Preliminary Report on the July 2003 Mobile Sentinel Survey In the Northern Gulf of St. Lawrence (3Pn, 4RS)

September 2003

Sentinel Fisheries Project

Biologists from Fisheries and Oceans Canada conduct annual assessment of the status of fish and invertebrate stocks. To perform this assessment, scientists use data provided by mobile gear sentinel fishers. Once analysed, the collected data will be used to derive an abundance index that will be used to estimate the status of various stocks. Sentinel fisheries must cover the entire northern Gulf of St. Lawrence.

The sentinel survey requires a great deal of precision and involves collecting a variety of data. Sentinel fishers must sort fish by species, weight and measure some individual species of fish. Otoliths are collected from cod for analysis by DFO Science. Moreover, the harvest of frozen fish samples is carried out (herring, capelin and sampling for species at risk and biodiversity). Fishers are also required to collect water temperature data. These data will yield valuable information on the size, growth, condition and diet of various species, as well as stock abundance and water temperature.

Catches not used for scientific purposes are sold to processing plants and the profits from such sales are used, in part, to finance the Sentinel Survey Program. Fisheries and Oceans has primary responsibility for the administration of the program. The implementation of the program is the responsibility of the Capitaines-Propriétaires de la Gaspésie inc. (ACPG), for mobile gear fisheries in 4S, 4T and the Fish, Food and Allied Workers (FFAW) of Newfoundland in 3Pn, 4R.

The Sentinel Fishery follows a depth-stratified random sampling plan. The Northern Gulf is divided into depth zones because depth is known to have an influence the distribution of cod. The following strata have been defined: 20-50 fathoms, 50-100 fathoms, 100-150 fathoms, 150-200 fathoms and over 200 fathoms. Fishers have 3 or more random sampling stations to sample within these strata. Trawlers perform a 30-minute standard tow at a speed of 2,5 knots for each of their assigned sampling stations. This type of tow is used to evaluate abundance.

Two mobile surveys of approximately two weeks each were carried out annually. These operations were conducted in July and October. In all, nine fishing vessels conducted 300 tows per survey in 3Pn, 4RS and 4T.

Each year, in August, Fisheries and Oceans Canada carries out a similar survey in the northern Gulf of St. Lawrence, aboard the CCGS Alfred Needler research vessel.

Rationalisation of the sentinel program

The department of Fisheries and Oceans Canada set up in 2001 and 2002, a review of all the Groundfish Sentinel Fisheries Program (GFSFP). This revision was centred on the various aspects of the GFSFP. The objectives, the administrative questions, the quality and the quantity of data and analysis, the contribution of the program to the assessments, the advantages and the profitability of Sentinel Fisheries are some of the aspects analysed at the time of the revision. Several stages led to the revision of the GFSFP of which examination and analyse of the programs, workshop, recommendations, analysis of options and the final decision of all this processes.

In November 2001 in Moncton, associations of fishermen, sentinel fishermen and DFO staff took part in a workshop to examine all the Atlantic Sentinel programs. This workshop gave a good insight of the various sentinel programs. Thereafter, the MPO judged that it was possible to achieve the initial objectives of the program, which is to provide abundance index of the stocks for the evaluations, but with a restricted GFSFP.

For the Quebec region sentinel program, this rationalisation involve a reduction of 34% of the total budget. For the 3Pn, 4RS zones, this rationalisation resulted in dropping the fall survey. The main arguments were: better statistical prediction with ADAPT, better climatic conditions, less expensive and the cod captures are more important than in October.

The saving made within the rationalisation of the sentinel program of Quebec region will be useful for creation of new funds, called the Program of joint research in halieutics science (PJRHS). An announcement was done in June 2003 by the Fisheries and Oceans Minister Robert G Thibault. This new program aims at supporting collaboration between DFO scientists and Atlantic fishermen in halieutic research. In addition to money available for the PJRHS, an additional funding was put forward in 2003 to proceed to new research initiatives concerning cod of 3Pn, 4RS. One of these new initiative, consists in the addition of new strata for the July sentinel mobile survey 3Pn 4RS. Another initiative, consists in carrying out paired mobile gear tows to longline sets.

