
HOOK, LINE AND THINKER

The Newsletter of the Fishermen and Scientists Research Society

Issue: 2007 - 4

Fall 2007

COLLECTORS SET IN LOBSTER BAY FOR NEWLY SETTLED LOBSTERS A SUCCESS

By John Tremblay, Research Scientist, DFO

Collectors made of wire mesh and filled with rocks appear to be good at sampling young lobsters in Lobster Bay, southwest Nova Scotia. This is the finding of an FSRS project that was a collaboration of fishermen from Lower Argyle, the Fishermen and Scientists Research Society, DFO Science Branch, Rick Wahle of the Bigelow Laboratory for Ocean Science in Maine and the Nova Scotia Department of Fisheries and Aquaculture.



Understanding where and how many newly hatched lobsters survive long enough to settle on the bottom has long been a challenge for scientists. Baby lobsters that hatch out of eggs in mid to late summer typically spend their first 3-6 weeks as larvae "free-floating" in the ocean. When they grow to a fully-formed lobster they are only about ½ inch long. It is at this size that they actively search for shelter on the bottom of the ocean. Often this shelter is in the form of rocks that are about the size of baseballs to small soccer balls.

Rick Wahle is an expert on the ecology of newly settled and juvenile lobsters and has made several presentations at FSRS meetings. In a recent project with the fishing industry in Maine, supported by NOAA's Northeast Consortium, his team designed a collector that successfully sampled newly settled

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John Tremblay measuring a newly settled lobster

lobsters. Sampling young lobsters has been done for many years with divers using suction sampling, but this work is restricted to shallow waters. The objective of the Northeast Consortium project was to develop a collector that could sample locations that are too deep for divers. I saw the collector as an excellent potential tool for monitoring settlement off Nova Scotia in deeper areas, as well as shallower areas because it is sometimes difficult to find trained divers to

do suction sampling. Fortunately FSRS agreed and the project was supported at a meeting of the FSRS Shellfish Working Group and sanctioned at the annual general meeting in Truro in February 2007. The FSRS project is one of several that deployed the newly designed collectors in 2006. There were four other projects in Canada, several in New England and one in Norway.

The site chosen for the project was Lobster Bay in southwest Nova Scotia, where there was already some information on where lobsters settle. The project involved first constructing 140 wire mesh collectors using the design from Rick Wahle. This was undertaken by Fox Hill Marine Wire in Lower Argyle. The collectors are about 2 feet by 3 feet by 6" high and an example collector was on display at the annual conference in Truro in February 2007. Once they were constructed, we lined the collectors with fine mesh so that the small lobsters would not escape when the collectors were hauled. Another coarser mesh was inserted to protect the fine mesh from the rock. The next task was actually filling the collectors with rock. This was a lot of work over a few days and I can't claim to have participated. Full of rock the collectors weighed about 250 lbs and fortunately we had lots of help and equipment from local fishermen to do the filling and moving.

After filling, the collectors were moved around by a combination of forklifts, flatbed trailers, wharf hoists and a Pullmaster winch. They were set on the ocean bottom in five locations in Lobster Bay in late June. Undisturbed for several months, the collectors were hauled up from October 9-18th. Additional sampling of newly settled lobsters was undertaken by diving using suction sampling on September 30th. This was done in the same areas where the collectors were set for purposes of



Setting the collectors on June 26th. Shown are Carl MacDonald, Steve Nolan and Carl Spinney.



Ashton and Carl Spinney readying the collectors for setting on trawl at the deeper site (85').

comparison.

The results were very encouraging. In total over 115 settlers were found in the collectors. This number may seem small until it is realized that the total area covered by the collectors was less than 30 feet by 30 feet. The number of newly settled lobsters compared favourably with what was found by divers using suction sampling. In addition to the newly settled lobsters, the collectors also had lobsters that were 1-2 years old as well as other animals such as small fish, shrimp, mussels and clams.

It is hoped that this project can continue and be expanded to other areas in the coming years. There are many people to thank for their contribution to this project. Ashton Spinney was vital for providing advice, infrastructure like his trap shed, contacts at the wharf and in actually putting the collectors out. Aubrey Spinney of Fox Hill Marine contributed the time and some of the materials needed for the construction of the collectors. He also provided lots of support in storing and moving the collectors and his fishing boat was chartered to set and retrieve the collectors. Carl Spinney operated the boat and got us out of a few snarls. The FSRS had a large contingent participating in the field work: Carl MacDonald, Julie Sperl, Alain d'Entremont, Jeff Graves and Blair Cabot. Patty King ably managed the FSRS input to the project. From DFO there was myself, Steve Nolan (still recovering from a broken heel while working in Lower Argyle), Cheryl Frail and Angelica Silva. Additional people who participated in the diving and suction sampling were Carl Wilson and Robert Russell from the State of Maine Department of Marine Resources and Glyn Sharp, Megan Veinot and Alan Reeves from DFO Science. Thanks to Ron Chisolm, Nova Scotia Minister of Fisheries and Aquaculture for his support via the Lobster Science Fund for this project.



Bringing a collector over to the sorting table. Carl Spinney (skipper), Jeff Graves and Alain d'Entremont.

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Carl MacDonald with a newly settled lobster.

Lobster Postlarvae Collector Trays

Location: _____ Date: _____ Boat: _____

Site	Lat	Long	Depth ft / m	Tray Name	Lobsters						
					CL mm	Sex CL	CL mm	Sex CL	CL mm	Sex CL	
1202					23	1					
					10	1					
					7	1					

Newly settled lobster (7 mm carapace length) on data sheet.



ATLANTIC CANADA MARINE BIODIVERSITY ESSAY CONTEST

Organised by Centre for Marine Biodiversity, www.marinebiodiversity.ca

Win your first year's tuition!

The *Centre for Marine Biodiversity* is pleased to announce its annual Atlantic-wide essay contest open to all grade 12 students. The contest is intended to increase awareness of the biological diversity within Canada's vast ocean territories.

