North Sea Stock Survey 2006

Preliminary report for the Attention of WGNSSK

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INTRODUCTION

This report comprises a preliminary detailed synopsis of the North Sea Stock Survey 2006 data for the attention of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK).

THE SURVEY IN 2006

The survey covered eight demersal species cod, haddock, whiting, saithe, monkfish, *Nephrops*, sole and plaice in ten areas across the North Sea (Figure 1). The questionnaire followed a similar format to previous years (an example is presented in Appendix 2) and was sent out to fishermen by industry representatives during June - July. The results were collated in an Access database and each countries completed database was sent to the NAFC Marine Centre in Shetland by 07 August 2006.

Questionnaires were received from skippers of vessels registered in Belgium, Denmark, England, The Netherlands and Scotland. Dutch German flagships contributed to the survey in 2005 but not in 2006. Three Dutch English flagships contributed to the survey in 2006. The numbers of respondents from each country are presented in Figure 2. The number of responses from Belgium, England, The Netherlands and Scotland were lower than in previous years. The number of responses from Denmark was higher than the average over the time series but lower than in 2005. A total of 249 questionnaires were returned expressing a total of 1566 views on the eight species over the ten areas. The overall decrease in the numbers of questionnaires being returned was reflected in the number of questions answered for each species (Figure 3). However the overall pattern of the distribution of responses between species was similar to that of previous years with cod and plaice attracting the most responses.

As in previous years the data have only been analysed by the main gear type noted on the questionnaires. Vessels that noted a major change in gear type from the previous year that may influence the perception of the state of the stock were omitted from the analysis; these numbered three.

The numbers of respondents from each country, their vessel size and their main fishing method are summarised in Table 1.

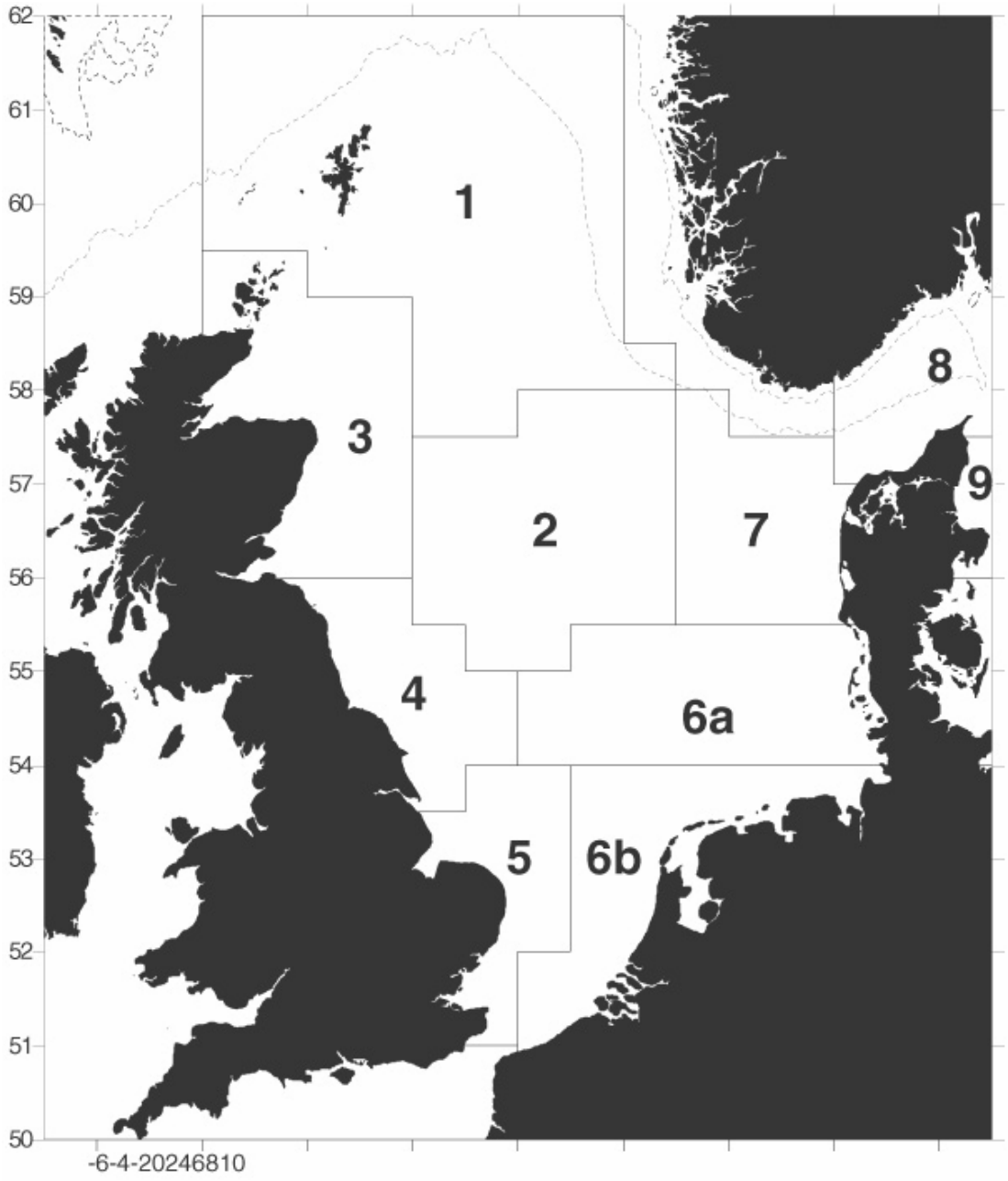


Figure 1 Areas of Fishing

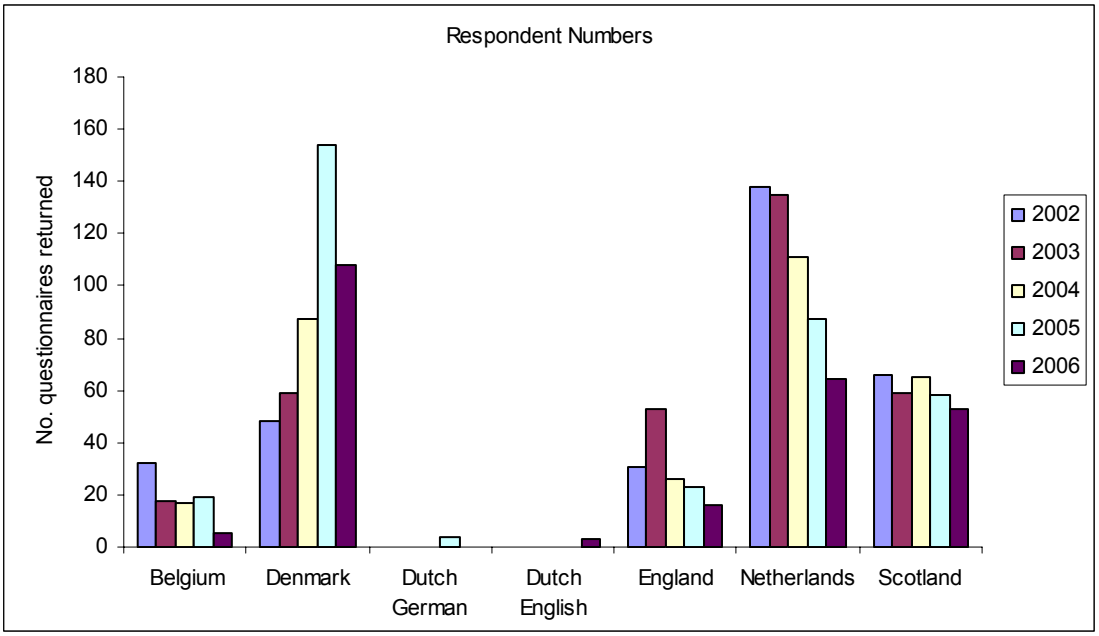


Figure 2 Numbers of respondents in the stock survey 2002 – 2006 by country of vessel registration.

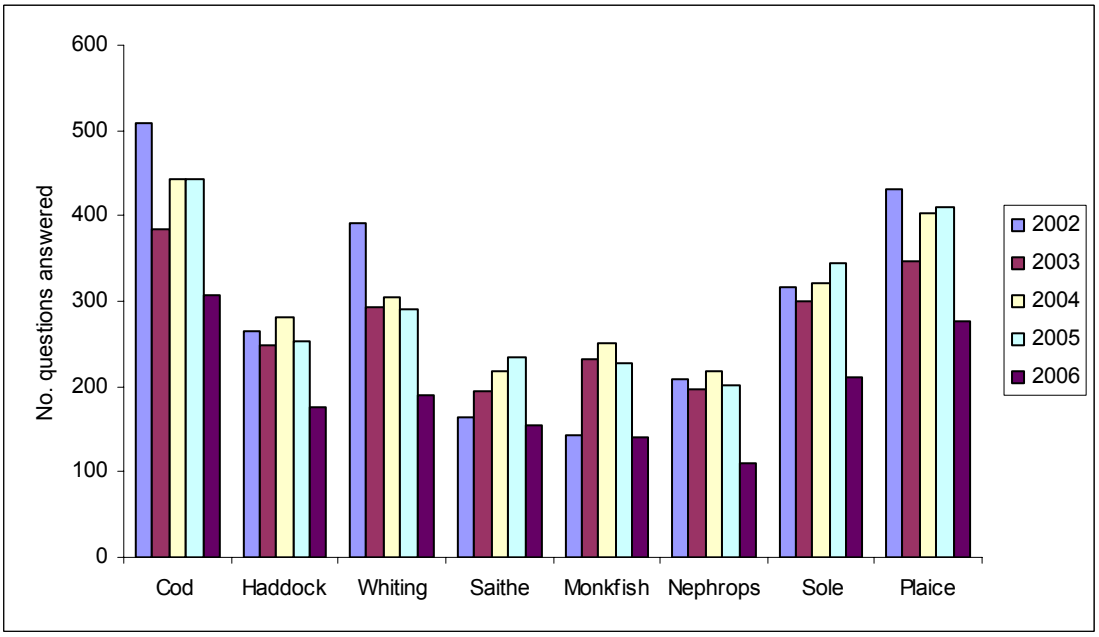


Figure 3 Numbers of respondents in the stock survey 2002 – 2006 for each species.

The North Sea fisheries are very complex. Complexities arise from the fact that any given species can be targeted by many different sizes of vessel and types of fishing gears. There are also spatial differences between fisheries. The survey responses have been collated according to: area fished; main gear type; and vessel size. The histograms are presented in Appendix 1.

Table 1 Summary of the vessel size, main fishing method and number of respondents from each of the countries participating in the 2006 survey.

	Belgium	Denmark	England	Netherlands	Scotland	
Vessel Size						Totals
<15m	0	65	5	3	4	77
15-24m	2	31	9	15	32	89
>24m	3	9	5	43	17	77
Totals	5	105	19	61	53	
Main fishing method						Totals
Trawl	0	21	7	7	27	62
Nephrops trawl	0	9	7	5	15	36
Beam Trawl	5	2	3	46	0	56
Gillnet	0	58	0	1	0	59
Seine	0	13	0	1	9	23
Other	0	2	0	1	2	5
Totals	5	105	17[†]	61	53	

[†] Two respondents did not give details of their fishing method.

COMMENTS ON THE FORM AND QUALITY OF THE DATA

The data are a representation of the views of fishermen on the state of the stocks. It should be emphasised that no explanation of these changes has been attempted. It therefore should be borne in mind that any changes in perception of abundance, discards etc, could be due to either actual changes in the stocks or in management practices.

The results of the survey are neither qualitative nor absolute but the value of the data increases as the time series grows. A time series of abundance data was developed by CEFAS, whereby responses were assigned a score of (-1, -0.5, 0, 0.5, 1) for the categories “much less”, “less”, “same”, “more” and “much more” respectively. A weighted score for each area and species was calculated (∑(score*percentage)), thus giving an index of change for each year of ±100. The year 2001 was assigned a value of zero and the time series were generated by cumulatively summing the indices for each area over the years. These figures have been updated for 2006 and are included in Appendix 1. There are however disadvantages to this approach; although it is known that the data are not quantitative the temptation to assign a meaning to the slope of the lines that join the points is great.

Ideally the data should be analysed using methods that are specifically designed for subjective data. In the 2005 analysis the 2005 abundance responses were compared to those in the 2004 data using chi-squared tests. This has been repeated, comparing the 2006 data with the 2005 data set. In the 2006 data set there were much higher incidences of zero in both the “much less” and “much more” categories, and the proportion of respondents selecting the “same” category was higher in the 2006 data set. Due to these factors and to avoid the generation of expected values of zero and to avoid more than 20% of expected values being less than 5, the “much less” and “less” categories and the “more” and “much more” categories were pooled for all of the chi-squared tests. Descriptions of these tests on the abundance data

are included in the area synopses and the results of the statistical tests are presented in Table 9.

PERCEPTIONS ON ECONOMIC CIRCUMSTANCES

No information on the perceptions on economic circumstances was provided in the 2005 report, therefore no comparison on any changes in perceptions can be made.

In relation to the difficulties on obtaining or retaining crew, the modal response, when grouped by vessel size, was “same” in each group. However the proportion of respondents reporting that it was “more” or “much more” difficult to obtain crew increased from 29% to 40% and 45% in each of the vessel size categories, <15m, 15-24m and >24m respectively. When grouped by fishing area, the modal response in each area was “same”, although the responses for area 4 were bimodal at “same” and “much more”. By fishing gear the modal response for each category was also “same” although the distribution of responses was skewed towards “more” and “much more” in the beam trawl, *Nephrops* trawl and trawl groups. When responses were grouped by species caught the modal response was “same”, but with a skew towards an increase in difficulty in each group.

The perceptions on operating costs were almost evenly split between the “more” and “much more” options in each of the 15-24m and >24m size groups. There was a weak modal response at “more” in the <15m group. When the responses were grouped by area fished there are strong responses in the “more” and/or “much more” categories in all except area 9 where the modal response is “same”. Less than 2% of respondents in each of areas 1 – 4 perceived that the operating costs had decreased while between 12% and 13% of respondents in areas 5, 6b, 8 and 9 thought that their costs had decreased. When grouped by gear differences emerge. There is a strong modal response at “more” from the seine group. There is an almost even split in responses between “same” and “more” in the gill net group and between “more” and “much more” in the beam trawl group. Both the *Nephrops* trawl and trawl groups had modal responses of “much more” for their operating costs. When the data were grouped by species the modal responses were either in the “more” or “much more” categories.

In response to the question on profits the respondents in the <15m vessel group showed a modal response at “same”, those in the 15-24m group were split between “same” and “less” and those in the >24m group were split between “less”, “same” and “more”. By area, the highest proportions responding that there was “much less” profit were in areas 1 – 4 (23 – 36%). For areas 1 – 4 the percentages reporting “much less” and “less” combined was from 50 - 61%. Areas 5 – 9 showed weak modal responses at “same” but with the distributions of responses skewed towards a decrease in profit. When grouped by fishing gear there were modal responses of “less” profit from the *Nephrops* trawl and trawl groups and modal responses of “same” in the other groups. When grouped by species caught the distributions of responses appear similar between groups with weak modal responses at either “less” or “same”.

The question on how optimistic they are for the future gave a weakly bimodal response at “much less” and “more” in the 15m vessel group, an almost even split at “less” and “same” in the 15-24m group and a weak modal response at “less” in the >24m group. By area there were modal responses at “less” for areas 4, 5, 6a and 7, at “same” for areas 1 and 3, and at more in area 9. The responses in the remaining areas were bimodal. When grouped by gear type responses were fairly evenly distributed between “much less”, “less”, “same” and “more” in the gill net, *Nephrops* trawl and trawl groups, the seine group had a split at “less” and “same” and the beam trawl had a weal modal response indicating less optimism. When grouped by species targeted 76% – 83% of respondents were fairly evenly split between the “less”, “same” and “more” options.

COD

As has been the pattern of responses in previous years, the highest numbers were in relation to cod. The number of responses was however lower that in 2005 at 306. There were responses for all areas, with the most responses referring to areas 1, 6b, 7 and 8 with 48 – 49 responses each. As in 2005, the least number of responses was for area 5 (n = 8).

Responses were fairly evenly split between vessel size with 29%, 35% and 36% for the <15m, 15–24m and >24m groups respectively. This is in contrast to the 2005 survey when responses from the 15-24m class dominated. In this survey 82% of the cod responses from <15m vessels referred to areas 7, 8 and 9. There were no responses for areas 1, 5 or 6a from this vessel size. For the 15-24m vessels, 24% of responses were for area 1 and none were from area 5. For the >24m vessels 32% of responses were for area 6b, 22% for area 1 and none for area 9.

The responses for cod by gear type has altered since 2005, trawling remains the modal method (28% of responses) but the proportion of respondents from gill netters has increased and proportion from *Nephrops* trawlers has decreased.

The highest number of respondents using trawl were in the 15-24m category with most responses being for area 1. Most of the *Nephrops* trawler respondents were in the 15-24m category and fishing in areas 1 and 3. The majority beam trawler respondents were in the >24m group and fishing in area 6b. Most gill netter respondents were in the <15m groups and fishing in areas 7 and 8 and the highest numbers of responses from seine netters was in the 15-24m category and referred to area 1.

Abundance

Results of the chi-squared tests indicate that perceptions in areas 2, 4, 5, 6b, 7 and 8 were significantly different in 2006 compared to 2005. The opinions on cod abundance during the reference period (January to June) were generally more positive than those reported in the 2005 analysis. Only one respondent indicated that there were “much less” cod and this was in area 6b. In contrast there were responses indicating “much less” cod in all areas except area 9 in the 2005 analysis.

Perceptions in areas 7, 8 and 9 continue to indicate that the cod abundance is increasing, with strong modal responses of “more” cod and no respondents believed that there were “less” cod in area 8. In areas 1, 3 and 4 there are weak modes at “same” and a slight skewing of responses towards “more” or “much more”. Areas 2 and 6a also had modal views of “same” abundance but the distributions of responses were skewed towards “less” cod. Area 5 showed a strong modal view of “more” cod, however the number of responses was low (*n* = 8). Area 6b showed a weak mode at “same” and an even distribution of views between “less” and “more”.

Of the respondents from vessels <15m 60% believe there are “more” cod, this is similar to the proportion of responses in 2005, however the proportion indicating that there are “much more” cod is less than in 2005. The modal

response from respondents in the 15-24m group was that cod abundance was the “same” (45%) and the distribution of responses was more positive than in 2005. The modal response from the >24m category has shifted from “same” to “more” since 2005.

By fishing gear type all respondents except the trawl group give more positive views of cod abundance than in 2005. In the trawl group the modal view has shifted from “more” to “same” since 2005. In the *Nephrops* group the modal view was also “same” but there were responses indicating increasing abundances, unlike in the 2005 analysis. The beam trawl, gill net and seine groups all had modal of “more” during this reference period.

Size Range

As in 2005 the modal response in all areas was for “all sizes” of cod being caught. Modes were much stronger during this reference period than in 2005. The highest proportion of “mostly small” cod that was reported, by 30% of respondents, was in area 2. Strong modal responses of “all sizes” were also observed by vessel size and gear type. Within the vessel size categories, the highest proportion reporting “mostly small” cod was the 15-24m group (23% of respondents), while the highest proportion reporting “mostly large” cod was the >24m group (14%). The gear type in which the highest proportion of “mostly small” cod was reported was the *Nephrops* trawl (24% of respondents); the lowest proportion of “mostly small” cod responses came from the seine group (11%) and this group gave the highest proportion of “mostly large” responses.

Discards

The modal response for discarding in all areas except area 8 was for discarding to have remained the same. In area 8 there was a weak mode at “more”. The modal response of “same” in areas 1 – 7 and 9 was from 44 – 77% of respondents. The responses for areas 1, 2 and 6b were very similar to those shown in the 2005 analysis. In areas 3 and 6a the mode at “same” was weaker and the data was more skewed towards a decrease in discarding, compared to 2005. In contrast to the 2005 analysis some respondents did report “more” cod discarding in areas 4 and 5 during the current reference period. In areas 7, 8 and 9 the responses for “same” had strengthened and the responses for increased discarding had weakened.

By both vessel size and gear type, each grouping also showed modal responses indicating no change in discarding. Patterns of responses were generally similar to those in 2005. The <15m group indicated some skewing towards an increase in cod discarding while the >24m group showed slight skewing towards a decrease in cod discards. The responses from *Nephrops* trawlers differed in that 22% reported an increase in discards but there were no reports of increased discards in the 2005 analysis.

Recruits

Between 13 and 44% of respondents for each area reported “don’t know” for recruitment. Excluding the “don’t know” responses the modal responses from all areas except area 8 was “moderate” and the response from area 8 was “high”. In all areas except 6b there were lower proportions of respondents

indicating “low” recruitment in this reference period compared to the 2005 analysis.

By vessel size there is strengthening of the modes for “moderate” recruitment in the 15-24m and >24m groups compared to the 2005 analysis. In the <15m group 34% and 36% responded “moderate” and “high” recruitment respectively. This is a lower perception of recruitment than in the 2005 analysis when there was a stronger modal response for “high” recruitment.

By gear type the modal response for each group was “moderate” (35 – 58%), except the gill net group where the modal response was “high” (42%). Overall the perception appears to be more positive than in the 2005 analysis as proportions reporting “low” cod recruitment have declined in the current reference period.

Table 2 Summary of the numbers of responses for cod.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	0	9	21	16	3	7	34	8	4	4	31	7	3	2	24	8	12	49
2	0	4	6	2	0	3	6	1	1	2	7	2	0	1	5	1	4	12
3	0	5	12	6	2	4	16	1	4	4	14	3	0	3	7	4	11	25
4	0	3	9	4	2	3	11	1	1	4	8	5	0	0	7	6	4	18
5	0	0	2	6	0	1	7	0	0	2	5	1	0	3	4	0	1	8
6a	0	5	11	3	0	0	14	2	2	4	11	0	0	3	7	0	7	19
6b	1	14	19	14	1	11	34	3	3	9	33	4	0	12	20	3	15	49
7	0	6	12	26	4	5	26	3	2	8	26	8	3	2	16	9	10	48
8	0	0	9	26	13	3	38	5	2	2	17	18	9	1	13	20	9	48
9	0	2	2	17	3	4	15	4	1	1	13	7	2	1	9	8	3	24

HADDOCK

There were 174 responses for haddock in 2006. This is lower than in previous years when responses have been between 241 and 281. There were no responses from area 5 and only 5, 7 and 6 responses from areas 6a, 6b ad 9 respectively, so any commentaries should be treated with caution due to the small sample sizes in these areas. The majority of the respondents reported on area 1 (27%) and 12 – 16% reported from each of areas 3, 4 and 8.

Almost half of respondents (49%) operated in vessels 15-24m in length, 35% were in vessels >24m and the remaining 16% in vessels <15m in length. Responses from the smaller vessels were fairly evenly distributed between areas 4, 7, 8 and 9. Responses from the 15-24m group were mainly for areas 1 (31%) and 3 (24%); and responses from the >24m group were mainly for area 1 (37%).

Abundance

Chi-squared tests revealed that only in areas 3, 7 and 8 had the perceptions on haddock abundance changed in relation to its decline, increase or staying the same. Area 1, where the number of responses was the highest, showed almost equal proportions of responses for “less”, “same” or “more” haddock at 27%, 31% and 31% respectively. Areas 2 and 4 showed weak modal responses of “less” haddock. Responses in 2005 also indicated a decrease in haddock in area 4. The response for area 3 is bimodal with modes at “less” and “more”. Areas 7 and 8 show modal responses of “same” but area 7 shows some skewing towards less haddock. Areas 6a, 6b and 9 showed strong modes at “same”.

Modal responses of “same” were also seen when the data was grouped by both vessel size and gear type. The groupings by vessel size produced a strong “same” mode in the <15m group. In the other size groups the modes were weaker. The data for each group showed a skew towards lower abundance. By gear type the modes were generally weak and the data skewed towards lower abundances except in the trawl group where the data was skewed towards higher abundances.

In comparison to the 2005 analysis the perceptions, when grouped by vessel size, indicate that the <15m group are more negative, the 15-24m group show similar proportions in each abundance category and the >24m group have a higher proportion with a positive view. When grouped by gear type perceptions are generally more negative, except in the trawl group which represent 38% of responses.

Size Range

Modal responses of “all sizes” of haddock being caught occurred in all areas except 6b and 9, but these areas had a low number of respondents so should be treated with caution. Respondents indicating “mostly large” were fishing in areas 1, 2, 7 and 8.

Modes of “all sizes” also occurred when data were grouped by vessel size. In the <15m group no respondents reported “mostly large” haddock. The

proportion reporting “mostly large” increased from 8% to 13% from the 15-24m group to the >24m group. In comparison to the 2005 analysis, the perceptions of the <15m group have altered from mainly “mostly small” haddock to “all sizes”; the perceptions of the 15-24m group are unchanged and a higher proportion of the >24m group report “all sizes” of haddock than in 2005.

When data was grouped by gear type the numbers in the gill net and beam trawl categories were low so no emphasis should be put on results from those gears. Strong modes occurred in the “all sizes” category (except in the gill net group) and higher proportions reported “mostly small” than “mostly large” for each gear type. Since the 2005 analysis, the perceptions when grouped by gear type are broadly similar in the current reference period. For the trawl and beam trawl groups the modes at “all sizes” are stronger.

Discards

Overall the perception is that discard levels for haddock have remained the same or have decreased throughout the North Sea. Areas 1, 2, 3, 4, 7 and 8 show some skewing towards a decrease in discard levels. The patterns of responses in the current survey are similar to those reported in the 2005 analysis. When grouped by vessel size more than 50% of respondents in each size category reported that discarding had remained the same. Approximately one third of respondents in each size category reported a decrease in discards and no respondents in the >24m group reported an increase in discarding. By gear type the majority reported discarding either to be the same or to have decreased. The *Nephrops* trawl group had the highest proportion of respondents reporting an increase in discarding (18%).

Recruits

Proportions of respondents reporting “don’t know” in relation to recruitment has increased in all areas since 2005. However, in areas 1 – 4, 7 and 8 the perception of recruitment is more positive than in 2005. The proportions of respondents reporting “high” haddock recruitment have increased and the proportions reporting “low” recruitment have decreased. The general perceptions of the groups with small or intermediate sized vessels are more positive than in 2005 and there is little change in the perceptions of those with large vessels. When grouped by gear type, the perceptions also appear more positive than in 2005, and although the proportions responding with “don’t know” have increased, there were higher proportions indicating that recruitment had increased and lower proportions have indicated a decrease in recruitment.

Table 3 Summary of the numbers of responses for haddock.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	2	13	15	15	3	10	32	5	3	14	27	2	0	2	20	7	16	48
2	2	6	4	3	0	5	7	1	1	3	8	2	0	1	4	4	4	15
3	0	12	5	10	1	12	15	0	3	8	11	4	1	1	11	6	10	28
4	7	9	5	1	0	7	15	0	7	5	7	1	2	7	7	3	5	22
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6a	0	0	5	0	0	1	2	0	0	0	5	0	0	0	2	0	2	5
6b	1	0	6	0	0	3	2	0	0	1	5	1	0	1	2	0	4	7
7	2	5	8	2	0	2	6	2	0	4	12	0	0	1	5	0	7	17
8	1	4	13	5	0	0	11	3	1	3	18	0	0	0	9	2	6	23
9	0	0	5	1	0	2	0	0	0	0	6	0	0	1	0	0	4	6

WHITING

There were 189 responses on whiting, a decrease of around 100 on previous years. Data were obtained on each area, although only 5 responses were obtained for area 9. The greatest number of responses was for area 1 (43). As in 2005, responses were dominated by fishermen operating intermediate and large sized vessels with only 13% of responses coming from the <15m group. Of the smaller vessels, *Nephrops* trawlermen provided the highest proportion of responses; for intermediate sized vessels the most responses came from trawlermen and for the largest vessels fishermen using beam trawl dominated the responses. By area, 23% of responses were for area 1, 21% for area 6b and 14% for area 3. For area 1 the highest proportion of respondents were in the 15-24m vessel group and of these the highest proportions were either using trawl or *Nephrops* trawl. Area 6b was dominated by respondents in the >24m vessel group and the majority of those were using beam trawl. Only 0.5% and 6% of those who provided information for whiting were gill or seine netters, respectively.

Abundance

Results of the chi-squared tests indicated that the perceptions of abundance were significantly different in 2006 in areas 1, 2, 5, 6a, 6b, 8 and 9. The modal response in areas 1, 2, and 3 is “more”. In area 4 the perception is bimodal with 40% responding that there are “less” whiting but 30% responding that there are “much more” whiting in the current reference period. In area 5, 80% reported that the abundance had either stayed the same or had increased. Area 6a was the only area with a modal response indicating “less” whiting however there were only 11 respondents for that area. Areas 6b, 7, 8 and 9 all showed modal responses indicating that the abundance of whiting had not changed since the 2005 analysis.

The modal view of fishermen of both small and intermediate sized vessel was that whiting abundance had remained the same, but in both cases distributions were skewed towards an increase in abundance. The distribution of views from fishermen from large vessels was bimodal at “less” and “more”, each option with 33% of the responses. Of the main fishing methods, where data was provided on whiting, the *Nephrops* and Beam trawler groups had weak modal views indicating no change in abundance. A weak mode indicating “more” whiting was observed in data from the otter trawl group.

Size Range

The proportions reporting “mostly small” whiting have decreased in all areas since the 2005 analysis. All areas except areas 3 and 9 showed strong modal responses for “all sizes” of whiting being caught. It should be noted that the sample sizes in each of areas 2, 5, 7, 8 and 9 was less than 10 respondents. Very few respondents indicated that whiting were “mostly large”; the highest proportion reporting “mostly large” whiting was in area 1 (10%). The highest proportion reporting “mostly small” whiting was in area 3 (38%).

By vessel size, the majority in each group reported that “all sizes” were caught. The <15m group were the only group where no reports of “mostly

large" were obtained. By gear type perceptions have also changed since 2005 with strong modes being found at "all sizes" and the proportion reporting "mostly small" greatly decreasing.

Discards

Modes indicating that there has been no change in the discard level are present in each area. Distributions in areas 2, 3, and 4 show higher proportions of fishermen reporting a decrease in whiting discards in this reference period, compared to the 2005 analysis. The distributions of perceptions are very similar to those observed in the 2005 analysis for areas 1, 6a, 6b and 7. Strong modes indicating that discards had not changed were found when data was grouped by vessel size. For each gear type modal values of "same" are also obtained. The groups of fishermen using *Nephrops* trawl had the highest proportion of respondents reporting a decrease in discarding (35%).

Recruits

The proportion of respondents choosing the "don't know" option in relation to the level of recruitment was about the same as in the previous survey for areas 1 – 5. The proportion choosing "don't know" had increased in the other areas. Of the respondents that did give an opinion on recruitment, and in the areas with the highest numbers of respondents (areas 1, 3 and 6b) there were strong modes indicating moderate recruitment. In general, the patterns of responses by area are more positive for whiting recruitment in the current reference period compared to the 2005 analysis. By vessel size, the modal view of each group is that whiting recruitment was "moderate". Compared to the 2005 analysis the proportions reporting "low" recruitment have decreased. When the data are grouped by gear type the response by trawl fishermen is bimodal at "moderate" and "don't know", the proportion reporting "low recruitment has decreased compared to the 2005 analysis. The other main gear types (*Nephrops* and beam trawl), from which opinions on whiting recruitment were obtained, show an increase in the perception of "moderate" recruitment compared to 2005.

Table 4 Summary of the numbers of responses for whiting.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	0	7	14	21	1	9	29	4	3	5	33	1	0	5	16	4	17	43
2	0	1	2	3	1	5	1	0	1	2	3	0	0	0	2	2	2	7
3	0	5	6	13	2	9	13	2	4	5	16	1	0	3	13	2	7	26
4	0	8	4	2	6	1	17	2	2	6	7	4	1	4	7	7	2	20
5	0	2	4	4	0	2	6	0	1	0	6	2	0	1	7	1	0	10
6a	1	4	3	3	0	3	7	0	1	3	5	2	0	2	4	0	4	11
6b	2	12	14	10	2	11	27	1	4	6	25	5	0	5	23	4	8	40
7	0	4	6	2	0	0	7	0	2	1	7	1	0	2	2	0	5	12
8	0	1	11	1	0	0	8	0	0	0	13	0	0	0	4	0	4	13
9	0	0	4	1	0	2	1	0	0	0	5	1	0	0	1	0	3	5

SAITHE

There were 153 responses given for saithe, 81 less than in 2005. No responses were obtained from area 5 and less than 10 responses were obtained in areas 6a, 6b and 9. As in 2005, most responses were obtained for areas 1 (30%) and 8 (15%). Responses from intermediate sized vessels were most prevalent (48%), with 21% and 32% from small and large vessel groups respectively. Gill net and *Nephrops* trawl fishermen dominated the responses from small vessels; trawl and *Nephrops* trawl fishermen were most prevalent in the intermediate group and trawl fishermen dominated the >24m group. Most responses from the <15m group were for area 8 and for the other two groups the majority of responses were for area 1.

Abundance

The results of the chi-squared tests indicated that only in areas 2 and 8, had the perceptions of abundance of saithe changed in terms of a decrease, no change or an increase. In areas 1, 2, 3, 7 and 9 there were weak modes indicating either no change or an increase in abundance. As in 2005 there was a strong mode indicating no change in abundance in saithe in area 4. Although modes of "same" were observed for areas 6a, 6b and 9 the sample size was small.

When data are grouped by vessel size strong modes at "same" (42 – 55%) are observed for each size group. Similar modes were observed in the 2005 analysis. With increasing vessel size the proportions reporting higher abundance increases. Modes of "same" are seen in each group when the data are grouped by gear type. Responses from the trawl and *Nephrops* trawl groups are strongly skewed towards an increase in abundance while responses from gill and seine net fishermen show little skewing. The sample size obtained from beam trawlers was to low to draw a valid comparison (n = 5). In comparison to the 2005 analysis the perceptions of the trawl and *Nephrops* trawl groups are more positive for the current reference period.

Size Range

For all areas (except 6a where the sample size was low) there were strong modes indicating that "all sizes" of saithe were being caught in the fishery. The proportions reporting "mostly small" saithe had decreased markedly since the 2005 analysis and in area 8, 29% of respondents reported that saithe were "mostly large".

Strong modes (69 – 79%) are also observed for "all sizes" of saithe when data are grouped by vessel size. This is a marked change in perception from fishermen from the <15m and 15-24m vessel groups, as in the 2005 analysis approximately 65% and 45% respectively, had reported that saithe were "mostly small".

When data are grouped by gear type strong modes at "all sizes" (68 – 89%) are also observed. This also a marked change in perception from "mostly small" to "all sizes" particularly for the *Nephrops* trawl and gill net groups.

Discards

Modes indicating that there has been no change in the level of discards were found in the data for each area. Responses from areas 1, 3, 7 and 8, in which the highest numbers of responses were obtained, each had from 53 – 87% of respondents indicating that the discard levels had not altered. The patterns of responses were generally very similar to those obtained during the 2005 analysis.

Strong modes indicating no change in discards were also obtained when data were grouped by either vessel size or gear type. By vessel size the pattern obtained in the current analysis was similar to that observed in the previous period for both the intermediate and large vessel groups; for small vessels, the perception that discarding has remained the same has strengthened. Grouping by gear type produced similar patterns of responses in the current reference period compared to the 2005 analysis.

Recruits

Only areas 1, 3, 7 and 8 are commented on as the numbers of responses were above 10 in each area. Of those who expressed an opinion on recruitment, the overall perception was that it was moderate or high in these areas. Up to half the fishermen in each of these areas indicated that they did not know what the recruitment of saithe was like. In all of the areas the proportions reporting that saithe recruitment was “low” have decreased substantially since the 2005 analysis.

When grouped by vessel size, data from the <15m and 15-24m groups were bimodal at “moderate” recruitment and “don’t know”. The >24m group showed a weak mode indicating that recruitment had been “high”. The <15m group differs markedly from the opinions expressed in the 2005 analysis, where approximately 50% of respondents had perceived recruitment to have been “low”. When data were grouped by gear type, the opinions of the trawl group were almost evenly split between “moderate”, “high” and “don’t know”. Of the *Nephrops* trawl group 50% reported that they didn’t know and one fifth each reported “moderate” and “high” recruitment. The numbers of respondents in the other gear types were relatively low, but opinions were mainly either that recruitment had been “moderate” or that they didn’t know. In comparison to the 2005 analysis the opinions of the main groups (otter and *Nephrops* trawlermen) were more positive, with lower proportions reporting “low” recruitment.

Table 5 Summary of the numbers of responses for saithe.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	2	4	16	18	6	10	34	1	3	6	24	10	2	2	15	12	13	46
2	1	1	4	4	1	2	7	0	0	2	8	0	1	0	3	2	4	11
3	2	2	10	6	1	4	15	0	3	3	11	2	1	3	3	6	8	21
4	0	1	12	0	0	1	6	0	0	2	7	0	0	4	1	0	4	13
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6a	0	0	3	0	0	1	1	0	0	0	2	1	0	0	0	0	2	3
6b	1	0	5	0	0	1	3	0	1	0	5	0	0	1	1	0	3	6
7	0	3	8	7	4	3	12	2	1	2	16	2	1	1	4	3	8	22
8	0	1	9	8	5	1	11	5	0	0	19	3	0	0	10	4	1	23
9	1	1	3	2	0	0	4	0	2	1	3	1	0	0	1	1	2	7

MONKFISH

There were 140 respondents who provided data on monkfish. This is approximately 100 fewer responses than in previous surveys. Responses were received on all areas although no comment is given on the responses given in areas 5, 6a and 9 as the numbers of respondents were 1, 4 and 3 respectively and this is considered too low for any valid conclusions to be drawn.

The most responses were for area 1 (32%). Of these 50% of respondents were fishermen in the 15-24m group, 32% were in the >24m group and the remaining 18% were in the <15m group. Trawlermen accounted for 40% of respondents and the majority of their responses were for area 1. A further 33% were *Nephrops* trawlermen and responses were mainly for areas 1 and 3. Trawl fishermen dominated the two larger vessel size groups, particularly the >24m group. The dominant gear types of the <15m group who responded for monkfish were *Nephrops* trawl and gill net.

Abundance

The results of the chi-squared tests (using decrease, same and increase groupings) to compare monkfish abundance perceptions in 2006 with those in 2005 indicate that perceptions are significantly different in areas 2, 6a, 7 and 8. The modal response in all areas was that abundance had remained the same since the previous reference period; this response was particularly strong in areas 4, 6b and 8. Distributions of responses were skewed towards a perceived increase in abundance in areas 1, 2, 3, 7 and 8.

