

COOPERATIVE RESEARCH REPORT

NO. 164

Recommended format for purposes of citation: Niels Daan 1989.
Data base report of the stomach sampling project 1981.
ICES Cooperative Research Report No. 164. pp. 144.
<https://doi.org/10.17895/ices.pub.4533>

DATA BASE REPORT OF THE STOMACH SAMPLING PROJECT 1981

Edited by

Niels Daan

ISSN 2707-7144
ISBN 978-87-7482-527-2

International Council for the Exploration of the Sea
Palægade 2-4, 1261 Copenhagen K
Denmark

April 1989

TABLE OF CONTENTS

	<u>Page</u>
PREFACE	1
SECTION 1 INTRODUCTION	2
1.1 Background of the Project	2
1.2 Historic overview	3
1.3 Objectives	4
1.4 Scope of the report	5
1.5 Participation and acknowledgements	5
SECTION 2 SAMPLING METHODS	6
SECTION 3 DATA PROCESSING	8
3.1 General comments	8
3.2 Cod	10
3.3 Haddock	11
3.4 Whiting	11
3.5 Mackerel	11
3.6 Saithe	12
3.7 Estimates of food consumption	12
SECTION 4 AUXILIARY INFORMATION	13
4.1 Catch rates	13
4.2 Age size keys	13
4.3 Mean weight of prey classes	13
4.4 Ambient temperatures	14
SECTION 5 STOMACH CONTENT DATA	14
5.1 Sampling intensity	14
5.2 Empty stomachs	17
5.3 Prey composition	17
5.4 Prey size distribution	17
5.5 Size composition exploited prey	17
5.6 Age composition exploited prey species	17
SECTION 6 DISCUSSION	17
6.1 General results	17
6.2 Exchange of data	19
6.3 Future studies	19
SECTION 7 REFERENCES	20
TABLE 1 Catch rates (N per hour fishing)	22
TABLE 2 Area weighting factors	23
TABLE 3 Age size distributions	24
TABLE 4 Mean weights of prey size classes	40
TABLE 5 Ambient temperatures	44
TABLE 6 Number of stomachs sampled	45

	<u>Page</u>
TABLE 7 Percentage of empty stomachs	50
TABLE 8 Stomach content composition	54
TABLE 9 Prey size distribution	69
TABLE 10 Stomach content weight by area	74
TABLE 11 Average stomach content total North Sea	115
TABLE 12 Average number of prey organisms	125
TABLE 13 Average prey weights	135
APPENDIX I Specification of record format for exchange of stomach content data	144
APPENDIX II Size class codes to be used on exchange tapes for stomach content data	144

PREFACE

The Stomach Sampling Project 1981 represents a major example of the integrated studies carried out under the ICES umbrella in recent years. It was aimed at quantitative answers to the question 'Who eats who?' among the exploited fish species in the North Sea. Many colleagues have shown a keen interest in the project and the collection of samples at sea has been a shared task of all countries having interests in the North Sea fisheries. The analysis of tonnes of half-digested material has been a burden for a few species coordinators and data processing has been a complex task. Thanks to all these efforts, reliable answers have been obtained in the end. As a scientific reward, our perception of the effects of species interactions has changed considerably and multispecies assessment has become a valued tool in preparing management advice.

Over the years, data availability and computational methods have kept changing and various sets of results have been used at different occasions. We, the species coordinators, believe that the data have now reached their ultimate quality and, since the project appeared to deserve an extensive documentation of the methods employed, basic information as well as selected results have been tabulated in this Cooperative Research Report.

We have necessarily been selective in deciding which data to include, our guidelines being: (1) to present the final data set as it is used as input for MSVPA; (2) to allow back tracking of ultimate results to inadequacies of the basic data; (3) to indicate the significance of regional and temporal variations in feeding habits; (4) to indicate the potential information on other entities than fish contained in the data base, which may be of interest to non-fish ecologists.

The report largely consists of tables and is not much for reading. The document is primarily a justification of all the work that has been done, although it is hoped that it also serves as a useful reference for future feeding studies. Although my name is connected to this report as the editor, the actual work in compiling the numerous tables has been shared among the coordinators and I thank Jacqueline, Henrik, John and Trond for their inspiring cooperation and their patience with me.

Niels Daan

SECTION 1 INTRODUCTION.

1.1 Background of the Project.

Interest in multispecies assessment has been aroused within ICES primarily by the pioneering efforts of ANDERSEN and URSIN (1977) in developing their North Sea ecosystem model as an extension of the BEVERTON and HOLT (1957) theory of exploited fish population dynamics. Since that time, several authors have tried to develop less complex multispecies assessment models, which were better tuned to the direct objective of producing advice on fisheries management (POPE, 1979; HELGASON and GISLASON, 1979; SPARRE, 1980). The essentially similar approach adopted by these authors was to develop algorithms for the simultaneous solution of Virtual Population Analyses for several fish stocks, the important feature being that natural mortality was partially modulated by interspecific and intraspecific predation among the species included. The major differences between the various approaches were related to how predation is formulated and how 'other food' (i.e. the food resource not explicitly defined by the species considered) is treated. By 1979, the theory had apparently advanced to a stage where in principle species interaction could be effectively incorporated in routine fish stock assessment. However, these types of Multispecies Virtual Population Analysis (MSVPA) require reliable information on food composition of and consumption by age groups of different species. Despite a long tradition of food investigations in fisheries research, the type of data required to test the underlying assumptions of these models and to estimate parameter values appeared not to be generally available.

With the progress in the theoretical field, this lack of basic quantitative information on various aspects of feeding was identified as the primary impediment to application of MSVPA and, at the Council Meeting in 1979 in Warsaw, ICES adopted a resolution (C.Res.1979/2:5) that an ad hoc Working Group should meet at ICES headquarters in order to

1. *identify the kind of information most urgently required for testing multispecies assessment models and*
2. *design an international sampling scheme to obtain this information and coordinate the available research effort.*

The meeting in March 1980 in Copenhagen (ANONYMOUS, 1980) was attended by 17 participants from 9 countries, indicating the great international interest in these matters. On the basis of a review of existing assessment models dealing with species interaction, the MSVPA type of models were selected as the most promising ones for management purposes within the ICES region. The essential input data for such models are, apart from the catch and weight at age traditionally collected on an annual basis, quantitative data on food composition and food intake. Such information depends entirely on stomach content investigations.

Since the data to be collected should be representative for the average total population present during a specified time span, a first requirement for any suitable sampling scheme should be that the entire area of distribution of the predators is covered. Secondly, the stomach content data must be structured by age class of both predators and prey in order to use the data in connection with cohort types of analysis and the time units should be set accordingly. It follows that estimating average food composition of a predator in the sea sets high demands on the appropriate sampling procedures.

The rate of food intake is even more difficult to establish. Although it is likely that there is some relationship between average stomach contents and feeding rate, a simple relation may be obscured by variations in digestion rate. Therefore, it was envisaged that additional experimental evidence on digestion rates was required and that considerations on likely levels of energy expenditure might have to be invoked when trying to quantify feeding rates.

Ideally, stomach content data should be available on an annual basis in the same way that catch data are routinely collected, but in practice such an annual sampling scheme

would not seem feasible because of time and effort constraints. However, by allowing some additional assumptions in the model, efficient use could be made of reliable data collected in one particular year to predict food composition in other years.

The North Sea was considered the most suitable area to concentrate further efforts upon, because the possibilities for making an integrated MSVPA appeared to be far greater than in any other ICES region. Not only are massive stock assessment data routinely collected for a great number of fish stocks in the North Sea, but also a great deal of fundamental knowledge about the functioning of this ecosystem has been accumulated over the years as exemplified by the work of ANDERSEN and URSIN (1977).

During the meeting in 1980, the group concluded that, in order to allow further progress in multispecies assessment, a large scale stomach sampling project should be executed in 1981 in the North Sea and the broad outlines of such a project in terms of sampling intensity and procedures were laid down. It was appreciated that, because of the large scale of the planned operation, the work would have to be split between a number of national laboratories. At the same time concern was expressed in respect of homogeneity in the quality of data collected within species and therefore it was stressed that, for each of the five species considered to be the most significant predators in the North Sea, a coordinator should be sought with full responsibility for analyzing all stomach samples.

During the Council Meeting in Copenhagen in October 1980 ICES endorsed this recommendation by the following resolution (C.Res. 1980/2:22):

1. *an intensive stomach sampling scheme for cod, whiting, saithe, mackerel and haddock should be implemented in the North Sea in 1981, and member countries are urged to make available the research effort to meet the requirements as defined in the report of the former ad hoc Working Group on Multispecies Assessment Model Testing, both in terms of research vessel time and analytical labour;*
2. *Dr N.Daan should be coordinator of the sampling, and he should, if necessary, meet with the coordinators for individual fish species for three days in IJmuiden in early 1981;*
3. *the coordinator should report to the Demersal Fish and the Pelagic Fish Committee at the next Statutory meeting.*

1.2 Historic overview.

As a first step, it appeared to be absolutely essential for the internal consistency of the work among the different species coordinators that all aspects of standardization, recording and processing were discussed at length. Therefore, the species coordinators met in early 1981 in IJmuiden to draft a stomach sampling manual (ANONYMOUS, 1981a) containing detailed instructions for the procedures to be followed when taking samples at sea and in the analysis of stomachs and processing of data in the laboratory.

A first progress report on the project (DAAN, 1981) showed that the response of the countries surrounding the North Sea had been favorable and that for cod, haddock and whiting the target of approximately 1500 stomachs per quarter had been amply exceeded during the first two quarters. However, for saithe and mackerel considerable problems were encountered in catching enough fish with the survey gear and it was foreseen that sampling of these species had to be continued after the 'Year of the Gut' had ended.

Already at this stage, it was also clear that the original plan to try to use the stomach content data in 1982 for the first trials with MSVPA had been over-optimistic and that the final data could not be expected to become available within a few more years. According to a Council resolution (C.Res. 1981/2:21) a second meeting of the coordinators was held in IJmuiden in July 1982 to produce an interim report on the results. By that time it was envisaged that preliminary reports on individual species could be expected in 1983 and the integrated analysis of the complete data set was scheduled for early 1984 (ANONYMOUS, 1982a). Indeed, reports on cod (DAAN, 1983), whiting (HISLOP et al, 1983), mackerel (MEHL and WESTGÅRD, 1983a) and saithe (GISLASON, 1983) were submitted to the Council Meeting in 1983. Only the analysis of the haddock samples had been delayed.

The coordinators met again in January 1984 (ANONYMOUS, 1984a) to prepare a first set of results excluding the haddock data, which could be directly applied as input for MSVPA and the first meeting of the ad hoc Multispecies Assessment Working Group was held in June 1984 in Copenhagen (ANONYMOUS, 1984b). The first trial runs with MSVPA yielded extremely interesting results indicating that some basic assumptions of single species assessment, with particular reference to levels of natural mortality among juvenile fish, had to be drastically revised. However, one of the important conclusions was that a sensible MSVPA could only be performed on a quarterly basis, because food composition proved highly variable during the year. Since single species VPA's were traditionally based on annual catch data, this change to quarterly time steps demanded a complete revision of the catch at age data. This revision was implemented in November 1985 at a second meeting of the ad hoc Working Group. The haddock data (DE LA VILLEMARQUÉ, 1985) had been worked up by that time also and several revisions had proven necessary to the data sets of other species, because more reliable information on age length keys for some species of prey had become available.

During the Council Meeting in London in 1985 a resolution was adopted (C. Res. 1985/1:5) that

"the detailed results of the 1981 Stomach Sampling Project be published in the ICES Cooperative Research Report series under the editorship of N.Daan".

Progress has been slow in this matter, because new revisions proved necessary as a consequence of the implementation of various data quality control procedures. Thus, even during the 1986 meeting of the Multispecies Assessment Working Group (ANONYMOUS, 1987), the final stomach content data were still not available for all species. Since that time, however, all major problems appear to have been solved and the data base seems to have reached its final quality. This report provides the ultimate data set that has been applied during the 1988 meeting (Anonymous, 1988b) and which is expected to remain in use in all future applications of MSVPA in the North Sea.

Along with this description of the developments in Multispecies Assessment in the North Sea, it should be noted that, in parallel, considerable progress within ICES has been made with MSVPA in the Baltic (ANONYMOUS, 1981b; 1982b; 1987b). In contrast to the North Sea, the situation in the Baltic was that a lot of information on stomach contents of cod, the predominant predator in the area, had already been collected in the past. Rather than planning a specific stomach sampling project, the emphasis was placed there on the integrated analysis of old data with a view of preparing the appropriate input data for MSVPA.

1.3 Objectives.

The primary aim of the project was to provide the essential input data for MSVPA, which can be summarized as:

1. mean contribution by weight of each prey age group in the stomach contents by predator age group;
2. mean body weight at time of ingestion of each prey age group for each predator age group;
3. average rates of food intake for each predator age group.

Only prey species belonging to the exploited fish species complex were of course of ultimate interest. Among the eleven fish species which, on the basis of the availability of detailed catch at age data, might ultimately be incorporated in MSVPA (cod, haddock, whiting, saithe, plaice, sole, herring, mackerel, Norway pout, sprat and sandeels), five species were selected as representing the most important fish consumers: **cod, whiting, saithe, mackerel and haddock**. Stomach sampling was restricted to these five.

Stomach content analysis can yield direct information on food composition, both in terms of weight and numbers, and on total weight of food in a stomach. The latter is probably related to food intake, but the consumption rate cannot be directly estimated

without independent information on digestion rates. Although the need for digestion experiments using natural food organisms had been stressed (ANONYMOUS, 1980), the coordination of such experimental work fell beyond the scope of this project.

1.4 Scope of the report.

A problem encountered in working up the primary data to the input level for MSVPA is that for good reasons alternative procedures have been chosen for individual species. A data base report should ideally contain all information required to allow alternative procedures. Given the size of the stomach content data base, this is not quite possible and the information presented here is necessarily a compromise. Still, it has been ascertained that, in addition to a set of detailed results, all auxiliary information used to attain the ultimate estimates of average food composition by quarter by age group of predator and prey is included.

Section 2 discusses general aspects of the sampling procedures and the analysis of the stomach contents.

Section 3 provides information on the general procedures applied in transforming the primary observations into input data for MSVPA, with a description of possible deviations from the general procedures for individual species. Although various methods of calculating food intake are briefly discussed, estimates of total food consumption have explicitly been left out of the report, because they do not follow directly from the stomach content data. Such estimates will in practice be modified, whenever additional evidence becomes available from digestion experiments, and therefore it did not seem appropriate to include any here.

Section 4 lists auxiliary information used at various stages in the calculations, including catch rates, age size distributions and prey weights.

Section 5 deals with the sampling intensity achieved and with a selection of the results on various aspects of feeding. The number of empty stomachs is included as a measure of regional and seasonal variations in feeding intensity. Weight percentage contributions of the various prey items and prey size distributions are provided for relatively high levels of aggregation in order to reduce the number of tables, but the observed weights by exploited prey size classes in predator stomachs by age group, area and quarter have been maintained because they provide the basis for estimating prey age distributions by applying regional age size keys. The ultimate results corresponding to the input required for MSVPA are contained in a set of tables providing the mean stomach content weights, mean number of prey organisms and average prey weights by prey age class for the total North Sea.

Potential users who might require data organized at different levels of aggregation are requested to contact the species coordinators directly, because in many cases it is relatively easy to produce results which are more specifically tuned to individual needs.

1.5 Participation and acknowledgements.

The five predatory fish species included in the project were allotted to individual species coordinators according to the following scheme:

<i>Cod</i>	- <i>N.Daan</i>	- <i>The Netherlands</i>
<i>Haddock</i>	- <i>J.de la Villemarqué</i>	- <i>France</i>
<i>Whiting</i>	- <i>J.R.G.Hislop</i>	- <i>Scotland</i>
<i>Saithe</i>	- <i>H.Gislason</i>	- <i>Denmark</i>
<i>Mackerel</i>	- <i>T.Westgård</i>	- <i>Norway</i>

All data have been computerized, but as yet they have not been merged into a central data base system. The results presented here have been prepared by the individual coordinators, who carry the ultimate responsibility.

Nine countries participated in collecting the stomach samples at sea by providing a considerable amount of research vessel effort, as illustrated in the text table below.

COUNTRY	QUARTER	1	2	3	4
Belgium					+
Denmark			+		+
Fed.Rep.of Germany		+		+	+
Netherlands		+	+	+	+
Norway		+		+	+
UK(England)		+	+	+	
UK(Scotland)		+	+	+	+
USSR		+			

Clearly, ICES has played a key role in the development of the Stomach Sampling Project and the application of the results. Food and feeding has been a major issue during many scientific discussions at Council Meetings, but in addition ICES has taken initiatives for several meetings of the scientists involved in North Sea multispecies assessment:

Meeting of the ad hoc Working Group on Multispecies Assessment Model testing, Copenhagen, 3 - 7 March 1980 (ANONYMOUS, 1980);

Meeting of the Coordinators of the Stomach Sampling Project, IJmuiden, 13 - 15 January 1981 (ANONYMOUS, 1981a);

Meeting of the Coordinators of the Stomach Sampling Project, IJmuiden, 12 - 16 July 1982 (ANONYMOUS, 1982a);

Meeting of the Coordinators of the Stomach Sampling Project, IJmuiden, 19- 23 March 1984 (ANONYMOUS, 1984a);

Meeting of the ad hoc Multispecies Assessment Working Group, Copenhagen, 18 - 22 June 1984 (ANONYMOUS, 1984b);

Meeting of the ad hoc Multispecies Assessment Working Group, Copenhagen, 13 - 19 November 1985 (ANONYMOUS, 1986);

Meeting of the ad hoc Multispecies Assessment Working Group, Copenhagen, 16 - 22 November 1986 (ANONYMOUS, 1987a);

Meeting of the Coordinators of the Stomach Sampling Project, IJmuiden, 28 March - April 1988 (ANONYMOUS, 1988a);

Meeting of the Multispecies Assessment Working Group, Copenhagen, 1 - 8 June 1988 (ANONYMOUS, 1988b)

Altogether, a large crowd has actively participated in the general planning, in the actual sampling at sea and in the processing of samples and data in the national laboratories. In particular, the sorting activity through the samples amidst the smells of partly digested material mixed with formalin vapors has not been a very appealing task. It is impossible to acknowledge all these people individually, but the outstanding quality of the results is indicative of what can be achieved with the positive interest and the international cooperation through ICES of a very large number of people.

SECTION 2 SAMPLING METHODS

Food composition and food intake are known to vary considerably from one area to another, from season to season and also individually. Traditionally, VPA deals with average annual populations and therefore it was essential that estimates of average food composition are representative for the total annual population. However, it was envisaged already at an early stage that MSVPA might have to be run on a quarterly basis to yield sensible results because of pronounced differences in food composition between seasons. Therefore, sampling cruises were planned in each quarter of the year.

Several countries perform routine trawling surveys in the North Sea for different purposes and at different times of the year. For logistic reasons stomach sampling was largely associated with existing surveys, even when gears and areas were necessarily dictated by the associated primary objectives. The first quarter provided least difficulties in this respect, because the International Young Fish Survey in February represents an internationally coordinated standardized survey covering the entire North Sea. In other

quarters there was less coordinated effort available, but the additional effort made available by various countries was distributed to fill in the expected gaps. In some cases additional sampling was also carried out from commercial trawlers.

In taking stomach samples at sea, the age of the fish sampled cannot readily be taken into account, nor can the age of the prey during the sorting process through the stomach contents. Therefore, stomach samples were stratified according to size categories. Since an estimated minimum of 6000 stomachs per predator species were required to obtain reliable estimates of food composition, it appeared impractical to store and analyze all stomachs individually and it was decided to group stomachs from individual hauls by predefined size classes. The analysis of stomach contents could also be accelerated considerably by working up grouped samples instead of individual stomachs within a sample and the resulting loss in information on individual variation was considered to be more than compensated by the larger number of samples that could be processed.

The information by size class had to be translated at a later stage in the analysis into age groups by means of appropriate age size keys. Requests went out for the collection of age length keys during the surveys for all exploited fish species, but in practice these remained largely restricted to only three predator species. For the others, ALK's had to be retrieved from other sources, particularly from the Danish industrial fisheries.

The size compositions of the predators caught during the trawl surveys were merged to estimate the spatial density distribution (number per hour fishing) in each quarter, using the statistical rectangle as the basic stratum in correspondence with the stomach sampling. No adjustments have been made for possible differences in catchability when different gears had been used by different vessels and a minimum density of 1 fish per size class per hour has been set for all rectangles from which samples had been obtained.

The catch of the predator fish in each haul was sorted into 9 size classes according to the following scheme:

10-15; 15-20; 20-25; 25-30; 30-40; 40-50; 50-70; 70-100; ≥ 100 cm

Routine sample size was set at 10 stomachs for the size classes < 50 cm and at 25 stomachs for the larger classes, excluding fish with everted stomachs. No samples were taken from fish < 10 cm, because fish predation among those fish was considered to be negligible. Special care was given to problems of regurgitation and feeding in trawls. When fish showed evidence of regurgitation, these were replaced with non-regurgitating fish with food in their stomach in order to avoid bias by an increased chance of including too high a proportion of 'truly' empty stomachs. If the target number of stomachs could not be met because the total catch was small, the number of regurgitated stomachs was recorded to allow subsequent adjustment when calculating average stomach contents. When stomachs contained prey suspected to be eaten while the predator was swimming in the trawl, as judged from the freshness of the prey and the composition of the catch, that part of the contents was excluded from the sample.

The stomachs were preserved in 4% formalin, either entire (haddock, whiting and mackerel) or only the contents to facilitate preservation of large food quantities (cod and saithe). Each jar contained a label with information on vessel, haul number, date, statistical rectangle, species, size class, and the number of stomachs with food, number empty and number regurgitated (if these had not been replaced by stomachs with food).

After completion of a cruise, the samples collected were exchanged between the five species coordinators, who took care of all analyses in order to ensure internal consistency in identification and analysis procedures within species.

Emphasis was naturally placed on prey species of commercial importance. However, since MSVPA models make implicit assumptions about preference functions, other prey were also recorded in as much detail as feasible in order to be able to use the data base to test such assumptions. Preference can be split into two aspects (ANDERSEN & URSIN, 1977): an ecological vulnerability of a prey species determined by its way of life in relation to the habits of the predator (including distribution overlap) and a size suitability of a prey organism depending on its relative size in respect of a predator. Since size preference models can be readily tested on the basis of stomach content data if size

spectra of prey are recorded (URSIN, 1973; ANDERSEN, 1982; ARNTZ & URSIN, 1981a,b, DEKKER, 1983), this aspect formed an important feature of the project. Therefore, all prey were classified whenever possible by size groups (see Appendix II).

ICES STOMACH SAMPLING PROJECT					
A. Sample information					
PREDATOR CODE	.....			Ship	-----
SIZE CODE	.....			Date	-----
YEAR	.....			Haul	-----
QUARTER	.....			Time	-----
COUNTRY	.....			Depth	-----
SQUARE	.....				
N-food	.....				
N-regurgitated	.....				
N-empty	.....				
N-sample	.....				
B. Stomach contents.					
Taxonomic unit	PREYCODE	SIZECODE	WEIGHT(g)	NUMBER	Additional Inform.
1	.....	.....	.....	.....	-----
2	.....	.....	.....	.....	-----
etcetera					

Fig. 1. Format for recording sample information and stomach content data (.....: mandatory input; ----- optional information).

The level of identification depended very much on prey type, degree of digestion and experience of the analyst and no fixed rules were applied, except that fish prey should be identified to the species level whenever possible. The minimum information collected for each prey category included wet weight and number of organisms. Recording of individual length of prey or degree of digestion was optional. To facilitate computerized data bases at a later stage an entry format was designed (Fig 1), which summarizes all available information per sample. This includes a 10-digit NODC code system (NOAA, 1978) for all prey taxa, adapted to suit the North Sea fauna (See ANONYMOUS, 1981a).

SECTION 3 DATA PROCESSING.

3.1 General comments.

At the outset of the project (ANONYMOUS, 1981), the various steps involved from primary collection of the samples up to the ultimate use in MSVPA were defined in general terms (Fig 2). Although the first part of the analysis in obtaining average stomach contents by area and quarter and the summation of these regional values over the total North Sea is essentially straightforward, in practice there were specific reasons why the actual procedures followed for the various species deviated from this basic scheme. Before these deviations will be specified in the following sections, the main scheme will be briefly outlined.

The basic strata for collecting samples were quarters of the year, statistical rectangles and predator size classes. If more samples were collected from the same stratum, these samples were added giving each stomach sampled equal weight. If there were regurgitated stomachs in the sample, a correction was applied assuming that the regurgitated stomachs contained on average the same amount of food and had the same prey composition as the stomachs with food in the sample. Samples containing only regurgitated and empty stomachs were rejected.

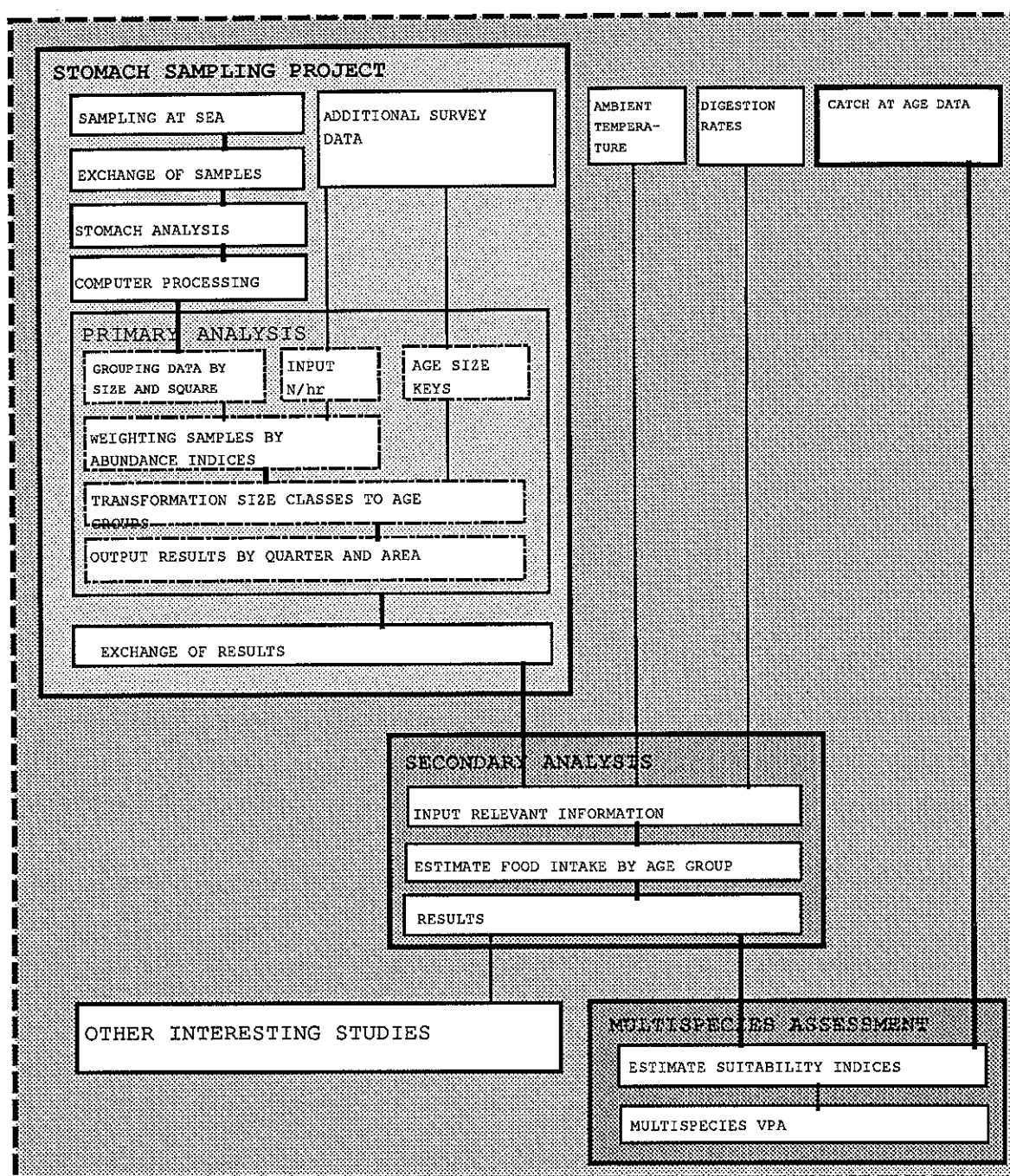


Fig. 2. Flow chart of operations to achieve the aim of using stomach content data as input for multispecies assessment.

The results were aggregated by Roundfish Area (cf. Fig 3) using the abundance (N/hr) per size class (derived from the surveys during which the stomachs had been collected) as a weighting factor. For mackerel a different division in geographical areas has been applied (cf. Fig 4).

During the surveys otolith samples of cod, haddock and whiting were collected by Roundfish Area and these ALK's were used to estimate the age size class distributions of the total catch by area. These data were then used to estimate the percentage contribution of each size class to the total food of each age class of predator. In addition the prey size

distributions of exploited fish species were redistributed over the age groups using the same data. No specific otolith sampling programme had been arranged during the planning stage of the project for other species and therefore appropriate ALK's had to be drawn from other sources.

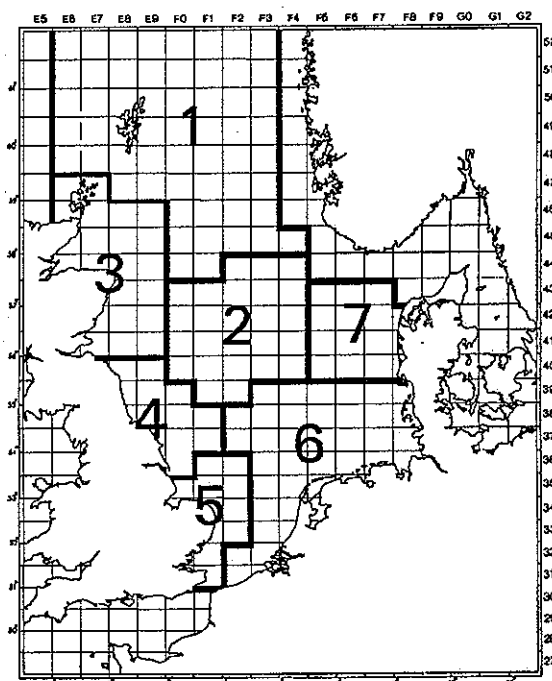


Fig. 3 Definition of Roundfish Areas.

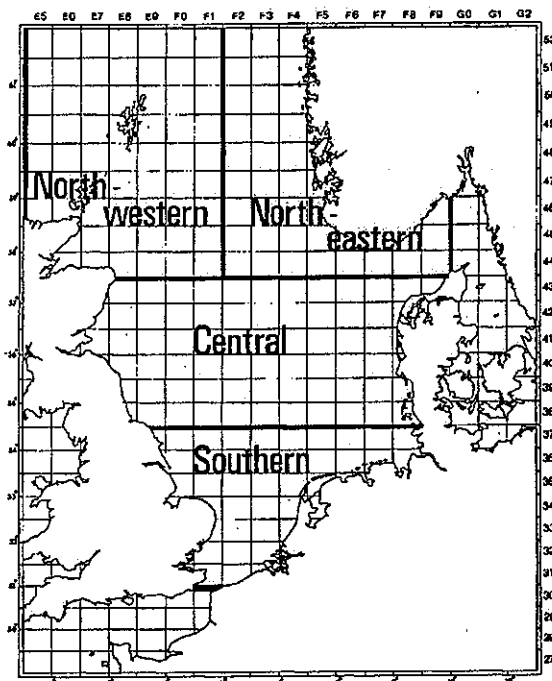


Fig. 4 Definition of areas used for working up mackerel data.

Before the age compositions of prey were estimated, the weights of each prey size class were adjusted by redistributing the unidentified components of the diet proportionally among the various identified components, taking into account the level of identification. Thus, completely unrecognizable items were left out, but weights of unidentified fish were allocated in proportion to all observed fish species, unidentified clupeoids to herring and sprats, etc. Similarly, remains which had not been assigned to size classes were allocated to the recorded size classes within each prey species.

The last step in the primary analysis was to combine the data by area to obtain an average quarterly North Sea value in terms of both average weights and numbers of prey by age group present in the stomach of a predator of each age group. The weighting factor of each area was defined by the survey index (N/hr), multiplied by the number of squares included in each area.

No standard procedures had been defined for estimating prey weights at time of ingestion by age group.

Data on the presence of plaice, sole and mackerel in stomachs have been excluded in the ultimate tables serving as input for MSVPA, because there is a suspicion based on the size distribution of these prey that they largely represent discarded fish from the commercial trawl fisheries (cf. DAAN, 1983). Inclusion of these fish in the predation term of MSVPA would in that case result in accounting twice for the same source of mortality.

3.2 Cod.

In view of the high variances related to research vessel catches, from which it can be inferred that single haul estimates of abundance are poor estimates of abundance, the weighting factor used in obtaining average stomach contents per Roundfish Area was the

square root of the N/hr with a minimum of 1. The rationale for this approach is that the factor reflected the differences in abundance while not giving too much weight to accidentally high catches.

Since the fraction of unidentified fish in cod was very low, no effort has been made to redistribute this fraction among the various fish species. The reason for the low proportion of unidentified fish showing up in the final figures is that the decision of redistributing unidentifiable fish remains among the predominant species in the sample was taken at the time of analysis whenever possible.

In redistributing the unknown size class fraction among the various size classes, this category sometimes happened to be the only one present for a particular prey/predator age group/area/quarter combination. In such cases no age composition of prey could be calculated, but when summing over the areas an adjustment was made for this unknown age group in proportion of the total North Sea age distribution.

Since weights and numbers were analyzed in parallel in this species, the implied average weight of any prey age category at time of ingestion (ω) was obtained by dividing the observed weight in the stomach (S), multiplied by 2 (assuming the average prey in the stomach to be halfway digested), by the number (n) in the stomach:

$$\omega = \frac{2 \cdot S}{n}$$

3.3 Haddock.

The haddock data have been processed in exactly the same manner as the cod data, using the same software. For details reference is made to the cod section (3.2) and to DE LA VILLE-MARQUÉ (1985).

3.4 Whiting.

The primary processing of the whiting data was done according to the standard procedure with the following exceptions. When replicate samples were obtained from a statistical rectangle, each sample was worked up separately, and the rectangle value was calculated as the arithmetic mean of the sample values, disregarding sample size. Furthermore, no estimates of the number items represented by barely recognizable prey were recorded and the total numbers of prey per 1000 stomachs given in table 12-C are based on a proportion of the total weight of food in the stomachs.

In contrast to cod and haddock, the weights of commercially important fish prey of each age in whiting stomachs were estimated from the mean weights within each size class of prey and the size/age distribution. The average numbers of these prey present in the stomachs (table 12-C) were derived by multiplying the weights in the stomach by two and dividing by the live weight (cf the equation given in paragraph 3.2). These numbers, which were obtained by calculation rather than by observation, are therefore not consistent with the total numbers of prey, which themselves only relate to part of the stomach contents.

3.5 Mackerel.

Because the survey gear yielded few stomachs of mackerel in some quarters, samples have been pooled over the period 1980 - 1983, including samples from a variety of gears throughout the North Sea (bottom and pelagic trawl, hook and line, gill-net and purse seine). No allowance has been made for possible differences in stomach contents of fish between different gears and all samples were lumped without trying to account for differences in abundance.

The data were filed and retrieved from the computer as described by WESTGÅRD, 1982. The diet observed in the 3674 stomach sampled in 1981 and 1982 has been presented in MEHL & WESTGÅRD, 1983a. In 1980 and 1983, an additional 1271 stomachs were sampled. Distribution of sampling effort by gear and area was comparable to the other two years. Since the number of stomachs sampled for mackerel was low in certain Roundfish Areas and quarters as compared to other species, it was decided to pool the data into four areas (cf. Fig 4) and combine all years.

3.6 Saithe.

Detailed information on the data processing has been given by GISLASON (1983). When samples from the same length group were combined, they were weighted according to sample size. Only if the sample consisted of more than 25 fish a maximum weighting factor of 25 was applied.

Due to the low sampling intensity of saithe stomachs, it was decided to deviate from the general flowchart by combining data from 1980, 1981 and 1982 and by not weighting samples by abundance indices. Especially in the second and fourth quarter, the number of samples were very low and for this reason the samples were grouped into a summer and a winter half year. The age size key applied to the saithe samples was constructed using quarterly ALK's from Denmark, England, Norway and Scotland. Because the samples were restricted to the northern part of the North Sea, the data have not been worked up by Roundfish Area. The age size keys applied to the various prey species correspond to Roundfish Area 1.

3.7 Estimates of food consumption.

Different models and methods have been applied to the various predator species for estimating rate of consumption on earlier occasions (cf. ANONYMOUS, 1981; DAAN, 1983; GISLASON, 1983; MEHL & WESTGÅRD, 1983a; HISLOP et al, 1983). The principal differences and similarities between the models actually applied have been reviewed by ANONYMOUS (1984a), but no agreement has been achieved on which model was a "most dependable" one.

The following models were considered:

$$\text{Linear model (DAAN, 1983):} \quad R = \frac{2 \cdot S}{D}$$

$$\text{Exponential model (ELLIOTT & PERSSON, 1978) :} \quad R = c1 \cdot S$$

$$\text{General model (JOBLING, 1981):} \quad R = \frac{(2-c2) \cdot S}{(1-c2) \cdot D}$$

where R represents ration, S average stomach content weight and D, c1 and c2 are constants.

The digestion time D depends on the meal size, which on average is related to the size of the predator. DAAN (1973) uses the expression $D = \delta \cdot L$ where L is the length of the predator and δ is a constant, thus allowing for a change in digestion rate with size of predator.

The exponential model implies proportionality between meal size (predator size) and digestion rate. In this model c1 is a function of temperature and the size of the predator. GISLASON (1983) uses the expression

$$c1 = c11 \cdot W^{c12}$$

where c11 and c12 are constants and W is the body weight of the predator.

The general model ($0 \leq c2 \leq 1$) implies that digestion rate depends on meal size (predator size) in the way that a small meal is digested at a faster rate than a large meal, or, when meal size is related to predator size : small predators have a relatively larger digestion rate than large predators.

URSIN et al (1984) apply various more elaborate models for food consumption to a variety of cod stocks. These are not considered here, because there is still a considerable discrepancy between such conceptual models of a higher degree of complexity and the available experimental data. This may be illustrated by a quote from their lamentations:

"In spite of the extensive literature on cod food consumption and digestion, it must be realized that we still have only the vaguest ideas of how food consumption depends on body size and of what determines the stomach evacuation rate."

Because of the uncertainty in respect of the appropriate methods to calculate food intake, it seems premature to try to come up with final estimates for the various species. Although MSVPA requires that preliminary estimates are produced, these are not further considered in this report. For more information on the rates of food intake presently applied, reference is made to a recent report of the ad hoc Multispecies Assessment Working Group (ANONYMOUS, 1988b).

SECTION 4 AUXILIARY INFORMATION.

4.1 Catch rates.

Catch rates by roundfish area have been calculated for cod, haddock and whiting from the surveys in each quarter according to standard procedures applied to International Young Fish Surveys (tables 1-A/C). No adjustments have been made for different catchabilities in the various survey gears used. For mackerel and saithe the survey data were inadequate to follow such a weighting procedure.

To obtain average stomach contents for the total North Sea populations of cod, haddock and whiting, the average stomach contents by roundfish area were weighted by the catch rates in each area and the size of the area. The size was taken as the approximate number of statistical rectangles in each area (table 2).

4.2 Age size keys.

The availability of age size keys varied widely between different predator and prey species. For cod, haddock and whiting extensive age size keys were collected by roundfish area during the surveys and these have been used to transform the size distributions of these species, both as predator and prey, to age distributions. To estimate the average stomach contents by age class of predator, the relative contribution of each size class to the total length distribution of each age class must be known. Therefore the arrays presented in tables 3-A/C represent the total numbers by age class and size class caught by area in the research vessel surveys.

Saithe and mackerel are not preyed upon and age length keys were only used for redistributing the stomach contents by size class over the age classes. In the case of mackerel, only three age class groups have been distinguished, which did not require detailed keys. Only the one collected in the 3rd quarter of 1982, which has been employed as a general reference, is reproduced here (table 3-D). For saithe generalized age length keys were derived from commercial catches made by Denmark, England, Norway and Scotland (table 3-E).

For Norway pout, herring, sprat and sandeel detailed information by area was lacking and generalized age size keys for the total North Sea were derived from Danish industrial fisheries (tables 3-F/I). Separate age size keys have only been constructed for area 1 for special use in the analysis of the saithe data, because this species is largely restricted to the northern North sea. Cod, haddock and whiting occurring in saithe stomachs were treated with the respective age size keys from area 1.

4.3 Mean weights of prey classes.

To estimate numbers of prey consumed from the weights consumed various weight at size or age data have been used. For cod and haddock as predators the mean weights of prey were calculated directly from the weights and numbers observed in stomachs and, therefore, no independent information was required. For the other predators, appropriate prey weights had to be obtained from other sources. In the case of whiting and mackerel, annual averages by size class were derived from a generalized weight length relationship for each individual prey species. Quarterly mean weights by size class and if possible by age class of prey were derived from Danish industrial fisheries in the northern North Sea to be used for saithe as predator. The relevant information is given in table 4-A/I. No data for saithe and mackerel are presented, because they did not occur as prey.

4.4 Ambient temperatures.

When estimating food consumption from stomach content data or on the basis of energy expenditure, it is necessary to make adjustments for possible differences in ambient temperature between quarters and species. For mackerel regional values have been collated, but for the others a single average value for the ambient temperature in the total area of distribution has been calculated. The values were derived from TOMCZAK & GOEDECKE (1964) and are given in table 5.

It should be noted that these figures only provide a rough indication of the ambient temperature regime for any of the species. No reliable data are available for adjusting for temperature differences between different age groups in different Roundfish Areas.

SECTION 5 STOMACH CONTENT DATA .

5.1 Sampling intensity.

For cod, haddock and whiting, the number of stomachs sampled in 1981 are given by statistical rectangle in Fig. 5-A/C and quarterly summaries by Roundfish Area are given in tables 6-A/C. The target of 1500 stomachs per quarter has been exceeded in all cases and also the coverage of the North Sea was satisfactory in most quarters. The data for mackerel (Fig. 5-D and table 6-D) have been grouped by the four sampling areas distinguished and they refer to the total number of stomachs sampled during the period 1981 - 1982. It can be seen that only the third quarter was adequately sampled over this period and that the sampling in the first quarter has been particularly poor. For saithe (Fig. 5-E and table 6-E) no geographical split has been made and the numbers sampled per year and quarter are indicated. In all instances sampling intensity remained considerably below the target, even after combining three years of data. In particular, the second quarter is poorly represented.

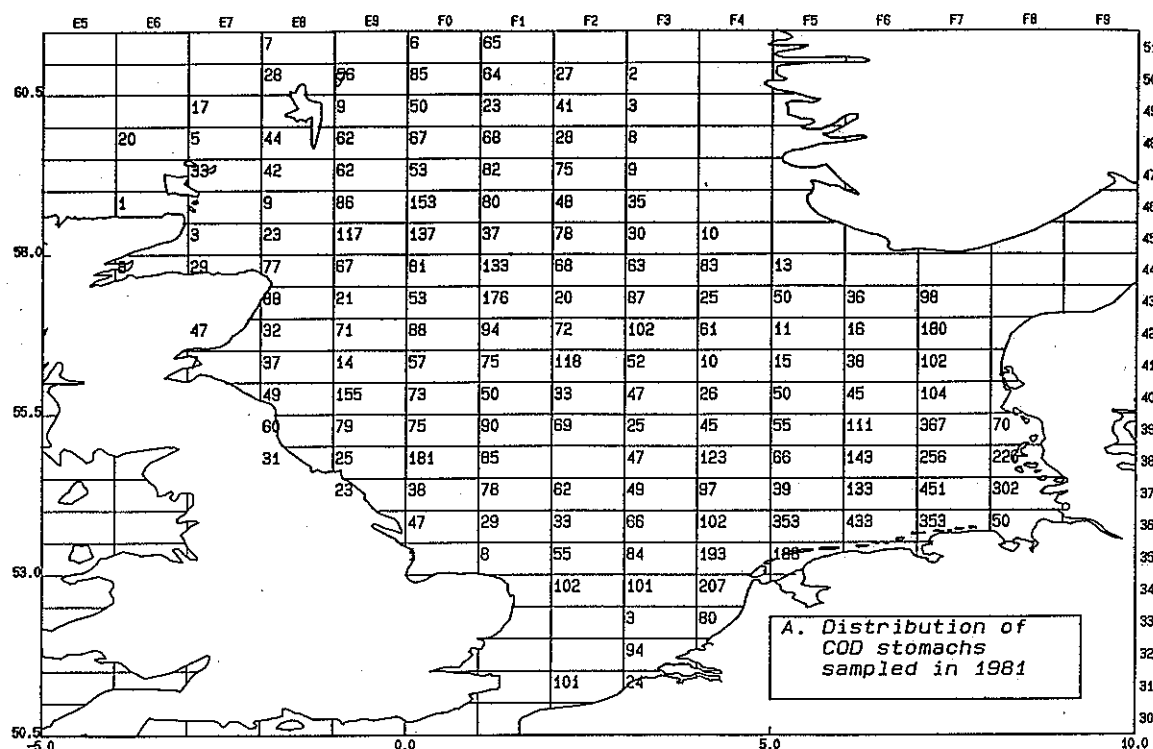


Fig. 5-A Spatial distribution of cod stomachs collected in 1981, all quarters.

