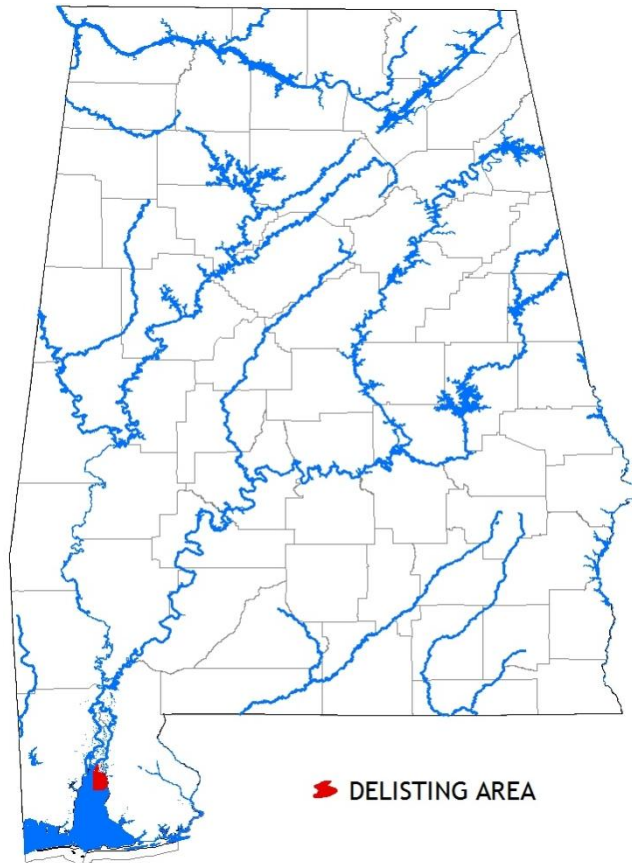


DRAFT
DELISTING DECISION
for
Pathogens (*Enterococci*)
in
Northeast Mobile Bay
(Assessment Unit ID # AL03160205-0300-502)



Alabama Department of Environmental Management
Water Division - Water Quality Branch
February 2014



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Useful Acronyms & Abbreviation

A

<i>A&I</i>	- Agriculture and Industry Use Classification
<i>AAF</i>	- Average Annual Flow
<i>ACES</i>	- Alabama Cooperative Extension Service
<i>ADEM</i>	- Alabama Department of Environmental Management
<i>ADPH</i>	- Alabama Department of Public Health
<i>AEMC</i>	- Alabama Environmental Management Commission
<i>AFO</i>	- Animal Feeding Operation
<i>AL</i>	- Alabama; Aluminum (Metals)
<i>AS</i>	- Arsenic
<i>ASWCC</i>	- Alabama Soil & Water Conservation Committee
<i>AWIC</i>	- Alabama Water Improvement Commission

B

<i>BAT</i>	- Best Available Technology
<i>BCT</i>	- Best Conventional Pollutant Control Technology
<i>BMP</i>	- Best Management Practices
<i>BOD</i>	- Biochemical Oxygen Demand
<i>BPJ</i>	- Best Professional Judgment

C

<i>CAFO</i>	- Confined Animal Feeding Operation
<i>CBOD₅</i>	- Five-Day Carbonaceous Biochemical Oxygen Demand
<i>CBOD_u</i>	- Ultimate Carbonaceous Biochemical Oxygen Demand
<i>CFR</i>	- Code of Federal Regulations
<i>CFS</i>	- Cubic Feet per Second
<i>CMP</i>	- Coastal Monitoring Program
<i>COD</i>	- Chemical Oxygen Demand
<i>COE</i>	- Corps of Engineers (US Army)
<i>CPP</i>	- Continuing Planning Process
<i>CWA</i>	- Clean Water Act
<i>CY</i>	- Calendar Year

D

<i>DA</i>	- Drainage Area
<i>DEM</i>	- Digital Elevation Model
<i>DMR</i>	- Discharge Monitoring Report
<i>DNCR</i>	- Department of Conservation & Natural Resources
<i>DO</i>	- Dissolved Oxygen

E

<i>E. coli</i>	- Escherichia Coliform Bacteria
<i>EOP</i>	- End of Pipe

F

<i>F&W</i>	- Fish and Wildlife Use Classification
<i>FDA</i>	- Food and Drug Administration
<i>Fe</i>	- Iron
<i>FO</i>	- Field Operations
<i>FS</i>	- Forestry Service (US)
<i>FY</i>	- Fiscal Year

G

<i>GIS</i>	- Geographic Information Systems
<i>GOMA</i>	- Gulf of Mexico Alliance
<i>GPS</i>	- Global Positioning System
<i>GSA</i>	- Geological Survey of Alabama

H

<i>HCR</i>	- Hydrographic Controlled Release
<i>Hg</i>	- Mercury
<i>HUC</i>	- Hydrologic Unit Code

I

<i>IBI</i>	- Index of Biotic Integrity
<i>IF</i>	- Incremental Flow
<i>IWC</i>	- Instream Waste Concentration

L

<i>LA</i>	- Load Allocation
<i>Lat/Long</i>	- Latitude / Longitude
<i>LDC</i>	- Load Duration Curve
<i>LIDAR</i>	- Light Detection & Ranging
<i>LWF</i>	- Limited Warmwater Fishery Use Classification

M

<i>m³/s</i>	- Cubic Meters per Second
<i>MAF</i>	- Mean Annual Flow (MAF = AAF)
<i>mg/l</i>	- Milligrams per Liter
<i>MGD</i>	- Million Gallons per Day
<i>mi</i>	- Miles
<i>MOS</i>	- Margin of Safety
<i>MS4s</i>	- Municipal Separate Storm Sewer Systems
<i>MZ</i>	- Mixing Zone

N

N - Nitrogen
NA - Not Applicable
NASS - National Agricultural Statistics Service
NBOD_x - Nitrogenous Biochemical Oxygen Demand
NED - National Elevation Database
NH₃-N - Ammonia Nitrogen
NHD - National Hydrography Database
NLCD - National Land Cover Dataset
NO₃+NO₂-N - Nitrate + Nitrite Nitrogen
NOAA - National Oceanic and Atmospheric Administration
NOV - Notice of Violation
NPDES - National Pollutant Discharge Elimination System
NPS - Non-Point Source
NRCS - National Resource Conservation Service
NTUs - Nephelometric Turbidity Units
NWS - National Weather Service

O

OAW - Outstanding Alabama Water Use Classification
OE - Organic Enrichment
ONRW - Outstanding National Resource Water

P

P - Phosphorus
Pb - Lead
PCBs - Polychlorinated Biphenyl
pH - Concentration of Hydrogen Ions Scale
POTW - Publicly Owned Treatment Works
ppb - Parts per Billion
ppm - Parts per Million
ppt - Parts per Trillion
PS - Point Source
PWS - Public Water Supply Use Classification
PWSS - Public Water Supply System

Q

Q - Flow (MGD, m³/s, cfs)
QA/QC - Quality Assurance / Quality Control
QAPP - Quality Assurance Project Plan

R

RRMP - River and Reservoirs Monitoring Program
RSMP - River and Streams Monitoring Program

S

S - Swimming and Other Whole Body Waters Contact Sports Use Classification

S (cont.)

