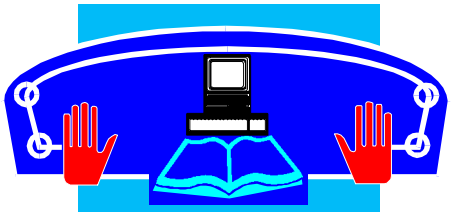

Atlantic Fisheries - 1993 Northern Shrimp Selectivity Workshop Fisheries, Offshore Atlantic

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1993
NORTHERN SHRIMP
SELECTIVITY WORKSHOP

SUMMARY REPORT

St. John's, Newfoundland
July 6 and 7, 1993

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August 1993

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NORTHERN SHRIMP SELECTIVITY WORKSHOP

SUMMARY REPORT

■ INTRODUCTION

The Northern Shrimp Selectivity Workshop organized by the Fishing Industry Services Branch of the Department of Fisheries and Oceans, in partnership with the Northern Shrimp Industry Association, was held in St. John's, Newfoundland on July 6-7, 1993 The purpose of [his workshop was to conduct a technical information exchange and industry consultation on Northern Shrimp research being carried out in Canada and abroad

An integral component of the technical exchange was the presentation of the results of three major Northern Shrimp selectivity experiments recently conducted h\' the department and industry in Atlantic Canada and to provide an opportunist> to examine similar work being carried out international lly

The workshop was co-chaired by David Balfour, Director 01' DFO's Fishing Industry Services Branch and Greg Fisk, Managing Director, Northern Shrimp Industry Association. Among the sixty delegates were industry representatives and trawler captains, as well as officials from both federal and provincial governments.

"1" echnical specialists from Canada, Norway, Russia, and the United States presented results of gear selectivity experiments and discussed options for future improvements in selective technologies in the Northern Shrimp fishery

Gear selectivity as it relates to shrimp, refers to the design and modification of fishing gear to allow

industrial (small) shrimp and/or non-target species to escape during harvesting operations, thus reducing pressure on the resource.

During the two-day workshop, delegates were given a complete overview of the subject, including the following:

- **Atlantic Canada project results**
- **The U.S. experience**
- **The Norwegian experience**
- **The Russian experience**
- **Scientific perspective**

This report provides a brief summary of the various presentations and participants' views on future strategies which might be pursued by government and industry to enhance the prospects for a sustainable northern shrimp fishery.

Fishing Gear Selectivity

A Definition

Fishing gear selectivity, as it relates to shrimp, has been defined as:

The ability to target and capture shrimp of preferred size during harvesting operations, allowing the by-catch of non-target species and small shrimp to escape unharmed.

Selectivity means catching exactly what we want, releasing unharmed what we don't want, thus reducing reducing overall pressure on the resource.

■ KEYNOTE ADDRESS

The Northern Shrimp fishery is relatively new by Canadian standards. It developed as a result of exploratory work done by DFO in the mid 1970's. Now, the fishery is worth over $100 million a year, employs over 600 people, and boasts a modem fleet of factory trawlers. This growth and expansion is reflective of the development strategy employed in the fishery. With it, we have tried to achieve three objectives:

- optimum exploitation of the Northern Shrimp resource;
- development of a modem offshore fleet;
- the highest possible level of Canadian participation, including an increase in Canadian benefits from the fishery; and special attention to the needs of native groups, i.e., to have them participate as full partners in the fishery.

Management and policy principles used to achieve these objectives can be summed up as follows. The first was to clearly define fishing areas, while continuing to explore new grounds. This was done by conservatively increasing the overall Total Allowable Catch (TAC) each year to encourage fishing and exploration. Second was the implementation of a "Canadianization policy" to encourage movement in ownership and control from foreign flag to Canadian flagged vessels. Third was the issuance of a limited number of licenses, and fourth, the implementation of the Individual Quota (Enterprise Allocation) Program in 1987.