The essay contest will provide an opportunity for motivated students at the pre-University level of education to learn about marine biodiversity in Canada and to share what is learned in a creative and effective manner.

The student with the most creative and effective essay will be awarded their first year's tuition in a Science program at a contributing Atlantic Canadian University or College. Two subsidiary prizes of partial tuition fees will also be available depending on further contributions from the Universities.

Contest Details

The essay contest will be open to any student currently enrolled in **Grade 12** at a Canadian high school in the Atlantic Region (i.e. Newfoundland, Nova Scotia, New Brunswick and Prince Edward Island). The student will write an original essay addressing the following statement:

Discuss the importance of and threats to marine biodiversity in Atlantic Canada.

Within the body of the essay, the student should address the following topics:

- **What is marine biodiversity (biological diversity)?**
- **Why should we know about and protect marine biodiversity in Atlantic Canada?**
- **What are the threats to marine biodiversity in Atlantic Canada?**
- **What can we do locally, and as members of an international community, to protect marine biodiversity?**

Essay Structure

The essay may be produced in any form, either electronic or hard-copy, and must contain no more than 2500 words. It can be written in French or English.

Judging

All entries will be judged according to the following criteria

1. Understanding of the topics and use of factual information (50%)
2. Clarity of ideas and writing skills (30%)
3. Originality (20%)

Judging will be by a panel of researchers who have expertise in areas of biological diversity and their judgements will be final. Winners will be chosen by **April 30th, 2008** and they will be invited to attend the Spring CMB meeting, where their essays will be on display. Winning essays will also be posted on the Centre for Marine Biodiversity website after the final decisions have been made. The students with winning entries must meet all eligibility requirements for the University of their choice before their prizes are granted.

Deadlines and Contacts

All entries must be received no later than 4:00 pm Atlantic Standard Time on **March 25, 2008**. Please provide a list of the universities to which you plan to apply. All entries should be sent to:

Essay Competition
The Centre for Marine Biodiversity
Bedford Institute of Oceanography
1 Challenger Drive, P.O. Box 1006 (B610)
Dartmouth, Nova Scotia
Canada, B2Y 4A2

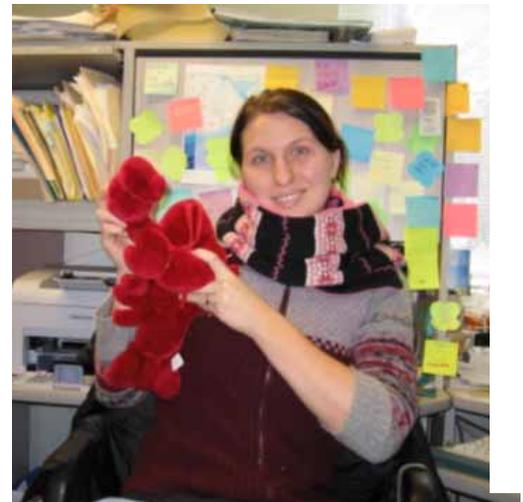
Or they may be e-mailed to: lawtonp@mar.dfo-mpo.gc.ca

For more information regarding this contest, please visit our website at: **www.marinebiodiversity.ca**.

JULIE SPERL: A YEAR IN REVIEW

By Julie Sperl, FSRS Research Assistant

As my time with the FSRS nears an end, I would like to reflect on the year I have worked here and share my experiences. For those of you who do not know me, my name is Julie Sperl, and I graduated last year from Dalhousie University with a Bachelor of Science, Honours in Marine Biology. I was first hired for a three month contract to help organize, write and compile the Ecosystem Overview and Assessment Report for the Inshore of the Scotian Shelf as part of the DFO-FSRS Inshore Ecosystem Project. This encompassing document was to merge original research done by the FSRS and DFO with the literature available for the inshore of Nova Scotia. In doing this research, I was able to meet many interesting scientists and learn a great deal about our inshore ecosystem.



During this time, I attended the Annual Conference and had the chance to meet and interact with many more of the colourful FSRS members and presenters. I was later hired to cover Shannon Scott-Tibbetts' maternity leave, managing the database, writing up reports and getting used to the daily antics of Jeff and Carl. I have acted as a scribe for many meetings and have also been honoured to represent the FSRS at various workshops and meetings. Finally I have been out in the field doing lobster v-notching, helping out with the 4VsW Sentinel Survey, and working on the lobster collector project, having the time of my life.

I have very much enjoyed my year with the FSRS, having learned so much and meeting so many interesting wonderful people. Though my full time term is ending and Shannon is returning, I will still be quietly working away part time doing a bit of lobster video analysis for John Tremblay. Farewell for now, and happy seas!

LFAS 33/34 MOULT & QUALITY MONITORING PROJECT ~NOVEMBER 2007 UPDATE~

Monitoring of lobster blood protein levels, shell hardness and molt stage has now been ongoing since the summer 2004 with pre-season, during and post-season sampling. The monitoring currently includes 18 areas in LFAs 33/34 with close to 52,000 lobsters sampled to date. The information collected for this project is available on the Internet and allows people to look at lobster sex, size, blood protein, molt stage and shell hardness by sampling location or dates. Below is a breakdown of some of the sampling locations for the last pre-season sampling for 2007 compared to similar dates in 2006.

	Argyle Inshore		Argyle Offshore		St Mary's Bay		Yarmouth Inshore		Yarmouth Offshore	
Sampling date	Nov 8/06	Nov 8/07	Oct 16/06	Oct 10/07	Nov 6/06	Nov 8/07	Nov 9/06	Nov 1/07	Oct 25/06	Oct 31/07
Mean protein level	9.37	10.72	7.67	8.66	11.41	11.45	8.68	9.61	8.09	8.17
% active pre-mol	0%	0%	0%	2%	0%	7 %	0%	1.5%	0.5%	0.5%
% soft-shell	24.5%	11%	1%	0%	10.5%	2 %	0%	1.5%	1.5%	2.5%
	Bay of Fundy		Sambro		Cape Sable Isl. Inshore		Cape Sable Isl. Off-shore		Port Latour	
Sampling date	Nov 1/06	Nov 9/07	Oct 27/06	Nov 6/07	Nov 7/06	Nov 12/07	Nov 6/06	Nov 13/07	Oct 10/06	Oct 16/07
Mean protein level	75	10.31	7.36	9.86	8.52	7.7	8.684	7.54	8.39	7.91
% active pre-mol	0.5%	1.5%	0.5%	10.2%	0%	1.5%	0%	2%	0.0%	0.5%
% soft-shell	25.3%	0.5%	2.6%	na	0%	2 %	0.5%	1%	7.5%	1.5%

What Can we expect for the 2007 fall season?

