HOOK, LINE AND THINKER

The Newsletter of the Fishermen and Scientists Research Society

Issue: 2007 - 2 **Spring 2007**

ARTIFICIAL COLLECTORS AS A TOOL TO MEASURE SETTLEMENT OF YOUNG-OF-YEAR LOBSTER IN COASTAL NOVA SCOTIA

To make progress on understanding variation in lobster recruitment, a program to measure the abundance of young-of-year (YOY) or 0-group lobsters is needed. YOY lobsters are those that have settled to the bottom in late summer and early fall and are less than one year old. They have molted beyond the postlarval stage (instar 4), so that by the end of the settlement season they are most likely in instar 5-7. These YOY lobsters have survived the vulnerable planktonic stage and have settled to those areas of the sea bottom where shelter is provided (e.g. cobble bottoms) and temperatures are sufficiently warm (thought to be > 12 ^{o}C). While there has been extensive work at numerous sites in New England, the study of lobster YOY abundance in coastal Nova Scotia has been limited to only a few sites. Only one area in Canada has a time-series of abundance of this life stage (Passamoquoddy Bay area). The New England studies show that their settlement index predicts the abundance of lobsters several years later. If these projections continue to hold, and settlement strength is correlated with lobster recruitment into the fishery, then the value of YOY lobster abundance indices will greatly increase.

In Canada, regular, long-term monitoring at more sites is needed if an "early warning system" is to be developed here and if recruitment variation in lobster populations is to be understood. In New England and at a few sites in Canada, monitoring has utilized divers and suction sampling. While this method has proven efficient and cost-effective, it relies on the long-term commitment of trained dive teams, and is limited to shallower areas (generally < 15-20 m). Recent experiments in New England show that artificial collectors can yield estimates of abundance that are similar to those obtained from suction sampling. Collectors are deployed from fishing boats and are not limited by depth.

• Inside this Issue •

In 2006, DFO Lobster Scientist John Tremblay developed a proposal for a **Lobster Collector Project**, which was presented to and approved by the FSRS Shellfish Working Group and approved as part of the FSRS Annual Workplan at the recent FSRS Annual General Meeting. The project is a collaboration between the FSRS, DFO and Rick Wahle from the Bigelow Laboratory for Ocean Sciences, and the fishing industry, with particular assistance from Ashton Spinney, LFA 34 Advisory Committee co-chair, and Aubrey Spinney of Fox Hill Marine Wire Limited. The objectives of the project are:

- To test artificial collectors for young-of-year (YOY) lobsters in a shallow area (< 15 m) of coastal Nova Scotia.
- To conduct sampling for YOY lobsters in deeper areas (20-50 m) where bottom temperatures in September are conducive to the settlement of lobster post-larvae (> 12 ^{o}C).

This pilot project will undertake a two-year study of collectors in the nearshore of southwest Nova Scotia. Collectors will be set at a range of depths. The project involves the construction of collectors using the design developed by R. Wahle et al. The collectors will be deployed in Lobster Bay in June 2007, where YOY lobsters were collected by suction sampling in 2005. If successful, the project would be repeated in 2008, with additional collectors deployed on the South Shore of NS (Shelburne County).

The following is an outline of the project:

1. Set 12 collectors at each of 3 sites within Lobster Bay where dive estimates were completed in 2005 (36 collectors total). Depths will be 10-20 m.
2. Set 15 collectors at each of 2 sites at 30-50 m depth in Lobster Bay (30 collectors).
3. Set 15 collectors at each of 2 sites at > 50 m depth in outer Lobster Bay (30 collectors) where bottom temperatures are > 12 ^{o}C in September.
4. Remove the collectors in October. Suction sampling will be done at some of the sites to compare with the numbers caught in the collectors.
5. Repeat in Year 2, modifying protocols based on experience in Year 1 in Lobster Bay.
6. Add a shallow site in Shelburne County and place 36 collectors.

This project has the potential to broaden the possibilities for initiating a program of long-term monitoring of lobster post-larvae abundance. It would demonstrate the methodology for using collectors as a tool for monitoring post-larval abundance in an area outside of New England. It could provide the basis for a program of long-term monitoring of lobster post-larvae, and for studies of distribution of post-larvae. This tool could be used in deep areas, or areas otherwise not accessible by diving, and could serve as an alternative to methods based on suction-sampling by divers.

If successful, the project could be expanded to other areas in future years. Where possible, it will be complemented by suction sampling. Another researcher planning to experiment with the collectors and do suction sampling for comparison is Rémy Rochette of the University of New Brunswick (Saint John) Biology Department. It is possible that the results from such research could be used to forecast lobster abundance in future years, to compare areas, and to make linkages with annual differences in oceanographic conditions.

A communication strategy for the project has been developed. Communication will be via the FSRS newsletter at least once per year and through a presentation at the FSRS 15th Annual Conference in February 2008. In addition, it is proposed to publish the results of this study along with a parallel project in New England in primary scientific journals.

