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# HOOK, LINE AND THINKER

The Newsletter of the Fishermen and Scientists Research Society

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Issue: 2006 - 4

Fall 2006

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## 2006 4VSW SENTINEL MONITORING PROGRAM UPDATE

By Carl MacDonald, FSRS Research Biologist

The winter is now upon us, and the 12<sup>th</sup> annual 4VsW Sentinel Monitoring Program has concluded. Beginning September 1st, three longline fishing vessels were contracted by the Fishermen and Scientists Research Society to participate in a groundfish survey carried out fully by the fishermen themselves. The fishermen surveyed 53 predetermined stratified random stations. The 4VsW monitoring program area encompasses the inshore waters from Sambro to Canso and the offshore waters including Emerald and Western Banks (Figure 1).

Following the 4VsW Survey protocols, the longline fishermen set 1500 number 12 circle hooks baited with mackerel. The fishermen are responsible for gathering all the scientific fisheries information as well as oceanographic information via the use of CTDs and minilog temperature recorders. The fishermen must record where they set their gear, how long the gear fished, and the number of hooks that were snarled - if any. They also record all species caught on the hooks, the number and weight of each species caught, and the length, sex, and stage of sexual maturity of the fish. The fishermen also remove the fish otoliths (used to age the fish) and remove the fish stomach if there are contents inside. All this work is completed by the fishermen on relatively small fishing vessels, 35 to 45 feet in length. To add to all this, the fishermen have to watch for hurricanes, ship traffic, and other fishing vessels and gear. Over the last decade, the survey was executed to perfection. The fishermen deserve a great deal of credit.

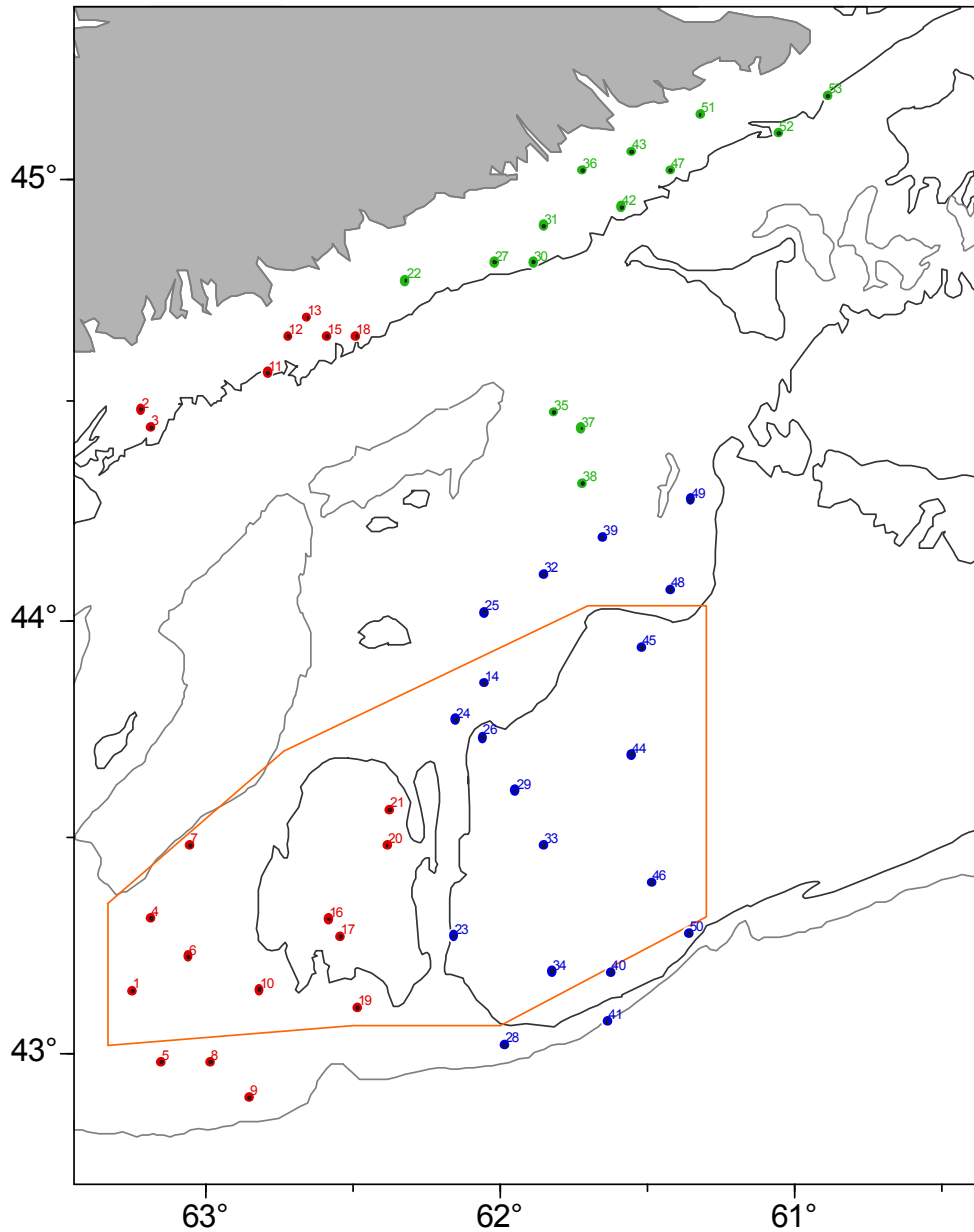
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Figure 1.