Overall, considerable progress has been made in expanding and developing the Northern Shrimp fishery. However, there is room for caution. The maximum level at which the resource can be fished may be reached at any time, and it may vary from year to year. Therefore, we must remain cautious concerning any increase in fishing effort. Related to this concern is the growing domestic and international awareness of the environmental impact of fishing technology and practices, including the dumping and discarding of small shrimp (high-grading) and of non-target species (by-catch).

All of this implies that for the future development of the Northern Shrimp fishery, more sustainable fishing technology and practices, accompanied by improved enforcement measures. will be needed.

This is where our fishing gear selectivity work fits in. Last year, DFO funded 33 projects across Canada for approximately $3.5 million. This work provides the basis for regulations which will improve selectivity in our various fisheries, including Northern Shrimp.

For this to work, three preconditions must be met. First, there must be recognition and acceptance that there is a by-catch problem, and that improvements need to be made. Secondly, we need proper knowledge and understanding of the problem and its possible solutions. Final ly, everything must be done in partnership with industry. This is necessary because there is a certain urgency right now that we find real and practical ways to improve fishing gear selectivity.

Earlier in the year, our former Minister, the Honorable John C. Crosbie. said, "We must put in place measures that will stop the current waste of small shrimp." Therefore, as part of the 1993 Management Plan, measures were adopted to improve the conservation and enforcement effort. It should be remembered that this is being done in the best interests of the industry.

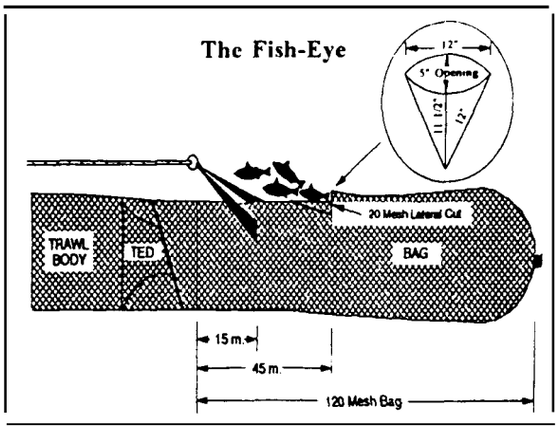
***Karl** Laubstein*
***Director General, Fisheries** Operations*
Fisheries and Oceans, Ottawa

■ INTERNATIONAL PRESENTATIONS

Excluder Devices in Southern Shrimp Trawls - United States

Although turtles are the primary selectivity concern of the southeastern shrimp fishery of the United States, considerable emphasis recently has been placed on fish by-catch.

In an attempt to develop technology to reduce fish by-catch, it has been found that the "Fish Eye" is one of the most efficient devices available. For reasons yet to be scientifically! established, it seems that the fish eye, an oval shaped hole of more than 12' across placed at the top of the trawl (see diagram), not only reduces by-catch. but increases the number of shrimp caught.



Research continues concerning the optimum placement of [he fish eye in the trawl.

Duncan Amos
University of Georgia
Marine Extension Service, USA

Measures for Achieving Responsible, Selective Fishing - Norway

The measures which Norway has put into effect to achieve a responsible. selective shrimp fishery are generally regarded by fishing authorities there as valuable. Their purpose is to provide better ecological and macroeconomic exploitation of the Northern Shrimp Fishery. Measures taken to date include:

- mandatory use of the Nordmore Grid inshore (1989), and in the offshore shrimp fishery (1992); and
- closing fishing grounds whenever the need to do so is established by the Fishing Grounds Monitoring Service.

Future measures will include limiting catches of shrimp under the minimum carapace length (15mm), and the development of gear which will assist the industry in this initiative.