SEA-FLOOR MAPPING: OCEAN KNOWLEDGE FROM THE BOTTOM UP

Courtesy of Fisheries and Oceans Canada Science - Publications

Multi-beam sonar has brought multiple benefits to a fishing area off southwest Nova Scotia. Through detailed mapping of the ocean floor, the advanced technology has opened up a multi-million dollar scallop fishery. And while providing their skills to the project fishermen, fishery scientists, geologists, oceanographers, and the hydrographers who create nautical charts have all learned more from it.

"It's a notable increase of both knowledge and co-operation," says Stephen Smith, research scientist at the Bedford Institute of Oceanography in Halifax, Nova Scotia. "The two went together."

The research project addressed a poorly known, L-shaped fishing area covering about 1,500 square kilometres. Lying south of the famous scallop grounds in the Bay of Fundy and north of offshore fisheries on German's Bank and Georges Bank, this in-between sector – technically, the western part of Scallop Fishing Area (SFA) 29 – supported some fishing in the past, but regulations after 1986 kept it minimal.

When a resource downturn struck Bay of Fundy scallop beds in the 1990's (they have since recovered), fishermen pressed for access to SFA 29. But fishery scientists worried about the strength of the resource, and fishery managers in the Department of Fisheries and Oceans (DFO) sought more information before allowing more fishing.

How to assess the scallop beds in timely fashion? Part of the answer emerged from another part of DFO, the Canadian Hydrographic Service (CHS), responsible for nautical soundings and charts, and recognized as among world leaders in using multi-beam sonar to picture the ocean floor.

Sonar devices convert electrical signals to sound pulses through an underwater transducer, and trace the echoes to show the bottom, rocks, fish, submarines, or whatever's down there. The technology has made great advances in recent decades.

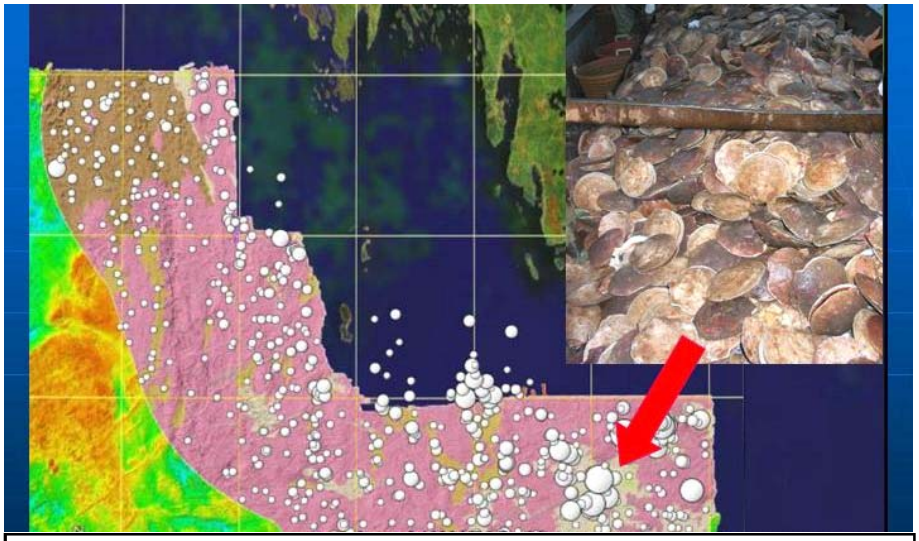
Multi-beam sonars now use transducer arrays to send out many narrow beams at slightly different angles. This allows unprecedented delineation of the depth, shape, and nature of the bottom. CHS and other experts, including researchers at the University of New Brunswick, have developed computerized methods to integrate sonar and other data, such as precise locations from the satellite-based Global Positioning System.

Sea-floor mapping soon found fishery applications. Scallop vessels tow sack-like metal drags along the bottom. CHS worked with the offshore industry to outfit a fishing vessel for sonar surveys on German's and Georges Banks. Fishermen found they could home in on mature scallops, avoid nursery areas, and reduce bottom disruption.

Further inshore, in SFA 29, a more elaborate project took shape. First, BIO technician Mark Lundy, on the DFO research vessel *J.L. Hart*, conducted a fishing survey in 2000. He found surprising abundance. Demands for access grew, by Bay of Fundy and other fishermen.

But besides resource worries, other factors complicated the picture. "The area is also a major lobster-fishing ground," Stephen Smith explains. "Scallop drags can take a bycatch of lobsters. If the fishery was to expand, we needed to know all we could about both scallops and bycatch."

Budget constraints hindered DFO from undertaking all the required research by itself. But new partnerships made it happen. Fishermen's groups anted up nearly $400,000 over three years to help pay incremental cost for sea-floor mapping. And fishing vessels, such as the *Julie Ann Joan* under Capt. Kevin Ross and the *Branntelle*, under Capt. Vance Hazelton, carried out fishing surveys.



