

SURVEY OF COASTAL ALABAMA MARINAS: AN INVENTORY OF CURRENT BEST MANAGEMENT PRACTICES

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Disclaimers

The mention or depiction of trade names or facility names in this document is for illustrative purposes only and does not constitute an endorsement by the Alabama Department of Environmental Management, the Alabama Department of Conservation and Natural Resources, or the National Atmospheric and Oceanic Administration.

**Survey of Coastal Alabama Marinas :
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Acronyms & Abbreviations

ACAMP	Alabama's Coastal Area Management Program
ACNPPCP	Alabama Coastal Nonpoint Pollution Control Program
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AWW	Alabama Water Watch
B.E.A.C.H.	Beaches Environmental Assessment and Coastal Health Act
BMP	Best Management Practices
GIS	geographic information system
GPS	Global Positioning System
HUCs	Hydrological Unit Codes
MA	management Area
MB	Marina Basin
MMs	Management Measures
NOAA-OCRM	National Oceanic and Atmospheric Administration Office of Ocean and Coastal Resource Management
NPS	nonpoint source
NPDES	National Pollutant Elimination Discharge System
NRCS	Natural Resources Conservation Service
SAV	Submerged Aquatic Vegetation
SPCC	Spill Prevention Control and Countermeasure
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
WQ	Water Quality

SURVEY OF COASTAL ALABAMA MARINAS: AN INVENTORY OF CURRENT BEST MANAGEMENT PRACTICES

I. Introduction

The *Survey of Coastal Marinas: An Inventory of Current Best Management Practices* (*Marina BMP Survey*) seeks to identify **baseline** existing Best Management Practices (BMPs) data in coastal Marina facilities, within the Mobile and Baldwin County area, during the 2004-2006 summer/ fall boating seasons. The Alabama Coastal Nonpoint Pollution Control Program (ACNPCP) developed this project to identify, survey, and map marina and residential facilities that provide mooring for 10 or more vessels and/or provide water access, as a boat launch facility (also referred to as *Marina Site*). The types of Marina & Recreational Boating facilities identified include, marinas, residential docking facilities and boat ramps. All of these three facility-types were evaluated in each of the *Marina BMP Survey*'s designated subwatershed areas for the purposes of this *Marina BMP Study*.

Alabama's Coastal Area Management Program (ACAMP) provided funding from NOAA that allows the Alabama Department of Environmental Management (ADEM) to coordinate the implementation of projects such as this, which have been designed by the ADEM's ACNPCP staff to address Alabama's CZARA-§6217 Conditional Approval items and provide the foundational 5-Step Projects Template below, for the Alabama Coastal Nonpoint Pollution Control Program:

ACNPCP Projects Development Template

- *Step 1*-Develop baseline information through interagency data coordination and BMP Surveys. Also to develop technical assistance training workshops that will enhance regulatory and public awareness.
- *Step 2*-Develop Targeted Water Quality (WQ) or Monitoring Studies applicable to each Category.
- *Step 3*-Compile available Projects and permit information, developing databases and Geographic Information System (GIS) components that allow the analysis of Program-related data for specific land-use categories, each five years.
- *Step 4*-Use this info to develop "on the ground" implementation projects and/or engage in related Program education and outreach projects.
- *Step 5*-Develop post-implementation monitoring and WQ Studies to gauge or measure effectiveness of ACNPCP Projects and develop current Program needs.

This *Marina BMP Survey* project implements *Step 1* of the *Template* for this category and satisfies the 1998 Conditional Approval issues cited in the *Alabama Coastal Findings and Conditions* document under the *Marinas & Recreational Boating* section. It states that "Alabama will develop a strategy to implement and demonstrate credible survey tools" within the ACNPCP Management Area, which may track and document implementation of all Management Measures (MMs).

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II. Project Objectives

The objectives of the *Survey of Coastal Marinas: An Inventory of Current Best Management Practices* project were two-fold:

1. Develop a Marina Best Management Practices Survey (BMP Survey) inspection form that reflects the multi-agency informational needs relating to Marinas and Recreational Boating management measures as outlined by the *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, EPA 840-B-92-002 January 1993*, and other issues of interest to Alabama's Coastal Area Management Program, the *Alabama-Mississippi Clean Marina Program*, U.S. Coast Guard, and the Alabama Marine Police.
2. That through the implementation of this *Marina BMP Survey* the ACNPCP would collect a complete suite of current and accurate baseline Marina BMP implementation data within the available marina/recreational boating facilities or *Marina Sites* located within Alabama's CNPCP Management Area, in order to ascertain or field-truth which existing BMPs were in place and functioning within those *Marina Sites* during potentially high boating activity periods.

Overall this Marina BMP Survey project provides proof and documentation of Alabama's appropriate implementation of credible survey tools throughout the ACNPCP Management Area, relating to documenting the inventory of coastal Alabama Marinas and the tracking of current baseline Marina and Recreational Boating Management Measures in coastal Alabama.

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III. Project Methodology

The *Marina BMP Survey evaluation form* (see **Appendix A**) was developed as a coordinated interagency effort over a ten-month period. ADEM's ACNPCP staff spearheaded the design of the *Marina BMP Survey* form, including review and design input from ADEM-Coastal Section and Mobile Branch staff, ADCNR-Marine Police and Coastal Section staff, and local U.S. Coast Guard representatives. The Survey was primarily designed to evaluate the presence and/or absence of USEPA recommended management measures, as best management practices for Marinas and Recreational Boating Activities, within the Alabama CNPCP Management Area. This Survey also sought to evaluate these land-use activities to correlate their positional relationship to the surrounding area, as well as, assess incidental items of interest for the partner agencies relating to Marinas usage.

To complement this effort ADEM developed a *Marinas Survey Letter* (see **Appendix B**) for this project, which was designed to communicate and introduce the concept of the project to the local Marina owner/managers. This was distributed to all known Marina owners and presented onsite by project staff, at the time of the Survey evaluation. If a facility operator was not present, then the staff conducted the Survey and if possible, conversed with the boat-owner tenants to ascertain key information.

Preliminary duties to prepare for the actual initiation of the Marina Survey involved many activities; first there was acquisition of any available data concerning coastal Alabama Marinas. This included tabletop setup, computer information queries and site specific information assessment (e.g. County Revenue Commissions tax plats and owner information with aerial photography and topographic maps and some field reconnaissance). The major amount of *Marina Site* locations and contact information was acquired by this means, with the balance being documented onsite, along with the onsite request to Survey the *Marina Site* facilities.

The ADEM staff began to collect accurate baseline data for the identified *Marina Sites*, which included those known sites within each of the designated 8 digit subwatersheds. Many *Marina Sites* were added as the staff conducted the Survey and spoke with Marina owners, tenants, and recreational users. The ADEM staff conducted an inspection of the *Marina BMP Survey* for each *Marina Site* which comprised an assessment of the Marina's adjacent constructed area, parking areas, stormwater conveyances, and waters wherein the marina/recreational boating facility is located; including boat ramps, docking piers, boat slips, break waters, and bulkheading, etc. Also, it is interesting to note that *Section V.*, the *Habitat Assessment* section, of the *Marina BMP Survey* was developed to provide important additional information relating to evaluation of the *Marina Site's* landscape positioning and adjacency of other development/land-use areas.

Each *Marina Site* was photographed and its location determined with Global Positioning System (GPS) instrumentation. These GPS coordinates were used to place each *Marina Site* within the appropriate subwatershed drainage area. These *subwatersheds* are listed for this report (see **Appendix C**) and mapped in terms of the Natural Resources Conservation Service (NRCS) Hydrologic Unit Codes (HUCs), primarily with 8-digit descriptors and cross-referenced secondarily to the new NRCS 12-digit numeric HUC designations.

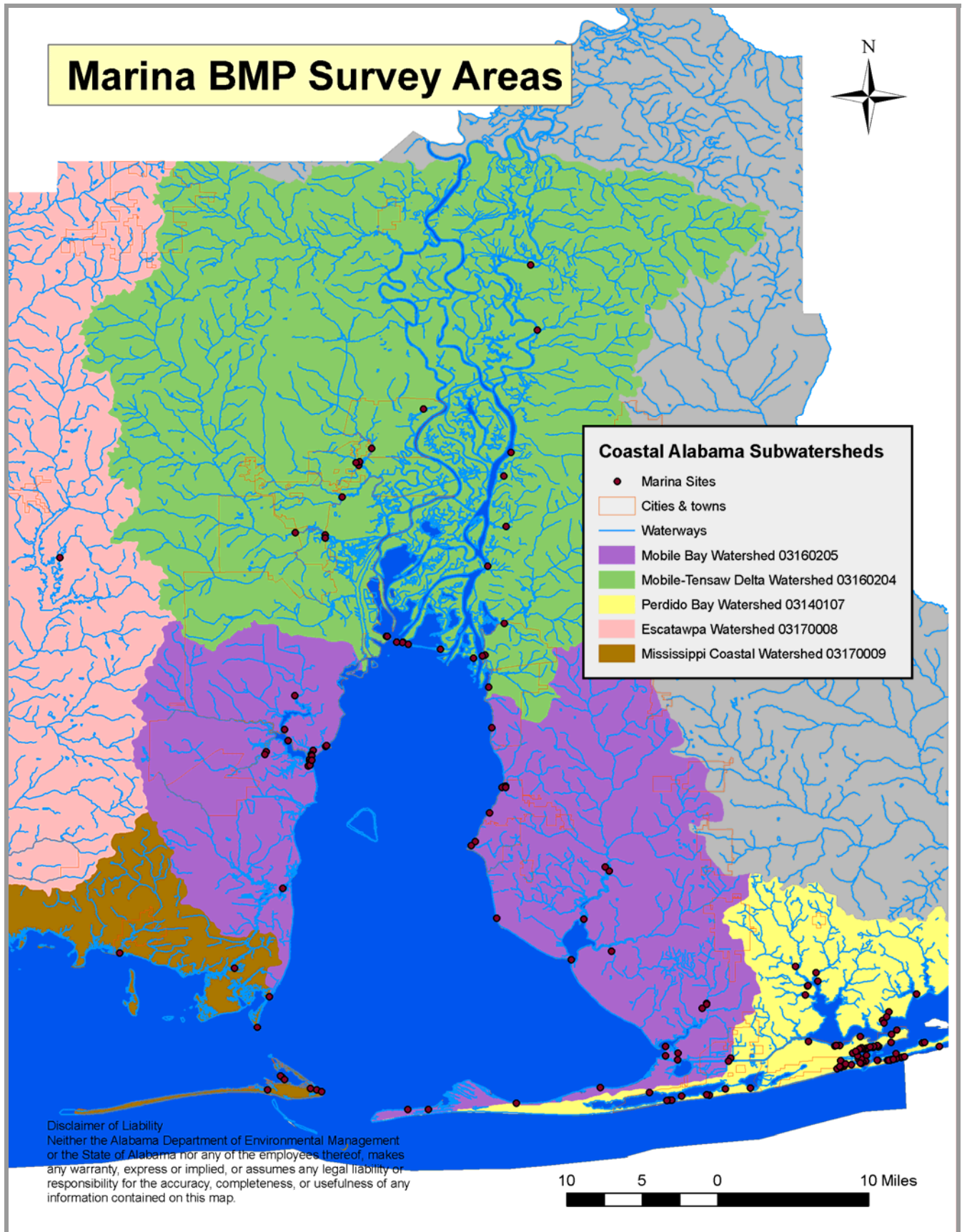
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IV. Management Measures for Marinas and Recreational Boating

The guidance formulating the Best Management Practices (BMPs) and related concepts that form the core for this project's *Marina BMP Survey* inspection form were referenced from EPA's *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, which provides the listing of **Marinas and Recreational Boating** management measures as follows:

1. Site and design marinas such that tides and/or currents will aid in flushing of the site or renew its water regularly.
2. Assess water quality as part of marina siting and design.
3. Site and design marinas to protect against adverse effects on shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, State, or Federal governments.
4. Where shoreline erosion is a nonpoint source pollution problem, shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other shorelines and offshore areas.
5. Implement effective runoff control strategies which include the use of pollution prevention activities and the proper design of hull maintenance areas.
6. Reduce the average annual loadings of total suspended solids (TSS) in runoff from hull maintenance areas by 80 percent. For the purposes of this measure, an 80 percent reduction of TSS is to be determined on an average annual basis.
7. Design fueling stations to allow for ease in cleanup of spills.
8. Install pumpout, dump station, and restroom facilities where needed at new and expanding marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.
9. Properly dispose of solid wastes produced by the operation, cleaning, maintenance, and repair of boats to limit entry of solid wastes to surface waters.
10. Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.
11. Provide and maintain appropriate storage, transfer, containment, and disposal facilities for liquid material, such as oil, harmful solvents, antifreeze, and paints, and encourage recycling of these materials.
12. Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.
13. For boats that are in the water, perform cleaning operations to minimize, to the extent practicable, the release to surface waters of: harmful cleaners and solvents and paint from in-water hull cleaning.
14. Public education / outreach / training programs should be instituted for boaters, as well as marina owners and operators, to prevent improper disposal of polluting material.
15. Ensure that sewage pumpout facilities are maintained in operational condition and encourage their use.
16. Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat. (applies to boating only).