When data are grouped by vessel size strong modes indicating no change in abundance are evident in each group (53 – 87%) although there is still some skewing of responses towards an increase in abundance. The proportions responding with “same” are much higher in the current data than were seen in the 2005 analysis. When grouped by fishing gear type strong modes are present at “same” in all except the seine group, however the sample size for this group is small (n = 9) and too much emphasis should not be put on this particular result. The proportions reporting “same” have increased substantially in the main gear type groups (otter and *Nephrops* trawl) since the 2005 analysis.

Size Range

More than 70% of respondents indicated that all sizes of monkfish were present in their catches in areas 1 – 4 and 6b – 8. Patterns of the distributions of responses are similar to that reported in the 2005 analysis except in areas 6b and 8 where the proportions reporting “mostly small” monkfish have decreased. There were no reports of monkfish catches comprising “mostly large” fish in the current survey.

By vessel size, 79 – 93% of respondents in each group reported that “all sizes” of monkfish are caught. In the <15m and 15-24m groups this represented an increase in the “all sizes” response and a decrease in the “mostly small” response. When responses are grouped by gear type the pattern of strong responses in the “all sizes” option is also evident and the

proportions reporting “mostly small” monkfish have generally decreased since the 2005 analysis.

Discards

The majority of respondents in each area reported that the level of discards had not changed. The proportions reporting no change has increased since the 2005 analysis. When grouped by either vessel size or gear type, the majority response was also that there had been no change in the level of discards.

Recruits

The proportions of respondents choosing the “don’t know” option in relation to monkfish recruitment was generally higher in all areas of the North Sea than had been observed in the 2005 analysis. Of the respondents who provided an opinion on recruitment, the modal response was for moderate recruitment, except in area 4 where there was a split between moderate and low and in 6b where the perception tended towards a low recruitment.

Although 41 – 43% of respondents in each vessel size group did not give an opinion on recruitment, the dominant response of those who did express an opinion was that recruitment had been “moderate” although there was some skewing towards “low”. The perceptions in this survey are a much more positive than those presented in the 2005 analysis. Similarly, when data are grouped by gear type, the proportions responding that recruitment was “low” were lower than that reported in the 2005 analysis.

Table 6 Summary of the numbers of responses for monkfish.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	0	6	21	10	8	1	44	0	1	5	37	0	1	4	14	4	21	45
2	0	3	3	3	1	1	9	0	1	0	8	0	0	1	5	1	2	10
3	0	4	9	6	2	2	18	0	2	3	13	2	0	1	8	2	8	21
4	0	5	14	0	0	3	15	0	2	3	13	0	0	8	8	0	2	19
5	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	1
6a	0	1	3	0	0	2	2	0	0	2	2	0	0	0	1	0	3	4
6b	0	1	6	1	0	2	5	0	0	2	5	1	0	2	1	1	4	8
7	0	0	7	5	2	0	10	0	1	1	10	0	1	0	3	2	5	14
8	0	0	11	2	1	1	9	0	0	0	12	0	0	0	5	1	0	14
9	0	0	3	0	0	1	1	0	0	0	3	0	0	0	0	0	1	3

NEPHROPS

A total of 109 respondents provided information on *Nephrops*. This is around 100 fewer than in previous surveys. Data was provided for each area but the numbers of responses in each of areas 2, 5, 7, 6b and 9 were less than 10 so interpretation is omitted from the following synopsis.

The majority of respondents were in the intermediate vessel size group (52%); 53% and 40% of these were fishing with *Nephrops* trawls and otter trawls respectively. The >24m vessel group provided 29% of the responses for *Nephrops* and responses were almost evenly split between otter, *Nephrops* and beam trawlers. The remaining 19% of responses were obtained from the <15m group and 50% of these were provided by fishermen primarily using *Nephrops* trawl.

Abundance

The results of the chi-squared tests (using decrease, same and increase groupings) to compare *Nephrops* abundance perceptions in 2006 with those in 2005 indicate that perceptions are significantly different in areas 2, 6a and 6b. The modal responses from areas 1, 3, 6 and 8 were that the abundance of *Nephrops* had remained the same, modes were not however particularly strong. In area 4 although there was a modal response indicating “less”, 35% of the respondents indicated that the abundance had increased. In area 6a the modal opinion (45%) was that the abundance had increased.

By vessel size the modal responses in both the <15m and >24m groups were that the abundance of *Nephrops* had increased. In the 15-24m group the modal response was that abundance had not changed. When data were grouped by fishing gear type, the distribution of the opinions of fishermen using the main gears (otter and *Nephrops* trawls) were weakly modal at “same” and the data from those using otter trawls was slightly skewed towards an increase in abundance. The perceptions are more positive than those observed in the 2005 analysis, particularly for the otter trawl group.

Size Range

In areas where data were interpreted there were strong modal responses indicating that “all sizes” of *Nephrops* were caught. The highest proportion of respondents reporting catches of “mostly large” *Nephrops* was in area 1. The proportions reporting “all sizes” were higher in this analysis than observed in 2005.

When data were grouped by vessel size, although there was a strong modal response at “all sizes” in each group, the strength of the response decreased with increasing vessel size. Compared to the 2005 analysis the proportions of respondents indicating that *Nephrops* catches were of “mostly small” had decreased. Strong responses at “all sizes” were also observed in the main gear type groups. The highest proportion of respondents reporting “mostly small” *Nephrops* was in the trawl group (20%) and the highest proportion reporting “mostly large” *Nephrops* was in the *Nephrops* trawl group (14%).

Discards

Except in area 4, strong modes were found indicating that the discard level for *Nephrops* had not changed, distributions of responses tended to be skewed towards a decrease in most areas and the modal response in area 4 was that discarding had decreased. Responses were generally similar to those observed in the 2005 analysis.

By vessel size 50 – 72% of each group reported that discarding had not changed. In the >24m group 40% of respondents reported that discarding had decreased. The proportions reporting that discarding had not changed were higher than in the 2005 analysis. Modal responses of no change in discard levels were also observed when data were grouped by gear type. Responses from both otter and *Nephrops* trawl fishermen, the main types for the fishery, were slightly skewed towards a decrease in discarding. These responses were similar to those observed in the 2005 analysis.

Recruits

The only area where recruitment was reported to be "low" was area 4. In the other areas where data is interpreted (1, 3, 6a & 8) and where opinions were given, there was generally a fairly even split between "moderate" and "high" recruitment. Proportions of respondents choosing the "don't know" option varied by area but were as high as 61% in area 1. The overall perception of recruitment can be interpreted to be more positive in this survey compared to the 2005 analysis. Although the proportions in the "don't know" category are higher in this analysis, the "low" option was only chosen in one area in this survey, compared to it being the modal choice in some areas in 2005.

The proportion of fishermen who didn't offer an opinion on *Nephrops* recruitment increased with increasing vessel size, but of the respondents who gave an opinion, the vast majority thought that recruitment had been "moderate" or "high"; the modal view in each group was that recruitment had been "moderate". For the two main gear types (otter and *Nephrops* trawl) a similar pattern is evident in the data. As in the area data, the perceptions appear to be more positive by both vessel size and gear fished groupings, with a marked decrease in the proportion reporting a "low" recruitment although the proportions choosing the "don't know" option have increased.

Table 7 Summary of the numbers of responses for *Nephrops*.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	0	5	7	4	1	1	11	5	4	1	12	0	0	0	3	4	11	17
2	0	1	1	2	1	0	5	0	2	1	2	0	0	0	1	3	1	5
3	0	6	8	2	2	2	14	1	1	3	13	1	0	0	5	4	9	18
4	1	7	3	4	2	1	15	0	0	9	7	1	0	6	7	2	2	17
5	0	0	2	0	0	1	1	0	0	0	1	1	0	0	0	1	1	2
6a	0	3	3	5	0	3	8	0	0	3	6	2	0	0	4	3	3	11
6b	0	1	6	2	0	2	6	1	0	1	8	0	0	0	7	1	1	9
7	0	1	4	3	1	1	3	3	1	1	7	0	0	0	2	1	4	9
8	0	2	6	3	2	2	8	2	0	1	10	2	0	0	4	3	4	13
9	0	0	1	5	0	0	4	2	0	0	4	2	0	0	0	3	2	6

SOLE

A total of 210 responses were collected for sole, this is 135 fewer than in 2005. Responses were received for each area although area 2 received only 3 responses and interpretation is therefore not included in this synopsis. As in 2005, considerably more data was provided for area 6b than any of the other areas (29% of responses). Responses were fairly evenly split between the vessel size groups at 36, 30 and 33% for the small, intermediate and large vessels respectively. As in 2005, the responses from the <15m group were dominated by those fishing with gill nets (71%), and in the >24m group 75% of respondents were using beam trawls. The intermediate group was more varied although 37% and 25% of respondents were fishing with otter and *Nephrops* trawls respectively. Only 4 respondents fishing with seine nets provided information on sole, so no interpretation of those views is included.

Abundance

The results of the chi-squared tests (using decrease, same and increase groupings) to compare Sole abundance perceptions in 2006 with those in 2005 indicate that perceptions are significantly different in all areas except areas 1, 3 and 4. The pattern of responses for abundance varied by area; areas in the north and west of the North Sea (areas 1, 3 and 4) showed strong modal responses for the "same" abundance while areas in the east and south-east (areas 6a, 6b and 7) showed strong responses indicating a decline in abundance. In the north-east (areas 8 and 9) there majority indicated either no change or an increase in abundance. In area 5 perceptions were fairly evenly split between "less", "same" and "more".

The modal responses from fishermen in the <15m and 15-24m groups perceived the abundance to have remained the same, although this was skewed towards an increase in the <15m group (46%) and slightly towards a decrease in the 15-24m group (30%). In the >24m group the modal response was that there were "less" sole (46%) although 40% believed the abundance had not changed. In the 2005 analysis the fishermen in the <15m group were also noted to have perceived an increase in sole abundance, but that response was much more pronounced than has been observed in the current survey. Higher proportions of fishermen from the 15-24m and >24m groups have reported "less" sole in this survey than in the previous survey. By gear type strong modal responses indicating no change in abundance were received from both otter and *Nephrops* trawlermen. The beam trawler respondents tended towards "less" sole; the responses from gill netters showed no clear pattern and only 4 respondents were in the seine net group so no emphasis is put on that result. The distributions of views between each of the gears are similar to those reported in 2005; the exception being the trawl group where there has been a decrease in the proportions reporting an increase in abundance.

Size Range

The majority view when data were grouped either by area; vessel size or gear type was that "all sizes" of sole were caught. In area 9, where abundance is also reported to be increasing, the highest proportion reporting "mostly large"

sole occurred. “Mostly large” sole were only reported in responses from areas 4, 5, 6b, 7 and 9. The highest proportion of respondents reporting “mostly small” sole was the 15-24m vessel size group. By gear, the gill net group had the highest proportion reporting “mostly large” sole (16%). Perceptions in relation to the size range of sole have not altered since the 2005 analysis.

Discards

The majority view in all areas except 5 and 6a is that discarding has remained the same. The proportions reporting the “same” level of discards are higher in the current survey than that observed in the 2005 analysis. The data for area 5 shows a weak mode at “less” discarding, and the data in area 6a is skewed towards a decrease in discarding. In the 2005 analysis the data in area 5 did not indicate a decrease in discarding. In contrast the 2005 analysis in area 6 showed a much stronger response for a decrease in discarding.

When data are grouped by either vessel size or by fishing gear the modal responses all indicate that discarding has remained the same and the proportions reporting “same” have generally increased since the 2005 analysis.

Recruits

Responses of “don’t know” were the modal option in a number of areas. Where an opinion on recruitment had been provided the modal response was that “moderate” recruitment had occurred, except in area 4 where opinions were skewed towards a “low” recruitment, and areas 8 and particularly 9 where the main response was that “high” recruitment had occurred. Compared to the 2005 analysis perceptions of recruitment in areas 4, 5 and 7 appear to be more negative, and in areas 8 and 9 opinions appear to be more positive in this survey.

The modal opinion of respondents in the <15m vessel group was that recruitment had been high but in the other two groups the dominant opinion was that recruitment had been “moderate”. Less than 15% of respondents in each group believed that recruitment had been “low”. Since the 2005 analysis there has been a decrease in the proportion reporting “low” recruitment in the <15m group. Patterns of perception in the other groups are fairly similar to those in the previous survey. By gear type opinions varied; responses by the trawl group were fairly evenly spread between options while the *Nephrops* trawl and gill net groups tended towards a “low” and “high” recruitment respectively. A strong response of “moderate” was given by the beam trawl group. In this survey a much higher proportion of the *Nephrops* trawl group reported “low” recruitment while a lower proportion of the gill net group reported “low” recruitment.

Table 8 Summary of the numbers of responses for sole.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	0	1	13	1	0	2	12	0	0	1	13	0	0	0	5	0	9	15
2	0	1	1	1	0	1	2	0	0	1	2	0	0	0	2	1	0	3
3	1	1	9	2	1	3	10	0	0	2	11	1	0	2	3	1	8	14
4	0	3	13	2	0	4	13	1	1	2	12	2	0	8	6	1	3	18
5	0	6	4	5	0	2	12	1	1	6	5	2	1	4	8	3	0	15
6a	0	7	1	1	0	1	8	0	2	3	4	0	0	1	6	0	2	9
6b	3	33	19	5	1	9	48	4	5	11	40	4	0	8	31	8	13	61
7	1	12	4	5	1	2	14	2	1	5	15	0	0	1	6	1	8	23
8	0	1	10	9	3	4	15	0	0	2	15	1	1	0	4	6	3	23
9	0	0	8	7	12	4	18	3	0	4	14	6	1	0	2	15	3	27

PLAICE

A total of 273 responses were obtained for plaice. This was however 173 fewer than in the 2005 survey. Responses were reasonably well distributed and covered all areas in the North Sea. The highest proportions of responses were for areas 6b and 7 (17% each). Responses were also fairly evenly distributed between vessel size groups, at 32, 36 and 32% for the small, intermediate and large groups respectively. The small vessel group was dominated by respondents fishing with gill nets (72%) and the large vessel group was dominated by respondents fishing with beam trawls (66%). Respondents in the 15-24m group had a wider distribution of fishing gears but the main gear for 36% of respondents was otter trawl. Amongst the <15m group 88% of responses were for areas 7, 8 and 9. There was a more even distribution of responses amongst the areas in the 15-24m group and in the >24m group 37% of responses were for area 6b.

Abundance

The results of the chi-squared tests (using decrease, same and increase groupings) to compare plaice abundance perceptions in 2006 with those in 2005 indicate that perceptions are significantly different in areas 6a, 6b and 8. Data for areas 1 and 3 have modal peaks indicating that the abundance of plaice had not changed. Areas 2, 6b and 7 showed a slight skewing towards an increase in abundance while the responses for an increase in abundance were strongest in areas 4, 6a, 8 and 9. Only in area 5 was there a substantial proportion of respondents (47%) who believed that plaice abundance had decreased. In this survey there are 7 areas where the “much less” option has not been selected, compared to 2 areas in 2005.

By vessel size the data provided by the <15m group shows a mode at “more”. In the other two groups the modes are at “same” but the distribution of the data is skewed towards an increase in abundance. These perceptions appear more positive than those in the 2005 analysis, particularly in the <15m and 15-24m vessel groups. When data are grouped by fishing gear type the otter and *Nephrops* trawl groups show a mode at “same” and a skew towards an increase in abundance. The distributions in the other gear type groups have modes at “more”. By each of the gear types the perceptions generally appear to be more positive than those in the 2005 analysis.

Size Range

Strong modes at “all sizes” are present when the data are grouped by, vessel size, by area (except area 4) and by gear type (except in the *Nephrops* trawl group where there is an almost even split between “all sizes” and “mostly small”). The proportion of respondents choosing the “all sizes” option is generally higher in each group and category than in the 2005 analysis.

Discards

The modal response for each area, by each vessel size and by each gear type is that discarding has not changed. The distribution of perceptions in each grouping appears similar to that observed in the 2005 analysis.

Recruits

Proportions of respondents choosing the “don’t know” option tended to be lower than for some of the other species, except in areas 1 and 3 where the proportions were >50%. Of those who did provide an opinion, the majority opinion in each area was that recruitment had been “moderate”. By vessel size and gear type the majority perception was also that recruitment had been “moderate”. The main difference between the responses in 2006 and those in 2005 is that there are less responses indicating “high” recruitment in 2006.

Table 9 Summary of the numbers of responses for plaice.

	Abundance					Size Range			Discards					Recruits				n
Area	Much Less	Less	Same	More	Much More	Mostly Small	All Sizes	Mostly Large	Much Less	Less	Same	More	Much More	Low	Moderate	High	Unknown	
1	0	2	21	3	0	4	21	0	0	1	23	1	0	3	8	0	13	26
2	0	3	4	5	2	3	9	2	0	1	13	0	0	0	8	0	1	14
3	0	3	13	3	1	6	11	0	0	2	16	2	0	4	5	0	10	20
4	0	0	7	10	2	10	9	0	0	3	8	6	2	1	16	0	2	19
5	1	6	6	2	0	2	13	0	0	2	10	3	0	1	14	0	0	15
6a	0	4	6	12	0	5	14	1	2	3	12	4	0	1	17	0	1	22
6b	1	8	16	17	5	14	33	0	2	6	25	13	1	3	40	0	4	47
7	2	8	14	15	6	4	33	2	2	7	31	2	0	2	24	0	6	45
8	0	0	17	15	6	3	24	1	0	4	27	4	0	0	22	0	4	38
9	0	2	5	14	4	6	19	0	1	7	12	3	1	1	16	0	3	25

PERCEPTION OF ABUNDANCES

The results given in Table 9 give an indication of whether fishermen's perceptions of the state of stocks are different from the previous year. The numbers of stars indicate the significance level. For descriptions of the changes in perceptions refer to relevant preceding text and the figures in Appendix 1.

Table 10 Results of chi-squared tests comparing abundance responses in 2006 with those in 2005 using categories of "decrease, same, increase". NS denotes no significant difference, * = a significant difference at *P* = 0.05, ** = a significant difference at *P* = 0.01 and * = a significant difference at *P* = 0.001. NA indicates either the data set was too small for analysis or that there were too many zeros, df is degrees of freedom (one less than the number of categories).**

	Cod		Haddock		Whiting		Saithe		Monkfish		Nephrops		Sole		Plaice	
Area	df	*P*	df	*P*	df	*P*	df	*P*	df	*P*	df	*P*	df	*P*	df	*P*
1	2	NS	2	NS	2	*	2	NS	2	NS	2	NS	2	NS	2	NS
2	2	*	2	NS	2	**	2	**	2	*	2	*	2	*	2	NS
3	2	NS	2	*	2	NS	2	NS	2	NS	2	NS	2	NS	2	NS
4	2	*	2	NS	2	NS	1	NS	1	NS	1	NS	2	NS	2	NS
5	2	**		NA	2	*	NA		NA		2	NS	2	*	2	NS
6a	2	NS	2	NS	2	*	2	NS	2	*	2	**	2	**	2	***
6b	2	**	2	NS	2	*	2	NS	2	NS	2	*	2	*	2	**
7	2	*	2	*	2	NS	2	NS	2	**	2	NS	2	*	2	NS
8	2	***	2	**	2	*	2	**	2	**	2	NS	2	**	2	***
9	2	NS	2	NS	2	*	2	NS	2	NS	2	NS	1	**	2	NS

SUMMARY OF COMMENTS GIVEN BY RESPONDENTS

No summaries of comments were provided in the 2005 report therefore no comparisons can be made between comments given in this reference period and any that were given in the previous reference period.

In this survey 15 of the respondents from Scotland, 8 of the respondents from England, 2 of the 3 English flag vessel respondents, 26 of the 105 Danish, 25 of the 64 Dutch and 1 of the Belgian respondents provided comments.

The comments given were wide ranging in topic but it is notable that amongst the comments the respondents did not contradict one another. Views on particular topics were similar from respondents whatever their country of origin. Comments have been summarised and given below in terms of those made in relation to stocks, economics and management.

Summary of comments made in relation to different species:

Cod

- Small cod (5", 13cm long) have been observed intermittently in area 1 and the amount of small cod around Shetland (area 1) is higher than in previous years.
- The abundance of cod in area 8 is as high as it was 15 years ago and it is heavily underestimated.
- Cod is increasing in areas 5, 6 and 9 and is abundant in area 9.
- The abundance of cod in area 9 in the last three years is higher than observed in the last 25 years and it is becoming a problem for shrimp fishermen.
- Cod in area 9 should be protected during the spawning season (Feb-Mar) for 2-3 years.
- It is almost impossible to fish for other species without getting a high discard of cod.

Haddock

- Still mainly 1999 year class of haddock being caught east of Shetland (area 1), but a new year class is evident.

Whiting

- Whiting stocks are at their best in area 1 for 5 years.
- No change in abundance in areas 5 & 6.

Sole

- Sole are more abundant in areas 5, 6 and 9 and the stock is heavily underestimated in area 9.
- Sole in area 9 is more abundant this year but smaller in size, possibly due to the cold water.

Plaice

- Plaice are more widespread in areas 1-3 and caught in areas where previously unobserved (but had to be discarded due to the 5% rule).
- There are less plaice in area 5.
- No change in plaice in areas 5 & 6.

Other species

- Hake are more abundant in area 9 and large hake are widespread in areas 1-3 (but had to be discarded through lack of quota).
- More megrims and red mullet observed in areas 1-3; more halibut in area 4 and Greater weavers are more abundant in area 9 than ever before.
- Species not previously caught, such as anchovy, herring, mullet and squid are being caught (area 6b).
- Abundance of sandeel in area 7 (English klondyke) higher so more chance of finding fish in that area.
- The minimum landing sizes of turbot and brill should be increased and should be introduced for other species e.g. mullet.

Other comments in relation to stocks

- There are no discards of cod, haddock or saithe in areas 1, 2, 7 and 8 but higher concentrations of these species occur in smaller areas, possibly in relation to temperature or food.
- It becomes increasingly clear that the low stocks are not due to over

fishing. Where are the new, young fish? Are they born at all?
- Low stocks are not only the result of fishing; de-eutrophication plays a very important role in lower stocks.
- The biological balance has gone.
- It is difficult to estimate recruitment with the large meshes we use today.
- The numbers of cormorants need to be reduced.
- Large increase in abundance of seals.

Summary of comments made in relation to economics:
- The most frequent comment was in relation to the high cost of fuel with some commenting that any profits due to better fish prices are lost due to high fuel costs and some commenting that the higher fish prices were offsetting some of the high fuel costs.
- Several comments were received in relation to increased prices for *Nephrops* and whitefish.
- No economic benefits to increased stocks as quotas remain too low.
- Skippers have taken more of a business approach - fuel and quota are much more important issues and skippers have fished less and thought more about what they do.
- Spending more on purchasing quota to continue to fish, especially whiting. The cost of renting quota is making vessels unviable.
- Using a large mesh net has economic benefits when you have an annual quota.
- Several comments about smaller vessels including the wish to move to a smaller vessel, the actual move to a smaller vessel having had positive economic benefits, the suggestion that more smaller vessels are needed and that there was not enough support for smaller vessels.
- Some comments on the lack of crew and difficulty to get new entrants because of poor economic outlook and that wages have actually decreased.

Summary of comments made in relation to management:
- There were a number of very negative comments by Danish fishermen in relation to Vessel Quota Shares (VQS). These included an accusation that VQS resulted in high-grading and increased discarding.
- There were several comments on the mis-match between stock levels and quota levels: quotas were ridiculously low for cod, monkfish, whiting, *Nephrops* and sole.
- Several comments on discards: they need to be better monitored; stocks could be better estimated if discards had to be entered into logbooks, or if a small number of selected vessels had to land all catch for analysis.
- Several comments in relation to no support / help from government or Brussels, and amount of legislation always increasing.
- Several comments about fishing days, including the need for increases, no increase to those fishing with smaller mesh sizes.

- The CFP has failed. Experts are needed to manage the fisheries, not policy makers and too many scientific institutions involved in fisheries management.
- Biologists do not pick up changes in stocks quickly enough.
- Decommissioning is not beneficial when boats are sold and used elsewhere.
- There is only room for 50% of the current fleet.
- Increases in sandeel stocks will never be allowed to benefit the fishermen.
- Beam trawl with chain mats should be stopped completely - or be moved at least 30 nm from the coast.
- In the *Nephrops* fishery the panel has benefits in that small fish escape but there is no increased selectivity for *Nephrops* and it acts as a way-out when the rear-end is closed in curtains.

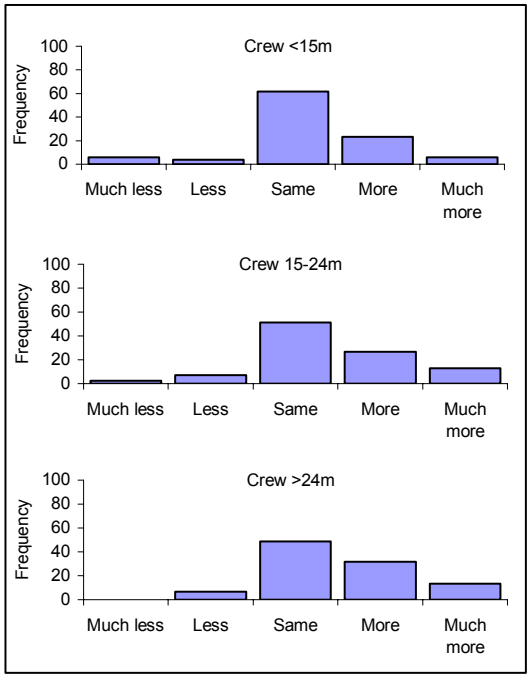
CO-ORDINATION OF QUESTIONNAIRES

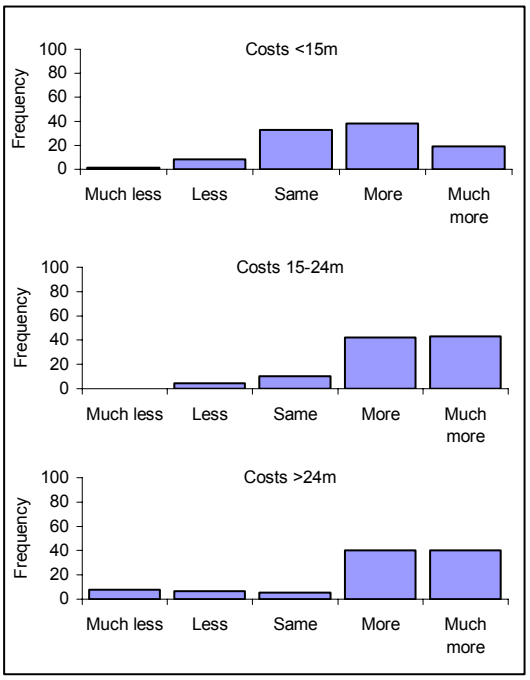
The following were responsible for co-ordinating the distribution and collection of questionnaires:

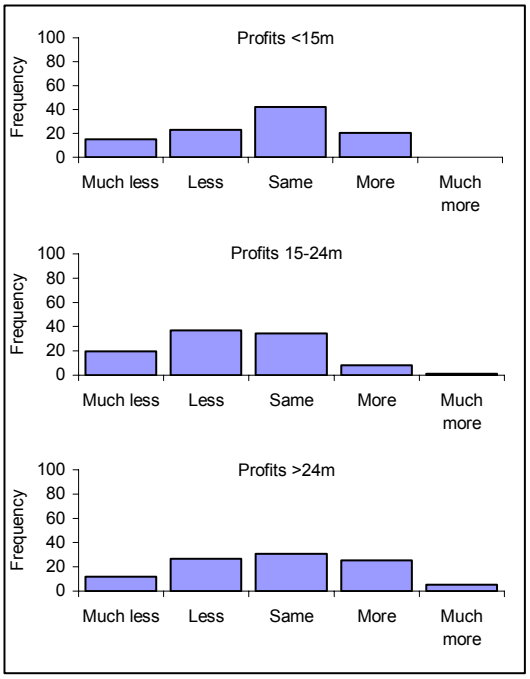
M Andersen	Danmarks Fiskeriforening (Danish Fishermen's Association), Denmark.
D Beveridge	National Federation of Fishermen's Organisations (NFFO), UK.
T Corbister & L Van de Velde	Rederscentrale, Belgium.
R McColl	The Fishermen's Association Ltd (FAL), Scotland.
J Petrie	Scottish Fishermen's Federation (SFF), Scotland.
F Tjallingii–Brocken & N Steins	Productschap Vis (Dutch Fish Product Board), Netherlands.

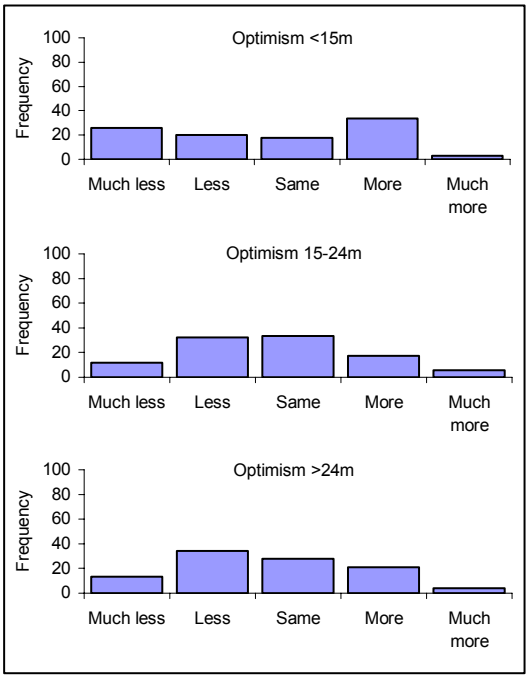
APPENDIX 1

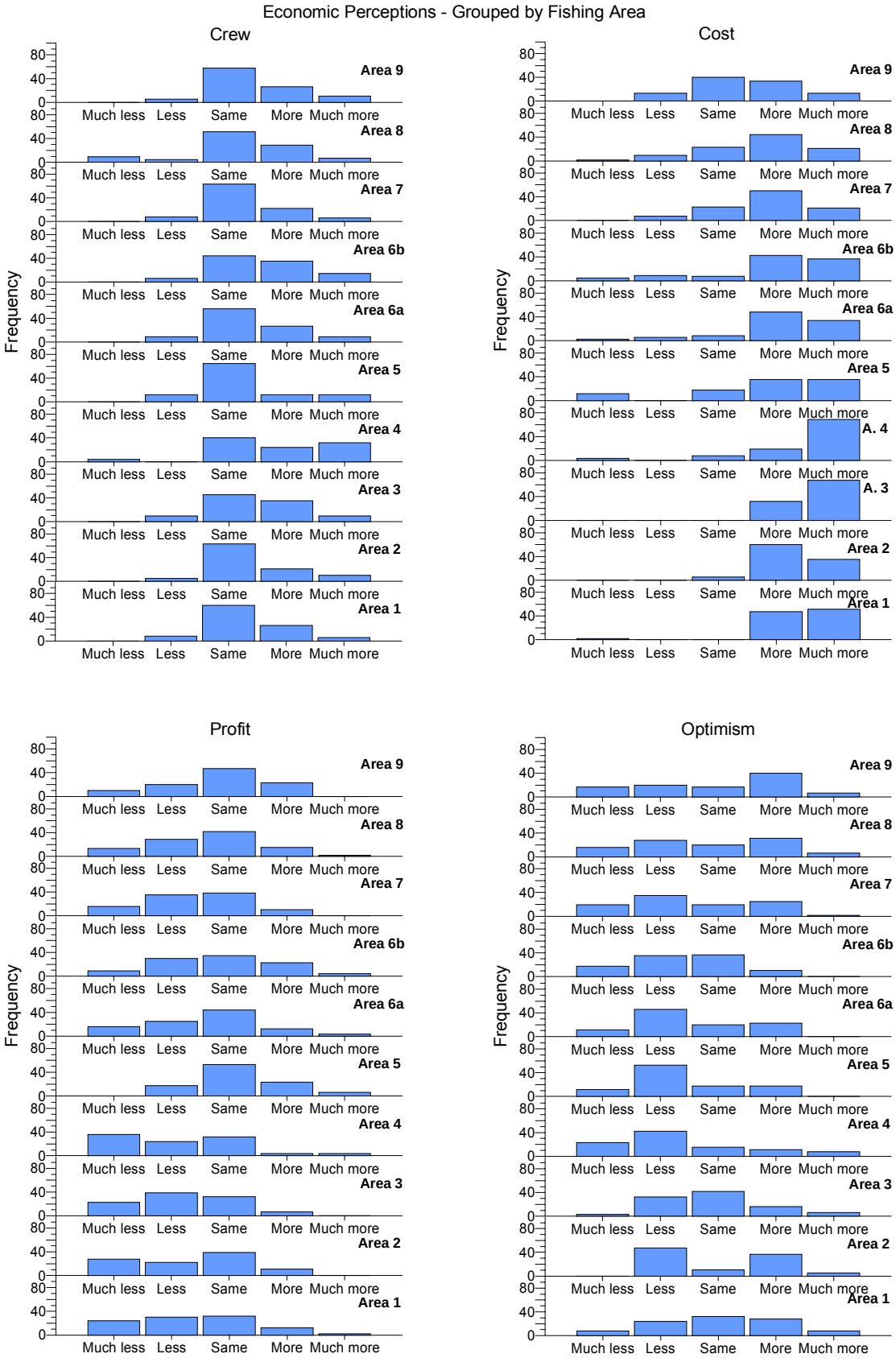
Economics - Responses grouped by vessel size



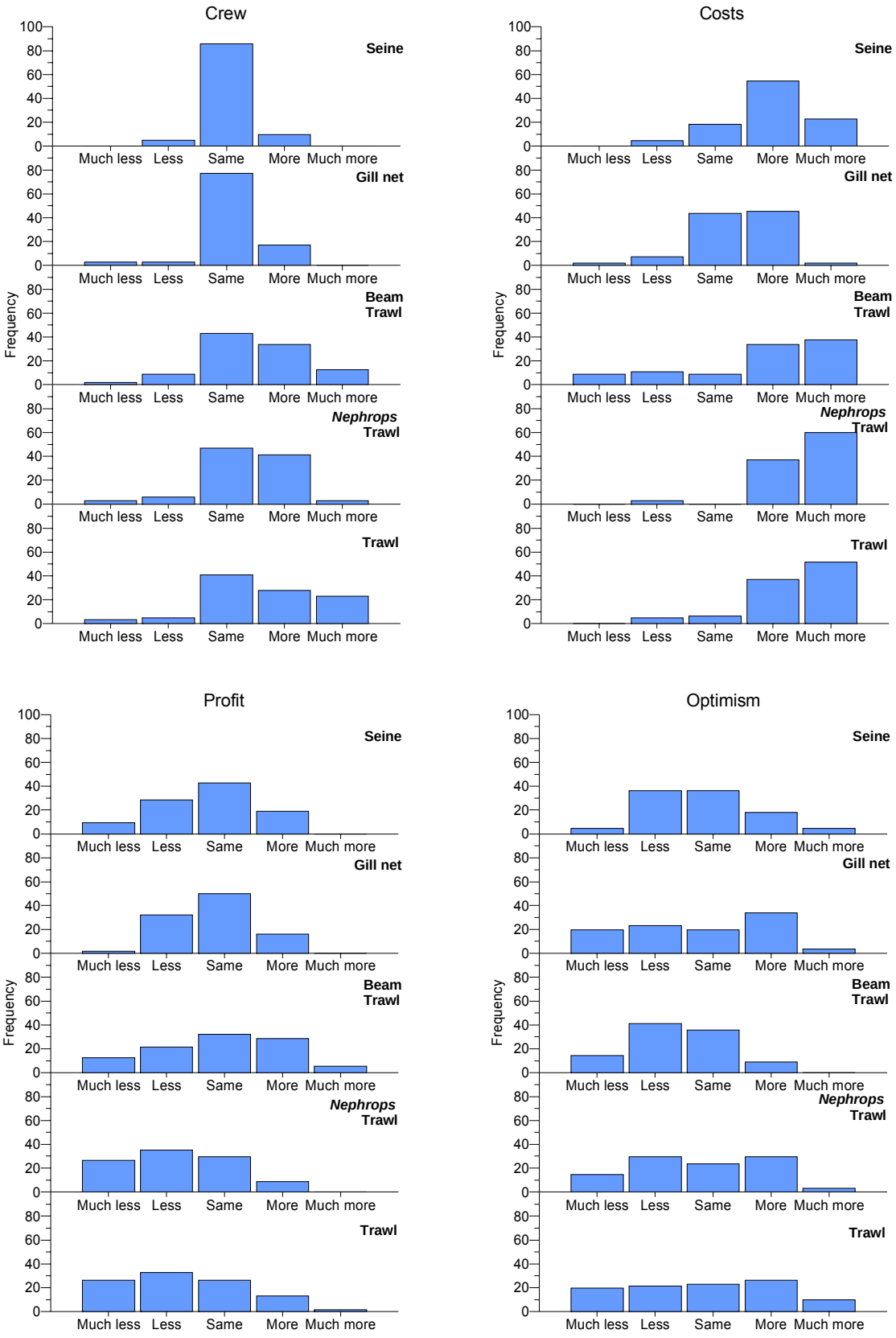


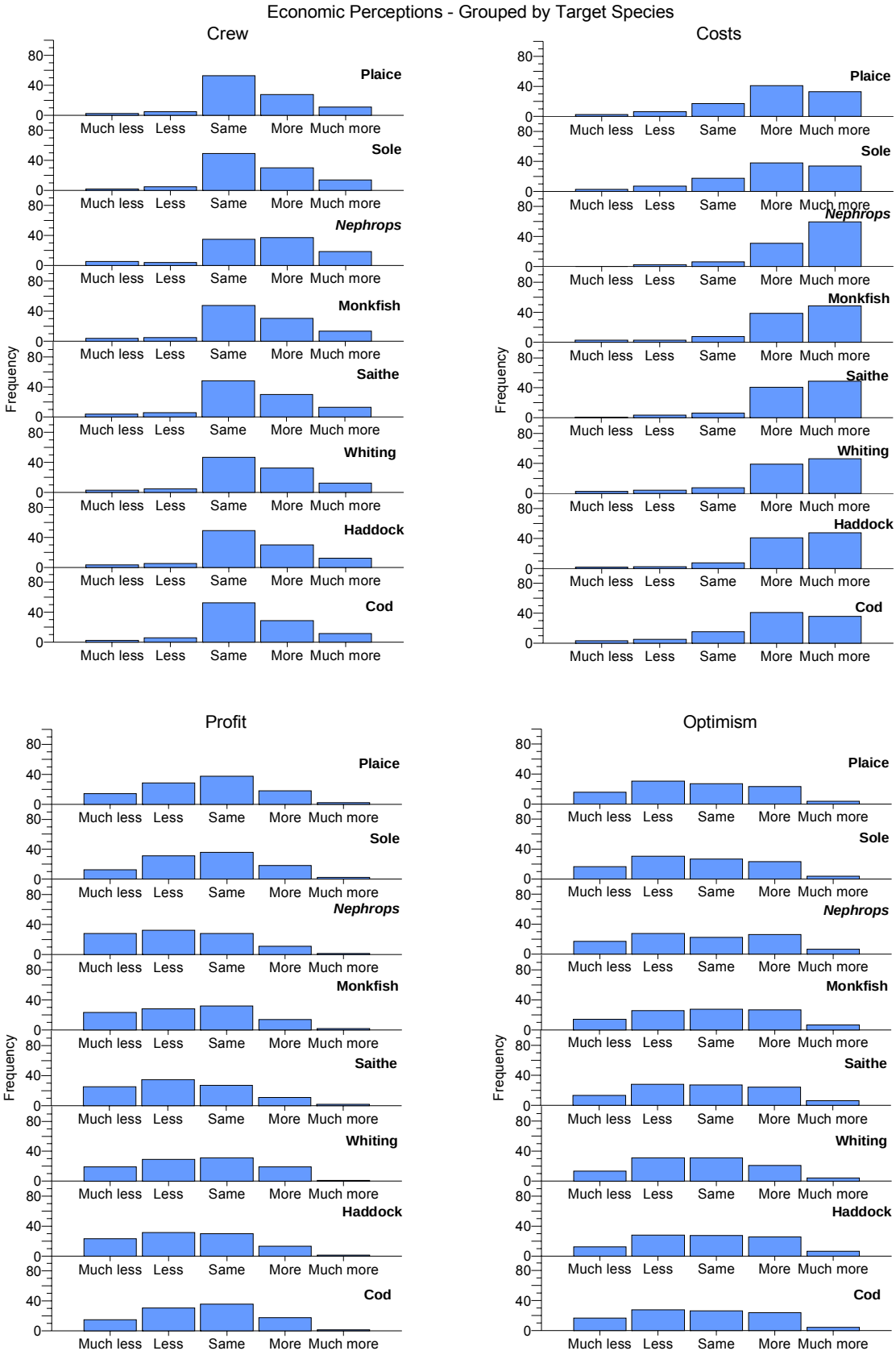




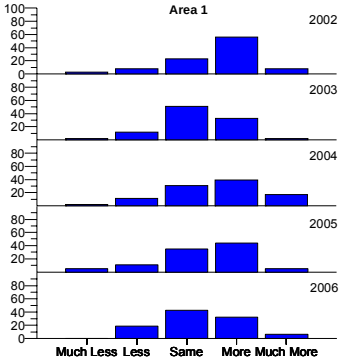

Economic Perceptions - Grouped by Fishing Area
Crew
Cost
Profit
Optimism
Frequency
Much less
Less
Same
More
Much more
Area 9
Area 8
Area 7
Area 6b
Area 6a
Area 5
Area 4
Area 3
Area 2
Area 1
A. 4
A. 3