## 2006 Sentinel Surveys Station Locations



For the last three years, the Sentinel Survey was reduced in scale due to economic reasons. Previous 4VsW Sentinel Surveys investigated 253 random stations. A 200 station reduction occurred in 2004. Only 53 random stations in pre-selected strata are now sampled. The 2006 Sentinel Monitoring Program only maintains continuity in the six strata surveyed, including; 462, 463, 464, 465, 468, 469. The strata surveyed were chosen because they had previously showed higher catch rates of a number of more economically valued groundfish species, and warranted continued survey. By monitoring catch rates in only these six strata, it is hoped one will be able to recognize significant changes in groundfish abundance within 4VsW. If significant changes were to happen within these six strata, it would then be beneficial to reinstate the 4VsW Sentinel Survey over the whole of 4VsW. In 2006, three longliners were employed to survey the six strata chosen in the 4VsW Sentinel Monitoring Project (Table 1).

Table I: 2006 Sentinel Survey Participants.

Name	Vessel	Home Port
James Baker	Government Slave I	East Jeddore
Richard Jewers	Scotty 'N' Sisters	Ecum Secum
Jerry Creamer	Darcy Dean	Canso

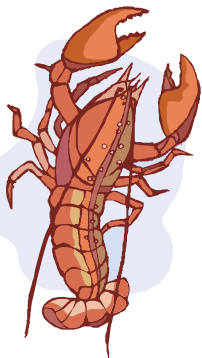
All 53 stations were surveyed by the 19<sup>th</sup> of September. Preliminary analysis of the 2006 catch results, in comparison to the previous years, indicated cod and haddock in the areas surveyed remain at low levels. On a more positive note, this year participants caught a record number of barndoor skates, 132 in total number or 2581 pounds. As in previous years, fishermen were granted their request to set free any barndoor skates that were uninjured to aid in the conservation of this species. The fishermen released alive all 132 barndoor skates.

There is a second part or phase of the Sentinel Monitoring Program called the Commercial Index. The Commercial Index phase of the Program was designed to address concerns by fishermen that data collected from standardized gear fished on randomly selected sites did not give an accurate picture of normal fishing activity.

