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# Year Nine of the NAFO Subdivision 3Ps Fall GEAC Surveys: Catch Results for Atlantic Cod (*Gadus morhua*), American Plaice (*Hippoglossoides platessoides* F.), Witch Flounder (*Glyptocephalus cynoglossus* L.), and Haddock (*Melanogrammus aeglefinus*)*

# Neuvième année des relevés d'automne 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 NAFO Subdivision 3Ps, the Groundfish Enterprise Allocation Council (GEAC) has funded surveys each fall from 1997 to 2005 directed at groundfish, with specific interest in cod, American plaice, witch flounder, and haddock. In this analysis, catch statistics, length and age distribution, and stratified analysis estimates of biomass, including age distribution estimates, and interpretation of results are presented. These results have also been presented annually during the regular Regional Stock Advisory Process (RAP) meetings in St. John's.

In 2005, the cod catch weights were about one half those from 2004. There was a continued absence of traditional large catches seen in strata 318 and 319 at the mouth of the Halibut Channel. The survey yielded an abundance estimate of 4.5 million cod and a biomass estimate of 11 kt (compared with the 2004 estimates of 6.6 million cod and 23 kt): the lowest estimates in the nine years of survey. The numbers of cod for the 1998 and 1997 year classes (ages 7 and 8 in 2005) are estimated at one million, down to 30% of the 2004 estimate of 3.6 million, and down to 7% of the 2003 estimate of 15.4 million of these year classes. A greater proportion of younger fish is contributing to the abundance estimate, with 64% of the total estimate in 2005 being from cod aged 3 to 5 years, compared with 33% in 2004. Plaice catch numbers and weights increased by about 30 and 40% respectively compared with those of 2004. The abundance estimate of 40.5 million was up 75% from that in 2004 and the biomass estimate of 39.1 kt was just over double the 2004 estimate. Witch catch numbers and weights were down slightly by about 22 to 30% respectively from 2004. The estimated abundance of 5.4 million was actually up 8% from the 2004 estimate of 5 million, while the estimated biomass of 2.2 kt was down 15% from the 2004 estimate of 2.6 kt. The 2005 haddock catch numbers and weights were comparable to those from the 2004 survey. The abundance estimate of 1.6 million haddock was up 36% from 2004 and is the median for the nine survey years. The biomass estimate of 3.6 kt was up 60% from 2004 and is slightly greater than the nine year average of 3.3 kt and median of 3.1 kt. The general pattern of haddock catches being predominantly of the slopes at the entrance to the Halibut Channel remains. There also continues to be a large inter-annual variability in the magnitudes of the abundance and biomass estimates.

## RÉSUMÉ

Pour améliorer la base de données de recherche sur les pêches dans la sous-division 3Ps de l'OPANO, le Groundfish Enterprise Allocation Council (GEAC) a financé des relevés effectués chaque automne, de 1997 à 2005. Ces relevés visent les poissons de fond, principalement la morue, la plie canadienne, la plie grise et l'aiglefin. La présente analyse fournit des statistiques sur les prises, des données relatives à la répartition selon la longueur et l'âge, des estimations de la biomasse obtenues par analyse stratifiée, notamment la répartition selon l'âge, ainsi qu'une interprétation des résultats. Ces résultats ont également été présentés annuellement dans le cadre des réunions régulières du processus consultatif régional sur l'évaluation des stocks, tenues à St. John's.

En 2005, le poids des prises de morue était d'environ la moitié de celles de 2004. On a constaté une absence continue de grosses morues dans les strates 318 et 319 à l'embouchure du chenal du Flétan. Selon ce relevé, l'abondance totale des morues a été estimée à 4,5 millions d'individus et la biomasse totale, à 11 kilotonnes (comparativement à l'estimation de 2004 de 6,6 millions de morues et de 23 kt), soit les plus faibles estimations issues des relevés échelonnés sur une période de neuf ans. Le nombre de morues des classes d'âge de 1998 et 1997 (âges 7 et 8 en 2005) est évalué à un million, soit une baisse de 30 % par rapport à l'estimation de 3,6 millions de 2004 et de 7 % par rapport aux 15,4 millions de 2003. Une proportion accrue de jeunes poissons contribue à l'abondance, puisque 64 % de l'abondance totale de la morue en 2005 sont des morues de 3 à 5 ans, comparativement à 33 % en 2004. Le nombre et le poids des prises de plie canadienne ont augmenté d'environ 30 et 40 % respectivement, comparativement à 2004. L'abondance, estimée à 40,5 millions était en hausse de 75 % relativement à 2004, tandis que la biomasse, évaluée à 39,1 kt correspondait à un peu plus du double de l'estimation de 2004. Le nombre et le poids des prises de plie grise étaient légèrement en baisse d'à peu près 22 à 30 %, respectivement, par rapport à 2004. L'abondance, estimée à 5,4 millions, était en fait supérieure de 8 % à l'estimation de 5 millions de 2004, tandis que la biomasse, évaluée à 2,2 kt avait diminué de 15 % par rapport aux 2,6 kt de 2004. Le nombre et le poids des prises d'aiglefin en 2005 étaient comparables à ceux du relevé de 2004. L'abondance, à 1,6 million, était en hausse de 36 % par rapport à 2004 et représente le point médian des neuf années de relevé. Quant à la biomasse, estimée à 3,6 kt, elle était supérieure de 60 % à celle de 2004, et légèrement plus élevée que la moyenne des neuf années, qui s'établit à 3,3 kt, et que la médiane de 3,1 kt. La tendance générale à la concentration des prises d'aiglefin sur les pentes et à l'entrée du chenal du Flétan n'a pas changé. On continue aussi de noter une grande variation interannuelle des estimations de l'abondance et de la biomasse.

## INTRODUCTION

To enhance the fisheries research database in NAFO Subdivision 3Ps, the Groundfish Enterprise Allocation Council (GEAC) has funded surveys each fall from 1997 to 2005 directed at groundfish, with specific interest in cod, American plaice, witch flounder, and haddock. The intent has been to create a series of annual fall surveys in 3Ps to complement current resource assessment activities carried out by the Department of Fisheries and Oceans (DFO). GEAC funded and performed the surveys 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. These results have been presented annually during the regular Regional Stock Advisory Process (RAP) meetings in St. John's. Companion CSAS Research Documents had been prepared separately up to 2003 for each species analysed in these surveys. Since the 2004 survey, the analyses of all four species are presented under the cover of one Research Document (McClintock, 2005). One trip to perform the 2005 survey was carried out from December 6 to 18, 2005[1]. These dates correspond well with the late-November and December time periods for the previous eight years. During the trip, set details and length frequencies were logged in the DFO Fisheries Form System (FFS) and otoliths were collected for subsequent aging. Catch statistics, length and age distribution, and stratified analysis estimates of 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.

Under contract to GEAC, AMEC has taken the data logged using the DFO FFS system, combined with the aged otiliths, created digital data files appropriate for inclusion in the DFO databases, and performed a first analysis of the survey results. This document presents these results.

*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:*



[1] There was no 2006 survey.

## METHODS

A Stratified Random survey was carried out in 3Ps by the M.V. Pennysmart. A summary of the trip is presented below.

### TRIP 10: STRATIFIED RANDOM SURVEY

Trip 10 was carried out from 6 to 18 December 2005. This time period is consistent with the 1997-2004 stratified random survey sets. The Pennysmart, the same boat used in the previous surveys, 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. 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. Weather and sea conditions were generally favourable with the result that no survey time was lost due to weather: two days were lost due to unsuccessful set 37 (see below). Near the end of the survey cod tagging was conducted during 10 sets (numbers 66-73): these are excluded from this survey analysis. Two sets were unsuccessful:

- set 37 was unsuccessful: “main winch broke – had to cut main warps and leave net on bottom for two days – dumped catch”
- set 61 was unsuccessful: “bottom went too deep”

A total of 71 successful sets were completed. This is comparable to the number of successful sets in previous years which range from 73 to 91 and average 83.

Tows of duration 30 minutes using an Engels 96 high lift trawl with a 135 mm diamond mesh cod end (not lined) were conducted. The trawl was fitted with rock hopper foot gear and Bergen #7 trawl doors. The 30 minute tows were commenced once the net reached the bottom.

Performance of the trawl was checked onboard using SCANMAR sensors: bridge display of doorspread 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. Wingspread was not measured for this trip. The doorspread, clearance, and opening measurements as well as temperature were logged to computer disk using Seatrawl software. The trawl gear and configuration were identical to those used in the 1997-2004 surveys.

Data were logged using FFS with the length and otolith sampling carried out on board. The resulting ages were input to create an age and growth digital file.

### SHORE-BASED ANALYSIS

The set details and length frequencies for cod, plaice, and witch 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 survey gear performance was monitored with SCANMAR units mounted on the net. Measurements were digitally logged every 5 seconds with the DFO Seatrawl software and typically noted every 5 min on the bridge log. Doors, opening, and clearance, as well as temperature and depth were recorded for most sets. The digital Seatrawl data were subsequently processed using the AMEC NetPlot Windows software developed for DFO as a Seatrawl data processing and viewing tool.

Statistics were computed from the data with application of typical range checks, in this instance, doorspread in the range [2,100 m], opening in [1,35 m] and clearance in [0,50 m]. Digital data coverage was good with doorspread logged for 66 of the 71 successful sets, and opening and clearance logged for 52 of the 71 sets.

Figures 2a and 2b present the derived net doorspread and opening statistics for each set. The mean +/- one standard deviation are shown. The mean doorspread is 67 m compared with means in the range 71-78 m from 1999 to 2003 and 89 m in 2004. Some of the mean statistics can be a little misleading, e.g. for set 28 the mean is 30 m but this is based on only 24 good data points equating to about 2 minutes of the 30 minute tow. Similarly for set 14, there are only six valid data points.

Mean opening in 2005 is 4.9 m compared with means of 3.8 m in 2004, 4.4 m in 2003 and 5.0 to 5.4 m for 2000-02. Computation of the 2004 and 2005 statistics were with the new NetPlot software compared with a traditional Seatrawl software processing stream: this may explain some of the differences.

There are about 15 sets with mean doorspread between 50 and 60 m, and about 19 sets with means larger than 80 m, the largest being 94 m for set 75. The median doorspread is 69 m. In general, the greater the depth, the greater the doorspread (Fig. 2d). Mean opening values are all in the range 2.6 to 6.6 m.

Figure 2c presents clearance with means that range from 0 to 1.3 m. The mean clearance is 0.25 m compared with values near 0.5 m from 2001-03 and 0.16 m in 2004. Figure 2d presents the mean doorspread versus set depth. The average mean set doorspread is 59 m for the 44 sets in depths less than 150 m and 68 m for the 27 sets in greater depths.

As noted, wingspread was not recorded. Recent mean values, for the last three .years 2001-03 for which measurements were taken, have been on the order of 16.4-18.5 m (approximately 60 ft).

There appears to be good consistency in the net performance opening and clearance measurements for most of the sets, although for some periods of the survey, e.g. sets 2-7 and 19-34, the variability in doorspread within a given set appears to be higher than is desirable. It is essential that the net performance should be carefully monitored in any future surveys.

The vessel and gear are the same as previous years and there is nothing apparent in the 2005 survey measurements to suggest a drastic change in net performance. It is unfortunate there was no measurement of wingspread. Nevertheless, a more detailed comparison of net performance and mensuration should be undertaken in the future. For the present though, the assumption is made here to use the same 60 ft wingspread value

for the stratified analysis that has also been used for the other years. This is appropriate for preserving the eight or nine year relative index of abundance for each species.

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. Consistent with all survey analyses since 1997, a wingspread of 60 ft was used.

## RESULTS: COD

ACON[2] scaled symbol plots of the spatial distribution of catch weights are presented in Fig. 3 and include the corresponding catch results from the 1997-2004 surveys. As has been the historical pattern for the survey, any large catches were located at the southern entrance to the Halibut Channel and on the western portion of St. Pierre Bank. In 2005, the set catch weights of 100 kg or greater are fewer in number and smaller in magnitude than in previous years.

Table 1 presents a summary of the cod set details and catch numbers and weights. The mean cod catch for the 71 stratified random sets is 8 fish and the mean catch weight is 20 kg. This is down noticeably compared with 10 and 31 kg in 2004, 45 and 136 kg in 2003, 47 and 114 kg in 2002, 48 and 90 kg in 2001 and 72 and 370 kg in 2000. The total number of cod caught was 554 in 2005 compared with 872 in 2004, 3982 in 2003, 3543 in 2002, 4340 in 2001 and 5247 in 2000. The total catch weight was 1446 kg in 2005 compared with 2697 kg in 2004, 12,101 kg in 2003, 8571 kg in 2002, 8195 kg in 2001 and 26,992 kg in 2000. The largest catch of 103 cod and weight 320 kg was from set 60 in stratum 318 at a depth of approximately 245 m at the mouth of the Halibut Channel. There is a noticeable absence of the traditional large catches in strata 318 and 319.

Figures 4a to 4c show summaries of the total and maximum number of cod caught, the total and maximum cod weights, and the largest catch weights over the survey years, respectively. Evident in Fig. 4a and 4b are the reductions in numbers and weights of cod which are about 54 to 64% of their 2004 values, respectively and about 12 to 14% of the 2003 values.

Figure 4c shows the largest sets for each of the nine survey years. The largest sets in four of the years are greater than the 5000 kg scale shown: the largest sets in 1998, 2000, 2002, and 2003 are 8035 kg, 17,083 kg and 5007 kg, 7020 kg, and 8330 kg respectively. As with 2004, for 2005, there is an absence of at least one or two large sets which had generally been the norm in previous years.

### COD AGE AND LENGTH COMPOSITION

Figures 5a and 5b present the sampled length compositions of the first four and most recent five survey years. In 2004 the sampled lengths are generally between about 42 and 63 cm with a peak in the distribution at 47 cm, compared with 2004 where lengths are largely from 50 to 80 cm and peak at 58 cm. In 2005 there are more smaller fish in the 38

[2] 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/acon/

to 50 cm range compared with 2004 and a similar, albeit in lesser numbers, distribution to 2001.

Figures 6a and 6b present age composition of the 2005 sampled cod. Figure 6a presents length versus age distribution. The mean sampled length from the aged cod was 61 cm compared with 66 and 67 cm in 2004 and 2003 respectively. Mean lengths for 1997 to 2002 were 63.5, 68.8, 63.9, 70, 65 and 62.9 cm respectively. The maximum lengths sampled for years 1997 through 2004 ranged from 103 to 118 cm (113 cm in 2004). In 2005 the maximum length was 119 cm. The mean sampled age for 2005 was 5.4 years compared with 6 years in 2004. Mean ages for 1997-2003 were 5.8, 6.4, 6.1, 6.6, 6.1, 5.4 and 6.1 years respectively. The maximum ages sampled for 1997 through 2005 were 12, 15, 13, 14, 16, 13, 15, 16, and 12 respectively. There were few sampled fish in 2005 older than 8 years. Figure 6b presents the sampled numbers of fish at age, stacking the total numbers from each year in the bars. The greatest numbers of cod in 2005 are of age 3, then ages 4 and 7. A total of 414 otoliths were taken in 2005 compared to 456 in 2004, 491 in 2003, 502 in 1997, 450 in 1998, 551 in 1999, 678 in 2000, 607 in 2001, and 422 in 2002.

## COD ABUNDANCE AND BIOMASS ESTIMATES

Table 2a presents the STRAP output of estimated abundance and biomass. The estimated total number of cod for 3Ps is 4.5 million (with a 95% confidence lower and upper limits of 2.5 and 6.5 million). The mean number of cod per standard 1.5 nautical mile tow is 5 fish (with limits of 3 and 8). The estimated total cod biomass is 11.5 kt (with lower and upper limits of 6.5 and 16.4 kt). The mean catch weight per tow is 13 kg.

Table 2b presents a summary comparison of these abundance and biomass STRAP estimates for 1997-2005.

The 2005 abundance estimate of 4.5 million is 68% of the estimate of 6.6 million from 2004. The biomass estimate of 11.5 kt is about one half that of 2004 and is the lowest value from any of the survey years. The mean number of fish per tow for 2005 is about two thirds the 2004 value of 7.6 and one fifth the 2003 value of 25.1. The mean catch weight per set in 2005 is one half that of 2004 and 16% of the 2003 estimate. There are large variances to the estimates in some years which yield negative lower limits: zero values are shown in the tables. Large variances can result when there are large differences in the catch sizes obtained for the different sets fished in a given stratum.

Table 3a presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 5.2 with the greatest numbers estimated at ages 3 (1.7 fish per tow) and 4 (1.2 fish per tow). Lesser numbers are at ages 7 (0.7 fish) and 8 (0.5 fish). Table 3b presents a comparison of the estimated abundances and mean numbers of fish per tow for 1997-2005. The 2005 age 7 estimate of 0.64 million cod is less than one quarter the 2004 age 6 estimate of 2.6 million, if one follows that year class. For the first time since the 1997 survey there are no cod sampled older than 12 years. The numbers of cod for the 1998 and 1997 year classes (ages 7 and 8 in 2005) are estimated at one million, down to 30% of the 2004 estimate of 3.6 million, and down to 7% of the 2003 estimate of 15.4 million of these year classes. A greater proportion of younger fish is contributing to the abundance estimate, with 64% of the total estimate in 2005 being from cod aged 3-5 years, compared with 33% in 2004.

Tables 4a and 4b present the cod abundance and biomass estimates by strata for 1997-2005, arranged by depth regime. The overall abundance estimate (Table 4a) of 4.5 is two thirds the 2004 estimate and 20% of the 21.9 million value from 2003. The largest differences compared with 2004 are a reduction of about 2 million cod from the stratum 319 estimate, and a drop of 0.7 million cod for stratum 315. Conversely there is an increase of about 0.5 million cod for 2005 compared with 2004 for the shallower strata less than 30 fathoms. Most of the other strata estimates are comparable with 2004. A similar pattern is shown in Table 4b for biomass, where for example the stratum 315 and 329 estimates are 18 and 27% of their 2004 estimates respectively and the total estimate of 11.5 t is half the 2004 estimate.

Figure 7 shows a 3-D histogram of the abundance estimates by age (Table 3b) for all survey years with a large reduction in numbers at all ages in 2005, not just ages 3-6 for which some progression was seen from 2001-03.

Figure 8 presents the STRAP-estimated abundance at length values for all sexes combined. From 1997 to 1998 the data indicate a "bottoming out" of sorts, and in 2000 there was a visible increase in the length distribution peaking from 1998 to 1999 to 2000, a consistent increase of approximately 6 cm each year from 61 cm in 1998 to 67 cm in 1999 to 73 cm in 2000. This increase disappeared in 2001 with there being few fish over 65-70 cm in length. There was evident growth from 2001 to 2002 with the peak located at 49 cm in 2001 and at 61 cm in the 2002 survey. In 2003, the peak of about 2.5 million is at 67 cm although this is less than half the 2002 value of 6 million. In 2004, the distribution is much smaller than that of 2002 and 2003 and more in line with the lower distribution of 1998. The 2005 distribution is flattened out still further with no length abundance estimate greater than 0.5 million and overall with very little resemblance in the distribution to years past.

Figures 9 and 10 present 3-D histograms of the abundance and biomass estimates grouped by strata for all years. The reduction in numbers for either of the traditionally well-represented strata 318 and 319 at the mouth of the Halibut Channel is evident. Figure 11 compares the abundance and biomass estimates by considering totals with all strata and without the two strata 318 and 319. Excluding contributions from these strata, the 2005 abundance estimates are comparable to those for 2004, while the 2005 biomass estimate is reduced by about 40% from 2004.

## COD SUMMARY

In 2005, the cod catch weights were about one half those from 2004. There was a continued absence of traditional large catches seen in strata 318 and 319 at the mouth of the Halibut Channel. The survey yielded an abundance estimate of 4.5 million cod and a biomass estimate of 11 kt (compared with the 2004 estimates of 6.6 million cod and 23 kt): the lowest estimates in the nine years of survey.

The numbers of cod for the 1998 and 1997 year classes (ages 7 and 8 in 2005) are estimated at one million, down to 30% of the 2004 estimate of 3.6 million, and down to 7% of the 2003 estimate of 15.4 million of these year classes. A greater proportion of younger fish is contributing to the abundance estimate, with 64% of the total estimate in 2005 being from cod aged 3-5 years, compared with 33% in 2004.

## RESULTS: PLAICE

ACON plots of the spatial distribution of American plaice catch weights are presented in Fig. 12 and include the corresponding catch results from the 1998 to 2004 surveys. The 2005 survey shows a catch distribution similar to the previous years with catches located along the western and southwestern slopes of the St. Pierre Bank and at the southern entrance to the Halibut Channel. The largest catch was set 48 with 1034 plaice and a set catch weight of 1212 kg. The set was located in stratum 317 in a water depth of 127 m on the western portion of St. Pierre Bank just south of 46°N and west of the French Exclusion Zone corridor (a similar location to the largest set in the 2004 survey). The next largest sets, set 58 (891 plaice, 866 kg) and set 56 (953 plaice, 624 kg), were located at the southern entrance to the Halibut Channel.

Table 5 presents a summary of the plaice set details and catch numbers and weights. The mean plaice catch for the 71 stratified random sets is 62 fish and the mean catch weight is 58 kg. These numbers are larger than the preceding three years 2002-2004 where the mean number of fish ranged from 30 to 39 and the mean catch weight ranged from 27 to 33 kg. For the earlier 1999, 2000, and 2001 surveys the mean values were 55, 53, and 63 fish and mean catch weights of 36, 37, and 39 kg respectively. A catch of plaice was reported in 58 of the 71 successful sets. A total of six sets had catches over 100 kg (the same statistic as 2004), with four sets over 200 kg (three in 2004).

Figures 13a-13c show summaries of the total and maximum number of plaice caught, the total and maximum plaice weights, and the largest catch weights, respectively over the survey years. The total numbers are up 30% from 2004: it is noted as well the number of sets was 71 in 2005 compared with 86 in 2004. The largest set numbers are comparable at 1034 up about 8% from the largest set of 955 plaice in 2004. The total catch weight of 4069 kg is up about 42% from 2003. The largest set weights are all greater in 2005 compared with their 2004 counterparts. There is a general increasing trend over the past four survey years.

### LENGTH AND AGE

Figures 14a and 14b present the sampled length compositions for all survey years. For 2005, the fish sampled range in size from 21 cm up to 70 cm. The distribution shows a peak at 35 cm below the sampled mean of 42 cm. The shape of the distribution in 2005 is quite similar to previous years, particularly the 2004 curve. There is a greater percentage of larger plaice of length 55 to 66 cm compared with the 2004 survey.

Figures 15a and 15b present age composition of the 2005 sampled plaice. Figure 15a presents length versus age distribution. The mean age of 723 sampled plaice was 10.3 years, comparable to 10 years for 2002-04, 9.6 years in 2001, and 9.5 years in 2000. The youngest and oldest fish were 4 and 19 years. Figure 15b presents a bar chart of the sampled numbers of plaice at age for all years. The number of sampled plaice in 2005 is comparable to that from the previous years and the overall shape of the age distribution remains consistent (See also Figure 16).

In 2005 the numbers of plaice ages 5 and 6 are decreased by about a factor of two from 2004 and for ages 7-10 the numbers are comparable to or slightly larger than those from

2004. For ages 11-16 the 2005 numbers are comparable or slightly less than those from 2004.

## STRATIFIED ANALYSIS

Table 6a presents the STRAP output of estimated abundance and biomass. The estimated total number of plaice for 3Ps is 40.5 million (with an upper 95% confidence limit of 67.9 million). The mean number of plaice per standard 1.5 nautical mile tow is 47. The estimated total plaice biomass is 39.1 kt. The mean catch weight per tow is 45 kg.

Table 6b presents a summary comparison of abundance and biomass STRAP estimates for all years. The 2005 total abundance and mean number of fish per tow estimates are increased by 75% from 2004. The 2005 biomass estimates are just over twice the 2004 estimates. The 2005 estimates are the largest since the 2001 survey.

Table 7a presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 46.6. The greatest numbers estimated are at ages 7-10 (from 6 to 7.2 fish per tow). Lesser numbers of fish are estimated for age 11 (4.4 fish per tow) and ages 12-15 (2-3 fish per tow).

Table 7b presents an age summary comparison of abundance STRAP estimates. Except for fish aged 11-13 (1992-94 year classes) for which the numbers in 2005 are comparable to those of 2004, the number of fish for 2005 are about double those from 2004.

Tables 8a and 8b present the plaice abundance and biomass estimates by strata for all eight survey years, arranged by depth regime. Consistent with previous years, most of the plaice are estimated to be present in the three depth regimes shallower than 100 fathoms. For strata 317 and 319 in the 51 to 100 fathom range, the 2005 estimates are from two to four times larger than their 2004 counterparts. Conversely for similar depth strata 311 the 2005 estimates are less than half, although the magnitudes are much less, on the order of 1 million fish. The total 2005 estimate in this regime is 2.3 times larger than the 2004 estimate. The 2004 and 2005 total estimates of 9.6 million plaice for depths less than 50 fathoms are within 1% of each other. Just 3% of the abundance estimates for 2005 are in depths greater than 100 fathoms, similar to previous years were typically from 2 to 5% only are in these deeper strata. The biomass estimates shown in Table 8b illustrate a similar picture.

Figure 16 shows a 3-D histogram of the abundance estimates by age for all survey years. The age distribution shape shows a general consistency through all years and a total abundance estimate of 40.5 million plaice that is 55 to 75% greater than each of the previous three years 2002-04 and is about 68% of the largest estimate from all survey years of 59 million from 2001.

Figure 17 presents the STRAP-estimated abundance at length values for all sexes combined. The greater differences for 2005 include greater numbers of fish at lengths 32 to 38 cm compared to the previous three years and greater numbers compared to all years for lengths greater than about 50 cm. The 2005 peak of about 5 million is at 38.5 cm. This compares with peaks of 6.6 to 9.5 million at lengths 36.5 to 38.5 cm for 1999 to 2001.

Figures 18 and 19 present 3-D histograms of the abundance and biomass estimates grouped by strata for all years. As presented in Tables 8a and 8b, the general patterns of strata with greatest numbers in each of the first three depth regimes is seen consistently for all years.

### PLAICE SUMMARY

In 2005, the plaice catch numbers and weights increased by about 30 and 40% respectively compared with those of 2004. The abundance estimate of 40.5 million was up 75% from that in 2004 and the biomass estimate of 39.1 kt was up about 108% from 2004. The greatest increases were seen for older fish at lengths greater than 50 cm and for ages about 7-10 and lengths 32-38 cm. The primary locations for plaice continue to be along the western portion of the St. Pierre Bank and at the entrance to Halibut Channel.

## RESULTS: WITCH

ACON plots of the spatial distribution of catch weights are presented in Fig. 20 and include the corresponding catch results from the 1998 to 2004 surveys. The 2005 survey shows most catches located along the slopes of the St. Pierre Bank, southwest of St. Pierre and south to the Halibut Channel, and in water depths typically between about 150 and 400 m. The largest catch in the 2005 survey was 159 witch weighing 77 kg located in stratum 318, at the southwestern tip of St. Pierre Bank in a water depth of 208 m.

Table 9 presents a summary of the witch set details, catch numbers and weights. A total of 718 witch with total weight 306 kg were caught (compared with totals of 928 and 437 kg in 2004). Witch was caught in 31 of the 71 sets. About half of these sets were of 10 witch or less. This general pattern is similar to previous years.

Figures 21a-21c summarize the total and maximum number of witch caught, the total and maximum witch weights, and the largest catch weights over the survey years, respectively. The numbers are generally down from 2004 and 2003 but quite comparable to the 2002 catch statistics. The total numbers of witch caught in 2005 are 77% of the 2004 total, and the total catch weight of 306 kg is 70% of the 2004 value. As shown in Fig. 21c, the largest sets in 2005 are slightly smaller but still comparable to those from 2004.

### LENGTH AND AGE

Figures 22a and 22b present the length composition of the 2005 survey together in two views with the first three and most recent four surveys years. For 2005, the sampled fish ranged in size from 26 cm up to 56 cm, with a mean length of 39 cm and a peak in the distribution at 40 cm. The overall shape is quite similar to recent years.

Figures 23a and 23b present age composition of the 2005 sampled witch. Figure 23a presents length versus age distribution. The mean age of 452 sampled witch was 8.7 years comparable to the other years. The mean was 9 years in 2004, 8.8 years in 2003, 8.7 years in 2002, 9.1 years in 2000 and 2001, 8.9 years in 1999, and 8.8 years in 1998. The youngest and oldest fish sampled were 5 and 14 years (same as 2004).

Figure 23b presents a bar chart of the sampled percent occurrence of witch at age for 1998-2005. The numbers of sampled witch are not the same for each survey year, although for the past five years the numbers are comparable. The numbers at age are quite similar and stable for the past few years. For 2005 the numbers of ages 6 to 9 are about 2 to 15% greater than their 2004 counterparts; for ages 5, 11, and 12, the 2005 numbers are 67 to 75% of the 2004 numbers; and for age 13 the 2005 number of 7 witch is about one third the 2004 sample of 20.

## STRATIFIED ANALYSIS

Table 10a presents the STRAP output of estimated abundance and biomass. The estimated total number of witch for 3Ps is 5.4 million. The mean number of witch per standard 1.5 nautical mile tow is 6.2. The total biomass is 2.2 kt and the mean catch weight per tow is 2.6 kg. Table 10b presents a summary comparison of abundance and biomass STRAP estimates. The abundance estimate for 2005 is up slightly about 8% compared to 2004, while the biomass estimate is down 15%, all comparable to the estimates from the previous three to five years. The upper and lower limits continue to reflect considerable variance in the estimates.

Table 11a presents the STRAP age composition of numbers per tow, with sexes combined. The total mean number per tow is 6.2. The greatest numbers estimated are at ages 9 (1.5 fish per tow), 8 (1.4 fish), 7 (1.1 fish) and 10 (0.9 fish). Table 11b presents an age distribution summary comparison of abundance STRAP estimates for all years. Estimates are comparable for all ages compared with 2004. Figure 24 shows a 3-D histogram of the abundance estimates by age for all survey years. The age distribution shows consistency through all years and the total abundance estimate in 2005 is comparable to those of 2004 and 2002, not quite as large as the 2003 estimate.

Tables 12a and 12b present the witch abundance and biomass estimates by strata, for all years, arranged by depth regime. In 2005 there is a complete absence of witch in the strata surveyed less than 50 fathoms. Compared with 2004 there is a slight redistribution of witch with increased numbers estimated in 2005 for the 51-100 fathom (up 60% from 2004) and 151-200 fathom (up 71% from 2004) regimes and decreased numbers estimated for the 101-150 fathom (down 24% from 2004) and 201-301 fathom (down 33% from 2004). Similar increases and decreases are seen for biomass, with increased estimates in 2005 for the 51-100 fathom (up 51% from 2004) and 151-200 fathom (up 40% from 2004) regimes and decreased predictions for the 101-150 fathom (down 25% from 2004) and 201-301 fathom (down 65% from 2004).

Figure 25 presents the STRAP-estimated abundance at length values for all sexes combined for all eight survey years. The 2005 estimated length distribution is quite similar to that from 2004, 2002 and 1998, with a peak of 0.9 million in 2005 at 36.5 cm. Figure 25 is particularly illustrative of the three witch distribution patterns seen in the surveys: one from 2000, 2001, and 2003; a second in 1998, 2002, 2004, and now 2005; and the year effect in 1999.

Figures 26 and 27 present 3-D histograms of the abundance and biomass estimates grouped by strata for all years. As presented in Tables 12a and 12b, the general patterns of strata with greatest numbers in the four deepest depth regimes is seen consistently throughout the survey years. Most the estimates are from strata 317/319 in the 51-100

fathom regime, strata 313/318 from the 101-150 fathom regime, and 707/708 from the two deepest regimes 151-200 and 201-300 fathoms.

*Witch Summary*

In 2005, the witch catch numbers and weights were down slightly by about 22 and 30% respectively from 2004. The estimated abundance of 5.4 million was actually up 8% from the 2004 estimate of 5 million, while the estimated biomass of 2.2 kt was down 15% from the 2004 estimate of 2.6 kt. The distribution of witch ages and lengths remains consistent as does the primary catch locations along the western slopes of St. Pierre Bank and near the entrance to Halibut Channel. In 2005 catches were exclusively in depths greater than 50 fathoms.

## RESULTS: HADDOCK

ACON plots of the spatial distribution of catch weights and numbers are presented in Fig. 28a and 28b. In virtually all years, the haddock catches are located primarily at the southern entrance to the Halibut Channel and in lesser magnitudes on the western portion of St. Pierre Bank, just west and southwest of St. Pierre et Miquelon. Many of the remaining sets in the surveys had no haddock. This pattern is generally consistent over time.

Table 13 presents a summary of the haddock set details and catch numbers from the 2005 survey. A summary of set catch numbers and weights for all survey years is presented in Table 14. For each of the survey years, the survey trip dates and numbers of sets, number of sets with haddock, and the maximum, mean, and total numbers and weights are reported. On average at least one haddock was caught in 11 sets each survey trip as was the case in 2004. In 2005, five of the 11 sets with haddock are of a single haddock: weights ranging from 2 to 6.5 kg.

The mean number of haddock per set is 2.8 in 2005 compared with the 2004 value of 2.3. The mean set weight is 6.5 kg in 2005 down from 4.2 kg in 2003. Other than the 2001 and 2003 surveys these numbers are generally in keeping with the survey results of other years. Both the 2001 and 2003 surveys reported much higher catches than the other years.

Figure 29 presents six graphs illustrating the range of haddock catch values exhibited over the seven years. Figures 29a and 29b report the haddock weights and numbers for the five largest sets each year. As noted, 2001 and 2003 exhibited the largest sets. Excluding these years, the largest sets are generally between 100 and 200 kg and 40 and 140 haddock, with 1998 again being much lower than this. In 2005 the largest set was 91 haddock with a weight of 189 kg. The number of survey sets and the number of sets with haddock caught are shown in Figure29c and here the pattern is pretty consistent in all years: from 8 to 20% of survey sets report a catch of haddock. Figure 29d presents the mean weight per fish for each survey, defined as the ratio of the total weights to total numbers. This value ranges between 0.9 and 3 kg and is generally on the order of 2 kg.

*Abundance and Biomass Estimates*

Tables 15a and 15b present the STRAP output of estimated abundance and biomass. The estimated total number of haddock for 3Ps ranges from 0.22 million in 1998 to 6 million in 2001. The 2005 estimate is 1.6 million. Biomass estimates in Table 15b illustrate a similar pattern to the abundance. The total 3Ps haddock biomass estimates range from 0.7 kt in 1998 to 6.4 kt in 2001. The 2005 estimate is 3.6 kt. In most years the estimates are present in the 51 to 100 fathom and 101 to 150 fathom regimes. There are generally few haddock in the shallowest regime of less than 30 fathoms, except for 2001 when approximately 13% of the total abundance estimate and 28% of the total abundance estimate.

Figure 30 presents a 3d chart of the annual distribution of abundance estimates, where the percent of the total abundance in each stratum is shown. The predominance of haddock in strata 319 and 318 is clear. Small contributions are also seen in the shallower strata 314, 320, and 312 and in strata 310, 313, and 316 in the 101-150 fathom regime, prior to 2002. For the past four years the stock is almost exclusively found in strata 319 and 318 with from about 2 to 6% also coming from stratum 310.

Figures 31 and 32 present 3d histograms of the abundance and biomass estimates grouped by strata for all years. As presented in Tables 15a and 15b, the general patterns of strata with greatest numbers in strata 318 and 319 at the mouth of the Halibut Channel are clearly shown. The annual variation in the total estimates of abundance and biomass is also seen with no clear trend evident.

Figure 33 reports the mean number of fish per tow and mean weight per tow from the stratified analysis for each of the surveys. The mean number of haddock per tow ranges from 0.3 in 1998 and 1.2 in 1999 to 4.1 in 2003 and 6.9 in 2001. The 2005 value is 1.9. The mean weight per tow ranges from 0.8 kg in 1998 and 2.9 kg in 1999 to 5.8 kg in 2003 and 7.4 in 2001. The 2004 value is 4.2 kg.

*Haddock Summary*

The 2005 haddock catch numbers and weights were comparable to those from the 2004 survey. The abundance estimate of 1.6 million haddock was up 36% from 2004 and is the median for the nine survey years. The biomass estimate of 3.6 kt was up 60% from 2004 and is slightly greater than the nine year average of 3.3 kt and median of 3.1 kt. The general pattern of haddock catches being predominantly of the slopes at the entrance to the Halibut Channel remains. There also continues to be a large inter-annual variability in the magnitudes of the abundance and biomass estimates.