July 2003 Survey

The 9th annual July sentinel survey was conducted in the northern Gulf of St. Lawrence between July 1 and July 28, 2003. A total of 305 sentinel fishing stations were surveyed (Figure 1). Of those 305 standard tows, 302 were successfully carried out, i.e., 22 in 3Pn, 127 in 4R, 113 in 4S, 30 in 4T and 10 in the three new coastal strata of 4R. The 302 stations represent 97.4% of the sampling target.

- From July 7 to July 28, four Quebec trawlers covering 4ST completed 143 out of a planned 150 stations (Figure 1). On the west coast of Newfoundland (3Pn, 4R), from July 1 to July 4, five trawlers carried out 159 stations out of a planned 160 stations (Figure 1).
- The 30 tows in 4T are conducted to complement the assessment of the redfish of Unit 1 and Greenland halibut (turbot) stocks for the management unit 4RST. **The cod captured in 4T is not used to estimate abundance of cod in 3Pn, 4RS**.
- The cod captured in the 10 tows carried out in the three new coastal strata in 4R (10 - 20 fathoms), are not used in the calculation of the index of minimum trawlable biomass for cod. The area of the three new strata will be determined soon.
- The sentinel survey of 3Pn, 4RS and 4T was completed in 28 days, this represents one of the longest duration for the July survey. This is due to the fact that two Quebec trawlers were delayed their departure by 2 weeks . Since 1995, the July surveys were completed on average in 21 days.

- The total catches of stratified random survey for cod, redfish and Greenland halibut (turbot) for the July surveys are presented in Table 1. For 2003, the cod catches included 1,638.2 kg of cod captured in the three new coastal stratum in 4R.

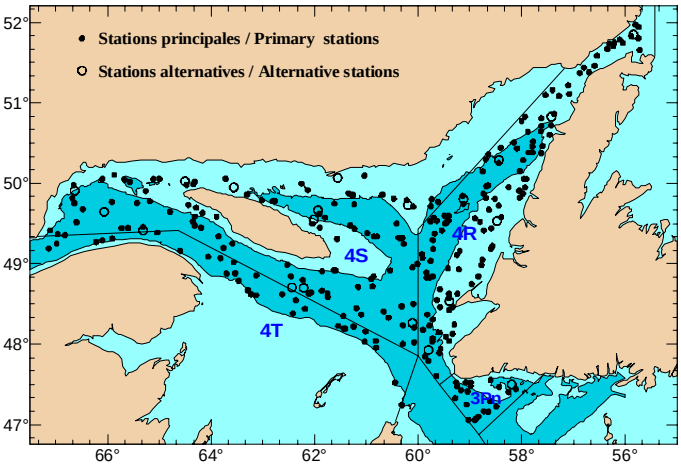

Figure 1: Map showing the distribution of stratified random tows done during the July 2003 survey.

Table 1: Total catches of stratified random tows for The July 1995-2003 survey for 3Pn, 4RST.

Year	Nomber of tows	Catch (kg) Cod	Redfish	Greenland halibut
1995	326	6,597.7	11,766.9	675.2
1996	280	7,254.2	16,941.5	1,304.0
1997	293	8,762.4	12,345.7	1,193.7
1998	293	8,158.7	16,060.2	1,498.0
1999	296	5,290.2	12,596.1	1,705.7
2000	296	7,872.7	7,573.2	1,582.6
2001	283	10,251.9	7,569.4	1,400.3
2002	264	7,731.1	8,220.7	1,486.9
2003	305	13,723.0	6,425.7	1,719.2

1. Biomass and Distribution of Groundfish.

Cod

Compared to 2002, the preliminary data show a slight increase of 16% in the index of the minimal trawlable biomass estimates for 3Pn, 4RS reaching a total of 67,998 tons (Figure 2). This value is comparable with that of 1998.