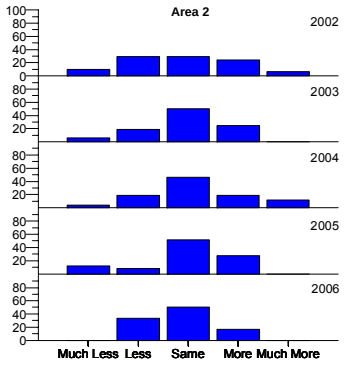
Economic Perceptions - Grouped by Fishing Gear

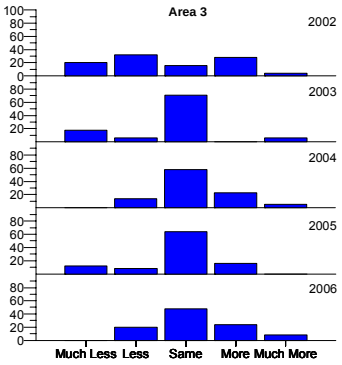


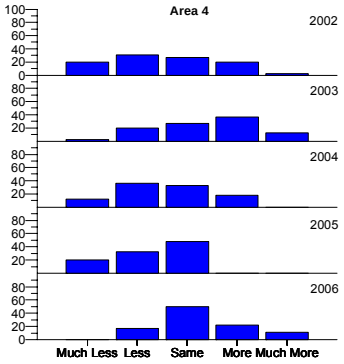

Economic Perceptions - Grouped by Target Species
Crew
Costs
Profit
Optimism
Frequency
Plaice
Sole
Nephrops
Monkfish
Saithe
Whiting
Haddock
Cod
Much less
Less
Same
More
Much more
0
40
80

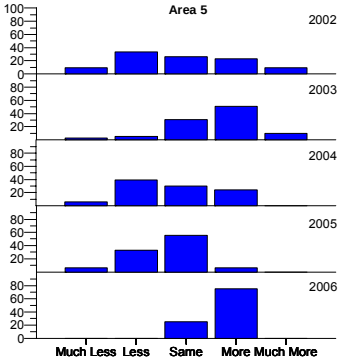
Abundance Time Series - Cod

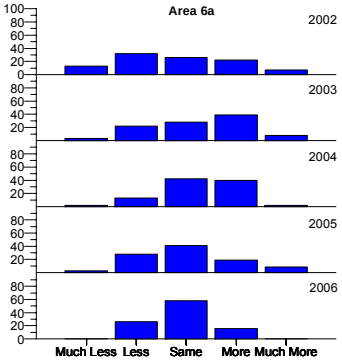


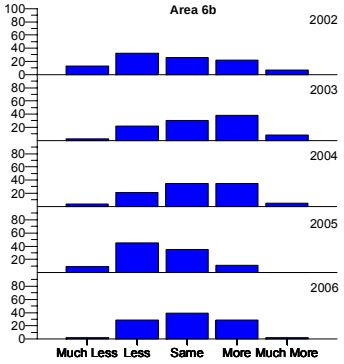


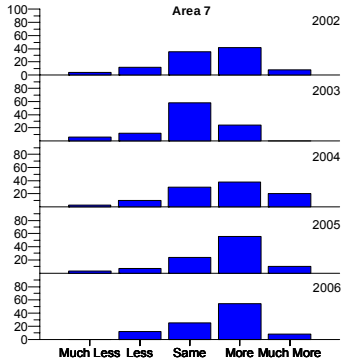


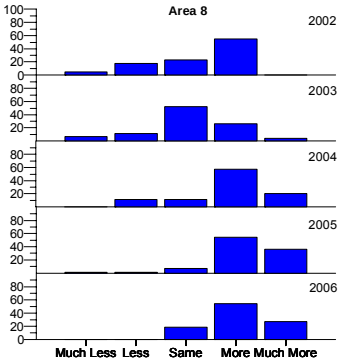


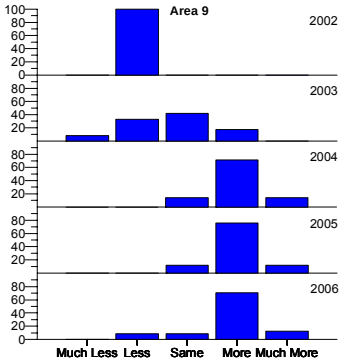










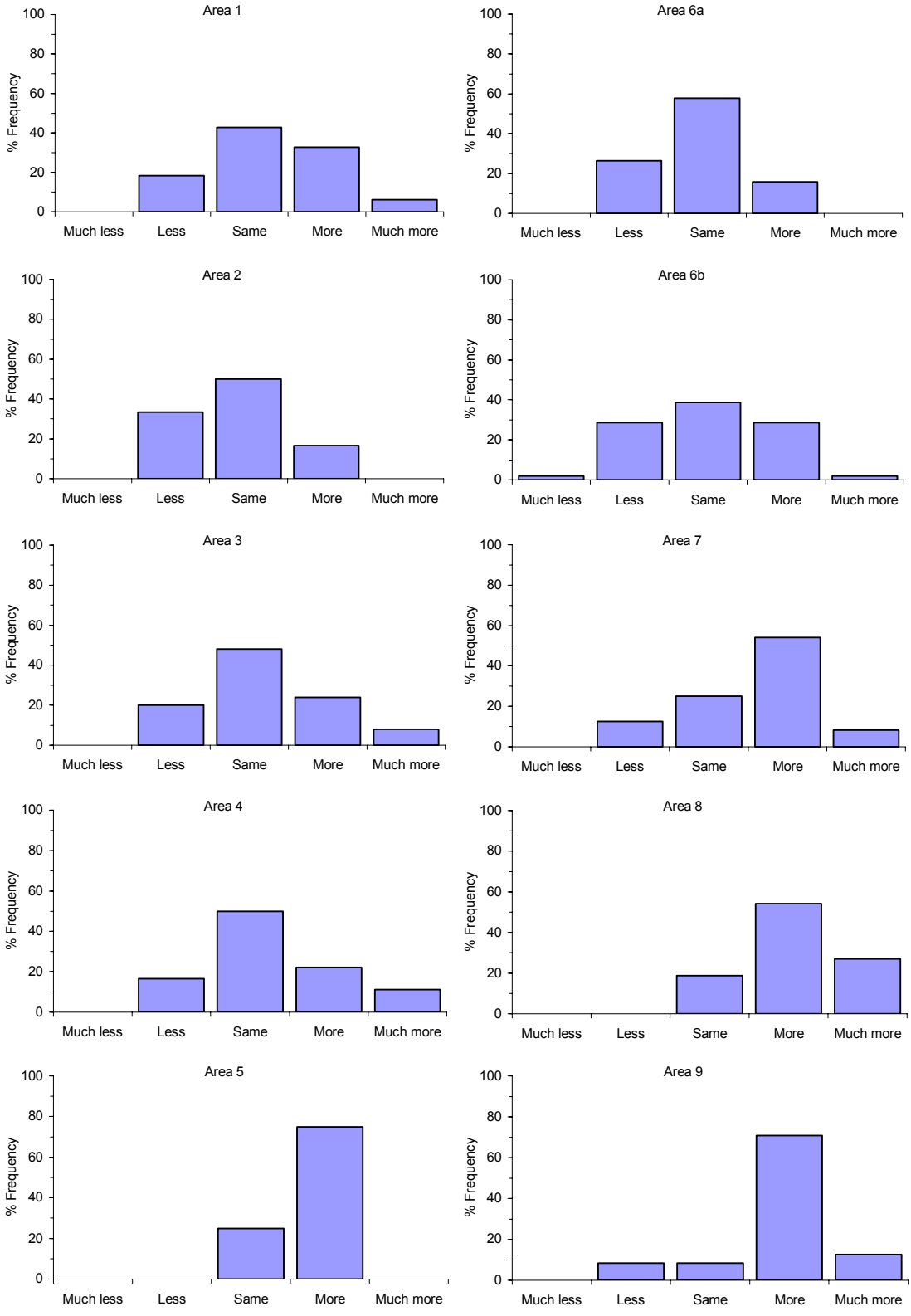


Number of observations

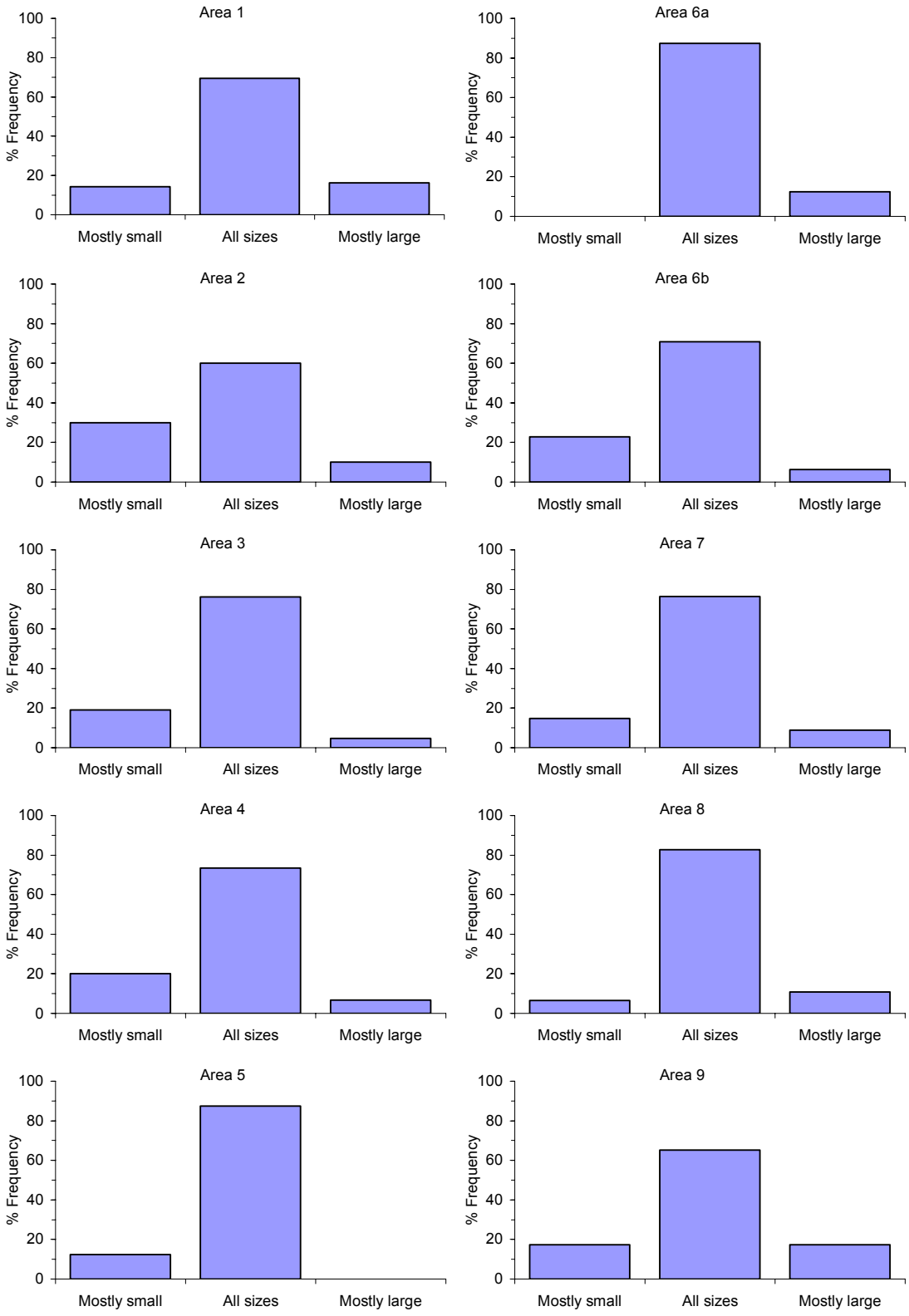
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	73	41	25	51	81	162	162	52	22	1
2003	51	16	17	45	39	36	87	33	27	12
2004	54	26	43	33	33	52	75	31	44	14
2005	57	25	25	25	18	32	74	70	81	33
2006	49	12	25	18	8	19	49	48	48	24

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

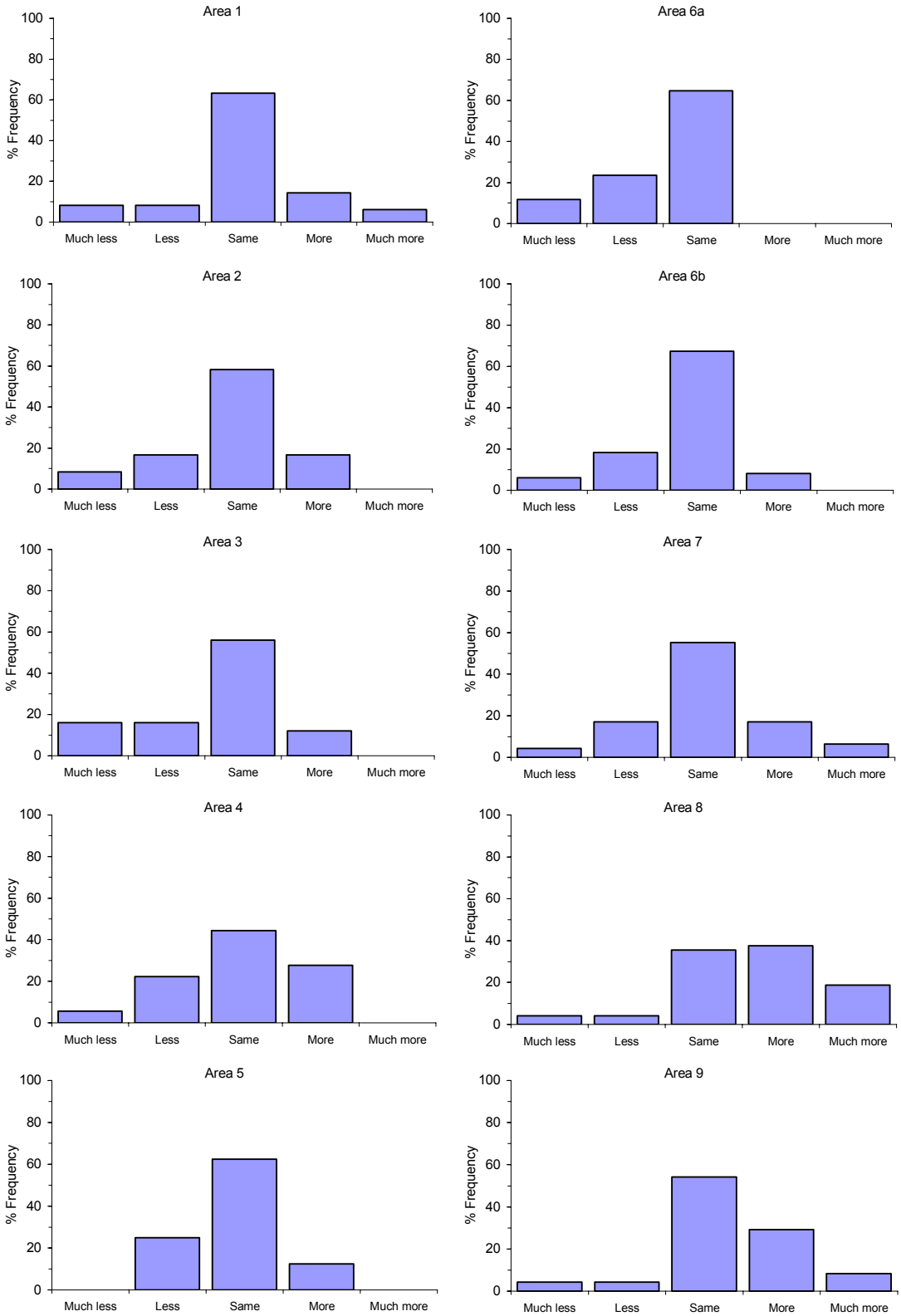
Cod Abundance



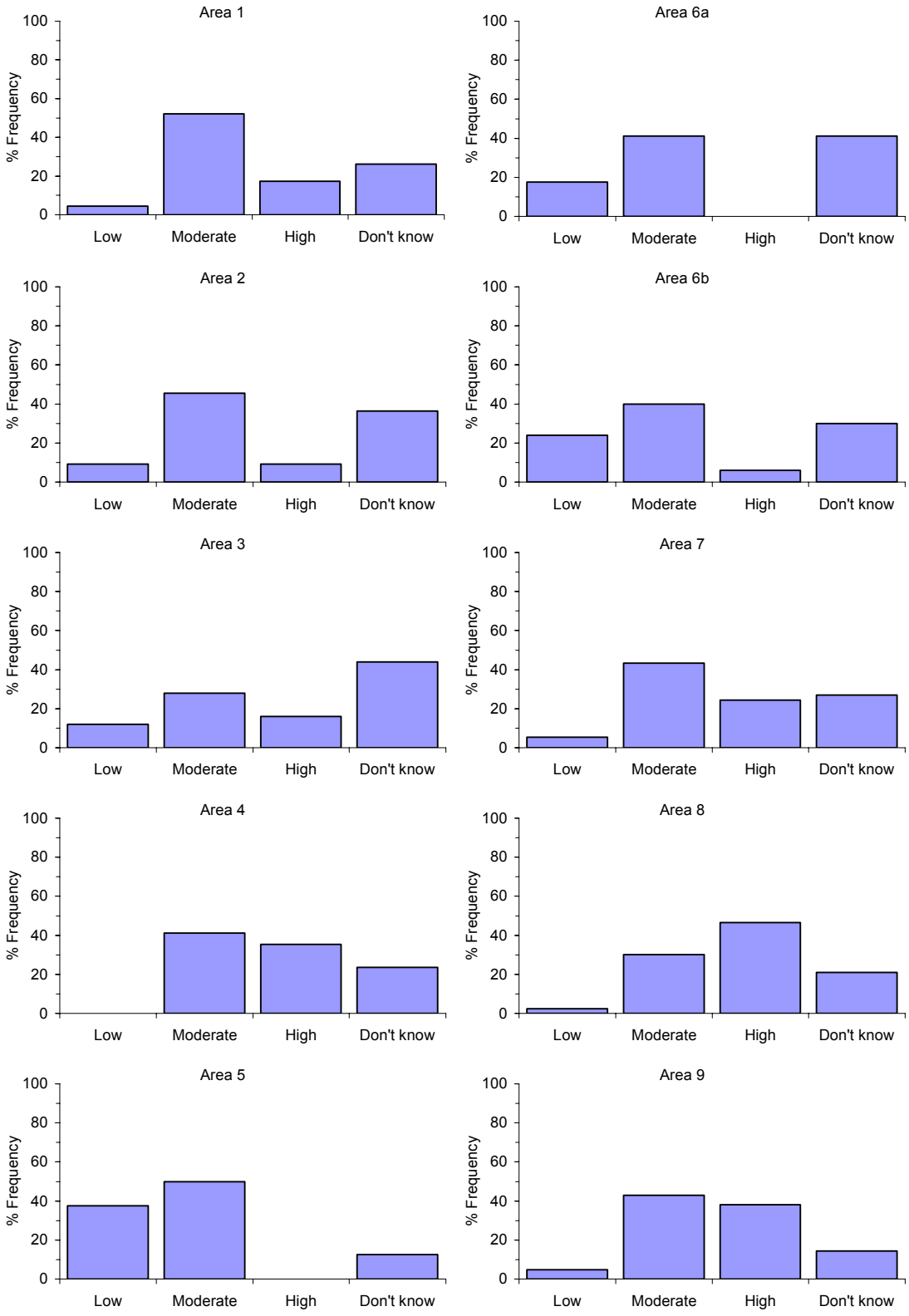
Cod Size


Area 1
Area 6a
Area 2
Area 6b
Area 3
Area 7
Area 4
Area 8
Area 5
Area 9
% Frequency
0
20
40
60
80
100
Mostly small
All sizes
Mostly large

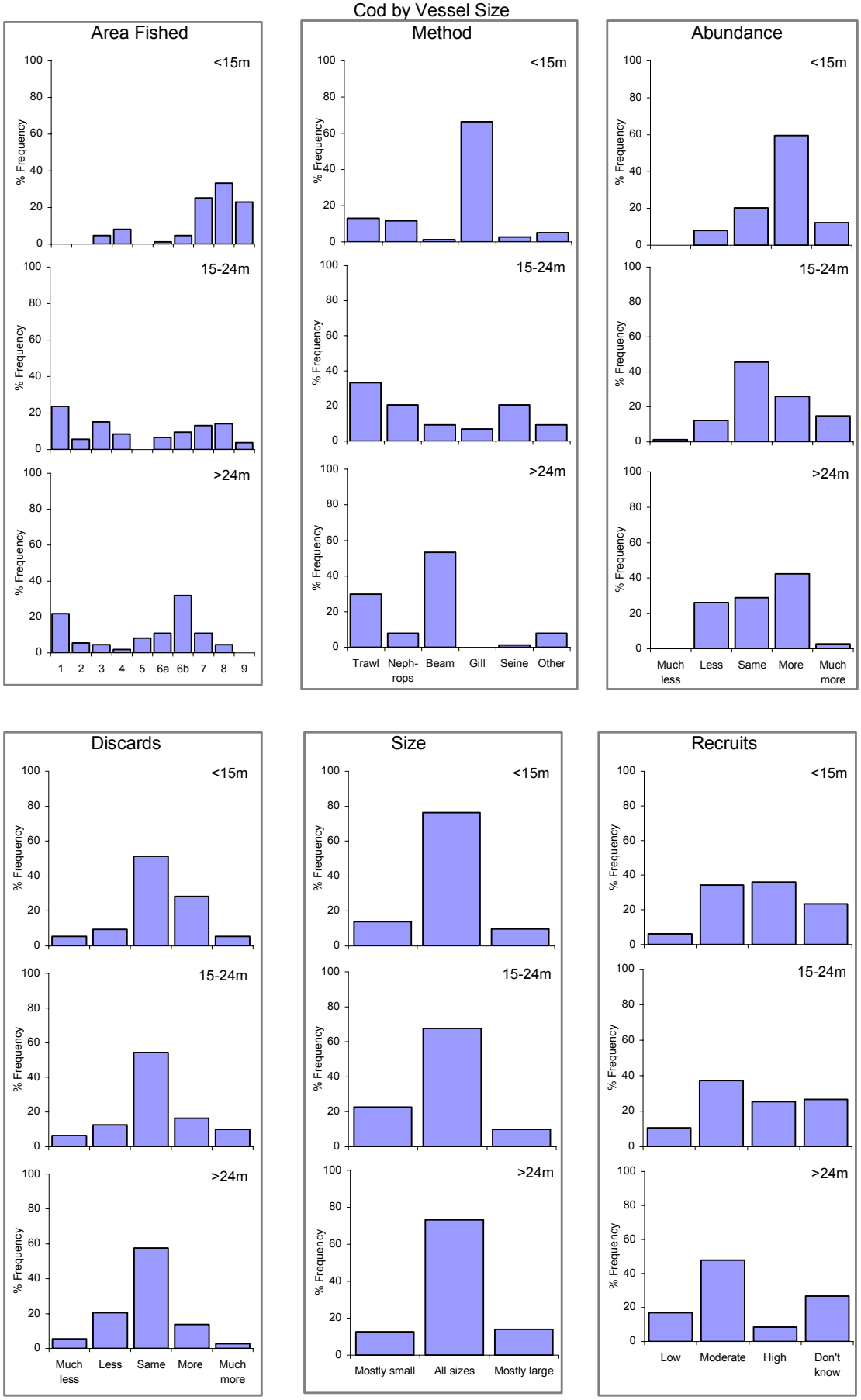
Cod Discards



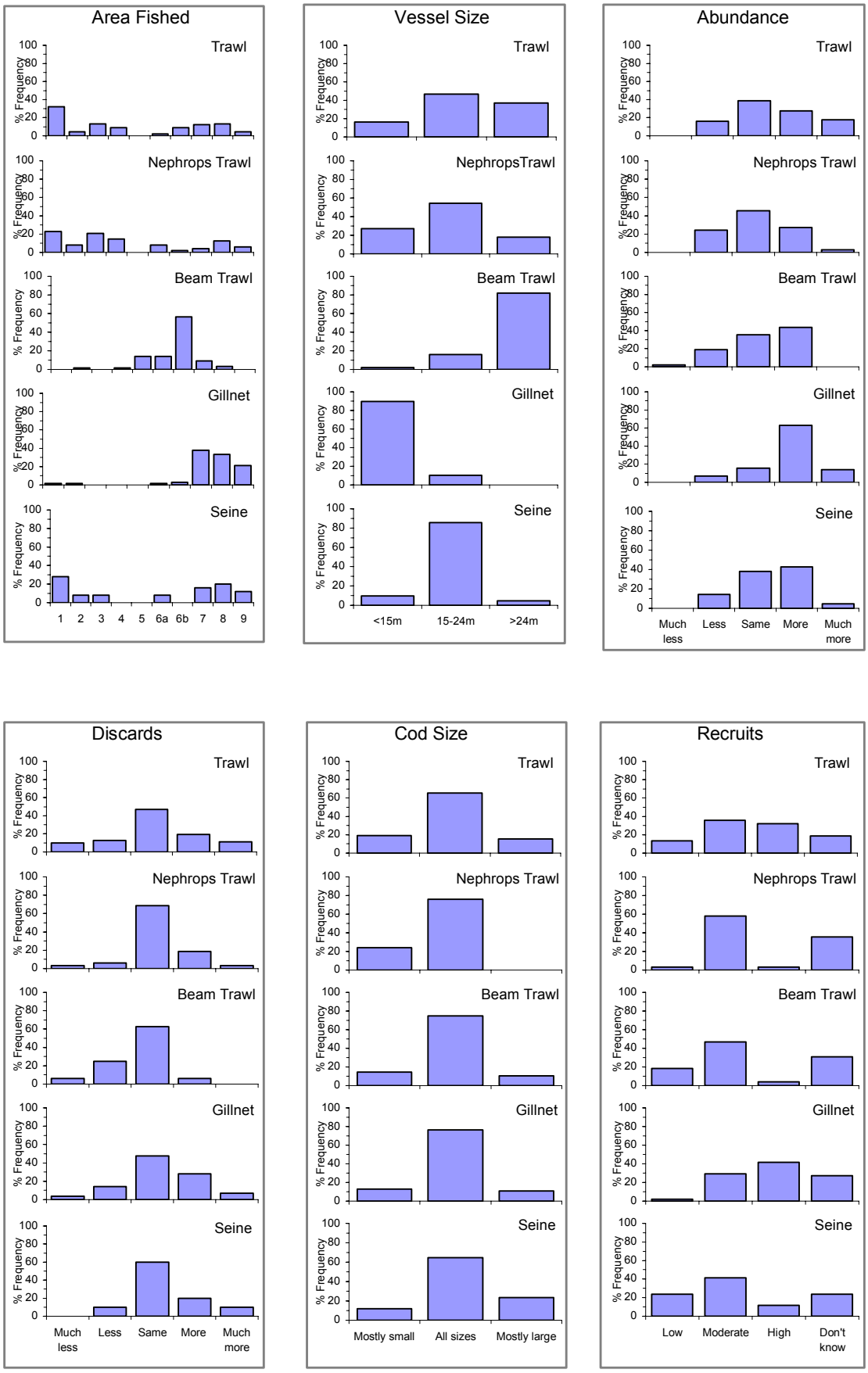
Cod Recruits



Cod by Vessel Size

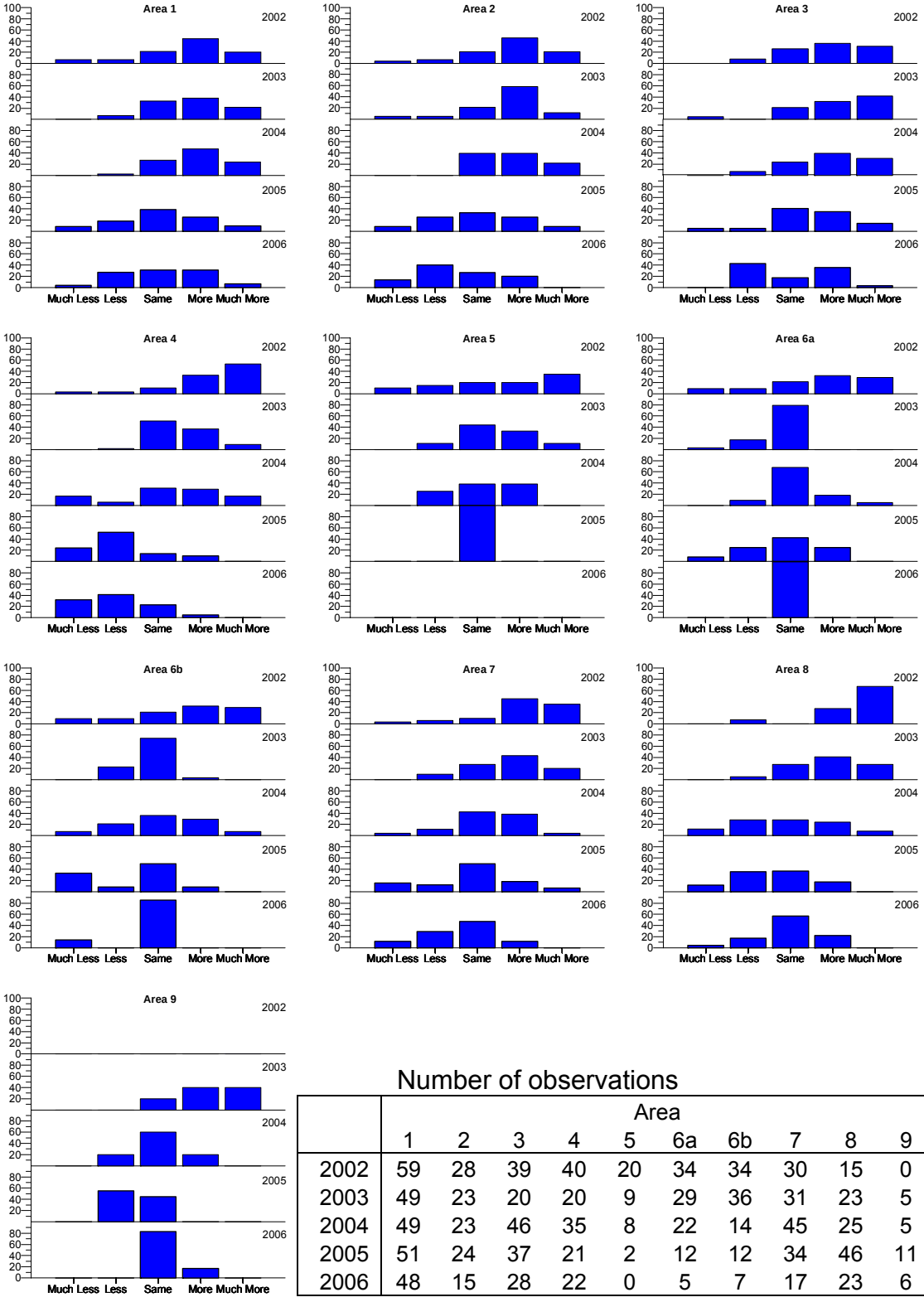


Cod by Gear Type



Time Series - Cod

Abundance Time Series - Haddock

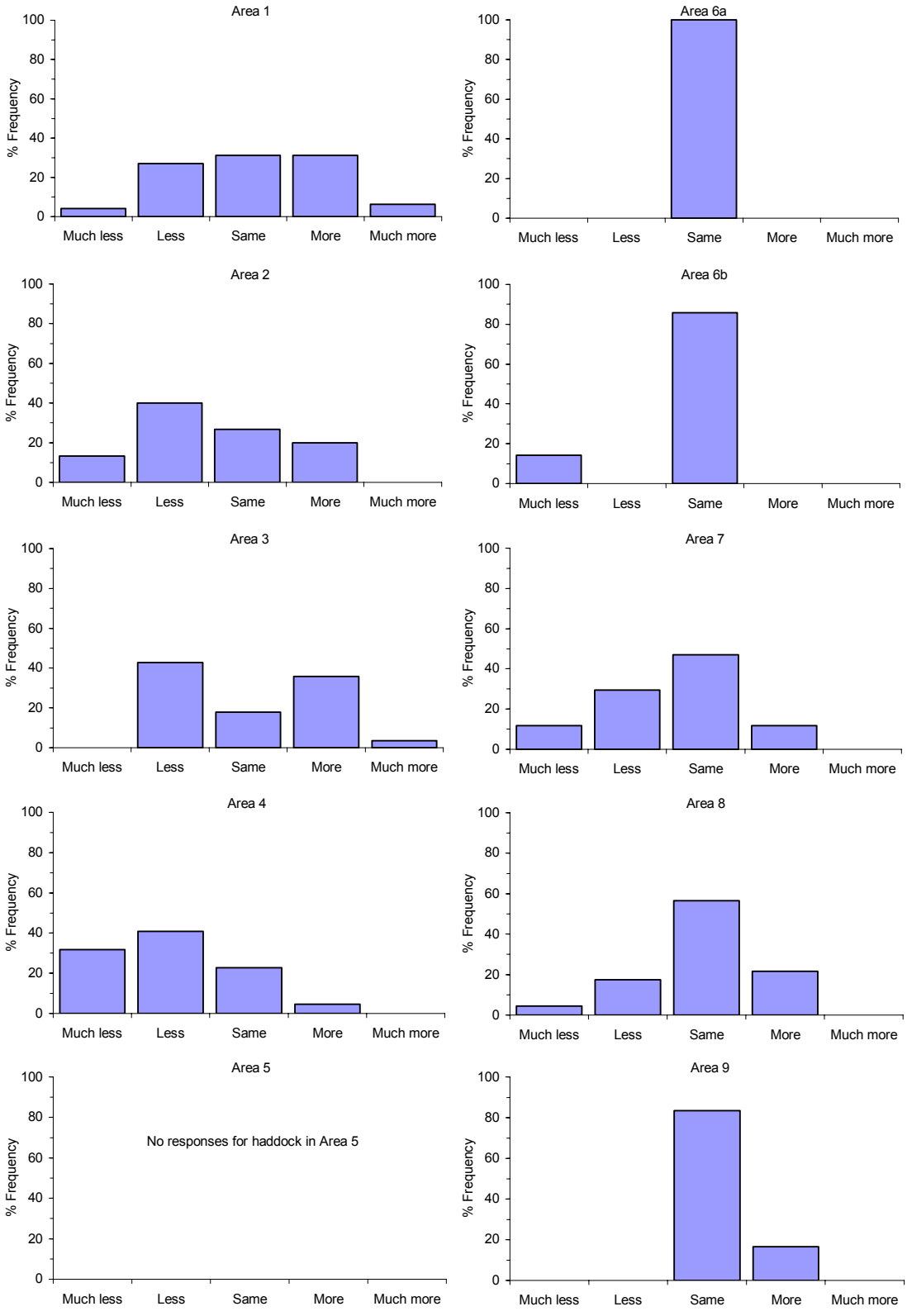


Number of observations

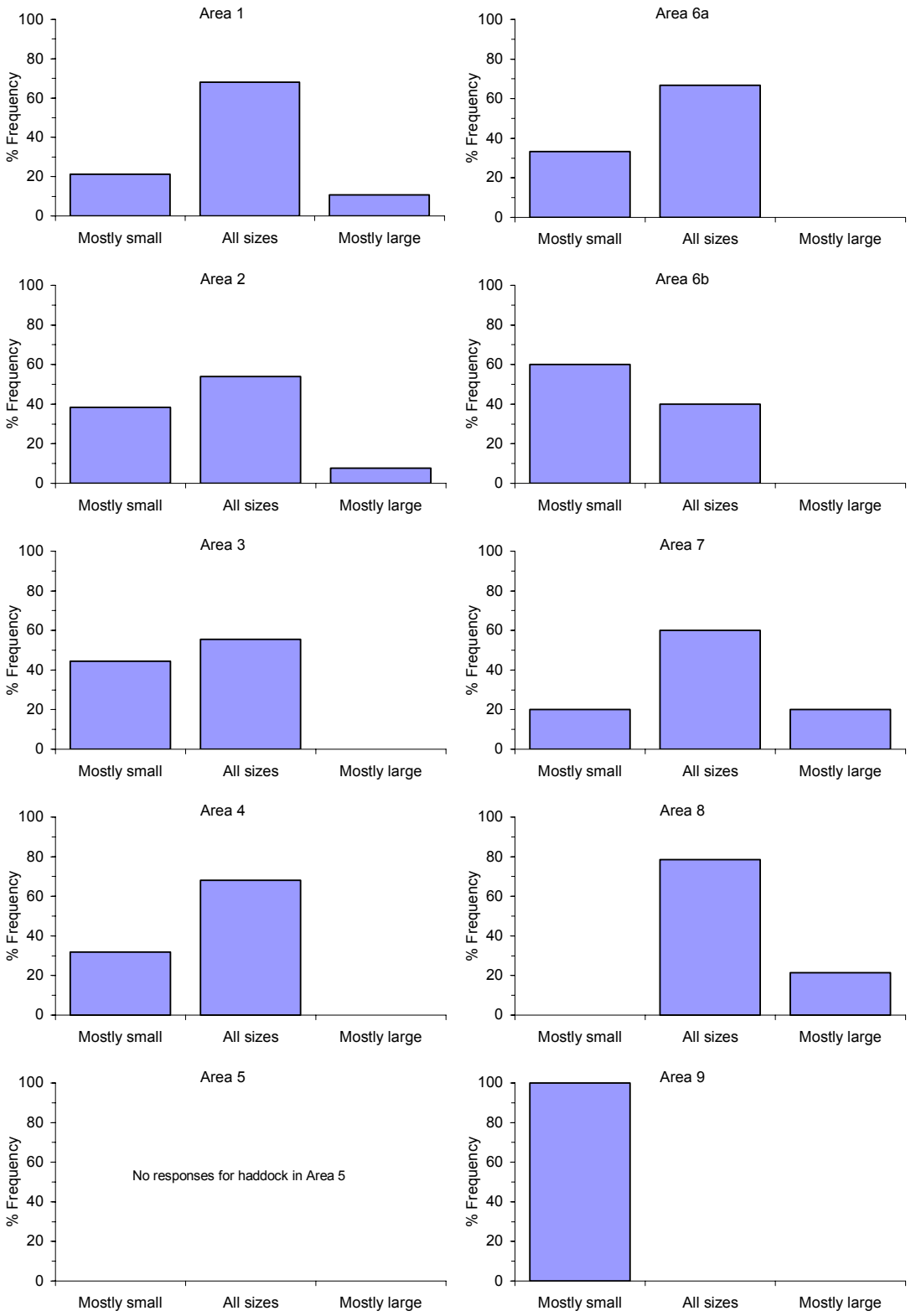
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	59	28	39	40	20	34	34	30	15	0
2003	49	23	20	20	9	29	36	31	23	5
2004	49	23	46	35	8	22	14	45	25	5
2005	51	24	37	21	2	12	12	34	46	11
2006	48	15	28	22	0	5	7	17	23	6

