Aquaculture Resource Guide

Compiled by
Don Webster and Victoria Corcoran
University of Maryland Extension

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Aquaculture Resource Guide

*Don Webster and Victoria Corcoran*
*University of Maryland Extension*

This guide provides Maryland shellfish growers with information about obtaining seed, supplies, equipment, assistance, financing and other items for developing successful aquaculture businesses. Modern shellfish farming has advanced rapidly in many areas of the world, bringing with it a need for quality larvae, seed, and culture equipment. This guide brings together many sources for quick reference for growers. It is updated as additional sources are identified and more businesses begin to supply the growing shellfish aquaculture industry. Feel free to contact the authors about your experiences using this guide as well as to add other sources that may not currently be included.

The University of Maryland does not endorse or recommend any particular business listed in this publication and urges that prudent business practice be used in all commercial dealings.

Information is divided into several sections:
- **Hatcheries and Nurseries**
- **Equipment and Supplies**
- **Agencies, Institutions and Organizations**
- **Definitions**

**HATCHERIES AND NURSERIES**

Building a commercial shellfish industry through aquaculture has become possible with the development of hatchery technology, selected lines of animals, and processes such as remote setting. This method of seed production allows hatcheries to concentrate on the production of larvae, which can be shipped overnight to distant locations for setting. The breeding of advanced lines of oysters has led to traits such as enhanced resistance to disease and superior meat quality. *Triploidy* provides oysters that do not spawn, producing high quality meats throughout summer when native oysters have become poor after reproducing.

Nurseries may provide both spat on shell and *cultchless* seed for growers. While some growers operate their own nursery systems prior to planting, others purchase seed at a size which can be immediately deployed for growout. Another option for spat on shell production is to set your own seed and plant it shortly after setting. This method is used for traditional submerged land leases and the setting can occur either at the hatchery or at another site, where it is known as *remote setting*. This form of production has been the mainstay of the West Coast industry for decades and has been used in Maryland as far back as 1982, when growers on the Eastern Shore used it to enhance their bottom leases for regular production. Whichever type of production is decided upon, growers should understand that hatcheries can provide a continuous supply of larvae or seed to plant their leases. This has brought about an increased and steady production of quality shellfish that can be found in many outlets throughout the region and nationally.
**Doing business with hatcheries or nurseries**

If you wish to purchase larvae or seed from a hatchery, it is good idea to visit the operation prior to then. You should tour the business, meet the owner or operator and establish a business relationship. Ask for names of prior customers and check out their experiences with the products. Word of mouth provides an excellent source of information. Most hatcheries and nurseries require a non-refundable deposit for your order to ensure that you pick up your seed on time. This keeps their business operating smoothly as well as yours. If you decide to deal with more than one hatchery or nursery, it is recommended that you keep subsamples separated to carry out growth comparisons to see which perform best for your location.

The list of hatcheries and nurseries is part of an annual report from Rutgers Cooperative Extension (NJ) and from personal communication with businesses. These are provided for information purposes only. The University of Maryland does not endorse or recommend any person or company. Users of this guide should be prudent in their business practices and exercise diligence before committing funds for purchases.

Maryland state law requires that you obtain a **Shellfish Import Permit** to allow transporting oyster or clam larvae, seed, spat and/or shell across state lines. Larvae and seed shipped within the Chesapeake Bay region usually have no problem with permits since the same diseases are prevalent in both states. Import permit applications are available at: [http://www.dnr.state.md.us/fisheries/oysters/industry/aquaculture](http://www.dnr.state.md.us/fisheries/oysters/industry/aquaculture) or by calling the DNR Aquaculture Division, Becky Thur at 410-260-8252. **Applications must be submitted at least 30 days prior to when you wish to import these items.**

**PRODUCT CODES USED FOR HATCHERY AND NURSERY LISTINGS**

- HC = Hard Clam
- OY = Eastern Oyster
- N = Nursery
- BS = Bay Scallop
- PH = Private Hatchery
Cultchless oyster seed being raised in upweller

Maryland
38° North LLC  OY, N
Contact: J.D. Blackwell
Post Office Box 2, Scotland MD 20687
Phone: 301-872-5051
JD38northoysters.com
http://www.38northoysters.com/

Gordon’s Shellfish LLC  HC, OY, N, PH
Contact: Steve Gordon
4248 Bayside Road, Snow Hill MD 21863
Phone: 410-726-1202
steve@seaclam.com

Hooper’s Island Oyster Company  OY, N
Contact: Johnny Shockley
2500 Old House Point Road, Fishing Creek MD 21634; Phone: 443-521-1635
Johnny@cgoysters.com
http://www.cgoysters.com

Johnny Oysterseed Co.  OY, N
Contact: John Farrington
5223 Williams Wharf Road, St. Leonard MD 20685 Phone: 410-610-1508
johnnyoysterseed@gmail.com
http://johnnyoysterseed.com

Oyster Recovery Partnership  OY
Contact: Kevin Wilcox
UMCES Horn Point Lab, PO Box 775, Cambridge MD 21313
Phone: 410-260-8328 (office) or 443-523-8400 (cell)
kwilcox@oysterrecovery.org

Piney Point Aquaculture Center  OY, N
Contact: Stan Tomaszewski
17996 Piney Point Road, PO Box 150, Piney Point MD 20674; Phone: 301-994-0241 ext 2
stomaszewski@dnr.state.md.us

University of Maryland Horn Point Hatchery  OY, N
Contact: Stephanie Alexander
UMCES Horn Point Lab, PO Box 775, Cambridge MD 21613; Phone: 410-221-8310
tobash@umces.edu
http://www.hpl.umces.edu/hatchery/

Shore Thing Shellfish, LLC.  OY, N
Contact Kevin Boyle
P.O. Box 74, Tall Timbers, MD 20690; Phone: 240-338-3841
shorethingshellfish@gmail.com
Virginia
Bagwell Enterprises   HC
Contact: Yvonne Bagwell
Smith Beach Road, P.O. Box 508, Eastville, VA 23347; Phone: 757-678-5806
clammom@gmail.com

Bay Watch Oyster Seeds, LLC  OY, N
Contact: Keith Rodgers
P.O. Box 535, 271 Bay Watch Lane, Reedville, VA 22539
Phone: 804-453-4367
baywatchoysterseeds@nnwifi.com
www.baywatchoysterseeds.com

Broadwater Salts   HC, OY
Contact Jimmy Kelly
P. O. Box 322, Nassawadox, VA 23413
Phone: 757-710-0353
broadwaterseafood@yahoo.com

Cherrystone Aquafarms   HC, OY, PH
Contact: Tim Rapine
P.O. Box 347, Cheriton, VA 23316; Phone: 757-331-1208
timr@littleneck.com
http://www.clamandoyster.com