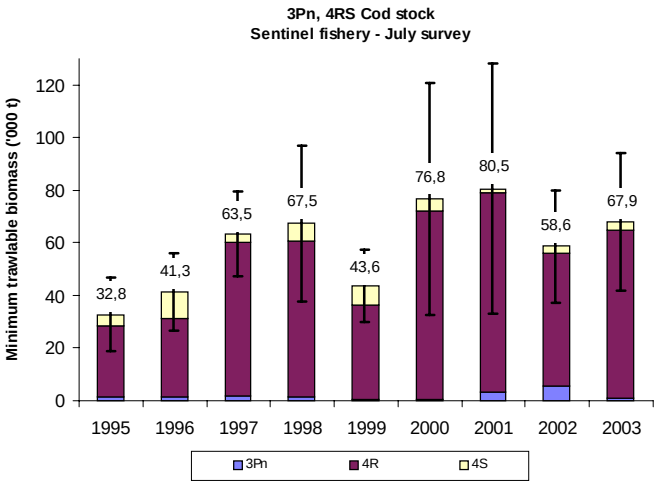

Figure 2: Index of the minimum trawlable biomass estimates for cod from July stratified random tows in 3Pn, 4RS (1995-2003).

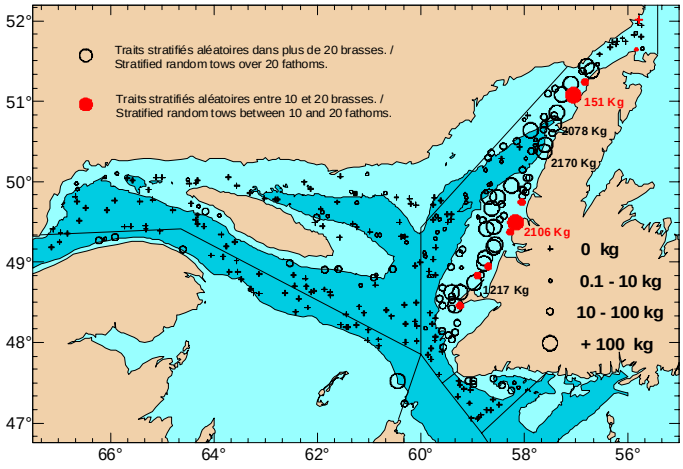

Figure 3: Map showing the observed catch distribution of cod from stratified random survey in 3Pn, 4RST for July 2003.

In 4R, the minimal trawlable biomass estimates increased from 50,749 tons for July 2002 survey to 63,835 tons in 2003. 4S recorded also a slight increase in the minimal trawlable biomass estimate compared to 2002 to increased from 2,604 to 3,229 tons. A decrease is observed in the southern part of the western shore of Newfoundland (3Pn division). For this division, the actual value in 2003 is one of lowest of the series comparable to 1999. As in the past, the cod concentrations remain very low in divisions 4S at more than 150 fathoms (Figure 3). Moreover, the quantities of cod as determined by the mobile sentinel surveys are much lower in 4S and 3Pn compared to 4R. The catch distribution of cod is located primarily in Division 4R along the west coast of Newfoundland (Figure 3).

Redfish

The preliminary data show a decline of the minimal trawlable biomass estimate of the redfish in 4RST with 38,352 tons for the July 2003 survey (Figure 4). In 4S, the redfish was at its lowest level since 1995. for 4R and 4T, the redfish also recorded a decrease in the minimal trawlable biomass estimate compared to last year

One can thus observe a 13% annual increase in the minimal trawlable biomass estimate for the period of 1995 to 1999 and a decrease of 24% for the period of 1999 to 2002. As in earlier years, the redfish was concentrated for the most part in the channels of the Northern region of the Gulf (Figure 5). In July, good concentrations of redfish were found in the 3Pn, in spite of the fact that this area is not a part of the stock of management Unit 1 (4RST).