SH - Shellfish Harvesting Use Classification
SID - State Indirect Discharge
SMZ - Streamside Management Zone
SOD - Sediment Oxygen Demand
SOP - Standard Operating Procedure
SRF - State Revolving Fund
SSO - Sanitary Sewer Overflow
STP - Sewage Treatment Facility
SW - Surface Water
SWMP - Stormwater Management Plan
SWQM - Spreadsheet Water Quality Model (AL)
SWQMP - Surface Water Quality Monitoring Program

T

TBC - Technology-Based Controls
TBD - To be Determined
TDS - Total Dissolved Solids
TKN - Total Kjeldahl Nitrogen
TMDL - Total Maximum Daily Load
TON - Total Organic Nitrogen
TOT - Time of Travel
Total P - Total Phosphorus
TSS - Total Suspended Solids
TVA - Tennessee Valley Authority

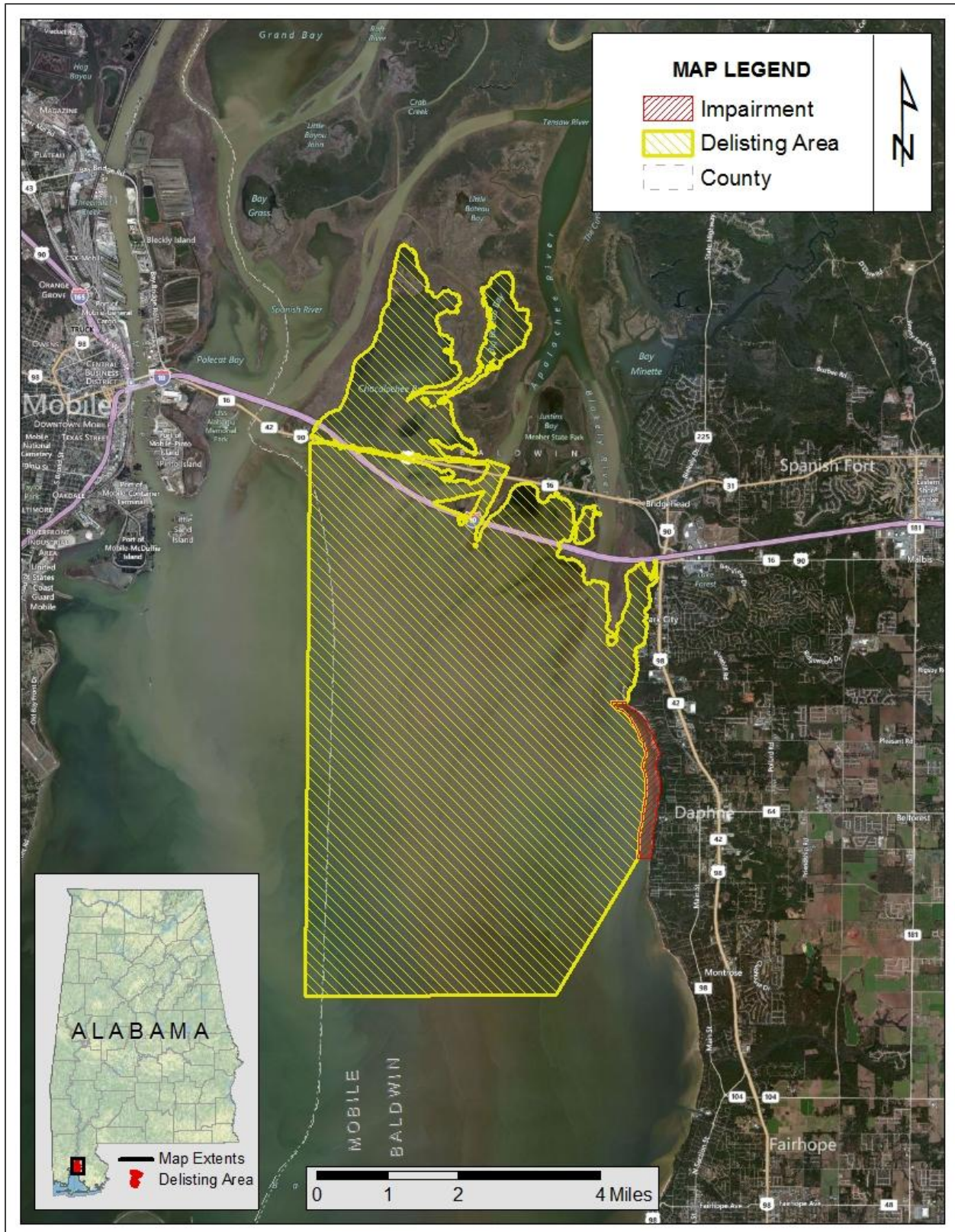
U

UAA - Use Attainability Analysis
UIC - Underground Injection Control
USDA - United States Department of Agriculture
USGS - United States Geological Survey
USEPA - United States Environmental Protection Agency
USFWS - United States Fish & Wildlife Services
UT - Unnamed Tributary
UV - Ultraviolet Radiation

W

WCS - Watershed Characterization System
WET - Whole Effluent Toxicity
WLA - Wasteload Allocation
WMA - Wildlife Management Area
WPCP - Wastewater Pollution Control Plant
WQB - Water Quality Branch
WRDB - Water Resources Database
WTP - Water Treatment Plant
WWTF - Wastewater Treatment Facility
WWTP - Wastewater Treatment Plant
WY - Water Year