## ACKNOWLEDGEMENTS

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## REFERENCES

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**Erratum*: October 2012

Table 1. Summary of cod catches for stratified random survey, NAFO Subdivision 3Ps, 6-18 December 2005.

| M.V. Pennysmart Trip | Set | Year | Month | Day | StrLin | Division | Unit Area | Depth (m) | Set Location Lat (N) | Long (W) | COD Catch # of Fish | Catch Weight (kg) | Set Duration (min) | Tow Distance (n.mi.) | COD Mean Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 1 | 5 | 12 | 6 | 322 | 3P | M29 | 172 | 46.62 | 55.05 | 4 | 5 | 30 | 1.5 | 1.3 |
| 10 | 2 | 5 | 12 | 6 | 322 | 3P | M30 | 146 | 46.48 | 55.09 | 9 | 16 | 30 | 1.5 | 1.8 |
| 10 | 3 | 5 | 12 | 6 | 322 | 3P | M30 | 153 | 46.43 | 55.34 | 8 | 16 | 30 | 1.5 | 2.0 |
| 10 | 4 | 5 | 12 | 6 | 322 | 3P | M30 | 167 | 46.30 | 55.02 | 1 | 1.5 | 30 | 1.5 | 1.5 |
| 10 | 5 | 5 | 12 | 6 | 324 | 3P | N30 | 101 | 46.29 | 54.60 | 1 | 0.4 | 30 | 1.5 | 0.4 |
| 10 | 6 | 5 | 12 | 6 | 324 | 3P | N30 | 119 | 46.21 | 54.45 | 0 | 0 | 30 | 1.6 | |
| 10 | 7 | 5 | 12 | 6 | 325 | 3P | N30 | 83 | 46.13 | 54.75 | 2 | 0.5 | 30 | 1.6 | 0.3 |
| 10 | 8 | 5 | 12 | 7 | 323 | 3P | N30 | 144 | 46.09 | 54.84 | 1 | 1 | 30 | 1.5 | 1.0 |
| 10 | 9 | 5 | 12 | 7 | 323 | 3P | M30 | 148 | 46.00 | 55.25 | 0 | 0 | 30 | 1.5 | |
| 10 | 10 | 5 | 12 | 7 | 322 | 3P | M30 | 126 | 46.25 | 55.66 | 0 | 0 | 30 | 1.5 | |
| 10 | 11 | 5 | 12 | 7 | 321 | 3P | M30 | 56 | 46.14 | 55.75 | 2 | 12 | 30 | 1.4 | 6.0 |
| 10 | 12 | 5 | 12 | 7 | 321 | 3P | M30 | 80 | 46.24 | 55.86 | 0 | 0 | 30 | 1.5 | |
| 10 | 13 | 5 | 12 | 7 | 322 | 3P | M30 | 129 | 46.31 | 55.76 | 2 | 3.5 | 30 | 1.5 | 1.8 |
| 10 | 14 | 5 | 12 | 7 | 322 | 3P | M30 | 137 | 46.48 | 55.78 | 0 | 0 | 30 | 1.5 | |
| 10 | 15 | 5 | 12 | 8 | 321 | 3P | M31 | 60 | 45.74 | 55.57 | 0 | 0 | 30 | 1.5 | |
| 10 | 16 | 5 | 12 | 8 | 321 | 3P | M31 | 81 | 45.69 | 55.40 | 0 | 0 | 30 | 1.5 | |
| 10 | 17 | 5 | 12 | 8 | 323 | 3P | M31 | 148 | 45.74 | 55.35 | 16 | 23 | 30 | 1.5 | 1.4 |
| 10 | 18 | 5 | 12 | 8 | 323 | 3P | M31 | 138 | 45.64 | 55.11 | 0 | 0 | 30 | 1.5 | |
| 10 | 19 | 5 | 12 | 8 | 325 | 3P | N31 | 63 | 45.69 | 54.92 | 1 | 1.2 | 30 | 1.5 | 1.2 |
| 10 | 20 | 5 | 12 | 8 | 325 | 3P | N31 | 69 | 45.85 | 54.79 | 0 | 0 | 30 | 1.5 | |
| 10 | 21 | 5 | 12 | 8 | 325 | 3P | N31 | 80 | 45.85 | 54.70 | 0 | 0 | 30 | 1.4 | |
| 10 | 22 | 5 | 12 | 8 | 326 | 3P | N31 | 81 | 45.74 | 54.43 | 0 | 0 | 30 | 1.5 | |
| 10 | 23 | 5 | 12 | 8 | 326 | 3P | N31 | 84 | 45.56 | 54.43 | 0 | 0 | 30 | 1.6 | |
| 10 | 24 | 5 | 12 | 8 | 325 | 3P | N31 | 78 | 45.55 | 54.88 | 1 | 22 | 30 | 1.5 | 22.0 |
| 10 | 25 | 5 | 12 | 8 | 319 | 3P | N31 | 104 | 45.55 | 54.99 | 0 | 0 | 30 | 1.5 | |
| 10 | 26 | 5 | 12 | 9 | 319 | 3P | M32 | 128 | 45.50 | 55.38 | 31 | 38 | 30 | 1.5 | 1.2 |
| 10 | 27 | 5 | 12 | 9 | 315 | 3P | M31 | 70 | 45.50 | 55.54 | 6 | 59 | 30 | 1.5 | 9.8 |
| 10 | 28 | 5 | 12 | 9 | 320 | 3P | M31 | 55 | 45.65 | 55.66 | 5 | 36 | 30 | 1.5 | 7.2 |
| 10 | 29 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.80 | 55.49 | 1 | 3 | 30 | 1.6 | 3.0 |
| 10 | 30 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.91 | 55.69 | 3 | 2.5 | 30 | 1.6 | 0.8 |
| 10 | 31 | 5 | 12 | 9 | 320 | 3P | L31 | 49 | 45.78 | 56.07 | 35 | 47 | 30 | 1.5 | 1.3 |
| 10 | 32 | 5 | 12 | 9 | 320 | 3P | L31 | 48 | 45.79 | 56.49 | 5 | 14 | 30 | 1.5 | 2.8 |
| 10 | 33 | 5 | 12 | 9 | 320 | 3P | L31 | 52 | 45.95 | 56.51 | 0 | 0 | 30 | 1.6 | |
| 10 | 34 | 5 | 12 | 9 | 314 | 3P | L30 | 54 | 46.22 | 56.69 | 3 | 3 | 30 | 1.5 | 1.0 |
| 10 | 35 | 5 | 12 | 10 | 312 | 3P | L30 | 63 | 46.20 | 56.76 | 6 | 71 | 30 | 1.5 | 11.8 |
| 10 | 36 | 5 | 12 | 10 | 314 | 3P | K30 | 47 | 46.29 | 57.01 | 0 | 0 | 30 | 1.5 | |
| 10 | 38 | 5 | 12 | 13 | 312 | 3P | K29 | 77 | 46.74 | 57.03 | 49 | 63 | 30 | 1.5 | 1.3 |
| 10 | 39 | 5 | 12 | 13 | 311 | 3P | K29 | 100 | 46.81 | 57.04 | 8 | 6.5 | 30 | 1.6 | 0.8 |
| 10 | 40 | 5 | 12 | 13 | 310 | 3P | K29 | 219 | 46.81 | 57.30 | 39 | 79 | 30 | 1.6 | 2.0 |
| 10 | 41 | 5 | 12 | 13 | 310 | 3P | K29 | 243 | 46.77 | 57.37 | 49 | 165 | 30 | 1.5 | 3.4 |
| 10 | 42 | 5 | 12 | 13 | 313 | 3P | K29 | 262 | 46.63 | 57.50 | 59 | 101 | 30 | 1.6 | 1.7 |
| 10 | 43 | 5 | 12 | 13 | 313 | 3P | K29 | 206 | 46.50 | 57.44 | 8 | 26 | 30 | 1.5 | 3.3 |
| 10 | 44 | 5 | 12 | 14 | 311 | 3P | K30 | 136 | 46.25 | 57.19 | 0 | 0 | 30 | 1.5 | |
| 10 | 45 | 5 | 12 | 14 | 705 | 3P | K30 | 340 | 46.12 | 57.28 | 2 | 4 | 30 | 1.5 | 2.0 |
| 10 | 46 | 5 | 12 | 14 | 705 | 3P | K30 | 321 | 46.07 | 57.18 | 1 | 8 | 30 | 1.6 | 8.0 |
| 10 | 47 | 5 | 12 | 14 | 706 | 3P | L31 | 356 | 45.80 | 56.93 | 0 | 0 | 30 | 1.6 | |
| 10 | 48 | 5 | 12 | 14 | 317 | 3P | L31 | 125 | 45.69 | 56.63 | 1 | 0.5 | 30 | 1.5 | 0.5 |
| 10 | 49 | 5 | 12 | 14 | 316 | 3P | L31 | 231 | 45.61 | 56.60 | 8 | 29 | 30 | 1.5 | 3.6 |
| 10 | 50 | 5 | 12 | 14 | 316 | 3P | L31 | 203 | 45.56 | 56.55 | 1 | 5.5 | 30 | 1.5 | 5.5 |
| 10 | 51 | 5 | 12 | 14 | 706 | 3P | L32 | 353 | 45.30 | 56.49 | 1 | 0.3 | 30 | 1.5 | 0.3 |
| 10 | 52 | 5 | 12 | 14 | 315 | 3P | L32 | 77 | 45.20 | 56.10 | 3 | 11 | 30 | 1.5 | 3.7 |
| 10 | 53 | 5 | 12 | 15 | 320 | 3P | M32 | 46 | 45.43 | 55.93 | 1 | 2.5 | 30 | 1.5 | 2.5 |
| 10 | 54 | 5 | 12 | 15 | 315 | 3P | M32 | 76 | 45.22 | 55.78 | 6 | 20 | 30 | 1.5 | 3.3 |
| 10 | 55 | 5 | 12 | 15 | 315 | 3P | M32 | 79 | 45.05 | 55.80 | 1 | 6 | 30 | 1.5 | 6.0 |
| 10 | 56 | 5 | 12 | 15 | 317 | 3P | M33 | 127 | 44.95 | 55.94 | 9 | 15 | 30 | 1.4 | 1.7 |
| 10 | 57 | 5 | 12 | 15 | 318 | 3P | M33 | 208 | 44.91 | 55.92 | 12 | 40 | 30 | 1.4 | 3.3 |
| 10 | 58 | 5 | 12 | 15 | 319 | 3P | M32 | 114 | 45.02 | 55.59 | 17 | 61 | 30 | 1.4 | 3.6 |
| 10 | 59 | 5 | 12 | 15 | 707 | 3P | M33 | 323 | 44.99 | 55.53 | 1 | 1.5 | 30 | 1.5 | 1.5 |
| 10 | 60 | 5 | 12 | 15 | 318 | 3P | M32 | 245 | 45.03 | 55.37 | 103 | 320 | 30 | 1.5 | 3.1 |
| 10 | 62 | 5 | 12 | 16 | 707 | 3P | N32 | 338 | 45.06 | 54.76 | 0 | 0 | 30 | 1.5 | |
| 10 | 63 | 5 | 12 | 16 | 319 | 3P | N32 | 101 | 45.15 | 54.78 | 3 | 21 | 30 | 1.5 | 7.0 |
| 10 | 64 | 5 | 12 | 16 | 319 | 3P | M32 | 155 | 45.37 | 55.15 | 1 | 1 | 30 | 1.6 | 1.0 |
| 10 | 65 | 5 | 12 | 16 | 319 | 3P | M32 | 168 | 45.31 | 55.36 | 21 | 64 | 30 | 1.4 | 3.0 |
| 10 | 74 | 5 | 12 | 17 | 708 | 3P | M33 | 425 | 45.00 | 55.49 | 4 | 15 | 30 | 1.6 | 3.8 |
| 10 | 75 | 5 | 12 | 17 | 708 | 3P | M33 | 506 | 44.91 | 55.59 | 2 | 1.5 | 30 | 1.5 | 0.8 |
| 10 | 76 | 5 | 12 | 17 | 711 | 3P | L32 | 390 | 45.14 | 56.51 | 0 | 0 | 30 | 1.5 | |
| 10 | 77 | 5 | 12 | 17 | 711 | 3P | L32 | 392 | 45.39 | 56.75 | 0 | 0 | 30 | 1.6 | |
| 10 | 78 | 5 | 12 | 18 | 712 | 3P | L31 | 410 | 45.60 | 56.96 | 0 | 0 | 30 | 1.6 | |
| 10 | 79 | 5 | 12 | 18 | 712 | 3P | K31 | 411 | 45.88 | 57.10 | 1 | 3 | 30 | 1.5 | 3.0 |
| 10 | 80 | 5 | 12 | 18 | 713 | 3P | K31 | 486 | 45.98 | 57.62 | 0 | 0 | 30 | 1.5 | |
| 10 | 81 | 5 | 12 | 18 | 713 | 3P | K30 | 456 | 46.17 | 57.60 | 0 | 0 | 30 | 1.6 | |
| | | | | | | | | | Minimum | | 0.0 | 0.0 | 30.0 | 1.4 | 0.3 |
| | | | | | | | | | Maximum | | 103.0 | 320.0 | 30.0 | 1.6 | 22.0 |
| | | | | | | | | | Mean | | 7.8 | 20.4 | 30.0 | 1.5 | 2.6 |
| | | | | | | | | | Median | | 1.0 | 3.0 | 30.0 | 1.5 | 2.0 |
| | | | | | | | | | Standard Error | | 0.2 | 0.6 | 0.0 | 0.0 | 0.1 |
| | | | | | | | | | Total | | 554.0 | 1445.9 | | | |

Notes: Sets 66-73 were tagging sets and are excluded from the stratified random survey
Sets 37 and 61 were unsuccessful

Table 2a. Stratified analysis estimated cod abundance and biomass.

COD GEAC 3PS 2005 No Zone
ANALYSIS FOR TRIP 10 2005 VESSEL 49 ICNAF 3P SPECIES 0438

NUMBERS

| STRATUM | NO.SETS | TOTAL | AV./SET | UNITS | TOTAL NO | VAR. |
|---|---|---|---|---|---|---|
| 310 | 2 | 85.56 | 42.78 | 9255. | 395958. | 77.35 |
| 311 | 2 | 7.50 | 3.75 | 17903. | 67136. | 28.13 |
| 312 | 2 | 55.00 | 27.50 | 16281. | 447739. | 924.50 |
| 313 | 2 | 63.31 | 31.66 | 11147. | 352873. | 1119.24 |
| 314 | 2 | 3.00 | 1.50 | 61748. | 92622. | 4.50 |
| 315 | 4 | 16.00 | 4.00 | 52357. | 209429. | 6.00 |
| 316 | 2 | 9.00 | 4.50 | 11147. | 50162. | 24.50 |
| 317 | 2 | 10.64 | 5.32 | 11620. | 61835. | 37.35 |
| 318 | 2 | 115.86 | 57.93 | 8715. | 504845. | 4062.87 |
| 319 | 6 | 75.65 | 12.61 | 66477. | 838182. | 171.00 |
| 320 | 5 | 46.00 | 9.20 | 79988. | 735893. | 213.20 |
| 321 | 6 | 5.89 | 0.98 | 73503. | 72190. | 1.52 |
| 322 | 7 | 24.00 | 3.43 | 94648. | 324509. | 13.95 |
| 323 | 4 | 17.00 | 4.25 | 47020. | 199836. | 61.58 |
| 324 | 2 | 1.00 | 0.50 | 33374. | 16687. | 0.50 |
| 325 | 5 | 3.88 | 0.77 | 63775. | 49425. | 0.63 |
| 326 | 2 | 0.00 | 0.00 | 11215. | 0. | 0.00 |
| 705 | 2 | 2.94 | 1.47 | 13174. | 19349. | 0.56 |
| 706 | 2 | 1.00 | 0.50 | 28509. | 14255. | 0.50 |
| 707 | 2 | 1.00 | 0.50 | 4999. | 2500. | 0.50 |
| 708 | 2 | 3.95 | 1.98 | 8512. | 16812. | 6.30 |
| 711 | 2 | 0.00 | 0.00 | 37630. | 0. | 0.00 |
| 712 | 2 | 1.00 | 0.50 | 49385. | 24692. | 0.50 |
| 713 | 2 | 0.00 | 0.00 | 57492. | 0. | 0.00 |

| TOTAL | | | AVERAGE | | |
|---|---|---|---|---|---|
| TOTAL | UPPER | LOWER | MEAN | UPPER | LOWER |
| 4496929. | 6520444. | 2473414. | 5.17 | 7.50 | 2.84 |

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 | 239.06 | 119.53 | 9255. | 1106311. | 4134.81 |
| 311 | 2 | 6.09 | 3.05 | 17903. | 54548. | 18.57 |
| 312 | 2 | 134.00 | 67.00 | 16281. | 1090855. | 32.00 |
| 313 | 2 | 120.69 | 60.34 | 11147. | 672654. | 2358.99 |
| 314 | 2 | 3.00 | 1.50 | 61748. | 92622. | 4.50 |
| 315 | 4 | 96.00 | 24.00 | 52357. | 1256575. | 578.00 |
| 316 | 2 | 34.50 | 17.25 | 11147. | 192286. | 276.13 |
| 317 | 2 | 16.57 | 8.29 | 11620. | 96279. | 121.23 |
| 318 | 2 | 362.86 | 181.43 | 8715. | 1581142. | 38404.08 |
| 319 | 6 | 193.87 | 32.31 | 66477. | 2147934. | 919.09 |
| 320 | 5 | 99.50 | 19.90 | 79988. | 1591769. | 431.80 |
| 321 | 6 | 18.01 | 3.00 | 73503. | 220673. | 24.93 |
| 322 | 7 | 42.00 | 6.00 | 94648. | 567891. | 49.92 |
| 323 | 4 | 24.00 | 6.00 | 47020. | 282121. | 128.67 |
| 324 | 2 | 0.40 | 0.20 | 33374. | 6675. | 0.08 |
| 325 | 5 | 23.67 | 4.73 | 63775. | 301893. | 93.40 |
| 326 | 2 | 0.00 | 0.00 | 11215. | 0. | 0.00 |
| 705 | 2 | 11.50 | 5.75 | 13174. | 75749. | 6.13 |
| 706 | 2 | 0.30 | 0.15 | 28509. | 4276. | 0.05 |
| 707 | 2 | 1.50 | 0.75 | 4999. | 3749. | 1.13 |
| 708 | 2 | 14.21 | 7.11 | 8512. | 60490. | 96.78 |
| 711 | 2 | 0.00 | 0.00 | 37630. | 0. | 0.00 |
| 712 | 2 | 3.00 | 1.50 | 49385. | 74077. | 4.50 |
| 713 | 2 | 0.00 | 0.00 | 57492. | 0. | 0.00 |

| TOTAL | | | AVERAGE | | |
|---|---|---|---|---|---|
| TOTAL | UPPER | LOWER | MEAN | UPPER | LOWER |
| 11480571. | 16418955. | 6542188. | 13.20 | 18.88 | 7.52 |

EFFECTIVE DEGREES OF FREEDOM= 5 STUDENTS T-VALUE= 2.57 ALPHA=0.05

Table 2b. Stratified analysis estimated cod abundance and biomass: comparison for 1997-2005.

| 3Ps Cod Estimates | | | | | | |
|---|---|---|---|---|---|---|
| "numbers"abundance (millions of fish) | | | | | | |
| | 95% upper limit | Estimated | 95% lower limit | 95% upper limit | Mean #fish /tow | 95% lower limit |
| 1997 | 57.1 | 30.9 | 4.8 | 97 | 52.6 | 8.2 |
| 1998 ** | 11.9 | 10.5 | 9.1 | 14 | 12.6 | 11 |
| 1999 | 20.7 | 13.7 | 6.7 | 24.9 | 16.5 | 8.1 |
| 2000 ** | 61.7 | 37.7 | 13.6 | 74.2 | 45.3 | 16.4 |
| 2001 | 79.6 | 44.0 | 8.3 | 91.5 | 50.5 | 9.58 |
| 2002 | 119.2 | 37.9 | 0 | 138.9 | 44.1 | 0 |
| 2003 | 51.9 | 21.9 | 0 | 59.7 | 25.1 | 0 |
| 2004 | 13.5 | 6.6 | 0 | 15.5 | 7.6 | 0 |
| 2005 | 6.5 | 4.5 | 2.5 | 7.5 | 5.2 | 2.84 |
| "weights" biomass (kt) | | | | | | |
| | 95% upper limit | Estimated | 95% lower limit | 95% upper limit | Mean catch /tow (kg) | 95% lower limit |
| 1997 | 174.2 | 99.3 | 24.4 | 296 | 169 | 41 |
| 1998 ** | 56.8 | 47.9 | 38.9 | 68.3 | 57.5 | 46.8 |
| 1999 | 61.7 | 44.5 | 27.3 | 74.1 | 53.5 | 32.9 |
| 2000 ** | 324.5 | 187.2 | 50.0 | 389.9 | 225.0 | 60.0 |
| 2001 | 142.7 | 82.7 | 22.7 | 164.0 | 95.1 | 26.1 |
| 2002 | 291.0 | 92.2 | 0 | 338.9 | 107.4 | 0 |
| 2003 | 162.5 | 69.7 | 0 | 186.8 | 80.1 | 0 |
| 2004 | 44.7 | 23.1 | 0 | 51.4 | 26.6 | 0 |
| 2005 | 16.4 | 11.5 | 6.5 | 18.9 | 13.2 | 7.5 |
| ** 75% upper and lower limits reported for 1998, 2000, 2003<br>*** Note: variance too large for valid lower limits for 2002-2004. Negative limit computed: 0 reported. | | | | | | |