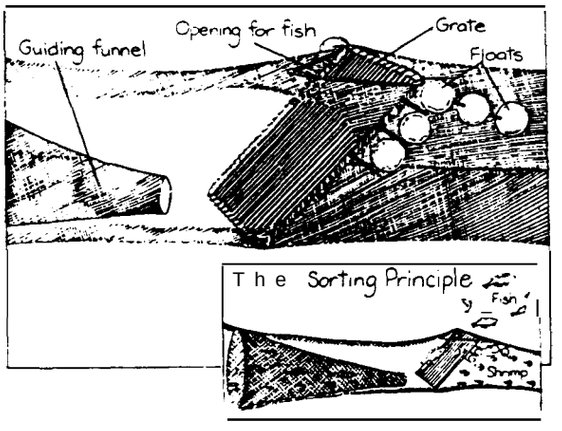
Shrimp trawl mesh size regulations in Norway have proven ineffective in limiting catches of shrimp below the minimum carapace length.

Bjarne Schultz,
Special Executive Oj'leer
Division Experimental Fishing
Directorate of Fisheries, Norway

Shrimp Trawling Using Grid Devices – Norway

Comparisons of fish escapement and shrimp loss between the Nordmore Grate and the V-Grid have been made on board a coastal shrimp trawler in Norway. Results using both devices were similar,

The Nordmore Grate



With further modification, however, devices like the V-Grid with multiple functions, the sloped grid for size selection of shrimp, and the sloping grid with multiple functions are expected to prove effective,

Results are pending on experiments involving "double function" systems (i.e., the use of combinations of grids to increase selectivity), but there is optimism that results will be favorable,

John Winy Valdemarsen
Research Director
Fish Capture Division
Department of Marine Resources, Norway

Matchability and Selectivity of u Shrimp Trawl in Reference to Current and Tow Orientation - Russia

Russian observations have shown that strong tidal currents (up to 1 knot) to depths of 175m and deeper, and water currents, are thought to determine the orientation of shrimp. The term "orientation" as used here refers to the tendency of shrimp to face away from the current (i.e. to orientate tail-on to the current].

Tests have shown that an approximate relationship exists between tidal currents and fishing efficiency. Hauls made with the water current catch more shrimp than hauls made against it.

This suggests that shrimp orientation affects catchability. This may be the case because hauls made with the current approach the shrimp "tail-on".

Environmental and behavioral characteristics, as well as technology, should be taken into account when fishing for shrimp.

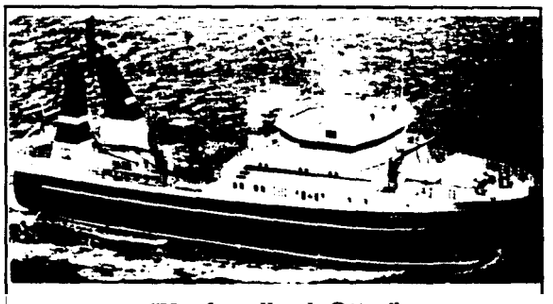
Dmitri Stolyarenko
School of Engineering
University of Moncton
Moncton, New Brunswick

■ CANADIAN PRESENTATIONS

Overview of the 1993 Northern Shrimp Selectivity Program

Developing effective methods of preventing the harvest of industrial shrimp and the by-catch of other (non-target) species has been a problem in the Northern Shrimp fishery from the very beginning. Equally problematic has been our inability to release by-catch without incurring unacceptable losses of market-sized shrimp and associated revenues.

For the Northern Shrimp industry, improved selectivity offers the possibility of increasing the ratio of higher-value large shrimp in the catch. In addition, although overall by-catch levels of non-target species are relatively low in the fishery, further reductions can decrease the labour involved in sorting the catch and improve overall product quality.



"Newfoundland Otter"

Therefore, early in 1993 the Department of Fisheries and Oceans decided the time had come to fully address the by-catch problem. We launched a million dollar program of selectivity projects, in full partnership with the fishing industry, designed to greatly reduce or eliminate by-catch.

Three major selectivity projects were conducted to address the selectivity issue. Square and diamond mesh of various sizes, as well as several different selectivity devices, including lastridge ropes, were tested at sea under commercial conditions.