One view of the western part of Scallop Fishing Area 29, showing relative catches by area. Sea-floor mapping can show many aspects of the sea-bed, including bathymetry, geology, flora and fauna.

More confident but still cautious, fishery managers allowed a fishery starting in 2001, but only outside the November-May lobster season, and with catch and other restrictions. Boats had to carry observers as required and to install Vessel Monitoring System (VMS) devices that reported their exact location by satellite. They also recorded tows and catches in log books. All such information feeds into BIO's computer data banks.

BIO-developed instrumentation added more layers to the picture. The Campod, a drift camera, provided photographs and videos of the bottom, its plant and animal life. BIO's Towcam, a towed-camera system, will also find use in future obtaining more information on the geology and benthic communities in this area. Sonar, photography, and catch sampling documented a good abundance of scallops. And sea-floor mapping and reports by on-board observers help to avoid bycatches of lobster.

To complement those data, BIO researchers with the Geological Survey of Canada (Atlantic), of the Department of Natural Resources, took grab and core samples along with photographs to catalogue the various sea-floor substrates. Scallops are most plentiful on sand and larger-grained glacial till.

BIO's research has given fishermen new eyes underwater. They can now slip a disk into an on-board computer and see the bottom in great detail, enabling more effective and conservationist fishing. And fishermen are enhancing that ocean picture, often calling Stephen Smith from the fishing grounds to relay extra information.

The fishing industry is only one beneficiary of the project. Hydrographers now have a picture of the sea floor that, compared with earlier charts, is like daylight compared with flashlights. Geologists have gained major amounts of information. Oceanographers too have learned more; for example, the orientation of small sand dunes reveals the direction of sea-bed currents. And researchers are exploring ways to enrich the integrated, computerized picture with other variables, such as the ocean's salinity, temperature, and plankton production at different times of year.

All told, in SFA 29, fishermen and government are creating one of the world's fullest pictures of the sea floor, the creatures it nourishes, and the workings of the water column above.

MONITORING OF NEW HAMPSHIRE'S FISHERY FOR AMERICAN LOBSTER USING VENTLESS TRAPS

By Clare McBane, Marine Biologist, New Hampshire Fish and Game Department

The fishery for American lobster is the most important and valuable commercial fishery in New Hampshire. Roughly 375 individuals are licensed to harvest and sell lobster in the state. In recent years, New Hampshire's lobster landings have ranged from 1.2 and 2 million pounds annually with values higher than 8.0 million dollars per year. Since 1991, the New Hampshire Fish and Game Department has been monitoring juvenile lobsters by means of SCUBA diving. This provides an index from year to year when looking at changes in catch per unit effort. In 2006, a ventless trap survey was initiated to monitor juvenile lobsters and to be used as a comparison with New Hampshire's data from the SCUBA program and the sea sampling program.

Coverage of New Hampshire coastal waters is accomplished by monitoring lobster catches during April-December at four designated regions: Sprague Cove (an upper river estuarine location), Portsmouth Harbor (a lower river estuarine location), New Castle (a coastal location) and the Isles of Shoals (an offshore location).

Two traps (both on one trawl) are set at each location, one of which has the legal rectangular vent while the other has the vent blocked. The traps are hauled a minimum of two set days during June-October, while a minimum set of three days occurs in April-May and November-December. The traps are hauled from the Fish and Game Department's thirty-eight foot research vessel by two biologists. Once the traps are hauled on board the boat, each lobster is measured for carapace length to the nearest millimeter, and noted for molt stage, shell damage, and shell disease. Abdominal width (mm) of female lobsters equal to or greater than 60 mm carapace length is measured. Female egg condition and V-notch condition are also noted. The number of set days, type of bait, bycatch (number of each species), surface and bottom water salinity and temperature are also collected at each site.

The program objectives are:

1. To collect fisheries independent information concerning lobsters prior to their recruitment to the fishery.
2. To compare the generated data to the New Hampshire SCUBA and sea sampling studies and to the regional studies using ventless traps for information on the recruitment of lobster to the fishery.

*For information and results on other ventless trap and recruitment projects, including the **FSRS Lobster Recruitment Project**, check out the report from the **FSRS-GOMLF Lobster Science Workshop** held in February 2007, now available on-line at www.fsrs.ns.ca or by contacting Patty King at*

THE FSRS AT THE YARMOUTH FISHERIES EXPO

By Jeff Graves, FSRS Senior Fisheries Technician

February 16, 17, and 18 saw the FSRS make our usual trek to Yarmouth to have a booth at the Yarmouth Fisheries Expo. This year's Expo was a great success not only for the organizers but for the FSRS as well. Over the three days of the Expo over 3,500 people passed through the facility.

The booth was visited by a large number of FSRS project participants as well as fishermen, and members of the general public who are interested in science. Of particular interest to almost all of the people who passed by the booth was the specially designed trap that when filled with rocks and left on the bottom for two or three months will help lobster scientists get an idea of post larval lobster abundance. Initial testing in Nova Scotia will take place in Lobster Bay. The booth also attracted the interest of Brian Mendel of *The Chronical Herald* who ran a story about the FSRS and this new study. FSRS Research Biologist Carl MacDonald was interviewed and Alain d'Entremont had his picture taken with the new trap for the article.

