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**The Fall 2007 NAFO Subdivision 3Ps
GEAC Survey: Catch Results for
Atlantic Cod (*Gadus morhua*),
American Plaice (*Hippoglossoides
platessoides* F.), Witch Flounder
(*Glyptocephalus cynoglossus* L.)*, and
Haddock (*Melanogrammus aeglefinus*)**

**Relevé d'automne de 2007 du GEAC
dans la sous-division 3Ps de l'OPANO :
Résultats concernant les prises de
morue (*Gadus morhua*), de plie
canadienne (*Hippoglossoides
platessoides* F.), de plie grise
(*Glyptocephalus cynoglossus* L.)* et
d'aiglefin (*Melanogrammus aeglefinus*)**

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ABSTRACT

To enhance the fisheries research database in Northwest Atlantic Fisheries Organization (NAFO) Subdivision 3Ps, under contract to the Department of Fisheries and Oceans (DFO), the Groundfish Enterprise Allocation Council (GEAC) completed a fall survey in 2007 directed at groundfish, with specific interest in cod, American plaice, witch flounder, and haddock. GEAC had previously completed fall surveys to 3Ps from 1997 to 2005. The 2007 survey represents a new starting point for this information: both a new survey vessel and new fishing gear were employed as well the survey area was expanded. In this analysis, catch statistics, length and age distribution, and stratified random survey analysis estimates of biomass, including age distribution estimates, are presented. The results were presented during the regular zonal stock assessment meetings in St. John's (February 2009).

The largest catches of cod were located at the southern entrance to the Halibut Channel and on the western portion of St. Pierre Bank with a few on the eastern side of the mouth of Placentia Bay. The estimated total number of cod for 3Ps is 18.1 million and the estimated total cod biomass is 13.1 ktonnes. For an estimated 8.7 cod per standard 15 minute tow the greatest numbers are at ages 1 (3 fish per tow) and 3 (2.5 fish). From the cod abundance index at length estimates there are two peaks at lengths 16-22 cm and 34-40 cm.

The largest catches of American plaice were located at the southern entrance to the Halibut Channel. The estimated total number of plaice for 3Ps is 127 million. The estimated total plaice biomass is 22.3 ktonnes though there is large variance and hence uncertainty in the estimates. The total mean number of plaice per tow is 58.3 with about 10 fish each at ages 2, 3, and 4. At ages 5 through 8 there are from 4.5 to 5.4 fish per tow. Lesser numbers are at ages 9 (3.2 fish) and 10 (2 fish). The majority of sampled plaice are in the 12-30 cm range.

Witch catches were located at the southern entrance to the Halibut Channel and also on the western portion of St. Pierre Bank both west of St. Pierre et Miquelon and on the Laurentian Channel slopes. The estimated total number of witch for 3Ps is 34.8 million. The estimated total witch biomass is 7.2 ktonnes. The total mean number per tow is 16.7 with the greatest numbers estimated at ages 5 (2.7 fish per tow), 7 (2.5 fish) and 6 (2.4 fish). Of the sampled witch there is a peak in the length distribution at 33 cm with the majority of samples in the 26-43 cm range.

Haddock were caught in only 7 of the 75 successful survey trip sets. The estimated total number of haddock for 3Ps is 2.8 million and the estimated total haddock biomass is 5.8 ktonnes though there is large uncertainty in these estimates due to the few sets reporting haddock: the within-stratum variance being an important factor as well. Seventy-one percent of the total abundance estimate and 91% of the total biomass estimate are for the 51-100 fathom regime.

RÉSUMÉ

Afin d'améliorer la base de données de recherche sur les pêches pour la sous-division 3Ps de l'Organisation des pêches de l'Atlantique Nord-Ouest (OPANO), le Groundfish Enterprise Allocation Council (GEAC) a effectué, à forfait, pour le ministère des Pêches et des Océans (MPO), un relevé d'automne en 2007 sur le poisson de fond, en mettant l'accent particulièrement sur la morue, la plie canadienne, la plie grise et l'aiglefin. Antérieurement, le GEAC avait effectué des relevés d'automne dans 3Ps, de 1997 à 2005. Le relevé de 2007 représente un nouveau point de départ pour cette série de données : un nouveau navire et de nouveaux engins de pêche ont été utilisés, et la zone couverte par le relevé a été élargie. On présente, dans cette analyse, les statistiques sur les prises, les répartitions selon la longueur et l'âge ainsi que des estimations de la biomasse fondées sur des analyses aléatoires stratifiées des données des relevés, y compris des estimations de la répartition selon l'âge. Les résultats ont été dévoilés au cours des réunions zonales régulières d'évaluation des stocks tenues à St. John's (février 2009).

Les plus importantes prises de morue ont été effectuées à l'entrée sud du chenal Halibut et sur la portion ouest du banc de Saint-Pierre, quoique quelques prises ont été réalisées du côté est de l'entrée de la baie de Plaisance. Le nombre total estimé de morues dans 3Ps est de 18,1 millions, et la biomasse totale estimée de la morue est de 13,1 Kt. Pour une estimation de 8,7 morues par trait standard de 15 minutes, les nombres les plus élevés à l'âge 1 sont de 3 poissons par trait et de 2,5 poissons par trait à l'âge 3. D'après les estimations de l'abondance de la morue fondées sur l'indice selon la longueur, deux crêtes sont présentes pour ce qui est des longueurs, à savoir 16-22 cm et 34-40 cm.

Les plus importantes prises de plies canadiennes ont été réalisées à l'entrée sud du chenal Halibut. Le nombre total estimé de plies dans 3Ps se chiffre à 127 millions d'individus. La biomasse totale estimée de la plie est quant à elle de 22,3 Kt, bien qu'il y ait une importante variance et, par le fait même, une grande incertitude en ce qui concerne les estimations. Le nombre moyen total de plies par trait est de 58,3, avec environ 10 poissons représentant les âges 2, 3 et 4. Aux âges 5 à 8, le nombre de poissons par trait varie de 4,5 à 5,4. Les nombres les moins élevés correspondent aux âges 9 (3,2 poissons) et 10 (2 poissons). La majorité des plies échantillonnées mesurent de 12 à 30 cm.

Les prises de plies grises ont été réalisées à l'entrée sud du chenal Halibut et également dans la portion ouest du banc de Saint-Pierre, à l'ouest de St-Pierre et Miquelon et sur le talus du chenal laurentien. Le nombre total estimé de plies grises dans 3Ps se chiffre à 34,8 millions. La biomasse totale estimée de la plie grise équivaut quant à elle à 7,2 Kt. Le nombre moyen total par trait est de 16,7, les nombres les plus importants estimés correspondant aux âges 5 (2,7 poissons par trait), 7 (2,5 poissons) et 6 (2,4 poissons). Parmi les plies grises échantillonnées, on observe une crête dans la distribution selon la longueur à 33 cm, la majorité des échantillons mesurant de 26 à 43 cm.

On a capturé de l'aiglefin dans seulement 7 des 75 calées réussies dans le cadre des relevés. Le nombre total estimé d'aiglefins dans 3Ps est de 2,8 millions d'individus, et la biomasse totale estimée de l'aiglefin se situe à 5,8 Kt, bien qu'il y ait une grande incertitude entourant ces estimations en raison du faible nombre de calées dans lesquelles on a observé de l'aiglefin. La variance dans la strate est également un facteur important. Soixante et onze pour cent de l'estimation de l'abondance totale et 91 % de l'estimation de la biomasse totale se situent dans la plage de profondeurs allant de 51 à 100 brasses.

INTRODUCTION

To enhance the fisheries research database in NAFO Subdivision 3Ps, under contract to the Department of Fisheries and Oceans (DFO), the Groundfish Enterprise Allocation Council (GEAC) completed a fall survey in 2007 directed at groundfish, with specific interest in cod, American plaice, witch flounder, and haddock. The intent has been to provide survey information in 3Ps to complement current resource assessment activities carried out by the Department of Fisheries and Oceans (DFO). GEAC had previously completed fall surveys to 3Ps from 1997 to 2005¹ (McClintock, 2007). The 2007 survey represents a new starting point for this information: both a new survey vessel and new fishing gear were employed as well the survey area was expanded. GEAC conducted the 2007 survey with scientific guidance from DFO in the design and execution of a stratified random survey and the associated sampling. The data collected during these surveys have been subsequently analysed on behalf of GEAC and for the additional intent of providing this information to DFO, for their databases and their assessment work. The results have been presented during the regular Advisory Process meetings in St. John's².

During the trip, set details and length frequencies were logged in the DFO Fisheries Form System (FFS) and otoliths were collected for subsequent aging. Under contract to GEAC, AMEC Earth & Environmental (AMEC) has taken the data logged using the DFO FFS system, combined with the aged otoliths, created digital data files appropriate for inclusion in the DFO databases, and performed a first analysis of the survey results.

In this paper, catch statistics, length and age distribution, and stratified analysis estimates of abundance and biomass, including age distribution estimates, and interpretation of results, are presented separately for cod, plaice, and witch. A similar analysis without the length or aging information is presented for haddock.

This research document presents the analysis for each of the four species, one species at a time: cod, plaice, witch, and finally haddock. Following a review of methods and materials and an overview of the survey gear net performance, results are presented as follows:

Cod: pages 3-4, Tables 1-4, Figures 7-12.

Plaice: pages 4-5, Tables 5-8, Figures 13-17.

Witch: pages 5-6, Tables 9-12, Figures 18-22.

Haddock: pages 6-7, Tables 13-15, Figure 23.

METHODS

A Stratified Random survey was carried out in 3Ps by the *Cape Ballard*, owned by Fishery Products International (FPI). A summary of the trip is presented below.

¹ There was no 2006 survey.

² The 2007 survey and cod results were presented by the author February 25, 2009 as part of the February 24 - March 6, 2009 Zonal stock assessment of Atlantic cod for NAFO divisions/subdiv. (2J3KL, 3Ps, 3Pn4RS, 4TVn, 4X5Y).

TRIP 7: STRATIFIED RANDOM SURVEY

Trip 7 was carried out from 28 November to 12 December 2007. The *Cape Ballard*, sailed from Marystown for operation in 3Ps, St. Pierre Bank, Halibut Channel, and Green Bank.

Figure 1 shows a map illustrating the location of the strata surveyed. Figure 2 shows the location of the survey sets. The survey area was expanded in 2007 compared with the earlier 1997-2005 surveys to include seven additional strata (783, 781, 782, 779, 780, 716, 714) which were added to five of the six depth regimes that span the survey (e.g., Table 4). The survey was directed at cod, American plaice, witch flounder, and haddock. Set details were collected for all species caught: length, sex, and otolith information were sampled for the cod, plaice, and witch. A total of 130 sets were targeted though six days were lost due to weather. 79 sets were subsequently completed and of these 75 were successful. Four sets where the gear was badly damaged and catch affected were unsuccessful: 18, 34, 71, and 75.

Tows of duration 15 minutes with Campelan 1800 trawl with codend liner were conducted³ and the tows were commenced once the net reached the bottom.

Performance of the trawl was checked onboard using SCANMAR sensors: bridge display of wingspread and net opening (headline height) was visually monitored and these measurements together with trawl depth and water temperature were noted every five minutes on the written bridge log for most sets. The wingspread, clearance, and opening, and for six sets, doorspread, measurements as well as temperature were logged to computer disk every 5 seconds with the DFO Seatrawl software and typically noted every 5 minutes on the bridge log.

Survey set and catch data were logged using FFS with the length and otolith sampling carried out on board.

Additional details are presented in the trip report (GEAC 2007).

SHORE-BASED ANALYSIS

The set details and (for cod, plaice, and witch) length frequencies were exported from FFS to create ASCII data files. The age and growth data were keyed in following completion of the otolith aging. Cod, plaice, and witch were all sampled in 1 cm length groupings, and all ratio/percentages of catch measured were applied. As noted, there was no haddock age or length information collected.

GEAR PERFORMANCE

The digital Seatrawl gear performance data were processed using the AMEC NetPlot Windows software developed for DFO as a Seatrawl data processing, viewing, and editing tool.

Statistics were computed by NetPlot with application of typical range checks: in this instance, wingspread and doorspread in the range [2,100 m], opening in [1,35 m] and

³ The 1997-2005 surveys employed a 30 minute set duration and gear of Engels 96 high lift trawl type with a 135 mm diamond mesh cod end (not lined).

clearance in [0,50 m]. Digital data coverage was good with wingspread logged for 64 sets; doorspread logged for 6 sets; opening logged for 64 sets; and clearance logged for 72 sets.

Figure 3 and Figure 4 present the derived net wingspread and opening statistics for each set. The mean +/- one standard deviation are shown. The wingspread ranges from 9.7 to 21.1 m with a mean of 15.6 m and a median of 15.7 m. Opening ranges from 1.4 m to 13.9 m with a mean of 5.6 m and a median of 5.5 m.

Figure 5 presents clearance with means that ranges from 0 to 26.4 m. The mean clearance is 3.5 m and the median is 0.3 m.

Figure 6 presents the mean wingspread versus set depth. Wingspread values range between 10 and 20 m for all but two sets. There is a slight increase in wingspread with depth.

As noted, doorspread was measured for six sets only, numbers 2, 4-6, 8, and 11. The mean doorspread ranges from 37 to 48.5 m. On average the value is 43 m and the median is 42.3 m.

There appears to be good consistency in the net performance measurements. As always, it is essential that net performance should be carefully monitored in any future surveys.

For each species, abundance and biomass were estimated using the DFO stratified analysis STRAP software and applying the French Exclusion Zone around St. Pierre et Miquelon for area calculations. Based on guidance received from DFO (D. Power, Pers. Comm.), a wingspread of 55.25 ft (16.84 m) was used.

RESULTS: COD

ACON⁴ scaled symbol plots of the spatial distribution of cod catch weights are presented in Fig. 7. The largest catches were located at the southern entrance to the Halibut Channel and on the western portion of St. Pierre Bank with a few on the eastern side of the mouth of Placentia Bay.

Table 1 presents a summary of the set details and cod catch numbers and weights for the 75 successful sets. The mean cod catch is 14 fish and the mean catch weight is 10 kg. The total number of cod caught was 1054 in 2007. The total catch weight was 751 kg. The largest catch of 122 cod and weight 199 kg was from set 41 in stratum 318 at a depth of approximately 247 m at the mouth of the Halibut Channel. This location is consistent with those of the largest sets historically (McClintock 2007).

To investigate the numbers and distribution of smaller fish, Figure 8 shows the distribution of cod numbers at age in nine panels for ages 1 to 9+. The majority of fish are at ages 1 and 3, with also good representation at ages 2, 4, and 5. The distributions are in general uniform across the survey area. There are few fish older than 5 years.

⁴ Black, J. 1991. ACON Data Visualization Software, Dartmouth (NS), Fisheries and Oceans Canada, Maritimes Region; Available from: <http://www.mar.dfo-mpo.gc.ca/science/acn/>

COD AGE AND LENGTH COMPOSITION

Figure 9 presents the sampled length composition for the 2007 survey. There are two primary peaks: one for smaller fish from about 13-26 cm, centered at 16 cm, and one from about 27-65 cm centered at 36 cm. For illustration only, since in 2007 both a different vessel and different gear were employed compared with 2005, the 2005 survey sampled length distribution is also shown.

Figure 10 presents the sampled length versus age distribution from the 2007 survey. Lengths ranged from 10 to 114 cm with a mean (and median) of 40 cm. Ages ranged from 1 to 14 years with a mean of 3.2 years and median of 3 years (Fig. 11).

COD ABUNDANCE AND BIOMASS ESTIMATES

Table 2 presents the STRAP output of estimated abundance and biomass. The estimated total number of cod for 3Ps is 18.1 million (with 95% confidence lower and upper limits of 13.6 and 22.7 million). The mean number of cod per standard 15 minute (0.75 nautical mile) tow is 8.7 (with approximate 95% confidence limits of 3 and 8). The estimated total cod biomass is 13.1 ktonnes (with lower and upper limits of 7.6 and 18.5 ktonnes). The mean catch weight per tow is 6.3 kg.

Table 3 presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 8.7 with the greatest numbers estimated at ages 1 (3 fish per tow) and 3 (2.5 fish). Lesser numbers are at ages 2 (1 fish), 4 (0.9 fish), and 5 (0.8 fish).

The abundance and biomass estimates by strata, arranged by depth regime, are presented in Table 4. Of the six depth regimes, 58% of the total abundance estimate and 30% of the total biomass estimate are for the 51-100 fathom regime. Two percent of the total abundance and 4% of the total biomass are for the two regimes greater than 150 fathoms. Twenty-seven percent of the total abundance and 40% of the total biomass are for the two depth regimes less than 50 fathoms.

Figure 12 presents the cod abundance index at length for males, females, and combined sexes. Males and females show similar distributions with two peaks at lengths 16-22 cm and 34-40 cm with abundance indices of about 1 million or just less than this for each centimetre length in these ranges.

RESULTS: PLAICE

ACON scaled symbol plots of the spatial distribution of American plaice catch weights are presented in Fig. 13. The largest catches were located at the southern entrance to the Halibut Channel. The largest catch was set 28 with 1343 plaice and a set catch weight of 128 kg. The set was located in stratum 323 in a water depth of 156 m at the mouth of the Halibut Channel just south of 46°N. Set 37 recorded the largest set plaice weight of 232 kg (464 fish) in a depth of 152 m a bit to the south of other large set 28. Table 5 presents a summary of the plaice set details and catch numbers and weights. The mean plaice catch for the 75 stratified random sets is 70 fish and the mean catch weight is 11 kg. The total number of plaice caught was 5256 in 2007. The total catch weight was 848 kg.

PLAICE AGE AND LENGTH COMPOSITION

Figure 14 presents the sampled length composition for the 2007 survey. The majority of samples are in the 12-30 cm range. There are fewer large fish and more small fish in the 2007 compared with that seen in the 2005 survey which is shown for illustrative comparison only.

Figure 15 presents the sampled length versus age distribution from the 2007 survey. Lengths ranged from 6 to 64 cm with a mean of 29 cm. Ages ranged from 1 to 18 years with a mean of 6.6 years (Fig. 16).

PLAICE ABUNDANCE AND BIOMASS ESTIMATES

Table 6 presents the STRAP output of estimated abundance and biomass. The estimated total number of plaice for 3Ps is 127 million (with 95% confidence lower and upper limits of 37 and 217 million). The mean number of plaice per standard 15 minute (0.75 nautical mile) tow is 61 (with limits of 18 and 104). The estimated total plaice biomass is 22.3 ktonnes. There is large variance and hence uncertainty in the estimates. For an alpha value of 5%: the upper 95% limit is 47.7 ktonnes but the lower limit is negative. The estimated mean catch weight per tow is 10.7 kg.

Table 7 presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 58.3 with about 10 fish each at ages 2, 3, and 4. At ages 5 through 8 there are from 4.5 to 5.4 fish per tow. Lesser numbers are at ages 9 (3.2 fish) and 10 (1.9 fish).