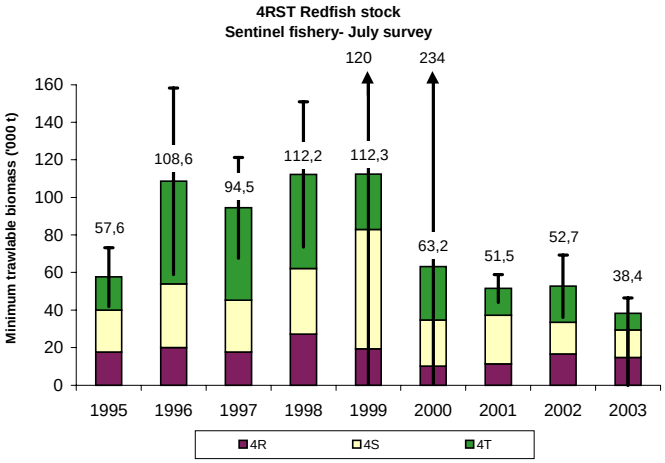

Figure 4: Index of the minimum trawlable biomass estimates for redfish from July stratified random tows in 3Pn, 4RS (1995-2003).

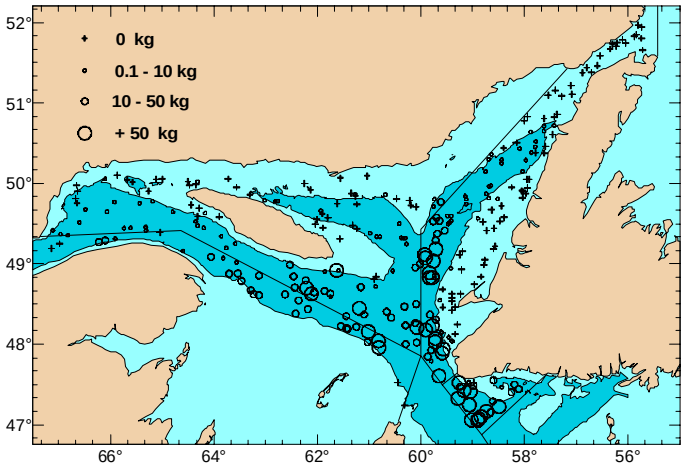

Figure 5: Map showing the observed catch distribution of redfish from stratified random survey in area 3Pn, 4RST during the July 2003 survey.

Greenland Halibut (turbot)

The preliminary data show a increase of the estimate of minimal trawlable biomass index of the Greenland halibut in area 4RST who reaches one of the highest levels since 1995 with a total of 21,980 tons (Figure 6). One can observe an annual increase in the minimal trawlable biomass estimate of 11% for the period of 1995 to 2003. In 4T, the Greenland halibut reaches one of highest levels since 1995.

The turbot was concentrated mostly in the Estuary and in the Laurentian Channel, around Anticosti Island and in the Northern portion of the Esquiman Channel (Figure 7). The distribution of Greenland halibut is overall similar to those of earlier years. The mobile sentinel survey does not sample the Estuary where turbot is found in abundance in the August DFO's annual scientific survey.

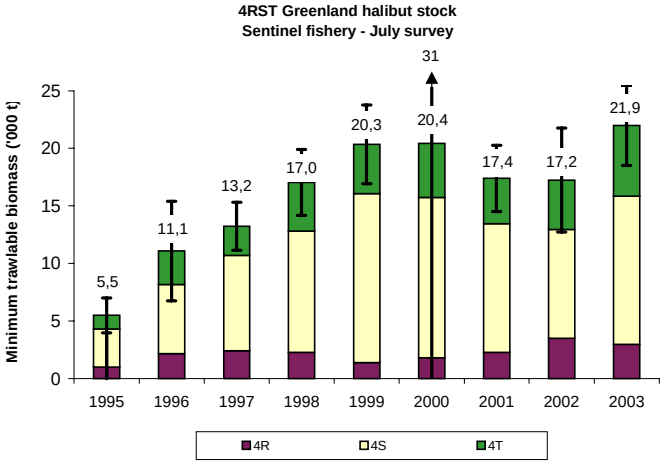

Figure 6: Index of the minimum trawlable biomass estimate for Greenland halibut from July stratified random tows in 4RST (1995-2003).