Photo courtesy of John Lavers.

The FSRS booth was manned by staff and members: Margaret Lynch, John Lavers, Winfred Risser, Chris Corkett, Kate Gardiner, Alain d'Entremont, Carl MacDonald and Jeff Graves. The FSRS would like to congratulate the show organizers for a successful Expo.

8th International Conference & Workshop on Lobster Biology & Management

INDUSTRY DAY
September 27, 2007

Lobster Fishery Management: *Is the bottom greener on the other side of the ocean?*

Have you ever wondered how the lobster fishery is managed in other parts of the world? If so, then on September 27th 2007 plan on attending the 8th International Conference & Workshop on Lobster biology & Management (ICWL) Industry Day where presentations will be given on lobster biology 101, as well as fishery management measures from the Canadian, USA, Australian, European, South African and New Zealand perspectives. Those presentations will be given by fishery managers and fishers from around the world. The upcoming ICWL to be held in Charlottetown, PEI on September 23 to 28, 2007 and its Industry Day will provide an unmatched opportunity for researchers, managers and industry professionals to discuss worldwide trends in lobster fisheries, management as well as lobster biology and health.

Don't miss the boat.

Date:	Thursday, September 27, 2007
Location:	Delta Prince Edward, Charlottetown PEI
Early Bird:	$150, includes lunch (by August 1st)
Cost:	$195, includes lunch
Banquet:	$125, includes entertainment

www.LobsterScience.ca/conference

or call **902.628.1861** for more information

NEW ENGLAND LOBSTER SETTLEMENT INDEX UPDATE 2006 – TESTING NEW TOOLS

By Richard Whale, Bigelow Laboratory for Ocean Sciences
Participants: MeDMR (C. Wilson), MaDMF (R. Glenn), RIDFW (M. Gibson), DFO Canada (P. Lawton, D. Robichaud, J. Tremblay)

The New England Lobster Settlement Index has both reached an important milestone and launched a new initiative. First the milestone: As of the summer of 2006, diver-based suction sampling is entirely conducted by participating state marine resource agency staff (MeDMR, MaDMF, and RIDFW), and is no longer contracted out. Canada's Department of Fisheries & Oceans (DFO) continues to support sampling at the mouth of the Bay of Fundy, in New Brunswick. The long-term goal of the program continues to be the understanding of the causes and consequences of variable larval supply to regional patterns and time trends in adult populations. As for the new initiative, with support from NOAA's Northeast Consortium (NEC), a fisherman-scientist collaboration has emerged that will allow us to expand our sampling into new waters – if only on a short-term basis - using experimental passive postlarval collectors. This update briefly summarizes the 2006 settlement patterns and gives an overview of the new project.

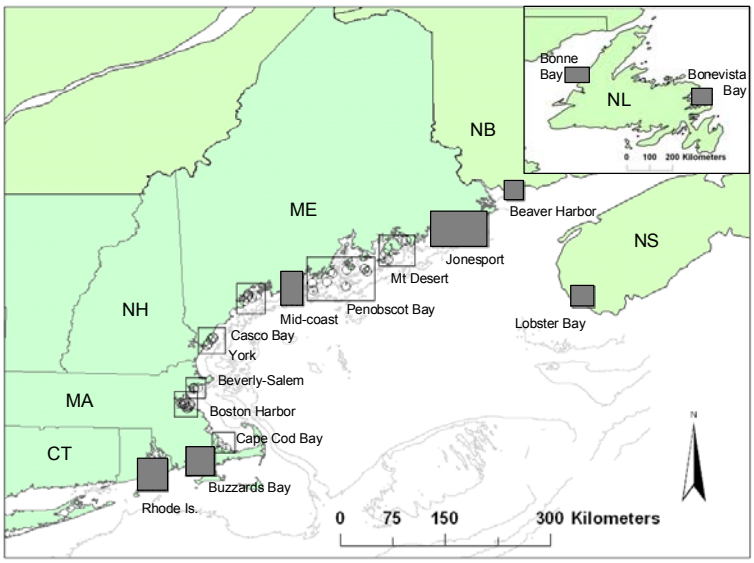


Figure 1. Sampling sites (circles) of the New England lobster settlement index. Initiated in Maine and Rhode Island in 1989-90, the annual survey spans some 65 sites from RI to New Brunswick. Surveys are conducted by divers using suction samplers in shallow rocky nurseries. Boxes surround sites used for regional averages in Fig. 2. Shaded boxes are regions where passive postlarval collectors will be deployed in 2007.