The abundance and biomass estimates by strata, arranged by depth regime, are presented in Table 8. Of the six depth regimes, 80% of the total abundance estimate and 73% of the total biomass estimate are for the 51-100 fathom regime. Less than 2% of the total abundance and less than 3% of the total biomass are for the two regimes greater than 150 fathoms. 12% of the total abundance and 18% of the total biomass are for the two depth regimes less than 50 fathoms.

Figure 17 presents the plaice abundance index at length for males, females, and combined sexes. Males and females show similar distributions with one peak at 12 cm and a second broader peak between lengths 16-36 cm with abundance indices of about 6 million for each sex for each centimetre length in these ranges.

RESULTS: WITCH

ACON scaled symbol plots of the spatial distribution of witch flounder catch weights are presented in Fig. 18. The largest catches were located at the southern entrance to the Halibut Channel and also on the western portion of St. Pierre Bank both west of St. Pierre et Miquelon and on the Laurentian Channel slopes.

Table 9 presents a summary of the witch set details and catch numbers and weights. The mean witch catch for the 75 stratified random sets is 16 fish and the mean catch weight is 4 kg. The total number of witch caught was 1175 in 2007. The total catch weight was 295 kg. The largest set was set 42 with 95 fish weighing 42 kg in stratum 707 at a depth

of approximately 321 m at the western entrance to the mouth of the Halibut Channel. There were five additional sets of catch weight 20 to 31 kg and 41 to 106 haddock.

WITCH AGE AND LENGTH COMPOSITION

Figure 19 presents the sampled length composition for the 2007 survey. There is a peak in the distribution at 33 cm with the majority of samples in the 26-43 cm range. There are fewer large fish and more small fish in the 2007 compared with that seen in the 2005 survey (which is shown for illustrative comparison only), though not to the extent seen for plaice (Fig. 14).

Figure 20 presents the sampled length versus age distribution from the 2007 survey. Lengths ranged from 6 to 55 cm with a mean of 31 cm. Ages ranged from 0 to 13 years with a mean of 6.6 years (Fig. 21).

WITCH ABUNDANCE AND BIOMASS ESTIMATES

Table 10 presents the STRAP output of estimated abundance and biomass. The estimated total number of witch for 3Ps is 34.8 million (with 95% confidence lower and upper limits of 25.3 and 44.2 million). The mean number of witch per standard 15 minute (0.75 nautical mile) tow is 16.7 fish (with limits of 12.2 and 21.3). The estimated total witch biomass is 7.2 ktonnes (with lower and upper limits of 4.3 and 10.1 ktonnes). The mean catch weight per tow is 3.5 kg.

Table 11 presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 16.7 with the greatest numbers estimated at ages 5 (2.7 fish per tow), 7 (2.5 fish) and 6 (2.4 fish). Lesser numbers are at ages 8 (2 fish), 9 (1.7 fish), 4 (1.6 fish), and 3 (1.5 fish).

The abundance and biomass estimates by strata, arranged by depth regime, are presented in Table 12. Of the six depth regimes, 49% of the total abundance estimate and 25% of the total biomass estimate are for the 201-300 fathom regime. 23% of the total abundance and 43% of the total biomass are for the 51-100 fathom regime. There are virtually no witch in depths less than 50 fathoms.

Figure 22 presents the witch abundance index at length for males, females, and combined sexes. Males and females show similar distributions with a broad peak in the length range 26-42 cm with abundance indices of 1-2 million for each sex for each centimeter length in this range. There is a secondary peak at about 18 cm with abundance indices of about 1 million for each centimetre length near this peak.

RESULTS: HADDOCK

ACON scaled symbol plots of the spatial distribution of haddock catch weights are presented in Figure 23. The only catches were located at the southern entrance to the Halibut Channel (four sets of 8 to 41 haddock and set weights 20 to 110 kg, together with one set of 36 haddock weighing 5 kg farther to the west) together with two sets on the northwestern portion of St. Pierre Bank west of St. Pierre et Miquelon (8 and 17 haddock weighing 1 and 11 kg). These sets were all in the depth range of 140 to 247 m.

Table 13 presents a summary of the haddock catch set details and catch numbers and weights. The mean haddock catch for the 75 stratified random sets is 1.9 fish and the mean catch weight is 2.8 kg. The total number of haddock caught was 140 in 2007. The total catch weight was 213 kg. The largest catch of 41 cod and weight 110 kg was from set 36 in stratum 319 at a depth of approximately 140 m at the mouth of the Halibut Channel.

HADDOCK ABUNDANCE AND BIOMASS ESTIMATES

Table 14 presents the STRAP output of estimated abundance and biomass. The estimated total number of haddock for 3Ps is 2.8 million. There is large uncertainty in the estimates for an alpha value of 5%: the upper 95% limit is 7.2 million. The estimated mean catch is 1.4 haddock per standard 15 minute (0.75 nautical mile) tow.

The estimated total haddock biomass is 5.8 ktonnes. Again there is large uncertainty in the estimate due to the few sets (just four stratum 310, 316, 318, and 319) recording any haddock and high variance. The mean catch weight per tow is 2.8 kg with a 95% upper limit of 8.2 and a negative lower limit.

The abundance and biomass estimates by strata, arranged by depth regime, are presented in Table 15. Of the six depth regimes, 71% of the total abundance estimate and 91% of the total biomass estimate are for the 51-100 fathom regime. The only other regime represented is the 101-150 range which comprises 29% of the total abundance and 9% of the total biomass.

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Table 1. Summary of cod catches for stratified random survey, NAFO Subdivision 3Ps, 29 November–12 December 2007

Set	Cape Ballard Trip 7			Unit Area	Depth (m)	Set Location		Catch # of Fish	COD		Set Duration (min)	Tow Distance (n.mi.)	COD Mean Weight (kg)
	Month	Day	StrLin			Lat (N)	Long (W)		Catch Weight (kg)				
1	11	28	780 N28	234	47.29	54.11	8	14.9	15	0.8	1.9		
2	11	29	780 N28	223	47.01	54.65	0	0.0	15	0.8			
3	11	29	782 N29	161	46.98	54.35	19	14.6	15	0.8	0.8		
4	11	29	783 N25	74	48.80	54.39	19	17.8	15	0.8	0.9		
5	11	29	783 N29	77	46.73	54.40	16	10.4	15	0.8	0.6		
6	11	29	782 N29	117	46.64	54.59	66	20.1	15	0.8	0.3		
7	11	29	779 N29	222	46.64	54.79	0	0.0	15	0.8			
8	11	30	322 M29	154	46.65	55.10	2	0.7	15	0.8	0.4		
9	11	30	781 M29	114	46.67	55.61	28	6.2	15	0.8	0.2		
10	11	30	781 M29	145	46.67	55.83	11	2.0	15	0.8	0.2		
11	11	30	322 M30	144	46.37	55.83	5	1.8	15	0.8	0.4		
12	11	30	322 M30	144	46.49	55.57	3	2.7	15	0.8	0.9		
13	11	30	322 M29	140	46.51	55.53	10	3.6	15	0.8	0.4		
14	11	30	322 M30	170	46.25	55.06	5	2.5	15	0.8	0.5		
15	11	30	324 N30	169	46.23	54.95	1	0.1	15	0.8	0.1		
16	12	1	779 N30	202	46.42	54.83	1	0.1	15	0.8	0.1		
17	12	1	324 N30	176	46.43	54.67	83	30.5	15	8	0.4		
19	12	1	326 N31	86	45.89	54.39	0	0.0	15	0.8			
20	12	1	326 N31	82	45.63	54.44	4	1.4	15	0.8	0.3		
21	12	1	325 N31	78	45.62	54.65	5	1.0	15	0.8	0.2		
22	12	1	325 N31	82	45.79	54.70	10	1.2	15	0.8	0.1		
23	12	1	325 N31	69	45.84	54.87	3	2.6	15	0.8	0.9		
24	12	1	325 N31	66	45.92	54.87	0	0.0	15	0.8			
25	12	2	323 M30	176	46.01	55.07	3	2.8	15	0.8	0.9		
26	12	2	323 M31	164	45.94	55.18	1	0.7	15	0.8	0.7		
27	12	3	323 M31	106	45.76	55.05	42	18.2	15	0.8	0.4		
28	12	3	323 M31	156	45.72	55.19	24	9.0	15	0.8	0.4		
29	12	3	320 N31	52	45.77	54.77	27	42.6	15	0.8	1.6		
30	12	3	321 M31	61	45.86	55.65	3	15.8	15	0.8	5.3		
31	12	3	321 M31	73	45.70	55.44	0	0.0	15	0.8			
32	12	3	321 M31	68	45.63	55.47	14	19.5	15	0.8	1.4		
33	12	4	321 M30	61	46.04	55.58	3	2.1	15	0.8	0.7		
35	12	5	319 M32	165	45.31	55.32	11	5.0	15	0.8	0.5		
36	12	6	319 M32	140	45.22	55.04	28	21.3	15	0.8	0.8		
37	12	6	319 N32	152	45.11	54.74	8	7.6	15	0.8	0.9		
38	12	6	319 N32	114	45.21	54.55	10	8.4	15	0.8	0.8		
39	12	6	318 M32	213	45.14	55.16	23	47.6	15	0.8	2.1		
40	12	6	707 M32	322	45.11	55.19	8	11.9	13	0.7	1.5		
41	12	6	318 M32	247	45.09	55.24	122	198.9	15	0.8	1.6		
42	12	7	707 M33	321	44.89	55.84	2	3.3	15	0.8	1.6		
43	12	7	711 L33	422	44.80	56.24	1	3.3	15	0.8	3.3		
44	12	7	706 L32	361	45.01	56.35	1	1.5	15	0.8	1.5		
45	12	7	706 L32	329	45.02	56.29	0	0.0	15	0.8			
46	12	7	316 L32	223	45.08	56.20	0	0.0	15	0.8			
47	12	7	315 M32	85	45.10	55.96	2	2.8	15	0.8	1.4		
48	12	7	315 M32	63	45.30	55.96	2	0.1	15	0.8	0.0		
49	12	8	315 L32	72	45.32	56.13	8	0.3	15	0.8	0.0		
50	12	8	320 L31	43	45.62	56.16	19	11.2	15	0.8	0.6		
51	12	8	317 L32	116	45.42	56.41	119	7.2	15	0.8	0.1		
52	12	8	706 L32	349	45.45	56.59	0	0.0	15	0.8			
53	12	8	711 J32	396	45.40	58.76	0	0.0	15	0.8			
54	12	8	712 K31	427	45.55	57.11	0	0.0	15	0.8			
55	12	8	712 K31	410	45.69	57.99	0	0.0	15	0.8			
56	12	8	317 L31	101	45.79	56.75	86	22.2	15	0.8	0.3		
57	12	8	316 L31	227	45.84	56.85	0	0.0	15	0.8			
58	12	9	320 L31	52	45.93	56.74	8	11.8	15	0.8	1.5		
59	12	9	320 L31	50	45.99	56.56	3	2.3	15	0.8	0.8		
60	12	9	320 L30	42	46.07	56.67	5	10.2	15	0.8	2.0		
61	12	10	716 L28	284	47.10	56.83	2	2.0	15	0.8	1.0		
62	12	10	716 L28	286	47.06	56.95	1	2.6	15	0.8	2.6		
63	12	10	310 L28	224	47.07	56.78	9	10.9	15	0.8	1.2		
64	12	11	310 L29	179	46.98	56.92	17	10.3	15	0.8	0.6		
65	12	11	311 L29	136	46.90	56.99	34	3.9	15	0.8	0.1		
66	12	11	311 K29	125	46.68	57.34	17	5.4	15	0.8	0.3		
67	12	11	312 K29	61	46.66	57.31	3	1.5	15	0.8	0.5		
68	12	11	313 K30	214	46.47	57.43	53	51.3	15	0.8	1.0		
69	12	11	705 K30	288	46.43	57.44	6	7.5	15	0.8	1.2		
70	12	11	312 K30	67	46.26	57.17	26	32.8	15	0.8	1.3		
72	12	11	313 K30	261	46.10	57.14	3	1.2	15	0.8	0.4		
73	12	12	705 K30	319	46.21	57.35	0	0.0	15	0.8			
74	12	12	713 K30	409	46.26	57.49	0	0.0	15	0.8			
76	12	12	713 K30	469	46.46	57.93	0	0.0	15	0.8			
77	12	12	714 J29	461	46.62	58.05	0	0.0	15	0.8			
78	12	12	714 J29	462	46.68	58.21	0	0.0	15	0.8			
79	12	12	714 K29	450	46.66	57.90	1	0.1	15	0.8	0.1		
							Minimum	0.0	13.0	0.7	0.0		
							Maximum	122.0	15.0	8.0	5.3		
							Mean	14.1	10.0	0.9	0.9		
							Median	4.0	2.6	0.8	0.7		
							Standard Error	0.3	0.3	0.0	0.0		
							Total	1054.0	751.1				

Note: Sets 18, 34, 71, 75 were unsuccessful

Table 2. Stratified analysis estimated cod abundance and biomass.

COD GEAC 3PS 2007 No Zone						
ANALYSIS FOR TRIP 7 2007 VESSEL 48 ICNAF 3P SPECIES 0438						
NUMBERS						
STRATUM	NO. SETS	TOTAL	AV. /SET	UNITS	TOTAL NO	VAR.
310	2	26.00	13.00	18846.	244996.	32.00
311	2	51.00	25.50	36454.	929569.	144.50
312	2	29.00	14.50	33152.	480707.	264.50
313	2	56.00	28.00	22698.	635532.	1250.00
315	3	12.00	4.00	106610.	426439.	12.00
316	2	0.00	0.00	22698.	0.	0.00
317	2	205.00	102.50	23661.	2425202.	544.50
318	2	145.00	72.50	17745.	1286540.	4900.50
319	4	57.00	14.25	135360.	1928882.	85.58
320	5	62.00	12.40	162872.	2019617.	104.80
321	4	20.00	5.00	149666.	748332.	38.00
322	5	25.00	5.00	192723.	963616.	9.50
323	4	70.00	17.50	95743.	1675494.	375.00
324	2	9.30	4.65	67955.	315992.	26.65
325	4	18.00	4.50	129858.	584360.	17.67
326	2	4.00	2.00	22835.	45670.	8.00
705	2	6.00	3.00	26824.	80473.	18.00
706	3	1.00	0.33	58051.	19350.	0.33
707	2	11.14	5.57	10180.	56714.	25.51
711	2	1.00	0.50	76622.	38311.	0.50
712	2	0.00	0.00	100557.	0.	0.00
713	2	0.00	0.00	117064.	0.	0.00
714	3	1.00	0.33	147741.	49247.	0.33
716	2	3.00	1.50	73320.	109980.	0.50
779	2	1.00	0.50	58051.	29025.	0.50
780	2	8.00	4.00	55437.	221748.	32.00
781	2	39.00	19.50	61352.	1196369.	144.50
782	2	85.00	42.50	25174.	1069881.	1104.50
783	2	35.00	17.50	31501.	551276.	4.50
		TOTAL			AVERAGE	
		18133324.	22660226.	13606424.	8.71	10.89
		EFFECTIVE DEGREES OF FREEDOM= 14		STUDENTS T-VALUE=	2.14	ALPHA=0.05
WEIGHTS						
STRATUM	NO. SETS	TOTAL	AV. /SET	UNITS	TOTAL NO	VAR.
310	2	21.20	10.60	18846.	199766.	0.18
311	2	9.25	4.63	36454.	168598.	1.20
312	2	34.35	17.18	33152.	569389.	490.16
313	2	52.52	26.26	22698.	596038.	1252.00
315	3	3.16	1.05	106610.	112296.	2.30
316	2	0.00	0.00	22698.	0.	0.00
317	2	29.42	14.71	23661.	348046.	112.80
318	2	246.58	123.29	17745.	2187828.	11445.85
319	4	42.23	10.56	135360.	1429064.	53.66
320	5	78.02	15.60	162872.	2541460.	241.60
321	4	37.41	9.35	149666.	1399756.	94.78
322	5	11.30	2.26	192723.	435554.	1.10
323	4	30.70	7.68	95743.	734824.	61.42
324	2	3.13	1.56	67955.	106350.	4.41
325	4	4.82	1.21	129858.	156479.	1.13
326	2	1.35	0.68	22835.	15414.	0.91
705	2	7.45	3.72	26824.	99921.	27.75
706	3	1.50	0.50	58051.	29025.	0.75
707	2	16.85	8.43	10180.	85762.	53.56
711	2	3.31	1.65	76622.	126809.	5.48
712	2	0.00	0.00	100557.	0.	0.00
713	2	0.00	0.00	117064.	0.	0.00
714	3	0.07	0.02	147741.	3447.	0.00
716	2	4.61	2.31	73320.	169003.	0.20
779	2	0.07	0.04	58051.	2032.	0.00
780	2	14.94	7.47	55437.	414115.	111.60
781	2	8.18	4.09	61352.	250931.	9.16
782	2	34.78	17.39	25174.	437770.	15.12
783	2	28.15	14.08	31501.	443384.	27.45
		TOTAL			AVERAGE	
		13063061.	18476490.	7649632.	6.28	8.88
		EFFECTIVE DEGREES OF FREEDOM= 6		STUDENTS T-VALUE=	2.45	ALPHA=0.05

Table 3. Stratified analysis cod age composition, numbers per standard tow.

COD GEAC 2007 3PS No Zone (S1 BY AGE)
 ANALYSIS FOR TRIP 7 2007 VESSEL 48 ICNAF 3P

AGE COMPOSITION-NUMBERS PER STANDARD TOW
 SUMMARY TABLE SPECIES:SPECIES 0438 SEX:COMBINED

AGE IN YEARS	TOTAL NUMBERS	UPPER LIMIT	LOWER LIMIT	MEAN PER TOW	UPPER LIMIT	LOWER LIMIT	D.F.
0	0.	0.	0.	0.00	0.00	0.00	0
1	6331955.	9729815.	934095.	3.04	4.68	1.41	3
2	2193412.	3268044.	1118780.	1.05	1.57	0.54	9
3	5088118.	7106058.	3070178.	2.45	3.42	1.48	11
4	1885653.	3229161.	542146.	0.91	1.55	0.26	3
5	1628653.	3278927.	-21621.	0.78	1.58	-0.01	2
6	469330.	907584.	31076.	0.23	0.44	0.01	3
7	88072.	163133.	13012.	0.04	0.08	0.01	6
8	64362.	103582.	25141.	0.03	0.05	0.01	7
9	168234.	250838.	85629.	0.08	0.12	0.04	6
10	24674.	62496.	-13149.	0.01	0.03	-0.01	4
11	0.	0.	0.	0.00	0.00	0.00	0
12	0.	0.	0.	0.00	0.00	0.00	0
13	0.	0.	0.	0.00	0.00	0.00	0
14	37417.	156489.	-81655.	0.02	0.08	-0.04	3
UNKNOWN	32574.	123011.	-57862.	0.02	0.06	-0.03	4
TOTAL	18012456.	22569116.	13455799.	8.66	10.85	6.47	14

ESTIMATION TYPE:STANDARD TRANSFORMATION TYPE:NONE CONFIDENCE LEVEL: 0.95%
 ***-ONE OR MORE OF THE LOWER LIMITS IN THE ABOVE TABLE IS LESS THAN OR EQUAL TO ZERO.
 VARIANCE IS TOO LARGE FOR VALID CONFIDENCE LIMITS ****

Table 4. Cod abundance (thousands of fish) and biomass (t) estimates.