Although this monitoring project is still in its infancy in terms of predictive value, 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 come the last week of November.

Based on the pre-season sampling, it seems that this coming season should be very similar to the 2006 fall commercial season in terms of quality and soft-shelled lobsters.

When comparing the 2006 with the 2007 pre-season sampling, we notice that most locations have very similar numbers. Some of the locations that are standing out in terms of average blood protein levels being higher than last year include Argyle Inshore, Bay of Fundy and Sambro. A decrease in the proportion of lobsters with soft shell was also observed in our sampling in Argyle Inshore and the Bay of Fundy, as well as in St Mary's Bay and Port Latour. Finally, our latest sampling in St Mary's Bay and Sambro demonstrated a higher proportion of lobsters in active pre-molt; it is expected that these lobsters will be molting shortly and therefore, could show up as soft shell lobsters if caught at the opening of the commercial season.

Note: Although only the latest sampling dates are shown here, the overall pattern throughout the year for the parameters monitored was considered when predicting the quality of the LFAs 33/34 2007 fall season. However, confidence is highest for those locations where sampling was done closest to the season start.

This information was prepared by the AVC Lobster Science Centre (AVCLSC) in collaboration with Fisheries & Oceans Canada.

For more information on this project, visit: WWW.LOBSTERSCIENCE.CA/MOLT

The AVCLSC is a research centre located at the University of Prince Edward Island. Since its inception in 2000, the AVCLSC has directed its research and development efforts to the long-term benefit of the lobster fishery.

AVC Lobster Science Centre - 550 University Avenue - Charlottetown - PEI - Canada - C1A 4P3

Tel: (902) 894-2887 - Fax: (902) 894-2885 - Lobster@UPEI.ca - www.LobsterScience.ca

NEW FSRS FISHERIES TECHNICIAN FOR THE WINTER SEASON

By Martina Kluge, FSRS Fisheries Technician

When I was born nearly twenty-five years ago my parents decided to call me Martina. Martina Kerstin Kluge. Born and raised in Davos, Switzerland, the Alps contributed to my continuously growing passion for snowboarding and snow in general.

Eleven years ago my parents decided to take their four daughters and move to Queens County, Nova Scotia. The lack of mountains made me miss Switzerland, but soon I found a second passion: The Ocean. So off I went to Dalhousie University to study Marine Biology. During my time there I became a passionate SCUBA diver. Currently I have my Advanced, Nitrox, and Rescue Diver courses and am planning on becoming certified as a Divemaster within the year.

I graduated from university back in May 2007, worked at a dive shop for five months, and now here I am, the newest member of the FSRS team. I feel honoured.

I will be working on the Lobster Recruitment Index Project and the Lobster Moulting and Quality Sampling Project for the first few months and later my work will involve groundfish condition sampling. Various other duties associated with this position include attending meetings, writing reports, Oceans 11 presentations and other tasks to which I look forward.

So far everybody I have met from the team has been great and I am excited to continue meeting interesting people and look forward especially to working with them!

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NEW TO THE FSRS LIBRARY

DFO, 2006. *State of the Ocean: Chemical and Biological Oceanographic Conditions in the Gulf of Maine—Bay of Fundy, Scotian Shelf, and the Southern Gulf of St. Lawrence*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/048.

DFO, 2006. *State of the Ocean 2005: Physical Oceanographic Conditions on the Scotian Shelf, Bay of Fundy and Gulf of Maine*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/017.

DFO, 2006. *Atlantic Halibut on the Scotian Shelf and the Southern Grand Banks (Div. 3NOPs4VWX)*. DFO Can. Sci. Advis. Rep. 2006/38.

DFO, 2006. *Pollock in Div. 4VWX and 5Zc*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/045.

DFO, 2006. *Haddock in the Southern Scotian Shelf and Bay of Fundy (Div. 4X/5Y)*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/047.

DFO, 2006. *Cod on the Southern Scotian Shelf and in the Bay of Fundy (Div. 4X/5Y)*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/046.

FSRS, 2006. *DFO/FSRS Inshore Ecosystem Research on the Scotian Shelf. 2005-2006 Year End Report. October 2005 to March 2006*. JPA F5261-050048.

FSRS, 2006. *Harvest Fisheries Partnering Joint Project Agreement. March 2005–April 2006 Year End Project Report*. F5198-04001.

LAROCQUE RULING IMPACTS FSRS LOBSTER RECRUITMENT INDEX AND LFA 33 COMMERCIAL TRAP SAMPLING PROJECTS

By Patty King, FSRS General Manager

Fisheries and Oceans Canada (DFO) was taken to court recently over the use of snow crab quota to help pay for science. The resulting ruling, commonly known as the Larocque Ruling, impacts many industry science projects. The Larocque Ruling says that DFO cannot use fish to extend its budget; fish for science doesn't exist anymore. The Ruling impacts the FSRS Lobster Recruitment Index and LFA 33 Commercial Trap Sampling Projects. Specifically, the lobsters caught in the project traps must be released according to the Ruling. In the past, the legal lobsters caught in the traps, which were in addition to the fishermen's legal limit, could be retained. Under the Ruling, however, this is now considered use of fish for science and is not permitted. Alternatives needed to be discussed and a strategy developed to address this requirement and its implications for the continuation of the projects.

The FSRS Shellfish Working Group developed three alternatives to address the concerns resulting from the Larocque Ruling about retaining the lobsters from the project traps. These were presented to project participants at a series of meetings held throughout the LFAs from August 20 – 30, 2007.

