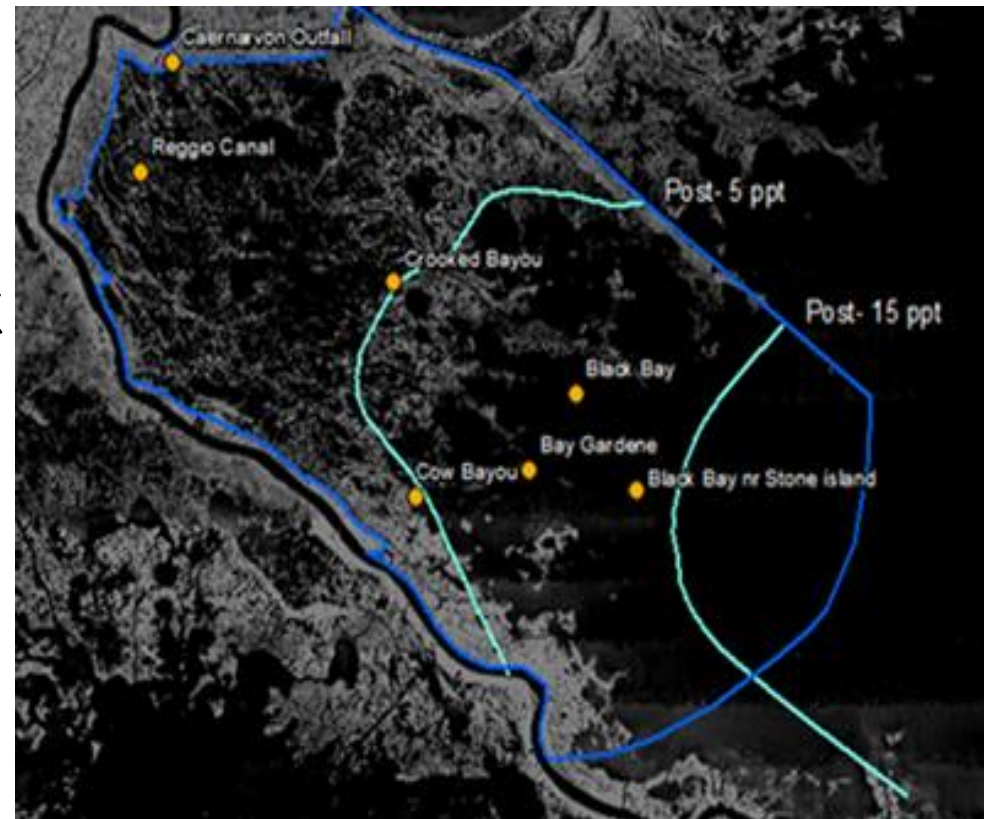
2018 Operations Summary





December-May: 15ppt line

- Black Bay nr Snake Island (Black Bay) Gauge
- Bay Gardene and Black Bay nr Stone Island (Stone Island) utilized for supporting information and guidance



Caernarvon Operations Range: December- May Black Bay Gauge

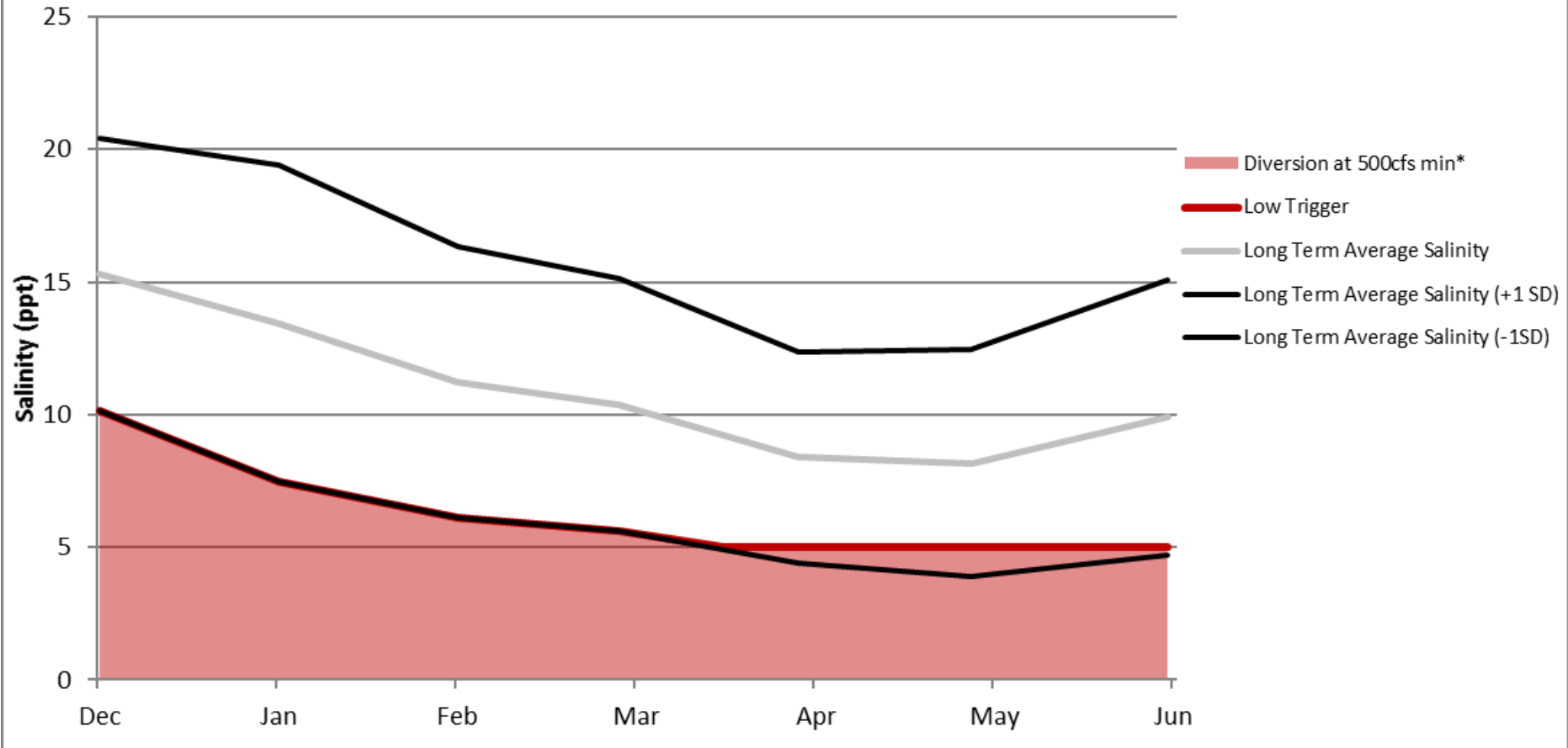
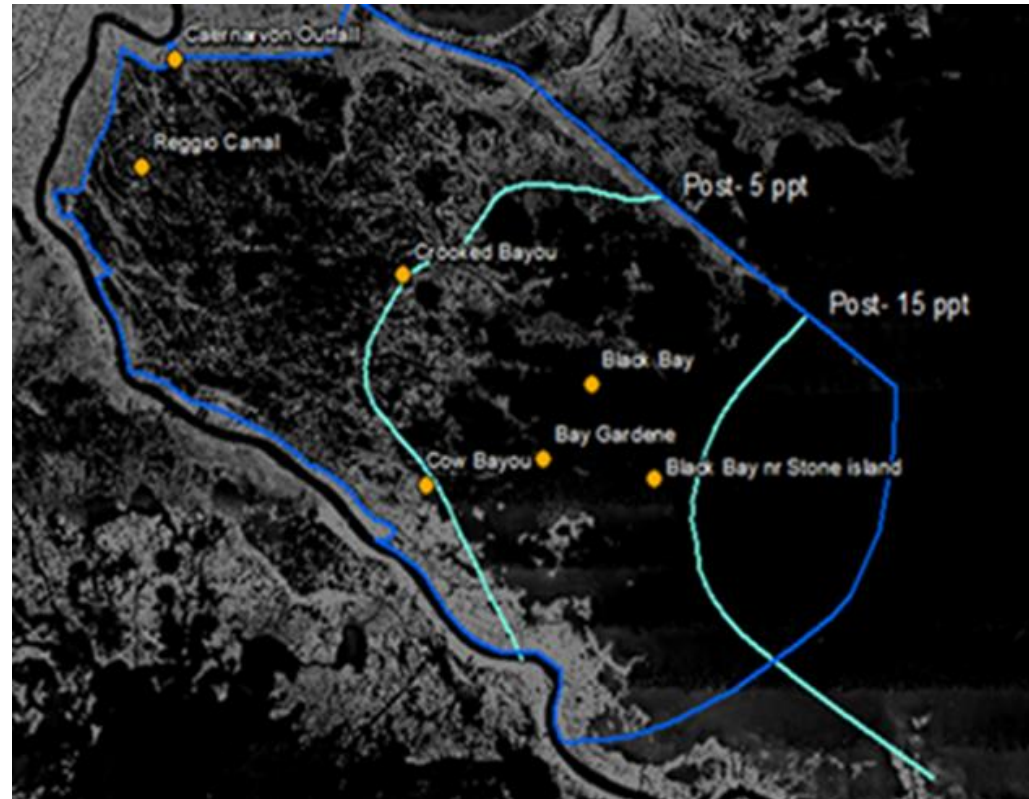


Figure 2. Long term average (+1 standard deviation) salinities from the Black Bay Gauge (USGS site 07374526). From December through May the Caernarvon Freshwater Diversion structure may be operated when the 14-day moving average salinity is within or above the data range. Operations will be decreased to the 500 cfs minimum if the moving average drops below the low trigger.*



June-November: 5ppt line

- Crooked Bayou
- Bay Gardene considered in decisions



Caernarvon Operations Range: June-November Crooked Bayou Gauge

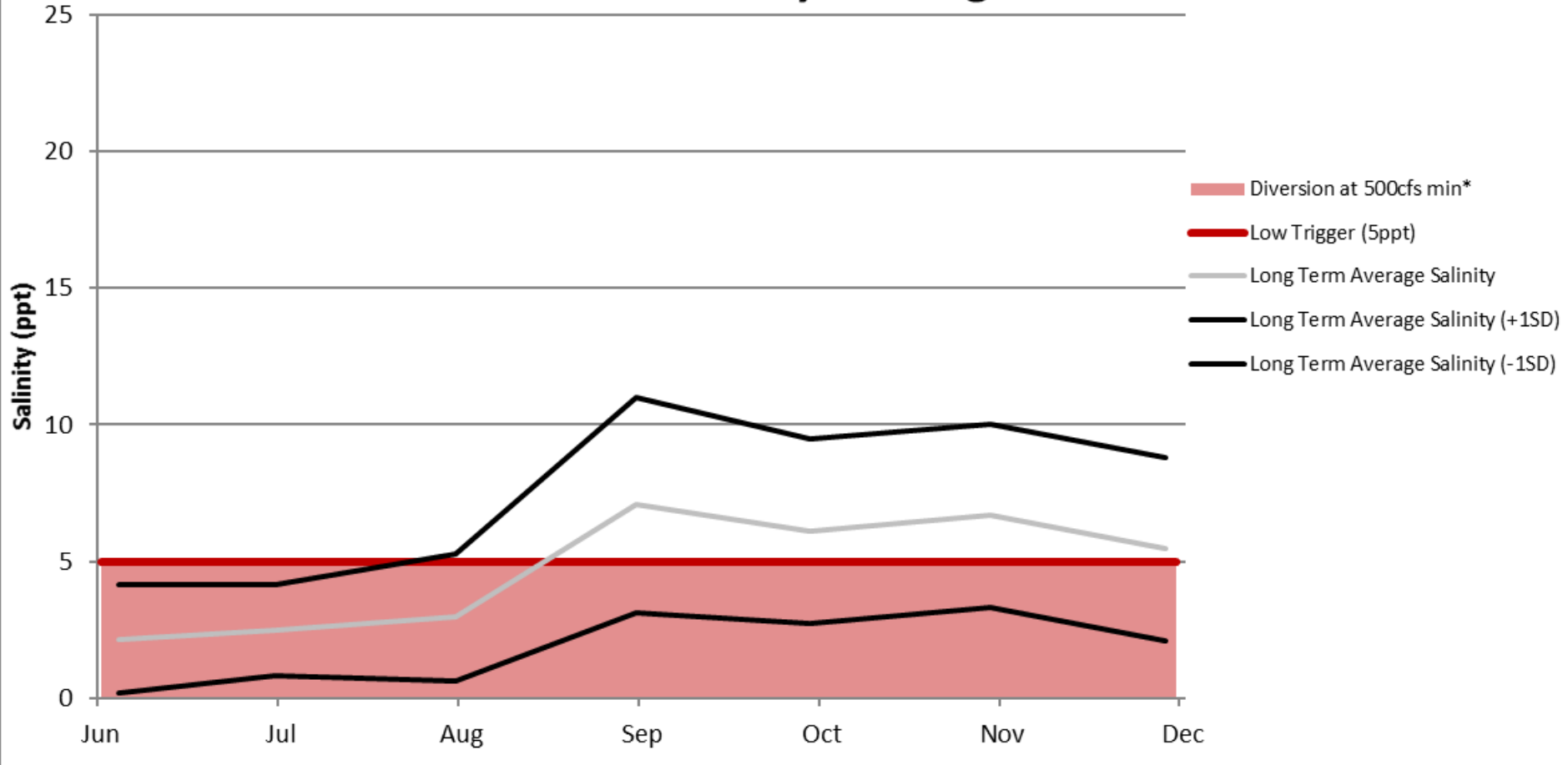


Figure 3. Long term average (+1 standard deviation) salinities from the Crooked Bayou (USGS site 073745257) and Cow Bayou (USGS site 073745258) gauges. From June through November the Caernarvon Freshwater Diversion structure may be operated when the 14-day moving average salinity is within or above the data range. Operations will be decreased to the 500 cfs minimum if the moving average drops below 5ppt.*