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Abundance (thousands of fish)		Biomass (t)	
			Cape Ballard	Cape Ballard	Cape Ballard	Cape Ballard
			7	7	7	7
			75	75	75	75
			5-Dec 2007	5-Dec 2007	5-Dec 2007	5-Dec 2007
<30	314	974	.	.	.	.
	320	1320	2020	2020	2541	2541
		Subtotal	2020	2020	2541	2541
31-50	312	272	481	481	569	569
	315	827	426	426	112	112
	321	1189	748	748	1400	1400
	325	944	584	584	156	156
	326	166	46	46	15	15
	783	229	551	551	443	443
		Subtotal	2837	2837	2697	2697
51-100	311	317	930	930	169	169
	317	193	2425	2425	348	348
	319	984	1929	1929	1429	1429
	322	1567	964	964	436	436
	323	696	1675	1675	735	735
	324	494	316	316	106	106
	781	446	1196	1196	251	251
	782	183	1070	1070	438	438
	Subtotal	10505	10505	3911	3911	
101-150	310	170	245	245	200	200
	313	165	636	636	596	596
	316	189	0	0	0	0
	318	129	1287	1287	2188	2188
	779	422	29	29	2	2
	780	403	222	222	414	414
		Subtotal	2418	2418	3400	3400
151-200	705	195	80	80	100	100
	706	476	19	19	29	29
	707	74	57	57	86	86
	716	539	110	110	169	169
	Subtotal	267	267	384	384	
201-300	708	126	.	.	.	.
	711	593	38	38	127	127
	712	731	0	0	0	0
	713	851	0	0	0	0
	714	1074	49	49	3	3
	Subtotal	88	88	130	130	
Total ¹			18,133	18,133	13,063	13,063

¹ Totals are for all strata fished. Individual strata totals rounded to nearest 1000.

. denotes strata not fished

Table 5. Summary of plaice catches for stratified random survey, NAFO Subdivision 3Ps, 29 November–12 December 2007.

Set	Cape Ballard Trip 7			Unit StrLin Area	Depth (m)	Set Location		PLAICE		Set Duration (min)	Tow Distance (n.mi.)	PLAICE Mean Weight (kg)
	Month	Day				Lat (N)	Long (W)	Catch # of Fish	Catch Weight (kg)			
1	11	28		780 N28	234	47.29	54.11	78	13.5	15	0.8	0.2
2	11	29		780 N28	223	47.01	54.65	57	8.2	15	0.8	0.1
3	11	29		782 N29	161	46.98	54.35	43	7.8	15	0.8	0.2
4	11	29		783 N25	74	48.80	54.39	10	1.9	15	0.8	0.2
5	11	29		783 N29	77	46.73	54.40	1	0.0	15	0.8	0.0
6	11	29		782 N29	117	46.64	54.59	16	3.0	15	0.8	0.2
7	11	29		779 N29	222	46.64	54.79	35	4.1	15	0.8	0.1
8	11	30		322 M29	154	46.65	55.10	22	1.4	15	0.8	0.1
9	11	30		781 M29	114	46.67	55.61	68	2.7	15	0.8	0.0
10	11	30		781 M29	145	46.67	55.83	19	2.8	15	0.8	0.1
11	11	30		322 M30	144	46.37	55.83	74	8.1	15	0.8	0.1
12	11	30		322 M30	144	46.49	55.57	43	2.4	15	0.8	0.1
13	11	30		322 M29	140	46.51	55.53	67	2.4	15	0.8	0.0
14	11	30		322 M30	170	46.25	55.06	128	5.7	15	0.8	0.0
15	11	30		324 N30	169	46.23	54.95	93	6.3	15	0.8	0.1
16	12	1		779 N30	202	46.42	54.83	58	4.1	15	0.8	0.1
17	12	1		324 N30	176	46.43	54.67	89	5.6	15	8	0.1
19	12	1		326 N31	86	45.89	54.39	45	1.0	15	0.8	0.0
20	12	1		326 N31	82	45.63	54.44	22	2.8	15	0.8	0.1
21	12	1		325 N31	78	45.62	54.65	10	4.0	15	0.8	0.4
22	12	1		325 N31	82	45.79	54.70	20	1.9	15	0.8	0.1
23	12	1		325 N31	69	45.84	54.87	4	1.2	15	0.8	0.3
24	12	1		325 N31	66	45.92	54.87	7	1.8	15	0.8	0.3
25	12	2		323 M30	176	46.01	55.07	271	14.4	15	0.8	0.1
26	12	2		323 M31	164	45.94	55.18	199	8.9	15	0.8	0.0
27	12	3		323 M31	106	45.76	55.05	10	6.1	15	0.8	0.6
28	12	3		323 M31	156	45.72	55.19	1343	128.1	15	0.8	0.1
29	12	3		320 N31	52	45.77	54.77	0	0.0	15	0.8	0.0
30	12	3		321 M31	61	45.86	55.65	7	5.1	15	0.8	0.7
31	12	3		321 M31	73	45.70	55.44	11	6.7	15	0.8	0.6
32	12	3		321 M31	68	45.63	55.47	3	1.9	15	0.8	0.6
33	12	4		321 M30	61	46.04	55.58	8	6.6	15	0.8	0.8
35	12	5		319 M32	165	45.31	55.32	82	18.3	15	0.8	0.2
36	12	6		319 M32	140	45.22	55.04	26	5.5	15	0.8	0.2
37	12	6		319 N32	152	45.11	54.74	464	232.1	15	0.8	0.5
38	12	6		319 N32	114	45.21	54.55	106	15.3	15	0.8	0.1
39	12	6		318 M32	213	45.14	55.16	3	0.6	15	0.8	0.2
40	12	6		707 M32	322	45.11	55.19	2	0.9	13	0.7	0.4
41	12	6		318 M32	247	45.09	55.24	2	1.6	15	0.8	0.8
42	12	7		707 M33	321	44.89	55.84	7	1.6	15	0.8	0.2
43	12	7		711 L33	422	44.80	56.24	0	0.0	15	0.8	
44	12	7		706 L32	361	45.01	56.35	0	0.0	15	0.8	
45	12	7		706 L32	329	45.02	56.29	1	0.7	15	0.8	0.7
46	12	7		316 L32	223	45.08	56.20	19	4.1	15	0.8	0.2
47	12	7		315 M32	85	45.10	55.96	156	14.4	15	0.8	0.1
48	12	7		315 M32	63	45.30	55.96	94	28.3	15	0.8	0.3
49	12	8		315 L32	72	45.32	56.13	68	23.3	15	0.8	0.3
50	12	8		320 L31	43	45.62	56.16	2	0.7	15	0.8	0.4
51	12	8		317 L32	116	45.42	56.41	573	69.3	15	0.8	0.1
52	12	8		706 L32	349	45.45	56.59	0	0.0	15	0.8	
53	12	8		711 J32	396	45.40	58.76	1	0.1	15	0.8	0.1
54	12	8		712 K31	427	45.55	57.11	0	0.0	15	0.8	
55	12	8		712 K31	410	45.69	57.99	0	0.0	15	0.8	
56	12	8		317 L31	101	45.79	56.75	283	40.6	15	0.8	0.1
57	12	8		316 L31	227	45.84	56.85	16	1.4	15	0.8	0.1
58	12	9		320 L31	52	45.93	56.74	7	14.5	15	0.8	2.1
59	12	9		320 L31	50	45.99	56.56	2	1.7	15	0.8	0.9
60	12	9		320 L30	42	46.07	56.67	0	0.0	15	0.8	
61	12	10		716 L28	284	47.10	56.83	26	6.8	15	0.8	0.3
62	12	10		716 L28	286	47.06	56.95	22	7.3	15	0.8	0.3
63	12	10		310 L28	224	47.07	56.78	31	8.1	15	0.8	0.3
64	12	11		310 L29	179	46.98	56.92	83	18.9	15	0.8	0.2
65	12	11		311 L29	136	46.90	56.99	94	21.0	15	0.8	0.2
66	12	11		311 K29	125	46.68	57.34	162	14.9	15	0.8	0.1
67	12	11		312 K29	61	46.66	57.31	7	3.7	15	0.8	0.5
68	12	11		313 K30	214	46.47	57.43	30	7.2	15	0.8	0.2
69	12	11		705 K30	288	46.43	57.44	9	4.7	15	0.8	0.5
70	12	11		312 K30	67	46.26	57.17	1	1.4	15	0.8	1.4
72	12	11		313 K30	261	46.10	57.14	10	6.1	15	0.8	0.6
73	12	12		705 K30	319	46.21	57.35	4	2.1	15	0.8	0.5
74	12	12		713 K30	409	46.26	57.49	0	0.0	15	0.8	
76	12	12		713 K30	469	46.46	57.93	0	0.0	15	0.8	
77	12	12		714 J29	461	46.62	58.05	2	0.1	15	0.8	0.0
78	12	12		714 J29	462	46.68	58.21	0	0.0	15	0.8	
79	12	12		714 K29	450	46.66	57.90	0	0.0	15	0.8	
								Minimum	0.0	13.0	0.7	0.0
								Maximum	1343.0	15.0	8.0	2.1
								Mean	70.1	15.0	0.9	0.3
								Median	16.0	15.0	0.8	0.2
								Standard Error	2.4	0.0	0.0	0.0
								Total	5256.0	847.6		

Note: Sets 18, 34, 71, 75 were unsuccessful

Table 6. Stratified analysis estimated plaice abundance and biomass.

PLAICE GEAC 3PS 2007 No Zone

ANALYSIS FOR TRIP 7 2007 VESSEL 48 ICNAF 3P SPECIES 0889

NUMBERS						
STRATUM	NO. SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	114.00	57.00	18846.	1074215.	1352.00
311	2	256.00	128.00	36454.	4666072.	2312.00
312	2	8.00	4.00	33152.	132609.	18.00
313	2	40.00	20.00	22698.	453952.	200.00
315	3	318.00	106.00	106610.	11300643.	2044.00
316	2	35.00	17.50	22698.	397208.	4.50
317	2	856.00	428.00	23661.	10126697.	42050.00
318	2	5.00	2.50	17745.	44363.	0.50
319	4	678.00	169.50	135360.	22943538.	39670.33
320	5	11.00	2.20	162872.	358319.	8.20
321	4	29.00	7.25	149666.	1085082.	10.92
322	5	334.00	66.80	192723.	12873903.	1592.70
323	4	1823.00	455.75	95743.	43634652.	361986.25
324	2	101.90	50.95	67955.	3462317.	3536.41
325	4	41.00	10.25	129858.	1331041.	48.25
326	2	67.00	33.50	22835.	764977.	264.50
705	2	13.00	6.50	26824.	174359.	12.50
706	3	1.00	0.33	58051.	19350.	0.33
707	2	9.29	4.64	10180.	47262.	11.11
711	2	1.00	0.50	76622.	38311.	0.50
712	2	0.00	0.00	100557.	0.	0.00
713	2	0.00	0.00	117064.	0.	0.00
714	3	2.00	0.67	147741.	98494.	1.33
716	2	48.00	24.00	73320.	1759682.	8.00
779	2	93.00	46.50	58051.	2699361.	264.50
780	2	135.00	67.50	55437.	3742006.	220.50
781	2	87.00	43.50	61352.	2668823.	1200.50
782	2	59.00	29.50	25174.	742624.	364.50
783	2	11.00	5.50	31501.	173258.	40.50
		TOTAL			AVERAGE	
TOTAL		UPPER	LOWER	MEAN	UPPER	LOWER
126813128.		217040400.	36585856.	60.95	104.31	17.58
EFFECTIVE DEGREES OF FREEDOM=		4 STUDENTS	T-VALUE=	2.78	ALPHA=0.05	

WEIGHTS						
STRATUM	NO. SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	27.03	13.52	18846.	254702.	58.00
311	2	35.84	17.92	36454.	653250.	18.85
312	2	5.09	2.55	33152.	84372.	2.49
313	2	13.26	6.63	22698.	150485.	0.56
315	3	66.02	22.01	106610.	2346128.	49.84
316	2	5.45	2.73	22698.	61851.	3.73
317	2	109.96	54.98	23661.	1300855.	411.27
318	2	2.20	1.10	17745.	19520.	0.58
319	4	271.24	67.81	135360.	9178770.	12026.20
320	5	16.94	3.39	162872.	551811.	38.89
321	4	20.29	5.07	149666.	759183.	4.91
322	5	19.95	3.99	192723.	768965.	8.09
323	4	157.57	39.39	95743.	3771537.	3511.50
324	2	6.86	3.43	67955.	233086.	16.47
325	4	8.85	2.21	129858.	287310.	1.51
326	2	3.82	1.91	22835.	43615.	1.55
705	2	6.79	3.39	26824.	91069.	3.62
706	3	0.67	0.22	58051.	12965.	0.15
707	2	2.61	1.31	10180.	13292.	0.22
711	2	0.09	0.05	76622.	3448.	0.00
712	2	0.00	0.00	100557.	0.	0.00
713	2	0.00	0.00	117064.	0.	0.00
714	3	0.07	0.02	147741.	3447.	0.00
716	2	14.04	7.02	73320.	514707.	0.15
779	2	8.16	4.08	58051.	236847.	0.00
780	2	21.77	10.89	55437.	603433.	13.99
781	2	5.45	2.73	61352.	167185.	0.00
782	2	10.77	5.39	25174.	135560.	11.38
783	2	1.89	0.94	31501.	29769.	1.67
		TOTAL			AVERAGE	
TOTAL		UPPER	LOWER	MEAN	UPPER	LOWER
22277160.		47701936.	-3147615.	10.71	22.93	-1.51
LOWER CONFIDENCE LIMIT IS LESS THAN OR EQUAL TO ZERO						
****-VARIANCE TOO LARGE FOR VALID CONFIDENCE INTERVAL AT THIS VALUE OF ALPHA-****						
EFFECTIVE DEGREES OF FREEDOM=		3 STUDENTS	T-VALUE=	3.18	ALPHA=0.05	

Table 7. Stratified analysis plaice age composition, numbers per standard tow.

PLAICE GEAC 2007 3PS No Zone (S1 BY AGE) ANALYSIS FOR TRIP 7 2007 VESSEL 48 ICNAF 3P

AGE COMPOSITION-NUMBERS PER STANDARD TOW
SUMMARY TABLE SPECIES:SPECIES 0889 SEX:COMBINED

AGE IN YEARS	TOTAL NUMBERS	UPPER LIMIT	LOWER LIMIT	MEAN PER TOW	UPPER LIMIT	LOWER LIMIT	D.F.
0	0.	0.	0.	0.00	0.00	0.00	0
1	648436.	1069406.	227467.	0.31	0.51	0.11	7
2	20253546.	41356216.	-849126.	9.73	19.88	-0.41	3
3	20795192.	34625828.	6964559.	9.99	16.64	3.35	4
4	21511784.	42145592.	877979.	10.34	20.26	0.42	3
5	9491576.	20022424.	-1039271.	4.56	9.62	-0.50	3
6	11113780.	22750754.	-523194.	5.34	10.93	-0.25	3
7	10941784.	20321988.	1561580.	5.26	9.77	0.75	4
8	11255228.	20692000.	1818457.	5.41	9.94	0.87	5
9	6669417.	17100582.	-3761746.	3.21	8.22	-1.81	3
10	3903038.	11146682.	-3340605.	1.88	5.36	-1.61	3
11	1589550.	4769156.	-1590055.	0.76	2.29	-0.76	3
12	1175933.	3473588.	-1121722.	0.57	1.67	-0.54	3
13	707437.	1969485.	-554612.	0.34	0.95	-0.27	3
14	458745.	1265911.	-348421.	0.22	0.61	-0.17	3
15	157367.	293549.	21185.	0.08	0.14	0.01	5
16	234266.	569995.	-101462.	0.11	0.27	-0.05	3
17	51319.	173873.	-71234.	0.02	0.08	-0.03	4
18	34056.	96010.	-27899.	0.02	0.05	-0.01	5
UNKNOWN	320465.	4114484.	-3473554.	0.15	1.98	-1.67	1
TOTAL	121312928.	212609760.	30016102.	58.30	102.18	14.43	4

ESTIMATION TYPE:STANDARD TRANSFORMATION TYPE:NONE CONFIDENCE LEVEL: 0.95%
 ***-ONE OR MORE OF THE LOWER LIMITS IN THE ABOVE TABLE IS LESS THAN OR EQUAL TO ZERO.
 VARIANCE IS TOO LARGE FOR VALID CONFIDENCE LIMITS ***

Table 8. Plaice abundance (thousands of fish) and biomass (t) estimates.

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Abundance (thousands of fish)		Biomass (t)	
			Cape Ballard	Cape Ballard	Cape Ballard	Cape Ballard
			5-Dec 2007	5-Dec 2007		
<30	314	974	.	.		
	320	1320	358		552	
		Subtotal	358		552	
31-50	312	272	133		84	
	315	827	11301		2346	
	321	1189	1085		759	
	325	944	1331		287	
	326	166	765		44	
	783	229	173		30	
		Subtotal		14788		3550
51-100	311	317	4666		653	
	317	193	10127		1301	
	319	984	22944		9179	
	322	1567	12874		769	
	323	696	43635		3772	
	324	494	3462		233	
	781	446	2669		167	
	782	183	743		136	
	Subtotal		101119		16209	
101-150	310	170	1074		255	
	313	165	454		150	
	316	189	397		62	
	318	129	44		20	
	779	422	2699		237	
	780	403	3742		603	
		Subtotal		8411		1327
151-200	705	195	174		91	
	706	476	19		13	
	707	74	47		13	
	716	539	1760		515	
	Subtotal		2001		632	
201-300	708	126	.		.	
	711	593	38		3	
	712	731	0		0	
	713	851	0		0	
	714	1074	98		3	
	Subtotal		137		7	
Total ¹			126,813		22,277	

¹ Totals are for all strata fished. Individual strata totals rounded to nearest 1000.
. denotes strata not fished

Table 9. Summary of witch catches for stratified random survey, NAFO Subdivision 3Ps, 29 November–12 December 2007.