In the 2006 Commercial Index (CI) phase, vessels are given 12 fishing days in which to fish, as they would normally do in areas where they would normally fish (exception of the closed haddock nursery area). There is an opportunity for 20 vessels to participate in the commercial index by 12 fishing days = 240 fishing days. The fishermen are allowed to set a maximum of 15,000 hooks per day baited with their choice of bait.

Vessels are required to choose a start date between July 1, 2006 and March 15, 2007, and must finish all fishing activity by March 31, 2007. Vessels are paid 90% of the value of the revenue generated by the sale of all fish. The other 10% goes to the FSRS to defray the cost of vessel participation. One exception, to discourage vessels from directing for halibut, vessels are only paid 50% of the value of the revenue generated by the sale of halibut. Participants are required to pay their own hail, DMP and observer costs. Observers or FSRS technicians are required to observe a minimum of 30% of vessels' fishing trips.

In 2006, there has been a total of six fishing days completed in the Commercial Index part of the Program. The fishermen who participated in the Commercial Index did realize a small catch of fish during their participation but the catch rates were not significant enough to warrant further activity.



## NEW TO THE FSRS LIBRARY

AVC Lobster Science Centre. 2006. All About Lobster Health. Measuring Lobster Hemolymph Proteins.

AVC Lobster Science Centre. 2006. All About Lobster Health. Mushy Tail.

## **FSRS MEMBERS REMEMBERED**

We would like to take a moment to remember Ricky Nickerson and Mike Newell, two long-time members of the Fishermen and Scientists Research Society who recently passed away.

Ricky Nickerson was a dedicated member of the FSRS, serving on the Executive Committee and Scientific Program Committee as well as a number of working groups. He was instrumental in the development of the Lobster Recruitment Index Project, identifying the need for such research. Ricky's involvement in the FSRS was greatly valued and contributed to our successes. His input on the many committees and projects on which he served and his wisdom will be deeply missed. He was a well respected individual and a key supporter of collaboration between fishermen and scientists.

Mike Newell was one of the founding members of the FSRS, a strong contributor to the successful development and implementation of the FSRS. Mike died at sea which is where he spent 40+ years of his life. Mike was a long-time participant in many research projects with the FSRS, from the collection of information for groundfish and shrimp to participating in the Lobster Recruitment Project. He motivated others to become involved in fisheries science and his leadership and wisdom will be greatly missed.

They were both respected leaders and their passing will leave a void in their respective communities and in the FSRS. They will be greatly missed.

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## **MOST WANTED: SPECIMENS OF ATLANTIC FISHES FOR DNA BARCODE OF LIFE.**

By Stephen Clarkson, Dalhousie University

Have you ever caught a fish that you can't identify? Have you ever been served a piece of haddock that didn't quite taste right? Researchers at Dalhousie University and the Bedford Institute of Oceanography (BIO) are using an innovative technique called 'DNA barcoding' to identify Atlantic Canadian fish species and they need your help! The barcode is a short stretch of DNA that can be used to identify different species, not unlike supermarket barcodes used to distinguish your apples from your oranges. These fish barcodes will enable scientists to tell closely related species apart, help them discover new ones, and even identify what was in your fish and chips last night.

Fishes are the most diverse group of vertebrates with 30,000 marine species found globally and over 800 that occur in Atlantic Canada. Sometimes it can be difficult to identify a fish because of the large number of species, and because the body forms of most fishes change dramatically during development (think of how much a flatfish changes from hatching to adult). DNA barcodes have the potential to provide a foolproof and rapid diagnosis of species across all life stages, including eggs and larvae. In addition, DNA barcodes have applications in discovering cryptic species (that is fish that look alike but don't breed together), and even enable identification of body parts such as fillets or scales. DNA barcodes could also be used in the analysis of stomach contents to determine how prey and predator interact. In the future, a hand held device will become available that uses information from DNA barcodes, so that anyone, anywhere, anytime will be able to identify quickly and accurately the species of a specimen whatever its condition.