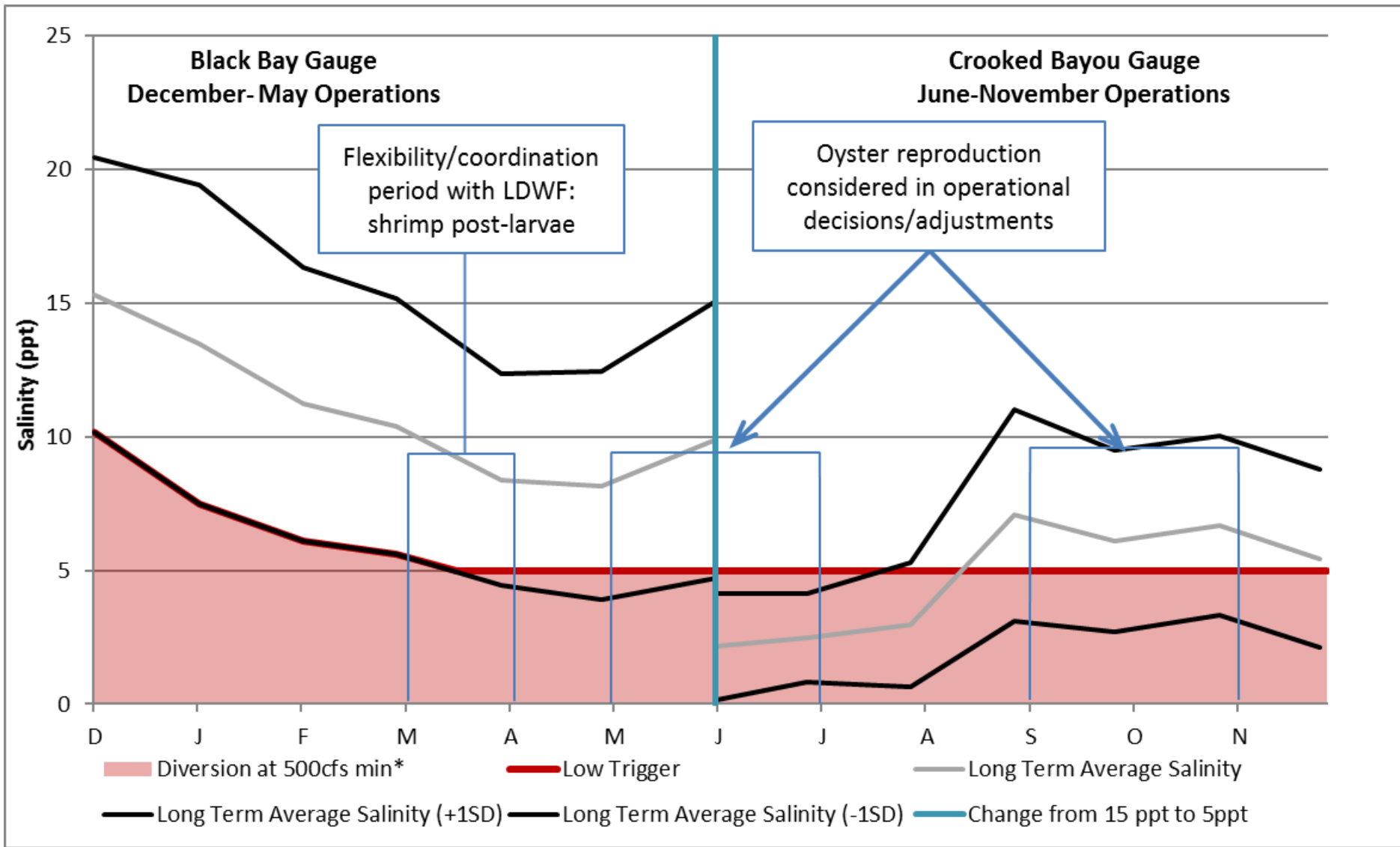


Figure 4. Long term average (+1 standard deviation) salinities from the Black Bay Gauge (USGS site 07374526). from December through May, and the Crooked Bayou (USGS site 073745257) gauge from June through November. The Caernarvon Freshwater Diversion structure may be operated when the 14-day moving average salinity is within or above the data range. Operations will be decreased to the 500 cfs minimum if the moving average drops below the low trigger. Blue boxes indicate timeframes of species-specific considerations. *



*Operational Considerations

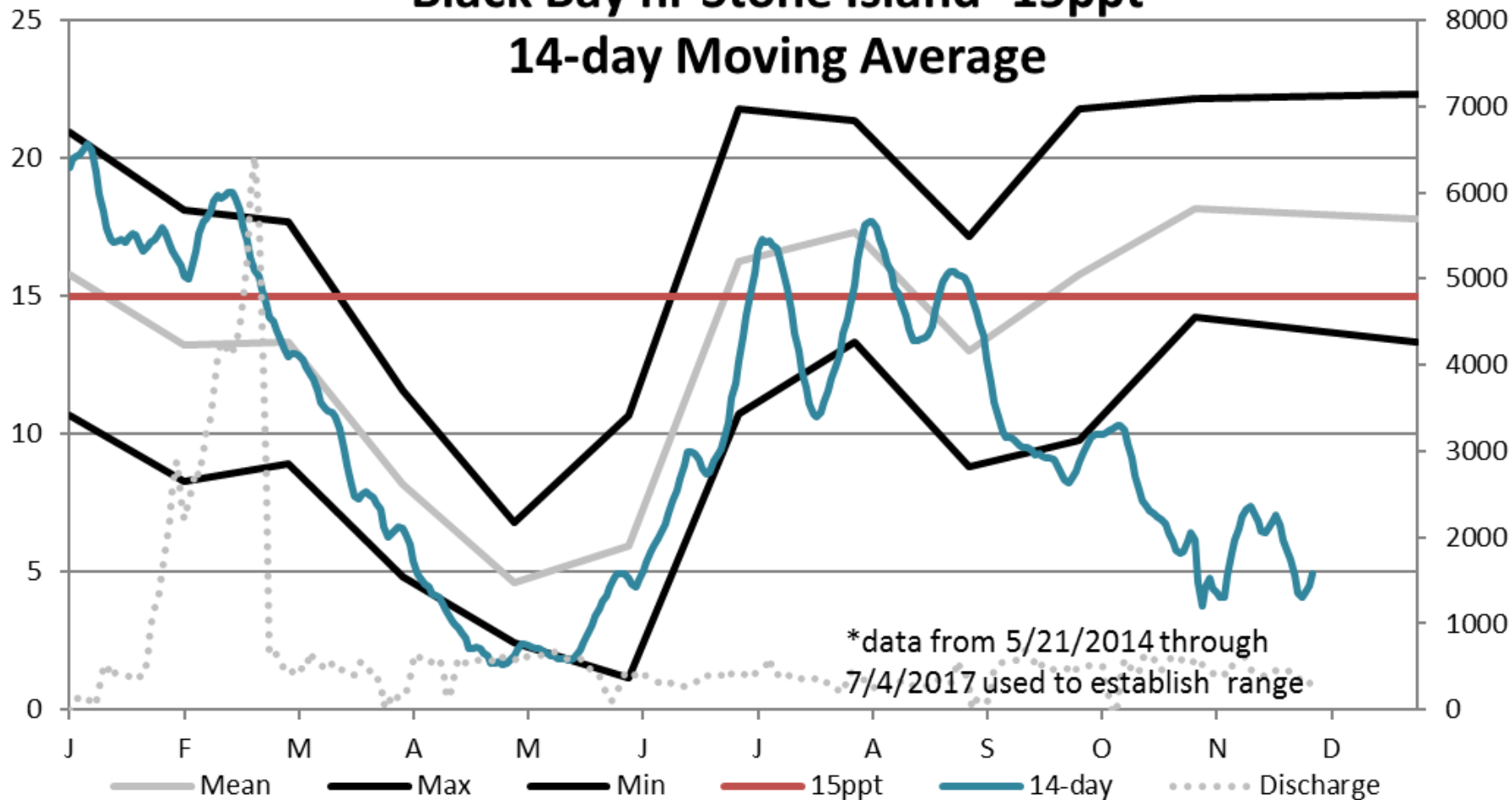
- Continued coordination with LDWF during shrimp migration periods and for facilitation of oyster recovery efforts
- Education and PR visits (outside normal operations)
 - NTE 5000 cfs, return to appropriate output within 2 hours
- Maintenance, Repair and Local issues
 - Evaluated on case-by-case basis
 - Notification to TWG/CIAC members for major issues



2018 Operations

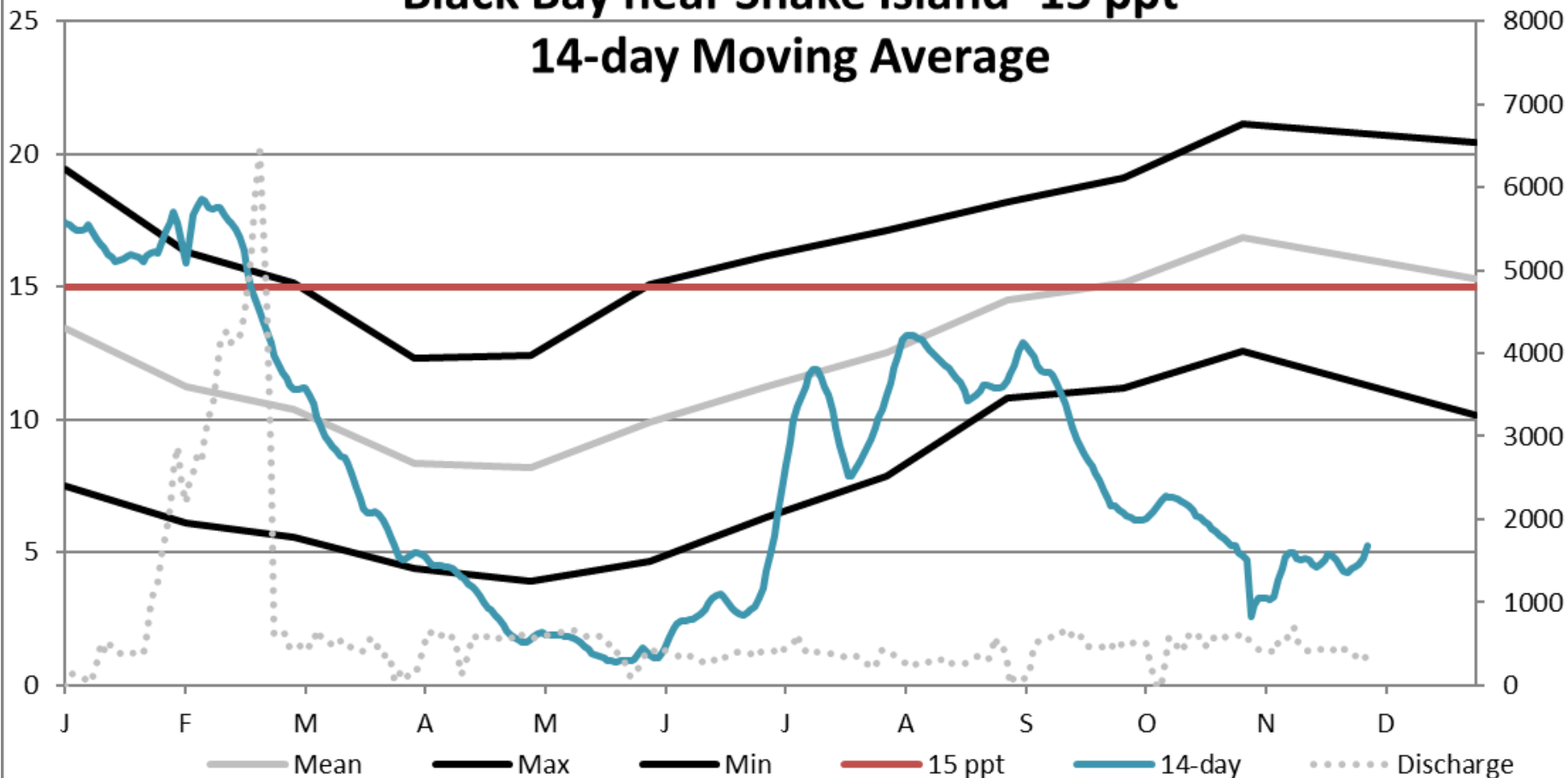
- Some pulses early in the year as river was rising with winter salinities
- Basin freshened up quickly as river rose
- 500 cfs minimum implemented
 - Outlined in signed EA 392 FONSI, but wasn't implemented until this year
 - Will help moderate conditions in the immediate outflow area
 - Low discharge= minimal impact on salinities downstream
- At 500 cfs minimum since 02/23

