

Northeastern Massachusetts Aquaculture Center  
Salem State College/Department of Biology  
Salem, Massachusetts 01970

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**NEMAC personnel** spent much of 2007-2008 musseling around the coastal waters off Cape Ann. They installed and deployed mussels on experimental long-line set-ups off Cape Ann to evaluate the potential for growing blue mussels (*Mytilus edulis*) in nearshore waters.



*Monitoring of mussels documented good growth and survival.*

Mussels survived and grew well, attaining a mean size of 61.1 mm during the 15 month study. In 2007-2008, juvenile mussels were again deployed off Hodgkins Cove and at a second, deep water location, in Rockport. On-going monitoring has confirmed the good survival and rapid growth observed for mussels stocked in 2006. Efficacy of long-line, mussel culture was shared with North Shore fishers on 18 June 2008 at a hands-on workshop, by Dr. Fregeau and Francois Bourque, from Quebec.



*Dr. Mark Fregeau readies floats and buoys for deployment.*

Mussel seed (mean size 6.2mm) was collected and stocked onto six dropper lines. Each line was 2m long and stocked at a density of ~ 1000 mussels/m using standard cotton socking and core “fuzzy” rope. In July 2006, these lines were deployed in 10 m of water off Hodgkins Cove in Gloucester. Lines were suspended from floats 6 m below the surface to avoid interfering with boat traffic. The set-up was designed to keep mussel lines 5m off the bottom to limit exposure to potential predators, especially crabs and sea stars. Mussels were monitored monthly for a period of 15 months. Inspections were conducted by divers and video recordings.



*Francois Bourque, Evan Parker and Tony Murawski (L to R) visit mussel culture site off Gloucester.*

## **Collaborative efforts between NEMAC and the Massachusetts Division of Marine Fisheries**

to restore and enhance softshell clams in Boston Harbor continue. Since 2006, over 2.5 million clams have been spawned and grown to a suitable size (preferably  $\geq 10$

mm Shell Length) at the Cat Cove Marine Laboratory for release at selected sites approved by DMF personnel and Town officials in Hingham, Hull, Quincy, Weymouth and Winthrop. Survival and growth of stocked clams has been good, but perhaps more germane, reproduction and recruitment of clams has been enhanced. Stocked clams, protected by predator exclusion netting, apparently function as a broodstock reservoir that can reseed tidal flats (figure 1). Note the bimodal distribution of clams collected from Snake Island in Winthrop; individual clams less than 25mm SL represent natural recruitment and a 10-fold increased density (from 0.41 clams/ft<sup>2</sup> to 4.43 clams/ft<sup>2</sup>). Monitoring will continue to assess how increased juvenile survival translates into adult survival.

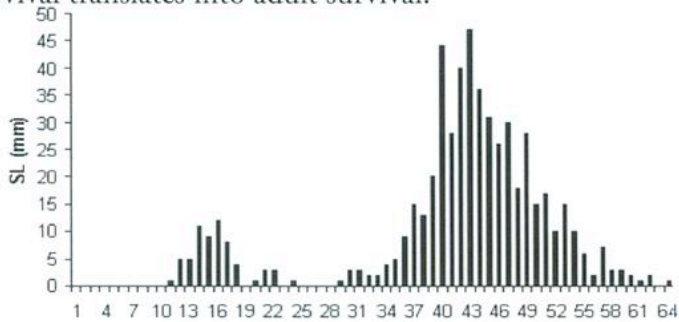


Figure 1. Size distribution of clams ( $n = 561$ ) from Snake Island in Winthrop sampled on 3 June 2008; clams (avg = 11.3; SD = 1.4 mm SL) were stocked on 1 July 2007.