Map I. Coastal Alabama Marina BMP Survey Areas



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V. Targeted Marina BMP Survey Areas (refer to Map I above)

The following Subwatersheds (see **Appendix D**) were targeted based upon the known presence of Marinas and boat ramp facilities within the ACNCP Management Area:

Perdido Bay –HUC 03140107 @ 313 sq. miles - refer to Map II

This subwatershed is located in the southeastern Baldwin County and encompasses subwatershed HUCs 031401070104 (Palmetto Creek), 031401070201 (Sandy Creek), 031401070202 (Milfin Creek), 031401070203 (Graham Bayou), 031401070204 (Hammock Creek), and 031401070205 (Little Lagoon). Waterbodies include Cotton Bayou, Ole River, Perdido Bay, Terry Cove, Wolf Bay, Wolf Creek, Milfin Creek, Owens Bayou, Graham Bayou, Bay La Launch, Bayou St. John, Stone Quarry Bayou, Palmetto Creek, Lake Shelby, and Ono Cove.

Mobile Bay -HUC 03160205 @ 883 sq. miles - refer to Map III

Mobile Bay Watershed encompasses subwatersheds with the following Hydrological Unit Codes (HUCs): 031602050104 (Bon Secour Bay), 031602050201 (Garrow's Bend- Mobile Bay), 031602050202 (Upper Dog River), 031602050204 (Lower Dog River), 031602050207 (Delchamp's Bayou), 031602050301 (Yancey Branch), 031602050302 (Fly Creek), 031602050303 (Gum Swamp), 031602050307 (Lower Fish River), 031602050308 (Magnolia River), 031602050310 (Bon Secour River), and 031602050311 (Oyster Bay). Waterbodies include Dog River, Rabbit Creek, Perch Creek, Weeks Bay, Fly Creek, Fish River, Noltie Creek, Intercoastal Waterway, Bon Secour River, Little Lagoon, Navy Cove, and Mobile Bay.

Escatawpa –HUC 03170008-90 @ 105 sq. miles - refer to Map III

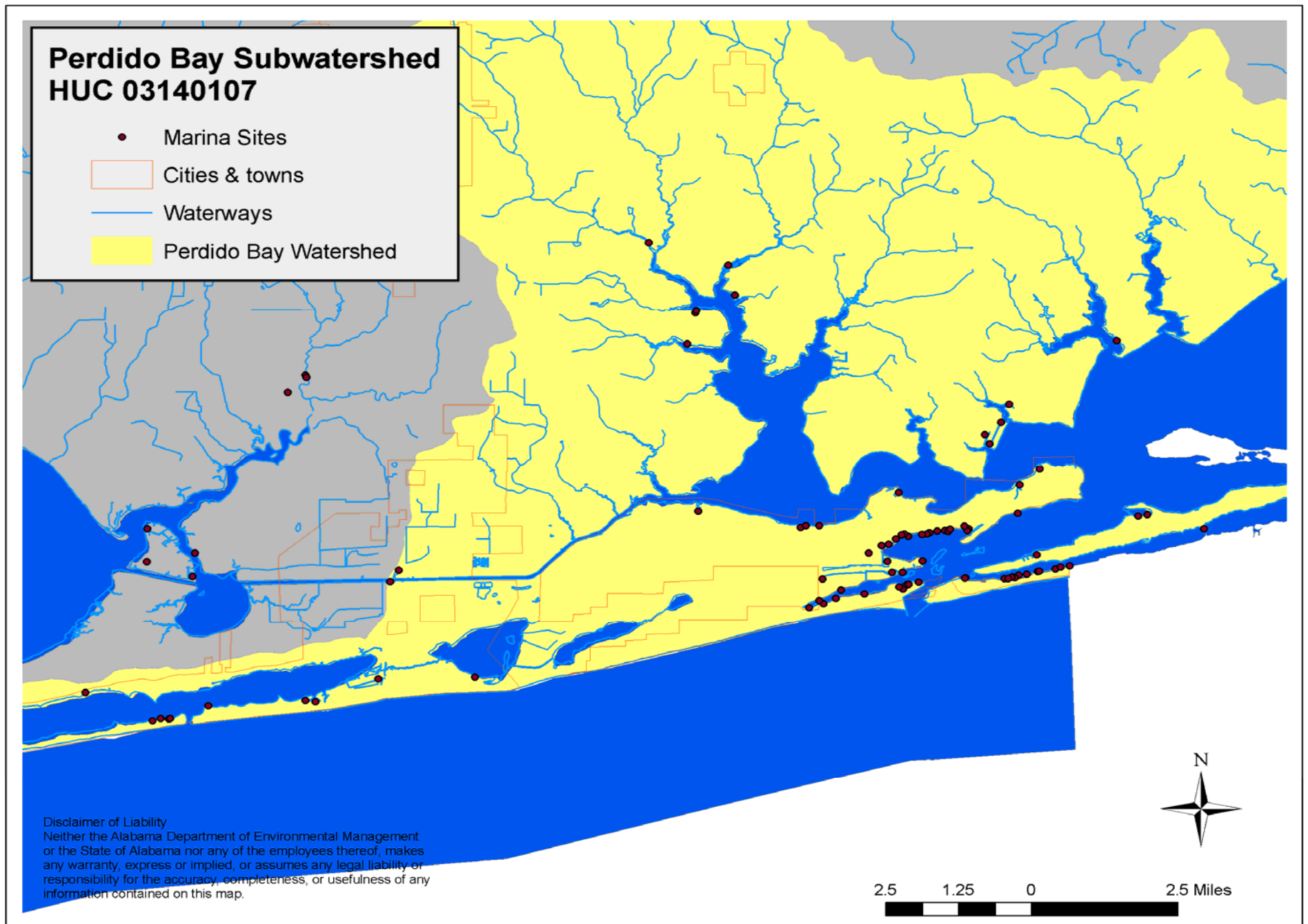
This subwatershed is located in west Mobile County on Big Creek Lake and encompasses subwatershed HUC 031700080402 (Big Creek Hamilton Creek).

Mobile Tensaw Delta -HUC 03160204 @ 972 sq. miles - refer to Map IV

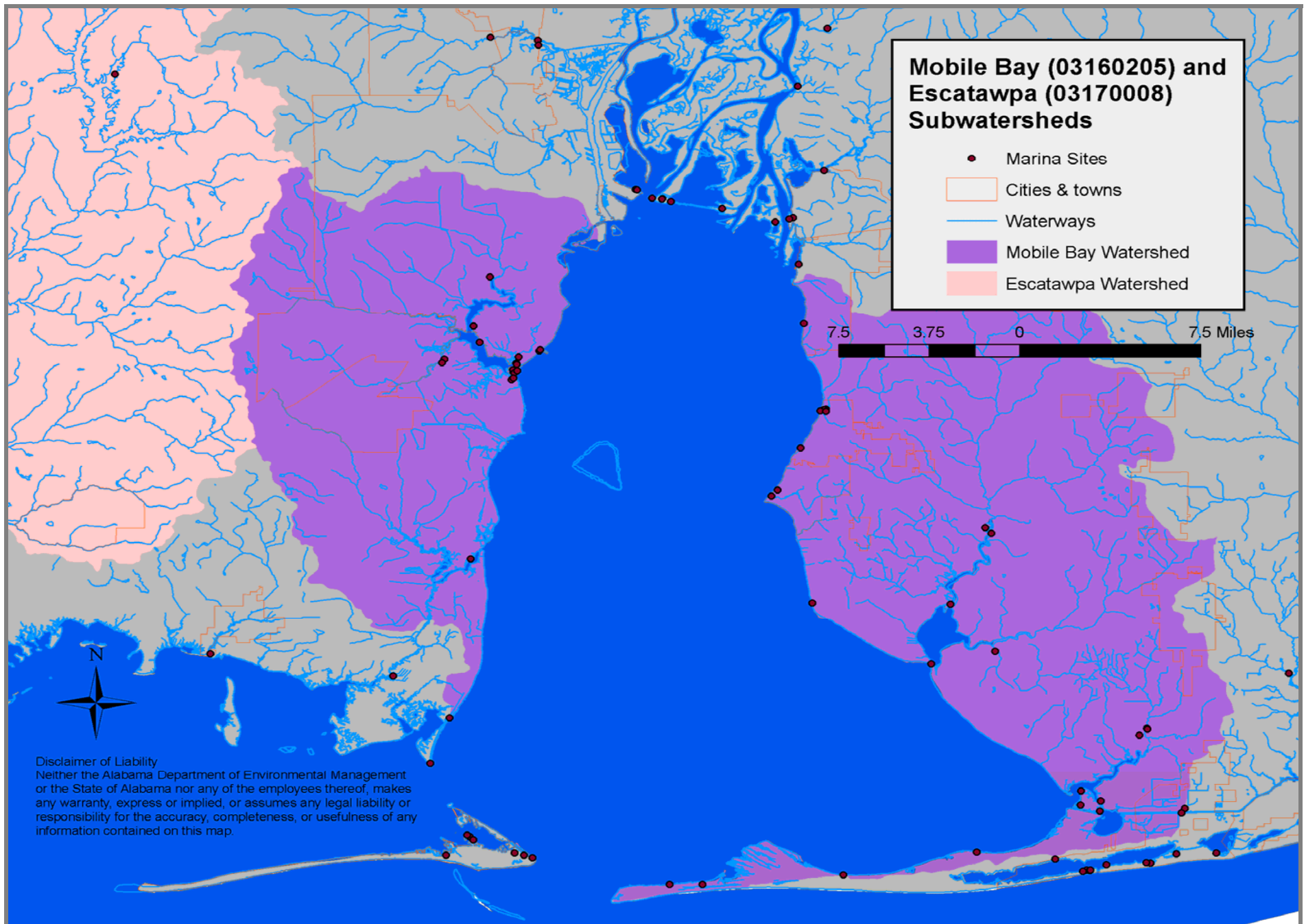
Sites located in the northeastern portions of Mobile County and the northwestern portions of Baldwin County, the Mobile-Tensaw Delta Watershed, encompasses subwatersheds with the following Hydrological Unit Codes (HUCs): 031602040105 (Big Chippewa Lake), 031602040201 (Miffin Lake), 031602040203 (The Basin), 031602040301 (Gunnison Creek), 031602040302 (Bayou Sara), 031602040303 (Grand Bay), 031602040404 (Lower Chasaw Creek), 031602040503 (Lower Bay Minette Creek), and 031602040505 (Tensaw River-Apalachee River). Waterbodies include Chickasaw Creek, Dead Lake, Gunnison Creek, Mobile River, Steele Creek, Bayou Sara, Tensaw River, Chacaloochee Bay, Bay Minette Creek, Blakely River, D'Olive Bay, Hurricane Creek, Shellbank River, and .

Mississippi Coastal -HUC 03170009 @ 231 sq. miles -refer to Map V

This subwatershed is located in southernmost Mobile County and encompasses 12 digit subwatershed HUCs 031700090103 (Grand Bay Swamp), 03170009020 2 (Dauphin Island), and 03160205010 (Mobile Bay). Waterbodies include Bayou Heron Canal, Bayou Aloe, Colony Cove, Dauphin Island Bay, Fort Gaines Pass, Mississippi Sound, Heron Bay, West Fowl River, Portersville Bay, and Mobile Bay.