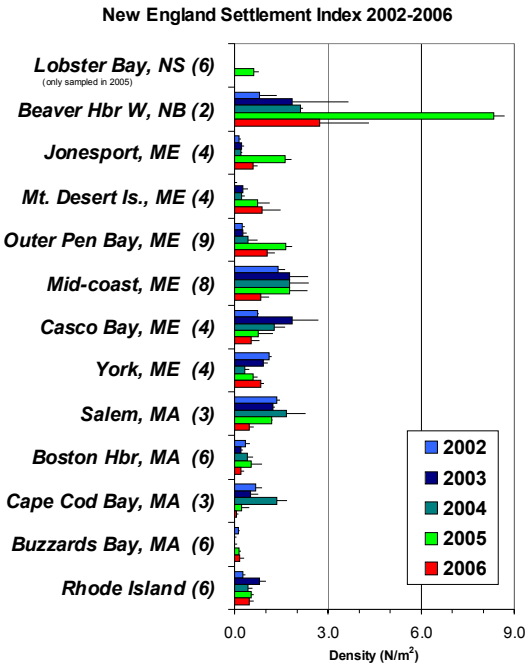


Figure 2. Regional 5-year time series of average lobster settlement throughout New England from 2002 to 2006. Number of sites sampled per region shown in parentheses.

- *2006 Settlement:* Most regions continued the stretch of relatively strong settlement we've seen since 2001, although not as impressive as 2005. That year was remarkable for the pulse of high settlement in eastern sectors. Beaver Harbor, NB, a location that has historically had high settlement, came in with an all-time, all-region record breaker, and eastern Maine for the first time had densities comparable to mid-coast and western Maine. Although not as dramatic in 2006, numbers in eastern Maine and New Brunswick were still above their historic averages. This trend may bode well for continued strong recruitment to the fishery in eastern Maine. From mid-coast Maine to the south and west settlement was either at or below recent levels.

Figure 3. Mimicking nature. Collector on the rail of a lobster boat. This collector was fitted with a fine mesh cover that is being removed after the test to evaluate haul-back losses of postlarval lobsters seeded to the collectors.

- *Probing the Depths with Collectors:* For years we have been nagged by the persistent question of how deep and how far offshore lobster postlarvae settle. Huge expanses of the seabed remain inaccessible to our diver-based sampling. Scientists studying spiny lobsters in Australia and the Caribbean have used moored passive collectors made of fibrous air conditioner filters and plastic laminates to sample postlarvae. Sadly, such convenient light-weight materials fail to attract postlarval clawed lobsters. Building on earlier success with various types of collectors, two of us (Wahle & Wilson), put our heads together with Boothbay lobsterman, Matt Parkhurst, to develop a design that would lend itself to being deployed with standard commercial trap hauler. The design simply consists of a flat trap-wire mesh tray filled with cobbles and lined with fine screening on the bottom and sides (Fig.3). We did not relish the prospect of lugging scores of hundred-pound trays of rock, nonetheless we heeded Matt's common sense advice: *"Make 'em heavy and they'll stay put."* The end-result is a design that mimics the natural nursery habitat.

Proof of Concept: With NEC Project Development support, we put our collector design to the test. Experiments were conducted in shallow water where divers could assist. We demonstrated that the new collectors effectively sample newly settled lobsters (as well as crabs and fish) in densities comparable to adjacent long-term monitoring sites sampled by divers (Fig. 4a). By the end of the settlement season (mid-October), newly settled lobsters predominated the contents of the collectors, although a considerable number of larger lobsters had moved in from the surrounding sea bed. Moreover, in two different experiments we found no significant losses of lobsters from the collectors during the haul-back (Fig. 4b). It will therefore not be necessary to incorporate a means to cover the collectors prior to hauling or to devise a correction factor in comparing diver- to collector-based estimates. We are now ready to address our original question regarding the depth range of lobster settlement.

Deep-water Settlement: With renewed NEC support in 2007 and 2008 we will continue our fisherman-scientist collaboration. The objectives of the project are to (1) Determine the depth-wise patterns of lobster settlement in three regions of contrasting oceanography (southern New England shelf, and central and eastern Gulf of Maine); (2) To better calibrate collector-derived data, continue to compare settlement density in collectors to adjacent natural nursery sites sampled by divers; and (3) Evaluate the link between water column thermal structure and depth patterns of settlement. Two new collaborating harvesters (Skip O'Leary, Wakefield, RI, and Norbert Lemieux, Cutler, ME) have joined the team enabling us to deploy 100 collectors in each of the three regions.

The project has also generated considerable interest among colleagues in New England and eastern Canada who also see the potential use of collectors as a tool in stock assessment. To date, Victoria Burdett-Coutts (Memorial Univ., NF), Peter Lawton and John Tremblay (DFO Canada), Remy Rochette (University New Brunswick), Kevin Stokesbury and Peter Milligan (UMass, Dartmouth) have all secured support to complement our efforts. Finally, Jim Manning (NMFS, Woods Hole, *e*Molt

Project) has kindly provided temperature loggers we can attach to collectors to monitor thermal structure in each region. We look forward to the wider collaboration and the greatly expanded geographic coverage it will provide (Fig. 1).