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

```
COD GEAC 2004 3PS No Zone (S1 BY AGE)   ANALYSIS FOR TRIP 10 2005 VESSEL 49 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.        0.00        0.00        0.00          0
    1.0          0.          0.          0.        0.00        0.00        0.00          0
    2.0      43415.     124271.     -37441.        0.05        0.14       -0.04          2
    3.0    1511828.    2663259.     360397.        1.74        3.06        0.41          7
    4.0     999624.    1511790.     487457.        1.15        1.74        0.56          8
    5.0     370075.     557616.     182533.        0.43        0.64        0.21          6
    6.0     270622.     544477.      -3233.        0.31        0.63        0.00          2
    7.0     641633.    1401908.    -118641.        0.74        1.61       -0.14          2
    8.0     432226.     884894.     -20443.        0.50        1.02       -0.02          2
    9.0      65294.     105096.      25492.        0.08        0.12        0.03          8
   10.0      34847.      59256.      10439.        0.04        0.07        0.01          6
   11.0      80738.     157791.       3685.        0.09        0.18        0.00          7
   12.0      34670.      84894.     -15555.        0.04        0.10       -0.02          4
UNKNOWN      11958.      45155.     -21240.        0.01        0.05       -0.02          4
TOTAL      4496929.    6520444.    2473414.        5.17        7.50        2.84         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 3b. Stratified analysis estimated cod abundance age distribution: 1997-2005.

| | 3Ps Cod Estimates | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | "number" abundance (millions of fish) | | | | | | | | | Mean #fish/tow | | | | | | | | |
| Age (years) | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| 1 | | 0.01 | | | 0.03 | | | | | | 0.01 | | | 0.03 | | | | |
| 2 | 0.17 | 0.05 | 0.28 | 1.36 | 0.18 | | 0.19 | 0.07 | 0.04 | 0.29 | 0.06 | 0.34 | 1.64 | 0.21 | | 0.22 | 0.08 | 0.05 |
| 3 | 1.93 | 0.33 | 0.95 | 6.03 | 10.85 | 1.08 | 0.36 | 0.59 | 1.51 | 3.28 | 0.40 | 1.14 | 7.24 | 12.47 | 1.26 | 0.41 | 0.68 | 1.74 |
| 4 | 5.55 | 1.47 | 1.43 | 2.38 | 23.26 | 14.49 | 2.10 | 0.70 | 1.00 | 9.42 | 1.76 | 1.71 | 2.86 | 26.74 | 16.88 | 2.46 | 0.80 | 1.15 |
| 5 | 8.02 | 1.93 | 2.35 | 2.79 | 3.27 | 15.86 | 7.30 | 0.93 | 0.37 | 13.62 | 2.32 | 2.83 | 3.35 | 3.75 | 18.47 | 8.34 | 1.07 | 0.43 |
| 6 | 1.78 | 1.51 | 2.98 | 4.31 | 1.86 | 2.48 | 8.07 | 2.60 | 0.27 | 3.02 | 1.81 | 3.58 | 5.18 | 2.14 | 2.90 | 9.28 | 2.98 | 0.31 |
| 7 | 5.91 | 0.29 | 2.73 | 4.90 | 1.41 | 1.19 | 1.15 | 1.02 | 0.64 | 10.03 | 0.35 | 3.27 | 5.89 | 1.62 | 1.39 | 1.32 | 1.18 | 0.74 |
| 8 | 7.05 | 1.36 | 0.43 | 3.32 | 1.17 | 1.01 | 0.60 | 0.13 | 0.43 | 11.97 | 1.64 | 0.51 | 3.99 | 1.34 | 1.18 | 0.73 | 0.15 | 0.50 |
| 9 | 0.79 | 2.83 | 1.19 | 0.95 | 0.84 | 0.78 | 1.15 | 0.11 | 0.07 | 1.34 | 3.40 | 1.43 | 1.14 | 0.96 | 0.91 | 1.32 | 0.12 | 0.08 |
| 10 | 0.32 | 0.33 | 1.13 | 4.85 | 0.09 | 0.39 | 0.42 | 0.16 | 0.03 | 0.54 | 0.40 | 1.36 | 5.83 | 0.10 | 0.46 | 0.48 | 0.18 | 0.04 |
| 11 | 0.14 | 0.04 | 0.14 | 5.94 | 0.38 | 0.07 | 0.21 | 0.11 | 0.08 | 0.24 | 0.04 | 0.17 | 7.14 | 0.44 | 0.09 | 0.24 | 0.13 | 0.09 |
| 12 | 0.02 | 0.11 | 0.08 | 0.66 | 0.50 | 0.23 | | 0.04 | 0.03 | 0.04 | 0.13 | 0.10 | 0.79 | 0.58 | 0.27 | | 0.05 | 0.04 |
| 13 | | 0.18 | 0.01 | 0.09 | 0.07 | 0.26 | 0.14 | | | | 0.22 | 0.02 | 0.11 | 0.08 | 0.30 | 0.16 | | |
| 14 | | | | 0.14 | 0.04 | | 0.13 | 0.11 | | | | | 0.17 | 0.05 | | 0.15 | 0.13 | |
| 15 | | 0.03 | | | 0.03 | | 0.03 | 0.06 | | | 0.04 | | | 0.03 | | 0.03 | 0.06 | |
| 16 | | | | | 0.01 | | | 0.01 | | | | | | 0.02 | | | 0.01 | |
| Total | **31.7** | **10.5** | **13.7** | **37.7** | **44.0** | **37.8** | **21.9** | **6.6** | **4.5** | **53.8** | **12.6** | **16.5** | **45.3** | **50.6** | **44.1** | **25.1** | **7.6** | **5.2** |

Table 4a. Cod abundance estimates (thousands of fish) from GEAC surveys in NAFO Subdivision 3Ps from 1997 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 2 84 12-Dec 1997 | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 86 | 1111 | 138 | 5527 | 15972 | 152 | 2787 | 46 | 93 |
| | 320 | 1320 | 4004 | 1540 | 1914 | 2760 | 22386 | 745 | 1823 | 232 | 736 |
| | | Subtotal | 4090 | 2651 | 2052 | 8287 | 38358 | 897 | 4610 | 278 | 829 |
| 31-50 | 312 | 272 | 725 | 33 | 347 | 554 | 8 | 73 | 627 | 225 | 448 |
| | 315 | 827 | 2046 | 1456 | 3158 | 3304 | 446 | 342 | 135 | 938 | 209 |
| | 321 | 1189 | 175 | 189 | 250 | 73 | 127 | 1481 | 103 | 119 | 72 |
| | 325 | 944 | 50 | 11 | 52 | 16 | 104 | 64 | 31 | 48 | 49 |
| | 326 | 166 | 17 | 0 | 5 | 5 | 16 | . | 0 | 0 | 0 |
| | | Subtotal | 3013 | 1689 | 3812 | 3952 | 701 | 1960 | 896 | 1330 | 779 |
| 51-100 | 311 | 317 | 832 | 63 | 141 | 18 | 197 | 303 | 25 | 36 | 67 |
| | 317 | 193 | 226 | 331 | 126 | 494 | 30 | 23 | 861 | 161 | 62 |
| | 319 | 984 | 17410 | 370 | 833 | 10991 | 4135 | 33092 | 252 | 2919 | 838 |
| | 322 | 1567 | . | 95 | 253 | 110 | 105 | 185 | 92 | 125 | 325 |
| | 323 | 696 | 225 | 47 | 18 | 0 | 176 | 93 | 80 | 169 | 200 |
| | 324 | 494 | . | 78 | 100 | 125 | 11 | 81 | 33 | 89 | 17 |
| | | Subtotal | 18693 | 984 | 1471 | 11738 | 4654 | 33777 | 1343 | 3499 | 1508 |
| 101-150 | 310 | 170 | 150 | 699 | 134 | 449 | 88 | 97 | 555 | 339 | 396 |
| | 313 | 165 | 443 | 167 | 1053 | 240 | 84 | 83 | 21 | 111 | 353 |
| | 316 | 189 | 3606 | 312 | 92 | 117 | 39 | 5 | 43 | 346 | 50 |
| | 318 | 129 | 339 | 3736 | 4959 | 12545 | 37 | 943 | 14142 | 283 | 505 |
| | | Subtotal | 4538 | 4914 | 6238 | 13351 | 248 | 1128 | 14761 | 1079 | 1304 |
| 151-200 | 705 | 195 | 103 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| | 706 | 476 | 513 | 29 | 10 | 19 | 0 | 54 | 20 | 69 | 14 |
| | 707 | 74 | 29 | 180 | 137 | 345 | 0 | 5 | 210 | 320 | 3 |
| | | Subtotal | 645 | 216 | 147 | 364 | 0 | 59 | 230 | 389 | 36 |
| 201-300 | 708 | 126 | . | 9 | 17 | 25 | 0 | 4 | 17 | 51 | 17 |
| | 711 | 593 | . | . | . | . | 0 | 18 | 13 | 12 | 0 |
| | 712 | 731 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| | 713 | 851 | . | 19 | 0 | 0 | 0 | 13 | 0 | 0 | 0 |
| | | Subtotal | 0 | 28 | 17 | 25 | 0 | 35 | 30 | 63 | 42 |
| | Total [1] | | 30,979 | 10,482 | 13,737 | 37,717 | 43,961 | 37,856 | 21,870 | 6,638 | 4,497 |

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

. denotes strata not fished

Table 4b. Cod biomass estimates (t) from GEAC surveys in NAFO Subdivision 3Ps from 1997 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 2 84 12-Dec 1997 | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 262 | 7464 | 246 | 62730 | 25024 | 540 | 12597 | 77 | 93 |
| | 320 | 1320 | 18907 | 5287 | 5276 | 4813 | 48280 | 2250 | 7095 | 1853 | 1592 |
| | | Subtotal | 19169 | 12751 | 5522 | 67543 | 73304 | 2790 | 19692 | 1930 | 1684 |
| 31-50 | 312 | 272 | 1215 | 138 | 775 | 1123 | 7 | 161 | 1862 | 754 | 1091 |
| | 315 | 827 | 11171 | 4071 | 10443 | 22405 | 1019 | 914 | 950 | 6888 | 1257 |
| | 321 | 1189 | 301 | 559 | 962 | 87 | 151 | 4246 | 151 | 610 | 221 |
| | 325 | 944 | 89 | 55 | 113 | 8 | 327 | 56 | 108 | 106 | 302 |
| | 326 | 166 | 36 | 0 | 2 | 8 | 7 | . | 0 | 0 | 0 |
| | | Subtotal | 12812 | 4823 | 12295 | 23631 | 1511 | 5377 | 3071 | 8358 | 2870 |
| 51-100 | 311 | 317 | 1558 | 120 | 286 | 27 | 292 | 589 | 46 | 134 | 55 |
| | 317 | 193 | 957 | 938 | 336 | 598 | 164 | 76 | 2601 | 261 | 96 |
| | 319 | 984 | 48133 | 1255 | 2455 | 22369 | 6498 | 80311 | 572 | 7945 | 2148 |
| | 322 | 1567 | . | 149 | 345 | 137 | 174 | 303 | 185 | 202 | 568 |
| | 323 | 696 | 341 | 103 | 31 | 0 | 258 | 140 | 171 | 390 | 282 |
| | 324 | 494 | . | 174 | 78 | 66 | 13 | 104 | 65 | 122 | 7 |
| | | Subtotal | 50989 | 2739 | 3531 | 23197 | 7399 | 81523 | 3640 | 9054 | 3155 |
| 101-150 | 310 | 170 | 263 | 1823 | 322 | 1039 | 170 | 171 | 1393 | 787 | 1106 |
| | 313 | 165 | 1132 | 458 | 2469 | 563 | 131 | 169 | 55 | 201 | 673 |
| | 316 | 189 | 12362 | 803 | 292 | 312 | 104 | 8 | 111 | 1059 | 192 |
| | 318 | 129 | 911 | 23797 | 19561 | 69788 | 65 | 2028 | 41165 | 715 | 1581 |
| | | Subtotal | 14668 | 26881 | 22644 | 71702 | 470 | 2376 | 42724 | 2762 | 3552 |
| 151-200 | 705 | 195 | 277 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 76 |
| | 706 | 476 | 1317 | 118 | 33 | 43 | 0 | 93 | 69 | 240 | 4 |
| | 707 | 74 | 96 | 480 | 466 | 1019 | 0 | 27 | 415 | 675 | 4 |
| | | Subtotal | 1690 | 609 | 499 | 1062 | 0 | 120 | 484 | 915 | 84 |
| 201-300 | 708 | 126 | . | 16 | 29 | 94 | 0 | 9 | 25 | 102 | 60 |
| | 711 | 593 | . | . | . | . | 0 | 5 | 25 | 24 | 0 |
| | 712 | 731 | . | 0 | 0 | 0 | | 0 | 0 | 0 | 74 |
| | 713 | 851 | . | 57 | 0 | 0 | 0 | 7 | 0 | 0 | 0 |
| | | Subtotal | 0 | 73 | 29 | 94 | 0 | 21 | 50 | 126 | 135 |
| | Total [1] | | 99,328 | 47,876 | 44,520 | 187,229 | 82,684 | 92,207 | 69,661 | 23,145 | 11,481 |

[1] [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, 6-18 December 2005.

| M.V. Pennysmart | | | | | | | Unit | Depth | Set Location | | PLAICE Catch | Catch | Set Duration | Tow Distance | PLAICE Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trip | Set | Year | Month | Day | StrLin | Division | Area | (m) | Lat (N) | Long (W) | # of Fish | Weight (kg) | (min) | (n.mi.) | Weight (kg) |
| 10 | 1 | 5 | 12 | 6 | 322 | 3P | M29 | 172 | 46.62 | 55.05 | 1 | 0.5 | 30 | 1.5 | 0.5 |
| 10 | 2 | 5 | 12 | 6 | 322 | 3P | M30 | 146 | 46.48 | 55.09 | 0 | 0 | 30 | 1.5 | |
| 10 | 3 | 5 | 12 | 6 | 322 | 3P | M30 | 153 | 46.43 | 55.34 | 0 | 0 | 30 | 1.5 | |
| 10 | 4 | 5 | 12 | 6 | 322 | 3P | M30 | 167 | 46.30 | 55.02 | 2 | 0.4 | 30 | 1.5 | 0.2 |
| 10 | 5 | 5 | 12 | 6 | 324 | 3P | N30 | 101 | 46.29 | 54.60 | 1 | 0.3 | 30 | 1.5 | 0.3 |
| 10 | 6 | 5 | 12 | 6 | 324 | 3P | N30 | 119 | 46.21 | 54.45 | 2 | 0.2 | 30 | 1.6 | 0.1 |
| 10 | 7 | 5 | 12 | 6 | 325 | 3P | N30 | 83 | 46.13 | 54.75 | 0 | 0 | 30 | 1.6 | |
| 10 | 8 | 5 | 12 | 7 | 323 | 3P | N30 | 144 | 46.09 | 54.84 | 5 | 4 | 30 | 1.5 | 0.8 |
| 10 | 9 | 5 | 12 | 7 | 323 | 3P | M30 | 148 | 46.00 | 55.25 | 4 | 2 | 30 | 1.5 | 0.5 |
| 10 | 10 | 5 | 12 | 7 | 322 | 3P | M30 | 126 | 46.25 | 55.66 | 12 | 5 | 30 | 1.5 | 0.4 |
| 10 | 11 | 5 | 12 | 7 | 321 | 3P | M30 | 56 | 46.14 | 55.75 | 11 | 10 | 30 | 1.4 | 0.9 |
| 10 | 12 | 5 | 12 | 7 | 321 | 3P | M30 | 80 | 46.24 | 55.86 | 2 | 1.5 | 30 | 1.5 | 0.8 |
| 10 | 13 | 5 | 12 | 7 | 322 | 3P | M30 | 129 | 46.31 | 55.76 | 13 | 5 | 30 | 1.5 | 0.4 |
| 10 | 14 | 5 | 12 | 7 | 322 | 3P | M30 | 137 | 46.48 | 55.78 | 0 | 0 | 30 | 1.5 | |
| 10 | 15 | 5 | 12 | 8 | 321 | 3P | M31 | 60 | 45.74 | 55.57 | 7 | 4 | 30 | 1.5 | 0.6 |
| 10 | 16 | 5 | 12 | 8 | 321 | 3P | M31 | 81 | 45.69 | 55.40 | 6 | 6 | 30 | 1.5 | 1.0 |
| 10 | 17 | 5 | 12 | 8 | 323 | 3P | M31 | 148 | 45.74 | 55.35 | 13 | 6 | 30 | 1.5 | 0.5 |
| 10 | 18 | 5 | 12 | 8 | 323 | 3P | M31 | 138 | 45.64 | 55.11 | 68 | 30 | 30 | 1.5 | 0.4 |
| 10 | 19 | 5 | 12 | 8 | 325 | 3P | N31 | 63 | 45.69 | 54.92 | 0 | 0 | 30 | 1.5 | |
| 10 | 20 | 5 | 12 | 8 | 325 | 3P | N31 | 69 | 45.85 | 54.79 | 0 | 0 | 30 | 1.5 | |
| 10 | 21 | 5 | 12 | 8 | 325 | 3P | N31 | 80 | 45.85 | 54.70 | 0 | 0 | 30 | 1.4 | |
| 10 | 22 | 5 | 12 | 8 | 326 | 3P | N31 | 81 | 45.74 | 54.43 | 0 | 0 | 30 | 1.5 | |
| 10 | 23 | 5 | 12 | 8 | 326 | 3P | N31 | 84 | 45.56 | 54.43 | 4 | 3.5 | 30 | 1.6 | 0.9 |
| 10 | 24 | 5 | 12 | 8 | 325 | 3P | N31 | 78 | 45.55 | 54.88 | 2 | 1 | 30 | 1.5 | 0.5 |
| 10 | 25 | 5 | 12 | 8 | 319 | 3P | N31 | 104 | 45.55 | 54.99 | 6 | 3 | 30 | 1.5 | 0.5 |
| 10 | 26 | 5 | 12 | 9 | 319 | 3P | M32 | 128 | 45.50 | 55.38 | 10 | 6 | 30 | 1.5 | 0.6 |
| 10 | 27 | 5 | 12 | 9 | 315 | 3P | M31 | 70 | 45.50 | 55.54 | 15 | 14 | 30 | 1.5 | 0.9 |
| 10 | 28 | 5 | 12 | 9 | 320 | 3P | M31 | 55 | 45.65 | 55.66 | 228 | 479.5 | 30 | 1.5 | 2.1 |
| 10 | 29 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.80 | 55.49 | 5 | 6 | 30 | 1.6 | 1.2 |
| 10 | 30 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.91 | 55.69 | 1 | 0.5 | 30 | 1.6 | 0.5 |
| 10 | 31 | 5 | 12 | 9 | 320 | 3P | L31 | 49 | 45.78 | 56.07 | 0 | 0 | 30 | 1.5 | |
| 10 | 32 | 5 | 12 | 9 | 320 | 3P | L31 | 48 | 45.79 | 56.49 | 0 | 0 | 30 | 1.5 | |
| 10 | 33 | 5 | 12 | 9 | 320 | 3P | L31 | 52 | 45.95 | 56.51 | 7 | 6.5 | 30 | 1.6 | 0.9 |
| 10 | 34 | 5 | 12 | 9 | 314 | 3P | L30 | 54 | 46.22 | 56.69 | 7 | 7 | 30 | 1.5 | 1.0 |
| 10 | 35 | 5 | 12 | 10 | 312 | 3P | L30 | 63 | 46.20 | 56.76 | 196 | 180 | 30 | 1.5 | 0.9 |
| 10 | 36 | 5 | 12 | 10 | 314 | 3P | K30 | 47 | 46.29 | 57.01 | 25 | 30 | 30 | 1.5 | 1.2 |
| 10 | 38 | 5 | 12 | 13 | 312 | 3P | K29 | 77 | 46.74 | 57.03 | 9 | 5 | 30 | 1.5 | 0.6 |
| 10 | 39 | 5 | 12 | 13 | 311 | 3P | K29 | 100 | 46.81 | 57.04 | 10 | 5 | 30 | 1.6 | 0.5 |
| 10 | 40 | 5 | 12 | 13 | 310 | 3P | K29 | 219 | 46.81 | 57.30 | 2 | 1 | 30 | 1.6 | 0.5 |
| 10 | 41 | 5 | 12 | 13 | 310 | 3P | K29 | 243 | 46.77 | 57.37 | 2 | 1.5 | 30 | 1.5 | 0.8 |
| 10 | 42 | 5 | 12 | 13 | 313 | 3P | K29 | 262 | 46.63 | 57.50 | 1 | 1 | 30 | 1.6 | 1.0 |
| 10 | 43 | 5 | 12 | 13 | 313 | 3P | K29 | 206 | 46.50 | 57.44 | 16 | 14 | 30 | 1.5 | 0.9 |
| 10 | 44 | 5 | 12 | 14 | 311 | 3P | K30 | 136 | 46.25 | 57.19 | 72 | 71 | 30 | 1.5 | 1.0 |
| 10 | 45 | 5 | 12 | 14 | 705 | 3P | K30 | 340 | 46.12 | 57.28 | 12 | 11 | 30 | 1.5 | 0.9 |
| 10 | 46 | 5 | 12 | 14 | 705 | 3P | K30 | 321 | 46.07 | 57.18 | 21 | 25 | 30 | 1.6 | 1.2 |
| 10 | 47 | 5 | 12 | 14 | 706 | 3P | L31 | 356 | 45.80 | 56.93 | 13 | 14 | 30 | 1.6 | 1.1 |
| 10 | 48 | 5 | 12 | 14 | 317 | 3P | L31 | 125 | 45.69 | 56.63 | 1034 | 1211.98 | 30 | 1.5 | 1.2 |
| 10 | 49 | 5 | 12 | 14 | 316 | 3P | L31 | 231 | 45.61 | 56.60 | 2 | 1 | 30 | 1.5 | 0.5 |
| 10 | 50 | 5 | 12 | 14 | 316 | 3P | L31 | 203 | 45.56 | 56.55 | 11 | 13 | 30 | 1.5 | 1.2 |
| 10 | 51 | 5 | 12 | 14 | 706 | 3P | L32 | 353 | 45.30 | 56.49 | 9 | 6 | 30 | 1.5 | 0.7 |
| 10 | 52 | 5 | 12 | 14 | 315 | 3P | L32 | 77 | 45.20 | 56.10 | 7 | 4.5 | 30 | 1.5 | 0.6 |
| 10 | 53 | 5 | 12 | 15 | 320 | 3P | M32 | 46 | 45.43 | 55.93 | 18 | 13 | 30 | 1.5 | 0.7 |
| 10 | 54 | 5 | 12 | 15 | 315 | 3P | M32 | 76 | 45.22 | 55.78 | 105 | 76 | 30 | 1.5 | 0.7 |
| 10 | 55 | 5 | 12 | 15 | 315 | 3P | M32 | 79 | 45.05 | 55.80 | 59 | 47 | 30 | 1.5 | 0.8 |
| 10 | 56 | 5 | 12 | 15 | 317 | 3P | M33 | 127 | 44.95 | 55.94 | 953 | 623.83 | 30 | 1.4 | 0.7 |
| 10 | 57 | 5 | 12 | 15 | 318 | 3P | M33 | 208 | 44.91 | 55.92 | 15 | 9 | 30 | 1.4 | 0.6 |
| 10 | 58 | 5 | 12 | 15 | 319 | 3P | M32 | 114 | 45.02 | 55.59 | 891 | 865.7 | 30 | 1.4 | 1.0 |
| 10 | 59 | 5 | 12 | 15 | 707 | 3P | M33 | 323 | 44.99 | 55.53 | 5 | 2 | 30 | 1.5 | 0.4 |
| 10 | 60 | 5 | 12 | 15 | 318 | 3P | M32 | 245 | 45.03 | 55.37 | 0 | 0 | 30 | 1.5 | |
| 10 | 62 | 5 | 12 | 16 | 707 | 3P | N32 | 338 | 45.06 | 54.76 | 20 | 14 | 30 | 1.5 | 0.7 |
| 10 | 63 | 5 | 12 | 16 | 319 | 3P | N32 | 101 | 45.15 | 54.78 | 15 | 8 | 30 | 1.5 | 0.5 |
| 10 | 64 | 5 | 12 | 16 | 319 | 3P | M32 | 155 | 45.37 | 55.15 | 39 | 20 | 30 | 1.6 | 0.5 |
| 10 | 65 | 5 | 12 | 16 | 319 | 3P | M32 | 168 | 45.31 | 55.36 | 350 | 175 | 30 | 1.4 | 0.5 |
| 10 | 74 | 5 | 12 | 17 | 708 | 3P | M33 | 425 | 45.00 | 55.49 | 5 | 7 | 30 | 1.6 | 1.4 |
| 10 | 75 | 5 | 12 | 17 | 708 | 3P | M33 | 506 | 44.91 | 55.59 | 11 | 9 | 30 | 1.5 | 0.8 |
| 10 | 76 | 5 | 12 | 17 | 711 | 3P | L32 | 390 | 45.14 | 56.51 | 9 | 9 | 30 | 1.5 | 1.0 |
| 10 | 77 | 5 | 12 | 17 | 711 | 3P | L32 | 392 | 45.39 | 56.75 | 3 | 4 | 30 | 1.6 | 1.3 |
| 10 | 78 | 5 | 12 | 18 | 712 | 3P | L31 | 410 | 45.60 | 56.96 | 5 | 5 | 30 | 1.6 | 1.0 |
| 10 | 79 | 5 | 12 | 18 | 712 | 3P | K31 | 411 | 45.88 | 57.10 | 4 | 4.5 | 30 | 1.5 | 1.1 |
| 10 | 80 | 5 | 12 | 18 | 713 | 3P | K31 | 486 | 45.98 | 57.62 | 0 | 0 | 30 | 1.5 | |
| 10 | 81 | 5 | 12 | 18 | 713 | 3P | K30 | 456 | 46.17 | 57.60 | 0 | 0 | 30 | 1.6 | |
| | | | | | | | | | Minimum | | 0.0 | 0.0 | 30.0 | 1.4 | 0.1 |
| | | | | | | | | | Maximum | | 1034.0 | 1212.0 | 30.0 | 1.6 | 2.1 |
| | | | | | | | | | Mean | | 61.7 | 57.6 | 30.0 | 1.5 | 0.9 |
| | | | | | | | | | Median | | 7.0 | 5.0 | 30.0 | 1.5 | 0.7 |
| | | | | | | | | | Standard Error | | 2.8 | 2.8 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | Total | | 4381.0 | 4088.9 | | | |

Notes: Sets 66-73 were tagging sets and are excluded from the stratified random survey
Sets 37 and 61 were unsuccessful

Table 6a. Stratified analysis estimated plaice abundance and biomass.

PLAICE GEAC 3PS 2005 No Zone
ANALYSIS FOR TRIP 10 2005 VESSEL 49 ICNAF 3P SPECIES 0889

NUMBERS

| STRATUM | NO.SETS | TOTAL | AV./SET | UNITS | TOTAL NO | VAR. |
|---|---|---|---|---|---|---|
| 310 | 2 | 3.88 | 1.94 | 9255. | 17932. | 0.01 |
| 311 | 2 | 81.38 | 40.69 | 17903. | 728421. | 1960.95 |
| 312 | 2 | 205.00 | 102.50 | 16281. | 1668846. | 17484.50 |
| 313 | 2 | 16.94 | 8.47 | 11147. | 94401. | 113.44 |
| 314 | 2 | 32.00 | 16.00 | 61748. | 987965. | 162.00 |
| 315 | 4 | 186.00 | 46.50 | 52357. | 2434614. | 2043.67 |
| 316 | 2 | 13.00 | 6.50 | 11147. | 72456. | 40.50 |
| 317 | 2 | 2055.07 | 1027.54 | 11620. | 11939901. | 83.57 |
| 318 | 2 | 16.07 | 8.04 | 8715. | 70031. | 129.15 |
| 319 | 6 | 1397.21 | 232.87 | 66477. | 15480303. | 145660.42 |
| 320 | 5 | 252.56 | 50.51 | 79988. | 4040415. | 9898.38 |
| 321 | 6 | 32.41 | 5.40 | 73503. | 397047. | 15.14 |
| 322 | 7 | 28.00 | 4.00 | 94648. | 378594. | 34.33 |
| 323 | 4 | 90.00 | 22.50 | 47020. | 1057955. | 936.33 |
| 324 | 2 | 2.88 | 1.44 | 33374. | 47974. | 0.38 |
| 325 | 5 | 2.00 | 0.40 | 63775. | 25510. | 0.80 |
| 326 | 2 | 3.75 | 1.88 | 11215. | 21027. | 7.03 |
| 705 | 2 | 31.69 | 15.84 | 13174. | 208722. | 29.55 |
| 706 | 2 | 21.19 | 10.59 | 28509. | 302021. | 5.08 |
| 707 | 2 | 25.00 | 12.50 | 4999. | 62491. | 112.50 |
| 708 | 2 | 15.69 | 7.84 | 8512. | 66768. | 19.92 |
| 711 | 2 | 11.81 | 5.91 | 37630. | 222250. | 19.14 |
| 712 | 2 | 8.69 | 4.34 | 49385. | 214515. | 0.24 |
| 713 | 2 | 0.00 | 0.00 | 57492. | 0. | 0.00 |

| TOTAL | | | AVERAGE | | |
|---|---|---|---|---|---|
| TOTAL | UPPER | LOWER | MEAN | UPPER | LOWER |
| 40540164. | 67885640. | 13194685. | 46.60 | 78.04 | 15.17 |

EFFECTIVE DEGREES OF FREEDOM= 6 STUDENTS T-VALUE= 2.45 ALPHA=0.05

WEIGHTS

| STRATUM | NO.SETS | TOTAL | AV./SET | UNITS | TOTAL NO | VAR. |
|---|---|---|---|---|---|---|
| 310 | 2 | 2.44 | 1.22 | 9255. | 11280. | 0.16 |
| 311 | 2 | 75.69 | 37.84 | 17903. | 677510. | 2198.67 |
| 312 | 2 | 185.00 | 92.50 | 16281. | 1506032. | 15312.50 |
| 313 | 2 | 14.94 | 7.47 | 11147. | 83254. | 85.31 |
| 314 | 2 | 37.00 | 18.50 | 61748. | 1142335. | 264.50 |
| 315 | 4 | 141.50 | 35.38 | 52357. | 1852139. | 1065.23 |
| 316 | 2 | 14.00 | 7.00 | 11147. | 78029. | 72.00 |
| 317 | 2 | 1880.37 | 940.18 | 11620. | 10924887. | 147745.42 |
| 318 | 2 | 9.64 | 4.82 | 8715. | 42019. | 46.49 |
| 319 | 6 | 1150.79 | 191.80 | 66477. | 12750102. | 135044.27 |
| 320 | 5 | 498.59 | 99.72 | 79988. | 7976344. | 45101.81 |
| 321 | 6 | 28.31 | 4.72 | 73503. | 346787. | 13.47 |
| 322 | 7 | 10.90 | 1.56 | 94648. | 147381. | 5.57 |
| 323 | 4 | 42.00 | 10.50 | 47020. | 493712. | 171.67 |
| 324 | 2 | 0.49 | 0.24 | 33374. | 8135. | 0.01 |
| 325 | 5 | 1.00 | 0.20 | 63775. | 12755. | 0.20 |
| 326 | 2 | 3.28 | 1.64 | 11215. | 18399. | 5.38 |
| 705 | 2 | 34.44 | 17.22 | 13174. | 226836. | 77.35 |
| 706 | 2 | 19.13 | 9.56 | 28509. | 272621. | 25.38 |
| 707 | 2 | 16.00 | 8.00 | 4999. | 39994. | 72.00 |
| 708 | 2 | 15.56 | 7.78 | 8512. | 66236. | 2.97 |
| 711 | 2 | 12.75 | 6.38 | 37630. | 239889. | 13.78 |
| 712 | 2 | 9.19 | 4.59 | 49385. | 226861. | 0.02 |
| 713 | 2 | 0.00 | 0.00 | 57492. | 0. | 0.00 |

| TOTAL | | | AVERAGE | | |
|---|---|---|---|---|---|
| TOTAL | UPPER | LOWER | MEAN | UPPER | LOWER |
| 39143540. | 68272904. | 10014175. | 45.00 | 78.49 | 11.51 |

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

Table 6b. Stratified analysis estimated plaice abundance and biomass: comparison for 1998-2005.

| 3Ps Plaice Estimates | | | | | | |
|---|---|---|---|---|---|---|
| "Numbers" Abundance (millions of fish) | | | | | | |
| | 95% upper limit | Estimated | 95% lower limit | 95% upper limit | Mean #fish /tow | 95% lower limit |
| 1998 | 17.4 | 12.7 | 8.0 | 20.9 | 15.3 | 9.6 |
| 1999 | 85.4 | 44.1 | 2.7 | 102.6 | 52.9 | 3.3 |
| 2000 | 84.1 | 47.6 | 11.2 | 101.0 | 57.3 | 13.5 |
| 2001 | 113.8 | 59.3 | 4.8 | 130.8 | 68.2 | 5.5 |
| 2002 | 141.3 | 26.0 | 0 | 164.5 | 30.3 | 0 |
| 2003 | 42.4 | 25.6 | 8.8 | 48.8 | 29.5 | 10.1 |
| 2004 | 34.5 | 23.1 | 11.8 | 39.6 | 26.6 | 13.6 |
| 2005 | 67.9 | 40.5 | 13.2 | 78.0 | 46.6 | 15.2 |
| "Weights" Biomass (kt) | | | | | | |
| | 95% upper limit | Estimated | 95% lower limit | 95% upper limit | Mean catch /tow (kg) | 95% lower limit |
| 1998 | 13.9 | 9.2 | 4.5 | 16.7 | 11.1 | 5.4 |
| 1999 | 57.8 | 28.7 | 0 | 69.4 | 34.5 | 0 |
| 2000 | 53.6 | 32.7 | 11.9 | 64.4 | 39.3 | 14.3 |
| 2001 | 69.7 | 36.4 | 3.1 | 80.2 | 41.9 | 3.6 |
| 2002 | 92.1 | 18.6 | 0 | 107.2 | 21.7 | 0 |
| 2003 | 42.1 | 25.2 | 8.3 | 48.4 | 28.9 | 9.52 |
| 2004 | 28.4 | 18.8 | 9.2 | 32.7 | 21.6 | 10.6 |
| 2005 | 68.3 | 39.1 | 10.0 | 78.5 | 45.0 | 11.5 |
| Note: Variance too large for valid lower limits for 1999 and 2002 biomass. Negative limit computed. Value of 0. reported. | | | | | | |

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

PLAICE GEAC 2005 3PS No Zone (S1 BY AGE) ANALYSIS FOR TRIP 10 2005 VESSEL 49 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 to 3 | 0. | 0. | 0. | 0.00 | 0.00 | 0.00 | 0 |
| 4.0 | 55264. | 498789. | -388261. | 0.06 | 0.57 | -0.45 | 1 |
| 5.0 | 238921. | 338718. | 139125. | 0.27 | 0.39 | 0.16 | 10 |
| 6.0 | 1444978. | 2237358. | 652598. | 1.66 | 2.57 | 0.75 | 7 |
| 7.0 | 5934338. | 9749746. | 2118928. | 6.82 | 11.21 | 2.44 | 6 |
| 8.0 | 6183388. | 10774528. | 1592247. | 7.11 | 12.39 | 1.83 | 5 |
| 9.0 | 5232731. | 9310102. | 1155359. | 6.02 | 10.70 | 1.33 | 5 |
| 10.0 | 6238160. | 10800690. | 1675629. | 7.17 | 12.42 | 1.93 | 5 |
| 11.0 | 3828073. | 6461545. | 1194602. | 4.40 | 7.43 | 1.37 | 6 |
| 12.0 | 2402378. | 4441017. | 363738. | 2.76 | 5.11 | 0.42 | 6 |
| 13.0 | 2375816. | 4621181. | 130451. | 2.73 | 5.31 | 0.15 | 7 |
| 14.0 | 2463216. | 4852996. | 73436. | 2.83 | 5.58 | 0.08 | 9 |
| 15.0 | 1962321. | 4009791. | -85149. | 2.26 | 4.61 | -0.10 | 8 |
| 16.0 | 1187525. | 2745263. | -370214. | 1.37 | 3.16 | -0.43 | 5 |
| 17.0 | 790321. | 1809888. | -229245. | 0.91 | 2.08 | -0.26 | 5 |
| 18.0 | 163685. | 383400. | -56029. | 0.19 | 0.44 | -0.06 | 5 |
| 19.0 | 31270. | 86763. | -24222. | 0.04 | 0.10 | -0.03 | 5 |
| UNKNOWN | 15998. | 60411. | -28416. | 0.02 | 0.07 | -0.03 | 4 |
| TOTAL | 40548380. | 67906088. | 13190680. | 46.61 | 78.06 | 15.16 | 6 |

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 7b. Stratified analysis estimated plaice abundance age distribution: 1998-2005.

| | 3Ps Plaice Estimates | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | "number" abundance (millions of fish) | | | | | | | | Mean #fish/tow | | | | | | | |
| Age (years) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| 3 | | 0.01 | 0.01 | 0.08 | 0.02 | | 0.02 | | | 0.01 | 0.02 | 0.09 | 0.02 | | 0.02 | |
| 4 | 0.03 | | 0.01 | 0.03 | 0.39 | 0.18 | 0.01 | 0.06 | 0.03 | | 0.02 | 0.03 | 0.45 | 0.21 | 0.01 | 0.06 |
| 5 | 0.10 | 0.23 | 0.09 | 0.29 | 0.56 | 0.78 | 0.38 | 0.24 | 0.12 | 0.27 | 0.11 | 0.33 | 0.66 | 0.89 | 0.43 | 0.27 |
| 6 | 0.26 | 1.23 | 1.34 | 1.04 | 0.86 | 1.37 | 2.05 | 1.44 | 0.31 | 1.48 | 1.61 | 1.19 | 1.01 | 1.57 | 2.35 | 1.66 |
| 7 | 0.60 | 3.09 | 5.42 | 9.48 | 2.04 | 1.61 | 3.22 | 5.93 | 0.72 | 3.72 | 6.52 | 10.90 | 2.37 | 1.85 | 3.71 | 6.82 |
| 8 | 1.62 | 7.67 | 9.48 | 14.66 | 5.33 | 2.90 | 2.62 | 6.18 | 1.94 | 9.21 | 11.39 | 16.86 | 6.21 | 3.34 | 3.02 | 7.11 |
| 9 | 2.11 | 14.52 | 11.85 | 13.69 | 5.27 | 4.90 | 2.52 | 5.23 | 2.53 | 17.45 | 14.24 | 15.74 | 6.14 | 5.63 | 2.89 | 6.02 |
| 10 | 2.77 | 9.96 | 7.34 | 8.68 | 4.83 | 3.90 | 3.97 | 6.24 | 3.33 | 11.97 | 8.82 | 9.97 | 5.62 | 4.49 | 4.56 | 7.17 |
| 11 | 1.64 | 3.68 | 3.19 | 6.26 | 2.06 | 2.35 | 2.81 | 3.83 | 1.97 | 4.43 | 3.83 | 7.20 | 2.40 | 2.70 | 3.23 | 4.40 |
| 12 | 1.73 | 2.20 | 2.71 | 3.08 | 1.66 | 2.07 | 2.18 | 2.40 | 2.08 | 2.64 | 3.26 | 3.54 | 1.93 | 2.38 | 2.51 | 2.76 |
| 13 | 0.91 | 0.89 | 1.39 | 1.05 | 1.42 | 1.98 | 1.37 | 2.38 | 1.09 | 1.07 | 1.67 | 1.21 | 1.65 | 2.28 | 1.57 | 2.73 |
| 14 | 0.40 | 0.43 | 0.49 | 0.47 | 0.74 | 1.67 | 0.84 | 2.46 | 0.49 | 0.52 | 0.59 | 0.55 | 0.87 | 1.92 | 0.97 | 2.83 |
| 15 | 0.31 | 0.07 | 0.37 | 0.26 | 0.49 | 1.19 | 0.64 | 1.96 | 0.37 | 0.08 | 0.45 | 0.30 | 0.57 | 1.37 | 0.74 | 2.26 |
| 16 | 0.12 | 0.03 | 0.05 | 0.08 | 0.24 | 0.57 | 0.36 | 1.19 | 0.15 | 0.04 | 0.06 | 0.09 | 0.28 | 0.66 | 0.42 | 1.37 |
| 17 | 0.02 | 0.03 | 0.07 | 0.08 | 0.08 | 0.14 | 0.09 | 0.79 | 0.03 | 0.04 | 0.08 | 0.09 | 0.10 | 0.17 | 0.10 | 0.91 |
| 18 | 0.08 | | 0.04 | 0.01 | 0.03 | 0.02 | 0.05 | 0.16 | 0.10 | | 0.05 | 0.01 | 0.03 | 0.02 | 0.05 | 0.19 |
| 19 | | | | | | | 0.01 | 0.03 | | | | | | | 0.01 | 0.04 |
| Total | **12.7** | **44.0** | **43.9** | **59.2** | **26.0** | **25.6** | **23.1** | **40.5** | **15.3** | **52.9** | **52.7** | **68.1** | **30.3** | **29.5** | **26.6** | **46.6** |

Table 8a. Plaice abundance estimates (thousands of fish) from GEAC surveys in NAFO Subdivision 3Ps from 1998 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 198 | 190 | 3816 | 154 | 707 | 2644 | 421 | 988 |
| | 320 | 1320 | 3020 | 1147 | 800 | 930 | 687 | 4593 | 3637 | 4040 |
| | | Subtotal | 3218 | 1337 | 4616 | 1084 | 1394 | 7237 | 4058 | 5028 |
| 31-50 | 312 | 272 | 147 | 779 | 33 | 269 | 0 | 154 | 483 | 1669 |
| | 315 | 827 | 2838 | 5015 | 9945 | 15154 | 4918 | 6904 | 4472 | 2435 |
| | 321 | 1189 | 210 | 2034 | 206 | 209 | 567 | 659 | 371 | 397 |
| | 325 | 944 | 53 | 144 | 16 | 83 | 188 | 10 | 103 | 26 |
| | 326 | 166 | 0 | 37 | 0 | 5 | - | 6 | 0 | 21 |
| | | Subtotal | 3248 | 8009 | 10200 | 15720 | 5673 | 7733 | 5429 | 4548 |
| 51-100 | 311 | 317 | 63 | 2202 | 528 | 6338 | 9116 | 2089 | 1674 | 728 |
| | 317 | 193 | 1482 | 1349 | 1278 | 862 | 1807 | 2336 | 6303 | 11940 |
| | 319 | 984 | 1947 | 28370 | 29471 | 32748 | 5477 | 5016 | 3702 | 15480 |
| | 322 | 1567 | 414 | 740 | 363 | 294 | 406 | 169 | 777 | 379 |
| | 323 | 696 | 263 | 906 | 436 | 881 | 835 | 219 | 222 | 1058 |
| | 324 | 494 | 11 | 67 | 141 | 200 | 47 | 110 | 122 | 48 |
| | | Subtotal | 4180 | 33634 | 32217 | 41323 | 17688 | 9939 | 12800 | 29633 |
| 101-150 | 310 | 170 | 440 | 148 | 143 | 9 | 9 | 42 | 93 | 18 |
| | 313 | 165 | 418 | 72 | 100 | 184 | 314 | 26 | 78 | 94 |
| | 316 | 189 | 50 | 153 | 100 | 256 | 21 | 102 | 33 | 72 |
| | 318 | 129 | 84 | 17 | 0 | 289 | 173 | 122 | 83 | 70 |
| | | Subtotal | 992 | 390 | 343 | 738 | 517 | 292 | 287 | 254 |
| 151-200 | 705 | 195 | 224 | 198 | 71 | 86 | 216 | 125 | 144 | 209 |
| | 706 | 476 | 475 | 295 | 151 | 152 | 332 | 125 | 273 | 302 |
| | 707 | 74 | 117 | 19 | 5 | 55 | 12 | 35 | 3 | 62 |
| | | Subtotal | 816 | 512 | 227 | 293 | 560 | 285 | 420 | 573 |
| 201-300 | 708 | 126 | 21 | 4 | 16 | 89 | 26 | 63 | 4 | 67 |
| | 711 | 593 | - | - | - | 19 | 56 | 12 | 59 | 222 |
| | 712 | 731 | 16 | 85 | 0 | 12 | 66 | 23 | 0 | 215 |
| | 713 | 851 | 211 | 89 | 23 | 11 | 42 | 54 | 84 | 0 |
| | | Subtotal | 248 | 178 | 39 | 131 | 190 | 152 | 147 | 504 |
| | Total [1] | | 12,702 | 44,060 | 47,642 | 59,289 | 26,022 | 25,638 | 23,141 | 40,540 |

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

Table 8b. Plaice biomass estimates (t) from GEAC surveys in NAFO Subdivision 3Ps from 1998 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 116 | 238 | 4025 | 188 | 795 | 2911 | 322 | 1142 |
| | 320 | 1320 | 3030 | 997 | 820 | 1347 | 885 | 7475 | 3895 | 7976 |
| | | Subtotal | 3146 | 1235 | 4845 | 1535 | 1680 | 10386 | 4217 | 9118 |
| 31-50 | 312 | 272 | 163 | 603 | 41 | 211 | 0 | 125 | 288 | 1506 |
| | 315 | 827 | 1671 | 3652 | 8784 | 8273 | 3866 | 6352 | 3480 | 1852 |
| | 321 | 1189 | 176 | 1198 | 132 | 172 | 679 | 692 | 265 | 347 |
| | 325 | 944 | 41 | 84 | 6 | 43 | 105 | 3 | 77 | 13 |
| | 326 | 166 | 0 | 14 | 0 | 2 | - | 3 | 0 | 18 |
| | | Subtotal | 2051 | 5551 | 8963 | 8701 | 4650 | 7175 | 4110 | 3736 |
| 51-100 | 311 | 317 | 43 | 1016 | 349 | 3676 | 5653 | 1601 | 1343 | 678 |
| | 317 | 193 | 1076 | 824 | 1084 | 594 | 1545 | 2172 | 5861 | 10925 |
| | 319 | 984 | 940 | 18769 | 16567 | 20391 | 3255 | 2934 | 1960 | 12750 |
| | 322 | 1567 | 131 | 202 | 118 | 107 | 175 | 78 | 351 | 147 |
| | 323 | 696 | 67 | 268 | 166 | 385 | 370 | 145 | 110 | 494 |
| | 324 | 494 | 11 | 27 | 26 | 65 | 23 | 16 | 67 | 8 |
| | | Subtotal | 2268 | 21106 | 18310 | 25218 | 11021 | 6946 | 9692 | 25002 |
| 101-150 | 310 | 170 | 273 | 99 | 72 | 5 | 16 | 31 | 60 | 11 |
| | 313 | 165 | 344 | 39 | 56 | 114 | 225 | 20 | 67 | 83 |
| | 316 | 189 | 32 | 139 | 100 | 291 | 29 | 145 | 42 | 78 |
| | 318 | 129 | 78 | 13 | 0 | 178 | 114 | 65 | 61 | 42 |
| | | Subtotal | 727 | 290 | 228 | 588 | 384 | 261 | 230 | 214 |
| 151-200 | 705 | 195 | 144 | 138 | 109 | 66 | 195 | 124 | 157 | 227 |
| | 706 | 476 | 635 | 238 | 237 | 196 | 436 | 132 | 290 | 273 |
| | 707 | 74 | 60 | 11 | 2 | 36 | 12 | 16 | 1 | 40 |
| | | Subtotal | 839 | 387 | 348 | 298 | 643 | 272 | 448 | 540 |
| 201-300 | 708 | 126 | 9 | 2 | 13 | 66 | 29 | 27 | 13 | 66 |
| | 711 | 593 | - | - | - | 13 | 75 | 12 | 47 | 240 |
| | 712 | 731 | 3 | 44 | 0 | 4 | 66 | 29 | 0 | 227 |
| | 713 | 851 | 161 | 65 | 34 | 5 | 56 | 61 | 55 | 0 |
| | | Subtotal | 173 | 111 | 47 | 88 | 226 | 129 | 115 | 533 |
| | Total [1] | | 9,204 | 28,680 | 32,741 | 36,428 | 18,604 | 25,169 | 18,812 | 39,143 |

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

Table 9. Summary of witch catches for stratified random survey, NAFO Subdivision 3Ps, 6-18 December 2005.

| M.V. Pennysmart | | | | | | | | | Set Location | | WITCH Catch | WITCH Catch | Set Duration | Tow Distance | WITCH Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trip | Set | Year | Month | Day | StrLin | Division | Unit Area | Depth (m) | Lat (N) | Long (W) | # of Fish | Weight (kg) | (min) | (n.mi.) | Weight (kg) |
| 10 | 1 | 5 | 12 | 6 | 322 | 3P | M29 | 172 | 46.62 | 55.05 | 0 | 0 | 30 | 1.5 | |
| 10 | 2 | 5 | 12 | 6 | 322 | 3P | M30 | 146 | 46.48 | 55.09 | 0 | 0 | 30 | 1.5 | |
| 10 | 3 | 5 | 12 | 6 | 322 | 3P | M30 | 153 | 46.43 | 55.34 | 0 | 0 | 30 | 1.5 | |
| 10 | 4 | 5 | 12 | 6 | 322 | 3P | M30 | 167 | 46.30 | 55.02 | 0 | 0 | 30 | 1.5 | |
| 10 | 5 | 5 | 12 | 6 | 324 | 3P | N30 | 101 | 46.29 | 54.60 | 0 | 0 | 30 | 1.5 | |
| 10 | 6 | 5 | 12 | 6 | 324 | 3P | N30 | 119 | 46.21 | 54.45 | 0 | 0 | 30 | 1.6 | |
| 10 | 7 | 5 | 12 | 6 | 325 | 3P | N30 | 83 | 46.13 | 54.75 | 0 | 0 | 30 | 1.6 | |
| 10 | 8 | 5 | 12 | 7 | 323 | 3P | N30 | 144 | 46.09 | 54.84 | 0 | 0 | 30 | 1.5 | |
| 10 | 9 | 5 | 12 | 7 | 323 | 3P | M30 | 148 | 46.00 | 55.25 | 0 | 0 | 30 | 1.5 | |
| 10 | 10 | 5 | 12 | 7 | 322 | 3P | M30 | 126 | 46.25 | 55.66 | 0 | 0 | 30 | 1.5 | |
| 10 | 11 | 5 | 12 | 7 | 321 | 3P | M30 | 56 | 46.14 | 55.75 | 0 | 0 | 30 | 1.4 | |
| 10 | 12 | 5 | 12 | 7 | 321 | 3P | M30 | 80 | 46.24 | 55.86 | 0 | 0 | 30 | 1.5 | |
| 10 | 13 | 5 | 12 | 7 | 322 | 3P | M30 | 129 | 46.31 | 55.76 | 0 | 0 | 30 | 1.5 | |
| 10 | 14 | 5 | 12 | 7 | 322 | 3P | M30 | 137 | 46.48 | 55.78 | 0 | 0 | 30 | 1.5 | |
| 10 | 15 | 5 | 12 | 8 | 321 | 3P | M31 | 60 | 45.74 | 55.57 | 0 | 0 | 30 | 1.5 | |
| 10 | 16 | 5 | 12 | 8 | 321 | 3P | M31 | 81 | 45.69 | 55.40 | 0 | 0 | 30 | 1.5 | |
| 10 | 17 | 5 | 12 | 8 | 323 | 3P | M31 | 148 | 45.74 | 55.35 | 0 | 0 | 30 | 1.5 | |
| 10 | 18 | 5 | 12 | 8 | 323 | 3P | M31 | 138 | 45.64 | 55.11 | 1 | 1 | 30 | 1.5 | 1.0 |
| 10 | 19 | 5 | 12 | 8 | 325 | 3P | N31 | 63 | 45.69 | 54.92 | 0 | 0 | 30 | 1.5 | |
| 10 | 20 | 5 | 12 | 8 | 325 | 3P | N31 | 69 | 45.85 | 54.79 | 0 | 0 | 30 | 1.5 | |
| 10 | 21 | 5 | 12 | 8 | 325 | 3P | N31 | 80 | 45.85 | 54.70 | 0 | 0 | 30 | 1.4 | |
| 10 | 22 | 5 | 12 | 8 | 326 | 3P | N31 | 81 | 45.74 | 54.43 | 0 | 0 | 30 | 1.5 | |
| 10 | 23 | 5 | 12 | 8 | 326 | 3P | N31 | 84 | 45.56 | 54.43 | 0 | 0 | 30 | 1.6 | |
| 10 | 24 | 5 | 12 | 8 | 325 | 3P | N31 | 78 | 45.55 | 54.88 | 0 | 0 | 30 | 1.5 | |
| 10 | 25 | 5 | 12 | 8 | 319 | 3P | N31 | 104 | 45.55 | 54.99 | 0 | 0 | 30 | 1.5 | |
| 10 | 26 | 5 | 12 | 9 | 319 | 3P | M32 | 128 | 45.50 | 55.38 | 0 | 0 | 30 | 1.5 | |
| 10 | 27 | 5 | 12 | 9 | 315 | 3P | M31 | 70 | 45.50 | 55.54 | 0 | 0 | 30 | 1.5 | |
| 10 | 28 | 5 | 12 | 9 | 320 | 3P | M31 | 55 | 45.65 | 55.66 | 0 | 0 | 30 | 1.5 | |
| 10 | 29 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.80 | 55.49 | 0 | 0 | 30 | 1.6 | |
| 10 | 30 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.91 | 55.69 | 0 | 0 | 30 | 1.6 | |
| 10 | 31 | 5 | 12 | 9 | 320 | 3P | L31 | 49 | 45.78 | 56.07 | 0 | 0 | 30 | 1.5 | |
| 10 | 32 | 5 | 12 | 9 | 320 | 3P | L31 | 48 | 45.79 | 56.49 | 0 | 0 | 30 | 1.5 | |
| 10 | 33 | 5 | 12 | 9 | 320 | 3P | L31 | 52 | 45.95 | 56.51 | 0 | 0 | 30 | 1.6 | |
| 10 | 34 | 5 | 12 | 9 | 314 | 3P | L30 | 54 | 46.22 | 56.69 | 0 | 0 | 30 | 1.5 | |
| 10 | 35 | 5 | 12 | 10 | 312 | 3P | L30 | 63 | 46.20 | 56.76 | 0 | 0 | 30 | 1.5 | |
| 10 | 36 | 5 | 12 | 10 | 314 | 3P | K30 | 47 | 46.29 | 57.01 | 0 | 0 | 30 | 1.5 | |
| 10 | 38 | 5 | 12 | 13 | 312 | 3P | K29 | 77 | 46.74 | 57.03 | 0 | 0 | 30 | 1.5 | |
| 10 | 39 | 5 | 12 | 13 | 311 | 3P | K29 | 100 | 46.81 | 57.04 | 0 | 0 | 30 | 1.6 | |
| 10 | 40 | 5 | 12 | 13 | 310 | 3P | K29 | 219 | 46.81 | 57.30 | 2 | 1 | 30 | 1.6 | 0.5 |
| 10 | 41 | 5 | 12 | 13 | 310 | 3P | K29 | 243 | 46.77 | 57.37 | 5 | 2 | 30 | 1.5 | 0.4 |
| 10 | 42 | 5 | 12 | 13 | 313 | 3P | K29 | 262 | 46.63 | 57.50 | 5 | 2 | 30 | 1.6 | 0.4 |
| 10 | 43 | 5 | 12 | 13 | 313 | 3P | K29 | 206 | 46.50 | 57.44 | 28 | 12 | 30 | 1.5 | 0.4 |
| 10 | 44 | 5 | 12 | 14 | 311 | 3P | K30 | 136 | 46.25 | 57.19 | 61 | 20 | 30 | 1.5 | 0.3 |
| 10 | 45 | 5 | 12 | 14 | 705 | 3P | K30 | 340 | 46.12 | 57.28 | 23 | 7 | 30 | 1.5 | 0.3 |
| 10 | 46 | 5 | 12 | 14 | 705 | 3P | K30 | 321 | 46.07 | 57.18 | 17 | 7 | 30 | 1.6 | 0.4 |
| 10 | 47 | 5 | 12 | 14 | 706 | 3P | L31 | 356 | 45.80 | 56.93 | 12 | 4.5 | 30 | 1.6 | 0.4 |
| 10 | 48 | 5 | 12 | 14 | 317 | 3P | L31 | 125 | 45.69 | 56.63 | 56 | 18 | 30 | 1.5 | 0.3 |
| 10 | 49 | 5 | 12 | 14 | 316 | 3P | L31 | 231 | 45.61 | 56.60 | 19 | 8 | 30 | 1.5 | 0.4 |
| 10 | 50 | 5 | 12 | 14 | 316 | 3P | L31 | 203 | 45.56 | 56.55 | 42 | 14 | 30 | 1.5 | 0.3 |
| 10 | 51 | 5 | 12 | 14 | 706 | 3P | L32 | 353 | 45.30 | 56.49 | 15 | 5 | 30 | 1.5 | 0.3 |
| 10 | 52 | 5 | 12 | 14 | 315 | 3P | L32 | 77 | 45.20 | 56.10 | 0 | 0 | 30 | 1.5 | |
| 10 | 53 | 5 | 12 | 15 | 320 | 3P | M32 | 46 | 45.43 | 55.93 | 0 | 0 | 30 | 1.5 | |
| 10 | 54 | 5 | 12 | 15 | 315 | 3P | M32 | 76 | 45.22 | 55.78 | 0 | 0 | 30 | 1.5 | |
| 10 | 55 | 5 | 12 | 15 | 315 | 3P | M32 | 79 | 45.05 | 55.80 | 0 | 0 | 30 | 1.5 | |
| 10 | 56 | 5 | 12 | 15 | 317 | 3P | M33 | 127 | 44.95 | 55.94 | 0 | 0 | 30 | 1.4 | |
| 10 | 57 | 5 | 12 | 15 | 318 | 3P | M33 | 208 | 44.91 | 55.92 | 159 | 77 | 30 | 1.4 | 0.5 |
| 10 | 58 | 5 | 12 | 15 | 319 | 3P | M32 | 114 | 45.02 | 55.59 | 0 | 0 | 30 | 1.4 | |
| 10 | 59 | 5 | 12 | 15 | 707 | 3P | M33 | 323 | 44.99 | 55.53 | 33 | 17 | 30 | 1.5 | 0.5 |
| 10 | 60 | 5 | 12 | 15 | 318 | 3P | M32 | 245 | 45.03 | 55.37 | 0 | 0 | 30 | 1.5 | |
| 10 | 62 | 5 | 12 | 16 | 707 | 3P | N32 | 338 | 45.06 | 54.76 | 58 | 25 | 30 | 1.5 | 0.4 |
| 10 | 63 | 5 | 12 | 16 | 319 | 3P | N32 | 101 | 45.15 | 54.78 | 4 | 4 | 30 | 1.5 | 1.0 |
| 10 | 64 | 5 | 12 | 16 | 319 | 3P | M32 | 155 | 45.37 | 55.15 | 53 | 29 | 30 | 1.6 | 0.5 |
| 10 | 65 | 5 | 12 | 16 | 319 | 3P | M32 | 168 | 45.31 | 55.36 | 77 | 33 | 30 | 1.4 | 0.4 |
| 10 | 74 | 5 | 12 | 17 | 708 | 3P | M33 | 425 | 45.00 | 55.49 | 4 | 3 | 30 | 1.6 | 0.8 |
| 10 | 75 | 5 | 12 | 17 | 708 | 3P | M33 | 506 | 44.91 | 55.59 | 11 | 5 | 30 | 1.5 | 0.5 |
| 10 | 76 | 5 | 12 | 17 | 711 | 3P | L32 | 390 | 45.14 | 56.51 | 5 | 2 | 30 | 1.5 | 0.4 |
| 10 | 77 | 5 | 12 | 17 | 711 | 3P | L32 | 392 | 45.39 | 56.75 | 6 | 2 | 30 | 1.6 | 0.3 |
| 10 | 78 | 5 | 12 | 18 | 712 | 3P | L31 | 410 | 45.60 | 56.96 | 10 | 4 | 30 | 1.6 | 0.4 |
| 10 | 79 | 5 | 12 | 18 | 712 | 3P | K31 | 411 | 45.88 | 57.10 | 5 | 1 | 30 | 1.5 | 0.2 |
| 10 | 80 | 5 | 12 | 18 | 713 | 3P | K31 | 486 | 45.98 | 57.62 | 7 | 2.5 | 30 | 1.5 | 0.4 |
| 10 | 81 | 5 | 12 | 18 | 713 | 3P | K30 | 456 | 46.17 | 57.60 | 0 | 0 | 30 | 1.6 | |
| | | | | | | | | | Minimum | | 0.0 | 0.0 | 30.0 | 1.4 | 0.2 |
| | | | | | | | | | Maximum | | 159.0 | 77.0 | 30.0 | 1.6 | 1.0 |
| | | | | | | | | | Mean | | 10.1 | 4.3 | 30.0 | 1.5 | 0.4 |
| | | | | | | | | | Median | | 0.0 | 0.0 | 30.0 | 1.5 | 0.4 |
| | | | | | | | | | Standard Error | | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | Total | | 718.0 | 306.0 | | | |

Notes: Sets 66-73 were tagging sets and are excluded from the stratified random survey
Sets 37 and 61 were unsuccessful

Table 10a. Stratified analysis estimated witch abundance and biomass.

