
CHAPTER 4

Wetland Programs

Introduction

Various assessments of Georgia's wetlands have identified from 4.9 to 7.2 million acres, including more than 600,000 acres of open water habitat found in estuarine, riverine, palustrine, and lacustrine environments. Estimates of wetland losses since colonial settlement beginning in 1733 and expanding over the next two and one-half centuries are between 20-25% of the original wetland acreage.

Georgia has approximately 100 miles of shoreline along the south Atlantic, with extensive tidal marshes separating the barrier island sequences of Pleistocene and Holocene age from the mainland. Georgia's coastline and tidal marshes are well preserved compared to other South Atlantic states.

Georgia's interior ranges in elevation from sea level to 4,788 feet at Brasstown Bald in the Blue Ridge Mountain Province. At the higher elevations, significant, pristine cool water streams originate and flow down steep to moderate gradients until they encounter lower elevations of the Piedmont Province. Many of the major tributaries originating in the mountains and piedmont have been impounded for hydropower and water supply reservoirs. These man-made lakes constitute significant recreational resources and valuable fishery habitat. At the fall line, streams flowing southeasterly to the Atlantic, or south southwesterly to the Gulf, have formed large floodplains as each encounters the soft sediments of the upper Coastal Plain.

Other significant wetlands found in the state are associated with blackwater streams originating in the Coastal Plain, lime sinkholes, springheads, Carolina bays, and the great Okefenokee Swamp, a bog-swamp measuring approximately one-half million acres in South Georgia and north Florida. The swamp drains to the east by the St. Marys River into the Atlantic, and to the west by the Suwannee River into the Gulf.

The lower Coastal Plain has frequently been referred to as Atlantic Coastal Flatwoods, where seven tidal rivers headwater in the ancient shoreline terraces and sediments of Pleistocene age. Scattered throughout the flatwoods are isolated depressional wetlands and drainageways dominated by needle-leaved and broad-leaved tree species adapted to long hydroperiods.

Due to considerable variation in the landscape in topography, hydrology, geology, soils, and climatic regime, the state has one of the highest levels of biodiversity in the eastern United States. The state provides a diversity of habitats for nearly 4,000 vascular plant species and slightly less than 1,000 vertebrate species. Numerous plant and animal species are endemic to the state. Many of the rarer species are dependent upon wetlands for survival.

Extent of Wetland Resources

The USDA Natural Resources Conservation Service, the USFWS National Wetland Inventory, and the state Department of Natural Resources have carried out assessments of wetland resources in Georgia with varying degrees of success. The extent and location of specific tidal marsh types have been reported in numerous scientific papers and reports. Estimates of other specific wetlands types, such as bottomland hardwood swamps, are also reported in studies on a regional scale.

Hydric soils as mapped in county soil surveys are useful indicators of the location and extent of wetlands for the majority of Georgia counties with complete surveys. The dates of photography from which the survey maps are derived vary widely across the state. There is an ongoing effort by NRCS to develop digital databases at the soil mapping unit level, but most of these data sets are not yet available. However, soil surveys have proven useful in wetland delineation in the field and in the development of wetland inventories. County acreage summaries provide useful information on the distribution of wetlands across the state.

The National Wetland Inventory (NWI) of the U.S. Fish and Wildlife Service utilizes soil survey information during photo-interpretation in the development of the 7.5-minute, 1:24,000 scale products of this nationwide

wetland inventory effort. Wetlands are classified according to the Cowardin system, providing some level of detail as to the characterization of individual wetlands. Draft products are available for the 1,017 7.5 minute quadrangles in the state of Georgia, and many final map products have been produced. All of these quadrangles are available in a digital format, and an effort is underway to combine them into a single, seamless database for Georgia. Although not intended for use in jurisdictional determinations of wetlands, these products are invaluable for site surveys, trends analysis, and landuse planning.

A complementary database was completed by Georgia DNR in 1991 and is based on classification of Landsat TM satellite imagery. Due to the limitations of remote sensing technology, the classification scheme is simplified in comparison to the Cowardin system used with NWI. Integration of this digital information with Geographic Information System technology is straightforward. The inclusion of other upland landcover classes adds to the utility of this database in environmental analysis and landuse planning.

A summary of wetland acreages derived from this database is as follows: open water = 647,501; emergent wetlands = 351,470; scrub/shrub wetlands = 387,793; forested wetlands = 3,194,593; salt marshes = 241,242; brackish marshes = 91,951; and tidal flats/beaches = 14,750. The total wetland acreage based on Landsat TM imagery is 4,929,300 acres or 13.1% of Georgia's land area. This data underestimates the acreage of forested wetlands in the Piedmont and Coastal Plain, where considerable acreage may have been classified as hardwood or mixed forest. The data overestimates emergent and scrub/shrub wetlands in the pine flatwoods because of wet surface soils associated with clear-cuts or young pine plantations. The data under-estimates the tidal marshes and tidal flats because of a high tide stage that flooded considerable acreage. The targeted accuracy level for the overall landcover assessment using Landsat imagery was 85%. However, the classification error was not necessarily distributed equally throughout all classes.

Georgia reported landcover statistics by county in 1996 that included acreage occurrences for 15 landcover classes derived from early spring Landsat TM satellite imagery from 1988-1990. This document (Project Report 26) and accompanying landcover map of the state at a scale of 1:633,600 (1 inch = 10 miles) are available to the public from the Georgia Geologic Survey, Map Sales office.

Similar Landsat-based landcover databases have been produced with more recent imagery. The Federal government completed mapping in Georgia using imagery from the mid-1990s as part of the National Landcover Database. The Georgia Gap Analysis Program, supported in part by Georgia DNR, completed an 18-class database using imagery from 1997-1999. Both these databases include wetland landcover classes.

Wetland Trends In Georgia

The loss of wetlands has become an issue of increasing concern to the general public because of associated adverse impacts to flood control, water quality, aquatic wildlife habitat, rare and endangered species habitat, aesthetics, and recreation. Historically, we have often treated wetlands as "wastelands" that needed "improvement". Today, "swamp reclamation" acts are no longer funded or approved by Congress and wetland losses are in part lessened. However, we still lack accurate assessments for current and historic wetland acreages. For this reason, we have varying accounts of wetland losses, which provide some confusion in the public's mind as to trends.

The most recent (1991) and precise measures of Georgia's wetland acreages were developed by the U.S. Fish and Wildlife Service's National Wetland Inventory efforts. This statistically sound study was based upon 206 sample plots of four (4) square miles each that were delineated and measured from 1975 and 1982 aerial photography. The total acreage of wetlands for Georgia was estimated at 7,714,285 acres in 1982 as compared to earlier estimates of 5.2 million acres. This estimate is considerably higher than the total shown in a 1984 trend study and is due in part to better quality photography.

Georgia's total wetland area covers an estimated 20 percent of the State's landscape. This total (7.7 mil. ac.) includes approximately 367,000 acres of estuarine wetlands and 7.3 million acres of palustrine wetlands (forested wetlands, scrub-shrub, and emergents). A net wetland loss due to conversion of approximately

78,000 acres was estimated for the seven (7) year period, while timber harvesting altered 455,000 acres. These latter estimates are less reliable than the total acreage and are slightly higher than the 1984 study. Regardless of the method used to measure total acreage or wetland losses, Georgia still retains the highest percentage of pre-colonial wetland acreage of any southeastern state. The state lacks the resources to conduct an independent monitoring program on the frequency of wetland alterations by class or type.

All dredge and fill activities in freshwater wetlands are regulated in Georgia by the U.S. Army Corps of Engineers (COE). Joint permit procedures between the COE and DNR, including public notices, are carried out in tidally influenced wetlands. The Coastal Marshlands Protection Committee, a State permitting authority, issues separate permits for alterations to salt marsh and the State's waterbottoms. Enforcement is carried out by the State, COE and EPA in tidal waters, and by the COE and EPA in freshwater systems. Normal agricultural and silvicultural operations are exempted under Section 404 regulations with certain conditions.

Integrity of Wetland Resources

Wetland Use Support. In Georgia, wetland uses are tied to both the state water quality standards through the definition of "water" or "waters of the state", and to established criteria for wetlands protection (Chap. 391-3-16-03) associated with the Comprehensive Planning Act of 1989 (O.C.G.A. 12-2-8).

The definition of "water" or "waters of the State" (Chap. 391-3-6) means "any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wells, wetlands, and all other bodies of surface or subsurface water, natural or artificial, lying within or forming a part of the boundaries of the state which are not entirely confined and retained completely upon the property of a single individual partnership, or corporation". The waters use classifications and general criteria for all waters are discussed elsewhere in this report.

The Comprehensive Planning Act requires all local governments and regional development centers to recognize or acknowledge the importance of wetlands for the public good in the landuse planning process. All local governments (municipalities and county governments) were required, beginning in 1990 and ending in 1995, to meet minimum criteria for wetland use and protection. Each government is required to map wetlands using DNR or NWI maps, and describe how wetlands will be protected from future development.

