UNIVERSITY OF NEW HAMPSHIRE
INSTITUTE FOR THE STUDY OF
EARTH, OCEANS AND SPACE
OCEAN PROCESS ANALYSIS LABORATORY
DURHAM, NH 03824

Final Report

The 2004 and 2005 Workshops on Selectivity and Conservation in Trawls

Submitted to:

The Northeast Consortium
142 Morse Hall
University of New Hampshire
Durham, NH 03824

August 2007 **UNH-FISH-REP-2007-042**

Final report

The 2004 and 2005 Workshops on Selectivity and Conservation in Trawls

by

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Submitted to

The Northeast Consortium
The University of New Hampshire,
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The 2004 and 2005 Workshops on Selectivity and Conservation in Trawls

INTRODUCTION

The trawl is one of the most widely used fishing gears in the Northeastern United States. There has been much debate over trawl selectivity, bycatch, discards, and seabed impacts in recent years. However, misunderstanding and knowledge gaps between industry, management and interest groups regarding the trawl hinder discussions and the likelihood of solutions to the above issues. Reducing bycatch is desirable to both industry and management and is part of a strategic plan released by NOAA Fisheries recently. But how do the existing trawls perform with regard to selectivity and conservation? Can trawls be further improved to be more conservation-oriented? A workshop with practical demonstrations and discussions on the trawl gear in a flume tank can help to answer these questions and facilitate relationships between people in industry, science and management.

Cooperative research on fishing gears and fisheries resource conservation and utilization have been supported by many government and grant agencies, especially NOAA Fisheries and the Northeast Consortium. However, many industry participants are not able to take this unique opportunity due to a lack of current knowledge and awareness of conservation technologies and how their ideas may be transformed into a cooperative project. In addition, they are less aware of the technologies available for testing innovative ideas and designs. As a result, many proposals have not been funded due to a lack of industry/science partnership, often an important criterion for a funding decision. The workshop would provide fishermen participants opportunities to visualize their gears in a flume tank setting, to introduce new gear designs and bycatch reduction devices, which may be adopted or modified for testing in New England waters. The workshop would stimulate fishermen to use their creative minds and rich fishing experience to conceptualize innovative designs and devices for testing in our local fishery. The workshop was also designed to provide a forum for communication between fishermen and fisheries managers and scientists.

OBJECTIVES

The objectives of the workshops were:

- To increase knowledge and awareness of conservation-oriented gear designs and operations among fishing industry participants;
- To provide a forum where innovative ideas of conservation technology and management practices are demonstrated and discussed;
- To improve communication and to establish partnership between fishermen, fisheries managers and scientists; and
- To stimulate ideas for cooperative research in Gulf of Maine.

This was the first and the second of a three-workshop outreach project funded by the Northeast Consortium, and it was the third and fourth similar workshop since 2001 organized by the University of New Hampshire.

APPROACHES AND METHODS

To ensure a wider industry participation, a project advisory team was formed to develop a fair participant selection criterion and oversee participant selection process

Project advisory team. An advisory team consisting of Dr. Pingguo He, the principal investigator, Mr. Rollie Barnaby, UNH Sea Grant extension educator, Capt. David Geothel of F/V "Ellen Diane", and Dr. Troy Hartley of the Northeast Consortium was established to oversee participant selection process.

Brochure and application form. A brochure and an application form were developed outlining the purpose and structure of the workshop and financial support to fishing industry participants. The brochure/application form (Appendix I) was distributed to fisheries organizations, fisheries cooperatives, fishery offices, Sea Grant offices, and at the Maine Fisheries Forum in early March of 2004 and 2005 and at the New England Fishery Management Council meetings. The workshop information was also published in the ***Commercial Fisheries News***, as well as on the web sites of ***National Fishermen*** (www.nationalfishermen.org), NH Sea Grant (www.seagrant.unh.edu), by emails via ***Collaborative Fishery Research*** emailing list, and the Sea Grant Northeast emailing list.

Participant selection criterions. The following participant selection criteria were established by the project advisory team:

- Applicant who has not been in any previous flume tank workshops
- Applicant who is an active fishermen fishing in Gulf of Maine and/or on Georges Bank using trawls.
- Maximum one participant for each vessel, preference to the skipper of the vessel
- Considering balances among states, and inshore/offshore sectors

Applications and participants. Altogether twenty-seven applications were received from Maine, New Hampshire, Massachusetts, and Rhode Island in 2004. A rotary system was employed to select participants from qualified applicants from each state/sector group. Fifteen fishermen was selected, of which fourteen participated the workshop.

Sixteen new applicants and five 2004 applicants (who were not able to attend) were considered in 2005. Fifteen seats were offered to fishermen, and nine attended the workshop.

Invitations were sent to National Marine Fisheries Service Northeast Regional Office, Northeast Fisheries Science Center, New England Fisheries Management Council and the Northeast Consortium.

Workshop participants.