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

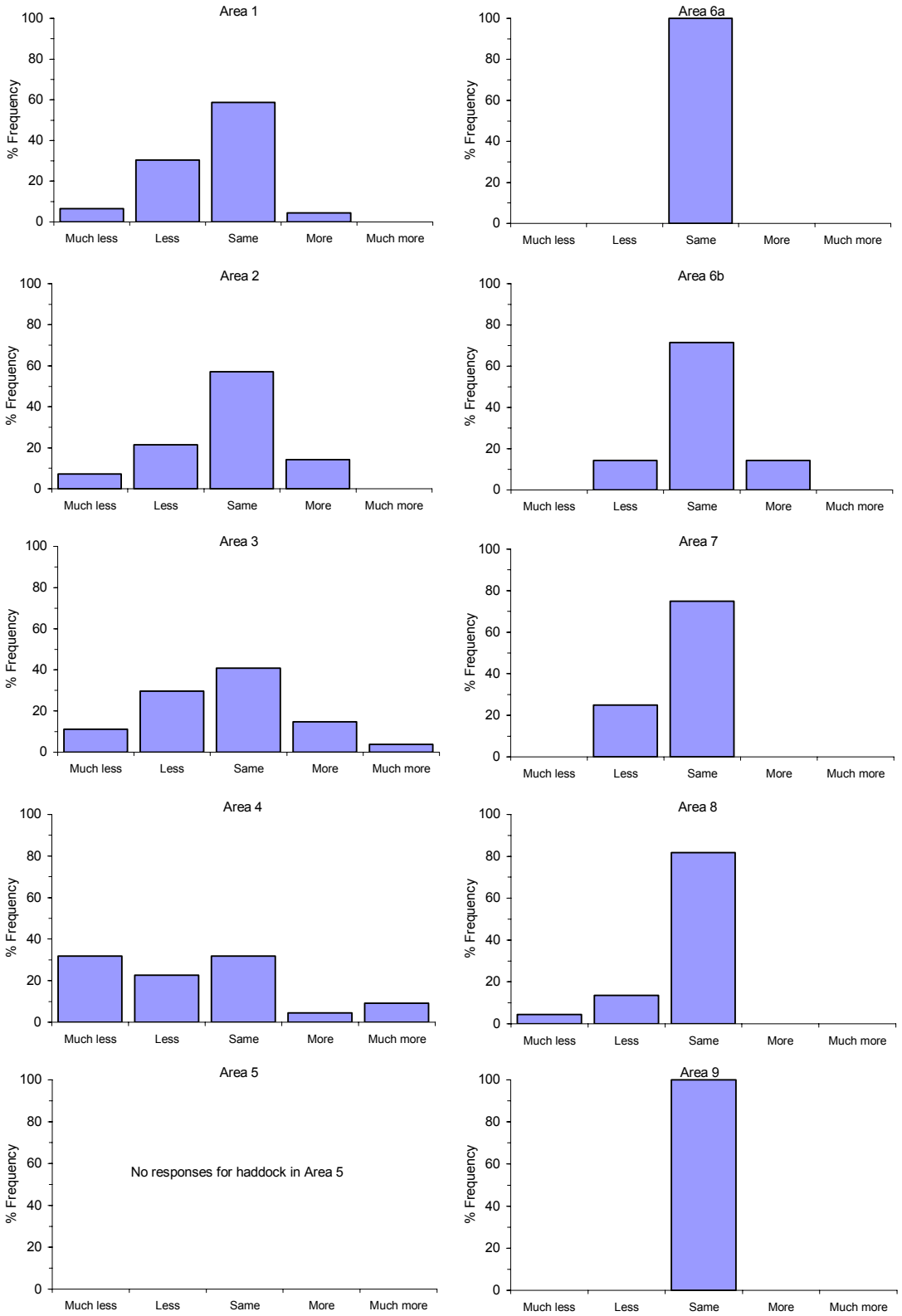
Haddock Abundance



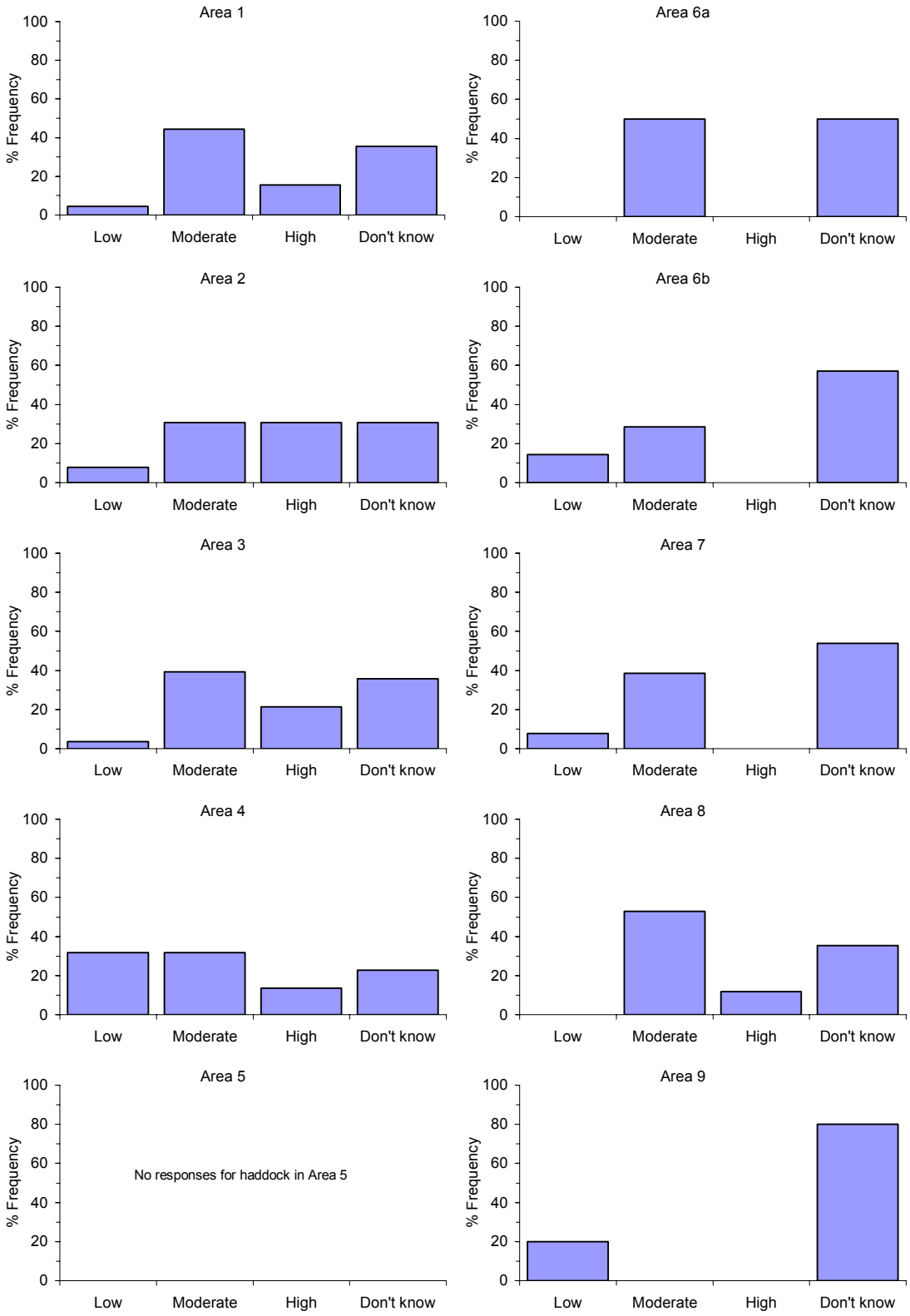
Haddock Size



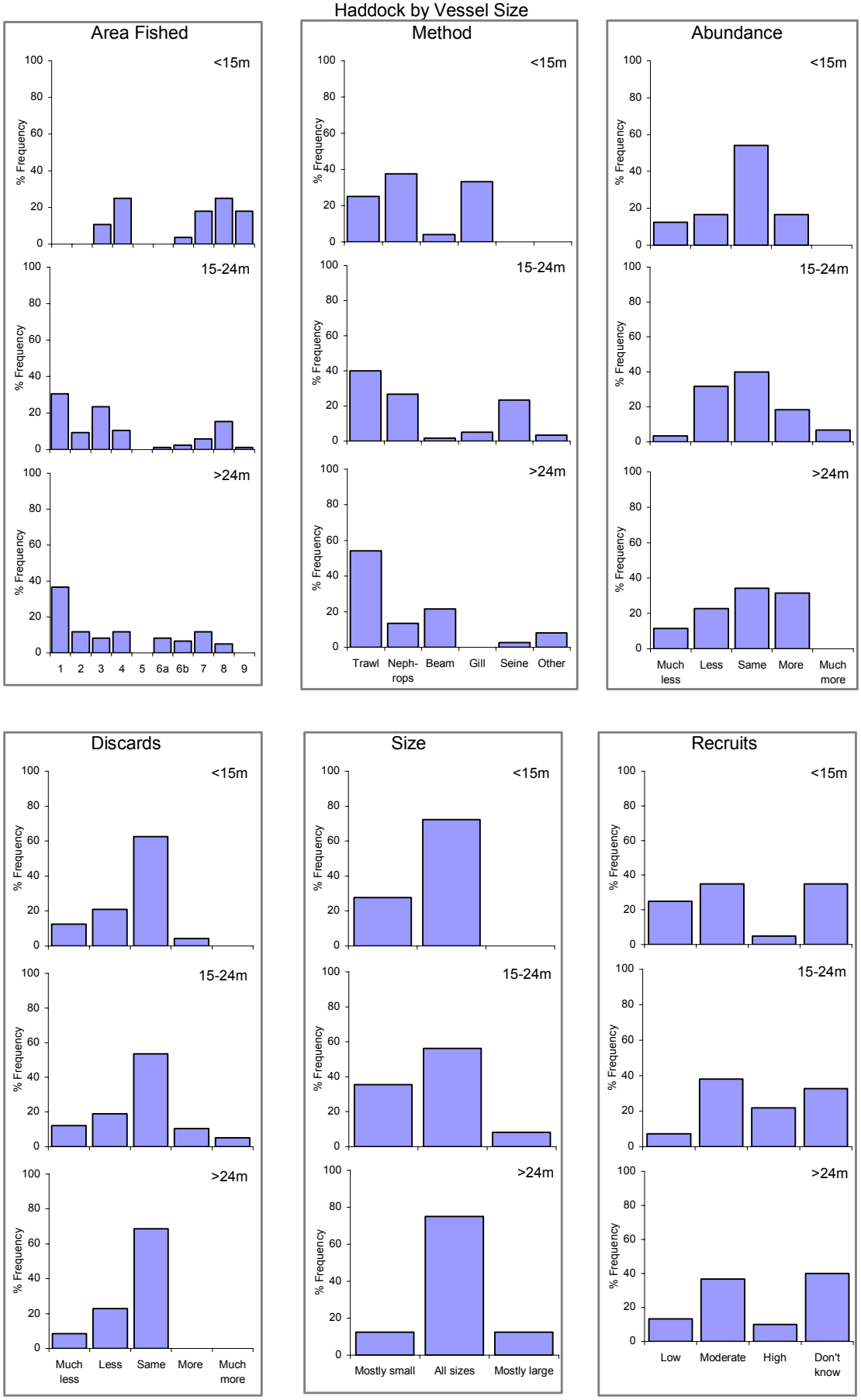
Haddock Discards



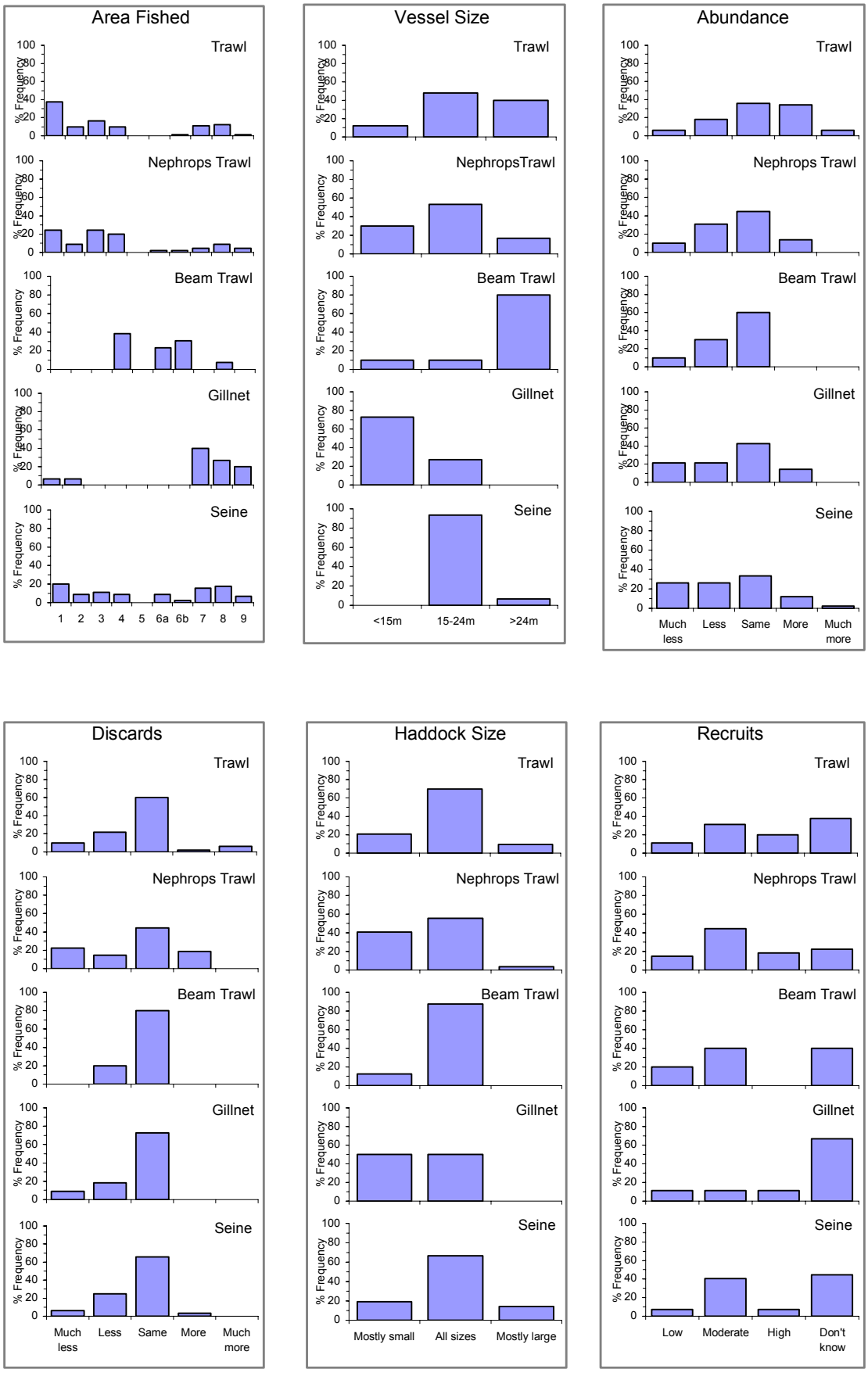
Haddock Recruits



Haddock by Vessel Size

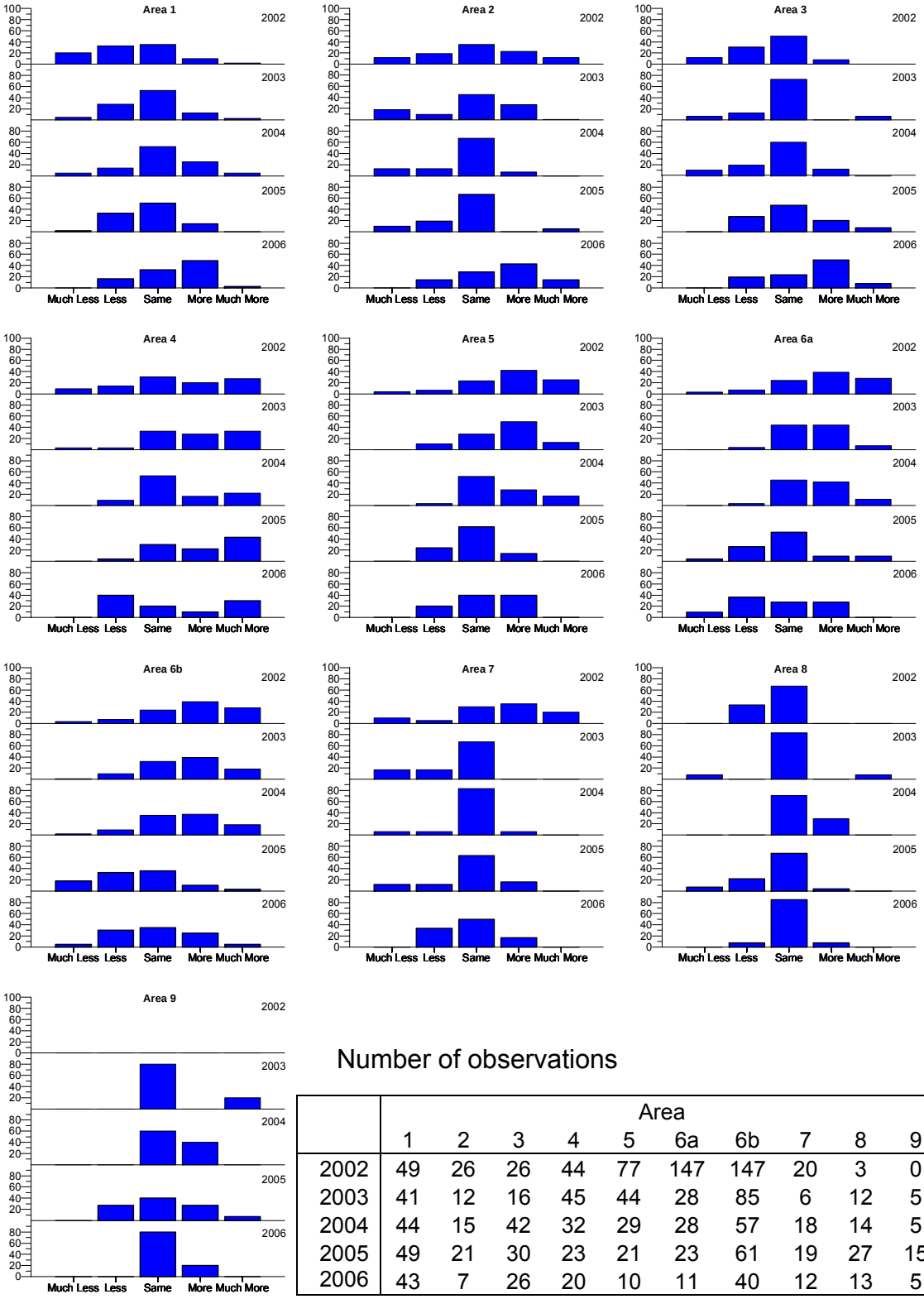


Haddock by Gear Type



Time Series - Haddock

Abundance Time Series – Whiting

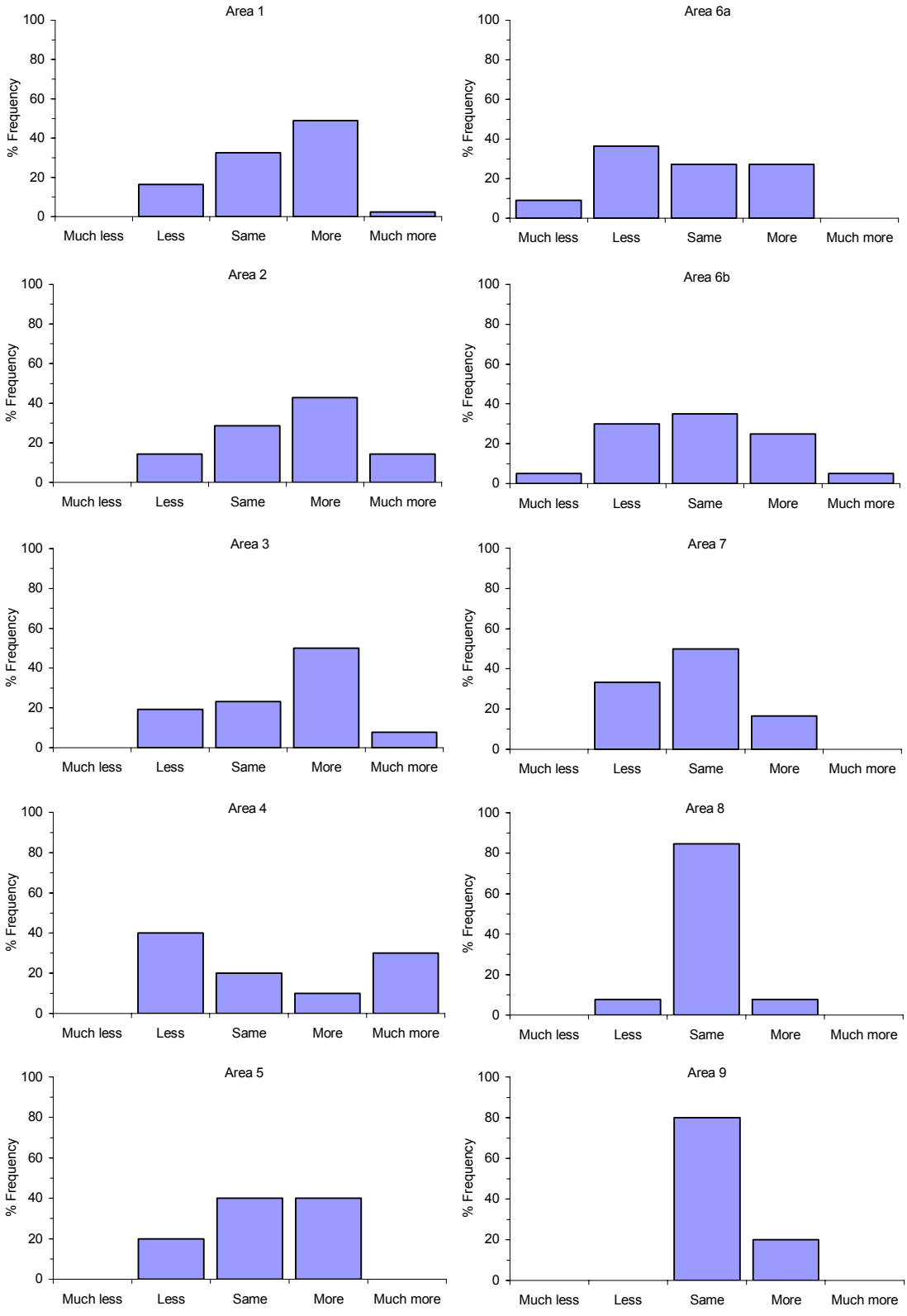


Number of observations

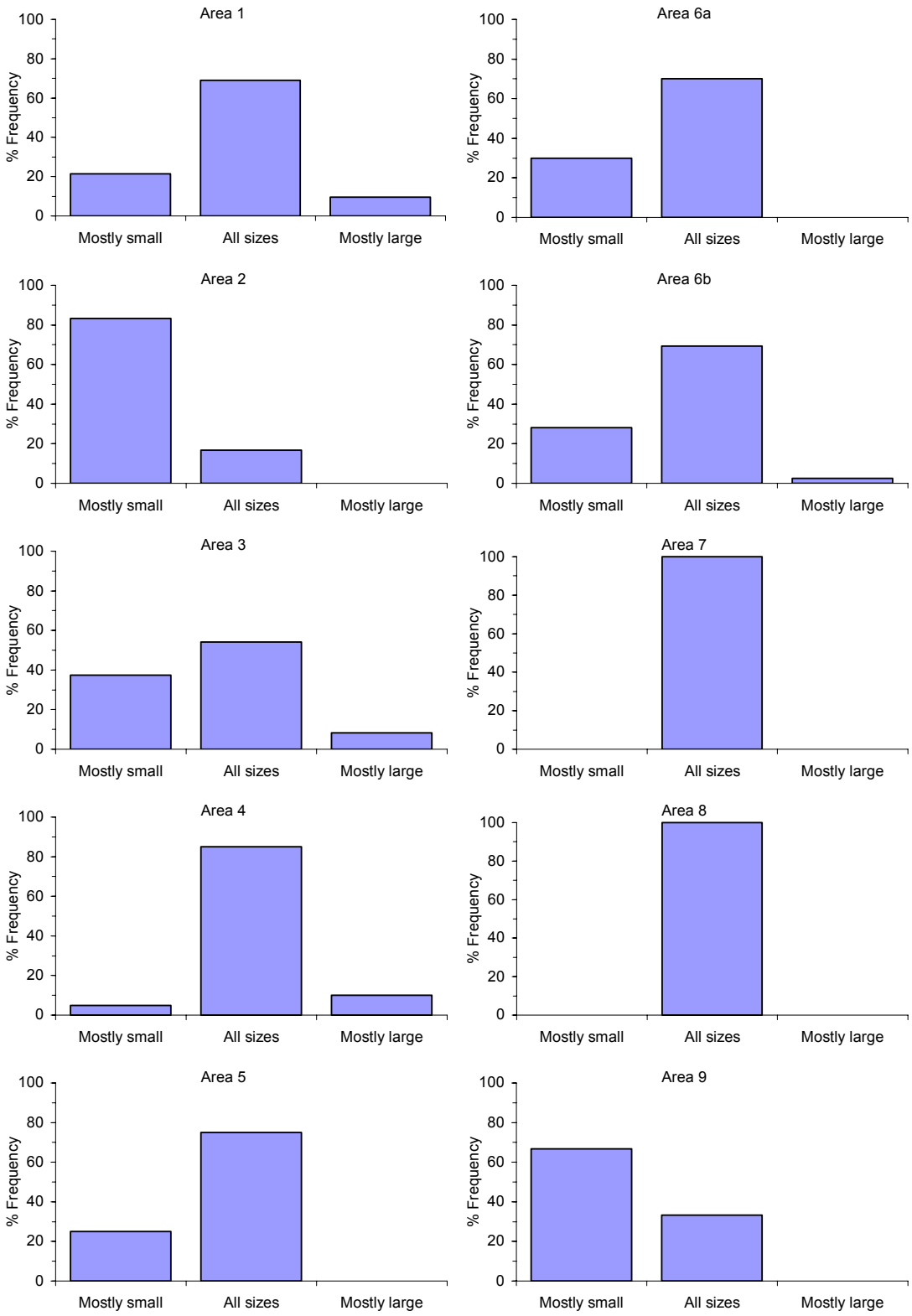
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	49	26	26	44	77	147	147	20	3	0
2003	41	12	16	45	44	28	85	6	12	5
2004	44	15	42	32	29	28	57	18	14	5
2005	49	21	30	23	21	23	61	19	27	15
2006	43	7	26	20	10	11	40	12	13	5