The wetlands protection criteria define freshwater "wetlands" as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 32.93)". This definition is not intended to include "coastal marshlands" or tidal salt marshes as defined by the Coastal Marshlands Protection Act. The minimum area of wetlands to be identified in landuse planning is not to exceed five acres.

The categories of freshwater wetlands and aquatic habitats to be identified, defined and mapped by the State and included in landuse planning are open water, non-forested emergent, scrub/shrub, forested and altered wetlands. Land use plans must address at least the following considerations with regard to wetland classes identified in the database:

- Whether impacts to an area would adversely affect the public health, safety, welfare, or the property of others.
- Whether the area is unique or significant in the conservation of flora and fauna including threatened, rare or endangered species.
- Whether alteration or impacts to wetlands will adversely affect the function, including the flow or quality of water, cause erosion or shoaling, or impact navigation.
- Whether impacts or modification by a project would adversely affect fishing or recreational use of wetlands.
- Whether an alteration or impact would be temporary in nature.

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- Whether the project contains significant state historical and archaeological resources, defined as "Properties On or Eligible for the National Register of Historic Places".
 - Whether alteration of wetlands would have measurable adverse impacts on adjacent sensitive natural areas.
 - Where wetlands have been created for mitigation purposes under Section 404 of the Clean Water Act, such wetlands shall be considered for protection.

The mapping of altered wetlands defined as "areas with hydric soils that have been denuded of natural vegetation and put to other uses, such as pasture, row crops, etc., but that otherwise retain certain wetland functions and values" has not been completed due to a lack of resources. It is unlikely that there will be any significant resources committed at the state or federal levels for monitoring wetland alterations and conversions in the near future.

The acceptable uses of wetlands without long-term impairment of function were identified in wetland protection criteria as the following:

Timber production and harvesting. The socio-economic value of wetlands for consumptive uses such as timber and wood products production is extremely high. High quality hardwoods are produced along the major river corridors throughout the state. There are established "best management practices" for harvesting in wetlands; the level of compliance with these voluntary standards is monitored by the Georgia Forestry Commission in cooperation with the DNR-EPD.

Wildlife and fisheries management. Wetlands are an invaluable resource, both ecologically and economically. They are among the state's most biologically productive ecosystems and are crucial as habitats for wildlife. Wetlands function as essential breeding, spawning, nursery, nesting, migratory, and/or wintering habitat for much of the migratory and resident fauna. More than 40% of the state threatened and endangered plant and animal species depend heavily on wetlands. Coastal wetlands function as nursery and spawning grounds for 60-90% of commercial fin and shellfish catches. In addition, high levels of plant productivity in coastal wetlands contribute to corresponding levels of invertebrate organisms upon which fish and other animals feed. Plant decomposition in wetlands is also important for waterfowl production, which contributes to the economy through hunting-related expenditures.

Water Quality Protection. Wetlands help to maintain water quality and improve degraded water by removing, transforming, or retaining nutrients; processing chemical and organic wastes and pollutants; and reducing sediment loads. Wetlands function as sediment, toxic substance, and nutrient traps, performing functions similar to a waste treatment plant. Wetland vegetation filters and retains sediments which otherwise enter lakes, streams, and reservoirs, often necessitating costly maintenance dredging activities. Wetlands may also perform similar purification functions with respect to ground water. Those wetlands hydrologically connected to ground water could also be a source of recharge for underground water supplies, in which case the natural settling and filtering of pollutants would increase the purity of the water resource. As with any filter, wetlands can be damaged, overloaded, or made nonfunctional. Wetlands conservation and careful management of point and non-point pollutants can provide good wetland filtration of materials.

Recreation. The non-consumptive uses of wetlands may contribute most significantly and positively to quality of life, yet these uses are often undervalued or unrecognized altogether. Wetlands are areas of great diversity and beauty and provide open space for recreational and visual enjoyment. They support a myriad of recreational activities including boating, swimming, birdwatching, and photography. In addition, tidal, coastal, and inland wetlands provide educational opportunities for nature observation and scientific study.

Natural water quality treatment or purification. (See wastewater treatment above). Maintaining the biological and ecological integrity of wetlands is essential to the capitalization of these natural systems for the improvement of water quality and quantity. The polluting, filling, silting, channelizing, draining, dredging, and converting to other uses of wetlands are destructive to the ecological functions of wetlands.

Other uses permitted under Section 404 of the Clean Water Act. Such uses must have an overwhelming public interest. Unacceptable uses of wetlands include:

- Receiving areas for toxic or hazardous waste or other contaminants.
- Hazardous or sanitary waste landfills.
- Other uses unapproved by local governments.

The criteria established by the State for freshwater wetlands are designed to assist in the identification and protection of wetlands, and do not constitute a state or local permit program. The protection of coastal marshlands, seashores, and tidal waterbottoms is described under the Estuary and Coastal Assessment section of this report.

Wetland Monitoring

The state maintains monitoring and enforcement procedures for estuarine marshes under authority of the Coastal Marshlands Protection Act of 1970. Monthly or bimonthly over-flights are made of the Georgia coastline for potential violations. Restoration and penalties are provided for in the Act.

The State does not maintain a specific monitoring program for freshwater wetlands because of the size of the area (>37 million acres), lack of resources, and weak public support for a state-managed regulatory program. At this time no assessment of costs has been made for establishing any monitoring of wetland changes for the entire state.

Additional Wetlands Protection Activities

Georgia is protecting its wetlands through aggressive land acquisition, public education, land use planning, regulatory programs, and wetland restoration. Since 1987, the state has acquired more than 200,000 acres through program expansion and the Preservation 2000 and RiverCare 2000 acquisition efforts. Additional protection to wetlands is provided either directly or indirectly by several statutes listed below, but described elsewhere in this report. These state laws are as follows:

- Coastal Marshlands Protection Act
- Shore Protection Act
- 401 Water Quality Certification
- Water Quality Control Act
- Ground Water Use Act
- Safe Drinking Water Act
- Erosion and Sedimentation Control Act
- Metropolitan Rivers Protection Act

Land Acquisition. Recent land acquisition activities that represent significant protection of wetland acreage include Chickasawhatchee Swamp WMA in southwest Georgia, where combined wetland and upland acreage totals 19,680 acres. In the Altamaha River basin, DNR and The Nature Conservancy at Moody Forest Natural Area jointly manage a total of 3,600 acres containing significant floodplain acreage. Preservation by DNR of a Carolina bay at Big Dukes Pond NA added 1,220 acres, including a wood stork rookery site. Other wetland acres have recently been protected through the establishment of Conasauga River Natural Area in northwest Georgia.

Education And Public Outreach. WRD has one full-time person involved in aquatic education, providing training for educators in wetland values and acting as a resource person for developing and coordinating teaching materials. The Aquatic Education Program consists of three key components: Youth Education, Adult Education, and Kids Fishing. Youth Education involves training educators to use Aquatic Project Wild (APW), which consists of instructional workshops and supplementary conservation curriculum materials for teachers of K-12 grade age children. About 1,000 educators are trained annually to use APW in the

classroom. Adult Education consists primarily of producing educational materials such as the annual Freshwater and Saltwater Sport Fishing Regulations, Reservoir and Southeast Rivers Fishing Predictions, Small Georgia Lakes Open to Public Fishing, Introduction to Trout Fishing, news releases, brochures, radio Public Service Announcements, videos, and staff presentations to sportsmen and civic organizations, as well as large events. The purpose of Kids Fishing Events (KFEs) is to introduce youth and their families to the joys of recreational fishing. The Aquatic Education Program touches tens of thousands of youths and adults each year, bringing these people closer to the environment, and teaching them conservation principles that are important to sustaining wetlands and healthy fish populations.