Chincoteague Shellfish Farms   HC
Contact: Mike McGee
P.O. Box 576, Chincoteague, VA 23336; Phone: 757-336-1985; 757-336-6900 (fax)
chincoteagueshellfishfarms@verizon.net

JC Walker Brothers   HC, OY, BS, PH
Contact: Tom & Wade Walker/Ann Gallivan
P.O. Box 10, Willis Wharf, VA 23486; Phone: 757-442-6000; 757-442-7059 (fax)
seasideclams@gmail.com
www.jcwalkerbrosclams.com

KCB Oyster Holdings, LLC   OY, PH
Contact: A.J. Erskine/Liz Walker
755 Lake Landing Drive, Lottsburg, VA 22511; Phone: 804-529-6654; 804-529-7374 (fax)
ajerskine@bevansoyster.com

Oyster Seed Holdings, LLC   OY, PH
Contact: Michael Congrove
PO Box 397, Grimstead, VA 23064; Phone: 804-725-3046; 804-725-3047 (fax)
msc@oysterseedholdings.com
www.oysterseedholdings.com

Silo boxes fit in a floating upweller (FLUPSY) to hold seed while it grows.
Shooting Point Oyster Company  OY, N
Contact: Tom Gallivan
5456 Bayford Road, Franktown, VA 23354; Phone: 757-693-1303; 757-414-0295 (fax)
tom@ShootingPointOysters.com
www.shootingpointoysters.com

Tarkill Aquaculture Ventures, LLC  OY,
Contact: Bob Boardman
PO Box 94, Onancock, VA 23417
Phone: 757-894-2009
www.tarkillaquacultureventures.com

Toms Cove Aquafarms  HC, OY
Contact: Tommy Clark
PO Box 355, Chincoteague Island, VA 23417
Phone: 757-336-1945
http://www.tomscove.net

Ward Oyster Company  OY, PH
Contact: John Vigliotta
6578 Jarvis Road, Gloucester, VA 23061; Phone: 804-693-7597; 804-693-0581 (fax)
Clamman47@hotmail.com

Oysters are graded and packed for distribution to buyers

Downweller with microculch provides production for "culchless" seed for single oysters
**EQUIPMENT AND SUPPLIES**

There are many methods for raising shellfish. Traditional production in Maryland was by bottom culture on submerged land leases but new ideas have developed to include various types of containment gear to protect single shellfish from predation. Aquaculture uses many of the same supplies as commercial fishing while relying on a variety of other gear to raise shellfish. These include downweller and upweller nursery equipment, bottom cages, surface floats, containers for containing cultch for setting and nets for protecting seed. A number of companies have begun to produce gear for the Chesapeake region.

**Maryland**

**Atlantic Pressure Washers**
Contact: Jeff Paulding
1708 Whitehead Road, Baltimore, MD 21207; Phone: 410-944-5566
[admin@atlanticpressurewashers.com](mailto:admin@atlanticpressurewashers.com)
Products: pressure washers; cleaning fluids

**Captain Bruce's Crabbing Supplies**
Contact: Captain Bruce
22 Theresa Lane, North East, MD 21901
Phone: 410-287-6315
[Captainbruce53@aol.com](mailto:Captainbruce53@aol.com)
Products: commercial fishing supplies

**D.O. Baker**
Contact: D.O. Baker
Broomes Island, MD 20615; Phone: 410-591-0361
Products: oyster cages, long line spat cages

**Eddie Heath's Crab Pots & Supply Co., Inc.**
Contact: Eddie Heath
724 West Main Street, Crisfield MD 21817; Phone: 410-968-1292
Products: commercial fishing and crabbing supplies and equipment; wire mesh, tools and equipment; fabrication of products made from wire mesh; consultation on specialized needs

**First State Packaging**
Contact: Tim Campbell
P.O. Box 3037, 511 Naylor Mill Road, Salisbury, MD 21801; Phone: 410-546-1008
Products: boxes; packaging products; trucking; warehousing

**Harrington Graphics and Screen**
116 Broad Street, Berlin, MD 21811; Phone: 410-641-1986
[chris@hgands.com](mailto:chris@hgands.com)
Products: promotional materials; screen printed shirts
Hooper’s Island Oyster Company
Contact: Johnny Shockley
2500 Old House Point Road
Fishing Creek, MD 21634
Phone: 443-521-1635
Johnny@cgoysters.com
http://www.cgoysters.com
Products: oyster cages; tools; cage materials; fabrication of upwellers and downwellers, oyster grader & sorters; custom building/modification of fiberglass boats for shellfish farming. Growing systems and consulting services are available.

Johnny Oyster Seed Co.
Contact: Jon Farrington
5223 Williams Wharf Road, St. Leonard, MD 20685; Phone: 410-610-1508
johnnyoysterseed@gmail.com
http://johnnyoysterseed.com
Products: “Revolution” self-maintaining Buoyant Oyster Cultivation System (BOCS); oyster cages; barge service; consulting

Tenax Corporation
4800 East Monument Street
Baltimore, Maryland 21205
Phone: 410-222-7000; 800-356-8495; 410-522-7015 (fax)
www.tenaxus.com
Products: plastic netting products; packaging; tubular nets; geotextiles; filtration material

Victory Packaging
Contact: Cheryl Schwabline
7605 B Dorsey Run Road, Jessup, MD 20794
Phone: 800-790-8457
http://www.victorypackaging.com
Products: packaging and shipping supplies
**Other States**

**Chesapeake Bay Oyster Company**  
Contact: Jon Quigley  
P.O. Box 96, Wake, VA, 23176; Phone: 804-338-6530; 804-776-0703 (fax)  
[sales@bayoyster.com](mailto:sales@bayoyster.com)  
Products: wire, oyster cages, oyster bags, floats; tools; grader/sorter; conveyors, upwellers

**Pentair Aquatic Eco-systems Inc.**  
2395 Apopka Blvd., Apopka, FL 32703; Phone: 877-347-4788  
[http://www.aquaticeco.com](http://www.aquaticeco.com)  
Products: company offers a wide range of aquaculture supplies and equipment

**Coastal Aquaculture Supply**  
Contact: Brian Bowes  
100 Glen Road, PO Box 8066  
Cranston, RI 02920  
Phone: 401-467-9370  
[bbowes@plasticpipesupply.com](mailto:bbowes@plasticpipesupply.com)  
[www://coastalaquacultural.com](http://www.coastalaquacultural.com)  
Products: aquaculture growout equipment and supplies; pipe & accessories