Set	Cape Ballard Trip 7			Unit StrLin Area	Depth (m)	Set Location		WITCH		Set Duration (min)	Tow Distance (n.mi.)	WITCH Mean Weight (kg)
	Month	Day	StrLin			Lat (N)	Long (W)	Catch # of Fish	Catch Weight (kg)			
1	11	28	780 N28	234	47.29	54.11	0	0.0	15	0.8		
2	11	29	780 N28	223	47.01	54.65	0	0.0	15	0.8		
3	11	29	782 N29	161	46.98	54.35	0	0.0	15	0.8		
4	11	29	783 N25	74	48.80	54.39	0	0.0	15	0.8		
5	11	29	783 N29	77	46.73	54.40	0	0.0	15	0.8		
6	11	29	782 N29	117	46.64	54.59	0	0.0	15	0.8		
7	11	29	779 N29	222	46.64	54.79	2	0.0	15	0.8	0.0	
8	11	30	322 M29	154	46.65	55.10	0	0.0	15	0.8		
9	11	30	781 M29	114	46.67	55.61	0	0.0	15	0.8		
10	11	30	781 M29	145	46.67	55.83	0	0.0	15	0.8		
11	11	30	322 M30	144	46.37	55.83	0	0.0	15	0.8		
12	11	30	322 M30	144	46.49	55.57	0	0.0	15	0.8		
13	11	30	322 M29	140	46.51	55.53	0	0.0	15	0.8		
14	11	30	322 M30	170	46.25	55.06	1	0.2	15	0.8	0.2	
15	11	30	324 N30	169	46.23	54.95	0	0.0	15	0.8		
16	12	1	779 N30	202	46.42	54.83	0	0.0	15	0.8		
17	12	1	324 N30	176	46.43	54.67	4	0.5	15	8	0.1	
19	12	1	326 N31	86	45.89	54.39	0	0.0	15	0.8		
20	12	1	326 N31	82	45.63	54.44	0	0.0	15	0.8		
21	12	1	325 N31	78	45.62	54.65	0	0.0	15	0.8		
22	12	1	325 N31	82	45.79	54.70	0	0.0	15	0.8		
23	12	1	325 N31	69	45.84	54.87	0	0.0	15	0.8		
24	12	1	325 N31	66	45.92	54.87	0	0.0	15	0.8		
25	12	2	323 M30	176	46.01	55.07	0	0.0	15	0.8		
26	12	2	323 M31	164	45.94	55.18	0	0.0	15	0.8		
27	12	3	323 M31	106	45.76	55.05	0	0.0	15	0.8		
28	12	3	323 M31	156	45.72	55.19	41	23.0	15	0.8	0.6	
29	12	3	320 N31	52	45.77	54.77	0	0.0	15	0.8		
30	12	3	321 M31	61	45.86	55.65	0	0.0	15	0.8		
31	12	3	321 M31	73	45.70	55.44	0	0.0	15	0.8		
32	12	3	321 M31	68	45.63	55.47	0	0.0	15	0.8		
33	12	4	321 M30	61	46.04	55.58	0	0.0	15	0.8		
35	12	5	319 M32	165	45.31	55.32	35	14.8	15	0.8	0.4	
36	12	6	319 M32	140	45.22	55.04	76	31.6	15	0.8	0.4	
37	12	6	319 N32	152	45.11	54.74	66	23.8	15	0.8	0.4	
38	12	6	319 N32	114	45.21	54.55	0	0.0	15	0.8		
39	12	6	318 M32	213	45.14	55.16	0	0.0	15	0.8		
40	12	6	707 M32	322	45.11	55.19	1	0.5	13	0.7	0.5	
41	12	6	318 M32	247	45.09	55.24	1	0.2	15	0.8	0.2	
42	12	7	707 M33	321	44.89	55.84	95	41.9	15	0.8	0.4	
43	12	7	711 L33	422	44.80	56.24	7	3.5	15	0.8	0.5	
44	12	7	706 L32	361	45.01	56.35	23	4.1	15	0.8	0.2	
45	12	7	706 L32	329	45.02	56.29	4	0.6	15	0.8	0.2	
46	12	7	316 L32	223	45.08	56.20	27	8.9	15	0.8	0.3	
47	12	7	315 M32	85	45.10	55.96	2	0.1	15	0.8	0.1	
48	12	7	315 M32	63	45.30	55.96	0	0.0	15	0.8		
49	12	8	315 L32	72	45.32	56.13	0	0.0	15	0.8		
50	12	8	320 L31	43	45.62	56.16	0	0.0	15	0.8		
51	12	8	317 L32	116	45.42	56.41	2	0.6	15	0.8	0.3	
52	12	8	706 L32	349	45.45	56.59	106	20.0	15	0.8	0.2	
53	12	8	711 J32	396	45.40	58.76	42	6.1	15	0.8	0.1	
54	12	8	712 K31	427	45.55	57.11	60	6.6	15	0.8	0.1	
55	12	8	712 K31	410	45.69	57.99	40	4.5	15	0.8	0.1	
56	12	8	317 L31	101	45.79	56.75	3	0.1	15	0.8	0.0	
57	12	8	316 L31	227	45.84	56.85	11	3.1	15	0.8	0.3	
58	12	9	320 L31	52	45.93	56.74	0	0.0	15	0.8		
59	12	9	320 L31	50	45.99	56.56	0	0.0	15	0.8		
60	12	9	320 L30	42	46.07	56.67	0	0.0	15	0.8		
61	12	10	716 L28	284	47.10	56.83	75	17.1	15	0.8	0.2	
62	12	10	716 L28	286	47.06	56.95	42	9.4	15	0.8	0.2	
63	12	10	310 L28	224	47.07	56.78	37	6.7	15	0.8	0.2	
64	12	11	310 L29	179	46.98	56.92	27	6.4	15	0.8	0.2	
65	12	11	311 L29	136	46.90	56.99	35	6.5	15	0.8	0.2	
66	12	11	311 K29	125	46.68	57.34	5	1.9	15	0.8	0.4	
67	12	11	312 K29	61	46.66	57.31	0	0.0	15	0.8		
68	12	11	313 K30	214	46.47	57.43	17	3.1	15	0.8	0.2	
69	12	11	705 K30	288	46.43	57.44	12	3.0	15	0.8	0.3	
70	12	11	312 K30	67	46.26	57.17	0	0.0	15	0.8		
72	12	11	313 K30	261	46.10	57.14	60	22.9	15	0.8	0.4	
73	12	12	705 K30	319	46.21	57.35	39	9.0	15	0.8	0.2	
74	12	12	713 K30	409	46.26	57.49	82	8.5	15	0.8	0.1	
76	12	12	713 K30	469	46.46	57.93	52	3.0	15	0.8	0.1	
77	12	12	714 J29	461	46.62	58.05	18	1.3	15	0.8	0.1	
78	12	12	714 J29	462	46.68	58.21	13	1.3	15	0.8	0.1	
79	12	12	714 K29	450	46.66	57.90	12	0.9	15	0.8	0.1	
							Minimum	0.0	0.0	13.0	0.7	0.0
							Maximum	106.0	41.9	15.0	8.0	0.6
							Mean	15.7	3.9	15.0	0.9	0.2
							Median	0.0	0.0	15.0	0.8	0.2
							Standard Error	0.3	0.1	0.0	0.0	0.0
							Total	1175.0	295.3			

Note: Sets 18, 34, 71, 75 were unsuccessful

Table 10. Stratified analysis estimated with abundance and biomass.

WITCH GEAC 3PS 2007 No Zone
 ANALYSIS FOR TRIP 7 2007 VESSEL 48 ICNAF 3P SPECIES 0890

NUMBERS							
STRATUM	NO. SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.	
310	2	64.00	32.00	18846.	603068.	50.00	
311	2	40.00	20.00	36454.	729074.	450.00	
312	2	0.00	0.00	33152.	0.	0.00	
313	2	77.00	38.50	22698.	873857.	924.50	
315	3	2.00	0.67	106610.	71073.	1.33	
316	2	38.00	19.00	22698.	431254.	128.00	
317	2	5.00	2.50	23661.	59151.	0.50	
318	2	1.00	0.50	17745.	8873.	0.50	
319	4	177.00	44.25	135360.	5989685.	1174.92	
320	5	0.00	0.00	162872.	0.	0.00	
321	4	0.00	0.00	149666.	0.	0.00	
322	5	1.00	0.20	192723.	38545.	0.20	
323	4	41.00	10.25	95743.	981361.	420.25	
324	2	0.40	0.20	67955.	13591.	0.08	
325	4	0.00	0.00	129858.	0.	0.00	
326	2	0.00	0.00	22835.	0.	0.00	
705	2	51.00	25.50	26824.	684023.	364.50	
706	3	133.00	44.33	58051.	2573585.	2942.33	
707	2	96.14	48.07	10180.	489344.	4404.58	
711	2	49.00	24.50	76622.	1877227.	612.50	
712	2	100.00	50.00	100557.	5027858.	200.00	
713	2	134.00	67.00	117064.	7843321.	450.00	
714	3	43.00	14.33	147741.	2117615.	10.33	
716	2	117.00	58.50	73320.	4289224.	544.50	
779	2	2.00	1.00	58051.	58051.	2.00	
780	2	0.00	0.00	55437.	0.	0.00	
781	2	0.00	0.00	61352.	0.	0.00	
782	2	0.00	0.00	25174.	0.	0.00	
783	2	0.00	0.00	31501.	0.	0.00	
		TOTAL	AVERAGE				
		UPPER	LOWER	MEAN	UPPER	LOWER	
		34759780.	44220844.	25298718.	16.71	21.25	12.16

EFFECTIVE DEGREES OF FREEDOM= 10 STUDENTS T-VALUE= 2.23 ALPHA=0.05

WEIGHTS							
STRATUM	NO. SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.	
310	2	13.02	6.51	18846.	122687.	0.04	
311	2	8.37	4.18	36454.	152559.	10.44	
312	2	0.00	0.00	33152.	0.	0.00	
313	2	25.98	12.99	22698.	294842.	196.42	
315	3	0.11	0.04	106610.	3909.	0.00	
316	2	11.95	5.98	22698.	135618.	16.53	
317	2	0.69	0.34	23661.	8163.	0.15	
318	2	0.20	0.10	17745.	1775.	0.02	
319	4	70.06	17.52	135360.	2370833.	183.52	
320	5	0.00	0.00	162872.	0.	0.00	
321	4	0.00	0.00	149666.	0.	0.00	
322	5	0.17	0.03	192723.	6553.	0.01	
323	4	22.97	5.74	95743.	549801.	131.91	
324	2	0.05	0.02	67955.	1665.	0.00	
325	4	0.00	0.00	129858.	0.	0.00	
326	2	0.00	0.00	22835.	0.	0.00	
705	2	11.99	5.99	26824.	160812.	17.58	
706	3	24.70	8.23	58051.	477951.	106.74	
707	2	42.54	21.27	10180.	216504.	852.96	
711	2	9.57	4.78	76622.	366634.	3.25	
712	2	11.14	5.57	100557.	560103.	2.12	
713	2	11.49	5.75	117064.	672536.	15.29	
714	3	3.50	1.17	147741.	172364.	0.04	
716	2	26.45	13.23	73320.	969658.	30.03	
779	2	0.03	0.01	58051.	871.	0.00	
780	2	0.00	0.00	55437.	0.	0.00	
781	2	0.00	0.00	61352.	0.	0.00	
782	2	0.00	0.00	25174.	0.	0.00	
783	2	0.00	0.00	31501.	0.	0.00	
		TOTAL	AVERAGE				
		UPPER	LOWER	MEAN	UPPER	LOWER	
		7245837.	10145601.	4346072.	3.48	4.88	2.09

EFFECTIVE DEGREES OF FREEDOM= 8 STUDENTS T-VALUE= 2.31 ALPHA=0.05

Table 11. Stratified analysis with age composition, numbers per standard tow.

WITCH GEAC 2007 3PS No Zone (S1 BY AGE)
 ANALYSIS FOR TRIP 7 2007 VESSEL 48 ICNAF 3P

AGE COMPOSITION-NUMBERS PER STANDARD TOW

SUMMARY TABLE
 SPECIES:SPECIES 0890
 SEX:COMBINED

AGE	IN YEARS	TOTAL NUMBERS	UPPER LIMIT	LOWER LIMIT	MEAN PER TOW	UPPER LIMIT	LOWER LIMIT	D.F.
0	0	0.	0.	0.	0.00	0.00	0.00	0
1	1	1129658.	7434210.	-5174894.	0.54	3.57	-2.49	1
2	2	779245.	2336303.	-777813.	0.37	1.12	-0.37	1
3	3	3210693.	11964325.	-5542941.	1.54	5.75	-2.66	1
4	4	3282928.	5492934.	1072922.	1.58	2.64	0.52	2
5	5	5536130.	9892245.	1180016.	2.66	4.75	0.57	2
6	6	4915587.	7501249.	2329925.	2.36	3.61	1.12	4
7	7	5103331.	7140055.	3066607.	2.45	3.43	1.47	6
8	8	4095551.	5761271.	2429833.	1.97	2.77	1.17	8
9	9	3479348.	6122757.	835939.	1.67	2.94	0.40	4
10	10	1916509.	3339339.	493679.	0.92	1.60	0.24	5
11	11	750426.	1371519.	129334.	0.36	0.66	0.06	6
12	12	347657.	627058.	68256.	0.17	0.30	0.03	5
13	13	89623.	215181.	-35936.	0.04	0.10	-0.02	4
UNKNOWN		58532.	802192.	-685127.	0.03	0.39	-0.33	1
TOTAL		34695220.	44154628.	25235814.	16.67	21.22	12.13	10

ESTIMATION TYPE:STANDARD TRANSFORMATION TYPE:NONE CONFIDENCE LEVEL: 0.95%
 ****-ONE OR MORE OF THE LOWER LIMITS IN THE ABOVE TABLE IS LESS THAN OR EQUAL TO ZERO.
 VARIANCE IS TOO LARGE FOR VALID CONFIDENCE LIMITS ****

Table 12. Witch abundance (thousands of fish) and biomass (t) estimates.

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Abundance (thousands of fish)		Biomass (t)	
			Cape Ballard	Cape Ballard	Cape Ballard	Cape Ballard
			7	7	7	7
			75	75	75	75
			5-Dec 2007	5-Dec 2007	5-Dec 2007	5-Dec 2007
<30	314	974	.	.	.	.
	320	1320	0	0	0	0
		Subtotal	0	0	0	0
31-50	312	272	0	0	0	0
	315	827	71	71	4	4
	321	1189	0	0	0	0
	325	944	0	0	0	0
	326	166	0	0	0	0
	783	229	0	0	0	0
		Subtotal	71	71	4	4
51-100	311	317	729	729	153	153
	317	193	59	59	8	8
	319	984	5990	5990	2371	2371
	322	1567	39	39	7	7
	323	696	981	981	550	550
	324	494	14	14	2	2
	781	446	0	0	0	0
	782	183	0	0	0	0
	Subtotal	7811	7811	3090	3090	
101-150	310	170	603	603	123	123
	313	165	874	874	295	295
	316	189	431	431	136	136
	318	129	9	9	2	2
	779	422	58	58	1	1
	780	403	0	0	0	0
	Subtotal	1975	1975	556	556	
151-200	705	195	684	684	161	161
	706	476	2574	2574	478	478
	707	74	489	489	217	217
	716	539	4289	4289	970	970
	Subtotal	8036	8036	1825	1825	
201-300	708	126	.	.	.	.
	711	593	1877	1877	367	367
	712	731	5028	5028	560	560
	713	851	7843	7843	673	673
	714	1074	2118	2118	172	172
	Subtotal	16866	16866	1772	1772	
	Total ¹		34,760	7,246	7,246	

¹ Totals are for all strata fished. Individual strata totals rounded to nearest 1000.
. denotes strata not fished

Table 13. Summary of haddock catches for stratified random survey, NAFO Subdivision 3Ps, 29 November–12 December 2007.

Set	Cape Ballard Trip 7			Unit StrLin Area	Depth (m)	Set Location		HADDOCK		Duration (min)	Tow Distance (n.mi.)	HADDOCK Mean Weight (kg)
	Month	Day				Lat (N)	Long (W)	Catch # of Fish	Catch Weight (kg)			
1	11	28		780 N28	234	47.29	54.11	0	0.0	15	0.8	
2	11	29		780 N28	223	47.01	54.65	0	0.0	15	0.8	
3	11	29		782 N29	161	46.98	54.35	0	0.0	15	0.8	
4	11	29		783 N25	74	48.80	54.39	0	0.0	15	0.8	
5	11	29		783 N29	77	46.73	54.40	0	0.0	15	0.8	
6	11	29		782 N29	117	46.64	54.59	0	0.0	15	0.8	
7	11	29		779 N29	222	46.64	54.79	0	0.0	15	0.8	
8	11	30		322 M29	154	46.65	55.10	0	0.0	15	0.8	
9	11	30		781 M29	114	46.67	55.61	0	0.0	15	0.8	
10	11	30		781 M29	145	46.67	55.83	0	0.0	15	0.8	
11	11	30		322 M30	144	46.37	55.83	0	0.0	15	0.8	
12	11	30		322 M30	144	46.49	55.57	0	0.0	15	0.8	
13	11	30		322 M29	140	46.51	55.53	0	0.0	15	0.8	
14	11	30		322 M30	170	46.25	55.06	0	0.0	15	0.8	
15	11	30		324 N30	169	46.23	54.95	0	0.0	15	0.8	
16	12	1		779 N30	202	46.42	54.83	0	0.0	15	0.8	
17	12	1		324 N30	176	46.43	54.67	0	0.0	15	0.8	
19	12	1		326 N31	86	45.89	54.39	0	0.0	15	0.8	
20	12	1		326 N31	82	45.63	54.44	0	0.0	15	0.8	
21	12	1		325 N31	78	45.62	54.65	0	0.0	15	0.8	
22	12	1		325 N31	82	45.79	54.70	0	0.0	15	0.8	
23	12	1		325 N31	69	45.84	54.87	0	0.0	15	0.8	
24	12	1		325 N31	66	45.92	54.87	0	0.0	15	0.8	
25	12	2		323 M30	176	46.01	55.07	0	0.0	15	0.8	
26	12	2		323 M31	164	45.94	55.18	0	0.0	15	0.8	
27	12	3		323 M31	106	45.76	55.05	0	0.0	15	0.8	
28	12	3		323 M31	156	45.72	55.19	0	0.0	15	0.8	
29	12	3		320 N31	52	45.77	54.77	0	0.0	15	0.8	
30	12	3		321 M31	61	45.86	55.65	0	0.0	15	0.8	
31	12	3		321 M31	73	45.70	55.44	0	0.0	15	0.8	
32	12	3		321 M31	68	45.63	55.47	0	0.0	15	0.8	
33	12	4		321 M30	61	46.04	55.58	0	0.0	15	0.8	
35	12	5		319 M32	165	45.31	55.32	19	46.0	15	0.8	2.4
36	12	6		319 M32	140	45.22	55.04	41	109.5	15	0.8	2.7
37	12	6		319 N32	152	45.11	54.74	0	0.0	15	0.8	
38	12	6		319 N32	114	45.21	54.55	0	0.0	15	0.8	
39	12	6		318 M32	213	45.14	55.16	8	19.8	15	0.8	2.5
40	12	6		707 M32	322	45.11	55.19	0	0.0	13	0.7	
41	12	6		318 M32	247	45.09	55.24	11	21.2	15	0.8	1.9
42	12	7		707 M33	321	44.89	55.84	0	0.0	15	0.8	
43	12	7		711 L33	422	44.80	56.24	0	0.0	15	0.8	
44	12	7		706 L32	361	45.01	56.35	0	0.0	15	0.8	
45	12	7		706 L32	329	45.02	56.29	0	0.0	15	0.8	
46	12	7		316 L32	223	45.08	56.20	36	5.0	15	0.8	0.1
47	12	7		315 M32	85	45.10	55.96	0	0.0	15	0.8	
48	12	7		315 M32	63	45.30	55.96	0	0.0	15	0.8	
49	12	8		315 L32	72	45.32	56.13	0	0.0	15	0.8	
50	12	8		320 L31	43	45.62	56.16	0	0.0	15	0.8	
51	12	8		317 L32	116	45.42	56.41	0	0.0	15	0.8	
52	12	8		706 L32	349	45.45	56.59	0	0.0	15	0.8	
53	12	8		711 J32	396	45.40	58.76	0	0.0	15	0.8	
54	12	8		712 K31	427	45.55	57.11	0	0.0	15	0.8	
55	12	8		712 K31	410	45.69	57.99	0	0.0	15	0.8	
56	12	8		317 L31	101	45.79	56.75	0	0.0	15	0.8	
57	12	8		316 L31	227	45.84	56.85	0	0.0	15	0.8	
58	12	9		320 L31	52	45.93	56.74	0	0.0	15	0.8	
59	12	9		320 L31	50	45.99	56.56	0	0.0	15	0.8	
60	12	9		320 L30	42	46.07	56.67	0	0.0	15	0.8	
61	12	10		716 L28	284	47.10	56.83	0	0.0	15	0.8	
62	12	10		716 L28	286	47.06	56.95	0	0.0	15	0.8	
63	12	10		310 L28	224	47.07	56.78	8	1.3	15	0.8	0.2
64	12	11		310 L29	179	46.98	56.92	17	10.5	15	0.8	0.6
65	12	11		311 L29	136	46.90	56.99	0	0.0	15	0.8	
66	12	11		311 K29	125	46.68	57.34	0	0.0	15	0.8	
67	12	11		312 K29	61	46.66	57.31	0	0.0	15	0.8	
68	12	11		313 K30	214	46.47	57.43	0	0.0	15	0.8	
69	12	11		705 K30	288	46.43	57.44	0	0.0	15	0.8	
70	12	11		312 K30	67	46.26	57.17	0	0.0	15	0.8	
72	12	11		313 K30	261	46.10	57.14	0	0.0	15	0.8	
73	12	12		705 K30	319	46.21	57.35	0	0.0	15	0.8	
74	12	12		713 K30	409	46.26	57.49	0	0.0	15	0.8	
76	12	12		713 K30	469	46.46	57.93	0	0.0	15	0.8	
77	12	12		714 J29	461	46.62	58.05	0	0.0	15	0.8	
78	12	12		714 J29	462	46.68	58.21	0	0.0	15	0.8	
79	12	12		714 K29	450	46.66	57.90	0	0.0	15	0.8	
								Minimum	0.0	13.0	0.7	0.1
								Maximum	41.0	109.5	8.0	2.7
								Mean	1.9	2.8	15.0	0.9
								Median	0.0	0.0	15.0	0.8
								Standard Error	0.1	0.2	0.0	0.0
								Total	140.0	213.3		