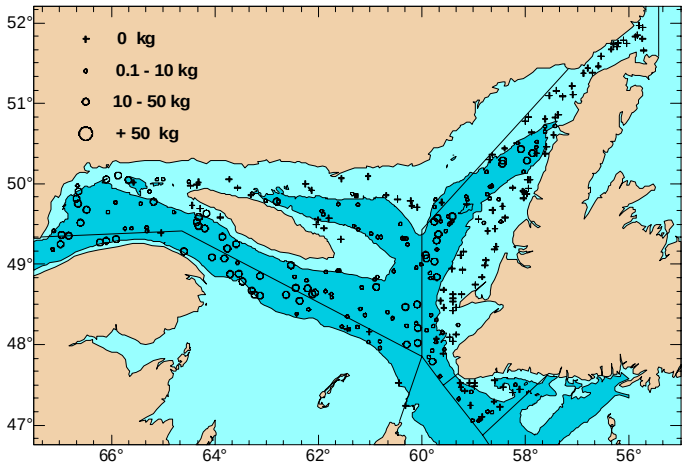

Figure 7: Map showing the observed catch distribution of Greenland halibut from stratified random survey in area 3Pn, 4RST during the July 2003 survey.

2. ***Sampling and Analysis***

The standard sampling procedures (length, sex and weight) were used for cod, redfish, Greenland halibut, witch flounder and Atlantic halibut. The data were recorded on separate forms for each tow.

Otoliths

Otoliths were taken from cod in area 3Pn, 4RS. The age of individual cod specimens will be determined from the otoliths before the next assessment in spring of 2004.

Biodiversity and species at risk

The main objective of this sampling is to obtain abundance data and biological measurements for the species which could be evaluated by the committee on the status of endangered wildlife in Canada (COSEWIC http://www.cosewic.gc.ca). When species from the priority list (92 species for the biodiversity and species at risk program) were captured, the length, the sex and the total weight were collected. When identification was doubtful, the individuals were frozen and brought back to the Maurice-Lamontagne Institute to be identified.

Witch Flounder

Witch flounder are typically found in deeper waters of the North Atlantic. The assessment of the resource relies on analyses based on length. The length frequencies per sex as well as the weight per length were collected for the assessment of the witch flounder. Douglas Swain of the Gulf Fisheries Center in Moncton (MPO) is the scientist responsible for the stock assessment on the witch flounder in the Gulf.

Herring and Capelin

The July 2003 sentinel survey allowed the harvest of whole specimens of herring and capelin. These frozen samples were brought back to the Maurice-Lamontagne Institute for analyses which will be completed soon by the team of François Gregoire, scientist responsible at Mont-Joli for the stock assessment on these species in the Gulf.

Addition of new fishings strata for the July mobile survey.

Two existing strata were added to the July mobile survey. These strata were visited by a boat of the Capitaines Propriétaires de la Gaspésie (ACPG). The purpose was to sample two strata of depth from 50 to 100 fathoms along the lower North-Shore of Quebec, in 4S, northeast of the Beaugé Bank (figure 8). This large area is normally not sampled by a scientific trawler survey because of the nature of the bottom. A total of 18 stations were to be sampled. A trawler went to the area and visited some 41 predetermined fishing sites (primary stations and alternatives) in two days (figure 8), none of these stations had adequate bottom for trawling. The risk of lossing the trawl was too great according to the captain and observer.