**Flexabar Corporation**  
Contact: Andy Guglielmo  
1969 Rutgers University Boulevard  
Lakewood, NJ 08701  
Phone: 732-901-6500; 732-901-6504 (fax)  
[Andy@flexabar.com](mailto:Andy@flexabar.com)  
Products: specialty marine coatings; water based antifouling

**Hamilton Marine**  
155 East Main Street, Searsport ME 04974  
Phone: 207-548-6302; 207-548-0481 (fax); 800-639-2715 (order line)  
Products: wide range of commercial fishing supplies; personal protective equipment

**Ketcham Traps**  
Contact: Myron Horzesky  
111 Myrtle Street, New Bedford, MA 02740; Phone: (508) 997-4787  
[www.Lobstering.com](http://www.Lobstering.com)  
Products: trap fabrication; construction materials
Memphis Net and Twine
P.O. Box 80331, 2481 Matthews Avenue, Memphis, TN 38108; Phone: 888-674-7638
fishinfo@memphisnet.net
http://www.memphisnet.net/
Products: commercial fishing supplies; aquaculture supplies; tools; knives; personal protection gear

New Bedford Ship Supply Co., Inc.
108 Front Street, New Bedford MA 02740; Phone: 508-994-2961
Products: commercial fishing supplies; personal protection gear; knives

New River Nets
140 Charles Creek Road, Sneads Ferry, NC 28460
Phone: 910-327-1231; 910-327-3136 (fax)
sales@newrivernets.com
http://www.newrivernets.com/
Products: commercial fishing supplies; personal protection gear; knives

Netminder Aquatic Coatings
Contact: Steven Fisher, President and CEO
1155 Youngsford Road, Gladwyne, PA 19035; Phone: 267-709-1397; 484-412-8322 (fax)
sfisher@netminder.us
Products: non-toxic antifouling coatings for aquaculture and commercial fishing applications

Sea Gear Marine Supply
Contact: Charles Barto
Route 109 and 4th Ave, Cape May, NJ 08204
Phone: 609-884-2711; 609-884-8467 (fax); 425-3511 (cell)
info@seagearmarine.com
http://www.seagearmarine.com
Products: commercial fishing supplies; personal protection gear

Southern Aquaculture Supplies
PO Box 326, 931 St. Mary’s Street, Lake Village AR 71653
Phone: 870-265-3584; 800-850-7274; 870-265-4146 (fax)
sales@southernaquaculturesupply.com
http://southernaquaculturesupply.com
Products: water test equipment; aeration & diffusers; scales

The Rope Locker
Contact: Jim Torbert
PO Box 1, Felton, DE 19943; Phone: 302-284-4587
jamestorbert@hotmail.com
http://theropelocker.com
Products: rope and cordage; Gripmoor® fasteners; splicing services
AGENCIES, INSTITUTIONS AND ORGANIZATIONS

Many state and federal agencies and organizations can help you with your shellfish aquaculture business. Some are involved in permitting while others provide assistance for industry development. This section lists them alphabetically with a description of what they do and contact information by the following groupings:

- Advisory Groups
- Business Assistance
- Education and Training
- Federal Agencies
- Financing
- Grants, Research and Development
- Industry Associations
- Non-Governmental Organizations
- Permitting
- Protection and Enforcement
- Regulatory

Advisory Groups

Aquaculture Review Board

The Aquaculture Review Board (ARB) is comprised of state and federal agency representatives who are charged with responsibility for aquaculture permitting and compliance. The ARB meets monthly to review and track applications to assure that they progress and that the applicant is informed during the process (Code Natural Resources Article, sec. 4-11A-03.1).

A feature of the ARB is the pre-application hearing. Individuals may schedule a presentation to present concepts and ideas about developing plans with the Board. Potential conflicts or possible problems can be identified and rectified prior to the application being submitted with the goal of providing the applicant with an easier path through the permitting process.

The ARB is chaired by the Department of Natural Resources Aquaculture Division Director and includes one representative each from the Department of Agriculture, Department of the Environment and Department of Health and Mental Hygiene. The National Marine Fisheries Service and the US Army Corps of Engineers have invited representatives on the Board. For matters involving navigation (i.e. lease marking, etc.) the US Coast Guard is also represented. Current members of the ARB include:

- **Department of Natural Resources**: Karl Roscher, Chairman
- **Department of Agriculture**: vacancy
- **Department of the Environment**: Kathy L. Brohawn
- **Department of Health & Mental Hygiene**: Erin Butler
- **National Marine Fisheries Service**: Brian Hopper (PRD) and Kristy Beard (HCD)
- **U.S. Army Corps of Engineers Baltimore District**: Woody Francis
- **U.S. Coast Guard, Norfolk District**: Albert Grimes
- **Maryland Historic Trust**: Troy Nowack

Information: Karl Roscher, DNR; phone: 410-260-8313; email: KRoscher@dnr.state.md.us
Aquaculture Coordinating Council
The Aquaculture Coordinating Council (ACC) was created in 2005 by the General Assembly to provide guidance and leadership for advancing Maryland aquaculture (Annotated Code of Maryland 4-11A-03.2). Responsibilities include fee structures, policy initiatives, market tests, pilot projects and Best Management Practices. The Council is charged with reviewing and recommending changes to laws and regulations affecting aquaculture and often uses workgroups that incorporate expertise of members and outside experts to investigate and report on issues. The ACC annually reports to the Governor and legislature on issues.

The Council meets bi-monthly (January, March, May, July, September and November) on the second Thursday at 6:30 pm at the Department of Natural Resources in Annapolis. Guests are encouraged to attend with time allotted for public input.

Among the responsibilities of the Aquaculture Coordinating Council are:
- Report to the Governor and General Assembly to advance Maryland aquaculture
- Conduct applied studies to expand the aquaculture industry in the State
- Support the industry in implementing innovation and to comply with regulations
- Enhance awareness of innovative products and programs among buyers and public
- Develop best management practices for freshwater and marine aquaculture
- Review State regulations affecting aquaculture and make recommendations to the Aquaculture Review Board regarding necessary or advisable regulatory changes

Membership of the Council is designated by law. Current members are:
- Tidal Fish License, Andrew Buck, Chairman
- Department of Health & Mental Hygiene: Erin Butler, Vice-chair
- Department of Natural Resources: Karl Roscher, Coordinator
- Tidal Fish License, Johnny Shockley
- Tidal Fish License, Ben Parks
- Aquaculture Industry, Don Flax
- Aquaculture Industry, Jon Farrington
- Aquaculture Industry, Terry Witt
- Maryland Senate: Katherine Klausmeier
- Maryland House of Delegates: Anthony O'Donnell
- Department of Agriculture: Joanna Kille
- Department of Business & Economic Development: Stacy Kubofcik
- Department of the Environment: Kathy Brohawn
- Natural Resources Police: Capt. Chris Sherman
- University of Maryland Extension, Donald Webster
- University of Maryland, College Park: Reginal Harrell, Ph.D.
- University of Maryland Center for Environmental Science: Donald Meritt, Ph.D.