Note: Sets 18, 34, 71, 75 were unsuccessful

Table 14. Stratified analysis estimated haddock abundance and biomass.

HADDOCK GEAC 3PS 2007 No Zone
 ANALYSIS FOR TRIP 7 2007 VESSEL 48 ICNAF 3P SPECIES 0441

NUMBERS						
STRATUM	NO. SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	25.00	12.50	18846.	235573.	40.50
311	2	0.00	0.00	36454.	0.	0.00
312	2	0.00	0.00	33152.	0.	0.00
313	2	0.00	0.00	22698.	0.	0.00
315	3	0.00	0.00	106610.	0.	0.00
316	2	36.00	18.00	22698.	408556.	648.00
317	2	0.00	0.00	23661.	0.	0.00
318	2	19.00	9.50	17745.	168581.	4.50
319	4	60.00	15.00	135360.	2030402.	380.67
320	5	0.00	0.00	162872.	0.	0.00
321	4	0.00	0.00	149666.	0.	0.00
322	5	0.00	0.00	192723.	0.	0.00
323	4	0.00	0.00	95743.	0.	0.00
324	2	0.00	0.00	67955.	0.	0.00
325	4	0.00	0.00	129858.	0.	0.00
326	2	0.00	0.00	22835.	0.	0.00
705	2	0.00	0.00	26824.	0.	0.00
706	3	0.00	0.00	58051.	0.	0.00
707	2	0.00	0.00	10180.	0.	0.00
711	2	0.00	0.00	76622.	0.	0.00
712	2	0.00	0.00	100557.	0.	0.00
713	2	0.00	0.00	117064.	0.	0.00
714	3	0.00	0.00	147741.	0.	0.00
716	2	0.00	0.00	73320.	0.	0.00
779	2	0.00	0.00	58051.	0.	0.00
780	2	0.00	0.00	55437.	0.	0.00
781	2	0.00	0.00	61352.	0.	0.00
782	2	0.00	0.00	25174.	0.	0.00
783	2	0.00	0.00	31501.	0.	0.00

TOTAL						
TOTAL	UPPER	LOWER	MEAN	UPPER	LOWER	
2843113.	7250935.	-1564709.	1.37	3.48	-0.75	

EFFECTIVE DEGREES OF FREEDOM= 3 STUDENTS T-VALUE= 3.18 ALPHA=0.05

WEIGHTS						
STRATUM	NO. SETS	TOTAL	AV./SET	UNITS	TOTAL NO	VAR.
310	2	11.86	5.93	18846.	111756.	42.50
311	2	0.00	0.00	36454.	0.	0.00
312	2	0.00	0.00	33152.	0.	0.00
313	2	0.00	0.00	22698.	0.	0.00
315	3	0.00	0.00	106610.	0.	0.00
316	2	4.98	2.49	22698.	56517.	12.40
317	2	0.00	0.00	23661.	0.	0.00
318	2	41.00	20.50	17745.	363780.	1.04
319	4	155.45	38.86	135360.	5260433.	2685.98
320	5	0.00	0.00	162872.	0.	0.00
321	4	0.00	0.00	149666.	0.	0.00
322	5	0.00	0.00	192723.	0.	0.00
323	4	0.00	0.00	95743.	0.	0.00
324	2	0.00	0.00	67955.	0.	0.00
325	4	0.00	0.00	129858.	0.	0.00
326	2	0.00	0.00	22835.	0.	0.00
705	2	0.00	0.00	26824.	0.	0.00
706	3	0.00	0.00	58051.	0.	0.00
707	2	0.00	0.00	10180.	0.	0.00
711	2	0.00	0.00	76622.	0.	0.00
712	2	0.00	0.00	100557.	0.	0.00
713	2	0.00	0.00	117064.	0.	0.00
714	3	0.00	0.00	147741.	0.	0.00
716	2	0.00	0.00	73320.	0.	0.00
779	2	0.00	0.00	58051.	0.	0.00
780	2	0.00	0.00	55437.	0.	0.00
781	2	0.00	0.00	61352.	0.	0.00
782	2	0.00	0.00	25174.	0.	0.00
783	2	0.00	0.00	31501.	0.	0.00

LOWER CONFIDENCE LIMIT IS LESS THAN OR EQUAL TO ZERO
 -VARIANCE TOO LARGE FOR VALID CONFIDENCE INTERVAL AT THIS VALUE OF ALPHA-*

TOTAL						
TOTAL	UPPER	LOWER	MEAN	UPPER	LOWER	
5792486.	16959808.	-5374836.	2.78	8.15	-2.58	

EFFECTIVE DEGREES OF FREEDOM= 3 STUDENTS T-VALUE= 3.18 ALPHA=0.05

Table 15. Haddock abundance (thousands of fish) and biomass (t) estimates.

Depth range (fathoms)	Strata	Vessel Trip #Sets Mean Date sq. mi.	Abundance (thousands of fish)		Biomass (t)	
			Cape Ballard	Cape Ballard	Cape Ballard	Cape Ballard
			7	7	7	7
			75	75	75	75
			5-Dec 2007	5-Dec 2007	5-Dec 2007	5-Dec 2007
<30	314	974	.	.	.	.
	320	1320	0	0	0	0
		Subtotal	0	0	0	0
31-50	312	272	0	0	0	0
	315	827	0	0	0	0
	321	1189	0	0	0	0
	325	944	0	0	0	0
	326	166	0	0	0	0
	783	229	0	0	0	0
		Subtotal	0	0	0	0
51-100	311	317	0	0	0	0
	317	193	0	0	0	0
	319	984	2030	5260	5260	5260
	322	1567	0	0	0	0
	323	696	0	0	0	0
	324	494	0	0	0	0
	781	446	0	0	0	0
	782	183	0	0	0	0
	Subtotal	2030	5260	5260	5260	
101-150	310	170	236	112	112	112
	313	165	0	0	0	0
	316	189	409	57	57	57
	318	129	169	364	364	364
	779	422	0	0	0	0
	780	403	0	0	0	0
		Subtotal	813	532	532	532
151-200	705	195	0	0	0	0
	706	476	0	0	0	0
	707	74	0	0	0	0
	716	539	0	0	0	0
	Subtotal	0	0	0	0	
201-300	708	126	.	.	.	.
	711	593	0	0	0	0
	712	731	0	0	0	0
	713	851	0	0	0	0
	714	1074	0	0	0	0
	Subtotal	0	0	0	0	
Total ¹			2,843	5,792	5,792	5,792

¹ Totals are for all strata fished. Individual strata totals rounded to nearest 1000.

. denotes strata not fished

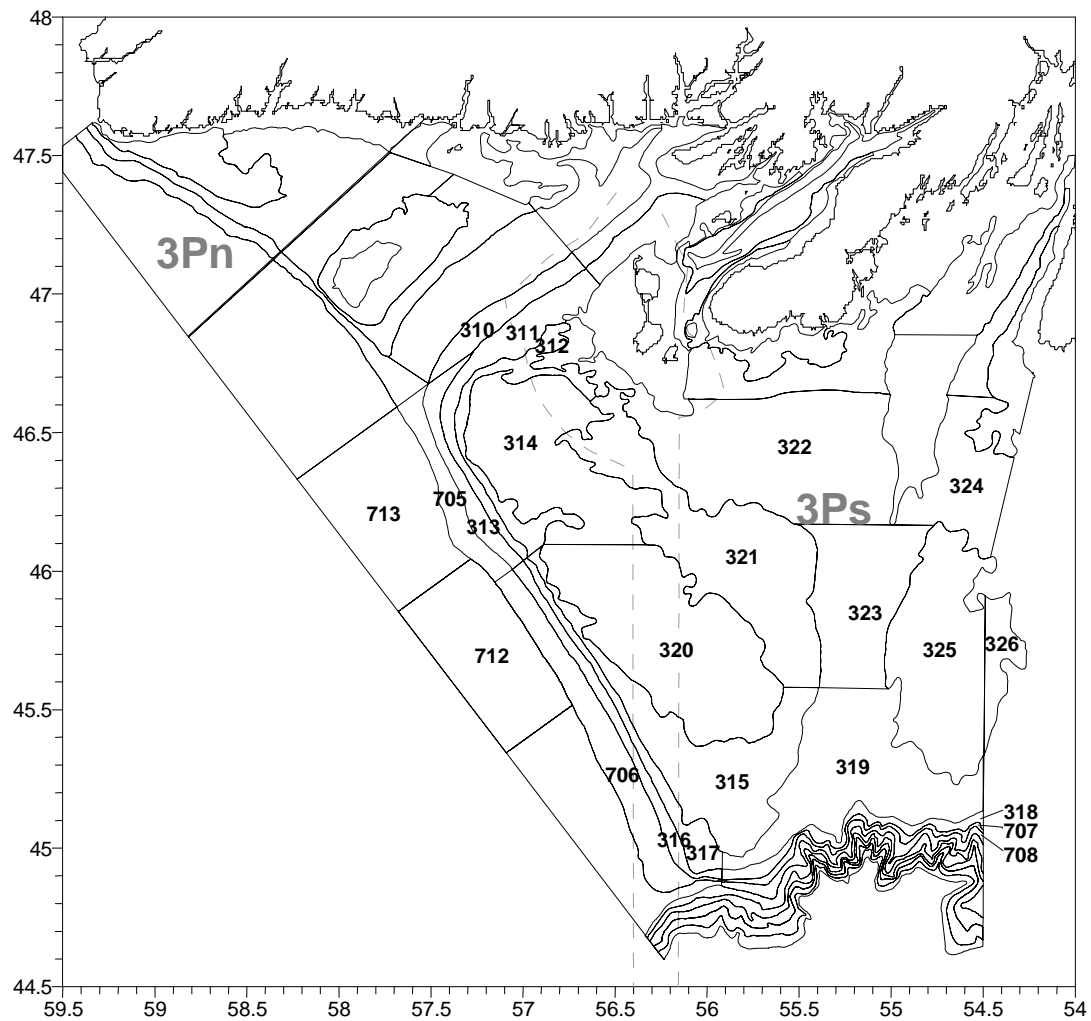


Figure 1. Stratum boundaries within NAFO Division 3P. Numbered strata indicate those surveyed during fall GEAC bottom trawl survey of Subdivision 3Ps. Dashed line is boundary of French economic zone.

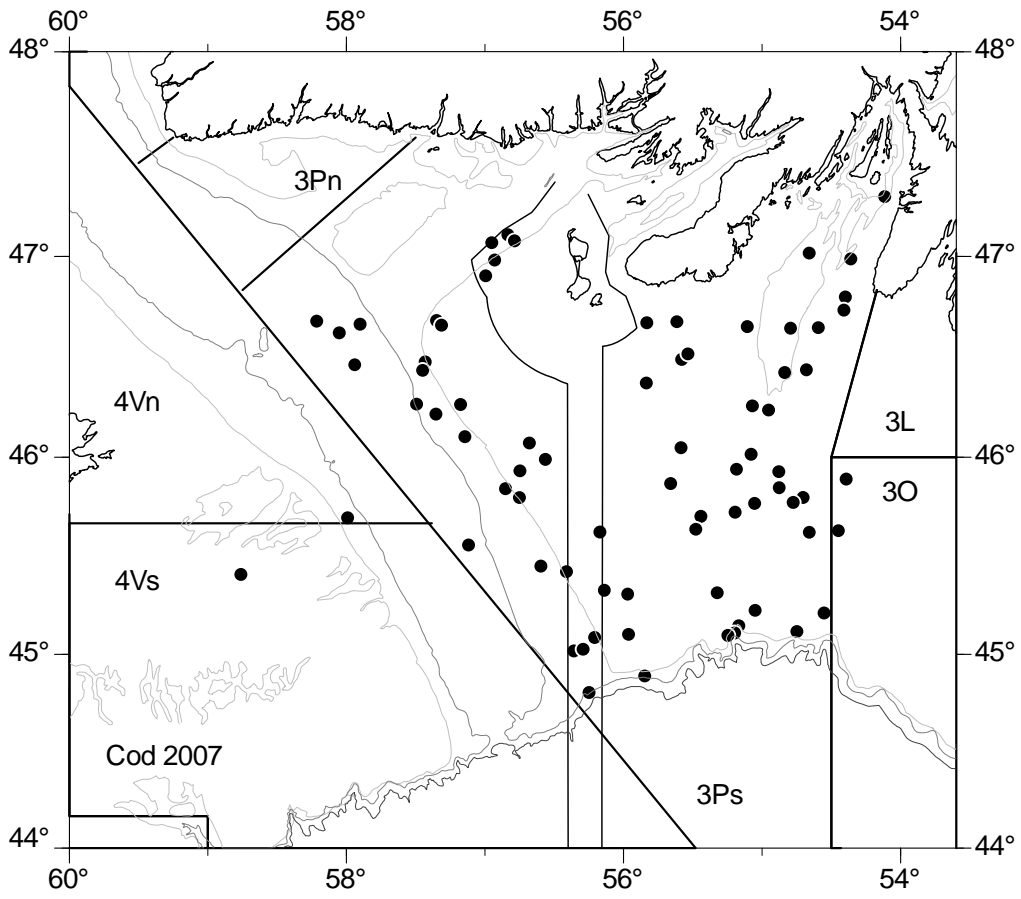


Figure 2. 2007 Survey set locations within NAFO Subdivision 3Ps.

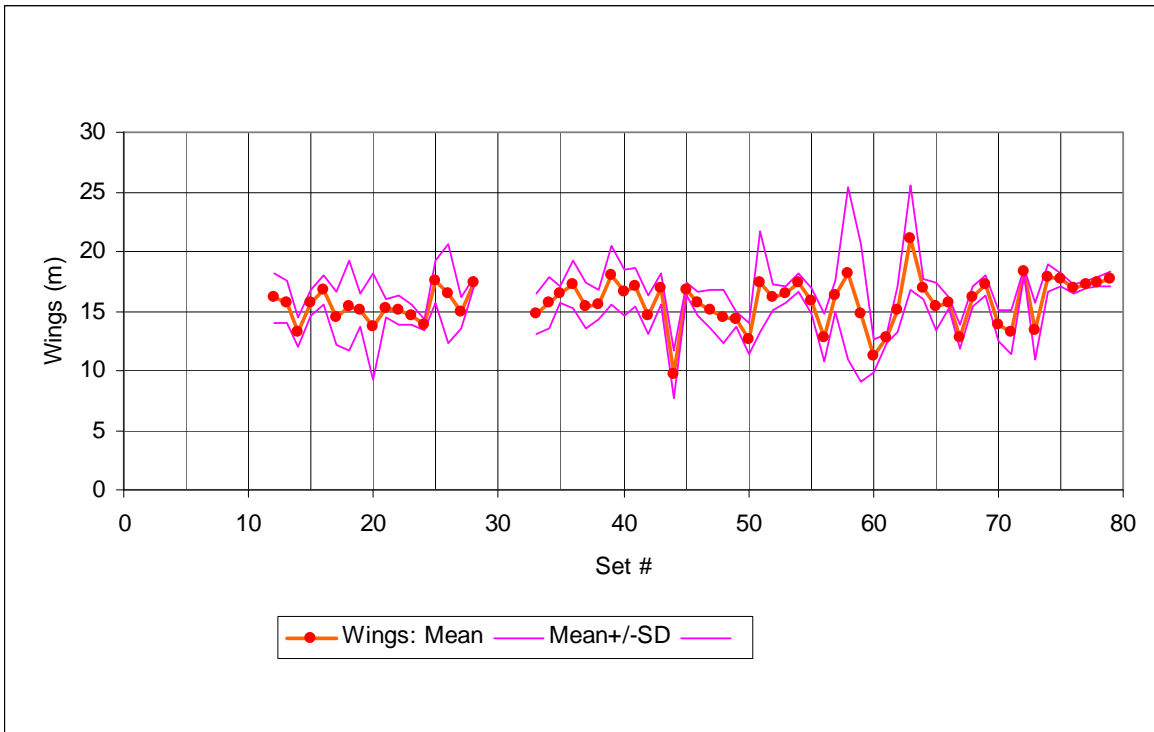


Figure 3. 2007 3Ps survey net wingspread.