State Protected Species in Wetlands. With assistance from the USFWS, Section 6 Federal Aid Program, and USDA-FS Stewardship Program, WRD developed and published a descriptive handbook of Georgia's 103 protected plant species that include endangered, threatened, unusual, and rare plant species found in the state. Forty percent of the protected species are dependent on wetland or aquatic habitats in the vast majority known occurrences. The "Protected Plants of Georgia" book includes illustrations, descriptions, threats to species or their habitats, range in adjoining states, historical notes, and recommendations for management of protected species habitats. The protected plant book has been distributed to all DNR personnel and wildlife biologists involved in the management of state properties. It has been distributed to the Georgia Forestry Commission, USDA-Natural Resource Conservation Service, Forest Service, USFWS, Corps of Engineers, US EPA, major utility companies, forest products corporations, consulting biologists, educators, and private citizens. The book calls the public's attention to the need to protect wetlands on private property as well as public property in the state. In addition, the following species are subjects of continuing research funded through Section 6 USFWS grant-in-aid programs:

- Loggerhead sea turtle - nest survey and protection, educational material
- Wood stork - aerial surveys of rookeries and educational material
- Bald eagle - nest surveys, monitoring, and management
- Manatee - comprehensive management plan implementation, investigate and analyze habitat use and movements
- Wood stork - ecology of coastal colonies
- Listed aquatic species - Conasauga River corridor identification and mapping of essential habitats
- Listed animal species - protected animal book for the State of Georgia (111 species)
- Goldline darter - life history and status in Coosawattee River system
- Tennessee Yellow-eyed Grass - surveys for undocumented populations
- Whorled Sunflower - habitat management plan development
- Pitcherplant Bogs - habitat management plan development
- Swamp Buckthorn - status survey

Federal funds made available through USFWS were used to complete an assessment of Carolina bays in Georgia. A combination of aerial photography and field surveys were used to priorities these wetlands for value in protecting wetland functions and in providing significant habitat to support wetland-dependant ecosystems. A final report on this effort will be available in 2004.

Managing Wetlands on State WMAs, PFAs, Parks, Heritage Preserves, and Natural Areas. M.A.R.S.H. Project. Georgia DNR-WRD has a cooperative agreement with Ducks Unlimited (DU) for the purpose of acquiring, developing, restoring, or enhancing waterfowl habitat. A major aspect of this agreement is the M.A.R.S.H. program (Matching Aid to Restore States Habitat). Under the MARSH program, 7.5% of the money raised by DU in Georgia is made available as matching funds for work to develop, improve, or restore waterfowl habitat. Since 1985, more than 1.2 million dollars have been spent on habitat projects in the state of Georgia involving thousands of acres of wetlands. Completed projects include:

Altamaha WMA - 4,500 acres	Arrowhead - 28 acres
Ansley-Hodges Memorial Marsh - 42 acres	Blanton Creek WMA - 50 acres
B.F. Grant WMA - 45 acres	Clark Hill - 70 acres
Crockford-Pigeon Mtn WMA - 35 acres	Dyar Pasture - 60 acres
Fishing Creek WMA - 50 acres	Grand Bay WMA - 8,730 acres
Horse Creek WMA - 110 acres	Joe Kurz WMA - 50 acres
Mayhaw WMA - 45 acres	Oconee WMA - 150 acres
Rum Creek WMA - 25 acres	West Point WMA - 20 acres

Assessment of DNR-Managed Wetlands. In 1990, while developing a state wetland conservation plan and strategy for mitigation of impacts from water supply reservoirs and public fishing lakes, Georgia DNR/WRD made an assessment of wetlands on DNR-managed state-owned lands. As part of this assessment, an effort was made to identify degraded wetland acreage suitable for mitigation. Degraded wetlands were identified as having potentials for restoration or enhancement of wetland functions and values.

Table 4-1 summarizes DNR-managed lands (as of 1990) by various categories. This plan was developed by DNR and Law Environmental, Inc. to mitigate potential impacts from future development of regional water supply reservoirs and public fishing areas. DNR still has under study and evaluation a potential regional water supply reservoir in the Tallapoosa River basin. To date there has been implementation of mitigation on state lands at a mitigation site at Horse Creek WMA for wetlands losses associated with the construction of the Dodge County PFA. Mitigation is being pursued for wetland impacts associated with the development of a public fishing area at Ocmulgee WMA.

TABLE 4-1. ASSESSMENT OF DNR LANDS (1990).

Categories	Total Acreage	Total Wetland Acreage	Acreage Suitable for Mitigation	
			Restoration	Enhancement
WMA/PFA Sites	128,106	38,754	1,782	9,749
Park Sites	43,850	6,158	509	86
Other Sites*	58,712	12,126	83	2,322
	230,668	57,038	2,374	12,157

*Includes natural areas, heritage preserves, and some barrier islands (Ossabaw, Sapelo)

CHAPTER 5

Estuary and Coastal Programs

Background

The Georgia Department of Natural Resources (DNR) Coastal Resources Division (CRD) manages Georgia's coastal resources. The CRD's Ecological Services Section administers Georgia's Coastal Management Program and its enforceable authorities, manages Georgia's shellfish harvest program, and conducts water quality monitoring based on specific grants and programmatic requirements. The CRD's Marine Fisheries Section manages Georgia's marine fisheries, balancing the long-term health of fish populations with the needs of those who fish for commercial and recreational purposes. The Section conducts scientific surveys of marine organisms and their habitats; collects harvest and fishing effort information; and assesses, restores and enhances fish habitats; along with other responsibilities. The DNR Wildlife Resources (WRD) and Environmental Protection Divisions (GAEPD) each play additional roles to manage resources in the Georgia coastal environment.

Georgia Coastal Management Program

Recognizing the economic importance of environmentally sensitive coastal areas, the Federal Coastal Zone Management Act of 1972 encourages states to balance sustainable development with resource protection in their coastal zone. As an incentive, the federal government awards states financial assistance to develop and implement coastal zone management programs that fulfill the guidelines established by the Act. Georgia entered this national framework in 1998 upon the approval of the Georgia Coastal Management Program (GCMP) by the National Oceanic and Atmospheric Administration. Financial assistance under the federal grant to the GCMP has been used, in part, to support the Public Health Water Quality Monitoring Program described below.

The Coastal Management Program has provided guidance and technical assistance to improve coastal water quality in general, and in the development of a Coastal Non-Point Source Control Program in particular. Under the Coastal Zone Management Act Reauthorization Amendments of 1990, Congress added a section entitled "Protecting Coastal Waters." That section directs states with federally approved coastal management programs to develop a Coastal Non-Point Source Program. To that end, the GAEPD is assisting the GCMP in 1) identifying land uses which may cause or contribute to the degradation of coastal waters, 2) identifying critical coastal areas adjacent to affected coastal waters, 3) identification of appropriate measures related to land use impacts to achieve and maintain water quality standards and designated uses, and 4) identifying management boundaries to more effectively manage land use impacts and water uses to protect coastal waters.

Public Health Water Quality Monitoring Program

The CRD conducts water quality monitoring in estuarine and near-shore coastal waters through its Public Health Water Quality Monitoring Program. This Program has four distinct parts. The Shellfish Sanitation and Beach Water Quality Monitoring Programs are concerned with public health. The Nutrient Monitoring Program and the National Coastal Assessment are designed to generate baseline-monitoring data for trends.

Shellfish Sanitation Program

CRD's Shellfish Sanitation Program monitors the quality of Georgia's shellfish harvest waters for harmful bacteria that might affect the safety of shellfish for human consumption. Nine (9) harvest areas are designated for recreational picking of oysters and clams by the general public. An additional seventeen (17) harvest areas are designated for the commercial harvest of oysters and clams.

The US Food and Drug Administration's National Shellfish Sanitation Program (NSSP) establishes national standards to show that shellfish harvest areas are "not subject to contamination from human and/or animal fecal matter in amounts that in the judgment of the State Shellfish Control Authority may present an actual or potential hazard to public health." Water samples from each approved harvest area are collected by CRD and

analyzed regularly to ensure the area is below the established fecal coliform threshold. Waters approved for shellfish harvest must have a geometric mean that does not exceed the threshold set forth by the NSSP.

TABLE 5-1. LOCATION AND SIZE OF AREAS APPROVED FOR SHELLFISH HARVEST

County	Approved	Leased	Public
Chatham	15,351 acres	4,887 acres	1,267 acres
Bryan/Liberty	55,747 acres	1,706 acres	936 acres
McIntosh	50,170 acres	13,756 acres	1,974 acres
Glynn/Camden	37,018 acres	4,855 acres	7,188 acres

Water quality sampling occurs every other month at eighty-four (84) stations in five (5) counties on the coast including Chatham, Liberty, McIntosh, Glynn, and Camden counties. These stations are located to provide representative coverage of all the approved harvest areas along the coast.

Beach Monitoring Program

The Beach Monitoring Program was developed in response to the federal Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000. The BEACH Act is an amendment to the Federal Clean Water Act. The Act requires states to: 1) identify and prioritize their coastal recreational beaches; 2) monitor the beaches for the presence of the bacterial indicator *Enterococcus*; 3) notify the public when the EPA threshold for *Enterococcus* has been exceeded; and 4) report the location, monitoring, and notification data to EPA.

Georgia's recreational beaches have been identified and prioritized into three (3) tiers based on their use and proximity to potential pollution sources. Tier 1 beaches are high-use beaches. Tier 2 beaches are lower-use beaches. Tier 3 beaches are lowest-use or at low probability for potential pollution. Water quality sampling occurs regularly depending upon the tier: Tier 1 beaches are monitored weekly year-round; Tier 2 beaches are monitored monthly from April through November; and Tier 3 beaches are not monitored. Beaches that exceed the threshold for *Enterococcus* are put under a swimming advisory that is not lifted until the levels of bacteria are sufficiently reduced, based on resampling. Beaches under a permanent swimming advisory are monitored quarterly.

