
HOOK, LINE AND THINKER

The Newsletter of the Fishermen and Scientists Research Society

Issue: 2012-4

FALL 2012

FSRS CELEBRATES 20TH ANNUAL CONFERENCE

By Jack MacAndrew, Communications Committee member, Fishermen and Scientists Research Society



All compasses will point to Truro, Nova Scotia, on the 19, 20 and 21 of February 2013 when we of the Fishermen and Scientists Research Society gather at the Best Western Glengarry Hotel for our annual conclave - to look back over 20 years of collaboration between fishermen and scientists in the cause of a science based fishery; and ahead to new challenges posed to all those in the fishing industry by changes in nature and external economic forces.

Our annual conference and daylong Collaborative Lobster Science Workshop is an unique combination of information, education, networking, fellowship and fun. What better way to spend three days in the middle of winter!

It's also an opportunity for existing members to introduce prospective new members to the society by bringing them along and signing them up. If members can bring a carload from their home port, it helps in cutting down on travel and other expenses.

"It's an important anniversary for the FSRS", says General Manager Patty King. "We have planned

three days of fascinating presentations, interspersed with some items purely designed for fun."

"And members should remember that the society will help with travel and accommodation costs over the three days, to make it easier on the individual pocketbook."

"We're also offering a special draw for a VHF radio to anyone registering before January 12, 2013."

It is safe to say that the oceans, like the fishing industry itself, are continually in a state of change. Never has there been a greater need for, and a reliance on, scientific evidence and explanation for the changes taking place, as the oceans get warmer and potentially more acidic, affecting every living thing beneath the surface of the sea, as well as those who pursue a living upon it.

So these three days in February, could be three of the most interesting days anyone interested in or connected to the commercial fishery will spend this winter.

We begin on Tuesday, February 19 with a daylong Lobster Science Workshop, a collaboration between our society and the Gulf of Maine Lobster Foundation, making the point that what happens with lobsters in Maine waters affects what happens in Atlantic Canada and vice versa.

In reality, they are of the same stock, and a lobster doesn't know which country it is crawling in when it crawls back and forth along the international boundary.



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During the daylong session we'll hear about results from the Lobster Moulting and Quality Project; a discussion on the best lobster baits; a Size at Maturity Project update; and there will be ghost stories about the menace of derelict fishing gear.

And there's more!

A reception at 6:30 pm will precede an evening presentation of Jean Lavallée's travelling roadshow on "Lobster Quality and Handling ". Dr. Lavallée, a scientist and teacher of long standing, will talk about lobster biology and how it is affected by poor handling, including stress factors and how to alleviate them aboard the fishing vessel and at the wharf. What he has to say has become especially important when quality has a lot to do with prices fishermen get for their catch.

The next day, Wednesday, brings on a full day of sessions with topics like: Our Journey So Far; Our Changing Oceans; Update on Mackerel Research; Changes in Physical Oceanography; a presentation on Leatherback Turtles; and a current hot topic - Predator-Prey Relationships between Atlantic Cod and Grey Seals.

The Annual General Meeting is scheduled for 4:30 that afternoon.

That evening there will be a reception, featuring a Pecha Kucha competition, wherein competitors present 20 slides for 20 seconds each, accompanying each with a dazzling and fast paced commentary. The competition is always the source of hilarity as well as good information.

If you want to compete, contact General Manager Patty King at 902-876-1160.

Two more sessions and committee reports will close out the conference by noon on Thursday the 21st.



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FSRS Annual Conference
PECHA KUCHA 20x20 COMPETITION
February 20, 2013

Once again we'll be entertained by participants in our second annual Pecha Kucha 20x20 competition.

Pecha Kucha 20x20 is a fast-paced, engaging presentation style in which viewers are shown 20 slides for a duration of 20 seconds each while the presenter talks along side.

Devised in Tokyo in 2003, the name draws on the Japanese term for the sound of "chit chat". It has turned into a massive celebration with events happening in hundreds of cities around the world, inspiring people worldwide. It is a format that makes presentations concise, and keeps things moving at a rapid pace.

Who can participate?

All FSRS conference delegates are invited to participate in the Pecha Kucha 20x20 competition either as viewers or competitors.

How does it work?

During the reception, your slides will be displayed automatically while you take to the floor to narrate. After you finish, the next speaker will stand up and start his or her story. No questions. No discussions. Straight on.

What can you present?

Anything goes, as long as it has a title. A special Pecha Kucha version of your poster display is an obvious topic. Challenge: the audience will consist of a broad range of people who may not be knowledgeable about your topic!

To reserve your Pecha Kucha space, please contact
Patty King at 902-876-1160 or
info@fsrs.ns.ca



Picture "Dragons' Den" without the dragons or "Shark Tank" without the sharks ... or, perhaps, with. At our conference, there's nothing riding on the presentation except fun and information!

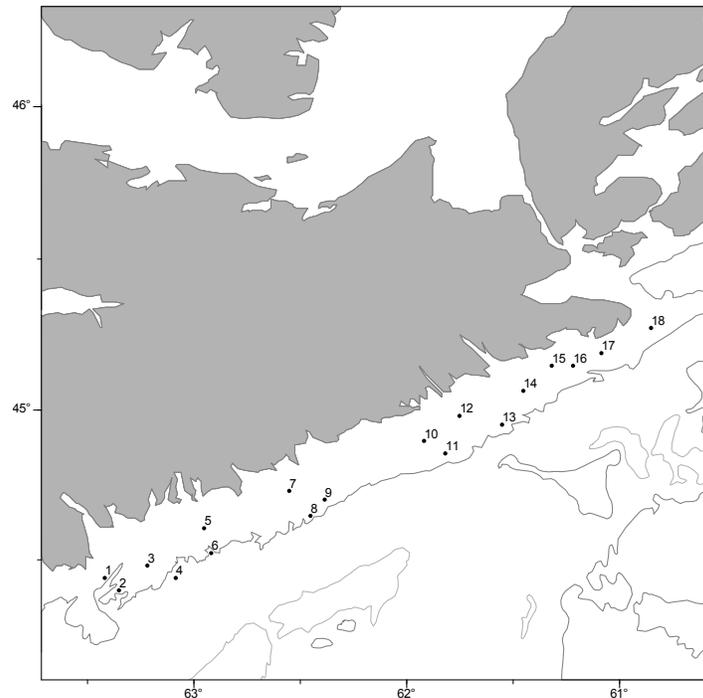
2012 4VSW SENTINEL MONITORING PROGRAM UPDATE