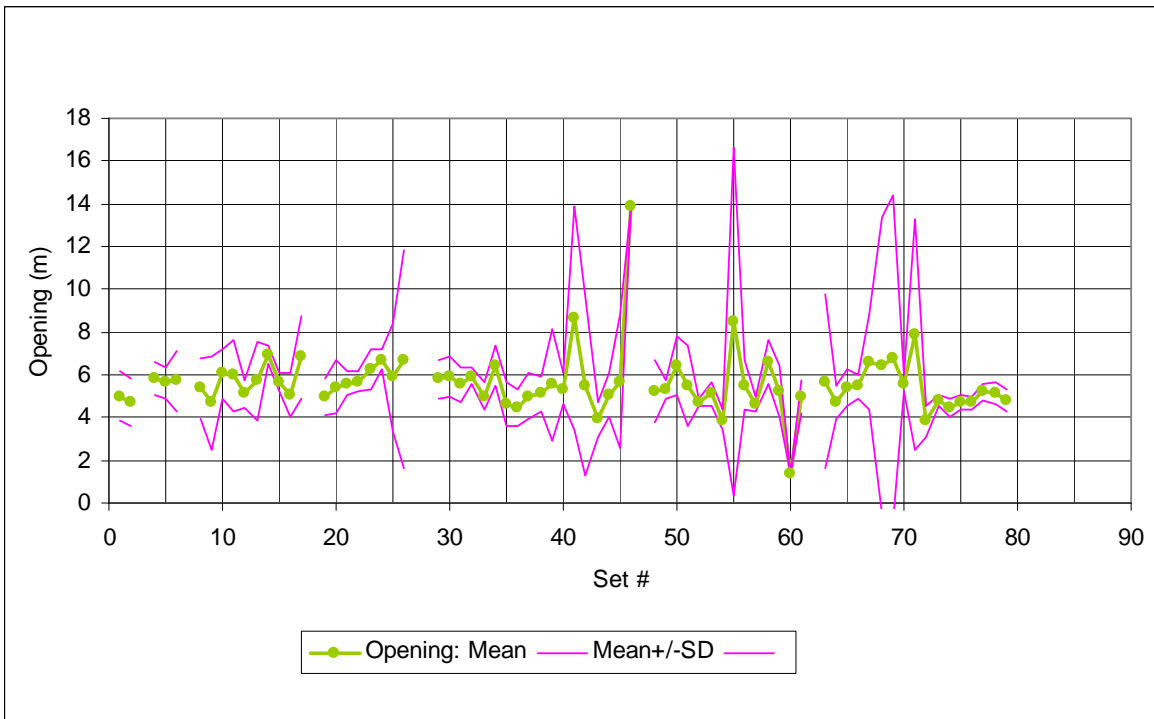


Figure 4. 2007 3Ps survey net opening.

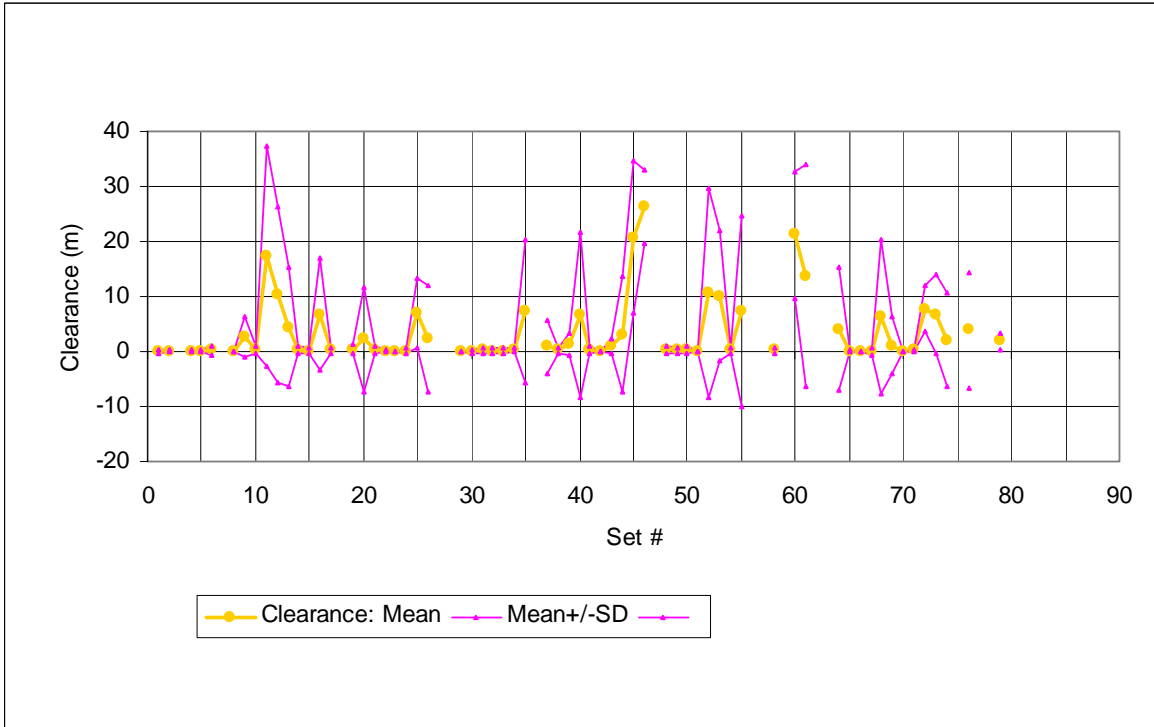


Figure 5. 2007 3Ps survey net clearance.

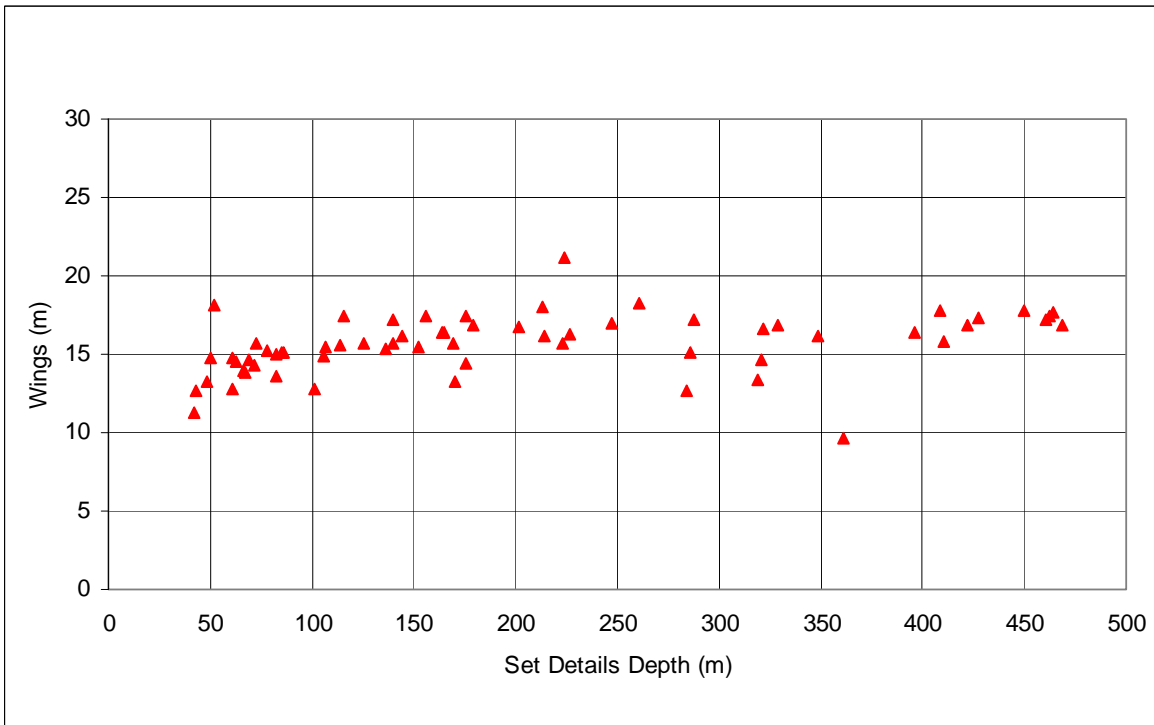


Figure 6. 2007 3Ps survey net wingspread vs. set depth.

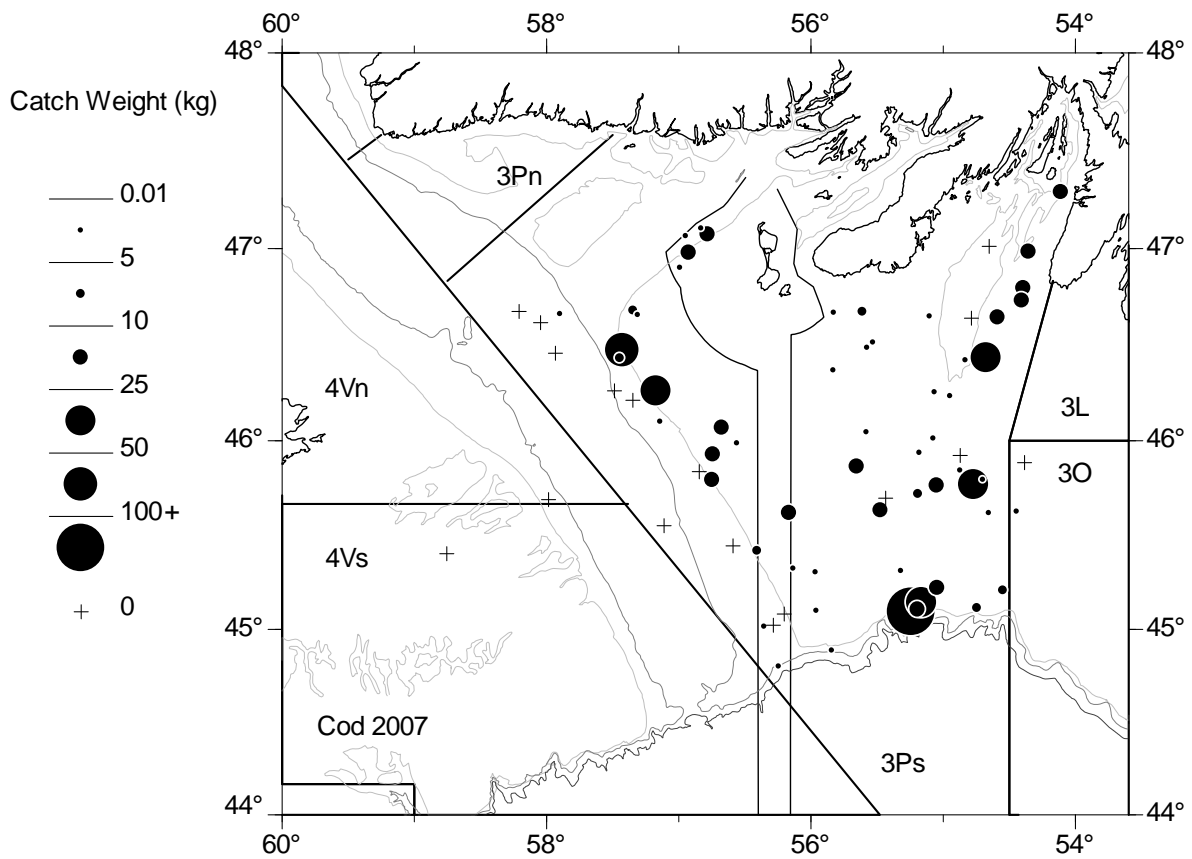


Figure 7. Cod catch weight distribution from GEAC stratified random survey, Subdivision 3Ps, 29 November to 12 December 2007. The 200, 400, and 800 m depth contours are shown.

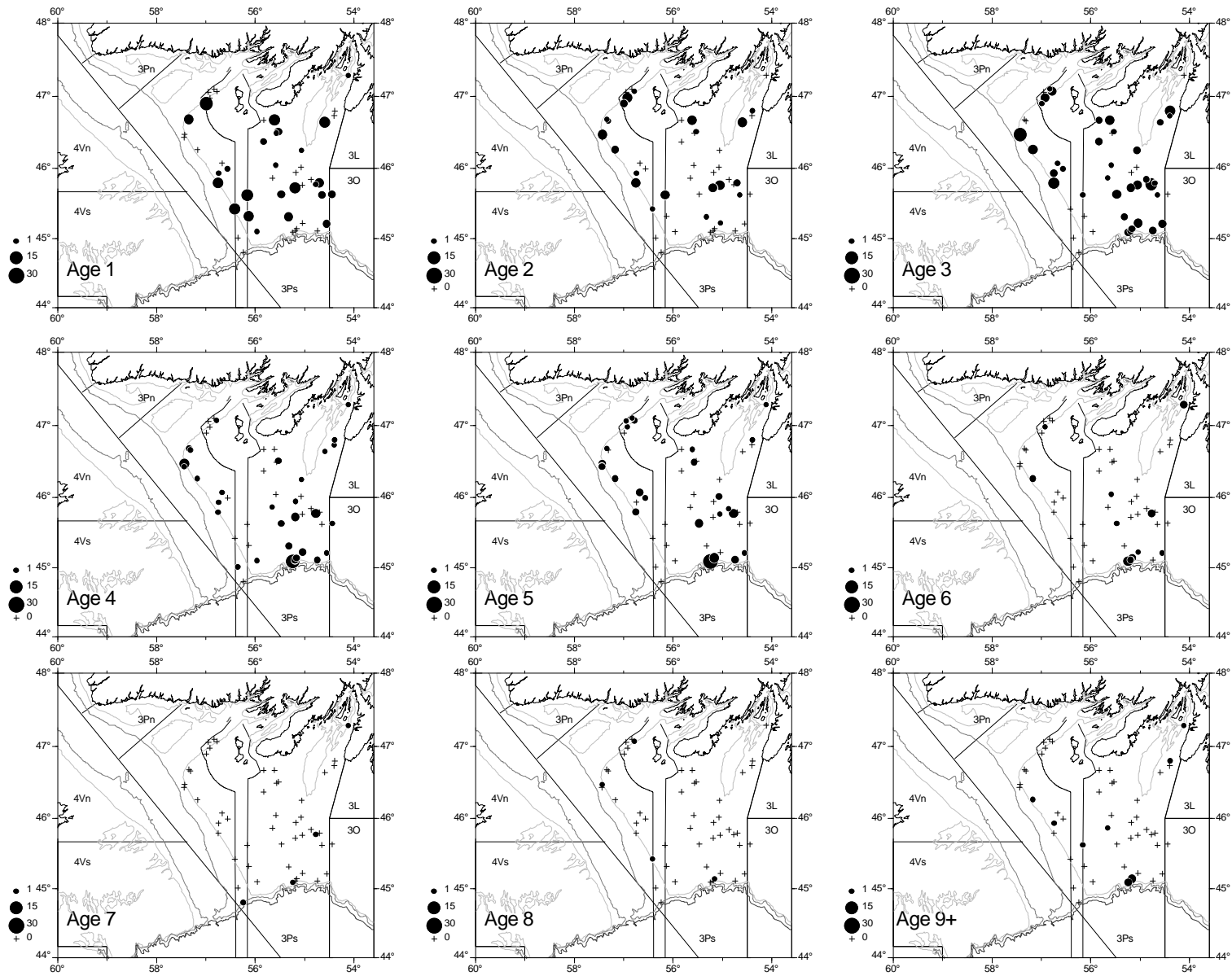


Figure 8. Cod catch numbers distribution for ages 1 to 9+.

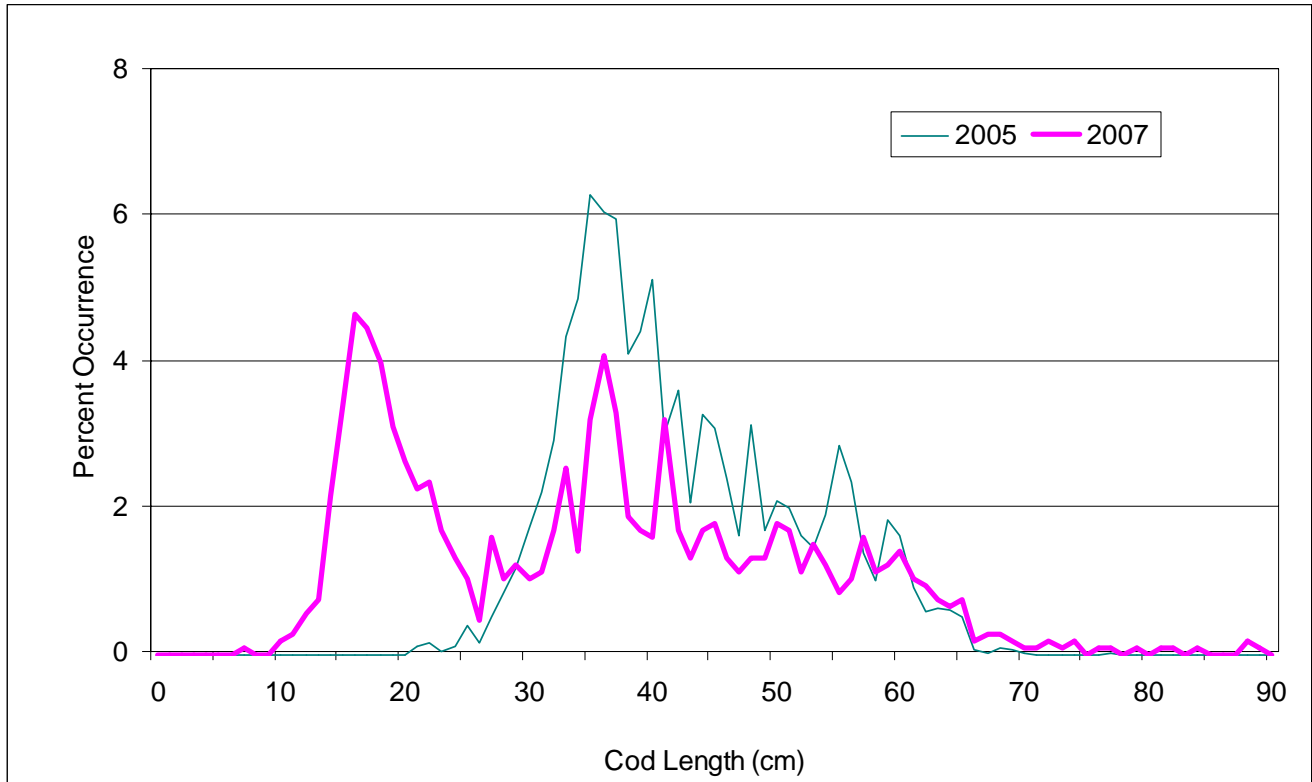


Figure 9. Length composition of cod, 3Ps.