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

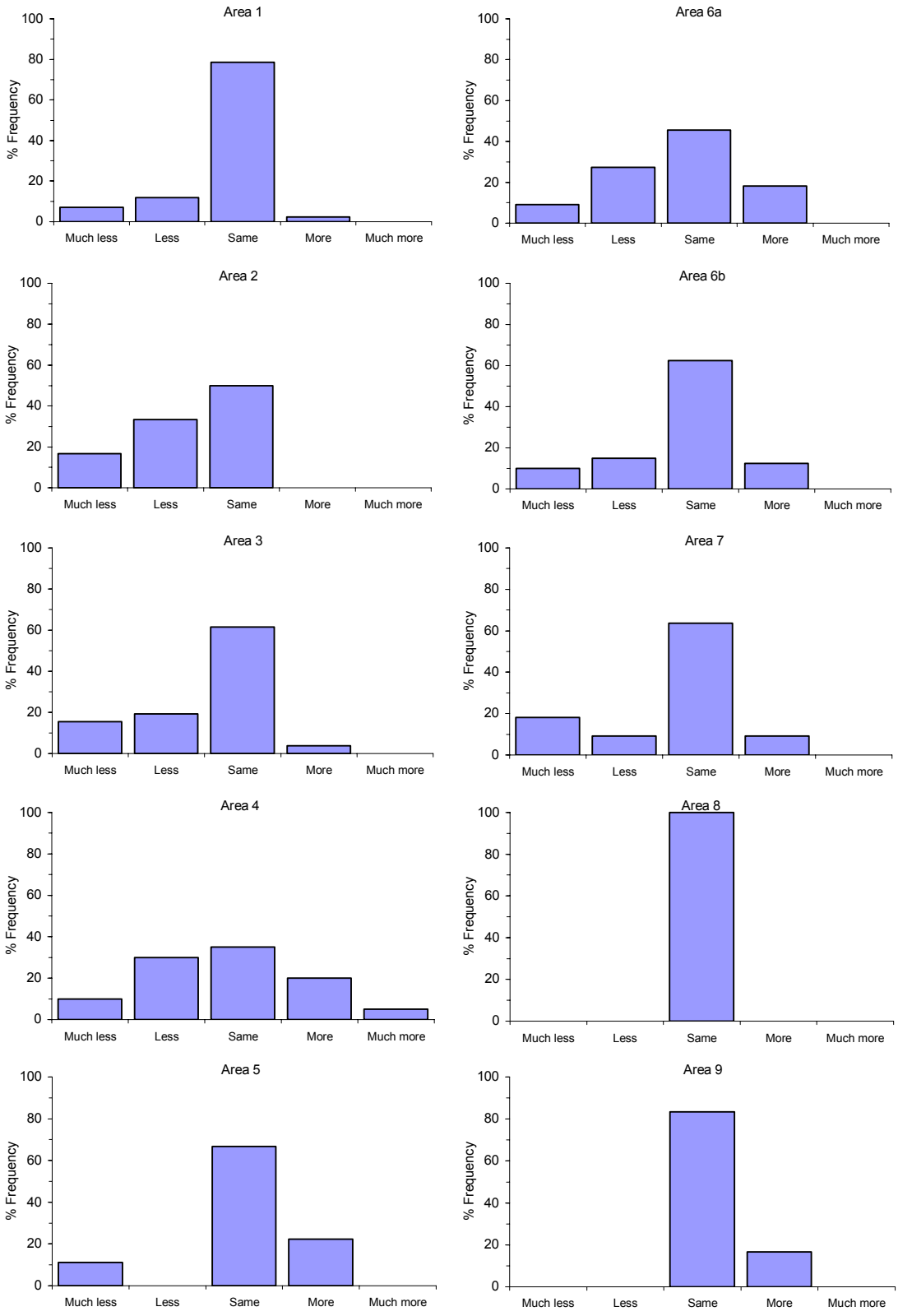
Whiting Abundance



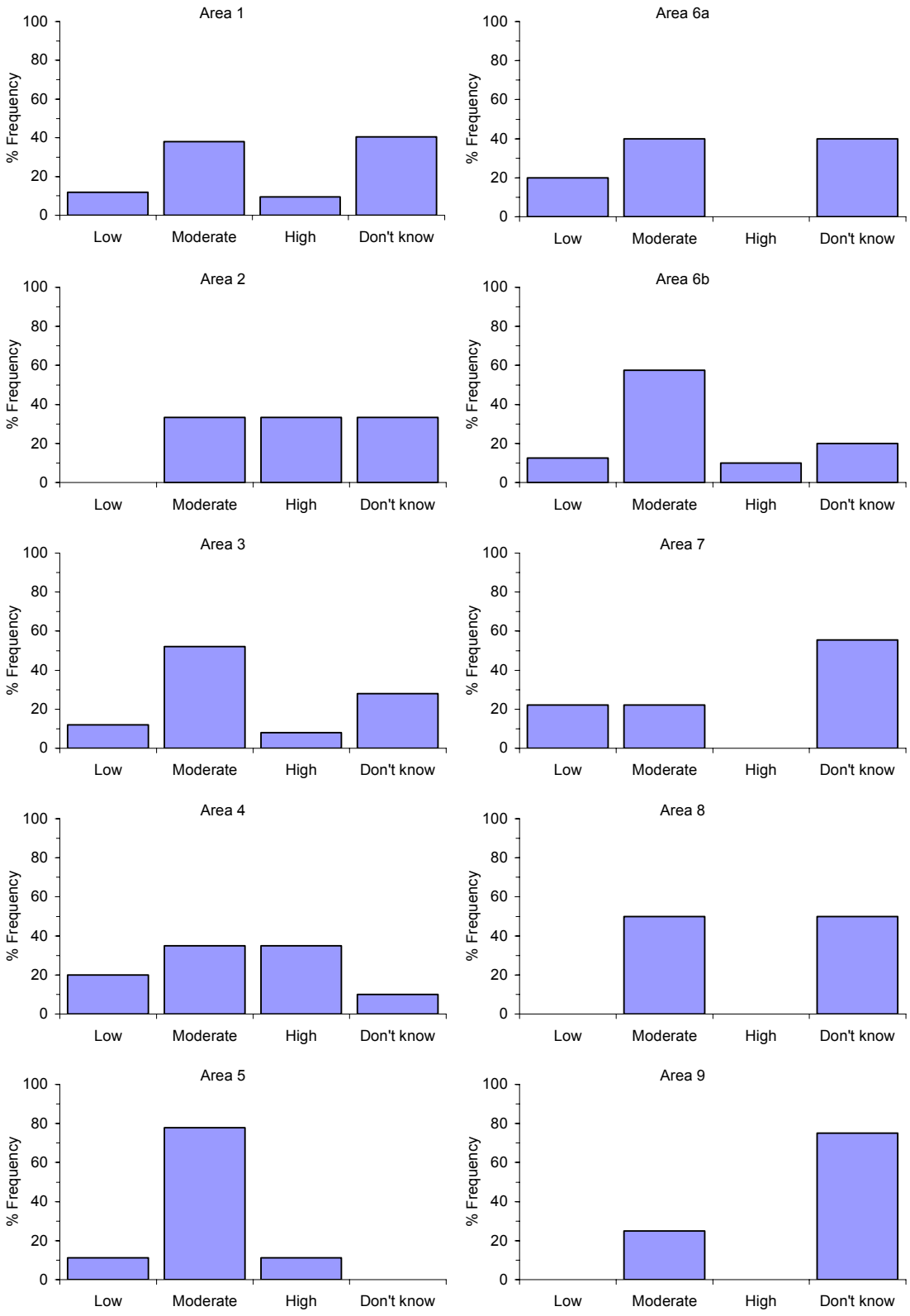
Whiting Size

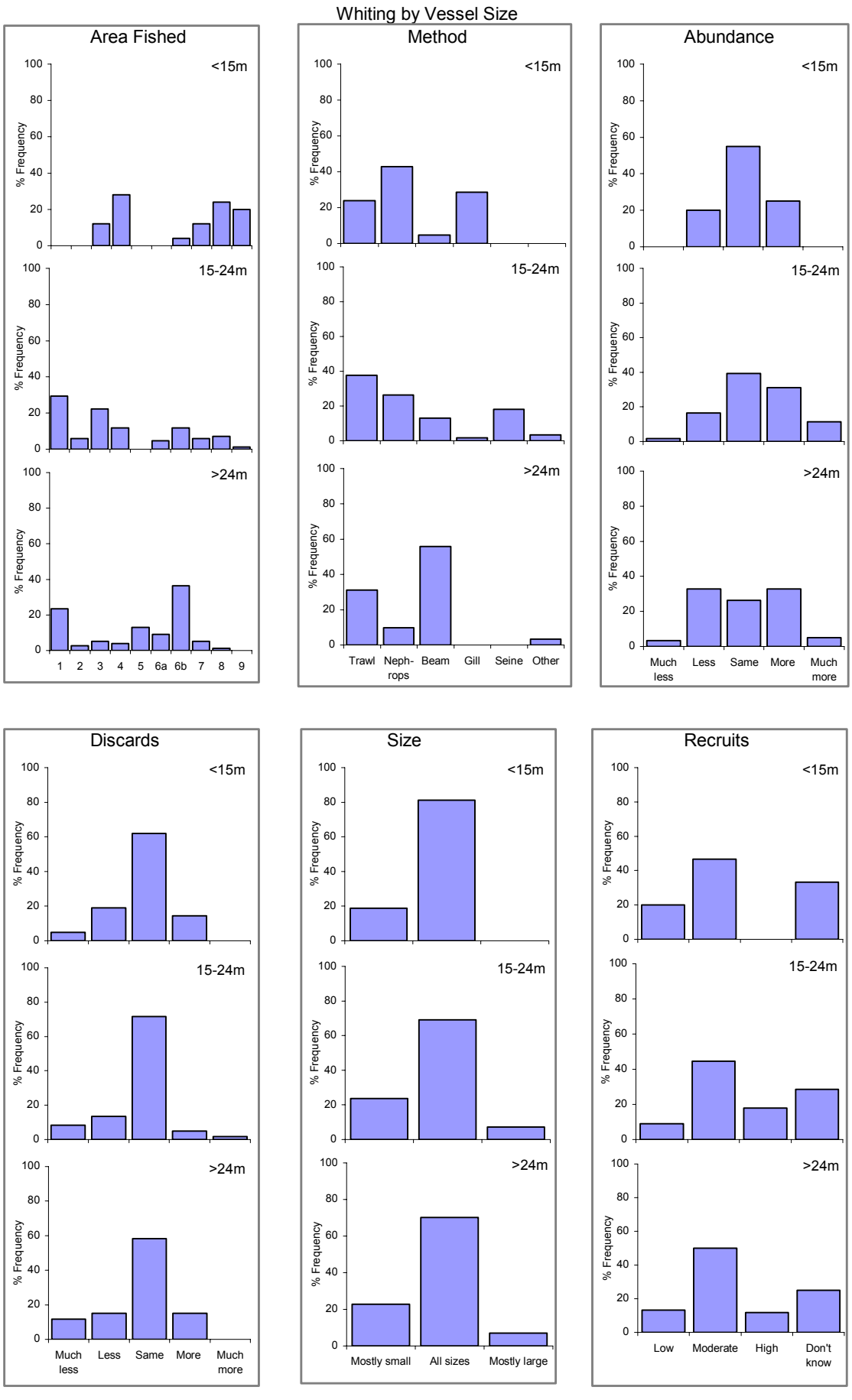


Whiting Discards

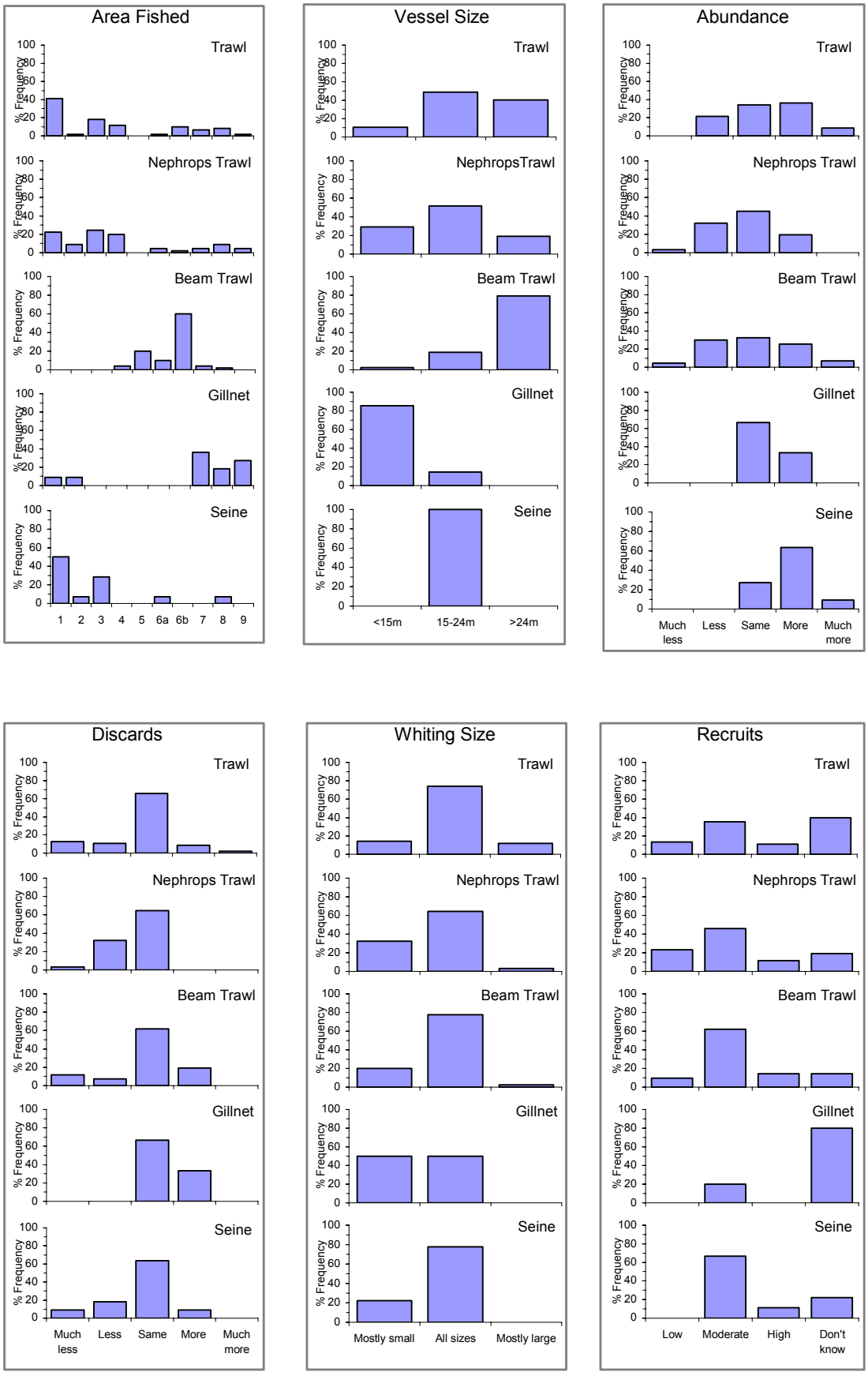


Whiting Recruits



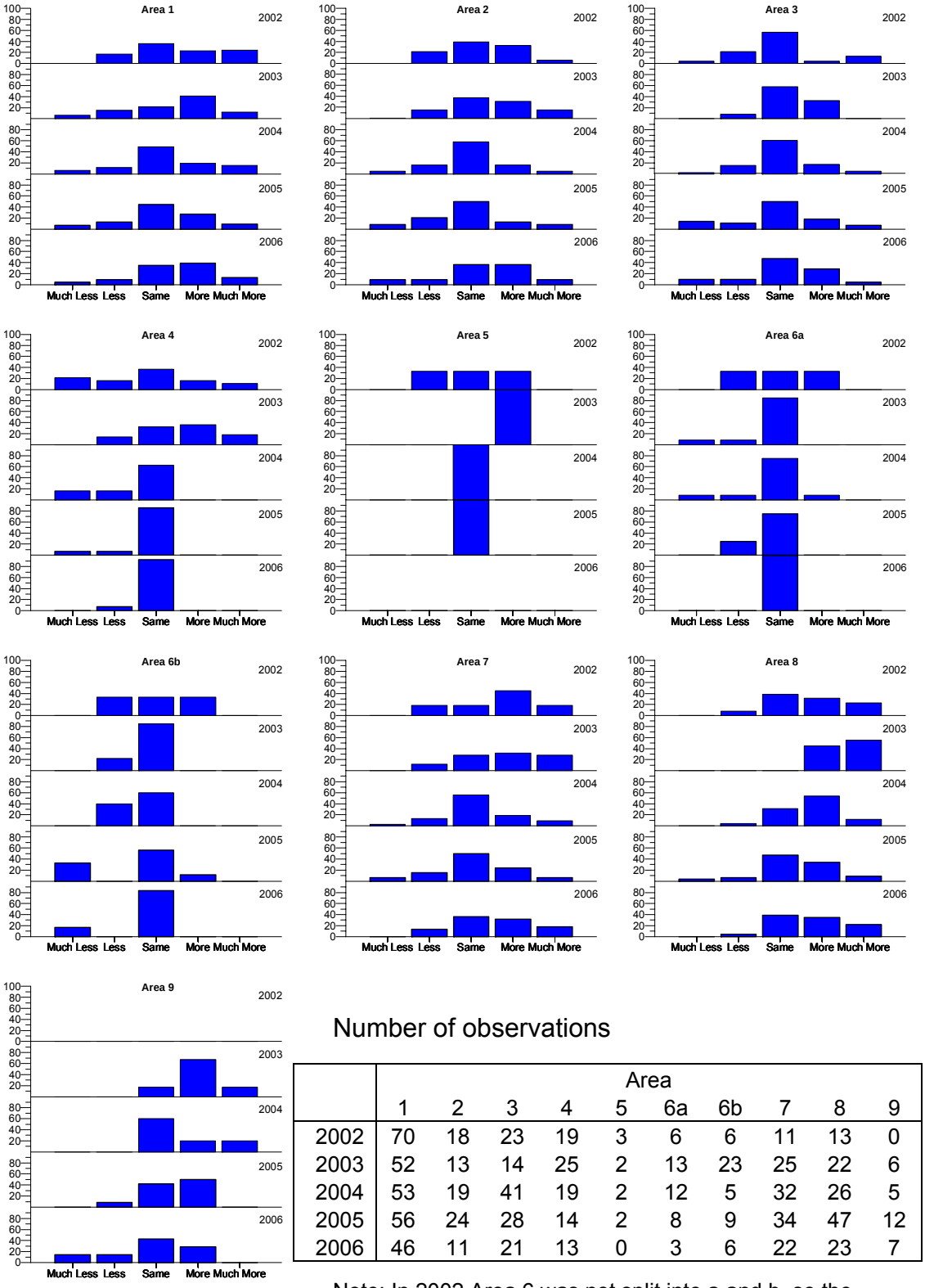

Whiting by Vessel Size
Area Fished
Method
Abundance
Discards
Size
Recruits
<15m
15-24m
>24m
% Frequency
1 2 3 4 5 6a 6b 7 8 9
Trawl
Neph-rops
Beam
Gill
Seine
Other
Much less
Less
Same
More
Much more
Mostly small
All sizes
Mostly large
Low
Moderate
High
Don't know

Whiting by Gear Type




62
61
60
59
58
57
56
55
54
53
52
51
50
-6-4-20246810
1
2
3
4
5
6a
6b
7
8
9
200
150
100
50
0
-50
-100
-150
-200
01
02
03
04
05
06

Abundance Time Series – Saithe

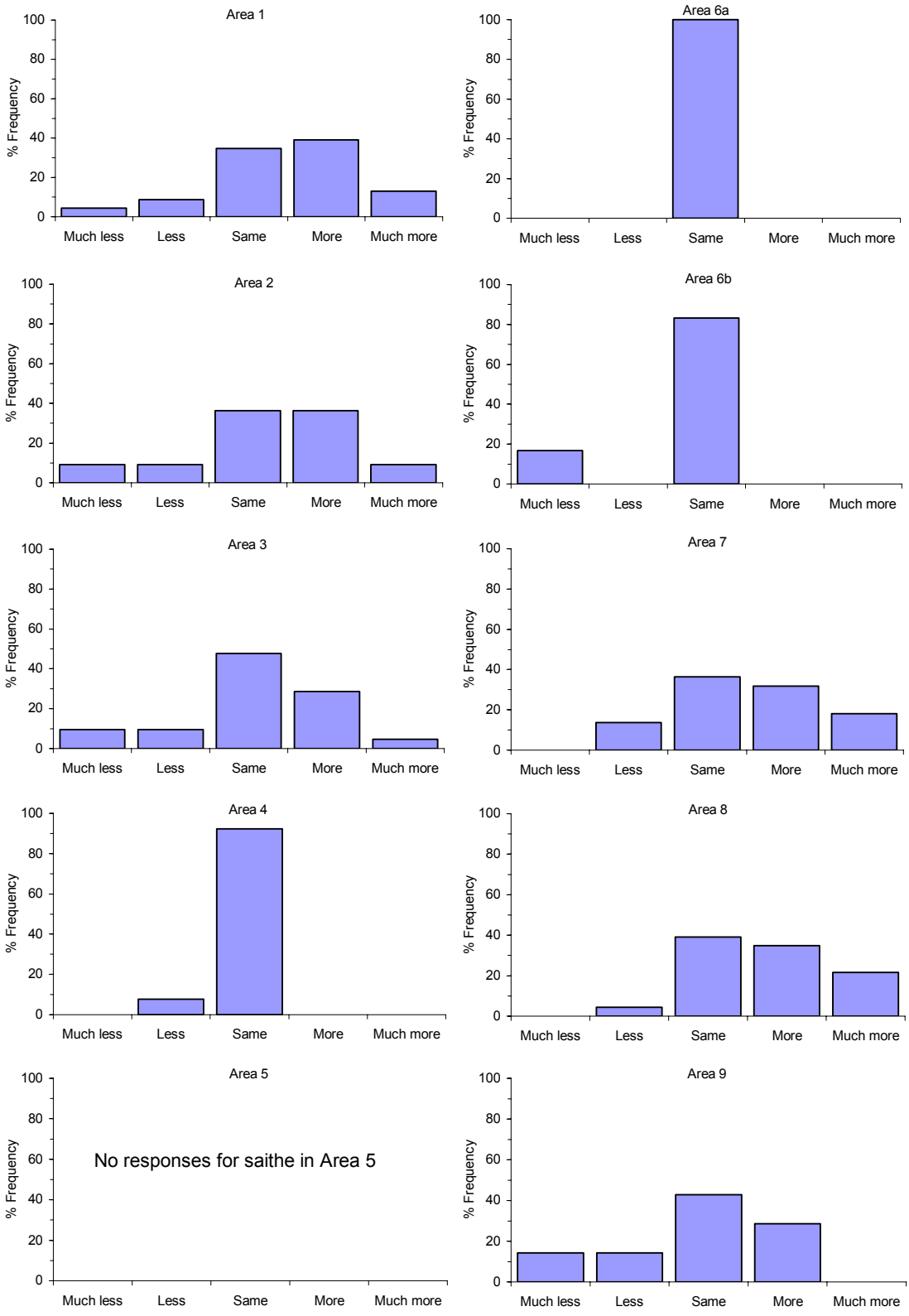


Number of observations

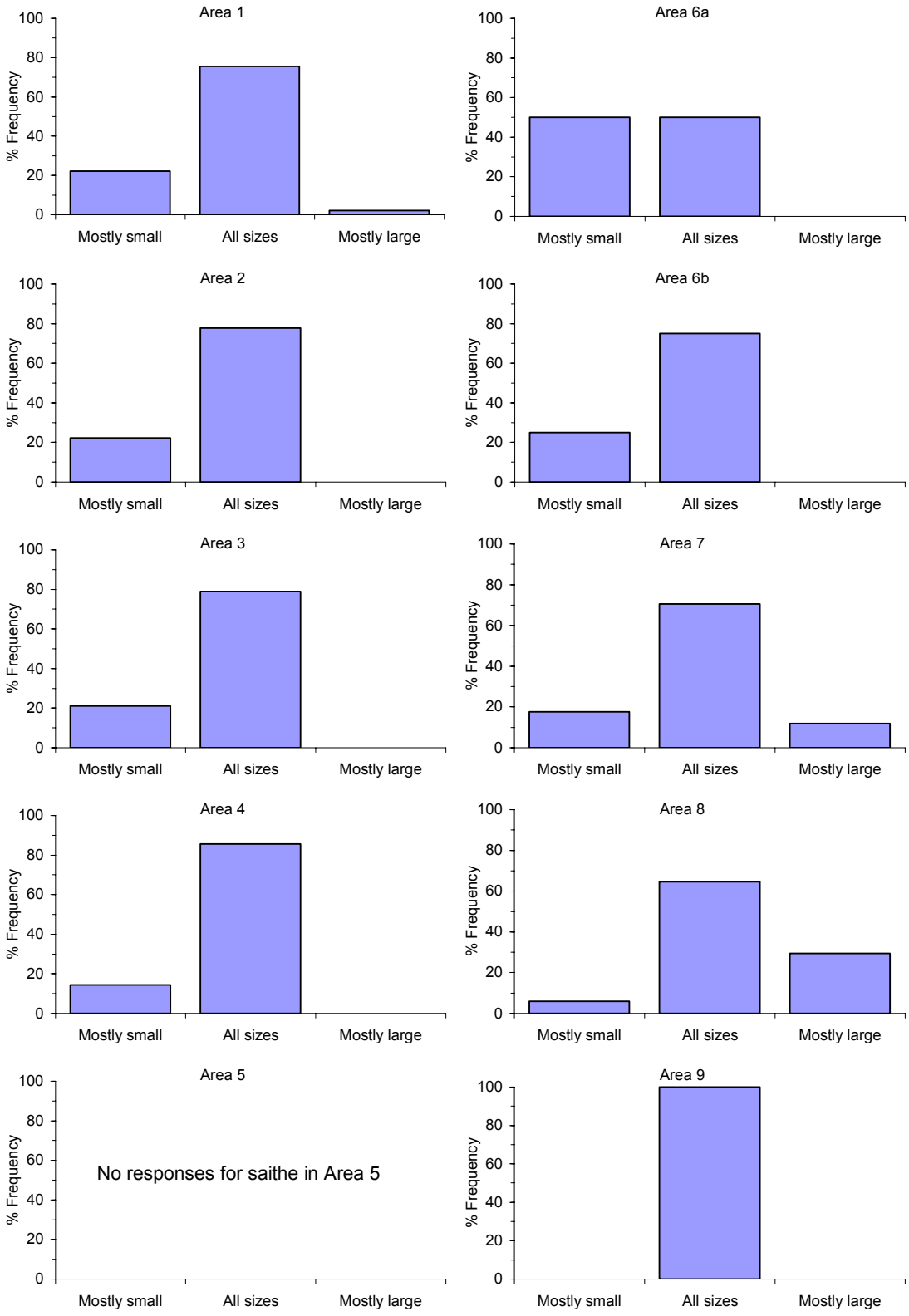
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	70	18	23	19	3	6	6	11	13	0
2003	52	13	14	25	2	13	23	25	22	6
2004	53	19	41	19	2	12	5	32	26	5
2005	56	24	28	14	2	8	9	34	47	12
2006	46	11	21	13	0	3	6	22	23	7

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

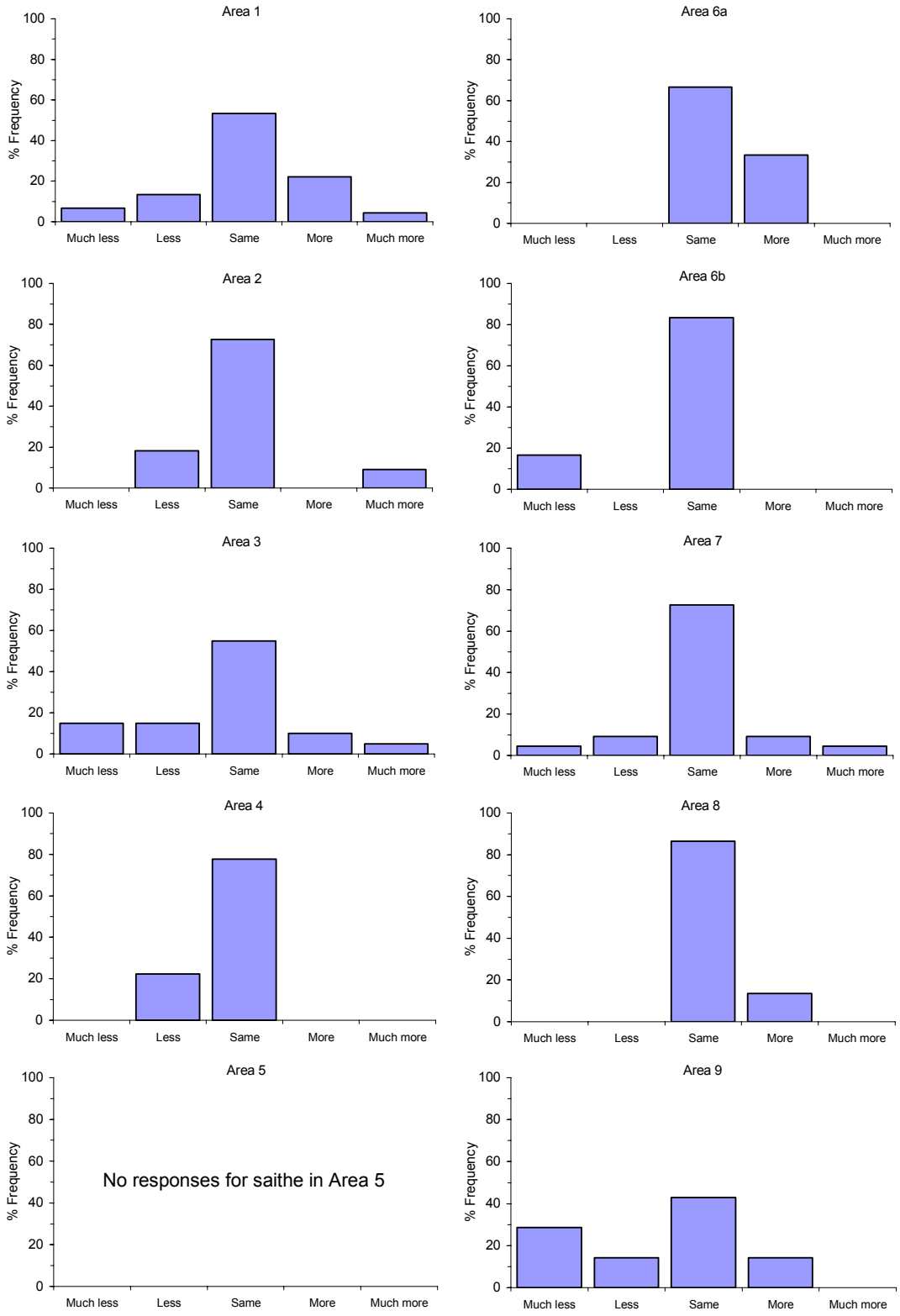
Saithe Abundance



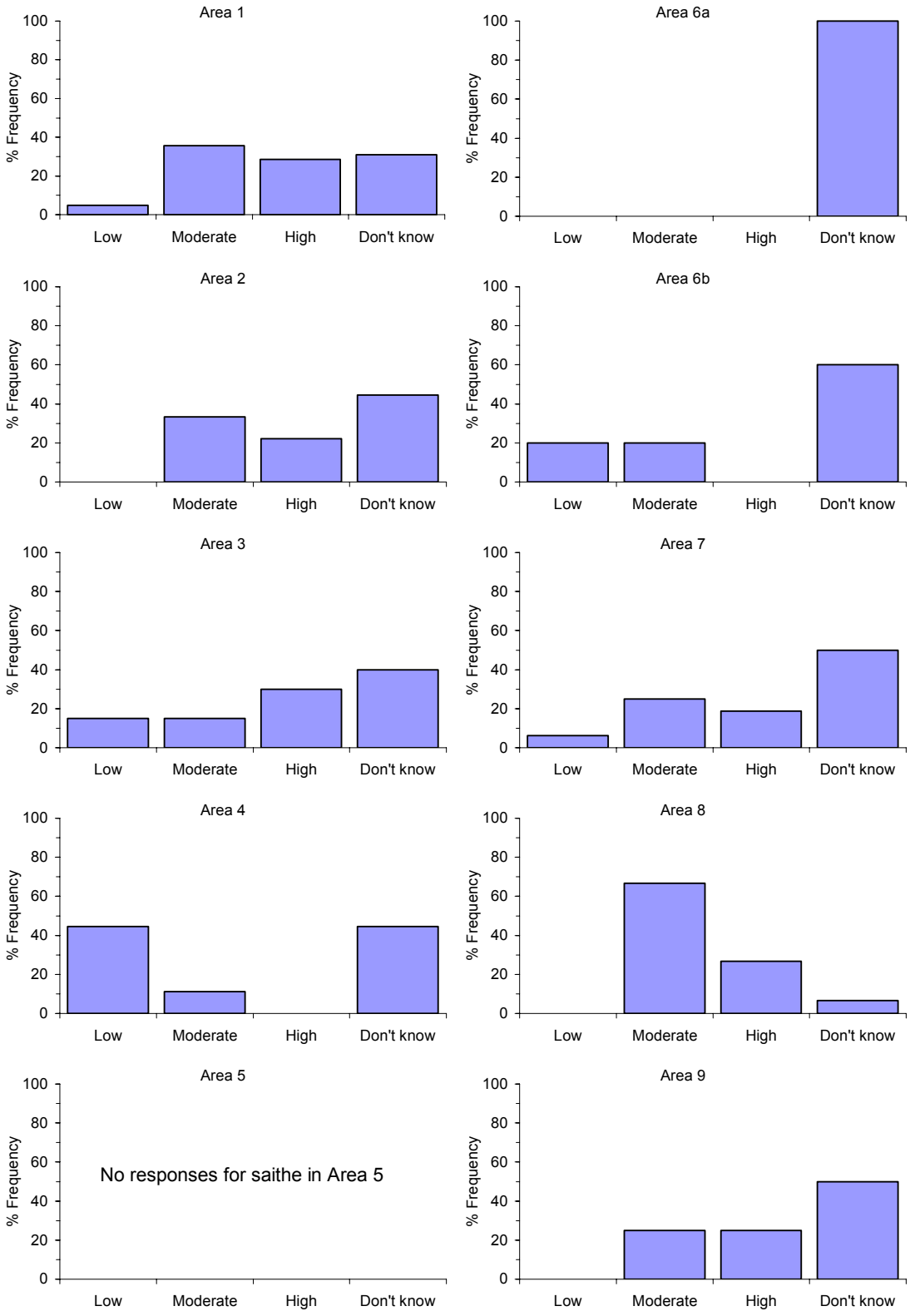
Saithe Size


Area 1
Area 6a
Area 2
Area 6b
Area 3
Area 7
Area 4
Area 8
Area 5
Area 9
% Frequency
100
80
60
40
20
0
Mostly small
All sizes
Mostly large
No responses for saithe in Area 5

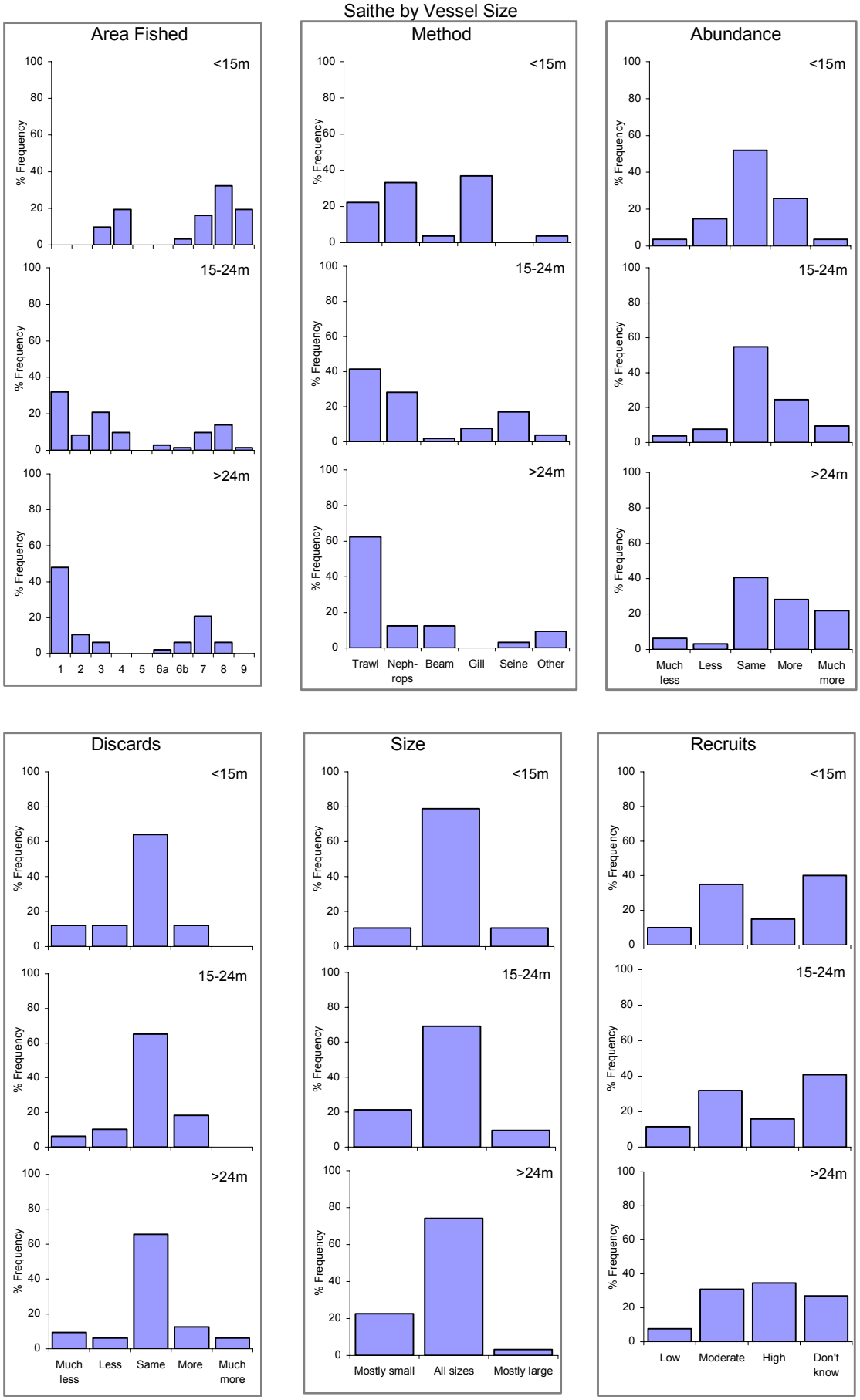
Saithe Discards



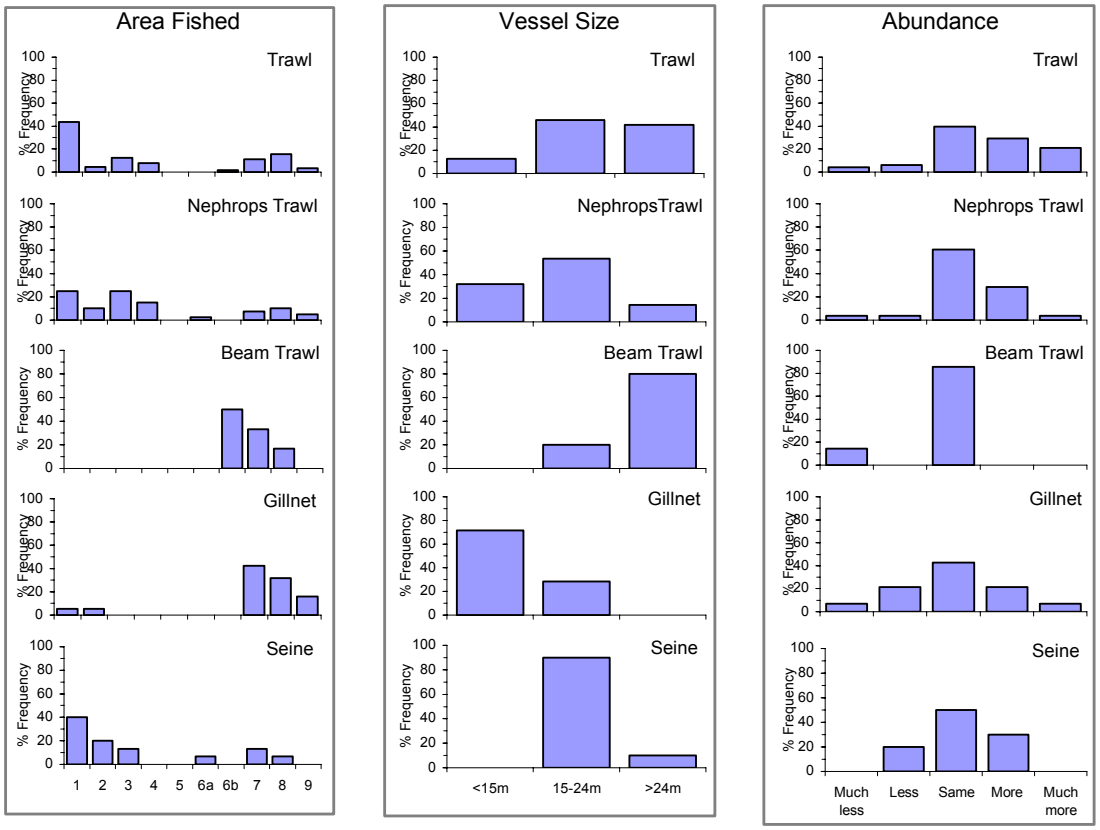
Saithe Recruits

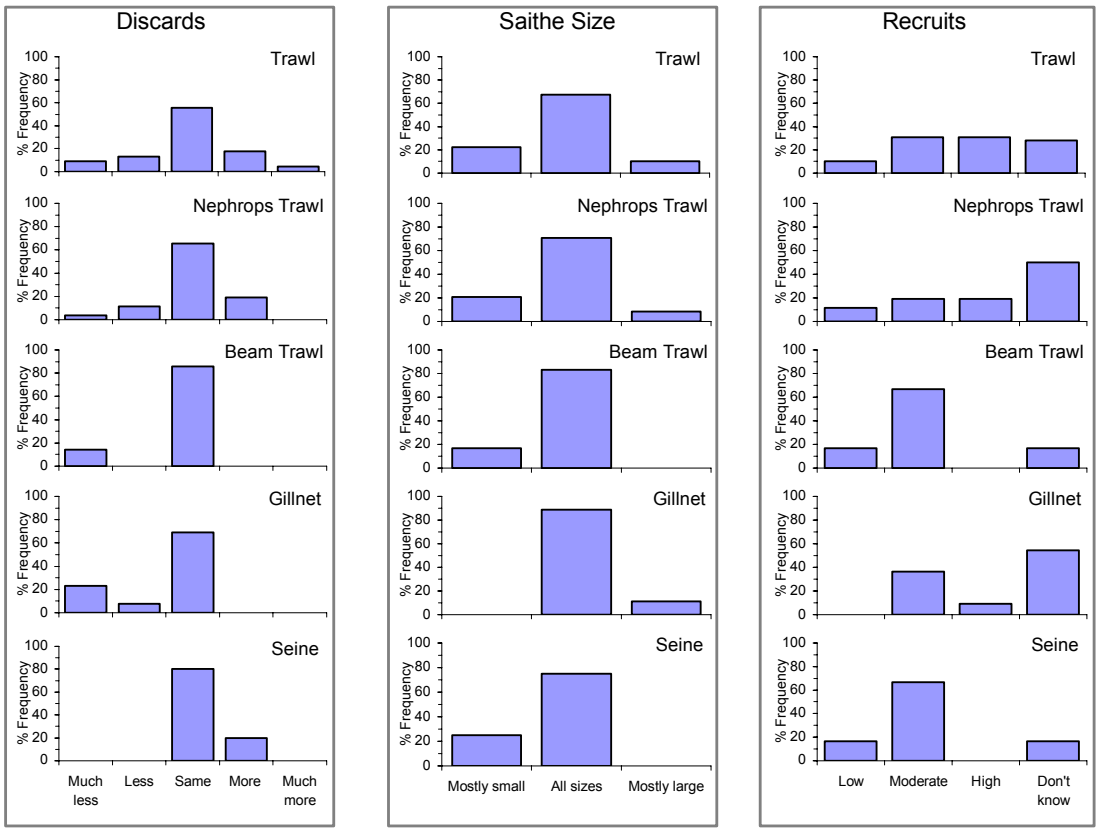


Saithe by Vessel Size



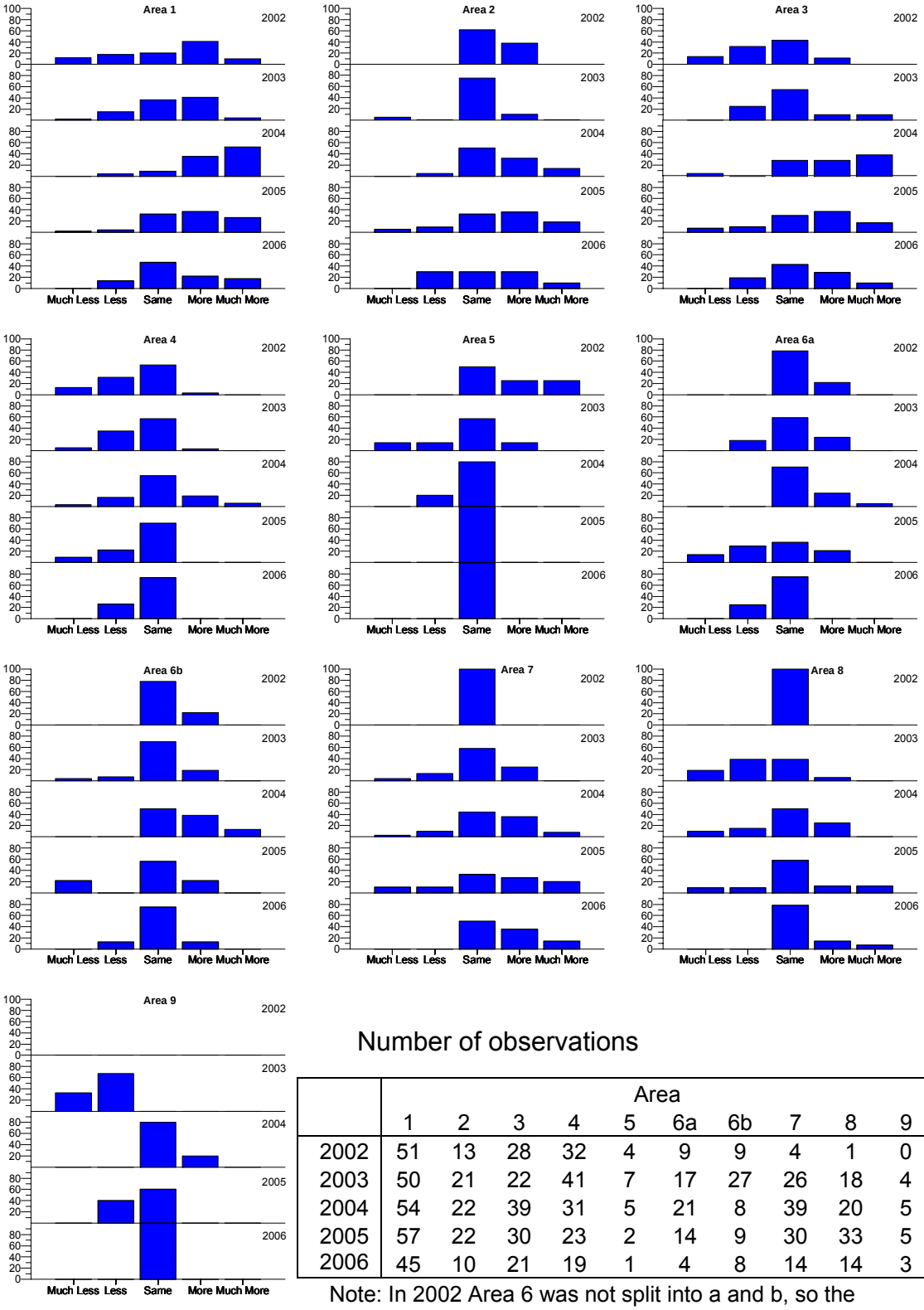
Saithe by Gear Type






62
61
60
59
58
57
56
55
54
53
52
51
50
1
2
3
4
5
6a
6b
7
8
9
200
150
100
50
0
-50
-100
-150
-200
01
02
03
04
05
06