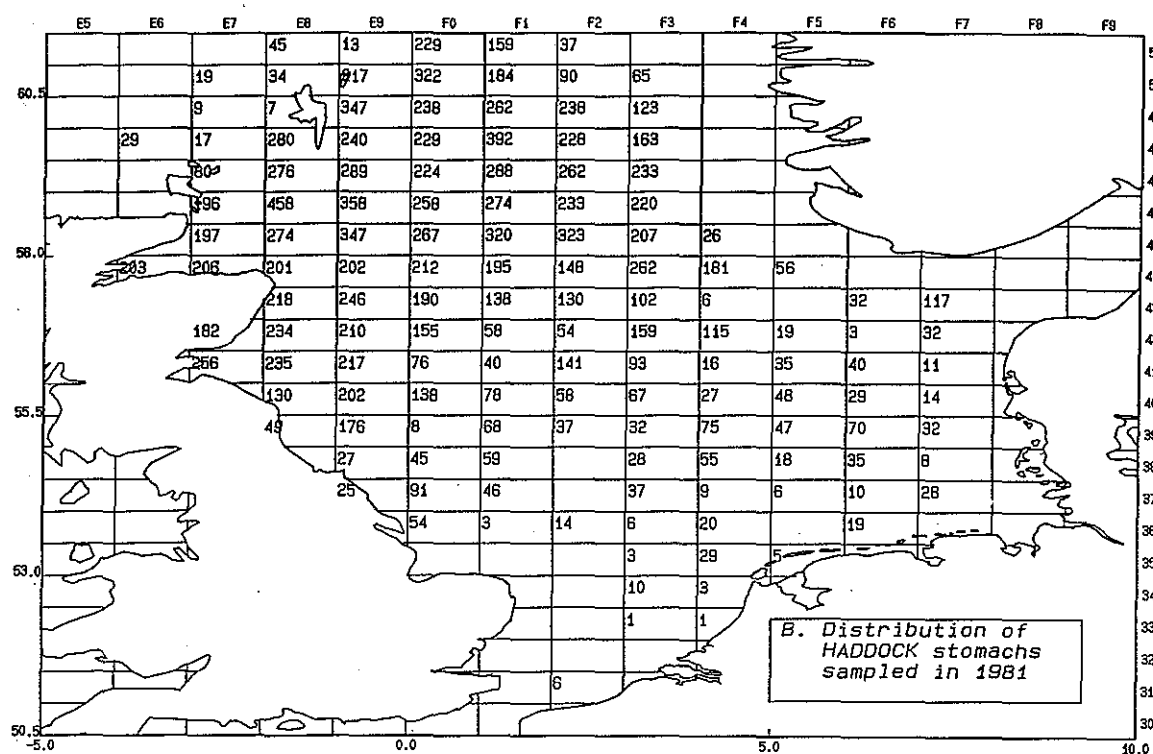


Fig. 5-B Spatial distribution of haddock stomachs collected in 1981, all quarters.

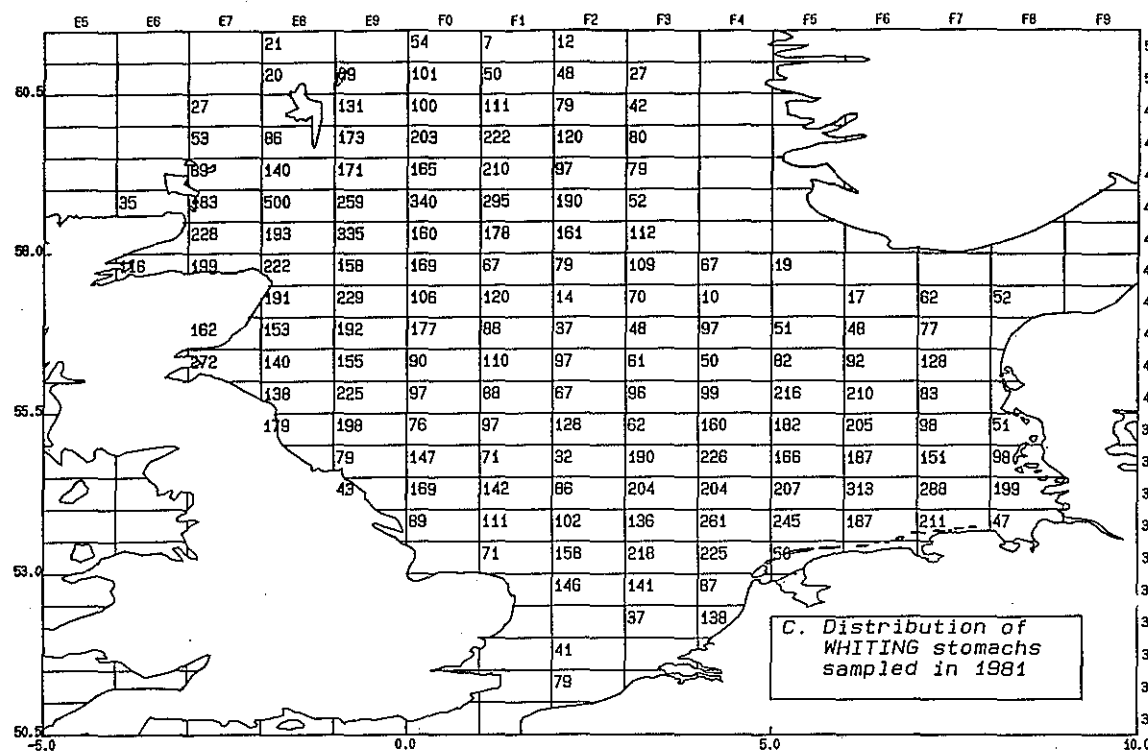


Fig. 5-C Spatial distribution of whiting stomachs collected in 1981, all quarters.

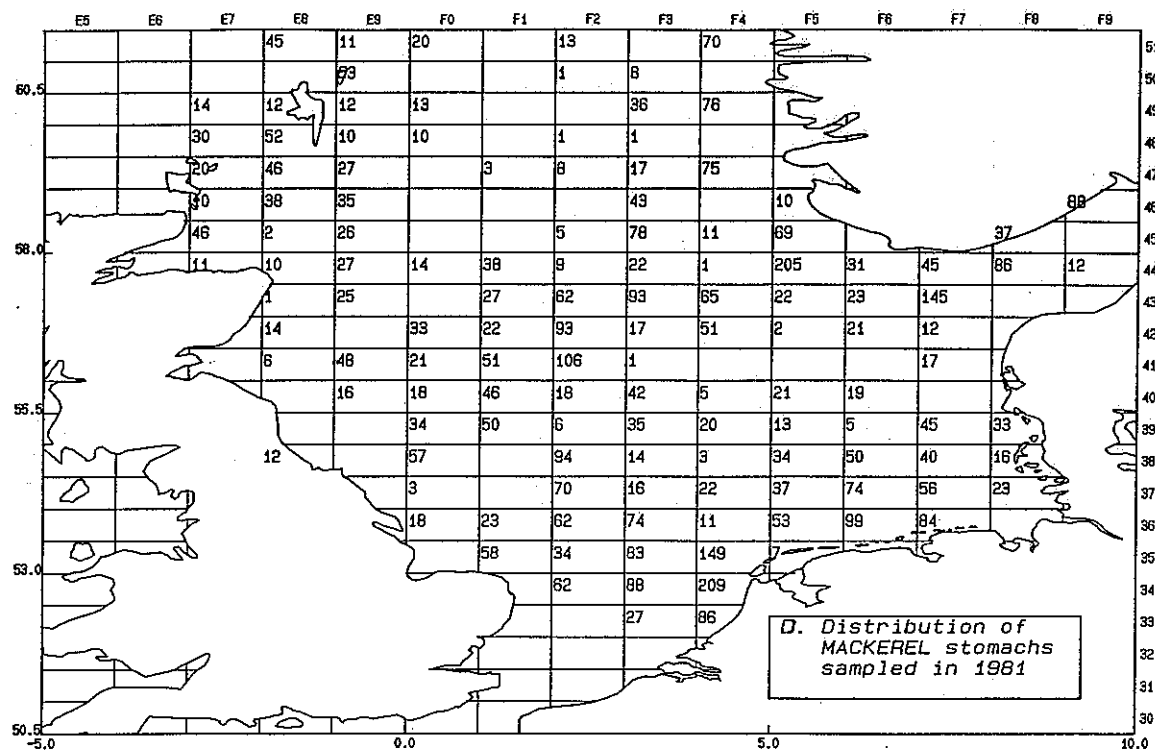


Fig. 5-D Spatial distribution of mackerel stomachs collected in 1981/1982, all quarters.

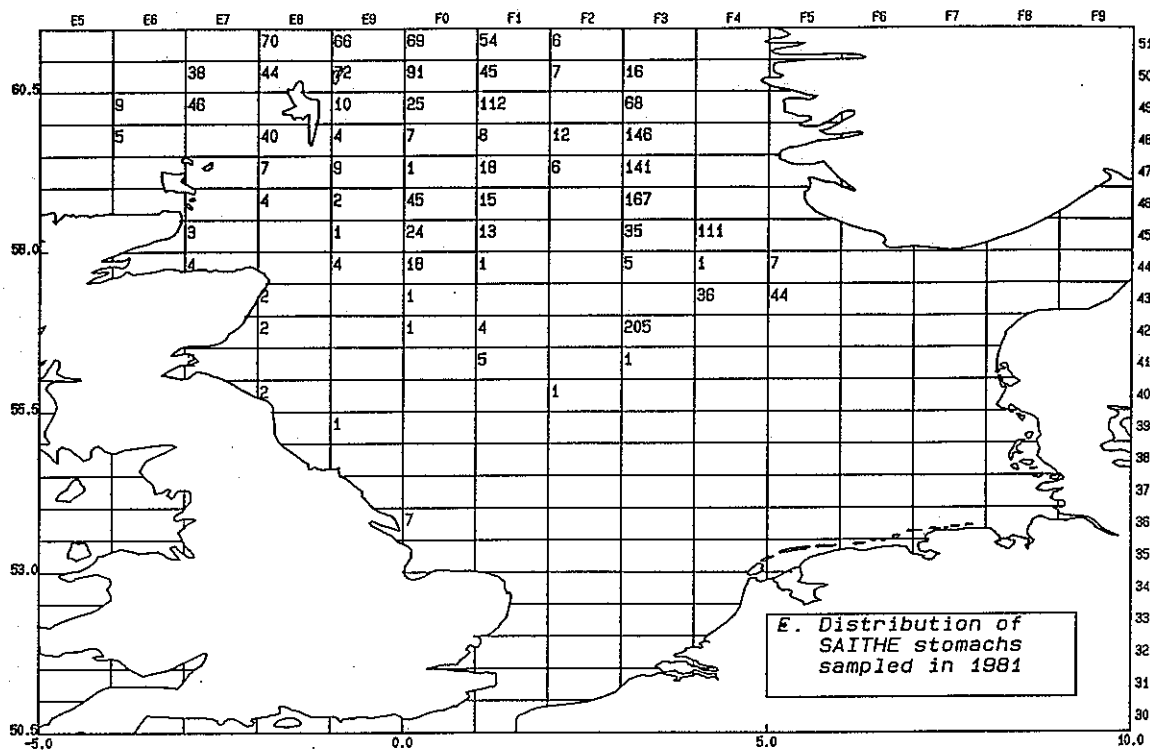


Fig. 5-E Spatial distribution of saithe stomachs collected in 1980/1982, all quarters.

5.2 Empty stomachs.

In table 7-A/D percentages of empty stomachs are given by predator size class, area and quarter as an index of seasonal variations in feeding rate. Data are not available for saithe. The fraction empty is consistently higher in whiting (ca 25%) than in the other species (ca 10%). Fractions within size classes and quarters are highly variable and the data cannot be readily interpreted without further statistical analysis.

5.3 Prey composition.

Tables 8-A/E provide information on the average composition of the stomach contents by age class. Data are presented as percentage weights by major taxonomic units (classes and for the crustacea orders) as well as for commercially exploited species, including evertbrates. The mackerel figures represent unweighted means of all samples for three groups of age classes. For saithe the data are given by size class and have been grouped by a winter and a summer half year because of limited sampling during certain parts of the year.

Crustaceans and fish represent the most important prey items for all species, with a marked shift from the former to the latter with increasing predator size. Although a variety of other faunal elements may be observed in the stomachs, their contribution to the total food is rather small. The food spectra of cod, haddock and whiting are fairly similar, although the shifts may occur at different ages related to different sizes. In mackerel and saithe, there is less variety and there is a higher component of pelagic species.

In all cases, commercially important species contribute significantly to the total food of these five predator species.

5.4 Prey size distribution.

The percentage distribution by number of prey by size class for fish and crustacea separately and for all prey is presented as an indication of size selection in tables 9-A/E. With the possible exception of mackerel, these data reveal a marked increasing trend of prey size distribution with predator size, which explains part of the shift from crustacean prey among the smaller size classes to fish prey among the larger ones.

5.5 Size composition exploited prey.

Table 10-A/E presents a detailed account of the regional variations in the food composition by weight with reference only to the exploited prey species. Although such information cannot be readily applied at present in multispecies assessment, apparent species interactions at a total North Sea scale must obviously be converted to much smaller space and time scales in order to be fully understood. Although further disaggregation would be possible, this tabulation by areas at least allows to explore specific regional species interactions. Also, these data may be used for discriminating between substocks in the North Sea. This applies particularly to the sandeels, which have so far not been split into a northern and a southern component in MSVPA (cf. ANONYMOUS, 1987b).

5.6 Age composition exploited prey species.

Tables 11, 12 and 13 contain the information on exploited prey species, which is directly relevant to MSVPA, because they contain information on average weights, numbers and individual prey weights by age group of prey and predator by quarter for the total North Sea.

SECTION 6 DISCUSSION.

6.1 General results.

The tables presented here will not be discussed in great detail, because proper interpretation is only possible after further processing, particularly by means of MSVPA. This aspect is beyond the scope of this report and the discussion will be largely restricted to aspects of data quality.

In respect of cod, haddock and whiting, no problems have been experienced in the collection of samples, because these species can be efficiently caught in standard demersal trawls. Also the necessary catch at age data could be collected for weighting the stomach samples by predator abundance in different areas. The major difficulties for these species were related to the absence of appropriate age length keys of some of the prey species by area and, in case of a follow up, more care must be given that such data are collected.

Cod and whiting are major fish predators and an appreciable proportion of their diet consists of a variety of exploited species, including their own direct relatives. The data for haddock indicate that this species may also consume a large quantity of fish prey, although the spectrum is much reduced. Sandeels represent the major component and Norway pout is also frequently observed.

The problems encountered with saithe and mackerel were considerable. Because these species cannot be effectively sampled with a bottom trawl, it proved impossible to obtain a sufficient number of stomachs in 1981 and samples from different years had to be combined. Thus, the results obtained for these species do not strictly reflect the diet in 1981 specifically but rather the average diet over some years. Not only was the sampling coverage rather poor but also, because no reliable data were available on the geographical distribution of the predators, the procedures to combine the individual samples to arrive at an average total North Sea food composition involved rather arbitrary assumptions.

Because the data of more years have been combined and generalized age size keys have been applied, the stomach content data for saithe and mackerel can not be expected to contain a reliable signal of relative year class strength of the various prey species in 1981. This has immediate consequences for MSVPA, because the estimated suitabilities will be biased. The main food of mackerel is invertebrates, the only prominent fish prey in the diet being 0-group Norway pout and sandeels. Since the confidence in the predation mortalities during the first year of life as estimated by MSVPA appears to be limited anyway, the ultimate effect of this bias in the integrated analysis is in this case of less concern. Saithe were eating a wider variety of fish prey and a larger array of age groups and therefore much stronger effects may be expected.

There is a general problem in respect of the statistical evaluation of the stomach content data, because of the complexity of the procedures. Firstly, stomachs from individual fish have been combined in grouped samples by size class, from which it follows that coefficients of variation in the estimated averages cannot be reliably assessed.

Secondly, there is the weighting factor used in raising the samples by statistical rectangles to averages over larger areas. These factors are based on catch rates according to trawl surveys, which inherently exhibit high variances. In the case of cod and haddock, the square root of the number per hour fishing has been chosen, with a minimum value of 1, in order to reduce the effect of spurious high catch rates. While a preliminary analysis had indicated that of 4 different weighting procedures tested, the square root tended to yield less extreme results than any of the others (DAAN, 1983), a proper evaluation has not been made so far.

A third critical source of error is related to the age size keys. For most of the prey species, these were not available on a regional basis and a total North Sea key may result in considerable bias when applied to regional stomach content data.

A last major problem is related to the transformation of weights consumed to numbers consumed, which is necessary at some stage because predation mortalities refer to numbers. This transformation requires that average prey weights by size or age class can be directly or indirectly estimated. In the case of cod and haddock, a direct estimate can be obtained because the number of prey has always been recorded in association with the weight. Assuming that on average the prey of a particular category are halfway digested, the average weight of a prey at time of ingestion can be calculated by dividing weights by numbers and multiplying by a factor 2. This procedure may lead to large discrepancies in both directions, when only a few organisms are involved in the ultimate estimate, because they may accidentally have been either fresh or almost completely digested individuals. For whiting and mackerel a generalized length weight relationship has been applied. Although this reduces the chance of outliers, a bias could be due to the fact that

predators may not select prey at random from each size class. Similarly, independent information drawn from samples in the Danish industrial fisheries as used for working up the saithe data may cause problems, when size preference within size or age classes plays a major role. The actual effect of these different approaches has not been properly evaluated, but one certainly would expect inconsistencies between species.

The introduction of a quarterly VPA has had considerable advantages from the point of view of any further stomach sampling schemes, because the original requirement for a complete coverage the whole year around could be relaxed. Representative samples for the entire North Sea from any single quarter can now be directly added to the data base and used to test underlying assumptions in respect of the constancy of suitability indices or to estimate aggregate suitability matrices on the basis of more data sets (GISLASON & SPARRE, 1987). For this reason, a new stomach sampling programs could be carried out between 1985 and 1987, which aimed at the collection of cod, whiting and saithe during the first and third quarter during 3 consecutive years (ANONYMOUS, 1988a).

6.2 Exchange of data.

During the 1982 meeting of the coordinators a format had been drawn up for the exchange of stomach content data (Appendix I). So far only data on cod, haddock, saithe and mackerel have been made available in this format, but little progress has been made in setting up a central data base. Due to differences in the procedures of analysis for the individual species, there is no software package available which can be unambiguously applied to all these data sets. However, in respect of the subsequent sampling project of cod, whiting and saithe stomachs in 1985/1987, the situation has considerably improved and more uniformity has been reached (ANONYMOUS, 1988a). Further standardization of methods of analysis and of computer processing should get a high priority when new large scale stomach sampling projects are undertaken.

6.3 Future studies.

Although the 1985/187 sampling project has resulted in a considerable extension of the data base (ANONYMOUS, 1988b), MSVPA in the North Sea is still heavily depending on the 1981 project, because for the second and fourth quarter no new data have become available for any species. Since mackerel and haddock have not been sampled in later years, more than 50% of all the predation mortalities estimated by MSVPA depend entirely on a single set of observations. Although the evidence provided by DEKKER (1983) that for all practical purposes size suitability of individual prey species is relatively constant, this appears to be a narrow basis for extrapolating over time spans, when large changes in species composition have been observed (notably herring and sprat). Therefore, there is a need for a repetition of a large scale sampling program in the foreseeable future.

In general, the procedures established in 1981 seem to have met the ultimate purpose. While this might suggest that there is no need to introduce major changes, any new scheme should be carefully considered in order to draw maximum profit from this costly type of research. For example, stomach sampling surveys might be arranged from 1st of July in one year to the 30th of June in the next so as to allow to follow the predation mortality on a specific year class of prey rather than on the I-group and O-group of successive year classes. Also, such a scheme might be easier to arrange since the scheduling of research vessel time would span two years rather than one.

Apart from doing more work of the same type for the same species, other options should be considered. MSVPA indicates that predation mortalities are particularly high among 0-group fish, but quantitatively these results are not very reliable, because there may be other important predators on these postlarval fish, which have not yet been assessed. There have been indications of cannibalism among 0-group roundfish and horse mackerel has recently been shown to consume considerable numbers of whiting in particular (DAHL, 1987), but there may be other important candidates which might have to be included in the sampling project if the scope of multispecies assessment is to be extended.

SECTION 7 REFERENCES

- ANDERSEN, K.P., 1982 - An interpretation of the stomach contents of fish in relation to prey abundance. *Dana* 2:1-50.
- ANDERSEN, K.P. & E. URSIN, 1977 - A multispecies extension to the Beverton and Holt theory of fishing, with accounts of phosphorous circulation and primary production. *Meddr Danm. Fisk.- og Havunders.*, N. 7:319-435.
- ANONYMOUS, 1980 - Report of the ad hoc Working Group on Multispecies Assessment Model Testing, Copenhagen, 3-7 March 1980. ICES C.M. 1980/G:2.
- ANONYMOUS, 1981a - Draft Manual for the Stomach Sampling Project, January 1981. Internal Report Netherlands Institute for Fishery Investigations.
- ANONYMOUS, 1981b - Report of the ad hoc Working Group on Multispecies Assessment of the Baltic, Gdynia, Poland 8-11 September 1981. ICES C.M. 1981/J:34.
- ANONYMOUS, 1982a - Report of the meeting of the coordinators of the North Sea Stomach Sampling Project 1981, IJmuiden, 12-16 July 1982. ICES C.M. 1982/G:73.
- ANONYMOUS, 1982b - Report of the ad hoc Working Group on Multispecies Assessment of the Baltic, Copenhagen, 25-28 May 1982. ICES C.M. 1982/Assess:15.
- ANONYMOUS, 1984a - Report of the meeting of the coordinators of the Stomach Sampling Project 1981, IJmuiden, 19-23 March 1984. ICES C.M. 1984/G:37.
- ANONYMOUS, 1984b - Report of the ad hoc Multispecies Assessment Working Group, Copenhagen, 18-22 June 1984. ICES C.M. 1984/Assess:20.
- ANONYMOUS, 1986 - Report of the ad hoc Multispecies Assessment Working Group, Copenhagen, 13-19 November 1985. ICES C.M. 1986/Assess:9.
- ANONYMOUS, 1987a - Report of the ad hoc Multispecies Assessment Working Group, Copenhagen, 12-18 November 1986. ICES C.M. 1987/Assess:9.
- ANONYMOUS, 1987b - Report of the Baltic Multispecies Assessment Working Group, Moscow, 22-26 September 1986. ICES C.M. 1987/Assess:6.
- ANONYMOUS, 1988a - Report of the meeting of the coordinators in the Stomach Sampling Project 1985 to 1987, IJmuiden, 28 March - 1 April 1988. ICES C.M. 1988/G:27.
- ANONYMOUS, 1988b - Report of the Multispecies Assessment Working Group, Copenhagen, 1-8 June 1987. ICES C.M. 1987/Assess:23.
- ARNZT, W.E. & E. URSIN, 1981a - On the estimation of food preference parameters when food concentrations are not known. ICES C.M. 1981/L:40.
- ARNZT, W.E. & E. URSIN, 1981b - Estimates of food consumption parameters for dab (*Limanda limanda*) utilizing information on food concentrations. ICES C.M. 1981/L:41.
- BEVERTON, R.J.H. & S.J. HOLT, 1957 - On the dynamics of exploited fish populations. *Fishery Invest.*, Lond.(2) 19: 1-533.
- DAAN, N., 1973 - A quantitative analysis of the food intake of North Sea cod, Gadus morhua. *Neth J. Sea Res.* 8 (1): 27-48.

- DAAN, N., 1981 - Progress report on the North Sea Stomach Sampling Project 1981. ICES C.M. 1981/G:72.
- DAAN, N., 1983 - Analysis of the cod data collected during the 1981 Stomach Sampling Project. ICES C.M. 1983/G:61.
- DAHL, K., 1987 - The diet and consumption of Horse mackerel (Trachurus trachurus) in the Eastern North Sea, August 1986. ICES C.M. 1987/H:43.
- DEKKER, W., 1983 - An application of the Andersen Consumption model in estimating prey size preference of North Sea cod. ICES C.M. 1983/G:63.
- ELLIOTT, J.M. & L. PERSSON, 1978 - The estimation of daily rates of food consumption for fish. J. Anim. Ecol. 47:977-991.
- GISLASON, H., 1983 - A preliminary estimate of the yearly intake of fish by Saithe in the North Sea. ICES C.M. 1983/G:52.
- GISLASON, H. & P. SPARRE, 1987 - Some theoretical considerations on the implementation of Multispecies Virtual population Analysis in ICES. ICES C.M. 1987/G:52.
- HISLOP, J.R.G., A.P. ROBB, M.A. BROWN and D.W. ARMSTRONG, 1983 - A preliminary report on the analysis of the whiting stomachs collected during the 1981 North Sea stomach sampling project. ICES C.M. 1983/G:59.
- JOBLING, M., 1981 - Mathematical models of gastric emptying and the estimation of daily rates of food consumption for fish. J. Fish. Biol. 19:245-257.
- MEHL, S. & T. WESTGÅRD, 1983a - The diet and consumption of mackerel in the North Sea. ICES C.M. 1983/H:34.
- MEHL, S. & T. WESTGÅRD, 1983b - Gastric evacuation rate in mackerel. ICES C.M. 1983/H:33.
- NOAA, 1978 - NODC Taxonomic Code. Second edition. National Oceanographic Data Center, Washington, DC.
- POPE, J.G., 1979 - A modified Cohort Analysis in which constant natural mortality is replaced by estimates of predation levels. ICES C.M. 1979/H:16.
- SPARRE, P., 1980 - A goal function of fisheries (Legion analysis). ICES C.M. 1980/G:40.
- TOMCZAK, G. & E. GOEDECKE, 1964 - Die thermische Schichtung der Nordsee auf grund der mittleren Jahresganges der Temperatur in 1/2° und 1° -Feldern. Deutschen Hydrographischen Zeitschrift, Ergänzungsheft Reihe B (4) Nr.8.
- URSIN, E., 1973 - On the prey size preference of cod and dab. Meddr Danm. Fisk.- og Havunders., N.S. 7:85-98.
- VILLEMARQUÉ, J. DE LA, 1985 - Rapport préliminaire sur l'analyse des estomacs d'églefins récoltés en 1981 dans le cadre du programme d'échantillonnage d'estomacs de poissons en Mer du Nord. ICES C.M. 1985/G:39.
- WESTGÅRD, T., 1982 - Programs for handling and analysis of stomach content data. ICES C.M. 1982/H:21.

TABLE 1 CATCH RATES (N per hour fishing).

TABLE 1-A Catch rate of cod by age class, area and quarter.

Species : COD		Age class						
		0	1	2	3	4	5	6+
Quarter 1	Area 1		0.1	8	8	5	2	1
	Area 2		3	49	5	2	1	1
	Area 3		1	7	2	2	1	0.5
	Area 4		2	37	1	2	0.5	1
	Area 5		0.5	3	0.5	1	1	1
	Area 6		55	44	2	1	2	1
	Area 7		3	25	2	3	3	1
Quarter 2	Area 1	0.1	0.1	6.9	4.8	1.5	0.4	0.1
	Area 2	132.4	10.6	16.4	3.8	2.9	0.8	0.1
	Area 3	0.1	0.3	6.2	2.6	0.6	0.5	0.9
	Area 4	1.0	13.1	193.7	8.3	5.7	1.0	0.5
	Area 5	0.1	2.8	29.8	1.0	0.1	0.4	0.1
	Area 6	34.9	158.5	47.4	4.6	0.3	0.3	0.1
Quarter 3	Area 1	12.9	0.6	3.5	3.0	1.2	0.5	0.4
	Area 2	34.2	2.5	12.3	2.1	0.7	1.0	1.4
	Area 3	2.0	2.5	8.8	2.8	2.3	0.3	0.3
	Area 4	68.8	4.0	10.5	1.3	0.3	0.1	0.1
	Area 5	1.7	0.5	3.7	0.7	0.1	0.1	0.1
	Area 6	168.4	38.0	6.7	0.2	0.2	0.1	0.1
	Area 7	18.7	26.1	11.2	0.5	0.1	0.1	0.1
Quarter 4	Area 1	1.7	0.3	3.4	1.5	0.9	0.2	0.1
	Area 2	9.1	8.7	36.2	5.8	1.7	0.5	0.5
	Area 3	0.4	0.3	2.4	1.3	0.1	0.1	0.1
	Area 4	20.0	3.1	14.1	7.0	2.0	0.1	0.1
	Area 5	5.0	10.0	1.5	0.5	0.1	0.1	0.1
	Area 6	157.9	48.8	10.6	0.5	0.1	0.1	0.1
	Area 7	14.3	22.3	24.6	2.9	1.2	0.1	0.2

TABLE 1-B Catch rate of haddock by age class, area and quarter.

Species : HADDOCK		Age class						
		0	1	2	3	4	5	6+
Quarter 1	Area 1		597	551	273	62	8	5
	Area 2		149	954	144	19	6	3
	Area 3		175	1466	271	12	1	5
	Area 4		7	141	10	0.1	0.1	0.1
	Area 5		1	0.1	0.1	0.1	0.1	0.1
	Area 6		13	15	0.1	0.1	0.1	0.1
	Area 7		3	38	16	4	2	2
Quarter 2	Area 1	33.2	280.1	756.4	121.6	7.9	0.3	0.1
	Area 2	0.4	67.6	610.8	51.3	0.6	0.1	0.1
	Area 3	10.1	243.5	2062.7	315.6	22.9	0.4	4.3
	Area 4	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Area 5	0.1	1.3	0.1	0.1	0.1	0.1	0.1
	Area 6	0.1	5.3	18.3	0.7	0.1	0.1	0.1
Quarter 3	Area 1	1607.5	256.6	301.3	65.2	8.0	0.8	0.1
	Area 2	147.4	61.8	257.7	32.3	2.7	0.1	0.1
	Area 3	81.5	252.3	469.7	35.9	2.4	0.3	0.4
	Area 4	355.0	21.6	182.9	8.6	1.3	0.1	1.1
	Area 5	1.2	0.1	0.3	0.1	0.1	0.1	0.1
	Area 6	37.0	3.0	7.1	0.3	0.1	0.1	0.1
	Area 7	251.4	3.6	40.4	0.9	1.7	0.3	1.4
Quarter 4	Area 1	613.1	311.1	299.8	50.4	4.4	1.0	1.0
	Area 2	181.3	76.4	308.1	39.7	0.1	0.1	1.5
	Area 3	366.3	164.8	449.1	32.3	1.6	0.1	1.9
	Area 4	197.0	47.9	127.3	15.4	8.6	0.1	1.6
	Area 5	11.0	2.0	0.1	0.1	0.1	0.1	0.1
	Area 6	222.3	0.5	2.3	0.1	0.1	0.1	0.1
	Area 7	90.3	18.9	29.6	24.0	0.1	0.1	2.1

TABLE 1-C Catch rate of whiting by age class, area and quarter.

Species : WHITING								
Age class		0	1	2	3	4	5	6+
Quarter 1	Area 1		89	176	237	104	17	7
	Area 2		375	912	208	34	9	1
	Area 3		306	1028	368	52	10	6
	Area 4		250	293	75	26	4	1
	Area 5		69	571	179	37	2	6
	Area 6		254	395	172	56	14	2
	Area 7		105	25	9	5	1	0.5
Quarter 2	Area 1		36.1	186.1	142.7	36.6	4.7	1.1
	Area 2		31.3	80.8	48.1	2.8	0.0	1.4
	Area 3		260.6	2086.8	531.0	74.0	16.7	8.9
	Area 4		933.9	478.2	62.9	38.9	5.9	0.9
	Area 5		150.6	1106.6	246.6	329.2	133.0	21.2
	Area 6		459.4	423.4	72.4	71.9	3.8	0.6
Quarter 3	Area 1	10.1	13.6	51.3	38.9	6.1	1.0	0.4
	Area 2	11.2	77.9	73.8	11.4	3.6	0.3	0.4
	Area 3	38.9	266.5	870.8	239.4	32.4	9.5	1.4
	Area 4	424.3	326.7	505.9	94.5	46.3	3.4	3.7
	Area 5	614.1	416.7	158.6	2.6	2.7	0.3	0.1
	Area 6	438.5	335.3	284.4	26.2	18.1	8.7	1.3
	Area 7	1479.9	84.5	22.4	5.7	0.9	0.6	0.0
Quarter 4	Area 1	8.5	10.2	52.7	37.2	15.6	2.1	1.8
	Area 2	28.8	193.0	421.8	166.6	26.1	1.8	4.2
	Area 3	136.6	385.1	432.9	71.9	18.1	5.9	0.9
	Area 4	259.1	603.6	878.6	91.6	61.0	15.6	8.9
	Area 5	16.0	244.5	296.5	10.0	40.0	2.0	0.0
	Area 6	1082.1	227.0	151.1	10.3	9.3	1.8	0.2
	Area 7	1390.8	322.0	82.6	25.1	10.0	3.4	0.0

TABLE 2 AREA WEIGHTING FACTORS.

(based on number of statistical rectangles within the 200 m depth contour.)

ROUNDFISH AREA	WEIGHTING FACTOR
1	45
2	25
3	19
4	11
5	10
6	33
7	12

TABLE 3 AGE SIZE DISTRIBUTIONS.

TABLE 3-A-1 Age size distributions (N caught) of cod by area and quarter.

Species : COD		Quarter : 1							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	<= 7 cm			2					
	10 - 15 cm			12					
	15 - 20 cm				2				
	20 - 25 cm			2	98				
	25 - 30 cm				203	5			
	30 - 40 cm				228	28			
	40 - 50 cm				44	131			
	50 - 70 cm					293	120	15	
	70 -100 cm					8	141	117	46
Area 2	>=100 cm							3	31
	<= 7 cm			2					
	7 - 10 cm			4					
	10 - 15 cm			72					
	15 - 20 cm			81	23				
	20 - 25 cm			18	640				
	25 - 30 cm				1436				
	30 - 40 cm				942	32			
	40 - 50 cm				23	109			
Area 3	50 - 70 cm					132			
	70 -100 cm						57	11	
	>=100 cm						59	53	24
	10 - 15 cm			15					
	15 - 20 cm			10					
	20 - 25 cm			1	19				
	25 - 30 cm			8	74	2			
	30 - 40 cm				128	9			
	40 - 50 cm				8	22	1		
Area 4	50 - 70 cm				6	53	12		2
	70 -100 cm					2	55	25	4
	>=100 cm								6
	10 - 15 cm			22					
	15 - 20 cm			35					
	20 - 25 cm			8	224	6			
	25 - 30 cm				603	19			
	30 - 40 cm				249	3			
	40 - 50 cm				10	17			
Area 5	50 - 70 cm					10	18		
	70 -100 cm						29	4	23
	>=100 cm								5
	15 - 20 cm			4					
	30 - 40 cm				20				
	40 - 50 cm				4	2			
Area 6	50 - 70 cm				2				
	70 -100 cm						9	7	2
	>=100 cm								8
	10 - 15 cm			174					
	15 - 20 cm			1277					
	20 - 25 cm			2057	101				
Area 7	25 - 30 cm			201	411				
	30 - 40 cm				1532				
	40 - 50 cm				1436	18			
	50 - 70 cm				103	163	29	6	
	70 -100 cm					19	146	210	31
	>=100 cm							7	40
	7 - 10 cm			2					
	10 - 15 cm			36					
	15 - 20 cm			66					
Area 8	20 - 25 cm			25	45				
	25 - 30 cm				244				
	30 - 40 cm				719	11			
	40 - 50 cm				107	33			
	50 - 70 cm					70	43	5	
	70 -100 cm						57	91	10
	>=100 cm								16

TABLE 3-A-2 Age size distributions (N caught) of cod by area and quarter.

Species : COD		Quarter : 2							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	15 - 20 cm			1	1				
	20 - 25 cm			2	4				
	25 - 30 cm			2	48				
	30 - 40 cm				138	5			
	40 - 50 cm				57	38			
	50 - 70 cm				16	157	15		
	70 - 100 cm					8	50	26	5
	>=100 cm								5
Area 2	4 - 5 cm		160						
	5 - 7 cm		897						
	7 - 10 cm		1						
	10 - 15 cm			3					
	15 - 20 cm			15					
	20 - 25 cm			31					
	25 - 30 cm			38	20				
	30 - 40 cm				81				
	40 - 50 cm				30	10			
	50 - 70 cm				1	23	3		
	70 - 100 cm						24	7	1
	>=100 cm								1
Area 3	15 - 20 cm			4					
	20 - 25 cm			4	3				
	25 - 30 cm				9				
	30 - 40 cm				94				
	40 - 50 cm				54	14			
	50 - 70 cm				5	57	5		
	70 - 100 cm					3	15	17	6
	>=100 cm								13
Area 4	5 - 7 cm		6						
	15 - 20 cm			64					
	20 - 25 cm			90	6				
	25 - 30 cm				658				
	30 - 40 cm				980				
	40 - 50 cm				349	34			
	50 - 70 cm				70	14	15		
	70 - 100 cm					5	21	9	3
Area 5	>=100 cm						2		1
	20 - 25 cm			6					
	25 - 30 cm			4					
	30 - 40 cm			2	12				
	40 - 50 cm				14				
	50 - 70 cm				24				
Area 6	>=100 cm							2	
	4 - 5 cm		256						
	5 - 7 cm		752						
	15 - 20 cm			306					
	20 - 25 cm			1924					
	25 - 30 cm			2090					
	30 - 40 cm			300	562				
	40 - 50 cm				648				
	50 - 70 cm				209	93			
	70 - 100 cm					42	7	7	
Area 7	>=100 cm							2	4
	NOT SAMPLED								

TABLE 3-A-3 Age size distributions (N caught) of cod by area and quarter.

Species : COD		Quarter : 3							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	5 - 7 cm		141						
	7 - 10 cm		516						
	10 - 15 cm		666						
	15 - 20 cm			4					
	20 - 25 cm			22					
	25 - 30 cm			23	17				
	30 - 40 cm			11	104	3			
	40 - 50 cm				101	55	1		
	50 - 70 cm				52	112	27	3	
	70 - 100 cm					29	49	32	10
>=100 cm								17	
Area 2	5 - 7 cm		339						
	7 - 10 cm		1334						
	10 - 15 cm		118						
	15 - 20 cm		16	3					
	20 - 25 cm			30					
	25 - 30 cm			40	21				
	30 - 40 cm			19	248				
	40 - 50 cm				157	45			
	50 - 70 cm				32	45	5		
	70 - 100 cm					8	22	35	13
>=100 cm							3	69	
Area 3	5 - 7 cm		41						
	7 - 10 cm		43						
	10 - 15 cm		16						
	15 - 20 cm		1						
	20 - 25 cm			28					
	25 - 30 cm			33	17				
	30 - 40 cm			35	207	11			
	40 - 50 cm				117	56			
	50 - 70 cm				20	32	10		1
	70 - 100 cm					3	32	10	4
>=100 cm								1	
Area 4	7 - 10 cm		1185						
	10 - 15 cm		530						
	15 - 20 cm		51						
	20 - 25 cm			20					
	25 - 30 cm			81	9				
	30 - 40 cm			38	204				
	40 - 50 cm				74	20			
	50 - 70 cm				15	23	9	2	
70 - 100 cm					2	3	7		
Area 5	10 - 15 cm		7						
	15 - 20 cm		6						
	30 - 40 cm			4					
	40 - 50 cm			5	14				
	50 - 70 cm				41	8			
70 - 100 cm					4		2		
Area 6	5 - 7 cm		31						
	7 - 10 cm		1312						
	10 - 15 cm		5800						
	15 - 20 cm		108						
	20 - 25 cm			139					
	25 - 30 cm			671					
	30 - 40 cm			1069	72				
	40 - 50 cm			19	219				
	50 - 70 cm				98	8			
70 - 100 cm				1	6	11	2		
Area 7	5 - 7 cm		46						
	7 - 10 cm		127						
	10 - 15 cm		46						
	15 - 20 cm			2					
	20 - 25 cm			121					
	25 - 30 cm			243					
	30 - 40 cm			86	82				
	40 - 50 cm				86				
	50 - 70 cm				12	7			
	70 - 100 cm						1		
	>=100 cm								1

TABLE 3-A-4 Age size distributions (N caught) of cod by area and quarter.

Species : COD		Quarter : 4							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	7 - 10 cm		17						
	10 - 15 cm		25						
	15 - 20 cm		11						
	20 - 25 cm			7					
	25 - 30 cm			2					
	30 - 40 cm			4	33	1			
	40 - 50 cm				56				
	50 - 70 cm				42	40	1		
	70 - 100 cm					23	52	12	5
	>=100 cm								3
Area 2	7 - 10 cm		96						
	10 - 15 cm		78						
	15 - 20 cm		10						
	20 - 25 cm		5	44					
	25 - 30 cm			156	115				
	30 - 40 cm			6	440	18			
	40 - 50 cm				202	69			
	50 - 70 cm				30	31	3		
	70 - 100 cm					13	35	10	
	>=100 cm								10
Area 3	7 - 10 cm		1						
	10 - 15 cm		4						
	25 - 30 cm			2					
	30 - 40 cm			4	9				
	40 - 50 cm				11				
	50 - 70 cm				13	9	1		
Area 4	70 - 100 cm					12	2	1	
	10 - 15 cm		65						
	15 - 20 cm		54						
	20 - 25 cm		18	4					
	25 - 30 cm			9	8				
	30 - 40 cm			11	64				
	40 - 50 cm				26	31			
Area 5	50 - 70 cm				2	19	7		
	70 - 100 cm				1		7		
	20 - 25 cm		4						
	25 - 30 cm		6	2					
	30 - 40 cm			16					
	40 - 50 cm			1	1				
Area 6	50 - 70 cm				2				
	70 - 100 cm				1	1			
	7 - 10 cm		2						
	10 - 15 cm		420						
	15 - 20 cm		2454						
	20 - 25 cm		1552						
	25 - 30 cm		158	16					
	30 - 40 cm			1265	25				
Area 7	40 - 50 cm			409	117				
	50 - 70 cm			3	210	5			
	70 - 100 cm				3	13	3		
	7 - 10 cm		24						
	10 - 15 cm		86						
	15 - 20 cm		15						
	20 - 25 cm		2	26					
	25 - 30 cm			97					
Area 7	30 - 40 cm			66	87				
	40 - 50 cm			14	97	14			
	50 - 70 cm				37	11	4		
	70 - 100 cm					2	7		
	>=100 cm							2	

TABLE 3-B-1 Age size distributions (N caught) of haddock by area and quarter.

Species : HADDOCK		Quarter : 1							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	7 - 10 cm			66					
	10 - 15 cm			25841					
	15 - 20 cm			7723	2094				
	20 - 25 cm				20001	284	25		
	25 - 30 cm				11147	3824			
	30 - 40 cm				784	10758	1539	17	
	40 - 50 cm					939	1408	310	78
	50 - 70 cm					6	129	93	180
Area 2	10 - 15 cm			450					
	15 - 20 cm			4285	275				
	20 - 25 cm			3030	12854				
	25 - 30 cm				28916	2751			
	30 - 40 cm				5694	4408	773	62	
	40 - 50 cm					518	186	75	65
	50 - 70 cm						65	279	83
	70 - 100 cm								2
Area 3	7 - 10 cm			4					
	10 - 15 cm			2120					
	15 - 20 cm			2518	372				
	20 - 25 cm			1296	28363	466			
	25 - 30 cm				14637	1839	33		
	30 - 40 cm				2628	4638	220	19	66
	40 - 50 cm					133	77	6	80
	50 - 70 cm						2	3	19
Area 4	10 - 15 cm			3					
	15 - 20 cm			65	10				
	20 - 25 cm			171	916				
	25 - 30 cm				3242	132			
	30 - 40 cm				418	178	13		
	40 - 50 cm				2	19	14	5	11
Area 5	20 - 25 cm			10					
	25 - 30 cm				2	2			
	30 - 40 cm					2			
Area 6	15 - 20 cm			429					
	20 - 25 cm			1015	137				
	25 - 30 cm				98	5			
	30 - 40 cm				1332	44			
	40 - 50 cm				33	40		6	
	50 - 70 cm					7	5	6	4
Area 7	10 - 15 cm			136					
	15 - 20 cm			144					
	20 - 25 cm			101	391				
	25 - 30 cm				570	44	10		
	30 - 40 cm				738	328	87	44	
	40 - 50 cm				6	238	48	39	49
	50 - 70 cm					22	41	14	45
	70 - 100 cm								6

TABLE 3-B-3 Age size distributions (N caught) of haddock by area and quarter.

Species : HADDOCK		Quarter : 3							
	Size class	Age Class	0	1	2	3	4	5	6+
Area 1	5 - 7 cm		356						
	7 - 10 cm		72166						
	10 - 15 cm		79810	176					
	15 - 20 cm		472	6990					
	20 - 25 cm			11003	3470				
	25 - 30 cm			70	13733				
	30 - 40 cm				8882	4904	289		
	40 - 50 cm				16	966	340	36	
	50 - 70 cm					16	81	46	2
	70 -100 cm								2
Area 2	5 - 7 cm		32						
	7 - 10 cm		3814						
	10 - 15 cm		4271						
	15 - 20 cm		78	61					
	20 - 25 cm			1503	208				
	25 - 30 cm			888	2070				
	30 - 40 cm			160	8654	761	55		
	40 - 50 cm				46	755	64		
	50 - 70 cm					11	10	1	
Area 3	5 - 7 cm		18						
	7 - 10 cm		445						
	10 - 15 cm		2169	33					
	15 - 20 cm		8	693	56				
	20 - 25 cm			4444	2114				
	25 - 30 cm			3804	9380	331			
	30 - 40 cm				5363	866	81	17	9
	40 - 50 cm				2	105	16	2	13
	50 - 70 cm					1	3		5
Area 4	7 - 10 cm		838						
	10 - 15 cm		7780						
	15 - 20 cm		537	2	2				
	20 - 25 cm			34	43	12			
	25 - 30 cm			406	1093	8			
	30 - 40 cm			63	3408	176	19		2
	40 - 50 cm				22	27	15	3	29
	50 - 70 cm						1		2
	Area 5	10 - 15 cm		2					
15 - 20 cm			4						
30 - 40 cm				1	2	1			
40 - 50 cm					1				
50 - 70 cm					1				
Area 6	7 - 10 cm		60						
	10 - 15 cm		1560						
	15 - 20 cm		403	157					
	20 - 25 cm			13					
	25 - 30 cm			27	7				
	30 - 40 cm			47	273	7			
	40 - 50 cm				293	16			
	50 - 70 cm					6	2		
Area 7	7 - 10 cm		75						
	10 - 15 cm		2501						
	15 - 20 cm		287						
	20 - 25 cm			1					
	25 - 30 cm			13	7	2			
	30 - 40 cm			13	345		13	17	
	40 - 50 cm				36	6	3		
	50 - 70 cm					1	4	4	9
		50 - 70 cm							

TABLE 3-B-4 Age size distributions (N caught) of haddock by area and quarter.

