## Web Resources

American Fisheries Society • www.fisheries.org/
Aquaculture Magazine • http://aquaculturemag.com/
Aquaculture Network Information Ctr • http://aquanic.org
Aquatic Network • www.aquanet.com
East Coast Shellfish Growers Assoc • www.ecsga.org
GA Dept Natural Resources • http://crd.dnr.state.ga.us
Georgia Sea Grant • www.marsci.uga.edu/gaseagrant/
GA Seafood Suppliers Directory • www.uga.edu/seafood
GA Small Business Development Cntr • www.georgiasbdc.org
Interstate Shellfish Sanitation Conference • http://issc.org
Marine Extension Service • www.marex.uga.edu
Marine Weather • www.marineweather.com/
National Marine Fisheries Service • www.nmfs.noaa.gov/
National Shellfisheries Association • www.shellfish.org
Pacific Shellfish Growers Association • www.pcsga.org
*Vibrio* Infection Prevention • http://SafeOysters.org
Seafood Network Info. Center • www-seafood.ucdavis.edu/
Secretary of State • www.sos.state.ga.us/first
Southeastern Fisheries Society • http://southeasternfish.org/
Southern Aquaculture Center • www.msstate.edu/dept/srac
The Aquaculture News • www.theaquaculturenews.com/
Tidal Predictions • http://co-ops.nos.noaa.gov/tp4days.html
World Aquaculture Society • www.was.org/

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# Georgia Shellfish Aquaculture

Public Service & Outreach
THE UNIVERSITY OF GEORGIA

*"There is great potential for marine aquaculture to become an even more important source of seafood for the U.S. market and a way to help reduce the nation's seafood trade deficit of $7 billion a year"*

***U.S. Commission on Ocean Policy: An Ocean Blueprint for the 21st Century***

## Shellfish Aquaculture is a Green Industry

- Shellfish improve water quality by filtering out algae and reducing levels of nutrients and suspended solids
- Shellfish farms provide essential fish habitat and improve biodiversity
- Shellfish aquaculture is sustainable
- Shellfish farmers do not use fertilizers, herbicides, feeds, drugs, or chemicals
- Shellfish farms may help to repopulate natural beds via broadcast spawning

## Status of Shellfish Aquaculture in Georgia

Shellfish aquaculture is a relatively new industry in Georgia; however, the potential for expansion is virtually limitless and could provide an economic basis for many displaced commercial fishermen. Shellfish aquaculture is also a sustainable and environmentally friendly industry.

Hard clams (*Mercenaria mercenaria*) are the leading commercial clam variety in the United States. Both a wild and an aquaculture-based fishery exist for the species in Georgia, which together generated an estimated $614,090 in state revenue in 2005 (http://crd.dnr.state.ga.us). Since Georgia at one time had the largest oyster industry in the nation, efforts have been recently directed towards developing an oyster (*Crassostrea virginica*) aquaculture-based fishery.

# Georgia Shellfish Aquaculture Contacts


**Tom Crow, President**
Georgia Aquaculture Association
P.O. Box 748
Tifton, GA 31793-0748
Tel: (706) 367-8817
E-mail: tomcrow@alltel.net

**Dominic Guadagnoli, Technical Assistant - Water Quality Biologist**
Georgia Department of Natural Resources
Coastal Resources Division
One Conservation Way, Suite 300
Brunswick, GA 31520
Tel: (912) 264-7218
E-mail: dominic_guadagnoli@coastal.dnr.state.ga.us

**Alan Power, Assistant Research Scientist**
UGA Marine Extension Service
Shellfish Research Laboratory
20 Ocean Science Circle
Savannah, GA 31411-1011
Tel: (912) 598-2348
E-mail: alanpowr@uga.edu

**Sandy Shepherd, Seafood Safety Officer**
Georgia Department of Agriculture
701 Highway 80 W
Savannah, GA 31408
Tel: (912) 963-2500
E-mail: sshepherd@agr.state.ga.us

**Tori Stivers, Seafood Specialist**
University of Georgia
Marine Extension Service
Sea Grant College Program
Office of Seafood Education and Marketing
313 Dividend Drive, Suite 102
Peachtree City, GA 30269-1990
Tel: (770) 460-2506
E-mail: tstivers@uga.edu

**Lynn Vos, Savannah Area Director**
University of Georgia
Small Business Development Center
111 E. Liberty Street, Suite 200
Savannah, GA 31401
Tel: (912) 651-3200
Email: lvos@georgiasbdc.org