The three alternatives being considered were:

- Alternative 1 – The FSRS would get commercial tags donated by licensed fishermen and use these tags to provide extra tags to project participants. Participants would be able to keep the legal lobsters from the recruitment traps.
- Alternative 2 – Participants would get extra science tags as has been the case in the past. They would return all lobsters in the recruitment traps to the water. They would receive a payment of \$65/trap for data collection.
- Alternative 3 – Participants would use their own commercial tags. They would be able to keep the legal lobsters. They would receive a payment of \$130/trap for data collection. (\$65 for LFA 33 Commercial Trap Sampling Project).

Everyone was asked to rank the alternatives in order of preference. Some ranked only one alternative, choosing not to indicate a second or third choice. The results of the consultations are summarized in Table 1.

Thanks to all those participants who took the time to attend the meetings this summer concerning the implications of the Larocque Ruling for the Lobster Recruitment Project and LFA 33 Commercial Trap Sampling Project. Your input was greatly appreciated. The turnout at the meetings was lower than hoped for and we did try to follow up with anyone who did not make it to the meetings. The total response rate ranged from 35% - 100% of participants in each of the LFAs. The results were reviewed by the FSRS Shellfish Working Group. There was considerable discussion and concern about the credibility of Alternative 2. Concern was expressed that not all participants would actually return all the lobsters to the water and that this could impact the credibility of the FSRS and the project. There was also concern about the low response rate in some of the LFAs. After much debate, it was decided to do the following, with the understanding that it is subject to review and discussion at the FSRS Annual General Meeting February 22-23, 2008:

Table 1. Summary of Results of Meetings and Calls

LFA	# Participants	# Participants Contacted (meetings or by phone)	% Contacted	1 st Choice	2 nd Choice	3 rd Choice
27	31	22	71%	1	3	2
28	2	2	100%	3	2	1
29	9	6	67%	2	1	2
30	7	3	43%	2	1	2
31A	8	7	88%	2	3	Tie 2-3
31B	13	8	62%	3	Tie 1-2	Tie 1-2
32	19	13	68%	3	Tie 1-2-3	1
33	50	34	68%	2*	3*	1
33 CTS	52	34	65%	3	3	1
34	49	17	35%	2	2	3
35	6	5	83%	2	1	3

LFA 27 - Alternative 1 was the first choice for LFA 27 and the plan was to check with the LFA Advisory Committee to see if we could get any tags donated. Unfortunately DFO Legal has since decided the risk level associated with this alternative in relation to meeting the conditions of the Larocque Ruling is high and they would not approve this alternative. Therefore the second choice, Alternative 3, will be implemented in LFA 27.

LFA 28, 31B, and 32 – Implement Alternative 3.

LFA 29, 30, 31A, 34 and 35 – Implement Alternative 2.

LFA 33 - At the meetings Alternative 3 was the first choice. Breakdown of votes:

- 1st choice: Alt 2 = 13, Alt 3 = 12
- 2nd choice: Alt 3 = 13, Alt 2 = 7

Because the vote for the 1st choice was so close (only 1 vote difference) and because the 2nd choice was overwhelmingly for Alternative 3, plus for the LFA 33 CTS the choice was Alternative 3, it was decided to implement Alternative 3 for both the LR and CTS projects in LFA 33.

Because of the low level of participant input in some of the LFAs, in particular LFAs 30 and 34, we plan to continue to try to contact participants to get their input. We also plan to consult with the LFA Advisory Committees to determine the level of concern by industry in general about the credibility issue for Alternative 2. For those areas where Alternative 2 is being implemented, it is being done on a trial basis and we will assess if there is any negative impact on the credibility of the project or the FSRs. At the next FSRs Shellfish Working Group meeting and the FSRs Annual General meeting, we will re-evaluate the results of the on-going consultations and assessment of Alternative 2.

This has been a difficult issue to deal with, and it is of course recognized that we are unable to satisfy everyone with the decision as to which Alternative to implement. I have already heard from some participants that they may not continue in the project because of this situation. I hope that this is not the case, that we will be able to maintain a high level of participation in all the LFAs. Everyone's

participation in the project over the years has been greatly appreciated and has contributed significantly to lobster science.

The data the fishermen collect is being used in the stock assessment process. These data contribute a large portion, >50% in some cases, to the data for lobster stock assessments. For example, in the most recent assessments of LFA 27, 33, and 34 it provided data sources for trends in not only adults, but juveniles, and to estimate exploitation rate. The LFA 33 assessment relied almost exclusively on data from this project to provide advice to fisheries managers on stock status.

Lobster fisheries in Atlantic Canada rely heavily on newly-recruited lobsters. Detecting declines in recruitment is essential for providing sound conservation advice for fisheries management. The FSRS Lobster Recruitment Project is currently the only method we have for detecting recruitment trends in the Maritimes Region lobster fishery. Without the efforts and commitment of the fishermen participating in these research projects, the quality of scientific advice would suffer. Exploitation rates, the key indicator of fishing pressure would not be as robust. Detection of declines in recruitment would not be detected.

Having solid science is necessary for the proper management and conservation of the lobster resource. It is only through the fishermen's participation in research such as the Lobster Recruitment Index and LFA 33 Commercial Trap Sampling Projects that such science is possible. All the participants deserve thanks for their hard work over the years and commitment to lobster science and helping ensure the future of our lobster fishery through better knowledge.