Black Bay nr Stone Island- 15ppt 14-day Moving Average

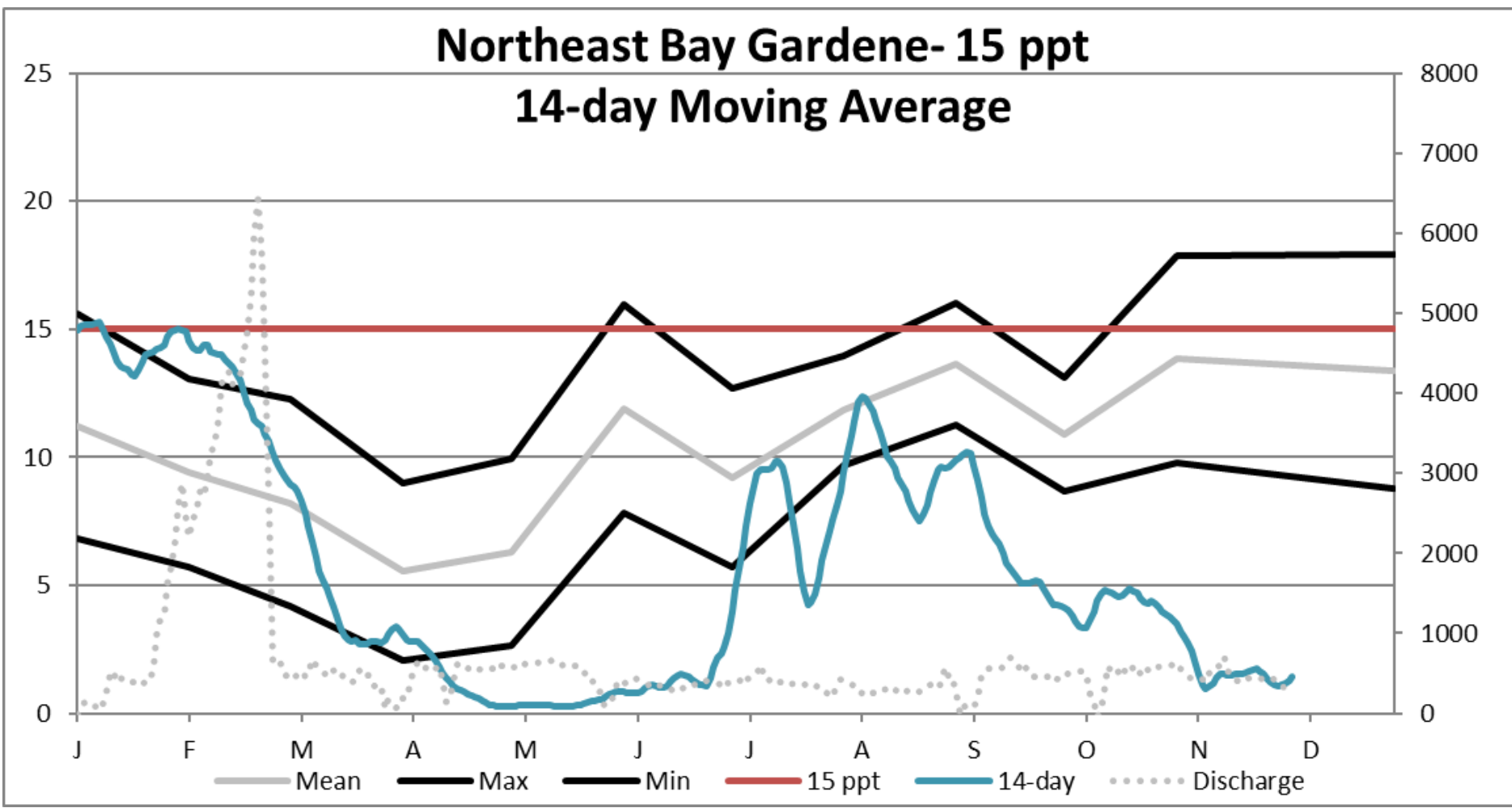


Black Bay near Snake Island- 15 ppt

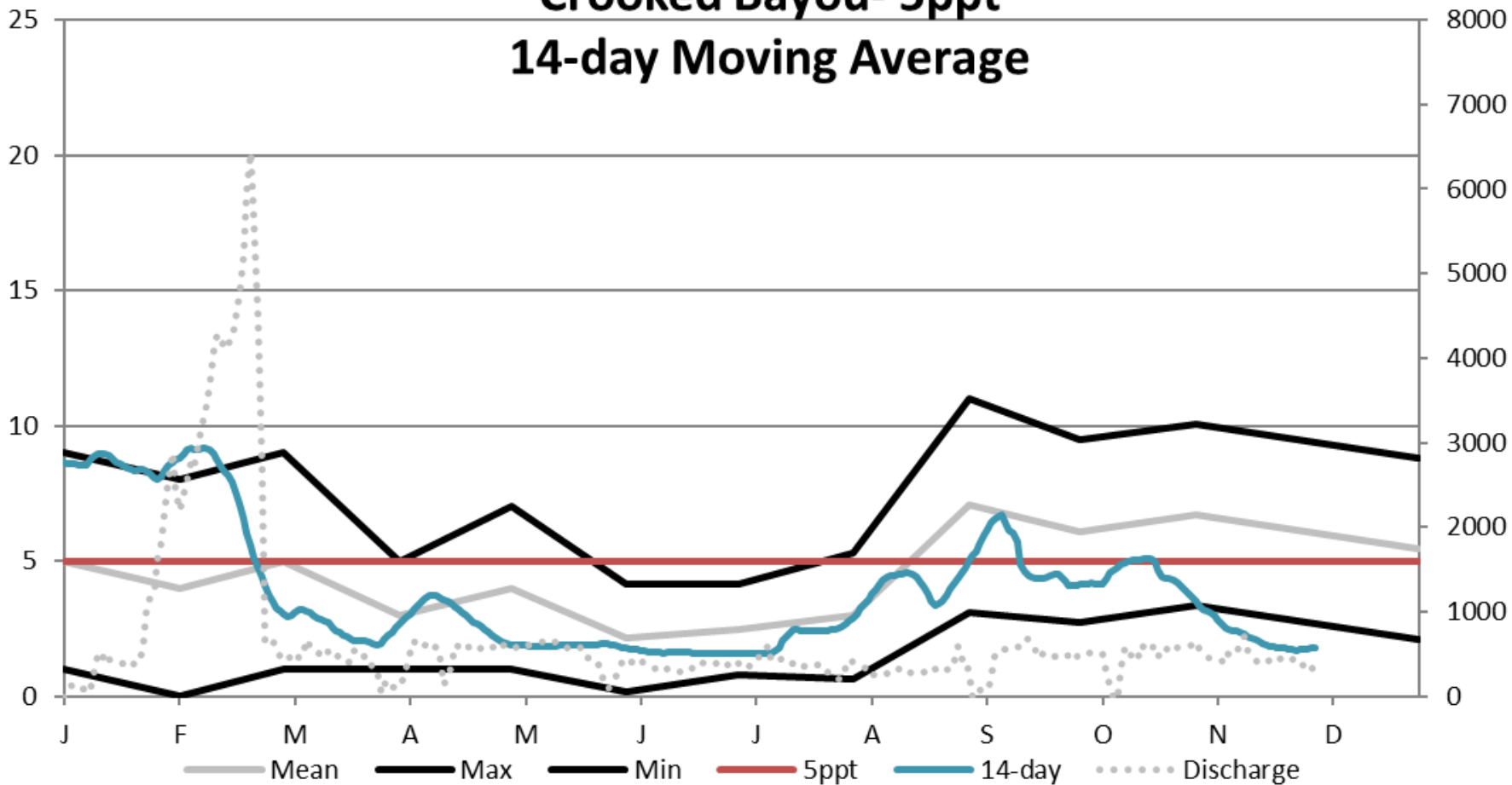
14-day Moving Average



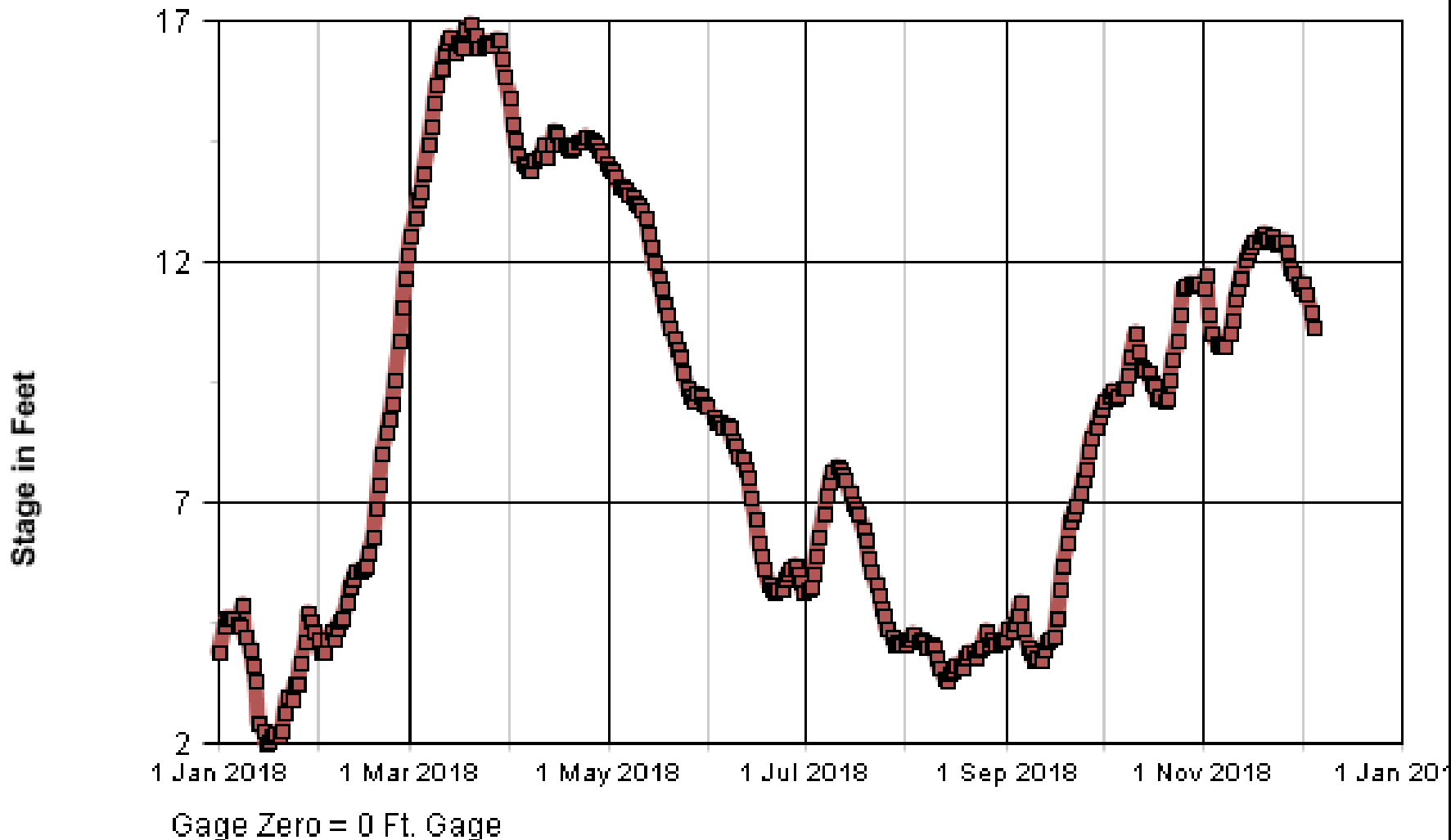
Northeast Bay Gardene- 15 ppt 14-day Moving Average



Crooked Bayou- 5ppt 14-day Moving Average



Mississippi River at New Orleans (Carrollton) (01300)
From 01/01/2018 To 12/31/2018





500 cfs evaluation

- 3 sampling events with increased number of sites to evaluate 500 cfs influence
 - August, September, October
- No significant impacts



REPLY TO
ATTENTION OF

Planning, Programs, and
Project Management Division
Environmental Planning
and Compliance Branch

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

**FINDING OF NO SIGNIFICANT IMPACT
(FONSI)**

**MISSISSIPPI DELTA REGION
CAERNARVON FRESHWATER DIVERSION STRUCTURE
CHANGE IN STRUCTURE OPERATION
PLAQUEMINES AND ST. BERNARD PARISHES, LOUISIANA**

EA #392

Description of the Proposed Action: The U.S. Army Corps of Engineers, Mississippi Valley Division, New Orleans District (CEMNVN) proposes to modify the operation of the Caernarvon Freshwater Diversion Structure. The proposed plan calls for a potential flow range from 0-8,000 cubic feet per second (cfs) for each month of the year, with minimum flows of at least 500 cubic feet per second. The operational plan has a target annual average salinity of 5 parts per thousand (ppt) in the area of the "with-project 5 ppt line", as shown in the 1985 final Environmental Impact Statement (FEIS), "Louisiana Coastal Area, Louisiana; Freshwater Diversion to Barataria and Breton Sound Basins", and in Figure 1 of Environmental Assessment (EA) #392 for the project. Future minor modifications to the operation are also expected.

Factors Considered in Determination: This office has assessed the impacts of the proposed action on significant resources, including marshes, water bodies, water quality, fisheries, wildlife, essential fish habitat, endangered and threatened species, cultural resources, recreational resources, and air quality. EA #392 is incorporated herein. No significant adverse impacts were identified for any of the significant resources. The risk of encountering hazardous, toxic, and radioactive waste is low. No impacts were identified that would require compensatory mitigation. The proposed project does not involve the placement of dredge or fill into the waters of the United States. Therefore, compliance the Clean Water Act, Section 401 and Section 404 were not required.

By letter dated January 14, 2008, the U.S. Fish and Wildlife Service (USFWS) concurs with CEMNVN's determination that the proposed change in the operating plan is not likely to adversely affect the pallid sturgeon. In a letter dated December 18, 2007, the National Marine Fisheries Service (NMFS) stated that the EA adequately addressed the issues associated with threatened and endangered species under the NMFS' purview. In a letter dated April 10, 2007, the

Breton Sound Water Quality

Red Pins = SWAMP Water Quality Stations
Green "x" = 500 CFS Stations
Yellow Lines = 5 ppt and 15 ppt isohalines



Google earth

Image © 2018 TerraMetrics

Image Landsat / Copernicus

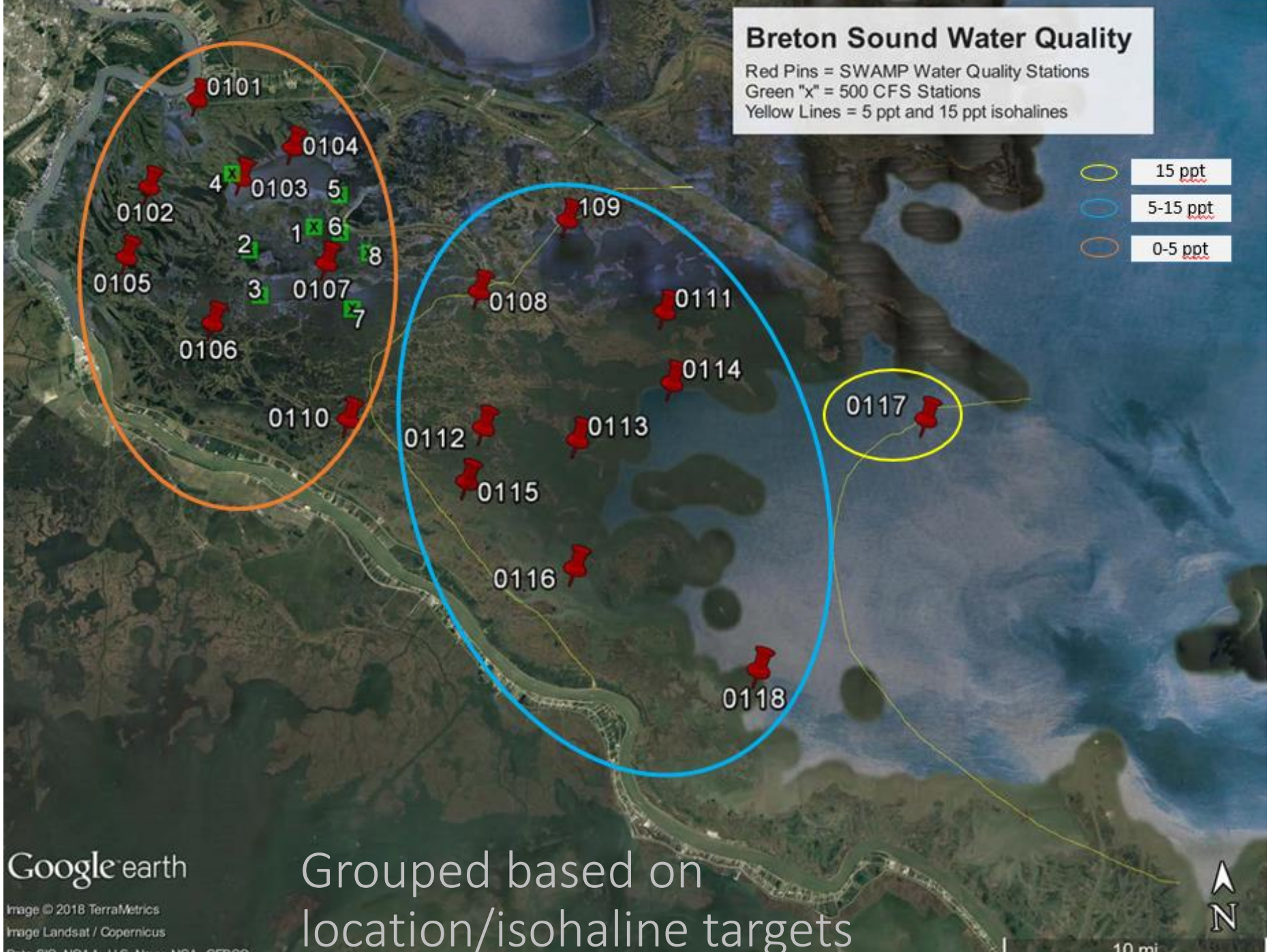
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