Nutrient Monitoring Program

The Nutrient Monitoring Program assesses nutrient baseline concentrations in coastal sounds and estuaries. High nutrient loads have been linked to outbreaks of harmful algal blooms in other states and can result in large kills of fish and other marine life as well as human sickness. CRD has been monitoring nutrients at eighty-four (84) stations along the coast since 2000 to establish trends in nitrite nitrogen, ammonia nitrogen, total dissolved phosphorus, ortho- phosphate, and silicate.

Nutrient samples are collected monthly in the Ogeechee, Altamaha, and St. Marys Rivers at six (6) sites in each river to provide data for the upper estuary/lower salinity environments. Samples are also collected at thirty (30) of the eighty-four (84) shellfish sample sites to provide both nutrient and fecal coliform bacteria data from tidal rivers and sounds. Nutrient data for the lower sounds are collected at twenty-four (24) sites in conjunction with the monthly Ecological Monitoring Survey performed by the Marine Fisheries Section with the Research Vessel ANNA. Altamaha and Doboy Sounds, which are not routinely sampled on the Ecological Monitoring Survey, are also sampled monthly with an additional six (6) sites per sound system.

National Coastal Assessment Program

The National Coastal Assessment Program (NCA) was a five-year pilot study (2000-2006) funded by the U.S. Environmental Protection Agency (EPA) to establish a baseline condition as part of a national survey of

estuarine environmental health. As a participant in the national program, Georgia's NCA Program sampled fifty (50) sites each year throughout the Georgia coast for a core suite of indicators including water quality parameters, sediment chemistry, sediment toxicity, benthic community composition, fish community composition, fish pathology, and contaminants in fish. EPA selected the sample sites randomly, and data were collected in July and August of each year. The same sampling time frame, sample site design, and protocol were followed by each participating state to generate a comparable "snapshot" of national estuarine conditions.

NCA data are being used nationally by EPA to generate the National Coastal Condition Reports. CRD recently completed a two-year Georgia Coastal Condition Report (2000-2001); an update to this report is currently being drafted to summarize all available data from Georgia's National Coastal Assessment Program.

Coastal Streams, Harbors, and Sounds

This 305(b) report contains information on many coastal streams, harbors, and sounds. Several water bodies have been shown to have low dissolved oxygen (DO) readings over discrete periods of time during an annual cycle. EPD has categorized these streams as needing further assessment. A large percentage of the low dissolved oxygen readings occurred in the late summer and early fall of 2003, a period of prolonged, extreme drought. In addition to the dry conditions, water temperatures and salinities during this period were noted to be well above average for all of the water quality monitoring stations in coastal Georgia. To more accurately represent and report on natural dissolved oxygen levels in coastal water bodies, additional directed effort will be required at each location to increase the general state of knowledge for these estuarine systems.

Coastal Beaches

This report contains information on twenty-seven (27) coastal beaches. Of these, twenty-one (21) are considered to be supporting their designated use of coastal recreation. Six (6) beaches are considered as not supporting their designated use: two (2) are located on Jekyll Island at the St. Andrews picnic area and at Clam Creek; and one (1) beach is on St. Simons Island near Gould's inlet. All three (3) of these beaches are Tier 1 and are sampled weekly year-round. The other three (3) "not supporting" beaches are Tier 2 beaches, which are sampled less frequently. The Kings Ferry beach is located at a small municipal park on the Ogeechee River in Chatham County. Reimold's Pasture is a small island in Buttermilk sound at the mouth of the Altamaha River. The Blythe Island sandbar is located in the South Brunswick River in Glynn County.

None of the listed beaches have an identified point source of pollution. A bacterial source tracking study, Targeted Sampling And Bacterial Source Tracking To Identify Sources Of Fecal Contamination Responsible For Beach Advisories On The Georgia Coast (Hartel, 2006), conducted at St. Simons and Jekyll Island beaches, found that bacteria levels were generally higher in the marsh areas adjacent to the beaches and were attributed to wildlife. Similar results were reported in another study, Combining Targeted Sampling and Fluorometry to Identify Sources of Human Fecal Contamination in Georgia's Coastal Waters (Hartel, 2007), performed at Kings Ferry Beach. No traces of human bacteria were found at any of the sites involved in these studies.

Data Not Included in Assessment

Much of the data used to generate the 305(b)/303(d) list for coastal streams, harbors, and sounds were collected by CRD for the programs as described earlier in this chapter. Other data are used by CRD to address fisheries management or recreational use in specific areas along the coast, but much of these data do not meet the minimum spatial or temporal (frequency) criteria of the GAEPD 2008 listing methodology guidance document and cannot be used to assess the ability of a water body to support its designated use(s). Data from the Georgia National Coastal Assessment (NCA) Program were not included for this listing period. NCA data are based on a probabilistic, random sampling design with only one sample per year at each location. For the purposes of 305(b)/303(d), these data may be used in the future to augment existing data sets.

The state's list of assessed waters for beaches does not contain all the coastal beaches that have been identified and prioritized by CRD. Tier 3 beaches are not monitored, so no data are available for assessment. Tier 3 beaches have few potential pollution sources.

Commercial and Recreational Fisheries

CRD has several projects that produce information used to determine the status of commercially and recreationally important fish, crustaceans, and mollusks. The Ecological Monitoring Survey conducts monthly assessment trawls (blue crabs, shrimp, and beginning in 2003, finfish) in the Wassaw, Ossabaw, Sapelo, St. Simons, St. Andrew and Cumberland estuaries. Data from this survey is used to describe the abundance, size composition, reproductive status of penaeid shrimp and blue crab. In addition, information collected on finfish and other invertebrate species since 2003 provides a broad ecologically based evaluation of species' abundance, distribution, and diversity in these estuaries. The Marine Sport fish Population Health Study uses gill and trammel nets to capture finfish in the Wassaw and Altamaha River Delta estuaries.

The Fisheries Dependent Work Unit collects catch and effort information from the recreational and commercial fisheries in cooperation with the National Marine Fisheries Service. Total annual commercial landings in Georgia ranged from 7.03 to 12.84 million pounds of product during the period from 1997 to 2006, with an annual average of 8.76 million pounds. Penaeid shrimps are the most valuable catch in Georgia commercial landings, typically totaling over 13 million dollars (3.51 million pounds of tails) in unadjusted, ex-vessel value during recent years. Catches are composed primarily of white shrimp (*Litopenaeus setiferus*) during the fall, winter and spring, and brown shrimp (*Farfantepenaeus aztecus*) during the summer. These shrimp spawn in oceanic waters, but depend on the salt marsh wetlands to foster their juvenile and sub-adult stages. White shrimp landings have varied over the last 50 years with a recent downward trend due to declining fishing effort. Research has shown that densities of spawning stock, and to a lesser extent fall harvest, respond strongly to cold air outbreaks during the early winter that can produce wide scale kills of white shrimp, and to a suite of environmental variables impacting the salt marsh ecosystem that produce a range of growing conditions. Cold weather kills have been associated with abnormally cold winters in 1984, 1989, and 2000.

A disease called black gill, caused by a ciliated protozoan, has impacted shrimp in several recent years. It was first observed in 1996 in the southern portion of the state and was speculated to be caused by freshets associated with Hurricane Fran and Tropical Storm Josephine. The disease has occurred each year since with the exception of 1997, 1998, and 2001. The disease appears to progress from north to south, first appearing in the Wassaw estuary in August and being most prevalent in September. The disease seems to dissipate by December. Annual infection rates in 2002 were the highest ever recorded, with the coast-wide annual rate at 18.1%. The life cycle of this protozoan is not completely understood, and its impact on shrimp survival is uncertain. However, in 2002, spring white shrimp catches were above normal through August and after the disease outbreak dropped 50% below the long-term average. Although catch rates from fisheries independent monitoring surveys appear to have a negative relationship with infection rates, this relationship is not statistically significant. The annual infection rate in 2007 reached 13.5% but was as high as 82% in particular estuaries (St. Simons) during specific months (October). Research is needed to understand this organism's life cycle and the environmental factors causing it to proliferate in some years but not others.

Trends in the brown shrimp fishery present a different picture. While recent landings and scientific survey catches have varied with no apparent pattern, the long-term (40 year) trend in brown shrimp landings has been downward. Several alternative hypotheses bear examination. Reported declines in brown shrimp production may reflect the effects of a shrinking range due to land use practices, and climatological changes. Conditions for juvenile growth and survival may have been altered by a changing climate or direct and indirect alteration to nursery grounds (losses or changes in the quality of fresh and salt water wetlands). Additionally, possible misclassification of brown shrimp by port agents may be a factor in the earlier time series of the reported landings. Although highly unlikely with current fishing technology and economic conditions, over fishing of the spawning stock may be resulting in poorer recruitment to Georgia's nursery grounds. Some combination of factors may be influencing stock abundance. Economic conditions in all domestic shrimp

fisheries are declining, primarily due to low unit prices kept down by high volumes of imported product, and by increasing costs of operation.