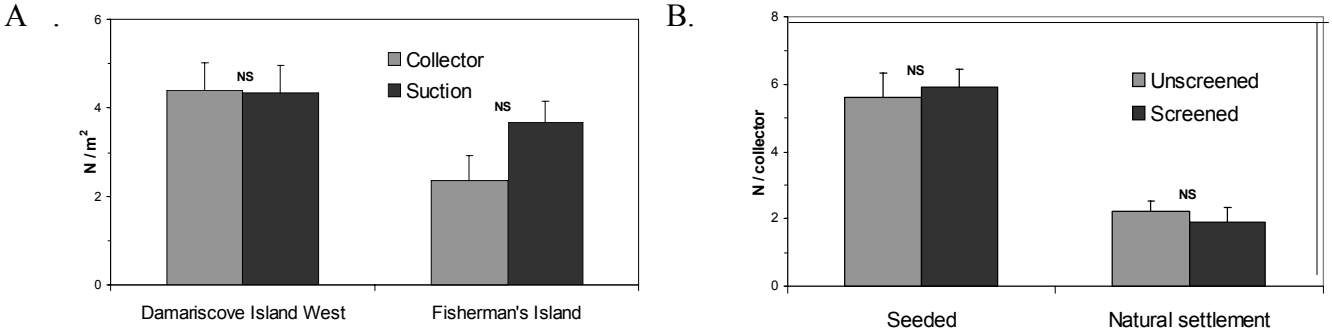


Figure 4. (a) Settlement in collectors versus natural cobble. Average density of newly settled lobster in artificial collectors and in adjacent natural cobble nurseries sampled by suction samplers at two sites in Maine (10 collectors and 12 suction samples per site). There was no statistical difference in densities estimated by the two methods at either site. (b) No losses on haul-back. Comparison of the settler numbers recovered in collectors that were covered and not covered with screening prior to haul-back in two different experiments. In seeded collectors, 10 hatchery-reared settlers were artificially placed in each of 20 collectors; the next day 10 of the collectors were covered just prior to hauling. To assess losses after natural settlement, 40 collectors were deployed, 20 of which were covered just prior to hauling at the end of the settlement season. There was no statistical difference in recoveries from screened and unscreened collectors in either experiment.

EASTERN CAPE BRETON LOBSTER TECHNICIAN

By Brooke Oland, FSRS Lobster Technician

Hi, my name is Brooke Oland, and I am helping out with the Lobster Recruitment Project in LFA 27-30 (eastern Cape Breton Island) this summer.

I have a background in Environmental Biology, and I worked as a Fisheries Observer for a while, so I was quite interested in the work of FSRS, and excited to be part of this project. I'm enjoying meeting fishermen from around the island, and learning about their lives and their work. It's great to be out on the water again, particularly off the shores of beautiful Cape Breton Island.

This project and the work of FSRS dovetails with the work my wife and I are doing on our Cape Breton farm. Old Man Farm is a small, mixed, Permaculture designed farm working towards modeling local, sustainable food growing. We are entering our first year as a CSA operation supplying weekly boxes of fresh, organic food to local subscribers, and we are working towards a longer-term goal of becoming a learning center for hands-on skills in agriculture, alternative energy, and green building. Understanding our natural resources and helping the human community live sustainably is at the heart of what we are trying to do. It is a privilege to be doing "off farm" work that adds to my understanding of food and sustainability, and to be contributing to the work of FSRS. I look forward to hearing the results of the current studies.

72 STUDENTS RECEIVE FSRS OCEANS 11 PROGRAM AWARD FOR OUTSTANDING ACHIEVEMENT

Seventy-two students from Oceans 11 classes throughout Nova Scotia received the seventh annual Fishermen and Scientists Research Society Award for Outstanding Achievement in the Oceans 11 Program. Twenty-five of these students received their awards at a ceremony held at the Bedford Institute of Oceanography, on Oceans Day, June 8, 2007. Each student was presented with their award and given a tour of the facilities by friendly and well trained tour guides. This annual award recognizes students, nominated by their teachers, who have demonstrated outstanding accomplishments in their Oceans 11 class, including level of interest, participation and contribution to the class, along with scholastic achievement. The Oceans 11 Program is a science program for grade 11 students, offering them the opportunity to learn about a wide range of marine science topics, including biology, oceanography, fisheries science and fisheries management.

Established in January 1994, the Fishermen and Scientists Research Society (FSRS) is a non-profit organization which is an active partnership between fishermen and scientists. The FSRS was developed with the overall objectives to establish and maintain a network of fishermen and scientists capable of conducting collaborative research and collecting information relevant and necessary to the long-term sustainability of marine fisheries, and to promote effective communication between fishermen, scientists and the general public. The current membership consists of 386 members. As the name suggests, the FSRS members are predominantly either fishermen or scientists who study the fisheries resources and the marine systems on which they depend. Other members include social scientists, educators and interested citizens. The prime requirements for becoming a member are an interest in the goals of the FSRS and a willingness to contribute towards them.