Trawlers from the Northern Shrimp fleet participated in the program. They were the "Newfoundland Otter", the "Aqviq" and the "Northern Osprey". The three projects respectively were:

- Fish By-catch Selectivity Experiment;
- Industrial Shrimp By-catch Experiment; and
- Codend Mesh Size Selectivity Experiment

Andrew Duthie
*Chief, **Fisheries Technology***
Fishing Industry Services Branch
DFO, Ottawa

Fish By-Catch Selectivity Experiment - "Newfoundland Otter"

This project, carried out in partnership between DFO and Fishery Products International (FPI), spanned the period January to March, 1993, to investigate, under commercial conditions. the effectiveness of:

- the Nordmore Grate, using three different bar spacings (22mm, 25mm, and 28mm), in reducing fish by-catch, and
- a square mesh codend in reducing the catch of small (industrial) shrimp.

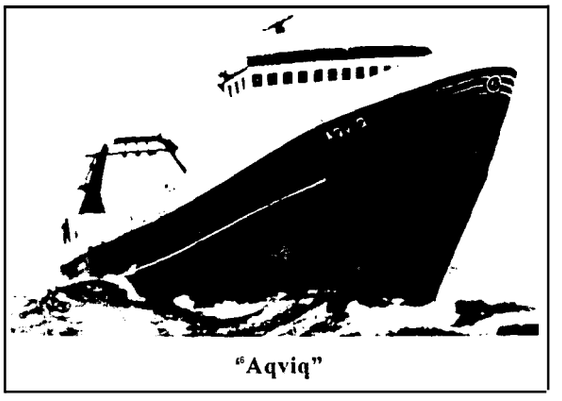
The "Newfoundland Otter", a 60 metre shrimp vessel, owned and operated by FPI, was used in this experiment which took place in NAFO Sub-divisions 2J and 3K.

The results confirm the effectiveness of the Nordmore Grate in reducing the by-catch of cod, turbot, American plaice, redfish and other species. With the largest bar spacing (28mm), loss of shrimp was less than with the 22mm and 25mm Grates.

In addition, the square mesh codend was found to be more selective than its diamond mesh counterpart, releasing more small shrimp from the catch.

Gerald Brothers
Section Head, Conservation Technology
Industry Development Division
DFO, St. John's

Industrial Shrimp By-Catch Experiment – "Aqviq"



"Aqviq"

This project consisted of experiments on various selectivity devices to asses their performance in reducing the by-catch of small shrimp by means other than changes to mesh size and shape

carried out within a commercial setting to test a variety of combinations of lastridge ropes and sorting grates.

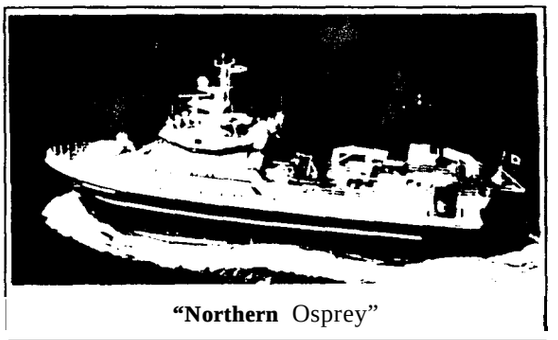
The trials clearly indicate that improved selectivity can be obtained without reliance on, or use of, mesh size increases in the codends and trawls.

Further research, however. is needed with both lastridge ropes and grate systems, the latter using different bar spacings and angles of deploy ment. The effectiveness of grates without guiding funnels should also be assessed.

Marcel Boudreau
Harvesting Sector *Co-ordinator*
Fisheries and Habitat *Management Branch*
DFO, Quebec

Mesh Size Selectivity Experiment – "Northern Osprey"

The purpose of this experiment was to investigate. under commercial conditions. the selectivity characteristics and catch rates of codend mesh sizes of 45, 50, and 55mm.