Blue crabs live longer than penaeid shrimps (3-4 years versus 1-2 years), and also exhibit less extreme fluctuations in annual abundance from one year to the next. Reported annual blue crab (*Callinectes sapidus*) landings in 2006 were above the most recent 10-year average of 3.7 million pounds (2006 = 4.1 million pounds). A severe drought from 1998 to 2002 reduced annual harvest 80% of the long-term average of 7.99 million pounds. The drought resulted in a reduction in the quantity of oligohaline and mesohaline areas within Georgia's estuaries. This effect was more pronounced in estuaries that did not receive direct freshwater inflow from rivers. It is believed this altered salinity profile resulted in (1) higher blue crab predation, (2) increased prevalence of the fatal disease caused by the organism, *Hematodinium* sp, (3) reduction in the quantity of oligohaline nursery habitat, and (4) recruitment failure. In 2007, drought conditions existed in the foothills, piedmont, and upper coastal plain regions of Georgia. However, localized rainfall moderated the severity of the drought along the coast.

Commercial finfish landings fluctuate annually depending on market conditions and the impacts of management. American shad populations in the Altamaha River have fluctuated over the past 30 years. Research conducted in 1967 and 1968 generated population size estimates, and the shad run of 1.9 million fish in 1968 was the largest of the time series examined. Additional research conducted since 1982 has been able to provide updated population estimates and has shown Altamaha shad runs to be cyclical on a 5-7 year time scale. From 1982 to 1983 the population increased from 92,687 to 201,683. Shad populations were generally stable from 1983-1985 and then declined from 214,928 shad in 1985 to a low of 70,396 fish in 1990. The population then entered a period of increase reaching a peak abundance level of 284,442 in 1996. A statistically significant decrease in commercial fishing effort occurred from 1982 to 1991, however, it does not appear that this decrease in effort was directly related to an increase in American shad abundance. From 1997 through 2002 shad abundance steadily declined to a low of 87,267 fish and by 2006 population numbers had once again increased to an estimated 223,046 fish. Anecdotal evidence indicates that participation in the American shad fishery continues to decline. Apparently, as older fishermen leave, there are few new entrants into the fishery. Since 2001, effort estimates have been collected using a trip ticket system with effort being recorded as the number of trips for both the set and drift gill net fisheries. Effort generally declined from a high of 860 trips in 2001 to a low of 193 trips in 2005. However, in 2006 effort increased to 645 trips and was likely related to the relatively strong shad run that occurred that spring. Regulations have remained fairly constant over the past 15 years. The only modifications were a 15-day season extension in 1983, change in commercial fishing regulations in 1984 to clarify open and closed areas on the Altamaha River, and 15-day season extensions on the Savannah River from 2003-2007. No changes were made to shad sport fishing regulations. While the increases in landings and stock size during the early 1990's and 2000's were significant, they still represent only a fraction of the 1968 run.

Total landings of bivalve mollusks have fluctuated greatly over the last 30 years. During the 1970's landings were totally dominated by oysters (*Crassostrea* sp.), generally over 50,000 pounds of raw meats per annum. During the early 1980's fishermen increasingly focused on hard clams (*Mercenaria* sp.) due to stock declines in other areas along the east coast and their market value. This combined with increasing acreages available for harvest activities due to water quality certifications, allowed the replacement of oysters by clams as the premier species from 1986-1988. From 1988-1992 clam landings again declined and oyster landings grew. Since 1990, the clam landings have shown a general increase in contrast to the oyster fishery that, after large catches from 1989-92, have shown a steady decline since. In 2006, clam harvest was 45,962 lbs of meat. Oyster harvest in 2006 was only 14,480 lbs of meat – 86% above the ten-year average. Labor costs have effected this change in combination with temporary inaccessibility to some grounds because of conflicts over harvest rights. No acreage has been lost due to deteriorating water quality. Current research is focusing on improvements in stock genetics (growth and appearance enhancements), cultch substrate comparisons, and establishing new populations.

CHAPTER 6

Public Health & Aquatic Life Issues

Fish Consumption Guidelines

Background

Fishing is a valuable activity to Georgia's citizens. The ways in which people participate in fishing varies widely. To some people, fishing is an activity associated with family. Teaching children to catch bream off a dock or taking a group of campers at a scout camp for an afternoon of bank fishing are both memorable experiences. Some people participate in fishing purely for the challenge of competition, either competing in an organized club tournament or just competing with the fish to bring to creel and release a limit. Catching fish for the dinner table is also a valuable activity. No matter how a person participates in fishing it should be a fun and safe activity. This also includes eating the fish.

Unfortunately, some fish from a few water bodies contain substances, which prohibit the safe consumption in unlimited quantities. The Wildlife Resources Division (WRD), the Coastal Resources Division (CRD), and the GAEPD of the Georgia Department of Natural Resources (DNR) work cooperatively to collect and analyze fish samples to provide information for Georgia fishermen.

Fish Monitoring Program. Georgia has more than 44,000 miles of perennial streams and more than 421,000 acres of lakes. It is not possible for the DNR to sample every stream and lake in the state. However, high priority has been placed on the 26 major reservoirs, which make up more than 90% of the total lake acreage. These lakes will continue to be monitored to track any trends in fish contaminant levels. The DNR has also made sampling fish in rivers and streams downstream of urban and/or industrial areas a high priority. In addition, DNR focuses attention on public areas that are frequented by a large number of anglers.

In response to regulatory actions requiring reductions in air emissions of mercury, DNR recognized the need to establish a mercury in fish trend network that would provide a database for evaluating potential changes that may result in fish body burdens. Twenty-two stations were established in 2006 having spatial significance to major air-emission sources in Georgia (coal-fired electric generating units and a chlor-alkali plant), waters with TMDLs for mercury in fish, and near State boundaries for out-of-state sources. Each station has a designated predator species that will be monitored annually. Mercury trend samples of individual fish muscle tissue are analyzed for mercury and other metals. Additional resources were not available to support this initiative and reductions in the general contaminants program were required.

The general contaminants program includes testing of edible fish and shellfish tissue samples for the substances listed in Table 6-1.

Of the 43 constituents tested, only PCBs, dieldrin, DDT and its metabolites, and mercury have been found in fish at concentrations above what may be safely consumed at an unlimited amount or frequency. The use of PCBs, chlordane, DDT and dieldrin have been banned in the United States, and, over time, the levels are expected to continue to decline. Currently there are no restricted consumption recommendations due to chlordane. One water segment has a restriction in consumption recommended for one species due to dieldrin residues, and one pond has restrictions recommended due to DDT/DDD/DDE residues. Mercury is a naturally occurring metal that cycles between the land, water, and the air. As mercury cycles through the environment it is absorbed and ingested by plants and animals. It is not known where the mercury in Georgia's fish originates. Mercury may be present due to mercury content in natural environments such as in South Georgia swamps, from municipal or industrial sources, or from fossil fuel uses.

TABLE 6-1. PARAMETERS FOR FISH TISSUE TESTING

Antimony	a-BHC	Heptachlor
Arsenic	b-BHC	Heptachlor Epoxide
Beryllium	d-BHC	Toxaphene
Cadmium	g-BHC (Lindane)	PCB-1016
Chromium, Total	Chlordane	PCB-1221
Copper	4,4-DDD	PCB-1232
Lead	4,4-DDE	PCB-1242
Mercury	4,4-DDT	PCB-1248
Nickel	Dieldrin	PCB-1254
Selenium	Endosulfan I	PCB-1260
Silver	Endosulfan II	Methoxychlor
Thallium	Endosulfan Sulfate	HCB
Zinc	Endrin	Mirex
Aldrin	Endrin Aldehyde	Pentachloroanisole
		Chlorpyrifos

It has been shown that mercury contamination is related to global atmospheric transport. The EPA has evaluated the sources of mercury loading to several river basins in Georgia as part of TMDL development, and has determined that 99% or greater of the total mercury loading to these waters occurs via atmospheric deposition. States across the southeast and the nation have detected mercury in fish at levels that have resulted in limits on fish consumption. In 1995, the USEPA updated guidance on mercury, which documented increased risks of consuming fish with mercury. The DNR reassessed all mercury data and added reduced consumption guidelines in 1996 for a number of lakes and streams, which had no restrictions in 1995. The Georgia guidance for 2007 reflects the continued use of the more stringent USEPA risk level for mercury.