```
  WITCH GEAC 3PS 2005 No Zone
  ANALYSIS FOR TRIP 10 2005 VESSEL 49 ICNAF  3P SPECIES 0890

              NUMBERS
           STRATUM   NO.SETS     TOTAL     AV./SET    UNITS  TOTAL NO      VAR.
             310         2         6.88      3.44     9255.    31815.      4.88
             311         2        61.00     30.50    17903.   546036.   1860.50
             312         2         0.00      0.00    16281.        0.      0.00
             313         2        32.69     16.34    11147.   182184.    271.74
             314         2         0.00      0.00    61748.        0.      0.00
             315         4         0.00      0.00    52357.        0.      0.00
             316         2        61.00     30.50    11147.   339985.    264.50
             317         2        56.00     28.00    11620.   325358.   1568.00
             318         2       170.36     85.18     8715.   742327.  14510.78
             319         6       136.19     22.70    66477.  1508886.   1239.99
             320         5         0.00      0.00    79988.        0.      0.00
             321         6         0.00      0.00    73503.        0.      0.00
             322         7         0.00      0.00    94648.        0.      0.00
             323         4         1.00      0.25    47020.    11755.      0.25
             324         2         0.00      0.00    33374.        0.      0.00
             325         5         0.00      0.00    63775.        0.      0.00
             326         2         0.00      0.00    11215.        0.      0.00
             705         2        38.94     19.47    13174.   256477.     24.94
             706         2        26.25     13.13    28509.   374186.      7.03
             707         2        91.00     45.50     4999.   227467.    312.50
             708         2        14.75      7.38     8512.    62778.     26.28
             711         2        10.63      5.31    37630.   199908.      0.20
             712         2        14.38      7.19    49385.   354953.      9.57
             713         2         7.00      3.50    57492.   201221.     24.50
                               TOTAL                              AVERAGE
                    TOTAL         UPPER          LOWER      MEAN      UPPER      LOWER
                  5365336.      8794370.       1936302.      6.17      10.11      2.23
EFFECTIVE DEGREES OF FREEDOM=  6 STUDENTS T-VALUE=  2.45 ALPHA=0.05

              WEIGHTS
           STRATUM   NO.SETS     TOTAL     AV./SET    UNITS  TOTAL NO      VAR.
             310         2         2.94      1.47     9255.    13594.      0.56
             311         2        20.00     10.00    17903.   179028.    200.00
             312         2         0.00      0.00    16281.        0.      0.00
             313         2        13.88      6.94    11147.    77333.     51.26
             314         2         0.00      0.00    61748.        0.      0.00
             315         4         0.00      0.00    52357.        0.      0.00
             316         2        22.00     11.00    11147.   122617.     18.00
             317         2        18.00      9.00    11620.   104579.    162.00
             318         2        82.50     41.25     8715.   359492.   3403.13
             319         6        66.54     11.09    66477.   737280.    253.45
             320         5         0.00      0.00    79988.        0.      0.00
             321         6         0.00      0.00    73503.        0.      0.00
             322         7         0.00      0.00    94648.        0.      0.00
             323         4         1.00      0.25    47020.    11755.      0.25
             324         2         0.00      0.00    33374.        0.      0.00
             325         5         0.00      0.00    63775.        0.      0.00
             326         2         0.00      0.00    11215.        0.      0.00
             705         2        13.56      6.78    13174.    89335.      0.10
             706         2         9.22      4.61    28509.   131410.      0.31
             707         2        42.00     21.00     4999.   104985.     32.00
             708         2         7.81      3.91     8512.    33251.      2.39
             711         2         3.88      1.94    37630.    72908.      0.01
             712         2         4.75      2.38    49385.   117289.      3.78
             713         2         2.50      1.25    57492.    71865.      3.13
                               TOTAL                              AVERAGE
                    TOTAL         UPPER          LOWER      MEAN      UPPER      LOWER
                  2226720.      3798035.        655405.      2.56      4.37       0.75
EFFECTIVE DEGREES OF FREEDOM=  5 STUDENTS T-VALUE=  2.57 ALPHA=0.05
```

Table 10b. Stratified analysis estimated witch abundance and biomass: comparison for 1998-2005.

| 3Ps Witch Estimates | | | | | | |
|---|---|---|---|---|---|---|
| "numbers"abundance (millions of fish) | | | | | | |
| | 95% upper limit | Estimated | 95% lower limit | 95% upper limit | Mean #fish /tow | 95% lower limit |
| 1998 | 7.20 | 4.65 | 2.10 | 8.7 | 5.6 | 2.5 |
| 1999 | 46.48 | 23.70 | 0.92 | 55.9 | 28.5 | 1.1 |
| 2000 | 18.58 | 6.33 | 0 | 22.3 | 7.6 | 0 |
| 2001 | 14.47 | 7.87 | 1.28 | 16.6 | 9.1 | 1.5 |
| 2002 | 24.05 | 4.83 | 0 | 28.0 | 5.6 | 0 |
| 2003 | 17.1 | 7.1 | 0 | 19.7 | 8.1 | 0 |
| 2004 | 8.5 | 5.0 | 1.6 | 9.8 | 5.8 | 1.8 |
| 2005 | 8.8 | 5.4 | 1.9 | 10.1 | 6.2 | 2.2 |
| "weights" biomass (kt) | | | | | | |
| | 95% upper limit | Estimated | 95% lower limit | 95% upper limit | Mean catch /tow (kg) | 95% lower limit |
| 1998 | 3.07 | 1.80 | 0.53 | 3.7 | 2.2 | 0.6 |
| 1999 | 19.11 | 9.60 | 0.95 | 23.0 | 11.5 | 0.1 |
| 2000 | 8.76 | 2.95 | 0 | 10.5 | 3.6 | 0 |
| 2001 | 6.61 | 3.60 | 0.59 | 7.6 | 4.1 | 0.7 |
| 2002 | 10.86 | 2.16 | 0 | 12.7 | 2.5 | 0 |
| 2003 | 7.2 | 2.99 | 0 | 8.3 | 3.4 | 0 |
| 2004 | 11.1 | 2.63 | 0 | 12.7 | 3.0 | 0 |
| 2005 | 3.8 | 2.23 | 0.66 | 4.4 | 2.6 | 0.8 |

Note: variance too large for valid lower limits for 2000, 2002-4. Negative limit computed. Value of 0 reported.

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

```
WITCH GEAC 2005 3PS No Zone (S1 BY AGE)
ANALYSIS FOR TRIP 10 2005 VESSEL 49 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 to 4        0.            0.          0.        0.00        0.00        0.00       0
     5.0     65906.       189142.     -57330.        0.08        0.22       -0.07       2
     6.0    442200.       973486.     -89086.        0.51        1.12       -0.10       2
     7.0    923436.      1917854.     -70983.        1.06        2.20       -0.08       2
     8.0   1200894.      1874272.     527515.        1.38        2.15        0.61       9
     9.0   1337992.      2492359.     183625.        1.54        2.87        0.21       4
    10.0    808326.      1591466.      25186.        0.93        1.83        0.03       5
    11.0    366230.       670960.      61500.        0.42        0.77        0.07       6
    12.0    162560.       366525.     -41406.        0.19        0.42       -0.05       4
    13.0     46680.       122079.     -28718.        0.05        0.14       -0.03       6
    14.0     11112.        30807.      -8583.        0.01        0.04       -0.01       4
UNKNOWN          0.            0.          0.        0.00        0.00        0.00       0
TOTAL      5365336.      8794370.    1936302.        6.17       10.11        2.23       6
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 11b. Stratified analysis estimated witch abundance age distribution: 1998-2005.

| | 3Ps Witch Estimates | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | "number" abundance (millions of fish) | | | | | | | | Mean #fish/tow | | | | | | | |
| Age (years) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| 5 | 0.09 | 0.06 | 0.02 | 0.13 | 0.08 | 0.10 | 0.05 | 0.07 | 0.11 | 0.07 | 0.03 | 0.15 | 0.09 | 0.11 | 0.06 | 0.08 |
| 6 | 0.09 | 0.50 | 0.08 | 0.32 | 0.26 | 0.24 | 0.31 | 0.44 | 0.10 | 0.60 | 0.10 | 0.37 | 0.30 | 0.27 | 0.36 | 0.51 |
| 7 | 0.47 | 2.21 | 0.41 | 0.72 | 0.68 | 0.79 | 0.71 | 0.92 | 0.57 | 2.65 | 0.50 | 0.83 | 0.80 | 0.91 | 0.82 | 1.06 |
| 8 | 1.05 | 6.00 | 1.10 | 1.43 | 0.95 | 1.55 | 1.11 | 1.20 | 1.27 | 7.21 | 1.32 | 1.64 | 1.11 | 1.79 | 1.28 | 1.38 |
| 9 | 1.61 | 6.79 | 2.30 | 2.44 | 1.32 | 2.32 | 1.19 | 1.34 | 1.93 | 8.16 | 2.76 | 2.80 | 1.53 | 2.67 | 1.36 | 1.54 |
| 10 | 0.83 | 5.13 | 1.62 | 1.72 | 1.02 | 1.31 | 0.80 | 0.81 | 1.00 | 6.16 | 1.95 | 1.98 | 1.19 | 1.51 | 0.92 | 0.93 |
| 11 | 0.39 | 1.97 | 0.48 | 0.79 | 0.35 | 0.46 | 0.48 | 0.37 | 0.46 | 2.36 | 0.58 | 0.90 | 0.41 | 0.53 | 0.56 | 0.42 |
| 12 | 0.09 | 0.74 | 0.22 | 0.27 | 0.13 | 0.20 | 0.25 | 0.16 | 0.11 | 0.88 | 0.27 | 0.31 | 0.15 | 0.22 | 0.28 | 0.19 |
| 13 | 0.02 | 0.13 | 0.07 | 0.06 | 0.03 | 0.09 | 0.12 | 0.05 | 0.02 | 0.16 | 0.08 | 0.07 | 0.04 | 0.10 | 0.14 | 0.05 |
| 14 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | | 0.02 | 0.01 |
| **Total** | **4.6** | **23.5** | **6.3** | **7.9** | **4.8** | **7.1** | **5.1** | **5.4** | **5.6** | **28.3** | **7.6** | **9.1** | **5.6** | **8.1** | **5.8** | **6.2** |

Table 12a. Witch abundance estimates (thousands of fish) from GEAC surveys in NAFO Subdivision 3Ps from 1998 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 0 | 0 | 0 | 21 | 107 | 0 | 0 | 0 |
| | 320 | 1320 | 100 | 0 | 0 | 10 | 12 | 44 | 14 | 0 |
| | | Subtotal | 100 | 0 | 0 | 31 | 119 | 44 | 14 | 0 |
| 31-50 | 312 | 272 | 41 | 15 | 8 | 16 | 0 | 89 | 24 | 0 |
| | 315 | 827 | 10 | 35 | 0 | 0 | 0 | 134 | 85 | 0 |
| | 321 | 1189 | 0 | 0 | 0 | 13 | 15 | 22 | 0 | 0 |
| | 325 | 944 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 326 | 166 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| | | Subtotal | 51 | 50 | 8 | 29 | 15 | 245 | 109 | 0 |
| 51-100 | 311 | 317 | 0 | 752 | 18 | 45 | 299 | 297 | 421 | 546 |
| | 317 | 193 | 0 | 120 | 0 | 0 | 116 | 261 | 631 | 325 |
| | 319 | 984 | 1548 | 19271 | 4416 | 3424 | 632 | 465 | 345 | 1509 |
| | 322 | 1567 | 0 | 11 | 16 | 0 | 0 | 16 | 0 | 0 |
| | 323 | 696 | 0 | 20 | 0 | 0 | 16 | 0 | 103 | 12 |
| | 324 | 494 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 |
| | | Subtotal | 1548 | 20174 | 4450 | 3469 | 1080 | 1039 | 1500 | 2392 |
| 101-150 | 310 | 170 | 69 | 116 | 116 | 0 | 9 | 37 | 134 | 32 |
| | 313 | 165 | 290 | 69 | 123 | 903 | 1474 | 1594 | 708 | 182 |
| | 316 | 189 | 591 | 1828 | 619 | 223 | 125 | 212 | 156 | 340 |
| | 318 | 129 | 290 | 35 | 22 | 1316 | 748 | 9 | 715 | 742 |
| | | Subtotal | 1240 | 2048 | 880 | 2442 | 2356 | 1852 | 1713 | 1296 |
| 151-200 | 705 | 195 | 244 | 184 | 155 | 92 | 173 | 287 | 144 | 256 |
| | 706 | 476 | 551 | 580 | 459 | 285 | 396 | 140 | 219 | 374 |
| | 707 | 74 | 35 | 77 | 53 | 320 | 55 | 1882 | 137 | 227 |
| | | Subtotal | 830 | 841 | 667 | 697 | 624 | 2309 | 500 | 857 |
| 201-300 | 708 | 126 | 38 | 38 | 24 | 417 | 30 | 655 | 702 | 63 |
| | 711 | 593 | - | - | - | 94 | 56 | 132 | 153 | 200 |
| | 712 | 731 | 230 | 123 | 198 | 319 | 214 | 301 | 148 | 355 |
| | 713 | 851 | 613 | 431 | 107 | 374 | 337 | 483 | 218 | 201 |
| | | Subtotal | 881 | 592 | 329 | 1204 | 637 | 1571 | 1221 | 819 |
| | Total [1] | | 4,650 | 23,705 | 6,334 | 7,872 | 4,831 | 7,060 | 5,057 | 5,364 |

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

Table 12b. Witch biomass estimates (t) from GEAC surveys in NAFO Subdivision 3Ps from 1998 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 0 | 0 | 0 | 15 | 58 | 0 | 0 | 0 |
| | 320 | 1320 | 28 | 0 | 0 | 3 | 6 | 33 | 14 | 0 |
| | | Subtotal | 28 | 0 | 0 | 18 | 64 | 33 | 14 | 0 |
| 31-50 | 312 | 272 | 15 | 8 | 12 | 11 | 0 | 44 | 16 | 0 |
| | 315 | 827 | 4 | 9 | 0 | 0 | 0 | 98 | 75 | 0 |
| | 321 | 1189 | 0 | 0 | 0 | 9 | 15 | 44 | 0 | 0 |
| | 325 | 944 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 326 | 166 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| | | Subtotal | 19 | 17 | 12 | 20 | 15 | 186 | 91 | 0 |
| 51-100 | 311 | 317 | 0 | 215 | 4 | 20 | 116 | 94 | 161 | 179 |
| | 317 | 193 | 0 | 38 | 0 | 0 | 38 | 105 | 224 | 105 |
| | 319 | 984 | 745 | 7938 | 2105 | 1634 | 343 | 241 | 215 | 737 |
| | 322 | 1567 | 0 | 5 | 8 | 0 | 0 | 16 | 0 | 0 |
| | 323 | 696 | 0 | 14 | 0 | 0 | 16 | 0 | 85 | 12 |
| | 324 | 494 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 |
| | | Subtotal | 745 | 8210 | 2117 | 1654 | 520 | 456 | 685 | 1033 |
| 101-150 | 310 | 170 | 14 | 32 | 44 | 0 | 5 | 19 | 51 | 14 |
| | 313 | 165 | 101 | 39 | 59 | 422 | 631 | 682 | 245 | 77 |
| | 316 | 189 | 245 | 821 | 254 | 78 | 73 | 76 | 78 | 123 |
| | 318 | 129 | 98 | 22 | 17 | 586 | 355 | 4 | 388 | 359 |
| | | Subtotal | 458 | 914 | 374 | 1086 | 1064 | 781 | 762 | 573 |
| 151-200 | 705 | 195 | 67 | 59 | 56 | 30 | 65 | 123 | 49 | 89 |
| | 706 | 476 | 198 | 178 | 192 | 112 | 141 | 48 | 102 | 131 |
| | 707 | 74 | 33 | 36 | 40 | 167 | 34 | 775 | 80 | 105 |
| | | Subtotal | 298 | 273 | 288 | 309 | 240 | 946 | 231 | 325 |
| 201-300 | 708 | 126 | 11 | 17 | 13 | 220 | 21 | 273 | 685 | 33 |
| | 711 | 593 | - | - | - | 43 | 19 | 39 | 47 | 73 |
| | 712 | 731 | 56 | 45 | 91 | 94 | 91 | 97 | 36 | 117 |
| | 713 | 851 | 188 | 124 | 59 | 158 | 127 | 182 | 74 | 72 |
| | | Subtotal | 255 | 186 | 163 | 515 | 258 | 591 | 842 | 295 |
| | Total [1] | | 1,803 | 9,600 | 2,954 | 3,602 | 2,161 | 2,993 | 2,625 | 2,226 |

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

Table 13. Summary of haddock catches for stratified random survey, NAFO Subdivision 3Ps, 6-18 December 2005.

| M.V. Pennysmart Trip | Set | Year | Month | Day | StrLin | Division | Unit Area | Depth (m) | Set Location Lat (N) | Long (W) | HADDOCK Catch # of Fish | Catch Weight (kg) | Set Duration (min) | Tow Distance (n.mi.) | HADDOCK Mean Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 1 | 5 | 12 | 6 | 322 | 3P | M29 | 172 | 46.62 | 55.05 | 0 | 0 | 30 | 1.5 | |
| 10 | 2 | 5 | 12 | 6 | 322 | 3P | M30 | 146 | 46.48 | 55.09 | 0 | 0 | 30 | 1.5 | |
| 10 | 3 | 5 | 12 | 6 | 322 | 3P | M30 | 153 | 46.43 | 55.34 | 0 | 0 | 30 | 1.5 | |
| 10 | 4 | 5 | 12 | 6 | 322 | 3P | M30 | 167 | 46.30 | 55.02 | 0 | 0 | 30 | 1.5 | |
| 10 | 5 | 5 | 12 | 6 | 324 | 3P | N30 | 101 | 46.29 | 54.60 | 0 | 0 | 30 | 1.5 | |
| 10 | 6 | 5 | 12 | 6 | 324 | 3P | N30 | 119 | 46.21 | 54.45 | 0 | 0 | 30 | 1.6 | |
| 10 | 7 | 5 | 12 | 6 | 325 | 3P | N30 | 83 | 46.13 | 54.75 | 0 | 0 | 30 | 1.6 | |
| 10 | 8 | 5 | 12 | 7 | 323 | 3P | N30 | 144 | 46.09 | 54.84 | 0 | 0 | 30 | 1.5 | |
| 10 | 9 | 5 | 12 | 7 | 323 | 3P | M30 | 148 | 46.00 | 55.25 | 0 | 0 | 30 | 1.5 | |
| 10 | 10 | 5 | 12 | 7 | 322 | 3P | M30 | 126 | 46.25 | 55.66 | 0 | 0 | 30 | 1.5 | |
| 10 | 11 | 5 | 12 | 7 | 321 | 3P | M30 | 56 | 46.14 | 55.75 | 0 | 0 | 30 | 1.4 | |
| 10 | 12 | 5 | 12 | 7 | 321 | 3P | M30 | 80 | 46.24 | 55.86 | 0 | 0 | 30 | 1.5 | |
| 10 | 13 | 5 | 12 | 7 | 322 | 3P | M30 | 129 | 46.31 | 55.76 | 0 | 0 | 30 | 1.5 | |
| 10 | 14 | 5 | 12 | 7 | 322 | 3P | M30 | 137 | 46.48 | 55.78 | 0 | 0 | 30 | 1.5 | |
| 10 | 15 | 5 | 12 | 8 | 321 | 3P | M31 | 60 | 45.74 | 55.57 | 0 | 0 | 30 | 1.5 | |
| 10 | 16 | 5 | 12 | 8 | 321 | 3P | M31 | 81 | 45.69 | 55.40 | 0 | 0 | 30 | 1.5 | |
| 10 | 17 | 5 | 12 | 8 | 323 | 3P | M31 | 148 | 45.74 | 55.35 | 0 | 0 | 30 | 1.5 | |
| 10 | 18 | 5 | 12 | 8 | 323 | 3P | M31 | 138 | 45.64 | 55.11 | 0 | 0 | 30 | 1.5 | |
| 10 | 19 | 5 | 12 | 8 | 325 | 3P | N31 | 63 | 45.69 | 54.92 | 0 | 0 | 30 | 1.5 | |
| 10 | 20 | 5 | 12 | 8 | 325 | 3P | N31 | 69 | 45.85 | 54.79 | 0 | 0 | 30 | 1.5 | |
| 10 | 21 | 5 | 12 | 8 | 325 | 3P | N31 | 80 | 45.85 | 54.70 | 0 | 0 | 30 | 1.4 | |
| 10 | 22 | 5 | 12 | 8 | 326 | 3P | N31 | 81 | 45.74 | 54.43 | 0 | 0 | 30 | 1.5 | |
| 10 | 23 | 5 | 12 | 8 | 326 | 3P | N31 | 84 | 45.56 | 54.43 | 0 | 0 | 30 | 1.6 | |
| 10 | 24 | 5 | 12 | 8 | 325 | 3P | N31 | 78 | 45.55 | 54.88 | 0 | 0 | 30 | 1.5 | |
| 10 | 25 | 5 | 12 | 8 | 319 | 3P | N31 | 104 | 45.55 | 54.99 | 0 | 0 | 30 | 1.5 | |
| 10 | 26 | 5 | 12 | 9 | 319 | 3P | M32 | 128 | 45.50 | 55.38 | 0 | 0 | 30 | 1.5 | |
| 10 | 27 | 5 | 12 | 9 | 315 | 3P | M31 | 70 | 45.50 | 55.54 | 0 | 0 | 30 | 1.5 | |
| 10 | 28 | 5 | 12 | 9 | 320 | 3P | M31 | 55 | 45.65 | 55.66 | 0 | 0 | 30 | 1.5 | |
| 10 | 29 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.80 | 55.49 | 0 | 0 | 30 | 1.6 | |
| 10 | 30 | 5 | 12 | 9 | 321 | 3P | M31 | 67 | 45.91 | 55.69 | 0 | 0 | 30 | 1.6 | |
| 10 | 31 | 5 | 12 | 9 | 320 | 3P | L31 | 49 | 45.78 | 56.07 | 0 | 0 | 30 | 1.5 | |
| 10 | 32 | 5 | 12 | 9 | 320 | 3P | L31 | 48 | 45.79 | 56.49 | 0 | 0 | 30 | 1.5 | |
| 10 | 33 | 5 | 12 | 9 | 320 | 3P | L31 | 52 | 45.95 | 56.51 | 0 | 0 | 30 | 1.6 | |
| 10 | 34 | 5 | 12 | 9 | 314 | 3P | L30 | 54 | 46.22 | 56.69 | 0 | 0 | 30 | 1.5 | |
| 10 | 35 | 5 | 12 | 10 | 312 | 3P | L30 | 63 | 46.20 | 56.76 | 0 | 0 | 30 | 1.5 | |
| 10 | 36 | 5 | 12 | 10 | 314 | 3P | K30 | 47 | 46.29 | 57.01 | 0 | 0 | 30 | 1.5 | |
| 10 | 38 | 5 | 12 | 13 | 312 | 3P | K29 | 77 | 46.74 | 57.03 | 1 | 5.5 | 30 | 1.5 | 5.5 |
| 10 | 39 | 5 | 12 | 13 | 311 | 3P | K29 | 100 | 46.81 | 57.04 | 1 | 6.5 | 30 | 1.6 | 6.5 |
| 10 | 40 | 5 | 12 | 13 | 310 | 3P | K29 | 219 | 46.81 | 57.30 | 12 | 34 | 30 | 1.6 | 2.8 |
| 10 | 41 | 5 | 12 | 13 | 310 | 3P | K29 | 243 | 46.77 | 57.37 | 2 | 8 | 30 | 1.5 | 4.0 |
| 10 | 42 | 5 | 12 | 13 | 313 | 3P | K29 | 262 | 46.63 | 57.50 | 1 | 4.5 | 30 | 1.6 | 4.5 |
| 10 | 43 | 5 | 12 | 13 | 313 | 3P | K29 | 206 | 46.50 | 57.44 | 1 | 2.5 | 30 | 1.5 | 2.5 |
| 10 | 44 | 5 | 12 | 14 | 311 | 3P | K30 | 136 | 46.25 | 57.19 | 0 | 0 | 30 | 1.5 | |
| 10 | 45 | 5 | 12 | 14 | 705 | 3P | K30 | 340 | 46.12 | 57.28 | 0 | 0 | 30 | 1.5 | |
| 10 | 46 | 5 | 12 | 14 | 705 | 3P | K30 | 321 | 46.07 | 57.18 | 0 | 0 | 30 | 1.6 | |
| 10 | 47 | 5 | 12 | 14 | 706 | 3P | L31 | 356 | 45.80 | 56.93 | 0 | 0 | 30 | 1.6 | |
| 10 | 48 | 5 | 12 | 14 | 317 | 3P | L31 | 125 | 45.69 | 56.63 | 0 | 0 | 30 | 1.5 | |
| 10 | 49 | 5 | 12 | 14 | 316 | 3P | L31 | 231 | 45.61 | 56.60 | 0 | 0 | 30 | 1.5 | |
| 10 | 50 | 5 | 12 | 14 | 316 | 3P | L31 | 203 | 45.56 | 56.55 | 0 | 0 | 30 | 1.5 | |
| 10 | 51 | 5 | 12 | 14 | 706 | 3P | L32 | 353 | 45.30 | 56.49 | 0 | 0 | 30 | 1.5 | |
| 10 | 52 | 5 | 12 | 14 | 315 | 3P | L32 | 77 | 45.20 | 56.10 | 0 | 0 | 30 | 1.5 | |
| 10 | 53 | 5 | 12 | 15 | 320 | 3P | M32 | 46 | 45.43 | 55.93 | 0 | 0 | 30 | 1.5 | |
| 10 | 54 | 5 | 12 | 15 | 315 | 3P | M32 | 76 | 45.22 | 55.78 | 0 | 0 | 30 | 1.5 | |
| 10 | 55 | 5 | 12 | 15 | 315 | 3P | M32 | 79 | 45.05 | 55.80 | 0 | 0 | 30 | 1.5 | |
| 10 | 56 | 5 | 12 | 15 | 317 | 3P | M33 | 127 | 44.95 | 55.94 | 0 | 0 | 30 | 1.4 | |
| 10 | 57 | 5 | 12 | 15 | 318 | 3P | M33 | 208 | 44.91 | 55.92 | 60 | 156 | 30 | 1.4 | 2.6 |
| 10 | 58 | 5 | 12 | 15 | 319 | 3P | M32 | 114 | 45.02 | 55.59 | 0 | 0 | 30 | 1.4 | |
| 10 | 59 | 5 | 12 | 15 | 707 | 3P | M33 | 323 | 44.99 | 55.53 | 0 | 0 | 30 | 1.5 | |
| 10 | 60 | 5 | 12 | 15 | 318 | 3P | M32 | 245 | 45.03 | 55.37 | 19 | 37 | 30 | 1.5 | 1.9 |
| 10 | 62 | 5 | 12 | 16 | 707 | 3P | N32 | 338 | 45.06 | 54.76 | 0 | 0 | 30 | 1.5 | |
| 10 | 63 | 5 | 12 | 16 | 319 | 3P | N32 | 101 | 45.15 | 54.78 | 0 | 0 | 30 | 1.5 | |
| 10 | 64 | 5 | 12 | 16 | 319 | 3P | M32 | 155 | 45.37 | 55.15 | 7 | 15 | 30 | 1.6 | 2.1 |
| 10 | 65 | 5 | 12 | 16 | 319 | 3P | M32 | 168 | 45.31 | 55.36 | 91 | 189 | 30 | 1.4 | 2.1 |
| 10 | 74 | 5 | 12 | 17 | 708 | 3P | M33 | 425 | 45.00 | 55.49 | 1 | 2 | 30 | 1.6 | 2.0 |
| 10 | 75 | 5 | 12 | 17 | 708 | 3P | M33 | 506 | 44.91 | 55.59 | 0 | 0 | 30 | 1.5 | |
| 10 | 76 | 5 | 12 | 17 | 711 | 3P | L32 | 390 | 45.14 | 56.51 | 0 | 0 | 30 | 1.5 | |
| 10 | 77 | 5 | 12 | 17 | 711 | 3P | L32 | 392 | 45.39 | 56.75 | 0 | 0 | 30 | 1.6 | |
| 10 | 78 | 5 | 12 | 18 | 712 | 3P | L31 | 410 | 45.60 | 56.96 | 0 | 0 | 30 | 1.6 | |
| 10 | 79 | 5 | 12 | 18 | 712 | 3P | K31 | 411 | 45.88 | 57.10 | 0 | 0 | 30 | 1.5 | |
| 10 | 80 | 5 | 12 | 18 | 713 | 3P | K31 | 486 | 45.98 | 57.62 | 0 | 0 | 30 | 1.5 | |
| 10 | 81 | 5 | 12 | 18 | 713 | 3P | K30 | 456 | 46.17 | 57.60 | 0 | 0 | 30 | 1.6 | |
| | | | | | | | | | Minimum | | 0.0 | 0.0 | 30.0 | 1.4 | 1.9 |
| | | | | | | | | | Maximum | | 91.0 | 189.0 | 30.0 | 1.6 | 6.5 |
| | | | | | | | | | Mean | | 2.8 | 6.5 | 30.0 | 1.5 | 2.3 |
| | | | | | | | | | Median | | 0.0 | 0.0 | 30.0 | 1.5 | 2.6 |
| | | | | | | | | | Standard Error | | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | | Total | | 196.0 | 460.0 | | | |