The following is a list of participants for the 2004 workshop:

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Industry participants:

Lendall Alexander, Jr. (Fisherman, ME)
Terry Alexander (Fisherman, ME)
Mark Bichrest (Fisherman, ME)
Shawn McLellan (Fisherman, ME)
Dale Page (Fisherman, ME)
Robert Scammon, Jr. (Fisherman, ME)
Michael Sinchfield (Fisherman, ME)
William Train (Fisherman, ME)
Gregory Turner (Fisherman, ME)

Tracey Wahlstrom (Fisherwoman, ME)
Christopher Allen (Fisherman, NH)
Timothy MacDonald (Fisherman, MA)
Richard Syphers (Fisherman, MA)
James O'Grady (Fisherman, RI)
Philip Ruhle (Fisherman, RI)

Non-industry participants:

Russell Brown (Head, Ecosystem Surveys, NEFSC, NMFS, NOAA)
Rachel Galland (Fisheries Specialist, Northeast Consortium, UNH)
Rachel Hamilton (Fisheries Research Technician, UNH Fisheries)
John Hoey (Coordinator, Cooperative Research, NEFSC, NMFS, NOAA)
Olivia Rugo (Coordinator, MA Fishermen Partnership, MA)
Jim Ruhle (Member, MAFMC, NEFMC; Chair, Survey Trawl Committee, fisherman)

The following is a list of participants for the 2005 workshop:

Industry participants:

Vincenzo Russo (Fisherman, MA)
Ralph St. Croix (Fisherman, MA)
Glenn Gilley (Fisherman, ME)
Martin Gorham (Fisherman, ME)
David Haggarty (Fisherman, ME)
Adrian Martin-Fisher (Fisherman, ME)
Christopher Odlin (Fisherman, ME)
Dennis Robillard, Jr. (Fisherman, ME)
Thomas Simpson (Fisherman, ME)

Non-industry participants:

John Kenny (National Marine Fisheries Service)
Richard Raynes (National Marine Fisheries Service)
Troy Hartley (Northeast Consortium, University of New Hampshire)

Ken La Valley (Sea Grant, University of New Hampshire)
Tracey Smith (Fisheries technician, University of New Hampshire)

Workshop venue - the Flume Tank. The workshops were conducted at the flume tank of the Center for Sustainable Aquatic Resources (CSAR) in Newfoundland, Canada. The tank is the largest fisheries flume tank in the world. The tank boasts an observation section of 21.5 m long, 8 m wide and 4 m deep. The water in the tank is circulated at velocity up to 1.25 m/s, representing a speed of 8 knots at 1:10 scale and 2.5 knots at full scale. The viewing gallery can accommodate up to 150 people for research projects, demonstrations and training workshops, even though a group of 15 to 25 participants is considered most suitable for most training courses and workshops.

The tank is operated by the Center for Sustainable Aquatic Resources which comprises a team of specialists including fishery engineers and technologists, fish behaviorists, model construction specialists, and mechanical engineering technologists. The tank has been used to test trawl, traps, gillnets, scallop dredges and aquaculture cages, and to provide technical services for fishermen, fishing gear manufacturers/suppliers. CSAR frequently conducts training workshops for the fishing industry and government and non-governmental organizations, on the operations and behavior of mobile and fixed fishing gears, and responsible fisheries. More information on the flume tank and CSAR can be found in Appendix II.

WORKSHOP PROGRAM

The workshops were conducted between May 11 and 15 of 2004 and May 10 and 14 of 2005. The workshops were facilitated by Capt. Roy Gibbons of Fisheries and Marine Institute. Capt. Gibbons worked on various fishing vessels before he joined the institute as an instructor on harvesting technology, navigation and marine electronics. The five-day workshop included flume tank demonstrations, discussion/lecture sessions, supplemented by visits to fisheries and marine related research and manufacturing facilities and fishing communities in or near St. John's. The workshops covered the following:

- Discussion/lecture: Fisheries research and development at the Center for

Sustainable Aquatic Resources (Glenn Blackwood);

- Discussion/demonstration: Model types and measurement parameters used in the flume tank (Roy Gibbons, George Legge, Harold Delouche)
- Discussion/lecture: Newfoundland Fishery in the last 20 years (Glenn Blackwood);
- Discussion/lecture: Trawl doors - theory, design and operation (Roy Gibbons, George Legge, Harold Delouche)
- Discussion/demonstration: Trawl door performance (Roy Gibbons, George Legge, Harold Delouche);
- Discussion/lecture: The importance of scientist and harvester partnerships in fisheries research: survival of Wolffish and American plaice captured incidentally in otter trawl fisheries (Scott Grant);
- Discussion/lecture: Conservation and selectivity in modern day fishing gear: reducing sea bed impact (Paul Winger);
- Discussion/demonstration: Model trawls and selectivity devices in the flume tank (Paul Winger);
- Discussion/lecture: Survey gear standardization in Canadian Department of Fisheries and Oceans - quality control and operation (Steve Walsh, Northwest Atlantic Fisheries Center);
- Discussion: Cooperative research in Gulf of Maine open session - ideas from the participants.

The workshops arranged the following site visits:

Center for Marine Simulation (MI),
Center for Aquaculture and Seafood Development (MI)
IMP Group St. John's (gear manufacturer),
North Atlantic Fishing Supplies in St. John's (gear manufacturer), ,
Northstar Technical Inc. (Manufacturer of the NetMind system),
Notus Electronics Ltd. (Manufacturer of TrawlMaster equipment),
F/V R.O Venture (St John's),
F/V Sea Gem (St. Joseph's, St. Mary's Bay)
F/V Joyful Sound (Port de Grave, Conception Bay)
Daley Brothers Shrimp/crab processing plant (St. Joseph's).