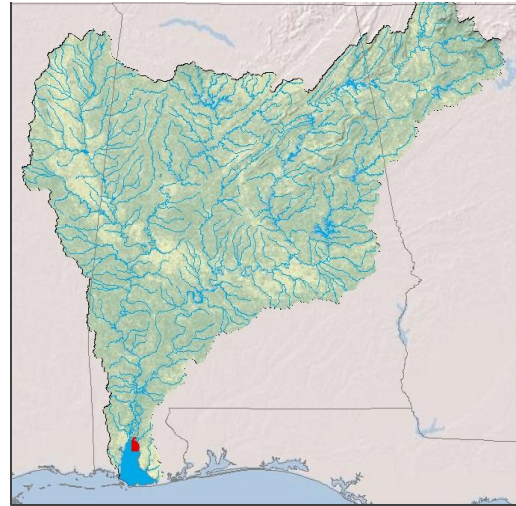
Map 1: Northeast Mobile Bay Delisting and Impairment Areas



1.0 EXECUTIVE SUMMARY

Located on the northern Gulf Coast, Mobile Bay has long since been recognized as a primary estuary system rich in economical, environmental, and historical significance. With a drainage area of over 44,000 square miles (mi²) spread across four states, the Mobile River basin is the sixth-largest river system in the United States ([Map 2](#)). In addition, Mobile Bay is the second-largest estuary in the US and has an average discharge of around 65,000 cubic feet per second at its mouth, which empties into the Gulf of Mexico. Mobile Bay provides essential habitat for a wide variety of marine species as well as an invaluable natural resource to surrounding communities that depend on the bay for recreational and economic benefit. In terms of tonnage, Mobile is the 9th-largest port in the US, with a statewide economic impact of \$8 billion annually (*Port Facts*, 2010). With so much dependent on a healthy and productive Mobile Bay, protecting its water quality is critical.

Map 2: Mobile Bay / River Basin



The northeast portion of Mobile Bay was originally placed on Alabama’s [2010 §303\(d\) List of Impaired Waters](#) for pathogen impairment based on Alabama Department of Environmental Management (ADEM) Beach Monitoring Program data collected in 2008 and 2009. This area of Mobile Bay has designated use classifications of *Swimming and Other Whole-Body Water Contact Sports (S)* and *Fish & Wildlife (F&W)*. Unlike the majority of Mobile Bay, shellfish harvesting is prohibited in this area so these waters are not subject to the Alabama Department of Public Health (ADPH) closures which have contributed to the listing of other segments in previous cycles.

After reviewing available data, it is evident that the majority of northeast Mobile Bay is meeting applicable water quality standards with respect to pathogens (*Enterococci*). However, beach monitoring data continues to show exceedances of Alabama’s pathogen criteria. In order meet water quality criteria along the shore where exceedances were observed, a separate total maximum daily load (TMDL) will be needed. The remaining unimpaired portion is the subject of this delisting decision. As a result, the original assessment unit (AL03160205-0300-500) has been split into two separate units (see [Table 1](#) below and [Map 1](#) on the previous page).

Table 1: New Assessment Unit IDs for Northeast Mobile Bay

Assessment Unit ID	Listing Action	Description
AL03160205-0300-501	TMDL	1000-ft-wide zone along shoreline
AL03160205-0300-502	Delisting	Remaining portion of northeast Mobile Bay

Table 2: Northeast Mobile Bay Delisting Summary

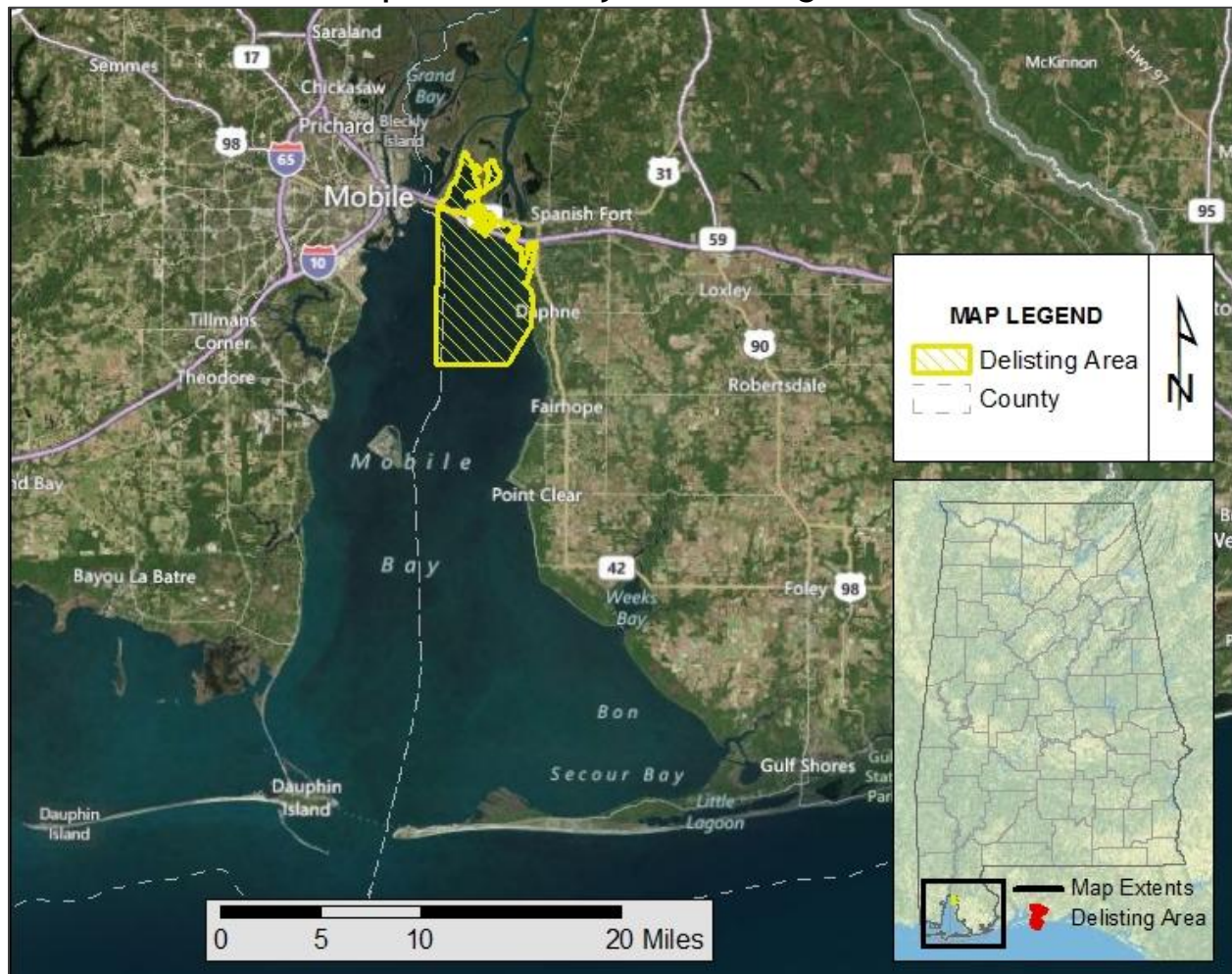
Northeast Mobile Bay Delisting Summary	
Waterbody	Mobile Bay (Northeast Portion)
Use Classification	<i>Swimming (S), Fish & Wildlife (F&W)</i>
River Basin	Mobile River / Mobile Bay
County	Baldwin (FIPS 01003), Mobile (FIPS 01097)
12-Digit HUC	031602050300, 031602040505
HUC-12 Name	Mobile Bay - Bon Secour Bay, Tensaw River - Appalachian River
Assessment Unit	AL03160205-0300-502 Total Area = 35.8 mi ²
Feature Extents	North 30.719310°; South 30.565590° East -87.913364°; West -87.995898°
Year Listed	2010
Date of Data	2008-2009 (listing); 2010 - 2013 (delisting)
Water Quality Impairment	Pathogens (<i>Enterococci</i>)
Pathogen WQ Criteria Swimming Use (Coastal Waters)	Single-sample Maximum ≤ 104 colonies / 100 ml Geomean ≤ 35 colonies / 100 ml
Sampling Results	0 Exceedances @ 3 stations