"Northern Osprey"

The "'Northern Osprey". a 66 metre shrimp vessel owned by the M.V. Osprey Ltd.. was used for the experiment during April and May. 1993 Fishing was conducted in NAFO Sub-divisions 2J and 3K, Sub-areas 6E, 69, 6A and 6C.

The results indicate that there is very little difference in catches of shrimp (amount and sizes) taken by the 45, 50 and 55mm codends Even more interesting is the fact that there was very little difference in result between the three experimental mesh sizes and the control mesh (22 mm).

Combined tows were carried out in a variety of conditions and locations, and the results were similar and consistent in each case.

A separate commercial assessment of production results, using data taken from the catch whenever commercial catch rates were obtained, shows that the impact on production of changing mesh size in the codend is minimal.

David Tait
President, Scantec Ltd.
Dartmouth. Nova Scotia

NOTE: Complete Technical Reports on ail three Canadian Projects are available upon request Scc Points of Contact at the end of this report.

■ SCIENCE PRESENTATIONS

The B-v-catch Problem in the Northern Shrimp Fishery

As a result of recent scientific research, two conclusions can be drawn in respect to by -catch in the Northern Shrimp fishery

The first is that the amount of cod taken is not as high as is generally believed. In fact, there is very little evidence to show [hat the fishery contributes in any significant way to the current decline of the northern cod stock

The second is that [he highest by-catch species in the fishery is small redfish. Yet. there is little known about these fish, including whether they even recruit into the biomass which forms the basis of the commercial redfish harvest.

Therefore, it is unclear at this time whether the by-catch of small redfish is even a problem

David Kulka
Science Branch
DFO, St. -John's

Therefore, it is unclear at this time whether the by-catch of small redfish is even a problem,

David Kulka
Science Branch
DFO, St. John's

New Issues in the Northern Shrimp Fishery

Measures proposed by DFO Science, Newfoundland Region include revisions to the Northern Shrimp fishing areas to rationalize the existing areas on a firm biological basis. It is felt that this measure might change how we conduct the fishery by avoiding areas where high levels of small shrimp and/or by-catch of other species are found.

Don Parsons
Science Branch
DFO, St. John's

■ RECOMMENDATIONS

Recommendations emerging from the workshop concerning the by-catch of small shrimp and non-target species included:

- use of Nordmore Grate whenever conditions warrant;
- further research on other selectivity devices (e.g. grates, lastridge ropes, fish eyes', etc.);
- proposed mesh size/shape changes, and
- the re-zoning of shrimp fishing areas (as suggested by DFO Science).

Selectivity Devices

The Nordmore Grate was deemed to be the best technology currently available to reduce the capture of non-target species, but there was general agreement that the technology could be improved. Possible improvements include bar spacing, size and type.

In any event, it was felt that grates should not be regulated for use under all circumstances, but only in areas were by-catch exceeds acceptable levels (5% was suggested, although this may vary according to circumstance). It was also suggested that vessels be given the option of installing a grate or moving to a new fishing area whenever by-catch becomes a problem.

Finally, it was suggested that alternative selectivity devices, such as the 'Fish Eye', should continue to be assessed on an ongoing basis and introduced only when proven effective (preferably on a voluntary basis).

Mesh Size/Shape

In light of the results of the recent mesh size selectivity experiment, it was felt that the existing regulatory mesh size (43mm) should remain unchanged.

This position was supported by recent experience in Greenland where a mandatory mesh size of 55mm has been introduced with no notable increase in selectivity, but with a higher incidence of damage to the shrimp catch. While square mesh holds some potential, any improvement in selectivity is likely to arise from alternative selectivity devices, rather than from changes to mesh size.

Re-Zoning

There was general consensus on proposed changes to the shrimp fishing areas. It was felt that these would allow the fishing captain added operational flexibility.