WORKSHOP EVALUATION

Evaluation and comment forms were distributed to all participants at the end of workshop. The evaluation form consisted of questions of three types: 1) rating scales for specific aspects of the workshop discussions, demonstrations and field trips, 2) open-ended questions concerning the technical content and logistics of the workshop, and 3) open-ended questions rating the overall effectiveness of the workshop and offering suggestions for improving subsequent programs. A sample Evaluation Form is included as Appendix II. Eleven forms were returned in 2004 and twelve in 2005.

Analysis of the 2004 evaluation:

For the Rated system, the participants were asked to rate aspects of the program on a scale of 1 to 5, with 1 being the least interested/useful and 5 being the most interested/useful. The results of these questions are detailed below.

Tank Demo	Survey Trawl	Fish Behavior	Otter Boards	Nfld Fisheries	Marine Mammals	Field Trips	Selectivity/ Conservation
5	5	5	5	5	4	4	5
5	5	5	4	5	4	4	5
5	5	5	5	4	4	4	5
5	3	5	5	5	3	3	5
5	5	5	4	4	2	3	4
5	4	5	4	4	4	5	4
5	5	5	5	4	4	5	5
5	5	5	3	5	3	4	5
4	4	5	2	5	5	5	5
5	5	5	4	4	3	4	4
5	4	4	2	4	2		4
5	5	5	5	3	3	3	5
Average **4.9**	Average **4.6**	Average **4.9**	Average **4.0**	Average **4.3**	Average **3.4**	Average **4.0**	Average **4.7**

The open-ended questions asked about the overall rating of the workshop provided further insight into the effectiveness of the workshop. 9 out of the 11 evaluations we received used words such as “excellent” and “great” to describe the overall rating of the workshop. 6 of these 9 responded to the improvement question by either leaving it blank or wrote that no improvement was possible. 3 out of these 9 wrote suggestions such as “additional field trips to understand the difference in U.S. fisheries vs.

Canadian" would be beneficial and two people indicated that they would have liked to spend more time interacting with local fishermen in either a social or structured way. Also, a suggestion to include a more structured presentation on collaborative research was made so that the fishermen would better be able to "put into practice what they learn if they wish to develop a concept". One individual out of this group indicated that they wished the workshop had spent less time on the basics of fishing. One participant wrote a "Thank you" letter to the tank, praising the workshop facilitator Capt. Roy Gibbons that his rich experience in fishing industry added "an unprecedented level of realism, understanding and credibility to the entire workshop". He was very impressed with the facility and staff acknowledged the tank as "world class facility".

One of the 11 evaluations rated the overall workshop as having a "good concept" but was technically too simple. They also suggested that the workshop be more geared toward New England gears as they would "like to see our exact gear and make various adjustments to see effects." In addition, more interaction with the local fleet was suggested.

As for recommending the workshop to others, all ten responded to the question indicated that they would recommend the workshop to their colleagues. Nothing negative was said about the staff. Five participants specifically mentioned the staff in a positive light, saying such things as the staff was "Fantastic, would answer any question sent their way" and that "UNH/ MI staff was extremely well prepared - all presentations were interesting, relevant and informative".

As for the questions concerning the technical and logistical elements of the workshop, Five out of the 11 evaluations indicated only positive things concerning this aspect of the workshop. Many wrote specifics about the technical aspects that they enjoyed explaining that, "it was nice to see how things changed (in the net) with adjustments," and that the technical content was "good for both the professional and lay audiences." One individual expressed that the logistical aspect of the workshop "couldn't have been better- everything was made easy and went smoothly." Two out of the 11 indicated that the technical content was too simple indicating that it was "too basic for the audience of experienced fishermen." In addition, one individual who may have rented a vehicle had some concern as some of the participants got some free ride to and from the workshop location. It should be pointed out though that local transportation in St.

John's was the responsibility of the participants. Ride share was voluntary and appreciated.

Analysis of the 2005 evaluation:

For the rated questions, the results of these questions are detailed below.

Tank Demo	Survey Trawl	Fish Behavior	Otter Boards	Nfld Fisheries	Selectivity/ Conservation	Field Trips
5	5	5	5	5	5	
5	4	5	5	4	5	
5	5	5	4	3	4	3
5	4	5	5	5	5	5
5	4	5	3	4	5	5
5	5	5	5	5	5	5
5	5	5	5	5	5	5
4	4	5	4	4	5	4
5	5	5	5	5	5	5
5	5	5	5	5	5	5
5	1	5	3	3	5	4
5	5	5	5	4	5	5
5	5	5	5	5	5	5
Average **4.9**	Average **4.4**	Average **5.0**	Average **4.5**	Average **4.4**	Average **4.9**	Average **4.6**

Participants had the greatest interest in the tank demonstrations of fishing gear and selectivity devices, the lecture/discussion on fish behavior and the lecture and discussion on selectivity and conservation.

The open-ended questions asked about the overall rating of the workshop provided further insight into the effectiveness of the workshop. Out of the 12 evaluations we received, 11 described the categories of overall rating of the workshop, technical content and logistics as "excellent" or "very good". Comments included "the content was excellent to prepare New England fishermen for the difficulty of conservation science blending with fishing techniques and effort" and "the workshop was extremely informative", "the technical content was sufficiently simplified for presentation and very well presented" though one person thought that "a less mathematical approach to door use would have been more appropriate". With regard to logistics one participant found the transport to and from the facility to be smooth, while another suggested that it would have been easier with a minibus or van.