By Shannon Scott-Tibbetts, Research Biologist, Fishermen and Scientists Research Society

The fall is upon us, and the 17th annual 4VsW Sentinel Monitoring Program has been another success. Starting September 1st, two longline fishing vessels contracted by the Fishermen and Scientists Research Society participated in a groundfish survey executed fully by the fishermen.

The fishermen surveyed 17 of the 18 predetermined stratified random stations within the 4VsW monitoring program area. The area encompasses the inshore waters from Sambro to Canso as indicated in Figure 1.

Figure 1. 2012 4VsW Sentinel Monitoring Stations



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 numbers 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 stomach (if there are contents inside). All this work is completed by the fishermen on relatively small fishing vessels, 35 to 50 feet in length. In addition, the fishermen have to watch for hurricanes, ship traffic, and other fishing vessels and gear. Over the last decade, the survey has been executed to perfection. The fishermen deserve a great deal of credit. Table I identifies the two longliners employed to survey the chosen strata in the 2012 4VsW Sentinel Monitoring Project.

Table I: 2012 Sentinel Survey Participants.

Name	Vessel	Home Port
Randy Boutilier	Ashley & Travis	Tangier
Jerry Creamer	Darcy Dean	Canso

Preliminary analysis of the 2012 catch results from the 17 stations, indicated cod numbers comparable to the 53 stations completed in previous years. Station 18 did not get sampled this year.

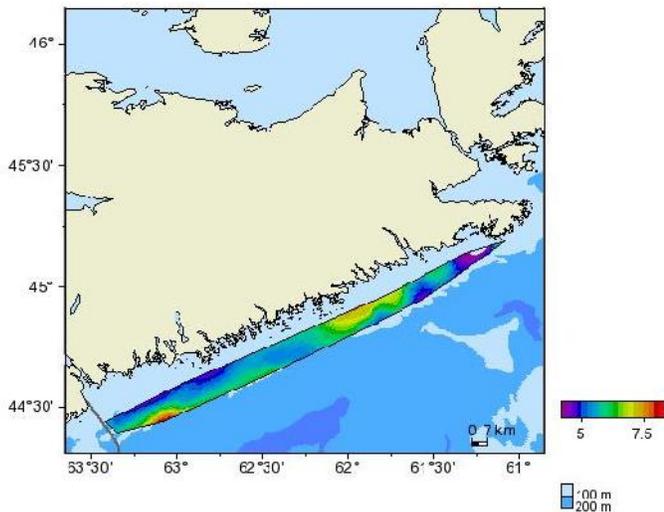
It should be noted that no haddock was caught since the stations sampled were inshore and were not in the closed haddock box. There were more cusk recorded this year.

Table II includes the catch data from all Sentinel sets completed in 2012. Kept weights and discarded weights are in round pounds. Total numbers of fish

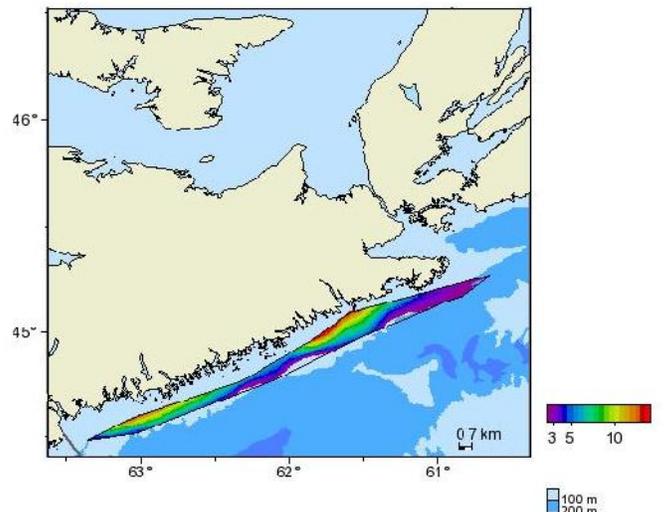
captured are the sum of the kept and discarded fish. Only dogfish, sculpins, skate, invertebrates and halibut are allowed to be discarded. Commercial groundfish (cod, haddock, white hake, pollock, cusk, and redfish) which were badly damaged, for example, by seals, dogfish or sand fleas (i.e. no tail or no head), were discarded and weights estimated by finding the average weight of that species for that set. Looking at the temperature profile from the 17 stations, it appears that the inshore water was slightly warmer than the previous year.

Table II. 2012 4VsW Sentinel Monitoring Program Catch Results from all 17 Stations.