2.0 DELISTING AREA DESCRIPTION

2.1 General Geographic Location

As mentioned in the introduction, the delisting area is located on the northeast portion of Mobile Bay. This area encompasses nearly 36 mi² of the bay's total 413 mi² area. It is bounded to the north by the Mobile-Tensaw River Delta, the second-largest delta system in the US behind the Mississippi River Delta. North-to-south, the bell-shaped bay is 32 miles long and empties directly into the Gulf of Mexico. To the west, it is bordered by the shores of Mobile County, AL and the Mississippi Sound. The eastern shore is Baldwin County, AL. The Mobile/Baldwin County line basically runs the centerline of the bay. The mouth of the bay is mostly protected by Dauphin Island, a barrier island on the western side, and the Fort Morgan Peninsula on the eastern side.

Map 3: Mobile Bay and Delisting Area

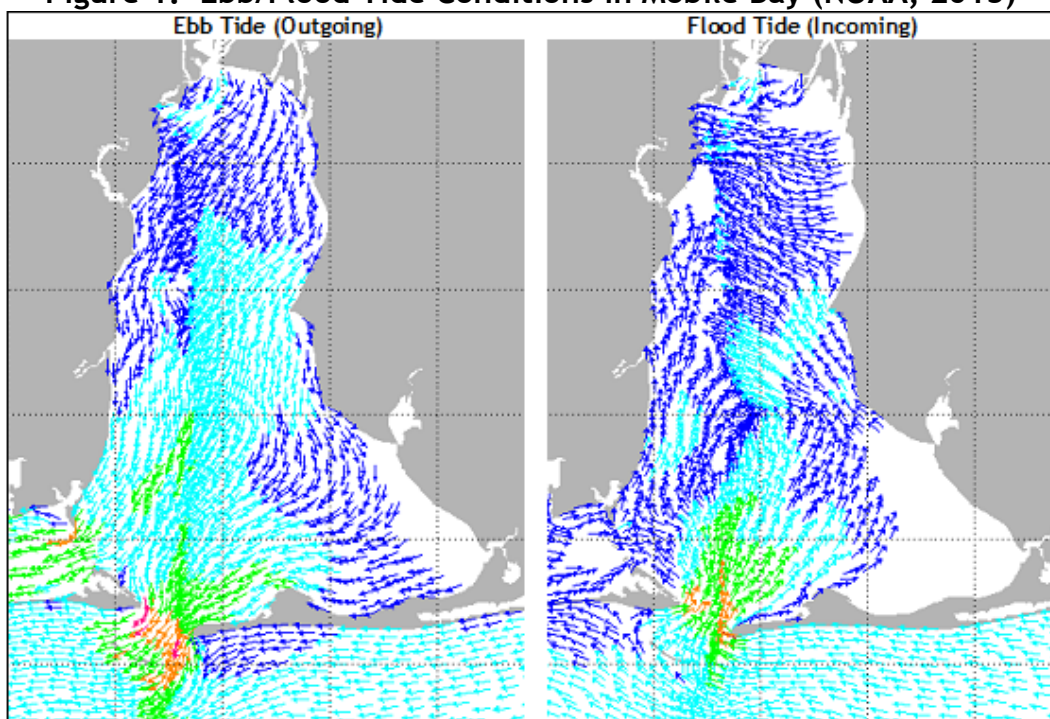


2.2 Hydrology

The 44,000 mi² drainage area of the Mobile River/Bay basin accounts for an average freshwater discharge of over 65,000 cfs into the Gulf of Mexico (Aubrey, 1996). This equates to over 486,000 gallons per second. The majority of this flow comes from the Mobile River (which forms from the confluence of the Tombigbee and Alabama Rivers), with additional inflows from the Tensaw, Spanish, Apalachee, and Blakeley Rivers. Additional localized flow enters the bay from adjacent watersheds such as Dog River, Deer River, and Fowl River on the western side and Fish River on the eastern side. This large freshwater influx makes Mobile Bay the second-largest estuary in the US. The bay is generally shallow with an average depth of only 10 feet with deeper areas located in the Mobile Shipping Channel and the Intracoastal Waterway. The Mobile Shipping Channel runs from the mouth of the Mobile River in the northwest quadrant of the bay to a narrow 3-mile-wide pass at the mouth of the bay located between Fort Gaines and Fort Morgan. The Intracoastal Waterway, on the other hand, transects Mobile Bay laterally near its widest point, extending from the southeastern shore of the bay to the Mississippi Sound on the western side.

The bulk of the flow travels north-to-south from the Mobile-Tensaw Delta down the main channel to the Gulf of Mexico. This is especially true during ebb (outgoing) tide conditions. During flood (incoming) tide conditions, however, currents can be vastly different. These conditions can contribute to more limited mixing, especially along the shores where slack conditions can create a bathtub-like environment (See [Figure 1](#) below). Locations in and around Mobile Bay have a normal tidal range of as much as 2.3 feet during spring tide events and nearly no change during neap tide events.