In response to the question regarding what could be improved about the workshop the most common response was that they would like the workshop be more geared toward New England fisheries and fishing gear, particularly the haddock and yellowtail fisheries. One individual was particularly interested in specifically learning how to use haddock separator trawls. Another participant suggested getting information from the fishermen prior to the workshop in order to concentrate on particular fisheries interests and gear types.

As for recommending the workshop to others, all twelve responded to the question indicated that they would recommend the workshop to their colleagues. The staff at the Marine Institute was highly commended with comments such as “very knowledgeable, helpful and interested”, “professional, quality personnel and equipment and friendly interaction” and “very approachable”. The facilities at the Marine Institute were also highly rated by participants “one of the best research facilities in the world” and “the flume tank was excellent” were among comments made.

WORKSHOP IMPACT

The workshops provided twenty-three fishing industry participants opportunities to upgrade their knowledge on trawl design and operation and to acquire techniques on selective gear designs and conservation concept. Interactions between the industry participants and non-industry participants have fostered understanding on fisheries issues from different perspectives. Some industry participants have been discussing with scientists project proposals submitted to the Northeast Consortium in the following fall. At least two cooperative projects have been developed and funded through these workshops. Long term impacts of the workshop may be realized in better relationship among industry, science and management, and empowerment of industry in enhanced participation in fisheries management issue for sustainable resource utilization and conservation.

APPENDICES

I. Workshop Brochure, Application and Evaluation Forms

II. The Flume Tank and the Fisheries and Marine Institute

III. Photo Gallery

APPENDIX I:

Workshop Brochure, Application and Evaluation Forms

Call for Applications

Industry Workshop on Trawl Selectivity and Conservation

at the Newfoundland Flume Tank, in St. John, NF, Canada

THE WORKSHOP

The workshop will be conducted at the Flume Tank operated by the Center for Sustainable Aquatic Resources of the Fisheries and Marine Institute of the Memorial University in St. John's, Newfoundland, Canada (http://www.mi.mun.ca/casr). The workshop will be five days in length compromised of practical demonstrations, discussions of trawls relevant to Gulf of Maine and Georges Bank groundfish and shrimp fisheries. Total duration of the event including travel will be seven days. **Airfare, hotel accommodation and workshop costs for fishing industry participants will be covered by the project**. Participants will be responsible for meals, local travel and personal expenses. One workshop each year will be offered in 2004, 2005 and 2006. The first workshop is scheduled to take place in the second week of May of 2004. Space is limited to a maximum of fifteen industry participants per workshop. The organizer may invite non-industry, governmental or non-governmental, representatives to attend the workshops to increase exchange and understanding.

THE FACILITY

The Center for Sustainable Aquatic Resources of Fisheries and Marine Institute of the Memorial University of Newfoundland offers unique benefits for the workshop. The Center boasts:

- **The largest fisheries flume tank in the world**. The observation section allows fishermen to observe the activity and behavior of a range of fishing gears and provide an opportunity for a more thorough visualization of the action of fishing gear under simulated conditions.
- **Knowledgeable staff**. Resident fishery engineers, technologists, fish behaviorists, and mechanical engineering technologists provide insight, instruction and assistance.

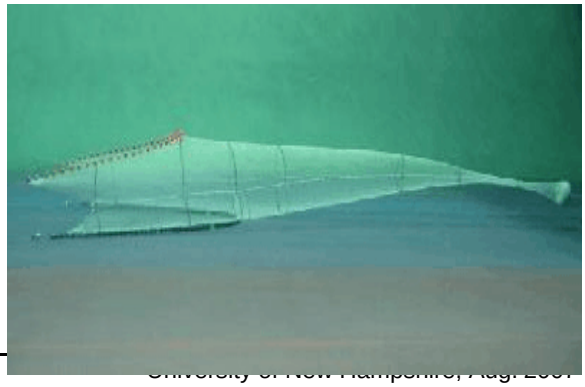
THE GOALS

The five-day workshop is designed to accomplish the following:

- Increase knowledge and awareness of conservation-oriented gear designs.
- Provide a forum where ideas concerning conservation technology and management practices can be demonstrated and discussed.
- Improve working relationships between fishermen, fisheries managers and scientists.
- Stimulate new ideas for cooperative research in the Gulf of Maine and/or Georges Bank.

PROVISIONAL WORKSHOP PROGRAM

- Discussion/lecture: Fisheries of Newfoundland and New England
- Discussion/lecture: Atlantic cod - past and present
- Discussion/demonstration: Dynamics of a trawl



system as seen in the flume tank and its implication in real fishing conditions
- Discussion/demonstration: Trawl gear components and their roles in bycatch reduction and responsible fishing
- Discussion/demonstration: Model trawls and selectivity devices in the flume tank
- Discussion/lecture: Survey trawl - quality control and operation
- Discussion/lecture: Fish behaviour and their application in bycatch reduction
- Discussion/lecture: Marine mammal and fishing gear interactions
- Discussion: Cooperative research in Northeastern US

Other topics or demonstrations suggested by participants will be considered.

WHO SHOULD APPLY

Any active commercial trawl fisherman who:
- Uses bottom trawling as primary mode of fishing
- Has not attended previous workshops at the flume tank
- Fishes in Gulf of Maine and/or Georges Bank
- Has interests in increasing knowledge in trawl operation and conservation
- Want to establish or improve relationships with scientists for cooperative research projects
- Has interests in implementing conservation-oriented fishing gears and operations

THE ORGANIZER AND THE FUNDING PARTNER

The workshop is organized by Dr. Pingguo He of the University of New Hampshire. Dr. He is a research associate professor and an extension specialist for fisheries. The project is funded by the Northeast Consortium, a joint initiative of the University of New Hampshire, the University of Maine, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution.