10 mi

Breton Sound Water Quality

Red Pins = SWAMP Water Quality Stations
Green "x" = 500 CFS Stations
Yellow Lines = 5 ppt and 15 ppt isohalines

- 15 ppt
- 5-15 ppt
- 0-5 ppt



Google earth

Image © 2018 TerraMetrics
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

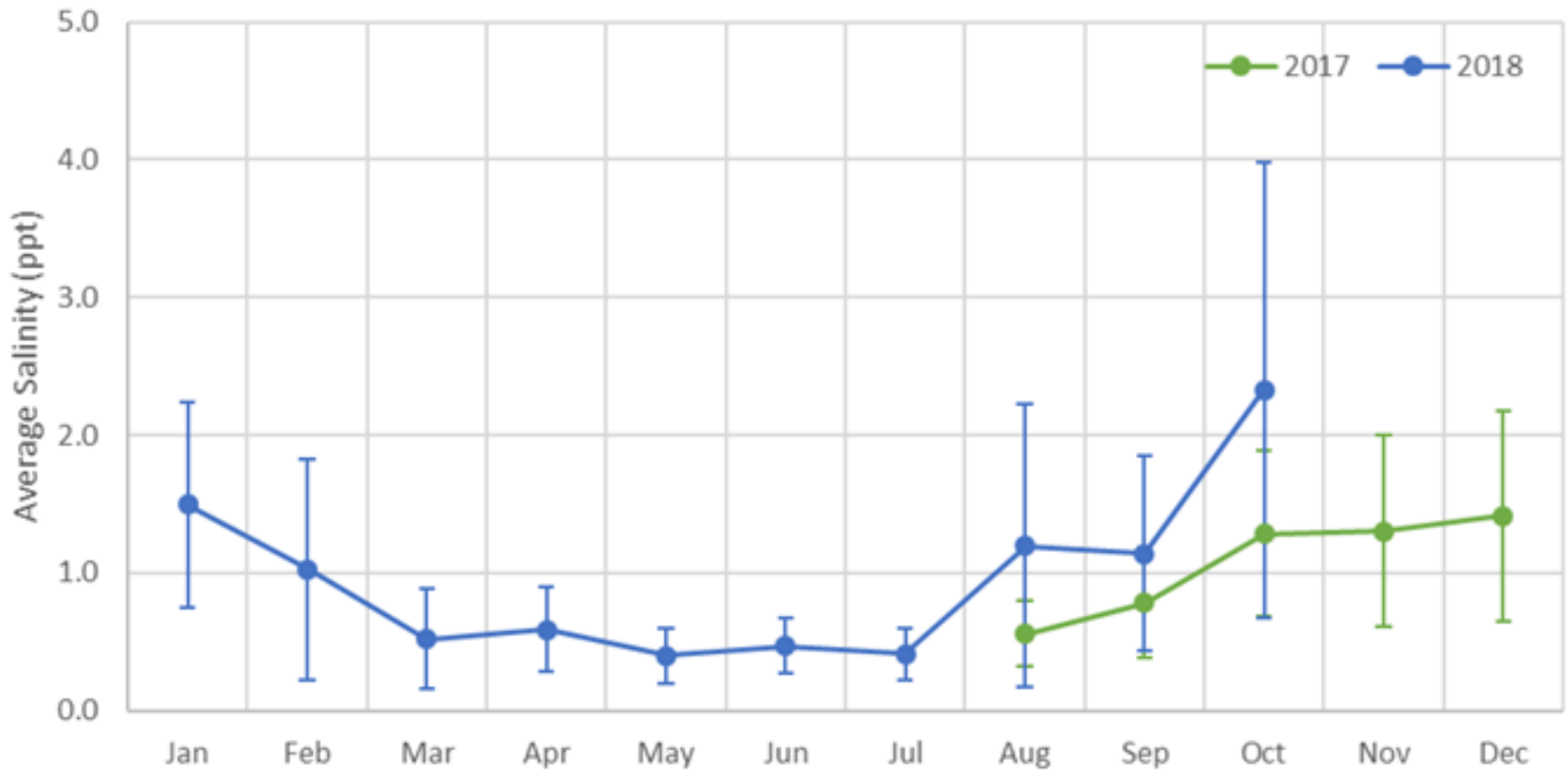
Grouped based on location/isohaline targets