Information on Council activities may be obtained at:
Information: Karl Roscher: phone: 410-260-8313; email: kroscher@dnr.state.md.us
Website: http://dnr2.maryland.gov/fisheries/Pages/mgmt-committees/acc-index.aspx
Business Assistance

Maryland Department of Business and Economic Development (DBED)

DBED provides a variety of support services for new and existing businesses. DBED Staff are available for individual consultation and DBED’s website includes easy-to-navigate modules for writing business plans, obtaining assistance from the Small Business Development Centers, developing legal structures for a business, selecting a name and providing access to capital for financing.

Information listed under Business Resources includes product development assistance, access to capital, tax credit programs, site selection and recruitment & training. Links are provided to funding agencies including state and federal agencies providing Agricultural loans are included through the Start a Business link and aquaculture is considered to be farming by the US Department of Agriculture.

Small Business Development Centers (SBDC) offer counseling and training to solve organizational, financial, marketing, technical and regulatory problems. They are located at:

- SBDC Headquarters, University of Maryland
  301-403-8300 or 877-787-7232
- Capital Region SBDC, University of Maryland
  301-403-0501 or 877-787-7232
  Serving Prince George’s and Montgomery counties
- Central Maryland SBDC, University of Baltimore
  410-837-4928 or 877-421-0830
  Serving Baltimore City/County, Anne Arundel and Howard counties
- Eastern Region SBDC, Salisbury State University
  410-548-4419 or 800-999-7232
  Serving the Eastern Shore from Kent to Worcester counties
- Northern Region SBDC, Harford Community College
  443-412-2237 or 866-836-6288
  Serving Harford, Carroll and Cecil counties
- Southern Maryland SBDC
  301-934-7583
  Serving St. Mary's, Calvert and Charles counties
- Western Maryland SBDC
  301-687-1080
  Serving Garrett, Allegany, Washington and Frederick counties

Regional offices are available throughout the state with staff who can meet with you one-on-one to help your business grow.

Website: http://www.choosemaryland.org/
Education

University of Maryland Extension (UME)
Extension provides technical training and outreach services to those in aquaculture through off-campus, non-credit, continuing education programs. UME currently provides training through the Oyster Aquaculture Education & Training Program funded by NOAA and the Maryland DNR. The project provides regional workshops, gear demonstrations, individual assistance and statewide conferences to build an aquaculture industry. Print and electronic information supporting our educational mission is available on the UME website. For assistance or program information contact:

Faculty:
- Don Webster, Wye Research and Education Center, Queenstown; general aquaculture information; educational and training program development; 410-827-8056 (office); 410-310-7191 (cell); email: dwebster@umd.edu
- Don Meritt, Horn Point Oyster Hatchery, Cambridge; hatchery, nursery and growout operations; remote setting system design and management; 410-221-8475 (office); email: dmeritt@umces.edu
- Matt Parker, Prince George’s County Extension Office, Clinton MD; business development and management; finance assistance; 301-868-8780 ext. 428 (office); email: mparke11@umd.edu
- Shannon Dill, Talbot County Extension Office, Easton; business development and management; finance assistance; marketing; 410-822-1244 (office); email: sdill@umd.edu
- Cathy Liu, University of Maryland Eastern Shore, Princess Anne MD; seafood technology, safe handling practices; processing technology, Hazard Analysis Critical Control Point (HACCP) training; 410-651-6636; email: cathyliu@umd.edu

Some publications available on our website:
- Production Systems: culture gear and systems used for growing oysters
- Remote Setting Systems: design and operation for production of seed oysters
- Setting System Economic Analysis: determining cost in seed production
- Bottom Culture Cost and Return: calculating profit and loss for submerged land leases
- Best Management Practices: a manual for maintaining safe and productive leases
- Aquaculture Systems for the Northeast: culture systems for shellfish production
- Planning for Success in your Aquaculture Business: profitable shellfish farming

Website: http://extension.umd.edu/aquaculture   Facebook: Maryland Aquaculture
UMCES Horn Point Lab (HPL)
The Horn Point Lab, located near Cambridge on the Eastern Shore, is the site of the largest oyster hatchery on the East Coast. The staff is engaged in large-scale restoration projects and support for developing shellfish aquaculture. Many educational programs aimed at rebuilding the oyster resource and industry are organized and conducted jointly between HPL, UME and other agencies and organizations including the Oyster Recovery Partnership (ORP) and the Maryland Department of Natural Resources. In recent years the HPL Hatchery has provided training facilities for an annual Oyster Hatchery Short Course, as well as workshops on Remote Setting and lease management. The facilities make it ideal for such programs.

The hatchery produces billions of oyster larvae and creates spat on shell for planting natural reefs, sanctuaries and commercial production areas. It offers products for commercial aquaculture including larvae, cultchless seed and spat on shell. These may be purchased as native oysters, selected lines or triploids, depending upon need. The ORP operates a field station at HPL that conducts the large-scale cultch handling required for production. HPL includes the hatchery as well as many setting tanks used in the operation.

The HPL Hatchery has an excellent website with information about the life cycle of the oyster, hatchery facilities and operations, production figures, and many photos. Tours are available during the spawning season, which runs from March through September where groups can see oysters spawn, larvae set, and view the working of this production facility. Tours are open to all ages and usually last 30-60 minutes. In addition to regular HPL lab tours offered twice weekly during summer, groups may be scheduled by advance appointment by contacting hatchery staff.

The Remote Setting Training (RST) program is conducted as a joint project with ORP. Setting tanks are located in many areas around the bay and are available to leaseholders in two-week periods from June until the end of August. Growers are responsible for obtaining clean, aged and containerized shell and providing labor to move it and clean the system at the end of the setting period. Larvae and technical assistance are provided free as part of the RST program, with follow-up visits by staff to determine setting success.

Tour contact: Stephanie Alexander, tobash@hpl.umces.edu; phone 410-221-8310
Remote Setting information and scheduling contact: remotesetting@umces.edu; Steven Weschler, 301-704-0737 (cell); sweschler@umces.edu or Alan Roache, 410-713-2517 (cell); aroache@umces.edu

Website: http://www.hpl.umces.edu/hatchery/
**Federal Agencies**

**National Oceanic and Atmospheric Administration (NOAA)**
This federal agency provides a wide range of services including weather, fisheries management, coastal management and marine commerce. Two NOAA offices provide services to support the development of aquaculture in the Chesapeake and coastal bays.