Current Participants

LFA 27

Bernard MacDonald	George Rambeau	Michael Buffett
Bernard Quinn	Glenn Fricker	Peter Harrison
Brian King	Gordon Hawley	Richard MacKinnon
Carl Donovan	Harold Montgomery	Ron MacKinnon
Carlton Lunn	Jay MacDonald	Ronald Fraser
David Ferguson	Keith Green	Sidney MacPherson
David Podanovitch	Kerry MacLeod	Stanley Buchanan
Dennis Smith	Kevin Green	Thomas Boutilier
Earl Sherwood	Kevin Squires	Sheila Mitchell
Gary Hatcher	Lloyd Fraser	
George Burton	Matthew Smith/JoAnn Smith	

LFA 28

David Marinelli	Floyd Carter	
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LFA 29

Alfred Richard	William Burkey	John Landry
Billy Boucher	Kerry (Martin) Gracie	Mark Mombourquette
Carla Sampson/James Landry	David Kehoe	Guy Landry

LFA 30

Albert Sampson
Claude Martell
Daniel MacIntyre

Gary Raney
Graham MacCuspic
Kevin MacAulay

Malcolm MacDonald

LFA31A

Alen Newell
Bill Bond
Cathy Newell

Emerson Murphy
Eugene O'Leary
Howard Munroe

Ken Snow
Kevin Horne

LFA 31B

Adrian Mailman
Bruce Jack
Cecil Cashin
Hugh MacDonald
John McGrath

Lawrence Rudolph
Lorne Jamieson
Paul Keith
Randy Burns
Randy Turner

Eric Pace
Rodney Manthorne
Thane Jordan

LFA 32

Brian Stevens
Clark Stevens
Darrell Anderson
Darren Stevens
David Swaine
Dean Fleet
Edward Lace

Gabriel McKay
Harold Pottie
Hubert Boutilier
James Baker
James Beck
Kevin Kiley
Ramey Munroe

Randy Boutilier
Randy Publicover
Rick Jewers
Ronald Boutilier
Ronald Stevens

LFA 33

Andrew Gray
Barry Levy
Bary Duggan
Ben Miller
Bill Ward
Blaine Goulden
Bradford Crouse
Brian Everett
Carrol Swaine
Cecil Herritt
Dale Garrison
Danny Roy
David Baker
Eric Holmes
Ernest Pierce

Garnet Heisler
Gary Tanner
George Zinck
Gerald Mossman
Gerald Risser
James Perry
Jamie Osborne
Jeffrey Levy
Joel Tanner
John Levy
Kevin Doane
Kevin Slaunwhite
Marc White
Marshall Blades
Mike Young

Percy Peters
Peter Burgess
Philip Irwin
Randy Henneberry
Ricky Demings
Rickey Joudrey
Robert Henneberry
Samuel Scott
Scott Schnare
Stephen Purdy
Stephen Scobey
Vincent Boutilier
Wayne Purdy
Wendell Brown
Wilford Smith

LFA 34

Bobby Stoddard
 Brian Nickerson
 Carl LeBlanc
 Craig Nickerson
 Darrell Ross
 Daryl Amirault
 Davis Nickerson
 Dennis Pothier
 Donnie Banks
 Douglas Swimm
 Earl Crocker
 Eric Landers

Franklin Messenger
 Gerald LeBlanc
 Gerard Robicheau
 Greg Cottreau
 Howard Ross
 Kirby Nickerson
 Kirk Symonds
 Larry Walker
 Mark Jeffrey
 Michael Nickerson
 Michel Boudreau
 Monty Goreham

Nelson Ross
 Peter Symonds
 Pius d'Entremont
 Ray Nickerson
 Richard Wagner
 Sidney O'Connell
 Todd Nickerson
 Vincent Goreham
 Wade Goodwin
 Wayne Pothier
 Wreyford Goodwin

LFA 35

Alan Morrison
 David Sproul

Gerry Field
 Jared Halliday

Kevin Corbett
 Reginald Collins

Past Participants**LFA 27**

Billy Joe Fraser/Margaret Fraser
 Charlie Smith

Joe Burke
 Ken MacPhee

Percy Fraser
 Robert MacKinnon

LFA 31A

Jerry Creamer

Dwayne Dort

Mike Newell

LFA 31B

David Boudreau

Ernest Rudolph

Mike Dort

LFA 32

Mark DeBaie

LFA 33

Doug MacDonald
 Barry Cook
 Chester MacKenzie
 Dale Cook
 Donald Perry
 Leon Doan
 Paul Swim
 Robie Verge
 Tim Chetwynd
 Derrick Purdy
 Larry Risser

Graham Levy
 Kevin Duffy
 Chester MacKenzie
 Chris Harnish
 John (Jack) Dunlop
 Bill Slaunwhite
 Don Fraelic
 Victor Westhaver
 Sterling Goulden
 Burton Mitchell
 James Bower

Robie Verge
 Victor Wolfe
 Tracey Wolfe
 David Schare
 John Levy Sr.
 James Bower
 Tom Henneberry
 Andrew Nickerson
 Peter Wayne Smith

LFA 34

Kevin Ross	Sanford Atwood	Roger Shand
Steve Mailllet	Wayne Spinney	Sinclair Daley
Brent Pothier	James Conrad	Ted Jacquard
Clyde Stanwood	Greg Tidd	Donald Comeau
Craig Theriault	Ben Richard	Normand Comeau
Grant Trites	Chris Surette	Jules d'Entremont
Jack Dunn	Richard LeBlanc	Calvin Nickerson
James McDormant	Wayne Outhouse	John Ross
Kendrick Nickerson	James Thurber	Kurt Symonds
Kevin Shaw	Craig Aubrey Smith	Noah Halliday
Lee Wentzell Jr.	Craig Steven Smith	Ricky Nickerson
Maurice Shand	Eldridge Garron	Ted Nickerson
Michael Ross	George Nickerson	Wallace Donaldson
Philip Shand	Hubert Saulnier	Leon Saulnier
Raymond Mailllet	J Roy Atkinson	Tim Nickerson

FSRS POPULAR STOP ON TOUR FOR INTERNATIONAL JOURNALISTS AND SCIENTISTS

Over the years, the Fishermen and Scientists Research Society (FSRS) has received numerous requests to give presentations to visiting journalists and scientists. They are interested in learning more about the FSRS as a proven model for effective collaboration between fishermen and scientists. In her presentations to these visitors, FSRS General Manager Patty King gives a description of the history of the development and implementation of the FSRS, its objectives, structure and operations, communication strategy and an overview of the extensive research the FSRS has undertaken over the years. The presentation goes on to talk about what is unique about the FSRS, the benefits, the challenges, and the lessons learned from the FSRS model. The feedback from these visits has been very positive.

