



University of Maryland, 2113 Animal Science Building
 College Park, Maryland 20742-2317
 Telephone: 301-405-6085, FAX: 301-314-9412
 E-mail: nrac@umd.edu Web: <http://www.nrac.umd.edu>

AQUACULTURE SITUATION AND OUTLOOK REPORT 2007: NEW HAMPSHIRE

Rollie Barnaby, University of New Hampshire Cooperative Extension, UNH Sea Grant
Kenneth La Valley, University of New Hampshire Cooperative Extension, UNH Sea Grant

Industry Trends and Outlook

New Hampshire has four trout farms that raise rainbow and brook trout. Most fish are used to stock public and private ponds. One farmer is raising brown bullheads, and there is great interest in baitfish culture.

Great Bay Aquaculture, the only commercial saltwater hatchery in New Hampshire, has been producing cod and summer flounder for many years. They shipped their first batch of cobia to Puerto Rico in 2006 and expect to have black sea bass on line in the near future.

The University of New Hampshire (UNH) Open Ocean Aquaculture Project has successfully grown blue mussels on submerged longlines for five years. A commercial fisherman has taken over six lines initially put in by UNH and added several others. He harvested his first mussels in December of 2006.

Commercial Species List

- Atlantic cod (*Gadus morhua*)
- Cobia (*Rachycentron canadum*)
- Summer flounder (*Paralichthys dentatus*)
- Blue mussel (*Mytilus edulis*)
- Brook trout (*Salvelinus fontinalis*)
- Brown bullhead (*Ameiurus nebulosus*)
- Rainbow trout (*Oncorhynchus mykiss*)

Addressing Industry Needs

Researchers, extension staff, resource managers, industry associations and concerned stakeholders all



New Hampshire salmonid farm. (Photo: J-J Newman-Rode)

play a role in addressing industry needs. The following sections outline the new initiatives and recent accomplishments in these areas.

Aquaculture Research

The University of New Hampshire has several researchers who focus on freshwater and marine aquaculture applications.

UNH has had an open ocean aquaculture project since 1997. The project is run by an interdisciplinary team of marine biologists, ocean engineers, benthic ecologists, extension educators and technical operations professionals based at the University. This team is recognized worldwide as a leader in open ocean aquaculture.

Emerging Issues and Critical Needs

- The most pressing need for marine aquaculture is a permitting process for conducting aquaculture in federal waters and a revamping of the process in state waters. These processes will facilitate and encourage additional entrepreneurs within the state to pursue marine aquaculture. The current displacement of the New Hampshire commercial fishing fleet makes marine aquaculture an attractive prospect.

The University's Open Ocean project is now called the Atlantic Aquaculture Center. The center's offshore demonstration site, which can hold up to four cages, is secured by a submerged mooring grid 440 feet in perimeter and held fast to the sea floor by 12 anchors. The opposing forces of these anchors and submerged floats place tension on the structure, maintaining the desired geometry and preventing loose lines that could ensnare a whale or other marine mammal.

The project has successfully grown summer flounder, cod, haddock, and halibut in the open ocean site. The breakthroughs over the past eight years have been numerous. At the World Aquaculture Society meeting in March 2007, eight of the 13 papers presented on open ocean aquaculture were given by researchers, graduate students, or graduates of UNH. Conclusions based on eight years of research:

- Farmed fish thrive in the harshest offshore conditions.
- Mooring and cage systems can withstand ocean forces when they are the result of innovative engineering combined with rigorous field-testing.
- Remotely controlled operations make the management of offshore farms safer and more efficient.
- Given proper location, species selection, system design, and husbandry practices, the impact of an offshore farm on the surrounding environment is negligible.
- Blue mussels can be successfully grown on submerged longlines in the open ocean.

In a more recent technology development, UNH deployed an innovative, 20-ton automatic fish feeder at their open ocean aquaculture site in the fall of 2007.

In addition to UNH research participation in the open ocean aquaculture program efforts are being made

to restore oyster habitat to promote recreational harvesting and potential commercial ventures.

Dr. Raymond Grizzle, of the UNH Jackson Estuarine Laboratory, and his team are experimenting with optimal conditions for reef restoration in the Great Bay estuary. One major research question is whether several small or one large reef will promote abundance, survival and growth of larval oysters.