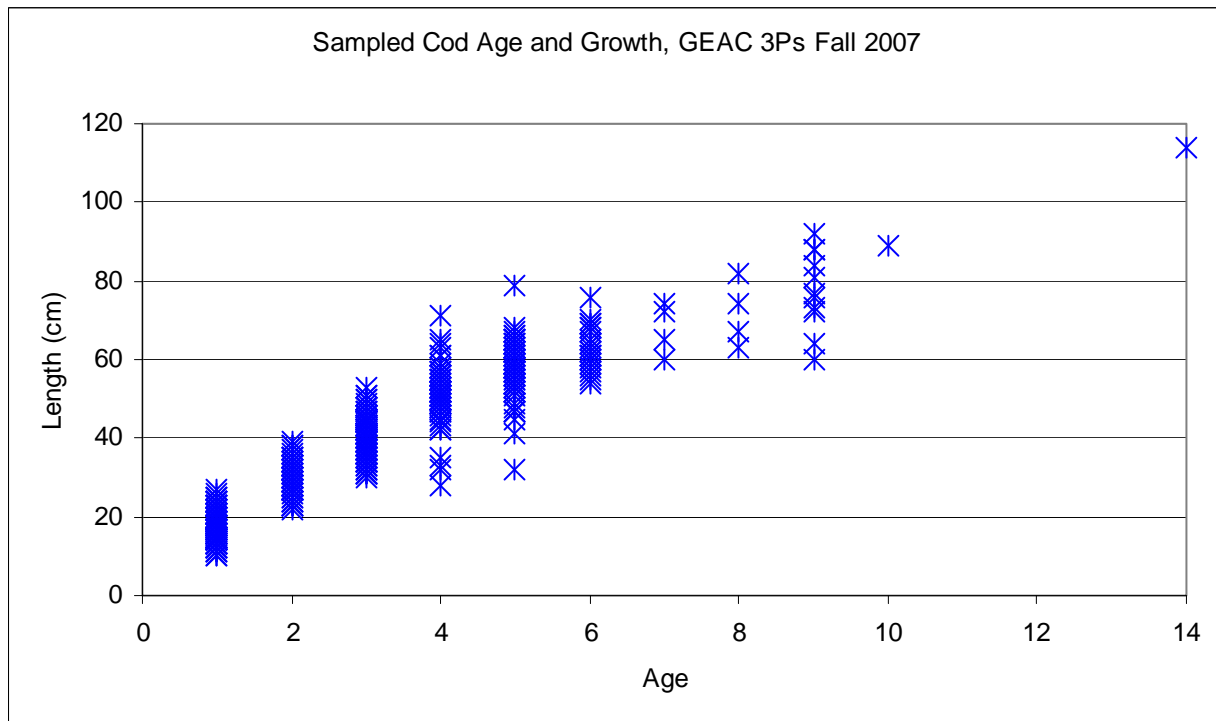


Figure 10. Cod age-length composition 3Ps 2007 (502 samples).

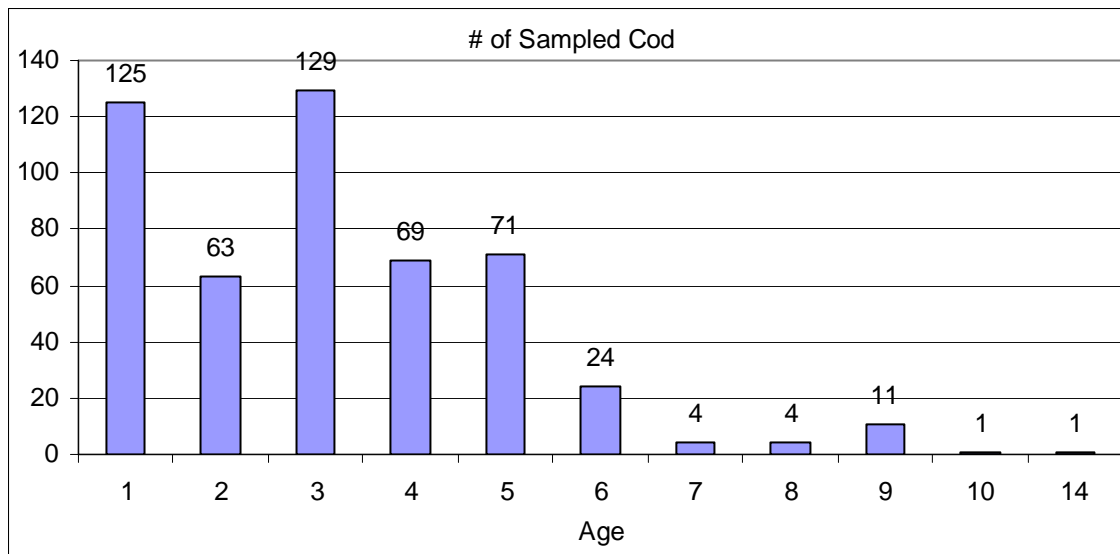


Figure 11. Age composition of cod, 3Ps.

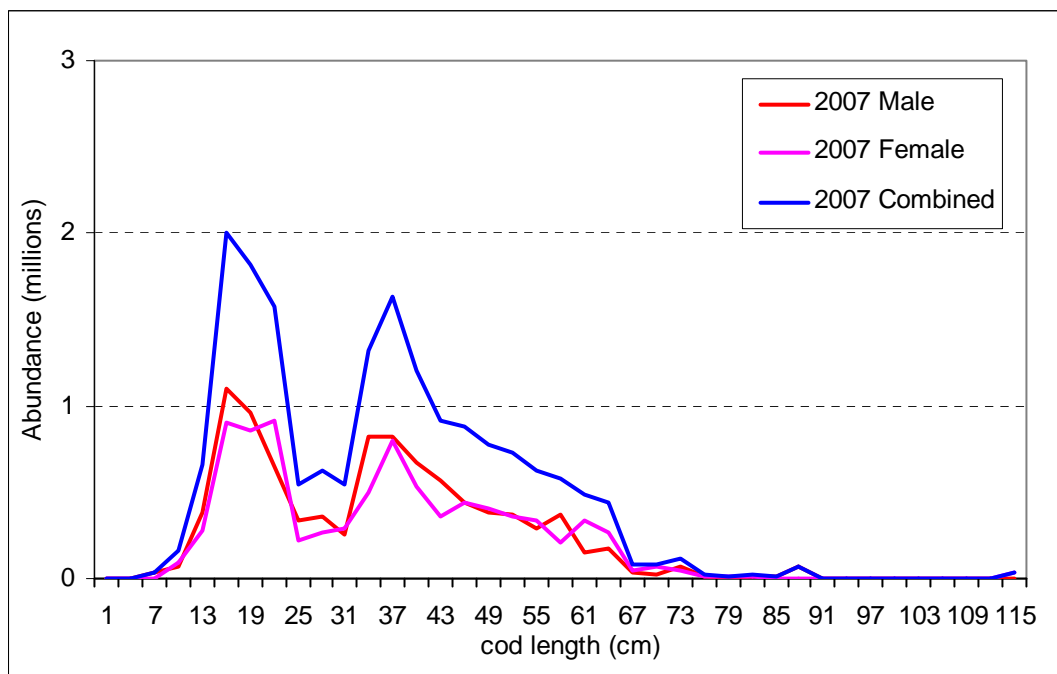


Figure 12. Cod survey abundance index at length, 3Ps, 2007.

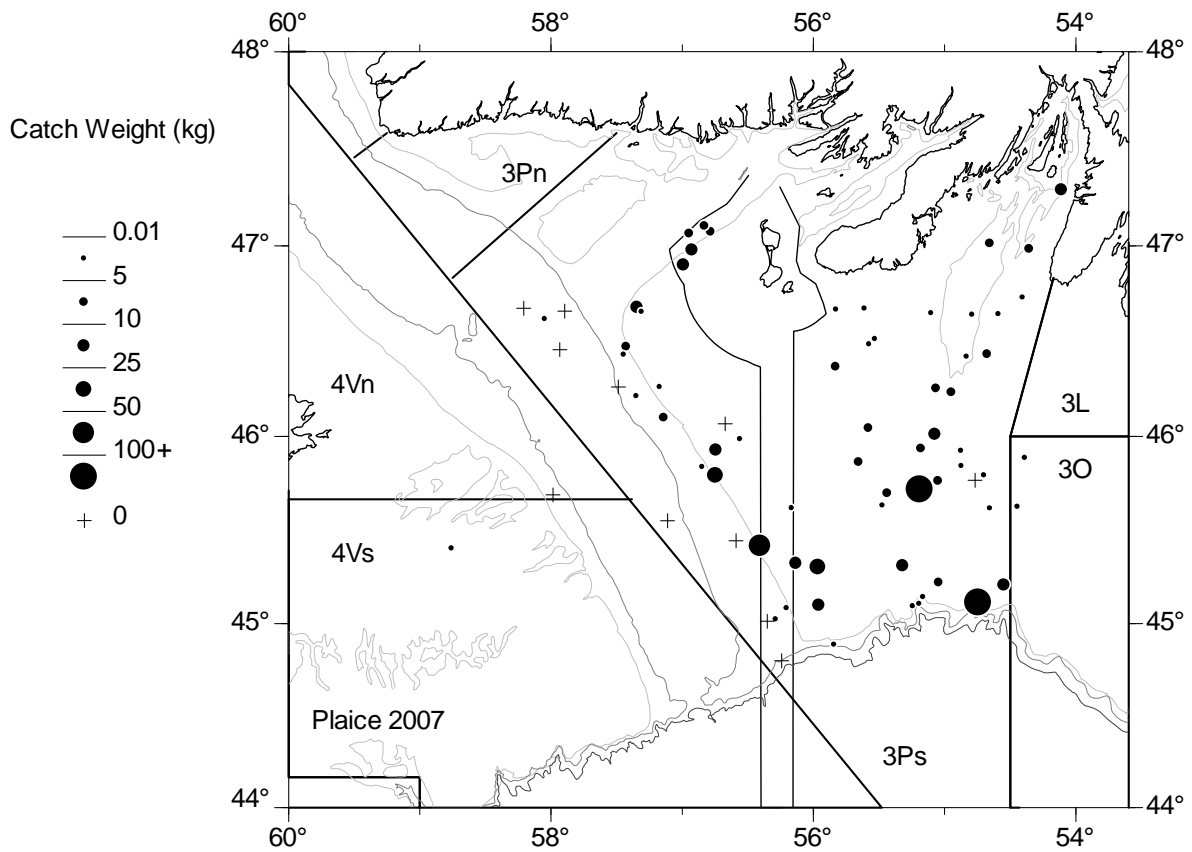


Figure 13. Plaiice catch weight distribution from GEAC stratified random survey, Subdivision 3Ps, 29 November to 12 December 2007. The 200, 400, and 800 m depth contours are shown.

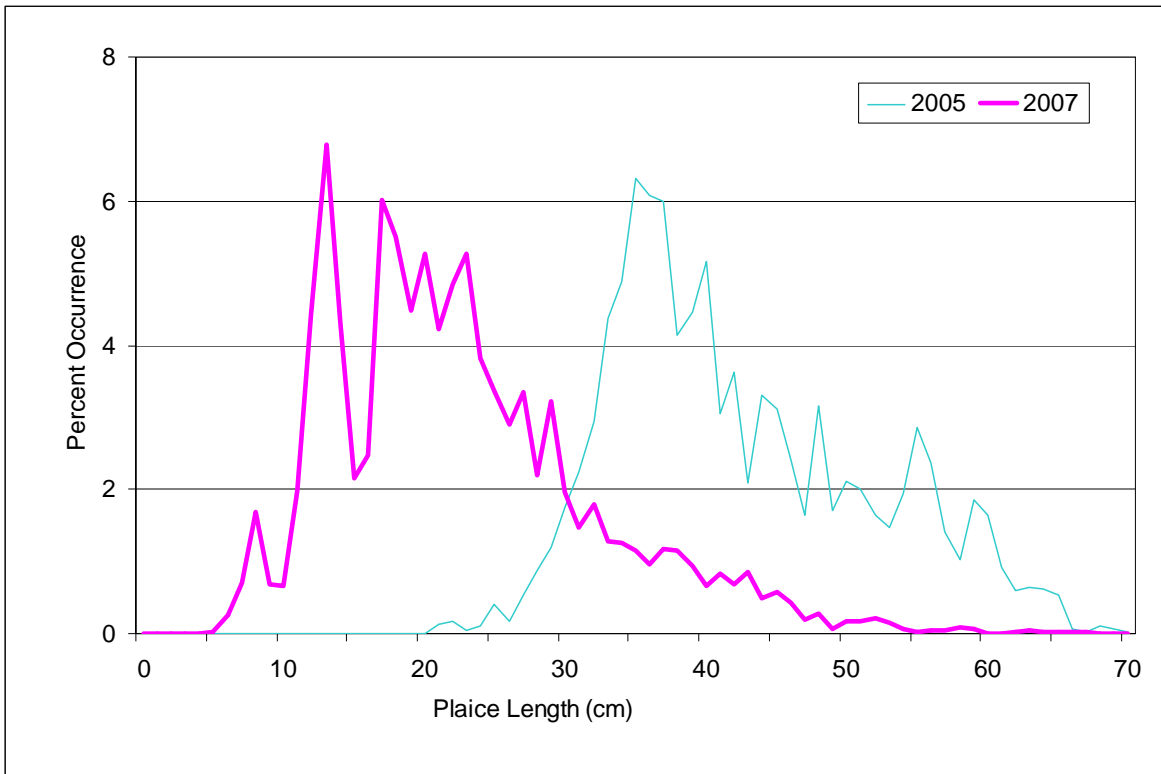


Figure 14. Length composition of plaice, 3Ps.

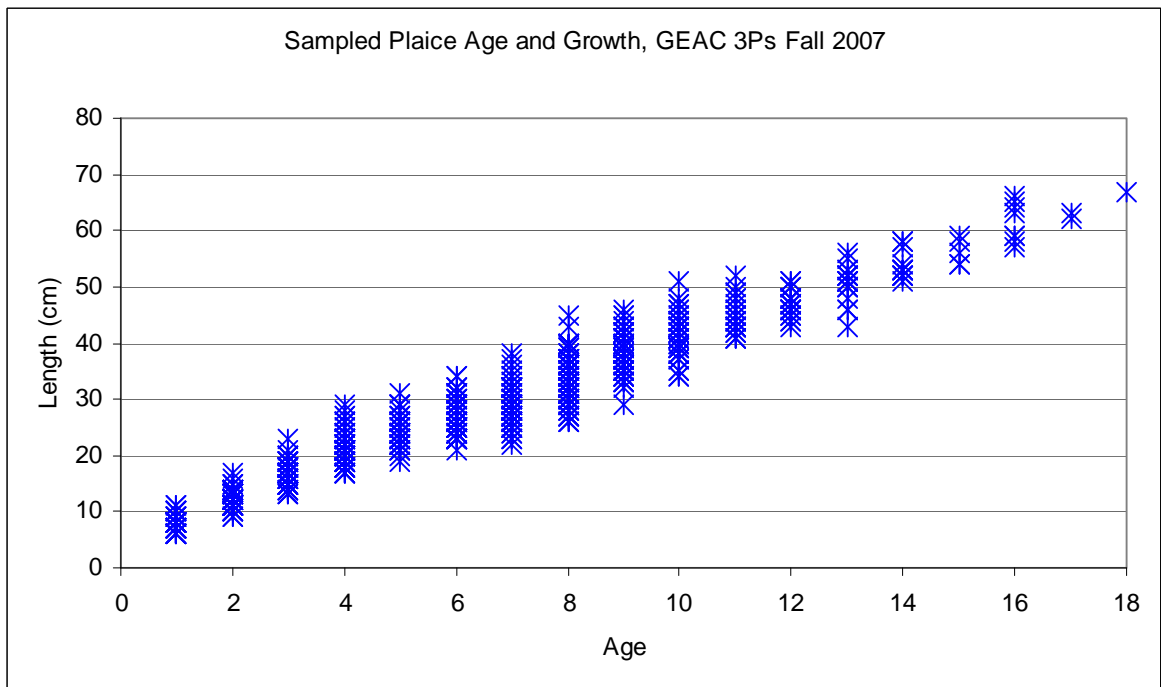


Figure 15. Plaice age-length composition 3Ps 2007 (804 samples).

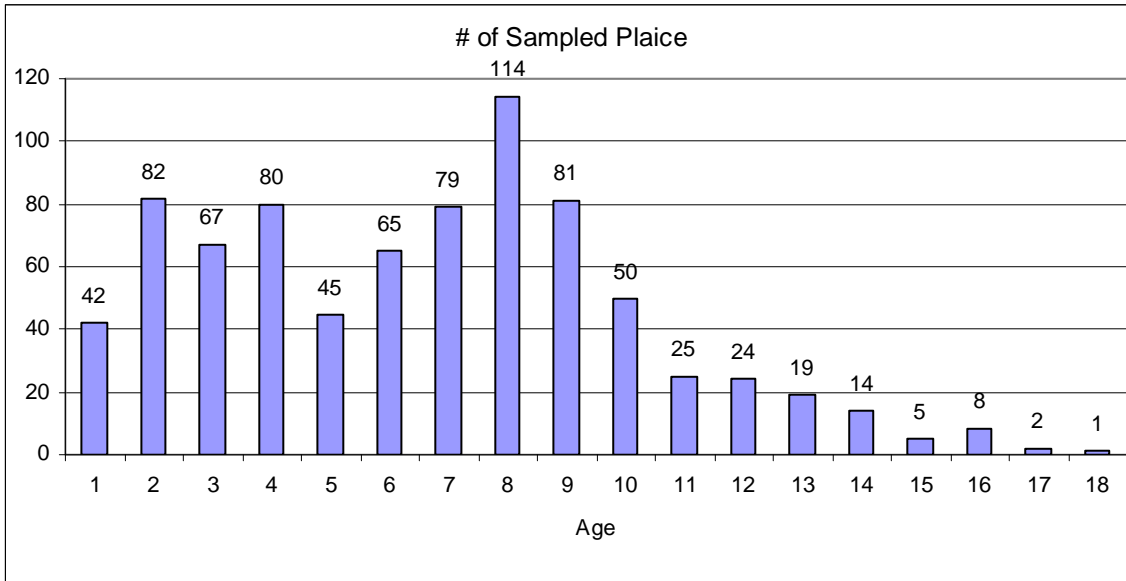


Figure 16. Age composition of 3Ps sampled plaice.