On the West coast of Newfoundland, it was decided to look at the presence of cod outside of the zone normally sampled by trawlers for the July mobile gear sentinel survey. Three new strata were created between 10 and 20 fathoms in 4R; one in the strait of Belle Isle, one in the north of the 49th parallel and another in the south of the 49th parallel. A total of 10 tows were done by four trawlers during the July survey (figure 8). The cod catches varied between 0 and 2,107 kg for 30-minute standard tow. Half of the tows (5) reached the 30-minute duration. The other 5 tows were shorter than 30 minute on duration either because of bad bottom (trawl hooked at the bottom) or because of the presence of fixed gears. One tow with a significant capture of 2,107 kg cod, was carried out close to zones between 20 and 50 fathoms, traditionally sampled by the July mobile gear sentinel survey and where the cod is abundant.

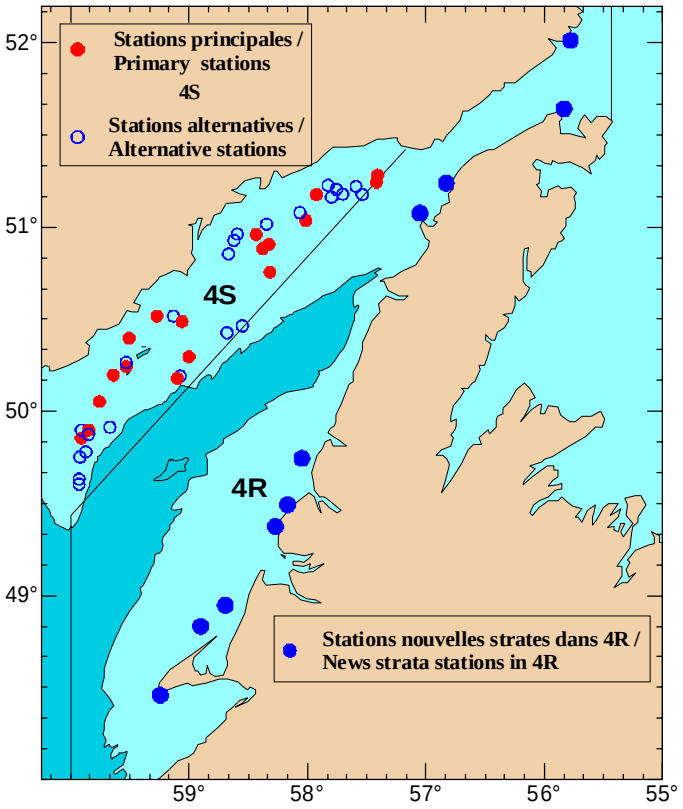

Figure 8: Map of the new stations for the 4RS survey in 2003.

Calculation of the area of these three new stratum, will be carried out soon and it will be possible to calculate a minimum trawlable biomass for these coastal strata. This biomass is not expected to be significant because of the restricted surface of these three new strata. This biomass will not be included in the Index of the minimum trawlable biomass because it was performed only once.

Paired mobile gear tows to longline sets.

Another new research initiative on cod consists in carrying out paired activities between trawls and longline. A survey including 21 randomly selected stations was conducted at the end of July beginning of August. Comparative sets were carried out in 4R between a trawler and longlines. The objective of this study is to establish a factor to convert longline catch rates into otter trawl equivalents while taking into account the differences in selectivity of this two gears.

Acknowledgements

We wish to acknowledge the work of the many fishers, observers and coordinators. Without their contributions, the objectives of the 9th annual July sentinel survey could not have been achieved.

Table 2: The following fishers and observers contributed to the July 2003 sentinel survey:

4R, 3Pn			4S		
Skipper	Crew	Observer	Skipper	Crew	Observer
Winsor Hedderson (*Northern Tip*)	Howard Pittman Dereck Pittman Chad Hedderson Dwayne Decker	Levi Harvey	Jean-Pierre Élément (*Rémy Martin*)	François Dionne Martin Élément	Guylain Dupuis
Garield Warren (*885-77*)	Leonard Warren Kayward Warren Jonathon Warren Enis Gaulton	A.J. Felix	Albert English (*Annie Annick*)	Robert Dumarais Marcel Côté	Mélanie Gaumond
Dereck Coles (*Catalina Venture*)	Robert Campbell Gorvin Williams Ashley Coles Randy Coles	Derek Poole	Marcel Roy (*Sextan*)	René Plourde Dino Côté	André Rioux
Murray Lavers (*Sylvia Lyn II*)	Floyd Biggin Warren House Barry Ryan	Bob O'Quinn	Réjean Bernatchez (*Chlorydon*)	Jean Guy Côté Gilles Côté	Louise Faulkner
Dan Genge (*Nfld Storm*)	Albert White Kevin Genge Claude Genge	Paul Osmond			