Abundance Time Series – Monkfish

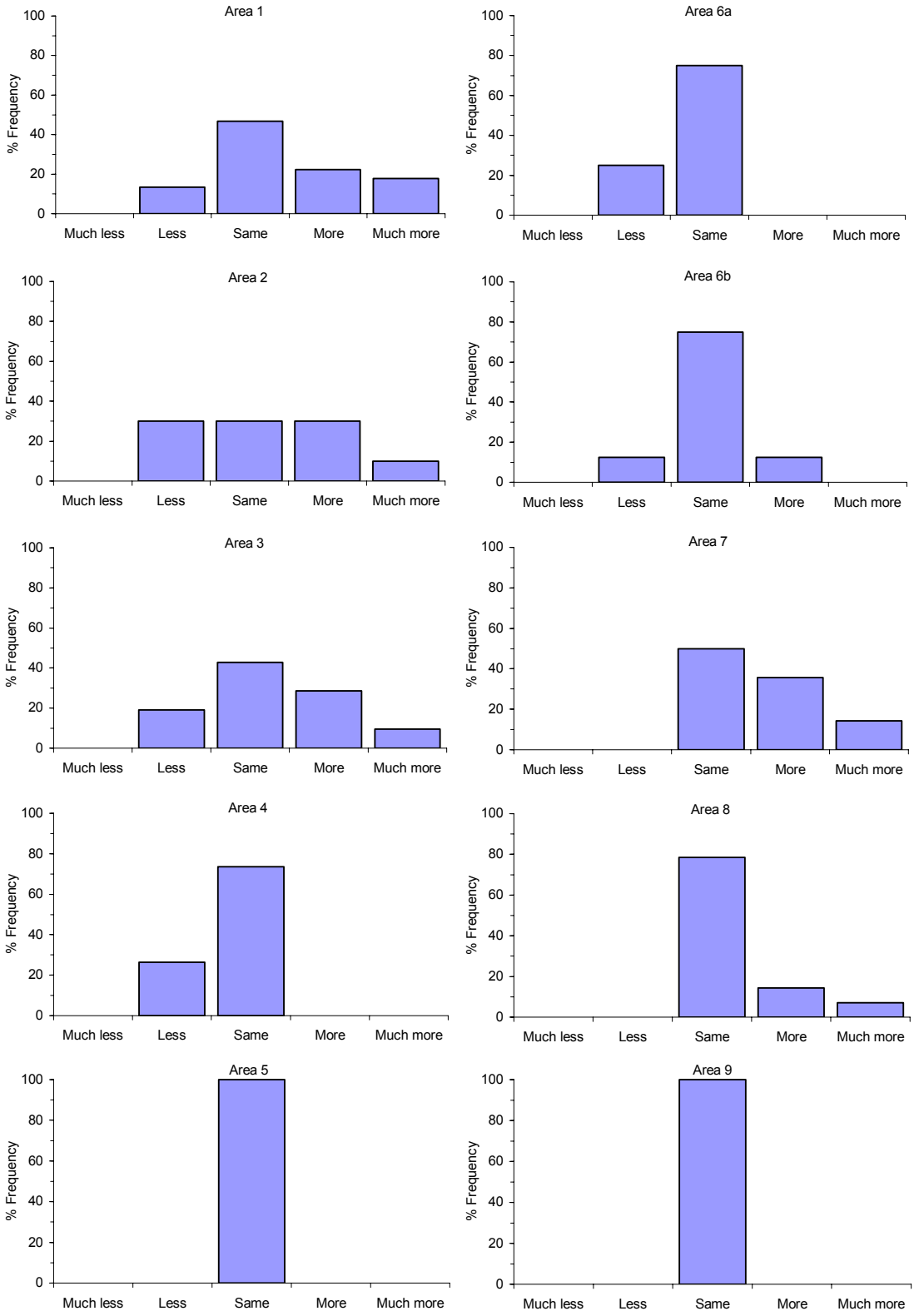


Number of observations

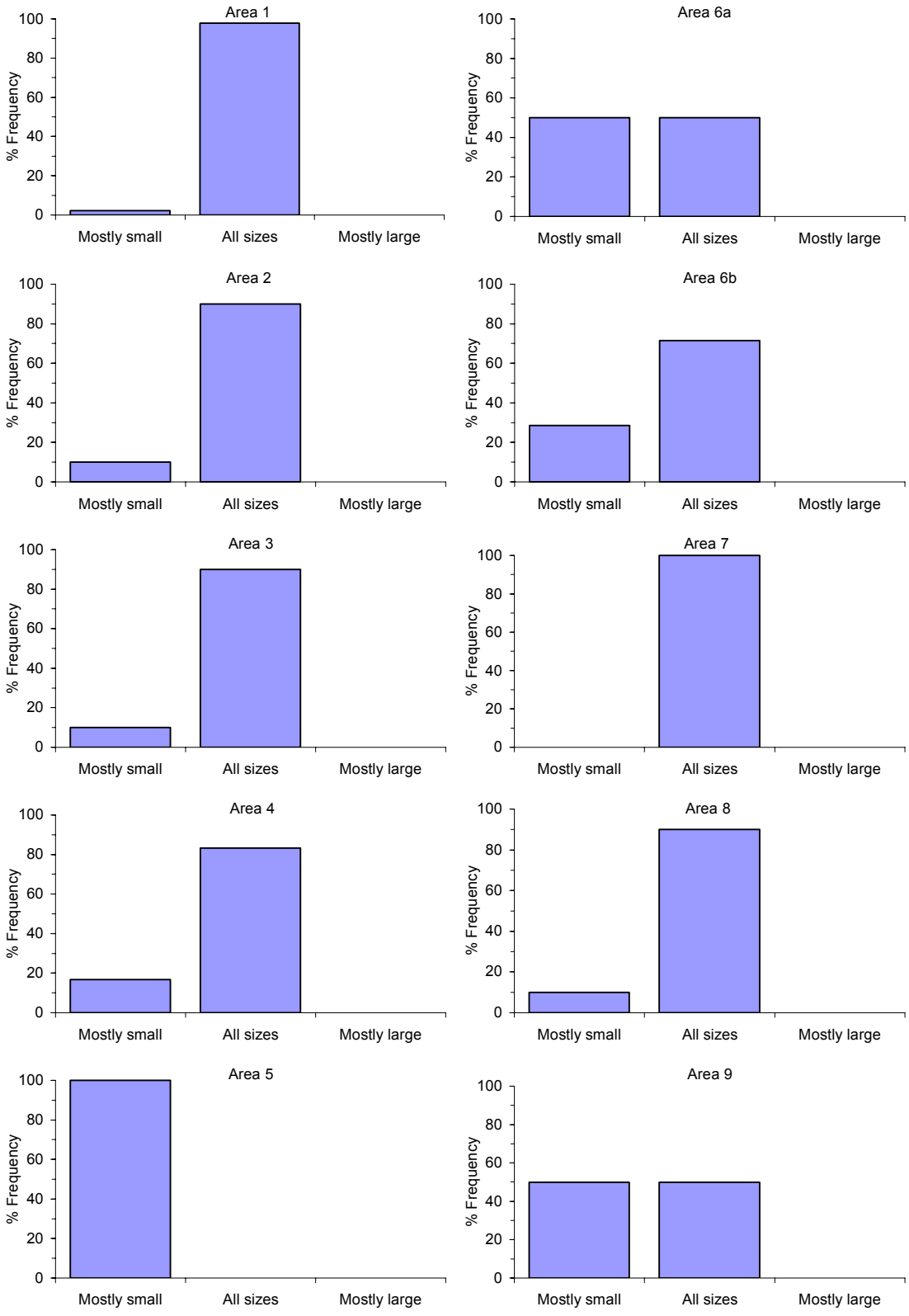
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	51	13	28	32	4	9	9	4	1	0
2003	50	21	22	41	7	17	27	26	18	4
2004	54	22	39	31	5	21	8	39	20	5
2005	57	22	30	23	2	14	9	30	33	5
2006	45	10	21	19	1	4	8	14	14	3

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

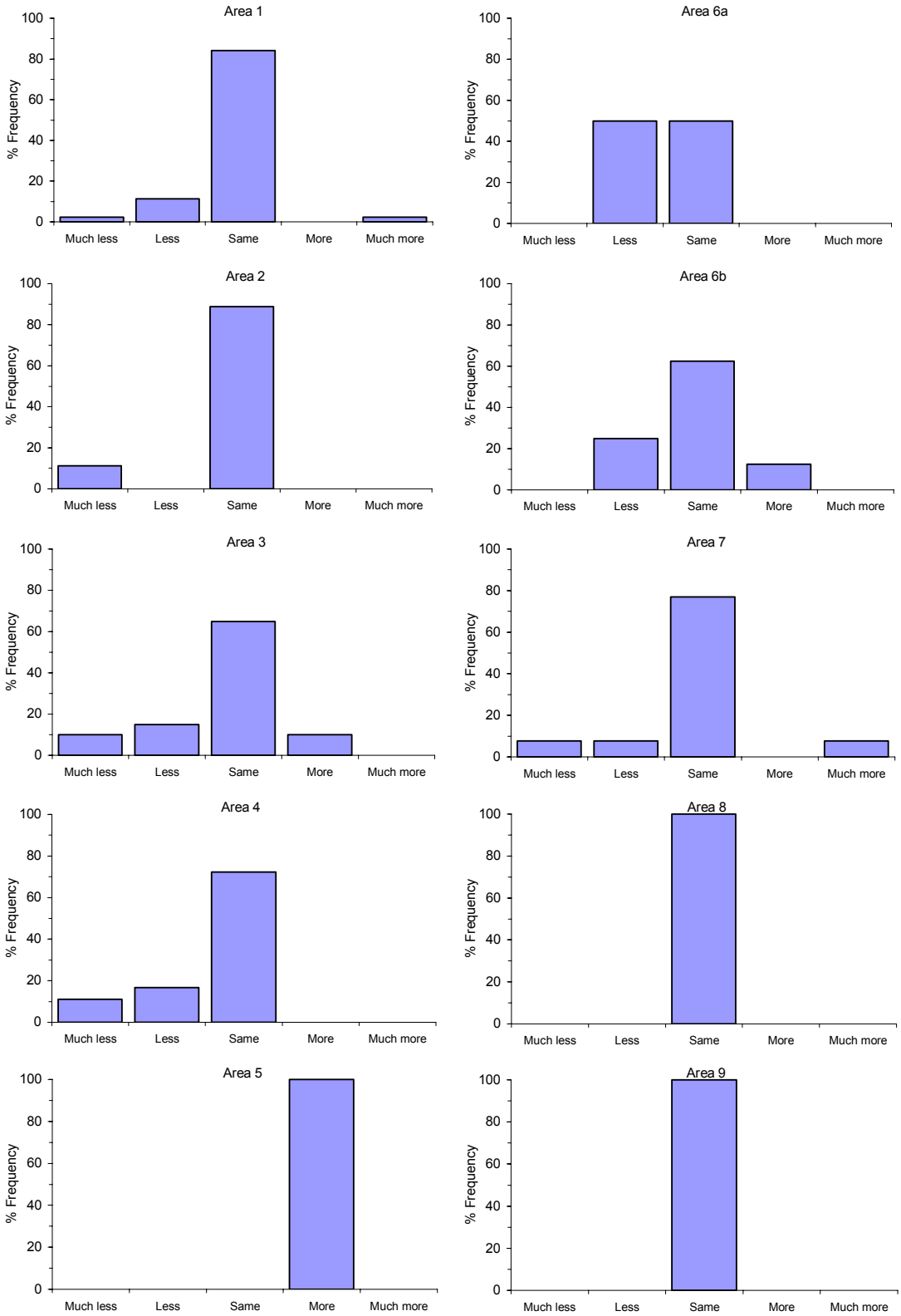
Monkfish Abundance



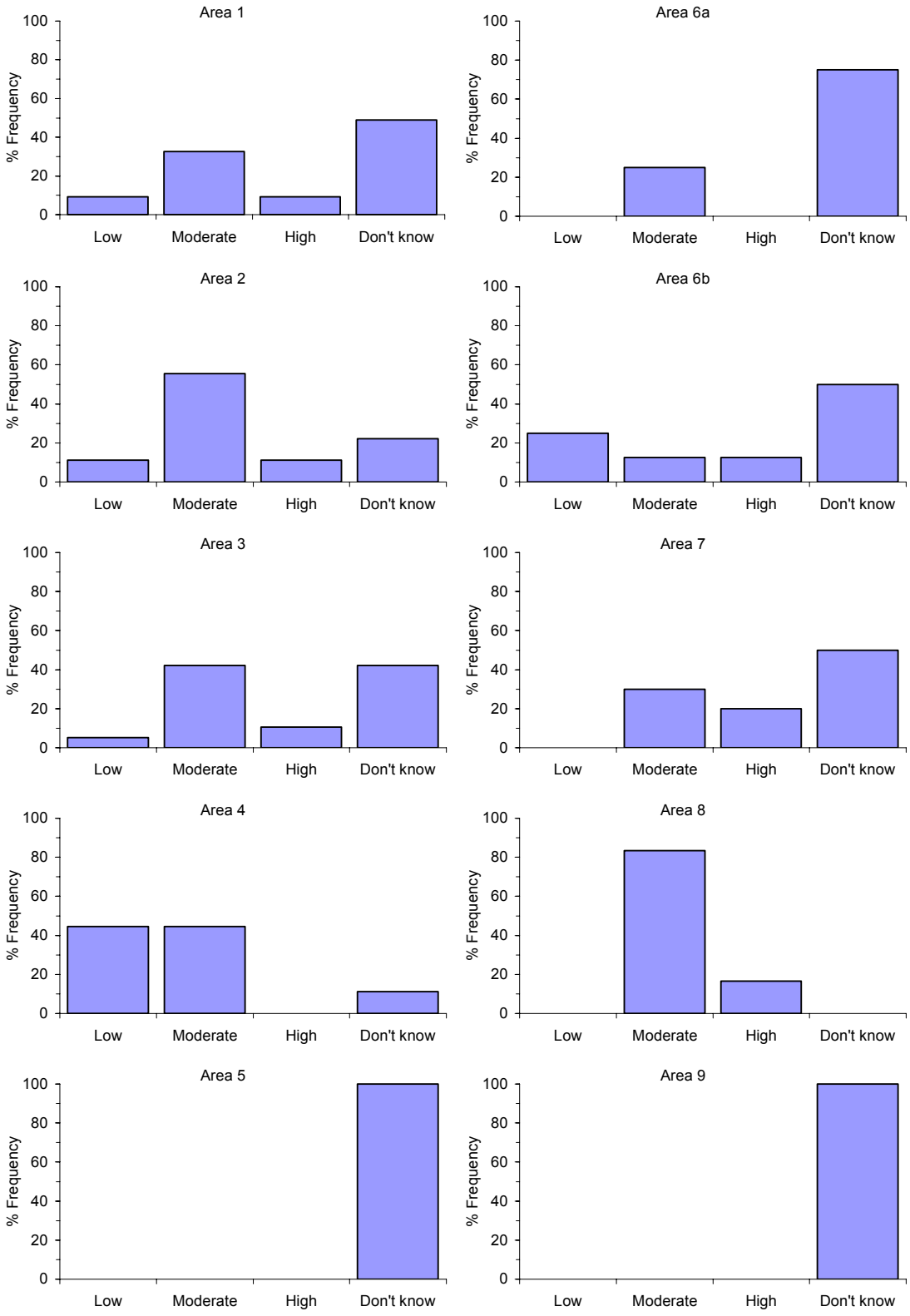
Monkfish Size



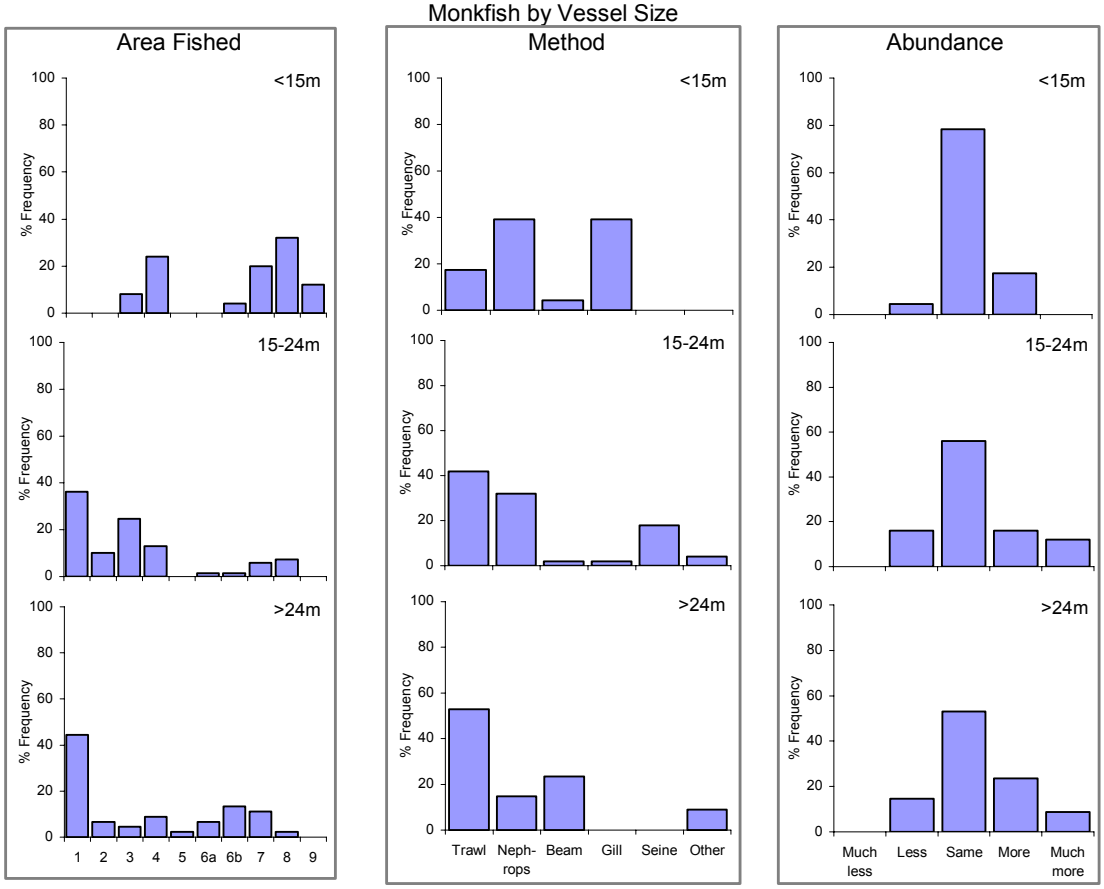
Monkfish Discards

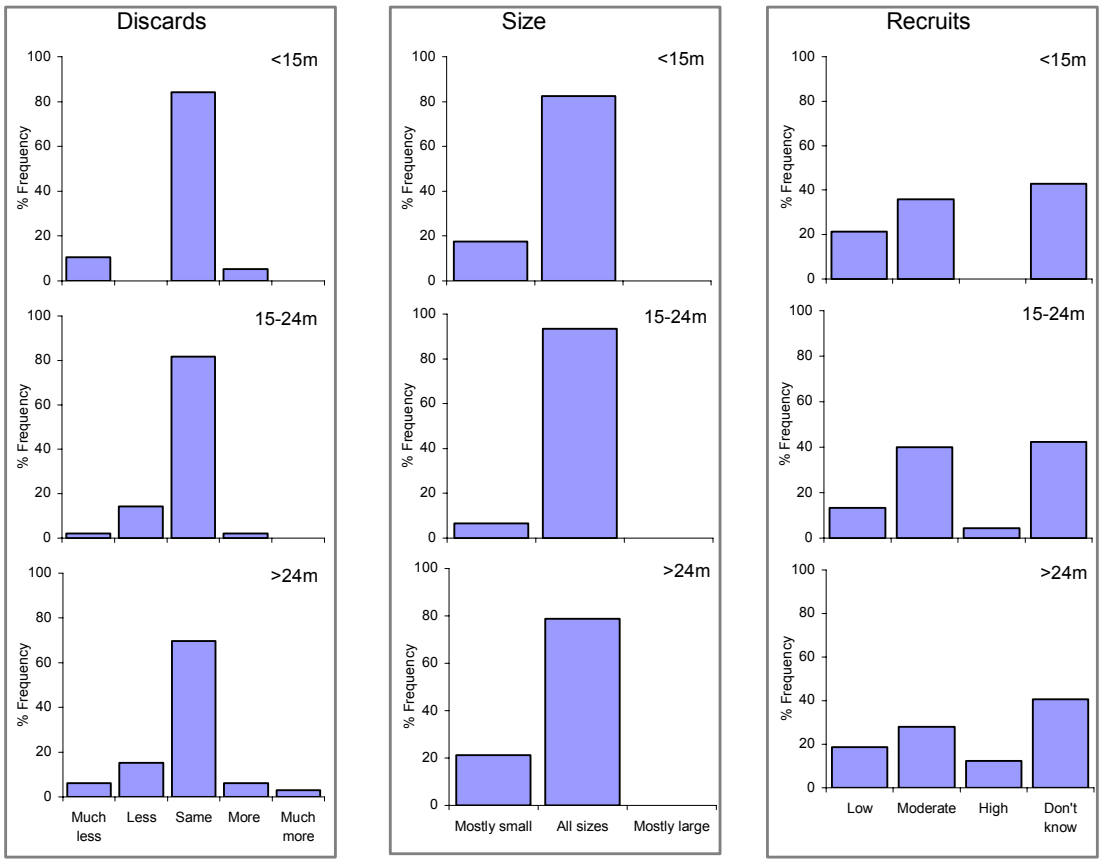


Monkfish Recruits

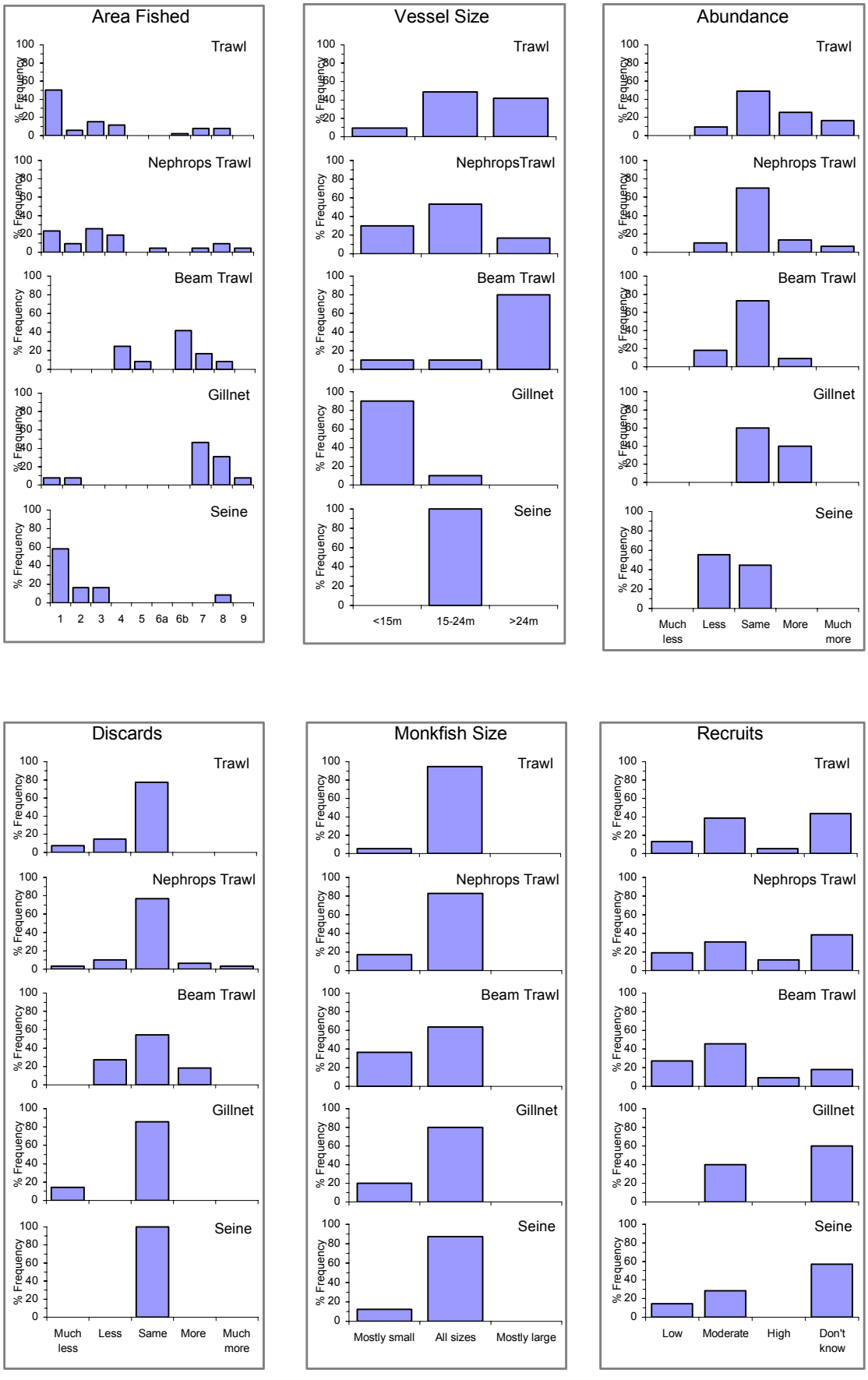


Monkfish by Vessel Size



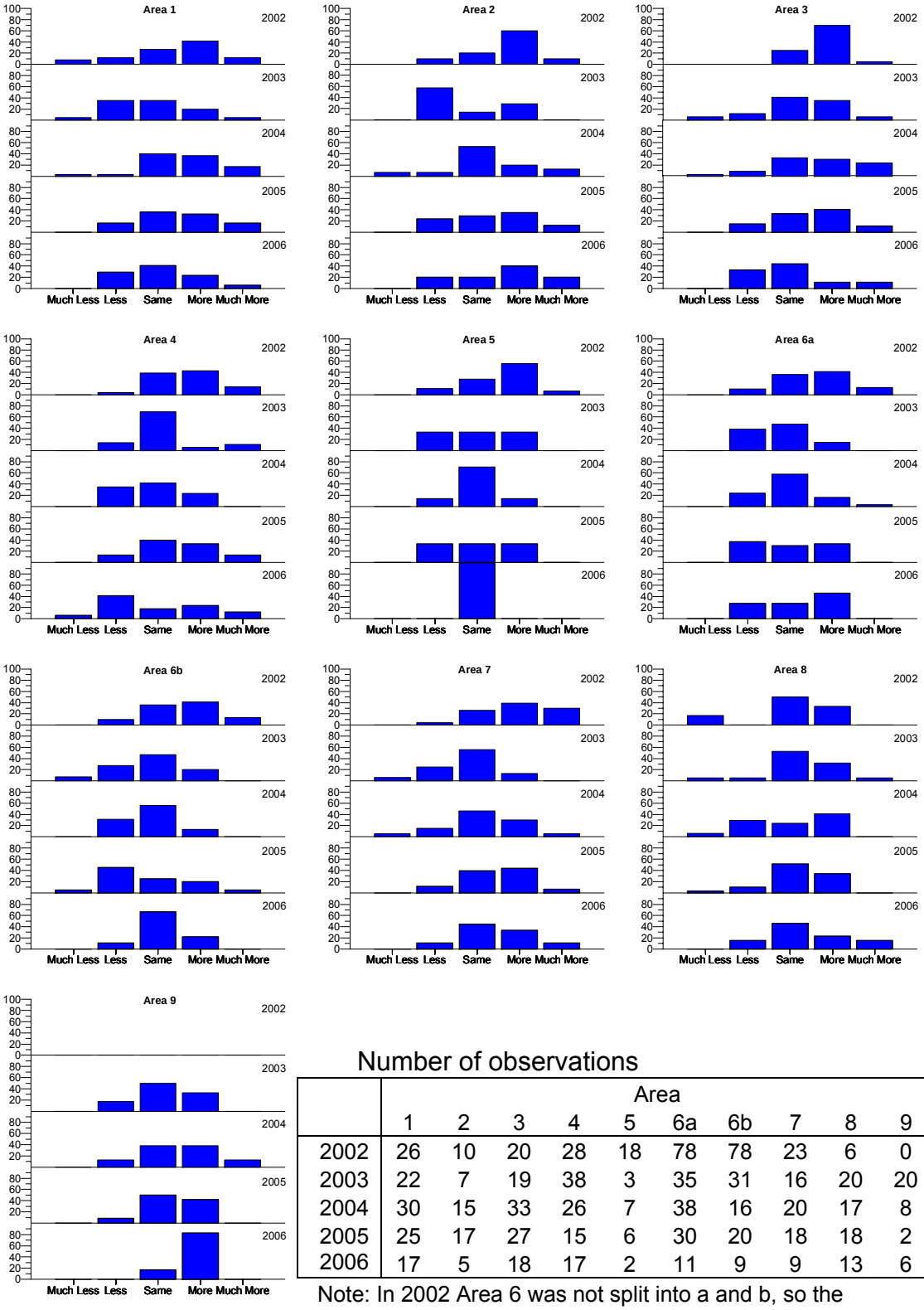


Monkfish by Gear Type



Time Series - Monkfish

Abundance Time Series – *Nephrops*

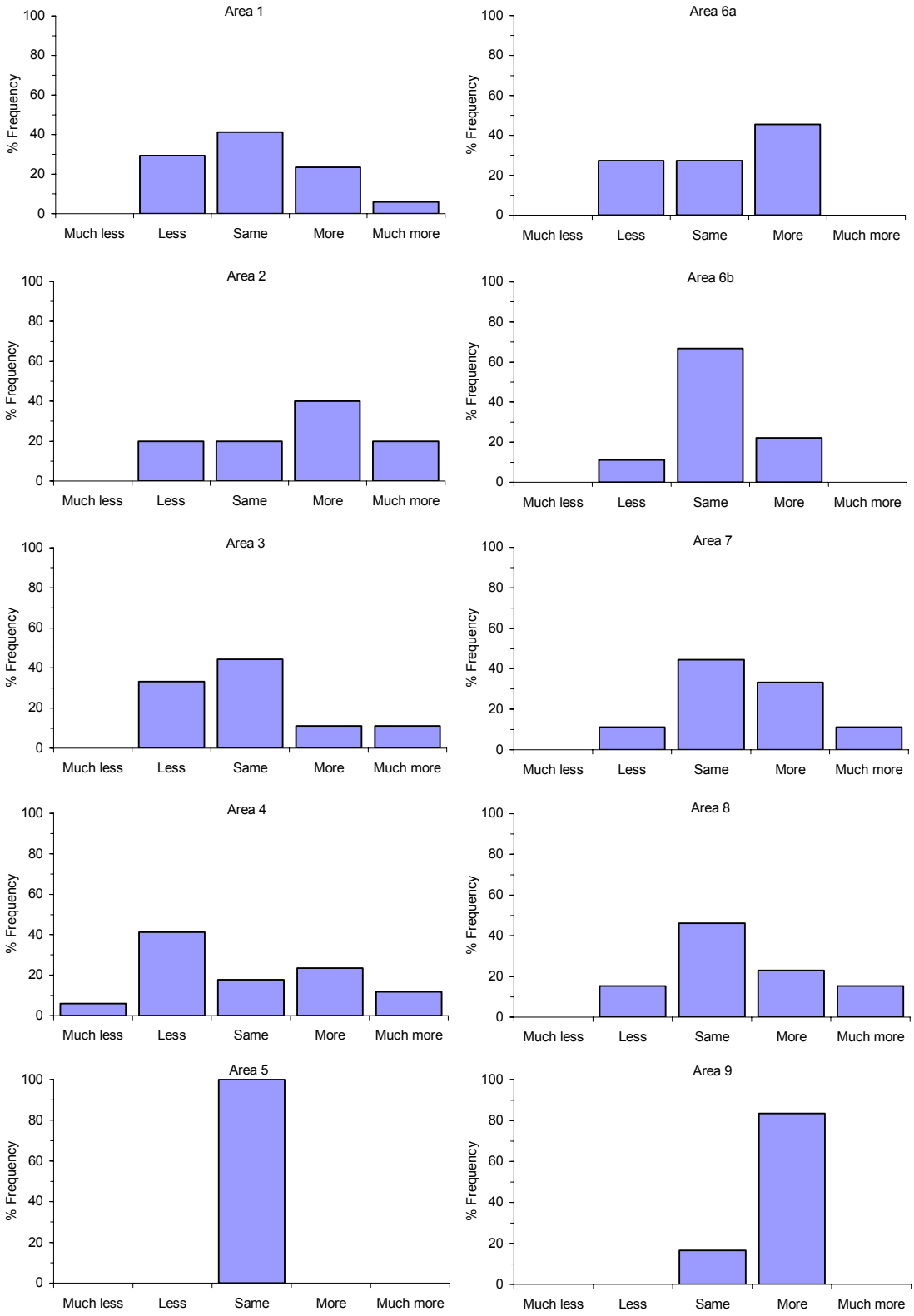


Number of observations

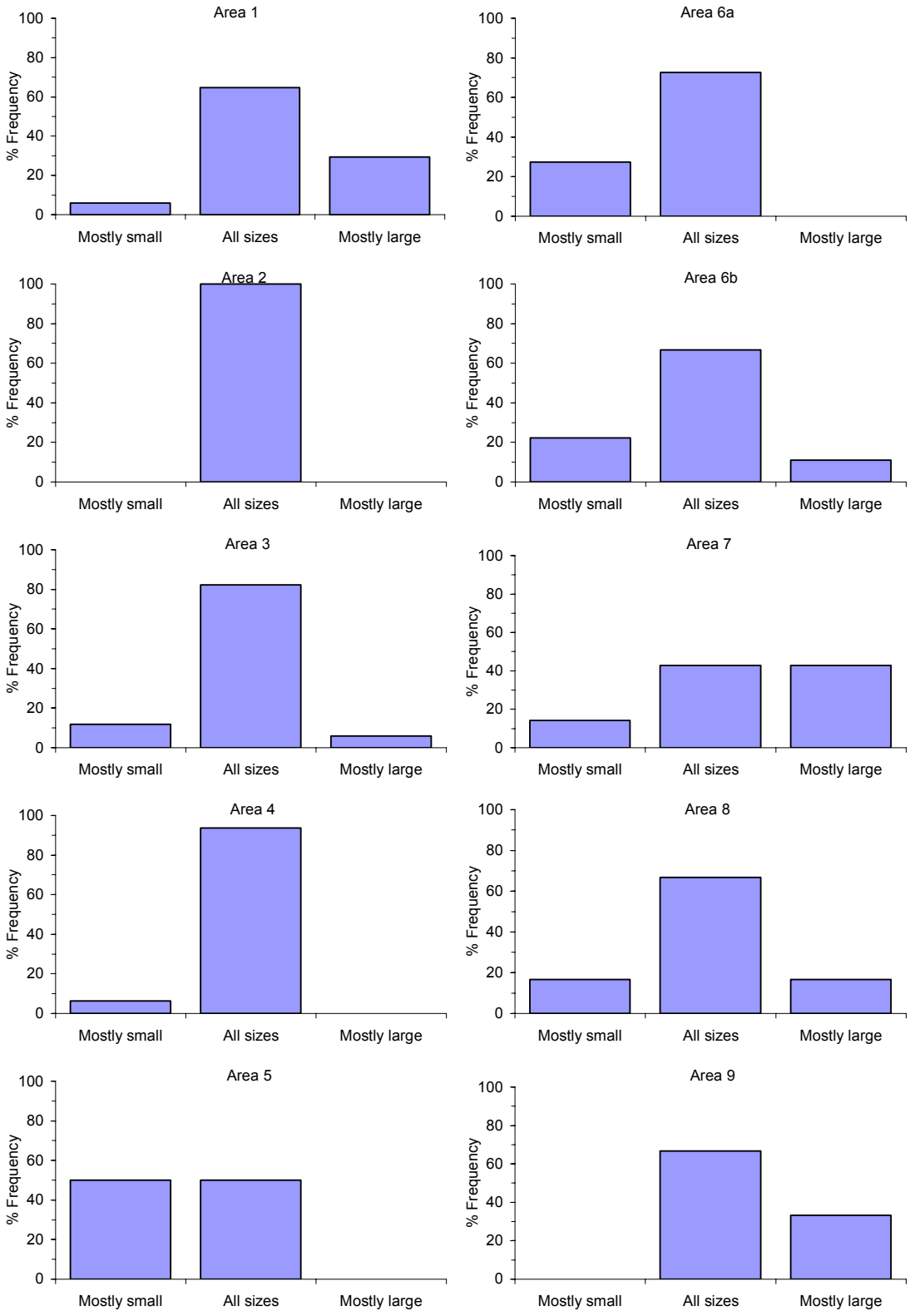
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	26	10	20	28	18	78	78	23	6	0
2003	22	7	19	38	3	35	31	16	20	20
2004	30	15	33	26	7	38	16	20	17	8
2005	25	17	27	15	6	30	20	18	18	2
2006	17	5	18	17	2	11	9	9	13	6

