HOOK, LINE AND THINKER

Issue: 2009-3 **Summer 2009**

LOBSTER SETTLEMENT WORKSHOP AT A GLANCE

By Tricia Pearo, Fisheries Technician, FSRS

On the weekend of June 19-21, 2009, lobster fisherman Jason Williams and I had the opportunity to attend the American Lobster Settlement Workshop at the Burnt Island Light Station Education Center in Boothbay Harbour, Maine. This workshop marked a milestone for the past 20 years of collaborative lobster settlement monitoring in New England and Atlantic Canada.

Lobster Settlement Workshop Participants.
(Picture by E. Cobb)

All participants arrived in Boothbay Harbour on Friday morning and were shuttled by boats to beautiful Burnt Island. Upon our arrival, we were welcomed by workshop coordinators Rick Wahle and Carl Wilson, of the Bigalow Laboratory for Ocean Sciences, along with their friendly staff. All attendees were quite comfortable in the restored 1950's education facility on the island. Friday afternoon featured interesting presentations on the history and accomplishments of the American Lobster settlement by some exceptional scientists. The afternoon's talks were followed by a delicious lobster bake.

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In the evening, we all had a chance to network with each other, share ideas and get to know one another. The highlight of the night was when renown lobster scientist, Bob Steneck (University of Maine), shared some 'Blast from the Past' videos highlighting key projects and events he and his colleagues participated in over the years.

Workshop talks continued Saturday morning, focusing on future objectives for lobster settlement monitoring, research and maintaining a strong US/Canada collaboration. As some attendees departed after the morning workshop, a group of us had the chance to go on an afternoon excursion to the historic Damariscove Island. After a refreshing hike around the island, we boarded the boat and returned to Burnt Island for the night.

This workshop was a great experience for both Jason and I. We are both very grateful for the opportunity to attend. Not only did we learn a great deal, but we made important connections in our respective fields of work and interest.

On behalf of the FSRS, I would like to thank Rick Wahle, Carl Wilson and staff for their phenomenal hospitality during this workshop. You all made the weekend a memorable one!

For more information on the topics covered by this workshop look for the upcoming article in our Fall issue of the *Hook, Line and Thinker.*

FROM THE RESEARCH DESK

By Shannon Scott-Tibbetts, Research Biologist, FSRS

I was lucky enough to attend the 8th BoFEP Bay of Fundy Science Workshop, held at Acadia May 26-29, 2009. The theme for this workshop was "*Resource development and its implications in the Bay of Fundy and Gulf of Maine*". There were a number of concurrent sessions dealing with various Bay of Fundy issues. They included: tidal power, salt marshes, coastal zone information management, intertidal ecology, fish, fisheries and aquaculture, watersheds, other industrial activities and conservation ecology. The sessions keynote speakers were Gordon Fader (marine geologist and President of Atlantic Marine Geological Consulting Ltd.), Michael Stokesbury (marine biologist and Director of Research for the Ocean Tracking Network), Rob Thompson (Director, Atlantic Service Centre, Parks Canada), and Terri McCulloch (Manager of Bay of Fundy Tourism).

I attended the session on Tidal Power and learned more about multibeam bathymetry and sea floor mapping to find the ideal locations for the tests sites for tidal turbine placement. There was also talk on tidal currents and tidal range expansion and the concerns with turbines on the Minas Passage. I also participated in discussions on *Indicators and Decision Support Tools*, as well as the *Fish, Fisheries and Aquaculture* sessions. These sessions showed data on striped bass in the Bay of Fundy system as well as discussion on right whale and their predicament with ship strikes and entanglement.

Overall it was a very informative workshop and it certainly expanded my knowledge about the issues of concern to the Bay of Fundy and Gulf of Maine. Please visit the website to learn more. www.bofep.org

The Atlantic Veterinary College's Lobster Science Centre held their 5th Annual Lobster Science Workshop this past July and I was fortunate enough to attend along with two fishermen from the FSRS, Wilford Smith and Cecil Cashin. The event was held July 15-16th in Charlottetown, Prince Edward Island at the Rodd Charlottetown. It was attended by a range of people from the four Atlantic provinces, Quebec, Ontario and even from the eastern seaboard in the United States.