**NOAA Aquaculture Office**
This office fosters marine aquaculture that creates employment and business development in coastal communities leading to safe and sustainable seafood. The group recognizes that aquaculture is one of a range of technologies needed to meet increasing global demand for seafood to support commercial and recreational fisheries, and restore species and marine habitat.

The NOAA Aquaculture Office helps with permitting issues, especially though complicated layers of federal regulations and complex application, review and approval processes. The goal is to develop aquaculture while conserving living marine resources. The Office oversees aquaculture grant programs that are announced periodically.

The principal NOAA Aquaculture Office is located at their headquarters in Silver Spring, MD while the Regional Coordinator for Maryland is located at the Greater Atlantic Regional Fisheries Office in Gloucester, MA. He may be contacted at:

**Contact:** Kevin Madley, 978-282-8494, email: kevin.madley@noaa.gov  
**Website:** [http://www.nero.noaa.gov/ob/aquaculture/](http://www.nero.noaa.gov/ob/aquaculture/)

**NOAA Chesapeake Bay Office**
The NOAA Chesapeake Bay Office (NCBO) is located in Annapolis and works to protect and restore coastal and marine habitat. The staff has been involved with habitat restoration and commercial aquaculture development for many years. The office has funded several projects leading to expansion of commercial shellfish aquaculture including partnering with state agencies and institutions to restore tributaries with self-sustaining oysters and to rebuild the oyster industry in Maryland and Virginia. A recent project is the development of an Oyster Data Tool that can aid growers in identifying suitable locations to develop leases for shellfish production. Data sets are based on a variety of information including those from the National Ocean Survey and related marine environmental sources.

The NCBO has recently been charged with broad new goals to advance programs that will protect and restore the Bay. They will be focusing on four key areas: Fisheries; Habitats; Observations; and Education. The CBO is organized in three primary programs: Ecosystem Science, Coastal and Living Marine Resources, and Environmental Literacy.

**Contact:** Bruce Vogt, 410-267-5655; email: Bruce.Vogt@noaa.gov  
**Website:** [http://chesapeakebay.noaa.gov/](http://chesapeakebay.noaa.gov/)
Financing

Maryland Agriculture and Resource Based Industries Development Corporation
MARBIDCO is an agricultural lending agency that administers funds specifically dedicated to developing shellfish aquaculture. They have partnered with the Maryland Department of Natural Resources to provide affordable financing to watermen and others starting or expanding shellfish aquaculture businesses. University of Maryland Extension contributes to the programs by providing training and individual assistance in developing applications. The following loan programs operated by MARBIDCO are available to growers, although some require the applicant to hold a Tidal Fish License (TFL) due to the nature of the funds.

Maryland Shellfish Aquaculture Loan Program
Eligible Expenses: Items including substrate (e.g., shell), seed (or larvae) and capital equipment (equipment with a 15-year life expectancy). On-bottom and water column (i.e., cages or floats) projects are eligible for funding. Purchase of motor vehicles, including boats and trucks, are not eligible under this program.
Minimum/Maximum Loan Amounts: $5,000 to $100,000
Loan Terms: In the first 1-3 years, quarterly interest-only payments of 3% APR are required; afterwards, regular amortizing payments are due with 25% of principal forgiven for first-time borrowers in good standing for making required interest payments. Borrowers not in good standing are required to repay the entire amount of the loan.
Loan Interest Rate: 5% APR maximum
Equity: At least 10% of loan amount (ownership of a commercial workboat may apply).
Credit history: Credit bureau score of at least 620; no bankruptcy within past seven years.
Requirements: 1) applicants must hold a current shellfish aquaculture lease or have applied for one; 2) have a production and business plan; and 3) must demonstrate that production will begin within one year.

Maryland Remote Setting Shellfish Aquaculture Loan Program
Eligible Expenses: Items related to commercial remote setting projects, with approved business plans, to raise oysters or clams in Maryland including larvae, shell (culch), tanks, pumps, blowers, heaters and plumbing.
Minimum/Maximum Loan Amounts: $5,000 to $30,000
Loan Terms: $5,000 - $15,000 (5 years); and $15,001 - $30,000 (6 years) - first year interest-only (Note: the final year of loan payments may be forgiven with good performance)
Loan Interest Rate: 5% APR
Loan Application Fee: None
Security: Cash Collateral of 15% is needed (and can be financed)
Requirements: At least one of the applicants must hold a TFL.

Contact: Steve McHenry; 410-267-6807 (office); email: smchenry@marbidco.org
Website: http://www.marbidco.org
USDA Natural Resources Conservation Service

NRCS operates the **Oyster Bed Restoration and Management** program through their Environmental Quality Incentives Program (EQIP). They provide financial and technical assistance to applicants to restore oyster beds in approved lease sites in Maryland’s Chesapeake Bay. The program supports several conservation practice options to develop oyster habitat and NRCS will work with you to determine which best suits your objectives. NRCS requires that the farmer establish a base of at least 2 inches thickness using oyster or clam shell but no longer requires or pays for the deposition of seed oysters on top.

Four options for the program exist. Two require restoration of a 2” base while two specify a 4” base. Options include renovating existing shell on the site while others require placement of new material on top of renovated areas. Areas with fairly regular natural sets could be left with only the shell base while most areas in Maryland will need the emplacement of spat on shell to bring the areas into commercial production.

While oyster shell is traditionally used to establish submerged land leases in Maryland, it is currently in very short supply. This is due to the decline in processing plants that provided shucked product and the increased demand for shell for use in rebuilding sanctuaries, public reefs and commercial leases. It is possible to contract for ocean clam shell to use to satisfy requirement for an NRCS EQIP project. However, with all of these shell resources, the grower will need to calculate the emplaced cost accurately to retain profitability.

Participants can perform their own dredging on leases or select a dredge operator from the Oyster Recovery Partnership list of qualified operators. The program seeks to rebuild habitat for the benefit of coastal waters. **For information, contact the NRCS office in your county.**

US Small Business Administration

SBA was founded in 1953 to provide service to small businesses. It provides a range of assistance to those seeking to go into business. While there are a few loan programs, SBA provides guarantees to local banks. They offer a wide range of assistance including help developing business plans and managing operations. Offices offer accessible service at the local and regional level.

The Service Corps of Retired Executives (SCORE) provides experienced business professionals who offer their services to those seeking to manage their business better. SCORE has offices in many local areas which can be accessed from the SBA website.