Species	Kept Weight (kg)	Kept Weight (lbs)	Discard Weight (kg)	Discard Weight (lbs)	Number Caught
Cod	984.8	2171	6.8	15	834
Cusk	98.9	218	0.0	0	41
Halibut	0.0	0	200.9	443	25
White Hake	3.6	8	0.0	0	3
Thorny Skate	0.0	0	3.6	8	4
Pollock	2.7	6	0.0	0	3
Atlantic Wolffish	0.0	0	0.9	2	1
Silver Hake	0.0	0	9.1	20	24
Blue Shark	0.0	0	22.7	50	1
Monkfish	3.2	7	0.0	0	1
Longhorn Sculpin	0.0	0	20.9	46	57
Shorthorn Sculpin	0.0	0	4.5	10	7
Redfish	42.2	93	0.0	0	111
Snow Crab	0.0	0	1.4	3	2
	1135.4	2503	270.8	597	1114



Temperatures from the 2012 Sentinel inshore stations



Temperatures from the 2011 Sentinel inshore stations

ODD THINGS WE SEE IN THE SEA...

By Jack MacAndrew, Communications Committee member, Fishermen and Scientists Research Society



Photos by Fishermen and Scientists Research Society Fisheries Technicians Nathan Jenkins and Bill Nuttall.

Every so often, as fishermen and scientists venture forth upon the sea, we come across surprising things. Could be a lobster with misshapen claws, or one of unusual colouration; or a fish not usually seen in these parts; or some piece of gear or garbage; or an unusual bit of coral or whatever.

We'd like to provide the opportunity for fishermen to share their experiences with the rest of us by making this a feature of each newsletter.

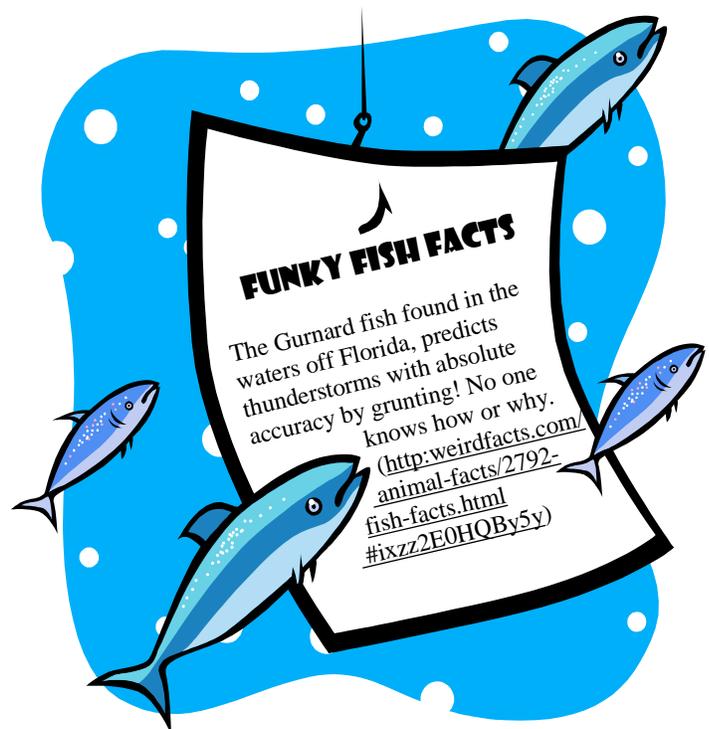
We'll need you to provide us with a picture or two of your prize, along with a brief account of your experience. We'll then try to dig out any scientific or other explanations of your catch.

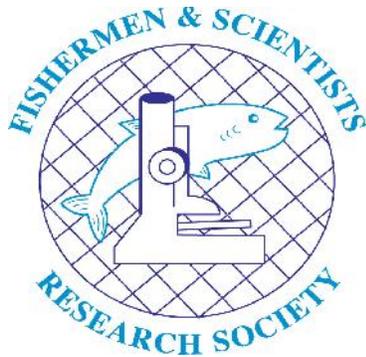
Our first entry comes from our own technicians, in the form of unusual and misshapen lobster claws, gathered during research trips.

We've looked up the scientific explanation for such grotesque and bizarre growths, and it seems such things "naturally occur on the limbs of *homarus americanus*" as well as other shellfish, and may occur as a result of a wound suffered by a lobster at the claws of another lobster or a predator of some kind. Similar abnormalities have been re-created in a laboratory setting by wounding a subject crayfish.

Most wounds would heal normally, but about ten percent formed extra structures on a claw. However, some malformations are genetic in origin. Abnormalities occur when regulatory genes give the wrong signal. And it seems that amongst lobsters - "size matters". The crusher claw of the sexually active male becomes much larger - and female lobsters find those males irresistibly attractive for breeding purposes.

Please send your suggestions to info@fsrs.ns.ca.





Call for Posters

Help celebrate the 20th Anniversary of the FSRs!

Plan now to display your poster during the conference on February 20 & 21, 2013.

fsrs.ns.ca/conference.html

The Fishermen and Scientists
Research Society
20th Annual Conference
Best Western Glengarry Hotel
Truro, NS

No charge to attend or display.



Reserve your space
before
January 30th, 2013

Contact Patty King
902-876-1160 or
info@fsrs.ns.ca

PRIZES WILL BE AWARDED FOR THE TOP STUDENT POSTERS: A PANEL OF JUDGES' CHOICES WILL BE ACCOMPANIED BY A PEOPLE'S CHOICE AWARD.

Assessment: Title & Abstract, Layout, Presentation, Graphics, Content (introduction & methods, results & discussion, analysis, originality), Answers.

WOODEN OR WIRE? WHAT'S THE CATCH?

By Audrie-Jo McConkey, Kim Novak and Jesse Ronquillo, Faculty of Agriculture, Dalhousie University

Traditional fishing methods are constantly evolving to accommodate more efficient techniques. Lobster traps have traditionally been hand made using wood. These forms of traps are weaning out and being replaced by wire traps. Although some fishermen testify that the wooden traps are more superior in catch rates, a study in an isolated location in LFA26A showed that there was not a significant difference between the two trap types.