The Honourable Gail Shea, Minister Fisheries and Oceans Canada, and Honourable Neil LeClair, Minister, PEI Dept of Fisheries, Aquaculture and Rural Development were present to give some opening remarks before the workshop began in earnest.

The keynote speaker was Dave Casoni from the Massachusetts Lobstermen's Association and the topic of his talk was: *Lobster Quality from an Outsider's View*. He gave an overview of the fishing in his area of Massachusetts, stating that they were experiencing the same sorts of issues with pricing as his Canadian counterparts. He mentioned the conservation measures that they are required to follow both federally and state wide, and also that they typically only fish 4-5 months of the year and use ~600 traps instead of their full legal allotment. He also mentioned that the Massachusetts Lobstermen's Association produces a newsletter which you can check out for more information about the lobster fishing in his area. http://www.lobstermen.com/

Speakers from the harvesting, processing and buyers side of the industry each presented their unique viewpoints to the discussion. As well, Tim Moffat from Darden Restaurants gave an overview of how the consumers where reacting to the changing lobster fishery. After the lunch break, staff from the Atlantic Veterinary College - Lobster Science Centre (AVCLSC) gave some updates on different projects they where working on at the Centre. Jean Lavallée's presentation, presented by Jerry Amirault, discussed the special PSP sampling that is happening around the region. The FSRS is actively involved in this project. The FSRS assists with the collection of live lobsters and also with the collection of the hepatopancreas for testing by the CFIA. There are currently 27 sites being sampled covering all of the Atlantic provinces and Quebec. 15 lobsters are being collected and sampled from each site and this may be done 2-3 times per site. Anyone interested in results can contact the AVCLSC (their website link can be found on the FSRS website: www.fsrs.ns.ca).

There was a presentation about "mushy tail" in lobsters, which was something that Tim Moffat touched on in his talk on quality and the consumer. Preliminary analysis seems to indicate a degenerative change in the muscle tissue but it is not caused by bacteria or parasite. This could be the result of handling stress, similar to a condition found in freshwater prawn. Rick Cawthorne brought the audience up to date on the bitter crab study that is currently underway and the last talk was on genetic mapping using DNA microarrays. It was a very interesting and informative workshop, as always, and I look forward to attending the next one. Visit the AVCLCS website to learn more about the workshops. http://www.lobsterscience.ca/.

You can reach me at the FSRS office at any time for further discussion on these or any fisheries related issue. 1-800-226-3777 or by email at shantibbetts@gmail.com.

YOU ARE WHAT YOU EAT

Courtesy of XNCR, Science Bulletin, DFO

The premise seems simple enough: the availability of zooplankton, the primary food source of fish, gives an indication of future fish stocks. A lack of food resources during the first stage of development, i.e., the larval stage, will inevitably have harmful consequences for the future adult fish population. It is a very intuitive relationship, but one that is not all that easy to demonstrate! Yet that is precisely what a team of researchers from the Maurice Lamontagne Institute (MLI) has done, in co-operation with Laval University and the University of Maine–Gulf of Maine Research Institute.

Photo of a female copepod of the species *Calanus finmarchicus*.
(source: R.W. Campbell)

Factors in the team's success

In scientific research, demonstrating a cause-and-effect relationship requires time, properly compiled data and knowledge: time, in order to be able to repeat analyses; data, in order to formally illustrate phenomena; and knowledge, in order to understand just what needs to be measured. The MLI team had all three.

To conduct their analyses, the researchers had two decades of data, covering the period from the early 1980s to the present day. They also identified a good research model: the Atlantic mackerel of the Gulf of St. Lawrence. Because this species is highly sensitive to the conditions of its environment, its recruitment shows strong variability from year to year. This variability is a fundamental criterion for studying the impacts of the environment on fish. The knowledge base has been refined over the years and has made it possible to identify potential prey of mackerel larvae.

This new knowledge contributed significantly to the implementation of the study. Until now, when researchers compared good fishing years for a given fish species with the prevailing conditions in its environment during the larval stage, the results from different years were often contradictory. The MLI team encountered the same situation. “In the first decade, we saw a relationship between zooplankton biomass and the good recruitment years that followed,” says MLI researcher Stéphane Plourde. “When we added a second decade of data, we observed that the relationship disappeared or became much less significant.”