For further information or an application form please contact:

Dr. Pingguo He
The University of New Hampshire, 137 Morse Hall, Durham, NH 03824
Tel. (603) 862-3154, Fax. (603) 862-7006, E-mail: pingguo.he@unh.edu

Download a copy of Application Form at http://www.seagrant.unh.edu/application.pdf

Application Form

Industry Workshop on Trawl Selectivity and Conservation

May 11 - 15, 2004

Deadline: March 26, 2004

Space is limited to a maximum of fifteen industry participants per workshop. A panel of advisors will make selections (likely with a lottery system) before April 9, 2004, but will consider geographic distribution and balance of inshore and offshore sectors..

Name:_____ Vessel/Company:_____

Vessel size (length) _____ Inshore ___ offshore ____ Groundfish ____ Pelagics ____ Shrimp ____

Address:_____State _____ Zip_____

Telephone: (____) _____ Fax, if any, (____) _____ E-Mail: _____

I would like to be considered for the May 2004 workshop. I understand that the organizer will pay airfare, accommodation and workshop costs, and I will be responsible for local travel, meals and incidentals. I will commit seven days' time (including travel time) for the workshop.

Signature _____ Date: _____

Additional Information

If you are interested but not able to attend the workshop in May 2004 due to your time commitment or limitation of workshop space, what would be the best months for 2005 and 2006 workshops? _____

What's is your main reason for interest in attending the workshop (tick as many as you want):

____ Increase knowledge of trawling in general

____ Increase knowledge of conservation technologies during trawling

____ Better understanding of science

____ Increase interaction with others to foster cooperative research

____ Other reasons : _____

Any other comments or questions:

Please send to: Dr. Pingguo He
The University of New Hampshire
137 Morse Hall, Durham, NH 03824
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EVALUATION AND COMMENTS

WORKSHOP ON CONSERVATION
AND SELECTIVITY IN TRAWL FISHERIES
MAY 11-15, 2004

1. Overall rating and comments on the workshop

   Technical content

   Logistics

2. Which topics interested you? (Please circle)

	Least interested				Most interested
Tank demonstrations	1	2	3	4	5
Survey trawl standardization	1	2	3	4	5
Fish behavior	1	2	3	4	5
Otter boards	1	2	3	4	5
Newfoundland fisheries	1	2	3	4	5
Marine mammals	1	2	3	4	5
Selectivity and conservation	1	2	3	4	5
Field trips	1	2	3	4	5

3. How can we improve the workshop?

4. Would you recommend this workshop to your colleagues?

5. Overall comments (use additional pages if required)

Occupation: (Please check one) Fisherman_____ Other_____

Optional: Name:_____

Vessel/Organization:_____

UNIVERSITY of NEW HAMPSHIRE

Call for Applications
Industry Workshop on Trawl Selectivity and Conservation

THE WORKSHOP

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THE FACILITY

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- **The largest fisheries flume tank in the world**. The observation section allows fishermen to observe the activity and behavior of a range of fishing gears and provide an opportunity for a more thorough visualization of the action of fishing gear under simulated conditions.
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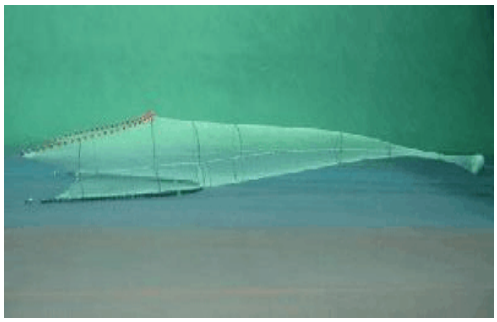

PROVISIONAL WORKSHOP PROGRAM

- Discussion/lecture: Fisheries of Newfoundland and New England
- Discussion/lecture: Atlantic cod - past and present
- Discussion/demonstration: Dynamics of a trawl system as seen in the flume tank and its implication in real fishing conditions
- Discussion/demonstration: Trawl gear components and their roles in bycatch reduction and responsible fishing
- Discussion/demonstration: Model trawls and selectivity devices in the flume tank
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- Discussion/lecture: Marine mammal and fishing gear interactions
- Discussion: Cooperative research in Northeastern US

Other topics or demonstrations suggested by participants will be considered.

WHO SHOULD APPLY

Any active commercial trawl fisherman who:

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Download a copy of Application Form at http://www.seagrant.unh.edu/application.pdf

APPLICATION FORM

Fill in information below and send to the address at the end of this page by **March 7, 2005.**

Name:_____ Vessel/Company:_____

Vessel size (length) _____ Inshore ___ offshore ____ Groundfish ____ Pelagics ____ Shrimp ____

In the last 5 years, I fished:
Gulf of Maine_____ Georges Bank_____ Other_____

Home Port:_____
Home or company addresses:_____
State _____ Zip_____

Telephone: (____) _____ Fax, if any, (____) _____ E-Mail: _____

I would like to be considered for the May 2004 workshop. I understand that the organizer will pay airfare, accommodation and workshop costs, and I will be responsible for local travel, meals and incidentals. I will commit seven days' time (including travel time) for the workshop.