Evaluation Of Fish Consumption Guidance for Assessment Of Use Support. USEPA guidance for evaluating fish consumption advisory information for 305(b)/303(d) use support determinations has been to assess a water as fully supporting uses if fish can be consumed in unlimited amounts. If consumption needs to be limited, or no consumption is recommended, the water is not supporting this use. Georgia followed this guidance in evaluating the fish consumption guidelines for the 2000 and earlier 305(b)/303(d) lists. This assessment methodology was followed again in developing the 2002-2008 305(b)/303(d) List for all fish tissue contaminants except mercury. Mercury in fish tissue was assessed and a segment or water body was listed if the trophic-weighted fish community tissue mercury was in excess of the USEPA water quality criterion (*Water Quality Criterion for the Protection of Human Health: Methylmercury*, EPA-823-R-01-001, January 2001). For mercury, waters were placed on the not support list if the calculated trophic-weighted residue value was greater than 0.3 µg/g wet weight total mercury. For contaminants other than mercury (PCBs, dieldrin, DDT/DDD/DDE) waters were placed on the not support list if the assessment indicated any limited or no consumption of fish. The USEPA criterion represents a national approach to address what mercury levels is protective for fishing waters. The existence of risk-based recommendations to reduce consumption was used with respect to other contaminants detected in fish tissue. EPD formally adopted the 2001 EPA national human health criterion for methylmercury as a human health standard for total mercury in fish tissue in the Georgia water quality rules in December 2002.

Risk-Based Assessment For Fish Consumption. In 1995, Georgia began issuing tiered recommendations for fish consumption. Georgia's fish consumption guidelines are "risk-based" and are conservatively developed using currently available scientific information regarding likely intake rates of fish and toxicity values for contaminants detected. One of four, simple, species-specific recommendations is possible under the guidelines: No Restriction, Limit Consumption to One Meal Per Week, Limit Consumption to One Meal

Per Month, or Do Not Eat. In 2007, 57.5% of recommendations for fish tested in Georgia waters were for No Restriction, 27.9% were to Limit Consumption to One Meal Per Week, 13.1% were to Limit Consumption to One Meal Per Month, and 1.5% was Do Not Eat Advisories. Eighty-five percent of the recommendations available in 2007 were for no, or only minor restrictions (allowing more than 50 meals to be consumed per year). It should be noted that the dramatic increase of waters not fully meeting designated uses as related to fish consumption was a result of converting to a conservative risk-based approach for evaluating contaminants data in 1995, and not a result of increased contaminant concentrations in Georgia's fish.

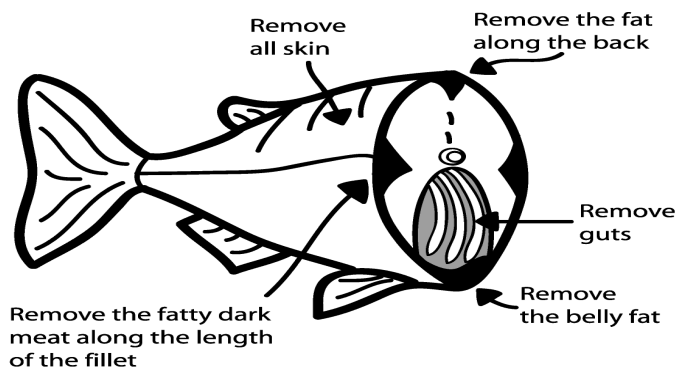
General Guidelines to Reduce Health Risks. The following suggestions may help to reduce the risks of fish consumption:

Keep smaller fish for eating. Generally, larger older fish may be more contaminated than younger, smaller fish. You can minimize your health risk by eating smaller fish (within legal size limits) and releasing the larger fish.

Vary the kinds of fish you eat. Contaminants build up in large predators and bottom-feeding fish, like bass and catfish, more rapidly than in other species. By substituting a few meals of panfish, such as perch, sunfish and crappie, you can reduce your risk.

Eat smaller meals when you eat big fish and eat them less often. If you catch a big fish, freeze part of the catch (mark container or wrapping with species and location), and space the meals from this fish over a period of time.

Clean and cook your fish properly. How you clean and cook your fish can reduce the level of contaminants by as much as half in some fish. Some chemicals have a tendency to concentrate in the fatty tissues of fish. By removing the fish's skin and trimming fillets according to the diagram, you can reduce the level of chemicals substantially. Mercury is bound to the meat of the fish, so these precautions will not help reduce this contaminant.



Remove the skin from fillets or steaks. The internal organs (intestines, liver, roe, and so forth), and skin are often high in fat and contaminants.

Trim off the fatty areas shown in black on the drawing below. These include the belly fat, side or body fat, and the flesh along the top of the back. Careful trimming can reduce some contaminants by 25 to 50%.

Cook fish so fat drips away. Broil, bake or grill fish and do not use the drippings. Deep-fat frying removes some contaminants, but you should discard and not reuse the oil for cooking. Pan frying removes few, if any, contaminants.

Specific Water body Consumption Guidelines. These guidelines are designed to protect you from experiencing health problems associated with eating contaminated fish. It should be noted that these guidelines are based on the best scientific information and procedures available. As more advanced procedures are developed these guidelines may change.

PCBs, chlordane, dieldrin, DDT and methylmercury build up in your body over time. It may take months or years of regularly eating contaminated fish to accumulate levels that would affect your health. It is important

to keep in mind that these guidelines are based on eating fish with similar contamination over a period of 30 years or more. These guidelines are not intended to discourage people from eating fish. They are intended to help fishermen choose safe fish for the table.

Table 6-2 lists the lakes and streams where the fish have been tested and found to contain little or no contamination. There are no problems with eating fish from these water bodies. Tables 6-3 and 6-4 list the lakes and streams where consumption guidance has been issued by the DNR. This information is provided annually in Georgia's Freshwater and Saltwater Fishing Regulations, which is available from DNR and also supplied with each fishing license purchased. This information is also updated annually in the DNR publication *Guidelines for Eating Fish From Georgia Waters*.

Special Notice For Pregnant Women, Nursing Mothers, and Children. If you plan to become pregnant in the next year or two, are pregnant now, or are a nursing mother, you and your children under 6 years of age are especially sensitive to the effects of some contaminants. For added protection, women in these categories and children may wish to limit consumption to a greater extent than recommended in Tables 6-3 and 6-4. Fish tissue consumption guidelines are discussed in detail in the DNR publication *Guidelines for Eating Fish from Georgia Waters-2007 Update* that is reproduced in Appendix C.

Development Of New Risk Communication Tools For Women of Childbearing Age and Children. In 2003, new approaches to spatial analyses were used to assess fish tissue contaminants by species and trophic level, and across distinct geographic areas including hydrologic unit codes, river basins, and hydrogeologic provinces of Georgia. The analyses were used to generate simple brochures with specific information targeting women of childbearing age and children for distribution through health and nutrition related outlets. Brochures were generated for four distinct areas of Georgia, and English versions were released in November 2003, followed by publication of Spanish brochures in March of 2004. The College of Family and Consumer Sciences, Cooperative Extension Services, University of Georgia and the Chemical Hazards Program, Georgia Division of Public Health collaborated in the development of the brochures. The information will be updated as needed, and all brochures are currently available on the DNR website.

Recreational Public Beach Monitoring

coliform monitoring at its reservoir bathing beaches in Georgia. Tennessee Valley Authority (TVA), Georgia Power, the U.S. Forest Service, the National Park Service, Georgia State Parks, and counties and cities throughout the state have also conduct some sampling at the public beaches they operate. The Coastal Resources Division of DNR conducts enterococcus monitoring at public coastal beaches and other recreationally used estuarine locations such as boat ramps and sandbars, and works with the local County Health Department in issuance of swimming advisories.

Shellfish Area Closures

The potential shellfish growing areas on the Georgia coast are classified as "Approved", "Restricted", or "Prohibited" in accordance with the criteria of the National Shellfish Sanitation Program. Shellfish growing areas are closed as a precaution to shell fishing because of the proximity to a marina or a municipal or industrial discharge. Georgia's one hundred linear mile coastlines contains approximately 700,000 acres of potential shellfish habitat. Only about 10% of that area, however, actually produces viable shellfish stocks. Lack of suitable clutch, tidal amplitudes, littoral slope, and other geomorphological features contribute to the limited occurrence of natural shellfish resources along the Georgia coast. Most shellfish in Georgia grow in the narrow intertidal zone and are exposed between high water and low water tide periods. Georgia maintains approximately 32,000 acres approved for the harvest of shellfish for commercial and/or personal consumption. Georgia currently has three harvest areas comprised of commercial leases and public recreational plots. Only those areas designated as Public Recreational Harvest or those areas under commercial lease are classified as "Approved". "Approved" areas are monitored regularly. All other waters of the state are classified as "Prohibited", are not monitored and are closed to the taking of shellfish due to the presence of human activities that may potentially create a problem. Even though some of these areas meet the criteria to allow harvesting, they were classified as "Prohibited" so that a safe zone can be maintained in

the event of an accidental spill. Additionally, another 179,000 acres of the potential shellfish growing area is classified as "Prohibited" due to the lack of available water quality data.