**Contact:** Stephen D. Umberger, District Director, Baltimore District Office, City Crescent Building, 6th Floor 10 South, Baltimore MD 21201; phone: 410-962-6195
Website: [http://www.sba.gov/](http://www.sba.gov/)
**USDA Rural Development**

US Department of Agriculture Rural Development improves the economy and quality of life in rural America through programs supporting loans through banks, credit unions and community-managed lending pools. They offer technical assistance and information to agricultural producers and cooperatives to start and improve operational effectiveness.

USDA Rural Development administers loans, loan guarantees and grants through their programs by helping rural individuals, communities and businesses get the financial and technical assistance needed to address rural needs. Since most shellfish aquaculture businesses are located in areas considered by USDA to be rural, this agency may provide the way to get assistance to build new processing plants and other capacity needed to provide economic growth and expand employment in these areas.

Some programs operated by Rural Development include:

- **Business Loans and Grants** – partnering with private lenders and community-based organizations for financial assistance
- **Cooperative Grants and Other Programs** – for use of cooperatives in agriculture marketing and distributing agricultural products
- **Community and Economic Development Programs** – initiatives that promote self-sustaining, long-term economic and regional development in rural areas

**Contact:** Bill McGowan, State Director (Delaware/Maryland), 1221 College Park Drive, Suite 200, Dover, DE 19904; phone: 302-857-3580

Website: [http://www.rd.usda.gov/md](http://www.rd.usda.gov/md)

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**Grants, Research and Development**

**Maryland Industrial Partnerships (MIPS)**

This program accelerates commercialization of technology by jointly funding Research and Development projects between companies and University System of Maryland faculty. MIPS funds are matched by participating companies for university-based research projects to develop new products. MIPS projects help companies find solutions to technical challenges, and develop products, processes or training materials. MIPS projects are conducted by university faculty and graduate students in conjunction with company researchers.

MIPS has a long history of involvement in aquaculture and some of our leading producers have benefitted from work carried out through these projects. These included development of nursery systems and processes for value-added production practices of high quality oysters. MIPS projects are attractive because of the two-round funding cycle available during the year.
The maximum award for MIPS single projects is $100,000 per year for large and small companies and $90,000 for start-up firms.

Staff members suggest that you contact them for a meeting before developing your proposal so that they can become familiar with your company and the needs of the project. They will be able to advise you on how to plan and write your proposal as well as assist you in submitting the application and identify high quality researchers to carry out the project.

**Staff:**
- Joseph Naft, Director; phone: 301-405-3892; email: jnaft@umd.edu
- Ronnie Gist, Manager; phone: 301-405-3890; email: rgist@umd.edu

**General contact:** Maryland Industrial Partnerships (MIPS), 2100 Potomac Building, University of Maryland, College Park MD 20742; phone: 301-405-3891; fax: 301-314-2658
Website: [http://mips.umd.edu](http://mips.umd.edu)

**Northeastern Regional Aquaculture Center (NRAC)**
The Regional Aquaculture Center (RAC) program was established by Congress and is administered by the US Department of Agriculture. The Northeast RAC is located at the within the College of Agriculture and Natural Resources at the University of Maryland and represents one of the five USDA centers supported through the program. The Center carries out research and outreach education to enhance the region’s aquaculture industry. Research priorities are developed from advice by Technical and Industry Advisory Committees with representatives from the twelve Northeast states and District of Columbia. Along with the Board of Directors, they guide the overall pathway for multi-state research and outreach through the Center activities for advancement of the industry.

NRAC has carried out many projects dealing with shellfish industry in the region and provides a range of technical publications on its website. These include information on many types of shellfish as well as annual reports and research documents.

**Contact:** Dr. Reginal Harrell; phone: 301-405-6511; email rharrell@umd.edu
or Sharon Adams; phone: 301-405-6917; email ssadams@umd.edu
Website: [https://agresearch.umd.edu/nrac](https://agresearch.umd.edu/nrac)
Industry Associations

East Coast Shellfish Growers Association (ECSGA)
The ECSGA represents over 1,000 shellfish farmers from Maine to Florida. The Association informs policy makers and regulators about the needs of the shellfish community to protect businesses for this environmentally helpful industry. The group provides input to federal issues affecting shellfish farmers and organizes an annual “Walk on the Hill” to visit congressional offices.

There are links on the ECSGA website that provide information on subjects of interest to those growing and marketing shellfish. The Association provides an informative newsletter to members and a useful listserv for time sensitive information. They completed a publication on Best Management Practices for East Coast Shellfish Farmers through NRAC funding that has been adopted as the official BMPs for Maryland growers. This project included meetings with growers along the coast and a thorough review prior to publication. Industry dues are based on gross annual sales with other member classifications that are non-voting. The Board of Directors represents all states on the East Coast.

Contacts: Bob Rheault, Executive Director, phone: 401-783-3360; email: Bob@ecsga.org
Website information is at: http://www.ecsga.org

Maryland Shellfish Growers Association (MSGA)
An organization formed to represent the Maryland shellfish aquaculture industry on statewide issues through lobbying, education, market development and dissemination of information to support and expand commercial businesses.

The MSGA currently has seven provisional members on their Board of Directors and will be electing a new Board and officers during the fall of 2015. These will be apportioned from both sides of the bay to represent the different areas and the culture methods that are used. In addition to Professional Grower members, there are categories for others who wish to support the industry and the association. These will include Associate and Supporting Business and Organizational members. Meetings will be planned throughout the year with fund raising and promotional events developed to showcase the benefits that the shellfish industry provides to the economy, employment and environment.

Contacts: Johnny Shockley, phone: 443-521-1635; email: johnny@hioac.com
J.D. Blackwell, phone: 240-298-1295; email: JD@38northoysters.com

Southern Maryland Oyster Growers Association (SMOGA)
This organization represents oyster growers in the Southern Maryland area, from Anne Arundel through St. Mary’s counties, and has been active in supporting growth of the industry in that region. The group meets throughout the year to discuss issues pertaining to shellfish culture including laws and regulations, permitting, protection and marketing. The Association regularly provides recommendations for outreach programs and statewide conferences.

Contact: Brian Russell, Chairman; phone: 240-538-1336; email: btr1286@verizon.net
Maryland Farm Bureau
The Farm Bureau is a grassroots organization promoting agriculture and rural life. County associations make up the state bureau which, in turn, forms the national group. Members present issues that are debated and voted on at state and national conventions. The Farm Bureau is effective at lobbying and provides members with information on issues affecting them. MFB offers benefits such as discounts on equipment, insurance, product and services.

National advisory groups provide the organization with the best possible input from those in the industry. Maryland has been represented on Farm Bureau advisory boards by shellfish growers and the Bureau has supported aquaculture as another component of the agriculture industry. Member applications are provided through the state website.

