

FISH: ASSESSMENT OF CURRENT SITUATION

Team Leaders

Kevin Anson, ADCNR – MRD 251-968-7576 kevin.anson@dcnr.alabama.gov

Sean Powers, USA 251-460-7136 spowers@usouthal.edu

Habitats to Consider

Freshwater wetlands; Intertidal Marshes and Flats; Oyster Reefs; Streams and Rivers; SAV; Sub-tidal habitats

Issues to consider

Sufficient Habitats, Sustaining fish populations, Monitoring status and trends of habitats, species populations and variety of uses (commercial fishing, recreational fishing, other) mitigating anthropogenic and climate change impacts on ecosystems, potential for marine protected areas

Stresses on Ecosystem Services provided by Beaches and Shorelines

The below tables are the result of an exercise completed by 30 scientists/resource managers to evaluate the level of impact of thirteen stressors on the habitats that support the ecosystem services related to fish. The rating scale was from 0-3 with 0 being no impact and 3 being severe impact. For the purposes of analysis the committee defined significant stress as any average value over 2.0.

Eco Service	Habitat	Chemical Contamination	Dredging/Filling	Fire Suppression	Fragmentation	Invasive Species	Land Use Change	Nutrient Enrichment	Pathogens	Sedimentation	Sea Level Rise	Climate Variability	Freshwater Discharge	Resource Extraction
Fisheries	Beaches and Dunes	0.5	0.6	0	0.4	0.4	0.6	0.6	0.6	0.9	0.6	0.6	0.5	0.3
Fisheries	Freshwater Wetlands	1.8	2.5	0.5	2.1	2.1	2.4	1.9	1	2.2	1.7	1.8	2.2	1.4
Fisheries	Intertidal Marsh and Flats	1.6	2.6	0.4	2	1.4	2.4	1.7	1.2	2.4	2.3	1.6	1.8	1.3
Fisheries	Longleaf Pine Habitat	0.4	0.3	0.1	0.6	0.6	0.7	0.4	0.4	0.5	0.5	0.4	0.4	0.4
Fisheries	Maritime Forest	0.1	0.5	0	0.4	0.2	0.8	0.4	0.1	0.4	0.4	0.8	0.2	0.7
Fisheries	Oyster Reefs	1.6	2.1	0.3	1.7	1.3	1.5	1.7	1.5	2.2	1.2	1.2	2	2.1
Fisheries	Pine Savanna Forest	0	0	0	0.1	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0	0.1
Fisheries	Riparian Buffers	1.1	1.8	0.5	1.5	1.2	1.8	1.2	0.9	1.7	1.1	1	1.2	1.3
Fisheries	Streams and Rivers	2	2.2	0.4	1.8	2.1	2.2	1.8	1.5	2.3	1.1	1.3	2.2	1.7
Fisheries	SAV	1	2.2	0.2	1.9	1.4	1.6	2	0.8	2.2	1.3	1.4	1.7	1.1
Fisheries	Subtidal habitats	1.4	2.1	0.3	1.3	1.2	1.4	1.9	1.3	2.2	1	1.3	1.5	1.7

Strengths

What is in place currently that supports the health/sustainability of this value?