DNA barcodes are being generated for all fish species found in Atlantic Canada. These barcodes will be stored in a public reference library and the actual fish body (voucher specimen) from which the

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DNA barcode came is being archived in a museum. In addition, both the fish and DNA barcodes are being linked, via the reference library, to information on the geographic origins of the fish, name of the person who collected and donated the fish, photographs and other life history details of the species. That means that if someone sends in a new species for barcoding, your fish, your name, and the rest of the details will be associated with that barcode.

To date more than 2000 fish have been collected from over 260 species. Most of these fish are commercial species, or those caught commonly in DFO's annual trawl surveys. However getting specimens from the over 500 hundred rare, deep sea and other not easily caught species will be a real challenge. For this reason we are asking for your help. Fish bodies (fresh frozen to preserve the DNA) or fish parts (such as fin clips) from species from Cape Chidley to George's Bank are needed. If you catch an unusual or unidentified fish, researchers at Dalhousie and BIO are asking you to save it for them so that DNA barcodes from these species can be obtained. The donated fish will be expertly taxonomically identified, the bodies stored in a museum and the collectors name will be listed along side the DNA barcode information in the reference library and museum catalogue.

A list of species required and further information can be obtained by contacting Stephen Clifford at Dalhousie University or BIO (email: [stephen.clifford@dal.ca](mailto:stephen.clifford@dal.ca), Tel: 902 981 8305). Any contribution will be very much appreciated.

#### **CORRECTION**

Please note the following correction to the article *Tunicates in Nova Scotia: Monitoring Unwelcome Invasive Species* in the 2006-3 issue of the Hook, Line and Thinker.

In the second paragraph of the section "What are tunicates?". The first sentence should be replaced to read "**Tunicates reproduce sexually by releasing eggs which are fertilized in the water (solitary forms) or by incubating fertilized eggs internally (colonial forms). The resulting larvae, which have a primitive backbone, are planktonic.**"

## **MEMBERS' HELP NEEDED IN OBTAINING ITEMS FOR AUCTION AT FSRS 14<sup>TH</sup> ANNUAL CONFERENCE**

The Fishermen and Scientists Research Society (FSRS) 14<sup>th</sup> Annual Conference being held on February 16 – 17, 2007 will include a Dutch Auction during the reception to be held the evening of February 16<sup>th</sup>. Last year's auction raised over \$1200 to support the valuable research the FSRS is doing. Let's try to double that this year!

You can help by contacting the suppliers you regularly deal with and asking them to donate something. They can either give the items to you or you can call Patty at 902-876-1160 to arrange to have the items picked up. The more great items you can all get the more there will be to bid on and win, and the more money we can raise to help fund our research projects. So talk to your suppliers now and see what you can get from them. Encourage them to help support fisheries research.

We are also seeking sponsors for the conference. If you know of a company or organization that would like to sponsor a coffee break or meal, please forward their contact information to Patty, 902-876-1160 or e-mail [pmdservices@eastlink.ca](mailto:pmdservices@eastlink.ca) Thanks for your help.

More information about the conference and registration is available at [www.fsrns.ca](http://www.fsrns.ca).

## CHALLENGES IN MANAGING THE BAY OF FUNDY FOCUS OF ST. ANDREW'S SCIENCE WORKSHOP

By Jon Percy

Almost 160 researchers, representatives of community groups and businesses, environmental managers and interested citizens from around the Bay of Fundy gathered at the Algonquin Hotel in St. Andrews by the Sea on October 25-27, 2006. They were there to participate in the 7<sup>th</sup> biennial Bay of Fundy Science Workshop. These popular workshops are sponsored by the Bay of Fundy Ecosystem Partnership (BoFEP), and the Huntsman Marine Science Centre in St. Andrews hosted and organized this year's event.