In Lobster Fishing Area 26A, two lines consisting of six wooden traps were compared to two lines of six wire traps. The lines were placed in the same location, with similar depths and were provided with the same bait type. The following parameters were assessed during the open season: sex, size, berried, egg tail coverage, claw and shell condition, and by-catch. Paired t-tests (Minitab) were used to evaluate the differences between trap types.

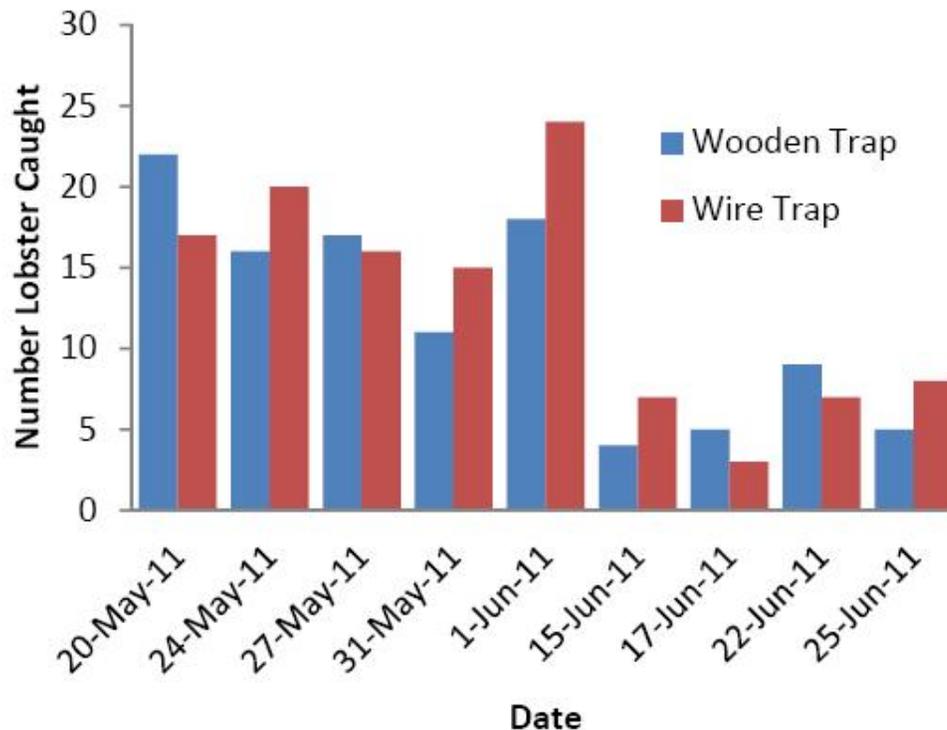


Figure 1.0 – Quantity of lobsters captured in wire and wooden traps at sampled intervals throughout LFA26A open season

The hypothesis that using wooden traps in the early season, when temperatures are lower, will be of benefit over wire traps did not prove to be true. There is no significant difference ($P>0.05$) found in the overall catch between the wooden and wire traps at any point in the season.

There is no significant difference ($P>0.05$) found in the catch of the legal size lobsters between the wooden and wire traps. However, the wooden traps captured less “shorts” or undersized lobster (11%) compared to the wire (26%).

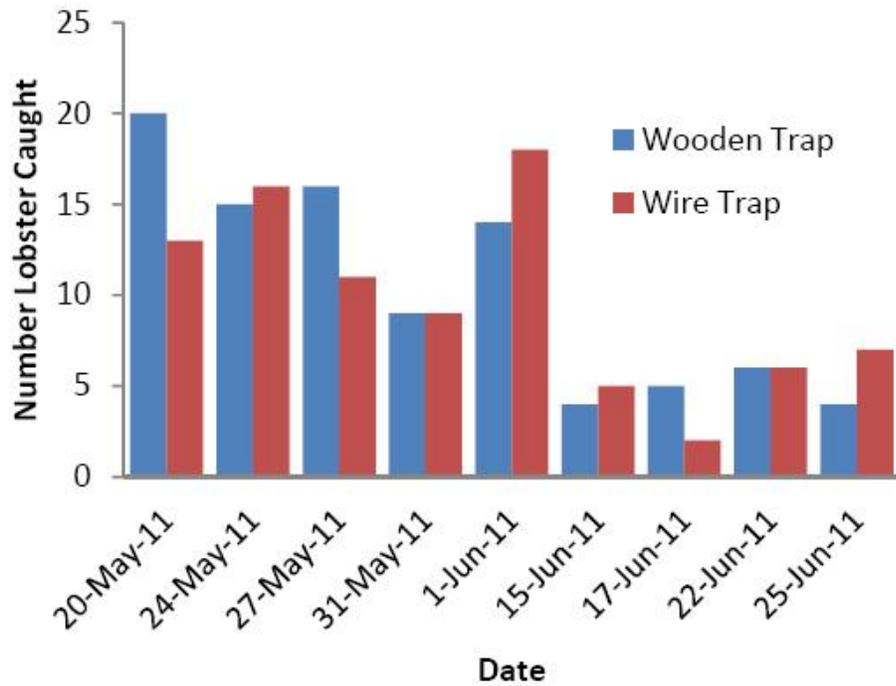


Figure 2.0 - Quantity of legal sized lobsters captured in wire and wooden traps at sampled intervals throughout LFA26A open season