Notes: Sets 66-73 were tagging sets and are excluded from the stratified random survey
Sets 37 and 61 were unsuccessful

Table 14. Haddock catch summary from GEAC fall surveys in NAFO Subdivision 3Ps from 1997 to 2005.

| Vessel | Pennysmart | Pennysmart | Pennysmart | Pennysmart | Pennysmart | Pennysmart | Pennysmart | Pennysmart | Pennysmart |
|---|---|---|---|---|---|---|---|---|---|
| Trip | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| #Sets | 84 | 86 | 90 | 73 | 91 | 75 | 89 | 86 | 71 |
| Mean Date | 12-Dec | 06-Dec | 27-Nov | 10-Dec | 05-Dec | 29-Nov | 04-Dec | 06-Dec | 13-Dec |
| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| *Set Numbers* | | | | | | | | | |
| #Sets w/ Haddock | 7 | 9 | 9 | 14 | 18 | 12 | 9 | 11 | 11 |
| Maximum | 50 | 11 | 44 | 91 | 853 | 142 | 483 | 82 | 91 |
| Mean | 1.4 | 0.4 | 1.7 | 3.3 | 12.6 | 4.2 | 7.3 | 2.3 | 2.8 |
| Total | 118 | 35 | 152 | 238 | 1151 | 317 | 740 | 195 | 196 |
| *Set Weights (kg)* | | | | | | | | | |
| Maximum | 130.0 | 26.0 | 136.5 | 150.0 | 618.4 | 179.4 | 630.8 | 158.0 | 189.0 |
| Mean | 3.8 | 1.2 | 4.4 | 4.7 | 11.7 | 5.5 | 10.3 | 4.2 | 6.5 |
| Total | 320.0 | 105.2 | 396.4 | 341.1 | 1067.6 | 409.4 | 1038.3 | 362.0 | 460 |
| *Mean Fish Weight (kg)* | 2.7 | 3.0 | 2.6 | 1.4 | 0.9 | 1.3 | 1.4 | 1.9 | 2.3 |
| *Largest Sets* | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| 1 - Weight/#s | 130/50 | 26/11 | 136.5/44 | 150/91 | 618.4/853 | 179.4/142 | 630.8/483 | 158/82 | 189/91 |
| 2 | 111.4/34 | 16.6/5 | 96/27 | 46/30 | 101.2/88 | 161/136 | 313/192 | 98/51 | 156/60 |
| 3 | 37.4/16 | 15/5 | 45/25 | 25/30 | 90.5/53 | 22/17 | 45/34 | 46/39 | 37/19 |
| 4 | 25/13 | 14/5 | 42/19 | 25/18 | 50.8/50 | 11/5 | 18/15 | 38/16 | 34/12 |
| 5 | 14.6/3 | 10/3 | 39.6/13 | 21/16 | 49.5/39 | 10/5 | 18/11 | 5/1 | 15/7 |

Table 15a. Haddock abundance estimates (thousands of fish) from GEAC surveys in NAFO Subdivision 3Ps from 1997 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 2 84 12-Dec 1997 | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 0 | 25 | 62 | 0 | 648 | 10 | 0 | 0 | 0 |
| | 320 | 1320 | 0 | 0 | 0 | 400 | 130 | 0 | 0 | 13 | 0 |
| | | Subtotal | 0 | 25 | 62 | 400 | 778 | 10 | 0 | 13 | 0 |
| 31-50 | 312 | 272 | 0 | 0 | 0 | 147 | 0 | 8 | 15 | 0 | 8 |
| | 315 | 827 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 11 | 0 |
| | 321 | 1189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 325 | 944 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 326 | 166 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 |
| | | Subtotal | 0 | 0 | 0 | 160 | 0 | 8 | 15 | 11 | 8 |
| 51-100 | 311 | 317 | 0 | 0 | 0 | 27 | 9 | 0 | 0 | 0 | 8 |
| | 317 | 193 | 0 | 0 | 0 | 0 | 12 | 6 | 0 | 0 | 0 |
| | 319 | 984 | 823 | 123 | 407 | 1658 | 211 | 1629 | 377 | 541 | 1153 |
| | 322 | 1567 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 323 | 696 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 324 | 494 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Subtotal | 823 | 123 | 407 | 1685 | 232 | 1635 | 377 | 541 | 1161 |
| 101-150 | 310 | 170 | 14 | 23 | 0 | 51 | 231 | 37 | 56 | 74 | 61 |
| | 313 | 165 | 0 | 6 | 139 | 89 | 240 | 5 | 5 | 6 | 11 |
| | 316 | 189 | 6 | 0 | 72 | 167 | 507 | 21 | 5 | 11 | 0 |
| | 318 | 129 | 61 | 38 | 275 | 46 | 4039 | 630 | 3092 | 527 | 363 |
| | | Subtotal | 81 | 67 | 486 | 353 | 5017 | 693 | 3158 | 618 | 435 |
| 151-200 | 705 | 195 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 706 | 476 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 |
| | 707 | 74 | 0 | 0 | 0 | 0 | 7 | 0 | 37 | 3 | 0 |
| | | Subtotal | 0 | 0 | 0 | 0 | 7 | 10 | 37 | 3 | 0 |
| 201-300 | 708 | 126 | . | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| | 711 | 593 | . | . | . | . | 0 | 0 | 0 | 0 | 0 |
| | 712 | 731 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 713 | 851 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Subtotal | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| | Total [1] | | 904 | 219 | 955 | 2,598 | 6,034 | 2,356 | 3,587 | 1,186 | 1,608 |

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

. denotes strata not fished

Table 15b. Haddock biomass estimates (t) from GEAC surveys in NAFO Subdivision 3Ps from 1997 to 2005.

| Depth range (fathoms) | Strata | Vessel Trip #Sets Mean Date sq. mi. | Pennysmart 2 84 12-Dec 1997 | Pennysmart 3 86 06-Dec 1998 | Pennysmart 4 90 27-Nov 1999 | Pennysmart 5 73 10-Dec 2000 | Pennysmart 6 91 05-Dec 2001 | Pennysmart 7 75 29-Nov 2002 | Pennysmart 8 89 04-Dec 2003 | Pennysmart 9 86 06-Dec 2004 | Pennysmart 10 71 13-Dec 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| <30 | 314 | 974 | 0 | 123 | 25 | 0 | 1312 | 29 | 0 | 0 | 0 |
| | 320 | 1320 | 0 | 0 | 0 | 200 | 508 | 0 | 0 | 50 | 0 |
| | | Subtotal | 0 | 123 | 25 | 200 | 1820 | 29 | 0 | 50 | 0 |
| 31-50 | 312 | 272 | 0 | 0 | 0 | 171 | 0 | 23 | 53 | 0 | 45 |
| | 315 | 827 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 56 | 0 |
| | 321 | 1189 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 325 | 944 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 326 | 166 | 0 | 0 | 0 | 0 | 0 | . | 0 | 0 | 0 |
| | | Subtotal | 0 | 0 | 0 | 184 | 0 | 23 | 53 | 56 | 45 |
| 51-100 | 311 | 317 | 0 | 0 | 0 | 30 | 12 | 0 | 0 | 0 | 55 |
| | 317 | 193 | 0 | 0 | 0 | 0 | 14 | 9 | 0 | 0 | 0 |
| | 319 | 984 | 2297 | 327 | 1139 | 2823 | 483 | 2098 | 499 | 1035 | 2399 |
| | 322 | 1567 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 323 | 696 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 324 | 494 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Subtotal | 2297 | 327 | 1139 | 2853 | 509 | 2107 | 499 | 1035 | 2454 |
| 101-150 | 310 | 170 | 68 | 65 | 0 | 60 | 235 | 69 | 95 | 176 | 185 |
| | 313 | 165 | 0 | 20 | 234 | 86 | 296 | 10 | 13 | 17 | 37 |
| | 316 | 189 | 1 | 0 | 251 | 256 | 584 | 57 | 8 | 36 | 0 |
| | 318 | 129 | 115 | 112 | 767 | 103 | 2945 | 754 | 4309 | 889 | 890 |
| | | Subtotal | 184 | 197 | 1252 | 505 | 4060 | 890 | 4425 | 1118 | 1112 |
| 151-200 | 705 | 195 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 706 | 476 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 |
| | 707 | 74 | 0 | 0 | 0 | 0 | 5 | 0 | 45 | 5 | 0 |
| | | Subtotal | 0 | 0 | 0 | 0 | 5 | 14 | 45 | 5 | 0 |
| 201-300 | 708 | 126 | . | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| | 711 | 593 | . | . | . | . | 0 | 0 | 0 | 0 | 0 |
| | 712 | 731 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 713 | 851 | . | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Subtotal | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| | Total | [1] | 2,481 | 667 | 2,416 | 3,742 | 6,394 | 3,063 | 5,022 | 2,264 | 3,619 |

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

. denotes strata not fished

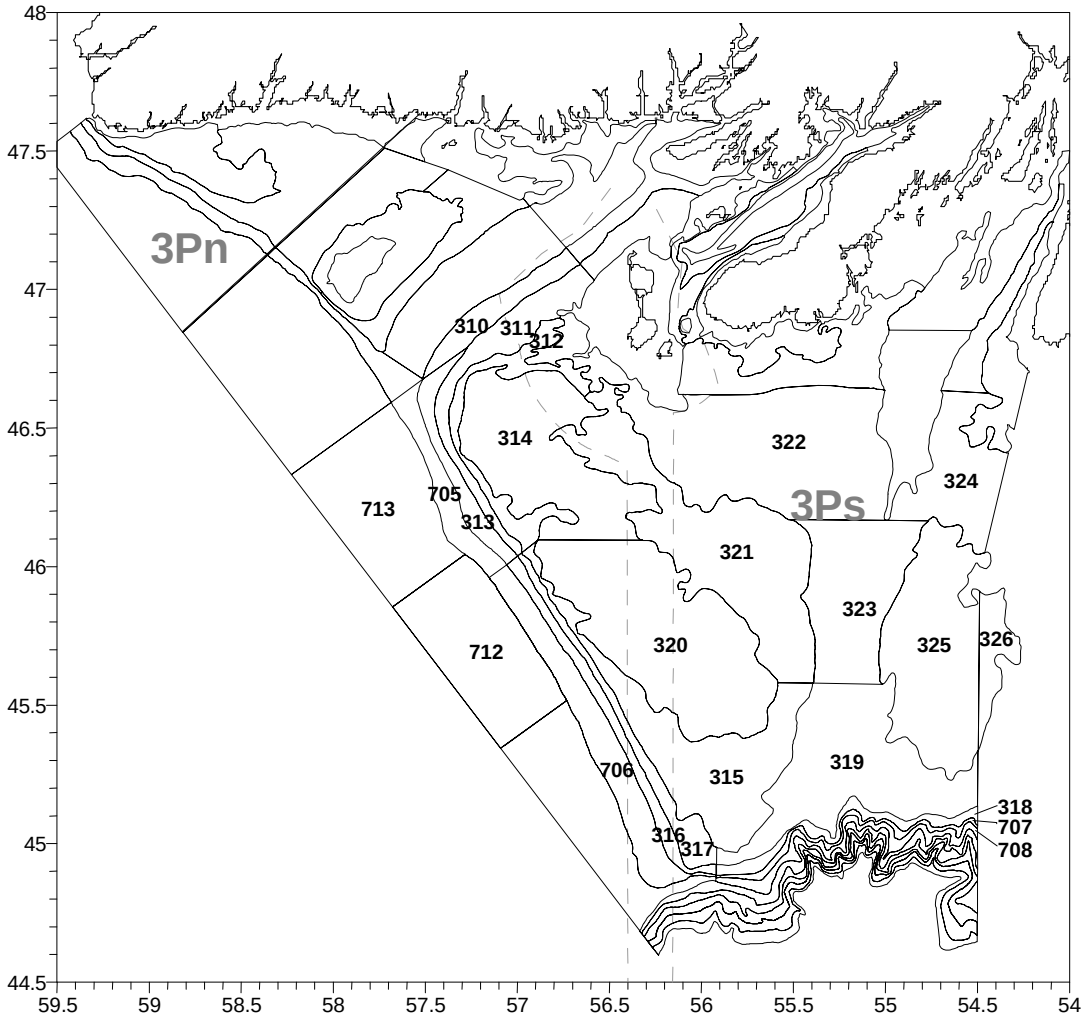


Figure 1. Stratum boundaries within NAFO Division 3P. Numbered strata indicate those surveyed during fall GEAC bottom trawl survey of Subdivision 3Ps. Dashed line is boundary of French economic zone which was not surveyed.

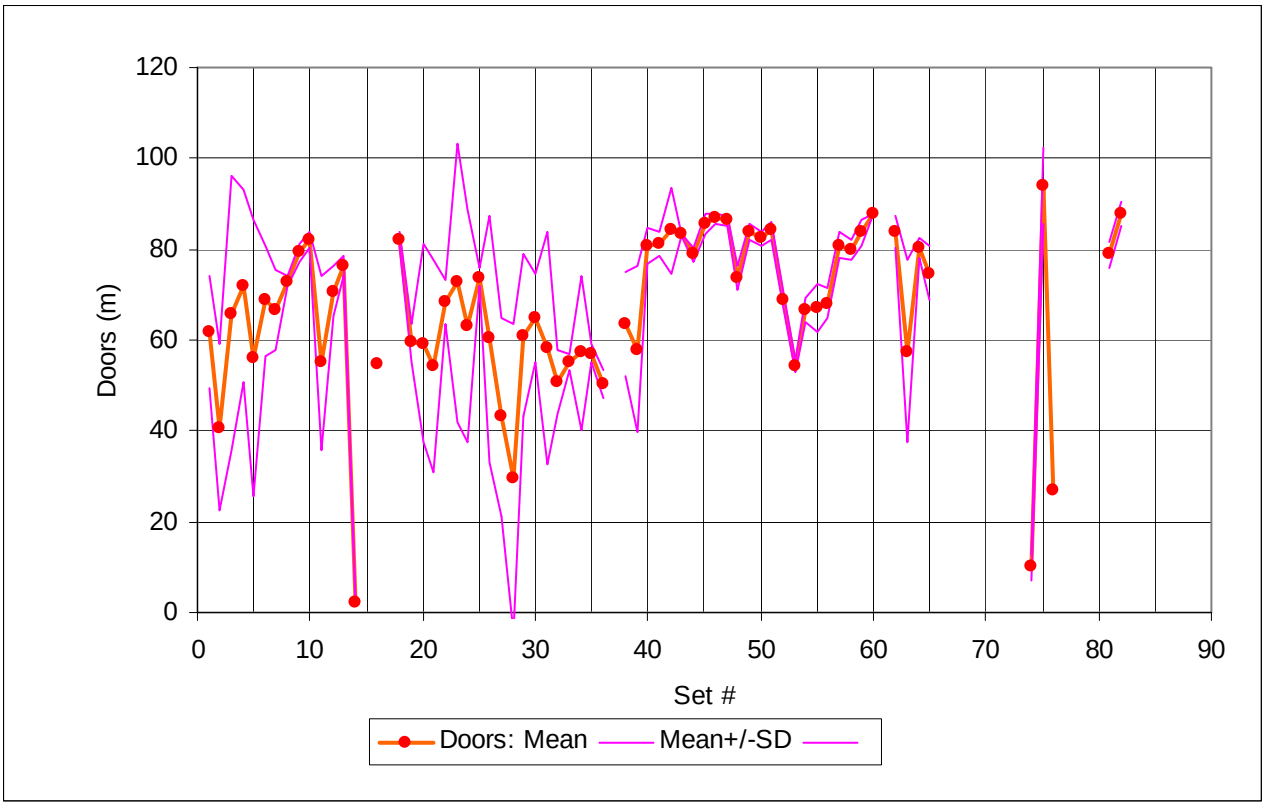


Figure 2a. 2005 3Ps survey net doors.

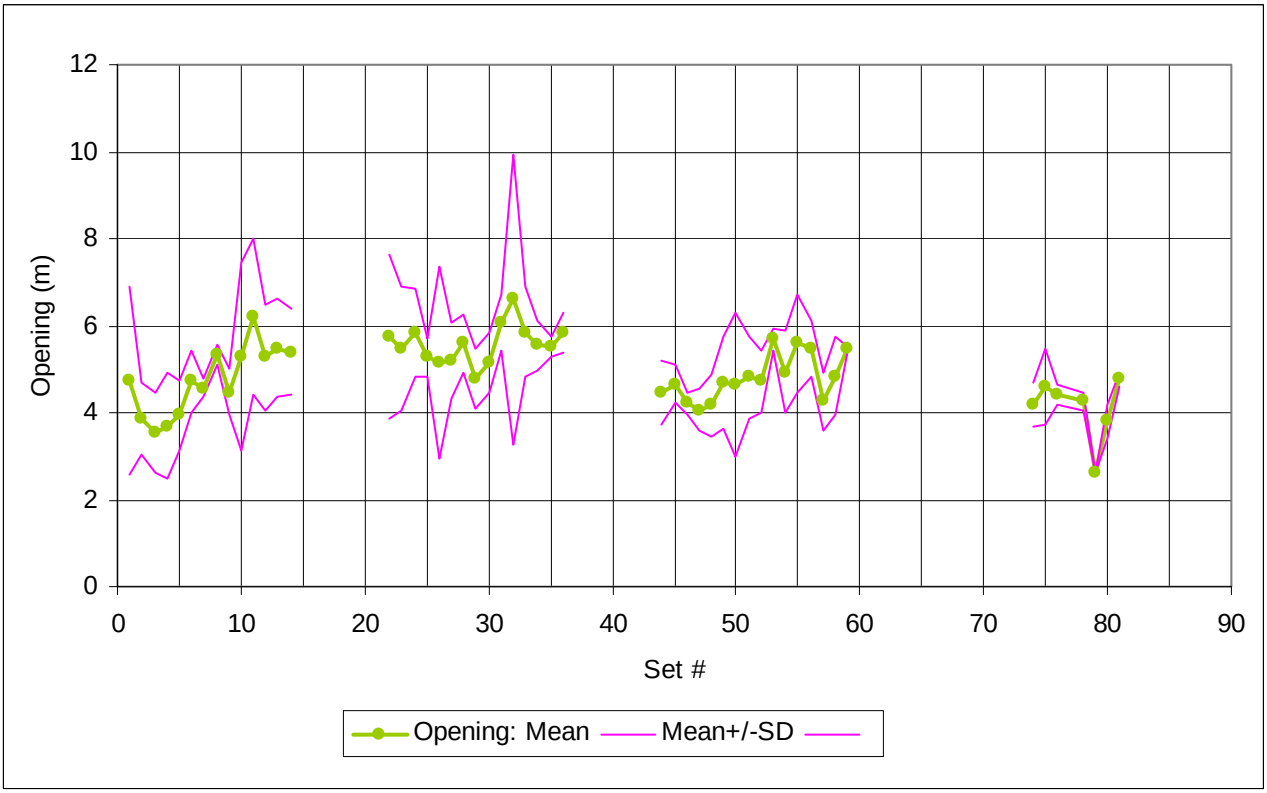


Figure 2b. 2005 3Ps survey net opening.

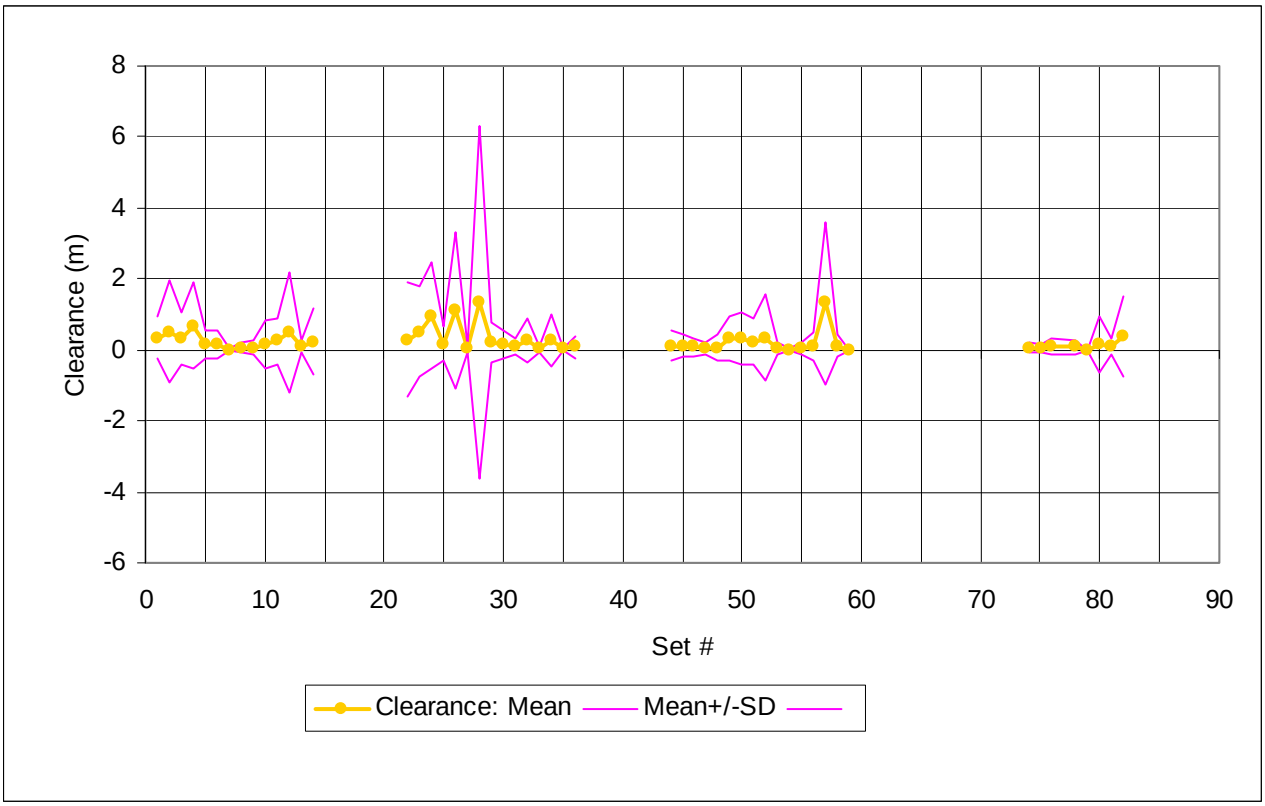


Figure 2c. 2005 3Ps survey net clearance.

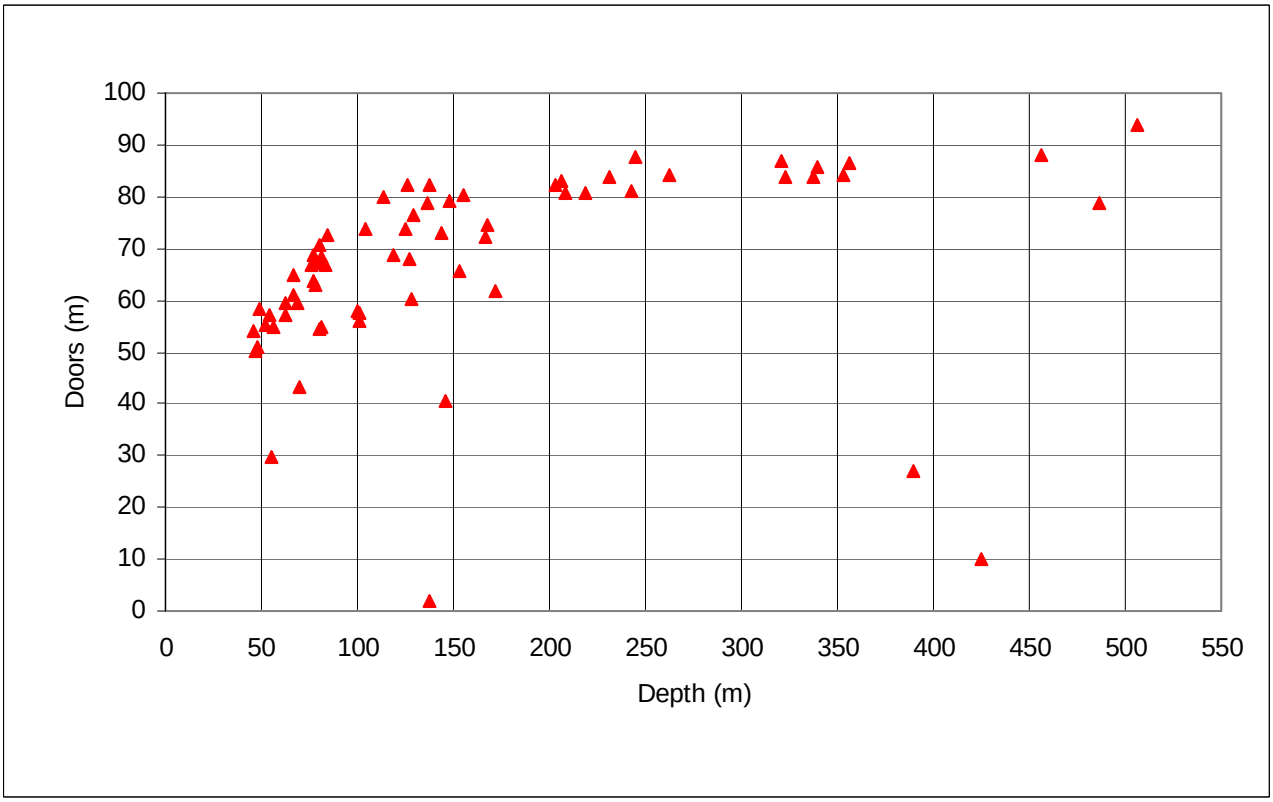


Figure 2d. 2005 3Ps survey net doors vs. set depth.

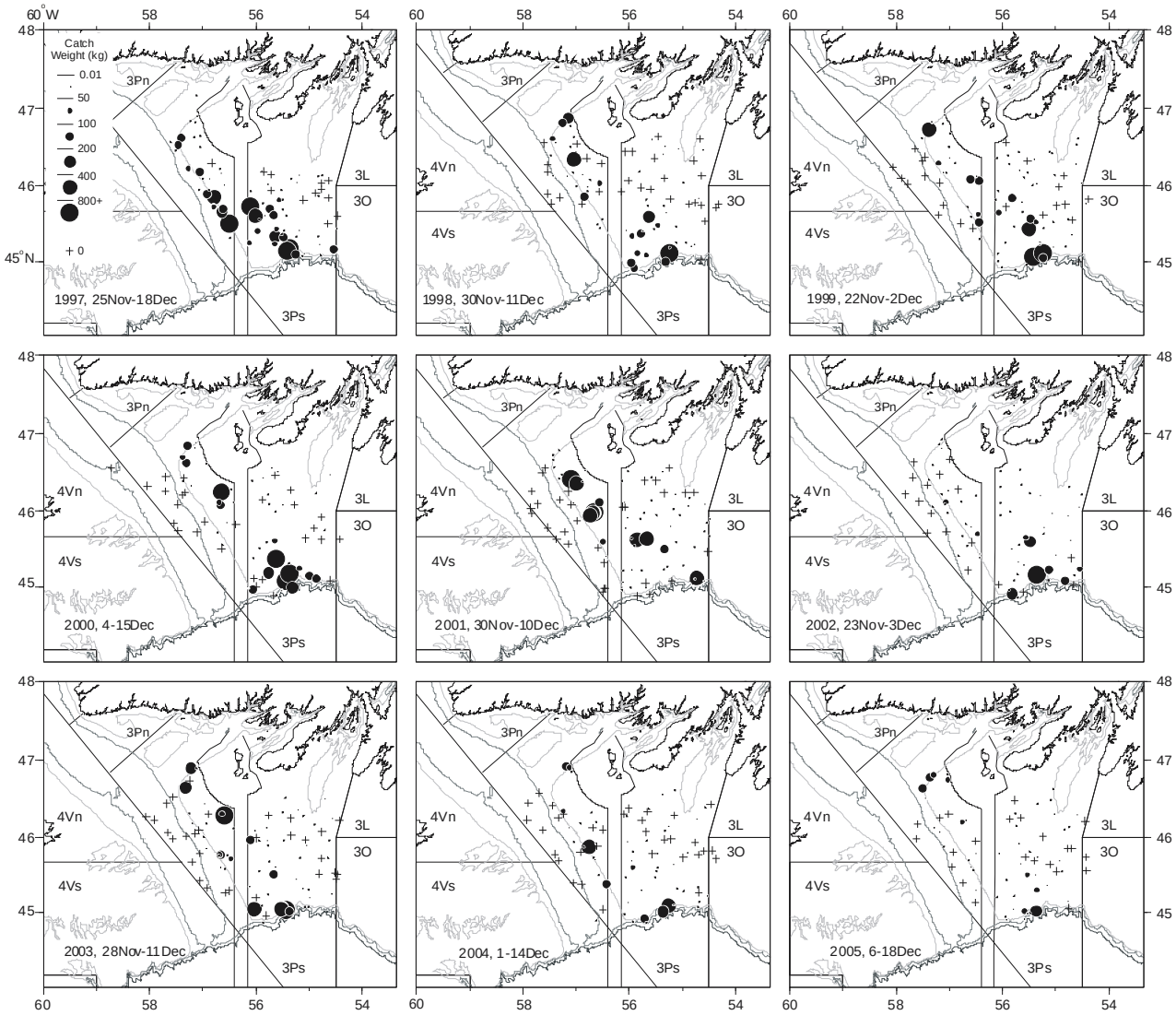


Figure 3. Cod catch weight distribution from GEAC stratified random surveys, Subdivision 3Ps, 1997-2005. The 200, 400, and 800 m depth contours are shown.

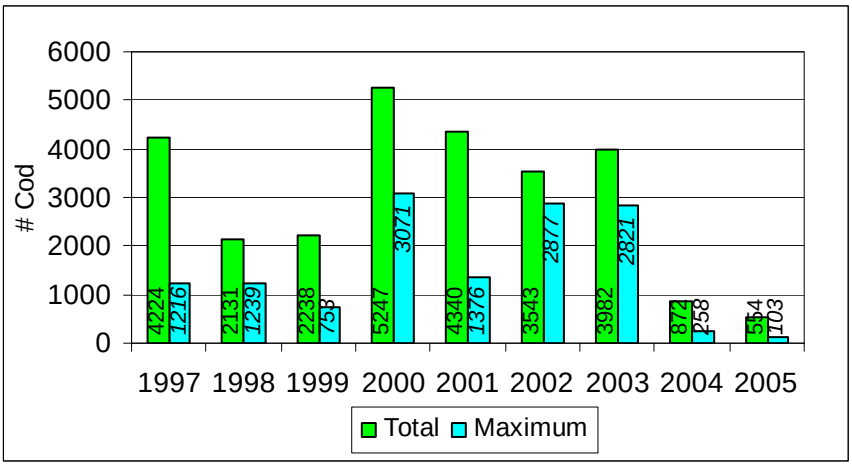


Figure 4a. GEAC fall 3Ps cod numbers.

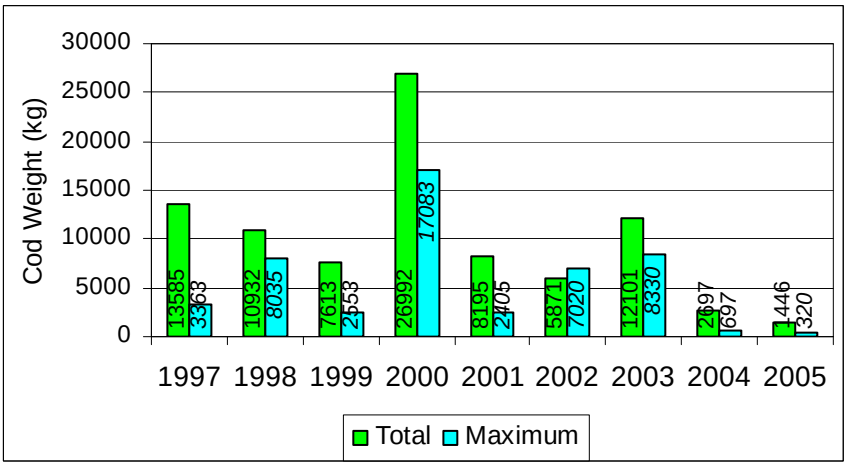


Figure 4b. GEAC fall 3Ps cod weights.

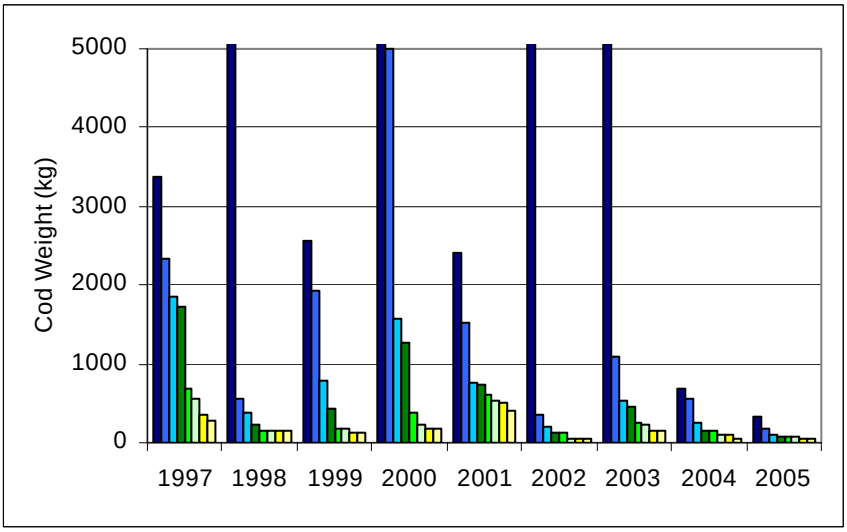


Figure 4c. GEAC fall 3Ps surveys: largest cod set weights.

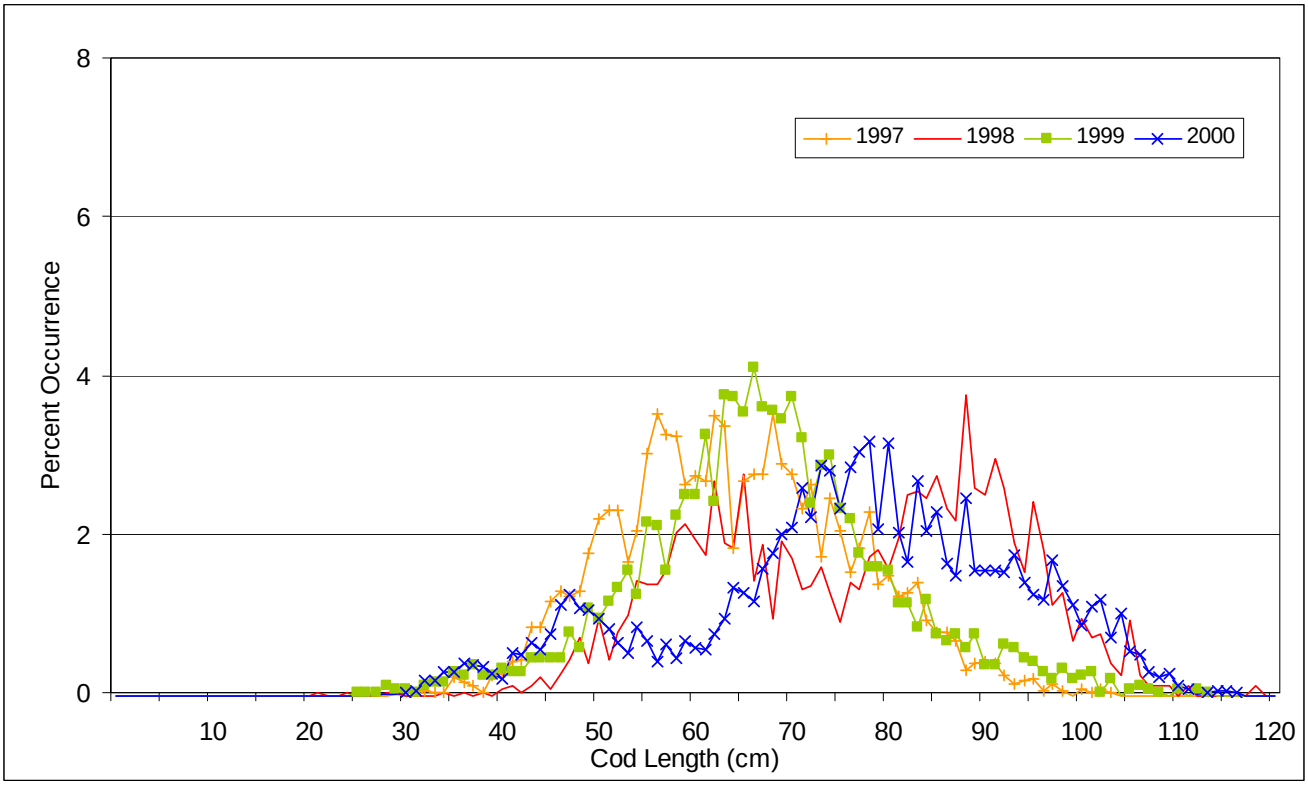


Figure 5a. Length composition of cod (3Ps stratified random surveys 1997-2000).