Research, Monitoring, Management Plans

1. **Management-** Reductions in numbers of commercially and recreationally important Gulf of Mexico fishes have resulted in limits to how many fish may be caught in federal waters.
<http://dcnr.state.al.us/fishing/saltwater/regulations/>
2. **An Analysis of the Long Term Fisheries Assessment and Monitoring Program Data Set Collected by the Marine Resources Division of the Alabama Department of Conservation and Natural Resources** - This study evaluated species with adequate spatial and temporal coverage of the data set for status and trends analysis; analyzed long term trends in the abundance of targeted species and suggest probable causes of change; summarized status of commercial or recreationally important finfish or shellfish species collected by FAMP based on analysis of the data set (we considered these species to be potential indicators of ecosystem change), and identified species requiring additional management, and made specific recommendations necessary to increase their abundance, including public outreach, habitat manipulation, protection etc.
http://www.mobilebaynep.com/images/uploads/library/Revised_Lrdas_final_report-May-18.pdf
3. **The Blue Crab Fishery of the Gulf of Mexico, United States: A Regional Management Plan** - Is intended to provide a framework for conservation of the resource and economic viability of the fishery, and for recommending suitable policies and strategies to each member state. The Blue Crab (*Callinectes sapidus*) FMP is a broad and comprehensive document which addresses all relevant aspects of the biology and fishery. <http://www.gsmfc.org/publications/GSMFC%20Number%20096.pdf>
5. **Gulf of Mexico Fishery Management Council** <http://www.gulfcouncil.org/>
6. **Fisheries Assessment and Monitoring Program (FAMP)**– This monitoring has been conducted by ALMRD since 1981. Its purpose is to show trends in populations of shrimp, crabs, finfish, and other species in order to quantify their abundance at time of sampling. Care is taken to use the same gear, protocol, tow times, locales, and time frames to insure cohesiveness of findings.
7. **Southeast Area Monitoring and Assessment Program (SEAMAP)** - A State/Federal/university program for collection, management, and dissemination of fishery-independent data and information in the southeastern United States. The **organizational structure** of the program presently includes three operational components, SEAMAP-Gulf of Mexico, which began in 1981, SEAMAP-South Atlantic, implemented in 1983 and SEAMAP-Caribbean, formed in 1988
http://www.gsmfc.org/default.php?p=sm_ov.htm
8. **Fisheries Oceanography of Coastal Alabama (FOCAL)** was established in 2006 and is a long-term baseline survey designed to provide critical biological and oceanographic data needed to assess impacts on Alabama’s marine fisheries resources. <http://press.disl.org/PDFs/focal.pdf>
9. **Fisheries Research-** University of South Alabama
<http://www.usouthal.edu/marinesciences/faculty.html>

Auburn University <http://www.ag.auburn.edu/fish/research/assessment-and-restoration-of-the-coastal-fisheries-of-alabama/>

10. **ALMRD Management, size and creel and bag limits, fishing gear restrictions.** Few are formalized into a management plan, but actions are designed to maintain sustainable fisheries and habitats. <http://www.outdooralabama.com/fishing/freshwater/regulations/>
11. **Investigation of Record Keeping Procedures Pertaining to Marine Commercial and Recreational Fishing Harvests among Gulf States.** The report gave recommendations to collect systematic data on a catch per unit effort that is standardized for the entire Gulf of Mexico. This data can be used for better management, resulting in healthier and more stable fish stocks. To date, a standardized trip ticket system has been implemented for all commercial landings in Alabama. This standardized system is being implemented by all of the Gulf states. http://water.epa.gov/type/oceb/nep/upload/2002_04_Characterization-Reports_CCMP-Final-Volume-2.PDF
12. **Harmful Algal Blooms-** Since scientists started to observe HABs, they appear to be occurring more often. The increased frequency of HABs is a major concern; these events can make people sick when contaminated shellfish are eaten or when people breathe toxic air sprayed from a beach with a harmful algal bloom. HAB events can result in the closure of beaches and shellfish beds, massive fish kills, death of marine mammals and seabirds, and alteration of marine habitats. This hurts commercial and recreational fishing, tourism, and valued habitats, which are important local economies and the livelihood of coastal residents. http://oceanservice.noaa.gov/websites/retiredsites/sotc_pdf/hab.pdf
<http://habsos.noaa.gov/>
13. **Little Lagoon Water Quality Monitoring** - Trained volunteers and DISL researchers sample four locations in the Lagoon every two weeks. The team gathers field measurements and samples, prepares and analyzes samples, and enters and maintains observations in the SEPMN national data base and the DISL Water Chemistry and Phytoplankton database. <http://littlagoon.org/water-quality/research-and-monitoring-results.cfm>
14. **The Alabama Natural Heritage Program** (TNC) database of rare and threatened species is the state's most comprehensive database of species distribution and Abundance. The Program has provided state and federal agencies, corporations, environmental groups, and the public with the information needed to monitor, preserve and protect Alabama's natural areas and biodiversity. http://mercury.ornl.gov/clearinghouse/send/xsltText2?full_datasource=anhp&fileURL=d:%5Cmercurency_instances%5Cusgs%5Canhp%5Charvested%5Cwww.alnhp.org_metadata_ALNHPEORS.xml