In other words, by repeating their research protocol, the scientists obtained results that contradicted the relationship between zooplankton biomass and mackerel populations, documented 10 years earlier! “Over time, we learned that we had to focus more on zooplankton composition and target the components that determine larval survival in mackerel,” Dr. Plourde says.

Mackeral, larval stage.
(Source: François Grégoire)

With its large temporal and spatial scales combined to a very fine level of detail, the study represents a major step forward for fisheries science.

LOBSTER SETTLEMENT COLLECTORS OFF THE ATLANTIC COAST OF NOVA SCOTIA: INCREASE IN COVERAGE IN 2009

By John Tremblay, Head, Atlantic Coast Crustacean Section, DFO

The FSRS-DFO project to study lobster settlement has increased from 4 locations in 2008 to 6 locations for 2009 (see table below). The collectors (basically rock filled cages) mimic the preferred habitat of young lobsters that seek shelter on the bottom in late summer. These settling lobsters typically hatch from eggs during the summer months and spend their first month or so as planktonic larvae in the water column.

The 6 locations are comprised of 3 from last year (Lobster Bay, Pennant Point and Port La Tour) and 3 new locations in Saint Mary's Bay, Eastern Shore, and False Bay, Cape Breton (a shift from the Big Bras d'Or location used last year). A total of 411 collectors were set in these locations. In addition to the above, collectors have again been set in the Canso area by the Guysborough County Inshore Fishermen's Association.

Collectors deployed from Cape Breton to Saint Mary's Bay, 2009

Location	Site	Date set	Number of collec-tors	Mean Depth (m)	Min Depth (m)	Max Depth (m)
1. Eastern Cape Breton	False Bay-east	30-Jul-2009	25	7.5	5.5	8.7
	False Bay-west	30-Jul-2009	25	7.6	5.5	8.9
2. Eastern Shore	Port Bickerton	23-Jun-2009	25	6.9	6.1	7.9
	Reid Is	23-Jun-2009	25	7.6	6.8	9.0
3. Halifax	Pennant Pt	06-Jul-2009	50	7.7	4.8	12.9
4. Port LaTour	Pt LaTour-deep	26-Jun-2009	25	7.6	5.9	8.8
	P LaTour-shallow	26-Jun-2009	25	3.8	2.8	5.8
5. Lobster Bay	Abbots Harbour Is	17-Jun-2009	25	5.0	2.8	7.9
	Canoe Is	17-Jun-2009	25	8.2	3.9	13.8
	Lears Is	17-Jun-2009	25	7.3	4.1	8.5
	Johns Is	18-Jun-2009	31	38.5	33.2	43.8
	Round Is	18-Jun-2009	30	30.3	27.7	31.4
6. Saint Mary's Bay	Skinny Shoal	08-Jul-2009	25	7.2	6.3	7.9
	Brooks Beach	08-Jul-2009	25	9.6	8.1	11.1
	Comeauville	08-Jul-2009	25	12.5	10.3	15.0
ALL Regions			411			

Thanks to all the fishermen who participated: Ashton, Aubrey and Carl Spinney in Lobster Bay, Mark Gidney for Saint Mary's Bay, David Ferguson in False Bay, George Stevens for Port Bickerton, Paddy Gray for Pennant Point and Jason Williams for Port La Tour. Thanks also to the deckhands who helped things go smoothly. All of the fishermen are vital to the success of the project.

FSRS and DFO staff put a lot of effort into the project from May to July in preparing new collectors and ensuring they were transported, repairing old collectors, and working with fishermen to deploy them. Thanks to all involved but especially to Steve Nolan (DFO), and Tricia Pearo and Shannon Scott-Tibbetts (FSRS).

We are looking forward to bringing the collectors up in October and November and we will report back in early winter.