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

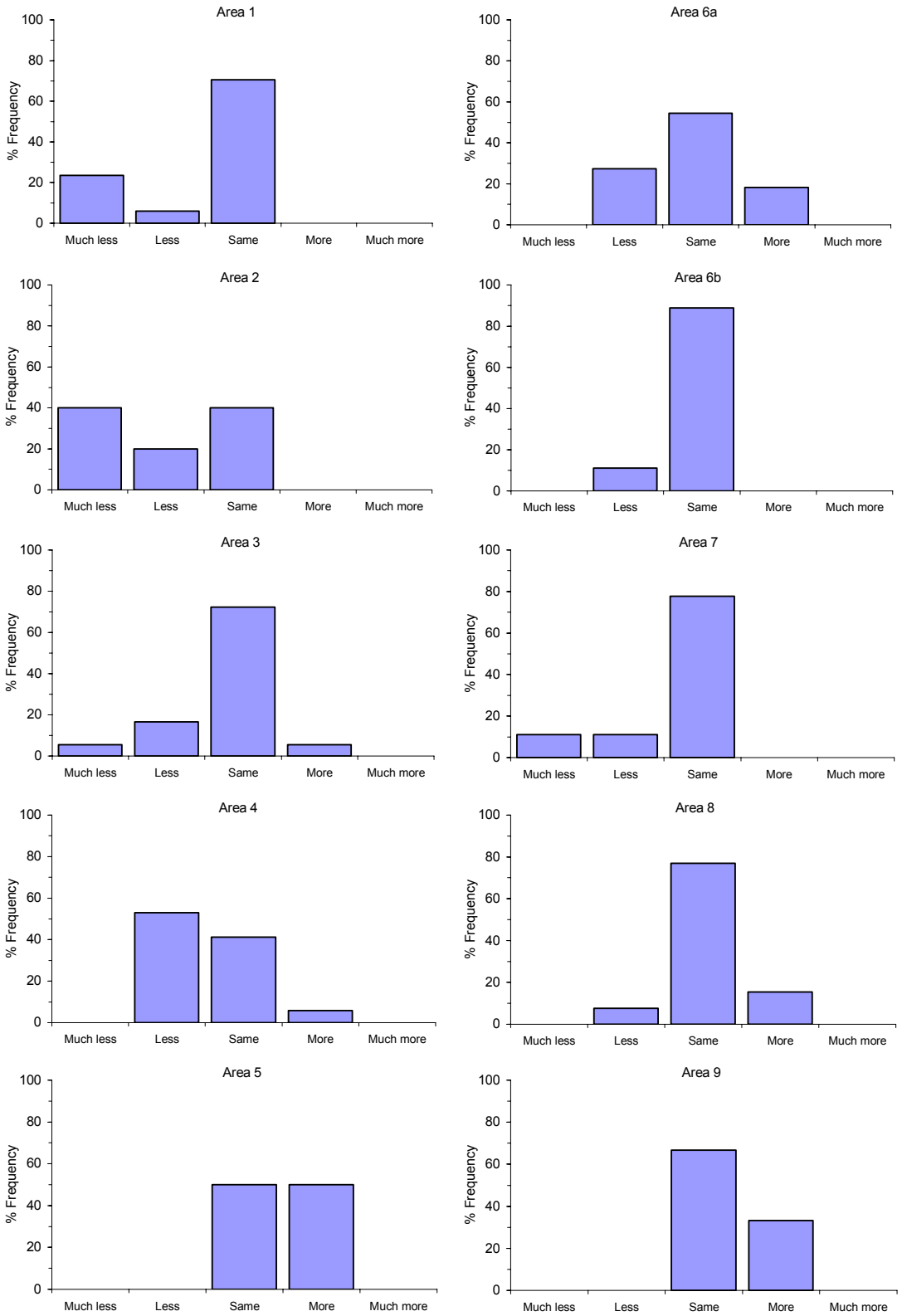
Nephrops Abundance



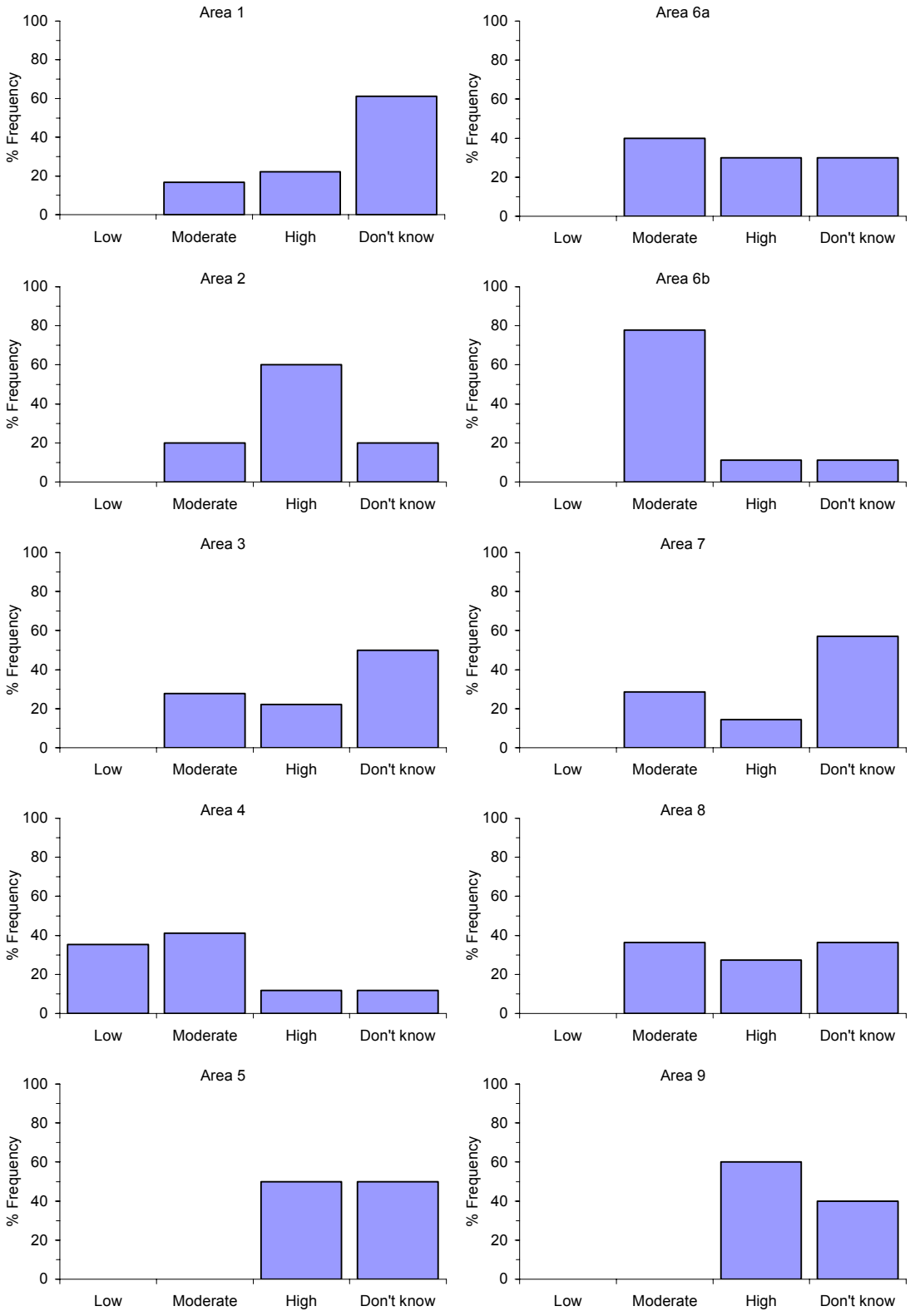
Nephrops Size



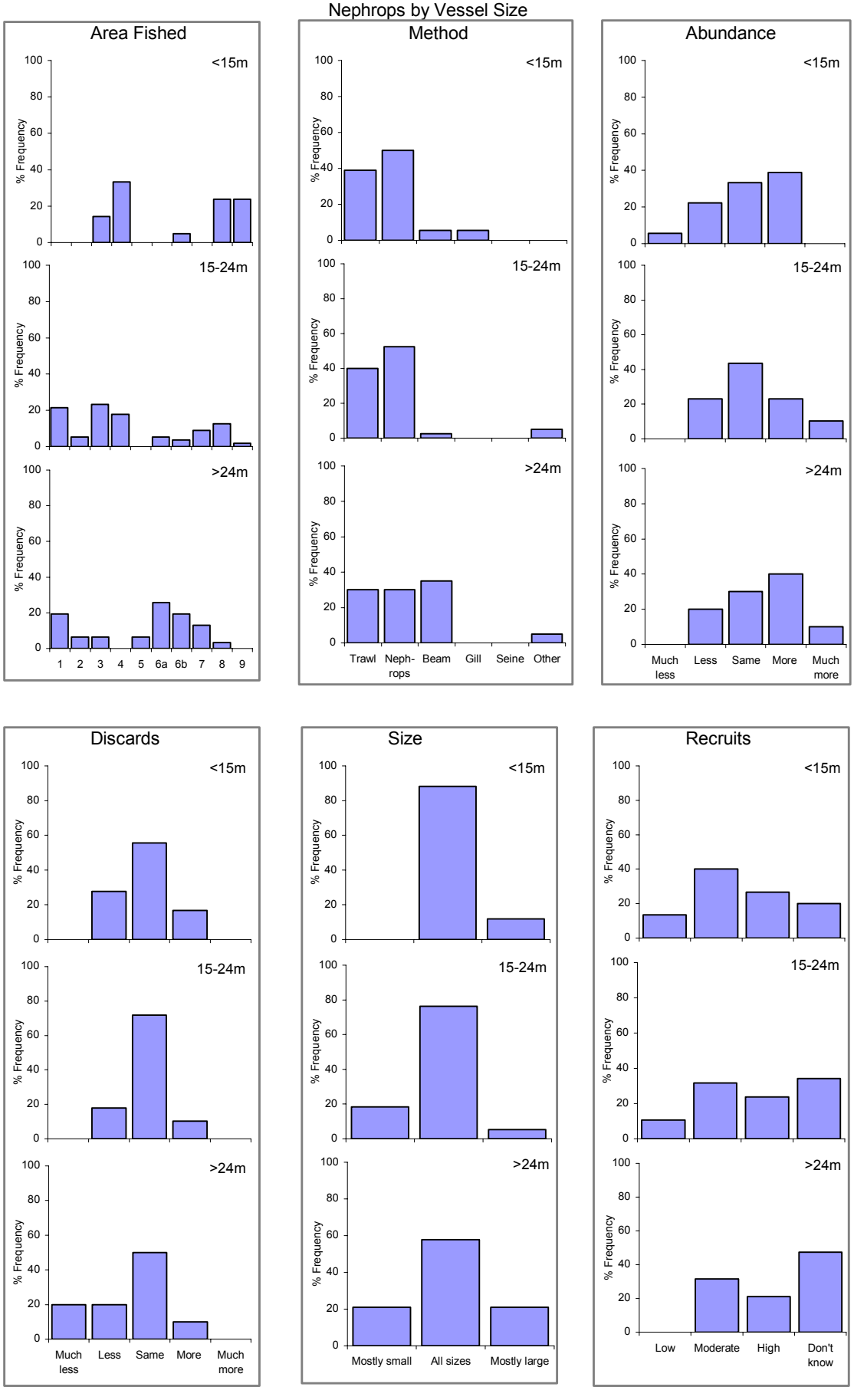
Nephrops Discards



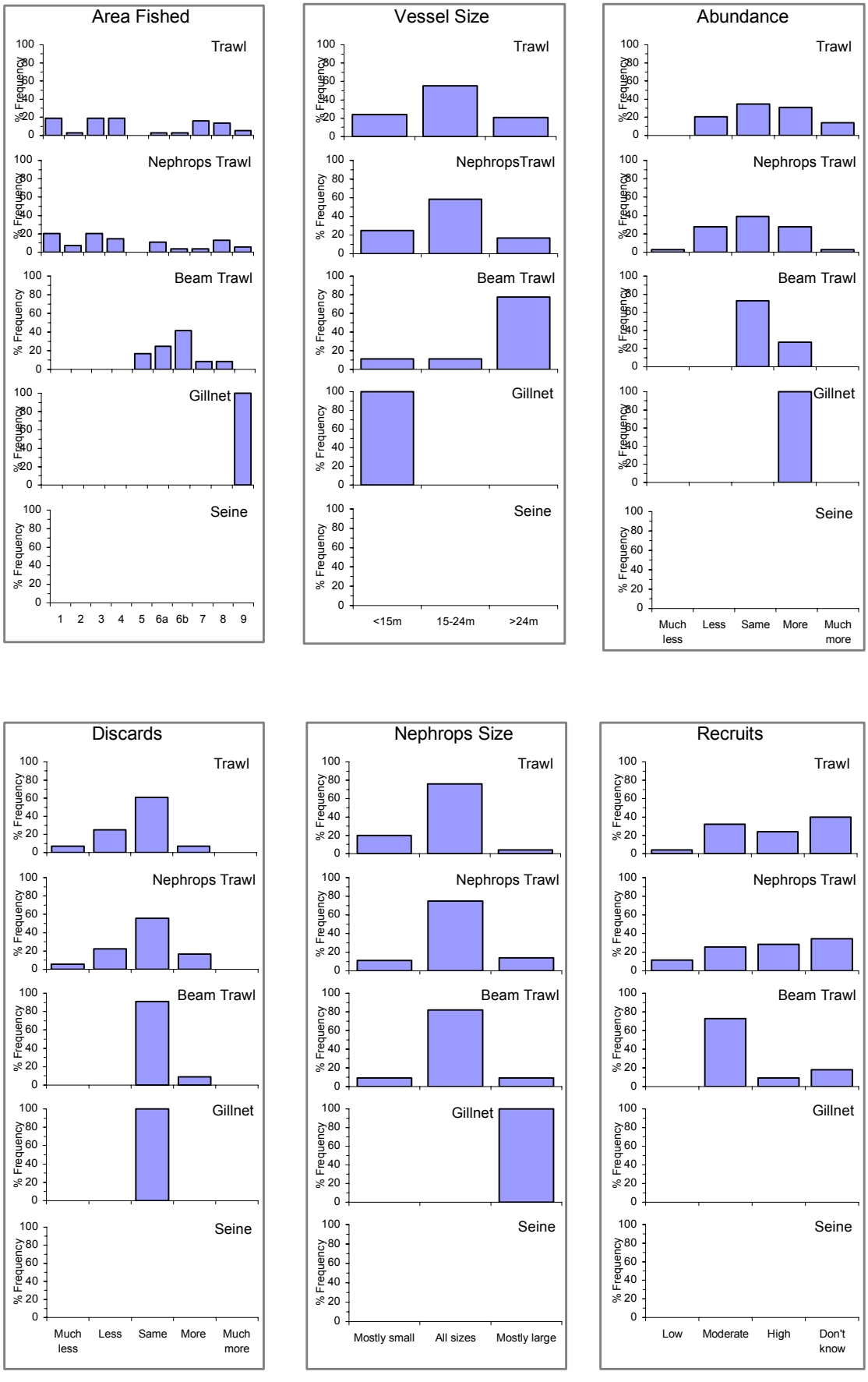
Nephrops Recruits



Nephrops by Vessel Size

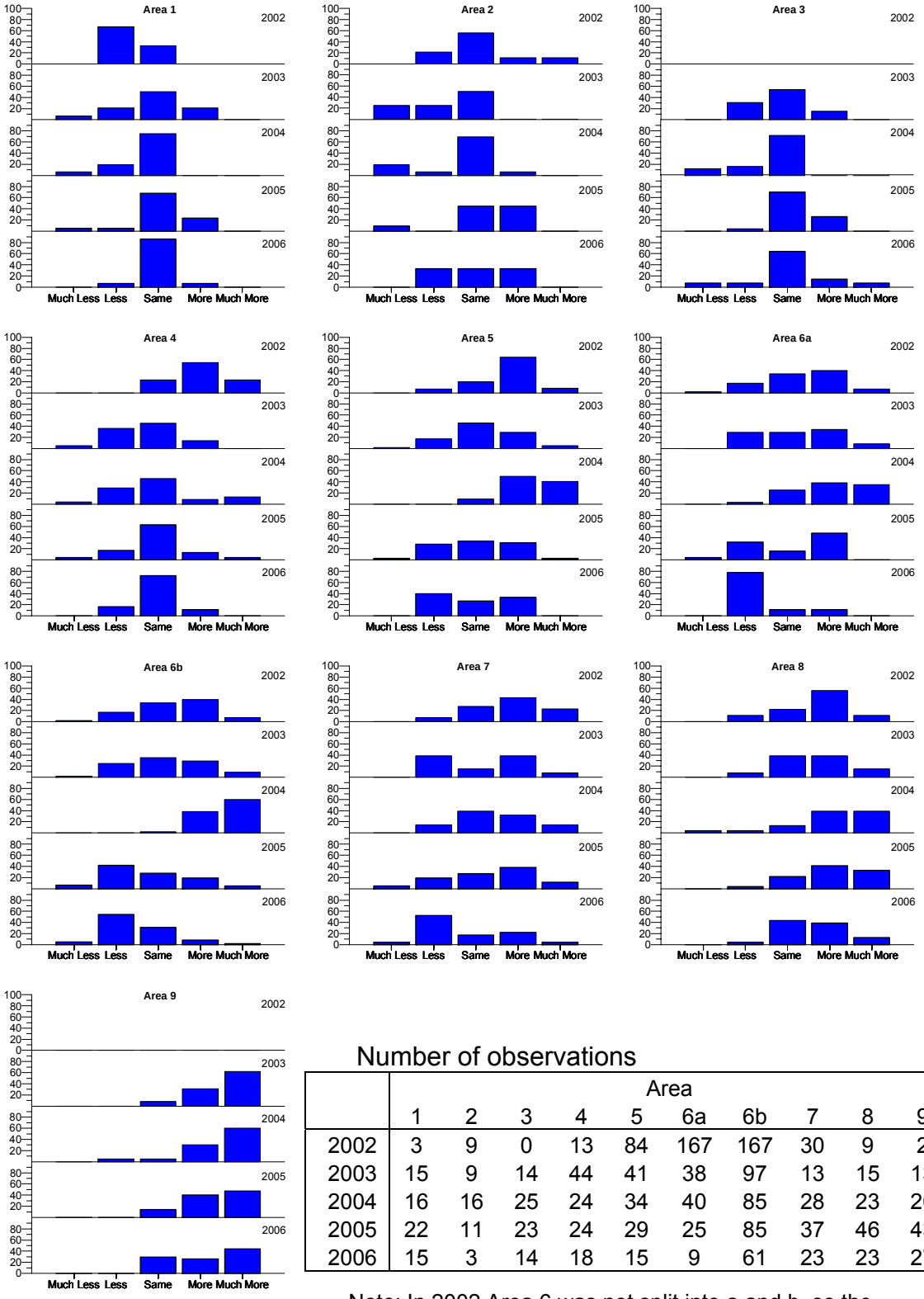


Nephrops by Gear Type



Time Series - Nephrops

Abundance Time Series – Sole

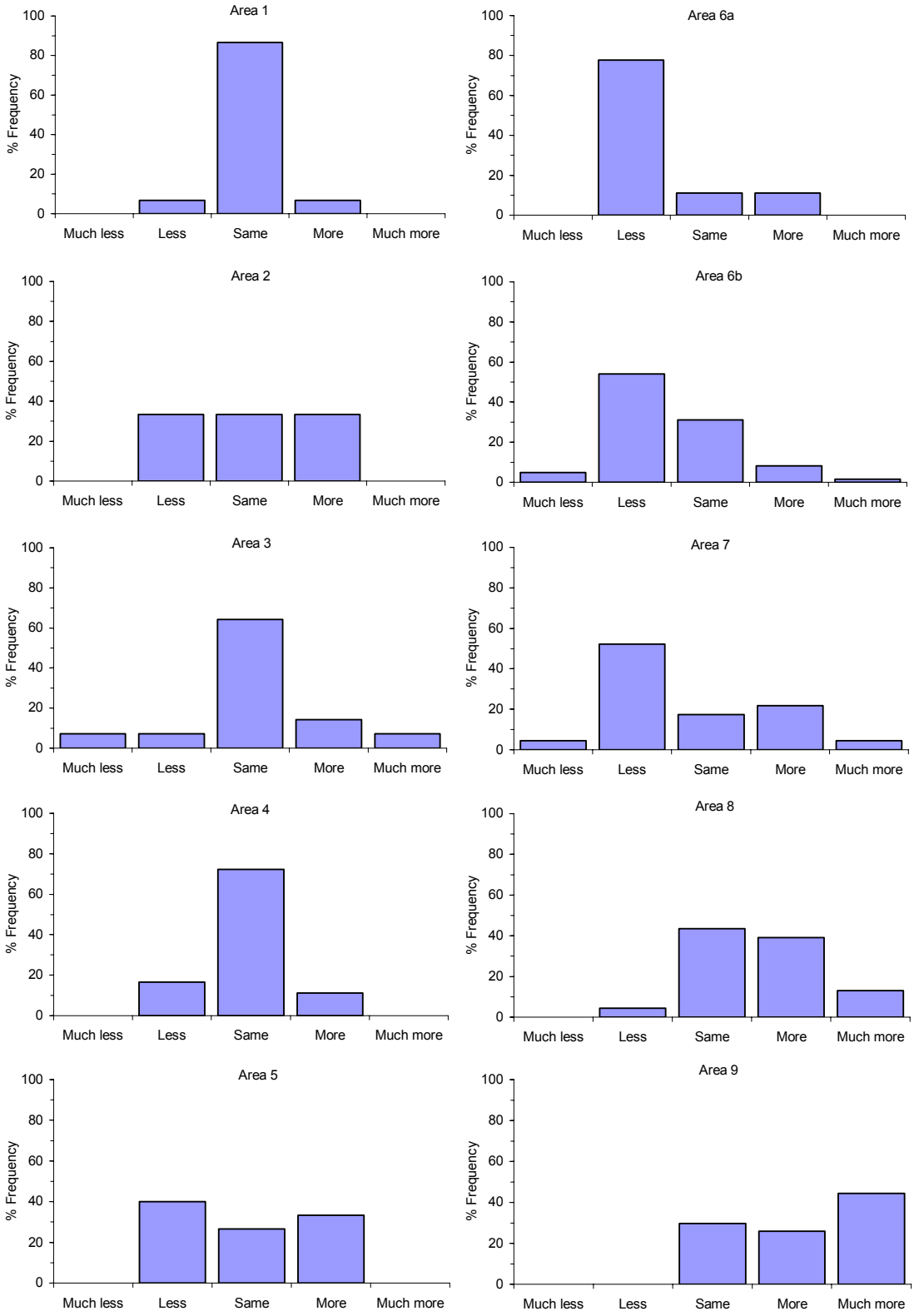


Number of observations

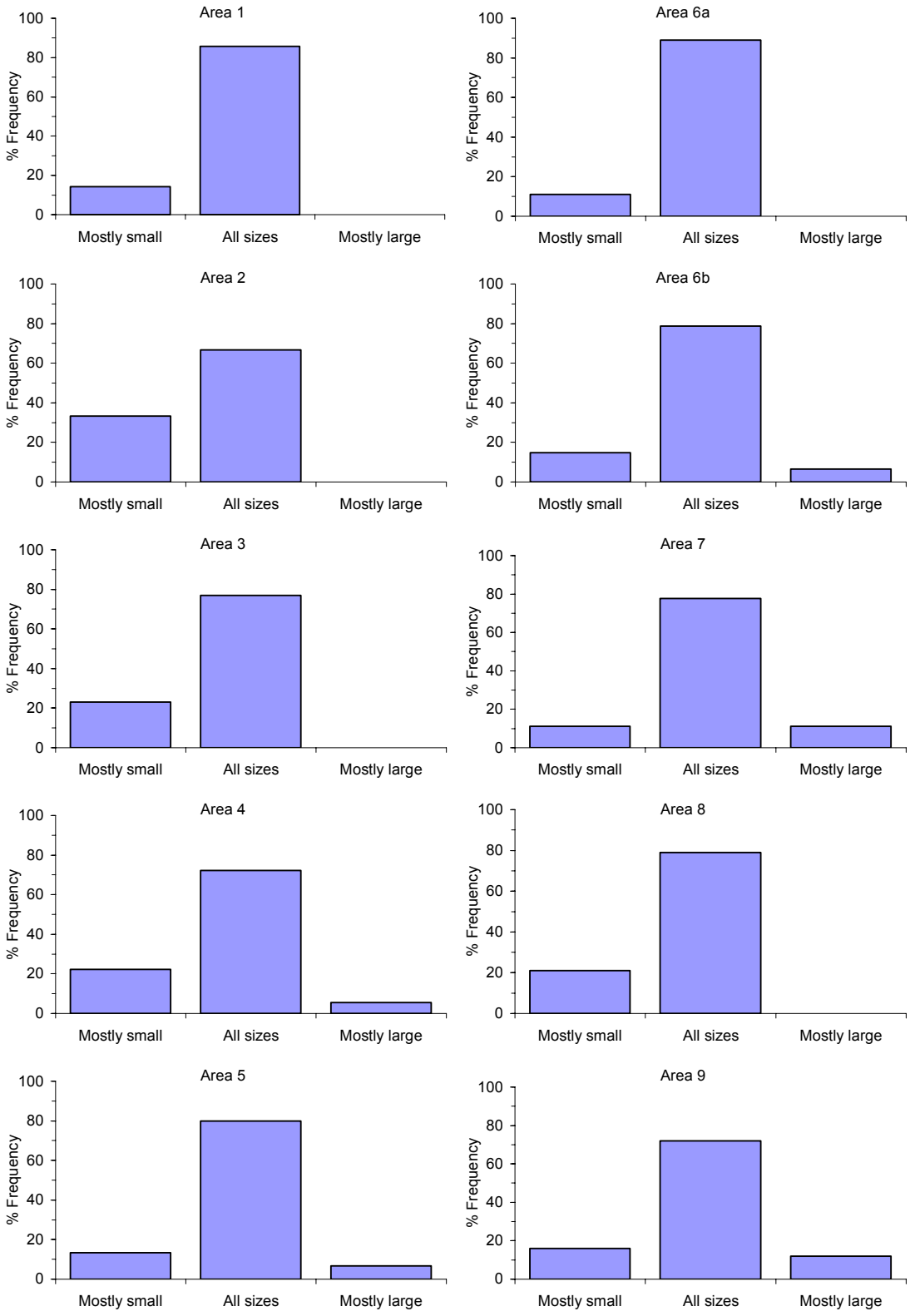
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	3	9	0	13	84	167	167	30	9	2
2003	15	9	14	44	41	38	97	13	15	13
2004	16	16	25	24	34	40	85	28	23	20
2005	22	11	23	24	29	25	85	37	46	43
2006	15	3	14	18	15	9	61	23	23	27

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

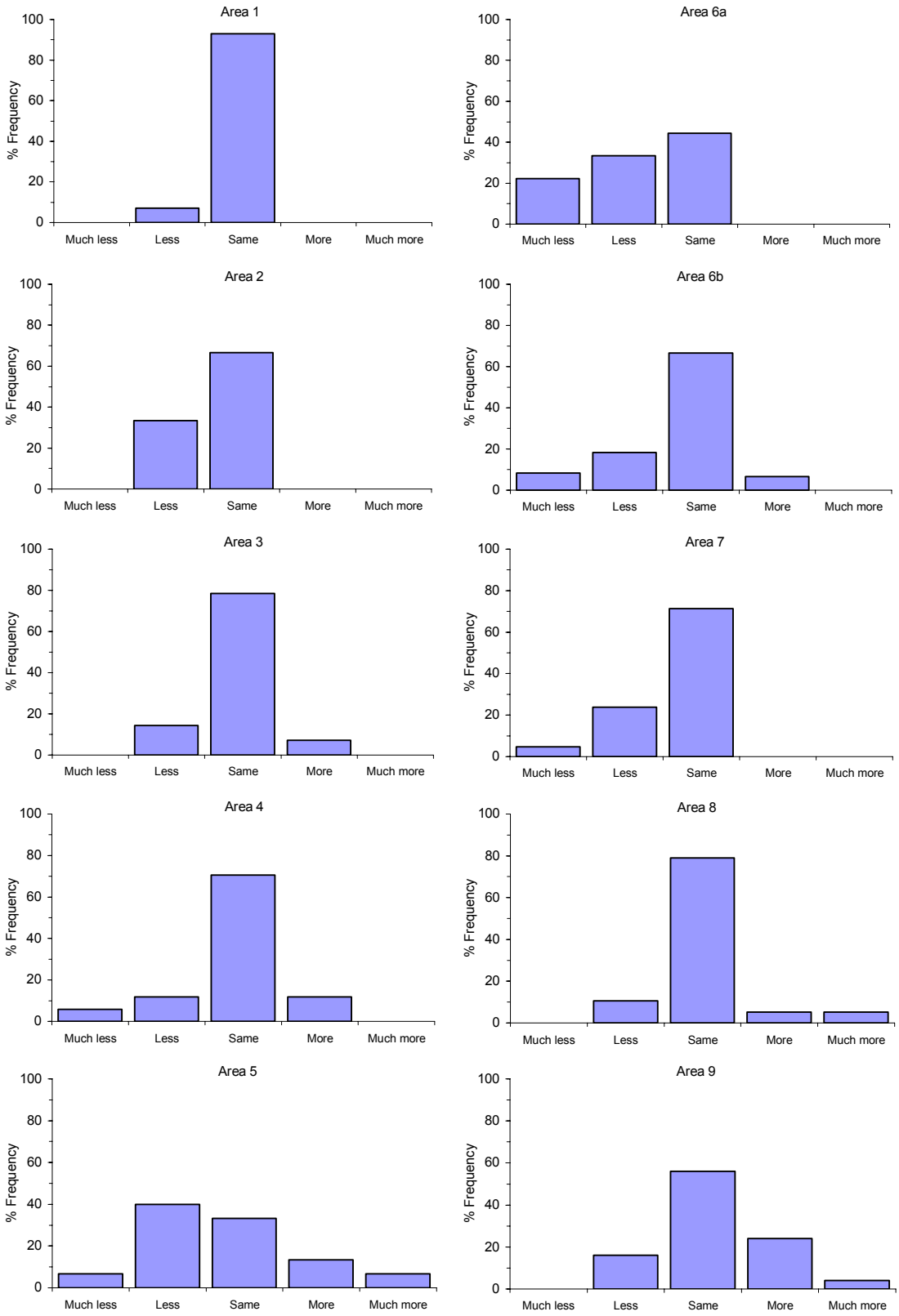
Sole Abundance



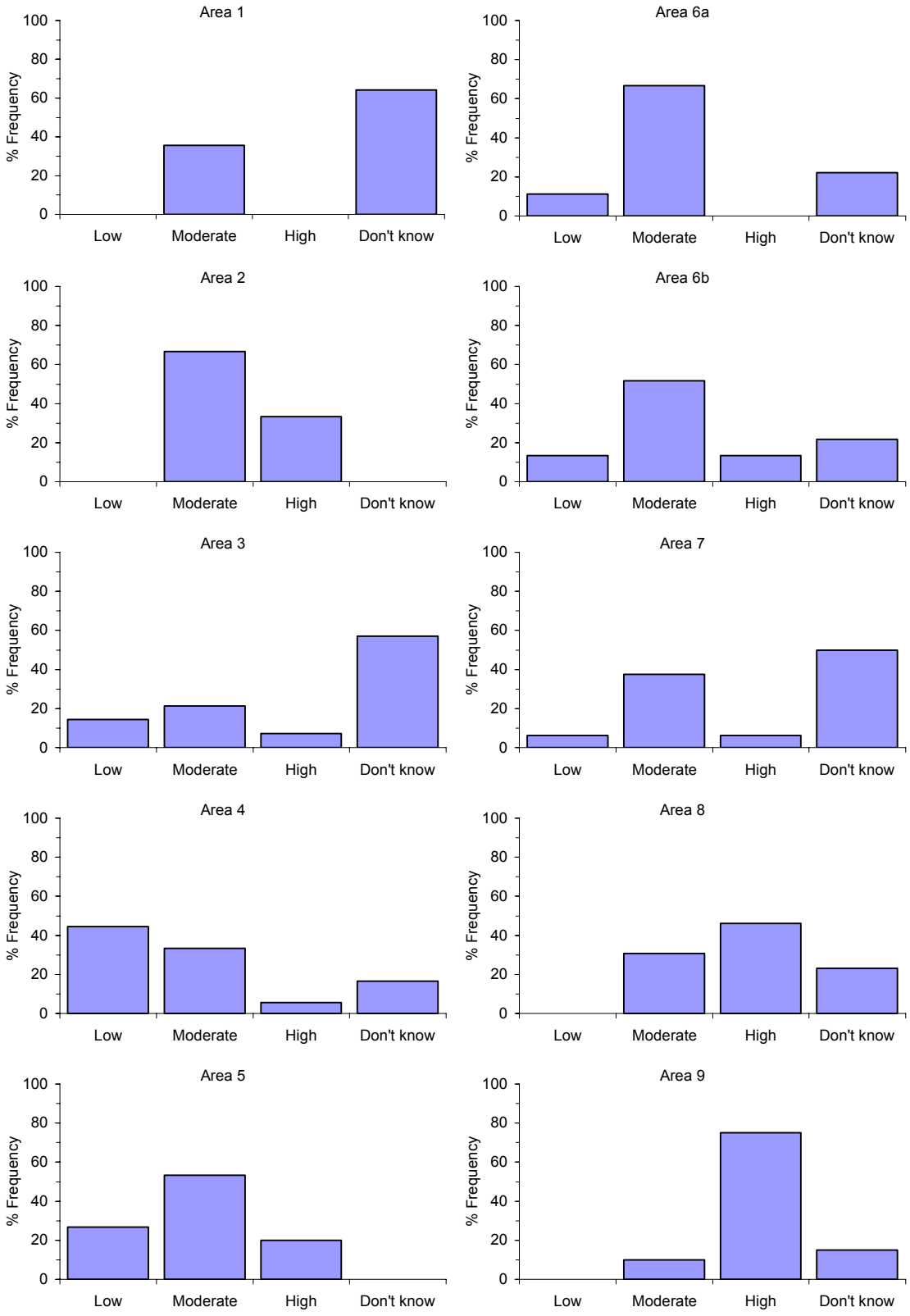
Sole Size


Area 1
Area 6a
Area 2
Area 6b
Area 3
Area 7
Area 4
Area 8
Area 5
Area 9
% Frequency
0
20
40
60
80
100
Mostly small
All sizes
Mostly large