The theme of the Workshop was *"Challenges in Environmental Management in the Bay of Fundy - Gulf of Maine"*. Dr. Gerhard Pohle, Chair of the Workshop, explained that *"the inclusion of the Gulf of Maine is deliberate, as the Bay of Fundy is a complex and interlinked component, with both bodies of water facing similar environmental challenges"*. Thus, several scientists from the northeastern US also participated actively in the workshop.

To kick-start each day of the workshop and get participants thinking an opening plenary presentation summarized particular aspects of Bay of Fundy science. On the first morning, Fred Page from the St. Andrews Biological Station discussed some of the problems in managing the environment and resources of the Bay raised by the fact that the Bay's physical environment is constantly changing. Some of these changes involve shorter or longer-term cycles, while others, such as sea level rise and climate change are general trends. On the second morning, Graham Daborn, Director of the Arthur Irving Academy for the Environment at Acadia University, invoked the image of the Greek Mythical figure Penelope to describe the progress over the years in trying to understand the Bay of Fundy and Gulf of Maine ecosystems. Penelope, during the absence of her husband, warded off legions of unwelcome suitors by promising to choose one of them as soon as she finished knitting a shroud for her father-in-law. However, every night she unraveled all the work that she had completed during the day, thus putting off the decision until her husband returned and slew the importunate suitors. The myth has become a symbol of a work never done, but always in hand. Daborn likened the science of the Bay to this unfinished shroud..... every now and then new knowledge forces scientists to unravel the models that they have constructed to explain how parts of the Bay work and rework them to reflect the new understanding.

The real meat of the workshop was the over 80 scientific papers and posters presented in 13 different sessions. These were devoted to subjects such as salt marshes, sea birds, climate change, biodiversity, fish ecology, resource management, seafloor mapping and environmental monitoring to name just a few. The Workshop was also an excellent opportunity for budding scientists to showcase the results of their research projects. Nineteen university students competed for awards for the best student papers and posters presented at the workshop. The winners were as follows:

### **Best student papers** (oral presentation)

**First prize** - Alexander Bond (University of New Brunswick, Fredericton)

*"Comparing adult and chick diet in two Alcids species using stable isotopes"*

**Second prize** - David Drolet (University of New Brunswick, Fredericton)

*"Effect of density of the gastropod *Ilyanassa obsoleta* on distribution and movement of the amphipod *Corophium volutator*"*

### **Best student posters**

**First prize** - Koreen Millard (Acadia University, Wolfville)

*"High-resolution LIDAR elevation data of inter-tidal areas: A potential tool for*

*examining salt marsh vegetation communities"*

**Second prize** - Shannon O'Connor (Acadia University, Wolfville)

*"The Atlantic Coastal Zone: all the little fishes"*

Abstracts of all the posters and papers presented at the workshop can be found on the BoFEP website at: [www.bofep.org/workshop2006.htm](http://www.bofep.org/workshop2006.htm).

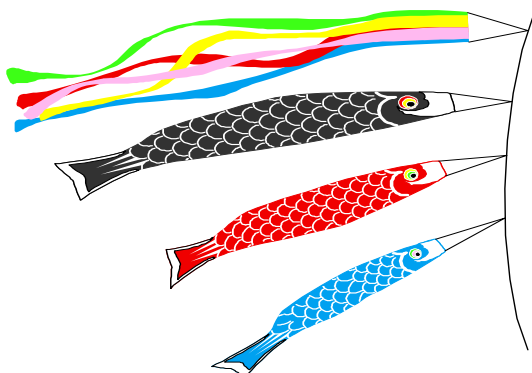
The papers and posters presented during the workshop provided abundant background information for the final wrap-up session on the last day of the workshop. After a stimulating presentation by John Coon of the University of New Hampshire entitled *"Can we get there from here? Ecosystem-based governance in the Gulf of Maine"*, participants discussed ways that people living and working in the region can play a greater role in keeping the Bay healthy and productive.