Species : HADDOCK		Quarter : 4							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	7 - 10 cm		1696						
	10 - 15 cm		19390						
	15 - 20 cm		3948	690					
	20 - 25 cm		48	8965	722				
	25 - 30 cm			2070	4250				
	30 - 40 cm				6074	1126	69	17	
	40 - 50 cm				82	772	67	10	20
	50 - 70 cm					16	51	26	28
Area 2	7 - 10 cm		354						
	10 - 15 cm		2872						
	15 - 20 cm		839	60					
	20 - 25 cm			759	60				
	25 - 30 cm			833	1403				
	30 - 40 cm			116	5446	699			
	40 - 50 cm				148	209			33
	50 - 70 cm					1	2		3
Area 3	7 - 10 cm		13						
	10 - 15 cm		3290						
	15 - 20 cm		2494	277	21				
	20 - 25 cm		49	1640	622				
	25 - 30 cm			625	3853	61			
	30 - 40 cm			102	2660	426	20		16
	40 - 50 cm				19	36	11		18
	50 - 70 cm					1			
Area 4	10 - 15 cm		378						
	15 - 20 cm		869						
	20 - 25 cm		126	44					
	25 - 30 cm			181	107				
	30 - 40 cm			111	751	93	13		
	40 - 50 cm				34	18	47		11
Area 5	50 - 70 cm						2		
	7 - 10 cm		6						
	10 - 15 cm		6						
	15 - 20 cm		2						
	20 - 25 cm		8						
Area 6	30 - 40 cm			4					
	7 - 10 cm		52						
	10 - 15 cm		42						
	15 - 20 cm		1946	4					
	20 - 25 cm		3294						
	25 - 30 cm		2	4					
	30 - 40 cm			12	8				
Area 7	40 - 50 cm			2	49	1			
	50 - 70 cm				2	2			
	7 - 10 cm		6						
	10 - 15 cm		206						
	15 - 20 cm		572	58					
	20 - 25 cm		24						
	25 - 30 cm			32					
	30 - 40 cm			83	244	52			
	40 - 50 cm				23	165			
	50 - 70 cm								19

TABLE 3-C-1 Age size distributions (N caught) of **whiting** by area and quarter.

Species : WHITING		Quarter : 1							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	<= 7 cm			4					
	7 - 10 cm			190					
	10 - 15 cm			2362					
	15 - 20 cm			2020					
	20 - 25 cm			1237	3308	456			
	25 - 30 cm				5602	7043	1902	148	
	30 - 40 cm				386	4533	3203	651	222
	40 - 50 cm					35	121	86	128
50 - 70 cm								8	
Area 2	<= 7 cm	2		4					
	7 - 10 cm			688					
	10 - 15 cm			5133					
	15 - 20 cm			12745	691				
	20 - 25 cm			4591	31266	884			
	25 - 30 cm				6350	6693	1193	311	
30 - 40 cm				24	268	155	68	32	
Area 3	7 - 10 cm			72					
	10 - 15 cm			3012					
	15 - 20 cm			3791	830				
	20 - 25 cm			386	30695	4937			
	25 - 30 cm				6018	7480	566	43	
	30 - 40 cm				19	1029	1203	300	209
40 - 50 cm						6	8	11	
Area 4	<= 7 cm			2					
	7 - 10 cm			129					
	10 - 15 cm			2292					
	15 - 20 cm			3549	586				
	20 - 25 cm			244	6948	837			
	25 - 30 cm				1351	1238	528	95	17
	30 - 40 cm				28	226	266	42	25
40 - 50 cm							2	7	
Area 5	<= 7 cm			2					
	7 - 10 cm			12					
	10 - 15 cm			64					
	15 - 20 cm			362	18				
	20 - 25 cm			40	4487	206			
	25 - 30 cm				988	1233	58	21	
30 - 40 cm				11	236	286		60	
Area 6	<= 7 cm			36					
	7 - 10 cm			1616					
	10 - 15 cm			6198					
	15 - 20 cm			14191	344				
	20 - 25 cm			6736	17566	219			
	25 - 30 cm				23060	11135	1155	148	
	30 - 40 cm				1067	5831	4245	1006	151
40 - 50 cm					35	172	228	52	
Area 7	<= 7 cm			6					
	7 - 10 cm			139					
	10 - 15 cm			1431					
	15 - 20 cm			3207	322				
	20 - 25 cm			139	732	86			
	25 - 30 cm				257	285	28		
	30 - 40 cm					89	209	44	10
40 - 50 cm						4	3	13	

TABLE 3-C-2 Age size distributions (N caught) of **whiting** by area and quarter.

Species : WHITING		Quarter : 2							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	10 - 15 cm			253					
	15 - 20 cm			606					
	20 - 25 cm			450	2994	215			
	25 - 30 cm				4261	3736	391		
	30 - 40 cm				60	1897	1079	193	105
	40 - 50 cm						38	11	16
	50 - 70 cm								3
Area 2	10 - 15 cm			269					
	15 - 20 cm			375					
	20 - 25 cm			15	413	36			
	25 - 30 cm				302	256			
	30 - 40 cm					115	29		9
	40 - 50 cm								7
Area 3	<= 10 cm		3						
	10 - 15 cm			3103					
	15 - 20 cm			2991	113				
	20 - 25 cm			1551	40927	988			
	25 - 30 cm				7789	10492	1028	350	199
	30 - 40 cm				101	1516	858	61	249
	40 - 50 cm						27	24	31
Area 4	10 - 15 cm			1322					
	15 - 20 cm			8812					
	20 - 25 cm			4443	6569				
	25 - 30 cm				2870	1651	645		
	30 - 40 cm				206	62	1087	497	94
	40 - 50 cm						94	167	25
Area 5	15 - 20 cm			108					
	20 - 25 cm			165	947				
	25 - 30 cm				1304	101	26	13	13
	30 - 40 cm				35	125	189	35	40
	40 - 50 cm						10	8	2
Area 6	<= 10 cm		26						
	10 - 15 cm		52	1746					
	15 - 20 cm			6930					
	20 - 25 cm			5996	3614				
	25 - 30 cm				10740	1209	1247		
	30 - 40 cm				1155	1414	1316	118	96
	40 - 50 cm				3		18	22	1
Area 7	NOT SAMPLED								

TABLE 3-C-3 Age size distributions (N caught) of **whiting** by area and quarter.

Species : WHITING		Quarter : 3							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	<= 10 cm		492						
	10 - 15 cm		496						
	15 - 20 cm		32	183					
	20 - 25 cm			1016	159	37			
	25 - 30 cm			480	4386	1300			
	30 - 40 cm				1359	2653	544	77	32
	40 - 50 cm				4	82	82	43	19
50 - 70 cm						4		6	
Area 2	<= 10 cm		215						
	10 - 15 cm		281						
	15 - 20 cm			309					
	20 - 25 cm			1258	309				
	25 - 30 cm			161	2041	260	37		
	30 - 40 cm				199	205	126	21	28
	40 - 50 cm						2		
Area 3	<= 10 cm		780						
	10 - 15 cm		547						
	15 - 20 cm			1086					
	20 - 25 cm			6603	5741	453			
	25 - 30 cm			410	24389	6029	410		
	30 - 40 cm				859	1808	628	309	37
	40 - 50 cm					6	17	3	8
50 - 70 cm								1	
Area 4	<= 10 cm		9464						
	10 - 15 cm		774						
	15 - 20 cm		3	973					
	20 - 25 cm			4849	2829				
	25 - 30 cm			676	6712	842	500		
	30 - 40 cm			27	187	1018	437	77	59
	40 - 50 cm							5	43
Area 5	<= 10 cm		2651						
	10 - 15 cm		1452						
	15 - 20 cm		123	430					
	20 - 25 cm			1941	412				
	25 - 30 cm			311	708				
	30 - 40 cm			22	293	42	34	5	
	40 - 50 cm						9	1	2
Area 6	<= 10 cm		4436						
	10 - 15 cm		12023						
	15 - 20 cm		2349	2329					
	20 - 25 cm			9952	2056				
	25 - 30 cm			1811	9874	451			
	30 - 40 cm				1965	1073	1164	517	95
	40 - 50 cm					6	6	10	1
Area 7	<= 10 cm		7665						
	10 - 15 cm		15127						
	15 - 20 cm		9	206					
	20 - 25 cm			1190					
	25 - 30 cm			418	415	48			
	30 - 40 cm				127	88	21	17	

TABLE 3-C-4 Age size distributions (N caught) of whiting by area and quarter.

Species : WHITING		Quarter : 4							
	Size class	Age class	0	1	2	3	4	5	6+
Area 1	<= 10 cm		40						
	10 - 15 cm		129						
	15 - 20 cm		116						
	20 - 25 cm		3	113					
	25 - 30 cm			282	650	119			
	30 - 40 cm				1260	1149	443	41	8
	40 - 50 cm				12	77	126	43	41
	50 - 70 cm						8	1	23
Area 2	<= 10 cm		114						
	10 - 15 cm		296						
	15 - 20 cm		202	221					
	20 - 25 cm			4039	1231				
	25 - 30 cm				8060	2842			
	30 - 40 cm				738	1182	621	37	101
	40 - 50 cm							5	4
Area 3	<= 10 cm		440						
	10 - 15 cm		1288						
	15 - 20 cm		411	139					
	20 - 25 cm		43	4793	940				
	25 - 30 cm			1223	5130	720	229		
	30 - 40 cm				837	429	62	101	15
	40 - 50 cm					11	6	2	3
Area 4	<= 10 cm		64						
	10 - 15 cm		1188						
	15 - 20 cm		477	40					
	20 - 25 cm		81	3379	793				
	25 - 30 cm			809	4904	376	188		
	30 - 40 cm				441	268	228	104	52
	40 - 50 cm					1	16	8	11
	50 - 70 cm								1
Area 5	15 - 20 cm		32						
	20 - 25 cm			296					
	25 - 30 cm			193	333		18		
	30 - 40 cm				259	21	61		
	40 - 50 cm						2	4	
Area 6	<= 10 cm		444						
	10 - 15 cm		9030						
	15 - 20 cm		14514						
	20 - 25 cm		5497	1945					
	25 - 30 cm		267	3490	2255				
	30 - 40 cm			455	1911	318	264	63	
	40 - 50 cm					2	6		5
Area 7	<= 10 cm		1944						
	10 - 15 cm		9586						
	15 - 20 cm		965	1185					
	20 - 25 cm			1600	36				
	25 - 30 cm			115	640	82			
	30 - 40 cm				72	151	91	31	
	40 - 50 cm						3	4	

TABLE 3-D Age size distribution (percent) of **mackerel** for the total North Sea by quarter (data from Norwegian commercial catches and tagging cruises in 3rd quarter of 1982 in the North Sea and Skagerak).

Species : MACKEREL			Area : ALL							
	Size class	Age class	1	2	3	4	5	6	7	8+
Quarter 3	25 - 30 cm		6.6	2.7	0.1					
	30 - 35 cm		3.1	24.4	4.1	1.3	0.1	0.5	0.2	
	35 - 40 cm			1.3	3.2	3.5	0.9	3.7	5.2	7.6
	40 - 50 cm					0.1	0.5	2.6	3.4	24.9

TABLE 3-E Size age keys of **saithe** (percent) for the total North Sea by quarter.

Species : SAITHE		Area : ALL									
	Size class	Age class	1	2	3	4	5	6	7	8	9+
Quarter 1	25 - 30 cm		16								
	30 - 40 cm		84	94	75						
	40 - 50 cm			6	20	3					
	50 - 70 cm				5	94	25	5			
	70 -100 cm					3	76	95	100	100	98
	>=100 cm										2
Quarter 2	25 - 30 cm		7								
	30 - 40 cm		93	82	19						
	40 - 50 cm			17	70	42					
	50 - 70 cm			1	11	57	63	47			
	70 -100 cm					1	37	53	100	99	97
	>=100 cm									1	3
Quarter 3	25 - 30 cm		3								
	30 - 40 cm		97	81	48	1	1				
	40 - 50 cm			19	42	6					
	50 - 70 cm				10	90	73	58	5	1	
	70 -100 cm					3	26	42	95	98	96
	>=100 cm									1	4
Quarter 4	25 - 30 cm		2								
	30 - 40 cm		98	73	33						
	40 - 50 cm			25	49	2					
	50 - 70 cm			2	18	91	63	8			
	70 -100 cm					7	37	92	99	98	96
	>=100 cm								1	2	4

TABLE 3-F Age size keys (percent) of Norway pout by quarter derived from Danish industrial fisheries.

Species : NORWAY POUT			Area : 1				
	Size class	Age class	0	1	2	3	4+
Quarter 1	<=10 cm			100			
	10 - 15 cm			70	30		
	15 - 20 cm				85	15	
	20 - 25 cm				46	43	11
Quarter 2	<= 5 cm	100					
	5 - 7 cm	50		50			
	7 - 10 cm			100			
	10 - 15 cm			97	3		
	15 - 20 cm			16	84		
	20 - 25 cm				46	43	11
Quarter 3	7 - 10 cm	91	9				
	10 - 15 cm	5	95				
	15 - 20 cm	2	67		31		
	20 - 25 cm				46	43	11
Quarter 4	7 - 10 cm	100					
	10 - 15 cm	63	37				
	15 - 20 cm		90	10			
	20 - 25 cm			46		43	11
Species : NORWAY POUT			Area : ALL				
Quarter 1	<= 5 cm	100					
	5 - 7 cm		100				
	7 - 10 cm		99	1			
	10 - 15 cm		55	45			
	15 - 20 cm			92	8		
	20 - 25 cm				63	37	
Quarter 2	<= 5 cm	100					
	5 - 7 cm	95	5				
	7 - 10 cm		100				
	10 - 15 cm		95	5			
	15 - 20 cm		17	82	1		
	20 - 25 cm			33	67		
Quarter 3	7 - 10 cm	100					
	10 - 15 cm		99	1			
	15 - 20 cm		41	59			
	20 - 25 cm			63	34	3	
Quarter 4	7 - 10 cm	100					
	10 - 15 cm	92	8				
	15 - 20 cm		71	29			
	20 - 25 cm			83	9	8	

TABLE 3-G Age size keys (percent) of **herring** by quarter derived from Danish industrial fisheries.

Species : HERRING			Area : 1						
	Size class	Age class	0	1	2	3	4	5	6+
Quarter 1	10 - 15 cm			97	3				
	15 - 20 cm			92	8				
	20 - 25 cm				87	12	1		
	25 - 30 cm				3	49	22	24	3
Quarter 2	7 - 10 cm	100							
	10 - 15 cm			100					
	15 - 20 cm			97	3				
	20 - 25 cm			50	42	8			
Quarter 3	25 - 30 cm				3	49	22	24	3
	<=15 cm	100							
	15 - 20 cm		11	89					
	20 - 25 cm			80	20				
Quarter 4	25 - 30 cm				3	49	22	24	3
	<=15 cm	100							
	15 - 20 cm		78	22					
	20 - 25 cm			91	8	1			
	25 - 30 cm				3	49	22	24	3
Species : HERRING			Area : ALL						
Quarter 1	10 - 15 cm			100					
	15 - 20 cm			79	21				
	20 - 25 cm				88.9	11.1			
Quarter 2	10 - 15 cm			100					
	15 - 20 cm			97.3	2.7				
	20 - 25 cm			54.5	36.4	9.1			
	25 - 30 cm					100			
Quarter 3	10 - 15 cm	100							
	15 - 20 cm		4	95	1				
	20 - 25 cm			77	23				
	25 - 30 cm					100			
Quarter 4	10 - 15 cm		98.0	2.0					
	15 - 20 cm		65.8	32.9	1.3				
	20 - 25 cm			82.2	15.0	2.3	0.5		
	25 - 30 cm					25.0	30.0	40.0	5.0

TABLE 3-H Age size keys (percent) of **sprat** by quarter derived from Danish industrial fisheries.

Species : SPRAT			Area : 1						
	Size class	Age class	0	1	2	3	4	5	6+
Quarter 1	5 - 7 cm			100					
	7 - 10 cm			27	73				
	10 - 15 cm				88	12			
Quarter 2	<= 7 cm	100							
	7 - 10 cm	25	62	13					
	10 - 15 cm		24	68	8				
Quarter 3	5 - 7 cm	100							
	7 - 10 cm	2	96	2					
	10 - 15 cm		83	16	1				
Quarter 4	5 - 7 cm	100							
	7 - 10 cm	6	85	9					
	10 - 15 cm	1	56	41	2				
Species : SPRAT			Area : ALL						
Quarter 1	<= 7 cm			100					
	7 - 10 cm			37.5	62.5				
	10 - 15 cm			0.6	82.8	16.4	0.2		
Quarter 2	<= 5 cm	100							
	5 - 7 cm	94.4	5.6						
	7 - 10 cm	34.2	51.8	14.0					
	10 - 15 cm		24.9	67.7	7.4				
Quarter 3	5 - 7 cm	100							
	7 - 10 cm	3.0	94.0	3.0					
	10 - 15 cm		79.5	19.6	0.9				
Quarter 4	5 - 7 cm	100							
	7 - 10 cm	55.9	44.1						
	10 - 15 cm	42.6	54.3	3.0	0.1				

TABLE 3-I Age size keys (percent) of sandeels by quarter derived from Danish industrial fisheries.

Species : SANDEELS			Area : 1						
	Size class	Age class	0	1	2	3	4	5	6+
Quarter 1	<=10 cm			100					
	10 - 15 cm			80	20				
	15 - 20 cm			18	46	25	9	2	
	20 - 25 cm				5	31	36	13	15
	25 - 30 cm								100
Quarter 2	<= 7 cm		100						
	7 - 10 cm		72	28					
	10 - 15 cm			75	23	2			
	15 - 20 cm			18	46	25	9	2	
	20 - 25 cm				5	31	36	13	15
	25 - 30 cm								100
Quarter 3	<= 7 cm		100						
	7 - 10 cm		93	7					
	10 - 15 cm		62	22	16				
	15 - 20 cm			18	46	25	9	2	
	20 - 25 cm				5	31	36	13	15
Quarter 4	25 - 30 cm								100
	<=15 cm		100						
	15 - 20 cm		5	17	44	23	9	2	
	20 - 25 cm				5	31	36	13	15
	25 - 30 cm								100
Species : SANDEELS			Area : ALL						
Quarter 1	<=10 cm			100					
	10 - 15 cm			68	32				
	15 - 20 cm			13	87				
	20 - 25 cm			1	6	31	37	12	13
	25 - 30 cm								100
Quarter 2	<= 5 cm		100						
	5 - 7 cm		95	5					
	7 - 10 cm		10	90					
	10 - 15 cm			64	33	2	1		
	15 - 20 cm			14	54	20	7	4	1
	20 - 25 cm			1	6	31	37	12	13
	25 - 30 cm								100
Quarter 3	<=10 cm		100						
	10 - 15 cm		79	2	19				
	15 - 20 cm			37	48	11	4		
	20 - 25 cm			1	6	31	37	12	13
	25 - 30 cm								100
Quarter 4	<=15 cm		100						
	15 - 20 cm			37	48	11	4		
	20 - 25 cm			1	6	31	37	12	13
	25 - 30 cm								100

TABLE 4 MEAN WEIGHTS OF PREY SIZE CLASSES.

TABLE 4-A Mean weights (g) assigned to each prey size class for **cod** (averages derived from $W = 0.00626 * L^{**3.109}$; quarterly values from Danish industrial fisheries).

Species : COD		Area : 1				Area : ALL
Size class	Quarter	1	2	3	4	Average
15 - 20 mm						0.04
20 - 25 mm						0.08
25 - 30 mm						0.15
3 - 4 cm						0.31
4 - 5 cm						0.67
5 - 7 cm				2.01		1.64
7 - 10 cm				4.85	5.03	4.85
10 - 15 cm		18.19		12.09	14.18	16.10
15 - 20 cm		48.32	64.16	59.19	36.05	45.83

TABLE 4-B Mean weights (g) assigned to each prey size class for **haddock** (averages derived from $W = 0.0101 * L^{**2.914}$; quarterly values from Danish industrial fisheries).

Species : HADDOCK		Area : 1				Area : ALL
Size class	Quarter	1	2	3	4	Average
25 - 30 mm						0.19
3 - 4 cm						0.39
4 - 5 cm						0.81
5 - 7 cm						1.87
7 - 10 cm		6.91	5.71	6.29	6.50	5.16
10 - 15 cm		17.80	20.30	11.83	15.15	15.88
15 - 20 cm		38.23	41.62	48.98	36.28	42.32
20 - 25 cm		92.66	90.32	83.54	92.66	88.02
25 - 30 cm		148.12	151.35	164.74	157.96	157.96

TABLE 4-C Mean weights (g) assigned to each prey size class for **whiting** (averages derived from $W = 0.00854 * L^{**2.978}$; quarterly values from Danish industrial fisheries).

Species : WHITING		Area : 1				Area : ALL
Size class	Quarter	1	2	3	4	Average
25 - 30 mm						0.17
3 - 4 cm						0.36
4 - 5 cm						0.75
5 - 7 cm						1.77
7 - 10 cm		5.52		6.51	6.10	5.00
10 - 15 cm		19.32	21.09	11.02	14.97	15.78
15 - 20 cm		37.88	39.24	53.79	40.63	42.98
20 - 25 cm		104.22	104.22	94.05	104.22	90.84
25 - 30 cm		164.34	159.06	166.13	173.40	164.34
30 - 40 cm		285.41	275.26	282.85	298.44	337.02

TABLE 4-F-1 Mean weights (g) assigned to each prey size class for Norway pout (averages derived from $W = 0.0101 \cdot L^{**2.2730}$; quarterly values from Danish industrial fisheries).

Species : NORWAY POUT			Area : 1				Area : ALL
Size class	Quarter	1	2	3	4		Average
10 - 15 mm							0.01
15 - 20 mm							0.05
20 - 25 mm							0.09
25 - 30 mm							0.16
3 - 4 cm							0.31
4 - 5 cm							0.61
5 - 7 cm		1.49	1.49	1.49			1.35
7 - 10 cm		4.23	4.30	3.71	4.18		3.48
10 - 15 cm		12.04	12.31	12.81	17.68		9.97
15 - 20 cm		35.68	33.72	37.42	38.66		25.00
20 - 25 cm		68.05	45.00	72.79	75.79		49.63

TABLE 4-F-2 Mean weights (g) assigned to each prey age and size class for Norway pout based upon data from Danish industrial fisheries.

Species : NORWAY POUT			Area : 1				
	Size class	Age class	0	1	2	3	4+
Quarter 1	7 - 10 cm			4.7	5.0		
	10 - 15 cm			7.6	17.6		
	15 - 20 cm				26.8	37.2	
	20 - 25 cm				62.7	61.3	71.4
Quarter 2	7 - 10 cm			4.5			
	10 - 15 cm			10.2	14.7		
	15 - 20 cm			23.9	30.6		
	20 - 25 cm				62.7	61.3	71.4
Quarter 3	7 - 10 cm		3.8	5.4			
	10 - 15 cm		17.7	19.2			
	15 - 20 cm		24.3	28.0	38.9		
	20 - 25 cm				62.7	61.3	71.4
Quarter 4	7 - 10 cm		5.0				
	10 - 15 cm		7.6	20.4			
	15 - 20 cm			30.1	42.1		
	20 - 25 cm				62.7	61.3	71.4

TABLE 4-G-1 Mean weights (g) assigned to each prey size class for herring (averages derived from $W = 0.00254 \cdot L^{**3.289}$; quarterly values from Danish industrial fisheries).

Species : HERRING		Area : 1				Area : ALL
Size class	Quarter	1	2	3	4	Average
3 - 4 cm						0.16
4 - 5 cm						0.36
5 - 7 cm						0.92
7 - 10 cm						2.90
10 - 15 cm		11.23	17.59	11.23	13.49	10.29
15 - 20 cm		34.55	37.46	34.55	37.28	31.13
20 - 25 cm		72.61	69.10	72.61	82.60	71.15
25 - 30 cm				179.50	164.89	

TABLE 4-G-2 Mean weights (g) assigned to each prey age and size class for herring based upon data from Danish industrial fisheries.

Species : HERRING		Area : 1							
	Size class	Age class	0	1	2	3	4	5	6+
Quarter 1	10 - 15 cm			14.6	15.0				
	15 - 20 cm			28.9	37.7				
	20 - 25 cm				78.1	89.5	60.9		
	25 - 30 cm				156.0	142.7	155.4	178.2	187.0
Quarter 2	7 - 10 cm	2.4							
	10 - 15 cm			15.3					
	15 - 20 cm			35.1	45.6				
	20 - 25 cm			63.5	68.2	130.0			
Quarter 3	25 - 30 cm				156.0	142.7	155.4	178.2	187.0
	7 - 10 cm	4.9							
	10 - 15 cm	9.6							
	15 - 20 cm	27.8		44.8					
Quarter 4	20 - 25 cm			71.4	92.1				
	25 - 30 cm				156.0	142.7	155.4	178.2	187.0
	7 - 10 cm	6.2							
	10 - 15 cm	15.1							
Quarter 4	15 - 20 cm	29.9		48.9					
	20 - 25 cm			78.3	91.1	60.9			
	25 - 30 cm				156.0	142.7	155.4	178.2	187.0

TABLE 4-H-1 Mean weights (g) assigned to each prey size class for sprat (averages derived from $W = 0.00971 \cdot L^{**2.855}$; quarterly values from Danish industrial fisheries).

Species : SPRAT		Area : 1				Area : ALL
Size class	Quarter	1	2	3	4	Average
3 - 4 cm						0.35
4 - 5 cm						0.71
5 - 7 cm		1.23	1.38		2.00	1.62
7 - 10 cm		3.62	4.55	4.49	4.75	4.37
10 - 15 cm		14.06	16.72	15.52	15.34	13.15
15 - 20 cm						34.36

TABLE 4-H-2 Mean weights (g) assigned to each prey age and size class for sprat based upon data from Danish industrial fisheries.

Species : SPRAT		Area : 1				
	Size class	Age class	0	1	2	3+
Quarter 1	5 - 7 cm			1.4		
	7 - 10 cm			3.1	5.2	
	10 - 15 cm				9.8	15.1
Quarter 2	5 - 7 cm		1.3			
	7 - 10 cm		2.5	4.8	4.9	
	10 - 15 cm			11.0	13.8	17.9
Quarter 3	5 - 7 cm		3.0			
	7 - 10 cm		3.9	6.1	6.1	
	10 - 15 cm			10.3	15.0	19.0
Quarter 4	5 - 7 cm		1.6			
	7 - 10 cm		2.9	6.4	5.4	
	10 - 15 cm		10.1	11.7	15.9	20.9

TABLE 4-I-1 Mean weights (g) assigned to each prey size class for **sandeels** (averages derived from $W = 0.00209 \cdot L^{**3.148}$; quarterly values from Danish industrial fisheries).

Species : SANDEELS		Area : 1				Area : ALL
Size class	Quarter	1	2	3	4	Average
20 - 25 mm						0.03
25 - 30 mm						0.05
3 - 4 cm						0.11
4 - 5 cm						0.24
5 - 7 cm			0.81	1.00		0.59
7 - 10 cm		1.31	1.68	1.60	1.79	1.76
10 - 15 cm		4.76	5.85	5.97	4.90	5.93
15 - 20 cm		11.86	17.30	17.23	17.23	17.11
20 - 25 cm		40.14	40.14	40.14	40.14	37.74
25 - 30 cm		57.50	57.50	57.50	57.50	

TABLE 4-I-2 Mean weights (g) assigned to each prey age and size class for **sandeels** based upon data from Danish industrial fisheries.

Species : SANDEELS			Area : 1						
	Size class	Age class	0	1	2	3	4	5	6+
Quarter 1	4 - 5 cm			.5					
	5 - 7 cm			.8					
	7 - 10 cm			1.6					
	10 - 15 cm			4.1	5.5				
	15 - 20 cm			13.9	13.7	14.5	16.0	15.2	
	20 - 25 cm				29.9	30.8	35.1	32.6	33.1
	25 - 30 cm								57.5
Quarter 2	4 - 5 cm		.5						
	5 - 7 cm		.6						
	7 - 10 cm		1.4	2.2					
	10 - 15 cm			5.8	7.1	8.0			
	15 - 20 cm			13.9	13.7	14.5	16.0	15.2	
	20 - 25 cm				29.9	30.8	35.1	32.6	33.1
	25 - 30 cm								57.5
Quarter 3	4 - 5 cm		.5						
	5 - 7 cm		1.0						
	7 - 10 cm		1.9	1.6					
	10 - 15 cm		3.9	5.3	8.3				
	15 - 20 cm			13.9	13.7	14.5	16.0	15.2	
	20 - 25 cm				29.9	30.8	35.1	32.6	33.1
	25 - 30 cm								57.5
Quarter 4	4 - 5 cm		.5						
	5 - 7 cm		1.0						
	7 - 10 cm		1.7						
	10 - 15 cm		3.9						
	15 - 20 cm		10.7	13.9	13.7	14.5	16.0	15.2	
	20 - 25 cm				29.9	30.8	35.1	32.6	33.1
	25 - 30 cm								57.5

TABLE 5 AMBIENT TEMPERATURES.

(used in estimating food intake of the various species; compiled from Tomczak and Goedecke, 1964).

Species	Area	DEPTH	Q1	Q2	Q3	Q4
COD						
	Total North Sea	bottom	6	7	9	8
HADDOCK						
	Total North Sea	bottom	6	7	8	7
WHITING						
	Total North Sea	bottom	6	7	10	8
MACKEREL						
	Northwestern	10 m	6	8	14	9
		bottom	7	7	7	8
	Northeastern	10 m	7	8	12	9
		bottom	7	7	10	9
	Central	10 m	5	8	15	10
		bottom	5	6	8	9
	Southern	10 m	5	8	16	11
		bottom	5	8	16	11
SAITHE						
	Northern	60 m	7.2	7.7	9.8	9.4

TABLE 6 NUMBER OF STOMACHS SAMPLED.

TABLE 6-A Number of cod stomachs sampled by predator size class, area and quarter.

Predator : COD											
Size class	70	100	150	200	250	300	400	500	700	1000	Total
Quarter 1											
Area 1		3		43	85	146	80	217	150	16	740
Area 2	1	19	29	155	204	157	30	56	55	12	718
Area 3		4	8	4	34	57	28	60	56	4	255
Area 4		2	3	28	88	43	5	8	67	23	267
Area 5						9	3	1	7	1	21
Area 6		70	187	277	131	342	280	175	272	55	1789
Area 7		15	24	24	59	83	29	39	77	6	356
Total	1	113	251	531	601	837	455	556	684	117	4146
Quarter 2											
Area 1				7	23	142	68	155	70	5	470
Area 2		2	8	15	42	61	30	19	27	1	205
Area 3			2	1	9	41	25	58	23	7	166
Area 4			26	41	51	79	51	32	32	2	314
Area 5				4	4	19	19	16			62
Area 6		30	120	248	239	191	198	112	28	4	1170
Area 7		4	20	12	2	5					43
Total		36	176	328	370	538	391	392	180	19	2430
Quarter 3											
Area 1				4	10	56	121	145	114	10	460
Area 2		8	12	16	24	66	41	53	69	36	325
Area 3				24	22	42	54	56	38	1	237
Area 4		8		15	32	83	41	40	7		226
Area 5		1	2				6	24	16		49
Area 6	63	288	192	23	93	120	61	32	12		884
Area 7	27	50	26	5	4	3	13	17	1	2	148
Total	90	355	232	87	185	370	337	367	257	49	2329
Quarter 4											
Area 1	1	12	3	5	4	22	36	83	107	2	275
Area 2		39	4	27	72	132	81	44	39	6	444
Area 3		7		1	2	22	39	26	15		112
Area 4		12	19	10	9	6	11	2	37	13	119
Area 5				2		4	1	1	69	19	96
Area 6		94	165	141	104	188	195	270	86	13	1256
Area 7		25	8	13	42	50	41	27	4	1	211
Total	1	189	199	199	233	424	404	453	357	54	2513
ALL QUARTERS											
Area 1	1	15	3	59	122	366	305	600	441	33	1945
Area 2	1	68	53	213	342	416	182	172	190	55	1692
Area 3		11	10	30	67	162	146	200	132	12	770
Area 4		22	48	94	180	211	108	82	143	38	926
Area 5		1	2	6	4	32	29	42	92	20	228
Area 6	63	482	664	689	567	841	734	589	398	72	5099
Area 7	27	94	78	54	107	141	83	83	82	9	758
Total	92	693	858	1145	1389	2169	1587	1768	1478	239	11418

TABLE 6-B Number of haddock stomachs sampled by predator size class, area and quarter.

Predator : HADDOCK									
Size class	100	150	200	250	300	400	500	700	Total
Quarter 1									
Area 1	110	118	102	119	109	67	20		645
Area 2	13	57	98	118	108	11	2		407
Area 3	103	212	252	282	214	52	4		1119
Area 4	1	18	44	44	58	4			169
Area 5			4		2				6
Area 6	1	17	45	23	98	19	9		212
Area 7	10	22	27	43	101	42	7		252
Total	238	444	572	629	690	195	42		2810
Quarter 2									
Area 1	350	340	356	380	419	229	56	1	2131
Area 2	13	77	77	90	101	35	2		395
Area 3	94	155	202	221	184	47	6		909
Area 4		2	33	66	64	26	2		193
Area 5				2					2
Area 6		2	25	43	72	23			165
Area 7									
Total	457	576	693	802	840	360	66	1	3795
Quarter 3									
Area 1	388	440	565	656	698	268	74	4	3093
Area 2	105	32	162	223	289	119			930
Area 3	195	127	302	340	327	25	4		1320
Area 4	56	42	20	101	107	30			356
Area 5	1	2							3
Area 6	27	36		13	30	13	4		123
Area 7									
Total	772	679	1049	1333	1451	455	82	4	5825
Quarter 4									
Area 1	418	414	490	390	430	304	66		2512
Area 2	49	127	89	220	217	98	4	1	805
Area 3	166	141	263	281	274	47			172
Area 4	36	53	26	40	29	10			194
Area 5		1	3		2				6
Area 6		35	32		8	16	2		93
Area 7	23	41	16	16	52	28	8		184
Total	692	812	919	947	1012	503	80	1	4966
ALL QUARTERS									
Area 1	1266	1312	1513	1545	1656	868	216	5	8381
Area 2	180	293	426	651	715	263	8	1	2537
Area 3	558	635	1019	1124	999	171	14		4520
Area 4	93	115	123	251	258	70	2		912
Area 5	1	3	7	2	4				17
Area 6	28	90	102	79	208	71	15		593
Area 7	33	63	43	59	153	70	15		436
Total	2159	2511	3233	3711	3993	1513	270	6	17396

TABLE 6-C Number of **whiting** stomachs sampled by predator size class, area and quarter.

Predator : WHITING								
Size class	100	150	200	250	300	400	500	Total
Quarter 1								
Area 1	114	214	288	415	455	125	4	1615
Area 2	309	220	178	188	45			940
Area 3	334	311	409	458	340	15		1867
Area 4	168	139	187	139	80			713
Area 5	11	31	21	24	21			108
Area 6	406	536	436	355	271	31		2035
Area 7	183	187	104	37	38	5		554
Total	1525	1638	1623	1616	1250	176	4	7832
Quarter 2								
Area 1	130	213	223	428	330	10		1334
Area 2	15	50	51	52	42	4		214
Area 3	133	208	241	293	227	2		1104
Area 4	28	49	69	72	50	9		277
Area 5		21	50	50	50	13		184
Area 6	122	215	255	266	225	15		1098
Area 7								
Total	428	756	889	1161	924	53		4211
Quarter 3								
Area 1	6	32	94	315	384	117	6	954
Area 2	17	29	106	135	98	8		393
Area 3	21	24	148	232	170	13		608
Area 4		36	120	104	102	1		363
Area 5	30	34	80	74	35	5		258
Area 6	157	161	257	249	226	16		1066
Area 7		5	38	22	17	3		85
Total	231	321	843	1131	1032	163	6	3727
Quarter 4								
Area 1	47	44	70	141	169	64	4	539
Area 2	59	39	158	170	127	2		555
Area 3	51	56	99	115	109	2		432
Area 4	43	41	64	60	32	3		243
Area 5		3	11	11	10	3		38
Area 6	230	249	253	244	207	30		1213
Area 7	94	87	74	80	86	6		427
Total	524	519	729	821	740	110	4	3447
ALL QUARTERS								
Area 1	297	503	675	1299	1338	316	14	4442
Area 2	400	338	493	545	312	14		2102
Area 3	539	599	897	1098	846	32		4011
Area 4	239	265	440	375	264	13		1596
Area 5	41	89	162	159	116	21		588
Area 6	915	1161	1201	1114	929	92		5412
Area 7	277	279	216	139	141	14		1066
Total	2708	3234	4084	4729	3946	502	14	9217

TABLE 6-D Number of mackerel stomachs sampled by predator size class, area and quarter.

Predator : MACKEREL				
Size class	200+250	300	400	Total
Quarter 1				
Northwestern	13	27	8	48
Northeastern	25	14	20	59
Central	92	30		122
Southern	15	4		19
Total	145	75	28	248
Quarter 2				
Northwestern	13	24	2	39
Northeastern	10	117	197	324
Central	30	188	193	411
Southern	200	227	76	503
Total	253	556	468	1277
Quarter 3				
Northwestern	102	206	36	344
Northeastern	88	407	142	637
Central	260	518	158	936
Southern	314	388	118	820
Total	764	1519	454	2737
Quarter 4				
Northwestern	13	108	83	204
Northeastern		18	20	38
Central	69	163	23	255
Southern	38	127	21	186
Total	120	416	147	683
ALL QUARTERS				
Northwestern	141	365	129	635
Northeastern	123	556	379	1058
Central	451	899	374	1724
Southern	567	746	215	1528
Total	1282	2566	1097	4945

TABLE 6-E Number of **saithe** stomachs collected by predator size class, year and quarter.

Predator : SAI THE		Area : ALL						
Size class		250	300	400	500	700	1000	Total
Year								
Quarter 1								
1980				1	26	32	11	70
1981				3	109	208	16	336
1982		2	45	32	35	25	2	141
Total		2	45	36	170	265	29	547
Quarter 2								
1981			14	7	45	113	6	185
Total			14	7	45	113	6	185
Quarter 3								
1980	1	5	3	5	26	3		43
1981		45	114	167	108	4		438
1982		33	84	186	107	8		418
Total	1	83	201	358	241	15		899
Quarter 4								
1981				46	82	78	173	379
1982			10	16	88	65	1	180
Total			10	62	170	143	174	559
ALL QUARTERS								
1980	1	5	4	31	58	14		113
1981		59	170	403	507	199		1338
1982	2	88	132	309	197	11		739
TOTAL	3	152	306	743	762	224		2190

TABLE 7 PERCENTAGE OF EMPTY STOMACHS.

TABLE 7-A Percentage of empty cod stomachs by predator size class, area and quarter.

Predator : COD											
Size class	70	100	150	200	250	300	400	500	700	1000	Total
Quarter 1											
Area 1		0.00		4.65	16.47	13.01	22.50	24.88	20.00	43.75	19.46
Area 2	100.00	10.53	10.34	19.35	12.25	16.56	16.67	12.50	21.82	8.33	15.60
Area 3		0.00	0.00	25.00	8.82	8.77	10.71	11.67	14.29	50.00	11.37
Area 4		0.00	0.00	10.71	13.64	4.65	0.00	12.50	11.94	13.04	10.86
Area 5						1.11	0.00	0.00	0.00	0.00	4.76
Area 6		7.14	9.63	7.94	11.45	5.85	6.43	13.71	14.34	10.91	9.33
Area 7		46.67	29.17	8.33	6.78	9.64	6.90	12.82	10.39	0.00	12.08
Total	100.00	12.39	11.16	11.30	12.15	9.68	10.11	17.63	15.35	16.24	12.66
Quarter 2											
Area 1				28.57	8.70	5.63	7.35	2.58	0.00	0.00	4.47
Area 2		100.00	12.50	13.33	9.52	9.84	13.33	5.26	3.70	0.00	10.24
Area 3			0.00	0.00	33.33	7.32	4.00	10.34	0.00	0.00	7.83
Area 4			0.00	9.76	1.96	8.86	9.80	6.25	0.00	0.00	6.05
Area 5				0.00	25.00	5.26	5.26	6.25			6.45
Area 6		6.67	20.00	16.13	12.55	13.09	10.61	7.14	3.57	0.00	12.91
Area 7		0.00	10.00	25.00	0.00	0.00					11.63
Total		11.11	15.34	15.55	11.08	9.29	9.46	5.61	1.11	0.00	9.63
Quarter 3											
Area 1				0.00	0.00	14.29	19.01	13.10	16.67	10.00	15.22
Area 2		25.00	8.33	0.00	0.00	3.03	7.32	18.87	14.49	47.22	13.85
Area 3				41.67	40.91	23.81	20.37	19.64	7.89	0.00	22.78
Area 4		12.50		46.67	21.88	18.07	21.95	30.00	14.29		23.01
Area 5		0.00	50.00				16.67	8.33	0.00		8.16
Area 6	23.81	13.19	9.90	17.39	13.98	13.33	8.20	15.63	8.33		13.12
Area 7	18.52	10.00	3.85	0.00	0.00	0.00	30.77	29.41	0.00	50.00	14.19
Total	22.22	12.96	9.48	24.14	15.68	13.78	16.62	17.44	13.23	38.78	15.54
Quarter 4											
Area 1	0.00	16.67	66.67	40.00	25.00	0.00	13.89	12.05	1.87	0.00	8.73
Area 2		12.82	0.00	18.52	22.22	25.00	8.64	31.82	5.13	0.00	18.47
Area 3		0.00		0.00	0.00	0.00	17.95	11.54	6.67		9.82
Area 4		33.33	5.26	0.00	11.11	16.67	18.18	0.00	5.41	15.38	10.92
Area 5				0.00		0.00	0.00	0.00	0.00	0.00	0.00
Area 6		26.60	12.73	13.48	5.77	2.13	6.15	0.74	4.65	15.38	7.56
Area 7		12.00	12.50	7.69	11.90	8.00	7.32	7.41	0.00	0.00	9.00
Total	0.00	20.63	12.56	13.57	12.45	9.91	8.91	6.84	3.08	7.41	9.71
ALL QUARTERS											
Area 1	0.00	13.33	66.67	10.17	13.93	9.56	16.72	14.50	11.56	24.24	13.32
Area 2	100.00	16.18	9.43	17.37	13.16	16.11	10.44	18.60	13.16	32.73	15.37
Area 3		0.00	0.00	36.67	22.39	11.11	15.07	13.50	9.09	16.67	13.90
Area 4		22.73	2.08	14.89	11.67	11.85	14.81	18.29	7.69	13.16	12.20
Area 5		0.00	50.00	0.00	25.00	6.25	6.90	7.14	0.00	0.00	3.95
Area 6	23.81	14.52	12.35	12.34	11.29	7.73	7.63	6.62	11.31	11.11	10.37
Area 7	18.52	15.96	14.10	11.11	8.41	8.51	10.84	14.46	9.76	11.11	11.61
Total	22.83	14.86	11.89	13.89	12.38	10.33	11.03	12.16	10.28	17.57	11.95

TABLE 7-B Percentage of empty haddock stomachs by predator size class, area and quarter.

Predator : HADDOCK									
Size class	100	150	200	250	300	400	500	700	Total
Quarter 1									
Area 1	0.00	0.00	0.00	0.00	0.92	2.99	0.00		0.47
Area 2	0.00	0.00	1.02	0.85	4.63	36.36	0.00		2.70
Area 3	0.00	4.25	4.76	5.67	7.01	21.15	25.00		5.72
Area 4	0.00	5.56	9.09	2.27	6.90	50.00			7.10
Area 5			0.00		0.00				0.00
Area 6	0.00	0.00	8.89	13.04	22.45	42.11	22.22		18.40
Area 7	0.00	0.00	0.00	4.65	8.91	7.14	0.00		5.56
Total	0.00	2.25	3.67	3.66	8.12	15.38	7.14		5.09
Quarter 2									
Area 1	24.86	20.88	13.20	13.68	15.75	17.03	12.50	0.00	17.32
Area 2	46.15	14.29	14.29	11.11	17.82	14.29	00.00		15.95
Area 3	50.00	32.90	17.33	19.00	18.48	25.53	16.67		24.42
Area 4		0.00	24.24	7.58	3.13	11.54	0.00		9.33
Area 5				0.00					0.00
Area 6		0.00	0.00	2.33	1.39	8.70			2.42
Area 7									
Total	30.63	23.09	14.57	13.72	14.40	16.94	15.15	0.00	17.81
Quarter 3									
Area 1	28.35	20.91	13.98	8.38	6.16	14.93	8.11	50.00	13.81
Area 2	26.67	25.00	23.46	16.59	12.46	3.36			16.24
Area 3	16.92	18.11	14.57	8.82	6.73	8.00	50.00		11.82
Area 4	16.07	16.67	10.00	4.95	5.61	0.00			8.15
Area 5	0.00	0.00							0.00
Area 6	3.70	11.11		7.69	3.33	0.00	25.00		6.50
Area 7									
Total	23.45	19.73	15.54	9.60	7.44	10.11	10.98	50.00	13.24
Quarter 4									
Area 1	4.55	4.59	1.63	3.85	1.16	1.64	1.52		2.87
Area 2	4.08	9.45	6.74	20.91	23.04	14.29	25.00	00.00	16.40
Area 3	4.22	5.67	3.04	0.36	2.55	6.38			2.90
Area 4	22.22	22.64	15.38	7.50	37.93	20.00			20.62
Area 5		0.00	66.67		0.00				33.33
Area 6		8.57	31.25		0.00	6.25	0.00		15.05
Area 7	17.39	14.63	12.50	6.25	11.54	3.57	0.00		10.87
Total	5.78	7.39	4.35	6.97	7.81	5.17	2.50	00.00	6.32
ALL QUARTERS									
Area 1	17.06	13.87	8.86	7.90	6.94	9.91	6.48	40.00	10.39
Area 2	20.00	10.58	13.15	14.44	15.24	10.27	37.50	00.00	14.07
Area 3	15.59	14.33	9.72	7.92	7.81	16.37	28.57		10.53
Area 4	18.28	17.39	14.63	5.58	8.91	10.00	0.00		10.86
Area 5	0.00	0.00	28.57	0.00	0.00				11.76
Area 6	3.57	7.78	13.73	6.33	11.54	15.49	20.00		10.96
Area 7	12.12	9.52	4.65	5.08	9.80	5.71	0.00		7.80
Total	16.72	13.42	10.05	8.81	9.12	10.77	8.89	50.00	10.95

TABLE 7-C Percentage of empty **whiting** stomachs by predator size class, area and quarter.