Signature _____ Date: _____

Additional Information

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____ Increase knowledge of trawling in general

____ Increase knowledge of conservation technologies during trawling

____ Better understanding of science

____ Increase interaction with others to foster cooperative research

____ Other reasons : _____

Any other comments or questions:

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EVALUATION AND COMMENTS

WORKSHOP ON CONSERVATION AND
SELECTIVITY IN TRAWL FISHERIES
MAY 10-14, 2005

1. Overall rating and comments on the workshop

   Technical content

   Logistics

2. Which topics interested you? (Please circle)

	Least interested				Most interested
Tank demonstrations	1	2	3	4	5
Survey trawl standardization	1	2	3	4	5
Fish behavior	1	2	3	4	5
Otter boards	1	2	3	4	5
Newfoundland fisheries	1	2	3	4	5
Selectivity and conservation	1	2	3	4	5
Field trips	1	2	3	4	5

3. How can we improve the workshop?

4. Would you recommend this workshop to your colleagues?

5. Overall comments (use additional pages if required)

Occupation: (Please check one) Fisherman_____ Other_____

Optional: Name:_____

Vessel/Organization:_____

APPENDIX II:

The Flume Tank at Memorial University of Newfoundland

THE FLUME TANK

Center for Sustainable Aquatic Resources
Fisheries and Marine Institute
Memorial University of Newfoundland
P. O. Box 4920, 155 Ridge Road
St, John's, Newfoundland, Canada A1C 5R3
Tel. (709) 778-0521, Fax. (709) 778-0661
E-mail: claudene.hartery@mi.mun.ca
Http://www.mi.mun.ca

Located in St. John's, Newfoundland, Canada, the oldest city in North American, the Newfoundland Flume Tank embraces five centuries of fishing traditions and modern technology. The flume tank opened in February of 1988 and is still the largest fisheries flume tank in the world. The tank boasts a test section of 21.5 m long, 8 m wide and 4 m deep, contains 1.7 million liters of water. The water in the tank is circulated at velocity of 0 - 1.25 meters per second. This represents a speed of 8 knots at 1:10 scale and 2.5 knots at full scale. The tank bottom is equipped with a rotating belt which can move at same speed as water, at a selected speed, or remain stationary to simulate seabed for bottom trawls, and to eliminate eddies caused by fluid friction against a stationary surface. A 32-channel high-speed data-acquisition system collects tensions from various points in the gear using a number of underwater load cells ranging in sizes from 2 kg to 45 kg. An underwater video camera can be positioned at any depth in the tank, and provides a view of towed fishing systems from the perspective of the fish. Three other video cameras positioned along the length of the tank are used to measure linear distances and geometry of the gear. The viewing gallery can accommodate 150 people for research tests, demonstrations and training workshops.

The tank is operated by the Center for Sustainable Aquatic Resources (CSAR) of the Fisheries and Marine Institute of Memorial University of Newfoundland. CSAR comprises a team of specialists including fisheries engineers, fishing technologists, fish behaviorists, model construction specialists, and mechanical engineering technologists. The tank has been used to:

- test fishing gears, including trawls, traps, gillnets, aquaculture cages
- provide technical services for fishermen, fishing gear manufacturers/suppliers, other fishing industry groups, and public and private organizations;
- conduct training workshops for the fishing industry and the general public on the operations and behavior of mobile and fixed fishing gears, and responsible fisheries.

Some of the recent training workshops include:

- Advanced Trawl Workshop for Alaskan Skippers
- Trawl Selectivity and Conservation Workshop for New Hampshire Fishermen
- Workshop on Trawl Selectivity and Conservation for Gulf of Maine Fishermen
- Mobile Gear Selective Workshop
- Trawl Gear Workshop for Survey Technicians
- Shrimp Vessel Workers Course
- Salmon Trap Workshop for BC fishermen
- Surveillance Officers Workshop
- Technology Workshops on the use of Scanmar Trawl Equipment
- Wire Rope Splicing Workshops for Scallop Fishers
- Responsible fishing workshop