Ecosystem restoration, protection, conservation

1. **Marsh protection/limitations** – While there is no Alabama State prohibition on filling in marshes there are some permitting protections. http://www.alabamaadministrativecode.state.al.us/docs/con_/220-4.pdf

2. **Roads to Reefs** -A public/private program of recycling old road construction material for use as reefs in Mobile Bay. So far, there are nine such reefs in the estuary.
<http://alapark.com/press/release.cfm?ID=69>
<http://www.outdooralabama.com/fishing/saltwater/where/ramps-reefs.pdf>
3. **Oyster Reef Replenishment**– These intermittent projects are undertaken under the direction of the ADCNR Marine Resources Division using local fishermen to place shell on existing reefs. This activity is done to expand these long term reefs within the estuary with a focus on sustaining oyster populations for harvest purposes. Refer to the Marine Calendar for a map of existing reefs.
<http://www.outdooralabama.com/fishing/saltwater/tides-weather/2012%20Tide%20Calendar.pdf>
4. **100-1000 Restore Coastal Alabama** - This effort brings together both public and private entities to build 100 miles of oyster reefs along the state’s coastline which will assist in setting up the conditions needed to plant, support, and promote more than 1000 acres of coastal marsh and seagrass. Not only will it help replenish needed habitat but will also help reduce wave energy and decrease erosion, stabilize sediments and decrease turbidity. <http://100-1000.org/>
5. **Point aux Pins** is one of the latest locations for an extensive habitat shoreline restoration project to be undertaken by this public/private partnership which came into being following Hurricane Katrina.
http://skimmer.disl.org/pastissues/vol19_no8_2008/article3.html
6. **Habitat Creation and Shoreline Stabilization on Mon Louis Island** -This project involves installation headland breakwaters, clean sand fill, and submerged oyster habitat along the Mon Louis Island-Mobile Bay shoreline and planting of native marsh vegetation in intertidal areas along the shore to create and enhance subtidal and intertidal habitat and stabilize sediments.
http://www.mobilebaynep.com/static/mon_louis_island
7. **SAV restoration** – The aerial extent of seagrass meadows has declined globally during the last several decades, with major losses of seagrasses reported along the Atlantic and Gulf coasts of the United States. The positive correlation between the area covered by seagrass and the production of valuable finfish and shellfish has led to a large number of studies designed to determine the causes of seagrass declines. Worldwide, the destruction and loss of critical seagrass habitat is being attributed to both natural and human-induced disturbances. In many cases, deteriorating water quality, especially resulting from excessive nutrient inputs and turbid runoff, has been associated with seagrass loss. Reversing seagrass loss in these cases usually requires large scale changes in land use practices and water treatment. <http://marineecologylab.disl.org/projects.htm>
<http://masgc.org/pdf/masgp/07-011-01.pdf>
8. **Oyster Reef Restoration: Isle of Herbes and Bayfront Park** - Part of a federal economic stimulus program aimed at restoring the nation's coastlines, a plan to build two oyster reefs that would block waves and create fish habitat in South Mobile County. Nearly a mile of underwater reefs along eroding shoreline in two locations: near Bay Front Park in Mobile Bay and in Portersville Bay near Bayou La Batre have been built.