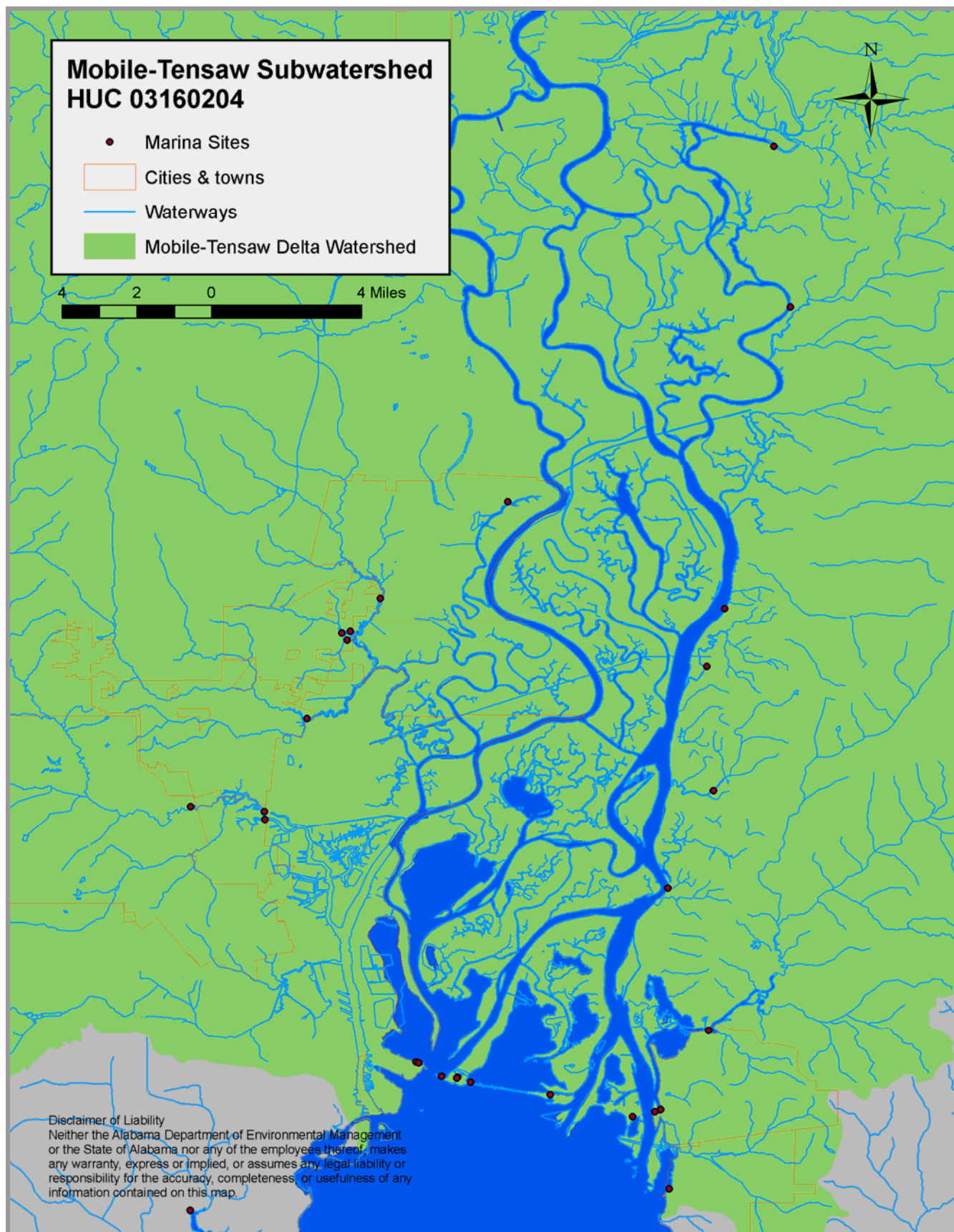


Map II. Perdido Bay Marina BMP Survey Sites

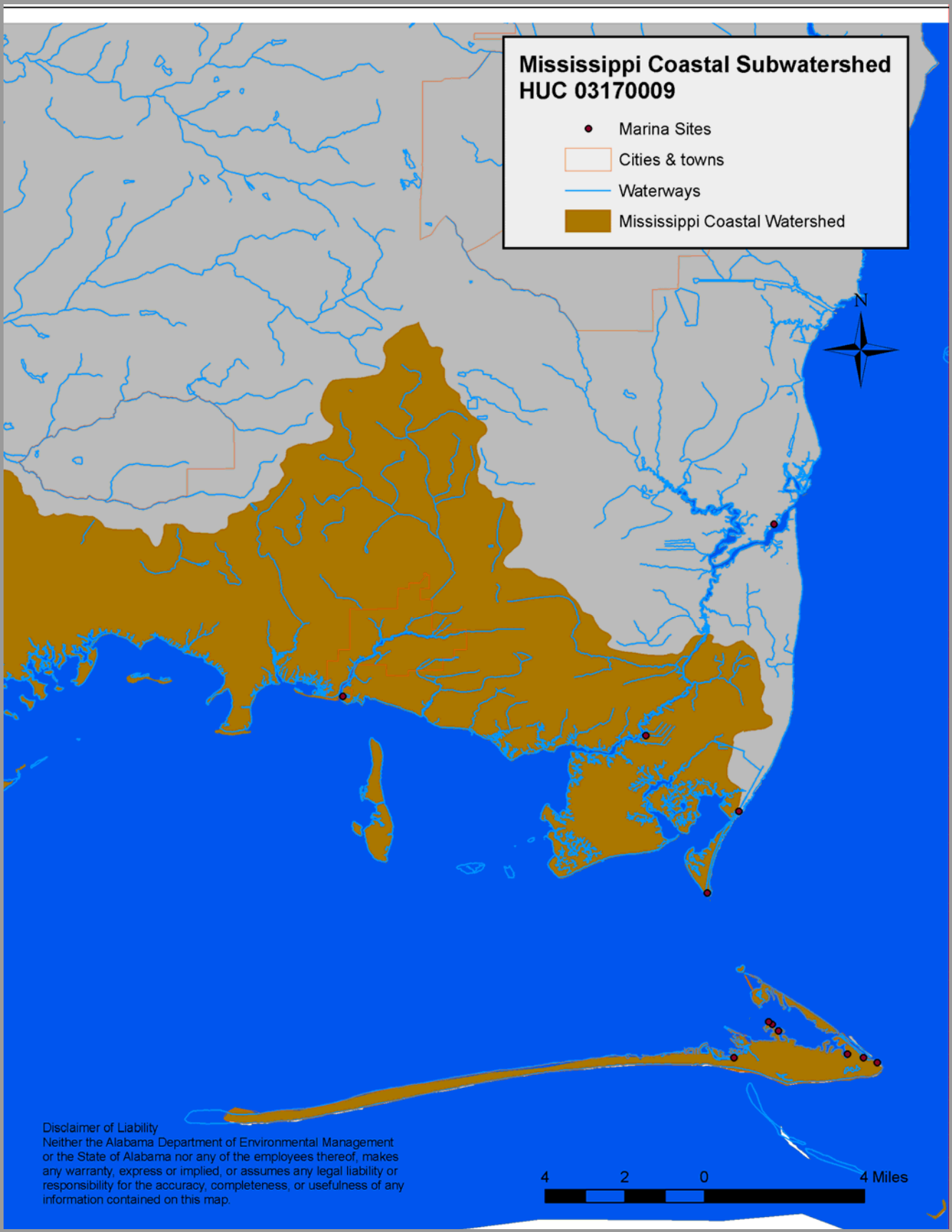


Map III. Mobile Bay and Escatawpa Marina BMP Survey Sites

Map IV. Mobile- Tensaw Delta Marina BMP Survey Sites



Map V. Mississippi Coastal Marina BMP Survey Sites



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VI. Marina BMP Survey Results

Each Survey Section in the *Marina BMP Survey* was developed to quantify and address the management measures put forth in the EPA's 1993 *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, as well as other pertinent Marina information for coastal Alabama. These *Marina BMP Surveys* were developed, recorded, and documented at **163 inspected Marina Sites** through the efforts of ADEM's Mobile Branch, including both the Environmental Assessment Section and Coastal Section staff members. These *Marina BMP Survey Results* and Summary scores were derived by calculating the mean of the Section percentile rankings with a score of 50 or greater, as adjusted for applicability to each site. This was calculated using the following process:

These data observations were recorded at each *Marina Site* using the *Marina BMP Survey Form* (see Appendix A). The manner in which the *Marina Sites* were evaluated differed based upon the type of facility (e.g. Recreational Marina vs. Boat Ramp). In order to compute scores in an equivalent manner, specific BMPs or Sections that were non-applicable were documented as "NA" on the Marina Survey form. The points for each section were then calculated against the total possible score of applicable BMPs for each *Marina Site*. This yielded a percentile based score from 0 to 100 for each BMP Section, creating a probability distribution. The mean of those percentile scores ranked at 50% or greater were calculated to provide the Overall score for each *Marina Site*, including each Section and Subwatershed.

Scoring Example for Section XI. Fish Waste: [Overall Point Range of -6 to +6]

T11 Score for Marina A:

(Marina with Fish Cleaning Station, with O&M Plan)

Section Score= (3-Yes @ +3 points & 3-No @ -3 points, with 0 NAs) = 0 points, within the a range of -6 to +6 = 50% = 50

T11 Score for Marina B:

(Marina with Fish Cleaning Station, without O&M Plan)

Section Score = (2-Yes @ +2 points & 3-No @ -3 points, with 1 NA) = -1 point, within a range of -5 to +5= 40%=40

T11 Score for Marina C:

(Marina without Fish Cleaning Station, without O&M Plan, with signage)

Section Score = (1-Yes @ +1 point & 4-No @ -4 points, with 1 NA) = -3 points within a range of -5 to +5 = 20%=20.

Since Marina A has the only passing score, ***which for the purposes of this Marina BMP Study has been determined to be a percentile score of 50 or greater per Section***, the Section T11% Score = $1/3 = .33 = 33\%$. This means that 33% of the marinas in this sample were documented to have suitable Fish Waste BMPs at a level of 50 percent or greater.

This method of data ranking and calculation was utilized for each Section and Subwatershed tabulated in this *Marina BMP Survey* in order to identify those *Marina Sites* that exhibited the presence of a majority of the surveyed BMPs. Overall percentage scores were also tabulated for all *Marina Sites* that achieved a compliance standard at or above 50 percent for the observed presence of these BMPs.

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Section I. Site Location and Contact Information

For purposes of this Report, the pertinent information collected for this Survey section has been displayed in the following Subwatershed Maps:

Map I	Marina BMP Survey Area,
Map II	Perdido Bay Marina BMP Sites -HUC 03140107
Map III	Mobile Bay Marina BMP Sites -HUC 03160205, including Escatawpa Site -HUC 03170008-90
Map IV	Mobile-Tensaw Marina BMP Sites -HUC 03160204,
Map V	Mississippi Coastal Marina BMP Sites -HUC 03170009.

All other information from this section has not been included, in order to provide non-disclosure as assured to the Survey participants of this project.

Section II. Marina Flushing

The second section of the *Marina BMP Survey* pertains to EPA Management Measures that address the **marina flushing** and **design** parameters. The *Marina Sites* surveyed in this Study were ranked and **82%** of these sites exhibited the presence of a majority of the surveyed BMPs related to **Marina Flushing** at a level of 50 percent or higher.

The photographs below depict a few of the local facilities that incorporated some of the practices to ensure proper flushing (e.g. alternative designs to protect interior basin Submerged Aquatic Vegetation (SAV) areas and Marina entrance attenuators that allow more marina basin flow.)



Slotted wave attenuator as protection for SAVs



Slotted wave attenuator at entrance of marina

Section III. Marina Dredge and Fill

For purposes of this Report, activities relating to this Survey section were not observed during this Study period, therefore scores for this section were not included.

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Section IV. Erosion Prevention

The fourth section of the *Marina BMP Survey* is specific to **Erosion Prevention** and applies to several MMs, such as items #3, #4, and #16 (see page 4). The *Marina Sites* surveyed in this Study were tabulated and only **18.4%** of these sites exhibited the presence of a majority of the surveyed BMPs related to **Erosion Prevention** at a level of 50 percent or higher.

The following pictures are examples of these BMPs documented at the surveyed *Marina Sites*, including local marinas, residential docking facilities, and boat ramps:



In-Basin Signage



In-Basin Signage



Shoreline Issues Signage



Shoreline Issues Signage

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In-Basin Signage- 'Idle Speed / No Wake'



Shoreline Issues Signage- 'Danger / Slow'



Example of Erosion Due to Undermined Bulkheading



Example of Erosion Due to Wave Energy



Restricted Boating Activities in Emergent Areas



Restricted Boating Activities in Emergent Areas



Boating activities need to be restricted in SAV and emergent areas adjacent to Marina Site

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Section V. Habitat Assessment

This section in the *Marina BMP Survey* applies to **Habitat Assessment** concepts found in MMs #3, #4, and #16. In this *Marina BMP Survey*, **54.6%** of these sites exhibited the presence of a majority of the surveyed BMPs related to **Habitat Assessment** at a score of 50 percent or higher. The *Habitat Assessment* section was developed to provide important additional information that describes and evaluates **the Marina Site's landscape positioning and adjacency to other development and /or land-use areas surrounding these marinas/recreational boating facilities**. This Section also includes BMPs that relate to shoreline stabilization and vegetation. The following pictures are examples of some of the BMPs that were documented at the surveyed *Marina Sites*.



Shoreline partially stabilized by vegetation



Minimal disturbance to riparian zone



Minimal disturbance to riparian zone



Emergent vegetation versus bulkheading and bordering with impervious surfaces.



Other shoreline stabilization techniques...



Interesting shoreline stabilization techniques with the use of roof shingles.

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This section of the Marina Survey also seeks to evaluate the adjacency of the predominant land uses that surround the *Marina Sites*, in order to provide a basic assessment of the Marina's position on the landscape. It may also serve to provide relative scores that express development pressures within each of the designated subwatersheds.



This aerial photograph illustrates the general position of this Marina complex, as it relates to Open Waters, Transportation Corridors, Undeveloped Marsh Areas and some Residential Areas at the top of this picture.

These Habitat Areas are evaluated by the type of Adjacent Marina Land Use that is in proximity to the *Marina Site* within a 500 foot radius. The photographs below provide some typical examples of these Habitat Area designations:

-Open Water and/ or Undeveloped Areas-



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-Open Water and/ or Undeveloped Areas-



-Agriculture/ Silviculture Areas-



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-Adjacent Transportation Corridors-



-Adjacent Residential Areas-



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Section VI. Water Quality Assessment

In the *Marina BMP Survey*, Sections III, IV & VI pertain to **water quality** standards and concepts, which were derived from several of the CNPCP management measures. Only **15.3%** of the *Marina Sites* in this *Marina BMP Study* exhibited the presence of a majority of the surveyed BMPs related to **Water Quality Assessment** at 50 percent or higher. Below is a picture of some of the local facilities that participate in the State's B.E.A.C.H. water quality sampling program that is conducted jointly by ADEM and the Alabama Department of Public Health (ADPH).