UPDATE ON TRENDS OF LARVAL SEALWORM INFECTION IN SCOTIA-FUNDY GROUNDFISH: EVIDENCE OF SEALWORM-INDUCED FISH MORTALITY

By Gary McClelland, Parasitologist, Fisheries and Oceans Canada

Surveys of eastern Canadian fish stocks conducted during the early 1980s revealed that larval sealworm, *Pseudoterranova decipiens*, were most abundant in demersal species from southern Newfoundland (NAFO Division 3P), the Gulf of St. Lawrence (4RST), the Cape Breton and Scotian Shelves (4VWX) and the Gulf of Maine (4X-5Z). Prevalence (% of host population infected) and abundance (A) (mean worm count) of the parasite had been increasing in Atlantic cod (*Gadus morhua*) and other groundfish species from 3P, 4RS, 4VWX and 5Z since the 1950s, and began to increase in southern Gulf of St. Lawrence (4T) groundfish after 1983. By the late 1980s, the heaviest infections were found in demersal fish from the central Scotian Shelf (4W) near Sable Island, site of the largest colony of grey seals (*Halichoerus grypus*), important definitive hosts of *P. decipiens*, in the Northwest Atlantic. The "Sealworm Index" time series, a survey employing an indicator host, American plaice (*Hippoglossoides platessoides*) 31-40 cm in length, to monitor spatial and temporal distributions of larval sealworm, however, revealed that infection parameters began to decline in 4VW plaice after 1990, despite proximity to the rapidly growing Sable Island seal colony. Abundances in "Index" plaice from the southern Gulf of St. Lawrence and southwestern Nova Scotia, on the other hand, continued to increase through the 1990s, and by 2000, the heaviest infections (A = 15.48) were found in fish from the German Bank/Jordan Basin (4X) area.

In 2006, larval anisakine (sealworm and related species) infections were surveyed in 1376 cod, and 1510 plaice from Nova Scotian waters, following protocols used in surveys during the 1980s. Cod samples included 502 fish from the Cape Breton Shelf (4Vn), 279 from Sable Island and Western Banks (4W) and 595 from the southern Scotian Shelf and northeastern Gulf of Maine (4X). Two-way ANOVA (host length x survey year) of 1981, 1989-90 and 2006 samples of 4Vn cod (≤ 70 cm in length) reveals that sealworm abundances in the '06 sample were significantly greater ($P \leq 0.0001$) than those recorded in '81, but did not differ from those found in the '89-90 sample. Similar contrasts of 1982, 1989-90 and 2006 samples of 4W cod ≤ 60 cm in length indicate that worm abundances in the '06 sample had fallen significantly ($P \leq 0.001$) from those recorded in '89–90, and, in fact, did not differ significantly ($P = 0.061$) from abundances observed in 1982. Finally, a two-way ANOVA of infections in 4X cod showed that sealworm was significantly more abundant ($P \leq 0.0001$) in 2006 sample from Roseway Basin and vicinity than they were in 1983-84 sample from the same area. Worm abundances in the '06 sample and those recorded in cod from the Grand Manan Basin in 1990, however, did not differ significantly ($P = 0.075$). Among cod sampled in 2006, sealworm abundance was greatest (A = 13.35) in 4X cod >70 cm in length, with the highest individual worm counts (98 & 99) being recorded in two Roseway Bank cod, 66 and 59 cm in length respectively.

Plaice from the Cape Breton Shelf were partitioned into Smokey Channel (n=276) and Louisbourg Hole (n=234) groups in compliance with results of a recent 4TVn plaice stock delineation study, while 4X plaice were partitioned into groups from northern 4X (Sambro area) (n=97), Roseway Basin and vicinity (n=718), Browns Bank (n=57) and German Bank (n=134) following analyses of spatial variation in worm count/host length scatters. One-way ANOVA of "Index" survey data reveal that sealworm abundance in 31-40 cm plaice peaked from 1995 to 2000, and from 1987 to 1989 for Smokey Channel ($P \leq 0.0001$) and Louisbourg Hole ($P \leq 0.05$) respectively, but abundances have since declined, and in more recent samples, are similar to those recorded in the early 1980s. ANOVAs for 4X index data, on the other hand, indicate that *P. decipiens*

abundances have increased dramatically in both the Roseway Basin ($P \leq 0.001$) and German Bank/Jordan Basin ($P \leq 0.0001$) areas since 1993. Sealworm abundance in 31-40 cm German Bank plaice in 2006 remained among the highest recorded (A = 15.0) over the course of the "Index" time series, although Browns Bank plaice in the 21-25 cm length bracket were the most heavily infected (A = 21.78) plaice overall. The highest individual worm counts (≥ 100) were recorded in 25, 28 and 37 cm plaice, from German Bank, Roseway Basin and Browns Bank, respectively.