10 mi



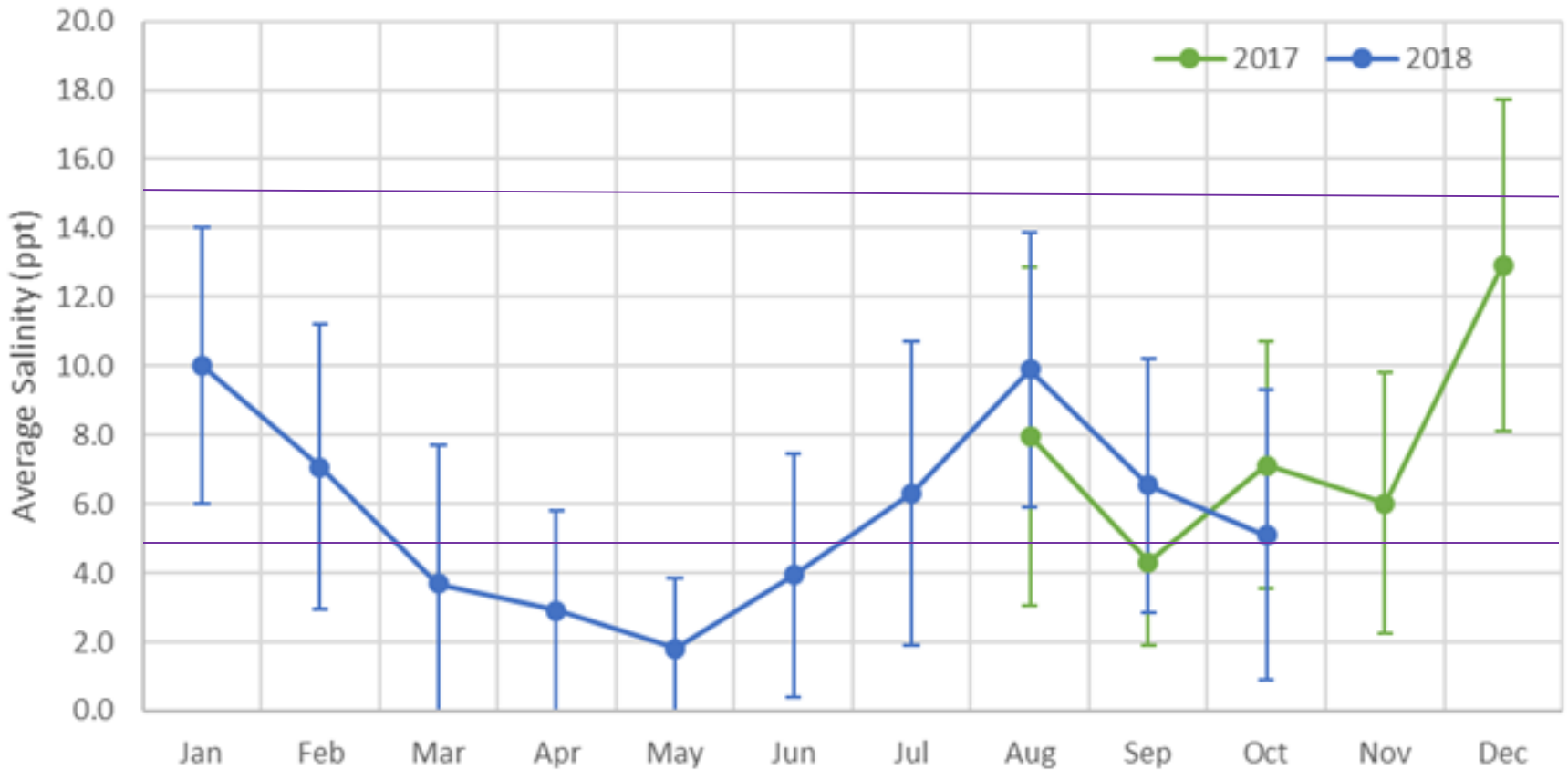


Breton Sound Salinity
0-5 ppt Zone



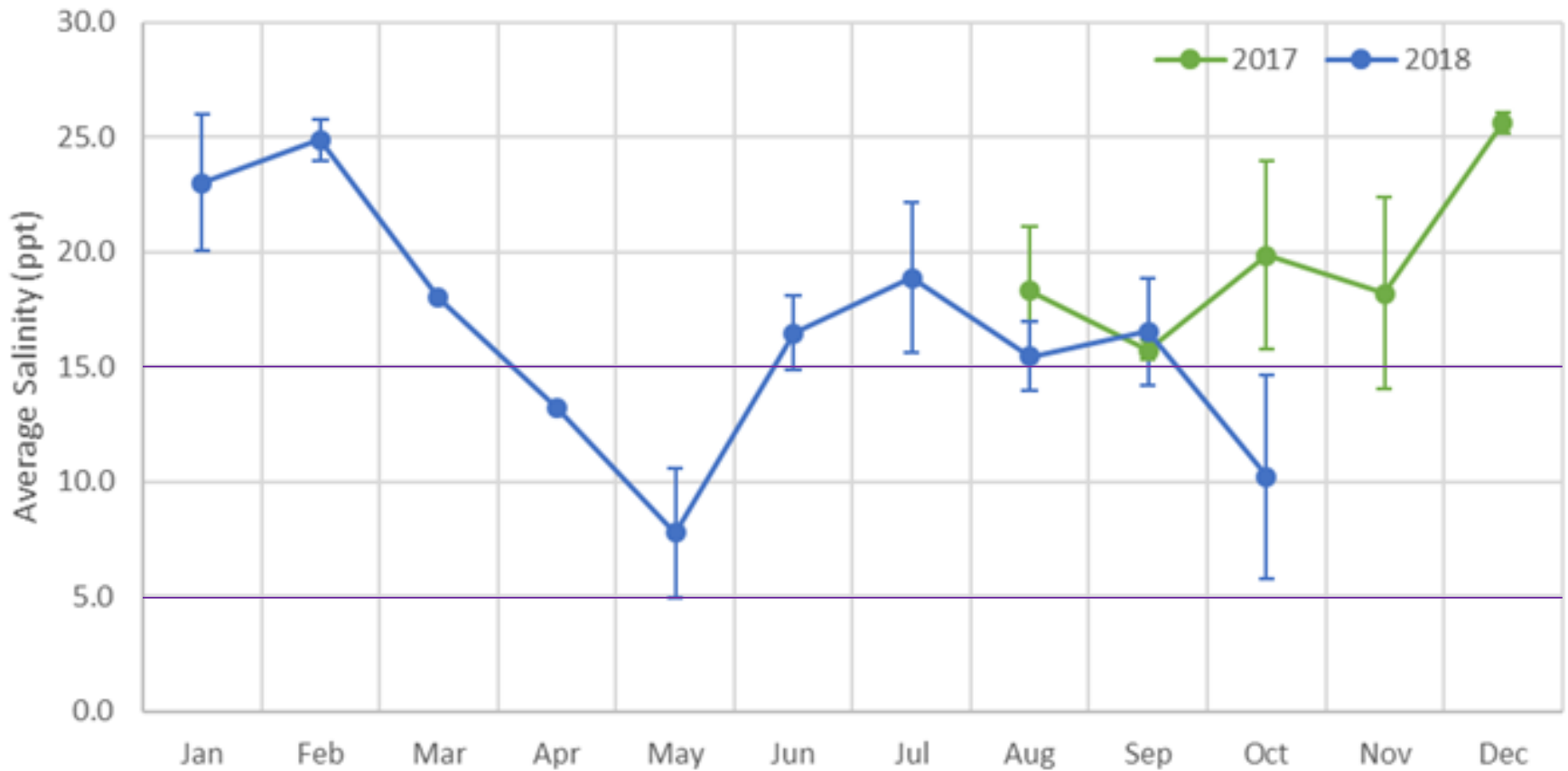


Breton Sound Salinity
5-15 ppt Zone



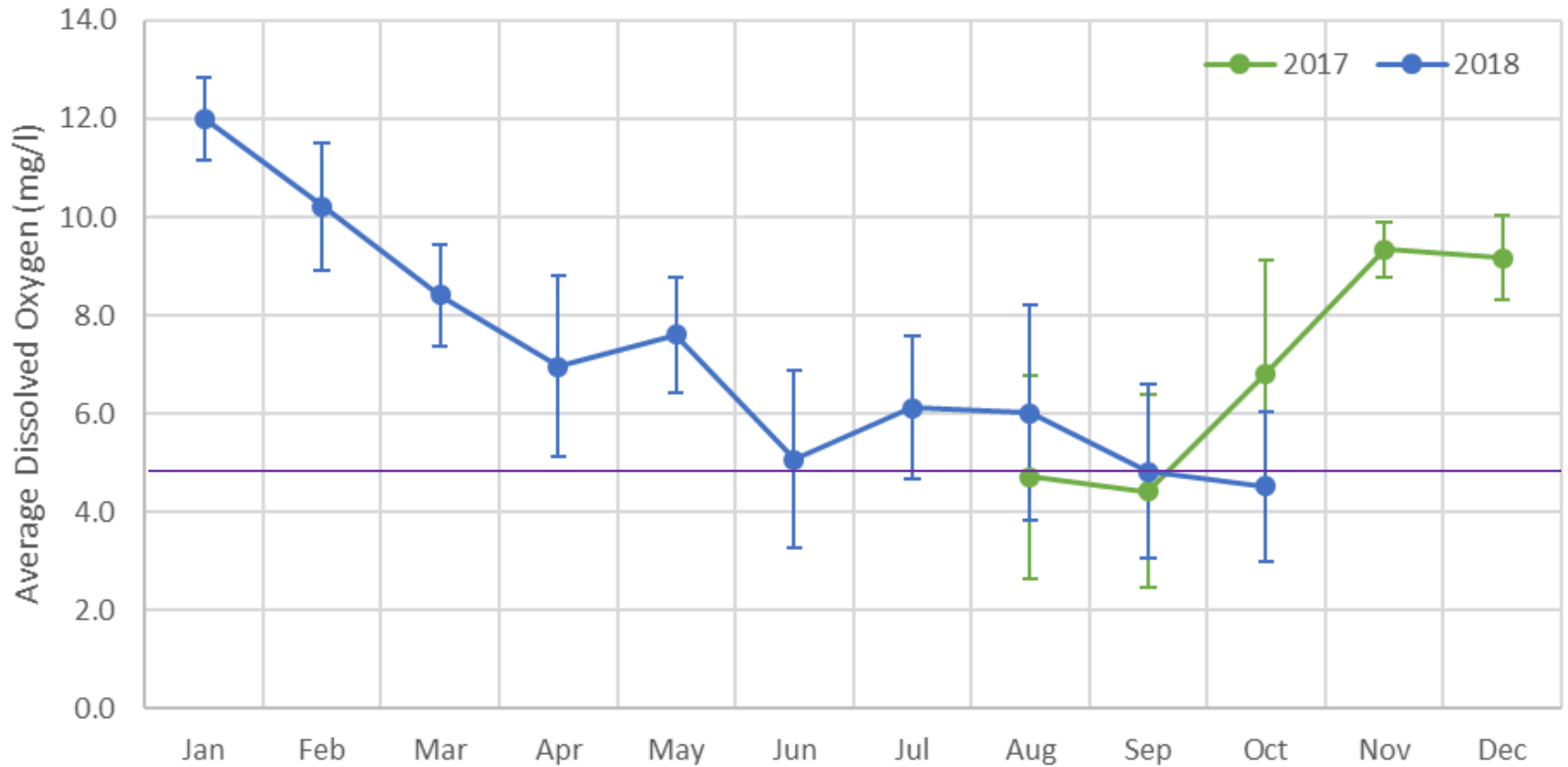


Breton Sound Salinity
15+ ppt Zone





Breton Sound Dissolved Oxygen
0-5 ppt Zone



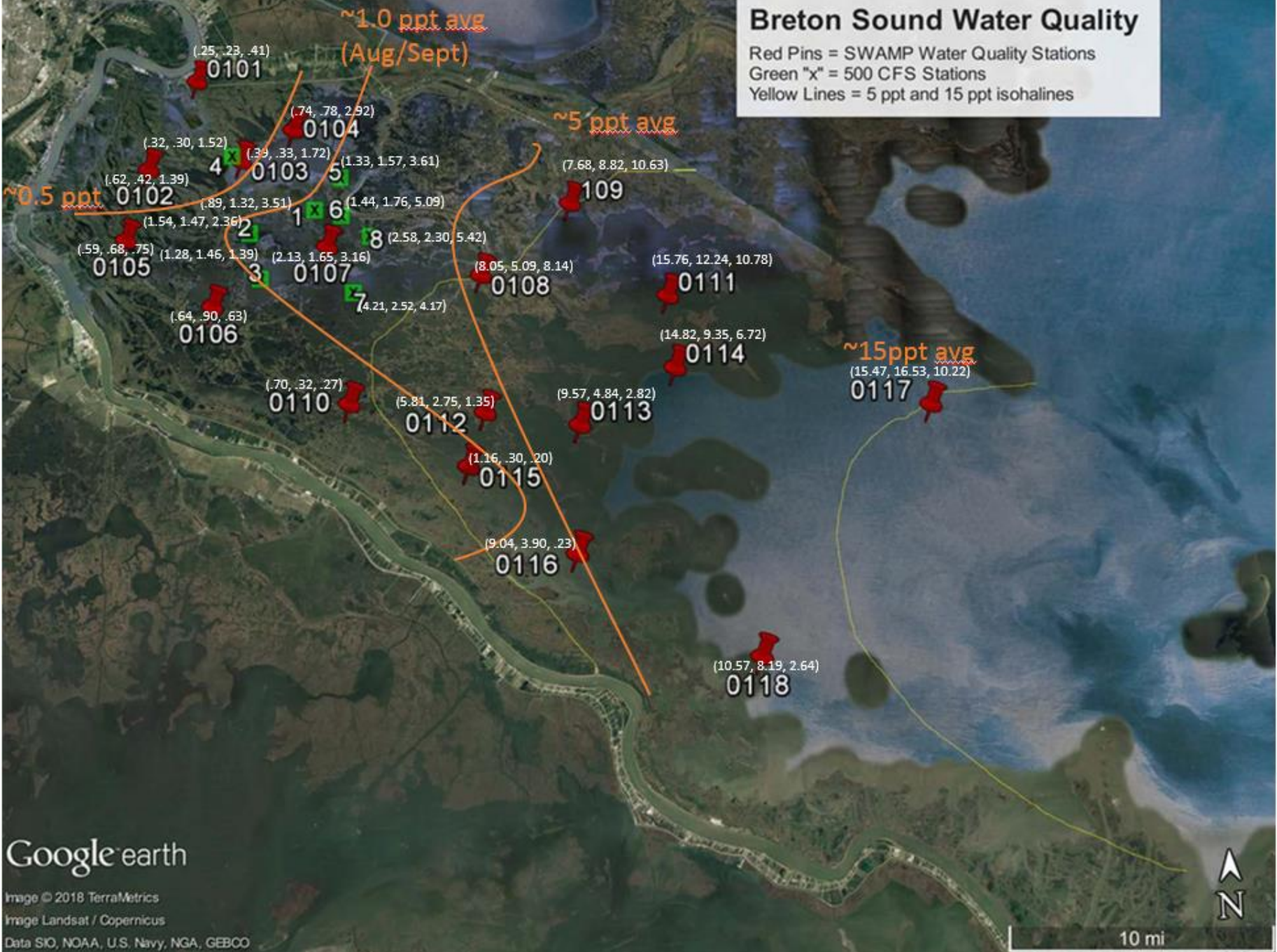
Breton Sound Water Quality

Red Pins = SWAMP Water Quality Stations
Green "x" = 500 CFS Stations
(Aug, Sep, Oct) Average Salinity Values 2018



Breton Sound Water Quality

Red Pins = SWAMP Water Quality Stations
Green "x" = 500 CFS Stations
Yellow Lines = 5 ppt and 15 ppt isohalines



Google earth

Image © 2018 TerraMetrics
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

10 mi





Results Summary

- No significant impacts of 500 cfs minimum on Salinity or Dissolved Oxygen
 - Operations above min flow take into account all other influences on the basin
- Flow Path and Area of Influence- Lake Lery
- Storm events can push saline water into typically fresh areas of the upper basin
- River has a high influence on salinities in western portion of the basin



Proposed 2019 Operational Plan

- TWG met 11/15/2018
- No changes to ops plan proposed



2019 Operations Plan Discussion and Vote



By-Laws Updates

- Update all references to CPRA/Executive Director, include DNR as a separate agency
- Update committee processes
 - TWC -> TWG
 - Operational Plan Development section
- Clarify and define process for appointment of representatives

Membership:

Membership shall consist of one representative of each of the following entities:

Coastal Protection and Restoration Authority of La., who will serve as chairman

La. Department of Natural Resources

La. Department of Environmental Quality

La. Department of Health and Hospitals

La. Department of Wildlife and Fisheries

Plaquemines Parish Government

St. Bernard Parish Government

Lake Pontchartrain Basin Foundation

U.S. Dept. of Agriculture, Natural Resource Conservation Service

U.S. Army Corps of Engineers

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

U.S. National Marine Fisheries Service

Marsh property owner **from Breton Sound Hydrologic Unit**

Protected area property owner **from Breton Sound Hydrologic Unit**

Marine Recreational Fisheries **from Breton Sound Hydrologic Unit**


Freshwater Recreational Fisheries **from Breton Sound Hydrologic Unit**

Oyster Fisheries **from Breton Sound Hydrologic Unit**

Shrimp Fisheries **from Breton Sound Hydrologic Unit**

Additional members may be added to the committee by a two-thirds majority vote of the committee and concurrence of the Executive Director. Members shall serve without compensation.

Defines how to add additional members, but not how a particular person is chosen as a representative of that member organization/group



Each agency/group shall designate a representative annually. For Oyster, Shrimp and Recreational Fisheries representatives, the Louisiana Oyster, Shrimp, and Finfish Task Forces (respectively) shall designate their representative annually. For Marsh and Protected Area Property Owners, the Executive Director shall annually appoint a representative. Additional members may be added to the committee by a two-thirds majority vote of the committee and concurrence of the CPRA Executive Director. Members shall serve without compensation.*

*Note: Current members at the time of the 2018 meeting are invited to continue to serve on the advisory committee, with the above policy to take effect upon each current member vacating his or her position.



By-Laws Discussion Point

- Appointment of representatives not currently associated with an agency/organization upon vacancies
 - Fisheries and Landowner Representatives

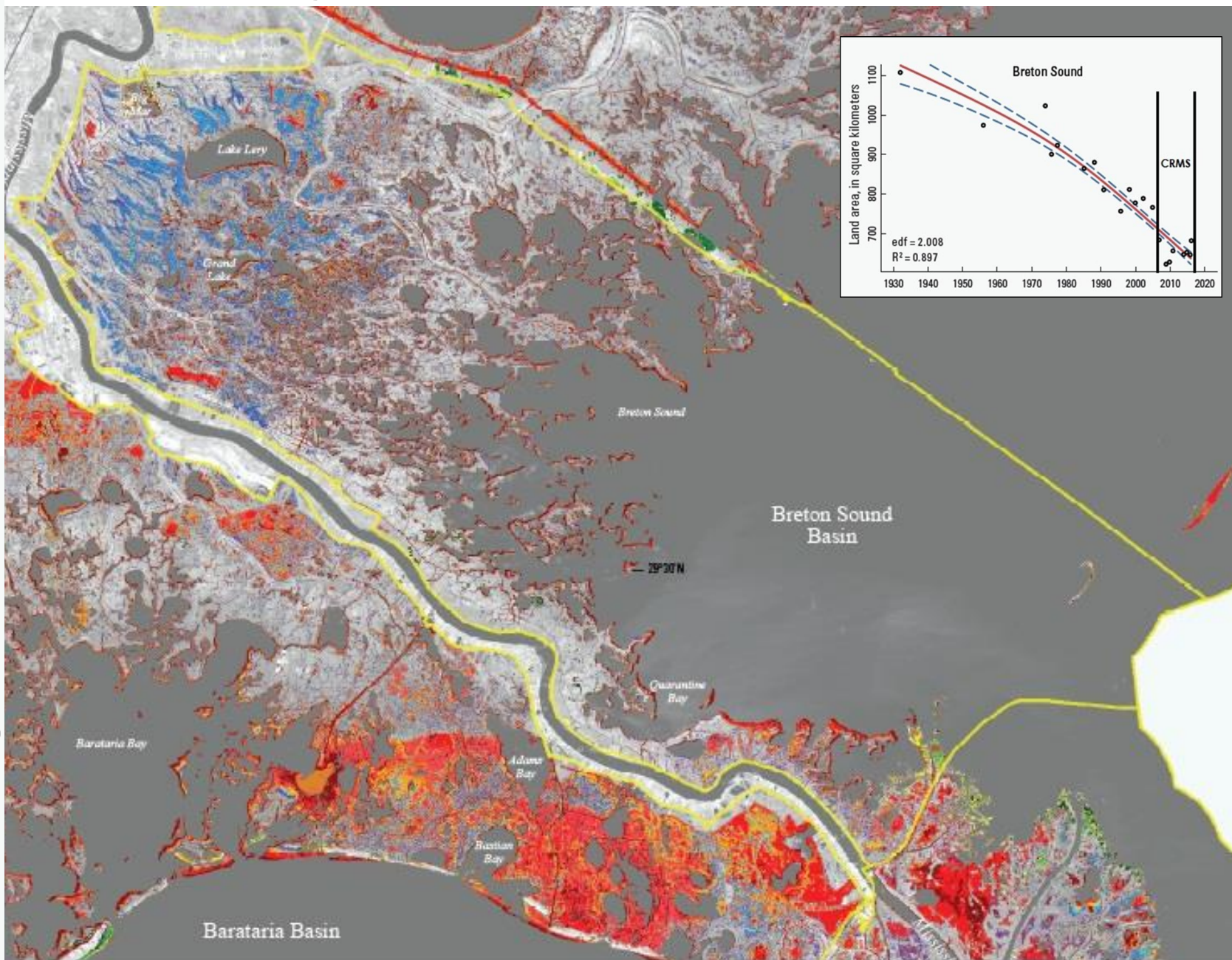
Land area change in Breton Sound Basin 1932–2016 (Couvillion et al. 2017)

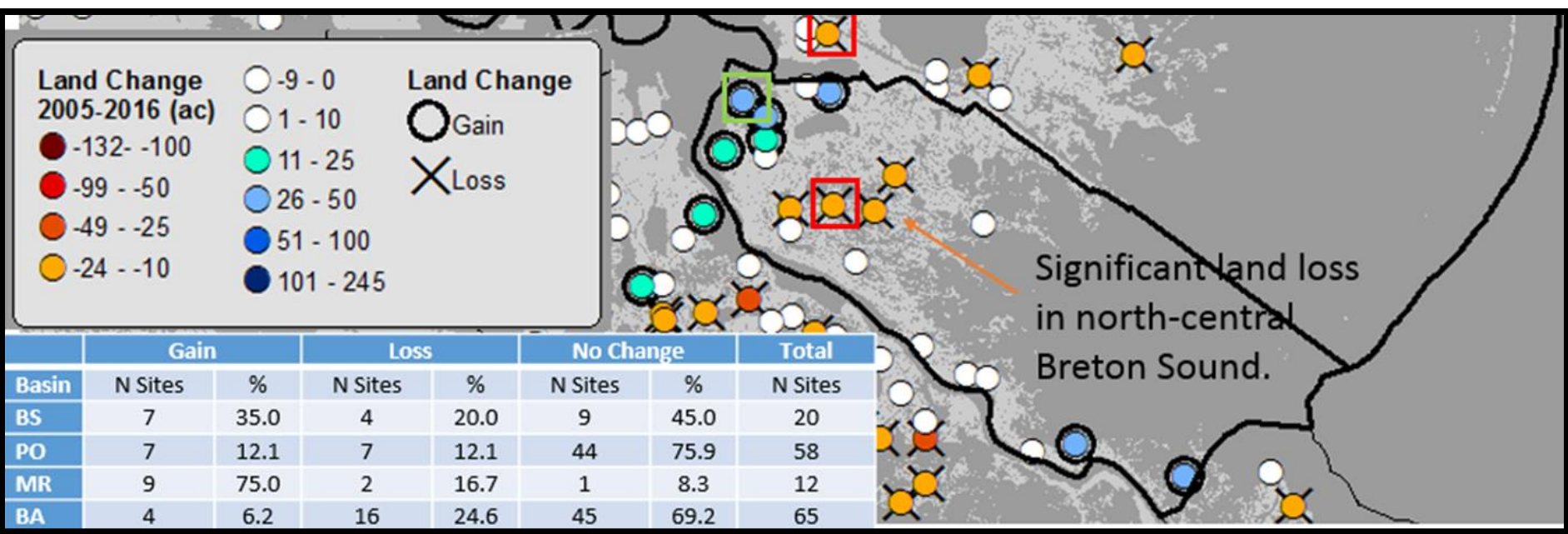
Loss

- 1932–56 Persistent land loss²
- 1956–73 Persistent land loss^{2A}
- 1973–75 Persistent land loss^{2A}
- 1975–77 Persistent land loss^{2A}
- 1977–85 Persistent land loss^{2A}
- 1985–88 Persistent land loss²
- 1988–90 Persistent land loss²
- 1990–95 Persistent land loss²
- 1995–98 Persistent land loss²
- 1998–99 Persistent land loss²
- 1999–2002 Persistent land loss²
- 2002–04 Persistent land loss²
- 2004–06 Persistent land loss²
- 2006–08 Persistent land loss²
- 2008–09 Persistent land loss²
- 2009–10 Persistent land loss²
- 2010–13 Persistent land loss²
- 2013–14 Persistent land loss²
- 2014–15 New water area²