Website: [http://mdfarmbureau.com](http://mdfarmbureau.com)

Non-Governmental Organizations

Oyster Recovery Partnership (ORP)
ORP is a leading nonprofit organization dedicated to restoring oysters in Chesapeake Bay. Public and private sources fund projects for restoration and commercial production. ORP is a partner in the Remote Setting Training (RST) project with a field station at Horn Point Lab that carries out cultch processing and handling of hatchery seed for projects. Funding agencies include NOAA, the US Army Corps of Engineers and Maryland Department of Natural Resources.

ORP coordinates shell and seed sales. Larvae can be picked up at the hatchery or shipped via FedEx. There is a minimum order of $500 by cash, check or credit card (3% service fee for card purchases). Orders should be made prior to when they are needed and a 50% deposit is required for quantities exceeding 50,000 seed/spat or 5 million larvae. If the order is cancelled, the deposit may be forfeited. Disease resistant lines and/or triploids are available with prior planning. Advance orders are necessary to ensure fulfillment.

2015 ORP prices:

<table>
<thead>
<tr>
<th></th>
<th>Diploid Wild</th>
<th>Diploid (DR*)</th>
<th>Triploid (DR*)</th>
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<tbody>
<tr>
<td>Eyed larvae (per million)</td>
<td>$210</td>
<td>$260</td>
<td>$295</td>
</tr>
<tr>
<td>Cultchless Oyster Seed (per thousand)</td>
<td>&lt;5 mm $9.00</td>
<td>&lt;5 mm $9.60</td>
<td>&lt;5 mm $11.25</td>
</tr>
<tr>
<td></td>
<td>5-10 mm $12.00</td>
<td>5-10 mm $12.85</td>
<td>5-10 mm $15.60</td>
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<tr>
<td>Spat on Shell (per thousand)**</td>
<td>&lt;5 mm $8.50</td>
<td>&lt;5 mm $9.10</td>
<td>&lt;5 mm $10.75</td>
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<tr>
<td></td>
<td>5-10 mm $11.50</td>
<td>5-10 mm $12.35</td>
<td>5-10 mm $15.10</td>
</tr>
<tr>
<td>Cost per Million (1M) &lt;5mm</td>
<td>$3,500</td>
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*DR* = Disease Resistant lines; call for availability; sold under license

Triploid = sold under license

**Vessel delivery fees may apply to deliveries of spat on shell. Call for pricing to your lease.
Shell/Cultch
1 bushel of cleaned shell $ 5.25
1 shell bag (approx. ½ bushel of shell) $ 3.25
Shell exchange (1 bu. green shell exchanged for 1 bu. cleaned) $ 2.75
1 cu. yd. oyster fines (shell fragments, small pieces, etc.) $65.00

ORP Labor and Rates
Load & unload one tank at HPL Hatchery (equipment rental/labor) $ 400
One tank (w/shell exchange, cleaning, loading/unloading) $ 825
One tank (aged, cleaned shell, loading/unloading) $1,100

REMOTE SETTING TRAINING PROGRAM PARTICIPANTS ONLY
All products and services are being partially underwritten by a local foundation to encourage watermen to participate in the program.
Discount shell bag pricing will only be available to growers participating in the program in 2015. Shell bags must be picked up from ORP in Cambridge MD.

Shell Bag Prices (ORP)
1 shell bag (approx. ½ bushel) $ 2.00
1 bushel of shell exchange for two (2) shell bags $ 2.00

Remote Setting Leaseholder Labor & Rates (ORP)
Load & unload one tank at HPL Hatchery (equipment rental/labor) $ 400
One tank (w/shell exchange, cleaning, loading/unloading) $ 825
One tank (aged, cleaned shell, loading/unloading) $1,100

Complete information on ORP larvae, seed and shell sales available at: http://www.oysterrecovery.org/what-we-do/aquaculture-seed/ (click on 2015 Prices)

ORP contact: Kevin Wilcox; phone 443-523-8400; email: kwilcox@oysterrecovery.org
Remote Setting Training program contact: remotesetting@umces.edu

Don Meritt instructs growers in the proper technique for remote setting at a training workshop at the UM Horn Point Hatchery
Permitting

Maryland Department of Natural Resources
Tawes State Office Building
580 Taylor Avenue
Annapolis MD 21401

Aquaculture Division
The DNR Aquaculture Division processes commercial shellfish aquaculture lease applications jointly with the US Army Corps of Engineers (ACOE). They are in charge of:

- Shellfish Import Permits
- Shellfish Aquaculture Harvester Permits
- Shellfish Nursery Permits
- Lease Transfers
- Monthly harvest reports
- Compiling annual lease reports
- Chairing the Aquaculture Review Board
- Administration of the Coordinating Council

Aquaculture Division Contacts:
Karl Roscher, Division Director
410-260-8313
kroscher@dnr.state.md.us

Katie Busch, Deputy Division Director
410-260-8342
kbusch@dnr.state.md.us

Rebecca Thur, Leasing and Permitting Coordinator
410-260-8252
rthur@dnr.state.md.us

Steve Schneider, Field Operations
410-260-8329
sschneider@dnr.state.md.us

Alyssa Cranska, Leasing and Permitting Reviewer
410-260-2405
acranska@dnr.state.md.us

If you are looking to obtain information and application forms for any of the programs operated by the Division, they can be accessed online at:
http://www.dnr.state.md.us/fisheires/oysters/industry/aquaculture

The site provides links that allow you to download lease applications and instructions for completion. Others are provided for Transfers, Import Permits, Nursery Permits, monthly
Aquaculture Harvest Reports and Harvesters Permits. Additional links provide information on financial assistance programs, the US Army Corps of Engineers Baltimore District and news from the Department regarding the industry.

A Shellfish Aquaculture Siting Tool has been developed by the Department to provide prospective growers with a way to assess potential lease sites online. While the information is useful, it should not replace a physical survey of the site itself. The tool has been designed with multiple layers that can be switched on and off to show a variety of information for making decisions about where a lease may be located. Much of the information shows where a lease cannot be located in order to save time for applicants. These include:

- Public Shellfish Fishing Areas reserved for public harvest (but which can be petitioned for regulatory change if few shellfish exist or no harvest has occurred within 3 years)
- Submerged Aquatic Vegetation areas
- Near marinas and other areas where water quality would affect shellfish safety
- Within 150 feet of a federal navigation channel
- Locations with existing leases

Siting tool website: [http://dnrweb.dnr.state.md.us/fisheries/aquatool/aquatool.asp](http://dnrweb.dnr.state.md.us/fisheries/aquatool/aquatool.asp)

**U.S. Army Corps of Engineers, Baltimore District (ACOE)**

The Corps is responsible for activities in tidal waters and adjacent land areas. Authority for their regulation is from the River and Harbor Act of 1899 and Section 404 of the Clean Water Act involving a discharge of dredged or fill material into waters of the US. Corps authorization is required for the placement of structures or other work in navigable waters.