B.E.A.C.H. Water Quality Testing Site



B.E.A.C.H. Water Quality Testing Site

The following web address lists all the Beaches Environmental Assessment and Coastal Health Act (B.E.A.C.H.) Program sampling sites for adjacent *Marina Sites* and public swimming areas in coastal Alabama:

www.adem.state.al.us/FieldOps/Monitoring/BeachMonitoring.htm

The Alabama Water Watch (AWW) also has volunteers that provide water quality sampling locations at some of the *Marina Sites* and recreational facilities located within our ACNPCP Management Area. Please consult this website link for further AWW information, including *Marina Site* and volunteer sampling site listings:

<https://aww.auburn.edu>



County boat launch involved in AWW sampling



Local marina participates in AWW sampling

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Section VII. Stormwater Run-Off

This portion of the *Marina BMP Survey* pertains to **stormwater run-off** and what **stormwater run-off control strategies** are being implemented at the surveyed *Marina Sites*. Management Measures associated with this section are MMs #4, #5, #6, #9, and #11 (see Page 4). The *Marina BMP Survey* documented that **50.3%** of the *Marina Sites* exhibited the presence of a majority of the surveyed BMPs related to **Stormwater Run-Off** at a level of 50 percent or higher. It should be noted that ADEM Administrative Code Rule 335-8-x-.xx) makes various provisions concerning some of this Section's Management Measures, which were evaluated as baseline Marina BMPs (which may be attributable to Marina construction permitting processes). A few of the BMPs that relate to these Stormwater Run-Off concepts are depicted below:



Constructed wetland



Porous parking and grassed buffer



Vegetated Infiltration basin



Catch basin



Onsite Infiltration Trench



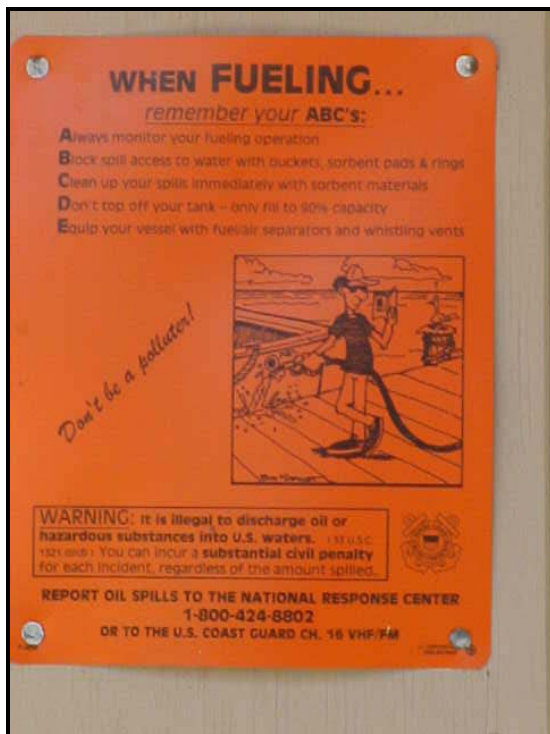
Typical Designated Boat Hull Maintenance Area

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Section VIII. Fuel Station Design

The Management Measures that relate to this section are listed specifically in MMs #3 and #7 (see page 4). It is important to note that of all the *Marina Sites* surveyed, **only 11% contain Fuel Station facilities**. The *Marina BMP Survey* further documented that of those *Marina Sites* with fuel facilities, **55% exhibited the presence of a majority of the surveyed BMPs** related to **Fuel Station Design** at a level of 50 percent or higher.

It should be noted that ADEM Administrative Code Rule 335-8-2-.04 (c) makes provisions for the requirement of Spill Prevention Control and Countermeasure (SPCC) Plans, concerning Marina construction sites in coastal Alabama, which include many of this Section's Management Measures that were evaluated as Marina BMPs. Onsite photographs that relate to **Fuel Station Design** BMPs and concepts are documented below:



Promotion of fuel separators signage



Station location so that spills can be limited to a contained area



Local marina with emergency shut off button



Maintain & recycle oil absorbing materials

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Section IX. Sewage Facility

This portion of the *Marina BMP Survey* pertains to **sewage facilities** that were observed onsite to evaluate the current **Sewage Facility BMPs** that have been implemented within these coastal *Marina Sites*. The specific Management Measures associated with this section are #8, #14 and #15 (see Page 4). **The *Marina BMP Survey* documented that 21.5% of the *Marina Sites* exhibited the presence of a majority of the surveyed BMPs, related to the Sewage Facility Section at a level of 50 percent or higher.** A few of the BMPs that relate to these Sewage Facility concepts are depicted below:



Vessel Pump Out Station



Dockside Vessel Pump Out Station



Portable Pump Out Installed in Marina Vessel.



Portable Sewage Pump Out

Survey of Coastal Alabama Marinas : An Inventory of Current Best Management Practices

Section X. Solid Waste

This section in the *Marina BMP Survey* applies to **Solid Waste BMP** concepts found in MMs #9 and #14 (see page 4). The *Marina BMP Study* documented that **22.7%** of these sites exhibited the presence of a majority of the surveyed BMPs related to the **Solid Waste Section** at a score of 50 percent or higher. These photographs illustrate some examples of these BMPs:



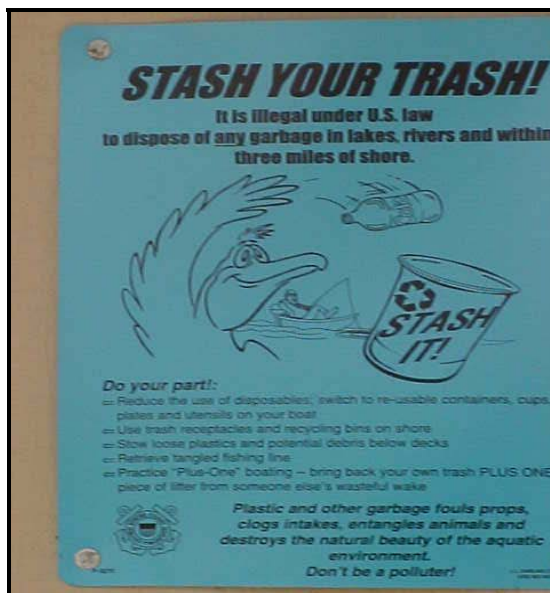
Solid Waste Signage-AL Boaters Pledge Program



Solid Waste Recycling Containers



Spray Booths Help Contain Pollutants and Debris



Solid Waste Signage



Covered Dumpsters for Solid Waste



Fishing Line Disposal

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Section XI. Fish Waste

The Management Measures that relate to this **Fish Waste** section are listed specifically in MMs #10 and #14 (see page 4). The *Marina BMP Survey* documented that of those *Marina Sites* with **Fish Waste** facilities; only **11.65% exhibited the presence of a majority of the surveyed BMPs** related to **Fish Waste** facilities at a level of 50 percent or higher. A few of the BMPs that relate to these **Fish Waste** concepts are depicted below:



Signage for designated cleaning station



Rules governing fish cleaning operations



General Rules, including fish cleaning operations.



Proper fish cleaning station, but lacks signage.



Rules governing fish cleaning operations.



Needs signage and proper disposal of fish waste.

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Section XII. Liquid Materials

This portion of the *Marina BMP Survey* pertains to observed **Liquid Materials BMPs** that were tabulated to evaluate the current Liquid Materials MMs that have been implemented within these coastal *Marina Sites*. The Management Measures associated with this section are #11, #12, #13, and #14 (see Page 4).

The *Marina BMP Survey* documented that **33.0%** of the *Marina Sites* exhibited the presence of a majority of the surveyed BMPs related to the **Liquid Materials** Section at a level of 50 percent or higher. A few of the BMPs that relate to these **Liquid Materials** pollution prevention concepts are depicted below:



Barriers in place around liquid storage area



Needs labeling & signage for disposal of liquid waste



Barriers in place around liquid storage area



Containers with Proper labeling for disposal of liquid waste.

Section XIII. Comments

For the purposes of this summary Report, this Survey section collected information that was miscellaneous in nature and not directly applicable to the baseline tabulation. Some of these items were treated as potential outlier information to be included, if possible, in any future statistical analysis of this Project data.

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VII. Summary of Survey Results

A. Overall Conclusions

The Overall BMP data gathered for this Marina Survey is presented in **Table 1** below. The data is presented as ranked by percentage per Survey Section and also grouped by designated 8-digit HUC subwatersheds.

Table 1. Overall Ranking of *Marina Sites*
(Based Upon the Presence of Survey BMPs at 50% or More).

<u>BMP Section</u>	<u>Overall Ranked Total %</u>	<u>Perdido Bay HUC</u> [83]	<u>Mobile Tensaw Delta HUC</u> [27]	<u>Mobile Bay-Escatawpa HUC</u> [45]	<u>Mississippi Coastal HUC</u> [8]	<u>Total Of 50%+ Sites</u> [163]
<u>Marina Flushing</u>	82.0	73	26	27	8	134
<u>*Fuel Station</u>	55.0	7/7	0/3	2/7	1/1	10/18
<u>Habitat Assessment</u>	54.6	31	23	31	4	89
<u>Stormwater Run-Off</u>	50.3	40	18	19	5	82
<u>Liquid Materials</u>	33.0	33	3	14	4	54
<u>Solid Waste</u>	22.7	14	8	13	2	37
<u>Sewage Facilities</u>	21.5	16	5	12	2	35
<u>Erosion Prevention</u>	18.4	17	7	5	1	30
<u>Water Quality Assessment</u>	15.3	11	3	10	1	25
<u>Fish Waste BMPs</u>	11.6	9	2	6	2	19

* Fuel stations are present in only 11 % of the surveyed *Marina Sites*, therefore only those sites were graded for BMP compliance. [] indicate the number of *Marina Sites* surveyed in each HUC.

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The overall data tabulated from this *Marina BMP Survey* indicates that those management measures, which have already been encompassed within the regulatory process, as an artifact of established Marina construction and the National Pollutant Discharge Elimination System (NPDES) permitting activities, have resulted in their general implementation. As a result, the following BMP Sections in the *Marina BMP Survey* had the highest rankings (all at 50% or greater), which are listed in the following order:

- 1. Marina Flushing**
- 2. Fuel Station Design**
- 3. Habitat Assessment**
- 4. Stormwater Run-Off**

These four BMP Sections yielded survey scores indicating that 50 percent or more of these BMPs were present *in situ* for each Section.

However, it should be noted that these Sections comprise only 4 out of 10 of the tabulated *Marina BMP Survey* Sections for this assessment. **In fact, the ranked total score percentiles for this *Marina BMP Survey* yielded only eighteen (18) of the 163 *Marina Sites* having overall totaled score rankings at 50% or higher. This group comprises only 11% of the *Marina Sites* surveyed for this project (See Appendix E).**

B. Comparisons of 8-digit Hydrologic Unit Codes (HUCs)

In an effort to properly address the results of the *Marina BMP Survey* in terms of subwatersheds (see **Appendix D**) the following 8-digit HUCs were designated for the purpose of this project:

1. Perdido Bay HUC

A general description of this subwatershed is found on page 6, with a map of the surveyed *Marina Sites* presented on Map II. **83 *Marina Sites*** were surveyed in this subwatershed, which yields the highest marina density for Coastal Alabama at **26.5 marinas per 100 square miles**. The four lowest ranked Sections in this subwatershed for the Marina Survey were the following:

- 1) Fish Waste BMPs at ~11%
- 2) Water Quality Assessment at 13.2%
- 3) Solid Waste at 16.8%
- 4) Sewage Facilities at ~19%

This subwatershed yielded the lowest Habitat Assessment ranking at 37%

Two of the best Survey Sections, Fuel Station Design and Marina Flushing and Habitat Assessment were surveyed at 100% and ~88% respectively.

2. Mobile Bay-Escatawpa HUCs

These subwatersheds are described on page 6, with a map of the surveyed *Marina Sites* presented on Map III. **45 *Marina Sites*** were surveyed in these subwatersheds. The Mobile Bay subwatershed yields the second highest marina density for Coastal Alabama at **4.9 marinas per 100 square miles**. The three lowest ranked Sections in these subwatersheds for the Marina Survey were the following:

- 1) Erosion Prevention at 4.4%
- 2) Fish Waste BMPs at ~13%
- 3) Sewage Facilities at ~26%

Two of the best Survey Sections, Habitat Assessment and Marina Flushing were surveyed at 69% and 60% respectively.

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3.Mobile Tensaw Delta HUC

This subwatershed is described on page 6, with a map of the surveyed *Marina Sites* presented on Map IV. **27 Marina Sites** were surveyed in this subwatershed, which yields the lowest marina density for Coastal Alabama at **2.8 marinas per 100 square miles**. The five lowest ranked Sections in this subwatershed for the Marina Survey were the following:

- 1) Fuel Station Design at 0%
- 2) Fish Waste BMPs at 7.4%
- 3) Water Quality and Liquid Materials at ~11%
- 4) Sewage Facilities at 18.5%

Two of the best Survey Sections, Marina Flushing and Habitat Assessment were surveyed at 96% and 85% respectively.