The FSRS works towards achieving the first objective in two related ways. First, members conduct science projects. These involve field collections of data, samples and specimens, and laboratory processing and analysis by FSRS technicians, interns and members. The data produced by FSRS projects have been used in stock assessments and marine mapping of fisheries resources, and published results have appeared in the primary scientific literature. The second way the FSRS seeks to improve the long-term prospects for our fisheries is through education, or more properly, co-education. Both the fishermen and scientist members have a wealth of knowledge about fisheries resources and the ocean. They certainly do not express it the same way but, more importantly it is not the same knowledge. When these two groups have put their heads together, learned each other's way of describing what they know, and pooled their knowledge, strong new insights have emerged.

As previously mentioned, one of the FSRS's primary objectives is to facilitate and promote effective communication between fishermen, scientists, and the general public. With a view to advancing communication between these stakeholders and increasing fishermen’s participation in fisheries science, the FSRS has undertaken a number of initiatives since its inception, including a quarterly newsletter, an annual conference and workshops, and a web site. Promoting communication and education also includes supporting initiatives such as the Oceans 11 Program, which is educating the future stakeholders of this industry, the future scientists and fishermen.

The FSRS supports the Oceans 11 Program in two ways. One is through hands-on presentation to Oceans 11 classes. The other is through the annual award for outstanding achievement in the Oceans 11 Program, which is presented to a student from each of the Ocean 11 classes in Nova Scotia, nominated by their teachers.

The FSRS congratulates the following students who received the award:

Avon View High School	Jacob Williams	
Baddeck Academy	Kyle Dennis	
Barrington Municipal High School	Brandon Nickerson	Jacob Pierce
Central Kings Rural High School	Alexander Houston	Samantha Sponagle
Chignecto-Central Adult High School	Darren Brooks	
Cobequid Educational Center	Stephanie Boates	Sarah Boyce
	Samantha Hoskin	Chelsea LeBlanc
	Christina MacDonald	Nicole Pardy
	Nicole Pardy	Bijoux Verkuyl
Cole Harbour District High School	James Cardey	Catherine Corkum
	Katie Matheson	Angela Millington
	Devin Reid	Sabrina Schnare
	Adrian Tansley	
Dalbrae Academy	Nancy Cameron	Cody MacDonald
	Jenelle MacFadyen	
Dartmouth High School	Daniel S. Grenon	Keltie Saulnier
Digby Regional High School	Shaun Gerhardt	Casie Tidd
École secondaire de Par-en-Bas	Tristan Surette	
Glace Bay High School	Deneal Aucoin	Kelly Bray
	James Callaghan	Travis MacNeil
	Brittany MacPhee	Sharla Morgan
	Patrick Mulrooney	Ian Oliver
	Tyler Poirier	
Guysborough Academy	Matthias Bieber	
Holy Angels High School	Kari Carew	Miranda Livingstone
Memorial High School	Alyssa Leblanc	Robert MacKinnon
	Brittany MacLean	Justin MacNeil
	Jonathon Robinson	
Middleton Regional High School	Saara Ainamo	Laura Cole
	Laura Skaling	
Musquodoboit Rural High School	Jillian Dean	
North Nova Educational Centre	Kayla Cruickshank	John Fraser
	Candice Parker	Jayne Peters
	Andrew Thompson	Lindsay Walker
Pugwash District High School	Michelle Alkema	
Queen Elizabeth High School	Matthew Bustin	Beth Conrod
	Poppy A. Riker	
River Hebert District High School	Lacy Maloney	
Sackville High School	Cyndi LeBlanc	
South Colchester Academy	Tracy Eldershaw	Charlie Fleming
	Laskey Hart	Kurt Queripel
Strait Area Education Recreation Centre	Gillian Michelle	George
Sydney Academy	Tony Gillis	Ashley LeBlanc
	Lyndon Musgrave	Lindsay Senior
Yarmouth Consolidated Memorial High	Colin Boudreau.	

WORLD TRAVELLERS SPEND SUMMERS ALONG NOVA SCOTIA'S COAST: TERNS

By Jennifer LeBlanc, FSRS Fisheries Technician

Unlike the birds in the last two articles (gannets and auks) that are easily recognized, unfortunately terns seem to go unnoticed, perhaps because people often assume they are "just gulls". On first inspection, their grey and white bodies may appear gull-like, but they really can be distinguished quite easily. Our terns are smaller and more elegant looking than most gulls. They have narrower wings, forked tails, sharply pointed bills, short legs, and perhaps most notably, a black cap in summer. They can often be seen hovering over the water before diving to catch small fish such as sandlance.

Arctic Tern. Photo by Ted D'Eon. www.ted.ca

There are three tern species that breed in Nova Scotia – the Common Tern, the Arctic Tern, and the Roseate Tern. As its name implies, the Common Tern is fairly common along the coast of Nova Scotia, followed by the Arctic Tern. The Roseate tern has always been the least common species in the Maritimes but they are now only known to nest at a few sites in Nova Scotia, and are currently listed as endangered by COSEWIC.