Laboratory experiments and field data indicate that larval sealworm infections may prove lethal to their fish host either through direct damage to vital organs and tissues, or through chemical impairment of the host's ability to forage and avoid predators. Sealworm densities (no./unit host weight) in free-living juvenile plaice and other small demersal fishes often exceed levels which have proven lethal to laboratory hosts, or at least detrimental to their performance. Hence, the nematode may have played a role in the collapse of plaice stocks on the central and eastern Scotian Shelf, where fish of commercial size have become increasingly scarce since the late 1980s. Mortality of heavily infected fish would result in the truncation of the tails of right skewed worm count frequency distributions and, in turn, be evident in declines of sealworm abundance and/or the variance/mean worm count (abundance) ratio. Declines in both of these latter parameters have been apparent in recent 4VW samples from the "Index" time series, most notably in those taken from the Sable Island Bank complex, in close proximity to the Sable Island grey seal population. Further, declines in both the abundance and the variance/abundance ratio frequently occur in larger (older) fish in given samples of plaice collected throughout 4VWX. With regards to cod, the decline in sealworm abundance observed in 4W from 1989-90 to 2006, and the weakness or lack of correlation between the variance/mean worm count ratio and host length in the 2006 sample from 4Vn ($R^2 = 0.0058$) and in both the 1989-90 ($R^2 = 0.25$) and 2006 ($R^2 = 0.11$) samples from 4W, may also be indicative of sealworm-induced host mortality.

Reference:

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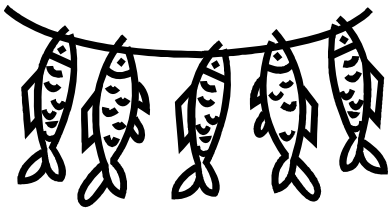
QUESTIONS FROM THE WHARF



Our technicians often get questions from the fishermen they work with. In this series "Questions from the Wharf" we will be providing answers to some of the more commonly asked questions. If you have a question you would like answered, please email your query to chrispmd@eastlink.ca or give us a call at 902-876-1160 or 902-461-8119.

Question: Does shell disease kill the lobsters affected by it?

Answer: Shell disease is a syndrome that is caused by bacteria capable of eroding the three innermost chitinous layers of a lobster's shell. Rarely do lobsters die from shell disease, though it can occur in severe cases. Those with mild to moderate cases of the disease are not known to die. When a lobster's shell is damaged or diseased, the moulting process speeds up and moulting occurs sooner. Moulting may eliminate or improve the problem but in some cases moulting causes it to worsen. In all but extreme cases, the meat of lobsters affected by shell disease is still good to eat.

Reference: http://www.fishresearch.org/Articles/2003/01/shell_disease.asp

A BELUGA IN THE BAY OF FUNDY??

By Katie McGrath, Fisheries Technician, FSRS

Q enjoying the waters of Advocate Harbour.
(Source: Courtney Gilbert)

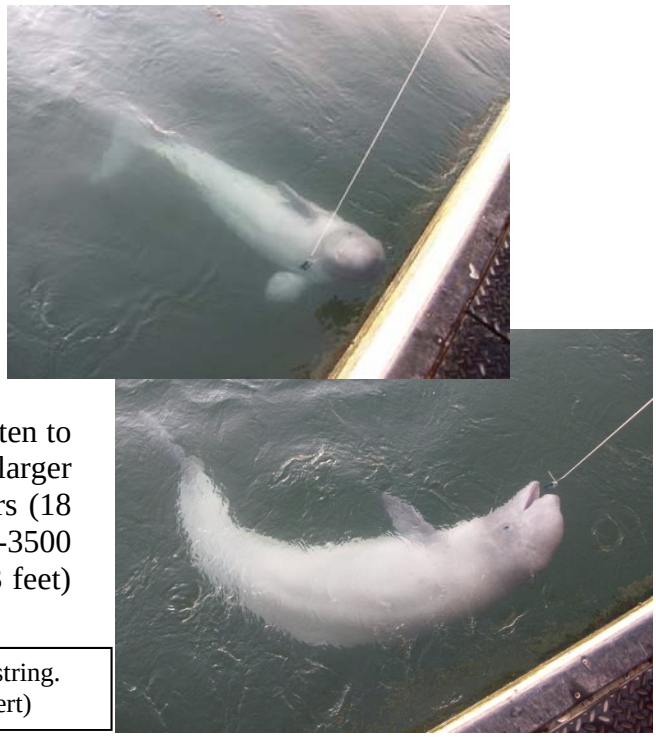
Advocate Harbour has recently added a new part time resident, his name is Q, a male juvenile beluga whale. He can be found most often near the bell buoy just outside the mouth of the harbour. Q is believed to be around three years old. He arrived in May 2008 right around the time a female beluga whale was found dead on a beach in New Brunswick. That summer he was very friendly and came to visit all the boats that came to see him. He really loved to play when someone would dangle a toy over the side of the boat on a stick or string.