**Randal Walker, Director Marine Extension Service**
University of Georgia
1030 Chicopee Complex - Buliding #1
Athens, GA 30602-5416
Tel: (706) 542-8849
E-mail: walker@uga.edu


# Georgia Shellfish Aquaculture Details

## Classification of Harvesting Areas

As of January 1, 1997 Georgia has had two classifications for shellfish waters - approved and prohibited. In order for an area to be approved, fecal coliform bacteria levels must be monitored monthly for a period of at least 30 months, and must not present an actual or potential hazard to public health. The Department of Natural Resources, Coastal Resources Division (CRD) administers this monitoring under the guidance of the United States Food and Drug Administration's (FDA) National Shellfish Sanitation Program (NSSP) standards. Acceptable coliform levels are determined by the SSCA [State Shellfish Control Authority], which in Georgia are jointly the Department of Natural Resources and the Department of Agriculture. At present the maximum MPN (Most Probable Number) per 100 ml of water is 14. The SSCA Standards of the NSSP further require the state to collect at least six water samples from each approved harvest area per year to ensure that levels remain safe. Temporary closures of shellfish lease areas may occur when fecal coliform counts reach unacceptable levels for more than 3 sampling periods.

## Current Shellfish Acreage

There are presently (November 2006) 84 stations being sampled. In these approved waterbodies there are 17 commercial leases and nine public recreational harvesting areas maintained.

| County | Number of Stations | Approved Havrvest Acreage |
|---|---|---|
| Chatham | 7 | 14,300 |
| Bryan/Liberty | 10 | 52,000 |
| McIntosh | 27 | 45,800 |
| Glynn/Camden | 40 | 33,600 |

## Shellfish Leases

There are two types of commercial lease available, private and state. The Department of Natural Resources Coastal Resources Division (912-264-7218) maintains these leases. Any person desiring to lease any state shellfish beds for the exclusive rights to harvest those shellfish pursuant to Georgia Code section 27-4-198 shall make an application in writing to the department. The application shall include the name and legal residence of the applicant, a National Oceanic and Atmospheric Administration chart indicating the area desired to be leased, the names and addresses of adjacent landowners as recorded on county tax maps and verification of such information in such form as the department may prescribe, the proposed plans for managing the resources, and such other information as the department may prescribe.

Upon receipt of the application for the lease of shellfish beds, the department shall determine if the area or a portion thereof is suitable for leasing and if such a lease would be in the best interests of the state. The department may then offer the lease, through public competitive bidding, all or any portion thereof as described in the application. The department shall cause to be published once per week for two consecutive weeks in the legal organ of the county or counties in which the area to be bid upon is located an advertisement of an invitation for bid, setting forth a description of the area proposed to be leased; the date, time, and place when and where bids will be received; the minimum acceptable bid as determined by the department; and such other information as the department may deem necessary. Prior to such advertisement, the department shall prepare a proposed form of lease and appropriate instructions for prospective bidders. Sealed bids shall be submitted to the department, and each bid shall be accompanied by a refundable certified check, cashier´s check, or money order for the total annual amount of the submitted bid. In addition, each sealed bid must be accompanied by a detailed management plan for working the shellfish beds. The lease form shall contain provisions regarding the term of the lease, the method of taking shellfish, the time and place for payment for the lease, the minimum replanting or management requirements of shellfish to be harvested, the placement and type of signs to mark the site as a leased area, and such other terms as the department deems necessary.

All bids shall be opened in public on the date and at the time and place specified in the advertisement of the invitation to bid. The department shall announce which bid and bidder it considers most advantageous to the state.

The Department of Agriculture must also be contacted to obtain permits and regulations for the sale of shellfish. If approved, a copy of the lease and a master collecting permit is issued authorizing the harvest of shellfish. There is no formal leasing process for a privately owned lease; however a signed and notarized copy of the lease is required.