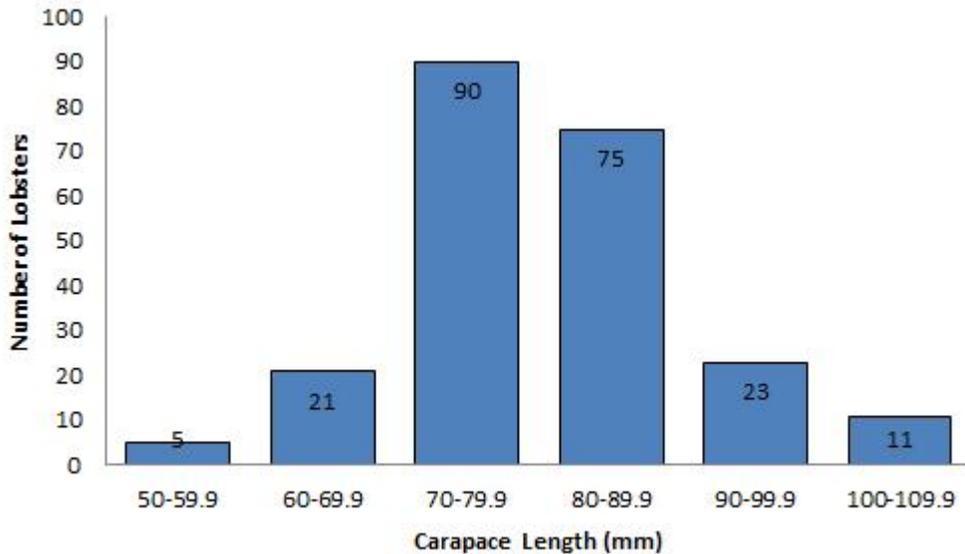


Figure 3.0 – Average size of lobsters at sampled intervals throughout LFA26A open season

Captured lobsters were (1 Male : 2 Female) between 52-109 mm in range. Overall in the sampled site the lobster health proved to be promising. The egg-tail coverage was full and 25% of the lobsters caught were berried. Short lobsters contributed to 20% of the catch, with 55% being legal catch. Both shell and claw condition proved to be in very good condition.

It can be concluded that based on this assessment, wooden traps have no advantage on catch-rates over modern wire traps, keeping in mind this research was conducted on one test site at a consistent depth. Although slightly more costly (~25%), wire traps do not become saturated with water and require little maintenance.



**FISHERMEN & SCIENTISTS
RESEARCH SOCIETY**

LFA's 33/34 Lobster Moul & Quality Monitoring Project

~November 2012 update~



Monitoring of lobster blood protein levels, shell hardness and moult stage was initiated in the summer 2004 with pre-season, during and post-season sampling. Since June 2004, approximately 117,500 lobsters were sampled in 15 different sites in LFAs 33/34. The information collected for this project is available on the Internet and allows the user to look at lobster sex, size, blood protein (Brix), moult stage and shell hardness by sampling location or dates.

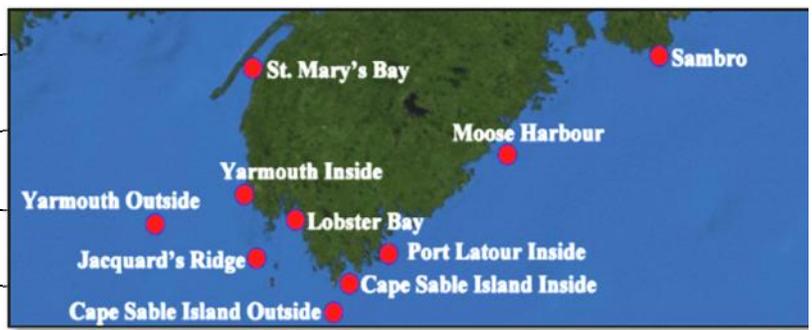
Below is a breakdown of some of the pre-season sampling sites for **2012** compared to similar dates in 2011, 2010 and 2009.

Sampling date	Lobster Bay				Jacquard's Ridge				Sambro			
	Nov 02 2012	Oct 27 2011	Oct 28 2010	Oct 28 2009	Nov 03 2012	Oct 28 2011	Oct 30 2010	Oct 27 2009	Nov04 2012	Oct 24 2011	Oct 30 2010	Oct 27 2009
Mean protein levels	9.5	8.8	10.3	8.5	11.6	8.8	9.9	9.3	10.0	8.8	10.4	10.2
% active p - moult	0%	1.6%	0%	0%	0%	1.6%	0%	0%	0%	0%	0%	0%
% hard-shell	71.2%	78.4%	80.0%	65.6%	82.4%	77.6%	86.6%	71.2%	89.6%	80.0%	92.0%	87.2%

Sampling date	Yarmouth Inside				Yarmouth Outside				Port Latour			
	Oct 29 2012	Oct 26 2011	Oct 26 2010	Oct 28 2009	Oct 28 2012	Oct 25 2011	Oct 25 2010	Oct 27 2009	Nov 03 2012	Oct 26 2011	Oct 27 2010	Oct 29 2009
Mean protein levels	10.4	8.0	8.6	9.4	9.9	7.8	8.3	8.8	9.9	8.1	6.6	7.6
% active p - moult	4.8%	3.2%	0%	0%	2.4%	0%	0.8%	0%	2.4%	1.6%	1.6%	0%
% hard-shell	37.1%	68.8%	93.1%	80.0%	54.1%	76.0%	88.0%	72.0%	75.2%	78.4%	83.2	95.2%

Sampling date	Cape Sable Island Inside				Cape Sable Island Outside				St. Mary's Bay			
	Nov 05 2012	Oct 28 2011	Oct 26 2010	Oct 28 2009	Nov 4 2012	Oct 27 2011	Oct 25 2010	Oct 27 2009	Nov 04 2012	Oct 28 2011	Oct 29 2010	Oct 29 2009
Mean protein levels	9.6	6.3	6.9	6.3	9.9	6.0	6.1	6.6	10.6	10.9	11.4	9.4
% active p - moult	0%	0.8%	0.8%	1.5%	0%	0.8%	0.8%	1.0%	0%	1.6%	0%	0%
% hard-shell	71.2%	91.2%	84.0%	96.8%	72.8%	92.0%	76.0%	98.4%	62.4%	80.0%	79.2%	69.6%

	Moose Harbour			
	Nov 03 2012	Oct 27 2011	Oct 29 2010	Oct 30 2009
Sampling date				
Mean protein levels	8.3	7.9	8.1	8.3
% active p - moult	0%	0%	0%	0%
% hard-shell	56.0%	48.8%	58.4%	68.8%



What can we expect from the 2012 fall season?