Predator : WHITING								
Size class	100	150	200	250	300	400	500	Total
Quarter 1								
Area 1	27.08	40.65	32.29	33.25	29.45	29.60	0.00	32.69
Area 2	25.25	31.82	34.83	39.36	77.78			33.94
Area 3	7.78	18.01	28.12	20.74	21.76	40.00		19.93
Area 4	10.12	10.79	11.23	15.11	8.75			11.36
Area 5	9.09	22.58	33.33	16.67	4.76			18.52
Area 6	17.49	22.01	26.61	33.52	32.47	16.13		25.41
Area 7	27.32	36.90	31.73	37.48	36.84	20.00		32.67
Total	18.49	25.76	27.54	28.77	28.24	27.84	0.00	25.77
Quarter 2								
Area 1	3.08	9.86	13.45	9.58	10.00	10.00		10.49
Area 2	53.33	22.00	41.18	44.23	33.33	0.00		35.98
Area 3	2.26	20.19	16.18	16.38	10.13	0.00		14.04
Area 4	0.00	6.12	7.25	13.89	30.00	11.11		12.27
Area 5		38.10	38.00	52.00	24.00	30.77		37.50
Area 6	33.61	43.26	40.39	39.47	36.44	53.33		39.62
Area 7								
Total	16.12	23.54	24.41	21.79	19.37	26.42		21.61
Quarter 3								
Area 1	0.00	28.13	20.21	15.56	18.23	20.51	33.33	18.13
Area 2	29.41	31.03	25.47	25.93	18.37	50.00		24.94
Area 3	57.14	12.50	23.65	24.14	34.12	15.38		27.30
Area 4		30.56	35.83	47.17	37.25	00.00		39.12
Area 5	50.00	38.24	42.50	48.69	40.00	0.00		43.41
Area 6	12.74	22.98	21.79	26.10	28.76	75.00		23.92
Area 7		20.00	44.74	50.00	52.94	0.00		44.71
Total	22.51	25.86	27.40	26.61	26.36	26.38	33.33	26.40
Quarter 4								
Area 1	6.38	15.91	10.00	7.80	8.88	3.13	0.00	8.35
Area 2	18.64	15.38	30.38	39.41	43.31	0.00		33.69
Area 3	15.69	10.71	13.13	8.70	10.09	00.00		11.57
Area 4	39.53	29.27	43.75	38.33	62.50	66.67		41.98
Area 5		0.00	45.45	0.00	40.00	0.00		23.68
Area 6	26.96	20.48	21.74	17.21	18.36	0.00		20.45
Area 7	18.09	16.09	27.03	23.75	16.28	16.67		19.91
Total	22.52	18.50	24.14	20.95	21.22	6.36	0.00	21.06
ALL QUARTERS								
Area 1	18.86	24.65	22.07	18.40	18.83	20.25	14.29	19.95
Area 2	25.50	28.40	32.05	36.51	39.10	28.57		32.40
Area 3	9.09	17.86	22.52	19.03	19.62	31.25		18.52
Area 4	14.23	15.47	22.05	27.47	30.30	30.77		22.49
Area 5	39.02	31.46	40.12	41.51	26.72	19.05		35.71
Area 6	21.53	25.75	27.48	29.71	29.39	27.17		26.88
Area 7	24.19	30.11	32.41	31.65	26.24	14.29		28.52
Total	19.24	24.09	26.22	25.19	24.35	22.51	14.29	24.13

TABLE 7-D Percentage of empty mackerel stomachs by predator size class, area and quarter.

Predator : MACKEREL				
Size class	200+250	300	400	Total
Quarter 1				
Northwestern	15.4	14.8	12.5	14.6
Northeastern	8.0	14.3	25.0	15.0
Central	22.5	16.7		21.0
Southern	20.0	0.0		15.8
Total	19.0	14.7	21.4	18.0
Quarter 2				
Northwestern	0.0	0.0	0.0	0.0
Northeastern	10.0	4.3	4.1	4.3
Central	3.3	5.9	3.7	5.6
Southern	10.7	11.0	15.8	11.6
Total	9.2	7.4	6.6	7.5
Quarter 3				
Northwestern	4.9	7.3	19.4	7.8
Northeastern	6.8	8.8	12.0	9.3
Central	10.4	10.6	13.9	11.1
Southern	6.4	12.1	16.1	10.5
Total	7.6	10.1	14.3	10.1
Quarter 4				
Northwestern	0.0	17.6	24.1	19.1
Northeastern		0.0	0.0	0.0
Central	17.4	15.3	17.4	16.1
Southern	23.7	13.4	19.0	16.1
Total	17.5	14.7	19.0	16.1
ALL QUARTERS				
Northwestern	5.0	10.4	21.7	11.5
Northeastern	7.3	7.7	7.9	7.8
Central	13.4	10.7	9.9	11.2
Southern	9.4	11.9	16.3	11.6
Total	10.1	10.4	11.9	10.6

TABLE 8 STOMACH CONTENT COMPOSITION.

TABLE 8-A-1 Summary of cod stomach content composition by predator age class and quarter.

Predator : COD	Quarter : 1			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	749	2025	467	426	322	192	
Total weight all prey	0.906	5.669	28.746	66.758	81.956	123.944	
Total nr of prey items	2.797	4.497	5.199	5.633	5.783	6.437	
Average weight per prey	0.324	1.261	5.529	11.852	14.172	19.254	
WEIGHT % OF MAJOR TAXA							
PHAEOPHYTA	0.00	0.02	0.01	0.00	0.00		
CNIDARIA	0.12	0.12	0.10	0.09	0.08	0.03	
ANNELLIDA	8.90	8.78	5.02	2.74	2.26	1.40	
GASTROPODA	3.31	1.76	0.49	0.35	0.32	0.29	
BIVALVIA	6.84	5.46	1.03	0.25	0.18	0.15	
SCAPHOPODA		0.00	0.00	0.00	0.00	0.00	
CEPHALOPODA	2.21	1.92	0.83	0.55	0.48	0.33	
PYCNOGONIDA	0.46	0.08	0.00				
CRUSTACEA	49.53	32.56	16.68	10.07	9.07	6.55	
Mysida	0.70	0.11	0.01	0.00	0.00	0.00	
Cumacea	0.01	0.00	0.00				
Valvifera	0.14	0.06	0.08	0.02	0.01	0.00	
Gammaridea	1.02	0.10	0.01	0.00	0.00	0.00	
Hyperiidea	0.21	0.39	0.01	0.00	0.00	0.00	
Euphausiacea	2.00	1.20	0.09	0.01	0.00	0.00	
Caridea	29.52	6.05	1.55	0.61	0.44	0.21	
Astacidea	0.76	0.66	1.80	3.49	3.76	2.16	
Anomura	12.03	9.51	3.15	1.25	0.96	0.95	
Oxystomata		0.04	0.01	0.00			
Oxyrhyncha	0.33	1.74	0.66	0.15	0.08	0.03	
Cancridea	0.07	1.15	1.07	0.96	0.96	0.93	
Brachyrhyncha	2.75	11.55	8.23	3.57	2.86	2.25	
SIPUNCULA	0.08	0.00	0.00	0.00	0.00	0.00	
ECHIURA	0.09	0.96	0.54	0.11	0.04	0.01	
PRIAPULIDA	0.04	0.05	0.01	0.00			
ECHINODERMATA	0.13	0.76	0.95	0.38	0.26	0.12	
CHAETOGNATHA	0.01	0.04	0.00				
UROCHORDATA		0.01	0.00	0.00	0.00	0.00	
CEPHALOCHORDATA	0.00	0.06	0.01	0.00	0.00	0.00	
GNATHOSTOMATA	28.26	47.44	74.32	85.42	87.26	91.11	
UNKNOWN	0.02	0.01	0.00	0.03	0.03	0.01	
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua		1.04	3.08	9.55	10.92	9.50	
Melanogrammus aeglefinus	0.80	3.80	8.71	18.55	20.05	8.10	
Merlangius merlangus	0.08	7.30	21.49	28.61	29.68	29.88	
Trisopterus esmarkii	3.61	3.82	4.62	3.56	3.16	1.42	
Clupea harengus	0.14	2.91	5.44	3.07	2.45	2.65	
Sprattus sprattus	8.81	8.40	4.83	3.07	2.76	2.69	
AMMODYTIDAE	1.11	8.91	12.53	2.92	0.69	0.15	
Pleuronectes platessa		0.01	0.16	0.94	1.25	3.75	
Solea solea		0.12	0.06	0.39	0.46	0.16	
Microstomus kitt			0.03	0.31	0.54	3.67	
Limanda limanda	0.38	3.26	7.32	7.87	8.33	16.57	
Nephrops norvegicus	0.76	0.66	1.80	3.49	3.76	2.16	
Crangon crangon	18.23	2.01	0.55	0.25	0.20	0.08	

TABLE 8-A-2 Summary of cod stomach content composition by predator age class and quarter.

Predator : COD	Quarter : 2			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	895	1100	264	104	50	25	
Total weight all prey	2.473	11.407	41.205	94.854	116.094	160.519	
Total nr of prey items	6.199	12.188	23.909	79.180	96.027	48.968	
Average weight per prey	0.399	0.936	1.723	1.198	1.209	3.278	
WEIGHT % OF MAJOR TAXA							
CNIDARIA	0.09	0.18	0.06	0.10	0.10	0.03	
ANNELLIDA	9.02	5.74	4.29	3.80	3.95	5.83	
GASTROPODA	1.34	1.01	0.15	0.05	0.05	0.01	
BIVALVIA	2.35	0.74	0.12	0.01			
SCAPHOPODA		0.00	0.00	0.00			
CEPHALOPODA	0.22	0.05	0.07	0.14	0.15	0.14	
CRUSTACEA	38.68	34.99	35.98	38.59	38.41	32.06	
Mysida	0.32	0.02	0.00	0.00			
Cumacea	0.01	0.00					
Valvifera	0.44	0.06	0.01	0.00			
Gammaridea	0.11	0.01	0.00	0.00			
Hyperiidea	0.00	0.00	0.00				
Euphausiacea	11.18	7.34	6.91	10.77	10.65	3.12	
Caridea	7.47	2.45	0.49	0.10	0.06	0.18	
Astacidea	0.06	1.74	6.63	10.09	11.30	18.78	
Anomura	10.32	5.91	1.92	0.47	0.29	0.09	
Oxystomata	0.04	0.02	0.00				
Oxyrhyncha	0.60	1.25	0.97	0.24	0.11	0.03	
Cancridea	1.79	8.00	13.07	12.27	11.67	7.51	
Brachyrrhyncha	6.34	8.19	5.98	4.66	4.32	2.35	
SIPUNCULA	0.03	0.00					
ECHIURA	0.34	0.02	0.00				
PRIAPULIDA	0.06	0.05	0.01	0.00			
ECHINODERMATA	1.58	4.47	2.17	0.26	0.01	0.00	
CHAETOGNATHA	0.01	0.00					
UROCHORDATA	0.07	0.05	0.00				
CEPHALOCHORDATA	0.00	0.00	0.00				
GNATHOSTOMATA	46.22	52.71	57.15	57.05	57.35	61.93	
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua	0.99	1.36	4.04	7.72	7.74	2.19	
Melanogrammus aeglefinus	1.76	3.12	5.48	5.73	5.39	1.91	
Merlangius merlangus	0.08	2.38	6.34	8.62	9.62	16.54	
Trisopterus esmarkii	1.26	2.67	4.23	4.36	4.10	1.50	
Clupea harengus	0.20	1.20	2.48	4.03	4.07	1.99	
Sprattus sprattus	1.35	3.43	1.98	0.88	0.86	2.29	
AMMODYTIDAE	32.77	25.10	11.55	6.84	5.89	2.77	
Pleuronectes platessa	0.00	0.06	0.14	0.08	0.20	1.57	
Solea solea	0.00	0.08	0.04	0.00			
Limanda limanda	0.56	4.50	10.02	7.72	7.36	8.59	
Nephrops norvegicus	0.06	1.74	6.63	10.09	11.30	18.78	
Crangon crangon	4.33	0.74	0.05	0.00	0.00	0.02	

TABLE 8-A-3 Summary of cod stomach content composition by predator age class and quarter.

Predator : COD	Quarter : 3			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	666	497	618	267	141	85	73
Total weight all prey	0.235	4.285	14.767	40.684	107.833	140.162	318.009
Total nr of prey items	2.395	7.756	12.373	19.920	15.116	9.262	5.341
Average weight per prey	0.098	0.553	1.193	2.042	7.134	15.134	59.545
WEIGHT % OF MAJOR TAXA							
CNIDARIA	0.03	0.00	0.01	0.01	0.01	0.00	
ANNELLIDA	1.02	5.50	5.56	6.85	9.03	8.69	1.33
GASTROPODA		1.63	0.72	0.17	0.03	0.02	0.00
BIVALVIA	5.80	0.05	0.75	0.53	0.09	0.02	0.00
SCAPHOPODA		0.00	0.00	0.00	0.00		
CEPHALOPODA		0.02	0.26	0.14	0.13	0.14	0.14
PYCNOGONIDA		0.00	0.00				
CRUSTACEA	66.79	41.53	33.47	28.72	20.43	18.20	12.66
Mysida	0.76	0.02	0.00	0.00	0.00		
Cumacea	0.16						
Valvifera		0.29	0.01	0.00	0.00		
Gammaridea	3.27	0.00	0.00	0.00	0.00	0.00	0.00
Euphausiacea	0.00	9.65	7.91	5.57	1.09	0.15	0.01
Caridea	46.61	1.76	0.95	0.49	0.33	0.31	0.03
Astacidea		1.02	5.22	10.25	12.50	12.14	7.14
Anomura	2.15	8.43	3.65	1.62	0.48	0.30	0.03
Oxystomata		0.16	0.03	0.01	0.00	0.00	0.00
Oxyrhyncha		0.73	1.49	1.21	0.33	0.15	0.02
Cancridea	0.35	3.45	3.39	2.85	1.31	0.90	0.10
Brachyrrhyncha	13.48	16.01	10.81	6.70	4.39	4.25	5.33
PRIAPULIDA	0.01	0.03	0.01	0.00			
ECHINODERMATA	0.06	0.26	0.84	0.83	0.55	0.46	0.07
GNATHOSTOMATA	26.33	50.95	58.38	62.75	69.74	72.47	85.79
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua		8.06	2.63	1.06	1.51	1.44	0.16
Melanogrammus aeglefinus		5.50	8.57	10.20	11.76	13.80	30.83
Merlangius merlangus	0.91	12.28	5.50	3.05	2.99	2.94	1.73
Trisopterus esmarkii		2.99	17.70	23.00	20.65	18.33	2.98
Clupea harengus		4.32	5.88	8.51	13.51	13.25	1.48
Sprattus sprattus		2.17	2.83	0.87	0.03	0.00	0.00
AMMODYTIDAE	0.78	8.07	6.69	3.12	0.76	0.47	0.05
Pleuronectes platessa		0.08	0.02	0.00		1.20	12.75
Solea solea		0.08	0.02	0.07	0.16	0.19	0.23
Microstomus kitt			0.08	0.10	0.02	0.00	0.00
Limanda limanda	2.51	1.30	2.35	4.19	5.82	5.58	0.81
Scomber scombrus			0.01	0.88	2.12	2.52	4.33
Nephrops norvegicus		1.02	5.22	10.25	12.50	12.14	7.14
Crangon crangon	41.45	0.83	0.36	0.23	0.29	0.29	0.03

TABLE 8-A-4 Summary of cod stomach content composition by predator age class and quarter.

Predator : COD	Quarter : 4			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	645	570	710	273	203	41	63
Total weight all prey	0.851	6.732	13.134	37.741	94.444	104.136	137.292
Total nr of prey items	2.341	4.425	5.027	6.018	7.187	7.330	7.012
Average weight per prey	0.363	1.521	2.612	6.271	13.141	14.206	19.581
WEIGHT % OF MAJOR TAXA							
PORIFERA	0.00	0.00	0.00				
CNIDARIA		0.07	0.07	0.06	0.04	0.04	0.01
ANNELLIDA	4.08	7.20	7.93	4.43	1.73	1.41	1.39
GASTROPODA	0.67	1.26	0.75	0.58	0.60	0.61	0.12
BIVALVIA	0.27	1.62	0.71	0.16	0.02	0.02	0.01
SCAPHOPODA		0.00	0.00	0.00	0.00		
CEPHALOPODA	0.58	0.53	0.51	4.90	8.06	8.39	6.03
PYCNOGONIDA		0.00	0.00	0.00			
CRUSTACEA	69.92	49.51	46.95	26.56	12.60	11.13	6.55
Mysida	0.41	0.01	0.00	0.00			
Cumacea	0.00						
Valvifera		0.00	0.00	0.01	0.01	0.01	0.00
Gammaridea	0.05	0.19	0.06	0.00	0.00		
Hyperiidea	0.00	0.00	0.00	0.00			
Euphausiacea	0.04	0.04	0.02	0.00	0.00		
Caridea	47.09	13.64	7.42	2.33	0.34	0.25	0.10
Astacidea		2.91	3.38	2.87	2.32	2.31	0.44
Anomura	9.94	9.14	5.67	2.51	1.27	1.15	0.90
Oxyrhyncha	0.10	0.81	0.50	0.21	0.09	0.09	0.02
Cancridea	0.22	1.65	1.84	1.56	1.31	1.29	1.40
Brachyrrhyncha	12.06	21.12	28.05	17.05	7.25	6.03	3.69
ECHIURA	0.23	0.44	0.21	0.05	0.00		
PRIAPULIDA	0.05	3.47	1.56	0.33			
ECHINODERMATA	0.02	0.07	0.07	0.03	0.01	0.00	0.00
UROCHORDATA	0.20	0.02	0.01				
GNATHOSTOMATA	23.98	35.81	41.23	62.91	76.95	78.39	85.90
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua	0.10	0.05	0.30	5.62	9.37	9.77	3.02
Melanogrammus aeglefinus	1.17	9.88	8.43	12.39	15.56	16.03	27.74
Merlangius merlangus		0.80	1.60	10.24	16.22	16.86	15.00
Trisopterus esmarkii	1.01	6.56	8.29	7.51	6.56	6.36	2.83
Clupea harengus	0.00	2.16	1.95	1.76	1.62	1.68	0.32
Sprattus sprattus	0.08	0.40	0.90	0.91	0.77	0.75	0.14
AMMODYTIDAE	3.38	4.94	2.60	4.16	5.94	6.17	7.70
Pleuronectes platessa		0.00	0.05	0.03	0.00		0.19
Solea solea		0.14	0.24	0.15	0.06	0.04	0.99
Limanda limanda	1.36	1.83	2.15	6.85	10.13	10.47	23.97
Scomber scombrus		0.08	6.32	4.89	2.19	1.70	0.32
Nephrops norvegicus		2.91	3.38	2.87	2.32	2.31	0.44
Crangon crangon	39.35	11.83	6.25	1.81	0.12	0.05	0.02

TABLE 8-B-1 Summary of haddock stomach content composition by predator age class and quarter.

Predator : HADDOCK	Quarter : 1			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled		668	1392	588	147	44	31
Total weight all prey		0.265	0.982	1.933	3.298	6.415	6.909
Total nr of prey items		2.604	7.607	8.291	9.233	12.746	13.246
Average weight per prey		0.102	0.129	0.233	0.357	0.503	0.522
WEIGHT % OF MAJOR TAXA							
ANNELLIDA		25.99	19.07	11.71	9.15	11.54	12.01
GASTROPODA		1.66	1.63	0.92	1.20	1.66	1.72
POLYPLACOPHORA				0.00	0.01	0.01	0.01
BIVALVIA		2.64	7.26	5.28	2.88	1.40	1.28
SCAPHOPODA		0.00	0.00	0.00	0.00		
CEPHALOPODA		7.92	1.88	1.16	1.31	0.71	0.59
PYCNOGONIDA		0.01	0.02	0.01	0.01	0.00	0.00
CRUSTACEA		19.89	15.77	11.98	16.36	17.95	17.90
Calanoida			0.00	0.00			
Leptostraca		0.01	0.03	0.01	0.00		
Mysida		0.04	0.04	0.02	0.01	0.00	0.00
Cumacea		0.06	0.05	0.04	0.02	0.01	0.00
Tanaidacea dikionophora		0.25	0.07	0.07	0.10	0.05	0.04
Flabellifera		2.96	3.04	2.12	2.12	1.61	1.53
Valvifera			0.00	0.01	0.00	0.00	0.00
Gammaridea		4.31	2.36	1.50	0.80	0.33	0.29
Hyperiidea		0.21	0.40	0.18	0.06	0.03	0.03
Caprellidea		0.06	0.00	0.00	0.00	0.00	0.00
Euphausiacea		4.21	2.56	2.46	5.18	7.44	7.62
Caridea		3.65	2.95	1.63	1.00	0.36	0.29
Anomura		4.02	3.43	3.42	6.43	7.07	6.99
Oxyrhyncha		0.02	0.18	0.13	0.15	0.23	0.24
Cancridea		0.00	0.00	0.00	0.00	0.00	0.00
Brachyrrhyncha		0.08	0.57	0.35	0.47	0.82	0.86
ECHINODERMATA		22.35	15.87	15.77	12.44	7.78	7.31
CHAETOGNATHA			0.00	0.00	0.00		
CEPHALOCHORDATA			0.00	0.01	0.00	0.00	0.00
GNATHOSTOMATA		10.51	32.29	47.47	51.89	54.58	54.80
UNKNOWN		9.03	6.20	5.70	4.73	4.38	4.39
WEIGHT % OF COMMERCIAL SPECIES							
Trisopterus esmarkii			16.65	24.32	33.24	35.08	34.78
Clupea harengus				0.05	1.37	5.68	6.28
Sprattus sprattus		0.10	1.52	5.21	3.35	1.91	1.86
AMMODYTIDAE		0.13	0.92	4.38	7.25	6.77	6.56
Crangon crangon		0.51	0.33	0.13	0.07	0.01	0.01

TABLE 8-B-2 Summary of haddock stomach content composition by predator age class and quarter.

Predator : HADDOCK	Quarter : 2			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	89	753	1924	785	183	9	52
Total weight all prey	0.239	0.367	1.906	5.178	8.782	10.341	10.483
Total nr of prey items	2.228	4.478	15.639	39.517	46.843	40.378	40.109
Average weight per prey	0.107	0.082	0.122	0.131	0.187	0.256	0.261
WEIGHT % OF MAJOR TAXA							
ANNELLIDA	14.99	17.15	7.25	5.20	4.41	3.94	3.86
GASTROPODA		0.11	0.29	0.30	0.90	0.91	0.98
POLYPLACOPHORA			0.00	0.00			
BIVALVIA	3.10	5.25	3.98	2.61	2.22	1.77	1.73
SCAPHOPODA			0.01	0.02	0.01		
CEPHALOPODA		0.02	0.83	0.63	0.14		
CRUSTACEA	21.06	23.34	20.12	13.66	9.26	6.95	7.04
Calanoida	0.05	1.32	1.55	1.33	1.03	0.77	0.76
Mysida	0.23	0.06		0.00	0.00	0.00	0.00
Cumacea		0.07	0.01	0.00	0.00	0.00	0.00
Flabellifera	0.09	0.17	0.62	0.33	0.19	0.12	0.20
Valvifera			0.00	0.00			
Gammaridea	1.14	3.83	1.09	0.37	0.17	0.09	0.09
Hyperiidea	0.12	0.35	0.11	0.16	0.04		
Caprellidea			0.00	0.00	0.00		
Euphausiacea	8.00	11.37	13.17	9.18	6.29	4.71	4.61
Caridea	4.25	2.95	1.90	0.41	0.13	0.22	0.21
Anomura	5.87	2.30	0.77	1.49	1.32	1.02	1.00
Oxurhyncha	1.31	0.89	0.71	0.18	0.03	0.01	0.01
Cancridea			0.05	0.09	0.02		
Brachyrrhyncha		0.01	0.14	0.12	0.03		0.16
ECHINODERMATA	30.34	29.09	12.53	9.64	11.43	11.55	11.86
CEPHALOCHORDATA				0.00	0.00	0.00	0.00
GNATHOSTOMATA	4.29	8.40	41.78	62.65	67.94	71.58	70.79
UNKNOWN	26.22	16.63	13.21	5.28	3.70	3.29	3.73
WEIGHT % OF COMMERCIAL SPECIES							
Trisopterus esmarkii			0.02	0.82	4.60	7.03	6.89
Sprattus sprattus				0.05	0.29	0.31	0.30
AMMODYTIDAE		3.47	6.65	2.54	0.88	0.42	1.09

TABLE 8-B-3 Summary of haddock stomach content composition by predator age class and quarter.

Predator : HADDOCK	Quarter : 3			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	895	1563	2575	616	130	27	18
Total weight all prey	0.171	1.524	3.315	6.010	10.314	18.409	15.121
Total nr of prey items	1.616	17.965	23.694	18.794	16.724	13.728	14.110
Average weight per prey	0.106	0.085	0.140	0.320	0.617	1.341	1.072
WEIGHT % OF MAJOR TAXA							
CNIDARIA		0.00	0.00	0.01	0.01	0.00	0.00
CTENOPHORA			0.00	0.00	0.01	0.03	0.02
RHYNCHOCOELA		0.00	0.00				
ANNELLIDA	10.21	8.94	6.13	4.78	3.32	2.14	2.35
GASTROPODA	0.02	0.37	0.20	0.38	0.37	0.16	0.29
POLYPLACOPHORA		0.00	0.00				
BIVALVIA	0.19	3.13	3.63	2.61	1.79	1.25	1.29
SCAPHOPODA		0.00	0.08	0.08	0.03	0.01	0.01
CEPHALOPODA		0.11	0.18	0.05	0.01	0.00	0.00
PYCNOGONIDA		0.00	0.00				
CRUSTACEA	30.34	22.32	25.08	17.79	11.43	7.70	9.37
Calanoida	0.05	0.01	0.00				
Leptostraca	0.00						
Mysida	0.42	0.11	0.03	0.00	0.00	0.00	0.00
Cumacea	0.39	0.01	0.00	0.00			
Flabellifera	0.09	0.53	0.43	0.19	0.08	0.02	0.03
Valvifera		0.04	0.04	0.03	0.02	0.01	0.02
Asellota			0.00	0.00	0.00	0.00	0.00
Gammaridea	1.23	0.48	0.48	0.25	0.10	0.03	0.04
Hyperiidea	0.12	0.04	0.14	0.28	0.26	0.11	0.19
Caprellidea	0.02	0.01	0.00				
Euphausiacea	25.24	15.73	20.15	14.94	8.66	4.09	5.10
Caridea	1.47	0.67	0.48	0.33	0.14	0.05	0.05
Anomura	0.14	2.12	1.06	0.52	1.25	2.77	2.65
Oxyrhyncha	0.15	2.00	1.63	0.53	0.28	0.19	0.18
Cancridea	0.01	0.06	0.11	0.09	0.06	0.06	0.64
Brachyrrhyncha	0.49	0.22	0.26	0.40	0.46	0.32	0.40
ECHINODERMATA	1.90	9.51	11.38	9.84	6.99	4.68	12.27
UROCHORDATA	1.01	2.52	1.24	0.46	0.15	0.03	0.03
GNATHOSTOMATA	39.86	46.74	46.09	59.64	72.95	82.08	72.34
UNKNOWN	16.47	6.36	5.97	4.37	2.93	1.91	2.04
WEIGHT % OF COMMERCIAL SPECIES							
Melanogrammus aeglefinus		0.06	0.20	0.43	0.43	0.19	0.33
Merlangius merlangus			0.00	0.01	0.09	0.23	0.14
Trisopterus esmarkii	0.16	1.39	5.94	12.47	20.26	28.24	22.48
Sprattus sprattus		0.01	0.17	0.18	0.19	0.35	0.22
AMMODYTIDAE	9.14	11.82	12.27	7.78	5.00	2.47	3.24
Crangon crangon	0.46	0.24	0.04	0.03	0.01	0.00	0.00

TABLE 8-B-4 Summary of **haddock** stomach content composition by predator age class and quarter.

Predator : HADDOCK	Quarter : 4			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	1627	1005	1706	488	70	18	52
Total weight all prey	0.303	1.209	2.654	4.985	7.487	9.106	9.335
Total nr of prey items	4.515	8.461	15.712	16.607	17.514	18.342	17.986
Average weight per prey	0.067	0.143	0.169	0.300	0.427	0.496	0.519
WEIGHT % OF MAJOR TAXA							
ANNELLIDA	10.54	11.30	10.89	13.16	11.38	8.04	10.80
GASTROPODA	0.65	0.39	0.35	0.86	0.71	0.27	0.68
BIVALVIA	2.50	3.90	2.99	2.13	1.23	0.85	0.84
SCAPHOPODA		0.01	0.01	0.00	0.00	0.00	0.00
CEPHALOPODA	0.40	1.04	1.12	2.07	1.68	0.70	1.57
CRUSTACEA	20.36	20.11	19.52	11.68	12.67	16.84	12.87
Mysida	0.00	0.00	0.00	0.01	0.01	0.00	0.01
Cumacea	0.73	0.13	0.27	0.29	0.19	0.09	0.14
Flabellifera	0.58	0.68	0.65	0.33	0.27	0.37	0.24
Valvifera	0.40	0.54	0.15	0.07	0.05	0.04	0.05
Gammaridea	1.17	0.57	0.19	0.11	0.09	0.08	0.09
Hyperidea	1.58	7.36	9.53	5.59	5.38	6.26	5.25
Caprellidea	0.11						
Euphausiacea	3.10	0.05	0.07	0.10	0.48	0.91	0.63
Caridea	5.45	3.52	3.11	1.53	0.67	0.44	0.30
Anomura	1.32	2.85	2.73	2.10	4.23	7.12	5.00
Oxyrhyncha	1.37	0.65	0.08	0.03	0.01	0.01	0.01
Cancridea		0.00	0.01	0.01	0.01	0.02	0.01
Brachyrhyncha	2.10	2.93	2.46	1.30	0.98	1.11	0.83
ECHIURA	0.01	0.02	0.01	0.02	0.02	0.01	0.02
ECHINODERMATA	12.37	9.61	7.02	6.16	7.07	8.33	7.40
UROCHORDATA		0.00	0.02	0.13	0.11	0.04	0.11
GNATHOSTOMATA	42.48	47.36	54.05	61.21	62.81	62.61	63.51
UNKNOWN	10.70	6.25	4.03	2.59	2.32	2.31	2.21
WEIGHT % OF COMMERCIAL SPECIES							
Melanogrammus aeglefinus		0.08	0.06	0.00			
Merlangius merlangus		0.01	0.07	0.29	0.25	0.09	0.24
Trisopterus esmarkii	1.39	5.25	6.83	7.54	10.01	12.59	10.95
Clupea harengus		0.00	0.02	0.30	0.27	0.09	0.27
AMMODYTIDAE	1.28	4.69	21.46	23.16	20.42	18.62	19.26
Limanda limanda	0.01	0.00					

TABLE 8-C-1 Summary of whiting stomach content composition by predator age class and quarter.

Predator : WHITING	Quarter : I			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	3285	2179	1414	669	178	107	
Total weight all prey (g)	0.440	0.909	1.866	2.910	3.565	4.770	
Total Nr of prey items *)	0.250	3.892	6.218	6.567	5.638	5.058	
Average weight (g) per prey *)	0.176	0.218	0.283	0.415	0.593	0.923	
WEIGHT % OF MAJOR TAXA							
CNIDARIA	0.00	0.00					
CTENOPHORA	0.01	0.05	0.07	0.01	0.01		
NEMERTEA		0.00	0.01	0.02	0.01	0.01	
PLATYHELMINTHES		0.00	0.03	0.05	0.05	0.01	
ANNELLIDA	5.05	2.52	0.89	0.38	0.41	0.25	
GASTROPODA	0.01	0.02	0.16	0.25	0.21	0.16	
BIVALVIA	0.05	0.16	0.09	0.01	0.01		
CEPHALOPODA	14.04	9.71	4.54	1.59	1.02	0.52	
Unknown mollusca	1.54	1.07	0.34	0.45	0.47	0.15	
CRUSTACEA	34.12	28.53	23.58	18.18	16.99	12.13	
Copepoda	0.14	0.00					
Mysida	0.08	0.02	0.01	0.01	0.01	0.01	
Cumacea	0.00	0.00					
Isopoda	0.15	0.14	0.27	0.27	0.23	0.21	
Amphipoda	0.31	0.23	0.08	0.05	0.05	0.04	
Euphausiacea	13.79	20.49	19.35	14.51	10.84	8.65	
Caridea	12.80	4.08	2.52	2.01	1.49	1.20	
Macrura	3.21	0.81	0.26	0.23	0.23	0.07	
Anomura	0.30	0.22	0.07	0.09	0.13	0.05	
Brachyura	0.12	0.01	0.06	0.66	3.78	1.80	
Unknown crustacea	3.21	2.57	0.99	0.35	0.26	0.10	
ECHIURA	0.20	0.03	0.05	0.07	0.07	0.02	
ECHINODERMATA	0.00	0.00	0.00	0.00	0.00	0.00	
CHAETOGNATHA	0.17	0.01	0.00	0.00	0.00	0.00	
UROCHORDATA	0.21	0.20	0.04	0.00	0.00		
GNATHOSTOMATA	44.44	56.46	69.39	78.93	80.52	86.61	
Unknown	0.19	1.16	0.75	0.22	0.14	0.02	
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua	0.00	0.22	0.05			3.35	
Melanogrammus aeglefinus	1.14	0.22	1.66	2.47	2.64	4.36	
Merlangius merlangus		0.33	2.30	5.74	15.75	7.11	
Trisopterus esmarki	3.18	5.50	21.01	30.58	29.40	36.56	
Clupea harengus		12.21	12.49	15.84	9.90	15.95	
Sprattus sprattus	15.91	28.60	21.28	14.26	11.78	7.38	
AMMODYTIDAE	20.23	6.27	4.77	3.64	3.96	4.13	
Microstomus kitt	0.00	0.00					
Limanda limanda		0.02	0.09	0.13	0.17	0.04	
Nephrops norvegicus	0.00	0.00					
Crangon crangon	0.23	0.33	0.21	0.21	0.20	0.08	
Pandalus spec.	0.23	0.22	0.43	0.41	0.31	0.25	
*) % of total weight accounted for (see text):	89.8	93.6	94.3	93.7	93.9	97.9	

TABLE 8-C-2 Summary of whiting stomach content composition by predator age class and quarter.

Predator : WHITING	Quarter : 2			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	1405	1329	877	402	75	57	
Total weight all prey (g)	0.711	1.675	3.059	2.676	2.738	3.901	
Total Nr of prey items *)	19.794	16.049	12.050	10.402	3.954	8.274	
Average weight (g) per prey *)	0.034	0.101	0.247	0.247	0.660	0.459	
WEIGHT % OF MAJOR TAXA							
PORIFERA	0.00	0.05	0.01				
CNIDARIA	0.38	0.27	0.03	0.58	2.59	0.32	
CTENOPHORA	0.00	0.00	0.00	0.00	0.01	0.00	
NEMERTEA				0.03	0.13	0.26	
ANNELLIDA	1.57	2.01	0.80	2.87	3.49	1.50	
GASTROPODA	0.03	0.07	0.13	0.16	0.05	0.06	
BIVALVIA	0.01	0.05	0.01	0.04	0.01	0.01	
CEPHALOPODA	3.17	0.52	0.15	0.38	0.22	0.16	
Unknown mollusca	0.02	0.00	0.02	0.08	0.10	0.06	
CRUSTACEA	38.39	20.93	15.41	15.11	13.34	10.50	
Copepoda	0.25	0.09	0.08	0.03	0.00	0.08	
Mysida	0.06	0.01	0.01	0.02	0.01	0.01	
Isopoda	0.12	0.14	0.05	0.05	0.02	0.04	
Amphipoda	1.32	0.08	0.04	0.03	0.01	0.01	
Euphausiacea	33.83	18.34	11.88	6.99	4.65	4.52	
Caridea	1.43	1.06	2.15	2.85	2.69	3.05	
Macrura	0.08	0.03	0.05	0.14	0.05	0.06	
Anomura	0.04	0.38	0.12	0.30	0.04	0.06	
Brachyura	0.08	0.03	0.53	2.81	4.22	1.69	
Unknown crustacea	1.15	0.78	0.50	1.89	1.65	0.98	
ECHIURA	0.02	0.00					
ECHINODERMATA	0.01	0.06	0.05	0.03	0.00	0.00	
CHAETOGNATHA	0.68	0.39	0.32	0.15	0.03	0.14	
UROCHORDATA	2.44	0.76	0.15	0.43	0.03	0.03	
GNATHOSTOMATA	52.90	74.28	82.60	79.63	79.62	86.86	
Unknown	0.35	0.69	0.15	0.46	0.33	0.17	
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua	0.56	0.30	0.59	0.19	0.04	0.23	
Melanogrammus aeglefinus	0.00	0.42	3.89	5.19	2.34	8.33	
Merlangius merlangus	0.00	0.54	2.84	3.96	3.21	2.85	
Trisopterus esmarki	0.42	7.40	17.69	20.37	31.88	16.79	
Clupea harengus	0.28	0.84	0.52	0.45	0.00	0.00	
Sprattus sprattus	2.25	2.27	1.31	6.24	4.67	2.20	
AMMODYTIDAE	48.10	61.97	54.40	38.27	32.25	45.55	
Limanda limanda		0.00	0.03	0.11	0.04	0.05	
Scomber scombrus		0.00	0.03	0.11	0.04	0.05	
Crangon crangon	0.00	0.00	0.00	0.00	0.00	0.00	
Pandalus spec.	0.00	0.12	0.72	1.08	0.47	1.69	
*) % of total weight accounted for (see text):	96.7	97.1	97.6	96.0	95.3	97.2	

TABLE 8-C-3 Summary of whiting stomach content composition by predator age class and quarter.

Predator : WHITING	Quarter : 3			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	977	1389	652	257	90	37	
Total weight all prey (g)	0.916	2.442	3.714	4.534	5.571	4.787	
Total Nr of prey items *)	0.777	1.244	1.891	2.279	1.842	3.080	
Average weight (g) per prey *)	0.717	1.552	1.658	1.546	1.980	1.243	
WEIGHT % OF MAJOR TAXA							
CNIDARIA			0.00	0.00	0.00	0.00	0.00
ANNELLIDA	9.36	2.78	0.55	0.65	0.93	0.63	
GASTROPODA	3.26	0.28	0.06	0.07	0.07	0.08	
BIVALVIA	0.01	0.00	0.00				
CEPHALOPODA	0.00	0.02	0.13	0.16	0.23	0.13	
Unknown mollusca	0.39	0.17	0.04	0.08	0.04		
CRUSTACEA	21.99	10.31	6.02	9.13	6.27	7.72	
Mysida				0.00		0.00	
Cumacea	0.12	0.02	0.04	0.06	0.03	0.09	
Isopoda	0.04	0.06	0.02	0.04	0.05	0.04	
Amphipoda	0.17	0.20	0.11	0.16	0.06	0.30	
Euphausiacea	3.64	4.94	4.36	5.76	2.21	4.11	
Caridea	1.38	0.34	0.13	0.20	0.23	0.18	
Macrura	1.18	0.12	0.04	0.04	0.04	0.03	
Anomura	1.36	0.22	0.10	0.25	0.33	0.24	
Brachyura	3.69	1.63	0.61	1.53	1.97	1.56	
Unknown crustacea	10.40	2.79	0.61	1.09	1.35	1.17	
ECHINURA	0.64	0.06	0.05	0.03	0.05		
ECHINODERMATA	3.09	0.15					
CHAETOGNATHA	0.03	0.00					
UROCHORDATA	0.75	0.16	0.04	0.00	0.00	0.00	
GNATHOSTOMATA	60.53	86.12	93.12	89.94	92.42	91.40	
Unknown	0.00		0.00	0.00	0.00	0.00	
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua	0.00	0.00	0.00				
Melanogrammus aeglefinus	1.64	17.32	23.08	17.42	16.39	19.09	
Merlangius merlangus	6.87	6.68	4.90	3.88	4.51	3.89	
Trisopterus esmarkii	5.02	8.35	13.20	8.38	5.62	5.47	
Clupea harengus	1.75	29.24	29.33	20.78	16.39	13.89	
Sprattus sprattus	3.05	7.74	9.72	30.37	44.66	31.19	
AMMODYTIDAE	39.61	16.14	12.09	7.83	3.32	9.02	
Solea solea	0.00	0.00	0.00				
Microstomus kitt	0.00	0.00	0.00				
Limanda limanda	0.00	0.00	0.00				
Scomber scombrus		0.00	0.05	0.22	0.29	0.05	
Crangon crangon	0.22	0.16	0.05				
Pandalus spec.	0.00	0.00					
*) % of total weight accounted for (see text):	60.7	79.1	84.5	77.7	65.5	80.0	

TABLE 8-C-4 Summary of whiting stomach content composition by predator age class and quarter.

Predator : WHITING	Quarter : 4			Area : ALL			
Age class	0	1	2	3	4	5	6+
GENERAL RESULTS							
Nr of stomachs sampled	813	912	334	162	42	34	
Total weight all prey (g)	1.061	1.823	2.845	3.597	4.830	4.957	
Total Nr of prey items *)	29.375	18.684	19.228	2.474	2.117	3.322	
Average weight (g) per prey *)	0.027	0.071	0.128	1.234	2.054	1.305	
WEIGHT % OF MAJOR TAXA							
PORIFERA	0.00	0.00	0.00	0.00			
CNIDARIA		0.01	0.01	0.01			
CTENOPHORA	0.00	0.00	0.00	0.00			
PLATYHELMINTHES	0.00	0.00					
ANNELLIDA	2.02	0.45	0.20	0.20	0.21	0.03	
GASTROPODA	0.06	0.16	0.12	0.06	0.05	0.01	
BIVALVIA	0.01	0.00					
CEPHALOPODA	0.55	0.43	0.27	1.06	0.31	7.78	
Unknown mollusca	0.01	0.01	0.01	0.00	0.00	0.00	
CRUSTACEA	14.81	10.12	8.23	8.33	10.17	10.03	
Copepoda	0.01	0.00	0.00				
Mysida	0.10	0.05	0.01	0.01	0.01	0.00	
Cumacea	0.05	0.00	0.00				
Isopoda		0.00	0.00	0.00	0.00	0.00	
Amphipoda	0.84	3.93	4.71	1.56	0.76	1.78	
Euphausiacea	0.02	0.35	1.55	3.68	4.58	6.74	
Caridea	5.10	2.68	0.90	1.19	1.13	0.35	
Macrura	0.29	0.10	0.06	0.07	0.08		
Anomura	2.98	1.53	0.24	0.80	0.18	0.03	
Brachyura	3.57	0.88	0.56	0.90	3.37	0.42	
Unkmown crustacea	1.86	0.61	0.19	0.12	0.08	0.10	
ECHIURA	6.21	5.41	0.15	2.26	0.05		
PRIAPULIDA	0.02						
ECHINODERMATA	0.06	0.00	0.00	0.00	0.00		
CHAETOGNATHA	0.61	0.24	0.09	0.05	0.00	0.00	
UROCHORDATA	1.24	0.40	0.24	0.02	0.01	0.03	
GNATHOSTOMATA	74.21	82.96	90.60	88.00	89.17	82.15	
Unknown	0.17	0.08	0.05	0.02	0.00	0.02	
WEIGHT % OF COMMERCIAL SPECIES							
Gadus morhua	0.09	0.22	0.49	0.61	0.66	0.48	
Melanogrammus aeglefinus	3.21	10.80	20.01	19.97	24.25	29.87	
Merlangius merlangus	3.02	2.91	3.52	2.48	6.79	2.91	
Trisopterus esmarkii	9.52	21.99	41.22	37.18	20.86	21.80	
Clupea harengus	6.03	6.03	2.22	8.15	11.41	15.84	
Sprattus sprattus	21.03	15.79	6.79	7.18	5.36	1.05	
AMMODYTIDAE	24.99	22.48	15.02	9.04	8.24	5.51	
Solea solea	0.19	0.05	0.00	0.03	0.02		
Microstomus kitt		0.00	0.00				
Limanda limanda	0.00	0.00	0.00	0.00	0.02		
Crangon crangon	2.26	1.10	0.32	0.64	0.56		
Pandalus spec.	0.28	0.60	0.25	0.17	0.19	0.04	
*) % of total weight accounted for (see text):	76.1	73.2	86.3	84.9	90.1	87.5	

TABLE 8-D Summary of mackerel stomach content composition by predator age class and quarter.

Predator : MACKEREL		Quarter : 1	Area : ALL	
Age class		1-2	3-7	8+
GENERAL RESULTS				
No. of stomachs sampled		145	75	28
Total weight all prey (g)		1.52	3.01	4.01
Total no. of prey items *)		52	63	48
Average weight (g) per prey		0.029	0.047	0.083
WEIGHT % OF MAJOR TAXA				
CNIDARIA		0.4	0.1	0.1
GASTROPODA		0.3	0.0	
CEPHALOPODA		0.6	0.8	
CRUSTACEA		94.3	85.8	95.8
Copepoda			0.0	
Amphipoda		3.1	3.0	0.0
Euphausiacea		91.2	82.4	95.8
Caridea			0.4	
GNATHOSTOMATA		3.2	12.2	
Unknown		1.2	1.1	4.1
WEIGHT % OF COMMERCIAL SPECIES				
AMMODYTIDAE			12.2	
Crangon crangon			0.4	

Predator : MACKEREL		Quarter : 2	Area : ALL	
GENERAL RESULTS				
No. of stomachs sampled		253	556	468
Total weight all prey (g)		2.56	5.69	8.63
Total no. of prey items *)		588	1942	4160
Average weight (g) per prey		0.004	0.003	0.002
WEIGHT % OF MAJOR TAXA				
CNIDARIA		2.4	0.4	0.2
ANNELIDA		0.6	0.3	0.1
GASTROPODA			0.0	0.0
BIVALVIA			0.0	
CEPHALOPODA		0.0	0.2	0.5
CRUSTACEA		6.2	47.1	73.4
Copepoda		5.5	28.0	42.7
Amphipoda			0.1	0.5
Euphausiacea		0.6	19.0	30.2
Caridea		0.0		0.0
Anomura		0.1	0.0	0.0
Brachyura		0.0	0.1	0.0
UROCHORDATA		1.7	1.8	1.3
GNATHOSTOMATA		82.0	47.9	23.4
Unknown		7.1	2.2	1.1
WEIGHT % OF COMMERCIAL SPECIES				
Clupea harengus			0.5	0.6
Sprattus sprattus		2.5	1.5	1.0
Trisopterus esmarkii		0.2	0.0	0.0
AMMODYTIDAE		79.3	45.5	21.1
Scomber scombrus		0.0	0.2	0.4

*) For prey category "Unknown" the number of prey items has not been registered.