## Purchasing Seed

There is no commercial shellfish hatchery in Georgia and therefore seed is imported from South Carolina and Florida. Five hatcheries are currently approved and should be contacted for size, price and availability:

**Bay Shellfish Company**
4337 Pompano Lane, Palmetto, Fl 34221
Contact: Curt Hemmel (941) 721-3887

**Cedar Creek Shellfish Farms**
859-A Pompano Avenue, New Smyrna Beach, FL 32169
Contact: Mike Sullivan (386) 426-0113

**Ewan Leighton**
270 Sea Dunes Drive, Melbourne Beach, Fl 32951
Contact: Ewan Leighton (321) 288-8201

**Island Fresh Seafood**
7575 Ethel Post Office Road, Meggett, SC 29449
Contact: Bill Cox (843) 889-6920

**SeaPerfect / Atlantic Farms**
P.O. Box 12139, Charleston, SC 29422
Contact: Knox Grant or Coley (800) 728-0099

All hatcheries are required to issue a health certificate with each shipment that ensures they have been tested for all pathogens and diseases. Most Georgia farmers purchase clam seed at about 8 to 12 mm in size (length). Since Georgia has one of the highest oyster spat recruitment rates in the nation (up to 200,000 $m^2$ per month), the collection of natural oyster spatfall is relatively easy and economical (e.g. cement coated PVC).

## Growout

Clams are typically raised from approximately 10 mm to 25 mm in ADPI mesh bags. The bags measure 3 ft x 1.5 ft, and are stocked with several thousand clams, which are thinned bimonthly. Clams will remain in these bags for up to 6 months and must be shaken regularly to remove accumulated silt and sediment. Once they reach a size of 25 mm, they are planted out in bottom plots. A crop requires approximately 18 months in the field before they reach harvestable size. Investigations are currently underway to determine the optimal growout techniques for oysters: off bottom swinging baskets; off bottom trays; on bottom mesh bags; floating rafts; and recruitment sticks.

## Harvesting

Shellfish must be harvested between the hours of ½ hour before official sunrise and ½ hour after official sunset and may only be taken by hand or with handheld implements. All pickers must possess a valid personal commercial fishing license as provided for in Code Section 27-4-110 and, when a boat is used, a valid commercial fishing boat license as provided in Code Section 27-2-8. A master collecting permittee may request authorization from the DNR for employees to harvest shellfish. Such requests should be in writing to the DNR (One Conservation Way, Suite 300, Brunswick, GA, 31520-8687) and should include the name, address and commercial fishing license number of the picker. Pickers must also first attend a shellfish health and safety seminar presented by DNR. Once harvested the shellfish are placed in bags labeled with the date, time, and harvester I.D. number. A master collecting permittee must report to DNR the volume and location of shellfish harvested during the previous season. In order to sustain reefs, commercial oyster harvesters must return at least 33% by volume of the shell harvested during the immediately preceding harvest season or they should distribute as least as much culch material by volume.

## Size Limits

The size of adult clams is determined by measuring the thickness across the hinge. The minimum size at harvesting is 0.75". Clams are measured on a grader which separates the too small "plant backs" so that they can be returned to the lease within 48 hours. Marketing size classes vary regionally and nationally *(See table at right)*. Oysters must measure no less than three inches from hinge to mouth, unless the oyster cannot be removed from a legal-sized oyster without destroying it.

| Clam Type | Size |
|---|---|
| Pasta Clams | 0.750" |
| Buttons | 0.875" |
| LittleNecks | 1.000" |
| MiddleNecks | 1.250" |
| Topnecks | 1.500" |
| Cherrystones | 2.000" |
| Chowders | 2.500" |

## Post Harvesting

The Georgia Department of Agriculture regulates shellfish product handling, storage, shucking, packing, shipping and distribution in both intrastate and interstate commerce. The number of certified dealers in Georgia generally averages 30-35 annually. Dealers are inspected for compliance with State Shellfish Regulations Chapter 40-7-12 (http://rules.sos.state.ga.us/pages/GEORGIA_DEPARTMENT_OF_AGRICULTURE/FOOD_DIVISION_REGULATIONS/index.html) and for requirements of the National Shellfish Sanitation Program (NSSP) Model Ordinance (http://www.cfsan.fda.gov/~ear/nss3-toc.html). Dealer facilities must operate under Hazard Analysis and Critical Control Point (HACCP) which implements routine monitoring of operations such as receiving, cooler storage, and processing to control food safety hazards. The Georgia Department of Agriculture together with the Georgia Division of Public Health also monitor illness cases associated with shellfish consumption and provide this information to the Georgia DNR and the Food & Drug Administration to help assess whether an illness can be traced to a specific growing area or whether it is a result of mishandling at a certified dealer facility.

To avoid problems with disease and contaminated shellfish, harvesters should be aware of such factors as fecal bacteria levels and viruses in the water, the presence of chemical hazards, on-board handling, and personal hygiene. For more information read the product safety guidelines developed by the Georgia DNR (http://crd.dnr.state.ga.us/assets/documents/03_Shellfish.pdf).