Depending on the location, we have between 5-8 years of continuous data. We have looked at the information collected so far and tried to see if we could predict with some level of certainty what will be coming out of the water once the season opens at the end of November 2012. With an increasing number of companies and individual fishermen using blood proteins as an indicator of quality, it is important to keep in mind that *several factors can influence blood protein levels such as moult cycle, water temperature, health, diet, handling, etc.* and therefore, caution must be used when making predictions.

BLOOD PROTEIN LEVELS - BRIX INDEX - When looking at the 2011 pre-season sampling conducted in those 10 sites, we see that lobster blood protein levels are above 8 on the Brix index in every site. Additionally, only one site, St. Mary's Bay, has blood protein levels slightly lower than last year's pre-season levels, although the 2012 levels are the second highest of all sites sampled. The trend analyses of Brix levels were very similar in all sites, with the 2012 levels being consistently higher than the corresponding levels of 2011 from the summer on. *Therefore, based on blood protein levels alone, the 2012 pre-season sampling points toward a similar or faster recovery from the moult compared to the 2011 season.*

SHELL HARDNESS & MOULT CYCLE - Overall, very few lobsters assessed were in active pre-moult. This is suggesting that the majority of lobsters have already moulted, while only a small proportion will be moulting in the weeks or days surrounding the opening of the fall season. When looking at shell hardness, five of the ten sites have a significantly lower proportion of lobsters classified as 'hard-shelled' in the 2012 pre-season sampling compared to last year; Yarmouth Inside & Outside, Cape Sable Island Inside & Outside, and St. Mary's Bay. Yarmouth Inside also showed the highest proportion of lobsters in active pre-moult, although that proportion is still less than 5%. Similar to previous years, approximately half of the lobsters sampled out of Moose Harbour were hard-shelled. *Based on the shell hardness alone, the 2012 pre-season sampling indicates that the proportion of softer lobsters at the start of the fall season could be similar or more significant than in previous years, especially out of Yarmouth.*

When looking at the quality parameters from the 2012 pre-season sampling, we get conflicting results. The lobster blood protein levels are pointing towards a faster recovery from the moult in almost every sampling location, while shell-hardness is suggesting that we could see higher proportion of soft-shelled lobsters being landed at the start of the season in some of the sampled sites. While shell hardness assessment is not as objective as measuring blood protein, there is a rigorous and consistent procedure in place to ensure that the results are accurate and precise. Lobsters coming out of Port Latour, Lobster Bay, Jacquard's Ridge, Moose Harbour and Sambro could be in similar or better condition than lobsters landed in the same areas at the start of the season last year. Lobsters coming out of Yarmouth Inside & Outside, Cape Sable Island Inside & Outside and St. Mary's Bay should have better blood proteins at the start of the season compared to last year, but could still show a high proportion of soft shells. As advised in the past, extra caution should be taken when deciding what product can be stored for later sale.

Note: Only the latest sampling dates are shown here. All size categories are part of the analysis, including sub-legal lobsters with carapace lengths of 70-80 mm. The overall pattern throughout the year for the parameters monitored was considered when predicting the quality of the LFAs 33/34 2012 fall season. Confidence is highest for those locations where sampling was done closest to the start of the season. The spatial coverage of the sampling is very limited and therefore, the results from each location may not necessarily be generalized to the entire LFA.

THE JELLYFISH ARE COMING, THE JELLYFISH ARE COMING

By Jack MacAndrew, Freelance Journalist

It is certain that changes, some of them drastic, are taking place in our climate, with significant effects now being experienced on land and in ocean waters around the globe.

Two of the most widespread changes would be the warming of the oceans, and the increasing acidity of some bodies of water - both directly attributable to the release and build-up of greenhouse gases in the atmosphere.

Here in the Atlantic Region we have seen the effect of warming waters on the moulting patterns of *homarus americanus*, and in the collapse of lobster stocks in southern New England waters due to the warming of the southern extent of the lobsters range.

It seems that lobsters will "actively avoid water temperatures greater than 19 degrees centigrade"; and there is a mounting file of reports on food fish, like capelin, which are in the midst of changing migratory and breeding patterns.

But there is one marine species which can thrive on two specific factors resulting from the warming of the oceans - that warmth in itself; and as well the increase of zooplankton in waters where they compete for food fish, after the food fish have moved to colder temperatures.

Lobster fishermen in Atlantic Canadian waters have begun reporting a noticeable increase in the number and severity of jellyfish "blooms" on their inshore fishing grounds. Other fishermen despair when the gelatinous bodies of jellyfish in their millions can fog the surface of the sea and twist nets into a messy tangle.

Atlantic Canadian fishermen are not alone. The jellyfish plague is worldwide, and it's getting worse.

They are not only increasing in our ocean waters - they are clogging our inland lakes and rivers, more than 100 of them at last count.