In November 2008 Q left Advocate Harbour; nobody is quite sure where he went. In the spring of 2009 Q returned to the harbour. In May he was spotted in his favourite location near the bell buoy.

I saw him for the first time in mid-June. He was larger than he is in the pictures shown; longer and fatter, so he must have had a good winter and spring. He is still grayish in color, but not as friendly as he had been the year before. Near the end of June Q left Advocate again, he has not returned as of yet. So if you are ever on a boat in Advocate Harbour take a swing by the bell buoy and see if Q has come back to visit.

Belugas are Arctic whales that can be found in the waters off Russia, Greenland, Alaska and Canada. In Canada the southernmost area that they are usually found is in the St. Lawrence River and the Saguenay Fjord around the village of Tadoussac, Quebec.

The beluga diet consists of squid, octopus, crabs and slow moving fish since they are a slow swimming whale. On average a beluga can live to be more than 50 years old. Males and females reach sexual maturity at different ages, male between 4-7 years and females between 6-9 years. Calves are born gray in color but lighten to a brilliant white color as they grow older. Males are the larger of the two sexes, they can grow to a length of 5.5 meters (18 feet) and weigh anywhere between 1100-1600 kg (2400-3500 lbs). The smaller females can grow to be 4.1 meters (13 feet) and weigh as much as 700-12 kg (1500-2600 lbs).



Q playing with a toy on a string.
(Source: Courtney Gilbert)

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NEW TO THE FSRS LIBRARY

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NOTICE TO AVC 2009 LOBSTER SCIENCE WORKSHOP ATTENDEES

Presentations from the 2009 Lobster Science Workshop are now available online on the Attendee site at www.lobsterscience.ca/workshop/attendees

The following username and password is required to gain access:

Username: 2009attendee
Password: lobsterquality

If you have problems accessing the site, please contact Natasha at nmacdonald@upei.ca or 902-566-0906.

DFO/FSRS LOCAL ECOLOGICAL KNOWLEDGE SURVEY OF INSHORE COMMERCIAL FISH HARVESTERS ON THE SCOTIAN SHELF - PRELIMINARY REPORT

By Alida Bundy, Research Scientist, Population Ecology Division, Fisheries and Oceans Canada

The DFO-FSRS Inshore Ecosystem Research Project is a joint project between the Fishermen and Scientists Research Society (FSRS) and DFO which began in 2005. Inshore areas are critical nursery and feeding areas for many marine species but we have insufficient scientific data to meaningfully and comprehensively contribute to the management of the inshore areas and associated marine species on an ecosystem basis. The primary objective of the project is to increase our understanding of the inshore ecosystems in support of an ecosystem approach to management through field studies, data analysis and by conducting a local ecological knowledge (LEK) study of fish harvester's knowledge. This report summarises some of the initial results from the LEK study.