9. **Grand Bay Marsh restorations** –This project at the Bayou Heron boat ramp uses coconut husk fibers (coir) in the form of compacted logs. These logs, backfilled with sand and planted with native black needle rush (*Juncus roemerianus*), provide structure and support to stabilize and rebuild the shoreline.
10. **Farming the Fertile Crescent: Intensification of Oyster Culture in the Northern Gulf of Mexico** - The primary goal of the proposed work is to allow adoption and implementation of intensive oyster culture by coastal citizens within the northern Gulf of Mexico, increasing productivity, creating jobs and providing a safe, sustainable domestic supply. <http://www.masgc.org/page.asp?id=761>
<http://gulfseagrant.tamu.edu/news/oyster-farming.htm>http://www.issc.org/client_resources/gsassc%20presentations/auburn%20university%20shellfish%20laboratory.pdf Additional Aquaculture information-
11. **Brookley Hole** - Brookley Hole disposal site for beneficial use dredge disposal. Numerous alternatives are being considered that could produce productive fish, oyster, or wetland habitat. 650,000 - 1,200,000 cubic yards of dredged sediment would be utilized.
<http://www.arcgis.com/home/item.html?id=b64d3a6695d946ce8176822749a76916>

Federal, State, local regulations and policies, technical training

1. **Essential Fish Habitat designation-**
http://www.gulfcouncil.org/fishery_management_plans/essential_fish_habitat.php
2. **Laws and regulations-** Prohibitions on fishing gear (no oyster dredges on Cedar Point, No trawling Seagrass beds, etc [http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20\(R\)%20Code-Regs%207-11.pdf](http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20(R)%20Code-Regs%207-11.pdf)
3. **The Marine Regulation Act** - Regulates sewage discharge and marine litter from recreational vessels and residence boats <http://www.outdooralabama.com/outdoor-alabama/attn-boaters.pdf>
4. **Ballast water control-** Ballast water discharged from ships is one of the pathways for the introduction and spread of aquatic nuisance species (ANS). The Coast Guard has established both regulations and guidelines to prevent the introduction and spread of ANS.
<http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp>
5. **Prohibition of species transport from one body of freshwater to another** - One of the greatest challenges facing natural resource agencies is the indiscriminate release of non-native aquatic species, transplanting of an aquatic species from one water drainage to another and the release of native aquatic species which may be infected with an infectious disease or parasite. These types of aquatic species are often referred to as nuisance species.
<http://www.outdooralabama.com/fishing/freshwater/regulations/unlawful-stockings.cfm>
<http://www.outdooralabama.com/fishing/freshwater/regulations/>

6. **MS-AL Habitats Tool** – This web-based tool provides resources to aid conservation and restoration activities in Mississippi and Alabama, including a Projects Database and a Priority Habitat Mapper. The Projects Database includes information on conservation and restoration projects occurring in the two states. These projects can be visually viewed in the Habitat Mapper, which provides additional conservation planning data for Alabama's Mobile and Baldwin Counties. Included in these data are the priority habitats identified for conservation and restoration that were identified in 2008-2009 by the Mobile Bay National Estuary Program's Coastal Habitats Coordinating Team. Other data sets for further planning purposes include but are not limited to land cover, political boundaries, human uses, and ecological attributes for the two-county area. list of projects with descriptions <http://habitats.disl.org/>