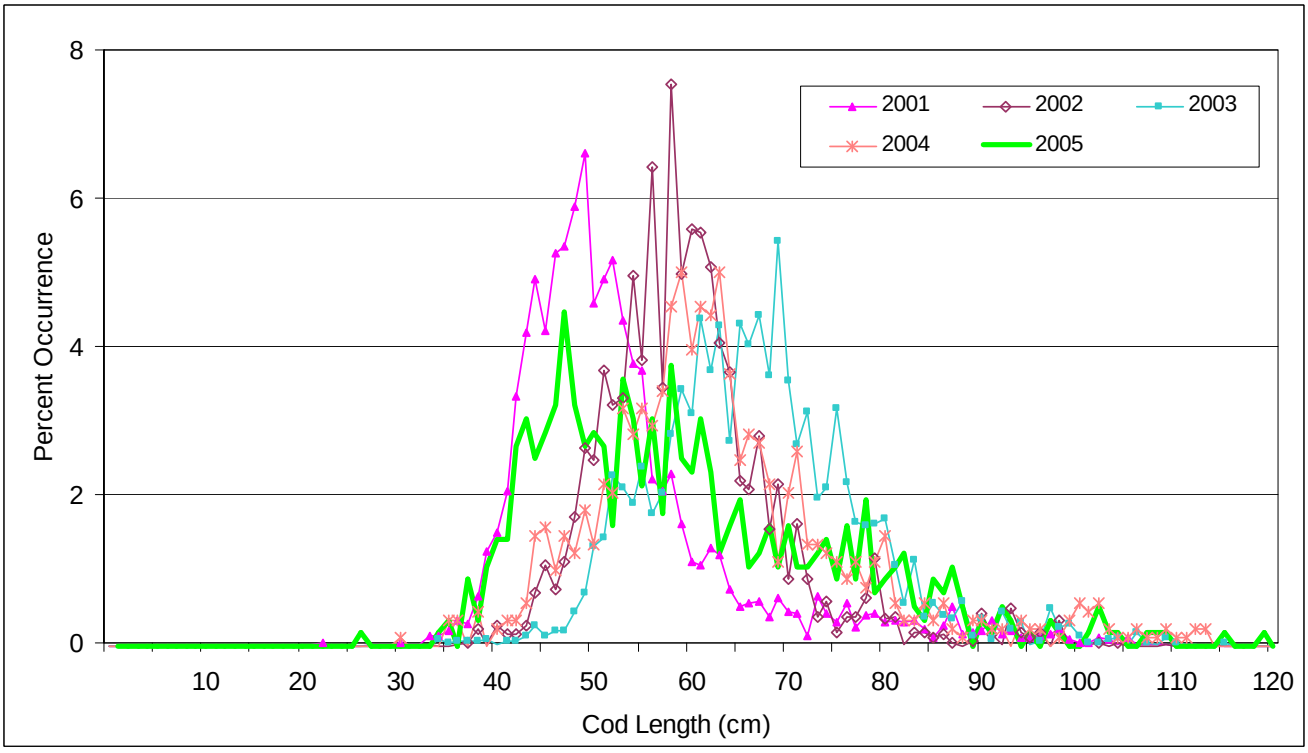


Figure 5b. Length composition of cod (3Ps stratified random surveys 2001-2005).

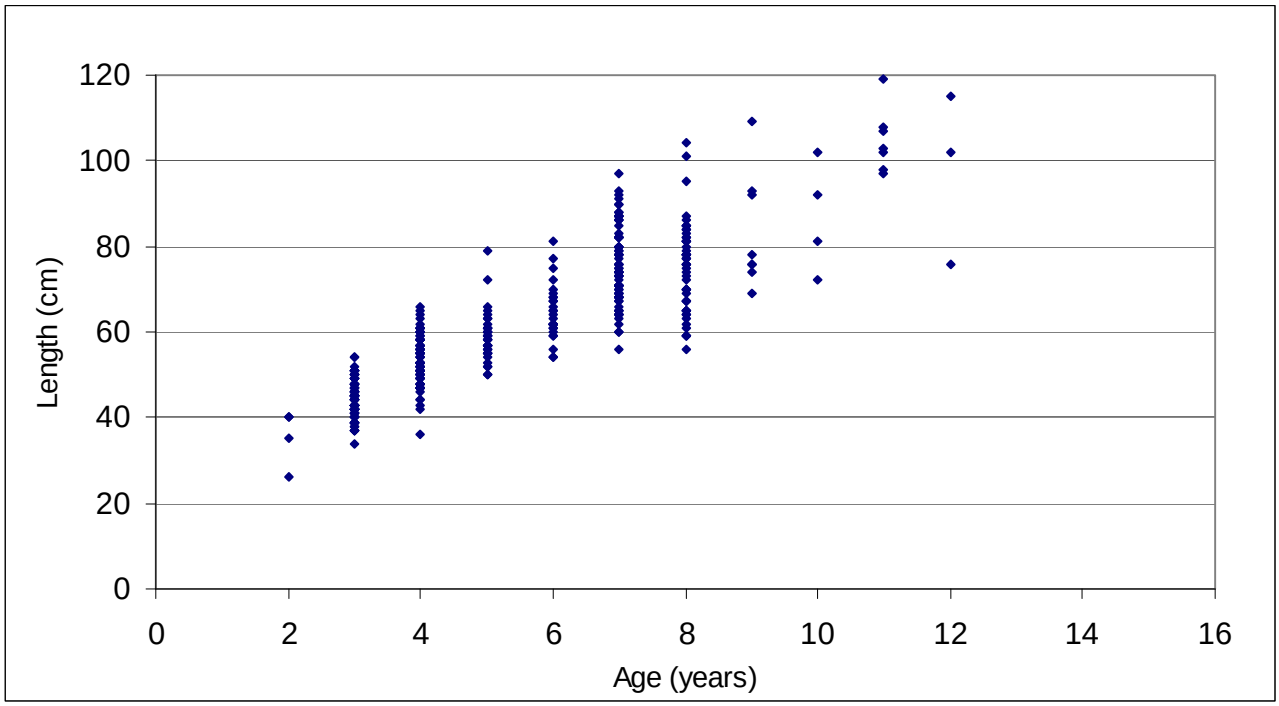


Figure 6a. Cod age-length composition 3Ps 2005 (414 samples).

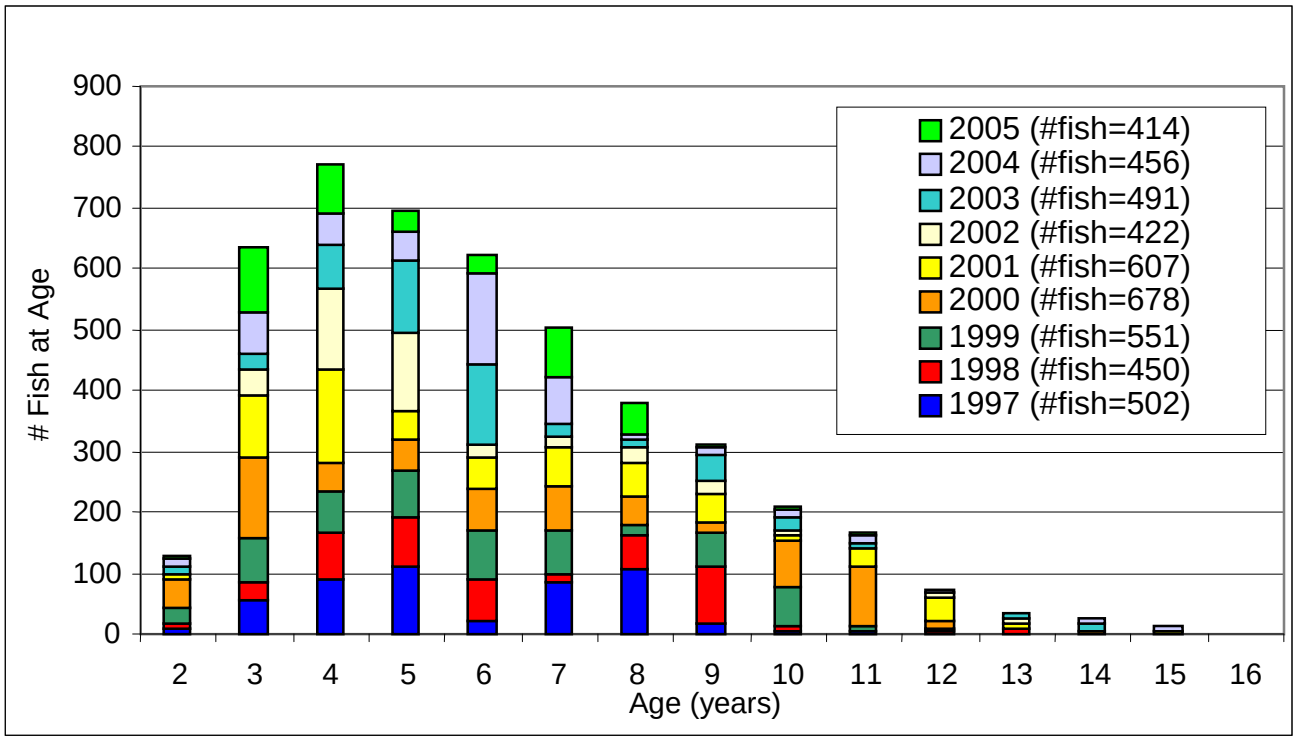


Figure 6b. Age composition of 3Ps sampled cod.

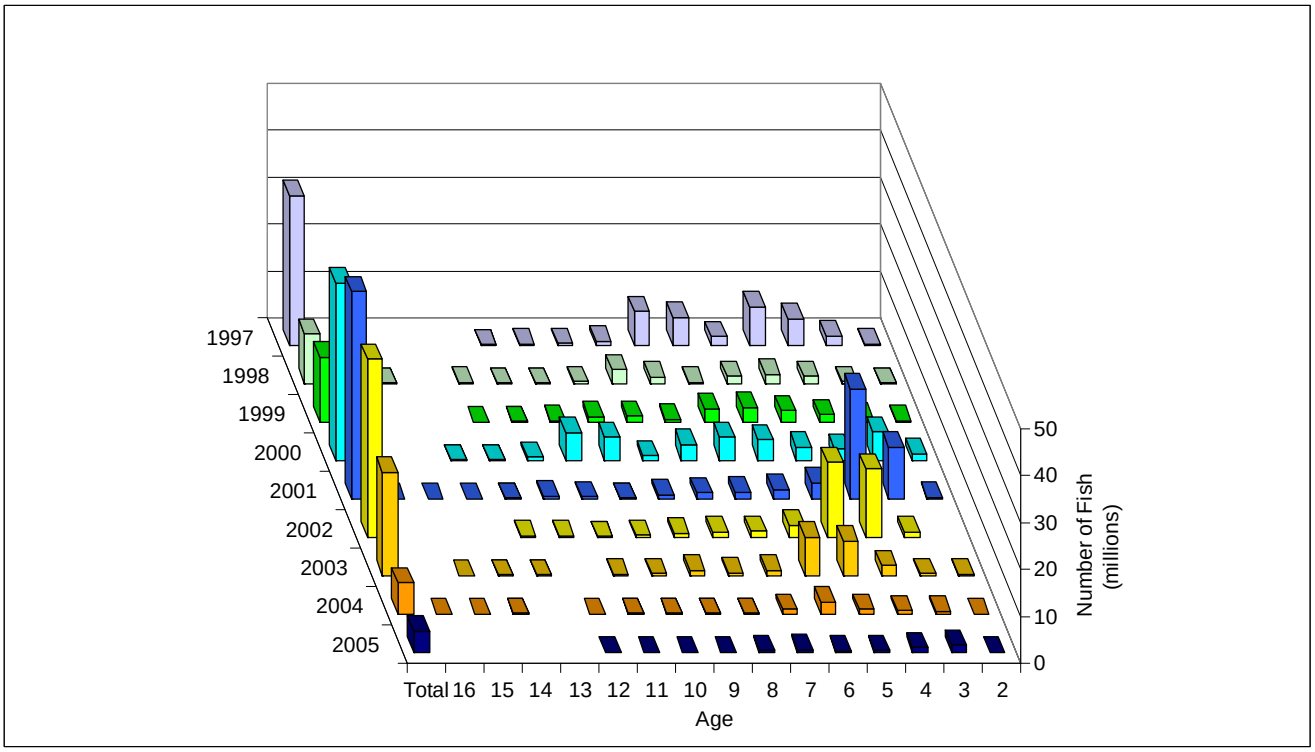


Figure 7. Cod, 3Ps, 1997-2005, estimated age composition.

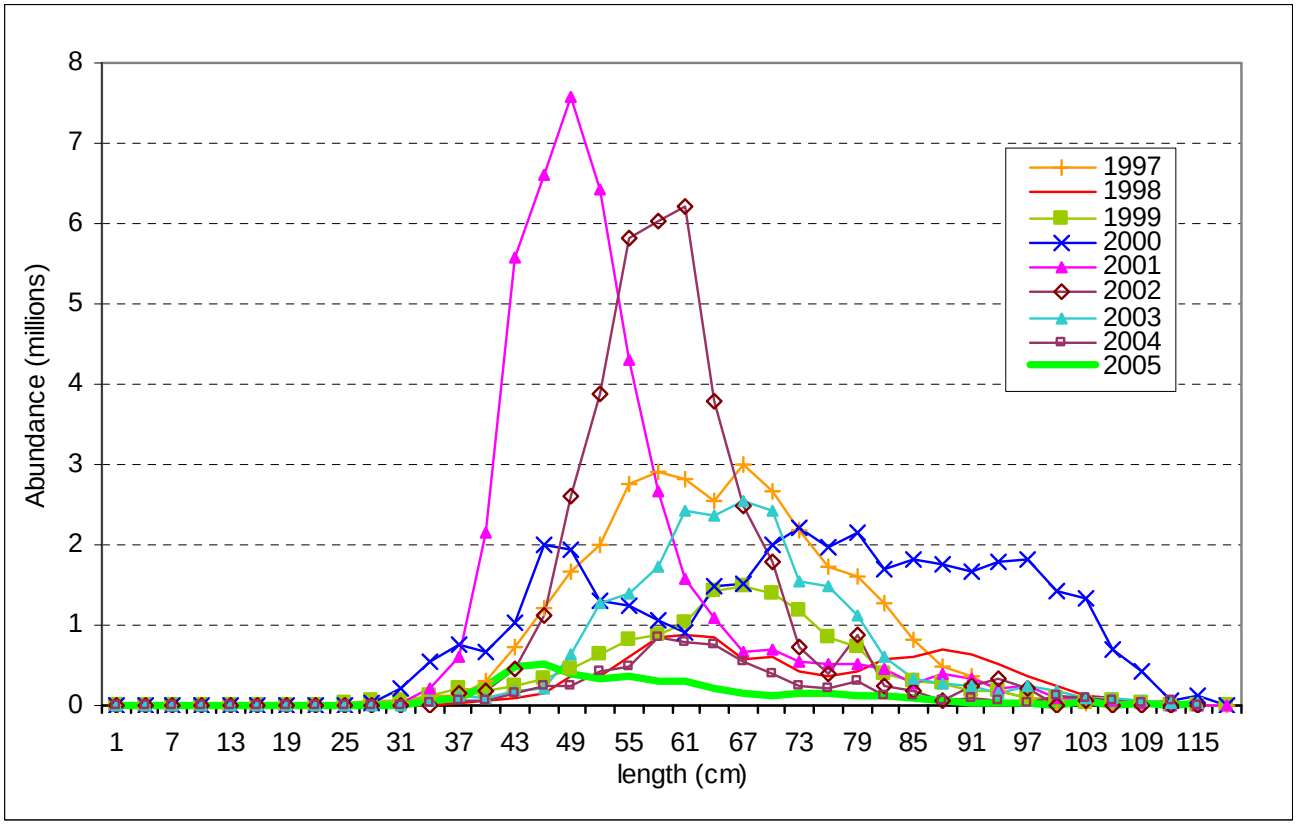


Figure 8. Cod survey abundance index at length, 3Ps, 1997-2005.

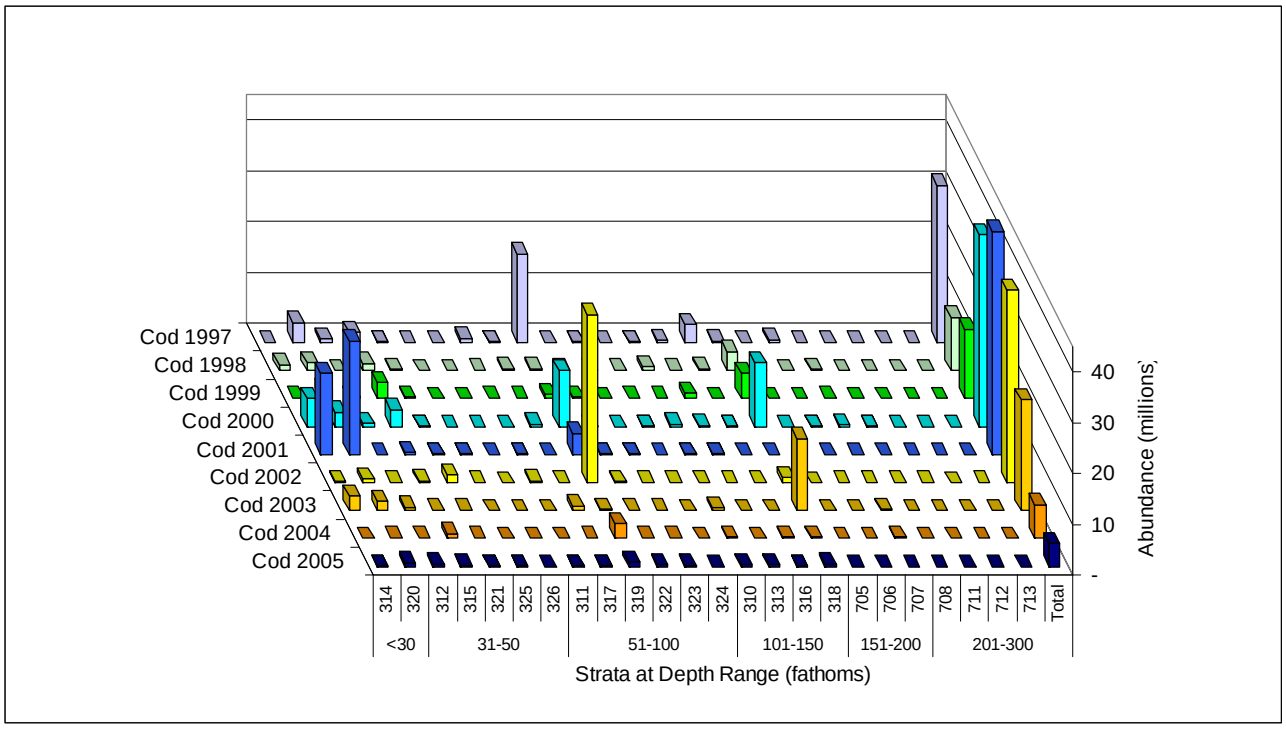


Figure 9. Cod, 3Ps, 1997-2005, estimated abundance.

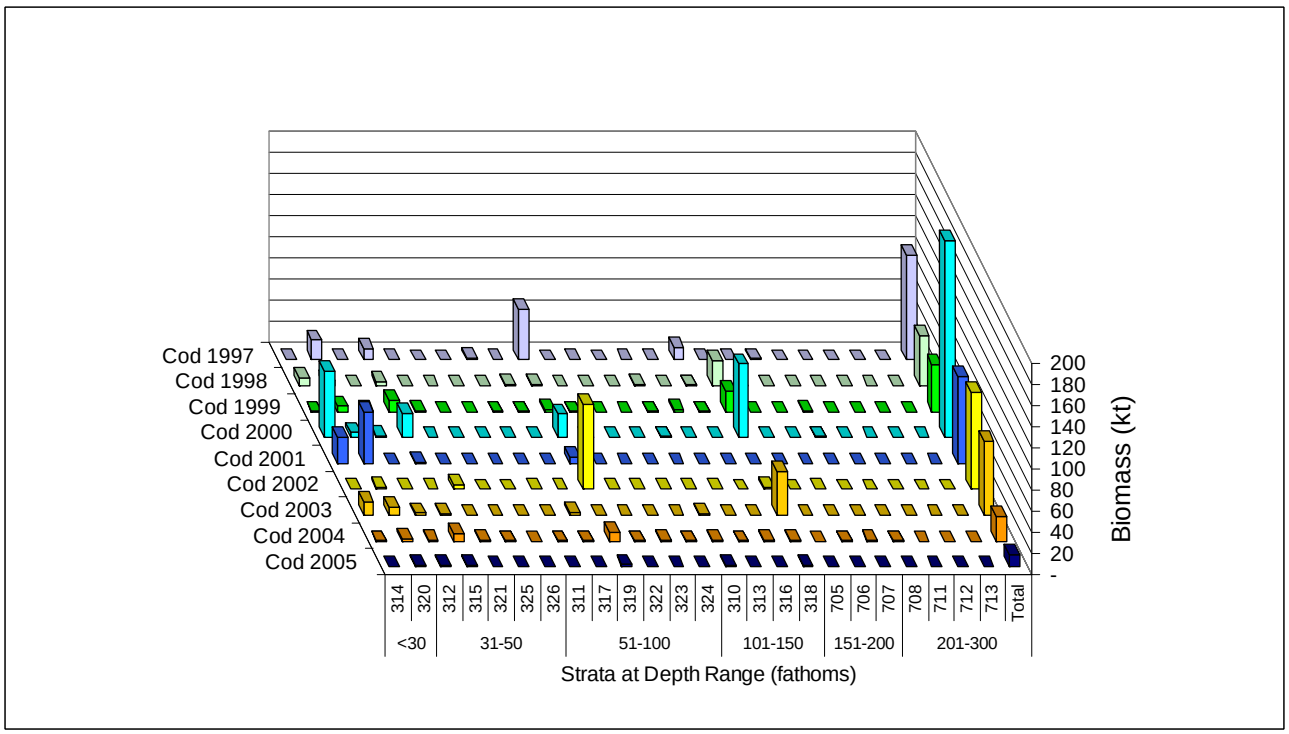


Figure 10. Cod, 3Ps, 1997-2005, estimated biomass.

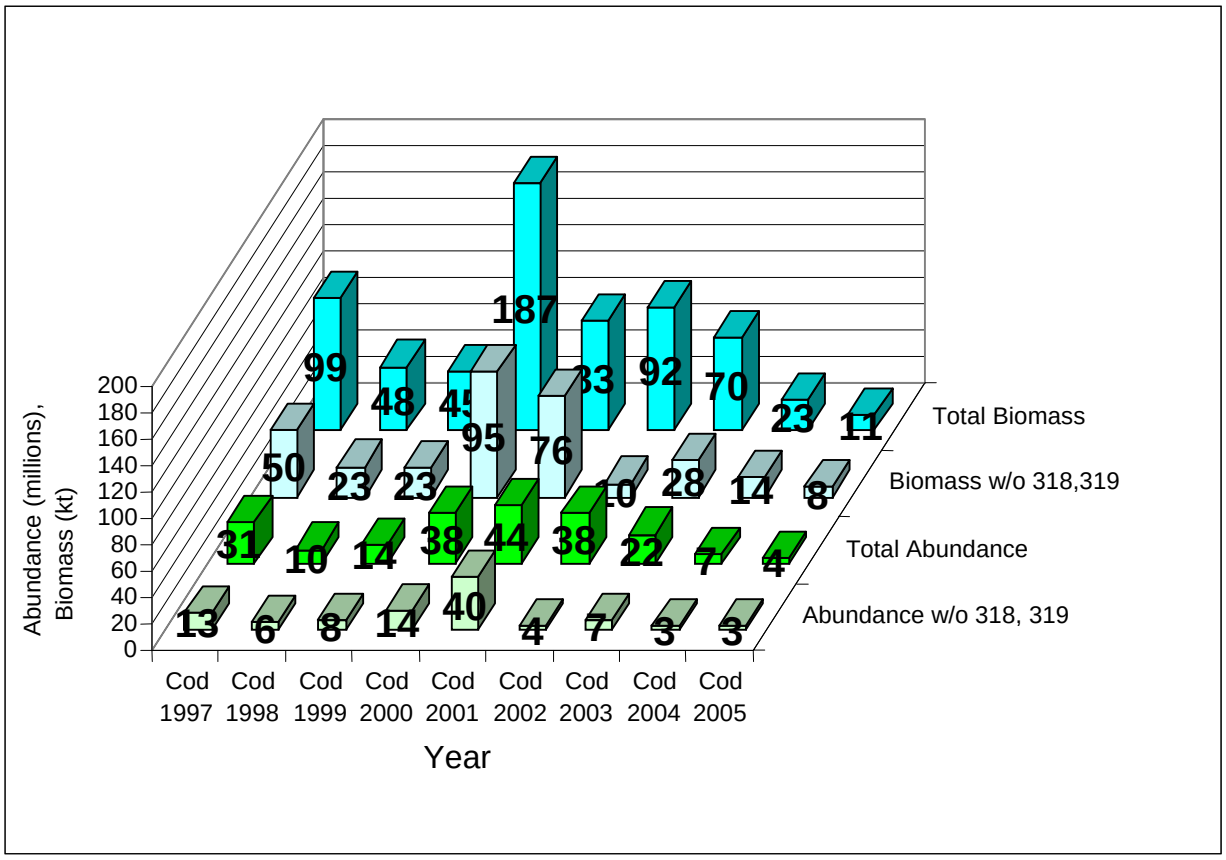


Figure 11. Cod , 3Ps, 1997-2005, estimated abundance and biomass.

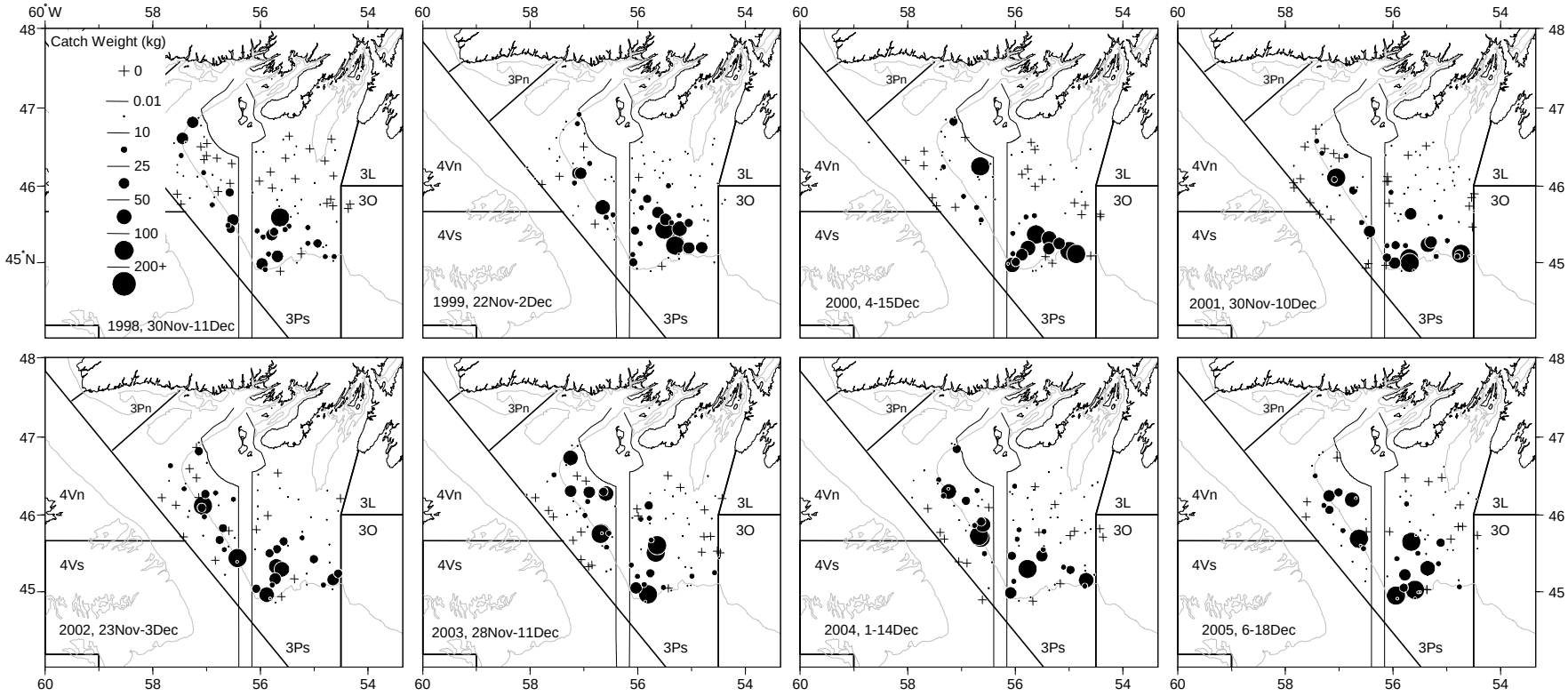


Figure 12. American Plaice catch weight distribution from GEAC stratified random surveys, Subdivision 3Ps, 1998-2005. The 200, 400, and 800 m depth contours are shown.

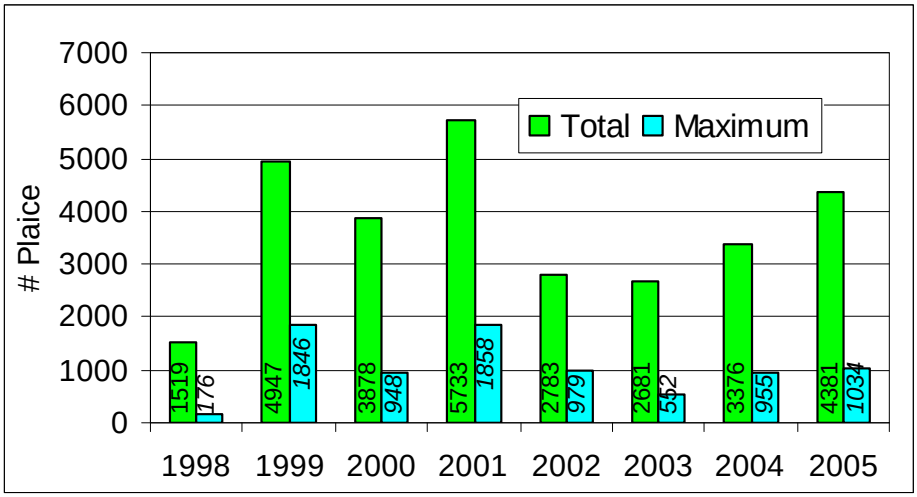


Figure 13a. GEAC fall 3Ps plaice numbers.

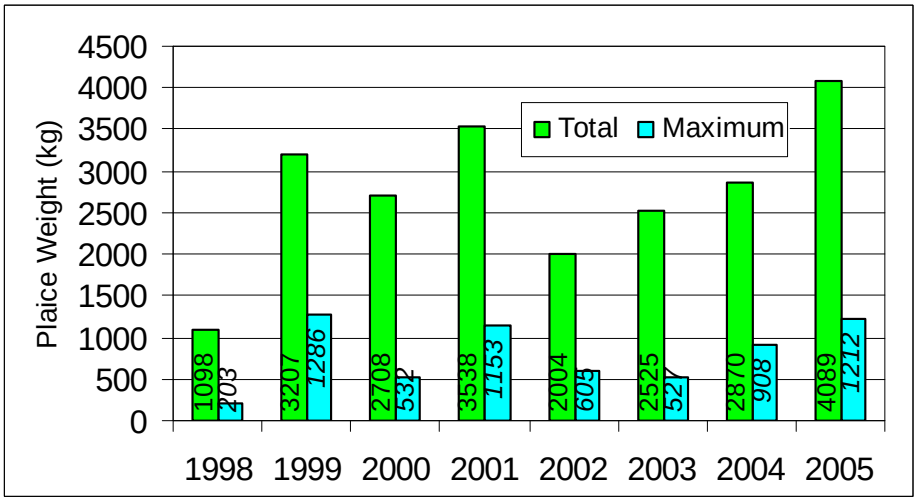


Figure 13b. GEAC fall 3Ps plaice weights.

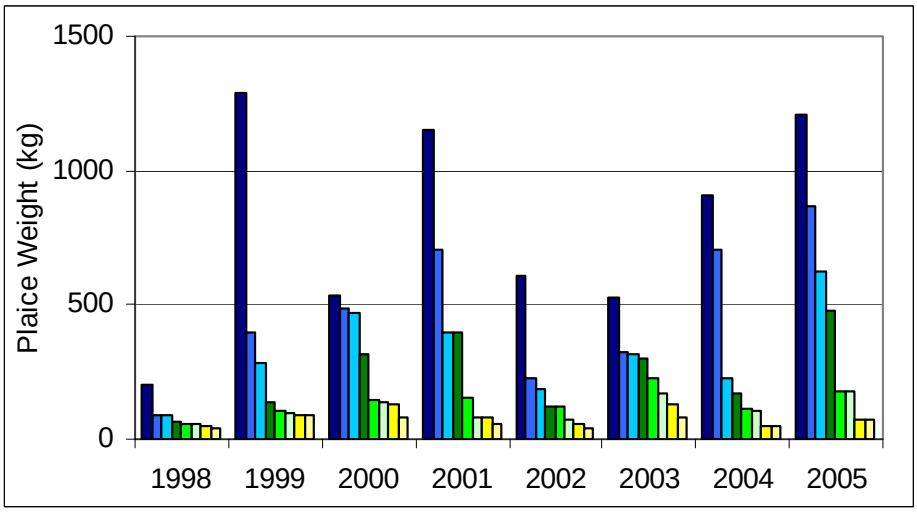


Figure 13c. GEAC fall 3Ps: largest plaice set weights.

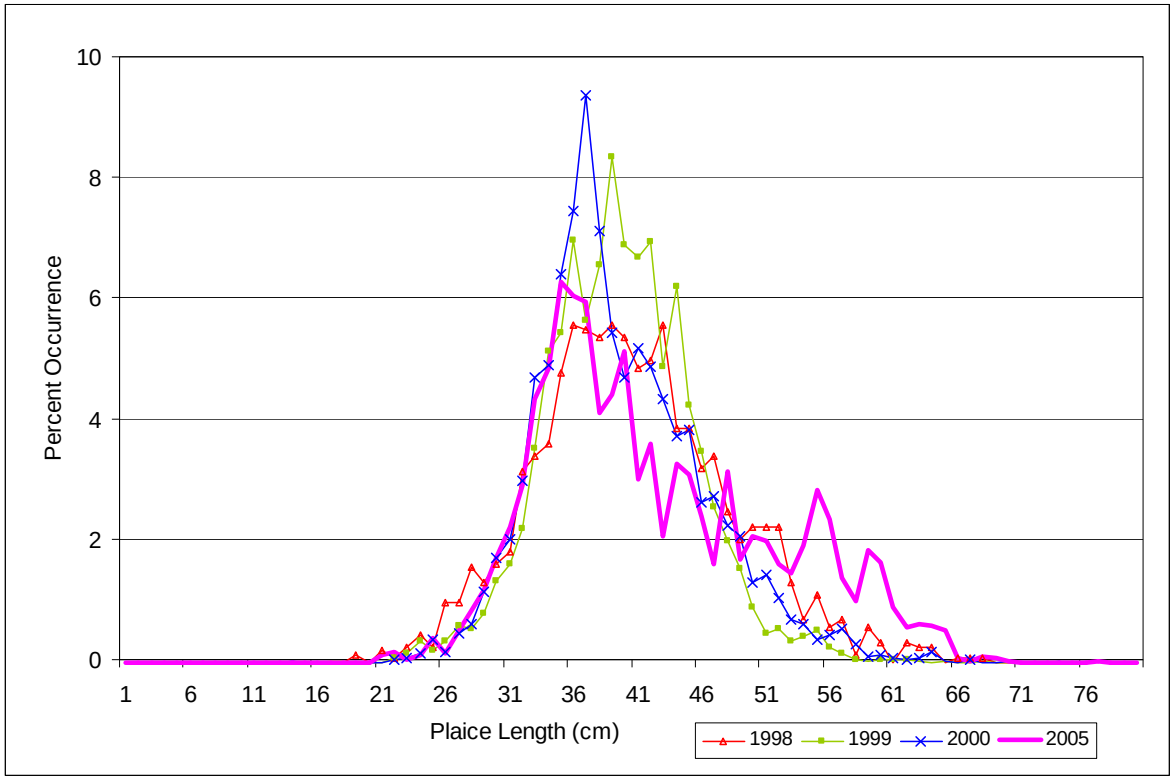


Figure 14a. Length composition of 3Ps plaice: 1998-2000, 2005.