The Canadian Department of Foreign Affairs and International Trade (DFAIT) has been the organizer of a number of the visits from international journalists. In February 2005, the FSRS was visited by journalists from Iceland, Denmark and the United Kingdom and in March 2005 by journalists from Portugal and Spain. On October 4, 2006 we were visited by seven journalists from across Europe, including Iceland, Belgium, Portugal, Italy and Norway, as well as a journalist from Russia. On October 10, 2006 five journalists from Spain met with the FSRS. DFAIT has also organized visits for its own staff. In May 2004, Political/Economic Officers, Trade Commissioners, and Management and Consular Officers from the Department met with FSRS staff.

In March 2005, the Canadian Embassy in Paris, France organized a visit for a number of French journalists and a photographer. They included Bruno Côt, an assistant science editor for the magazine *l'Express*, Isabelle Brisson, who writes for the Science and Health pages of *Le Figaro*, Hélène Petit, a freelance contributor to *Science et Vie*, France's largest science magazine, Jean Le Borgne, a reporter for *Le Télégramme*, a regional daily in Brittany, and Hélène David, a photographer from *Sciences et Vie* who has done some remarkable work on fisheries in Norway and in Brittany, France.

International scientists and fishermen have also shown an interest in the FSRS. One of the most recent visits was by Doug Wilson, a sociologist from the Institute of Fisheries Management in Denmark, and Clara Ulrich-Rescan, a biologist from the Danish Institute of Fisheries Research. Doug and Clara were working on a case study of the fishery in South West Nova Scotia. They examined the FSRS as part of the Participatory Approaches to Science and Management Decisions component of their study.

The FSRS is always pleased to meet with international visitors and share our experiences and knowledge. It is rewarding to see the FSRS being recognized internationally as a model for effective collaboration. Thank you to all those who have taken the time to meet with us and learn more about the valuable work we are doing.

THE ATLANTIC MACKEREL

By François Grégoire, Mackerel Biologist, DFO

It is one of the most beautiful fish found in our waters. It has a bright, steel blue colour. It is powerful and strong and makes very long annual migrations. It is relatively not well known compared to other species. It is elusive and therefore holds many secrets. It also happens to be the focus of the biologist who has been writing these lines for the last 20 years.



Compliments of Mr. Claude Nozière, Maurice Lamontagne Institute.

Introduction

The Atlantic mackerel belongs to the great *Scombridae* family which is widely distributed throughout tropical and temperate ocean waters the world over. Belonging to the genus *Scomber*, the *scombrus* species has the most northerly distribution. In the Northwest Atlantic, Atlantic mackerel are found from Cape Hatteras to the coasts of Newfoundland and Labrador. This vast region is characterized by two principal spawning grounds, one in American waters and the other in the southern Gulf of St. Lawrence. Atlantic mackerel were already being caught by First Nations when Europeans arrived in North America. They are still being caught today and are of significant economic value to a number of Canadian Atlantic communities. The text that follows is an update of the data concerning the species' biology, the fishery, abundance and distribution.

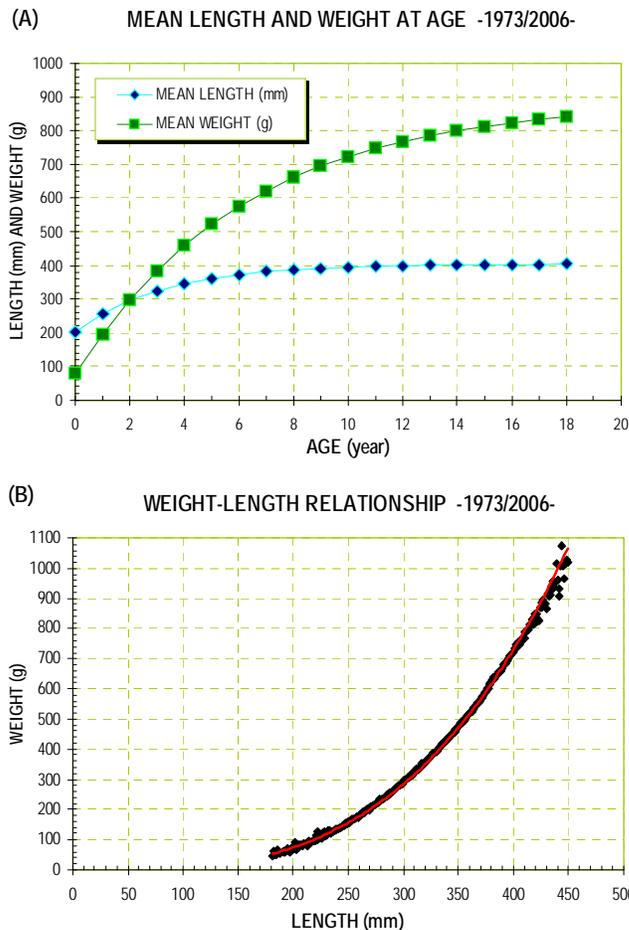


Figure 1. Mean length (mm) and weight (g) at age (A) and weight-length relationship (B) calculated using commercial samples collected in Canadian waters since 1973.