Volunteer programs, outreach, and education Outreach

1. **Zebra mussels** – An educational tool for boaters. <http://www.aces.edu/pubs/docs/A/ANR-1033/>
2. **Apple Snails** – Volunteer effort to remove invasion species from Langan Park in the City of Mobile. http://www2.wkrg.com/news/2012/jun/27/help-needed-fight-apple-snale-invasion-ar-4049662/http://www.fox10tv.com/dpp/news/local_news/mobile_county/Invasive-snails-could-cause-problems
3. **Dock Watch**- Volunteers along the coasts of Alabama and Mississippi collect environmental data and visual observations of jellyfish species and numbers. <http://dockwatch.disl.org/overview.htm>
4. **Manatee Sighting Network** – Is designed to track and study these mammals to not only bring about awareness of their dwindling numbers but also to use them as a means by which to predict ecosystem responses to environmental changes. <http://manatee.disl.org/>
<http://southeasternwildlifeconservation.org/index.html>
5. **Dauphin Island Sea Lab- Discovery Hall Program** - Offers a variety of programs for children during the summer, ranging from single-day programs to residential camps and academic courses. <http://dhp.disl.org/studentopps.htm>
6. **Coast Watch** – A volunteer program that trains volunteers to form a community watch on area waters to help enforce marine laws is part of a three part plan to better enforce and prosecute those who violate marine resource regulations. <http://www.ifish.net/board/showthread.php?t=232310>
7. **ADEM Water Watch** – A program dedicated to providing citizen volunteer monitoring of Alabama's lakes, streams and wetlands. <https://aww.auburn.edu/Docs/manuals/chem-qaqc.pdf>
8. **Mobile Bay Oyster Gardening** joins volunteers together with science and nature to grow these vital members of estuarine ecology. <http://www.aces.edu/pubs/docs/A/ANR-1207/>
9. **SAVing the Gulf: Submerged Aquatic Vegetation** – A guide to the underwater grass beds that populate our coastal waters. It describes environmental benefits, offers ways for students and volunteers to become involved in their restoration, shares easy tips to aide in protection and gives step-by-step instructions for how to take measurements from natural and restored beds in order to learn about the

benefits they provide. <http://www.mobilebaynep.com/images/uploads/library/SAV-Manual-final-proof.pdf>

10. **Grand Bay Marsh Restoration** – Students from a neighborhood public school were used in this project. <http://grandbaynerr.org/restoration-science>
11. **The Voices from the Fisheries Database** is a central repository for consolidating, archiving, and disseminating oral history interviews related to commercial, recreational, and subsistence fishing in the United States and its territories. Oral history interviews are a powerful way to document the human experience with our marine, coastal, and Great Lakes environments and our living marine resources. <http://www.st.nmfs.noaa.gov/voicesfromthefisheries/>

Weaknesses/Threats

What stresses are currently putting negative pressure on the long-term viability of this value?

1. **Limited enforcement of current regulations, size and creel and bag limits, fishing gear restrictions.** Few of these are formalized into a management plan, but current actions are designed to maintain sustainable fisheries and habitats. [http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20\(R\)%20Code-Regs%207-11.pdf](http://www.outdooralabama.com/images/file/2011-12%20WFF/Comm%20FW%20Fish%20(R)%20Code-Regs%207-11.pdf)
2. **Further regulations needed to protect marshes**
http://www.alabamaadministrativecode.state.al.us/docs/con_/220-4.pdf
3. **Sedimentation, Stormwater Polluted Runoff** - Stormwater runoff cause increasing impervious surfaces like pavement and rooftops causes flooding and erosion and carries pollutants like dirt, clay, oil, chemicals, pet waste, and fertilizers into our streams, rivers, and bays without any kind of treatment or purification. It causes a typical city block to produce more than five times as much runoff as a woodland area of the same size rather than allowing it to seep, or infiltrate, into the ground. <http://www.mobilebaynep.com/stormwater1/>
4. **Habitat impacts** – The anthropologic causes of loss of natural habitat are many and include, but are not limited to recreational and commercial fishing gear such as gill nets. http://www.outdooralabama.com/images/File/Weeks_Bay/Preliminary_Character_of_Habitat_Loss_Mobile_Bay_NEP.pdf
<http://habitats.disl.org/>
5. **Bycatch from commercial and recreational fisheries** – The adverse effects of net fishing to fish and mammal species. http://blog.al.com/live/2011/12/alabamas_rich_fish_harvest_unq.html
<http://www.outdooralabama.com/fishing/saltwater/regulations/Rec%20Gill%20Net%20Regs.pdf> <http://msucares.com/pubs/infobulletins/ib324.htm>
6. **Lack of education about state of the fishery** - <http://www.outdooralabama.com/search/index.cfm?q=public+awareness+species+threats>
<http://gulfofmexicoalliance.org/community/tools.html>
7. **Invasive species** - The spread of exotic or non-native species through intentional or inadvertent transport by man has become an extremely serious threat to native plants and animals worldwide.