Figure 1: Ebb/Flood Tide Conditions in Mobile Bay (NOAA, 2013)



3.0 BASIS FOR §303(D) LISTING

3.1 §303(d) List of Impaired Waters

Section 303(d) of the Clean Water Act and EPA’s *Water Quality Planning and Management Regulations* (40 CFR Part 130) require states to identify waterbodies which are not meeting their designated uses and to determine the total maximum daily load (TMDL) for pollutants causing use impairment. The TMDL process establishes the allowable loading of pollutants for a waterbody based on the relationship between pollution sources and instream water quality conditions, so that states can establish water quality-based controls to reduce pollution and restore and maintain the quality of their water resources (USEPA, 1991). If subsequent water quality sampling shows that segments listed in a previous cycle are meeting applicable water quality standards and fully supporting their use classification(s), the waterbody can be proposed as a candidate for delisting based on more recent or more accurate data.

3.2 Water Quality Criteria

Table 3: Alabama’s Bacteria Criteria

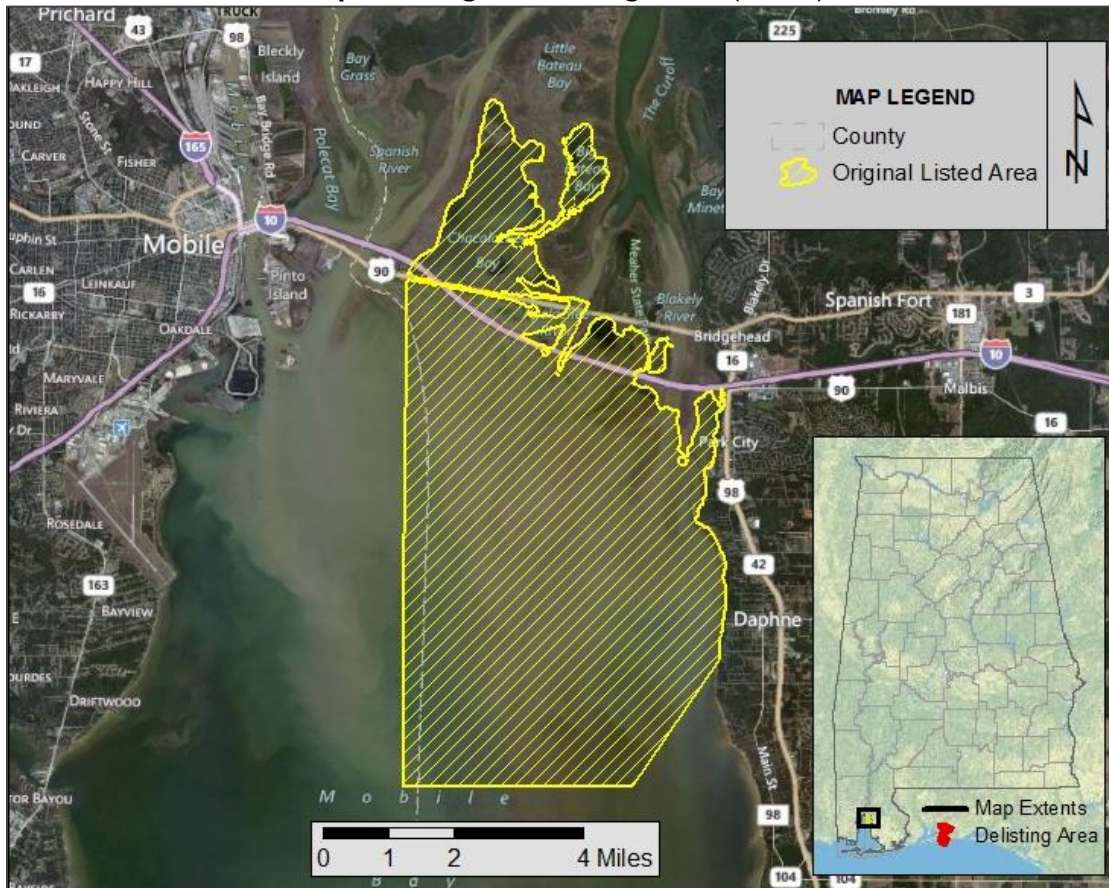
Use Classification	Non-Coastal Waters	Coastal Waters
Swimming and Other Whole-Body Water Contact (S)	<p><i>E. Coli</i> (colonies/ 100 ml)</p> <ul style="list-style-type: none"> Geometric Mean ≤ 126 Single Sample Max ≤ 235 	<p><i>Enterococci</i> (colonies/ 100 ml)</p> <ul style="list-style-type: none"> Geometric Mean ≤ 35 Single Sample Max ≤ 104
Fish & Wildlife (F&W)	<p><i>E. Coli</i> (colonies/ 100 ml)</p> <p>June - September:</p> <ul style="list-style-type: none"> Geometric Mean ≤ 126 Single Sample Max ≤ 487 <p>October - May:</p> <ul style="list-style-type: none"> Geometric Mean ≤ 548 Single Sample Max ≤ 2507 	<p><i>Enterococci</i> (colonies/ 100 ml)</p> <p>June - September:</p> <ul style="list-style-type: none"> Geometric Mean ≤ 35 Single Sample Max ≤ 158 <p>October - May:</p> <ul style="list-style-type: none"> Single Sample Max ≤ 275

3.3 Original Listing Information

This portion of Mobile Bay was originally placed on Alabama’s [2010 §303\(d\) List of Impaired Waterbodies](#) for pathogens (*Enterococci*) based on Beach Monitoring Program data collected in 2008-2009 at station MAY_DAY near the City of Daphne, AL. ADEM’s Beach Monitoring Program identifies near-shore locations where human whole-body water contact is most likely. In accordance with [Alabama’s Water Quality Assessment and Listing Methodology](#), a waterbody designated as *Swimming* can be placed in Category 5 (§303(d) list) if more than 10% of single samples exceed the criteria. Beach monitoring data showed an exceedance rate of about 20% for the cycle prior to

the 2010 §303(d) list. The original listing was given the assessment unit ID AL03160500-0300-500 shown in [Map 4](#) below:

Map 4: Original Listing Area (2010)