Biology

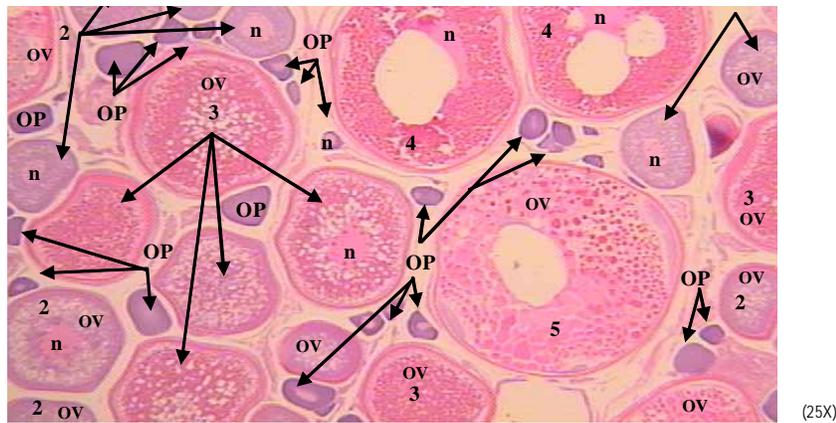
Mackerel are a very fast growing species. By the end of their first year, the length and weight of certain individuals can reach near 200 mm and 100 g (Figure 1A). Growth not only varies from one year to another, but also from one year-class to another. In fact, it is slower for more abundant year-classes, which strongly suggests the presence of a dependence density relationship. The relationship between weight and length has not varied much over the years. Mean weights at length for the 1973-2006 period are found in Figure 1B.

Sexual maturity is reached relatively early. For example, the size at which 50% of mackerel were mature was only 251.4 mm in 2006 and all the fish over 340 mm were mature. At one year, less than 40% of mackerel are mature and they all are at age 4. Sexual maturity also varies annually and from one year-class to another.

Atlantic mackerel mostly feed on small and large zooplankton. In the northern Gulf of St. Lawrence, however, the significance of zooplankton in the mackerel diet has dropped over recent years in favour of shrimp and capelin. The main causes of mortality are predation followed by fishing. Currently, the most significant predators include marine mammals rather than cod and large groundfish as was the case twenty years ago.

Spawning can take place at any time of day. It occurs at the surface and begins when water temperature reaches around 9° C. At the peak of the spawning period, water temperature varies between 10° C and 12° C and in these conditions, the egg incubation period lasts approximately one week.

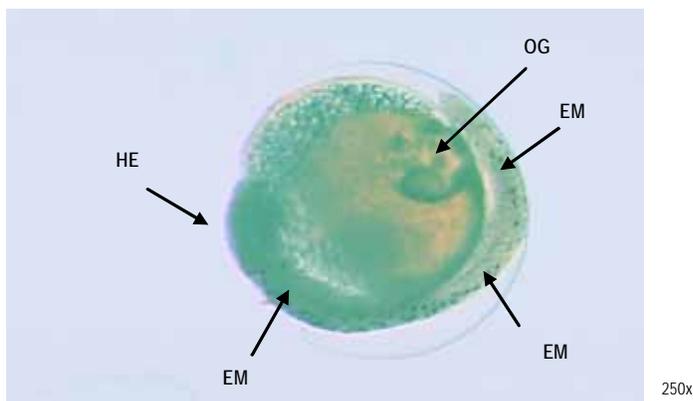
Each female spawns several times (batch spawning; Figure 2) during the spawning season and eggs (Figure 3), which are around 1 mm in diameter upon hatching, have an oil globule which, in addition to being a food reserve for the future larvae, allows the eggs to remain within the first few meters of water. Upon hatching, young mackerel measure about 3 mm. They keep their yolk sac for a few days. The disappearance of the yolk sac and the appearance of fins characterize the larvae (Figure 4), which becomes juvenile after a two-month period and at a length of approximately 50 mm. Juveniles are miniature replicas of adults, which form into schools and gather near the coast. Then they begin their fall migration to wintering areas.



Legend:

OP = Immature oocyte (stage 1)
 OV = Mature oocyte (stages 2, 3, 4 and 5)
 n = Nucleus

Figure 2. *Histological slide of an Atlantic mackerel ovary (from St. Margaret's Bay in Nova Scotia) showing the oocytes (unfertilized eggs) at different stages of development. For mackerel, the development of oocytes is asynchronous in that several spawning periods are required for the expulsion of mature oocytes. Stage 1 oocytes are immature (OP) and will hatch in years to come. There are 4 stages of mature oocytes (OV) (stages 2, 3, 4 and 5). The last of these stages (5 or hydrated) corresponds to the oocytes that are expelled upon each spawning period.*



Legend:

OG= Oil globule
 EM= Embryo
 HE= Head of the embryo

Figure 3. *Photo of an Atlantic mackerel egg in which the embryo (EM) and oil globule (OG) can be seen.*



(Compliments of Mr. Claude Nozière, Maurice Lamontagne Institute)

Figure 4. Atlantic mackerel larvae collected during the June 2006 egg survey in the southern Gulf of St. Lawrence.

Fishery and distribution

In the Maritime Provinces, Newfoundland and Labrador and in Quebec (NAFO Subareas 3 and 4), over 15,000 commercial fishermen participate in the mackerel fishery. They fish mainly inshore using gill-nets, jiggers, hand-lines, purse seines, weirs, and traps. Traditionally, the most significant mackerel landings have been made by Nova Scotia, Quebec and Prince Edward Island (Figure 5A). In recent years, Canadian landings have significantly increased from 13,380 t in 2000, to nearly 55,000 t in 2005 and 2006. This increase can mostly be attributed to the sharp rise in landings in Newfoundland, particularly on the province's east coast (Figure 5B). *The occurrence of mackerel on Newfoundland's east coast and in such large quantities is unusual.*