Negative economic effects of invasions or introductions of non-native species in the US alone were estimated at 97 billion dollars in 1991. <http://nsgl.gso.uri.edu/flsgp/flsgpg05001.pdf>

8. **Need for Ballast Water Control**- both regulations and enforcement
<http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp>
9. **Increased oil/gas drilling** means more impact to ocean floor –
http://www.outdooralabama.com/images/File/CIAP/CIAP_Plan_Volume_1_-_update.pdf
10. **Adverse effects of removal of derelict rigs** -http://blog.al.com/live/2012/08/post_220.html
<http://m.caller.com/news/2012/aug/01/outrage-mounts-over-rig-removal-policy/>
11. **Technological accidents** like that of the Deep Water Horizon can take many forms but as population increases so does the likelihood of accidents. –
http://www.gulfofmexicoalliance.org/pdfs/GOMA_2012_All_Hands/GoMRI_CSO_presentation.pdf
12. **Marine debris**: Marine debris resulting from storms and other natural events disturbs benthic communities, as well as, creates problems and hazards for individuals using Alabama's marine resources. Damaged and deteriorating structures found area waters produce hazards that threaten public safety. In addition, debris can destroy habitat and result in economic hardships to fishermen by damaging or destroying valuable fishing gear when encountered.
<http://www.outdooralabama.com/public-lands/stateLands/landsCoastal/309%20Assessment%202006%20Final.pdf>
13. **Climate Change**- Increased intensity of storms, drought, sea level rise -
<http://www.epa.gov/climatechange/science/overview.html>
14. **Lack of biological monitoring of key species**- Need invertebrate and/or other key species list for early indication of stress. (Shrimp, blue crab, menhaden)
<http://www.outdooralabama.com/research-mgmt/cwcs/Chapter1.pdf>
<http://www.outdooralabama.com/research-mgmt/cwcs/Chapter5.pdf>
15. **Barriers to Fish Movement**- Hydroelectric and navigational dams in major river systems – Damming a river dramatically alters a stream ecosystem by replacing a flowing water system with a relatively still water system, creating a migration barrier for many aquatic species, and changing the hydrology of the stream. Flowing water generally absorbs more oxygen than the calmer water of reservoirs or lakes. Without flowing water, many species of fish, mussels, and aquatic insects cannot survive, and these species are replaced by species that tolerate standing water (lake) conditions. The operation of some hydropower dams result in a wide range of water releases from very high flow when generating to almost no flow when generators are off-line. The frequency and wide variation in flows can adversely impact fish and other aquatic organisms below the dam.
<http://www.aces.edu/pubs/docs/A/ANR-0911/www.bama.ua.edu/~joshua/archive/aug06/Bennett%20and%20Howell.pdf>
http://www.mobilebaynep.com/images/uploads/library/03-05_Implementationfinal.pdf
16. **Mercury and other chemical concentrations** exceed acceptable levels in multiple areas of south Alabama and warrants further investigation and analysis.
<http://www.mobilebaynep.com/images/uploads/library/mercury-final-report.pdf>

17. Nuisance Species Management – No plan ALANSTF (Plan for Aquatic Nuisance Species in AL)

Opportunities

Are there any opportunities that you know of to support the long term sustainability of this value?

1. Develop Research, monitoring, management plans- Improved data collection
2. Ecosystem based monitoring program, integrating existing programs under a unified data envelope
3. Ecosystem restoration, protection, conservation- Living shorelines, reefs, freshwater wetlands, marshes
4. Restore natural conditions to promote re-establishment of SAV
5. Ecosystem based management
6. Improving/ better integration of Federal, State, local regulations and policies, technical training
7. Better enforcement of current regulations
8. Training of charter boats and guides, commercial and recreational fishermen
9. Volunteer monitoring
10. Outreach, education on state of Fishery-Deep Sea Fishing Rodeo, Greater Gulf State Fair, other
11. Restore Act? NRDA
12. Educating tourists during their recreational activities– deep sea and pier fishing
13. Joint state projects
14. Mobile phone apps (fishing regulations app, one already for federal species through Gulf Council)