4.Mississippi Coastal HUC

This subwatershed is described on page 6, with a map of the surveyed *Marina Sites* presented on Map V. **8 Marina Sites** were surveyed in this subwatershed, which yields the second lowest marina density for Coastal Alabama at **3.4 marinas per 100 square miles**. The five lowest ranked Sections in this subwatershed for the Marina Survey were the following:

1. Erosion Prevention and Water Quality Assessment, both at ~12%
2. Sewage Facilities, Solid Waste, and Fish Waste; all at ~25%

Two of the best Survey Sections, Marina Flushing and Fuel Station Design were both surveyed at 100%.

C. Survey Recommendations

One of the implied objectives within any resource survey is to develop recommendations based upon the project data gathered, in order to provide research-based program and project guidance for future targeting and development.

The overall results of this *Marina BMP Survey* yielded observations concerning Water Quality Monitoring and Enforcement issues. Based upon the positive rankings tabulated for the four items that yielded *overall* percentiles at or above 50% (i.e. Marina Flushing, Fuel Station Design, Habitat Assessment, Stormwater Run-Off); the balance of the results from the *Marina BMP Survey* seem to indicate that if the State, County, Municipal or local regulatory entities were to promulgate more specific resource-management guidelines relative to the BMPs surveyed in this project, then the potential for associated land-use water quality impacts might be substantially reduced through the further implementation of many of these basic Marinas and Recreational Boating Best Management Practices.

The key area for recommendations concerning this *Marina BMP Survey* focus directly toward to potential Education and Outreach project development and implementation issues, the *Marina BMP Survey* seems to highlight some important BMP sections and subwatersheds that could benefit from targeted efforts to address the items in following order of suggested prioritization:

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- 1. Fish Waste BMPS**
- 2. Water Quality Assessment**
- 3. Erosion Prevention**
- 4. Sewage Facilities and BMPs**
- 5. Solid Waste BMPs**
- 6. Liquid Materials BMPs**

Future ADEM ACNPCP Projects and Studies should incorporate better statistical analysis that consider the appropriate weighting of these identified priorities, as calibrated across the distribution of *in situ* conditions.

In conclusion, the funding and implementation of these recommendations as tangible future projects should serve to build upon the projects and goals set forth by the coastal resource management agencies, while working with local entities to build consensus, in order to effectively manage and conserve coastal resources that will provide for the continued improvement of Alabama's coastal waters.



Appendix A



Alabama Coastal Non-Point Pollution Control Program Coastal Marina Survey Report

I.

Marina Information				
Owner Name	Marina Name		Date	
Address	City	State	ZipCode	
Phone	County	15 Digit HUC		
Sub Watershed Name	GPS Decimal Latitude (decimal degrees)	GPS Decimal Longitude (decimal degrees)		
Marina site land acreage:	Survey Date/Time	Evaluation Complete Date		
Marina Manager Name:	<input type="checkbox"/> Samples Taken	<input type="checkbox"/> Photos Taken		
Years in Operation:	Permit Information:			
Quantity of Boat Slips: Wet _____ Dry Storage Count _____				
Does Marina Possess a Marina Operation & Maintenance Plan <input type="checkbox"/> Yes <input type="checkbox"/> No				
Site Contact :		Phone:		

Marina in use? <input type="checkbox"/> Yes <input type="checkbox"/> No	If No <input type="checkbox"/> Proposed <input type="checkbox"/> Defunct	if Defunct only answer sections II. , IV. , and V, & VII.
Survey Type: <input type="checkbox"/> Baseline <input type="checkbox"/> Complaint <input type="checkbox"/> Follow-up		
Previous Date: _____		

II.

Marina Flushing (*)					
Yes	No	NA	Yes	No	NA
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Marina Flushes Properly		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Open Marina Basin Design		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Artificial Water Circulating Device		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Design Promotes Basin Circulation		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Permeable or Slotted Wave Attenuator		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bulkhead/Breakwater		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Multiple Entrances to Promote Flushing		
			Marina Type: _____ (ie; open, slotted, key hole/river, bay)		

Dredging: (*)									
<input type="checkbox"/> Hydraulic			<input type="checkbox"/> Mechanical			<input type="checkbox"/> Not Applicable			
Yes	No	NA							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Spoil/Disposal Site BMPs	Yes	No	NA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Weir Box	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated Dikes		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Turbidity Curtain in Place		

Erosion Prevention (*)				
Yes	No	NA	Yes	No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No-Wake Zones (Approaching Marina Basin)			Erosion Not Visible	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If no, then choose one below:	
Signage Related to Shoreline Issues for Boaters (Idle Speed in Basin, etc)			Minimum Erosion present < 5% (No visible plume, compromised bulkheading)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active Erosion > 5% (Plume visible & bedload visible)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Restricted Boating Activities In SAV/Emergent Areas	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wave Barriers to Protect In-basin Shoreline Vegetation	
			Comment: _____	

Habitat Assessment (*)		
Yes	No	NA
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimal Disturbance to Adjacent SAV's		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimal Disturbance to Riparian Zone		
		<u> % </u>
<input type="checkbox"/>	<input type="checkbox"/>	<u> </u> Shoreline Stabilized by Vegetation
<input type="checkbox"/>	<input type="checkbox"/>	<u> </u> Shoreline Stabilization Mixed –Veg w/ underwater Structure
<input type="checkbox"/>	<input type="checkbox"/>	<u> </u> Shoreline Structurally Stabilized --type: _____
<u> </u> Ratio of Vegetation to Impervious Surface (0 to 3)		
Adjacent Marina Land Use[within 500ft radius from waterfront center of marina]:		
<input type="checkbox"/>	(1)Commercial	<input type="checkbox"/>
<input type="checkbox"/>	(2)Undeveloped	<input type="checkbox"/>
<input type="checkbox"/>	(3)Recreational	<input type="checkbox"/>
<input type="checkbox"/>	(4)Transportation/Utility	<input type="checkbox"/>
	Corridor	(5)Residential-SFLD-SFHD- MF(select one)
		(6)Agriculture/Silviculture
		(7)Industrial
		(8)AFO/CAFO
		Other: _____
Characterize Surrounding Marina Habitat: _____		
(Choose landuse codes from list above; Choose as many as apply & percentage of use)		
North _____		
South _____		
East _____		
West _____		

VI.**Water Quality Assessment (*)**

Yes No NA	Yes No NA
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Water Quality Monitoring	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Data Available (Freq. _____)
___ Marina Operator	
___ Agency	
___ Other	
Comment: _____	

VII.**StormWater Run Off (*)**☐ Not Applicable

NPDES Permit	<input type="checkbox"/> Yes <input type="checkbox"/> No	Permit #
Yes No NA	Yes No NA	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Boat Hull Maint. Areas Designed to Minimize Contaminate Runoff	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Chemical & Filtration Treatment Systems	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Implement Source Control Practices	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Grassed Swale	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Constructed Sand Filter	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Oil-Grit Separators	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Wet Pond/Constructed Wetland	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Holding Tanks	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Adsorbents in Drainage areas	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Swirl Concentrator	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Infiltration Basin/Trench	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Catch Basin	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Vegetated Filter Strip	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Catch Basin w/ Sand Filter	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Porous Pavement: Type _____	Comment: _____	

VIII.**Fuel Station Design (*)**☐ Above Ground ☐ Below Ground☐ Not Applicable

Yes No NA	Yes No NA
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Station Located so that Spills can be Limited in a Contained Area	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Possess a Spill Contingency Plan
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Automatic Shut off Nozzles/ Emergency Shut off Valve	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Promote use of Fuel/Air Separators on Tank Stems of Inboard Tanks
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Promote the Use of Oil Absorbing Materials in the Bilge Areas	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Maintain & Recycle Oil Absorbing Materials	Other: _____

IX.**Sewage Facility (*)**☐ Not Applicable

Yes No NA	Yes No NA
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Restroom Facilities Plumbed to Approved Sewage System	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> RV Dump Station
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Vessel Pump Out Station	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Signage for Facilities
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Inspect Pump out Stations Regularly (Freq. _____)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Maintenance Plan for Pump-out Performed by a Contractor
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Mandate use of Pump out Stations In Lease Agreement	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Marina promotes Dye Tablets in Vessel Holding Tanks to Discourage Illegal Disposal
Comment: _____	

X.

Solid Waste (*)						<input type="checkbox"/> Not Applicable	
Yes	No	NA		Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Marina Discourages Maintenance Below Waterline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clean Maint./Parking Area Regularly (Freq. _____)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Designate Repair & Maintenance Areas on Shore	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Provide Recycling of Material
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Provide Covered Dumpsters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Prohibit In-the-Water Hull Scraping (Lease or Signage)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Promote Phosphate-free & Biodegradable Detergents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Perform Abrasive Blasting within Spray Booths or Plastic Tarp Enclosures
Comment: _____							

XI.

Fish Waste (*)						<input type="checkbox"/> Not Applicable	
Yes	No	NA		Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Designated fish cleaning stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Designated fish cleaning stations Per O&M Plan
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Proper Disposal of Solid Fish Waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Proper Disposal of Fish Liquid Waste (Washwater, Offal, etc.)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Implement Recycling of Fish Waste (Composting or Freezing chum)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Signage for Boaters regarding use & location of Fish Cleaning Station
Comment: _____							

XII.

Liquid Materials (*)						<input type="checkbox"/> Not Applicable	
Yes	No	NA		Yes	No	NA	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SPCC Plan Available On-site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Separate Containers for the Disposal of Liquid Wastes
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Barriers Around Liquid Storage Areas To Prevent Spills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Signage for Disposal of Liquid Waste
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Impervious Surface in Storage Area To Contain Spills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Comment: _____							

Observations/Comments:

Preparer Signature	Printed Name	ADEM
Review Signature	Printed Name	Date

Appendix B



Alabama Coastal Non-Point Pollution Control Program

Marina Survey Request

To Coastal Alabama Marina Owners:

We are conducting a base-line survey to assess local marina needs. This information will be useful in managing resources, requesting financial assistance and acquiring federal grants in the future for the Coastal Alabama Area. We thank you for providing the requested information in order that we may promote a voluntary Clean Marina Program and reflect the status of Marinas for Coastal Alabama.

We appreciate your participation in the Coastal Alabama Marina Survey. If you have any questions concerning the survey, please call:

Heather Krantz
ADEM Mobile Branch
2204 Perimeter Road
Mobile, AL 36615
251-450-3409

Appendix C

Overall % score	8-Digit- HUC	12-Digit-HUC	Sub-watershed- Name	ADEM-ID- #	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10- % score	T11- % score	T12- % score
70.53	03160204	031602040203	The Basin	MBPM167	50	55.56	68.5	100	71.4	50	71.43	83.33	80	75
64.44	03160205	031602050204	Lower Dog River	MBMP009	50	33.33	55.5	0	55.6	60	100	100	90	100
63.03	03140107	031401070204	Hammock Creek	MBMP069	50	100	43.6	0	26.7	80	66.67	83.33	100	80
61.89	03140107	031401070204	Hammock Creek	MBMP131	100	63.64	45.5	0	100	83.3	57.14	64.29	25	80
60.15	03170009	031700090202	Dauphin Island	MBMP006	60	44.44	65.5	0	75	100	71.43	85.17	20	80
57.79	03160205	031602050204	Lower Dog River	MBMP060	75	27.27	67.3	100	100	50	33.33	100	25	0
53.64	03170009	031700090202	Dauphin Island	MBMP011	75	42.86	43.5	100	100	50	0	25	100	0
52.78	03160205	031602050311	Oyster Bay	MBMP154*	100	27.27	50.5	50	50	50	50	50	50	50
52.54	03170008	031700080402	Big Creek Hamilton Creek	MBMP024	100	42.86	82.5	100	33.3	50	50	66.67	0	0
52.51	03160204	031602040505	Tensaw River- Apalachee River	MBMP057	100	63.64	38.6	100	42.9	0	80	66.67	0	33.33
52.38	03170009	031700090202	Dauphin Island	MBMP010	100	45.45	70	0	66.7	50	66.67	25	100	0
52.14	03160205	031602050302	Fly Creek	MBMP027	40	11.11	45.5	100	26.7	100	66.67	71.43	0	60
51.95	03140107	031401070204	Hammock Creek	MBMP051	100	27.27	58.9	100	66.7	50	50	66.67	0	0
51.72	03140107	031401070204	Hammock Creek	MBMP052	33.3	0	57.2	100	100	50	66.67	50	0	60
51.69	03140107	031401070204	Hammock Creek	MBMP133*	33.3	28.57	55	50	100	50	50	50	50	50
51.46	03140107	031401070204	Hammock Creek	MBMP123	60	88.89	39.1	0	16.7	50	83.33	33.33	83.33	60
50.34	03140107	031401070204	Hammock Creek	MBMP147*	100	42.86	60.6	50	0	50	50	50	50	50
50.05	03160205	031602050307	Lower Fish River	MBMP021	33	45.45	72	0	75	50	25	50	100	50
49.86	03140107	031401070202	Milfin Creek	MBMP075	75	27.27	48	100	66.7	50	40	66.67	25	0
47.23	03140107	031401070204	Hammock Creek	MBMP158*	0	27.27	45	50	100	50	50	50	50	50
47.17	03160204	031602040301	Gunnison Creek	MBMP004	50	77.78	87.3	0	100	50	66.67	40	0	0
47.04	03160205	031602050202	Upper Dog River	MBMP166	100	80	47.5	100	42.9	50	50	0	0	0
45.90	03160205	031602050204	Lower Dog River	MBMP020	40	27.27	48.4	100	33.3	50	60	50	0	50
45.42	03140107	031401070204	Hammock Creek	MBMP115*	50	18.18	46	50	40	50	50	50	50	50
45.37	03140107	031401070204	Hammock Creek	MBMP093	0	42.86	42.5	0	100	60	66.67	66.67	0	75
45.35	03160205	031602050204	Lower Dog River	MBMP013	50	57.14	35.5	0	50	50	33.33	87.5	40	50
45.30	03140107	031401070204	Hammock Creek	MBMP096	80	45.45	77.5	0	50	50	100	50	0	0
44.97	03140107	031401070203	Graham Bayou	MBMP103	100	45.45	59.3	100	50	50	20	25	0	0