Arguments put forward in support of the change suggested that it would:

- lower the take of less valuable juvenile shrimp, with positive effects on both catch value and resource conservation, and
- further minimize the already low by-catches of other commercially valuable species (cod, turbot, American plaice, southern redfish, etc.),

NOTE: Biological Research

Research is needed to determine the proper classification of the tiny Redfish commonly encountered in Arctic fishing, and to determine if they are related to, or recruit into, any commercially exploited redfish stock.

General Observations

There was consensus that the industry should expand its role in selectivity research and development; i.e. the time has come when industry should share the financial burden with government of all future experimentation.

In more general terms, it was agreed that regulations should only be introduced when a specific problem has been identified.

The point was made that the by-catch problem may be more one of perception than reality. In fact, observer data over a number of years demonstrates that by-catch of commercially valuable species in the sector is quite low. By-catches of cod are typically less than 1°A, and the same is true of turbot, commercial size redfish, and American plaice.

While it was agreed that this is an area which requires immediate attention, industry felt that mandatory landing of by-catch presents certain difficulties, and these should be given due consideration.

The by-catch of small shrimp was felt to be more of an industry problem than the proper concern of regulators. The industry has a vested financial interest in optimizing the ratio of large to small shrimp in the catch and thus can be left to manage the situation on its own.

Finally, it was agreed that selectivity initiatives by all fishing nations should be carefully monitored; existing mechanisms for co-operation, including data sharing, should be fully employed; and the industry should be apprised of all developments in this area by DFO's Fishing Industry Services Branch, using the same communications methods that have been proven so effective at the Workshop.

The above recommendations were reported to the Northern Shrimp Advisory Committee by Workshop Chairmen, David Balfour and Greg Fisk at a meeting held on Thursday, July 8, 1993.

APPENDIX "A"

- AGENDA –

DAY 1- July 6, 1993

8:30-9:00	Registration	
9:00-9:15	Opening Remarks	D. Balfour, Department of Fisheries and Oceans, Ottawa; and, G. Fisk, Northern Shrimp Industry Association Co-C' hairmen
9:15-9:30	Keynote Address	Karl Laubstein.DFO. Ottawa
9:30-12:00	International presentations	
12:00-12:30	Panel Session - Question and answer period	
12:30-13:30	Lunch	
13:30-14:30	Science presentations and discussion	D. Parsons and D. Kulka, DFO, St. John's
14:30-14:40	*1993* Canadian Northern Shrimp Selectivity! Program - Overview	A. Duthie.DFO. Ottawa
14:40-15:40	Fish B}- Catch Selectivity Experiment - Project results and discussion	G. Brothers,DFO. St. John's and M.V. "NEWFOUNDLAND OTTER" representative
15:40-16:00	Coffee break	
16:00-17:00	Industrial Shrimp By-Catch Selectivity Experiment - Project results and discussion	M. Boudreau,DFO, Quebec and M.V. "AQVIQ" representative
17:00-18:00	Mesh Size Selectivity Experiment - Project results and discussion	D. Tait, Scantec, Dartmouth, and M.V. "NORTHERN OSPREY" representative
18:00-18:30	Break	
18:30-19:30	Reception	

19:30	Dinner hosted by the Northern Shrimp Industry Association	

DAY 2- July *7, 1993*

09:00 - 09:10	Chairmen's instructions	D. Balfour/G. Fisk
09:10 -11:45	Working Group Sessions '	
12:00 - 13:00	Plenary Session - Recommendations	
13:00 - 13: 15	Closing Remarks	D. Balfour/G.Fisk

APPENDIX "B"

– POINTS OF CONTACT -

FISH BY-CATCH SELECTIVITY EXPERIMENT

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IINDUSTRIAL SHRIMP BY-CATCH EXPERIMENT

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Department of Fisheries and Oceans
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G1K 7Y7

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MESH SIZE SELECTIVITY EXPERIMENT

Andrew Duthie
Chief, Fisheries Technology Division
Fishing Industry Services Branch
Department of Fisheries and Oceans
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Ottawa, Ontario
K1A OE6

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APPENDIX "C"

- LIST OF ATTENDEES -

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