TABLE 8-D Continued

TABLE 3-4		Continued	
Predator : MACKEREL	Quarter : 3	Area : ALL	
Age class	1-2	3-7	8+
GENERAL RESULTS			
No. of stomachs sampled	764	1519	454
Total weight all prey (g)	1.87	2.90	4.10
Total no. of prey items *)	1422	1440	1304
Average weight (g) per prey	0.001	0.002	0.003
WEIGHT % OF MAJOR TAXA			
CNIDARIA	0.6	0.3	0.4
ANNELIDA	0.1	0.2	0.0
GASTROPODA	0.8	1.9	0.8
BIVALVIA	0.0	0.0	
CEPHALOPODA	0.1	0.3	0.9
CRUSTACEA	34.1	46.6	52.4
Copepoda	13.3	15.1	23.6
Amphipoda	0.2	0.8	0.5
Euphausiacea	6.9	19.8	22.5
Caridea	8.9	7.1	0.2
Anomura	0.0	0.0	
Brachyura	4.8	3.8	5.6
CHAETOGNATHA	6.8	3.2	0.7
UROCHORDATA	17.6	5.2	1.4
GNATHOSTOMATA	30.6	34.4	33.9
Unknown	9.3	7.9	9.5
WEIGHT % OF COMMERCIAL SPECIES			
Clupea harengus	2.5	4.8	11.3
Sprattus sprattus	0.4	3.1	10.2
Gadus morhua		0.4	
Melanogrammus aeglefinus		0.2	
Merlangius merlangus		0.1	
Trisopterus esmarkii	3.6	5.5	7.0
AMMODYTIDAE	19.6	18.3	3.6
Limanda limanda	0.1	0.0	
Crangon crangon	0.0	0.2	0.2

Predator : MACKEREL	Quarter : 4	Area : ALL	
GENERAL RESULTS			
No. of stomachs sampled	120	416	147
Total weight all prey (g)	1.51	2.73	4.30
Total no. of prey items *)	997	1139	3334
Average weight (g) per prey	0.002	0.002	0.001
WEIGHT % OF MAJOR TAXA			
CNIDARIA	0.0	0.1	0.6
ANNELIDA		0.0	
GASTROPODA	2.3	2.0	3.0
CEPHALOPODA	14.7	3.1	
CRUSTACEA	37.6	58.0	62.1
Copepoda	25.2	13.9	27.8
Amphipoda	0.5	0.8	0.1
Euphausiacea	8.1	43.1	34.2
Caridea	0.0	0.0	0.0
Brachyura	3.8	0.2	0.0
UROCHORDATA	19.6	6.0	0.0
GNATHOSTOMATA	14.6	21.5	27.3
Unknown	11.2	9.3	7.0
WEIGHT % OF COMMERCIAL SPECIES			
Clupea harengus		7.2	1.4
Sprattus sprattus		1.7	
Trisopterus esmarkii	11.7	6.5	22.2
AMMODYTIDAE	2.9	1.0	0.0

*) For prey category "Unknown" the number of prey items has not been registered.

TABLE 8-E Summary of saithe stomach content composition by predator size class and quarter.

Predator : SAITHE	Quarter : 1+4		Area : ALL			
Size class	250	300	400	500	700	1000
GENERAL RESULTS						
Nr of stomachs sampled	2	55	98	340	408	203
Total weight of all prey (g)	4.700	4.212	11.395	21.916	42.032	57.696
Total nr of prey items	23.000	13.290	74.883	38.930	42.940	7.069
Average weight (g) per prey *)	0.204	0.317	0.144	0.530	0.951	7.951
WEIGHT % OF MAJOR TAXA						
CNIDARIA						0.93
ANNELIDA				0.02		
GASTROPODA						0.03
CEPHALOPODA	29.79	9.69		0.85	0.80	0.14
CRUSTACEA		47.78	76.43	21.10	9.70	0.18
Amphipoda				0.00	0.01	
Euphausiacea		47.78	76.43	21.10	9.35	0.12
Caridea					0.34	0.01
Anomura						0.05
Brachyura						0.00
ECHINODERMATA				0.01	0.00	0.02
UROCHORDATA					0.01	
GNATHOSTOMATA	70.21	42.53	23.57	78.02	89.49	98.70
WEIGHT % OF COMMERCIAL SPECIES						
Melanogrammus aeglefinus		9.92	2.84	5.92	3.67	4.93
Merlangius merlangus					1.01	8.16
Trisopterus esmarki		10.89	11.47	67.44	75.49	74.23
Clupea harengus				0.70	1.88	
Sprattus sprattus			7.52		0.32	
AMMODYTIDAE	70.21	21.72			0.81	3.42
Limanda limanda					0.34	1.18
Crangon sp.					0.01	0.01
Pandalus sp.					0.33	

Predator : SAITHE	Quarter : 2+3		Area : ALL			
GENERAL RESULTS						
Nr of stomachs sampled	1	97	208	403	354	21
Total weight of all prey (g)	5.800	4.307	9.562	16.044	46.844	75.209
Total nr of prey items	7.961	44.904	32.753	53.635	137.694	81.781
Average weight (g) per prey *)	0.729	0.095	0.274	0.274	0.329	0.899
WEIGHT % OF MAJOR TAXA						
CEPHALOPODA		0.22			0.49	
CRUSTACEA		28.16	37.90	45.75	33.91	13.48
Copepoda		0.01				
Isopoda				0.01		
Amphipoda			0.73	0.07	0.01	
Euphausiacea		28.15	37.13	45.66	33.56	13.48
Caridea				0.01	0.34	
ECHINODERMATA					0.03	
UROCHORDATA					0.06	
GNATHOSTOMATA	100.00	71.62	62.14	54.25	65.88	86.52
WEIGHT % OF COMMERCIAL SPECIES						
Gadus morhua		0.38		0.78	0.39	
Melanogrammus aeglefinus		35.16	3.89	5.36	12.75	31.82
Merlangius merlangus			0.46	0.30		
Trisopterus esmarki		1.67	39.55	21.72	29.27	14.35
Clupea harengus				1.11	0.44	17.29
Sprattus sprattus		0.30				
AMMODYTIDAE	100.00	31.79	1.98	0.47	1.88	
Crangon sp.				0.01		

*) Average weight per prey is estimated after subtracting remains from the total weight.

TABLE 9 PREY SIZE DISTRIBUTION.

TABLE 9-A Annual prey size distribution of cod in % by number by predator size class.

Predator : COD	Quarter : ALL					Area : ALL				
Size class	70	100	150	200	250	300	400	500	700	1000
FISH PREY										
Eggs				0.79		15.63	0.60	0.01		
5 - 7 mm	2.10									
7 - 10 mm	4.47									
10 - 15 mm	2.63		0.52	1.13			0.00			
15 - 20 mm	0.79	0.28	0.05	0.01	0.18	0.03				
20 - 25 mm	1.13	0.21	0.34	0.08	0.19	0.07	0.05	0.02	0.02	
25 - 30 mm	0.67	1.41	0.63	0.24	0.56	0.28	0.02	0.05	0.00	0.10
3 - 4 cm		3.16	2.44	2.28	1.77	0.72	0.40	0.27	0.02	0.09
4 - 5 cm		1.60	3.00	2.65	3.70	1.20	2.56	0.56	0.06	
5 - 7 cm		0.52	4.03	5.61	7.55	6.75	8.98	3.28	3.88	2.07
7 - 10 cm		0.26	0.80	2.19	3.09	6.36	8.75	5.13	3.45	6.66
10 - 15 cm				0.35	0.91	1.65	5.73	4.09	4.72	10.85
15 - 20 cm					0.05	0.21	1.29	2.15	1.86	32.51
20 - 25 cm						0.03	0.22	0.74	1.15	6.61
25 - 30 cm					0.01		0.04	0.08	0.45	2.23
30 - 40 cm								0.09	0.14	5.02
40 - 50 cm									0.01	0.30
50 - 70 cm										0.10
Not known		4.66	1.56	2.06	1.42	0.90	1.24	1.17	0.65	2.21
CRUSTACEAN PREY										
< 5 mm		4.85	4.99	0.20	0.13	0.01	0.07		0.01	
5 - 7 mm	68.62	14.23	4.92	6.33	3.74	0.80	0.15	0.19		
7 - 10 mm	8.16	5.58	9.04	3.48	9.25	2.92	0.96	0.27	0.01	
10 - 15 mm	8.31	25.75	13.05	22.84	12.79	7.11	4.23	0.78	0.07	0.01
15 - 20 mm	0.78	4.76	4.79	5.94	5.75	2.27	3.83	1.64	0.27	0.13
20 - 25 mm	0.76	3.71	10.23	6.82	8.64	6.12	20.03	24.25	9.55	1.32
25 - 30 mm		1.62	9.19	5.88	18.15	28.89	13.89	41.40	65.52	3.46
3 - 4 cm		3.51	8.09	5.69	3.28	4.31	6.59	4.32	2.45	10.38
4 - 5 cm		3.84	3.89	4.25	2.60	1.69	2.98	0.82	0.47	1.11
5 - 7 cm		2.04	2.57	3.20	1.43	1.44	2.85	0.98	0.48	1.55
7 - 10 cm				0.15	0.24	0.47	0.39	0.38	0.47	1.63
10 - 15 cm					0.02	0.03	0.13	0.48	0.83	3.90
15 - 20 cm								0.01	0.08	0.68
Not known	0.30	7.84	5.75	5.51	3.72	2.47	3.51	1.15	0.54	1.10
ALL PREY										
Eggs				0.96	0.15	15.63	0.60	0.83	0.57	
< 5 mm		4.85	4.99	0.27	0.13	0.01	0.10		0.01	
5 - 7 mm	70.72	14.23	4.92	6.33	3.79	0.98	0.25	0.21		
7 - 10 mm	12.63	5.58	9.04	3.55	9.51	3.09	1.20	0.30	0.02	
10 - 15 mm	10.94	25.75	13.61	24.05	13.25	7.58	4.60	1.48	0.18	0.01
15 - 20 mm	1.57	5.04	6.66	6.00	6.19	2.66	5.86	2.62	0.55	0.13
20 - 25 mm	1.88	3.93	10.56	7.06	8.95	6.37	20.29	24.28	9.59	1.43
25 - 30 mm	0.67	3.04	9.82	6.14	18.78	29.29	13.99	41.48	65.57	3.56
3 - 4 cm		6.96	10.53	8.02	5.28	5.43	7.59	4.73	2.54	10.59
4 - 5 cm		5.95	6.98	7.00	6.35	3.21	6.67	1.78	0.69	1.18
5 - 7 cm		2.55	6.63	8.97	9.24	8.49	12.98	4.80	5.06	4.54
7 - 10 cm		0.26	0.80	2.39	3.34	7.00	9.35	5.68	4.19	10.72
10 - 15 cm				0.38	0.94	1.72	5.86	4.57	5.65	14.75
15 - 20 cm					0.05	0.21	1.29	2.17	1.94	33.24
20 - 25 cm						0.03	0.22	0.74	1.15	6.63
25 - 30 cm					0.01		0.04	0.08	0.47	2.23
30 - 40 cm								0.09	0.14	5.02
40 - 50 cm									0.01	0.30
50 - 70 cm									0.00	0.10
Not known	1.59	21.85	15.46	18.88	14.03	8.29	9.12	4.14	1.67	5.56

TABLE 9-B Annual prey size distribution of **haddock** in % by number by predator size class.

Predator : HADDOCK	Quarter : ALL				Area : ALL			
Size class	100	150	200	250	300	400	500	700
FISH PREY								
Eggs		0.01						
7 - 10 mm	0.06		0.01					
10 - 15 mm	0.01		0.09	0.00				
15 - 20 mm		0.01	0.01	0.01		0.01		
20 - 25 mm		0.13	0.02	0.01	0.01	0.02		
25 - 30 mm	0.15	0.12	0.06	0.01	0.03	0.00	0.13	
3 - 4 cm	0.03	0.02	0.02	0.02	0.03	0.52	0.33	
4 - 5 cm	0.18	0.06	0.14	0.36	0.12	0.06		
5 - 7 cm	0.73	0.14	0.59	0.65	1.36	3.81	3.41	
7 - 10 cm		0.07	0.22	0.33	0.66	1.37	4.75	
10 - 15 cm			0.04	0.11	0.35	0.62	1.89	24.24
15 - 20 cm			0.00		0.02	0.10	0.53	
20 - 25 cm					0.00			
Not known	2.18	1.27	1.21	0.79	1.01	1.90	3.72	
CRUSTACEAN PREY								
Eggs		0.01	0.02					
< 3 mm	7.13	4.94	0.06	0.01	5.33	0.05		
3 - 4 mm	13.56	25.04	16.76	15.67	23.19	36.05		
4 - 5 mm	4.90	2.89	5.67	18.64	14.61	0.06	0.10	
5 - 7 mm	3.21	1.70	2.79	0.87	8.10	1.03	1.28	
7 - 10 mm	3.04	0.96	0.95	0.56	0.49	10.74	0.29	
10 - 15 mm	3.54	0.64	1.17	1.37	0.44	0.57	11.77	
15 - 20 mm	0.59	0.15	0.40	0.77	0.19	0.45	0.24	
20 - 25 mm	4.53	2.28	2.67	1.19	1.63	3.35	5.73	
25 - 30 mm	0.84	0.34	0.79	1.59	6.69	9.28	3.48	15.15
3 - 4 cm	0.79	0.20	2.12	3.03	6.22	0.62	1.51	
4 - 5 cm	0.08	0.02	0.04	0.00	0.03	0.13	0.36	
5 - 7 cm		0.01	0.03	0.02	0.03	0.01		
7 - 10 cm			0.02	0.01	0.02			
Not known	7.36	5.57	1.15	0.79	1.20	1.39	2.29	6.06
ALL PREY								
Eggs		0.02	0.04					
< 3 mm	8.26	7.26	2.82	1.48	6.20	0.11	0.51	
3 - 4 mm	20.00	32.08	25.08	39.93	26.39	36.86		
4 - 5 mm	5.76	3.14	6.57	19.71	15.18	1.08	0.82	
5 - 7 mm	4.94	3.30	4.37	1.87	9.26	1.92	4.46	
7 - 10 mm	3.50	17.64	27.42	10.11	6.36	11.46	2.59	
10 - 15 mm	3.59	1.02	2.20	1.97	1.34	1.71	12.96	
15 - 20 mm	0.61	0.20	0.52	0.95	0.63	0.78	0.27	34.85
20 - 25 mm	4.53	2.42	2.82	1.22	1.68	3.40	5.74	
25 - 30 mm	1.15	0.47	0.85	1.61	6.80	9.31	3.71	15.15
3 - 4 cm	0.89	0.22	2.29	3.06	6.27	1.19	1.84	
4 - 5 cm	0.26	0.10	0.19	0.38	0.17	0.21	1.05	
5 - 7 cm	0.73	0.15	0.62	0.67	1.41	3.85	3.53	
7 - 10 cm		0.07	0.24	0.34	0.67	1.38	4.93	
10 - 15 cm			0.04	0.11	0.35	0.62	1.89	24.24
15 - 20 cm			0.00	0.00	0.02	0.10	0.53	
20 - 25 cm					0.00			
Not known	45.80	31.92	23.93	16.60	17.25	26.00	55.17	25.76

TABLE 9-C Annual prey size distribution of whiting in % by number by predator size class.

Predator : WHITING	Quarter : ALL				Area : ALL		
Size class	100	150	200	250	300	400	500
FISH PREY							
7 - 10 mm		0.01	0.00	0.00			
10 - 15 mm		0.00	0.00	0.00	0.00		
15 - 20 mm	1.36	0.08	0.00	0.06	0.05		
20 - 25 mm	0.29	0.40	0.19	0.07	0.44		
25 - 30 mm	0.31	1.15	0.04	0.77	0.24		
3 - 4 cm	0.39	0.42	0.34	0.87	1.30		
4 - 5 cm	0.51	0.62	0.17	0.58	0.60	0.53	
5 - 7 cm	0.86	1.06	2.24	3.00	4.72	7.44	11.11
7 - 10 cm	0.64	1.29	8.44	2.51	7.64	8.80	36.26
10 - 15 cm		0.21	0.19	1.26	3.49	9.61	14.04
15 - 20 cm			0.00	0.17	0.44	6.25	13.33
20 - 25 cm					0.02	0.25	6.67
25 - 30 cm					0.00		
Not known	0.69	1.38	1.81	5.04	5.59	9.47	13.33
CRUSTACEAN PREY							
<= 7 mm	27.80	16.68	9.34	3.37	2.91	5.93	
7 - 10 mm	5.34	10.01	1.49	4.66	7.24	0.09	
10 - 15 mm	17.12	15.60	3.76	8.08	1.91	0.27	
15 - 20 mm	19.00	6.17	10.84	10.72	1.57	0.45	
20 - 25 mm	0.57	3.65	5.61	3.30	6.02	19.25	
25 - 30 mm	1.36	1.69	0.78	2.50	10.69	1.36	
3 - 40 cm	0.62	1.61	2.49	3.64	8.67	11.46	
4 - 50 cm	6.81	3.56	0.10	0.22	0.37	0.19	
5 - 70 cm	0.00	0.05	0.03	0.02	0.15	0.03	
7 - 10 cm				0.00	0.02	0.02	
Not known	12.00	7.60	12.65	8.48	7.89	10.88	
ALL PREY							
<= 7 mm	28.83	34.91	46.11	39.58	13.90	5.93	
7 - 10 mm	5.34	10.05	1.49	4.66	7.24	0.11	
10 - 15 mm	17.27	20.67	3.96	8.50	2.41	0.62	
15 - 20 mm	21.65	7.27	11.36	12.94	3.15	4.01	
20 - 25 mm	0.91	4.06	5.80	3.37	6.58	19.25	
25 - 30 mm	1.70	2.86	0.83	3.26	10.95	1.36	
3 - 4 cm	1.13	2.10	2.84	4.64	10.01	11.46	
4 - 5 cm	7.37	4.23	0.46	0.84	1.00	0.72	
5 - 7 cm	0.88	1.11	2.29	3.04	4.91	7.47	11.11
7 - 10 cm	0.64	1.30	8.44	2.52	7.65	8.81	36.26
10 - 15 cm		0.21	0.19	1.26	3.49	9.61	14.04
15 - 20 cm			0.01	0.17	0.44	6.25	13.33
20 - 25 cm					0.02	0.25	6.67
25 - 30 cm					0.00		
Not known	14.31	11.25	16.25	15.23	28.26	24.17	18.59

TABLE 9-D Annual prey size distribution of mackerel in % by number by predator size class.

Predator : MACKEREL	Quarter : ALL		Area : ALL	
Size class	200-250	300	400	
FISH PREY				
Eggs	0.0	0.2	0.5	
<= 7 mm	0.0	0.0	0.0	
7 - 10 mm	0.0	0.0	0.0	
10 - 15 mm	0.0	0.0	0.0	
15 - 20 mm	0.0	0.0	0.0	
20 - 25 mm	0.0	0.0	0.0	
25 - 30 mm	0.0	0.0	0.0	
3 - 4 cm	0.0	0.0	0.0	
4 - 5 cm	0.0	0.0	0.0	
5 - 7 cm	0.0	0.0	0.0	
7 - 10 cm	0.0	0.0	0.0	
10 - 15 cm		0.0	0.0	
15 - 20 cm		0.0	0.0	
20 - 25 cm		0.0		
Not known	0.0	0.0	0.0	
CRUSTACEAN PREY				
Eggs			0.0	
<= 7 mm	50.6	73.6	2.8	
7 - 10 mm	0.0	0.0	0.0	
10 - 15 mm	0.7	0.7	0.1	
15 - 20 mm	0.1	0.4	0.0	
20 - 25 mm	0.2	0.2	0.2	
25 - 30 mm	0.0	0.1	0.2	
3 - 4 cm	0.0	0.1	0.1	
4 - 5 cm		0.0	0.0	
5 - 7 cm		0.0	0.0	
Not known	0.1	0.2	0.2	
ALL PREY				
Eggs	0.0	0.2	0.5	
<= 7 mm	95.9	95.9	98.4	
7 - 10 mm	2.5	2.2	0.4	
10 - 15 mm	0.9	0.4	0.1	
15 - 20 mm	0.2	0.2	0.0	
20 - 25 mm	0.0	0.1	0.2	
25 - 30 mm	0.0	0.1	0.2	
3 - 4 cm	0.0	0.0	0.1	
4 - 5 cm	0.0	0.0	0.0	
5 - 7 cm	0.0	0.0	0.0	
7 - 10 cm	0.0	0.0	0.0	
10 - 15 cm		0.0	0.0	
15 - 20 cm		0.0	0.0	
20 - 25 cm		0.0		

TABLE 9-E Annual prey size distribution of *saithe* in % by number by predator size class.

Predator : SAITHE	Quarter : ALL		Area : ALL			
Size class	250	300	400	500	700	1000
FISH PREY						
10 - 15 mm					0.01	0.01
15 - 20 mm						
20 - 25 mm			0.31	0.02	0.26	
25 - 30 mm		0.11	0.03	0.05	0.39	8.85
3 - 4 cm		0.19	0.06	0.19	2.15	0.10
4 - 5 cm		0.29	0.26	1.11	1.64	1.85
5 - 7 cm	12.65	1.61	2.28	3.27	4.00	11.31
7 - 10 cm	83.65	3.90	1.96	1.86	1.24	3.96
10 - 15 cm		0.17	0.22	1.02	1.84	8.51
15 - 20 cm		0.06	0.01	0.18	0.36	3.70
20 - 25 cm				0.01	0.02	0.32
25 - 30 cm						0.57
30 - 40 cm						0.03
Not known				0.02	0.01	0.23
CRUSTACEAN PREY						
<= 7 mm		3.94	1.82			
7 - 10 mm				0.01	0.01	
10 - 15 mm		62.81	12.80	0.05	0.51	1.79
15 - 20 mm			2.08	0.94	0.28	0.01
20 - 25 mm			1.33	0.89	6.70	0.01
25 - 30 mm		24.78	72.65	90.31	79.34	58.11
3 - 4 cm		2.01	4.20	0.02	1.15	
4 - 5 cm						0.02
5 - 7 cm						0.02
7 - 10 cm					0.02	
Not known					0.02	0.16
ALL PREY						
<= 7 mm		3.94	1.82			
7 - 10 mm				0.01	0.01	
10 - 15 mm		62.81	12.80	0.06	0.52	1.79
15 - 20 mm			2.08	0.94	0.29	0.12
20 - 25 mm			1.64	0.92	6.96	0.01
25 - 30 mm		24.89	72.67	90.36	79.73	66.96
3 - 4 cm	3.70	2.20	4.26	0.20	3.30	0.14
4 - 5 cm		0.29	0.26	1.12	1.65	1.93
5 - 7 cm	12.65	1.74	2.28	3.27	4.01	11.54
7 - 10 cm	83.65	3.90	1.96	1.87	1.26	3.97
10 - 15 cm		0.17	0.22	1.03	1.84	8.52
15 - 20 cm	0.06	0.01	0.18	0.36	3.71	
20 - 25 cm				0.01	0.02	0.32
25 - 30 cm					0.01	0.57
30 - 40 cm						0.03
Not known				0.03	0.04	0.39

TABLE 10 STOMACH CONTENT WEIGHT BY AREA.

TABLE 10-A-1 Average stomach content weight (g) per 1000 cod by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : COD		Quarter : 1			Area : 1			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		141	2802	17351	35645	46157	61189	
Gadus morhua	20 - 25 cm				20	622	1084	1971
	3 - 4 cm						73	1329
	TOTAL				20	622	1157	3299
Melanogrammus aeglef.	7 - 10 cm	14	41	4	90	158	299	
	10 - 15 cm		269	1114	1912	2501	2253	
	15 - 20 cm		50	1579	2671	3094	3596	
	20 - 25 cm			1477	8388	12434	8421	
	25 - 30 cm			58	1787	2911	2006	
	Not known		39	145	64	92	63	
	TOTAL	14	398	4377	14912	21189	16639	
Merlangius merlangus	10 - 15 cm		22	86	214	341	235	
	15 - 20 cm			107	358	509	726	
	20 - 25 cm			895	1870	2655	9704	
	25 - 30 cm			844	1944	2372	1537	
	3 - 4 cm			22	679	1105	762	
	Not known			0	11	18	12	
	TOTAL		22	1954	5076	7000	12977	
Trisopterus esmarkii	7 - 10 cm			202	873	1262	1305	808
	10 - 15 cm			134	1544	2046	2211	2329
	15 - 20 cm			17	1178	3044	3953	3233
	Not known	2	40	10	66	107	74	
	TOTAL	2	393	3607	6418	7575	6444	
Clupea harengus	15 - 20 cm			175	185	129	68	
	20 - 25 cm			230	301	265	155	
	25 - 30 cm		34	836	785	804	4535	
	Not known			16	73	105	71	
	TOTAL		34	1257	1343	1304	4830	
Sprattus sprattus	7 - 10 cm		6	0				
	Not known		7	8	5	1		
	TOTAL		13	9	5	1		
AMMODYTIDAE	7 - 10 cm		22	130	171	155	92	
	10 - 15 cm		11	180	312	336	211	
	15 - 20 cm		12	56	39	10		
	20 - 25 cm		92	14				
	Not known		1	9	7	2		
	TOTAL		138	390	528	502	302	
Other prey		126	1804	5737	6740	7428	16697	

TABLE 10-A-1 Continued

Predator : COD		Quarter : 1			Area : 2			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		225	2072	29866	59791	69032	145656	
Gadus morhua	15 - 20 cm			136	691	948	449	
	20 - 25 cm				649	1057	6017	
	25 - 30 cm				737	1199	10245	
	3 - 4 cm						10019	
	Not known						1737	
	TOTAL			136	2076	3204	28468	
Melanogrammus aeglef.	5 - 7 cm		3	1				
	7 - 10 cm		58	7				
	10 - 15 cm				561	914	457	
	15 - 20 cm				2657	4325	3867	
	20 - 25 cm				9771	15908	7949	
	25 - 30 cm				5683	9252	4623	
	Not known			219	268	151	36	
	TOTAL		61	228	18939	30550	16932	
Merlangius merlangus	7 - 10 cm			119	148	86	22	
	10 - 15 cm		26	700	1217	1191	908	
	15 - 20 cm		64	1947	2519	1605	461	
	20 - 25 cm				2184	3557	29276	
	25 - 30 cm				1368	2227	11665	
	3 - 4 cm				967	1575	10646	
	Not known		1	38				
	TOTAL		91	2804	8404	10241	52977	
Trisopterus esmarkii	5 - 7 cm			35				
	7 - 10 cm		16	83	10	137	223	111
	10 - 15 cm					45	73	36
	Not known			31	12			
	TOTAL		16	150	22	181	295	148
Clupea harengus	Not known				92	93	33	
Sprattus sprattus	7 - 10 cm			3				
	10 - 15 cm			4	604	614	215	
	Not known			1	37	5	2	
	TOTAL			8	641	620	217	
AMMODYTIDAE	5 - 7 cm				11	11	4	
	7 - 10 cm			12	1122	693	242	
	10 - 15 cm			101	3750	1623	568	
	15 - 20 cm			20	4399	3364	1177	
	20 - 25 cm			23	8753	7641	2673	
	TOTAL			157	18035	13333	4664	
Other prey		209	1607	7909	16145	19829	47132	

TABLE 10-A-1 Continued

Predator : COD		Quarter : 1		Area : 3				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		1106	5354	29156	107239	123837	53602	
Gadus morhua	Not known		2	87	1790	2200	744	
Melanogrammus aeglef.	10 - 15 cm		16	394	508	489	269	
	20 - 25 cm		66	2015	16547	19892	7063	
	25 - 30 cm		68	1890	10572	12489	4607	
	Not known			15	528	653	218	
	TOTAL		151	4314	28155	33523	12157	
Merlangius merlangus	7 - 10 cm			1	50	62	21	
	10 - 15 cm		76	897	168		136	
	15 - 20 cm		29	679	199		188	
	20 - 25 cm		262	7426	45827	54417	25018	
	TOTAL		367	9004	46244	54478	25363	
Trisopterus esmarkii	7 - 10 cm	136	182	13				
	10 - 15 cm		964	1184	776	641	448	
	TOTAL	136	1145	1197	776	641	448	
Clupea harengus	10 - 15 cm	109	187	997	289		273	
	15 - 20 cm		111	2615	936	211	793	
	20 - 25 cm		34	808	237		223	
	Not known		148	28				
	TOTAL	109	480	4448	1461	211	1289	
Sprattus sprattus	4 - 5 cm		4	1				
	10 - 15 cm	118	203	1089	316		298	
	TOTAL	118	207	1089	316		298	
AMMODYTIDAE	5 - 7 cm		23	79	19		18	
	7 - 10 cm	23	62	369	69		56	
	10 - 15 cm		42	460	79		61	
	15 - 20 cm		97	388	109		103	
	TOTAL	23	225	1297	276		238	
Other prey		721	2778	7720	28220	32784	13064	

Predator : COD		Quarter : 1		Area : 4				
Total weight all prey		208	3051	24623	111403	116593	104876	
Gadus morhua	15 - 20 cm				137	222	183	
	20 - 25 cm				158	256	211	
	3 - 4 cm				209	339	278	
	TOTAL				504	817	671	
Melanogrammus aeglef.	10 - 15 cm		179	43				
	Not known		6	196				
	TOTAL		184	238				
Merlangius merlangus	15 - 20 cm				3861	6257	5140	
	20 - 25 cm			3248	22569	25488	20937	
	25 - 30 cm			10255	30033	13667	11226	
	Not known		36	9	285	462	380	
	TOTAL		36	13512	56748	45874	37682	
Clupea harengus	10 - 15 cm		153	36	887	1437	1309	
	15 - 20 cm			752	7338	9326	9397	
	20 - 25 cm				1307	2119	6026	
	25 - 30 cm				2125	3444	2829	
	TOTAL		153	788	11657	16327	19562	
Sprattus sprattus	7 - 10 cm				2003	3246	3156	
	10 - 15 cm		349	709	9531	13378	12833	
	Not known						60	
	TOTAL		349	709	11534	16624	16048	
AMMODYTIDAE	10 - 15 cm		147	35	17	28	23	
Other prey		208	2181	9341	30942	36923	30890	

TABLE 10-A-1 Continued

Predator : COD		Quarter : 1		Area : 5				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey				3860	845	141483	141483	181737
Gadus morhua	Not known					3775	3775	755
Merlangius merlangus	20 - 25 cm			38	245			46400
	25 - 30 cm					105250	105250	21050
	Not known							12000
	TOTAL			38	245	105250	105250	79450
Trisopterus esmarkii	7 - 10 cm			57	370			
Sprattus sprattus	10 - 15 cm			462		4900	4900	980
	Not known					33	33	2327
	TOTAL			462		4933	4933	3307
Other prey				3304	230	27525	27525	98225
Predator : COD		Quarter : 1		Area : 6				
Total weight all prey		1257	12598	48910	80653	89715	152029	
Gadus morhua	10 - 15 cm			6	193	202	194	87
	15 - 20 cm			35	177	135	132	254
	20 - 25 cm			23	799	1474	1537	703
	25 - 30 cm			73	2453	3857	3949	1799
	3 - 4 cm			25	1194	4314	4728	2181
	Not known			3	112	309	334	153
	TOTAL			165	4928	10292	10874	5178
Melanogrammus aeglefs.	10 - 15 cm			22	14	121	145	209
	15 - 20 cm						60	1083
	25 - 30 cm				25	218	246	114
	Not known			7	23	5	1	
	TOTAL			29	62	344	452	1406
Merlangius merlangus	7 - 10 cm	0		7				
	10 - 15 cm			380	456	484	487	556
	15 - 20 cm			156	1786	3103	3513	6788
	20 - 25 cm			612	2394	9673	10868	8220
	25 - 30 cm				563	4942	5932	8935
	3 - 4 cm			90	2647	1330	999	424
	Not known	0		14	9	77	87	40
	TOTAL	1	1259	7854	19610	21886		24963
Clupea harengus	7 - 10 cm			7	2			
	10 - 15 cm			438	797	1128	1159	587
	15 - 20 cm			36	1114	1083	1042	798
	20 - 25 cm			6	172	85	63	27
	25 - 30 cm				11	93	105	49
	Not known			26	534	108	18	
	TOTAL			513	2630	2496	2386	1460
Sprattus sprattus	4 - 5 cm			2	1	5	6	3
	5 - 7 cm	58		136	51	84	130	751
	7 - 10 cm	144		624	651	1294	1716	6826
	10 - 15 cm			928	4249	3636	3353	1496
	Not known	3		35	63	143	154	80
	TOTAL	205	1724	5015	5162	5359		9155
AMMODYTIDAE	5 - 7 cm	2		26	6			
	7 - 10 cm	11		97	21	3	3	1
	10 - 15 cm	10		181	261	167	148	111
	15 - 20 cm			43	205	174	160	71
	20 - 25 cm			5	132	27	4	
	Not known	0		1	20	4	5	72
	TOTAL	23	352	646	374	319		255
Other prey		1028	8556	27776	42375	48439	109611	

TABLE 10-A-1 Continued

Predator : COD		Quarter : 1			Area : 7			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		448	3157	32161	95580	127847	245451	
Gadus morhua	10 - 15 cm		355	471				
	15 - 20 cm				1546	2571	1043	
	20 - 25 cm				2204	3665	1487	
	25 - 30 cm				13581	22585	9164	
	3 - 4 cm				10534	17518	18800	
	TOTAL		355	471	27864	46338	30494	
Melanogrammus aeglefinus	10 - 15 cm		80	240				
	20 - 25 cm			2622	4715	5009	1942	
	25 - 30 cm				3380	5621	2281	
	Not known		29	87				
	TOTAL		108	2949	8095	10630	4223	
Merlangius merlangus	7 - 10 cm		11					
	10 - 15 cm			1855	5450	7061	2801	
	15 - 20 cm		116	1407	6027	8522	14401	
	20 - 25 cm				12589	20936	41972	
	25 - 30 cm			1994	9535	13704	42538	
	3 - 4 cm			9101	6373	772		
	Not known			233	395	406	157	
	TOTAL		127	14589	40370	51402	101868	
Trisopterus esmarkii	7 - 10 cm				94	156	63	
	Not known		10	29				
	TOTAL		10	29	94	156	63	
Clupea harengus	5 - 7 cm				6	4	0	
	15 - 20 cm					1052	1750	710
	TOTAL				6	1056	1751	710
Sprattus sprattus	4 - 5 cm			27	20	5	1	
	5 - 7 cm			43	344	205	50	134
	7 - 10 cm			46	139	15	25	96
	10 - 15 cm			22	68	228	380	154
	Not known	2	6	14				
	TOTAL	2	118	592	469	460	386	
AMMODYTIDAE	4 - 5 cm		1	0				
	5 - 7 cm		3	4	0			
	7 - 10 cm			2				
	10 - 15 cm				172	121	15	
	15 - 20 cm				37	26	3	
	Not known		0					
	TOTAL	3	8	210	147	18		
Other prey		442	2431	13315	17485	17092	107706	

TABLE 10-A-2 Average stomach content weight (g) per 1000 cod by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : COD		Quarter : 2			Area : 1			
	Age class	0	1	2	3	4	5	6+
Total weight all prey		2944	12450	36811	88815	103738	179269	
Gadus morhua	10 - 15 cm			36	31			
	20 - 25 cm				127	2544	3308	1654
	4 - 5 cm				467	9349	12154	6077
	TOTAL			36	626	11893	15462	7731
Melanogrammus aeglef.	4 - 5 cm			1	0			
	5 - 7 cm			2	36	118	141	71
	7 - 10 cm				6	129	168	84
	10 - 15 cm			466	293	1113	1385	692
	15 - 20 cm			231	1211	333		
	20 - 25 cm			172	2207	1859	1564	782
	25 - 30 cm				214	4290	5577	2788
	Not known			4	54	16		
	TOTAL			877	4021	7859	8835	4417
Merlangius merlangus	4 - 5 cm			0	4	1		
	5 - 7 cm			73	6			
	7 - 10 cm			9	0			
	15 - 20 cm			209	2219	670		
	20 - 25 cm			31	626	4794	6077	3038
	25 - 30 cm				136	2722	3538	1769
	Not known			3	1	8	10	3822
	TOTAL			326	2991	8195	9626	8630
Trisopterus esmarkii	4 - 5 cm			16	197	60		
	5 - 7 cm			45	11	107	138	603
	7 - 10 cm	440		17				
	10 - 15 cm			1209	2046	5976	7112	5139
	15 - 20 cm			93	1350	4227	5035	2518
	Not known			132	111			
	TOTAL	440		1511	3716	10370	12286	8260
Clupea harengus	15 - 20 cm			1	10	3		
	Not known			3	2			
	TOTAL			4	12	3		
Sprattus sprattus	4 - 5 cm			2	1			
AMMODYTIDAE	5 - 7 cm			748	1096	3699	4568	2434
	7 - 10 cm			632	1115	1660	1796	898
	10 - 15 cm			265	995	3593	4367	2183
	15 - 20 cm			40	559	1453	1692	846
	20 - 25 cm			78	1036	1470	1523	762
	TOTAL			1763	4800	11876	13946	7123
Other prey		2504	7931	20644	38618	43584	143109	
Predator : COD		Quarter : 2			Area : 2			
Total weight all prey		2945	11350	39215	77344	80691	130845	
Gadus morhua	4 - 5 cm			42	116	10		
	5 - 7 cm		74	506	408	56		
	20 - 25 cm					16687	18773	9386
	TOTAL	74		547	524	16752	18773	9386
Melanogrammus aeglef.	7 - 10 cm			51				
	10 - 15 cm	348		121				
	15 - 20 cm			987	3129	1267	864	432
	TOTAL	348		1159	3129	1267	864	432
Merlangius merlangus	7 - 10 cm					461	518	259
	20 - 25 cm					1835	2065	1032
	Not known			3	279	222	200	100
	TOTAL			3	279	2518	2783	1392
AMMODYTIDAE	4 - 5 cm	81		91	94	2		
	5 - 7 cm	1186		2238	5152	2793	2382	1191
	7 - 10 cm	411		2443	474	6651	7436	4218
	10 - 15 cm			56				
	15 - 20 cm			79	105	537	605	302
	20 - 25 cm			9	815	130		
	TOTAL	1679		4915	6641	10113	10423	5711
Other prey		845	4726	28642	46694	47849	113924	

TABLE 10-A-2 Continued

Predator : COD		Quarter : 2			Area : 3			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		1845		14054	59749	118193	135669	167681
Gadus morhua	20 - 25 cm			100	2548	827		
Melanogrammus aeglefinus	10 - 15 cm			36	922	299		
	15 - 20 cm			151	3845	1248		2429
	20 - 25 cm				343	6345	8460	2672
	25 - 30 cm				653	12083	16111	5088
	TOTAL			188	5763	19976	24571	10188
Merlangius merlangus	10 - 15 cm			40	1007	327		
	15 - 20 cm			19	478	155		
	20 - 25 cm			232	6097	5704	5056	1596
	25 - 30 cm				396	7333	9778	38496
	TOTAL			290	7979	13519	14833	40092
Trisopterus esmarkii	10 - 15 cm			361	1477	2017	2167	684
	15 - 20 cm			394	3845	2061	1167	368
	TOTAL			755	5322	4078	3333	1053
Clupea harengus	15 - 20 cm			35	889	288		
	20 - 25 cm							5303
	25 - 30 cm				1232	22792	30389	9596
	Not known			31				
	TOTAL			66	2121	23080	30389	14899
AMMODYTIDAE	5 - 7 cm			760	155	83	45	14
	7 - 10 cm			5041	2131	443	140	133
	10 - 15 cm			27	717	986	1022	323
	15 - 20 cm			443	3733	1212		
	TOTAL			6270	6735	2724	1207	470
Other prey		1845		6385	29282	53989	61335	100978
Predator : COD		Quarter : 2			Area : 4			
Total weight all prey		1885		11322	35512	110263	148875	174031
Gadus morhua	4 - 5 cm			4	7	11		
	5 - 7 cm			14	57	16		
	20 - 25 cm				124	725	1313	984
	TOTAL			18	188	752	1313	984
Merlangius merlangus	10 - 15 cm					789		3750
	15 - 20 cm			14	119	3063	685	13264
	20 - 25 cm			187	1081	5064	3926	16694
	25 - 30 cm				2629	15402	27870	20903
	Not known			9	68	101		
	TOTAL			210	3897	24420	32481	54611
Clupea harengus	30 - 40 mm			1				
	15 - 20 cm			69	437	1023	1852	1389
	20 - 25 cm			130	1641	5189	6648	4986
	TOTAL			200	2078	6213	8500	6375
Sprattus sprattus	7 - 10 cm			64	33	171		813
	10 - 15 cm			89	1221	5752	6402	11426
	15 - 20 cm			23	176	263		
	Not known			4				
	TOTAL			179	1430	6186	6402	12239
AMMODYTIDAE	4 - 5 cm			28	278	182		
	5 - 7 cm			528	2363	1865	194	113
	7 - 10 cm			146	1854	502	228	167
	10 - 15 cm						166	788
	15 - 20 cm			187	709	421		2000
	20 - 25 cm			87	678	1013		
	Not known			1	44	258	467	350
	TOTAL			703	4770	3980	839	3417
Other prey		1182		5945	23939	70413	99340	96405

TABLE 10-A-2 Continued

Predator : COD		Quarter : 2			Area : 5			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		3055	16801					
Sprattus sprattus	10 - 15 cm			2149				
AMMODYTIDAE	4 - 5 cm		56					
	5 - 7 cm		79					
	10 - 15 cm			2719				
	15 - 20 cm		391	564				
	Not known			23				
TOTAL			526	3305				
Other prey			2528	11346				
Predator : COD		Quarter : 2			Area : 6			
Total weight all prey		1697	12470	54700	113776	114711	117983	
Gadus morhua	30 - 40 mm		5	5				
	4 - 5 cm		17	85	3	11	8	
	5 - 7 cm			14				
	15 - 20 cm		2	164	903	444	345	
	25 - 30 cm				797	2563	1993	
TOTAL			24	267	1704	3017	2346	
Melanogrammus aeglefs	15 - 20 cm			104				
Merlangius merlangus	10 - 15 cm		1	28				
	15 - 20 cm			66				
	20 - 25 cm			91	427		2111	9500
	Not known			0	1			
TOTAL			1	185	428		2111	9500
Clupea harengus	30 - 40 mm		1					
	10 - 15 cm		3	19				
	15 - 20 cm		4	166				
	Not known		1					
TOTAL			10	186				
Sprattus sprattus	5 - 7 cm		11	10				
	7 - 10 cm		9	239			889	4000
	10 - 15 cm		35	602	473			
	Not known		9	27	13			
TOTAL			63	878	485		889	4000
AMMODYTIDAE	4 - 5 cm		11	5				
	5 - 7 cm		20	46				
	7 - 10 cm		11	58				
	10 - 15 cm		225	1148	1928		900	4050
	15 - 20 cm		17	859	899			
	20 - 25 cm			119				
	Not known		1	17	16	20	15	
TOTAL			284	2251	2843	20	915	4050
Other prey			1316	8598	49239	110740	108449	100433
Predator : COD		Quarter : 2			Area : 7 NOT SAMPLED			

TABLE 10-A-3 Average stomach content weight (g) per 1000 cod by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : COD		Quarter : 3			Area : 1			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		4713	24117	62538	125477	156263	456262	
Melanogrammus aeglefinus	5 - 7 cm							600
	7 - 10 cm	219	1260	1157	983	994	817	
	10 - 15 cm	408	1787	1189	766	718	417	
	15 - 20 cm		891	2453	2010	1251	590	
	20 - 25 cm			1636	7144	10264	6603	
	25 - 30 cm			530	2316	3328	2141	
	3 - 4 cm							92071
	4 - 5 cm							64786
	Not known			790	3449	4955	3188	
TOTAL		627	3937	7755	16668	21509	171213	
Merlangius merlangus	5 - 7 cm	12	26	1				
	10 - 15 cm	87	179	7				
	3 - 4 cm			402	1756	2523	1624	
	TOTAL	99	205	410	1756	2523	1624	
Trisopterus esmarkii	4 - 5 cm	53	19	8	0			
	5 - 7 cm		57	156	380	512	325	
	7 - 10 cm	51	209	492	1411	1916	1218	
	10 - 15 cm		3041	14750	38145	50157	31663	
	15 - 20 cm		4247	11488	11433	9374	5108	
	Not known	62	129	26	90	129	83	
	TOTAL	166	7701	26920	51460	62088	38398	
Clupea harengus	20 - 25 cm	23	49	2				
	25 - 30 cm		590	1482	2898	3679	2306	
	3 - 4 cm			4237	18502	26582	17103	
	Not known		102	303	189	46		
TOTAL		23	741	6024	21589	30308	19408	
AMMODYTIDAE	5 - 7 cm	11	32	15	32	46	30	
	7 - 10 cm	2567	1511	1364	1337	1339	788	
	10 - 15 cm	203	1142	613	111	79	45	
	15 - 20 cm	140	829	415	19			
	TOTAL	2922	3513	2408	1499	1464	863	
Other prey		876	8021	19021	32505	38370	224756	