Overall % score	8-Digit- HUC	12-Digit-HUC	Sub-watershed- Name	ADEM-ID- #	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10- % score	T11- % score	T12- % score
44.42	03160204	031602040302	Bayou Sara	MBMP065	75	55.56	63.6	0	100	50	66.67	33.33	0	0
43.99	03160205	031602050310	Bon Secour River	MBMP032	80	27.27	74.3	0	100	50	25	33.33	0	50
43.66	03160205	031602050311	Oyster Bay	MBMP094	100	22.22	31	0	50	50	50	33.33	100	0
43.51	03140107	031401070204	Hammock Creek	MBMP149	100	77.78	59	0	66.7	50	40	16.67	25	0
43.36	03160204	031602040404	Lower Chasaw Creek	MBMP002	80	81.81	48.2	0	50	50	20	28.57	0	75
43.22	03140107	031401070204	Hammock Creek	MBMP109	100	45.45	86.8	0	100	50	25	25	0	0
42.49	03160204	031602040301	Gunnison Creek	MBMP003	75	63.64	67.1	0	60	25	16.67	37.5	40	40
41.91	03160204	031602040404	Lower Chasaw Creek	MBMP063	100	45.45	73.6	0	100	50	0	50	0	0
41.74	03160205	031602050301	Yancey Branch	MBMP028	75	0	53.5	100	22.2	50	50	66.67	0	0
41.33	03140107	031401070204	Hammock Creek	MBMP059	75	100	80	0	25	50	33.33	50	0	0
41.27	03160205	031602050311	Oyster Bay	MBMP106	75	42.86	61.3	0	60	50	20	28.57	25	50
41.12	03140107	031401070204	Hammock Creek	MBMP043	75	42.86	40	100	20	50	0	33.33	0	50
40.80	03160205	031602050307	Lower Fish River	MBMP056	100	45.45	54.3	100	25	50	25	8.33	0	0
40.57	03140107	031401070204	Hammock Creek	MBMP042	75	63.64	62.5	0	20	50	42.86	16.67	25	50
40.47	03160204	031602040505	Tensaw River- Apalachee River	MBMP137	100	45.45	75.9	0	60	50	33.33	40	0	0
40.31	03140107	031401070204	Hammock Creek	MBMP080	100	42.86	40	0	66.7	50	50	28.57	25	0
40.23	03140107	031401070204	Hammock Creek	MBMP116	50	42.86	47.5	0	66.7	50	66.67	28.57	0	50
40.19	03140107	031401070204	Hammock Creek	MBMP092	60	77.78	45.5	0	50	50	20	28.57	20	50
40.12	03140107	031401070204	Hammock Creek	MBMP107	75	63.64	48.3	0	75	50	0	14.29	25	50
40.05	03160205	031602050302	Fly Creek	MBMP128	75	14.29	44.5	0	66.7	25	75	50	0	50
39.80	03140107	031401070204	Hammock Creek	MBMP097	100	45.45	77.5	0	50	50	0	25	0	50
39.58	03140107	031401070204	Hammock Creek	MBMP041	75	81.82	47.5	0	20	50	42.86	28.57	0	50
39.24	03160204	031602040404	Lower Chasaw Creek	MBMP062	50	55.56	61.8	100	25	50	25	25	0	0
39.03	03140107	031401070203	Graham Bayou	MBMP104	100	27.27	68	0	50	50	20	25	0	50
38.99	03160204	031602040303	Grand Bay	MBMP015	100	9.09	69.6	0	80	50	0	6.25	75	0
38.93	03140107	031401070203	Graham Bayou	MBMP105	100	33.33	64.3	0	66.7	50	0	25	0	50
38.92	03140107	031401070204	Hammock Creek	MBMP125	75	71.43	42.8	0	50	50	0	25	25	50
38.67	03160205	031602050204	Lower Dog River	MBMP118	50	63.64	58.8	0	100	50	50	14.29	0	0
38.34	03160205	031602050302	Fly Creek	MBMP126	100	42.86	40.5	0	25	50	0	25	100	0
37.96	03140107	031401070204	Hammock Creek	MBMP040	75	45.45	92.5	0	100	50	0	16.67	0	0

Overall % score	8-Digit- HUC	12-Digit-HUC	Sub-watershed- Name	ADEM-ID- #	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10- % score	T11- % score	T12- % score
37.76	03160205	031602050310	Bon Secour River	MBMP031	20	33.33	40	0	75	50	20	14.29	75	50
37.73	03160205	031602050311	Oyster Bay	MBMP124	60	33.33	52.3	0	75	50	40	16.67	0	50
37.73	03160204	031602040203	The Basin	MBMP030	75	45.45	56.8	0	50	50	33.33	66.67	0	0
37.72	03140107	031401070204	Hammock Creek	MBMP039	75	45.45	92.5	0	100	50	0	14.29	0	0
37.59	03140107	031401070204	Hammock Creek	MBMP146	100	0	58.3	100	33.3	50	20	14.29	0	0
37.23	03140107	031401070205	Little Lagoon	MBMP037	100	45.45	43.3	0	60	50	20	28.57	25	0
37.23	03140107	031401070204	Hammock Creek	MBMP016	75	42.86	47.5	0	33.3	50	20	28.57	25	50
37.08	03160204	031602040201	Miffin Lake	MBMP143	100	27.27	65	0	100	50	0	28.57	0	0
36.94	03170009	031700090202	Dauphin Island	MBMP159	60	50	47.5	0	33.3	50	25	28.57	25	50
36.91	03140107	031401070204	Hammock Creek	MBMP078	75	45.45	43.6	0	40	50	20	20	25	50
36.89	03140107	031401070204	Hammock Creek	MBMP114	50	33.33	37.3	0	8.33	50	71.43	28.57	40	50
36.66	03140107	031401070204	Hammock Creek	MBMP081	75	45.45	69.5	0	40	50	20	16.67	0	50
36.64	03160204	031602040303	Grand Bay	MBMP014	100	33.33	50	0	25	50	16.67	71.43	20	0
36.53	03140107	031401070204	Hammock Creek	MBMP046	100	63.64	35	0	0	50	60	16.67	40	0
36.49	03170009	031700090202	Dauphin Island	MBMP034	75	33.33	44.1	0	75	50	12.5	50	25	0
36.08	03160204	031602040505	Tensaw River- Apalachee River	MBMP142	75	45.45	48.6	0	66.7	50	25	50	0	0
35.88	03140107	031401070204	Hammock Creek	MBMP111	33.3	42.86	35	100	33.3	50	0	14.29	0	50
35.86	03140107	031401070204	Hammock Creek	MBMP068	50	100	35.8	0	0	50	20	42.86	60	0
35.84	03140107	031401070205	Little Lagoon	MBMP049	75	42.86	42	0	25	50	20	28.57	75	0
35.77	03160204	031602040505	Tensaw River- Apalachee River	MBMP066	75	33.33	57.7	0	75	50	0	66.67	0	0
35.34	03140107	031401070204	Hammock Creek	MBMP151	100	42.86	57	0	50	50	0	28.57	25	0
35.21	03140107	031401070204	Hammock Creek	MBMP132	0	71.43	45	0	50	50	57.14	28.57	50	0
34.93	03140107	031401070204	Hammock Creek	MBMP079	75	27.27	42	0	40	50	20	20	25	50
34.92	03160205	031602050310	Bon Secour River	MBMP101	0	45.45	69.5	0	100	50	20	14.29	0	50
34.88	03140107	031401070204	Hammock Creek	MBMP089	60	27.27	41.5	0	100	50	20	50	0	0
34.72	03140107	031401070204	Hammock Creek	MBMP098	100	42.86	45	0	50	50	20	14.29	25	0
34.10	03140107	031401070204	Hammock Creek	MBMP038	100	45.45	61.3	0	20	50	0	14.29	0	50
34.09	03140107	031401070204	Hammock Creek	MBMP134	100	42.86	49.5	0	25	50	20	28.57	25	0
33.80	03140107	031401070204	Hammock Creek	MBMP086	60	45.45	57.5	0	60	50	20	25	20	0
33.66	03160205	031602050204	Lower Dog River	MBMP061	50	27.27	59.3	0	100	50	16.67	33.33	0	0
33.48	03160204	031602040505	Tensaw River- Apalachee River	MBMP139	100	27.27	56.8	0	40	50	25	35.71	0	0

Overall % score	8-Digit- HUC	12-Digit-HUC	Sub-watershed- Name	ADEM-ID- #	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10- % score	T11- % score	T12- % score
33.46	03160204	031602040301	Gunnison Creek	MBMP064	50	33.33	59.6	0	75	50	16.67	0	0	50
33.45	03140107	031401070204	Hammock Creek	MBMP083	100	55.56	47	0	33.3	50	20	28.57	0	0
33.38	03140107	031401070204	Hammock Creek	MBMP112	100	45.45	40	0	25	50	40	33.33	0	0
33.36	03160205	031602050310	Bon Secour River	MBMP102	0	27.27	72	0	100	50	20	14.29	0	50
33.25	03140107	031401070204	Hammock Creek	MBMP095	75	71.43	42.5	0	20	50	20	28.57	25	0
33.22	03140107	031401070204	Hammock Creek	MBMP044	100	42.86	45	0	60	50	20	14.29	0	0
33.17	03160205	031602050311	Oyster Bay	MBMP050	100	45.45	65	0	16.7	16.7	20	42.86	25	0
33.10	03160205	031602050303	Gum Swamp	MBMP033	100	0	56	0	33.3	50	66.67	25	0	0
33.10	03140107	031401070204	Hammock Creek	MBMP100	20	45.45	70.5	0	50	50	20	25	0	50
32.87	03160205	031602050204	Lower Dog River	MBMP022	60	42.86	67.5	0	75	50	0	33.33	0	0
32.73	03160204	031602040503	Lower Bay Minette Creek	MBMP007	100	27.27	75	0	50	50	0	25	0	0
32.63	03160205	031602050303	Gum Swamp	MBMP088	100	45.45	52.5	0	25	50	33.33	0	20	0
32.41	03140107	031401070201	Sandy Creek	MBMP035	100	27.27	57.5	0	50	50	0	14.29	25	0
32.15	03140107	031401070204	Hammock Creek	MBMP090	60	27.27	44.3	0	50	50	20	50	20	0
31.86	03140107	031401070204	Hammock Creek	MBMP055	75	18.18	63.8	0	50	50	20	16.67	25	0
31.75	03160204	031602040505	Tensaw River- Apalachee River	MBMP140	100	45.45	52	0	20	50	0	50	0	0
31.66	03160204	031602040105	Big Chippewa Lake	MBMP136	100	27.27	50.8	0	60	50	0	28.57	0	0
31.56	03170009	031700090202	Dauphin Island	MBMP012	50	33.33	45.6	0	20	50	33.33	33.33	0	50
31.37	03140107	031401070204	Hammock Creek	MBMP054	100	27.27	54.8	0	20	50	20	16.67	25	0
31.37	03140107	031401070204	Hammock Creek	MBMP058	75	42.86	42.5	0	25	50	33.33	25	20	0
31.06	03160205	031602050311	Oyster Bay	MBMP117	20	71.43	57.5	0	25	50	20	16.67	0	50
30.86	03140107	031401070205	Little Lagoon	MBMP155	75	27.27	48	0	25	50	25	33.33	25	0
30.70	03140107	031401070204	Hammock Creek	MBMP053	0	42.86	52.5	0	50	50	20	16.67	25	50
30.56	03160204	031602040505	Tensaw River- Apalachee River	MBMP008	100	9.09	53.2	0	60	50	0	33.33	0	0
30.51	03160204	031602040505	Tensaw River- Apalachee River	MBMP005	50	45.45	36.4	0	40	50	25	33.33	25	0
30.34	03160205	031602050207	Delchamps Bayou	MBMP160	75	27.27	51.1	0	25	50	25	50	0	0
30.15	03140107	031401070204	Hammock Creek	MBMP121	100	42.86	38.6	0	25	50	20	25	0	0
29.88	03160205	031602050310	Bon Secour River	MBMP036	60	27.27	47.3	0	75	50	25	14.29	0	0
29.67	03140107	031401070204	Hammock Creek	MBMP045	16.7	45.45	55.3	0	20	50	20	14.29	25	50
29.45	03160205	031602050204	Lower Dog River	MBMP017	60	33.33	62	0	12.5	50	16.67	60	0	0