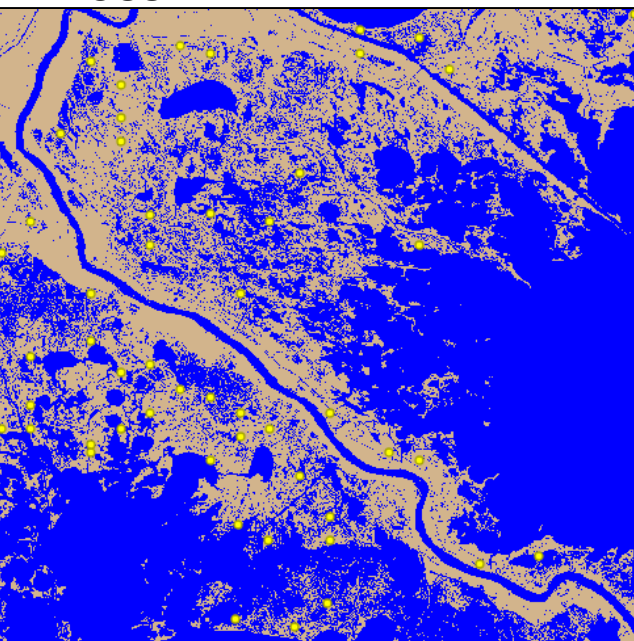
Gain

- 1932–56 Persistent land gain¹
- 1956–73 Persistent land gain^{1A}
- 1973–75 Persistent land gain^{1A}
- 1975–77 Persistent land gain^{1A}
- 1977–85 Persistent land gain^{1A}
- 1985–88 Persistent land gain¹
- 1988–90 Persistent land gain¹
- 1990–95 Persistent land gain¹
- 1995–98 Persistent land gain¹
- 1998–99 Persistent land gain¹
- 1999–2002 Persistent land gain¹
- 2002–04 Persistent land gain¹
- 2004–06 Persistent land gain¹
- 2006–08 Persistent land gain¹
- 2008–09 Persistent land gain¹
- 2009–10 Persistent land gain¹
- 2010–13 Persistent land gain¹
- 2013–14 Persistent land gain¹
- 2014–15 New land area²

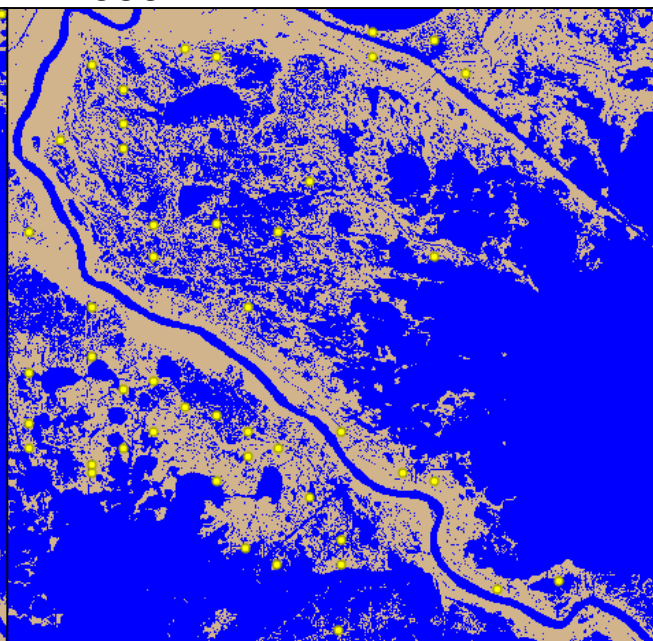




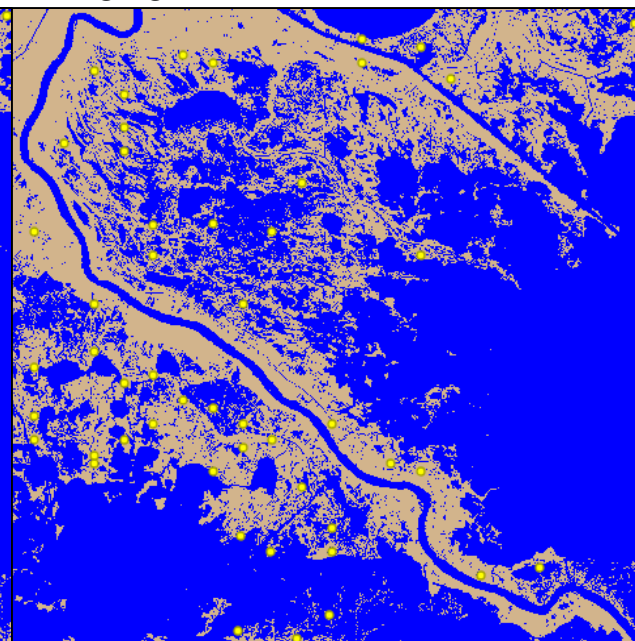
1988

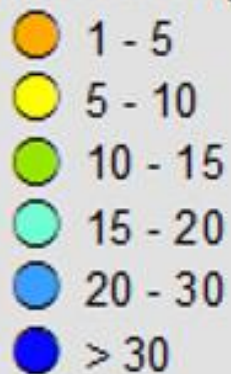
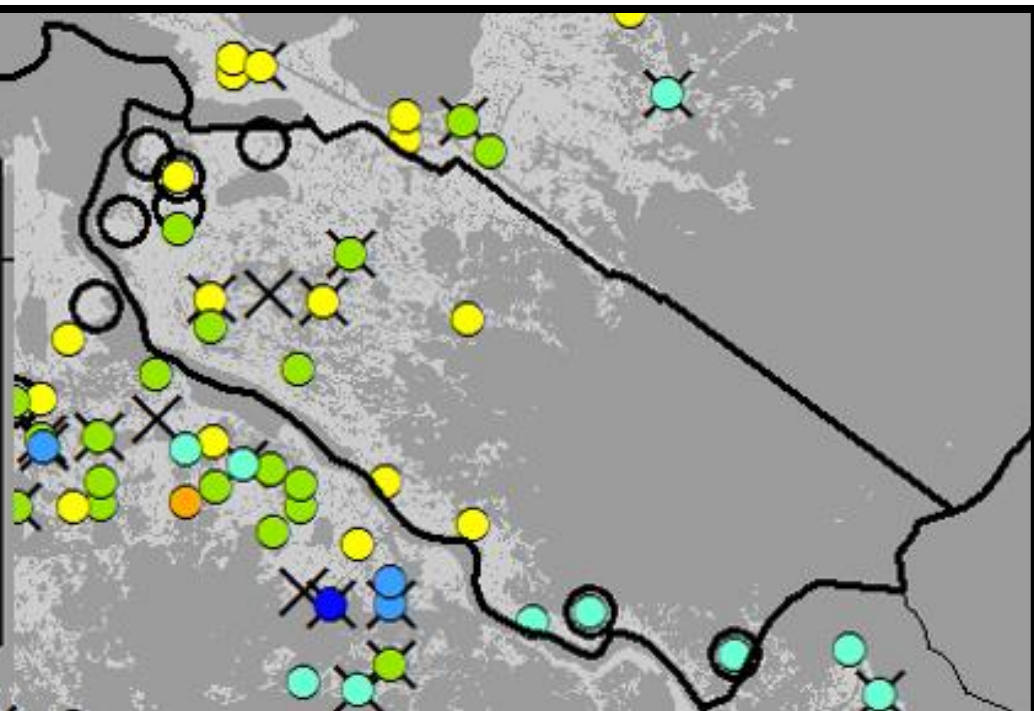
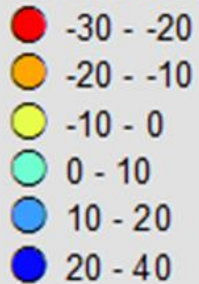
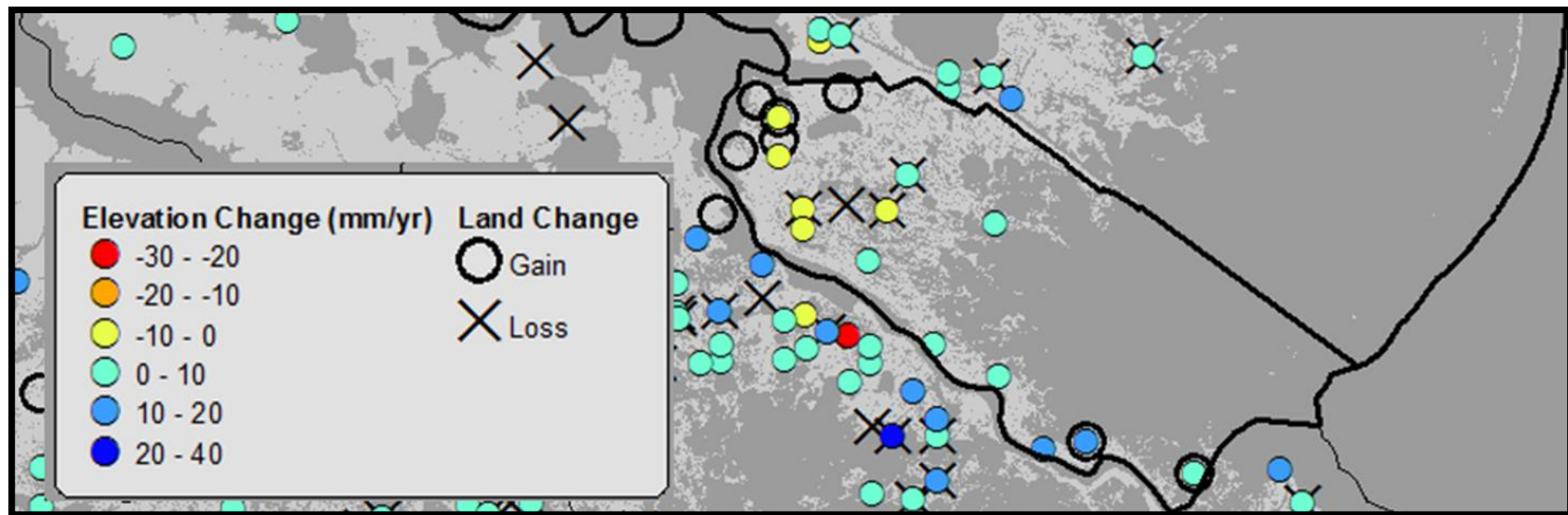
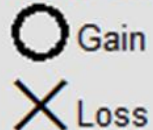