Last July, the invasion of a variety nicknamed "the mauve stinger" sent over 1000 people to hospital from beaches in Spain, and closed the most popular beaches in the country.

On the north shore of PEI bathers ran from the water to escape the stinging red tentacles of another variety common to that shore, but lately in increasing numbers.

In Scotland, Japan, Israel and Florida, they came ashore in such mass that nuclear and de-salination plants were forced to shut down.

Five years ago, in Northern Ireland, a mass of mauve stingers numbering in the millions, and covering an area of 10 square miles, attacked open pen salmon cages, wiping out the entire Irish salmon aquaculture industry.

And in Japan they grow their jellyfish big. There, a variety called Nomura will weigh up to 220 kgs. Masses of them come on shore every year where they have overturned trawlers and ruined the fishing industry, causing a loss of billions of yen to the Japanese economy.

Now here's the bad news - we of the human species are responsible.

And here's even worse news - the worst is yet to come.

Worst of all - scientists are unsure why it's happening, though they know some things.

They list several factors:

- Overfishing: of food fish like sardines and capelin
- Climate change: warming of the oceans encourages expansion of jellyfish reproduction

- Eutrophication: the creation of hypoxic waters deadly to finfish but dandy for jellyfish
- Aquaculture: particularly open pen methodology
- Multiple factors: including manmade pollution of the oceans

One thing scientists agree upon is that jellyfish are better able to cope with these factors than any other form of marine life.

Some scientists are now predicting that we are desecrating our oceans to what they were like millions of years ago in pre-Cambrian times, when jellyfish ruled the oceans at the expense of almost every other form of marine life.

Marine scientist Rob Condon begs to differ. He says that a gelatinous, stinging "jellygeddon" future is not likely to happen.

Dr. Condon has put together what he calls a "JEDI" team of more than 20 scientists. It has compiled more than half a million reports on jellyfish blooms dating back to 1790. After analysis the JEDI reported there is "no evidence for a global increase in jellyfish blooms".

That does not solve the problems a jellyfish invasion can cause when it gets into fishing waters or comes ashore on a tourist beach. A mild sting from a jellyfish tentacle on a PEI beach is one thing, but when the variety known as the

Portuguese Man-o-War comes ashore on a Cuban beach, the red flag goes up immediately, and small boys amuse themselves by scooping them up from the sand and digging holes in which to bury them.

The sting from a Man-o-War is cause for a visit to the nearest doctor, and tourists having paid thousands to enjoy beach life in the dead of winter tend not to be amused when that beach is closed for days at a time.

But science has yet to determine specifically or what combination of factors brings on jellyfish blooms, or whether they are ultimately a threat to the survival of other species we consider more valuable to humanity.

For, despite their unpopularity, jellyfish do have their uses: in the bio-medical industry, for instance, for the treatment of rheumatoid arthritis.

And in Japan and other Asian countries, dried and chopped jellyfish have been added to soups for centuries. After a nice warm bowl of jellyfish soup, you can even top off your meal with a dish of "vanilla and jellyfish ice cream".

Who knows when dried jellyfish will be coming to a Sobeys store near you!

PATTY'S PICKS WEB SITES OF INTEREST

www.vemco.ca/

Vemco. Designer and manufacturer of underwater acoustic telemetry transmitters and receivers.

www.lobstersustainability.ca

The Atlantic Lobster Sustainability Foundation is dedicated to preserving and enhancing a viable, strong, and sustainable lobster industry.

www.lfa27.com/lobster-science

LFA27 Management Board - Lobster Science. A summary of lobster science information collected in LFA27.

<http://museum.gov.ns.ca/fma/en/home/default.aspx>

Fisheries Museum of the Atlantic - Lunenburg, NS



UNDERSTANDING THE SOFT SHELL LOBSTER

Article courtesy of and reprinted in its entirety from the Lobster Institute's *Lobster Bulletin*, Summer 2012 issue.

Newspapers this spring and summer have been filled with articles about the early arrival of shedders in 2012, and the resulting over-supply of soft shell lobsters on the market. Readers have learned that this over-supply means a low price is paid to the fishermen for their catch, and most of these soft shell lobsters are either eaten locally or sent to processors for cooking and picking. But what is happening physiologically to the lobster?

Lobsters are invertebrates. A lobster has no internal skeleton; however its shell serves as an external skeleton or exoskeleton. In order to allow for growth, this hard external skeleton is shed during what is called the molt cycle. As Dr. Diane Cowan describes it on the Lobster Conservancy Web site, www.lobster.org, "The act of escaping from the old shell is known as *ecdysis* (from the Greek, *ekdysis*, meaning "getting out") or, more commonly, as shedding. The term molting refers to the entire cyclical process of preparing for, undergoing, and recovering from ecdysis."

As the lobster prepares to shed, it is forming a new, identical, soft shell underneath its hard shell. It will pull blood away from its claws and other appendages causing them to shrink. It will draw minerals, particularly calcium, from the existing shell and store them in gastroliths (stone-like formations) found in the lobster's stomach. It will then take in excess water which causes the lobster to swell, thus causing the old shell to crack right down the middle of its carapace (body) and between the carapace and the tail. The lobster then pulls itself out of the old shell. According to the Gulf of Maine Research Institute's Web site, www.gma.org, "While the new shell is still soft, the lobster absorbs sea water to gain about 15% in size and 40-50% in weight. A just-molted lobster feels like a rubber toy... It stays in hiding for a week or two until the new shell is fortified against predators." The excess water remains in the shell until it is supplanted by tissue growth.