TABLE 10-A-3 Continued

Predator : COD		Quarter : 3			Area : 2			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		28	5006	14205	35158	142023	192555	424399
Gadus morhua	50 - 70 mm		526	1378				
	7 - 10 cm		419	1098	272	2716	3070	528
	10 - 15 cm		220	576				
	20 - 25 cm				578	5770	6523	1123
	3 - 4 cm				292	2915	3295	567
	Not known				44	443	500	86
	TOTAL		1164	3052	1187	11844	13389	2305
Melanogrammus aeglef.	7 - 10 cm		31	81	25	248	280	48
	10 - 15 cm			48	220	390	370	64
	15 - 20 cm			62	407	164		
	25 - 30 cm				73	728	983	1845
	3 - 4 cm				678	6763	17492	106277
	Not known		1	3				
	TOTAL		32	195	1403	8293	19126	108233
Merlangius merlangus	5 - 7 cm	6	23					
	7 - 10 cm		1864	173				
	10 - 15 cm			60	397	160		
	15 - 20 cm			1699	2416	71		
	20 - 25 cm			42	356	896	887	153
	25 - 30 cm				113	1127	2590	14255
	TOTAL	6	1887	1975	3281	2254	3477	14407
Trisopterus esmarkii	5 - 7 cm		147	162	6	63	128	618
	7 - 10 cm		152	1753	2810	761	652	1685
	10 - 15 cm			229	307			
	15 - 20 cm						679	7237
	TOTAL		299	2145	3123	825	1459	9540
Clupea harengus	10 - 15 cm			8	53	21		
Sprattus sprattus	5 - 7 cm				2	17	19	3
AMMODYTIDAE	30 - 40 mm		49					
	5 - 7 cm	1	32	18				
	7 - 10 cm	5	340	1290	2887	870	174	30
	10 - 15 cm		71	583	781			
	15 - 20 cm			25	163	66		
	Not known		23	26				
	TOTAL	5	516	1942	3831	936	174	30
Other prey		16	1108	4888	22280	117833	154911	289881

TABLE 10-A-3 Continued

Predator : COD		Quarter : 3			Area : 3			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		3811	10304	23260	96082	113583	113585	
Gadus morhua	15 - 20 cm			98	553	420		294
	20 - 25 cm			43	243	185		129
	TOTAL			141	796	604		423
Melanogrammus aeglef.	5 - 7 cm		139	19	7	171	225	150
	7 - 10 cm		153	348	381	170		119
	10 - 15 cm		151	647	1075	811	986	699
	15 - 20 cm				92	2395	3143	2095
	20 - 25 cm			136	772	586		410
	25 - 30 cm				568	14712	19310	12873
	TOTAL		443	1151	2895	18844	23663	16346
Merlangius merlangus	7 - 10 cm		1436	2339	525			
	20 - 25 cm			99	818	7066	8714	6108
	TOTAL		1436	2438	1344	7066	8714	6108
Trisopterus esmarkii	5 - 7 cm		106	191	144	80		56
	7 - 10 cm		125	1288	2213	66		46
	10 - 15 cm			179	1012	768		538
	15 - 20 cm			519	878			
	TOTAL		231	2176	4248	914		640
Clupea harengus	25 - 30 cm				718	18599	24411	16274
	3 - 4 cm			55	310	235		165
	Not known			2	3			
	TOTAL			56	1031	18834	24411	16438
AMMODYTIDAE	5 - 7 cm		154	1	5	35	43	30
	Not known		12					
	TOTAL		165	1	5	35	43	30
Other prey			1536	4341	12942	49784	56752	73599

Predator : COD		Quarter : 3			Area : 4			
Total weight all prey		13	4569	13196	29727	47302	72828	
Melanogrammus aeglef.	7 - 10 cm				60	338	1050	
	10 - 15 cm		33	323	1336	1596	473	
	15 - 20 cm			74	765	1122	332	
	20 - 25 cm			68	696	1022	303	
	25 - 30 cm			161	1652	2424	718	
	TOTAL		33	626	4509	6502	2877	
Merlangius merlangus	10 - 15 cm		344	851				
	20 - 25 cm			46	478	701	208	
	25 - 30 cm			173	2717	7905	17261	
	TOTAL		344	1070	3195	8606	17468	
Trisopterus esmarkii	7 - 10 cm			8	14			
Clupea harengus	7 - 10 cm		33	131	281	339	100	
	10 - 15 cm		646	1837	807	661	196	
	15 - 20 cm			586	4583	8729	12720	
	20 - 25 cm			1752	4150	3047	6321	
	TOTAL		679	4306	9820	12776	19337	
Sprattus sprattus	7 - 10 cm		16	43	29	42	12	
	10 - 15 cm		123	744	798			
	Not known			38	394	579	171	
	TOTAL		139	825	1221	621	184	
AMMODYTIDAE	7 - 10 cm		50	123				
	10 - 15 cm		138	7				
	Not known		12	29				
	TOTAL		200	159				
Other prey		13	3174	6202	10968	18797	32961	

TABLE 10-A-3 Continued

Predator : COD		Quarter : 3			Area : 5			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		118	4676	17041	18113		14366	
Trisopterus esmarkii	7 - 10 cm			114	102			
AMMODYTIDAE	5 - 7 cm			300	269			
	7 - 10 cm			40	45		28	
	10 - 15 cm			327	293			
	TOTAL			668	606		28	
Other prey		118	4676	16260	17405		14339	
Predator : COD		Quarter : 3			Area : 6			
Total weight all prey		304	2795	15458	63862	114433	114433	
Melanogrammus aeglefinus	10 - 15 cm		4	506	632			
Merlangius merlangus	7 - 10 cm		61	46	61			
	10 - 15 cm		74	24				
	15 - 20 cm		6	322				
	Not known		1	0				
	TOTAL		142	393	61			
Sprattus sprattus	7 - 10 cm		38	12				
	10 - 15 cm		103	1019				
	15 - 20 cm		4	231				
	TOTAL		145	1263				
AMMODYTIDAE	5 - 7 cm	0	1	1	2			
Other prey		304	2503	13295	63167	114433	114433	
Predator : COD		Quarter : 3			Area : 7			
Total weight all prey		134	5777	15457	21476	139900		208500
Gadus morhua	5 - 7 cm		266	638				
	7 - 10 cm		457	1093				
	TOTAL		723	1731				
Melanogrammus aeglefinus	7 - 10 cm			60	903			
	10 - 15 cm			49	733			
	Not known			24				
	TOTAL			133	1636			
Merlangius merlangus	7 - 10 cm		609					
	10 - 15 cm			1714	622			
	TOTAL		609	1714	622			
Trisopterus esmarkii	7 - 10 cm			60	903			
Clupea harengus	10 - 15 cm			148	2222			
AMMODYTIDAE	7 - 10 cm			150	2252			
	10 - 15 cm			281				
	TOTAL			431	2252			
Other prey		134	4445	11240	13840	139900		208500

TABLE 10-A-4 Average stomach content weight (g) per 1000 cod by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : COD	Age class Size class	Quarter : 4			Area : 1			
		0	1	2	3	4	5	6+
Total weight all prey		516	4634	26610	64986	842042	96228	106783
Gadus morhua	3 - 4 cm				54	1293	149	93
Melanogrammus aeglefinus	7 - 10 cm		220	944	1062	16788	1926	1204
	10 - 15 cm		836	4452	5540	104479	12018	13305
	15 - 20 cm			2744	3521	42533	4853	3033
	20 - 25 cm				2354	56778	6551	20032
	25 - 30 cm				1378	33222	3833	2396
	3 - 4 cm				428	10333	1192	745
	Not known		413		54	1311	151	95
	TOTAL		1469	8139	14338	265444	30525	40809
Merlangius merlangus	7 - 10 cm			211				
	10 - 15 cm			87	170	45		
	20 - 25 cm				843	20333	2346	1466
	25 - 30 cm							5456
	Not known			28	55	15		
	TOTAL		326	1068	20393	2346	6923	
Trisopterus esmarkii	5 - 7 cm				5	127	15	9
	7 - 10 cm	377	559	4103	7592	64440	7283	4552
	10 - 15 cm		769	1535	4108	56044	6412	4008
	15 - 20 cm		942	1813	2884	19962	2241	1401
	Not known		26	21	1			
	TOTAL	377	2296	7472	14591	140573	15951	9969
Clupea harengus	15 - 20 cm			8	15	4		
	25 - 30 cm			81	157	42		
	3 - 4 cm				1327	32000	3692	2308
	TOTAL			88	1499	32046	3692	2308
AMMODYTIDAE	5 - 7 cm		134	126	38	8		
	7 - 10 cm		125	51	10	2		
	TOTAL		259	177	48	10		
Other prey		139	611	10408	33389	382282	43564	46681

TABLE 10-A-4 Continued

Predator : COD		Quarter : 4			Area : 2			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		140	1885	4414	14822	74190	79563	135160
Gadus morhua	7 - 10 cm			12	72	24		
	3 - 4 cm				1598	14836	16107	
	TOTAL			12	1671	14860	16107	
Melanogrammus aeglef.	7 - 10 cm		69	278	208	102	111	
	10 - 15 cm		14	495	676	474	455	
	15 - 20 cm			28	173	58		
	25 - 30 cm				170	1582	1718	
	3 - 4 cm				702	6513	7071	70000
	Not known				8	75	81	
	TOTAL		83	801	1937	8804	9436	70000
Merlangius merlangus	15 - 20 cm				123	1140	1238	
	20 - 25 cm			151	1067	7029	7631	
	25 - 30 cm				682	6329	6872	28800
	3 - 4 cm				298	2763	3000	
	TOTAL			151	2169	17261	18741	28800
Trisopterus esmarkii	5 - 7 cm			15	47	140	152	
	7 - 10 cm		118	279	748	583	497	7140
	10 - 15 cm		91	201	262	159	151	
	Not known		3	64	29			
	TOTAL		212	559	1085	883	801	7140
Clupea harengus	15 - 20 cm			142	291			
Sprattus sprattus	25 - 30 mm		0	0	0			
	30 - 40 mm	0	2					
	7 - 10 cm		24	5				
	10 - 15 cm			43	106	156	170	
	TOTAL	0	25	48	106	156	170	
AMMODYTIDAE	5 - 7 cm	13	40	14	5	0		
	7 - 10 cm	5	227	426	399	311	338	1380
	10 - 15 cm	8	295	187	538	3586	3893	3200
	15 - 20 cm				646	5992	6505	12900
	20 - 25 cm				548	5082	5518	11200
	Not known	0	4					
	TOTAL	26	565	627	2135	14971	16254	28680
Other prey		114	999	2075	5427	17256	18055	540

TABLE 10-A-4 Continued

Predator : COD		Quarter : 4			Area : 3			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		146	4337	11262	58849	66093	91447	
Melanogrammus aeglef.	10 - 15 cm			1012				
Merlangius merlangus	20 - 25 cm				33143	38667	58000	
	25 - 30 cm				317	370	555	
	TOTAL				33460	39037	58555	
Trisopterus esmarkii	50 - 70 mm		872	357				
	7 - 10 cm		1404	1683	4451	4888	6420	
	10 - 15 cm			296	663	649	598	
	15 - 20 cm				1886	2200	3300	
	TOTAL		2276	2336	7000	7737	10318	
Clupea harengus	10 - 15 cm			86				
AMMODYTIDAE	50 - 70 mm			7				
	7 - 10 cm			199	217	169		
	10 - 15 cm			79	86	67		
	Not known		5	2				
	TOTAL		5	287	303	235		
Other prey		146	2056	7540	18087	19084	22575	
Predator : COD		Quarter : 4			Area : 4			
Total weight all prey		410	8169	16662	20147	87110		
Gadus morhua	10 - 15 cm					402		
	15 - 20 cm					1363		
	20 - 25 cm					191		
	TOTAL					1956		
Melanogrammus aeglef.	10 - 15 cm		3496	5671	1884	417		
	15 - 20 cm					990		
	TOTAL		3496	5671	1884	1407		
Merlangius merlangus	15 - 20 cm					436		
	20 - 25 cm					33031		
	25 - 30 cm					25435		
	TOTAL					58902		
Clupea harengus	10 - 15 cm			1833	4372			
	20 - 25 cm					3137		
	Not known			51	969	1275		
	TOTAL			1884	5341	4412		
Sprattus sprattus	7 - 10 cm			102	243			
	10 - 15 cm					59		
	TOTAL			102	243	59		
AMMODYTIDAE	5 - 7 cm		55	77				
	10 - 15 cm					8		
	TOTAL		55	77		8		
Other prey		410	4619	8928	12679	20366		
Predator : COD		Quarter : 4			Area : 5			
Total weight all prey		460	5715	50854	187918			
Gadus morhua	10 - 15 cm			405	1621			
	15 - 20 cm			147	586			
	TOTAL			552	2207			
Melanogrammus aeglef.	15 - 20 cm			750	3000			
	20 - 25 cm			388	1552			
	TOTAL			1138	4552			
Merlangius merlangus	7 - 10 cm			59	236			
	10 - 15 cm			979	3917			
	15 - 20 cm			578	2313			
	20 - 25 cm			2807	11226			
	25 - 30 cm			3865	15460			
	TOTAL			8288	33152			
Clupea harengus	20 - 25 cm			863	3450			
	25 - 30 cm			303	1213			
	TOTAL			1166	4663			
AMMODYTIDAE	5 - 7 cm			1	5			
Other prey		460	5715	39710	143339			

TABLE 10-A-4 Continued

TABLE 10-A-4

Continued

Predator : COD		Quarter : 4		Area : 6				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		935	8730	25019	100326	126797		
Gadus morhua	10 - 15 cm	2	1					
	15 - 20 cm		0	62	3366	4646		
	20 - 25 cm			42	3581	4958		
	25 - 30 cm			9	745	1031		
	Not known	1	0	13	1074	1488		
TOTAL		3	1	125	8766	12123		
Melanogrammus aeglef.	10 - 15 cm		31	43				
	15 - 20 cm			89	7644	10583		
	20 - 25 cm			58	4935	6833		
	TOTAL		31	190	12579	17417		
Merlangius merlangus	7 - 10 cm		0	3	1			
	10 - 15 cm		1	236	168	79		
	15 - 20 cm		1	293	1731	2218		
	20 - 25 cm		0	19	541	740		
	25 - 30 cm			54	4627	6406		
	Not known		0	99	106	83		
	TOTAL		2	704	7173	9527		
Clupea harengus	10 - 15 cm		19	27	1			
	15 - 20 cm			1	62	85		
	20 - 25 cm			2	132	182		
	Not known		7	9				
	TOTAL		26	39	194	268		
Sprattus sprattus	30 - 40 mm		1	4	2			
	5 - 7 cm		7	10				
	7 - 10 cm		4	43	17			
	TOTAL		13	57	19			
AMMODYTIDAE	5 - 7 cm		8	4	1			
	10 - 15 cm		164	188	64			
	15 - 20 cm		64	54	22			
	Not known	1	0	46	22			
TOTAL		1	237	292	109			
Other prey		931	8421	23612	71486	87463		
Predator : COD		Quarter : 4		Area : 7				
Total weight all prey		270	3655	13228	30879	104499		315500
Gadus morhua	7 - 10 cm			25	61	55		
	25 - 30 cm				4426	38023		
	TOTAL			25	4487	38077		
Melanogrammus aeglef.	7 - 10 cm		21	260	469	281		
	10 - 15 cm		70	85				
	Not known		50	61				
	TOTAL		141	405	469	281		
Merlangius merlangus	5 - 7 cm		18	22				
	7 - 10 cm		33	101	148	132		
	Not known		8	50	59			
	TOTAL		59	173	207	132		
Trisopterus esmarkii	Not known			3	8	7		
Clupea harengus	30 - 40 mm		3					
	10 - 15 cm		22	140	166			
	TOTAL		25	140	166			
Sprattus sprattus	7 - 10 cm			72	176	157		
	10 - 15 cm		17	393	1803	9051		
	TOTAL		17	466	1979	9208		
AMMODYTIDAE	10 - 15 cm				2370	20364		
	15 - 20 cm		37	236	279			
	20 - 25 cm		44	281	332			
	Not known	1	21	15				
	TOTAL	1	102	531	2981	20364		
Other prey		269	3311	11485	20584	36431		315500

TABLE 10-B-1 Average stomach content weight (g) per 1000 haddock by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : HADDOCK		Quarter : 1		Area : 1				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			184	926	3042	5463	8645	10884
Trisopterus esmarkii	30 - 40 mm			0	0	2	4	1
	5 - 7 cm			14	11			
	7 - 10 cm			264	965	1455	2517	4252
	10 - 15 cm				151	1148	2097	1466
	Not known			52	245	220	197	286
TOTAL				331	1373	2826	4815	6006
AMMODYTIDAE	7 - 10 cm			0	14	22	23	9
	10 - 15 cm			2	62	137	177	72
	15 - 20 cm			6	32	271	629	925
	20 - 25 cm			2	71	50	4	
	Not known			2	65	145	189	76
TOTAL				12	244	625	1023	1083
Other prey			184	582	1425	2012	2807	3795
Predator : HADDOCK		Quarter : 1		Area : 2				
Total weight all prey			295	656	816	1383	6110	5303
Other prey			295	656	816	1383	6110	5303
Predator : HADDOCK		Quarter : 1		Area : 3				
Total weight all prey			395	999	1886	2198	2605	2693
Sprattus sprattus	5 - 7 cm			3	30	31	31	18
	7 - 10 cm			28	322	326	333	197
	TOTAL			31	352	356	365	215
Other prey			395	968	1533	1842	2241	2478
Predator : HADDOCK		Quarter : 1		Area : 4				
Total weight all prey			567	1318	1567	1016		297
Other prey			567	1318	1567	1016		297
Predator : HADDOCK		Quarter : 1		Area : 5				
Total weight all prey			338	105	53			
Other prey			338	105	53			
Predator : HADDOCK		Quarter : 1		Area : 6				
Total weight all prey			694	1340	2643	14788	5617	14788
Trisopterus esmarkii	Not known			17	9			
Clupea harengus	15 - 20 cm				608	8333	2778	8333
Sprattus sprattus	4 - 5 cm		33	4				
	5 - 7 cm			16	138		104	
	7 - 10 cm			247	136			
	10 - 15 cm				130	1788	596	1788
	Not known			214	118			
TOTAL			33	482	523	1788	700	1788
AMMODYTIDAE	7 - 10 cm			22	12			
Other prey			661	819	1491	4668	2140	4668
Predator : HADDOCK		Quarter : 1		Area : 7				
Total weight all prey			414	1402	2194	2855	2668	3658
Sprattus sprattus	5 - 7 cm			4	16	12	16	15
	10 - 15 cm			1	62	43	67	81
	TOTAL			4	78	55	83	96
Other prey			414	1398	2116	2801	2585	3562

TABLE 10-B-2 Average stomach content weight (g) per 1000 haddock by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : HADDOCK		Quarter : 2			Area : 1			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		249	326	1546	3047	6726	7465	8468
Trisopterus esmarkii	10 - 15 cm				97	926	1414	1869
	Not known				24	196	193	
	TOTAL				121	1122	1607	1869
AMMODYTIDAE	20 - 25 mm			0	0			
	5 - 7 cm			21	145	40		
	10 - 15 cm							993
	Not known		3	23	3			
	TOTAL		3	44	148	40		993
Other prey		249	323	1502	2778	5563	5858	5606
Predator : HADDOCK		Quarter : 2			Area : 2			
Total weight all prey		157	538	2164	3943	4747		
AMMODYTIDAE	5 - 7 cm		6	125	72	24		
	7 - 10 cm			122				
	Not known		7	139	24			
	TOTAL		123	387	96	24		
Other prey		157	415	1777	3847	4723		
Predator : HADDOCK		Quarter : 2			Area : 3			
Total weight all prey		230	389	2312	9175	14274	17800	17966
Trisopterus esmarkii	7 - 10 cm			1	14	8		
	TOTAL			1	14	8		
AMMODYTIDAE	4 - 5 cm			70	44			
	5 - 7 cm		4	70	5			
	7 - 10 cm				11	124	180	176
	Not known		6	22	113	64	7	7
	TOTAL		10	162	173	188	187	183
Other prey		230	379	2148	8988	14079	17613	17783
Predator : HADDOCK		Quarter : 2			Area : 4 NOT SAMPLED			
Predator : HADDOCK		Quarter : 2			Area : 5			
Total weight all prey		1545						
Other prey		1545						
Predator : HADDOCK		Quarter : 2			Area : 6			
Total weight all prey		827						
Sprattus sprattus	7 - 10 cm			20	75			
	Not known			8	28			
	TOTAL			28	102			
AMMODYTIDAE	Not known			6	6			
Other prey		827						
Predator : HADDOCK		Quarter : 2			Area : 7 NOT SAMPLED			

TABLE 10-B-3 Average stomach content weight (g) per 1000 haddock by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : HADDOCK		Quarter : 3			Area : 1			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		182	1318	3719	6919	13709	24739	22674
Melanogrammus aeglefs.	7 - 10 cm			8	48	93	77	
	Not known		0	6				
	TOTAL		0	14	48	93	77	
Trisopterus esmarkii	30 - 40 mm			1	2	15	71	63
	4 - 5 cm			20	49	25	1	
	5 - 7 cm	0	0	68	218	364	284	
	7 - 10 cm		1	130	193	245	295	147
	10 - 15 cm			48	414	2032	6544	5185
	15 - 20 cm			0	24	71	65	
	Not known		0	128	457	857	777	91
	TOTAL	0	1	394	1357	3609	8037	5487
Sprattus sprattus	5 - 7 cm			0	1	2	2	
AMMODYTIDAE	4 - 5 cm	18	2	177	6	17	15	
	5 - 7 cm	2	137	284	68	77	204	179
	7 - 10 cm		0	57	110	186	146	
	Not known	0	49	46	84	41		
	TOTAL	20	188	564	267	320	365	179
Other prey		161	1129	2747	5247	9684	16258	17009
Predator : HADDOCK		Quarter : 3			Area : 2			
Total weight all prey		109	1648	2921	6903	6692		
Trisopterus esmarkii	5 - 7 cm		1	8	166	166		
	Not known			1	114	115		
	TOTAL		1	9	280	281		
AMMODYTIDAE	5 - 7 cm		36	197	386	370		
	Not known		8	107	68	58		
	TOTAL		45	304	453	428		
Other prey		109	1603	2608	6170	5984		
Predator : HADDOCK		Quarter : 3			Area : 3			
Total weight all prey		137	1275	2012	3315	4622	3899	8611
AMMODYTIDAE	30 - 40 mm			1	367	729	480	2195
	4 - 5 cm		27	110	173	191	211	79
	5 - 7 cm		10	53	88	100	110	41
	7 - 10 cm			104	217	265	292	109
	Not known		7	102	200	238	263	98
	TOTAL		44	369	1045	1523	1357	2521
Other prey		137	1231	1643	2270	3099	2542	6089
Predator : HADDOCK		Quarter : 3			Area : 4			
Total weight all prey		153	5222	6504	6217	4556	1706	1927
AMMODYTIDAE	5 - 7 cm		317	94	14			
	7 - 10 cm		268	80	12			
	TOTAL		585	174	26			
Other prey		153	4637	6330	6191	4556	1706	1927
Predator : HADDOCK		Quarter : 3			Area : 5			
Total weight all prey		367						
Other prey		367						
Predator : HADDOCK		Quarter : 3			Area : 6			
Total weight all prey		119	432	1712	2892	7108		
Merlangius merlangus	7 - 10 cm				431	2085		
	TOTAL				431	2085		
Sprattus sprattus	7 - 10 cm		105	260	742	2950		
	TOTAL		105	260	742	2950		
Other prey		119	327	1452	1718	2073		
Predator : HADDOCK		Quarter : 3			Area : 7			
					NOT SAMPLED			

TABLE 10-B-4 Average stomach content weight (g) per 1000 haddock by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : HADDOCK		Quarter : 4			Area : 1			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		237	1373	3478	7649	9911	10852	13345
Melanogrammus aeglefinus	7 - 10 cm		2	4				
Trisopterus esmarkii	5 - 7 cm		17	38	17	80	128	159
	7 - 10 cm	0	67	286	375	834	1258	1336
	10 - 15 cm		21	90	122	144	148	182
	Not known	0	6	7	359	319	168	371
	TOTAL	0	112	421	872	1377	1702	2048
AMMODYTIDAE								
	4 - 5 cm		3	6				
	5 - 7 cm	6	2	363	1058	1437	1617	1993
	7 - 10 cm		35	78	169	150	79	175
	10 - 15 cm			307	331	208	181	
	Not known		15	36	146	323	423	570
	TOTAL	6	55	790	1704	2118	2300	2738
Other prey		231	1205	2262	5072	6416	6850	8559
Predator : HADDOCK		Quarter : 4			Area : 2			
Total weight all prey		150	643	1402	2441	10997		5875
Merlangius merlangus	7 - 10 cm		0	9	45			148
Trisopterus esmarkii	10 - 15 cm		11	5				
	Not known		1	16	16			
	TOTAL		13	21	16			
AMMODYTIDAE								
	5 - 7 cm		3	36	40			17
	7 - 10 cm		86	381	356			
	10 - 15 cm		3	35	75			166
	Not known		3	5	41			154
	TOTAL		95	458	512			337
Other prey		150	534	914	1868	10997		5391
Predator : HADDOCK		Quarter : 4			Area : 3			
Total weight all prey		228	1255	2520	3555	5042		5858
AMMODYTIDAE								
	4 - 5 cm		1	8	17	13		10
	5 - 7 cm			4	104	535		799
	7 - 10 cm		38	369	809	642		468
	Not known			12	300	1548		2309
	TOTAL		39	392	1229	2739		3586
Other prey		228	1215	2127	2326	2303		2272
Predator : HADDOCK		Quarter : 4			Area : 4			
Total weight all prey		332	653	788	855	1021		1125
AMMODYTIDAE	7 - 10 cm		60	154	153	38		
Other prey		332	593	634	702	983		1125
Predator : HADDOCK		Quarter : 4			Area : 5			
Total weight all prey		119	175					
Other prey		119	175					
Predator : HADDOCK		Quarter : 4			Area : 6			
Total weight all prey		574	1345	2815	4655			
Other prey		574	1345	2815	4655			
Predator : HADDOCK		Quarter : 4			Area : 7			
Total weight all prey		228	2427	4327	3473			10029
Merlangius merlangus	5 - 7 cm			3	23			
Clupea harengus	10 - 15 cm			33	291			
Other prey		228	2427	4291	3159			10029

TABLE 10-C-1 Average stomach content weight (g) per 1000 whiting by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : WHITING		Quarter : 1		Area : 1				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			631	1088	1843	2376	2884	4025
Gadus morhua	20 - 25 cm							303
Melanogrammus aeglef.	5 - 7 cm		4	6	1			
	7 - 10 cm		38	3	20	31	37	31
	10 - 15 cm			3	24	46	80	167
	15 - 20 cm			4	35	61	87	187
	Total		42	16	80	138	204	385
Trisopterus esmarkii	10 - 15 mm		0	0	0			
	5 - 7 cm		35	2	7	11	12	10
	7 - 10 cm		52	131	230	279	299	257
	10 - 15 cm		19	91	378	630	897	1349
	15 - 20 cm			35	255	420	544	630
	Total		107	259	870	1340	1753	2246
Sprattus sprattus	4 - 5 cm			1	0	0	0	
	5 - 7 cm			4	4	2	1	
	7 - 10 cm		2	7	7	10	18	41
	Total		2	12	11	12	19	41
AMMODYTIDAE	5 - 7 cm			2	3	4	3	2
	7 - 10 cm		1	3	3	2	2	1
	10 - 15 cm		5	9	2	3	5	13
	15 - 20 cm		1	4	4	4	4	92
	20 - 25 cm				0	3	11	40
	Total		7	18	12	16	25	148
Pandalus spec.	7 - 10 cm			10	18	21	22	21
	Unknown			0	0	0	0	0
	Total			11	19	21	22	21
Predator : WHITING		Quarter : 1		Area : 2				
Total weight all prey			218	498	661	666	650	434
Melanogrammus aeglef.	10 - 15 cm			0	4	14	22	121
Trisopterus esmarkii	7 - 10 cm		2	9	1			
Sprattus sprattus	7 - 10 cm			1	1	1	1	
	10 - 15 cm			3	4	4	3	
	Unknown		0					
	Total		0	4	5	5	4	
AMMODYTIDAE	5 - 7 cm			1	7	8	10	
	Unknown							20
	Total			1	7	8	10	20

TABLE 10-C-1 Continued

Predator : WHITING		Quarter : 1		Area : 3				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			731	687	1626	3827	4561	5174
Gadus morhua	10 - 15 cm		0	6	3			
Merlangius merlangus	7 - 10 cm			0	1	1	0	
	10 - 15 cm			2	13	48	57	61
	Total			2	14	49	57	61
Trisopterus esmarkii	10 - 15 mm		0	0				
	7 - 10 cm			0	2	1	0	
	10 - 15 cm			69	395	1540	1823	1969
	15 - 20 cm			0	28	287	590	958
	Total		0	70	425	1828	2413	2927
Clupea harengus	10 - 15 cm			13	51	95	98	98
Sprattus sprattus	3 - 4 cm		27	2	5	3	1	
	4 - 5 cm		6	5	2	3	4	4
	5 - 7 cm		2	30	14	0	0	
	7 - 10 cm		2	27	17	3	1	
	10 - 15 cm			2	6	4	1	
	Total		37	66	44	13	7	4
AMMODYTIDAE	3 - 4 cm			2	7	4	2	
	5 - 7 cm		58	3	6	4	2	1
	7 - 10 cm		295	69	59	106	121	128
	10 - 15 cm		128	98	168	186	168	155
	15 - 20 cm			9	42	107	119	124
	Total		481	181	282	407	412	408
Pandalus spec.	15 - 20 mm		2					
	3 - 4 cm			0	0	2	2	2
	4 - 5 cm			0	0	0	0	
	5 - 7 cm			1	5	3	1	

Predator : WHITING		Quarter : 1		Area : 4				
Total weight all prey			308	878	1644	2784	2645	3177
Merlangius merlangus	10 - 15 cm			0	7	23	21	35
Trisopterus esmarkii	7 - 10 cm		0	2	2	2	2	1
Clupea harengus	10 - 15 cm			13	406	1386	1250	2111
Sprattus sprattus	3 - 4 cm		0					
	5 - 7 cm		2	70	156	176	181	92
	7 - 10 cm		10	240	250	235	233	189
	10 - 15 cm			120	483	736	729	603
	Total		12	430	889	1147	1143	884
AMMODYTIDAE	4 - 5 cm		0	0				
	5 - 7 cm			1	2	3	3	1
	7 - 10 cm		4	85	40			
	Total		4	86	42	3	3	1
Microstomus kitt	25 - 30 mm		1	0				
Pandalus spec.	25 - 30 mm		7	1				
	7 - 10 cm			3	12	15	15	8
	Total		7	4	12	15	15	8

Predator : WHITING		Quarter : 1		Area : 5				
Total weight all prey			296	754	2636	6405	2113	7284
Clupea harengus	7 - 10 cm			286	659	3643		4382
	10 - 15 cm			3	178	1053		1266
	Total			289	837	4696		5648
Sprattus sprattus	4 - 5 cm		3	0				
	5 - 7 cm			359	1472	337	2000	
	7 - 10 cm		29					
	10 - 15 cm			3	207	1220		1467
	Total		32	362	1679	1557	2000	1467

TABLE 10-C-1 Continued

Predator : WHITING		Quarter : 1		Area : 6				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			486	1937	3126	4182	5903	7139
Merlangius merlangus	7 - 10 cm			1	15	33	32	33
	10 - 15 cm			7	96	287	646	901
	15 - 20 cm			8	127	467	1382	2017
	Total			16	238	787	2060	2951
Trisopterus esmarkii	10 - 15 cm			0	1	3	3	3
Clupea harengus	5 - 7 cm			0	0	0	0	0
	7 - 10 cm			0	1	2	2	2
	10 - 15 cm			465	841	930	1028	1100
	15 - 20 cm			4	56	126	121	123
	Total			469	898	1058	1151	1225
Sprattus sprattus	3 - 4 cm			0	4	9	9	9
	4 - 5 cm		21	13	6	5	4	4
	5 - 7 cm		98	156	92	88	76	68
	7 - 10 cm		92	421	450	373	311	262
	10 - 15 cm		17	482	889	1029	913	847
	Total		228	1072	1441	1504	1313	1190
AMMODYTIDAE	5 - 7 cm		0	0	0	0	0	0
	7 - 10 cm			0	0	1	1	1
	10 - 15 cm		3	7	19	41	45	49
	15 - 20 cm			1	11	25	24	25
	20 - 25 cm			6	76	181	230	271
	Total		3	14	106	248	300	346
Limanda limanda	5- 7 cm			1	9	19	19	19
Nephrops norvegicus	Unknown		0					
Crangon crangon	15 - 20 mm		0	0				
	20 - 25 mm		0	0				
	25 - 30 mm			8	10	3	0	
	3 - 4 cm		1	1	1	1	1	0
	4 - 5 cm		2	2	7	20	22	29
	5 - 7 cm		1	2	2	3	3	3
	Unknown		0	5	4	1	1	0
	Total		4	19	24	29	27	33

Predator : WHITING		Quarter : 1		Area : 7				
Total weight all prey		202	398	335	1121	1581	6000	
Merlangius merlangus	15 - 20 cm			17	153	166	77	
Clupea harengus	10 - 15 cm			8	74	80	37	
Sprattus sprattus	5 - 7 cm	53	54	5	72	279	2468	
	7 - 10 cm	3	8	1	90	347	3071	
	Total	56	62	6	162	626	5539	
AMMODYTIDAE	7 - 10 cm		34	51	19			
	10 - 15 cm	1	30	47	377	407	189	
	Total	1	64	98	396	407	189	
Crangon crangon	3 - 4 cm	3	1					
Pandalus spec.	25 - 30 mm		0	1	0			
	7 - 10 cm			1	8	9	4	
	Total		0	2	8	9	4	

TABLE 10-C-2 Average stomach content weight (g) per 1000 **whiting** by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : WHITING		Quarter : 2		Area : 1				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			453	2524	3699	4318	4847	6064
Gadus morhua	3 - 4 cm			1	1	0		
	4 - 5 cm			2	2	1		
	Total			3	3	1		
Melanogrammus aeglefinus	10 - 15 cm			2	21	42	55	49
	15 - 20 cm			2	63	139	184	164
	Total			4	84	181	239	213
Merlangius merlangus	10 - 15 cm			17	291	500	619	554
Trisopterus esmarkii	25 - 30 mm			0	0	0		
	3 - 4 cm			2	3	1		
	7 - 10 cm	16		208	246	167	110	98
	10 - 15 cm			431	935	1235	1387	1241
	15 - 20 cm			23	184	367	474	424
	Total	16		664	1367	1770	1971	1763
AMMODYTIDAE	5 - 7 cm	29		40	12	9	9	8
	7 - 10 cm	49		8	7	12	19	41
	10 - 15 cm	27		32	3			
	15 - 20 cm			993	1089	442		
	Total	105		1073	1111	463	28	49
Pandalus spec.	7 - 10 cm			1	22	49	65	58
	Unknown			1	1	1		
	Total			2	23	49	65	58

Predator : WHITING		Quarter : 2		Area : 2				
Total weight all prey		430	788	1037	1259		1827	
Gadus morhua	4 - 5 cm			95	179	134		76
	5 - 7 cm	17		63	133	137		77
	Total	17		158	132	271		153
AMMODYTIDAE	4 - 5 cm	40		5	14	19		11
	5 - 7 cm	109		208	279	373		210
	7 - 10 cm	34		2	29	90		50
	10 - 15 cm			6	8			985
	Total	183		221	330	482		1256

TABLE 10-C-2 Continued

Predator : WHITING		Quarter : 2		Area : 3				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			819	1947	3754	5487	4466	6350
Melanogrammus aeglefinus	10 - 15 cm			3	174	670	209	776
	15 - 20 cm			9	48	32	48	25
	Total			12	222	702	257	801
Merlangius merlangus	10 - 15 cm		0	1	15	56	18	65
Trisopterus esmarkii	4 - 5 cm		17	66	6			
	7 - 10 cm		1	4	2	5	2	5
	10 - 15 cm			32	278	588	303	642
	15 - 20 cm			9	91	212	100	235
	Total		18	111	377	805	405	882
Sprattus sprattus	7 - 10 cm			0	2	2	2	1
	10 - 15 cm		3	1	3	9	4	10
	Total		3	1	5	11	6	11
AMMODYTIDAE	3 - 4 cm		11	47	4			
	4 - 5 cm			0	2	6	2	7
	5 - 7 cm		114	427	320	407	827	875
	7 - 10 cm		244	501	799	719	858	723
	10 - 15 cm		81	314	1237	2121	1298	2125
	15 - 20 cm		9	90	283	226	282	193
	Total		459	1379	2645	3379	3267	3923
Pandalus spec.	5 - 7 cm		1	3	31	118	37	137
	7 - 10 cm			0	4	17	5	19
	Unknown		0	0	0			
	Total		1	4	35	135	42	156

Predator : WHITING		Quarter : 2		Area : 4				
Total weight all prey			1190	2342	3190	3689	4169	4120
Merlangius merlangus	15 - 20 cm					137	667	558
Trisopterus esmarkii	10 - 15 cm			1	2	38	48	51
Clupea harengus	Unknown					148	479	176
Sprattus sprattus	7 - 10 cm		5	12				
	10 - 15 cm			40	67	1102	1385	1462
	Total		5	52	67	1102	1385	1462
AMMODYTIDAE	20 - 25 mm		1					
	25 - 30 mm		0					
	3 - 4 cm		5	14	5	2		
	4 - 5 cm		83	82	95	35		
	5 - 7 cm		413	979	1454	1160	807	852
	7 - 10 cm		132	392	297	474	470	496
	10 - 15 cm		1	14	33	29	22	23
	15 - 20 cm			22	72	26		
	Total		635	1503	1956	1726	1299	1371

TABLE 10-C-2 Continued

Predator : WHITING		Quarter : 2			Area : 5			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		283	586	954	1362	1988	1268	
<i>Trisopterus esmarkii</i>	15 - 20 cm				290	932	237	
<i>Sprattus sprattus</i>	7 - 10 cm		2	89	135	100	117	
AMMODYTIDAE	5 - 7 cm		9	6	2	3	3	
	7 - 10 cm		286	209	78	120	126	
	10 - 15 cm		175	276	277	243	274	
	15 - 20 cm		1	28	42	31	37	
	Unknown	104						
Total		104	471	519	399	397	440	
<i>Pandalus spec.</i>	10 - 15 mm	0	0					
Predator : WHITING		Quarter : 2			Area : 6			
Total weight all prey		436	1132	1558	1552	2009	1851	
<i>Gadus morhua</i>	15 - 20 mm	4						
	20 - 25 mm	0	0					
	25 - 30 mm	1	2	5	5	8	9	
	3 - 4 cm	3	4	5	5	4	4	
	4 - 5 cm	0						
	5 - 7 cm	0	0					
Total		10	6	10	10	12	13	
<i>Melanogrammus aeglefinus</i>	3 - 4 cm			1	1			
<i>Merlangius merlangus</i>	10 - 15 cm		1	5	5	8	10	
<i>Clupea harengus</i>	3 - 4 cm		0	0	0	0	0	
	4 - 5 cm	5	9	7	7	2	2	
	5 - 7 cm	10	13	8	8			
	Total	15	22	15	15	2	2	
<i>Sprattus sprattus</i>	4 - 5 cm	0	0					
	5 - 7 cm	18	20	7	7			
	7 - 10 cm		160	191	193	201	175	
	10 - 15 cm	14	16	60	57	94	111	
	Total	32	196	258	257	295	286	
AMMODYTIDAE	25 - 30 mm	26	2	2	2			
	3 - 4 cm	37	32	13	13	9	10	
	4 - 5 cm	24	12	8	8	1	1	
	5 - 7 cm	12	22	59	57	84	98	
	7 - 10 cm	28	88	51	54			
	10 - 15 cm	34	267	540	527	711	763	
	15 - 20 cm		18	108	115	440	213	
Total		161	441	781	776	1245	1085	
<i>Limanda limanda</i>	7 - 10 cm		2	14	13	22	25	
<i>Scomber scombrus</i>	25 - 30 cm		1	10	10	16	19	
<i>Crangon crangon</i>	10 - 15 mm		1	0	0	0	0	
	15 - 20 mm	0	0	0	0	0	0	
	4 - 5 cm	1	1	1	1	0	0	
	Unknown		0	0	0			
Total		1	2	1	1	0	1	
Predator : WHITING		Quarter : 2			Area : 7 NOT SAMPLED			

TABLE 10-C-3 Average stomach content weight (g) per 1000 whiting by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : WHITING		Quarter : 3		Area : 1				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		2009	2839	3292	4536	6650	6542	
Gadus morhua	5 - 7 cm	2						
Melanogrammus aeglef.	3 - 4 cm	38	125	119	101	75	66	
	4 - 5 cm	0	20	57	82	81	72	
	5 - 7 cm	10	123	306	496	633	574	
	7 - 10 cm	35	171	343	729	1355	1247	
	10 - 15 cm	16	114	311	884	1908	1764	
	Total	99	553	1136	2292	4052	3723	
Merlangius merlangus	25 - 30 mm	27	71	30				
	3 - 4 cm	33	88	46	12	9	8	
	4 - 5 cm	45	96	41				
	5 - 7 cm		3	7	10	7	6	
	7 - 10 cm	2	15	35	49	49	44	
	10 - 15 cm	2	6	32	197	543	505	
	Total	109	279	191	268	608	563	
Trisopterus esmarkii	3 - 4 cm	2	1	0	0	0	0	
	4 - 5 cm	7	19	15	11	8	7	
	5 - 7 cm	1322	1283	1238	1090	819	817	
	7 - 10 cm	289	325	232	184	164	511	
	10 - 15 cm		20	58	90	100	90	
	Total	1620	1648	1543	1375	1091	1425	
Sprattus sprattus	Unknown	24						
AMMODYTIDAE	4 - 5 cm		0	1	1	1	1	
	5 - 7 cm	33	33	53	60	45	39	
	7 - 10 cm	29	28	63	82	67	59	
	10 - 15 cm	19	60	52	51	65	59	
	15 - 20 cm	39	1148	9	131	280	258	
	Total	120	235	258	325	458	416	
Microstomus kitt	15 - 30 mm	0	0	0				
Scomber scombrus	Unknown		0	11	74	203	189	
Predator : WHITING		Quarter : 3		Area : 2				
Total weight all prey		850	2799	3620	4081	4472	4472	
Gadus morhua	7 - 10 cm	1						
Melanogrammus aeglef.	5 - 7 cm	17	134	93	37			
	7 - 10 cm	26	379	1115	1739	2202	2202	
	10 - 15 cm		3	15	25	33	33	
	Total	43	516	1223	1801	2235	2235	
Merlangius merlangus	5 - 7 cm	42	366	275	140	5151		
Trisopterus esmarkii	4 - 5 cm	0	2	2	1	1	1	
	5 - 7 cm	44	366	544	657	748	748	
	7 - 10 cm	20	95	200	286	350	350	
	Total	64	463	746	944	1099	1099	
AMMODYTIDAE	5 - 7 cm	104	22	33	58	76	76	
	7 - 10 cm	554	1177	1054	842	715	715	
	Total	658	1199	1087	900	791	791	
Pandalus spec.	4 - 5 cm	0	0					

TABLE 10-C-3 Continued

Predator : WHITING		Quarter : 3		Area : 3				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			1671	3190	3914	5049	6035	6261
Melanogrammus aeglefs.	5 - 7 cm		1	0	0			
	7 - 10 cm		5	104	268	572	887	720
	10 - 15 cm		45	720	835	870	876	711
	Total		51	824	1103	1442	1763	1431
Merlangius merlangus	4 - 5 cm			2	11	30	51	41
	5 - 7 cm			3	27	75	125	101
	7 - 10 cm		162	135	167	248	333	319
	10 - 15 cm		1	12	11	6		
Total		163	151	216	359	509	461	
Trisopterus esmarkii	4 - 5 cm		1	15	14	7		
	5 - 7 cm		12	142	218	334	450	365
	7 - 10 cm		13	23	52	218	215	1484
	Total		26	180	284	559	665	1849
Clupea harengus	10 - 15 cm		82	1338	1731	2158	2551	2072
Sprattus sprattus	7 - 10 cm			3	26	70	117	95
AMMODYTIDAE	5 - 7 cm		80	8	8	4		
	7 - 10 cm		1176	295	120	45	42	34
	10 - 15 cm		2	39	36	19		
	15 - 20 cm		19	295	279	165	33	27
	Total		1277	637	443	233	75	61

Predator : WHITING		Quarter : 3		Area : 4				
Total weight all prey			983	1750	3301	3115	4073	2505
Merlangius merlangus	5 - 7 cm		50	4				
	7 - 10 cm		33	38	25	30		
	Total		83	42	25	30		
Clupea harengus	7 - 10 cm		133	213	643	581	933	575
	10 - 15 cm		90	596	698	720	538	332
	Total		223	809	1341	1301	1471	907
AMMODYTIDAE	5 - 7 cm		81	50	575	490	986	607
	7 - 10 cm		325	141	427	364	733	451
	Total		406	191	1002	854	1719	1058

Predator : WHITING		Quarter : 3		Area : 5				
Total weight all prey			400	719	1459	1500	1491	1652
Merlangius merlangus	7 - 10 cm		2	50	239	189	199	
	10 - 15 cm		1	31	148	117	123	
	Total		3	81	387	306	322	
AMMODYTIDAE	Unknown		13	73	333	263	277	
Crangon crangon	3 - 4 cm		1	5				
	Unknown		2	10				
	Total		3	14				

TABLE 10-C-3 Continued

Predator : WHITING		Quarter : 3			Area : 6			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey		626	1652	4176	5442	5435	5450	
Merlangius merlangus	5 - 7 cm		1	4	5	5	5	
	7 - 10 cm	36	195	102	32	32	32	
	10 - 15 cm		4	22	31	31	31	
	Total	36	200	128	68	68	68	
Trisopterus esmarkii	3 - 4 cm	0						
Sprattus sprattus	5 - 7 cm	1	5	2				
	7 - 10 cm	20	67	47	31	31	31	
	10 - 15 cm	3	676	3366	4773	4769	4771	
	Total	24	748	3415	4804	4800	4803	
AMMODYTIDAE	5 - 7 cm	6	10	4				
	7 - 10 cm	3	1					
	Total	9	11	4				
Solea solea	20 - 25 mm	0						
	25 - 30 mm	0						
	5 - 7 cm	0	1	0				
	Total	0	1	0				
Limanda limanda	3 - 4 cm	0	0	0				
Crangon crangon	10 - 15 mm	0	0	1				
	15 - 20 mm	1	1	0				
	20 - 25 mm	0	0					
	3 - 4 cm	0						
	4 - 5 cm	1	7	3				
	Unknown	0	7	16				
	Total	2	15	20				
Predator : WHITING		Quarter : 3			Area : 7			
Total weight all prey		1668	2597	2886	3129	3129		
Gadus morhua	Unknown	1	5	2				
Merlangius merlangus	5 - 7 cm	20	66	31				
	7 - 10 cm	32	107	49				
	10 - 15 cm		76	209	324	324		
	Total	52	249	289	324	324		
Trisopterus esmarkii	Unknown	5	18	8				
Sprattus sprattus	Unknown	16	573	1462	2223	2223		
AMMODYTIDAE	5 - 7 cm	524	669	308				

TABLE 10-C-4 Average stomach content weight (g) per 1000 whiting by size class of commercially exploited prey species by predator age class, area and quarter.