At the workshop Banquet, Dr. Peter Wells, recently retired from Environment Canada in Dartmouth, NS, was presented with the BoFEP "Environmental Stewardship Award". This award is given biennially to an individual who has *"contributed significantly to the environmental health or sustainability of the Bay of Fundy"*.

A full report of all the workshop deliberations, as well as copies of the papers and posters presented, will be included in the Workshop Proceedings which should be available early in the new year.

BoFEP is a decade-old partnership of many diverse groups (governmental, community, academic, First Nations, industry etc.) and individuals with an interest in conserving and wisely using the Bay of Fundy and its renewable and non-renewable resources. The fundamental currency of BoFEP is "knowledge", specifically scientific and traditional knowledge about the Bay of Fundy, its watersheds and biological communities. BoFEP is dedicated to creating, sharing and using knowledge to promote the ecological integrity, vitality, biodiversity and productivity of the Bay of Fundy ecosystem in support of the social and economic well-being of its coastal communities. For further information about BoFEP and its activities visit: [www.bofep.org](http://www.bofep.org).

## THE FSRS WELCOMES NEW MEMBERS



The Fishermen and Scientists Research Society would like to welcome the following members, whose applications were approved at the August Executive Committee meeting. We trust that this expansion of the FSRS's membership will prove to be beneficial to all involved.

Sue Abbott  
Chinmoy Chakraborty  
John Dedden  
Rajashree Gouda  
Audrie-Jo McConkey  
Dennis Smith

Clifford Allen  
Brian Dearing  
Kim Drysdale  
David Lockwood  
Perry Richardson  
Azure Westwood

## TAKE A SECOND LOOK

By Megan Venoit, FSRS Fisheries Technician



Have you ever looked closely at juvenile green crabs and thought they looked a little different? If you did you might have been correct. It turns out mud crabs (*Dyspanopeus sayi*), which are also found around Nova Scotia look like juvenile green crabs. Mud crabs are very small, usually they have a carapace width of less than 25 mm or less than 1 inch when they are full grown. They have one claw which can grow to be about half of its body size and another claw that is much smaller. They are a brownish/purple mottled colour and can be very difficult to distinguish from green crabs when they are small. It takes a second glance to make sure you don't pass them off as green crabs. They become reproductive at approximately 8 to 10 mm or 1/3 of an inch. Mud crabs are found in the Bras d'Or Lakes and are known to occur elsewhere in the Maritimes. They are a very significant predator on oysters, especially oyster spat and they can often be found hanging off the Chinese hats used to collect/grow oyster spat. They can be devastating because their populations can reach high numbers and they do have the capacity to consume quite a number of oysters. Mud crabs seem to feed in numbers comparable to that of juvenile rock crabs and green crabs. An interesting point to note is that this species is now an invasive species in the Mediterranean and is causing quite an impact on the bivalve populations.

### References

- ELNER, R.W., AND R.E. LAVOIE. "Predation on American Oyster (*Crassostrea virginica* Gmelin) by American Lobsters (*Homarus americanus* Milne-Edwards), Rock Crabs (*Cancer irroratus* Say), and Mud Crabs (*Neopanope sayi* Smith)," *Journal of Shellfish Research*, Vol. 3, No. 2, 129-134, 1983
- M. C. DE VRIES, D. RITTSCHOF, AND R. B. FORWARD JR." *Chemical Mediation of Larval Release Behaviors in the Crab *Neopanope sayi**" *Reference: Bid. BLIP/*. 180: 1-1 I. (February, 1991)



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## **HOW WILL GLOBAL CLIMATE CHANGE IMPACT COMMERCIAL MARINE SPECIES IN ATLANTIC CANADA?**

By Carl MacDonald, FSRS Research Biologist

On October 24<sup>th</sup> 2006, I attended a half-day workshop which investigated the impacts of global warming on 33 marine species important to fisheries and aquaculture in Atlantic Canada. Scientists, using models, have predicted between a 2 to 4 degrees Celsius rise in global air temperatures toward the end of the 21<sup>st</sup> century. A 2 degree Celsius rise in air temperature is predicted to cause an increase in the sea surface temperature of the Northwest Atlantic by 1.5 to 2.2 degrees Celsius.