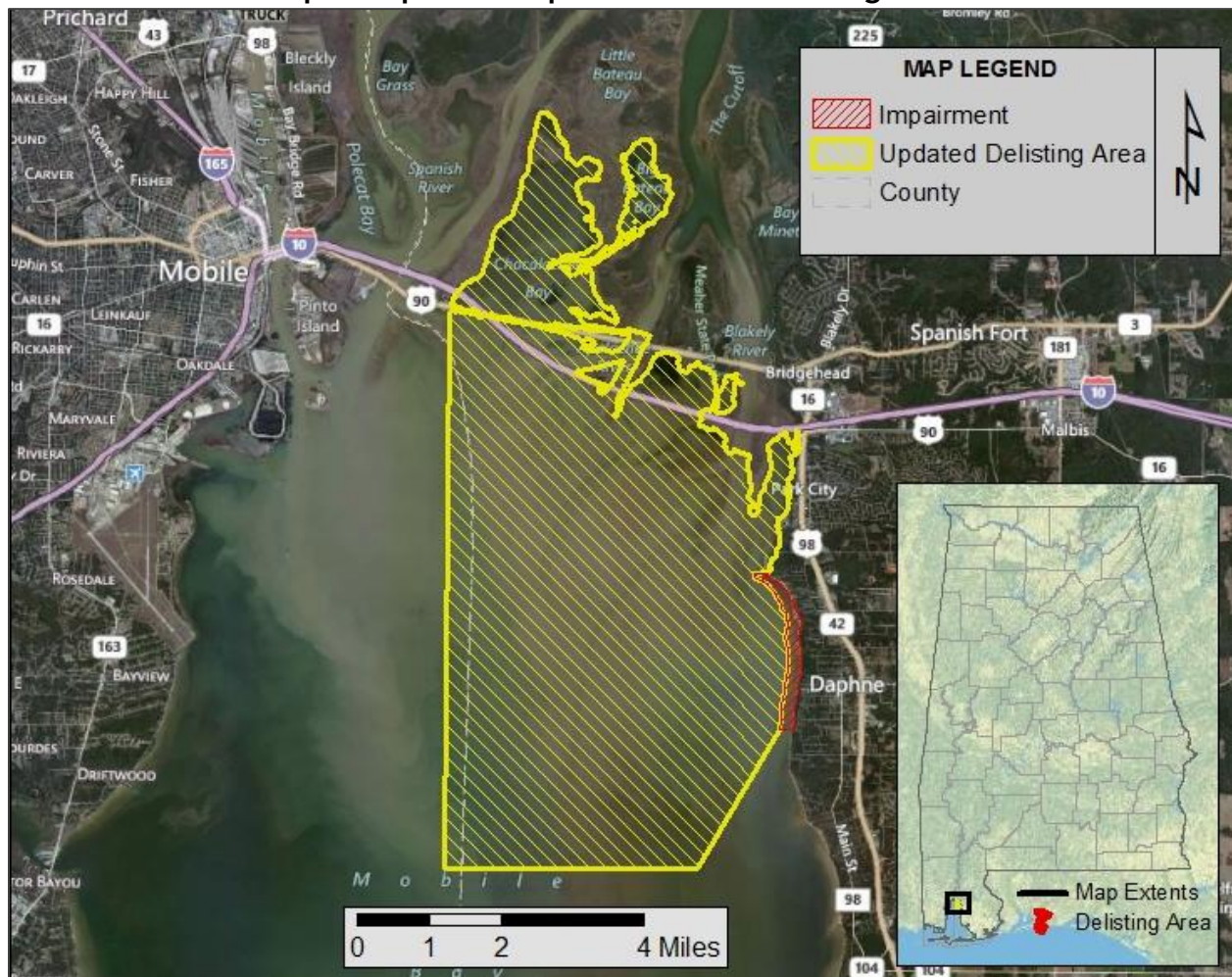
3.4 Updated Assessment Unit IDs and Delisting Area

Since the 2010 listing, the original northeast portion of Mobile Bay was divided into two assessment units as shown in [Table 4](#) below and [Map 5](#) on the following page. The updated segmentation includes a 1000-foot-wide near-shore zone where exceedances were observed and swimming and other whole-body contact recreation is most likely (“TMDL area”), as well as a far-shore, open-water portion where no exceedances were observed (“delisting area”). This delisting document addresses only the far-shore, open-water portion with the updated assessment unit ID of AL03160205-0300-502. The impaired near-shore zone will be addressed in a separate TMDL analysis scheduled for FY2014.

Table 4: New Assessment Unit IDs for Northeast Mobile Bay

Assessment Unit ID	Listing Action	Description
AL03160205-0300-501	TMDL	1000-ft-wide zone along shoreline
AL03160205-0300-502	Delisting	Remaining portion of northeast Mobile Bay