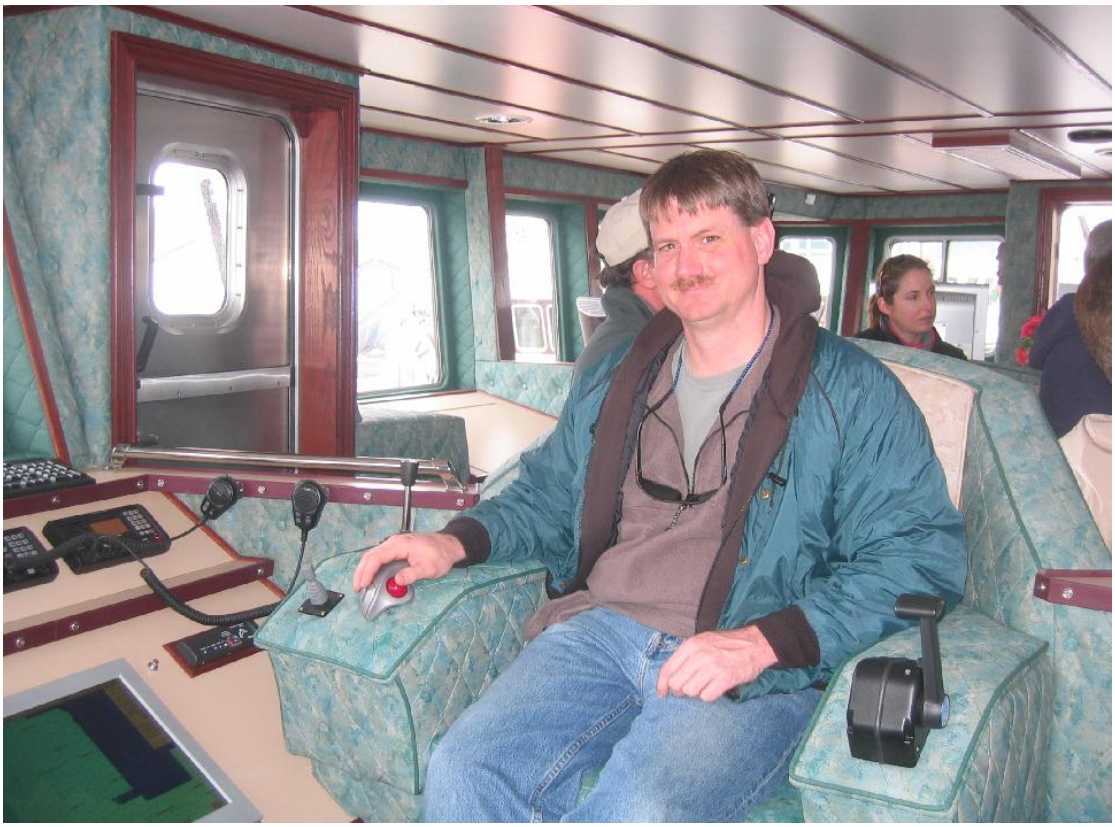
APPENDIX III

Photo Gallery

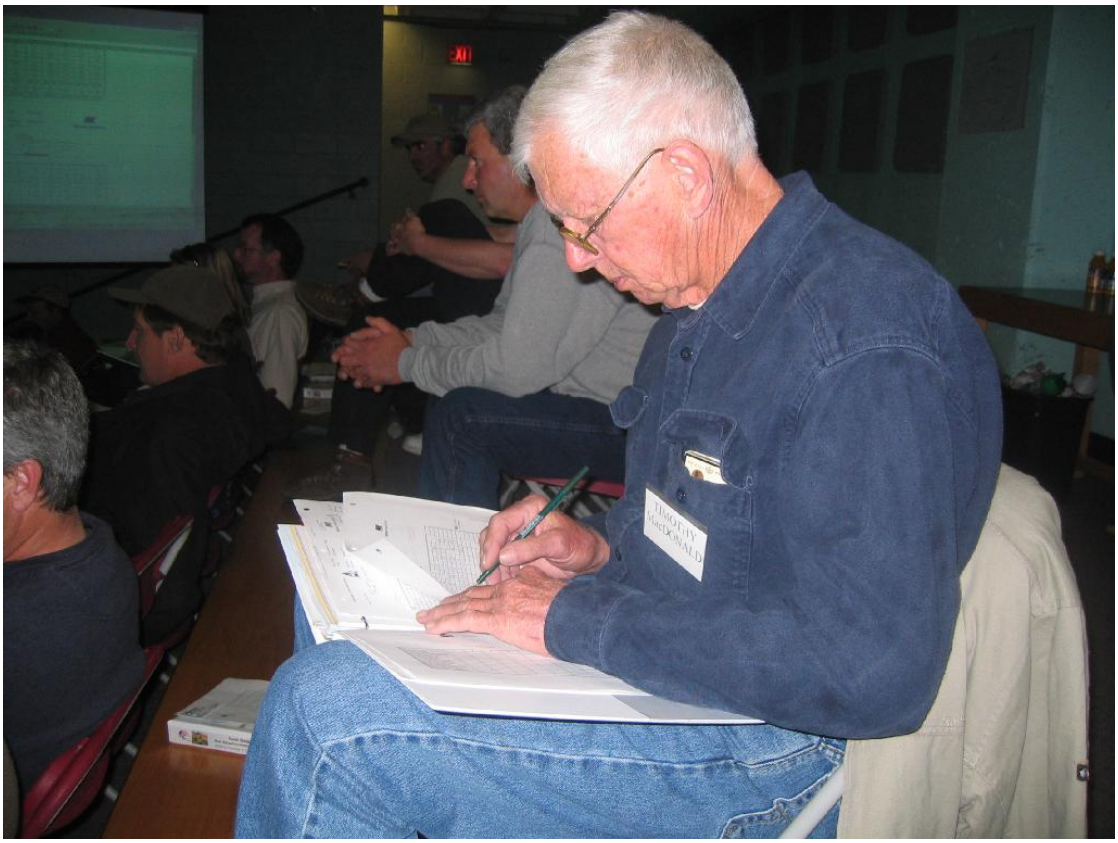
PUMA

JIM
RUHLE

Joyful Sound
Joyful Sound



WILLIAM