According to Dr. Bob Bayer of the Lobster Institute, who specializes in lobster nutrition, the

newly molted lobster is likely to eat its old shell as a way to gain the extra calcium that is needed for the new shell to harden. Additionally, "Stored calcium from the gastroliths located on the lobster stomach is mobilized to help harden the new shell. The gastroliths are released into the gastric juices during shedding, and the calcium that is held there is re-absorbed by the lobster, thus helping to harden the shell. The rate of ongoing hardening will vary depending on what is available for feed." It may take several months for a newly molted lobster to develop a shell that is considered hard enough for live shipping without risk of mortality. Bayer adds that following a shed a lobster has proportionately less hemocyanin per body fluids as it takes on extra water. Oxygen is carried by hemocyanin, and reduced oxygen diminishes the length of time a lobster will survive out of water. "It is important to note," says Bayer, "that soft-shell lobsters are good and healthy even though they are not as strong as the hard shell. The nutritional quality of the meat is the same, and the taste even preferred by some diners."

During its first month a lobster will molt repeatedly as it grows from the smallest larval stage to a post-larval size of approximately 15 millimeters. It will molt less and less frequently as it grows to market size over the next 5 to 7 years, at which point it will molt roughly once a year. Females typically molt every other year as they go through the reproductive cycle.

There are several environmental factors that also come into play in the growth of a lobster, including: water temperature, salinity, depth of water, bottom type, and availability of food and shelter. Growth is accelerated as water temperatures rise, which is likely a key factor in the early shed of 2012. Data from the NOAA indicates that water temperatures in Maine were running from 3 to 10 degrees [fahrenheit] above ranges of the last 10 years.

NOVA SCOTIA TEACHERS UNION HOSTS THE ASSOCIATION OF SCIENCE TEACHERS ANNUAL CONFERENCE – FSRS ATTENDS

By Shaun Allain, Fisheries Technician, Fishermen and
Scientists Research Society



FSRS Director George Zinck participated in the Association of Science Teachers Annual Conference.

As part of our ongoing effort to increase the society's outreach and education efforts with young people in the classroom, myself, Patty King, and George Zinck attended the Nova Scotia Teachers Union's Association of Science Teachers Conference. The event occurs annually on the fourth Friday of October, offering a wide range of sessions for all grade level teachers that focus on the many fields of science. It is very well attended by science teachers from all over the province. They come looking for opportunities for professional development and to promote positive student involvement in science.

Aside from sessions, the conference also had a large room opened up as booth space for exhibitors to promote their work and offer services to teachers looking for new, innovative ways to cover material in their classrooms. We were one such exhibitor, along with many others, including the Atlantic Geoscience Society and The Discovery Center, to name a just couple. As we anticipated, our booth grabbed a lot of attention from Oceans 11 teachers as well as others who cover marine components in their classrooms. We managed to hand out quite a

bit of information as well as a large number of the newly developed teacher's resource kit.

Shortly after the event, emails began rolling in from teachers expressing interest in having a technician come in and speak to their students. We have already scheduled a few presentations for the near future and are looking forward to doing more as requests keep coming.

FSRS PARTICIPATES IN BEDFORD INSTITUTE OF OCEANOGRAPHY'S 50TH ANNIVERSARY OPEN HOUSE

By Shaun Allain, Fisheries Technician, Fishermen and
Scientists Research Society

This year marked a milestone for the Bedford Institute of Oceanography, where the FSRS office is located, as it celebrated its 50 year anniversary. To commemorate the event, the institute held an open house where each group of employees set up booths, exhibits, and interactive displays to educate students and the general public about ongoing research currently taking place. The FSRS was one of the many such groups that set up shop for the five day event. Our booth was completely re-vamped for the event with a new poster as well the banners we launched earlier this year.

The society's booth also hosted a draw for a gift basket graciously donated by the Fisheries Museum of the Atlantic in Lunenburg. After hundreds of ballots were filled out, the gift basket ultimately went to a lucky student from the Eastern Shore area. The museum also supplied a large amount of youth content activities such as coloring books, crosswords, and fact sheets that were mass produced as giveaways for the swarms of students that came through the open house throughout the week.

We would like to thank our staff, members, and past employees who volunteered their time to help run the booth throughout the course of the event. Your help was crucial in making everything go so smoothly with so many people passing through.

BEACHCOMBING - What's New in The News

Gulf of Maine Research Institute Conducts Seal Predation Study in Gulf of Maine

Funding provided by the Northeast Gear Conservation Engineering Network (GEARNET) enabled the Gulf of Maine Research Institute (GMRI) to implement a new project this summer, assess and quantify the impact of seal predation in the Gulf of Maine.

Fishermen participation was essential. They kept logs on the frequency and location of damage to catch that were collected, reviewed and analysed by the GMRI.

For more information on this project, check out the article, *Scientists Examine Seal Predation* in the October 24, 2012 issue of *Tidings*, the Gulf of Maine Research Institute's newsletter available on line at:

http://gmri.org/about/newsItem.asp?ID=174&utm_source=Tidings+-+Fall+2012&utm_campaign=Tidings+-+Fall+2012&utm_medium=email

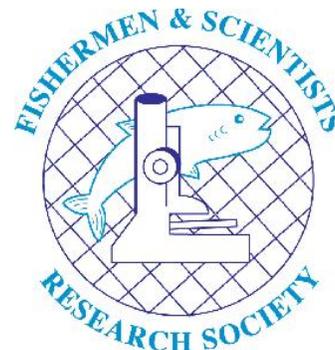
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UPCOMING EVENTS

Eastern Canadian Fisheries Exposition

February 8-9, 2013
Mariners Centre
Yarmouth, NS

www.EasternCanadianFisheriesExpo.ca

Celebrate with us at the Fishermen and Scientists Research Society's

20th Annual Conference

February 20-21, 2013
Best Western Glengarry Hotel
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