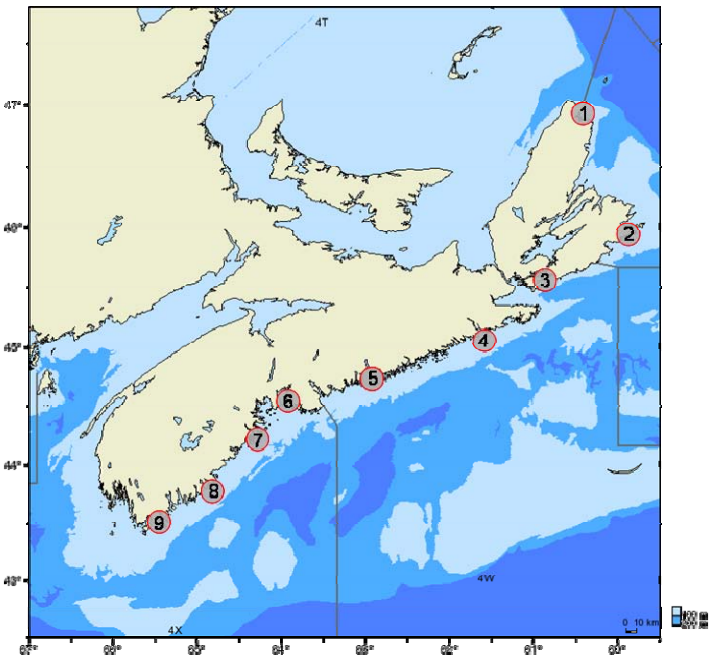

Figure 1: Map of the Study Sites along the Atlantic coast of Nova Scotia

1 = Cape North
2 = Mira Bay/Gabarus Bay
3 = St Peters Bay
4 = Country Island
5 = Ship Harbour/ Chezzetcook
6 = St. Margarets Bay
7 = La Have
8 = Port Mouton
9 = Port La Tour

The objectives of the LEK study were to map fishermen's knowledge of the distribution, seasonal changes in abundance, and life history and habitat associations of fish, invertebrates, birds, mammals and macrophytes, as well as to identify areas considered to be ecologically and biologically significant. The survey was conducted in nine sites along the Atlantic coast of Nova Scotia (Figure 1) in two stages. In the first stage, a random sample of fish harvesters were interviewed by telephone and were asked to identify up to three fishermen particularly knowledgeable about the ecology of their fishing grounds. In the second stage, face to face interviews were conducted with the peer-identified experts who were most frequently recommended through the phone survey. This methodology was employed to ensure that fish harvesters recognised as experts by their fellow fish harvesters participated in the survey.

The survey took place from December 2006 to June 2008. In total, 318 telephone interviews (Stage 1) and 53 face-to-face interviews (Stage 2) were conducted (Table 1).

Table 1. Number of interviews conducted by area for the LEK study, Stage 1 and 2.

AREA	**Stage 1 Number Telephone Interviews**	**Stage 2 Number Face to Face Interviews**
N Cape Breton	30	6
Gabarus and Mira Bay	49	6
Isle Madame/St Peters Bay	19	6
Country Harbour	17	6
Chezzetcook and Ship Harbour	46	6
St Margarets Bay	30	6
La Have River	22	6
Port Mouton	50	5
Port La Tour	55	6
Totals	**318**	**53**

The average length of the face to face interviews was 4 ½ hours. This represents a large body of knowledge which has not yet been fully analysed. In this brief report we present raw summary results for the following 7 questions:

1. Are there any spawning areas that you consider to be really ecologically important (particularly significant) either currently or in the past?
2. Nursery or juvenile areas are areas where young fish are known to aggregate. Are there any nursery or juvenile areas that you consider to be really ecologically important (particularly significant) either now or in the past?
3. Are there areas that you know of that have a very high abundance of one particular species (relative to other areas where this species aggregates) either currently or in the past?
4. Areas of high diversity are areas where many species, such as fish, birds, marine mammals, invertebrates, etc. aggregate. Currently or in the past are there areas that have a particularly high diversity of species either part of the year or year round?
5. Are there areas that you would consider to be unique, rare or distinct either currently or in the past? For example, a unique area may be the only place you now about where a particular seabird nests or where the ocean bottom has a particular feature.
6. Are there areas that you would consider to be pristine, e.g., where there are minimal impacts from human activity?
7. Are there areas that are of particular significance to you for any reason either currently or in the past (e.g. cultural, historical, ecologically, etc…)?