Predator : WHITING		Quarter : 4		Area : 1				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			5310	6895	7536	8760	10760	11230
Melanogrammus aeglef.	7 - 10 cm		1339	1852	1775	1534	1131	774
	10 - 15 cm		160	111	243	831	1863	2663
	15 - 20 cm		613	302	180	395	916	1031
	Total		2112	2265	2198	2760	3910	4468
Merlangius merlangus	7 - 10 cm			3	4	3	2	1
Trisopterus esmarkii	5 - 7 cm		493	56	43	32	20	5
	7 - 10 cm		2450	3998	4388	4194	3667	2112
	10 - 15 cm		210	463	579	766	1073	975
	Total		3153	4517	5010	4992	4760	3092
AMMODYTIDAE	Unknown		35	18	6	1	1	0
Pandalus spec.	7 - 10 cm		10	5	1			
Predator : WHITING		Quarter : 4		Area : 2				
Total weight all prey			691	992	1214	1822	1867	1836
Gadus morhua	7 - 10 cm		6	3	5	11	10	11
	10 - 15 cm			7	19	57	51	55
	Total		6	10	24	68	61	66
Melanogrammus aeglef.	7 - 10 cm			3	13	44	39	42
	10 - 15 cm		9	23	82	276	243	266
	Total		9	26	95	320	282	308
Merlangius merlangus	7 - 10 cm			18	16			
Trisopterus esmarkii	7 - 10 cm		21	193	249	356	574	425
	10 - 15 cm		22	32	44	82	72	79
	Total		43	225	293	438	646	504
Sprattus sprattus	10 - 15 cm			61	73	90	79	87
AMMODYTIDAE	5 - 7 cm		48	46	36	4	4	4
	7 - 10 cm		392	60	38	122	108	117
	10 - 15 cm		40	21	14			
	15 - 20 cm			207	291	475	419	457
	Total		480	334	379	601	529	578
Microstomus kitt	15 - 25 mm			1	1			
Pandalus spec.	3 - 4 cm		2	0				
	4 - 5 cm		0	0	0			
	Total		2	0	0			
Predator : WHITING		Quarter : 4		Area : 3				
Total weight all prey			1455	2132	3106	2472	5406	4605
Melanogrammus aeglef.	7 - 10 cm		17	112	285	174	705	599
	10 - 15 cm			152	463	261	1227	1043
	Total		17	264	748	435	1932	1642
Merlangius merlangus	7 - 10 cm		4	9	26	15	70	59
	10 - 15 cm		9	124	373	210	989	840
	Total		13	133	399	225	1059	899
Trisopterus esmarkii	5 - 7 cm		8	1				
	7 - 10 cm		170	97	123	92	239	203
	10 - 15 cm			11	33	19	87	74
	Total		178	109	156	111	326	277
Sprattus sprattus	5 - 7 cm		77	62	150	85	398	338
	7 - 10 cm		290	57	23	13	60	51
	Total		367	119	173	98	458	389
AMMODYTIDAE	4 - 5 cm		130	111	77	96		
	5 - 7 cm		94	36	17	21		
	7 - 10 cm		469	704	548	678	8	7
	10 - 15 cm		4	4	11	6	30	26
	15 - 20 cm		99	551	860	696	1458	1239
	Total		796	1406	1513	1497	1497	1272
Pandalus spec.	3 - 4 cm			4	11	6	29	24
	4 - 5 cm		1	0				
	5 - 7 cm		4	17	17	19	10	8
	Total		5	21	28	25	38	32

TABLE 10-C-4 Continued

TABLE 10 C : Continued

Predator : WHITING		Quarter : 4		Area : 4				
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			326	985	1199	1633	2120	3233
Trisopterus esmarkii	7 - 10 cm		40	205	338	368		
Clupea harengus	15 - 20 cm				25	559	1179	2413
Sprattus sprattus	10 - 15 cm		148	665	713	583		
AMMODYTIDAE	5 - 7 cm		0					
	7 - 10 cm		2	12	14	12		
	Total		2	12	14	12		
GADIDAE (Unassigned)	5 - 7 cm						499	436
Crangon crangon	20 - 25 mm		0					
Pandalus spec.	10 - 15 mm		0	0				
	4 - 5 cm		6	24	18	13		
	Total		6	24	18	13		

Predator : WHITING		Quarter : 4		Area : 5				
Total weight all prey			966	1651	1075	1445	6843	
CLUPEIDAE (Unass.)	Unknown			198	453	341		
AMMODYTIDAE	4 - 5 cm		138					

Predator : WHITING		Quarter : 4		Area : 6				
Total weight all prey			1513	2428	3342	3355	3338	4159
Gadus morhua	10 - 15 cm		1	7	16	16	16	
Merlangius merlangus	10 - 15 cm		15	37	85	143	62	3679
	15 - 20 cm		35	97	166	163	167	
	Total		50	134	251	306	229	3679
Trisopterus esmarkii	7 - 10 cm		16	15				
Clupea harengus	7 - 10 cm		276	799	1514	1490	1523	
	10 - 15 cm		8	49	106	105	107	
	Total		284	848	1620	1595	1630	
Sprattus sprattus	7 - 10 cm		182	174	50	49	50	
	10 - 15 cm		275	339	226	222	227	
	Total		457	513	276	271	277	
AMMODYTIDAE	5 - 7 cm		2					
	7 - 10 cm		0	2	5	5	5	
	10 - 15 cm		21	126	273	269	275	
	15 - 20 cm		10	61	131	129	132	
	Total		33	189	409	403	412	
Solea solea	3 - 4 cm		7					
	4 - 5 cm		0	1	2	2	2	
	5 - 7 cm		1	5	10	10	10	
	Total		8	6	12	12	12	
Limanda limanda	5 - 7 cm		0	2	5	5	5	
Crangon crangon	15 - 20 mm		0	0	1	1	1	
	20 - 25 mm		2	3	4	4	4	
	25 - 30 mm		1	0	0	0	0	
	3 - 4 cm		14	22	32	30	32	
	4 - 5 cm		25	36	46	45	46	
	5 - 7 cm		20	12	13	13	13	
	Unknown		45	89	151	149	153	
	Total		107	163	247	242	249	

TABLE 10-C-4 Continued

Predator : WHITING		Quarter : 4			Area : 7			
	Age class Size class	0	1	2	3	4	5	6+
Total weight all prey			716	1624	3665	5049	5302	
Gadus morhua	7 - 10 cm			10	68	163	313	
Merlangius merlangus	7 - 10 cm		90	100	623	931	852	
	10 - 15 cm		63	66	25			
	Total		153	166	648	931	852	
Trisopterus esmarkii	Unknown			165	1110	1659	1518	
Sprattus sprattus	7 - 10 cm			11	77	115	105	
	10 - 15 cm		75	398	1059	1509	1594	
	Total		75	409	1136	1624	1699	
AMMODYTIDAE	4 - 5 cm		0					
	7 - 10 cm			1	4	7	6	
	10 - 15 cm		7	157	64			
	Total		7	158	68	7	6	
Pandalus spec.	3 - 4 cm		2	0	2	3	3	
	Unknown			1	8	12	11	
	Total		2	1	10	15	14	

TABLE 10-D-1 Average stomach content weight (g) per 1000 mackerel by size class of commercially exploited prey species by predator age class and quarter.

Predator : MACKEREL		Quarter : 1	Area : NORTHWESTERN		
	Age class Size class		1-2	3-7	8+
Total weight all prey			3240	5070	13470
AMMODYTIDAE	5- 7 cm			430	
	7-10 cm			190	
	Unknown			330	
	Total			950	
Predator : MACKEREL		Quarter : 1	Area : NORTHEASTERN		
Total weight all prey			1710	640	220
AMMODYTIDAE	Unknown		140	70	
Predator : MACKEREL		Quarter : 1	Area : CENTRAL		
Total weight all prey			1440	2600	
AMMODYTIDAE	Unknown		40	30	
Predator : MACKEREL		Quarter : 1	Area : SOUTHERN		
Total weight all prey			160	430	
Crangon crangon	5-7 cm			240	

TABLE 10-D-2 Average stomach content weight (g) per 1000 mackerel by size class of commercially exploited prey species by predator age class and quarter.

Predator : MACKEREL		Quarter : 2		Area : NORTHWESTERN		
		Age class	1-2	3-7	8+	
		Size class				
Total weight all prey			2330	3640	4050	
Trisopterus esmarkii	4- 5 cm		70			
	5- 7 cm		50			
	Total		120			
AMMODYTIDAE	3- 4 cm		220	10	430	
	4- 5 cm		750	340	1500	
	5- 7 cm		870	610	1250	
	7-10 cm			90		
	Unknown		270	2140		
	Total		2110	3190	3180	
Predator : MACKEREL		Quarter : 2		Area : NORTHEASTERN		
Total weight all prey			10	6500	9690	
GADIDAE	10-15 mm			0		
	15-20 mm			20	0	
	20-25 mm			10	0	
	25-30 mm				0	
	Unknown				10	
	Total			30	10	
Predator : MACKEREL		Quarter : 2		Area : CENTRAL		
Total weight all prey			3960	5960	7830	
Clupea harengus	10-15 cm			80	50	
Sprattus sprattus	5- 7 cm			10		
	7-10 cm			20		
	Total			30		
Trisopterus esmarkii	4- 5 cm			0		
	5- 7 cm			10		
	Total			10		
AMMODYTIDAE	3- 4 cm			500	300	
	4- 5 cm			180	200	
	5- 7 cm	40		270	600	
	7-10 cm	170		110	330	
	10-15 cm	2730		670	20	
	15-20 cm	400				
	Unknown	10		360	220	
	Total	3350		2090	1690	
Scomber scombrus	Eggs	0		30	70	
Predator : MACKEREL		Quarter : 2		Area : SOUTHERN		
Total weight all prey			2490	5260	8050	
Clupea harengus	10-15 cm				200	
Sprattus sprattus	Eggs	0		0	0	
	5- 7 cm	30		70		
	7-10 cm	40		120	290	
	10-15 cm				250	
	Unknown				30	
	Total	70		190	570	
AMMODYTIDAE	3- 4 cm				30	
	4- 5 cm				110	
	5- 7 cm	20		50	180	
	7-10 cm	350		740	920	
	10-15 cm	340		1770	2380	
	15-20 cm	70		370	820	
	Unknown	1150		1210	1640	
	Total	1930		4140	6080	
Scomber scombrus	Eggs	0		0	0	

TABLE 10-D-3 Average stomach content weight (g) per 1000 mackerel by size class of commercially exploited prey species by predator age class and quarter.

Predator : MACKEREL		Quarter : 3		Area : NORTHWESTERN	
	Age class Size class	1-2	3-7	8+	
Total weight all prey		3130	5190	5180	
Melanogrammus aeglefinus	10-15 cm		40		
Trisopterus esmarkii	3- 4 cm	60	20	50	
	4- 5 cm	100	120	200	
	5- 7 cm	310	710	1620	
	7-10 cm	30	130	230	
	Unknown		480	500	
	Total	500	1460	2600	
AMMODYTIDAE	3- 4 cm	20	20	30	
	4- 5 cm	70	20		
	5- 7 cm	580	720		
	7-10 cm	510	370		
	10-15 cm	50	30		
	Unknown	650	1040		
	Total	1880	2200	30	
Predator : MACKEREL		Quarter : 3		Area : NORTHEASTERN	
Total weight all prey		1250	1780	2940	
Sprattus sprattus	5- 7 cm			110	
	7-10 cm			20	
	10-15 cm		100		
	Unknown		70	90	
	Total		170	220	
Trisopterus esmarkii	3- 4 cm		0		
	5- 7 cm		20		
	Total		20		
Crangon crangon	4- 5 cm		0		
Predator : MACKEREL		Quarter : 3		Area : CENTRAL	
Total weight all prey		2160	3610	4450	
Gadus morhua	7-10 cm		0		
	10-15 cm		10		
	Total		10		
Trisopterus esmarkii	5- 7 cm	0			
	7-10 cm		10	240	
	Total	0	10	240	
Clupea harengus	7-10 cm	80	140	200	
	10-15 cm		170	590	
	Total	80	310	790	
Sprattus sprattus	7-10 cm		10		
	10-15	20	60		
	Total	20	70		
AMMODYTIDAE	5- 7 cm		80	40	
	7-10 cm		90	20	
	10-15 cm	10			
	Unknown	60	40	50	
	Total	70	210	110	
Crangon crangon	4- 5 cm	0	10	10	

TABLE 10-D-3 Continued

Predator : MACKEREL		Quarter : 3	Area : SOUTHERN		
	Age class Size class	1-2	3-7	8+	
Total weight all prey		1390	1920	4710	
Merlangius merlangus	7-10 cm		10		
	Total		10		
Trisopterus esmarkii	5- 7 cm			80	
	7-10 cm			30	
	Unknown	0			
	Total	0		110	
Clupea harengus	7-10 cm	60	40	330	
	10-15 cm		160	340	
	15-19 cm			390	
	Total	60	200	1060	
Sprattus sprattus	3- 4 cm	0	0		
	7-10 cm		90	670	
	10-15 cm			520	
	Total	0	90	1190	
AMMODYTIDAE	3- 4 cm	10	20		
	5- 7 cm	30			
	10-15 cm	20			
	15-20 cm	30	20		
	20-25 cm	130	110		
	Unknown	10	100		
	Total	230	250		
Limanda limanda	3- 4 cm		0		
	5- 7 cm		10		
	Unknown	0	0		
	Total	0	10		
Crangon crangon	4- 5 cm	0	10	20	

TABLE 10-D-4 Average stomach content weight (g) per 1000 mackerel by size class of commercially exploited prey species by predator age class and quarter.

Predator : MACKEREL		Quarter : 4	Area : NORTHWESTERN		
	Age class Size class		1-2	3-7	8+
Total weight all prey			850	3860	4960
Trisopterus esmarkii	7-10 cm		320	140	590
	10-15 cm			120	160
	15-20 cm				460
	Unknown			60	
	Total		320	320	1210
AMMODYTIDAE	3- 4 cm			0	0

Predator : MACKEREL		Quarter : 4	Area : NORTHEASTERN		
Total weight all prey				2760	5030
Trisopterus esmarkii	7-10 cm				260
	Unknown			20	
	Total			20	260

Predator : MACKEREL		Quarter : 4	Area : CENTRAL		
Total weight all prey			2100	2430	3100
Trisopterus esmarkii	7-10 cm		80	70	220
	10-15 cm		110		1170
	Total		190	70	1390
Clupea harengus	10-15 cm			60	
AMMODYTIDAE	2- 3 cm		10	20	
	3- 4 cm		10		
	7-10 cm			10	
	Unknown		30	40	10
	Total		50	70	10

Predator : MACKEREL		Quarter : 4	Area : SOUTHERN		
Total weight all prey			650	2160	1660
Clupea harengus	7-10 cm			190	100
	10-15 cm			510	330
	Total			700	430
Sprattus sprattus	10-15 cm			150	
AMMODYTIDAE	2- 3 cm		90		
	10-15 cm				60
	Unknown		60	20	10
	Total		150	80	10

TABLE 10-E-1 Average stomach content weight (g) per 1000 *saithe* by size class of commercially exploited prey species by predator age class and quarter.

Predator : SAI THE		Quarter : I			Area : ALL			
	Age class Size class	3	4	5	6	7	8	9+
Total weight all prey		6534	22204	37423	41026	42032	42032	42345
Melanogrammus aeglef.	7 - 10 cm	318	78	21	4			
	10 - 15 cm	114	987	1360	1439	1463	1463	1469
	15 - 20 cm	11	213	117	87	80	80	81
	20 - 25 cm							18
	Total	443	1278	1498	1530	1543	1543	1568
Merlangius merlangus	10 - 15 cm		4	105	132	139	139	136
	20 - 25 cm		7	166	208	219	219	223
	25 - 30 cm		2	54	68	71	71	146
	3 - 4 cm							10
	Total		13	325	408	429	429	515
Trisopterus esmarkii	5 - 7 cm	1	11	12	13	13	13	12
	7 - 10 cm	680	3768	3468	3317	3287	3287	3221
	10 - 15 cm	436	7534	17028	19351	19982	19982	20018
	15 - 20 cm	228	3574	7302	8202	8448	8448	8665
	20 - 25 cm							35
Total	1345	14887	27810	30883	31730	31730	31951	
Clupea harengus	7 - 10 cm		2	45	56	59	59	58
	10 - 15 cm	8	146	80	60	55	55	54
	15 - 20 cm		13	342	427	450	450	441
	20 - 25 cm		7	169	212	223	223	218
	Total	8	168	636	755	787	787	771
Sprattus sprattus	10 - 15 cm	171	30	102	128	135	135	132
AMMODYTIDAE	7 - 10 cm	686	2	48	60	63	63	64
	10 - 15 cm		4	96	120	126	126	140
	15 - 20 cm		1	29	36	38	38	50
	20 - 25 cm		2	57	72	76	76	82
	25 - 30 cm							1
	Total	686	9	230	288	303	303	337

TABLE 10-E-2 Average stomach content weight (g) per 1000 saithe by size class of commercially exploited prey species by predator age class and quarter.

Predator : SAITHE		Quarter : 2			Area : ALL			
	Age class Size class	3	4	5	6	7	8	9+
Total weight all prey		9277	13630	27440	32368	46844	47128	47695
Gadus morhua	25 - 30 mm	1	7	8	6			
	3 - 4 cm	9	48	72	67	52	51	50
	4 - 5 cm	2	13	50	62	98	97	95
	5 - 7 cm	4	5	17	21	33	32	32
	Total	16	73	147	156	183	180	177
Melanogrammus aeglef.	25 - 30 mm	2	1	33	47	89	88	86
	3 - 4 cm	7	6	232	333	628	621	609
	4 - 5 cm	23	42	309	416	731	723	709
	5 - 7 cm	100	78	712	999	1841	1836	1825
	7 - 10 cm	392	386	561	590	675	670	660
	10 - 15 cm	118	189	778	1004	1668	1680	1706
	15 - 20 cm		3	127	181	342	383	465
	25 - 30 cm						150	451
	Total	642	705	2752	3570	5974	6151	6511
Merlangius merlangus	10 - 15 cm	31	18					
	15 - 20 cm	5	27	30	23			
	Total	36	45	30	23			
Trisopterus esmarkii	25 - 30 mm			2	2	5	5	5
	3 - 4 cm	9	6	10	15	28	28	28
	4 - 5 cm	25	21	17	20	28	30	33
	5 - 7 cm	1069	996	482	380	80	79	77
	7 - 10 cm	1712	1596	1163	1189	1265	1254	1232
	10 - 15 cm	155	651	3074	3981	6647	6685	6660
	15 - 20 cm	74	442	2519	3317	5659	5602	5489
	Total	3044	3712	7267	8904	13712	13683	13524
Clupea harengus	10 - 15 cm		2	76	109	206	204	200
	25 - 30 cm						130	390
	Total		2	76	109	206	334	590
Sprattus sprattus	5 - 7 cm	2						
AMMODYTIDAE	4 - 5 cm			14	20	37	37	36
	5 - 7 cm	187	92	66	80	122	121	118
	7 - 10 cm	110	23	276	389	721	714	700
	10 - 15 cm	13	16	17	13			
	15 - 20 cm	91						
	Total	401	131	373	502	880	872	854

TABLE 10-E-3 Average stomach content weight (g) per 1000 *saithe* by size class of commercially exploited prey species by predator age class and quarter.

Predator : SAITHE		Quarter : 3			Area : ALL			
	Age class Size class	3	4	5	6	7	8	9+
Total weight all prey		7688	16462	23934	28980	45304	46820	47979
<i>Gadus morhua</i>	25 - 30 mm	1	12	9	7	1		
	3 - 4 cm	8	77	74	70	53	51	49
	4 - 5 cm	2	22	41	53	95	97	94
	5 - 7 cm	9	8	15	18	32	32	31
	Total	20	119	139	148	181	180	174
<i>Melanogrammus aeglefinus</i>	25 - 30 mm	6	3	23	37	85	87	85
	3 - 4 cm	18	19	164	264	596	615	603
	4 - 5 cm	48	78	235	342	697	717	702
	5 - 7 cm	143	107	517	802	1751	1818	1820
	7 - 10 cm	588	488	545	570	666	668	655
	10 - 15 cm	166	286	622	848	1597	1666	1718
	15 - 20 cm		10	89	144	325	379	505
	25 - 30 cm						150	602
	Total	969	991	2195	3007	5717	6100	6690
<i>Merlangius merlangus</i>	10 - 15 cm	18	3					
	15 - 20 cm	5	43	35	28	2		
	Total	23	46	35	28	2		
<i>Trisopterus esmarkii</i>	25 - 30 mm			1	2	4	5	5
	3 - 4 cm	6	2	7	12	27	28	28
	4 - 5 cm	15	13	16	18	27	30	35
	5 - 7 cm	692	734	546	450	112	85	76
	7 - 10 cm	1065	1168	1135	1171	1257	1252	1221
	10 - 15 cm	126	1081	2440	3358	6364	6628	6798
	15 - 20 cm	68	778	1964	2768	5410	5552	5432
	Total	1972	3776	6109	7779	13201	13580	13595
<i>Clupea harengus</i>	10 - 15 cm		6	54	87	196	202	198
	25 - 30 cm						130	520
	Total		6	54	87	196	332	718
<i>Sprattus sprattus</i>	5 - 7 cm	6						
AMMODYTIDAE	4 - 5 cm		1	10	16	36	37	36
	5 - 7 cm	237	48	60	71	117	120	117
	7 - 10 cm	250	41	203	311	686	707	693
	10 - 15 cm	28	25	20	16	1		
	15 - 20 cm	229	5	5				
	Total	744	120	298	414	840	864	846

TABLE 10-E-4 Average stomach content weight (g) per 1000 *saithe* by size class of commercially exploited prey species by predator age class and quarter.

Predator : SAITHE		Quarter : 4			Area : ALL			
	Age class Size class	3	4	5	6	7	8	9+
Total weight all prey		10918	23114	29359	40423	42189	42345	42659
<i>Melanogrammus aeglefinus</i>	7 - 10 cm	153	76	52	7			1
	10 - 15 cm	337	1012	1167	1425	1466	1469	1475
	15 - 20 cm	40	209	170	91	81	81	83
	20 - 25 cm					9	18	35
<i>Merlangius merlangus</i>	10 - 15 cm		10	51	128	137	136	133
	20 - 25 cm		15	81	201	221	223	228
	25 - 30 cm		5	26	66	109	146	220
	3 - 4 cm					5	10	19
<i>Trisopterus esmarkii</i>	5 - 7 cm	2	11	12	12	12	12	12
	7 - 10 cm	1198	3776	3661	3334	3254	3221	3156
	10 - 15 cm	1492	8109	12034	18973	20000	20018	20055
	15 - 20 cm	761	3803	5346	8054	8557	8665	8881
	20 - 25 cm					18	35	70
<i>Clupea harengus</i>	7 - 10 cm		4	22	54	58	58	56
	10 - 15 cm	28	143	117	63	54	54	53
	15 - 20 cm		31	166	414	445	441	432
	20 - 25 cm		16	82	205	221	218	214
<i>Sprattus sprattus</i>	10 - 15 cm	420	27	50	124	133	132	129
AMMODYTIDAE	7 - 10 cm	302	4	23	58	63	64	64
	10 - 15 cm		9	47	116	133	140	154
	15 - 20 cm		3	14	35	44	50	62
	20 - 25 cm		5	30	70	79	82	88
	25 - 30 cm						1	1
Total		302	21	114	279	319	337	369

TABLE 11 AVERAGE STOMACH CONTENT TOTAL NORTH SEA.

TABLE 11-A-1 Average stomach content weight (g) per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : I			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey			1184	6360	24408	60479	82655	122778
Gadus morhua	1			60	247	531	1483	627
	2			28	327	3312	8730	8926
	3					14	41	130
Melanogrammus aeglef.	1		0	93	1510	3049	2940	3008
	2			5	1379	10081	11226	6154
	3			0	35	529	602	320
	4			0	7	41	48	23
Merlangius merlangus	1		1	308	1289	2956	5438	6337
	2			179	1338	9919	13698	21860
	3			19	701	4386	5707	6234
	4			12	409	1032	726	767
	5			3	78	192	130	122
	6			0	15	35	18	12
Trisopterus esmarkii	1		2	99	1032	1370	987	696
	2		0	23	1059	2085	1714	1281
	3			0	54	134	115	81
Clupea harengus	1		1	215	494	771	951	1058
	2			8	269	401	308	682
	3			4	510	602	428	1712
Sprattus sprattus	1		104	149	54	113	253	874
	2		85	484	595	1000	1530	2441
	3		0	66	108	172	237	259
	4		0	1	1	2	3	3
AMMODYTIDAE	0			0	0			
	1		19	138	1095	527	254	109
	2		3	62	1229	578	229	59
	3			5	547	287	83	
	4			6	653	342	99	
	5			2	212	111	32	
	6			2	229	120	35	
Other prey			969	4382	8907	15402	24132	57070

TABLE 11-A-2 Average stomach content weight (g) per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 2		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			1766	12166	42586	92852	102999	153311
Gadus morhua	0		23	88	91	29	1	
	1		2	57	580	5949	5860	889
	2			1	217	2212	2329	619
	3				66	1117	1186	312
Melanogrammus aeglef.	0		1	12	47	148	149	39
	1		15	153	1067	743	480	992
	2			28	1238	2753	4661	4271
	3				8	115	262	257
Merlangius merlangus	0		0	6	3	162	151	20
	1		1	105	1092	2074	752	4528
	2			70	1038	5806	6159	12775
	3			0	189	2070	2574	11239
	4				53	593	643	1414
	5				1	7	22	330
	6				0	4	13	188
Trisopterus esmarkii	0			4	75	48	32	73
	1		0	93	953	2026	2149	1032
	2			18	698	1214	1231	461
	3			0	8	14	14	5
Clupea harengus	1		9	122	269	1076	838	2068
	2		0	29	216	1826	4396	6258
Sprattus sprattus	0		14	40	2	16	41	174
	1		15	149	77	422	308	725
	2		26	273	218	1123	686	1327
	3		3	33	35	155	73	137
AMMODYTIDAE	0		101	1500	1513	2235	1982	454
	1		170	1573	1405	3425	3313	1165
	2		78	417	783	867	769	588
	3		8	121	370	431	257	148
	4		3	66	287	363	191	80
	5		1	27	105	128	68	31
	6		0	15	85	112	54	18
Other prey			1296	7168	29753	53610	61372	100732

TABLE 11-A-3 Average stomach content weight (g) per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 3			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey		219	3512	15377	45975	114133	160283	380925
Gadus morhua	0		171	1041	161	533	1392	332
	1			6	166	918	3063	684
	2				54	387	1387	305
Melanogrammus aeglefinus	0		26	774	1901	1584	1354	696
	1		0	145	2171	6325	5677	3446
	2			22	889	6983	11785	73054
	3			1	18	201	651	27489
	4				0	1	5	5315
	5							501
Merlangius merlangus	0	1	324	767	197	22		
	1		2	510	626	1400	858	865
	2			24	278	1622	1931	6878
	3			2	134	546	743	1109
	4			1	31	101	151	172
	5				3	12	16	8
	6				1	5	7	3
Trisopterus esmarkii	0		19	1259	8252	16103	19450	10130
	1			281	2463	2160	1831	2343
	2			397	3436	2870	2351	3240
Clupea harengus	0		17	221	125	38	15	
	1		0	199	393	276	324	
	2		0	43	52	20	30	
	3			103	3160	15646	14325	7042
Sprattus sprattus	0		1	0	0	3	9	2
	1		88	238	51	15	3	
	2		17	77	12	0	0	
	3		1	14	1			
AMMODYTIDAE	0	1	69	900	1650	751	649	264
	1		1	52	96	7	1	0
	2		3	126	198	17	6	2
	3		0	13	26	2		
	4		0	5	9	1		
Other prey		217	2771	8118	18945	54655	91163	236222

TABLE 11-A-4 Average stomach content weight (g) per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 4			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey		855	7284	12808	35622	329997	73648	125062
Gadus morhua	0	2	1	36	450	671		
	1			0	428	4506	103	2
	2				602	5159	7247	16
	3				25	207	296	0
Melanogrammus aeglef.	0		109	1581	3224	52436	6449	3313
	1			33	609	22921	3100	4486
	2				548	13762	4823	33239
	3				43	771	438	4195
	4				1	32	4	1
	5				0	8	1	0
Merlangius merlangus	0		8	181	296	654	316	7
	1		0	95	2689	14050	5657	556
	2			39	906	7122	3997	12021
	3				123	1247	1471	4129
	4			1	35	353	329	
	5				2	13	20	
	6				4	36	53	
Trisopterus esmarkii	0	5	21	533	1999	21251	3027	4691
	1		18	337	1351	22689	2877	954
	2		2	44	198	2067	279	86
Clupea harengus	0		21	223	1181	2		
	1		0	32	105	645		
	2			2	9	118		
	3			2	12	21		
	4			3	14	8		
	5			4	18	5		
	6			0	244	10391	1254	444
Sprattus sprattus	1	0	10	54	128	482	34	
	2		3	57	144	610	43	
	3		0	2	6	33	2	
	4		0	1	2	11	1	
AMMODYTIDAE	0	1	181	364	624	3685	1995	2446
	1		19	19	106	773	1161	2609
	2		24	26	146	1064	1598	3597
	3		8	19	107	762	1144	2612
	4		4	18	102	723	1086	2489
	5		1	5	29	208	312	718
	6		1	6	32	225	338	778
Other prey		847	6853	9089	19078	140266	24160	41604

TABLE 11-B Average stomach content weight (g) per 1000 haddock stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : HADDOCK		Quarter : 1			Area : ALL				
	Age class	0	1	2	3	4	5	6+	
All prey			223	883	2372	4659	7458	7593	
Trisopterus esmarkii	0			0	0	2	2	1	
	1			103	735	1764	2461	2808	
	2			1	54	452	654	393	
Clupea harengus	1				1	1	4	15	
	2				0	0	1	4	
Sprattus sprattus	1		0	6	37	10	6	22	
	2			8	49	14	10	35	
	3			0	0	0	1	1	
	4			0	0	0	0	0	
AMMODYTIDAE	1			1	48	154	179	102	
	2			2	40	289	480	475	
	3			0	17	16	1		
	4			0	21	19	1		
	5			0	7	6	0		
	6			0	7	7	0		
Other prey			223	761	1355	1924	3656	3737	
Predator : HADDOCK		Quarter : 2			Area : ALL				
All prey			245	365	1992	6010	10709	9143	16121
Trisopterus esmarkii	1				1	56	473	791	94
	2					3	25	42	5
Sprattus sprattus	0			0	0				
	1			0	0				
	2			0	0				
AMMODYTIDAE	0		13	121	137	27	6	16	
	1		1	34	17	92	50	177	
	2							17	
	3							1	
	4							1	
Other prey			245	350	1837	5798	10093	8254	15810
Predator : HADDOCK		Quarter : 3			Area : ALL				
All prey			169	1377	3179	6332	11123	17609	4563
Melanogrammus aeglef.	0			6	31	66	54		
Merlangius merlangus	0				1	4			
Trisopterus esmarkii	0	0	1	168	871	2369	5113	563	
	1			0	14	46	71	6	
	2			0	14	39	29		
Sprattus sprattus	0		0	0	1	2	1		
	1		1	2	2	5			
	2		0	0	0	0			
AMMODYTIDAE	0	17	142	418	411	420	409	468	
Other prey			152	1234	2583	4961	8041	11581	3485
Predator : HADDOCK		Quarter : 4			Area : ALL				
All prey			281	1276	2599	5329	6819	9575	7960
Melanogrammus aeglef.	0			1	2				
Merlangius merlangus	0			0	2	12			34
Trisopterus esmarkii	0	0	63	141	348	716	1356	501	
	1		17	44	107	112	144	60	
	2		0	0	1	1	1	1	
Clupea harengus	0			0	19				
	1			0	0				
AMMODYTIDAE	0	3	56	562	1189	1535	2030	1616	
Other prey			278	1138	1848	3650	4455	6044	5747

TABLE 11-C Average stomach content weight (g) per 1000 whiting stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : WHITING		Quarter : 1		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			440	909	1866	2910	3565	4770
Gadus morhua	1		0.05	1.62	0.67			159.87
Melanogrammus aeglef.	1		5.21	1.73	28.59	65.82	85.59	187.49
	2			0.09	2.51	6.60	8.14	20.72
Merlangius merlangus	1			3.46	43.00	165.21	554.46	334.78
	2			0.03	0.47	2.00	7.54	4.53
Trisopterus esmarkii	0		0.08	0.10	0.09			
	1		12.62	33.05	200.38	419.20	468.24	738.00
	2		1.13	16.61	184.49	451.03	555.05	965.13
	3			0.31	7.46	19.81	24.60	41.23
Clupea harengus	1			111.07	231.07	455.98	346.62	758.22
	2			0.15	2.14	5.38	6.83	2.86
Sprattus sprattus	1		49.42	108.60	149.74	77.57	94.08	61.47
	2		20.01	136.60	214.88	290.10	281.58	248.38
	3		0.72	15.34	30.84	46.39	43.38	41.36
	4		0.01	0.19	0.38	0.57	0.53	0.50
AMMODYTIDAE	1		80.80	44.82	50.97	41.73	45.53	67.24
	2		7.93	11.91	25.33	29.09	34.06	82.31
	3			0.33	4.31	11.90	20.69	15.83
	4			0.40	5.14	14.20	24.70	18.89
	5			0.13	1.67	4.61	8.01	6.13
	6+			0.14	1.80	4.99	8.68	6.64

Predator : WHITING		Quarter : 2		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			711	1675	3059	2676	2738	3901
Gadus morhua	0		4.26	5.42	17.98	4.86	0.73	9.32
Melanogrammus aeglef.	0		0.44	2.28	79.46	104.50	34.55	288.57
	1			4.15	33.25	25.26	22.51	27.49
	2			0.08	6.78	9.69	7.43	9.01
Merlangius merlangus	0		0.00	0.01	0.02	0.04	0.02	0.02
	1		0.04	8.69	87.35	105.51	88.46	111.20
Trisopterus esmarkii	0		2.45	32.81	3.50	0.22		
	1		0.90	82.56	443.99	361.44	307.81	445.15
	2			8.65	92.96	180.86	558.56	207.69
	3			0.07	0.90	2.02	6.70	2.28
Clupea harengus	1		2.21	13.56	15.82	12.10	0.14	0.18
Sprattus sprattus	0		8.13	13.25	10.91	35.29	26.50	18.56
	1		2.87	16.69	17.89	67.72	52.66	35.91
	2		4.69	8.05	10.59	59.26	44.89	28.80
	3		0.49	0.44	0.70	4.98	3.72	2.32
AMMODYTIDAE	0		221.64	345.40	243.45	155.34	177.14	375.29
	1		108.47	478.61	818.51	536.12	483.19	958.84
	2		10.18	158.29	443.15	265.64	181.78	381.24
	3		0.84	35.12	100.40	42.74	26.17	39.94
	4		0.38	12.98	37.01	16.59	10.37	16.95
	5		0.05	6.11	17.59	6.37	3.63	4.02
	6+		0.01	1.53	4.40	1.59	0.91	1.01

TABLE 11-C Continued

Predator : WHITING		Quarter : 3		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			916	2442	3714	4534	5571	4787
Gadus morhua	0		0.15	0.04	0.02			
Melanogrammus aeglef.	0		14.65	418.27	850.19	786.18	908.33	911.78
	1		0.02	4.78	6.77	4.01	4.47	2.51
Merlangius merlangus	0		63.21	163.28	181.95	176.49	250.68	185.82
Trisopterus esmarkii	0		45.74	202.51	478.18	367.92	305.29	250.17
	1			1.22	11.71	11.49	7.86	11.46
	2			0.01	0.12	0.12	0.08	0.12
Clupea harengus	0		15.58	713.57	1088.62	942.32	913.08	665.22
Sprattus sprattus	0		1.20	1.80	0.76	0.88	1.60	0.84
	1		25.65	152.19	289.41	1099.29	1984.50	1191.15
	2		1.03	33.85	67.58	265.14	478.52	288.05
	3		0.01	1.53	3.08	12.13	21.90	13.19
AMMODYTIDAE	0		358.34	250.82	276.12	287.56	150.91	391.62
	1		1.63	51.58	62.13	24.42	12.30	14.35
	2		2.25	70.37	85.49	33.68	16.81	19.86
	3		0.48	15.21	18.30	7.19	3.63	4.22
	4		0.18	5.53	6.65	2.61	1.32	1.54
Predator : WHITING		Quarter : 4		Area : ALL				
All prey			1061	1823	2845	3597	4830	4957
Gadus morhua	0		1.10	3.78	14.06	21.53	32.45	24.29
Melanogrammus aeglef.	0		33.14	193.84	564.18	705.32	1146.27	1435.82
	1		1.28	2.70	5.05	13.01	25.36	43.91
Merlangius merlangus	0		32.11	53.42	100.38	89.23	328.43	146.12
Trisopterus esmarkii	0		100.67	397.48	1161.05	1321.65	989.53	1055.04
	1		0.49	3.10	11.05	15.69	17.89	24.82
Clupea harengus	0		64.36	110.34	62.67	249.54	422.61	516.81
	1		0.04	0.13	0.08	42.07	123.10	258.41
	2					1.65	4.86	10.21
Sprattus sprattus	0		17.05	13.32	23.35	9.92	87.53	19.09
	1		101.52	120.62	72.76	106.37	78.69	14.41
	2		100.78	144.21	90.54	132.54	88.10	17.59
	3		3.03	7.18	4.85	7.11	3.81	0.91
	4		1.01	2.39	1.62	2.37	1.27	0.30
AMMODYTIDAE	0		241.19	233.53	154.97	141.02	363.07	44.06
	1		8.95	65.34	100.47	68.16	12.85	84.86
	2		11.61	84.76	130.34	88.42	16.67	110.08
	3		2.66	19.42	28.87	20.26	3.82	25.23
	4		0.97	7.06	10.86	7.37	1.39	9.17

TABLE 11-D Average stomach content weight (g) per 1000 mackerel stomachs by age class of prey and predator by quarter for the total North Sea.

Class of prey and predator by quarter for the total North Sea.						
Predator : MACKEREL		Quarter : 1		Area : ALL		
Age class				1-2	3-7	8+
All prey				1520	3010	4010
AMMODYTIDAE		1		50	370	
Predator : MACKEREL		Quarter : 2		Area : ALL		
All prey				2560	5690	8630
Trisopterus esmarkii		0		0	0	0
		1		0	0	0
Clupea harengus		1			30	50
Sprattus sprattus		0		38	58	17
		1		18	33	36
		2		4	9	34
		3				3
AMMODYTIDAE		0		250	601	739
		1		1218	1325	506
		2		464	555	248
		3		62	69	42
		4		18	28	16
		5		8	8	6
		6		2	2	2
Predator : MACKEREL		Quarter : 3		Area : ALL		
All prey				1870	2900	4100
Gadus morhua		0			10	
Melanogrammus aeglefinus		0			0	
Merlangius merlangus		0			0	
Trisopterus esmarkii		0		60	160	310
Clupea harengus		1		30	140	314
		2				95
		3				1
Sprattus sprattus		0		1	1	28
		1		26	78	393
		2		3	10	47
		3		0	1	2
AMMODYTIDAE		0		289	463	130
		1		7	1	
		2		15	5	
		3		24	9	
		4		27	11	
		5		8	4	
		6		9	4	
Predator : MACKEREL		Quarter : 4		Area : ALL		
All prey				1510	2730	4300
Trisopterus esmarkii		0		80	90	400
		1		59	29	462
		2		1	1	78
Clupea harengus		0			206	59
		1			4	1
Sprattus sprattus		0			21	
		1			26	
		2			2	
		3			1	
AMMODYTIDAE		0		70	70	20

TABLE 11-E Average stomach content weight (g) per 1000 saithe stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : SAITHE		Quarter : 1			Area : ALL			
Age class		3	4	5	6	7	8	9+
All prey		6534	22204	37423	41026	42032	42032	42345
Melanogrammus aeglef.	1	441	1233	1473	1512	1526	1526	1534
	2	2	45	24	18	17	17	34
Merlangius merlangus	1		6	147	184	193	193	192
	2		5	130	163	171	171	203
	3		2	41	51	54	54	95
	4			7	9	9	9	22
	5			1	1	1	1	2
Trisopterus esmarkii	1	986	9053	15400	16875	17287	17287	17247
	2	324	5298	11315	12777	13176	13176	13387
	3	34	536	1095	1230	1267	1267	1315
	4							4
Clupea harengus	1	7	156	437	507	526	526	515
	2		11	177	220	231	231	227
	3		1	20	25	27	27	26
	4			2	2	2	2	2
Sprattus sprattus	2	151	26	90	112	118	118	116
	3	21	4	12	15	16	16	16
AMMODYTIDAE	1	686	5	130	162	171	171	185
	2		1	35	44	46	46	55
	3		1	25	31	33	33	38
	4		1	23	29	31	31	34
	5			8	10	11	11	12
	6			9	11	11	11	13
Predator : SAITHE		Quarter : 2			Area : ALL			
All prey		9277	13630	27440	32368	46844	47128	47695
Gadus morhua	0	17	73	146	156	183	181	177
Melanogrammus aeglef.	0	550	555	2018	2606	4330	4308	4264
	1	92	150	684	893	1509	1544	1614
	2			49	71	133	294	615
	3						6	18
Merlangius merlangus	1	36	46	30	23			
Trisopterus esmarkii	0	568	525	271	228	101	102	105
	1	2409	2797	4789	5772	8658	8674	8706
	2	67	390	2208	2905	4953	4906	4814
Clupea harengus	1		2	76	109	206	204	200
	2						4	12
	3						64	191
	4						29	86
	5						31	94
	6						4	12
Sprattus sprattus	0	2						
AMMODYTIDAE	0	266	109	279	380	679	672	658
	1	57	18	90	119	202	200	196
	2	45	4	4	3			
	3	23						
	4	8						
	5	2						

TABLE 11-E Continued

Predator : SAITHE		Quarter : 3			Area : ALL			
	Age class	3	4	5	6	7	8	9+
All prey		7688	16462	23935	28980	45304	46820	47979
Gadus morhua	0	20	118	139	149	180	180	175
Melanogrammus aeglef.	0	969	981	2112	2872	5412	5594	5613
	1		10	84	135	305	357	478
	2						150	599
Merlangius merlangus	0	19	9	5	4			
	1	4	37	30	24	2		
Trisopterus esmarkii	0	1690	1881	1764	1772	1740	1729	1703
	1	261	1654	3737	5150	9783	10129	10207
	2	21	241	609	858	1677	1721	1684
Clupea harengus	0		6	54	87	196	202	198
	2						4	16
	3						64	255
	4						29	114
	5						31	125
	6						4	16
Sprattus sprattus	0	6						
AMMODYTIDAE	0	487	102	271	386	792	814	797
	1	65	9	20	25	48	50	48
	2	110	6	5	3			
	3	57	1	1				
	4	21						
	5	5						

Predator : SAITHE		Quarter : 4			Area : ALL			
	Age class	3	4	5	6	7	8	9+
All prey		10918	23114	29359	40423	42189	42345	42659
Melanogrammus aeglef.	0	524	1266	1364	1509	1535	1539	1547
	1	6	31	26	14	20	28	45
	2					1	1	2
Merlangius merlangus	0		10	54	134	144	143	140
	1		16	86	213	244	256	280
	2		3	16	41	69	95	145
	3		1	3	7	14	20	32
	4					1	1	3
Trisopterus esmarkii	0	2140	8896	11254	15300	15867	15845	15803
	1	1236	6423	9264	14269	15101	15205	15413
	2	76	380	535	805	864	883	920
	3					8	15	30
	4					2	4	8
Clupea harengus	0	28	172	268	439	460	455	446
	1		21	112	278	299	296	290
	2		1	7	16	18	17	17
	3			1	2	2	2	2
Sprattus sprattus	0	4			1	1	1	1
	1	235	15	28	69	75	74	72
	2	172	11	20	51	55	54	53
	3	8	1	1	2	3	3	3
AMMODYTIDAE	0	302	13	71	176	199	206	221
	1			2	6	7	8	11
	2		1	8	19	23	26	32
	3		2	12	30	35	37	42
	4		2	11	28	32	34	37
	5		1	4	10	11	12	13
	6		1	4	10	12	13	14

TABLE 12 AVERAGE NUMBER OF PREY ORGANISMS.