2006

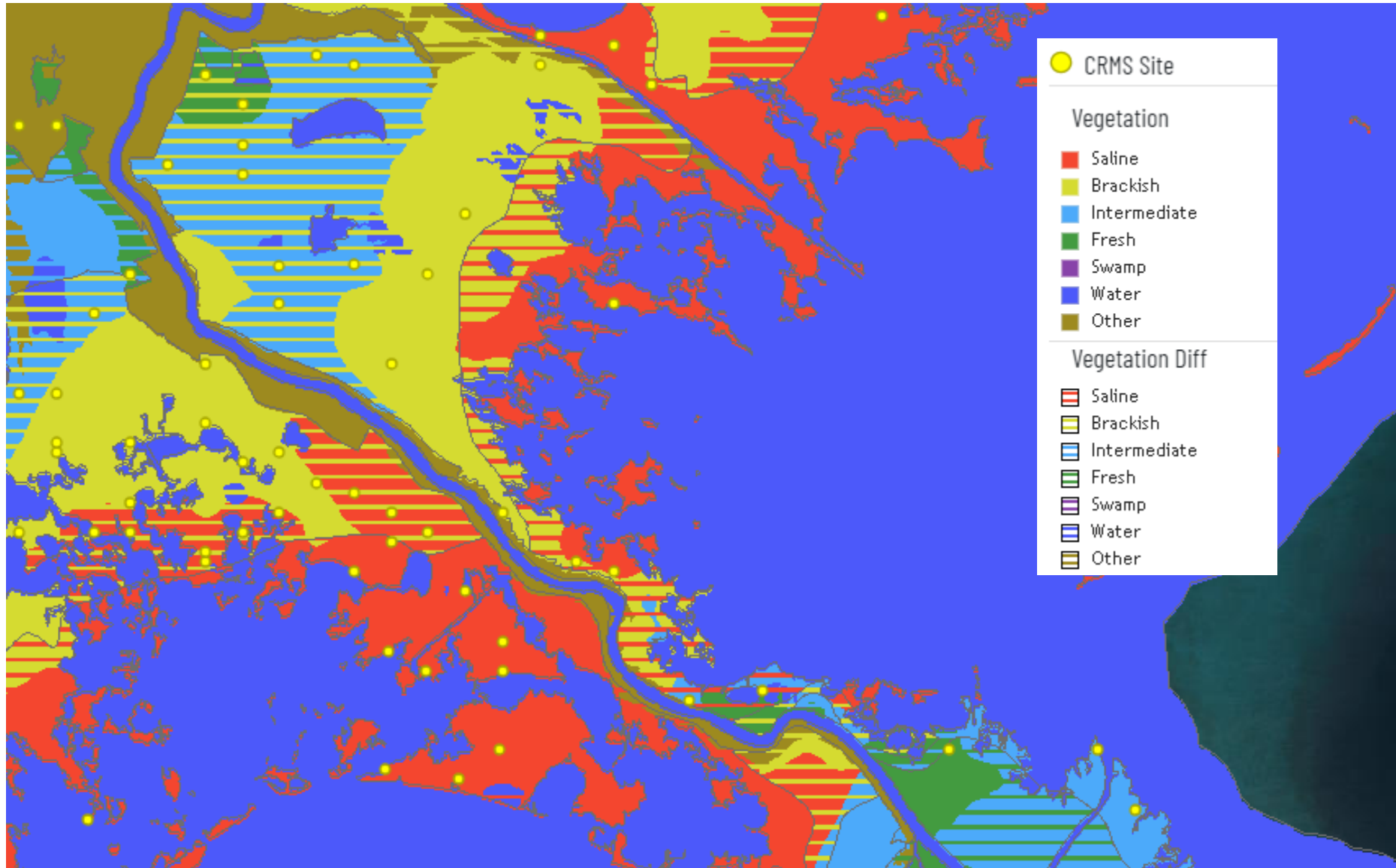


2016



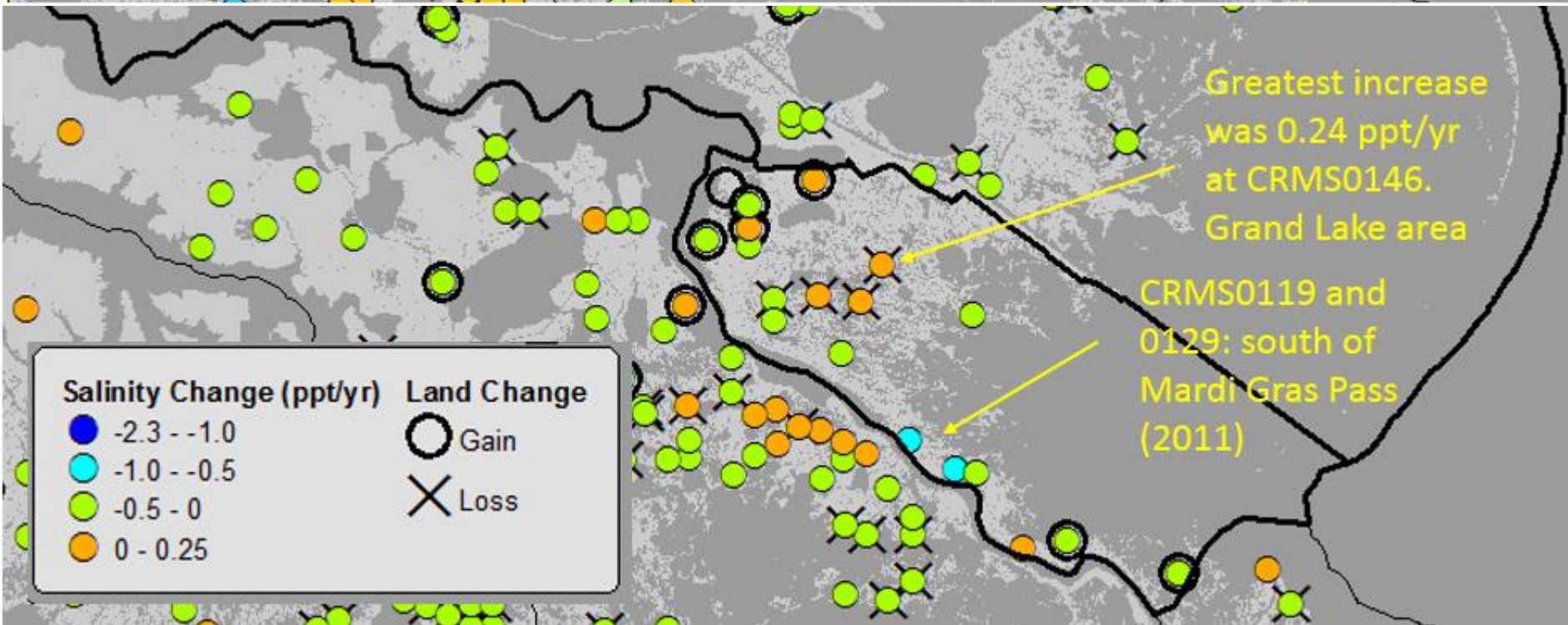
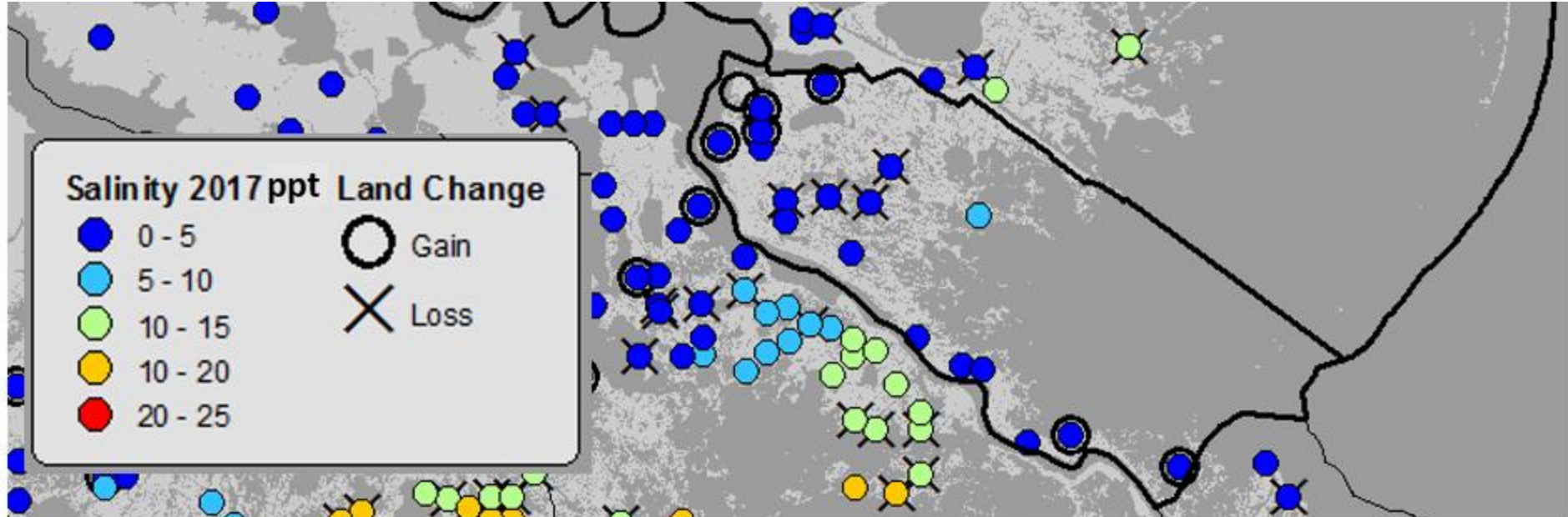
Accretion (mm/yr)**Land Change****Elevation Change (mm/yr)****Land Change**

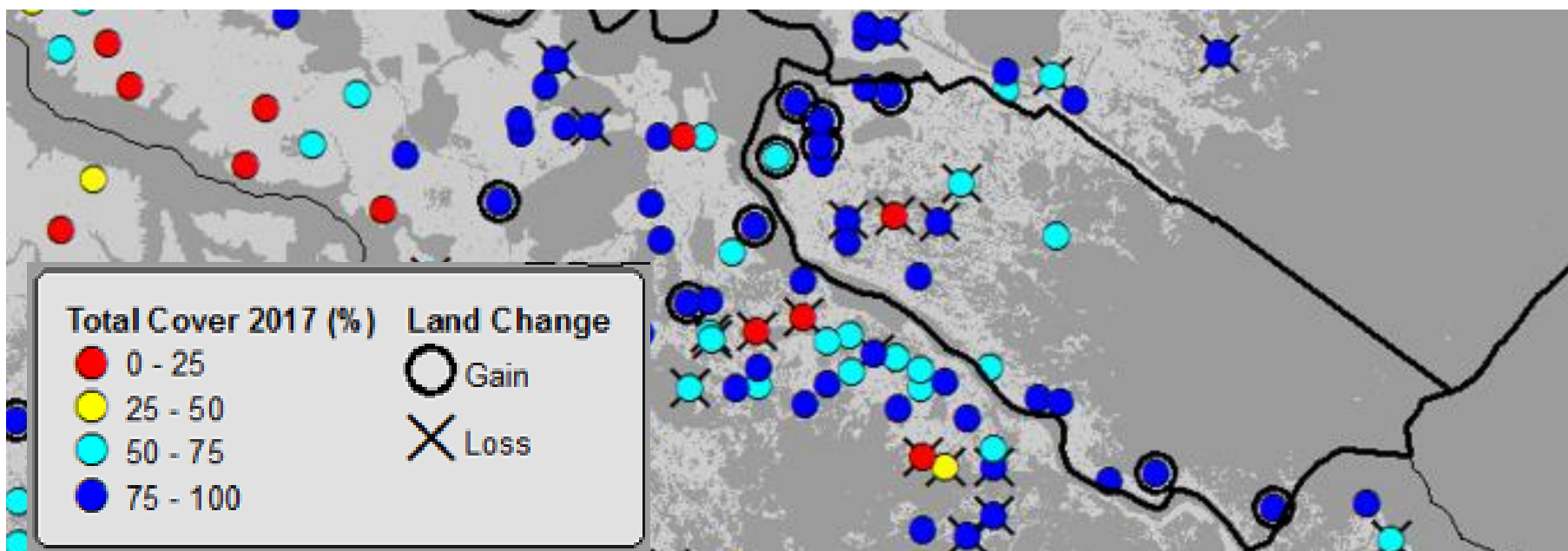
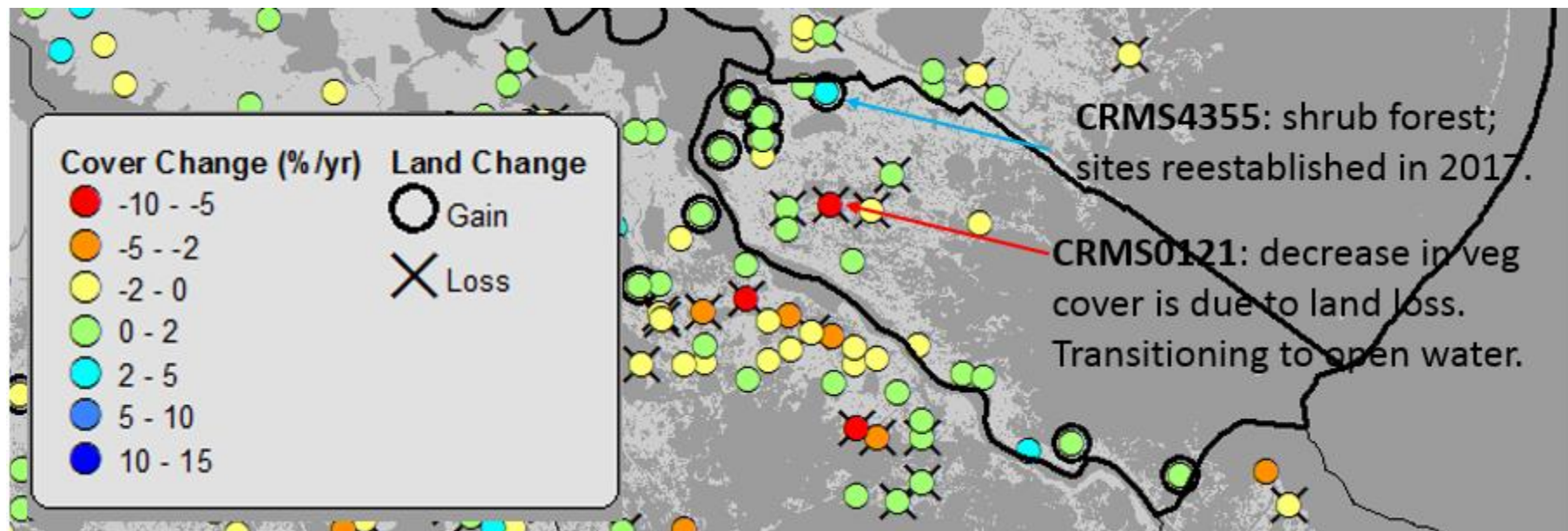
1988-2013 Marsh Classification Change