Overall % score	8-Digit- HUC	12-Digit-HUC	Sub-watershed- Name	ADEM-ID- #	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10- % score	T11- % score	T12- % score
29.26	03140107	031401070204	Hammock Creek	MBMP084	60	27.27	51	0	60	50	30	14.29	0	0
29.22	03140107	031401070204	Hammock Creek	MBMP150	0	45.45	51.5	0	50	50	33.33	28.57	33.33	0
28.95	03160204	031602040303	Grand Bay	MBMP144	100	18.18	71.4	0	50	50	0	0	0	0
28.93	03140107	031401070104	Palmetto Creek	MBMP108	75	27.27	42	0	20	50	0	25	0	50
28.67	03140107	031401070204	Hammock Creek	MBMP122	16.7	77.78	43	0	40	50	20	14.29	25	0
28.58	03160204	031602040505	Tensaw River- Apalachee River	MBMP145	100	27.27	66.8	0	25	50	0	16.67	0	0
28.43	03140107	031401070205	Little Lagoon	MBMP048	75	9.09	42.8	0	50	50	20	12.5	25	0
28.33	03140107	031401070203	Graham Bayou	MBMP087	100	18.18	41.5	0	20	50	25	28.57	0	0
27.94	03160205	031602050302	Fly Creek	MBMP127	75	9.09	37.7	0	60	50	33.33	14.29	0	0
27.87	03160204	031602040505	Tensaw River- Apalachee River	MBMP138	0	33.33	56.8	0	60	50	50	28.57	0	0
27.66	03140107	031401070204	Hammock Creek	MBMP110	0	27.27	55	0	60	50	20	14.29	0	50
27.45	03170009	031700090202	Dauphin Island	MBMP148	50	0	54.5	0	25	50	20	0	25	50
27.41	03140107	031401070204	Hammock Creek	MBMP091	80	33.33	45.8	0	0	50	20	25	20	0
27.33	03140107	031401070205	Little Lagoon	MBMP047	40	27.27	42.5	0	60	50	25	28.57	0	0
27.17	03160205	031602050302	Fly Creek	MBMP130	66.7	0	42.5	0	37.5	50	0	75	0	0
26.90	03140107	031401070205	Little Lagoon	MBMP153	100	45.45	53.5	0	20	50	0	0	0	0
26.87	03140107	031401070204	Hammock Creek	MBMP082	75	42.86	41.5	0	25	50	20	14.29	0	0
26.79	03140107	031401070204	Hammock Creek	MBMP135	0	9.09	49.5	0	100	50	20	14.29	25	0
26.60	03160204	031602040505	Tensaw River- Apalachee River	MBMP141	75	45.45	55.5	0	40	50	0	0	0	0
26.58	03140107	031401070205	Little Lagoon	MBMP157	0	42.86	36.3	0	50	50	20	16.67	0	50
26.28	03170009	031700090103	Grand Bay Swamp	MBMP025	50	0	67.8	0	75	50	20	0	0	0
26.25	03160205	031602050104	Bon Secour Bay	MBMP119	16.7	9.09	56	0	57.1	50	20	28.57	25	0
25.87	03160205	031602050204	Lower Dog River	MBMP071	0	33.33	57.5	0	25	50	50	42.86	0	0
25.66	03160205	031602050204	Lower Dog River	MBMP018	33.3	33.33	57.8	0	14.3	50	25	42.86	0	0
25.51	03140107	031401070204	Hammock Creek	MBMP074	66.7	63.64	40.5	0	0	50	20	14.29	0	0
24.53	03160204	031602040301	Gunnison Creek	MBMP023	100	27.27	61.4	0	0	0	16.67	0	0	40
24.14	03140107	031401070204	Hammock Creek	MBMP099	0	42.86	55	0	20	50	20	28.57	25	0
23.72	03160205	031602050302	Fly Creek	MBMP072	33.3	22.22	44.5	100	10	0	20	7.14	0	0
23.55	03160205	031602050104	Bon Secour Bay	MBMP161	100	0	53	0	20	50	0	12.5	0	0
23.38	03140107	031401070204	Hammock Creek	MBMP113	66.7	42.86	40	0	0	50	20	14.29	0	0

Overall % score	8-Digit- HUC	12-Digit-HUC	Sub-watershed- Name	ADEM-ID- #	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10- % score	T11- % score	T12- % score
23.31	03160205	031602050204	Lower Dog River	MBMP001	20	42.86	55	0	16.7	50	20	28.57	0	0
22.94	03160205	031602050307	Lower Fish River	MBMP070	50	9.09	65.5	0	18.2	16.7	16.67	33.33	20	0
22.27	03160205	031602050308	Magnolia River	MBMP019	20	27.27	77.8	0	33.3	50	0	14.29	0	0
22.22	03160205	031602050204	Lower Dog River	MBMP120	0	63.64	55	0	8.33	50	16.67	28.57	0	0
21.66	03140107	031401070204	Hammock Creek	MBMP067	33	27.27	36.4	0	35.7	50	20	14.29	0	0
21.64	03160205	031602050201	Garrow's Bend- Mobile Bay	MBMP163	0	18.18	23.3	100	0	50	0	25	0	0
20.58	03140107	031401070205	Little Lagoon	MBMP156	0	27.27	36.8	0	16.7	50	0	25	0	50
19.26	03140107	031401070204	Hammock Creek	MBMP076	50	9.09	35.9	0	13.3	50	20	14.29	0	0
18.83	03140107	031401070204	Hammock Creek	MBMP077	50	9.09	43.2	0	7.69	50	20	8.33	0	0
17.45	03160205	031602050302	Fly Creek	MBMP029	16.7	42.86	32.5	0	12.5	50	0	0	20	0
14.51	03160205	031602050302	Fly Creek	MBMP026	0	11.11	59	0	0	50	0	0	0	25
13.73	03140107	031401070205	Little Lagoon	MBMP152	0	18.18	38.2	0	16.7	50	0	14.29	0	0
11.27	03160205	031602050204	Lower Dog River	MBMP073	0	27.27	56.8	0	14.3	0	0	14.29	0	0
10.85	03140107	031401070204	Hammock Creek	MBMP085	0	0	32.8	0	9.09	50	0	16.67	0	0
*Defunct Sites														

Appendix D

Perdido Bay HUC 03140107

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
63.03	031401070204	Hammock Creek	MBMP069	50	100	43.64	0	26.67	80	66.67	83.33	100	80
61.89	031401070204	Hammock Creek	MBMP131	100	63.64	45.45	0	100	83.3	57.14	64.29	25	80
51.95	031401070204	Hammock Creek	MBMP051	100	27.27	58.86	100	66.67	50	50	66.67	0	0
51.72	031401070204	Hammock Creek	MBMP052	33.33	0	57.15	100	100	50	66.67	50	0	60
51.69	031401070204	Hammock Creek	MBMP133*	33.33	28.57	55	50	100	50	50	50	50	50
51.46	031401070204	Hammock Creek	MBMP123	60	88.89	39.09	0	16.67	50	83.33	33.33	83.33	60
50.34	031401070204	Hammock Creek	MBMP147*	100	42.86	60.56	50	0	50	50	50	50	50
49.86	031401070202	Milfin Creek	MBMP075	75	27.27	48	100	66.67	50	40	66.67	25	0
47.23	031401070204	Hammock Creek	MBMP158*	0	27.27	45	50	100	50	50	50	50	50
45.42	031401070204	Hammock Creek	MBMP115*	50	18.18	46	50	40	50	50	50	50	50
45.37	031401070204	Hammock Creek	MBMP093	0	42.86	42.5	0	100	60	66.67	66.67	0	75
45.30	031401070204	Hammock Creek	MBMP096	80	45.45	77.5	0	50	50	100	50	0	0
44.97	031401070203	Graham Bayou	MBMP103	100	45.45	59.25	100	50	50	20	25	0	0
43.51	031401070204	Hammock Creek	MBMP149	100	77.78	59	0	66.67	50	40	16.67	25	0
43.22	031401070204	Hammock Creek	MBMP109	100	45.45	86.75	0	100	50	25	25	0	0
41.33	031401070204	Hammock Creek	MBMP059	75	100	80	0	25	50	33.33	50	0	0
41.12	031401070204	Hammock Creek	MBMP043	75	42.86	40	100	20	50	0	33.33	0	50
40.57	031401070204	Hammock Creek	MBMP042	75	63.64	62.5	0	20	50	42.86	16.67	25	50
40.31	031401070204	Hammock Creek	MBMP080	100	42.86	40	0	66.67	50	50	28.57	25	0
40.23	031401070204	Hammock Creek	MBMP116	50	42.86	47.5	0	66.67	50	66.67	28.57	0	50
40.19	031401070204	Hammock Creek	MBMP092	60	77.78	45.5	0	50	50	20	28.57	20	50
40.12	031401070204	Hammock Creek	MBMP107	75	63.64	48.25	0	75	50	0	14.29	25	50
39.80	031401070204	Hammock Creek	MBMP097	100	45.45	77.5	0	50	50	0	25	0	50
39.58	031401070204	Hammock Creek	MBMP041	75	81.82	47.5	0	20	50	42.86	28.57	0	50
39.03	031401070203	Graham Bayou	MBMP104	100	27.27	68	0	50	50	20	25	0	50
38.93	031401070203	Graham Bayou	MBMP105	100	33.33	64.25	0	66.67	50	0	25	0	50
38.92	031401070204	Hammock Creek	MBMP125	75	71.43	42.75	0	50	50	0	25	25	50
37.96	031401070204	Hammock Creek	MBMP040	75	45.45	92.5	0	100	50	0	16.67	0	0
37.72	031401070204	Hammock Creek	MBMP039	75	45.45	92.5	0	100	50	0	14.29	0	0
37.59	031401070204	Hammock Creek	MBMP146	100	0	58.25	100	33.33	50	20	14.29	0	0
37.23	031401070205	Little Lagoon	MBMP037	100	45.45	43.25	0	60	50	20	28.57	25	0

Perdido Bay HUC 03140107 (continued)

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
37.23	031401070204	Hammock Creek	MBMP016	75	42.86	47.5	0	33.33	50	20	28.57	25	50
36.91	031401070204	Hammock Creek	MBMP078	75	45.45	43.64	0	40	50	20	20	25	50
36.89	031401070204	Hammock Creek	MBMP114	50	33.33	37.25	0	8.33	50	71.43	28.57	40	50
36.66	031401070204	Hammock Creek	MBMP081	75	45.45	69.5	0	40	50	20	16.67	0	50
36.53	031401070204	Hammock Creek	MBMP046	100	63.64	35	0	0	50	60	16.67	40	0
35.88	031401070204	Hammock Creek	MBMP111	33.33	42.86	35	100	33.33	50	0	14.29	0	50
35.86	031401070204	Hammock Creek	MBMP068	50	100	35.75	0	0	50	20	42.86	60	0
35.84	031401070205	Little Lagoon	MBMP049	75	42.86	42	0	25	50	20	28.57	75	0
35.34	031401070204	Hammock Creek	MBMP151	100	42.86	57	0	50	50	0	28.57	25	0
35.21	031401070204	Hammock Creek	MBMP132	0	71.43	45	0	50	50	57.14	28.57	50	0
34.93	031401070204	Hammock Creek	MBMP079	75	27.27	42	0	40	50	20	20	25	50
34.88	031401070204	Hammock Creek	MBMP089	60	27.27	41.5	0	100	50	20	50	0	0
34.72	031401070204	Hammock Creek	MBMP098	100	42.86	45	0	50	50	20	14.29	25	0
34.10	031401070204	Hammock Creek	MBMP038	100	45.45	61.25	0	20	50	0	14.29	0	50
34.09	031401070204	Hammock Creek	MBMP134	100	42.86	49.5	0	25	50	20	28.57	25	0
33.80	031401070204	Hammock Creek	MBMP086	60	45.45	57.5	0	60	50	20	25	20	0
33.45	031401070204	Hammock Creek	MBMP083	100	55.56	47	0	33.33	50	20	28.57	0	0
33.38	031401070204	Hammock Creek	MBMP112	100	45.45	40	0	25	50	40	33.33	0	0
33.25	031401070204	Hammock Creek	MBMP095	75	71.43	42.5	0	20	50	20	28.57	25	0
33.22	031401070204	Hammock Creek	MBMP044	100	42.86	45	0	60	50	20	14.29	0	0
33.10	031401070204	Hammock Creek	MBMP100	20	45.45	70.5	0	50	50	20	25	0	50
32.41	031401070201	Sandy Creek	MBMP035	100	27.27	57.5	0	50	50	0	14.29	25	0
32.15	031401070204	Hammock Creek	MBMP090	60	27.27	44.25	0	50	50	20	50	20	0
31.86	031401070204	Hammock Creek	MBMP055	75	18.18	63.75	0	50	50	20	16.67	25	0
31.37	031401070204	Hammock Creek	MBMP054	100	27.27	54.75	0	20	50	20	16.67	25	0
31.37	031401070204	Hammock Creek	MBMP058	75	42.86	42.5	0	25	50	33.33	25	20	0
30.86	031401070205	Little Lagoon	MBMP155	75	27.27	47.95	0	25	50	25	33.33	25	0
30.70	031401070204	Hammock Creek	MBMP053	0	42.86	52.5	0	50	50	20	16.67	25	50
30.15	031401070204	Hammock Creek	MBMP121	100	42.86	38.64	0	25	50	20	25	0	0
29.67	031401070204	Hammock Creek	MBMP045	16.67	45.45	55.25	0	20	50	20	14.29	25	50
29.26	031401070204	Hammock Creek	MBMP084	60	27.27	51	0	60	50	30	14.29	0	0
29.22	031401070204	Hammock Creek	MBMP150	0	45.45	51.5	0	50	50	33.33	28.57	33.33	0
28.93	031401070104	Palmetto Creek	MBMP108	75	27.27	42	0	20	50	0	25	0	50
28.67	031401070204	Hammock Creek	MBMP122	16.67	77.78	43	0	40	50	20	14.29	25	0