Terns make major migrations, flying from South America to Canada and back again each year. In fact, the Arctic tern migrates farther than any other bird in the world. They travel each year from Antarctica to the Arctic (Nova Scotia is at the southern range of their breeding grounds) then back to Antarctica, travelling along the coast of Africa. The longest recorded trip was over 35,000km!

Roseate Tern. Photo by Ted D'Eon. www.ted.ca

Terns arrive here in the summer to nest on rocky beaches (especially on islands), laying two to four eggs in a depression on the ground. They aggressively defend their territory, although the Roseate Tern is less aggressive than the others. Common and Arctic Terns will not hesitate to swoop down at intruders, sometimes making contact, so if you are being dive-bombed by a tern, you are too close to the nests!

In the late 1800s, tern feathers were widely sought for decorating hats, and this impacted the populations in eastern North America. Terns are generally able to avoid mammalian predators since they nest on islands, but gulls and ravens will prey on eggs and chicks. Another problem for the Roseate Terns is that they winter in South America, where they are often captured for food. Expanded human development and competition for nesting sites with more aggressive gulls can impact tern populations as well.

But terns are by no means hard to find, especially Common Terns. If you spend time at the coast this summer, take a moment to observe these beautiful birds diving for fish. Watching their noisy antics, you'll wonder how you never noticed them before!

References:

Atlas of Breeding Birds of the Maritime Provinces. By Anthony J. Erskine. 1992.
Complete Birds of North America. Edited by Jonathan Alderfer. 2006.

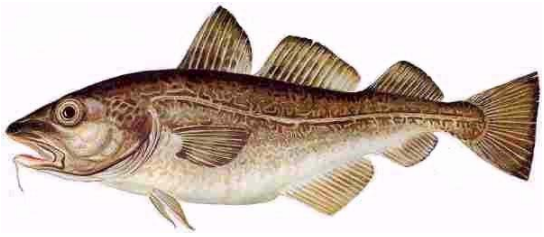
A Field Guide to the Nests, Eggs and Nestlings of British and European Birds. By Colin Harrison. 1975.

Fast Fact

Did you know that the Northeast Arctic cod stock, also known as the Arcto-Norwegian stock, is the largest in the world?

It is also known as the *skrei* which means 'wanderer' in Norwegian, thus distinguishing this group from the resident coastal stock.

Source: marinebio.org



http://folk.ntnu.no/vmbijmor/jmork/GearSelection/00sicily/4observations.html

NEW FSRS FISHERIES TECHNICIAN ARRIVES IN THE YARMOUTH AREA

By Blair Cabot, FSRS Fisheries Technician

My name is Blair Cabot and I would like to introduce myself as the newest member of the FSRS team. I was raised in the small fishing town of Lanse au Loup, Labrador and fished hook and line cod with my father and my three brothers until the 1991 cod moratorium.

After high school I went to Memorial University in Corner Brook, Newfoundland and studied environmental biology. Since graduation in 2003, I have worked in many different environmental fields including Fisheries Observing in Alaska. Most of my work was on pollock, cod, and king crab. I have even worked on the SeaStar that was featured in the Discovery Channel series "The Deadliest Catch".

I have just moved to Yarmouth from Halifax to begin work for the FSRS and I look forward to working in the area.

BEACHCOMBING – What's New in The News

Ocean Innovation 2007 Conference & Exhibition

Canadian Centre for Marine Communications (CCMC) is holding an **Ocean Innovation 2007 Conference & Exhibition** in Halifax, Nova Scotia from October 21-24, 2007.

Ocean Innovation 2007 will present ***The Rise of Maritime Simulation,*** the fifth installation of Canada's foremost oceans conference and exhibition. The 2007 event will include a highly focused three-day schedule that includes a two-day conference and exhibition and a third day of tours and meetings in Halifax.

The conference will feature four plenary sessions in single-stream format covering the following topics: Navigation and Pilotage, Ports and Waterways, Training Systems & Human Performance.

Social activities also planned for the event include the Annual Icebreaker Reception at the Halifax Maritime Museum, the Gala Dinner located onsite at the Marriott Halifax Harbourfront, several other networking events including tours and site visits to related ocean technology facilities.

For more information and online registration, please visit the web site: www.oceaninnovation.ca <http://www.oceaninnovation.ca>.

EXECUTIVE COMMITTEE

FISHERMEN AND SCIENTISTS RESEARCH SOCIETY
P.O. Box 25125
Halifax, NS B3M 4H4

Phone: (902) 876-1160 Fax: (902) 876-1320
E-Mail: pmdservices@eastlink.ca
Web Site: www.fsrs.ns.ca

Editor: PMD Services

UPCOMING EVENTS

Start Planning Now!!!

Fishermen and Scientists Research Society 15th Annual Conference

February 22-23, 2008
Best Western Glengarry Hotel , Truro, NS