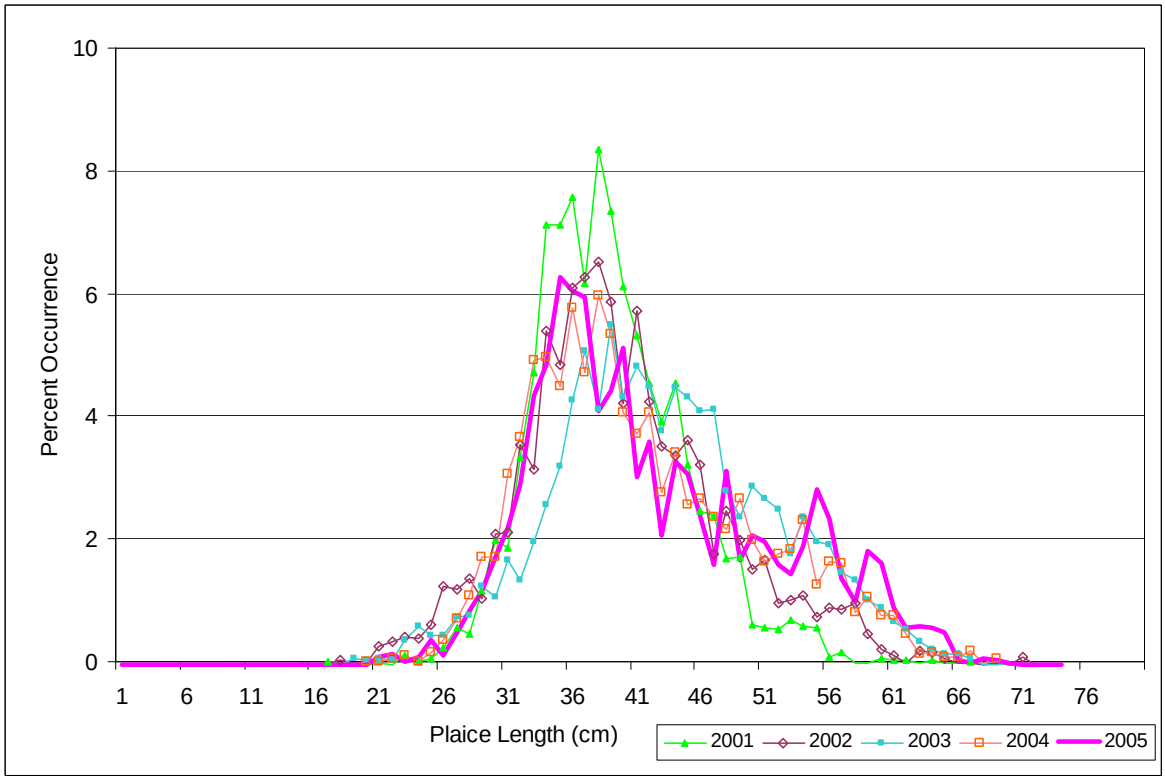


Figure 14b. Length composition of 3Ps plaice: 2001-2005.

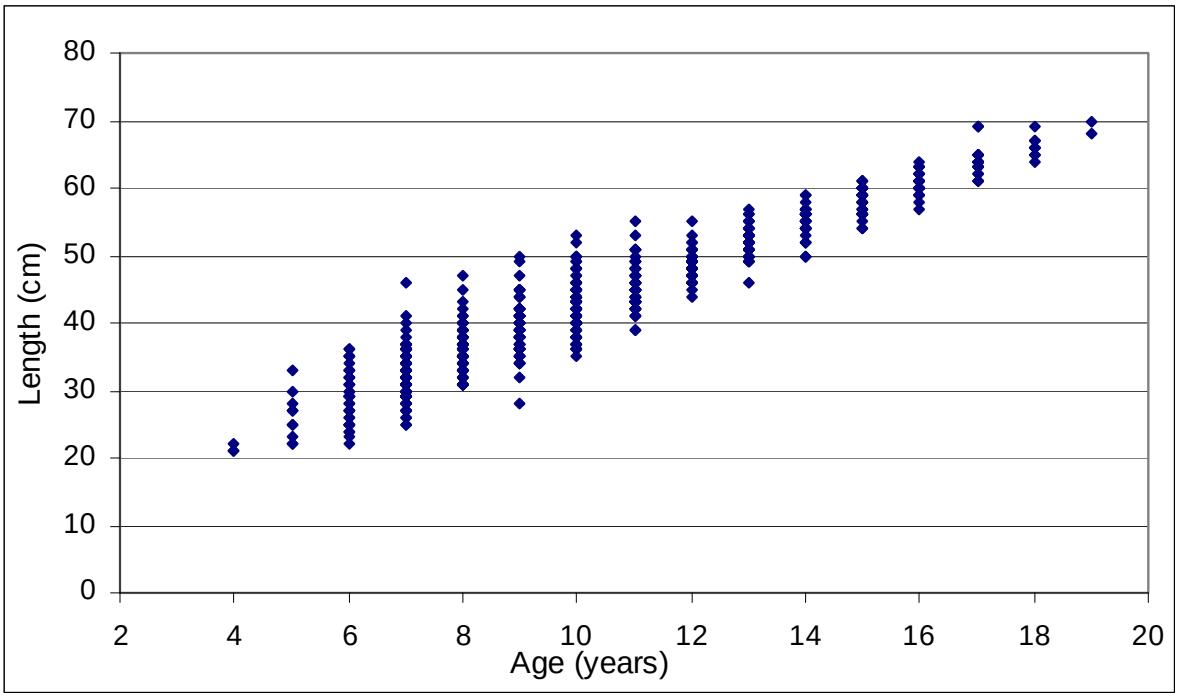


Figure 15a. Plaice age-length composition 3Ps 2005 (723 samples).

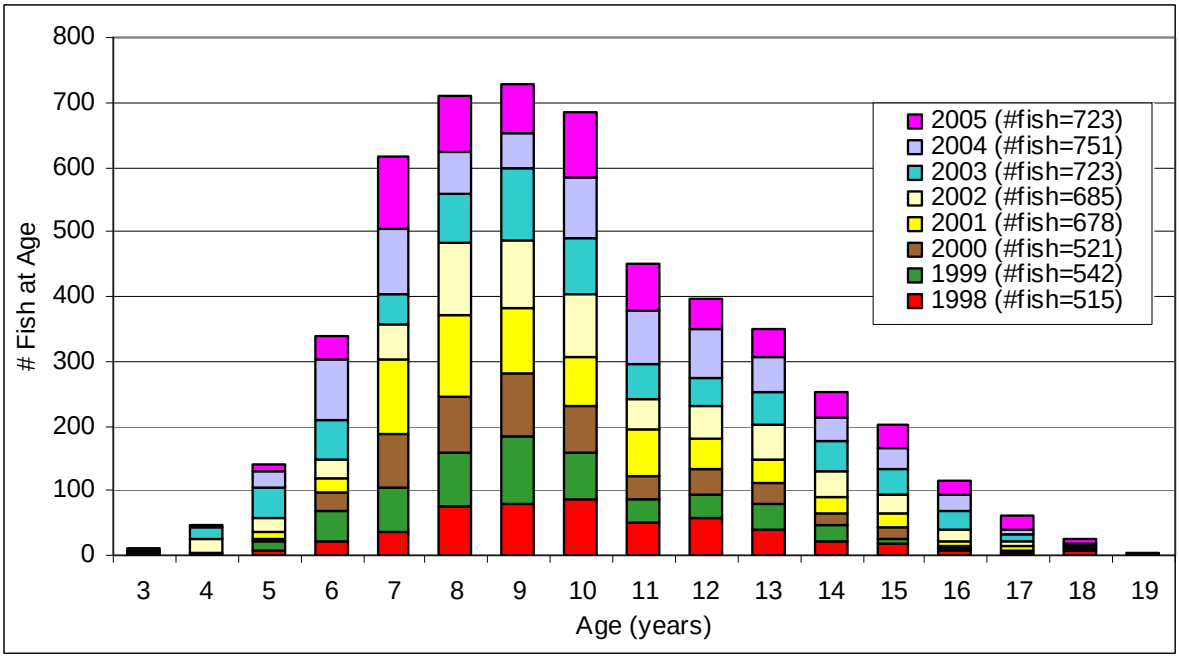


Figure 15b. Age composition of 3Ps sampled plaice.

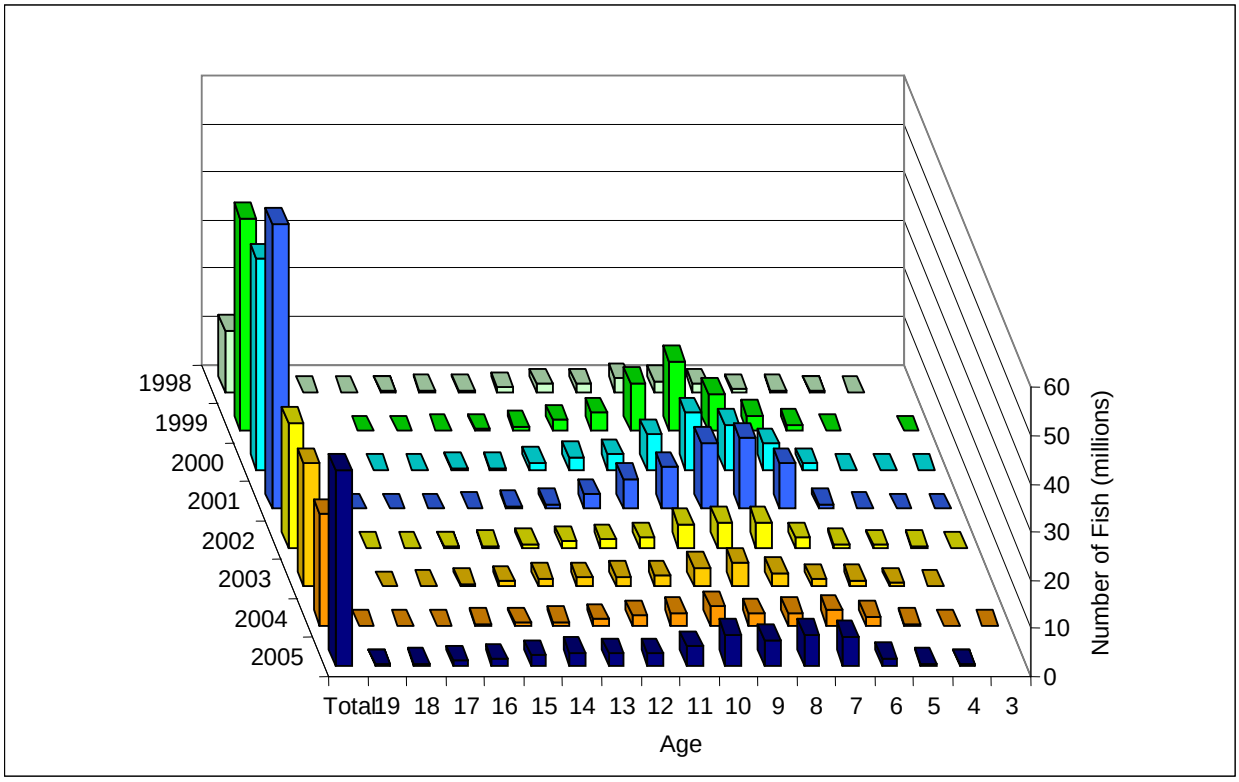


Figure 16. Plaice, 3Ps, 1998-2005, estimated age composition.

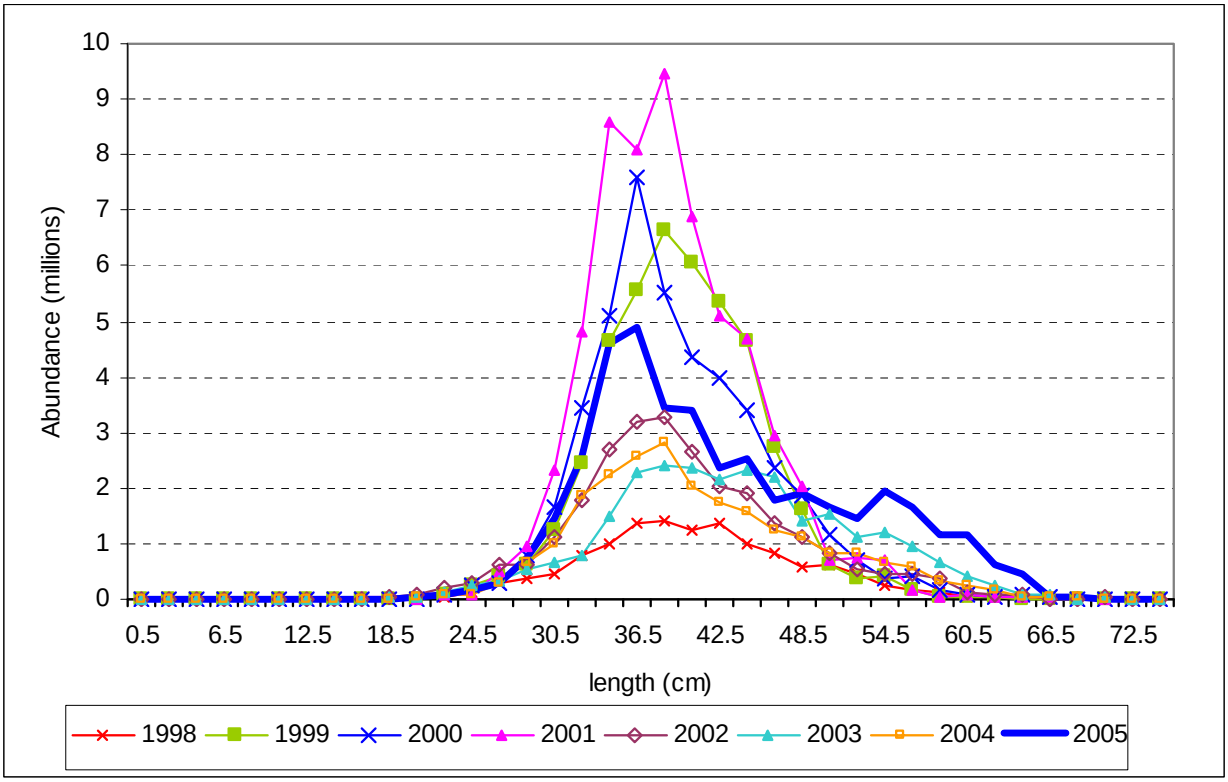


Figure 17. Plaice survey abundance index at length, 3Ps, 1998-2005.

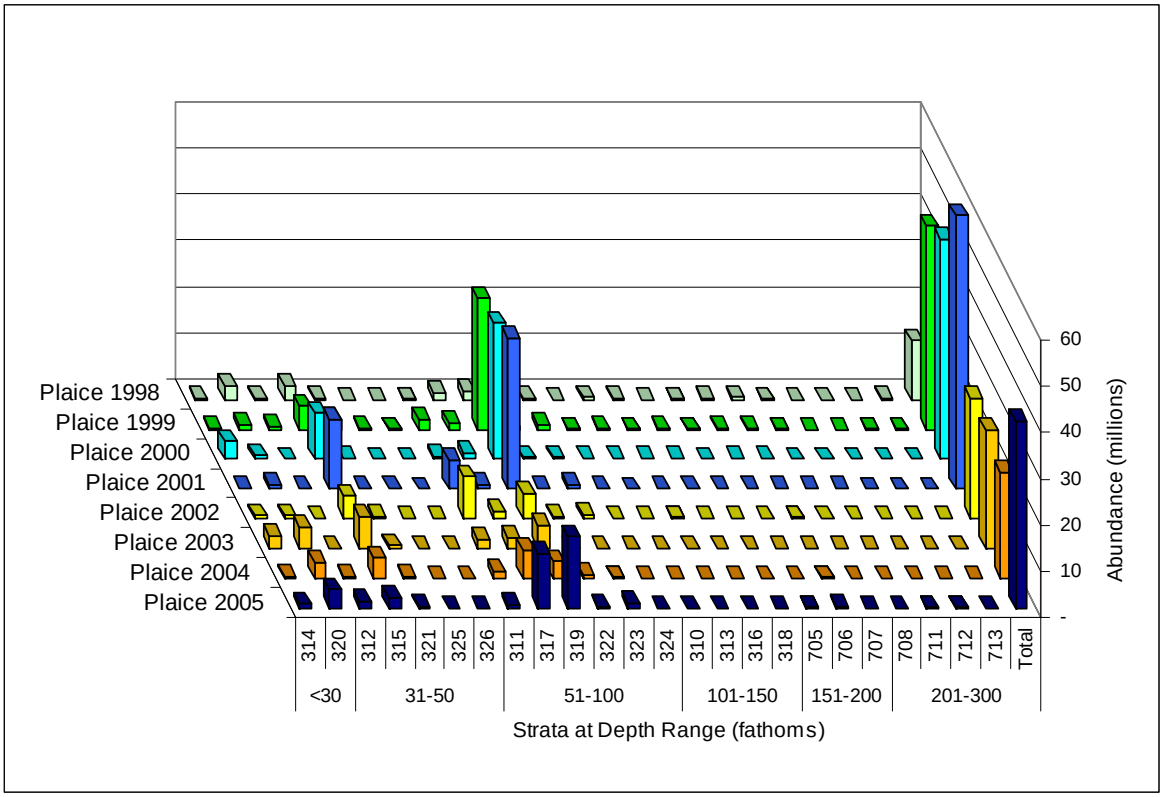


Figure 18. Plaice, 3Ps, 1998-2005, estimated abundance.

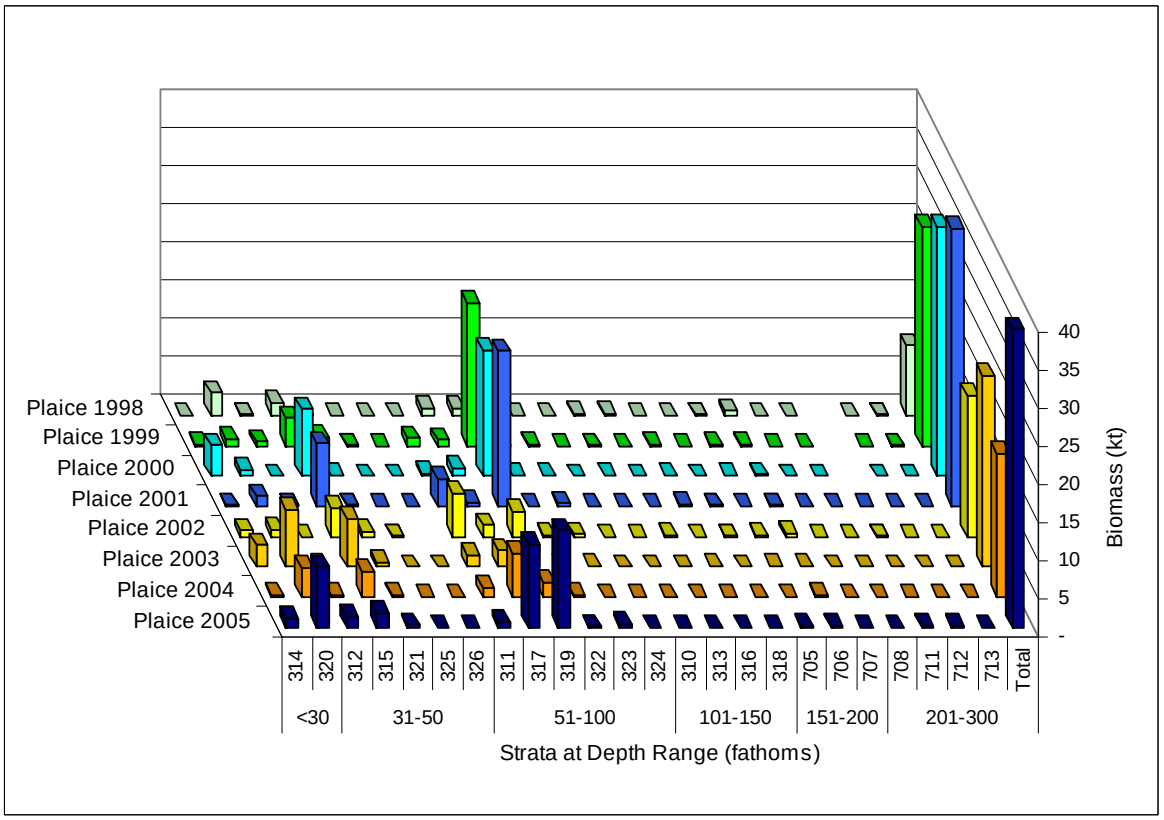


Figure 19. Plaice, 3Ps, 1998-2005, estimated biomass.

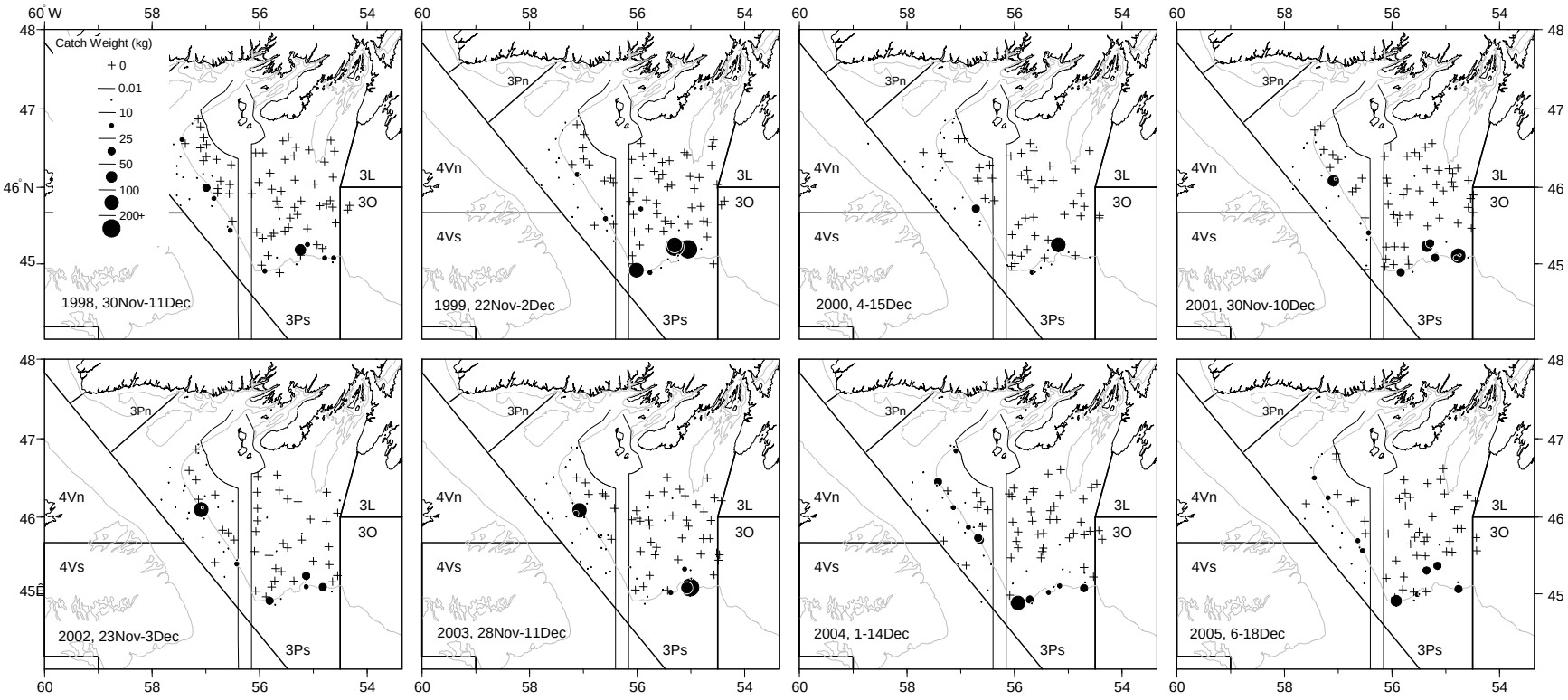


Figure 20. Witch catch weight distribution from GEAC stratified random surveys, Subdivision 3Ps, 1998-2005. The 200, 400, and 800 m depth contours are shown.

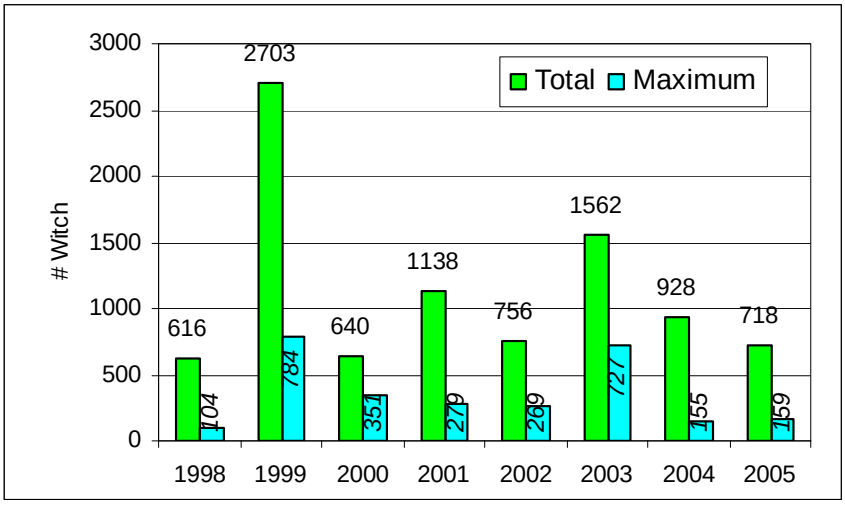


Figure 21a. GEAC fall 3Ps witch numbers.

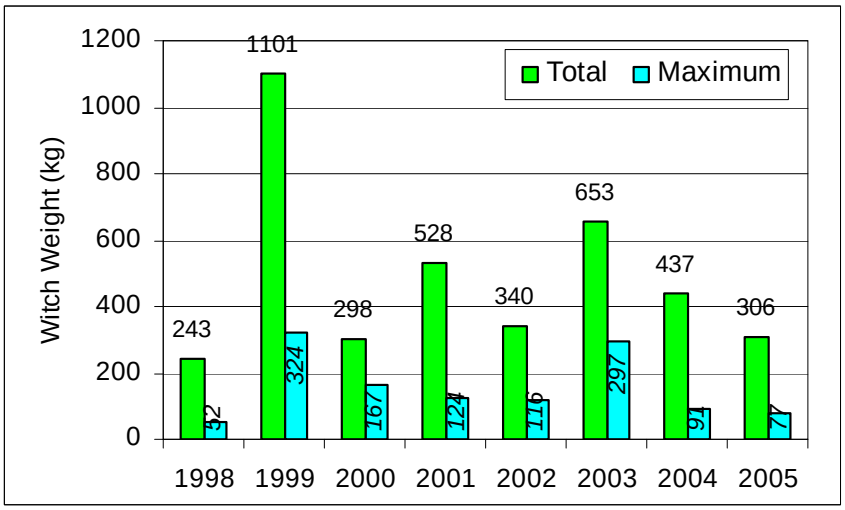


Figure 21b GEAC fall 3Ps witch weights.

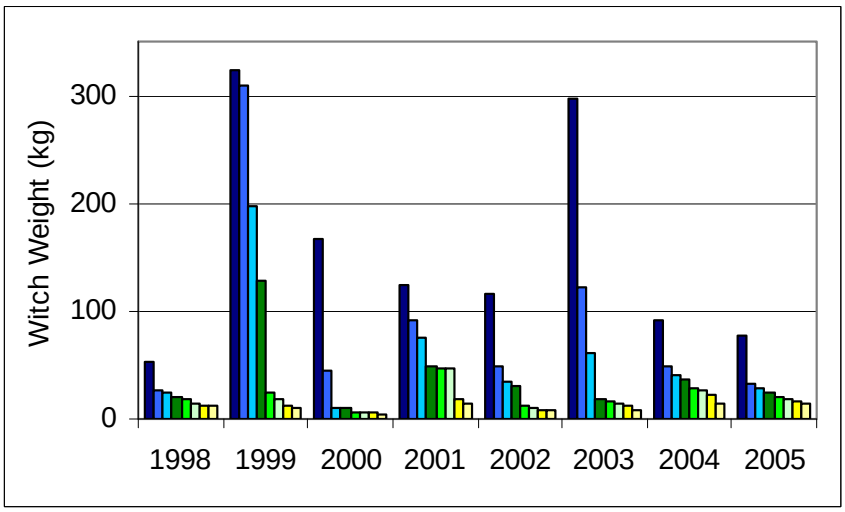


Figure 21c. GEAC fall 3Ps: largest witch set weights.

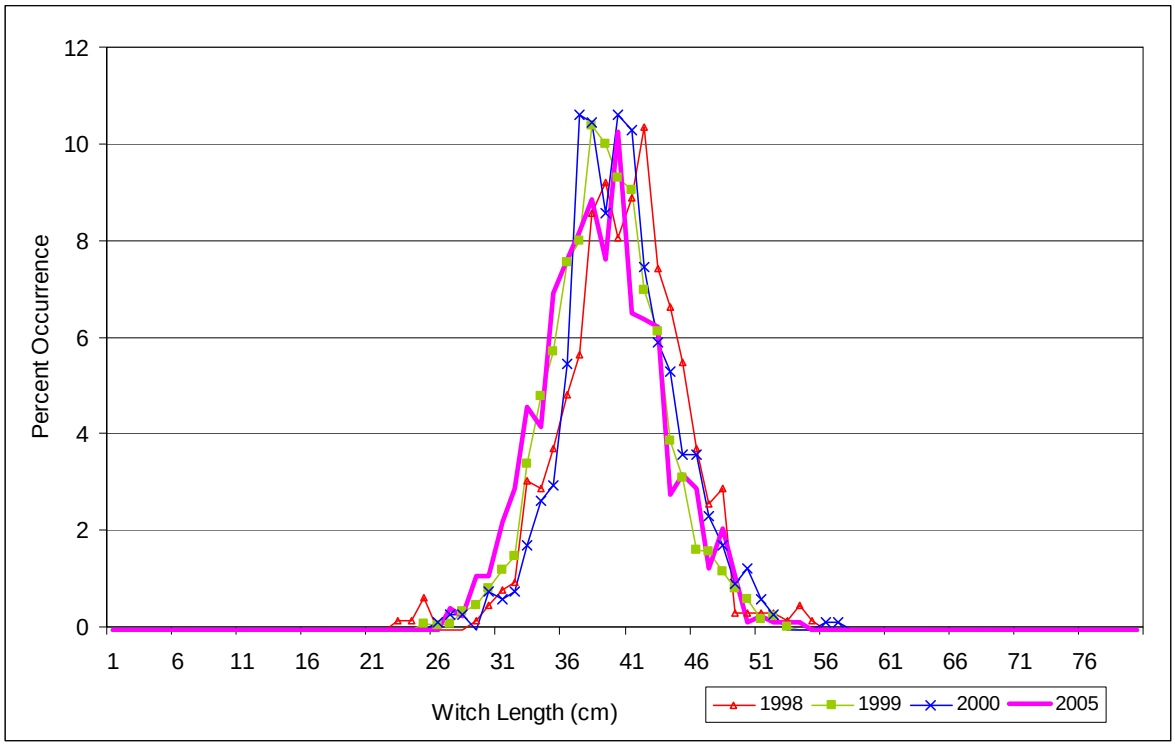


Figure 22a. Length composition of 3Ps witch: 1998-2000, 2005.

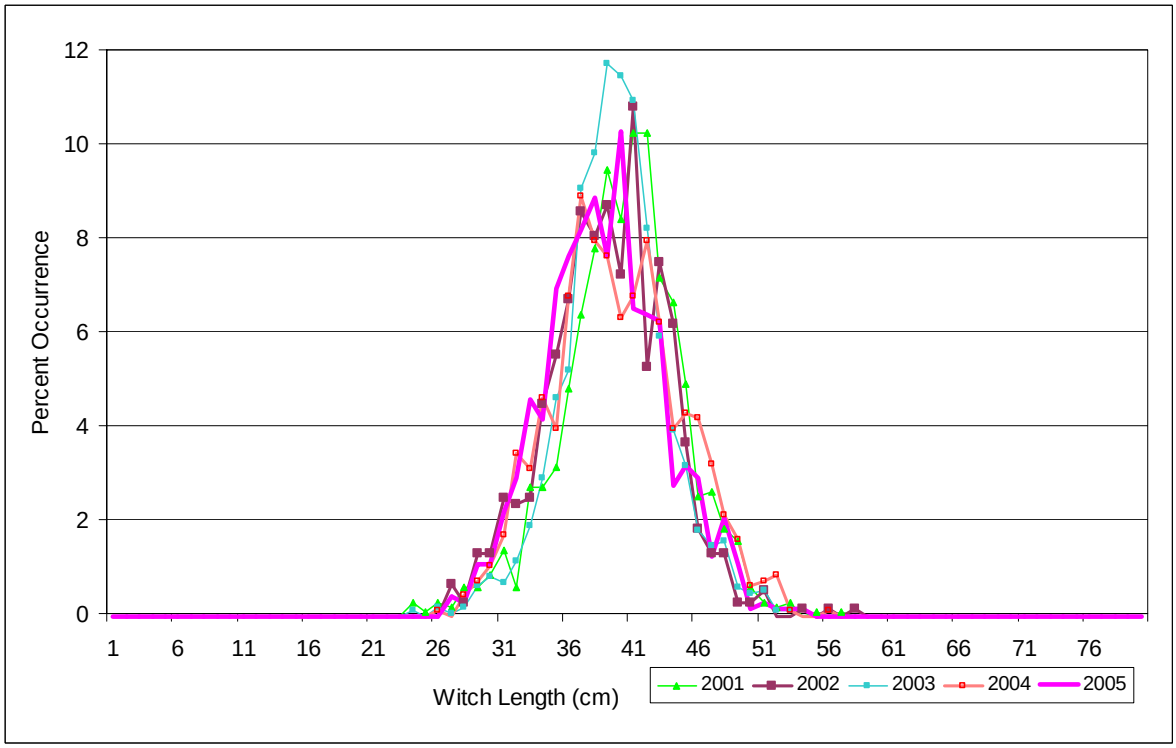


Figure 22b. Length composition of 3Ps witch: 2001-2005.

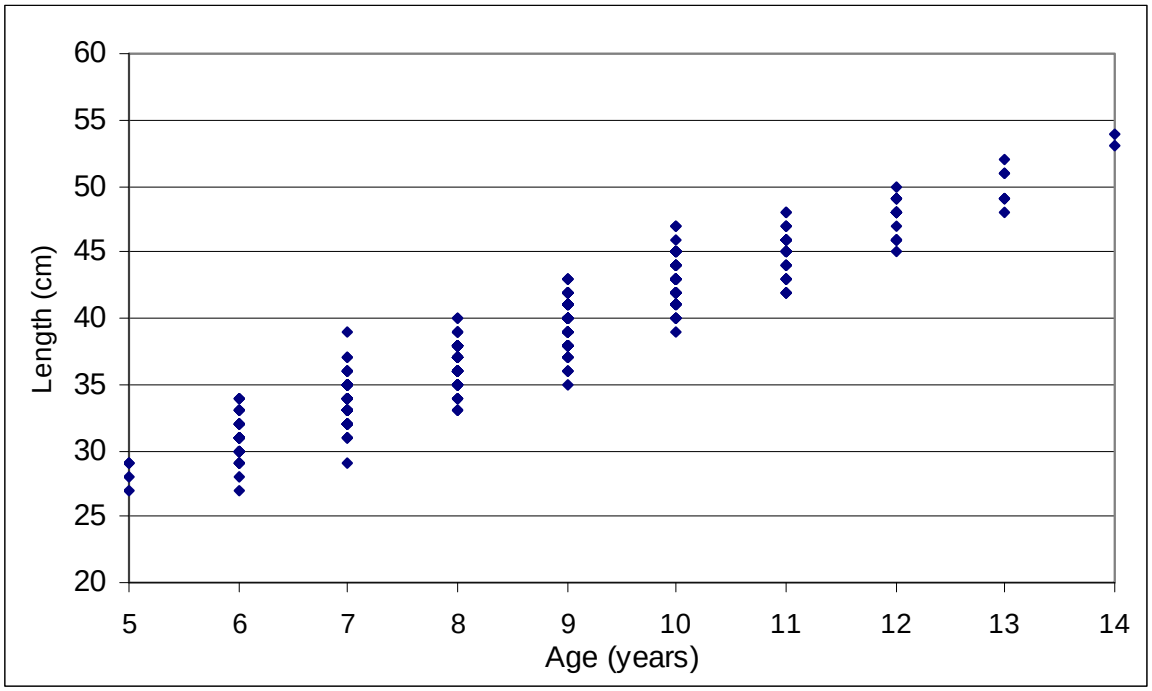


Figure 23a. Witch age-length composition 3Ps 2005 (452 samples).