Marine species have sensitivities to temperature ranges during their various life stages. Many marine species have pelagic larvae, even though they spend the majority of their life as an adult at the bottom of the ocean. For example; lobsters, shrimp, cod, and scallops all have larvae which spend some time at the sea surface. The warmer the temperature the faster the larvae develop. However, how warm is too warm? Many species may experience some loss due to very warm water temperatures in the southernmost part of their range, towards Cape Hatteras.

Other invasive species like the Asian shore crab which is currently spreading northward into the New England states may invade further into Atlantic Canada as warmer winter temperatures aid in its habitation. Other species such as the Atlantic salmon may have difficulties returning to very warm rivers. In the Gulf of St. Lawrence, the Atlantic salmon are getting close to their upper limits in water temperature. An increase in water temperature of a couple of degrees Celsius may cause further decline in those salmon runs.

The principal investigator in this research is Dr. Gail Chmura, from McGill University in Montreal, Quebec. All the details of this research can be found on a website at the following address; <http://www.geog.mcgill.ca/climatechange/index.htm>. Many gaps of knowledge were expressed at the workshop including; effects of ocean currents, the coarseness of the model used, the melting of glaciers, the effects of ice or lack of ice in the Gulf of St. Lawrence and effects of larger processes within the ecosystem. Even though these gaps in knowledge do exist, we all agree that impacts are going to be felt due to global warming. There are going to be changes and we need to be aware of the impacts.

### **RESEARCH ASSISTANT JOINS THE FSRS**

Hello readers. I would like to take a minute to introduce myself. My name is Julian West and I am the newest member of the FSRS team. I will be filling in for Shannon Scott-Tibbetts as Research Assistant while she is away on maternity leave until September.

I grew up in Ontario and moved to Halifax eight years ago. I graduated from Trent University with a degree in biology, Capilano College with a diploma in environmental science, and MSVU with a degree in teaching. I have spent the last eight years working on fishery related projects throughout Nova Scotia and New Brunswick with various industry, government, and non-government organizations.

I look forward to the opportunity to work with the FSRS over the next nine months and to meet and work with our members. Thanks for your time, and see you at the FSRS conference in February.

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## BEACHCOMBING - What's New in The News

### Hemolymph Proteins in Lobster

The following is an excerpt from The AVC Lobster Science Centre's fact sheet, "All About Lobster Health, Measuring Lobster Hemolymph Proteins".

Lobster THP concentration is influenced by the moulting cycle, water temperature and probably by many other factors including diet, size and gender<sup>1</sup>. A hard-shell 'fully meated' lobster will normally have a high THP concentration, while a recently-moulted lobster will have a lower THP level. Additionally, healthy lobsters usually have higher THP concentrations than weak lobsters.

To read this article and learn more about lobster hemolymph proteins you can visit the AVC Lobster Science Centre website at: <http://www.lobsterscience.ca/bin/news>

AVC Lobster Science Centre. 2006. All About Lobster Health. Measuring Lobster Hemolymph Proteins.

<sup>1</sup>Paterson & Spanoghe. Stress indicators in marine decapod crustaceans, with particular reference to the grading of western rock lobsters (*Panulirus cygnus*) during commercial handling. Mar Freshwater Res. 1997; 48: 829-834

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Editor: PMD Services

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## UPCOMING EVENTS

### 2007 FSRS - GOMLF LOBSTER SCIENCE WORKSHOP AND FSRS 14TH ANNUAL CONFERENCE

February 15, 16, 17, 2007  
 Best Western Glengarry Hotel, Truro, Nova Scotia  
 (Note New Location)

For more information on this and other FSRS events, visit our website at [www.fsrns.ca](http://www.fsrns.ca).