TRAIN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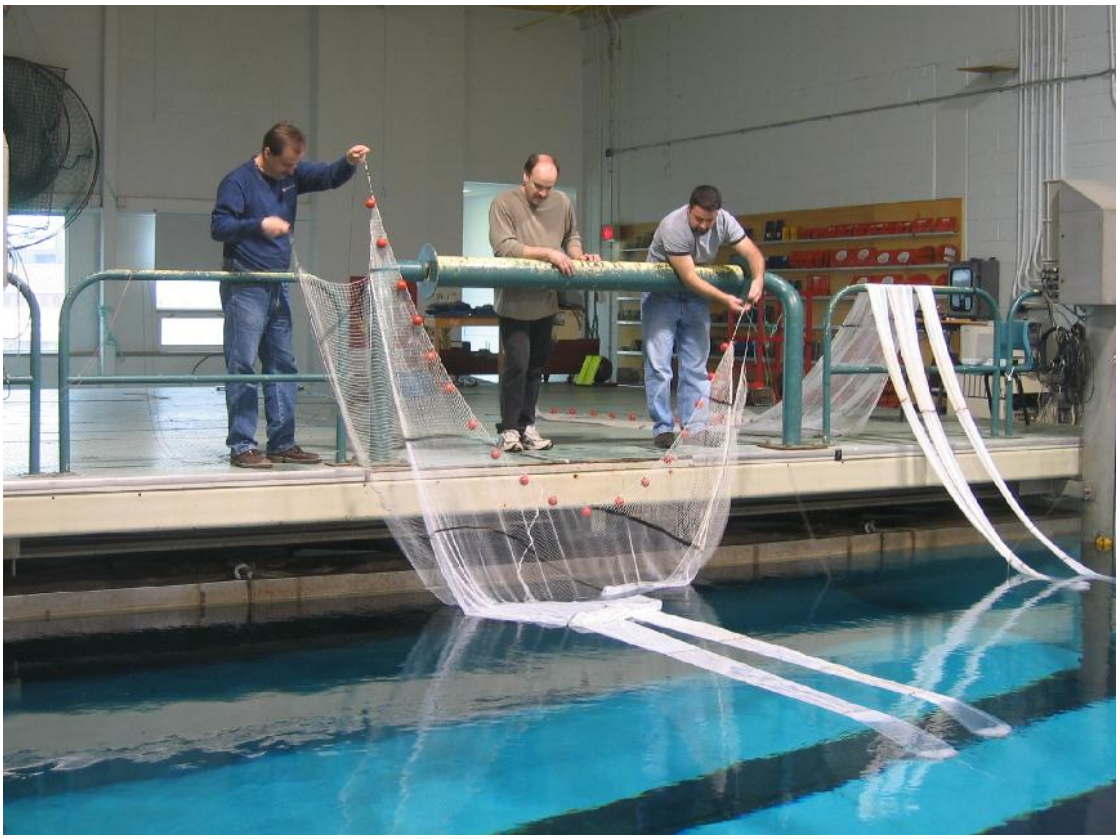

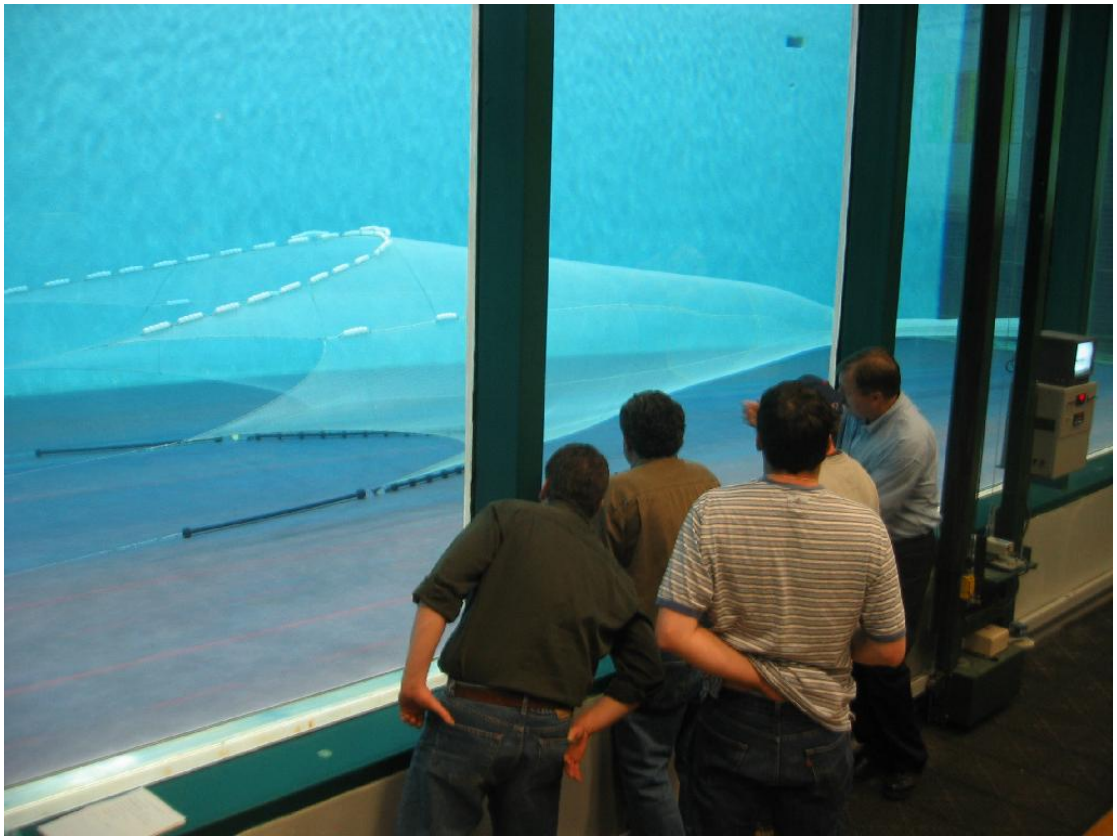

What's Happening Fisheries Ltd.
R.O. Venture

EANEX