**Educational offerings at the Cat Cove Marine Laboratory expanded during the 2007-2008 academic year.** In fall 2007, nine students gained a hands-on and practical introduction to aquaculture through *Introduction to Aquaculture* (Bio 203) and *Aquaculture Methods* (BIO 205). In spring 2008, 13 aspiring aquatic scientists enrolled in *Fish Biology* (Bio 323). Drs. Alan Young and Joe Buttner co-instructed *Estuarine Ecology* (BIO 706), which has been offered on alternate years as a summer institute since 2003. Eight local teachers participated in the summer experience.



Scott Buchert, Marsha Turin, Marty Horkann, Keith Hartan and Steve Grasso (lt to rt) monitor water quality from brackish portion of Forest River as part of their experience in *Estuarine Ecology*.

Aquatic experiences were also shared directly with local youth; two high school students with vocational aspirations in marine biology, Christine Francios and Grant Kokernak, worked at the Cat Cove Marine Laboratory. Christine was an intern from Girls Inc. in Lynn, MA. Grant, a senior at Berwick Academy in NH, earned college credit for his experience. *Explorations in Biology* (BIO 137) is a variable credit course developed and offered for nontraditional students interested in obtaining a focused experience in biology. In addition, several dozen youth “got wet” at the Cat Cove Marine Laboratory as they learned about marine biology by doing “marine biology” as part of several locally sponsored summer programs.



High school students participating in Northeastern University's Coastal Science Ocean Academy beach seine Smith Pool, adjacent the Cat Cove Marine Laboratory.

**In summer 2007 an auxiliary laboratory was added; this summer realized installation of an access ramp.** Collectively, the new lab and ramp greatly facilitate production of softshell clams grown at the Cat Cove Marine Laboratory. Nearly 4 million clams were spawned and settled this year.



Dr. Joe (L) and Grant Kokernak traverse the newly installed ramp to FLUPSY in Smith Pool, located below and behind the auxiliary lab used to grow clams from 0.5 to 2.0 mm SL.

## Student Perspective by Dana Monteiro

I began my college career in the fall of 2005 as an Environmental Science major at the University of Vermont. Unfortunately, my educational expectations and needs weren't realized and out-of-state tuition had skyrocketed. During my sophomore year I decided to take some time off and left UVM.

I worked full-time delivering pizza. I didn't want to do that for the rest of my life, so I started looking at colleges around my hometown of Stoneham. Knowing that I had an interest in marine biology, a close friend of mine, who was also a student at Salem State College, suggested that I check out the biology program at SSC. After a quick look, I immediately knew that I wanted to go here. I completed my application that day and began taking classes in the fall of 2007.



*Dana assesses condition of a female dogfish shark.*

My first semester at Salem State was far different than my experience at UVM. Although it took me a few weeks to readjust to college life, I knew that I had made the right decision. With smaller classes, friendly and accessible professors, I looked forward to getting up every morning and going to class. During my second semester, I decided to take Fish Biology, taught by Dr. Joe at the Cat Cove

Marine Laboratory. After a few weeks, Dr. Joe offered me a summer job at the Lab, which I gladly accepted.

Working at the Lab has provided invaluable hands-on experience. I gained more knowledge about marine biology and aquaculture than I could inside a classroom. At the lab, I monitor water quality, care for fresh and salt water fish, grow algae and assist in the culture of soft-shell clams. In the field, I help monitor growth of soft-shell clams at several locations in Boston Harbor. The work that I do at Cat Cove gives me tools needed to further my career in marine biology; working also enhances my college experience and gives me the opportunity to positively impact our coastal ecosystem.

## Cat Cove Alumni

**Cat Cove Alumni report good news** **Jamie Coffran** (2004) relocated from Vermont to the Upper Peninsula of Michigan, still growing salmonids in a federal hatchery. **Mae Taylor** (2007) has completed her first year as a M.Sc. student at Nova Southeastern University in Florida and reports her first peer reviewed publication is in press. **Matt Lotti** (2007) is pursuing a M.Sc. at the University of Rhode Island, receiving financial support as a Teaching Assistant. **Veronica Wade** (2008) writes us from Africa, where she and other SSC alumni spent the summer working in the bush where they encountered hyenas, a herd of 30 elephants and a recent leopard kill; all in one week!