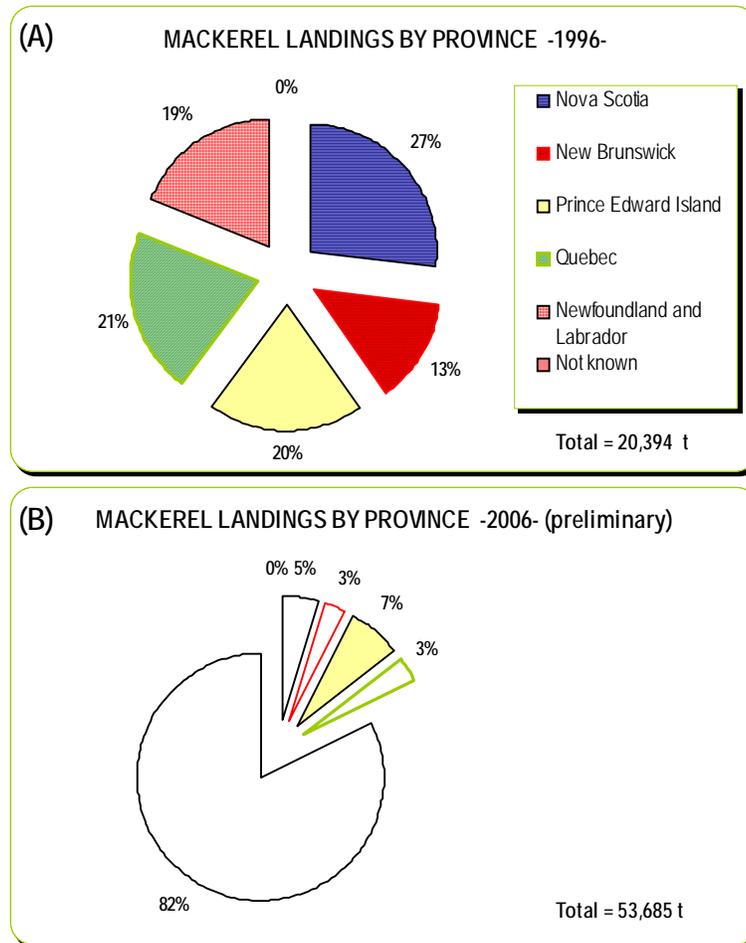


Figure 5. Atlantic mackerel landings (t and %) per Canadian province in 1996 and 2006. In 1996, the proportion of Canadian landings made by Newfoundland was 19%. In 2006, the proportion reached 82%.

Abundance and migration

Groundfish abundance is generally assessed using a bottom trawl survey. This type of survey cannot be used for pelagic fish such as mackerel which, depending on the area, time of year and temperature conditions, can be found in different parts of the water column. Catch rates by coastal fishermen cannot be used as an abundance index because not all catch data are recorded (e.g. bait catches) and that mackerel accessibility to fixed fishing gear is mostly related to environmental conditions rather than abundance. All these issues have mostly been solved by using an egg survey which is conducted at a time in the life cycle (spawning) and area where a large number of mackerel are gathered together. In Canadian waters, the southern Gulf of St. Lawrence has been identified as the main spawning ground for mackerel.

Issue

In recent years, there have been some unusual environmental conditions (cold waters from the Labrador Current) prevailing in the southern Gulf of St. Lawrence (area sampled by the egg survey). As a result of these changes, a significant drop in spawning biomass has been recorded during the egg survey. This decrease has also been followed by a significant drop in terms of landings in the southern Gulf. Spring migration for the mackerel could be delayed or occur elsewhere (e.g. Scotian Shelf) to

avoid the cold waters in the Gulf of St. Lawrence. These changes in migration routes could also be the reason for the sharp increase in landings on Newfoundland's east coast.

Research

Because of the oceanographic changes that have recently been observed in the southern Gulf of St. Lawrence, the egg survey, as it is currently being conducted, only measures a portion of the mackerel population that is reproducing in Canadian waters. Therefore, the egg survey should be extended outside of the Gulf of St. Lawrence (e.g. Scotian Shelf and south of Newfoundland). *An international egg survey could also measure, for the first time, mackerel abundance that is reproducing in American and Canadian waters.* The results from such a survey could be used to properly manage this species on an international basis.

A tagging study should be conducted as soon as possible in order to update our knowledge on the new species' distribution as a result of the recent oceanographic changes. The issue of stock discrimination (are there one, two or several mackerel stocks in the Northwest Atlantic?) should also be examined as soon as possible.

Conclusion

Significant oceanographic changes have been recorded in recent years in the southern Gulf of St. Lawrence. These changes have affected mackerel migration routes and distribution. There are less mackerel in some areas, smaller mackerel in others and obviously an increased occurrence elsewhere. These changes in migration and distribution have also been observed in New England and in Europe. One of the biggest challenges in upcoming years will be to better understand the effects that oceanographic and climate changes have on the distribution and abundance of marine species.

Atlantic mackerel are a wonderful species. We must all look after them and ensure their presence for future generations. It is our responsibility.

Epilogue

2007 Egg survey, somewhere offshore of Prince Edward Island.

It is 2:15 am, it is June 26th, and I am very sleepy. I am on the bridge of the Teleost and we are waiting, coffee in hand, the return to the surface of the temperature probe. With eyes half-open, or half-shut, I am listening to a crew member talk about politics once again. He is staring at me from the corner of his eye and probably thinking: "*Ha... these scientists, they're all wimps and if it wasn't for me keeping them awake, they'd all be asleep*". I tell myself that he's probably right. It's true; I'm no longer twenty years old and thank goodness for coffee. OK now, he's getting excited and he's waving his hands. He's telling us to approach the railing and look over. Another one of his jokes, I tell myself. I approach and I feel my brain come to life. My whole body is tingling. I'm reminded of the first trout my grandfather helped me to catch. My eyes are wide open now. A school of mackerel is near the surface. It is huge. I can see it as far as the vessel's lights can shine. It is thick as well. My goodness, there are so many mackerel that I cannot even see between them! How beautiful! What a great fish! I am still trembling as I write these lines. Everybody is leaning over the railing and staring with wonder. I tell myself, "*yes, I'm still only 20...*".

BEACHCOMBING - What's New in The News

Ecosystem Overview Report for the Minas Basin Released

The *Ecosystem Overview Report for the Minas Basin, Nova Scotia* has recently been released by the Oceans and Habitat Branch of Fisheries and Oceans Canada.

You can access the Report under the Hot Topics panel of *Offshore Energy Research Associations* website at

www.offshoreenergyresearch.ca

(under the Hot Topics click on Minas Basin Ecosystem Overview).

**We're on the
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UPCOMING EVENTS

Fishermen and Scientists Research Society 15th Annual Conference

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

The 2008 Canadian/US Lobstermen's Town Meeting

April 4th and 5th, 2008
 Portland, Maine

For further information, please contact
 Jean Day at the Lobster Institute at
 207-581-1443.