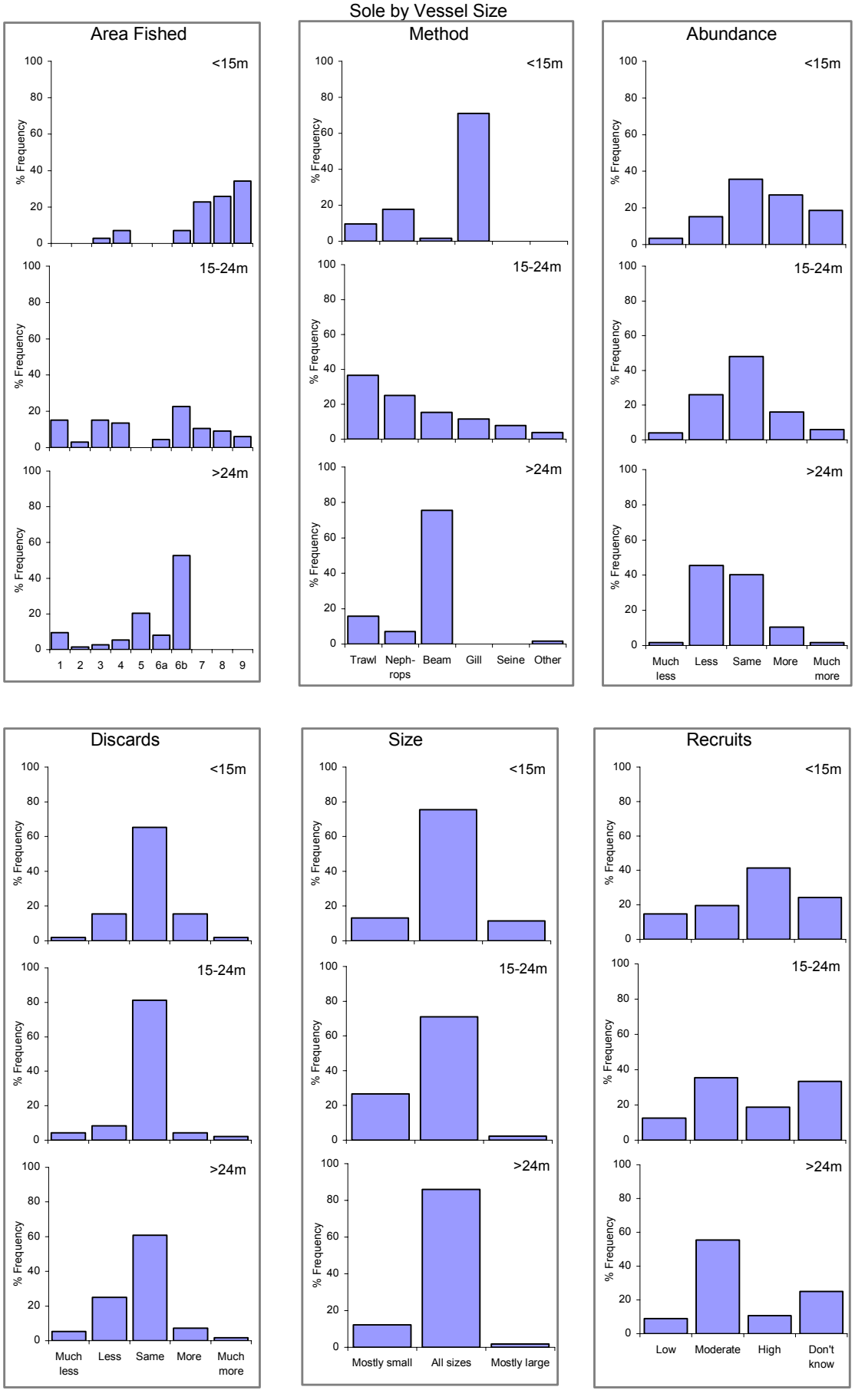
Sole Discards



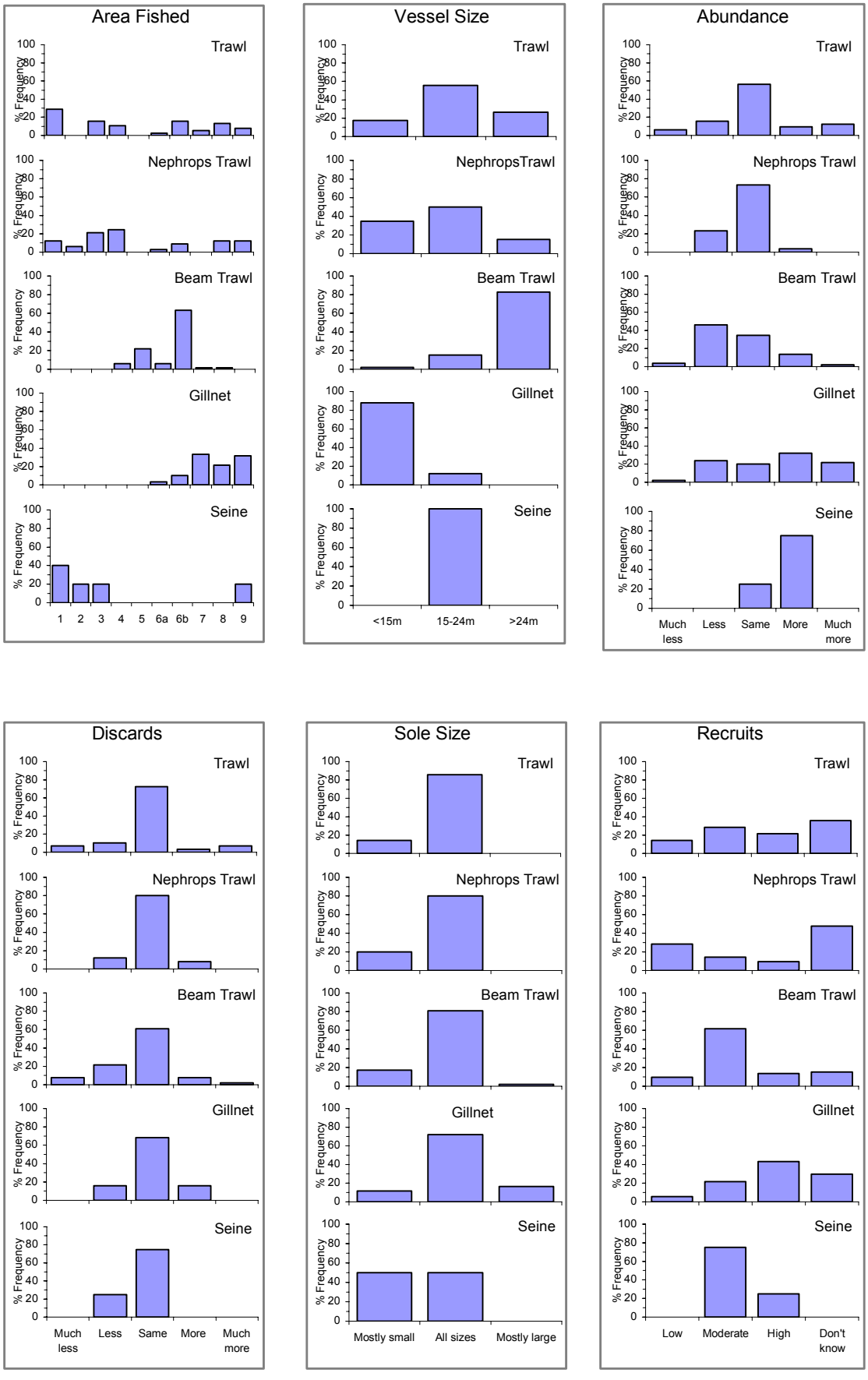
Sole Recruits



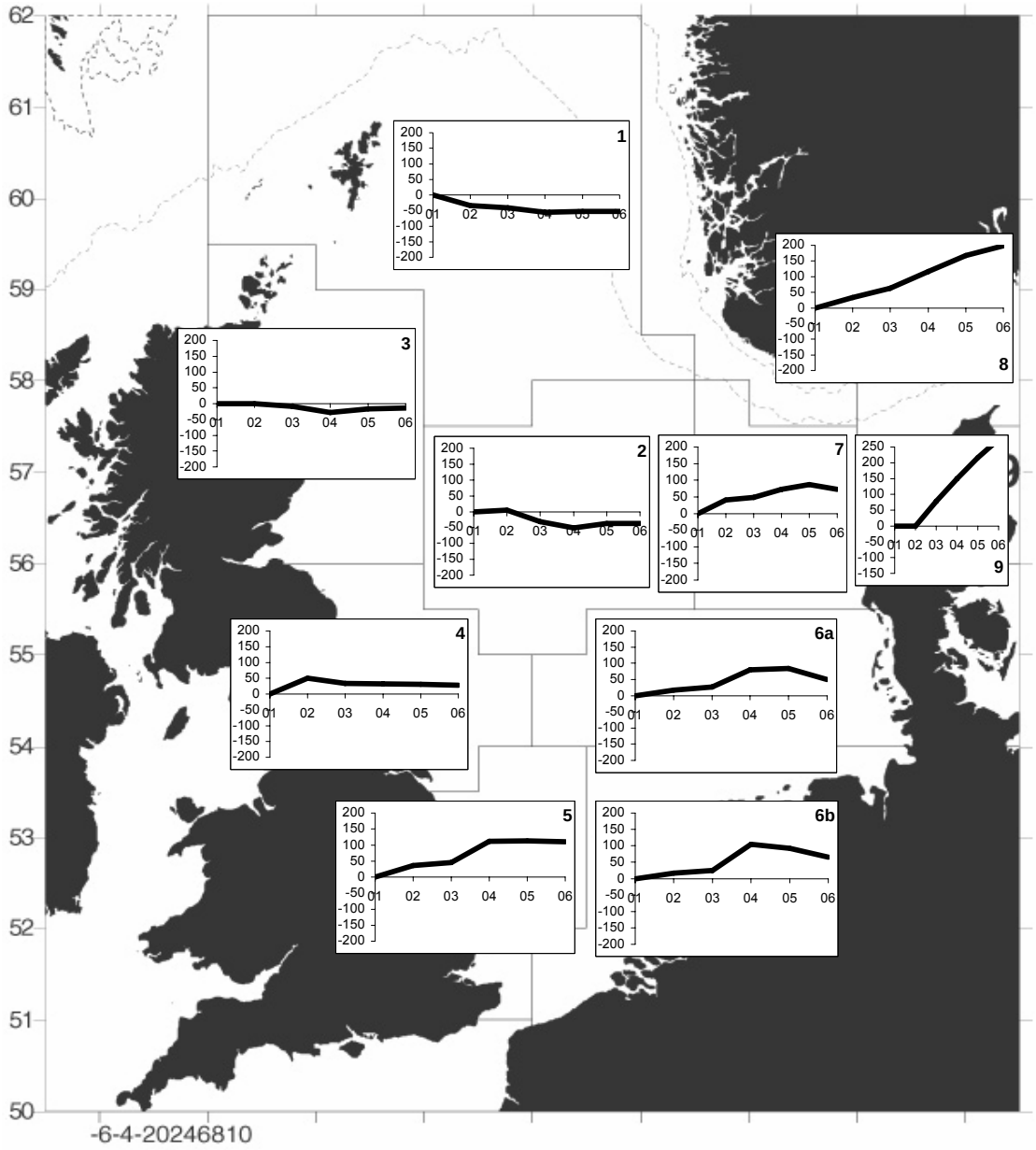
Sole by Vessel Size



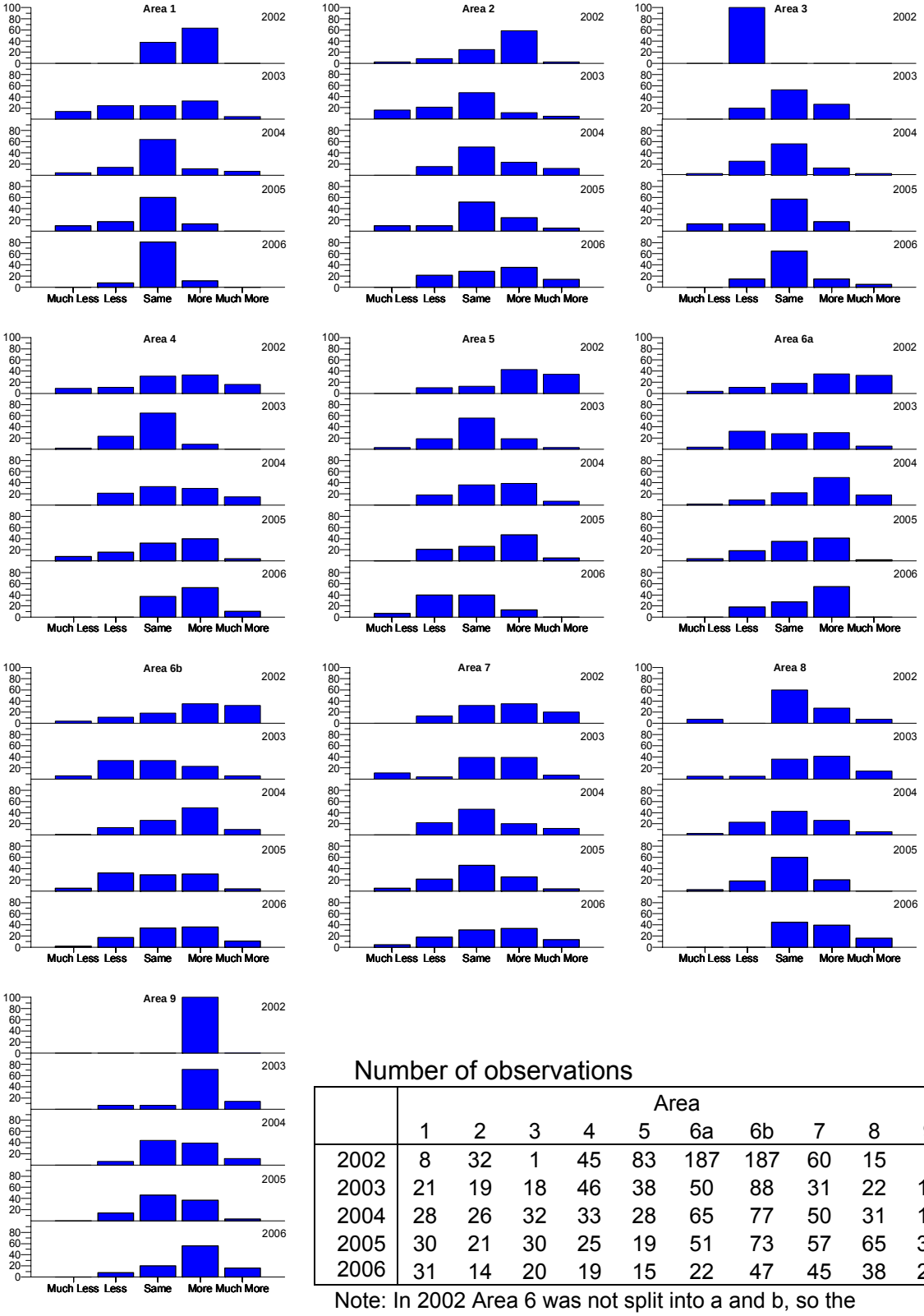
Sole by Gear Type



Time Series - Sole



Abundance Time Series - Plaice

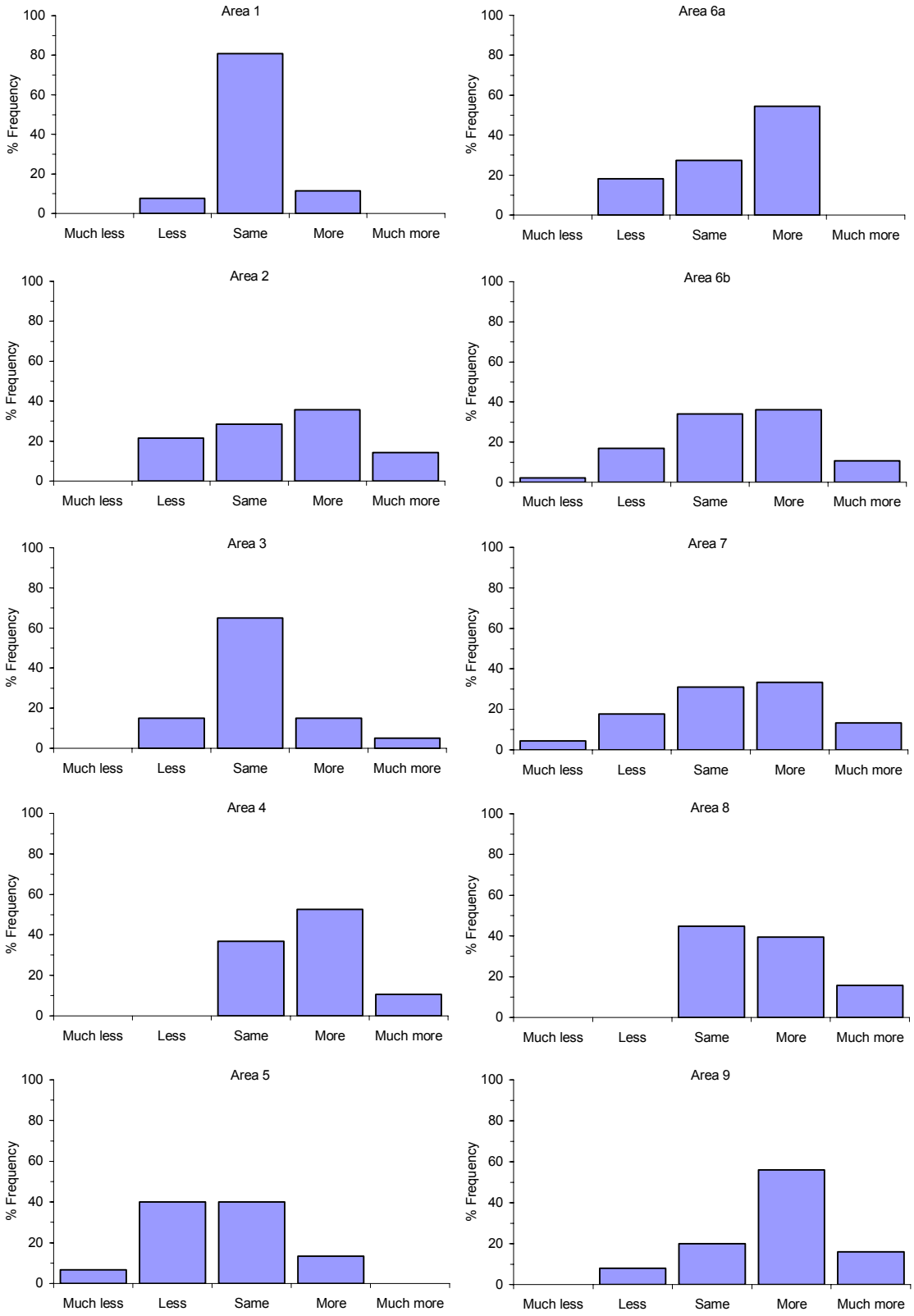


Number of observations

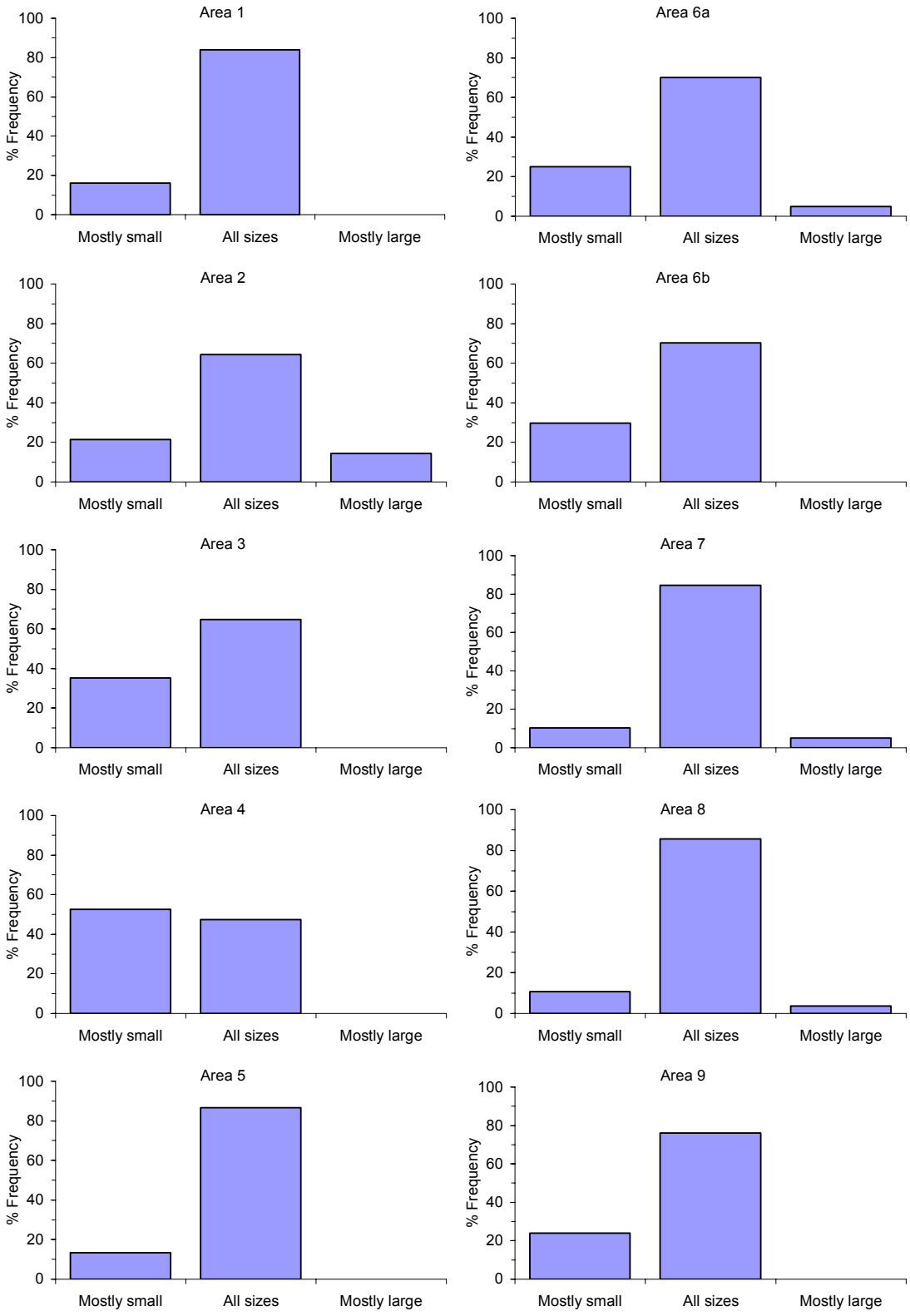
	Area									
	1	2	3	4	5	6a	6b	7	8	9
2002	8	32	1	45	83	187	187	60	15	1
2003	21	19	18	46	38	50	88	31	22	15
2004	28	26	32	33	28	65	77	50	31	18
2005	30	21	30	25	19	51	73	57	65	35
2006	31	14	20	19	15	22	47	45	38	25

Note: In 2002 Area 6 was not split into a and b, so the data have been presented twice.

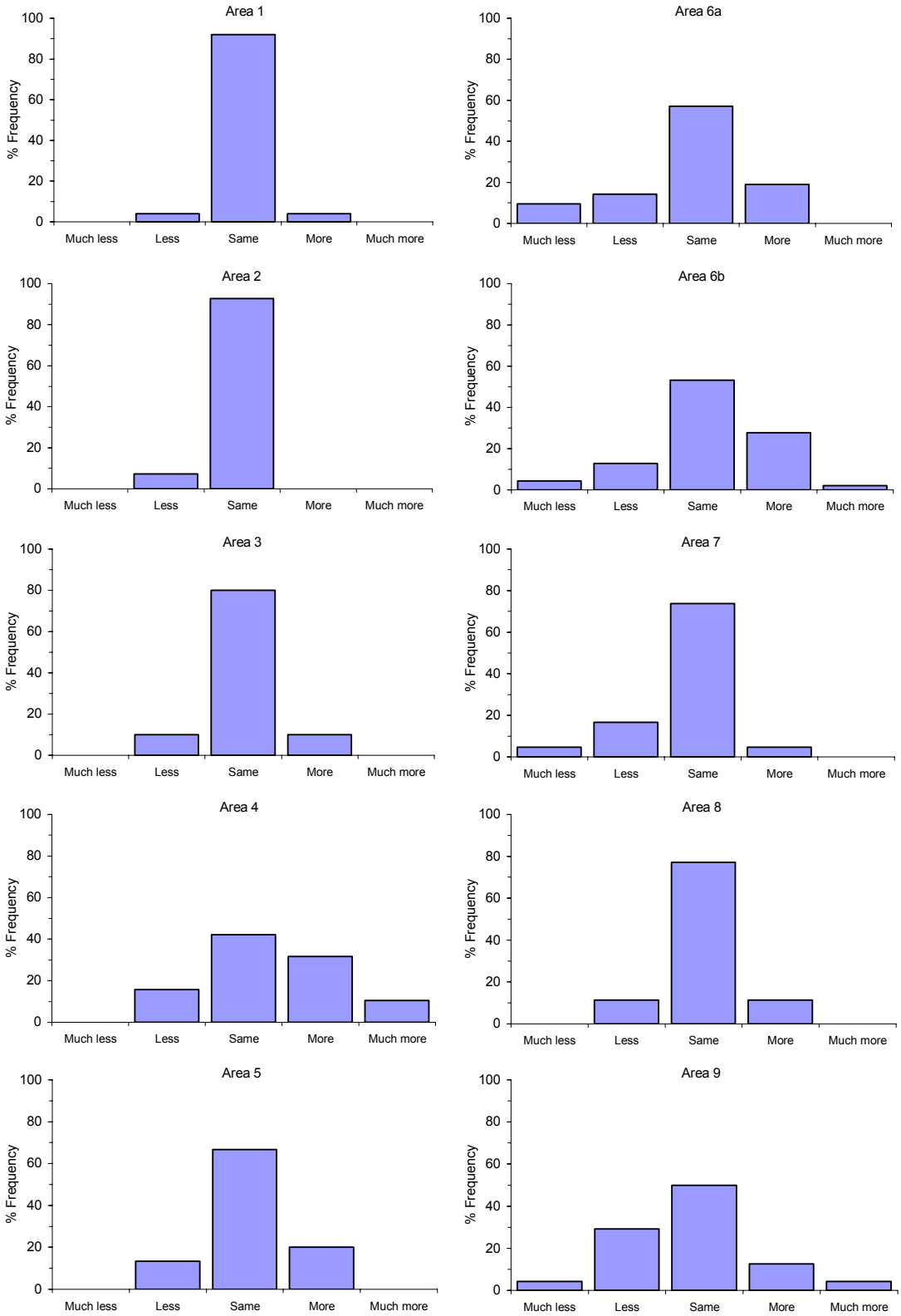
Plaice Abundance



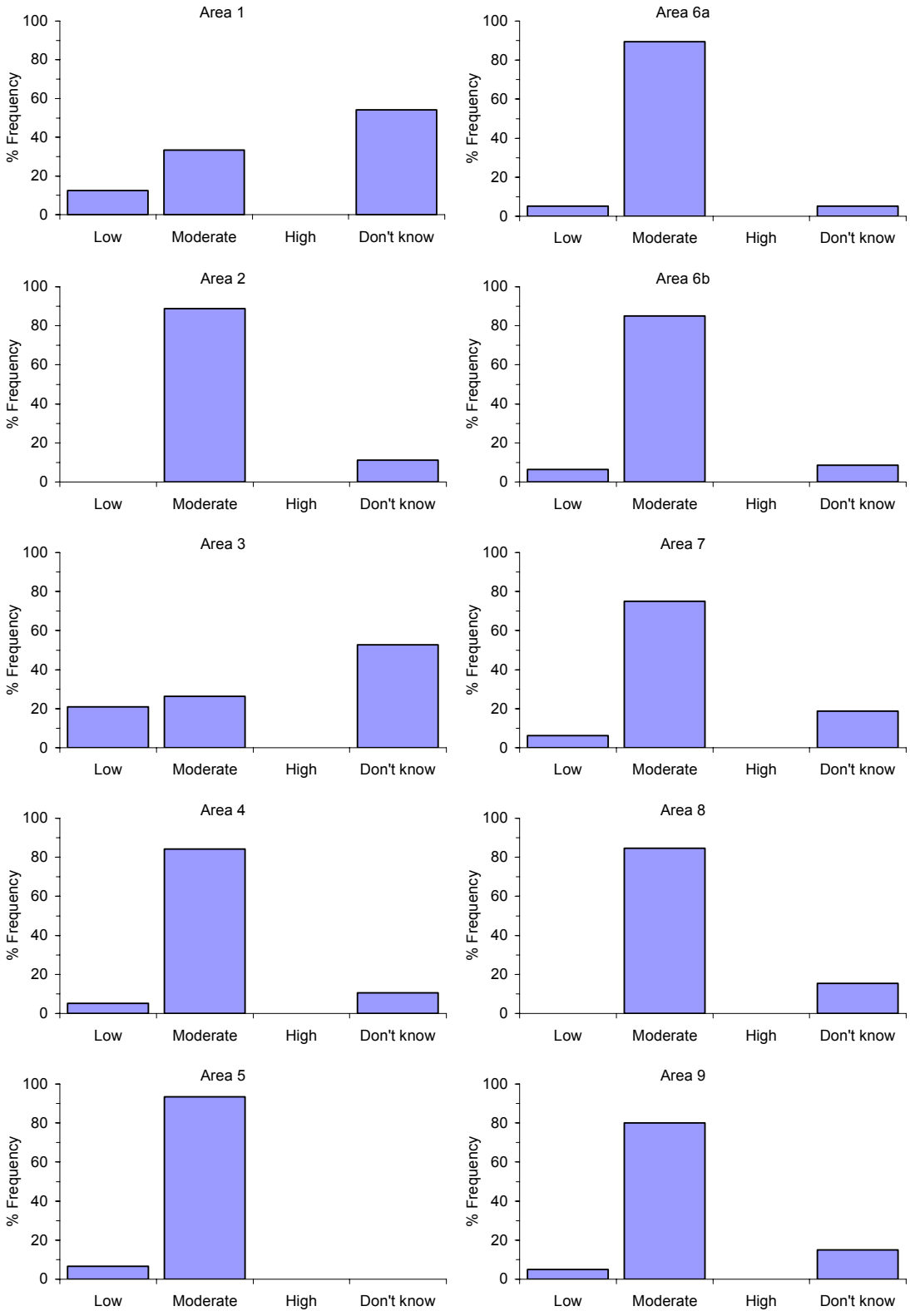
Plaice Size


Area 1
Area 6a
Area 2
Area 6b
Area 3
Area 7
Area 4
Area 8
Area 5
Area 9
% Frequency
0
20
40
60
80
100
Mostly small
All sizes
Mostly large

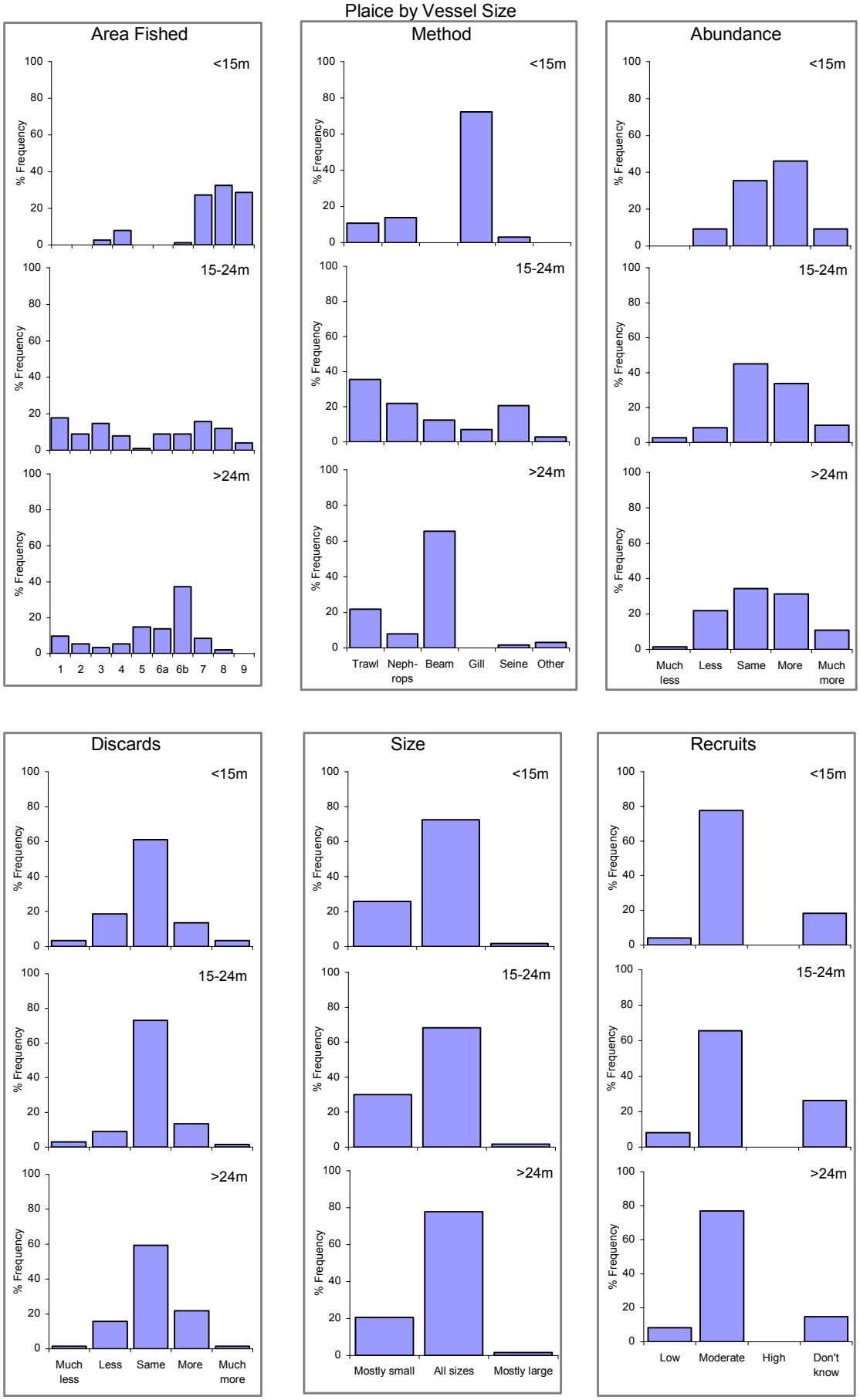
Plaice Discards



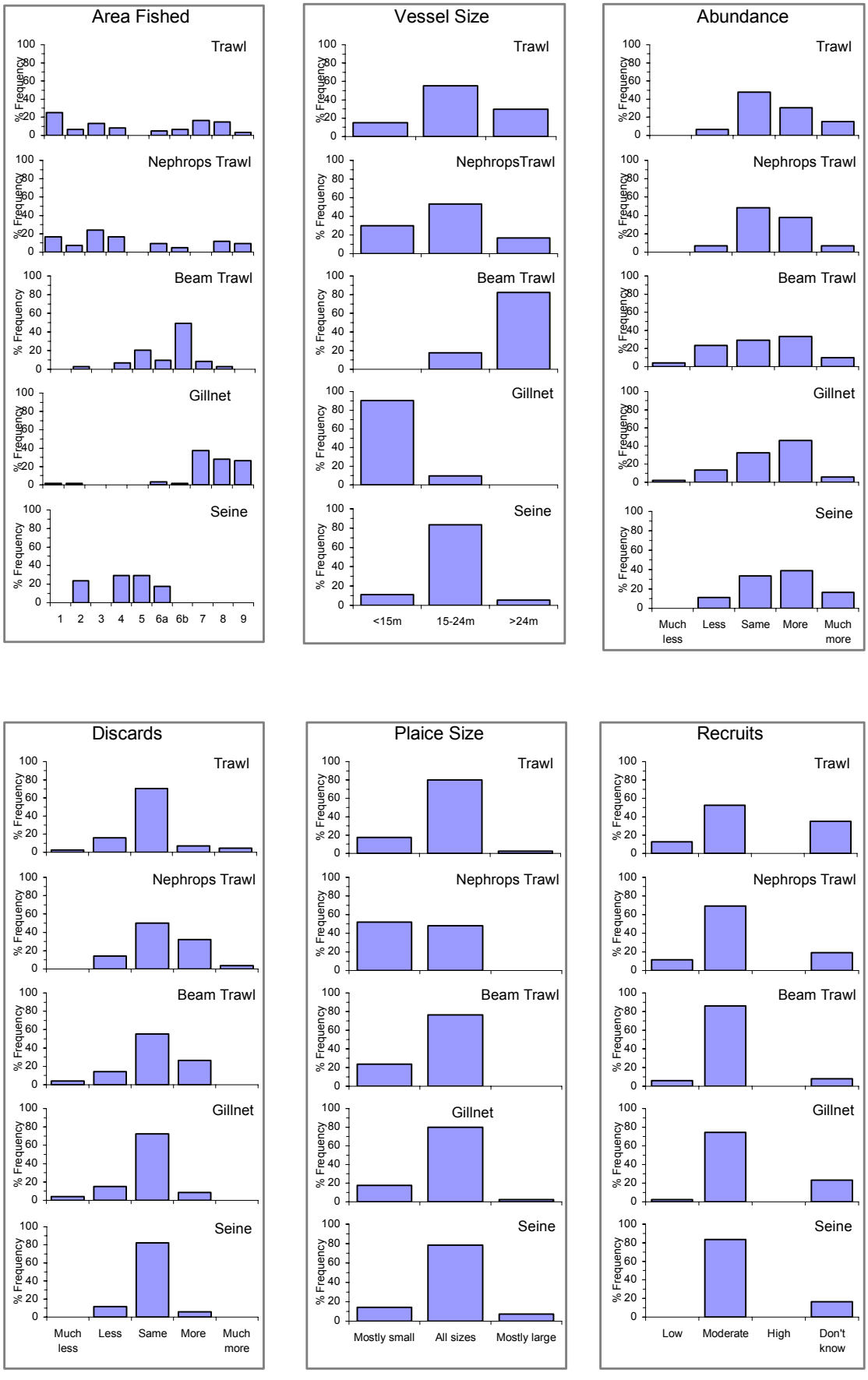
Plaice Recruits



Plaice by Vessel Size



Plaice by Gear Type



Time Series - Plaice

APPENDIX 2

2006 Survey of North Sea Stocks

The purpose of this questionnaire is to ensure that fishermen's knowledge of the state of fish stocks is considered during the development of TACs.

The questionnaire should be completed by
comparing conditions in January - June this year with conditions in January - June last year.

All information will remain strictly confidential. Data will be pooled before presentation to the Advisory Committee on Fisheries Management. To ensure complete confidentiality please *do not* write your name, or the name of your vessel, on this questionnaire.

Instructions

1. The questionnaire refers to the **North Sea only**.

2. The questionnaire is in four sections that will help us use the data
    1. Vessel size and gear type
    2. Information on the eight main species
    3. Your financial status compared to last year
    4. Any other information you may wish us to know

3. Questions should be answered by putting a tick in the appropriate box (see example below).

EXAMPLE		
Question 1	Answer 1	√

Answer 2	

Answer 3	

4. **Please return your completed questionnaire to *****address***** by ******date*****

SECTION 1

VESSEL & GEAR										
Size	Under 15m		15-24m		Over 24m					

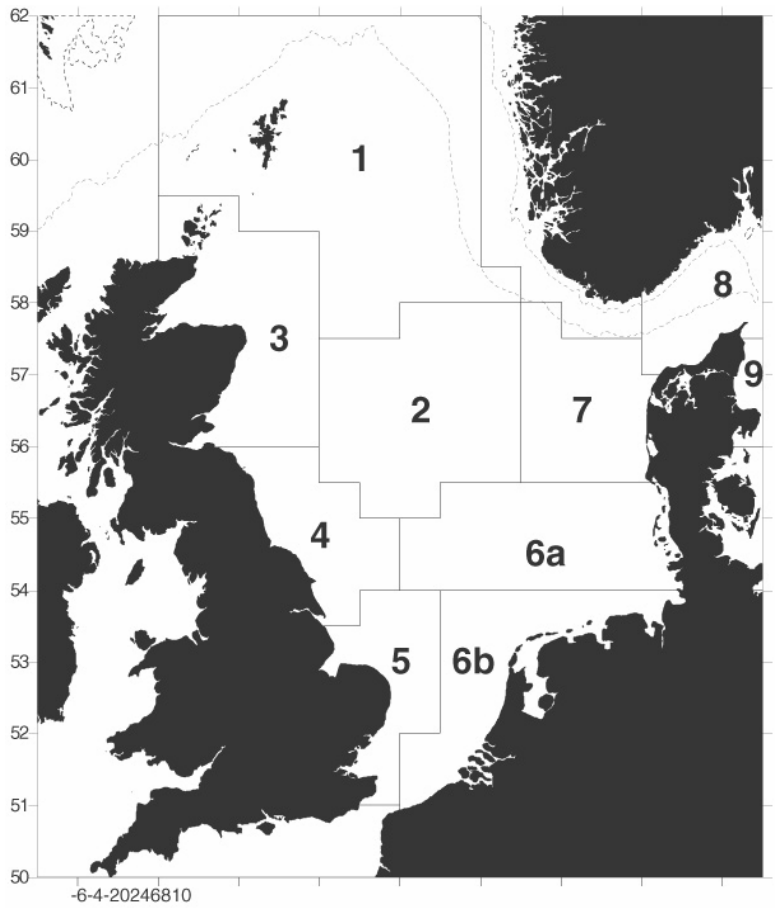
Main fishing method last year	Trawl		*Nephrops* Trawl		Beam Trawl		Gill Net		Seine	
	Other (please specify)									

Main fishing method this year	Trawl		Nephrops Trawl		Beam Trawl		Gill Net		Seine	
	Other (please specify)									

SECTION 2

When completing the question on fishing area in this section, reference should be made to the numbered boxes on the map below.

Information on abundance should be provided on the basis of **catch** not landings



COD

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of cod changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of cod discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small		All sizes		Mostly large	
Abundance of young fish about to enter fishery	Low	Moderate		High	Don't know	

HADDOCK

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of haddock changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of haddock discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small		All sizes		Mostly large	
Abundance of young fish about to enter fishery	Low	Moderate		High	Don't know	

WHITING

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of whiting changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of whiting discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small		All sizes		Mostly large	
Abundance of young fish about to enter fishery	Low	Moderate		High	Don't know	

SAITHE

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of saithe changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of saithe discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small		All sizes		Mostly large	
Abundance of young fish about to enter fishery	Low	Moderate		High	Don't know	

MONKFISH

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of monkfish changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of monkfish discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small			All sizes			Mostly large	
Abundance of young fish about to enter fishery	Low		Moderate		High		Don't know	

NEPHROPS

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of Nephrops changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of Nephrops discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small			All sizes			Mostly large	
Abundance of young fish about to enter fishery	Low		Moderate		High		Don't know	

SOLE

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of sole changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of sole discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small		All sizes		Mostly large	
Abundance of young fish about to enter fishery	Low	Moderate		High	Don't know	

PLAICE

Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of plaice changed since last year? No ☐ Yes ☐

If yes:

Change in Abundance	Much less		Less		More		Much more	

Has your level of plaice discarding changed since last year? No ☐ Yes ☐

If yes:

Change in Discards	Much less		Less		More		Much more	

For this year:

Size range	Mostly small		All sizes		Mostly large	
Abundance of young fish about to enter fishery	Low	Moderate		High	Don't know	

SECTION 3

ECONOMIC CIRCUMSTANCES

Have your economic circumstances changed since last year?

Difficulties in obtaining or retaining crew	Much less		Less		Same		More		Much more
Operating costs	Much less		Less		Same		More		Much more
Profits	Much less		Less		Same		More		Much more
Are you more or less optimistic about the future?	Much less		Less		Same		More		Much more

SECTION 4

Have you any additional information on the fisheries?

Thank you for your contribution.