Aquaculture leases are now handled through a joint permit process with the State of Maryland. When submitting an application you should only submit it through DNR (see prior listing). Some shellfish activities are included in the Corps’ Nationwide Permit #48 which covers the entire United States. During 2011, the ACOE issued a Regional General Permit (RGP-1) to the State of Maryland designed to streamline the federal review process for leases within certain size ranges. RGP-1 is effective for:

- Submerged Land Leases of 50 acres or less
- Water Column Leases using bottom cages of 5 acres or less
- Water Column Leases using surface floats of 3 acres or less

Contact: Woody Francis; phone (410) 962-5689; email: woody.francis@usace.army.mil
Website: [http://www.nab.usace.army.mil/Missions/Regulatory/Aquaculture.aspx](http://www.nab.usace.army.mil/Missions/Regulatory/Aquaculture.aspx)
Protection and Enforcement

MD Natural Resources Police (NRP)
The NRP was created in the 1800s to control illegal harvesting of oysters in the Chesapeake Bay. Today’s modern force patrols the state with missions ranging from natural resource protection to homeland security. **If you find someone illegally harvesting your lease, damaging lease markers, tampering with gear or otherwise interfering with your rights as a leaseholder you should contact the NRP immediately.** It is also suggested that you get to know the officers who patrol your area and familiarize them with your lease and operation as well as those who will be regularly managing and harvesting your grounds.

24 Hour Communications and Dispatch 410-260-8888
Report Suspicious Activity 800-628-9944 or VHF Channel 16

General Information: 410-260-8880
Emergencies: 410-268-8888
Catch-A-Poacher: 1-800-635-6124

Website information: [http://www.dnr.state.md.us/nrp/](http://www.dnr.state.md.us/nrp/)

Regulatory

Shellfish Sanitation

*Maryland Department of the Environment*
Seashell depends on consumers’ confidence products are of the highest quality. MDE monitors the quality of shellfish harvesting waters to certify that these are safe for human consumption. Humans in a watershed increase the potential for adverse effects on shellfish water quality. These include sewage treatment facility discharges and bypasses from sewage pumping stations, failing septic systems and increased runoff from development and farming. Where sewage outfalls exist, closed safety zones surrounding these outfalls are mandated and necessary to protect human health.

MDE monitors 900 stations in state waters for potential contaminants and bacteria. They post information on their website in the form of:

- Fish and Shellfish Consumption Advisories
- Shellfish Harvesting Area Classifications
- Fish Kills

Contact: Kathy Brohawn; phone 410-537-3608; email: kbrohawn@mde.state.md.us
Shellfish Shippers / Plant Inspection

Maryland Department of Health & Mental Hygiene (DHMH)
Growers interested in selling their product direct to the consumer, rather than to a broker, are required to possess a Shellfish Shipper license and undergo training to obtain the necessary skills to assure delivery of a healthy and quality product. DHMH, in cooperation with University of Maryland Extension, holds periodic training in developing Hazard Analysis Critical Control Point (HACCP) plans so that the shipper understands the regulations and requirements of handling safe seafood.

If you wish to process shellfish either by shucking or other removal techniques, the facility where you process the product must be inspected and permitted by the DHMH. To operate as a new food processing plant, a written plan is required. When it has been approved, an inspection will be conducted. Upon approval, you will receive and complete a license application. Existing food processing facilities must comply with Maryland health regulations.

Contact: Erin Butler, Office of Feed Protection and Consumer Health; phone 410-767-8404; mobile: 443-690-3079; email: erin.butler@maryland.gov

Aquaculture growers produce high quality shellfish

The amazingly fast growth of oysters from one week to one year old. Spat on shell provides the seed that is planted on submerged land leases.
Definitions

Cultch - Shell or other material that oyster larvae attach to during metamorphosis. Aged, clean oyster shell is deemed to be best for most setting although many other substances have been tried.

Cultchless oysters - Seed attached to finely ground oyster shell or microcultch intended for raising in protected containers. They are not actually ‘cultchless’ due to the fact that they set on small pieces but the cultch is usually not visible and allows the animals to grow as single oysters.

Diploid – Oysters having two sets of chromosomes as found naturally and that are capable of reproducing.

Downweller – A device that holds shellfish on a screen while water circulates down through the animals and is carried away. Frequently used with fine mesh for setting cultchless seed.

FLUPSY – Acronym for FLoating UPweller SYstem; an upweller that is designed as a raft to float at water level with a pumping device (propeller, paddlewheel, etc.) that displaces water from it. By displacing existing water, inflow of new water occurs, circulating food to the animals and carrying away waste products.

Import Permit – A Maryland permit required for bringing shell, larvae or seed across state lines to assure that only healthy animals are moved to prevent the transmission of diseases. The permit must be applied for at least 30 days prior to transportation.

Metamorphosis – The process by which a larva transforms from a motile organism to a sedentary, or benthic, one. In oysters, the change is from free-swimming larvae to spat.

Microcultch – finely ground shell (e.g. 300 microns) for setting “cultchless” seed to be raised principally for the raw bar or half-shell market.

Nursery - a facility that cares for juvenile shellfish until they are large enough for planting to growout grounds. Nurseries can provide various shellfish depending upon the salinity they are operating in. They can often provide either spat on shell or cultchless oyster seed.

Pre-application hearing – A meeting held between a prospective lease applicant and the Aquaculture Review Board to discuss plans and determine any problems that may exist prior to application.

Remote Setting – The process of attaching larvae to cultch at a site away (i.e., “remote) from the actual hatchery.

Shellfish hatchery - a facility which conditions and spawns broodstock shellfish and cares for the resulting larvae until metamorphosis is imminent. Hatcheries may sell larvae or seed.

Shellfish seed – small shellfish ready for planting.
**Spat** - A juvenile oyster after undergoing metamorphosis.

**Spat on shell** - Oysters that have attached to aged and clean oyster shell for traditional bottom planting and growout.

**Superlines** – Oysters that have been genetically selected through breeding programs to exhibit more tolerance of diseases found in the Chesapeake region.

**Triploid** – Oyster crosses between diploid (i.e., two sets of chromosomes) and tetraploid (i.e., four sets of chromosomes). These are normally sexually sterile and do not reproduce thereby providing a high quality meat yield throughout the year.

**Upweller** – A device that holds juvenile shellfish on a screen or mesh with water circulated up through the silo or cone, providing food to the animals and carrying away their waste.