TABLE 6-2 NO CONSUMPTION RESTRICTIONS - 2007

LAKES	RIVERS	
Allen Creek WMA (Ponds A & B) Bowles C. Ford Lake Brasstown Valley (Kid's Fish Pond) Carters City of Adairsville Pond Clayton Co. Water Auth. (Lakes Blalock, Smith and Shamrock) Dodge County PFA Fort Yargo State Park Lake Hard Labor Creek (Rutledge) High Falls Juliette Mayer (Savannah) McDuffie PFA East Watershed Ponds Nancy Town Lake Oconee Olmstead Paradise PFA (Patrick & Horseshoe 4) Payton Park Pond Rocky Mountain PFA (Lakes Antioch & Heath) Seed Sinclair Shepherd CEWC Varner Walter F. George	Alcovy River Boen Creek (Rabun Co.) Brasstown Creek (Towns Co.) Broad River Buffalo Creek (Carroll Co.) Butternut Creek (Union Co.) Cane Creek (Lumpkin Co.) Chattahoochee River (Chattahoochee, Early, & Stewart Cos.) Chattanooga Creek Chattooga River (NW Ga.) Chestatee River (Headwaters to Tesnatee River) Chickasawhatchee Creek Coleman River Conasauga River in Cohutta Forest Daniels Creek (Cloudland Canyon State Park) Dukes Creek East and South Chickamauga Creek Flint River (Dougherty, Baker & Mitchell Cos.) Goldmine Branch Hart Co. WMA (Tributary to Cedar Creek) Hayner's Creek Jacks River Jones Creek Little Dry Creek (Floyd Co.) Little Tallapoosa River Little Tennessee River Middle Oconee River	Mill Creek (Whitfield Co.) Moccasin Creek (Lake Burton Trout Hatchery) Mud Creek (Cobb County) Nickajack Creek Noonday Creek (Cobb Co.) North Oconee River Ocmulgee River (Butts, Monroe, Houston & Pulaski Cos.) Oconee River (Below Barnett Shoals to Lake Oconee, & Laurens Co. & Milledgeville to Dublin) Ogeechee River (Ft. McAllister) Olley Creek Ponder Branch (Walker Co.) Proctor Creek Sewell Mill Creek Slab Camp Creek (Oconee Co.) South River (Butts Co., Hwy. 36) Spirit Creek Stamp Creek (Pine Log WMA) Stekoa Creek Tallulah River Upatoi Creek Yahoola Creek Yellow River

TABLE 6-3. GUIDELINES FOR LIMITING THE FISH YOU EAT LAKES – 2007

LAKES	NO RESTRICTIONS	1 MEAL/ WEEK	1 MEAL/ MONTH
Albany By-Pass	Redear	LMB, Catfish	Carp
Acworth	Bluegill, LMB < 16"	LMB > 16"	
Allatoona	Carp, Crappie, SPB < 16", LMB 12-16", CCF, White bass < 12", G. redhorse	SPB > 16", LMB > 16", HB > 16"	
Andrews	CCF, Spotted Sucker	LMB > 12"	
Banks	Bluegill		LMB > 12"
Bartlett's Ferry	Blk crappie < 12", LMB < 16", SPB < 12"	HB & Striped bass & LMB > 16", CCF, Blk crappie & SPB > 12"	
Bear Cr. Reservoir	Sunfish	LMB < 12", CCF > 12"	
Bennett CEWC PFA		LMB > 12"	
Black Shoals (Randy Poynter)	CCF < 12", Redear	LMB 12-16", CCF > 12", Blk crappie	
Blackshear	CCF < 12"	CCF > 12", LMB > 12"	
Big Lazer PFA	LMB 12-16", CCF	LMB > 16"	
Blue Ridge	CCF < 16", LMB < 12"	White bass & LMB 12-16", CCF > 16"	
Burton	LMB < 16", CCF, Bluegill, White catfish	LMB > 16", SPB 12-16"	
Pond N. Bush Field	Bluegill, LMB < 12"	LMB 12-16"	
Chatuge	LMB > 12", CCF > 12"	SPB 12-16"	
Clarks Hill	CCF, Blk crappie, Redear, White perch, Striped bass, Spotted sucker, HB, LMB < 16"	LMB > 16"	
Evans County PFA	CCF, LMB 12-16"	LMB > 16"	
Goat Rock	Blk crappie, LMB 12-16", Spotted sucker, Bluegill	HB < 12", CCF 12-16"	CCF & LMB > 16", HB > 12", White bass
Hartwell (Tugaloo Arm)	Blk crappie, HB/Striped bass < 12", CCF < 16"	LMB < 16", Carp > 16"	HB/Striped bass 12- 16"
	DO NOT EAT Hybrid and Striped bass > 16 inches in length		CCF & LMB > 16"
Hartwell - main body of lake	DO NOT EAT Hybrid and Striped bass (S C Dept. Health and Environmental Control 1-888-849-7241)		LMB, CCF
Hugh M. Gillis PFA	Channel catfish, Bluegill	Largemouth bass 12-16"	
Jackson	Blk crappie, Redear sunfish, Catfish < 16"	Catfish > 16", LMB	
Ken Gardens	< 16" Channel catfish, Brown bullhead, Bluegill	Largemouth bass > 12"	
Kolomoki (DNR S.P.)	Redear Sunfish	Largemouth Bass > 12"	
Lanier	CCF & Striped bass < 16", Bluegill, Blk crappie White catfish	Striped bass, Carp & CCF > 16", LMB, SPB	
L. Ocmulgee St. Pk.		Brown bullhead 12-16"	LMB > 16"
McDuffie PFA, West	CCF	LMB	
Nottely	CCF, Blk crappie	LMB > 12", Striped bass > 16"	
Oliver	Hybrid bass < 12", CCF < 16", Redear,	LMB > 12"	CCF > 16"

LAKES	NO RESTRICTIONS	1 MEAL/ WEEK	1 MEAL/ MONTH
	Bluegill		
Rabun	LMB 12-16", Bluegill, White catfish < 16"	White catfish & LMB > 16"	
Reed Bingham S.P.			LMB > 12" Catfish > 16"
Richard B. Russell	Crappie, Bluegill, White perch, Catfish	LMB > 12"	
Seminole	CCF, Spotted sucker, Blk crappie, Redear	LMB > 12"	
So. Slappy Blvd. Offramp (Albany)	Bluegill	Largemouth bass 12-16"	Largemouth bass > 16"
Stone Mountain	Catfish	LMB > 16"	
Tobesofkee	CCF	LMB > 16"	
Tugaloo	White catfish 12-16", Bluegill		LMB > 12"
Tribble Mill Park	Blk Crappie, Bluegill, LMB < 12"	LMB 12-16"	
West Point	LMB, Carp, SPB, Crappie, CCF & HB < 16"	CCF & HB > 16"	Striped bass
Worth (Chehaw)	Spotted sucker, Redear	LMB 12-16", Channel catfish > 16"	
Worth (Flint Res.)	CCF > 12"	LMB > 12"	
Yohola (DNR S.P.)	Bluegill	Largemouth Bass > 12"	
Yonah	Bluegill	LMB 12-16", catfish 12-16"	

Abbreviations used in table: < means "less than", > means "more than", Blk = Black, CCF = Channel catfish, HB = Hybrid bass, LMB = Largemouth bass, SPB = Spotted bass

TABLE 6-4. GUIDELINES FOR LIMITING THE FISH YOU EAT RIVERS/CREEKS AND ESTUARINE SYSTEMS – 2007

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Alapaha River	Redbreast sunfish	Spotted sucker	LMB, Bullhead
Alapahoochee River		Bullhead	
Allatoona Creek, Cobb Co.		Spotted bass, Alabama Hog Sucker	
Altamaha River	Bluegill (US 1), CCF (below US 25), Striped mullet	Flathead catfish, LMB, CCF	
Apalachee River	CCF	LMB	
Beaver Creek (Taylor Co.)			Yellow bullhead
Brier Creek (Burke Co.)		Spotted sucker	LMB
Canoochee River			LMB, Catfish, Redbreast
Casey Canal	LMB, Bluegill	Striped mullet	
Chattooga River (NE Ga., Rabun County)		Northern Hog Sucker, Silver Redhorse	