UNH scientists are also laying the foundation for a sustainable stock enhancement program to bring back New England's failing winter flounder fishery and work with Massachusetts Institute of Technology Sea Grant's Aquaculture in the Classroom Program. The program engages teachers in K-12 schools throughout New England and helps them bring fisheries, aquaculture, and animal husbandry to their students in a creative way.

Aquaculture Extension

There are two extension educators who have responsibilities in commercial fisheries, marine aquaculture and seafood safety. Extension has conducted local informational meetings, produced fact sheets, a video, and publications, and met with decision makers and the media on the Open Ocean Aquaculture project. Extension specialists have also presented at National and regional meetings.

Extension specialists identified commercial fishermen interested in mussel culture, helped them acquire permits and are transferring the technology to additional producers at this time.

Aquaculture Education

The University of New Hampshire Marine Docents is a group of volunteers dedicated to the preservation and wise use of our marine resources. One of the areas they provide educational programs on is marine aquaculture. The volunteers conduct programs in public and private schools, parks, on campus, and on the water on passenger vessels.

Aquaculture Resources

Northeastern Regional Aquaculture Center
The NRAC is one of five Regional Aquaculture Centers established by the U. S. Congress which supports research and outreach efforts to promote the development of the aquaculture industry.
<http://www.nrac.umd.edu>

Acknowledgements

This publication was prepared with funding from

Research Contact Information		
Name	Address	Specialty:
David L. Berlinsky	University of New Hampshire (603) 862-0007 david.berlinsky@unh.edu	aquaculture; fish physiology; reproduction
Jessica Bolker	University of New Hampshire (603) 862-0071 jbolker@cisunix.unh.edu	development, evolution and their intersection, fish development; philosophy of biology
Barbaros Celikkol	University of New Hampshire (603) 862-1940 celikkol@cisunix.unh.edu	open ocean aquaculture engineering; environmental modeling; marine oil spill response technology
Raymond E. Grizzle	University of New Hampshire (603) 862-5130 ray.grizzle@unh.edu	ecology of faunal benthos; ecology and aquaculture of bivalve mollusks
W. Hunt Howell	University of New Hampshire (603) 862-2109 whh@christa.unh.edu	fisheries biology; ichthyology; aquaculture
Robinson Swift	University of New Hampshire (603) 862-1837 mrsswift@cisunix.unh.edu	offshore aquaculture; oil spill response engineering; compliant ocean structures
Winsor H. Watson	University of New Hampshire (603) 862-1629 win@unh.edu	aquaculture; behavior and physiology of lobsters
Richard Langan	University of New Hampshire (603) 862-0190 rlangan@cisunix.unh.edu	aquaculture of bivalve molluscs; environmental technologies; estuarine water quality monitoring
Extension and Education Contact Information		
Ken La Valley	UNH Cooperative Extension / Sea Grant (603) 862-4343 ken.lavalley@unh.edu	commercial fisheries
Rollie Barnaby	UNH Cooperative Extension / Sea Grant (603) 679 5616 rollie.barnaby@unh.edu	marine fisheries, open ocean aquaculture
Mark R. Wiley	UNH Cooperative Extension (603) 749 1565 mark.wiley@unh.edu	environmental education
State Aquaculture Coordinator		
Rollie Barnaby	UNH Cooperative Extension / Sea Grant (603) 679 5616 rollie.barnaby@unh.edu	marine fisheries, open ocean aquaculture
Aquaculture Industry Association		
Debbie Gile	New Hampshire Aquaculture Association dgile@conknet.com (603) 464-3301	

the Northeastern Regional Aquaculture Center (NRAC) as part of project Number 2004-38500-14589 from the United States Department of Agriculture Cooperative States Research, Education, and Extension Service. The authors gratefully acknowledge support from NRAC and USDA CSREES.

The cooperating agencies' programs are open to all citizens without regard to race, color, gender, disability, religion, age, sexual orientation, marital or parental status, or national origin. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the U.S. Department of Agriculture, the Northeastern Regional Aquaculture Center, or the University of Maryland.

A copy of this report may be downloaded from:
<http://www.nrac.umd.edu>

© 2007



UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