The seven types of significant areas were identified in all sites with the exception of Gabarus Bay and Mira Bay, and Port Mouton where no unique areas were identified (Table 2). These data reflect the raw information provided by the peer-identified experts and require further analysis. For example, some of these areas are identified by more than one expert. Sites of high abundance were the most frequently identified, followed by spawning areas.

Table 2. Number of significant areas identified by 53 peer-identified experts in the 9 LEK sites.

	Type of Significant Area						
	Spawning	Nursery	High Abundance	Diversity	Unique	Pristine	Other
Cape North	12	8	13	6	4	5	5
Gabarus and Mira Bay	5	3	4	7	0	2	2
Isle Madame/St Peters Bay	9	1	10	3	8	2	1
Country Harbour	6	2	4	5	10	7	3
Chezzetcook and Ship Harbour	23	9	29	16	6	5	2
St Margarets Bay	5	5	19	3	16	3	2
La Have River	11	19	29	13	8	5	7
Port Mouton	16	1	9	4	0	4	2
Port La Tour	1	0	6	1	13	1	1

In addition to the specific questions about significant areas, the LEK survey included questions about fishing history, fishing ground, fish and invertebrates (areas of high abundance, spawning areas, nursery areas and migration routes), birds, other species and marine plants. A large amount of data and information has been provided by the peer-identified experts. This data has been entered into databases and will be studied over the next two years.

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Acknowledgements:
This project relies heavily upon the participation of inshore fishermen for the local ecological knowledge survey. FSRS fishermen members have been involved in the design of the project and are critical to the successful completion of the project.

ARTIFICIAL REEF PRODUCTIVITY

By Krista MacEachern, Fisheries Technician, FSRS

A team of scientists from the Bedford Institute of Oceanography hosted a meeting recently to discuss a new project that is looking to determine the productivity of artificial reefs.

Artificial reefs are man-made structures that are set on the ocean floor where it is anticipated that they will act the same as a natural reef would and aid in the creation and maintenance of a diverse habitat for sea life. Artificial reefs have been around for thousands of years, with one of the first ones being recorded in Japan in the 1700's, and come in many different shapes and sizes. Structures such as ships, tires, planes, cars and trucks have been used as artificial reefs. Additionally, objects have also been created with the sole purpose of acting as an artificial reef, like reef balls which are dome shaped cement structures that have holes and crevices designed with similar textures and structures as would be seen in a real reef.

This new project will span from 2010 to 2012. It is anticipated that by the end of October 2009, 360 wire cage structures will be deployed at 6 sites around the Sambro area, with 60 collectors at each site. At regular pre-determined intervals, 10 of the wire cage structures from each site will be selected to be retrieved, so that all organisms and sediment can be removed for analysis. The artificial reef structures will then be deployed back to the ocean bottom until the next retrieval date. It is expected that these retrievals will occur once in the fall and once in the spring over the three year period.

Once completed, it is hoped that the information gathered will answer the following three questions:

1. How long does it take an artificial reef to mimic a natural habitat?
2. How productive is the new reef? Does the productivity vary according to location and the time of year the information is gathered?
3. Do artificial reefs behave like natural benthic communities?

The information that will be gained about artificial reef productivity through this project will certainly be an asset to both the scientific community, and to those who use the resources supported by the artificial reefs. We will be sure to keep you updated on its progress.

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BEACHCOMBING – What's New in The News

4TH EASTERN SCOTIAN SHELF INTEGRATED MANAGEMENT (ESSIM) FORUM WORKSHOP PROCEEDINGS

The proceedings for the 4th ESSIM Forum Workshop held in Halifax November 26 to 27, 2008 are now available at: http://www.dfo-mpo.gc.ca/Library/336858.pdf.

The workshop discussed advancing and implementing the Eastern Scotian Shelf Integrated Ocean Management Plan, released in June 2008.

For more information visit: http://www.mar.dfo-mpo.gc.ca/oceans/e/essim/plan/essim-plansum-e.html.

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UPCOMING EVENTS

Coastal Zone Canada 2010

Healthy Oceans - Strong Coastal Communities
July 25-29, 2010
Charlottetown, Prince Edward Island
For more information visit:
http://www.gov.pe.ca/czc2010.

Mark Your Calendar Now!

FSRS 17th Annual Conference

February 26 - 27, 2010
Best Western Glengarry Hotel
Truro, NS