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Chattahoochee River (Helen to Lanier)	CCF	Redeye bass, Bullhead, Redhorse	LMB
Chattahoochee River (Buford Dam to Morgan Falls Dam)	Brown trout, Carp, Rainbow trout, Yellow perch	LMB	
Chattahoochee River (Morgan Falls Dam to Peachtree Creek)	Brown trout, Rainbow trout, LMB, Bluegill	Jumprock sucker	Carp
Chattahoochee River (Peachtree Creek to Pea Creek)	CCF, White sucker	Bluegill, Black bass	Carp
Chattahoochee River (Pea Creek to West Point Lake, below Franklin)	CCF	LMB, Spotted bass	
Chattahoochee River Special Striped Bass (Morgan Falls Dam to West Point Lake)	This striped bass population migrates annually between West Point Lake and Morgan Falls Dam. DNR recommends the general public restrict consumption to one meal per month.		
Chattahoochee River (Oliver Dam to Upatoi Creek)		Bullhead catfish	LMB
Chattahoochee River (West Point dam to I-85)	LMB, Bullheads	Spotted bass	
Chestatee River (below Tesnatee River)	Channel catfish, Redbreast	Spotted Bass	
Chickamauga Creek (West)	Redbreast sunfish	Spotted bass	
Cohulla Creek (Whitfield County)		Blacktail redhorse	
Conasauga River (below Stateline)		Spotted bass	White bass, Buffalo
Coosa River (Rome to Hwy 100, Floyd Co.)		Spotted bass	LMB, Striped bass
	DO NOT EAT SMALLMOUTH BUFFALO		
Coosa River (Hwy 100 to State line, Floyd Co.)	Spotted bass	LMB	Striped bass, CCF, Buffalo
Coosa River Zero River Mile to Stateline	Blue Catfish: < 18" one meal per week; 18-32" one meal per month; and >32" do not eat.		
Coosa River System Special (Coosa, Etowah below Thompson-Weinman dam, Oostanaula)	Special Striped Bass: this population migrates annually between Weiss Lake and the Coosa River system. DNR recommends the general public restrict consumption of fish less than 20 inches to one meal per month, and to not eat any striped bass 20 inches or greater in length.		
Coosawattee River below Carters	Bluegill		Smallmouth buffalo
Etowah River (Dawson County)		Blacktail Redhorse	
Etowah River (above Lake Allatoona)	Golden redhorse	Spotted bass	
Etowah River (below Lake Allatoona dam)	CCF, Bluegill, Striped bass (above Thompson Weinman dam)	Spotted bass, LMB	Smallmouth buffalo
Flint River (Spalding/Fayette cos.)	Spotted sucker	LMB	
Flint River (Meriwether/Upson/Pike cos.)	CCF, Flathead catfish	Shoal bass	
Flint River (Taylor co.)	CCF, Shoal bass	LMB	
Flint River (Macon/Dooly/Worth/Lee)	CCF	LMB	
Gum Creek (Crisp Co.)	Carp	LMB	
Holly Creek (Murray County)		Blacktail redhorse	

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Ichawaynochaway Creek	Spotted Sucker	LMB	
Kinchafoonee Creek (above Albany)		LMB, Spotted sucker	
Little River (above Clarks Hill Lake)	Spotted sucker, Silver Redhorse	LMB	
Little River, (above Ga. Hwy 133, Valdosta)	Spotted sucker	LMB	
Mill Creek (Murray County)		Golden redhorse	
Muckalee Creek (above Albany)		LMB, Spotted sucker	
Ochlockonee River (near Thomasville)	Redbreast sunfish	Spotted sucker, White catfish	LMB
Ocmulgee River (below Macon, Bibb co.)	CCF	LMB	Flathead catfish
Ocmulgee River (Telfair/Wheeler cos.)	CCF	Flathead catfish, LMB	
Oconee River (above Barnett Shoals)		Silver redhorse, LMB	
Gum Creek (Crisp Co.)	Carp	LMB	
Ogeechee River (all to Ft. McAllister)		Redbreast sunfish, CCF, Spotted sucker, Snail bullhead	LMB
Ohoopsee River (Emanuel/Toombs Cos.)		Spotted sucker, Redbreast	LMB
Okefenokee Swamp (Billy's Lake)		Flier	Bowfin
Oostanaula River, Hwy. 156, Calhoun	Bluegill	Smallmouth buffalo	
Oostanaula River, Hwy 140, to Coosa River	Bluegill	LMB, CCF, Spotted bass, Buffalo	
Patsiliga Creek (Taylor Co.)		Suckers, Chain Pickerel	Bass
Pipemaker Canal		LMB	
Satilla River (Waycross, Ware/Pierce Cos.)		Redbreast sunfish, CCF	LMB
Satilla River (near Folkston, Camden Co.)			LMB, Redbreast, Flathead catfish < 36"
Savannah River (above & below New Savannah Bluff Lock & Dam)	Redear, Redbreast, Striped mullet	Spotted sucker, LMB	
Savannah River (Chatham/Screven cos.)	CCF, Redear sunfish	LMB, Bluegill	
Savannah River (Effingham Co.)	CCF	White catfish, Redbreast	LMB, Bowfin
Savannah River (Tidal Gate)	Red drum, Striped mullet	White catfish	
Savannah River Special (New Savannah Lock and Dam to Savannah Estuary)	DNR recommends the general public restrict consumption of legal size striped bass 27 inches and larger to one meal per month. Women who are pregnant or nursing and young children may wish to further restrict their consumption due to the variable mercury levels in these striped bass.		
Short Creek (Warren Co.)		Sunfish	
South River (Panola Shoals, Rockdale Co.)		Snail bullhead, Bluegill	
South River (Henry Co., Snapping Shoals)	Silver redhorse, CCF	LMB	
Spring Creek (Seminole/Decatur/Miller cos)		LMB, Spotted sucker, Redear	
St. Marys River (Camden Co.)	Redbreast, Striped mullet		LMB
St. Marys River (Charlton Co.)	Redbreast sunfish		LMB
Sugar Creek (Murray Co.)		Golden redhorse	
Sumac Creek (Murray Co.)		Golden redhorse	
Suwannee River		Bullhead, Chain pickerel	LMB
Swamp Creek (Redwine Cove Road)		Redeye bass	
Talking Rock Creek		Redeye bass	
Tallapoosa River	Bluegill	Blacktail Redhorse	
Trib. To Hudson River, Alto, Banks Co.	Brown bullhead	Redeye bass	

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Withlacoochee River (Berrien/Lowndes Cos.)		Redbreast sunfish	LMB

ESTUARINE SYSTEMS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH	DO NOT EAT
Turtle River System (Purvis, Gibson Cr.s)		Black & Red drum, Flounder	Shrimp, Blue crab, SST, SKF, Sheepshead, Spot	STM, ACR, Bivalves*
Turtle & Buffalo Rivers (upriver Hwy 303)	White Shrimp	Red drum, Blue crab, Flounder, SST	SKF, BDR, ACR, Spot, Sheepshead	Striped Mullet, Bivalves *
Turtle River (Hwy 303 - Channel Marker 9)	White Shrimp	Red drum, Flounder	Blue crab, ACR, BDR, SST, SKF, Sheepshead	Spot, STM, Bivalves *
Turtle River (C. Marker 9 & So. Brunswick River to Dubignons & Parsons creeks)	White Shrimp, Flounder	Blue crab, BDR, RDR, SST, Sheepshead	ACR, STM, SKF, Spot	Bivalves *
Terry Creek South of Torras Causeway to Lanier Basin	Spot, STM, Shrimp, ACR, SST, SKF, Blue crab	Yellowtail (Silver perch)		Bivalves *
Terry and Dupree Creeks North of Torras Causeway to Confluence w/ Back River	Blue crab, Shrimp	Red drum	STM, ACR, SST, SKF	Spot, Bivalves *
Back River One mile above Terry Creek to Confluence with Torras Causeway	STM, Shrimp, ACR, SST, SKF, Blue crab, Red drum		Spot	Bivalves *
Back River South of Torras Causeway to St. Simons Sound	Spot, STM, Shrimp, SST, SKF, Blue crab, Red drum	Atlantic croaker		Bivalves *
Floyd Creek	Blue crab, Southern kingfish			
Academy Creek	Blue crab			
Altamaha Estuary	Striped mullet			
Hayner's Creek (Savannah)	Blue crab			
Savannah Estuary	Striped mullet		Striped bass >=27"	

* Bivalves are all clams, mussels and oysters; Shellfish ban under National Shellfish Sanitation Program; Species codes used above are: SST = Spotted Seatrout; ACR = Atlantic Croaker; SKF = Southern Kingfish (whiting); STM = Striped Mullet; BDR = Black Drum; RDR = Red Drum; SHH = Sheepshead

King Mackerel Special Joint State Guidance Issued by Georgia, North Carolina, South Carolina and Florida For South Atlantic Ocean

Size Range (Fork Length, Inches)	Recommendations for Meal Consumption of King Mackerel Caught Offshore Georgia Coast
24 To Less Than 33 Inches	No Restrictions
33 To 39 Inches	1 meal per month for pregnant women, nursing mothers and children age 12 and younger. 1 meal per week for other adults
Over 39 Inches	Do Not Eat