Perdido Bay HUC 03140107 (continued)

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
28.43	031401070205	Little Lagoon	MBMP048	75	9.09	42.75	0	50	50	20	12.5	25	0
28.33	031401070203	Graham Bayou	MBMP087	100	18.18	41.5	0	20	50	25	28.57	0	0
27.66	031401070204	Hammock Creek	MBMP110	0	27.27	55	0	60	50	20	14.29	0	50
27.41	031401070204	Hammock Creek	MBMP091	80	33.33	45.75	0	0	50	20	25	20	0
27.33	031401070205	Little Lagoon	MBMP047	40	27.27	42.5	0	60	50	25	28.57	0	0
26.90	031401070205	Little Lagoon	MBMP153	100	45.45	53.5	0	20	50	0	0	0	0
26.87	031401070204	Hammock Creek	MBMP082	75	42.86	41.5	0	25	50	20	14.29	0	0
26.79	031401070204	Hammock Creek	MBMP135	0	9.09	49.5	0	100	50	20	14.29	25	0
26.58	031401070205	Little Lagoon	MBMP157	0	42.86	36.25	0	50	50	20	16.67	0	50
25.51	031401070204	Hammock Creek	MBMP074	66.67	63.64	40.45	0	0	50	20	14.29	0	0
24.14	031401070204	Hammock Creek	MBMP099	0	42.86	55	0	20	50	20	28.57	25	0
23.38	031401070204	Hammock Creek	MBMP113	66.67	42.86	40	0	0	50	20	14.29	0	0
21.66	031401070204	Hammock Creek	MBMP067	33	27.27	36.36	0	35.71	50	20	14.29	0	0
20.58	031401070205	Little Lagoon	MBMP156	0	27.27	36.82	0	16.67	50	0	25	0	50
19.26	031401070204	Hammock Creek	MBMP076	50	9.09	35.91	0	13.33	50	20	14.29	0	0
18.83	031401070204	Hammock Creek	MBMP077	50	9.09	43.18	0	7.69	50	20	8.33	0	0
13.73	031401070205	Little Lagoon	MBMP152	0	18.18	38.18	0	16.67	50	0	14.29	0	0
10.85	031401070204	Hammock Creek	MBMP085	0	0	32.78	0	9.09	50	0	16.67	0	0

Mobile Bay 03160205 and Escatawpa 03170008

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
64.44	031602050204	Lower Dog River	MBMP009	50	33.33	55.5	0	55.56	60	100	100	90	100
57.79	031602050204	Lower Dog River	MBMP060	75	27.27	67.27	100	100	50	33.33	100	25	0
52.78	031602050311	Oyster Bay	MBMP154*	100	27.27	50.5	50	50	50	50	50	50	50
52.14	031602050302	Fly Creek	MBMP027	40	11.11	45.5	100	26.67	100	66.67	71.43	0	60
50.05	031602050307	Lower Fish River	MBMP021	33	45.45	72	0	75	50	25	50	100	50
47.04	031602050202	Upper Dog River	MBMP166	100	80	47.5	100	42.86	50	50	0	0	0
45.90	031602050204	Lower Dog River	MBMP020	40	27.27	48.4	100	33.33	50	60	50	0	50
45.35	031602050204	Lower Dog River	MBMP013	50	57.14	35.5	0	50	50	33.33	87.5	40	50

Mobile Bay 03160205 and Escatawpa 03170008 (continued)

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
43.99	031602050310	Bon Secour River	MBMP032	80	27.27	74.25	0	100	50	25	33.33	0	50
43.66	031602050311	Oyster Bay	MBMP094	100	22.22	31	0	50	50	50	33.33	100	0
41.74	031602050301	Yancey Branch	MBMP028	75	0	53.5	100	22.22	50	50	66.67	0	0
41.27	031602050311	Oyster Bay	MBMP106	75	42.86	61.25	0	60	50	20	28.57	25	50
40.80	031602050307	Lower Fish River	MBMP056	100	45.45	54.25	100	25	50	25	8.33	0	0
40.05	031602050302	Fly Creek	MBMP128	75	14.29	44.5	0	66.67	25	75	50	0	50
38.67	031602050204	Lower Dog River	MBMP118	50	63.64	58.75	0	100	50	50	14.29	0	0
38.34	031602050302	Fly Creek	MBMP126	100	42.86	40.5	0	25	50	0	25	100	0
37.76	031602050310	Bon Secour River	MBMP031	20	33.33	40	0	75	50	20	14.29	75	50
37.73	031602050311	Oyster Bay	MBMP124	60	33.33	52.27	0	75	50	40	16.67	0	50
34.92	031602050310	Bon Secour River	MBMP101	0	45.45	69.5	0	100	50	20	14.29	0	50
33.66	031602050204	Lower Dog River	MBMP061	50	27.27	59.32	0	100	50	16.67	33.33	0	0
33.36	031602050310	Bon Secour River	MBMP102	0	27.27	72	0	100	50	20	14.29	0	50
33.17	031602050311	Oyster Bay	MBMP050	100	45.45	65	0	16.67	16.67	20	42.86	25	0
33.10	031602050303	Gum Swamp	MBMP033	100	0	56	0	33.33	50	66.67	25	0	0
32.87	031602050204	Lower Dog River	MBMP022	60	42.86	67.5	0	75	50	0	33.33	0	0
32.63	031602050303	Gum Swamp	MBMP088	100	45.45	52.5	0	25	50	33.33	0	20	0
31.06	031602050311	Oyster Bay	MBMP117	20	71.43	57.45	0	25	50	20	16.67	0	50
30.34	031602050207	Delchamps Bayou	MBMP160	75	27.27	51.14	0	25	50	25	50	0	0
29.88	031602050310	Bon Secour River	MBMP036	60	27.27	47.25	0	75	50	25	14.29	0	0
29.45	031602050204	Lower Dog River	MBMP017	60	33.33	62	0	12.5	50	16.67	60	0	0
27.94	031602050302	Fly Creek	MBMP127	75	9.09	37.73	0	60	50	33.33	14.29	0	0
27.17	031602050302	Fly Creek	MBMP130	66.67	0	42.5	0	37.5	50	0	75	0	0
26.25	031602050104	Bon Secour Bay	MBMP119	16.67	9.09	56	0	57.14	50	20	28.57	25	0
25.87	031602050204	Lower Dog River	MBMP071	0	33.33	57.5	0	25	50	50	42.86	0	0
25.66	031602050204	Lower Dog River	MBMP018	33.33	33.33	57.8	0	14.29	50	25	42.86	0	0
23.72	031602050302	Fly Creek	MBMP072	33.33	22.22	44.5	100	10	0	20	7.14	0	0
23.55	031602050104	Bon Secour Bay	MBMP161	100	0	53	0	20	50	0	12.5	0	0

Mobile Bay 03160205 and Escatawpa 03170008 (continued)

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
23.31	031602050204	Lower Dog River	MBMP001	20	42.86	55	0	16.67	50	20	28.57	0	0
22.94	031602050307	Lower Fish River	MBMP070	50	9.09	65.5	0	18.18	16.67	16.67	33.33	20	0
22.27	031602050308	Magnolia River	MBMP019	20	27.27	77.8	0	33.33	50	0	14.29	0	0
22.22	031602050204	Lower Dog River	MBMP120	0	63.64	55	0	8.33	50	16.67	28.57	0	0
21.64	031602050201	Garrow's Bend-Mobile Bay	MBMP163	0	18.18	23.25	100	0	50	0	25	0	0
17.45	031602050302	Fly Creek	MBMP029	16.67	42.86	32.5	0	12.5	50	0	0	20	0
14.51	031602050302	Fly Creek	MBMP026	0	11.11	59	0	0	50	0	0	0	25
11.27	031602050204	Lower Dog River	MBMP073	0	27.27	56.82	0	14.29	0	0	14.29	0	0
52.54	031700080402	Big Creek Hamilton Creek	MBMP024	100	42.86	82.5	100	33.33	50	50	66.67	0	0

Mobile-Tensaw Delta 03160204

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
70.53	031602040203	The Basin	MBPM167	50	55.56	68.5	100	71.43	50	71.43	83.33	80	75
52.51	031602040505	Tensaw River-Apalachee River	MBMP057	100	63.64	38.64	100	42.86	0	80	66.67	0	33.33
47.17	031602040301	Gunnison Creek	MBMP004	50	77.78	87.27	0	100	50	66.67	40	0	0
44.42	031602040302	Bayou Sara	MBMP065	75	55.56	63.64	0	100	50	66.67	33.33	0	0
43.36	031602040404	Lower Chasaw Creek	MBMP002	80	81.81	48.18	0	50	50	20	28.57	0	75
42.49	031602040301	Gunnison Creek	MBMP003	75	63.64	67.05	0	60	25	16.67	37.5	40	40
41.91	031602040404	Lower Chasaw Creek	MBMP063	100	45.45	73.64	0	100	50	0	50	0	0
40.47	031602040505	Tensaw River-Apalachee River	MBMP137	100	45.45	75.91	0	60	50	33.33	40	0	0
39.24	031602040404	Lower Chasaw Creek	MBMP062	50	55.56	61.82	100	25	50	25	25	0	0
38.99	031602040303	Grand Bay	MBMP015	100	9.09	69.55	0	80	50	0	6.25	75	0

Mobile-Tensaw Delta 03160204 (continued)

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
37.73	031602040203	The Basin	MBMP030	75	45.45	56.82	0	50	50	33.33	66.67	0	0
37.08	031602040201	Miffin Lake	MBMP143	100	27.27	65	0	100	50	0	28.57	0	0
36.64	031602040303	Grand Bay	MBMP014	100	33.33	50	0	25	50	16.67	71.43	20	0
36.08	031602040505	Tensaw River- Apalachee River	MBMP142	75	45.45	48.63	0	66.67	50	25	50	0	0
35.77	031602040505	Tensaw River- Apalachee River	MBMP066	75	33.33	57.73	0	75	50	0	66.67	0	0
33.48	031602040505	Tensaw River- Apalachee River	MBMP139	100	27.27	56.82	0	40	50	25	35.71	0	0
33.46	031602040301	Gunnison Creek	MBMP064	50	33.33	59.55	0	75	50	16.67	0	0	50
32.73	031602040503	Lower Bay Minette Creek	MBMP007	100	27.27	75	0	50	50	0	25	0	0
31.75	031602040505	Tensaw River- Apalachee River	MBMP140	100	45.45	52	0	20	50	0	50	0	0
31.66	031602040105	Big Chippewa Lake	MBMP136	100	27.27	50.75	0	60	50	0	28.57	0	0
30.56	031602040505	Tensaw River- Apalachee River	MBMP008	100	9.09	53.18	0	60	50	0	33.33	0	0
30.51	031602040505	Tensaw River- Apalachee River	MBMP005	50	45.45	36.36	0	40	50	25	33.33	25	0
28.95	031602040303	Grand Bay	MBMP144	100	18.18	71.36	0	50	50	0	0	0	0
28.58	031602040505	Tensaw River- Apalachee River	MBMP145	100	27.27	66.82	0	25	50	0	16.67	0	0
27.87	031602040505	Tensaw River- Apalachee River	MBMP138	0	33.33	56.82	0	60	50	50	28.57	0	0
26.60	031602040505	Tensaw River- Apalachee River	MBMP141	75	45.45	55.5	0	40	50	0	0	0	0
24.53	031602040301	Gunnison Creek	MBMP023	100	27.27	61.36	0	0	0	16.67	0	0	40

Mississippi Coastal 03170009

Overall %score	12-Digit-HUC	Sub-watershed-Name	ADEM-ID-#	T2-% score	T4-% score	T5-% score	T6-% score	T7-% score	T8-% score	T9-% score	T10-% score	T11-% score	T12-% score
60.15	031700090202	Dauphin Island	MBMP006	60	44.44	65.5	0	75	100	71.43	85.17	20	80
53.64	031700090202	Dauphin Island	MBMP011	75	42.86	43.5	100	100	50	0	25	100	0
52.38	031700090202	Dauphin Island	MBMP010	100	45.45	70	0	66.67	50	66.67	25	100	0
36.94	031700090202	Dauphin Island	MBMP159	60	50	47.5	0	33.33	50	25	28.57	25	50
36.49	031700090202	Dauphin Island	MBMP034	75	33.33	44.09	0	75	50	12.5	50	25	0
31.56	031700090202	Dauphin Island	MBMP012	50	33.33	45.64	0	20	50	33.33	33.33	0	50
27.45	031700090202	Dauphin Island	MBMP148	50	0	54.5	0	25	50	20	0	25	50
26.28	031700090103	Grand Bay Swamp	MBMP025	50	0	67.75	0	75	50	20	0	0	0

*Defunct Sites