Map 5: Updated Impairment and Delisting Areas

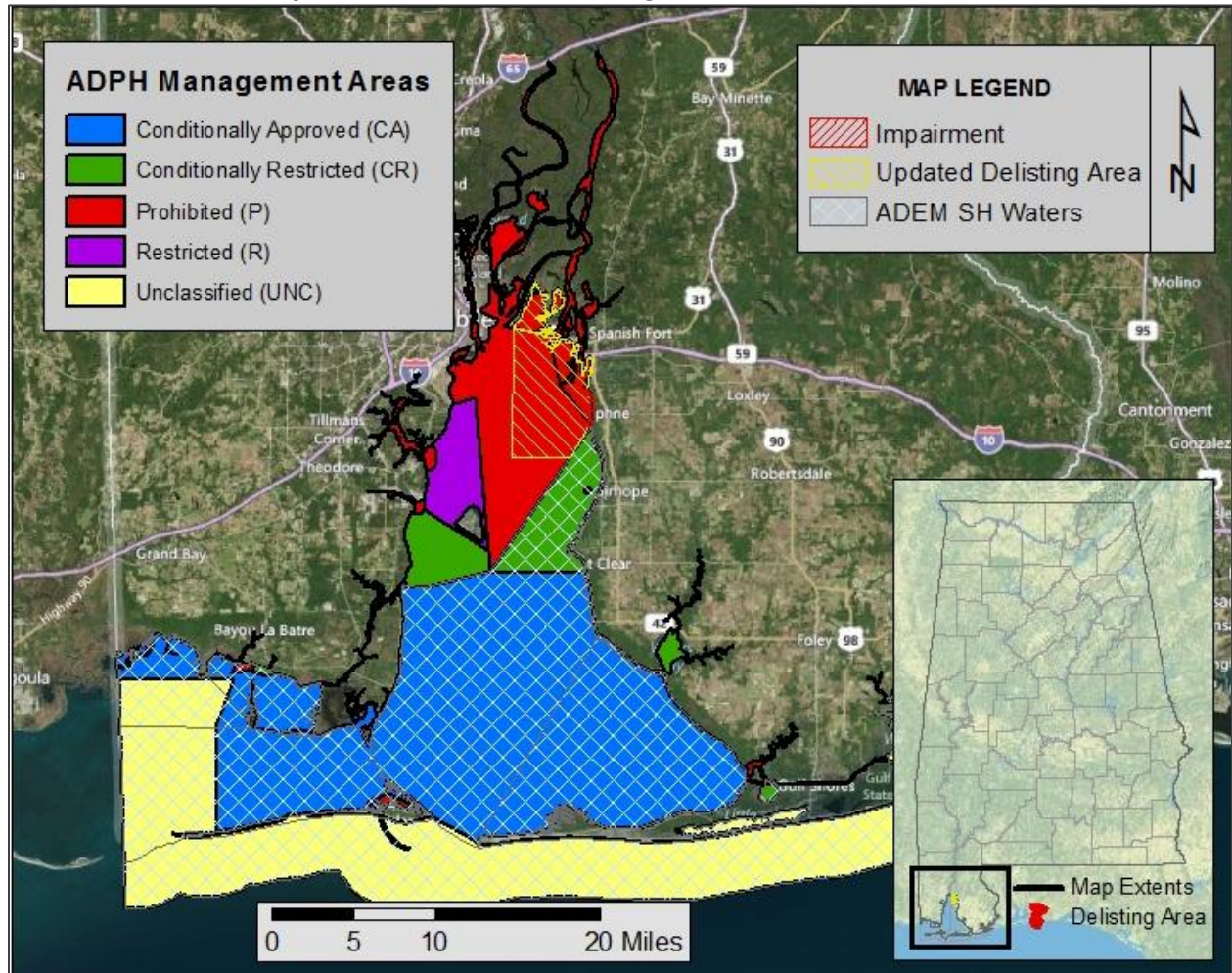


The delisting area is the northeast portion of Mobile Bay except a 1000-foot-wide near-shore zone along the eastern shore of Mobile Bay extending from Ragged Point near Daphne, AL to the mouth of Yancey Branch near Village Point.

3.5 Policy Issues (Shellfish Harvesting Waters)

In previous assessments of Alabama’s coastal waters, policy issues have arisen over waters designated as shellfish harvesting areas managed by the Alabama Department of Public Health (ADPH) Seafood Branch. ADPH issues closures of shellfish harvesting areas based on bacteriological data and/or a gage height exceeding 8 feet at a USGS gage located on the Mobile River. These closures would prompt the listing of coastal waters for pathogens even if the actual state water quality standard was not exceeded. In this case, it is important to note that the northeast portion of Mobile Bay is not designated as *Shellfish Harvesting (SH)* by ADEM and is managed as a prohibited area by ADPH. Thus, no policy issues related to shellfish harvesting exist for this portion of Mobile Bay. [Map 6](#) on the following page shows the delisting area relative to ADEM’s *SH* waters and ADPH’s shellfish harvesting management areas.

Map 6: Shellfish Harvesting Waters & ADPH Areas



4.0 TECHNICAL BASIS FOR DELISTING

Following the listing in 2010, additional sampling was conducted 2010-2013 as part of ADEM's Surface Water Quality Monitoring Plan (SWQMP) and Beach Monitoring Program. The data continued to show that the near-shore zone regularly exceeded Alabama's bacteria criteria, while the open-water portion had no exceedances.

4.1 Water Quality Target Identification

As mentioned in [3.2 Water Quality Criteria](#), the water quality criteria for pathogens are numeric with quantifiable endpoints. State regulations dictate that *Enterococci* counts are to be used as the bacteria indicator for coastal waters (saltwater & estuaries). For waters with multiple use classifications, the most stringent criterion is applied. In this case, the *Swimming* use classification is the most stringent. Thus, in coastal *Swimming* waters, the single-sample *Enterococci* count cannot exceed 104 colonies per 100 ml. Likewise, the geometric mean cannot exceed 35 colonies per 100 ml.

4.2 Data Availability and Analysis

[Map 7](#) on the following page depicts the updated delisting area and the ADEM sampling stations located within its boundaries and [Table 5: Summary of Pathogen Data in Delisting Area](#) summarizes the most recent data for the area being delisted. Stations MB-7, MOBB-1, and DVBB-1 had no exceedances. DVBB-1 and MOBB-1 were sampled in 2011, 2012, and 2013. Historically, the far-shore, open-water stations have never showed any sign of pathogen impairment. MAY_DAY, the station which prompted the initial listing, is located in the near-shore TMDL zone for which a TMDL is scheduled to be completed in 2014.

Map 7: ADEM Stations in Delisting Area



Table 5: Summary of Pathogen Data in Delisting Area

Station	# of Samples	Exceedances	Exceedance Rate	Date of Data
DVBB-1	10	0	0%	2011, 2012, 2013
MOBB-1	9	0	0%	2011, 2012, 2013

5.0 CONCLUSIONS

Based on the assessment of all available water quality data for the northeast portion of Mobile Bay delisting area (AL03160205-0300-502), ADEM concludes that no water quality impairment exists. Accordingly, ADEM will not proceed with TMDL development for the segment of Mobile Bay described within this document due to “more recent or accurate data” which, in doing so, provides sufficient justification for delisting a waterbody consistent with Title 40 of the *Code of Federal Regulations* (CFR), [Part 130.7\(b\)\(6\)\(iv\)](#). As for the near-shore 1000-foot-wide impairment zone (AL03160205-0300-501), a separate TMDL analysis will be performed. The approach of dividing large open-water §303(d)-listed segments of Alabama’s coastal waters into near-shore and far-shore zones is consistent with previous USEPA-approved TMDL development ([Bon Secour Bay 2010](#), [Mobile Bay 2010](#)).