*Mae Taylor (B.Sc. 07) moments before her first open water dive*



**A BIG thank you to our summer crew**, without whose assistance NEMAC would be unable to function at the capacity realized over the last half decade.

*Photo on left:*

*NEMAC summer 2008 crew (L-R): Dana Monteiro, Ted Maney, Ashley London, Scott Weston, Heather Tierney, Mark Fregeau, Christine Francois, Dr. Joe, Julie Greenwood (lt to rt). Not pictured is Grant Kokernak.*

**Professional contributions** take many forms including publications, professional and technical presentations. During the 2007-2008 academic year nearly a dozen presentations were made by Laboratory personnel before varied audiences. Recent publications and reports include:

Buttner, J.K. K.G. Pikora (**student**), and D. Leavitt. 2007. Augmenting the Lobster Catch: Oyster Aquaculture in Modified Lobster Traps. *World Aquaculture* 38 (3) 26-29.

Buttner, J.K., W. Burts, W. Walton, B. Wilbur, C. Hollingsworth, D. Murphy, and C. Goudey. 2007. Aquaculture Situation and Outlook Report 2007: Massachusetts. Northeastern Regional Aquaculture Center No. 103-2007, University of Maryland, College Park, MD. 11pp.

Webster, D., J. Buttner, and G. Flimlin. 2008. Planning for Success in Your Aquaculture Business. NRAC Publication No. 101-2008, University of Maryland, College Park. 8 pp.

Buttner, J., G. Flimlin, D. Webster. 2008. Freshwater Aquaculture Species for Northeast. NARC Publication No. 102-2008, University of Maryland, College Park. 7 pp.

Buttner, J., G. Flimlin, and D. Webster. 2008. Marine Aquaculture Species for the Northeast. NRAC Publication No. 1003-2008, University of Maryland, College Park. 6 pp.

Flimlin, G., J. Buttner, and D. Webster. 2008. Aquaculture Systems for the Northeast. NRAC Publication No. 104-2008, University of Maryland, College Park. 7 pp.

Fregeau, M., J.K. Buttner and S. Weston. Potential Commercial and Ecological Benefits of Mussel Culture in Coastal Waters. *Journal of Shellfish Biology*, 27(4):949-950.

Getchis, T., D. Alves, R. Barnaby, C. Bartlett, W. Burt, J. Buttner and 24 others. Northeast Aquaculture Extension Network. *Journal of Shellfish Biology*, 27(4):951-952.

Buttner, J.K. G. Karr. Hawaiian Culture and Aquaculture. *Journal of Shellfish Biology*, 27 (4):945-946.

## Calendar

3-5 December 2008 Northeast Aquaculture Conference and Exposition, Portland, ME.

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23-25 February 2009. 29<sup>th</sup> Milford Shellfish Seminar, Meridan, CT. (contact: Walter

Blogoslawski, [walter.blogoslawski@noaa.gov](mailto:walter.blogoslawski@noaa.gov), 203-883-6535; [mi.nefsc.noass.gov/seminarworkshop](http://mi.nefsc.noass.gov/seminarworkshop))

NEMAC News is published by the Northeastern Massachusetts Aquaculture Center, housed at the Cat Cove Marine Laboratory operated by Salem State College. The Cat Cove Marine Laboratory physically includes a 5,500 ft<sup>2</sup> laboratory and an 8 acre, tidal pool, Smith Pool. For more information regarding aquaculture initiatives by NEMAC and Salem State College or to be added to our Newsletter mailing list contact the Cat Cove Marine Laboratory at 978-542-6824 or Dr. Joe ([jbuttner@salemstate.edu](mailto:jbuttner@salemstate.edu)) or Dr. Fregeau ([mfregau@salemstate.edu](mailto:mfregau@salemstate.edu)) or visit our website [www.salemstate.edu/biology/aquaculture](http://www.salemstate.edu/biology/aquaculture).