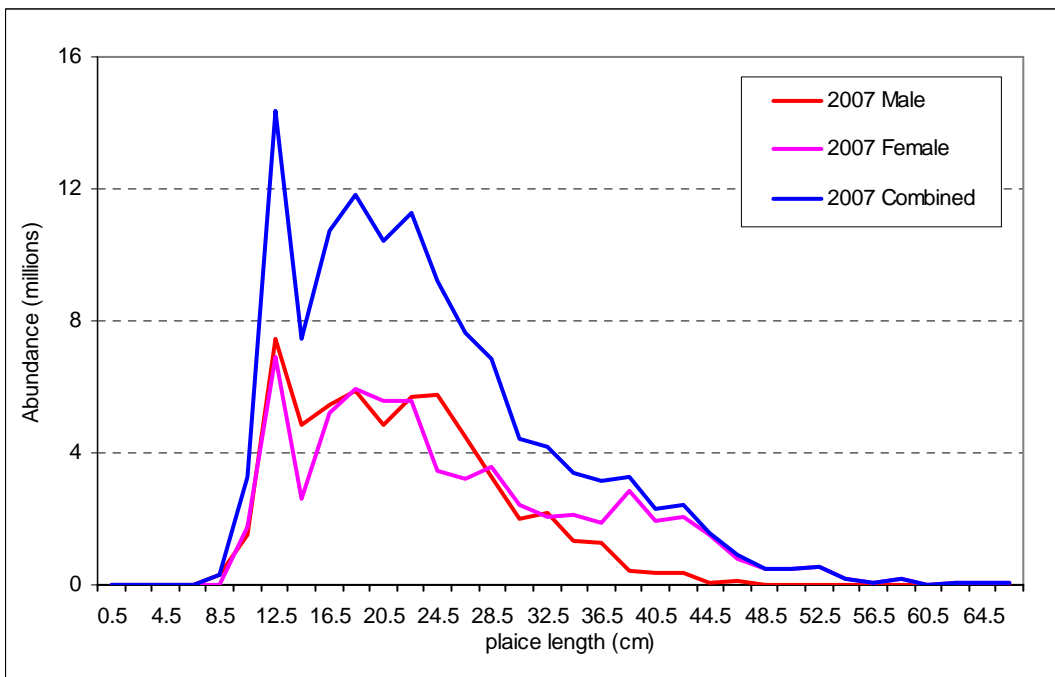


Figure 17. Plaice survey abundance index at length, 3Ps, 2007.

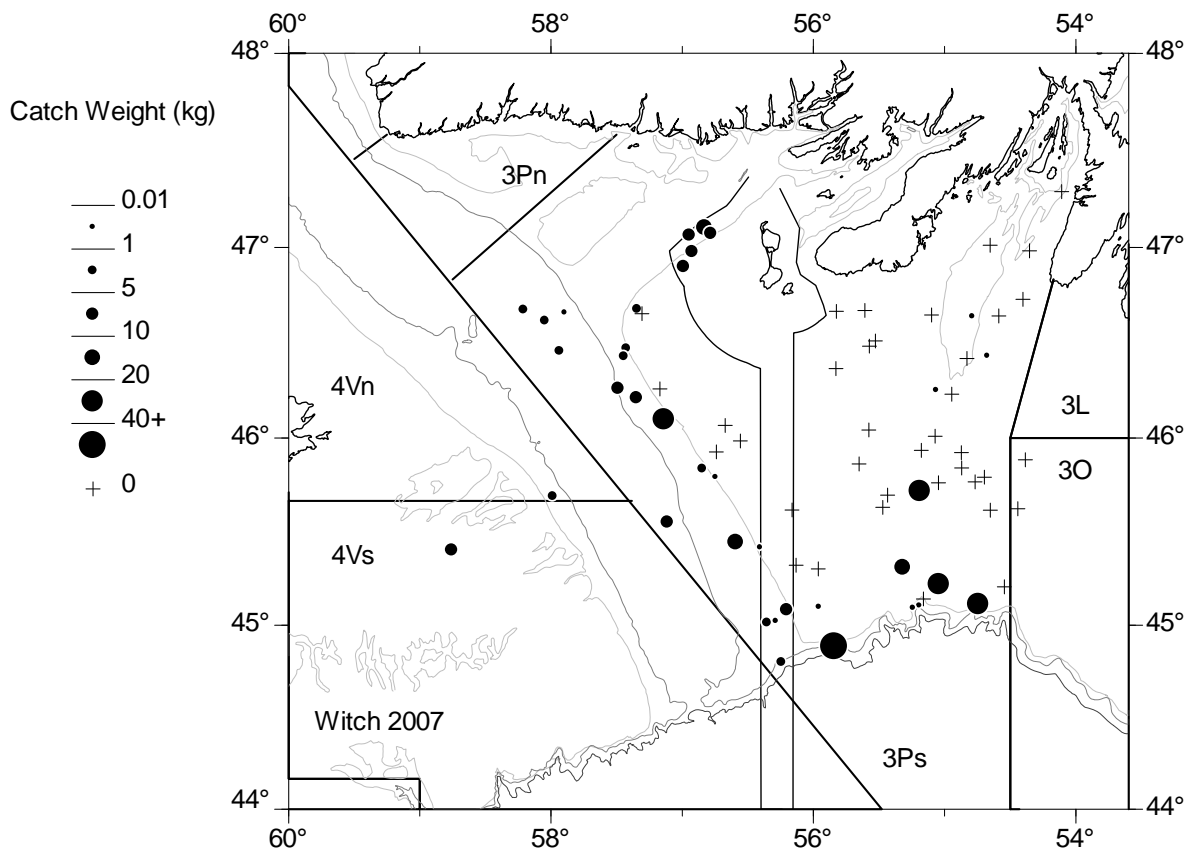


Figure 18. Witch catch weight distribution from GEAC stratified random survey, Subdivision 3Ps, 29 November to 12 December 2007. The 200, 400, and 800 m depth contours are shown.

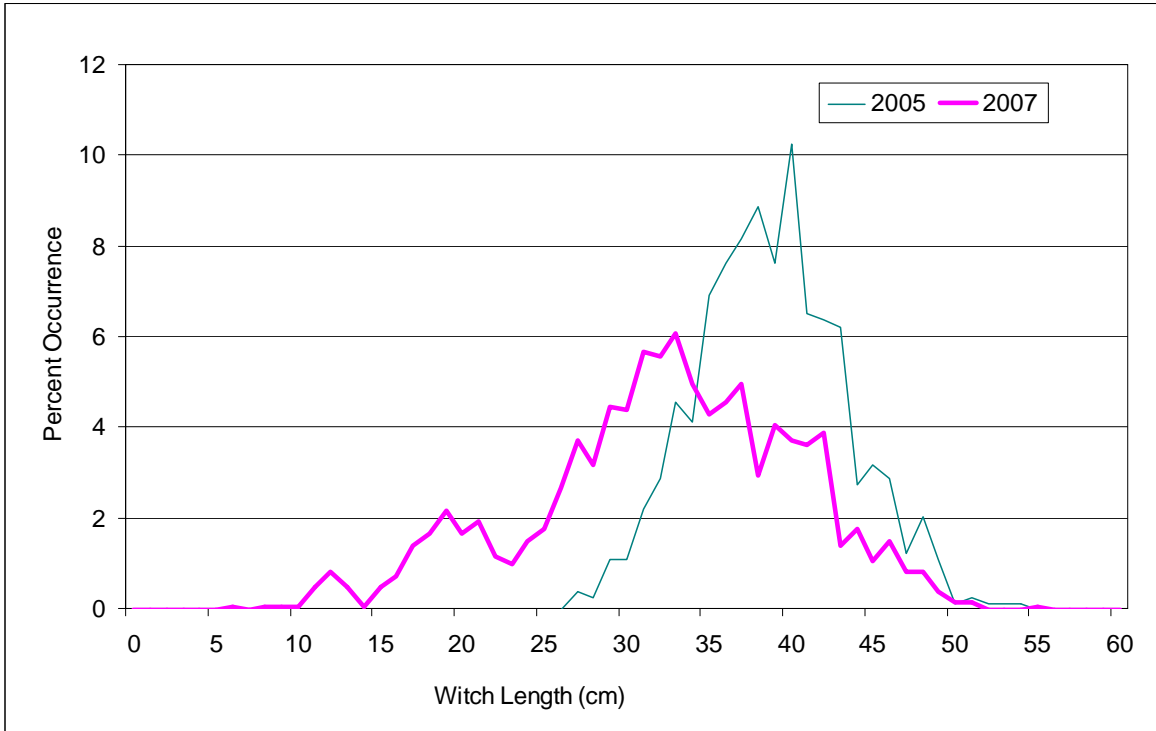


Figure 19. Length composition of witch, 3Ps.

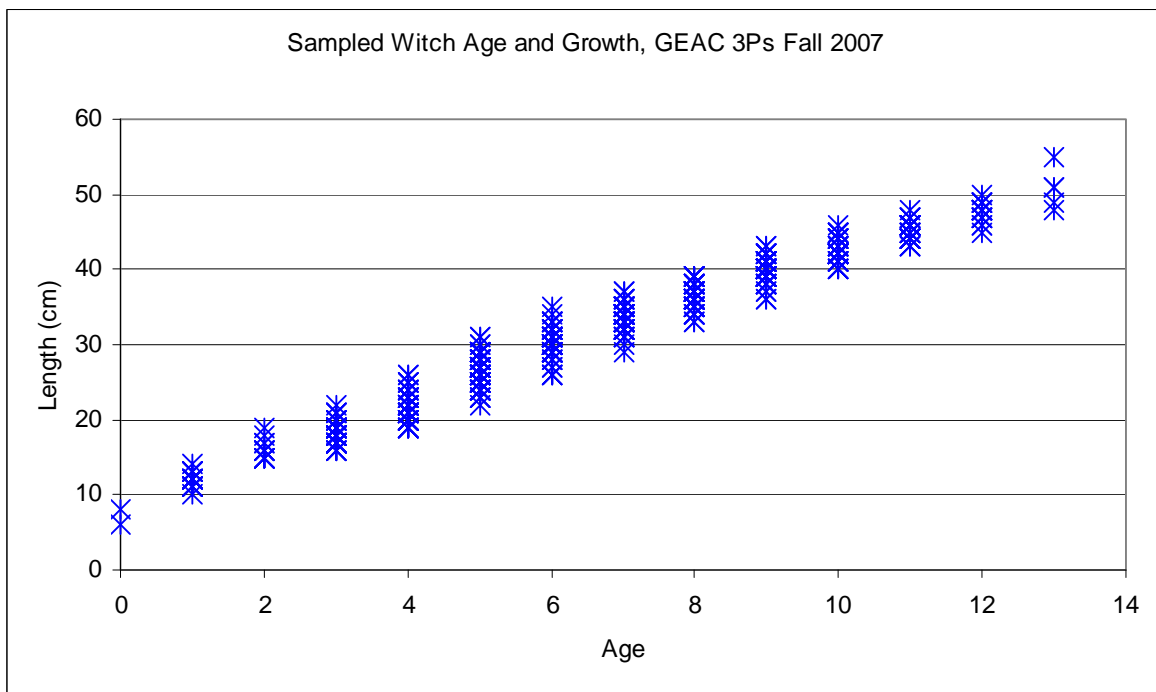


Figure 20. Witch age-length composition 3Ps 2007 (736 samples).

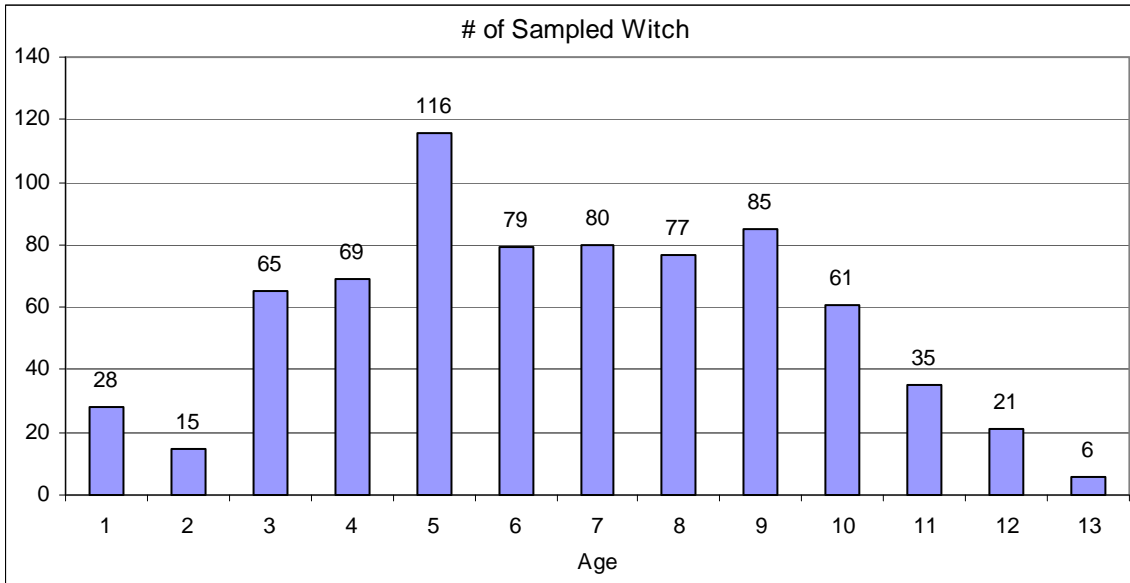


Figure 21. Age composition of 3Ps sampled witch.

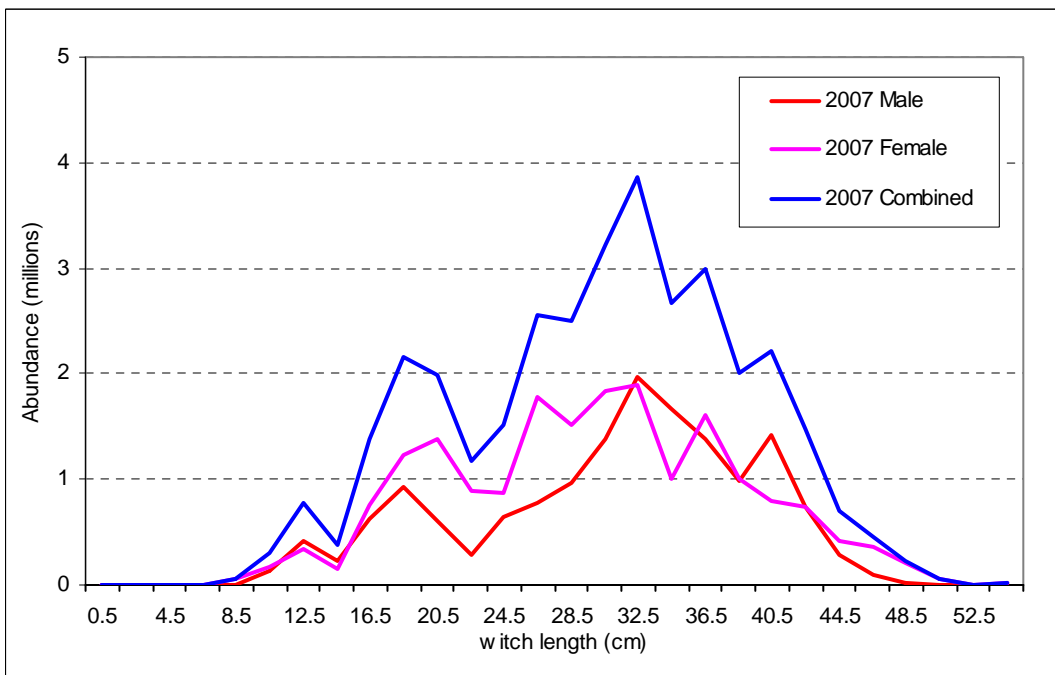


Figure 22. Witch survey abundance index at length, 3Ps, 2007

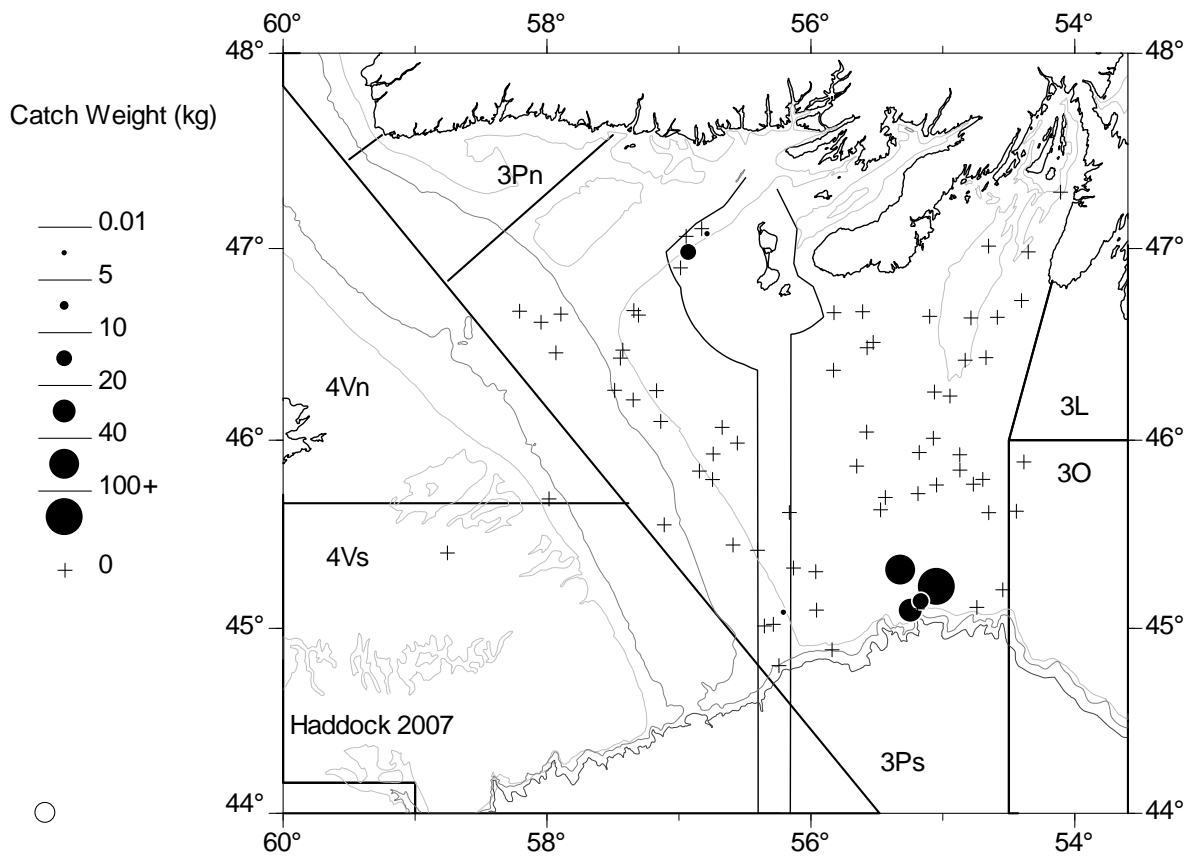


Figure 23. Haddock catch weight distribution from GEAC stratified random survey, Subdivision 3Ps, 29 November to 12 December 2007. The 200, 400, and 800 m depth