6.0 MONITORING SCHEDULE

ADEM uses a basin approach to water quality management that divides Alabama’s 14 major river basins into five groups. Each year, ADEM’s water quality monitoring resources are concentrated in one of the five basin groups. One goal of surface water quality sampling is continued monitoring of impaired. Monitoring will help further characterize practices and load reductions in impaired watershed and ensure that healthy watersheds are continuing to meet all applicable water quality standards. Monitoring will occur in each basin according to the schedule listed in [Table 6](#) below. In addition to scheduled basin rotation sampling, beach monitoring data is collected monthly every year and other stations that are part of trend monitoring or other sampling initiatives are often sampled more frequently than the basin rotation schedule. Station DVBB-1 and MOBB-1 are categorized as coastal assessment stations and are typically sampled several times annually.

Table 6: Basin Rotation Monitoring Schedule

River Basin Group	Year to be Monitored
Tennessee	2013
Chattahoochee / Chipola / Choctawhatchee / Perdido-Escambia	2014
Alabama / Coosa / Tallapoosa	2015
Escatawpa / Upper Tombigbee / Lower Tombigbee / Mobile	2016
Black Warrior / Cahaba	2017

7.0 PUBLIC PARTICIPATION

As part of the public participation process, this Delisting Decision (DD) will be placed on public notice and made available for review and comment. The public notice will be prepared and published in the major daily newspapers in Montgomery, Huntsville, Birmingham, and Mobile, as well as submitted to persons who have requested to be on ADEM's postal and electronic mailing distributions. In addition, the public notice and subject DD will be made available on ADEM's website: www.adem.state.al.us. The public can also request paper or electronic copies of the DD by contacting Mr. Chris Johnson at (334)271-7827 or cljohnson@adem.state.al.us. The public will be given an opportunity to review the DD and submit comments to the Department in writing. At the end of the public review period, all written comments received during the public notice period will become part of the administrative record. ADEM will consider all comments received by the public prior to final completion of this DD and subsequent submission to EPA Region 4 for final approval.

8.0 REFERENCES

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9.0 APPENDICES

9.1 Sampling Location Summary

9.2 Pathogen Data for Delisting Area

Table 7: Pathogen Data for Delisting Area

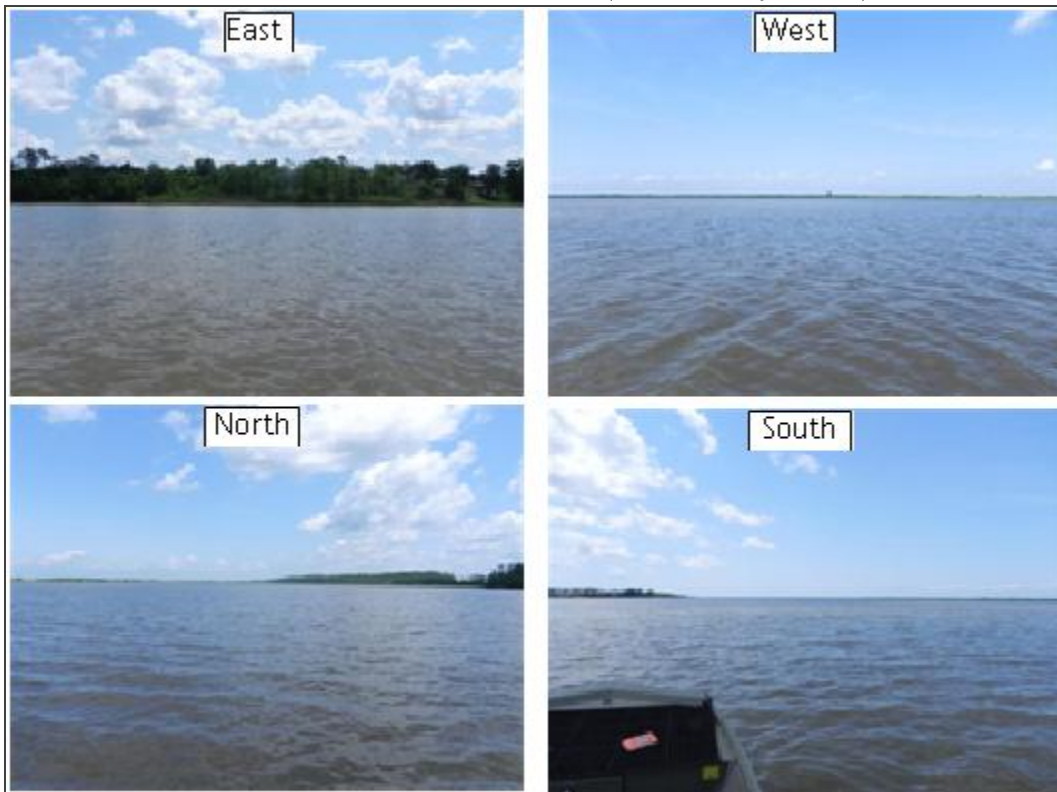
Station ID	Latitude	Longitude	Visit Date	Enterococcus (col/100ml)	
				Sampling Result	Single Sample WQ Criteria
DVBB-1	30.6453	-87.9179	4/10/2013	2	104
DVBB-1	30.6453	-87.9179	7/20/2011	4	104
DVBB-1	30.6453	-87.9179	7/19/2012	6	104
DVBB-1	30.6453	-87.9179	5/2/2011	10	104
DVBB-1	30.6453	-87.9179	5/7/2012	16	104
DVBB-1	30.6453	-87.9179	10/30/2012	16	104
DVBB-1	30.6453	-87.9179	6/24/2013	22	104
DVBB-1	30.6453	-87.9179	9/10/2012	32	104
DVBB-1	30.6453	-87.9179	9/12/2011	42	104
DVBB-1	30.6453	-87.9179	3/21/2011	68	104
MOBB-1	30.6276	-87.9548	5/2/2011	2	104
MOBB-1	30.6276	-87.9548	7/20/2011	2	104
MOBB-1	30.6276	-87.9548	5/7/2012	2	104
MOBB-1	30.6276	-87.9548	7/19/2012	2	104
MOBB-1	30.6276	-87.9548	10/30/2012	2	104
MOBB-1	30.6276	-87.9548	6/27/2013	2	104
MOBB-1	30.6276	-87.9548	9/12/2011	4	104
MOBB-1	30.6276	-87.9548	9/10/2012	6	104
MOBB-1	30.6276	-87.9548	3/21/2011	68	104

9.3 Sampling Station Pictures

Picture 1: May Day Park Beach, Daphne, AL



Picture 2: Station DVBB-1 (ADEM, May 2011)



Picture 3: Station MOBB-1 (ADEM, May 2011)