References **:**

Bérubé, M. and A. Frechet. 2001. Summary of the northern Gulf sentinel tagging program with emphasis on recaptures from adjacent management units. CSAS, Res. Doc. 2001/002. 24p.
http://www.dfo-mpo.gc.ca/csas/csas/DocREC/2001/RES2001_002b.pdf

Gillis, David J. 2002. Workshop on the Groundfish Sentinel Program. November 07 – 09, 2001 Moncton, New-Brunswick. CSAS, Proceedings Series 2002/003E
http://www.dfo-mpo.gc.ca/csas/Csas/Proceedings/2002/PRO2002_003e.pdf

Smedbol, R.K., P.A. Shelton, D.P. Swain, A. Fréchet and G.A. Chouinard. 2002. Review of population structure, distribution and abundance of cod (*Gadus morhua*) in Atlantic Canada in a species-at-rick context. CSAS, Res. Doc. 2002/082. 134p. http://www.dfo-mpo.gc.ca/csas/csas/DocREC/2002/RES2002_082e.pdf

NEW MPO, 2003. Northern Gulf of St. Lawrence Cod (3Pn, 4RS) in 2002. DFO, Atlant. Fish. Stock Status Report 2003/017. 12p. http://www.dfo-mpo.gc.ca/csas/Csas/etat/2003/SSR2003_017_F.pdf

NEW Dutil, J.-D., J. Gauthier, Y. Lambert, A. Fréchet, et D. Chabot. 2003. Cod stocks rebuilding and fish bioenergetics : low productivity hypothesis.. CSAS, Res. Doc.. 2003/060. 43p.
http://www.dfo-mpo.gc.ca/csas/Csas/DocREC/2003/RES2003_060_E.pdf

NEW Fréchet, A., J. Gauthier, P. Schwab, H. Bourdages, D. Chabot, F. Collier, F. Grégoire, Y. Lambert, G. Moreault, L. Pageau et J. Spingle. 2003. The status of cod in the Northern Gulf of St. Lawrence (3Pn, 4RS) in 2002. CSAS, Res. Doc. 2003/065. 92p.
http://www.dfo-mpo.gc.ca/csas/Csas/English/Research_Years/2003/2003_065_E.htm

NEW Frechet. A., R. Butler, E. Hussey, J. Kennedy et G. Ross. 2003. Quality at landing in relation to gears used in the 3Pn, 4R cod fishery, 2000-2002. CSAS, Rec. Doc. 2003/066. 13p.
http://www.dfo-mpo.gc.ca/csas/csas/DocREC/2003/RES2003_066_B.pdf

For more information contact

MPO/DFO

Alain Frechet,
Cod Biologist (418) 775-0628
Johanne Gauthier,
Sentinel fisheries Biologist (418) 775-0871
Philippe Schwab,
Cod Techician (418) 775-0626

ACPG inc.

Sylvain Samuel,
Executive Director (418) 269-7701
Guy Moreault,
Scientific coordinator (418) 775-0724
Louis Pageau,
Scientific coordinator (418) 775-0723

F.F.A.W.

David Decker,
Director (709) 634-7382
Jason Spingle,
Scientific coordinator (709) 634-7382
Jackie House,
Data verification (709) 634-7382

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Prepared by:

Guy Moreault, ACPG inc.
Scientific coordinator
Tel. (418) 775-0724
Fax. (418) 775-0679
E-mail moreaultg@dfo-mpo.gc.ca