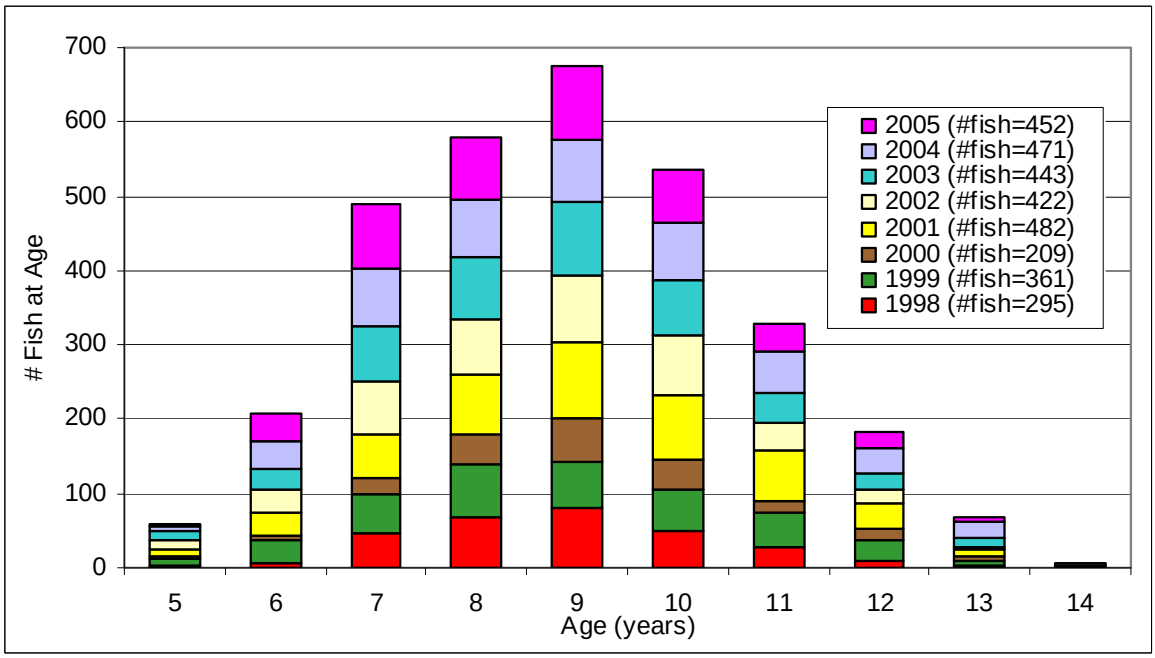


Figure 23b. Age composition of 3Ps sampled witch.

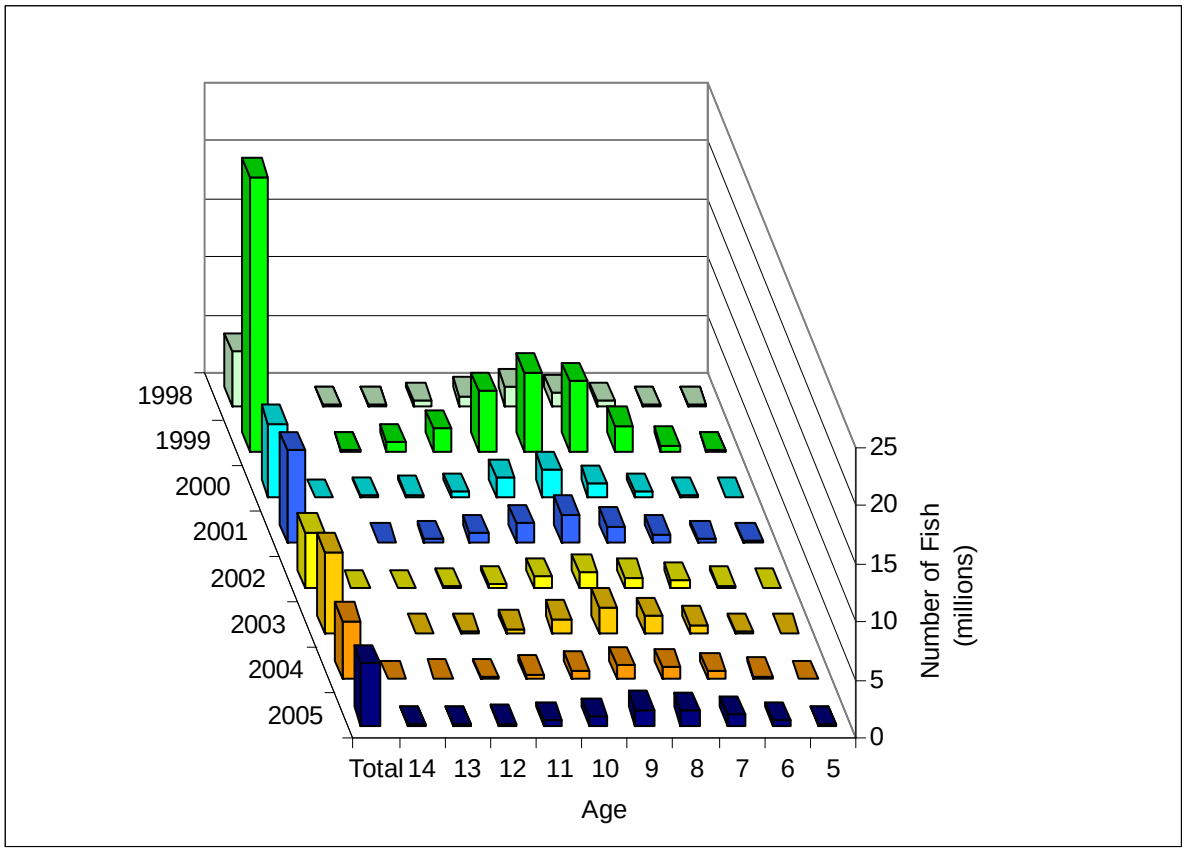


Figure 24. Witch, 3Ps, 1998-2005, estimated age composition.

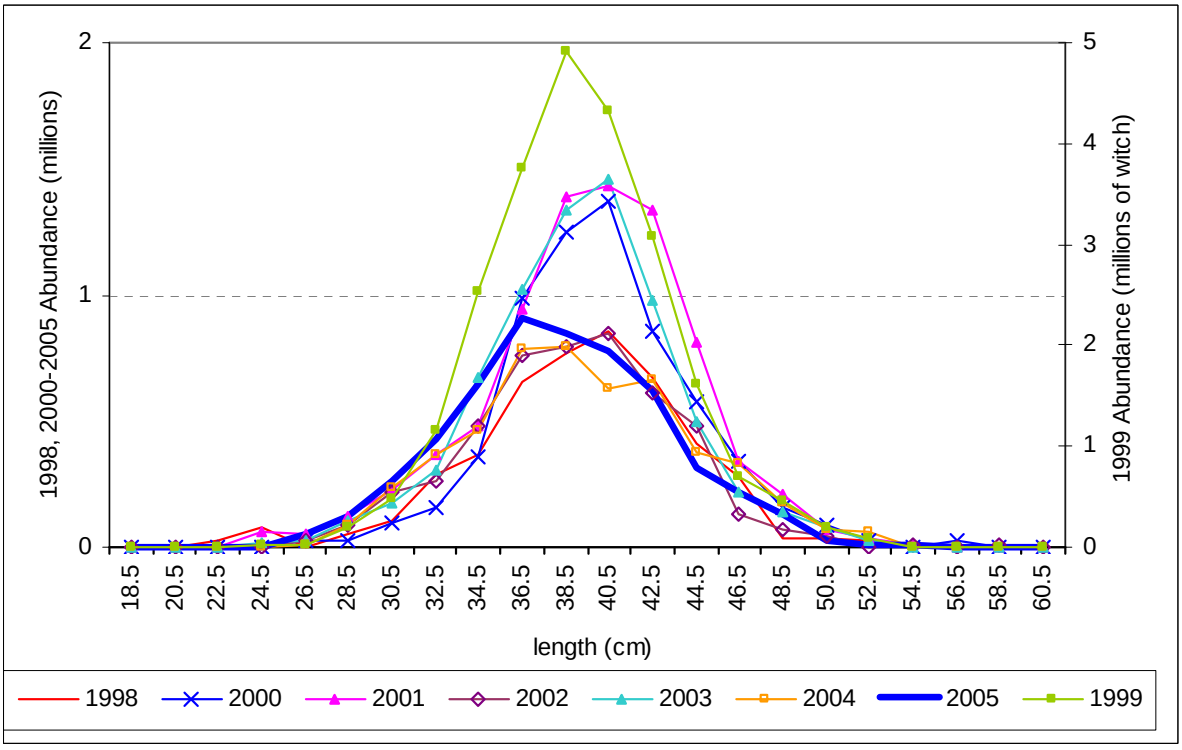


Figure 25. Witch survey abundance index at length, 3Ps, 1998-2005.

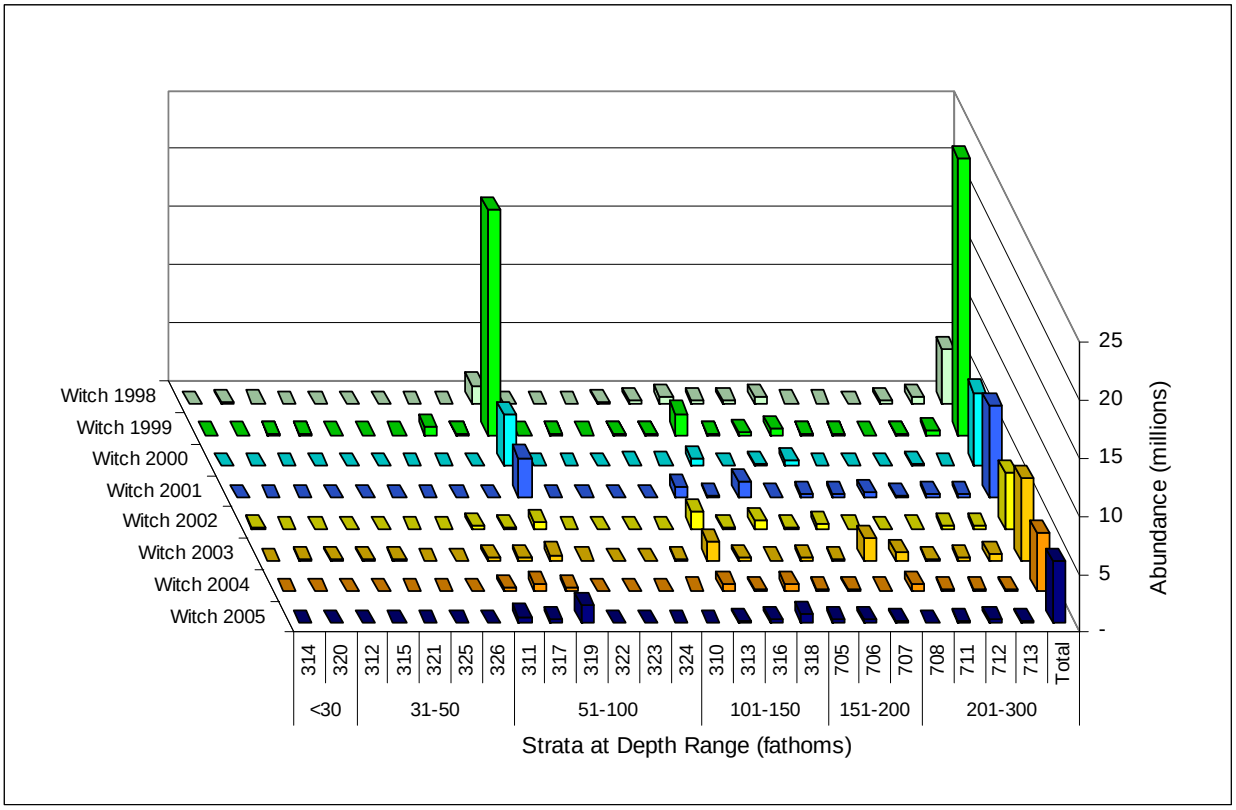


Figure 26. Witch, 3Ps, 1998-2005, estimated abundance.

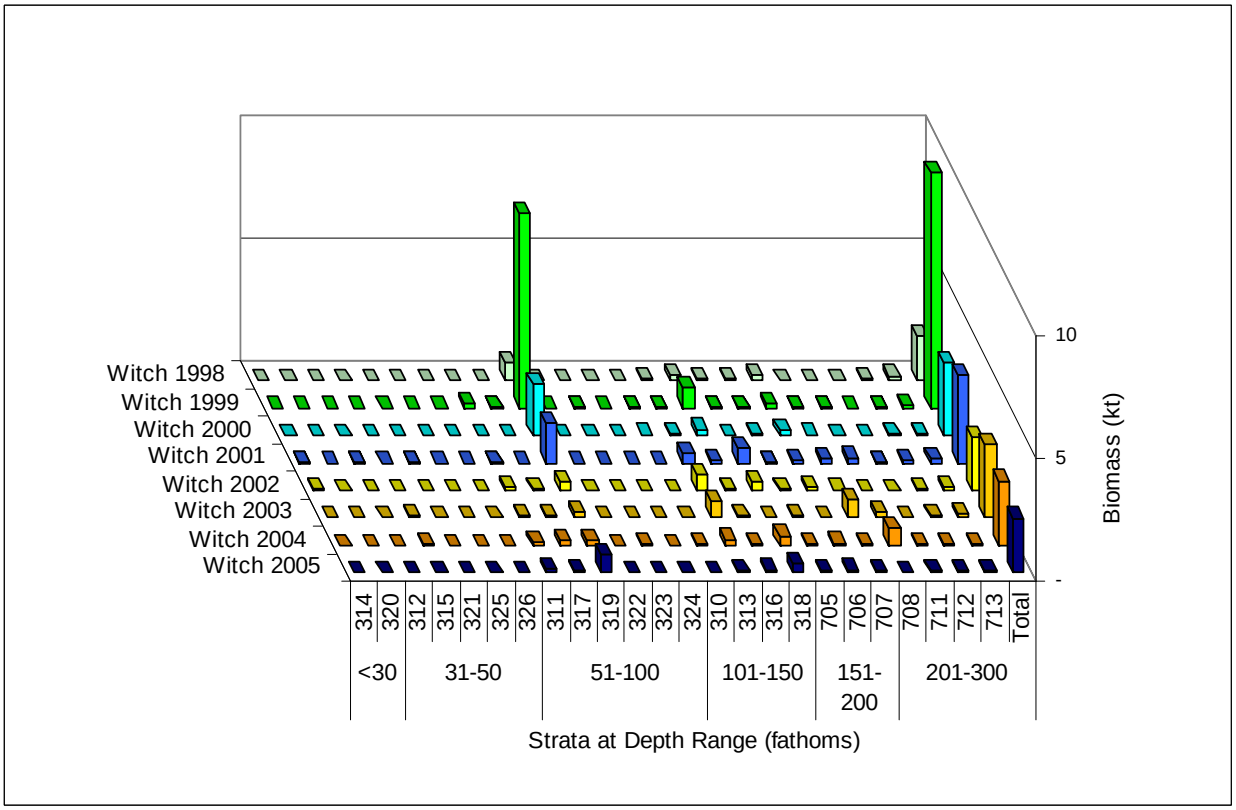


Figure 27. Witch, 3Ps, 1998-2005, estimated biomass.

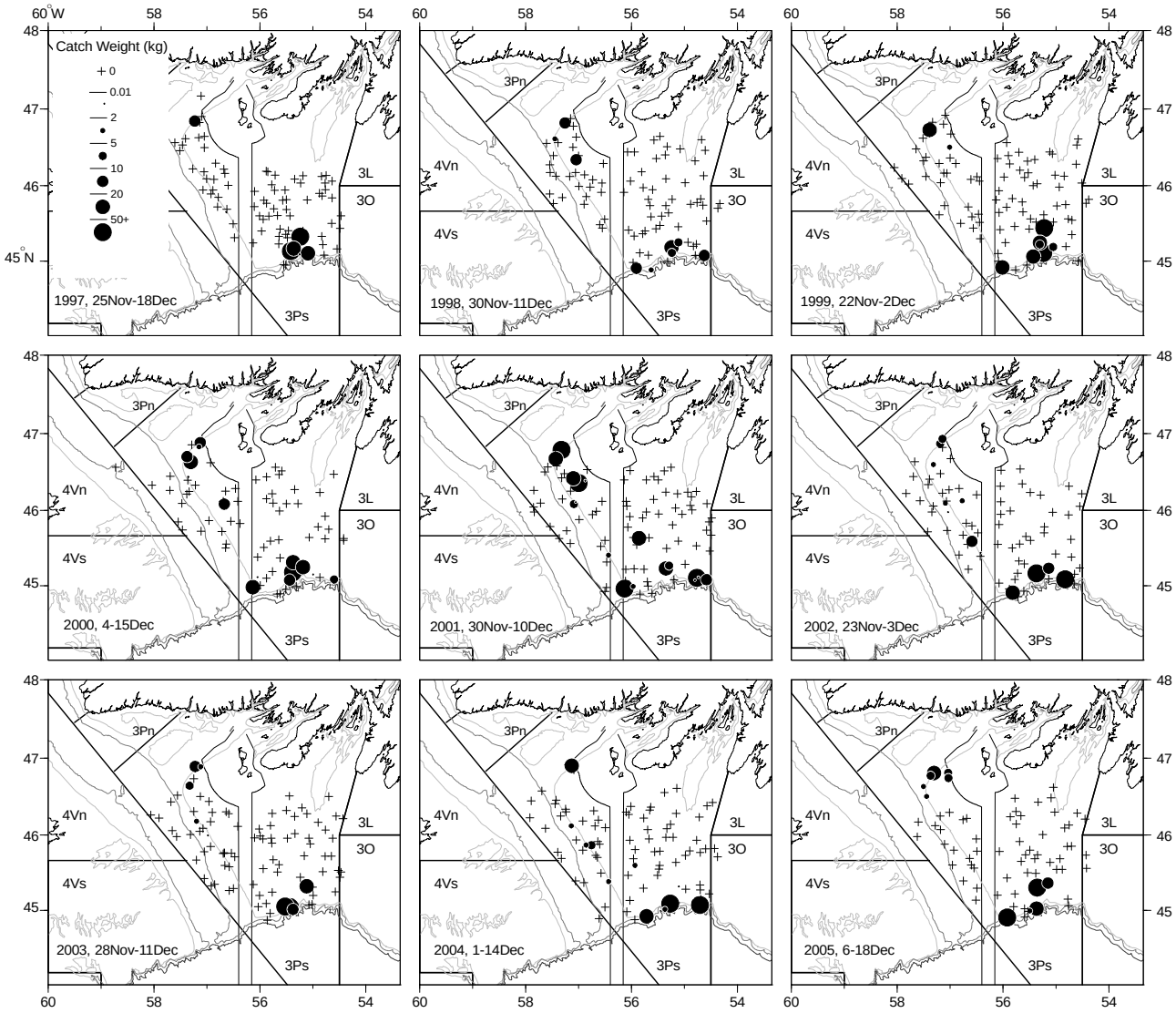


Figure 28a. Haddock catch weight distribution from GEAC stratified random surveys, Subdivision 3Ps, 1997-2005. The 200, 400 and 800 m depth contours are shown.

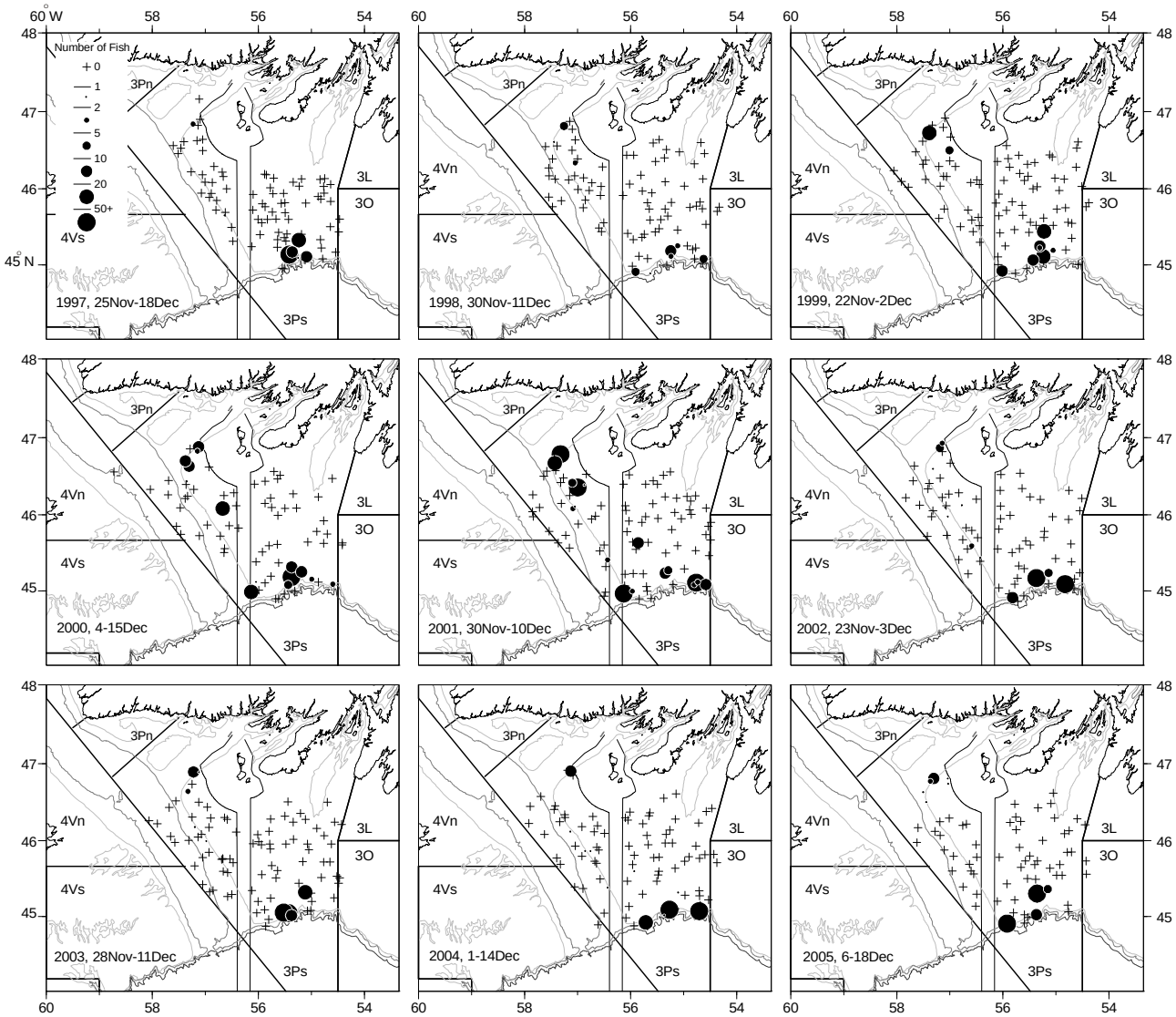


Figure 28b. Haddock catch numbers distribution from GEAC stratified random surveys, Subdivision 3Ps, 1997-2005. The 200, 400, and 800 m depth contours are shown.


Figure 29. Haddock Catch Summary Statistics: a) largest set weights; b) largest set numbers; c) number of sets fished; d) mean weight; e) survey weights; f) survey numbers.

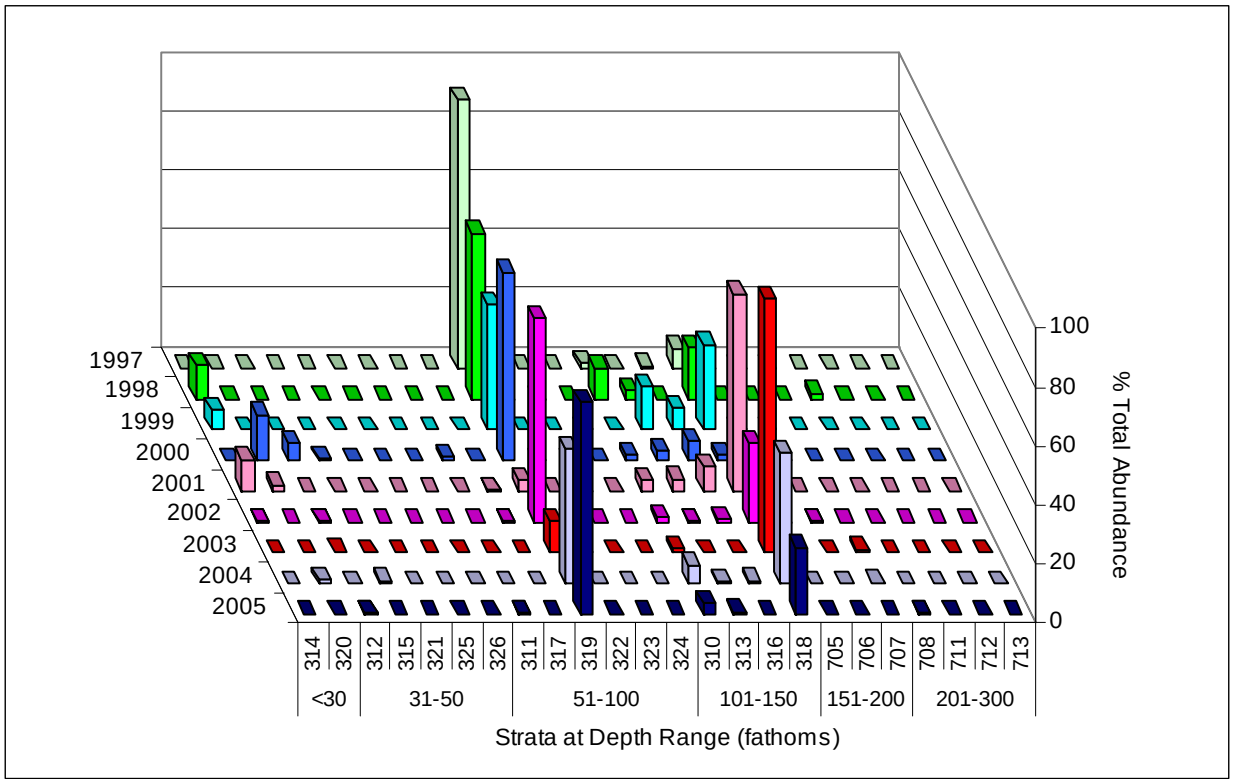


Figure 30. Haddock, 3Ps, 1997-2005, % total abundance.

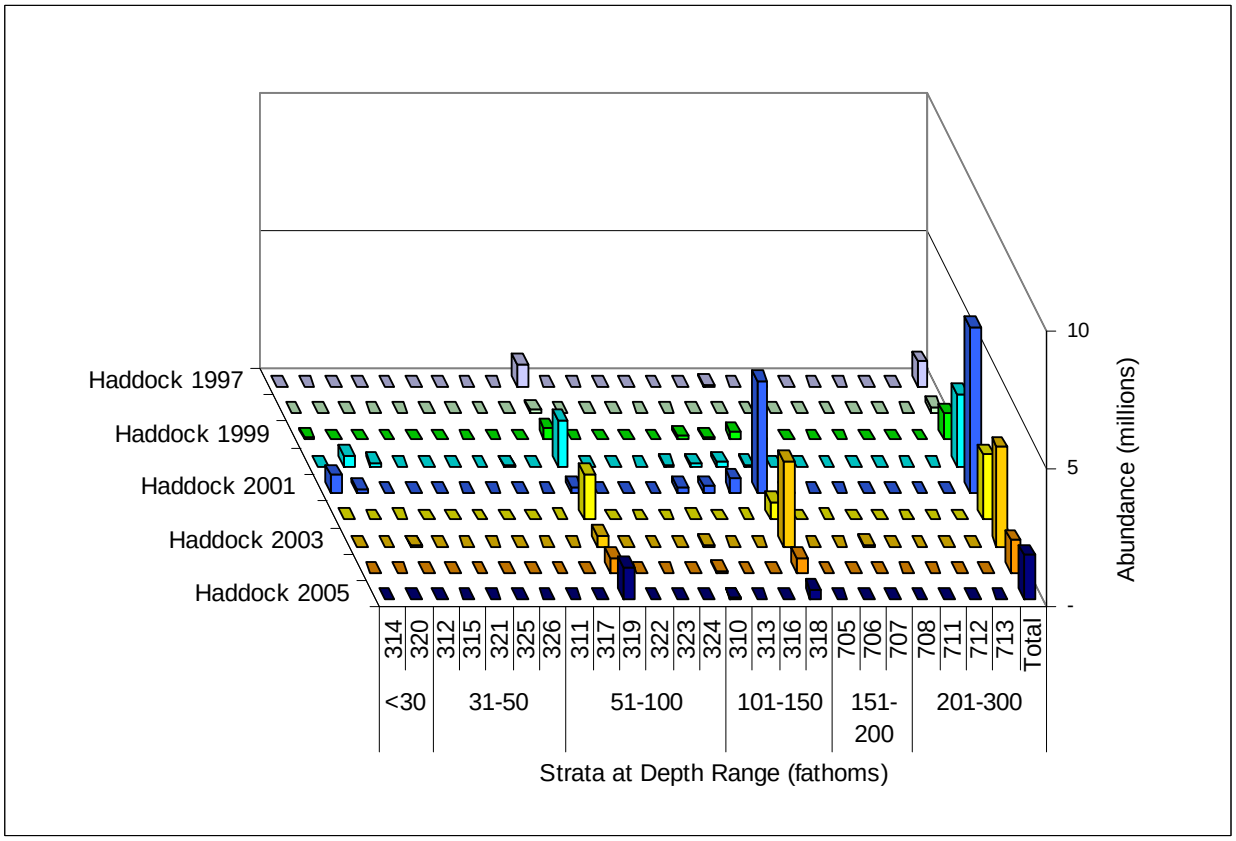


Figure 31. Haddock, 3Ps, 1997-2005, estimated abundance.

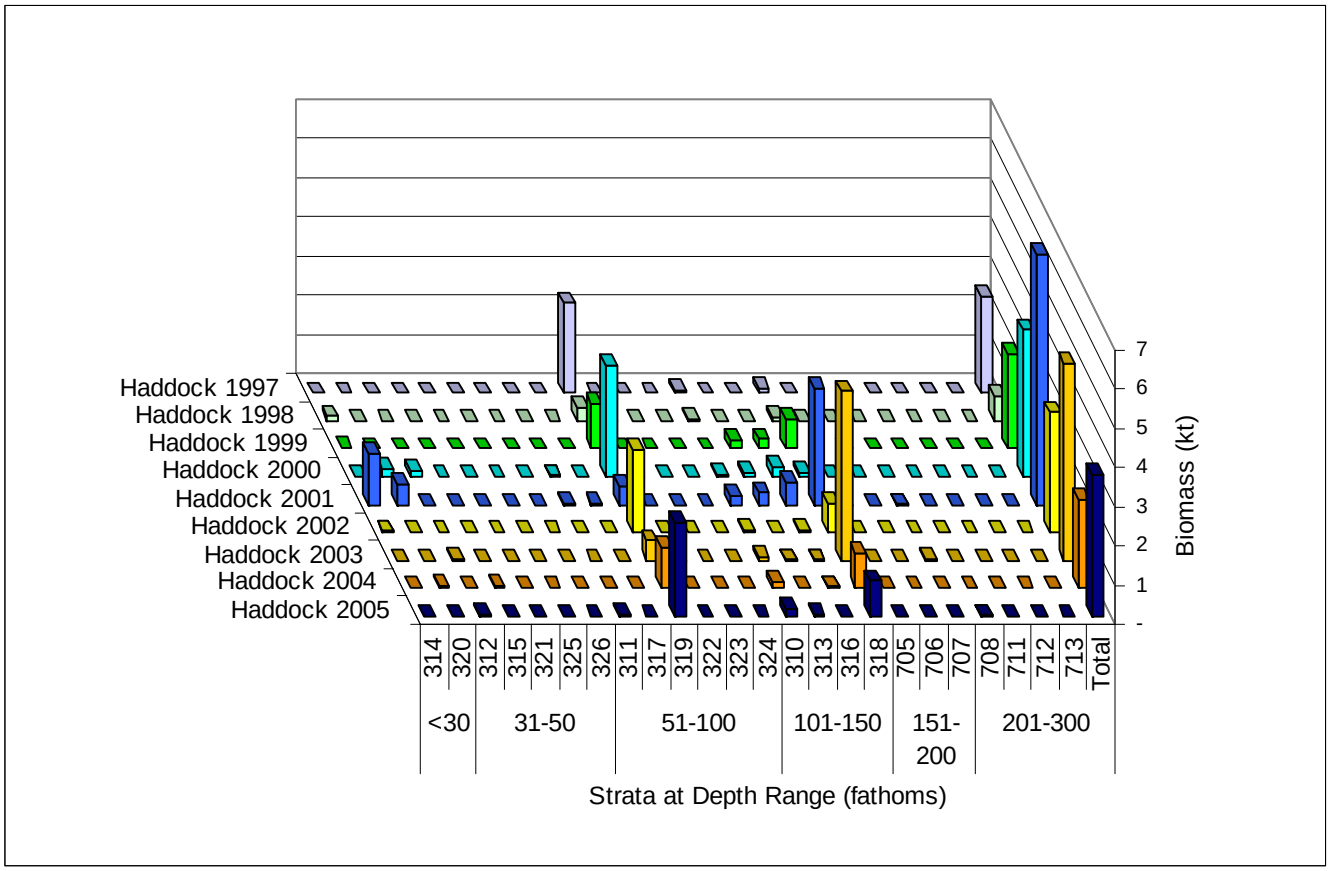


Figure 32. Haddock, 3Ps, 1997-2005, estimated biomass.

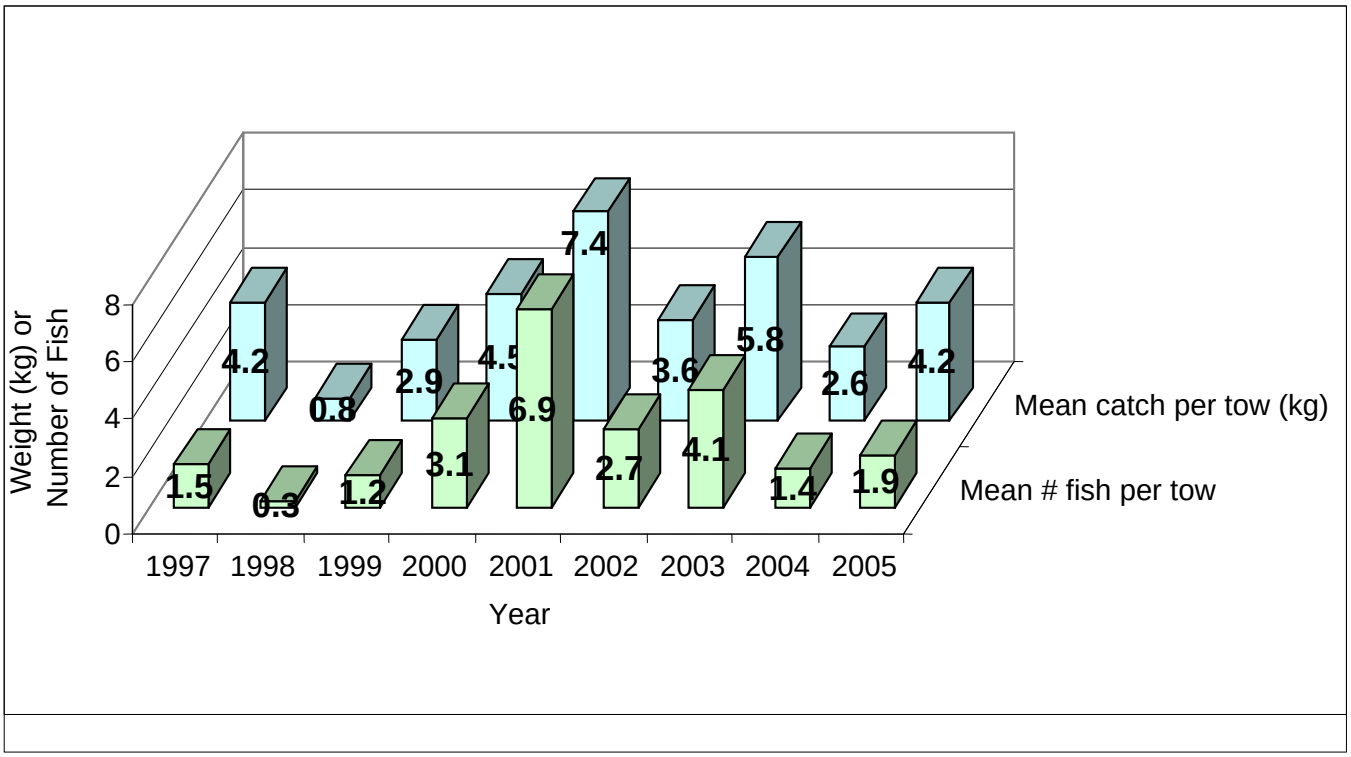


Figure 33. Haddock, 3Ps, 1997-2005, STRAP-estimated mean values per tow.