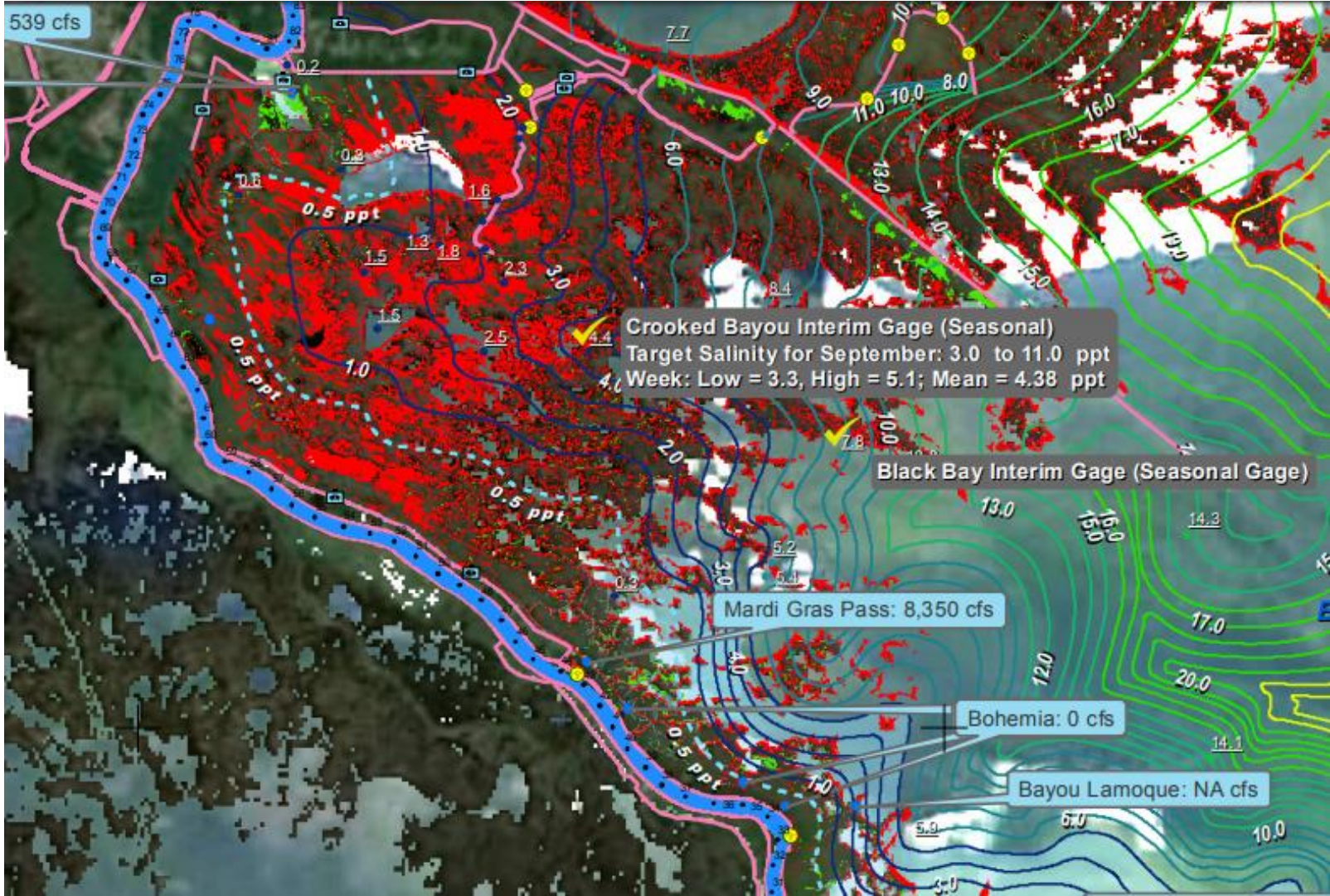


2007-2013 Marsh Classification Change











12/2010

500cfs_site4

500cfs_site5

500cfs_site1 500cfs_site6

500cfs_site2

500cfs_site8

500cfs_site3

500cfs_site7

Image Landsat / Copernicus

Google

Imagery Date: 12/30/2010 29°45'14.03" N 89°49'31.28" W elev 0 ft eye alt

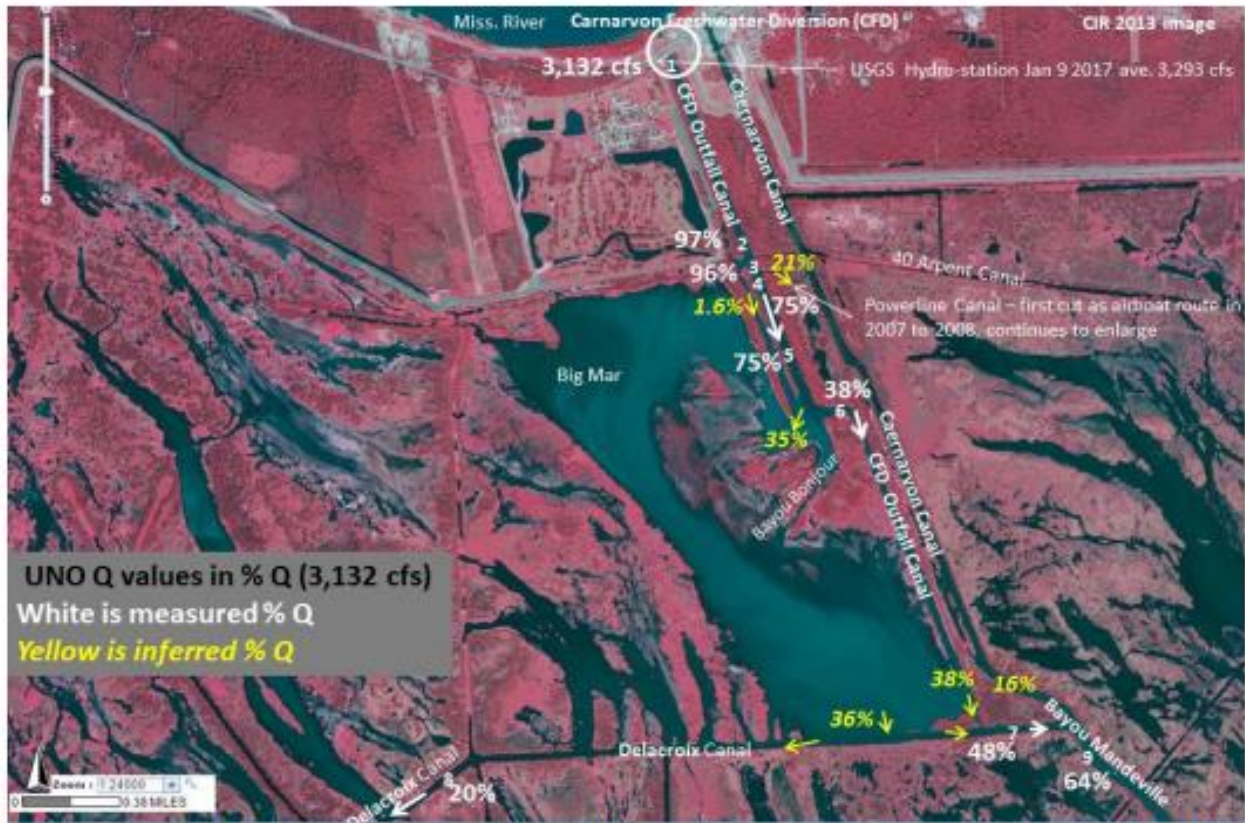


Figure 10: Flow pattern in the Caernarvon Freshwater Diversion receiving basin on January 9, 2017. White arrows show direction and white values are percent discharge at sites 2 through 9, based on the total flow measured at site 1 (3,132 cfs). Yellow arrows and values reflect inferred discharge, based on nearby discharge measurements.

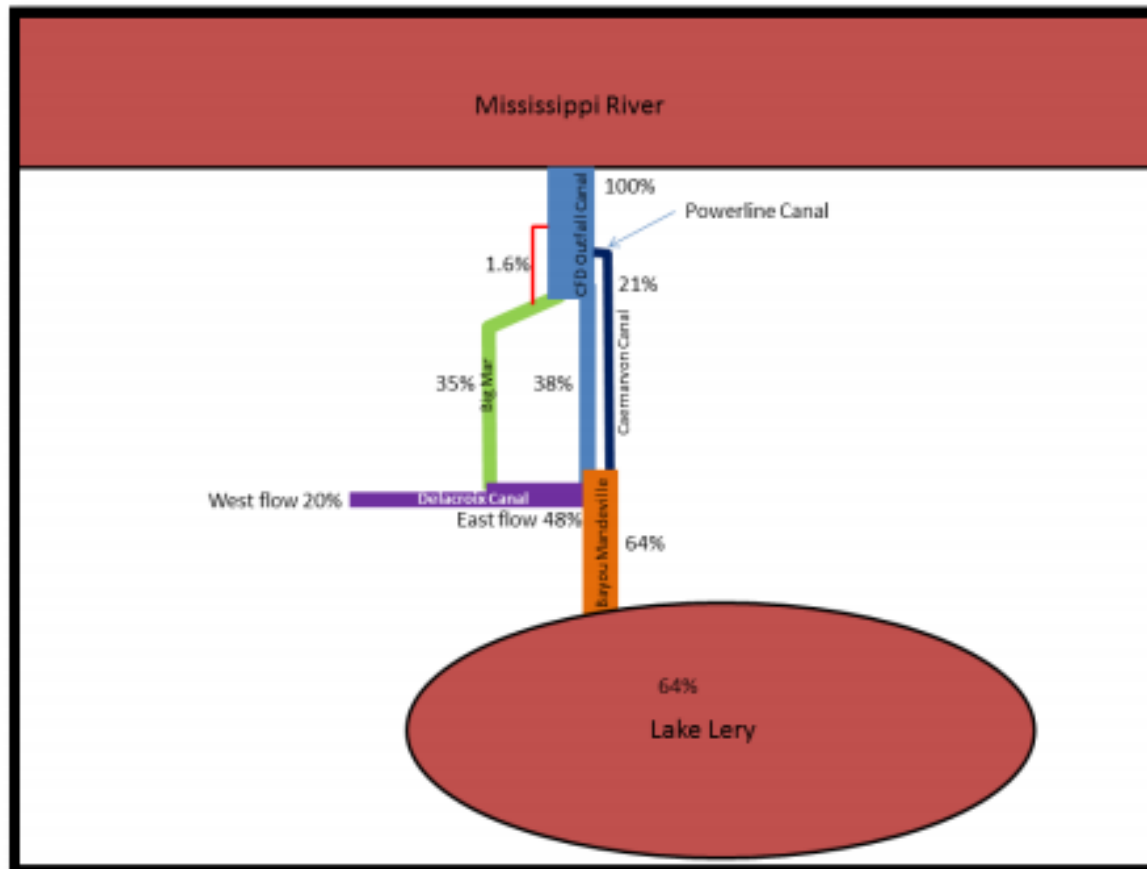


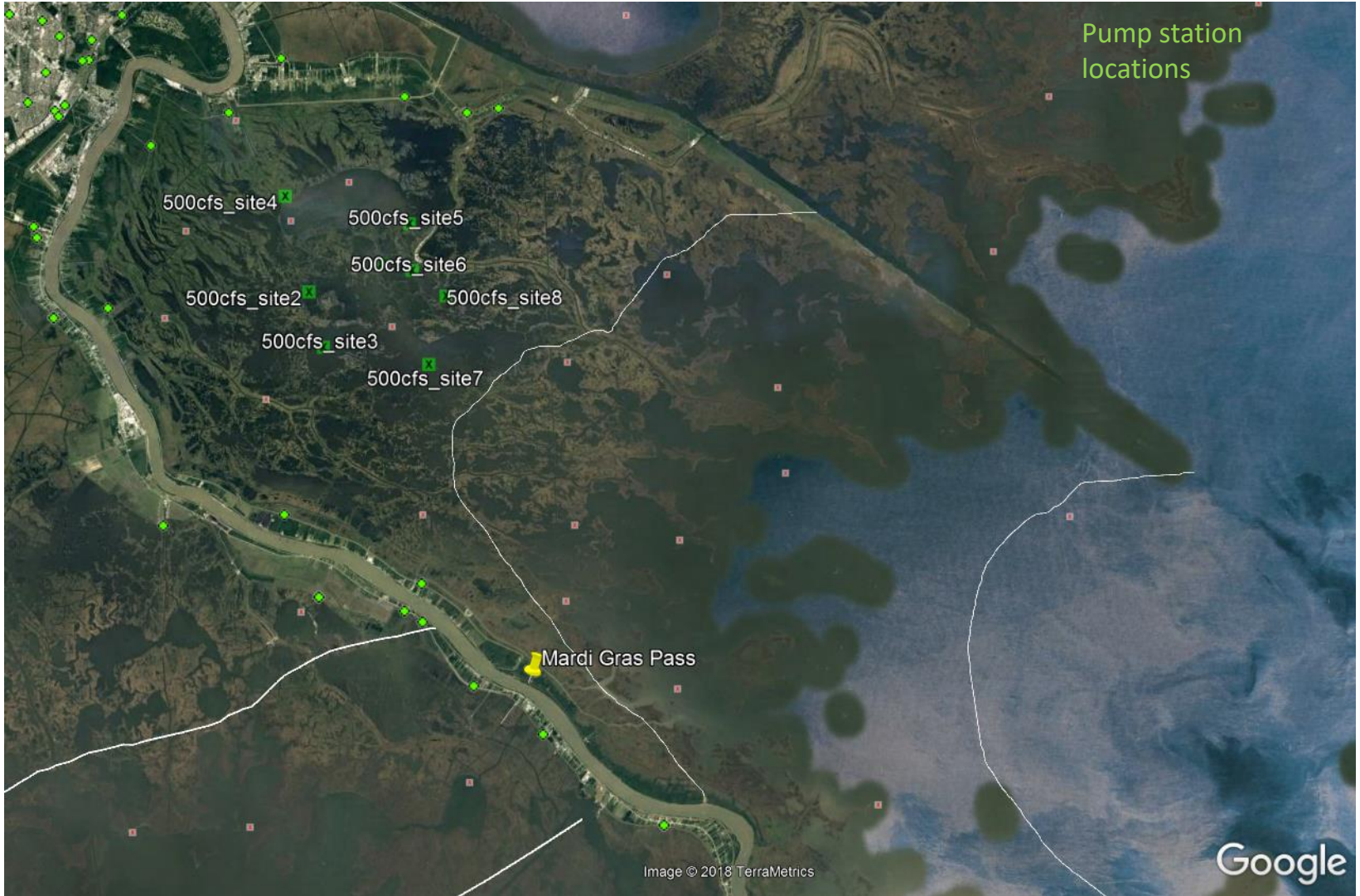
Figure 15: Discharge allocation using observed ADCP survey data and inferred flow.

Breton Sound Water Quality
 Red Pins = SWAMP Water Quality Stations
 Green "x" = 500 CFS Stations
 Yellow Lines = 5 ppt and 15 ppt isohalines



Google earth

Image © 2018 TerraMetrics
 Image Landsat / Copernicus
 Data SIO, NOAA, U.S. Navy, NGA, GEBCO



Pump station locations

500cfs_site4

500cfs_site5

500cfs_site6

500cfs_site2

500cfs_site8

500cfs_site3

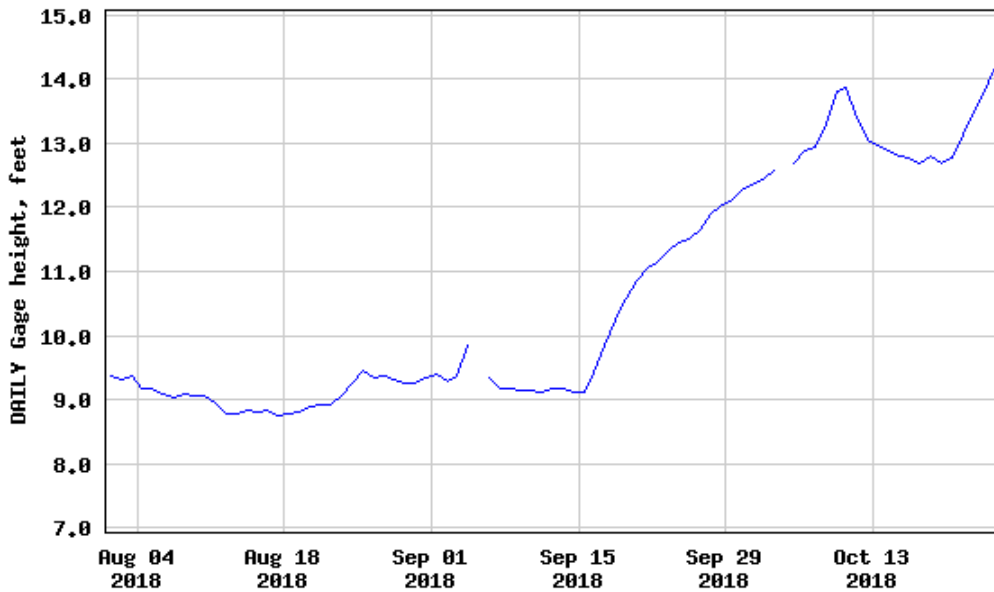
500cfs_site7

Mardi Gras Pass

Image © 2018 TerraMetrics

Google

USGS 07374525 Mississippi River at Belle Chasse, LA



----- Provisional Data Subject to Revision -----

USGS 07374525 Mississippi River at Belle Chasse, LA