TABLE 12-A-1 Average number of prey organisms per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 1			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey			2695.35	4803.26	4236.89	4682.86	5909.60	6669.52
Gadus morhua	1			1.69	7.48	13.13	37.71	24.47
	2			0.16	2.86	33.44	85.80	100.53
	3					0.10	0.35	1.96
Melanogrammus aeglef.	1		0.01	9.55	130.76	186.83	156.77	156.37
	2			0.13	26.53	142.41	163.48	79.20
	3			0.00	0.45	6.89	8.76	3.81
	4			0.00	0.09	0.55	0.89	0.31
Merlangius merlangus	1		6.56	18.18	73.75	145.13	251.80	332.57
	2			4.38	33.45	154.96	205.52	749.67
	3			0.16	8.21	50.39	64.21	99.68
	4			0.04	3.33	8.62	5.91	6.98
	5			0.01	0.60	1.56	1.04	1.30
	6			0.00	0.12	0.24	0.09	0.06
Trisopterus esmarkii	1		0.33	26.66	202.29	246.82	169.75	100.59
	2		0.00	2.58	113.80	160.55	114.21	80.21
	3			0.01	4.38	7.99	6.17	4.20
Clupea harengus	1		0.09	17.65	29.74	41.96	48.20	50.19
	2			0.38	13.72	17.03	11.29	28.57
	3			0.13	8.50	9.00	7.12	34.03
Sprattus sprattus	1		79.02	74.29	27.63	46.21	89.48	235.70
	2		25.10	91.10	81.57	148.40	246.21	485.97
	3		0.03	8.17	12.17	21.11	30.25	43.07
	4		0.00	0.10	0.15	0.26	0.37	0.53
AMMODYTIDAE	0			0.95	0.06			
	1		10.27	69.40	349.26	210.28	115.41	60.10
	2		1.04	12.73	159.81	85.83	44.66	18.39
	3			0.27	33.38	18.49	5.35	
	4			0.32	39.83	22.07	6.38	
	5			0.10	12.92	7.16	2.07	
	6			0.11	14.00	7.76	2.24	
Other prey			2572.66	4461.59	2840.27	2843.43	3977.04	3944.94

TABLE 12-A-2 Average number of prey organisms per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 2		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			3712.61	15957.46	36710.11	72454.29	80584.01	43183.31
Gadus morhua	0		52.35	123.56	77.62	21.71	3.26	
	1		0.27	2.72	20.39	183.73	181.94	35.33
	2			0.01	2.14	18.49	19.34	5.72
	3				0.21	3.53	3.75	0.99
Melanogrammus aeglef.	0		0.13	3.94	7.78	29.01	29.09	7.64
	1		1.30	10.32	33.06	44.75	36.81	69.46
	2			0.87	23.50	37.48	70.72	89.01
	3				0.06	0.80	1.80	1.78
Merlangius merlangus	0		0.00	6.48	4.32	62.16	53.97	7.09
	1		0.13	9.73	79.87	53.18	19.29	74.80
	2			1.43	18.40	110.43	115.86	167.77
	3			0.00	2.30	24.12	26.30	109.34
	4				0.62	5.91	5.85	13.41
	5				0.00	0.04	0.13	3.08
	6				0.00	0.02	0.07	1.75
Trisopterus esmarkii	0			3.28	110.97	42.95	17.82	65.58
	1		0.01	8.44	67.13	131.96	155.44	93.34
	2			0.81	16.92	41.62	46.27	20.16
	3			0.00	0.17	0.43	0.47	0.19
Clupea harengus	1		25.47	10.52	11.14	20.03	10.24	53.48
	2		0.05	1.20	3.87	18.15	25.59	67.65
Sprattus sprattus	0		28.74	11.74	2.02	2.50	5.10	23.01
	1		4.50	18.97	6.96	28.93	22.67	66.85
	2		3.06	22.75	17.63	70.91	42.74	96.41
	3		0.28	2.37	2.39	8.99	4.44	9.51
AMMODYTIDAE	0		261.40	2902.53	3182.52	4896.46	4245.10	896.04
	1		64.40	1064.09	884.64	2846.12	2557.97	1034.58
	2		19.43	66.27	118.44	580.50	110.93	1424.53
	3		1.62	12.83	32.41	211.19	21.30	500.15
	4		0.73	6.20	21.87	88.00	13.10	177.19
	5		0.10	2.34	7.80	44.51	4.36	99.19
	6		0.03	1.09	5.72	16.30	2.97	25.29
Other prey			3248.63	11662.86	31925.75	62806.99	72729.48	37943.96

TABLE 12-A-3 Average number of prey organisms per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 3			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey		1534.06	5349.92	11230.79	27064.62	17610.37	10787.15	6465.24
Gadus morhua	0		31.34	208.61	9.37	54.06	182.77	40.68
	1			0.10	1.95	9.60	30.74	6.94
	2				0.16	1.18	4.24	0.93
Melanogrammus aeglef.	0		9.23	142.68	258.13	224.14	182.89	155.51
	1		0.01	2.89	31.73	84.78	75.67	43.47
	2			0.31	8.87	72.77	87.21	258.29
	3			0.02	0.24	2.29	4.09	77.70
	4				0.00	0.01	0.03	8.39
	5							0.56
Merlangius merlangus	0	0.13	78.22	193.34	43.39	0.93		
	1		0.07	13.60	15.26	18.26	10.17	7.02
	2			0.34	2.94	17.44	14.37	35.37
	3			0.02	0.63	2.91	3.38	5.22
	4			0.01	0.14	0.40	0.62	0.77
	5				0.01	0.04	0.06	0.03
	6				0.00	0.02	0.02	0.01
Trisopterus esmarkii	0		10.97	353.81	970.94	1402.57	1755.36	1226.56
	1			12.78	93.76	81.78	69.68	65.76
	2			17.74	127.47	101.89	81.22	85.86
Clupea harengus	0		1.23	19.14	14.40	4.72	1.25	
	1		0.02	3.64	10.37	8.90	9.36	
	2		0.00	0.60	0.73	0.35	0.45	
	3			4.55	43.28	97.90	76.91	37.32
Sprattus sprattus	0		0.35	0.14	0.23	1.43	4.50	0.98
	1		14.03	21.42	9.71	5.70	1.25	
	2		1.18	5.04	2.00	0.18	0.04	
	3		0.06	0.59	0.09			
AMMODYTIDAE	0	0.45	70.38	650.09	1234.33	572.46	443.64	187.45
	1		0.16	6.43	9.78	0.83	0.24	0.10
	2		0.71	27.63	38.54	3.81	2.30	0.98
	3		0.03	1.21	1.96	0.15		
	4		0.01	0.44	0.71	0.05		
Other prey		1533.48	5131.91	9540.38	24097.66	14764.47	7655.30	4177.48

TABLE 12-A-4 Average number of prey organisms per 1000 cod stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 4			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey		2161.17	5502.00	4279.67	4355.86	23860.24	5093.69	5831.20
Gadus morhua	0	0.16	0.04	2.56	15.11	24.63		
	1			0.00	1.83	20.96	0.49	0.10
	2				1.75	29.43	18.24	0.80
	3				0.07	1.00	0.72	0.02
Melanogrammus aeglefinus	0		13.47	194.32	300.12	6169.77	782.12	331.53
	1			1.09	8.55	290.06	37.62	50.13
	2				3.35	106.45	27.80	192.64
	3				0.24	6.75	2.20	24.09
	4				0.01	0.35	0.04	0.01
	5				0.00	0.09	0.01	0.00
Merlangius merlangus	0		2.12	15.11	14.14	18.61	11.29	0.12
	1		0.00	1.30	39.19	224.74	105.58	14.18
	2			0.40	10.78	74.88	46.63	180.24
	3				0.96	9.43	10.64	59.78
	4			0.01	0.20	2.13	1.43	
	5				0.01	0.06	0.08	
	6				0.02	0.15	0.23	
Trisopterus esmarkii	0	1.21	6.63	153.93	509.93	5101.56	754.58	958.23
	1		3.06	38.06	122.93	1938.10	240.71	81.37
	2		0.09	2.11	8.38	71.67	9.21	2.94
Clupea harengus	0		5.01	17.83	122.95	0.13		
	1		0.04	1.04	4.38	44.96		
	2			0.04	0.19	8.19		
	3			0.11	0.53	1.48		
	4			0.13	0.62	0.54		
	5			0.18	0.81	0.36		
	6			0.02	1.90	77.35	9.33	3.30
Sprattus sprattus	1	0.04	14.49	18.30	19.05	45.77	3.59	
	2		0.79	6.65	17.96	57.74	4.57	
	3		0.01	0.22	0.58	3.14	0.25	
	4		0.00	0.07	0.19	1.05	0.08	
AMMODYTIDAE	0	1.88	68.08	277.78	328.46	1283.19	589.50	1175.02
	1		3.88	4.13	11.94	85.82	128.93	199.75
	2		5.01	5.39	15.68	112.72	169.35	263.85
	3		1.68	2.17	6.87	49.61	74.53	124.98
	4		1.06	1.58	5.28	38.23	57.43	100.41
	5		0.21	0.37	1.30	9.42	14.15	25.64
	6		0.22	0.40	1.41	10.20	15.33	27.77
Other prey		2154.31	5375.97	3533.04	2776.13	7936.14	1973.64	2008.95

TABLE 12-B Average number of prey organisms per 1000 haddock stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : HADDOCK		Quarter : 1			Area : ALL				
	Age class	0	1	2	3	4	5	6+	
All prey			2268.14	6726.21	5811.64	7529.63	9619.16	9460.19	
Trisopterus esmarkii	0			3.40	5.34	3.84	5.17	1.84	
	1			17.64	151.25	330.43	407.70	408.98	
	2			0.17	6.83	52.15	72.62	38.02	
Clupea harengus	1				0.18	0.33	0.93	3.79	
	2				0.05	0.09	0.25	1.01	
Sprattus sprattus	1		0.26	1.04	5.45	1.48	1.24	3.43	
	2			0.80	4.07	1.15	0.91	2.94	
	3			0.00	0.01	0.01	0.06	0.13	
	4			0.00	0.00	0.00	0.00	0.00	
AMMODYTIDAE	1			0.31	9.41	33.33	38.12	13.99	
	2			1.10	4.67	28.94	42.95	31.13	
	3			0.01	0.86	0.78	0.05		
	4			0.01	1.02	0.93	0.06		
	5			0.00	0.33	0.30	0.02		
	6			0.00	0.36	0.33	0.02		
Other prey			2267.88	6701.64	5621.80	7075.55	9049.05	8954.94	
Predator : HADDOCK		Quarter : 2			Area : ALL				
All prey			2350.95	5042.24	20206.58	28576.11	12484.74	7604.31	3198.06
Trisopterus esmarkii	1				0.12	5.63	39.24	62.70	6.98
	2					0.21	2.01	3.30	0.37
Sprattus sprattus	0				0.01	0.01			
	1				0.02	0.02			
	2				0.00	0.00			
AMMODYTIDAE	0		17.06	132.39	163.74	26.19	2.70	7.79	
	1		0.90	19.37	9.58	60.61	24.33	83.71	
	2							7.01	
	3							0.42	
	4							0.21	
Other prey			2350.95	5019.63	20054.48	28396.87	12356.69	7511.28	3091.56
Predator : HADDOCK		Quarter : 3			Area : ALL				
All prey			1559.69	12975.50	23372.75	13623.79	13742.38	9861.65	6601.46
Melanogrammus aeglef.	0				2.20	6.39	7.90	4.85	
Merlangius merlangus	0					0.11	0.47		
Trisopterus esmarkii	0		0.24	0.28	56.40	216.60	357.73	450.61	36.08
	1				0.02	0.48	1.80	2.99	0.25
	2				0.00	0.43	1.31	0.98	
Sprattus sprattus	0			0.00	0.01	0.47	1.48	1.32	
	1			0.04	0.14	0.13	0.45		
	2			0.00	0.00	0.00	0.01		
AMMODYTIDAE	0		14.92	99.70	270.52	254.95	279.70	298.48	549.70
Other prey			1544.53	12875.47	23043.36	13142.97	13085.29	9086.23	6013.72
Predator : HADDOCK		Quarter : 4			Area : ALL				
All prey			5017.71	5082.44	15193.78	16242.68	13492.49	10611.22	24527.50
Melanogrammus aeglef.	0			0.22	0.28				
Merlangius merlangus	0			0.01	0.49	3.30			6.16
Trisopterus esmarkii	0		0.02	12.23	20.92	44.66	115.35	239.62	87.54
	1			2.08	5.18	8.41	10.30	15.40	6.20
	2			0.02	0.05	0.08	0.10	0.16	0.06
Clupea harengus	0				0.04	2.20			
	1				0.00	0.04			
AMMODYTIDAE	0		2.27	25.25	216.85	527.60	703.39	874.05	835.14
Other prey			5015.42	5042.64	14949.97	15655.39	12663.34	9481.99	23592.40

TABLE 12-C Average number of prey organisms per 1000 whiting stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : WHITING		Quarter : 1		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey*)			2250	3892	6218	6567	5638	5058
*) % of total weight accounted for (see text) :			89.8	93.6	94.3	93.7	93.9	97.9
Gadus morhua	1		0.01	0.20	0.04			3.19
Melanogrammus aeglef.	1		2.36	0.90	5.02	10.52	12.68	21.76
	2			0.00	0.12	0.31	0.38	0.98
Merlangius merlangus	1			0.39	4.38	15.26	43.33	25.84
	2			0.00	0.02	0.09	0.35	0.21
Trisopterus esmarkii	0		8.00	10.00	8.95			
	1		9.35	11.00	60.13	120.01	124.52	169.98
	2		0.21	2.42	21.44	50.29	61.47	108.56
	3			0.02	0.42	1.11	1.38	2.31
Clupea harengus	1			31.35	59.68	155.04	58.97	359.20
	2			0.01	0.12	0.31	0.40	0.17
Sprattus sprattus	1		98.04	144.61	213.25	98.30	122.72	77.73
	2		9.56	43.69	54.84	64.19	65.73	51.56
	3		0.19	2.17	4.39	6.60	6.17	5.88
	4		0.00	0.03	0.05	0.08	0.08	0.07
AMMODYTIDAE	1		124.73	58.12	77.21	48.98	47.21	59.69
	2		3.30	4.32	7.54	7.25	8.15	17.04
	3			0.02	0.21	0.59	1.03	0.79
	4			0.02	0.26	0.71	1.23	0.94
	5			0.01	0.08	0.23	0.40	0.31
	6+			0.01	0.09	0.25	0.43	0.33

Predator : WHITING		Quarter : 2		Area : ALL			
		19794	16049	12050	10402	3954	8274
All prey*)							
*) % of total weight accounted for (see text):		94.7	97.1	97.6	96.0	95.3	97.2
Gadus morhua	0	116.71	20.81	49.75	31.32	8.32	29.20
Melanogrammus aeglef.	0	2.27	1.11	9.80	13.12	5.48	36.26
	1		0.21	1.93	1.65	1.41	1.72
	2		0.00	0.32	0.46	0.35	0.43
Merlangius merlangus	0	0.00	0.00	0.00	0.00	0.00	0.00
	1	0.00	1.10	11.07	12.86	9.52	13.42
Trisopterus esmarkii	0	8.01	107.94	14.71	1.72		
	1	0.42	22.67	105.38	76.45	51.10	88.73
	2		1.06	9.72	16.35	45.85	19.10
	3		0.07	0.07	0.16	0.54	0.18
Clupea harengus	1	12.38	49.87	62.08	47.54	0.88	1.14
Sprattus sprattus	0	11.42	9.24	5.48	17.23	11.65	8.15
	1	1.01	7.06	7.15	24.51	19.14	13.29
	2	0.63	2.26	2.61	11.49	8.84	5.88
	3	0.06	0.05	0.08	0.60	0.45	0.28
AMMODYTIDAE	0	1532.87	1345.93	598.14	463.70	419.30	917.02
	1	123.03	440.45	582.85	327.33	353.26	611.12
	2	3.32	35.47	97.79	71.35	51.08	118.04
	3	0.23	5.10	14.43	7.41	4.85	9.10
	4	0.11	2.02	5.69	3.15	2.11	4.20
	5	0.01	0.71	2.03	0.74	0.42	0.47
	6+	0.00	0.18	0.51	0.18	0.10	0.12

TABLE 12-C Continued

Predator : WHITING		Quarter : 3		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey*)			777	1244	1891	2279	1842	3080
*) % of total weight accounted for (see text):			60.7	79.1	84.5	77.7	65.5	80.0
Gadus morhua	0		0.12	0.03	0.02			
Melanogrammus aeglef.	0		8.56	127.27	383.12	338.34	316.70	368.82
	1		0.00	0.60	0.85	0.50	0.56	0.32
Merlangius merlangus	0		45.41	169.18	235.59	109.73	154.82	94.65
Trisopterus esmarkii	0		54.58	259.31	596.91	419.88	341.89	264.98
	1			0.14	1.32	1.30	0.89	1.30
	2			0.00	0.01	0.01	0.01	0.01
Clupea harengus	0		2.36	125.24	207.30	218.24	171.44	191.61
Sprattus sprattus	0		0.78	1.80	0.50	0.39	0.71	0.37
	1		11.11	25.02	42.85	150.34	271.58	161.78
	2		0.38	4.53	8.89	34.44	62.17	37.38
	3		0.00	0.20	0.40	1.56	2.82	1.70
AMMODYTIDAE	0		488.78	314.56	391.74	449.02	237.60	626.12
	1		0.19	6.08	7.34	2.89	1.45	1.70
	2		0.30	9.04	11.16	4.42	2.17	2.62
	3		0.06	1.77	2.12	0.83	0.42	0.49
	4		0.02	0.64	0.77	0.30	0.15	0.18

Predator : WHITING		Quarter : 4		Area : ALL				
All prey*)			29375	18684	19228	2474	2117	3322
*) % of total weight accounted for (see text):			76.1	73.2	86.3	84.9	90.1	87.5
Gadus morhua	0		0.03	0.77	3.08	5.09	11.55	4.18
Melanogrammus aeglef.	0		9.46	58.42	168.59	178.44	229.16	232.14
	1		0.06	0.13	0.24	0.62	1.20	2.08
Merlangius merlangus	0		6.55	8.34	21.26	20.27	63.13	19.30
Trisopterus esmarkii	0		63.15	182.27	522.88	581.59	410.89	414.20
	1		0.08	0.48	1.73	2.45	2.79	3.88
Clupea harengus	0		43.42	72.71	41.04	113.06	129.00	27.73
	1		0.01	0.02	0.01	2.28	6.63	13.86
	2					0.09	0.26	0.55
Sprattus sprattus	0		17.05	13.32	23.35	9.92	87.53	19.09
	1		30.37	21.45	10.81	15.70	17.57	2.35
	2		26.66	23.31	12.85	18.73	17.25	2.66
	3		0.39	0.94	0.63	0.93	0.50	0.12
	4		0.13	0.31	0.21	0.31	0.17	0.04
AMMODYTIDAE	0		609.45	452.81	287.18	220.34	187.97	51.36
	1		1.05	7.64	11.74	7.97	1.50	9.92
	2		1.36	9.91	15.24	10.34	1.95	12.87
	3		0.31	2.27	3.49	2.37	0.45	2.95
	4		0.11	0.83	1.27	0.86	0.16	1.07

TABLE 12-D Average number of prey organisms per 1000 mackerel stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : MACKEREL		Quarter : 1		Area : ALL	
		Age class	1-2	3-7	8+
All prey			52000	63000	48000
AMMODYTIDAE	1		80	480	
Predator : MACKEREL		Quarter : 2		Area : ALL	
All prey			588000	1942000	4160000
Trisopterus esmarkii	0		10	0	0
	1		0	0	0
Clupea harengus	1			0	0
Sprattus sprattus	0		22	25	3
	1		7	13	6
	2		1	2	1
	3				0
AMMODYTIDAE	0		469	1545	1719
	1		384	399	225
	2		75	103	32
	3		10	14	6
	4		8	13	5
	5		2	3	1
	6		2	3	2
Predator : MACKEREL		Quarter : 3		Area : ALL	
All prey			1422000	1440000	1304000
Gadus morhua	0			0	
Melanogrammus aeglefinus	0			0	
Merlangius merlangus	0			0	
Trisopterus esmarkii	0		70	130	190
Clupea harengus	1		0	20	40
	2				0
	3				0
Sprattus sprattus	0		0	0	12
	1		10	16	82
	2		0	4	6
	3		0	0	0
AMMODYTIDAE	0		556	640	140
	1		1	0	
	2		3	0	
	3		0	0	
	4		0	0	
	5		0	0	
	6		0	0	
Predator : MACKEREL		Quarter : 4		Area : ALL	
All prey			997000	113900	3334000
Trisopterus esmarkii	0		20	20	60
	1		10	0	37
	2		0	0	3
Clupea harengus	0			20	20
	1			0	0
Sprattus sprattus	0			0	
	1			0	
	2			0	
	3			0	
AMMODYTIDAE	0		700	220	100

TABLE 12-E Average number of prey organisms per 1000 *saithe* stomachs by age class of prey and predator by quarter for the total North Sea.

Predator : SAITHE		Quarter : 1			Area : ALL			
	Age class	3	4	5	6	7	8	9+
All prey		26891	40129	42367	42740	42940	4294	42223
Melanogrammus aeglef.	1	621.72	75.06	80.22	80.20	80.39	80.39	80.78
	2	0.07	1.42	0.84	0.65	0.61	0.61	0.72
Merlangius merlangus	1		0.34	8.49	10.62	11.18	11.18	10.98
	2		0.08	1.99	2.49	2.62	2.62	2.97
	3		0.04	0.99	1.23	1.30	1.30	1.76
	4		0.01	0.22	0.27	0.29	0.29	0.44
	5			0.02	0.02	0.02	0.02	0.04
Trisopterus esmarkii	1	178.88	1348.74	1842.23	1944.46	1974.96	1974.96	1952.57
	2	24.09	344.86	719.59	810.47	835.29	835.29	838.63
	3	1.50	20.55	43.09	48.56	50.06	50.06	51.54
	4							0.08
Clupea harengus	1	0.54	11.02	25.35	28.86	29.82	29.82	29.22
	2	0.02	0.42	2.76	3.36	3.52	3.52	3.45
	3		0.01	0.26	0.32	0.34	0.34	0.33
	4			0.02	0.03	0.03	0.03	0.03
Sprattus sprattus	2	16.77	2.84	8.23	10.28	10.82	10.82	10.61
	3	2.29	0.39	1.12	1.40	1.48	1.48	1.45
AMMODYTIDAE	1	1351.58	3.69	93.43	116.78	122.93	122.93	127.14
	2		0.38	9.73	12.16	12.80	12.80	14.55
	3		0.12	2.98	3.72	3.92	3.92	4.45
	4		0.10	2.62	3.27	3.45	3.45	3.73
	5		0.04	0.89	1.12	1.18	1.18	1.26
	6		0.04	0.93	1.17	1.23	1.23	1.34
Predator : SAITHE		Quarter : 2			Area : ALL			
All prey		37359	45705	84737	98186	137694	137135	136017
Gadus morhua	0	37.96	188.67	304.77	295.45	268.10	265.42	260.06
Melanogrammus aeglef.	0	310.22	183.23	1630.25	2254.65	4088.81	4054.01	3984.41
	1	39.19	7.02	40.40	54.90	97.50	98.81	101.43
	2		0.02	0.66	0.95	1.79	5.02	11.47
	3						0.11	0.34
Merlangius merlangus	1	4.92	4.67	2.14	1.60			
Trisopterus esmarkii	0	384.03	353.84	225.78	216.48	189.15	191.92	197.47
	1	806.63	871.68	765.63	768.05	775.16	773.13	769.08
	2	2.72	14.96	75.83	98.60	165.49	164.00	161.02
Clupea harengus	1		0.29	10.66	15.26	28.80	28.51	27.94
	2						0.03	0.08
	3						0.46	1.37
	4						0.21	0.62
	5						0.22	0.67
	6						0.03	0.08
Sprattus sprattus	0	4.14						
AMMODYTIDAE	0	360.38	160.53	397.31	545.62	981.27	971.46	951.83
	1	30.24	9.03	68.49	93.95	168.73	167.04	163.67
	2	4.24	1.11	1.23	0.92			
	3	1.67						
	4	0.56						
	5	0.12						

TABLE 12-E Continued

Predator : SAITHE		Quarter : 3			Area : ALL			
	Age class	3	4	5	6	7	8	9+
All prey		40674	54817	75403	88940	133491	136294	135457
Gadus morhua	0	37.86	301.82	308.01	301.86	271.01	266.00	257.38
Melanogrammus aeglef.	0	725.50	318.77	1242.73	1869.24	3984.25	4109.63	4046.80
	1		0.13	1.12	1.82	4.11	5.59	9.54
	2						2.79	11.15
Merlangius merlangus	0	2.78	0.85	0.37	0.30			
	1	0.29	2.60	2.11	1.68	0.14	0.03	
Trisopterus esmarkii	0	724.16	844.72	726.29	678.37	494.13	480.78	479.00
	1	46.18	201.08	300.81	366.47	577.36	592.53	594.26
	2	0.68	7.78	19.46	27.37	53.35	54.75	53.57
Clupea harengus	0		0.86	7.49	12.10	27.36	28.22	27.65
	2						0.03	0.11
	3						0.46	1.83
	4						0.21	0.82
	5						0.22	0.90
	6						0.03	0.11
Sprattus sprattus	0	10.46						
AMMODYTIDAE	0	566.57	115.54	342.49	501.28	1055.53	1086.28	1063.51
	1	19.75	4.14	13.32	19.27	40.21	41.37	40.49
	2	9.41	1.42	1.19	0.79			
	3	3.92	0.08	0.08				
	4	1.41						
	5	0.31						

Predator : SAITHE		Quarter : 4			Area : ALL			
	Age class	3	4	5	6	7	8	9+
All prey		48086	39930	40414	42619	42581	42223	41505
Melanogrammus aeglef.	0	295.45	76.13	78.28	80.27	80.76	80.96	81.35
	1	0.19	1.00	0.83	0.49	0.49	0.54	0.64
	2						0.01	0.01
Merlangius merlangus	0		0.74	3.91	9.73	10.48	10.37	10.16
	1		0.22	1.19	2.96	3.35	3.49	3.76
	2		0.10	0.50	1.25	1.65	1.94	2.51
	3		0.02	0.09	0.22	0.31	0.38	0.52
	4					0.01	0.02	0.03
Trisopterus esmarkii	0	367.78	1327.85	1510.05	1803.55	1835.48	1824.72	1803.20
	1	92.06	431.87	613.74	934.09	981.96	983.24	985.79
	2	3.23	14.62	20.83	31.78	33.93	34.48	35.59
	3					0.15	0.30	0.59
	4					0.04	0.08	0.15
Clupea harengus	0	2.00	12.09	17.51	27.03	28.13	27.85	27.28
	1		0.35	1.86	4.63	4.98	4.93	4.83
	2		0.02	0.08	0.21	0.22	0.22	0.22
	3			0.01	0.03	0.03	0.03	0.03
Sprattus sprattus	0	0.47	0.03	0.05	0.11	0.12	0.12	0.12
	1	26.15	1.55	2.55	6.34	6.82	6.75	6.61
	2	19.15	1.13	1.87	4.64	4.99	4.94	4.84
	3	0.93	0.06	0.09	0.23	0.24	0.24	0.24
AMMODYTIDAE	0	594.69	9.25	48.87	121.51	134.54	137.01	141.95
	1		0.07	0.35	0.86	1.08	1.22	1.51
	2		0.20	1.05	2.60	3.21	3.60	4.36
	3		0.27	1.41	3.50	4.06	4.31	4.81
	4		0.24	1.28	3.17	3.59	3.73	4.01
	5		0.08	0.44	1.08	1.22	1.26	1.34
	6		0.09	0.46	1.13	1.29	1.34	1.45

TABLE 13 AVERAGE PREY WEIGHTS.

TABLE 13-A-1 Average prey weight (g) at time of ingestion for cod by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 1		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			0.88	2.65	11.52	25.83	27.97	36.82
Gadus morhua	1			71.13	66.10	80.93	78.64	51.23
	2			348.10	228.39	198.07	203.50	177.58
	3					272.26	233.58	132.14
Melanogrammus aeglef.	1		9.80	19.55	23.10	32.64	37.50	38.47
	2			80.35	103.94	141.58	137.34	155.41
	3			153.79	159.01	153.60	137.34	167.87
	4			136.00	152.15	147.97	108.79	149.53
Merlangius merlangus	1		0.22	33.85	34.97	40.74	43.20	38.11
	2			81.64	79.98	128.01	133.31	58.32
	3			249.48	170.86	174.07	177.78	125.09
	4			635.37	245.74	239.50	245.67	219.90
	5			648.26	259.52	245.18	251.12	187.68
	6			560.50	249.62	287.32	407.26	363.66
Trisopterus esmarkii	1		11.27	7.45	10.20	11.10	11.62	13.84
	2		11.25	17.94	18.61	25.97	30.02	31.93
	3			39.95	24.71	33.48	37.29	38.66
Clupea harengus	1		24.00	24.33	33.24	36.75	39.45	42.16
	2			40.24	39.20	47.11	54.53	47.75
	3			55.32	119.85	133.67	120.14	100.64
Sprattus sprattus	1		2.64	4.01	3.90	4.90	5.65	7.42
	2		6.76	10.63	14.59	13.48	12.43	10.05
	3		13.00	16.14	17.75	16.26	15.68	12.02
	4		13.06	16.13	17.74	16.27	15.69	12.02
AMMODYTIDAE	0			0.25	0.27			
	1		3.66	3.98	6.27	5.02	4.40	3.64
	2		5.76	9.69	15.39	13.47	10.24	6.42
	3			40.66	32.78	30.99	31.00	
	4			40.65	32.78	30.99	31.00	
	5			40.74	32.78	30.99	30.99	
	6			40.74	32.78	30.99	31.00	
Other prey			0.75	1.96	6.27	10.83	12.14	28.93

TABLE 13-A-2 Average prey weight (g) at time of ingestion for cod by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 2		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			0.95	1.52	2.32	2.56	2.56	7.10
Gadus morhua	0		0.88	1.42	2.35	2.66	0.68	
	1		15.20	41.64	56.90	64.76	64.41	50.32
	2			171.84	203.55	239.31	240.82	216.45
	3				631.70	632.02	631.98	632.03
Melanogrammus aeglef.	0		22.70	6.14	12.21	10.22	10.22	10.22
	1		22.70	29.70	64.54	33.22	26.08	28.57
	2			63.56	105.34	146.90	131.81	95.97
	3				277.12	287.70	290.01	289.97
Merlangius merlangus	0		21.00	1.74	1.59	5.22	5.61	5.61
	1		20.65	21.66	27.35	78.00	78.00	121.08
	2			97.58	112.83	105.15	106.33	152.29
	3			122.95	164.77	171.61	195.69	205.58
	4				171.43	200.66	219.95	210.92
	5				348.85	352.16	351.92	214.07
	6				344.70	351.72	351.72	214.10
Trisopterus esmarkii	0			2.51	1.36	2.24	3.60	2.24
	1		13.20	22.07	28.40	30.70	27.65	22.11
	2			44.00	82.46	58.36	53.21	45.78
	3			67.68	96.72	63.82	58.61	52.87
Clupea harengus	1		0.69	23.13	48.35	107.40	163.62	77.34
	2		4.77	48.33	111.55	201.21	343.53	185.02
Sprattus sprattus	0		1.00	6.88	2.16	13.00	16.00	15.10
	1		6.52	15.75	22.28	29.17	27.16	21.69
	2		17.18	24.01	24.68	31.68	32.10	27.52
	3		19.72	27.59	29.58	34.37	32.92	28.87
AMMODYTIDAE	0		0.77	1.03	0.95	0.91	0.93	1.01
	1		5.26	2.96	3.18	2.41	2.59	2.25
	2		8.03	12.59	13.22	2.99	13.87	0.83
	3		9.47	18.79	22.81	4.08	24.12	0.59
	4		9.06	21.18	26.23	8.25	29.16	0.90
	5		13.38	22.76	26.86	5.74	31.01	0.63
	6		13.17	27.46	29.83	13.70	36.44	1.39
Other prey			0.80	1.23	1.86	1.71	1.69	5.31

TABLE 13-A-3 Average prey weight (g) at time of ingestion for cod by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 3		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey		0.28	1.31	2.74	3.40	12.96	29.72	117.84
Gadus morhua	0		10.88	9.98	34.38	19.70	15.23	16.32
	1			123.91	169.97	191.23	199.25	197.21
	2				653.83	653.83	653.75	653.46
Melanogrammus aeglefinus	0		5.73	10.85	14.73	14.13	14.81	8.95
	1		13.90	100.62	136.81	149.21	150.03	158.54
	2			140.74	200.49	191.90	270.29	565.68
	3			107.25	153.28	175.50	318.27	707.53
	4				203.50	188.74	344.10	1267.71
	5							1792.42
Merlangius merlangus	0	10.00	8.29	7.94	9.06	47.50		
	1		58.28	75.00	82.04	153.29	168.80	246.30
	2			142.74	188.69	186.02	268.73	388.92
	3			176.16	425.45	375.63	440.52	425.03
	4			260.13	448.43	501.91	484.06	447.56
	5				553.00	552.00	551.48	552.33
	6				555.00	550.86	552.76	546.44
Trisopterus esmarkii	0		3.54	7.11	17.00	22.96	22.16	16.52
	1			43.96	52.53	52.82	52.55	71.25
	2			44.73	53.91	56.35	57.88	75.46
Clupea harengus	0		27.65	23.12	17.30	16.04	24.61	
	1		36.81	109.18	75.85	61.90	69.15	
	2		36.78	142.74	143.11	115.80	133.22	
	3			45.24	146.02	319.64	372.52	377.35
Sprattus sprattus	0		4.79	3.01	3.40	3.99	3.81	3.80
	1		12.51	22.19	10.46	5.30	5.30	
	2		29.50	30.47	12.10	5.30	5.30	
	3		45.96	46.53	12.40			
AMMODYTIDAE	0	2.59	1.97	2.77	2.67	2.62	2.92	2.81
	1		12.34	16.20	19.68	17.53	5.11	4.96
	2		7.94	9.09	10.25	8.89	5.11	4.96
	3		16.18	22.07	26.37	25.67		
	4		16.18	22.07	26.38	25.64		
Other prey		0.28	1.08	1.70	1.57	7.40	23.82	113.09

TABLE 13-A-4 Average prey weight (g) at time of ingestion for cod by age class of prey and predator by quarter for the total North Sea.

Predator : COD		Quarter : 4			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey		0.79	2.65	5.99	16.36	27.66	28.92	42.89
Gadus morhua	0	30.48	32.55	28.43	59.57	54.44		
	1			356.40	467.73	430.04	419.61	38.82
	2				686.69	350.62	794.64	38.80
	3				728.90	412.75	819.85	38.94
Melanogrammus aeglefinus	0		16.16	16.27	21.49	17.00	16.49	19.99
	1			61.11	142.49	158.05	164.81	178.96
	2				327.89	258.55	347.04	345.10
	3				360.30	228.43	399.15	348.30
	4				183.77	180.77	180.22	182.36
	5				179.82	180.95	177.81	180.84
Merlangius merlangus	0		7.83	24.03	41.79	70.27	55.96	121.92
	1			146.16	137.24	125.03	107.17	78.46
	2			197.08	168.08	190.24	171.41	133.38
	3				255.67	264.32	276.49	138.14
	4			270.76	352.28	330.25	459.21	
	5				456.44	467.88	467.80	
	6				467.67	468.18	468.32	
Trisopterus esmarkii	0	8.00	6.25	6.93	7.84	8.33	8.02	9.79
	1		11.43	17.72	21.98	23.41	23.91	23.45
	2		41.45	42.01	47.19	57.69	60.68	58.40
Clupea harengus	0		8.31	25.05	19.22	35.33		
	1		18.70	60.96	47.82	28.69		
	2			89.04	96.79	28.68		
	3			41.33	46.63	28.97		
	4			39.92	44.53	29.62		
	5			39.58	44.04	30.61		
	6			39.60	256.75	268.66	268.80	268.81
Sprattus sprattus	1	0.36	1.39	5.85	13.41	21.07	19.00	
	2		8.85	17.11	16.07	21.12	19.00	
	3		20.44	22.54	21.95	21.20	18.99	
	4		20.00	22.56	21.96	21.21	18.95	
AMMODYTIDAE	0	1.04	5.31	2.62	3.80	5.74	6.77	4.16
	1		9.82	8.98	17.76	18.01	18.01	26.12
	2		9.78	9.52	18.66	18.87	18.87	27.27
	3		9.13	17.64	31.10	30.70	30.70	41.80
	4		8.51	23.27	38.62	37.80	37.80	49.57
	5		7.65	28.89	45.36	44.14	44.14	56.00
	6		7.65	28.89	45.36	44.14	44.14	56.00
Other prey		0.79	2.55	5.14	13.74	35.35	24.48	41.42

TABLE 13-B Average prey weight (g) at time of ingestion for haddock by age class of prey and predator by quarter for the total North Sea.

Predator : HADDOCK		Quarter : 1			Area : ALL			
	Age class	0	1	2	3	4	5	6+
All prey			0.20	0.26	0.82	1.24	1.55	1.61
Trisopterus esmarkii	0			0.02	0.09	0.95	0.94	0.90
	1			11.67	9.71	10.68	12.07	13.73
	2			11.92	15.94	17.34	18.01	20.67
Clupea harengus	1				8.00	8.00	8.00	8.00
	2				8.00	8.00	8.00	8.00
Sprattus sprattus	1		3.10	11.36	13.54	13.41	10.02	12.61
	2			19.74	24.22	24.10	22.64	23.70
	3			17.45	20.01	20.68	19.62	21.54
	4			20.01	20.15	20.14	19.70	21.82
AMMODYTIDAE	1			6.35	10.20	9.25	9.41	14.61
	2			3.95	17.33	19.99	22.34	30.52
	3			46.59	40.24	40.47	39.53	
	4			46.77	40.24	40.48	39.81	
	5			47.71	40.24	40.45	40.00	
	6			48.27	40.24	40.44	39.47	
Other prey			0.20	0.23	0.48	0.54	0.81	0.83
Predator : HADDOCK		Quarter : 2			Area : ALL			
All prey		0.21	0.14	0.20	0.42	1.72	2.40	10.08
Trisopterus esmarkii	1			8.49	19.81	24.10	25.25	26.99
	2				24.22	24.52	25.25	26.99
Sprattus sprattus	0			11.85	11.85			
	1			11.85	11.85			
	2			11.85	11.85			
AMMODYTIDAE	0		1.49	1.82	1.67	2.08	4.10	4.10
	1		1.49	3.48	3.63	3.02	4.10	4.24
	2							4.96
	3							4.96
	4							4.96
Other prey		0.21	0.14	0.18	0.41	1.63	2.20	10.23
Predator : HADDOCK		Quarter : 3			Area : ALL			
All prey		0.22	0.21	0.27	0.93	1.62	3.57	1.38
Melanogrammus aeglefs	0			5.37	9.62	16.71	22.09	
Merlangius merlangus	0				16.68	16.68		
Trisopterus esmarkii	0	2.44	4.79	5.96	8.04	13.24	22.69	31.19
	1			41.03	57.17	50.67	47.14	47.78
	2			52.67	64.33	58.83	59.96	
Sprattus sprattus	0		25.98	20.52	2.46	2.47	2.27	
	1		25.94	25.94	23.98	23.60		
	2		25.98	25.93	23.98	23.60		
AMMODYTIDAE	0	2.25	2.85	3.09	3.22	3.00	2.74	1.70
Other prey		0.20	0.19	0.22	0.75	1.23	2.55	1.16
Predator : HADDOCK		Quarter : 4			Area : ALL			
All prey		0.11	0.50	0.34	0.66	1.01	1.80	0.65
Melanogrammus aeglefs	0		12.54	12.51				
Merlangius merlangus	0		8.84	9.18	7.12			11.11
Trisopterus esmarkii	0	11.29	10.31	13.45	15.59	12.42	11.32	11.44
	1		16.34	16.97	25.45	21.67	18.67	19.49
	2		16.25	17.05	25.52	21.66	18.70	19.51
Clupea harengus	0			17.20	17.20			
	1			17.12	17.20			
AMMODYTIDAE	0	2.80	4.42	5.19	4.51	4.37	4.64	3.87
Other prey		0.11	0.45	0.25	0.47	0.70	1.27	0.49

TABLE 13-C Average prey weight (g) at time of ingestion for whiting by age class of prey and predator by quarter for the total North Sea.

Predator : WHITING		Quarter : 1		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			0.35	0.44	0.57	0.83	1.19	1.85
Gadus morhua	1		16.10	16.10	16.10			100.12
Melanogrammus aeglef.	1		4.42	3.87	11.38	12.52	13.50	17.23
	2			42.32	42.32	42.32	42.32	42.32
Merlangius merlangus	1			17.58	19.65	21.65	25.95	25.91
	2			42.98	42.98	42.98	42.98	42.98
Trisopterus esmarkii	0		0.02	0.02	0.02			
	1		2.70	6.01	6.67	6.99	7.52	8.64
	2		10.78	13.74	17.21	17.94	18.06	17.78
	3			35.68	35.68	35.68	35.68	35.68
Clupea harengus	1			7.09	7.74	5.88	11.76	4.22
	2			34.55	34.55	34.55	34.55	34.55
Sprattus sprattus	1		1.01	1.50	1.40	1.58	1.53	1.58
	2		4.19	6.25	7.84	9.04	8.57	9.63
	3		14.06	14.06	14.06	14.06	14.06	14.06
	4		14.06	14.06	14.06	14.06	14.06	14.06
AMMODYTIDAE	1		1.30	1.54	1.32	1.70	1.93	2.25
	2		4.80	5.52	6.72	8.02	8.36	9.66
	3			40.14	40.14	40.14	40.14	40.14
	4			40.14	40.14	40.14	40.14	40.14
	5			40.14	40.14	40.14	40.14	40.14
	6+			40.14	40.14	40.14	40.14	40.14

Predator : WHITING		Quarter : 2		Area : ALL				
	Age class	0	1	2	3	4	5	6+
All prey			0.07	0.20	0.49	0.49	1.32	0.92
Gadus morhua	0		0.07	0.52	0.72	0.31	0.18	0.64
Melanogrammus aeglef.	0		0.39	4.09	16.22	15.94	12.61	15.92
	1			39.94	34.49	30.54	31.84	31.92
	2			42.32	42.32	42.31	42.49	42.32
Merlangius merlangus	0		15.78	15.78	15.78	19.50	15.00	12.00
	1		15.78	15.78	15.78	16.40	18.59	16.58
Trisopterus esmarkii	0		0.61	0.61	0.48	0.26		
	1		4.30	7.28	8.43	9.46	12.05	10.03
	2			16.35	19.12	22.12	24.36	21.75
	3			24.99	25.08	24.99	24.98	24.99
Clupea harengus	1		0.36	0.54	0.51	0.51	0.31	0.31
Sprattus sprattus	0		1.42	2.87	3.98	4.10	4.55	4.55
	1		4.84	4.73	5.00	5.53	5.50	5.41
	2		14.95	7.11	8.12	10.32	10.16	9.80
	3		16.72	16.72	16.72	16.72	16.72	16.72
AMMODYTIDAE	0		0.29	0.51	0.81	0.67	0.85	0.82
	1		1.76	2.17	2.81	3.28	2.74	3.14
	2		6.14	8.93	9.06	7.45	7.12	6.46
	3		7.41	13.77	13.92	11.54	10.80	8.78
	4		7.02	12.84	13.01	10.54	9.83	8.07
	5		17.30	17.30	17.30	17.30	17.30	17.30
	6+		17.30	17.30	17.30	17.30	17.30	17.30

TABLE 13-C Continued

Predator : WHITING		Quarter : 3			Area : ALL			
	AGE CLASS	0	1	2	3	4	5	6+
All prey			1.43	3.10	3.32	3.09	3.96	2.49
Gadus morhua	0		2.53	2.25	2.00			
Melanogrammus aeglef.	0		3.42	6.57	4.44	4.65	5.74	4.94
	1		15.88	15.88	15.88	15.88	15.88	15.88
Merlangius merlangus	0		2.78	1.93	1.55	3.22	3.24	3.93
Trisopterus esmarkii	0		1.68	1.56	1.60	1.75	1.79	1.89
	1			17.68	17.68	17.68	17.68	17.68
	2			17.68	17.68	17.68	17.68	17.68
Clupea harengus	0		13.20	11.40	10.50	8.64	10.65	6.94
Sprattus sprattus	0		3.07	2.01	3.04	4.49	4.49	4.49
	1		4.62	12.17	13.51	14.62	14.61	14.73
	2		5.40	14.93	15.21	15.40	15.39	15.41
	3		15.52	15.52	15.52	15.52	15.52	15.52
AMMODYTIDAE	0		1.47	1.60	1.41	1.28	1.27	1.25
	1		16.85	16.97	16.92	16.91	16.96	16.91
	2		15.20	15.56	15.32	15.25	15.52	15.16
	3		17.23	17.23	17.23	17.23	17.23	17.23
	4		17.23	17.23	17.23	17.23	17.23	17.23
Predator : WHITING		Quarter : 4			Area : ALL			
All prey			0.05	0.14	0.26	2.47	4.11	2.61
Gadus morhua	0		5.69	9.82	9.14	8.47	5.62	11.61
Melanogrammus aeglef.	0		7.01	6.64	6.69	7.91	10.00	12.37
	1		34.42	42.32	42.32	42.32	42.32	42.32
Merlangius merlangus	0		9.81	12.81	9.44	8.82	10.41	14.93
Trisopterus esmarkii	0		3.19	4.36	4.44	4.55	4.82	5.09
	1		12.81	12.81	12.81	12.81	12.81	12.81
Clupea harengus	0		2.96	3.04	3.05	4.41	6.55	37.28
	1		13.49	13.49	13.49	36.94	13.16	37.28
	2					37.28	37.28	37.28
Sprattus sprattus	0		2.00	2.00	2.00	2.00	2.00	2.00
	1		6.69	11.25	13.46	13.55	8.96	12.28
	2		7.56	12.37	14.09	14.15	10.21	13.22
	3		15.34	15.34	15.34	15.34	15.34	15.34
	4		15.34	15.34	15.34	15.34	15.34	15.34
AMMODYTIDAE	0		0.79	1.03	1.08	1.28	3.86	1.72
	1		17.11	17.11	17.11	17.11	17.11	17.11
	2		17.11	17.11	17.11	17.11	17.11	17.11
	3		17.11	17.11	17.11	17.11	17.11	17.11
	4		17.11	17.11	17.11	17.11	17.11	17.11

TABLE 13-E Average prey weight (g) at time of ingestion for *saithe* by age class of prey and predator by quarter for the total North Sea.

Predator : SAITHE		Quarter : 1			Area : ALL			
	Age class	3	4	5	6	7	8	9+
All prey								
Melanogrammus aeglef.	1	12.90	19.85	18.84	18.68	18.64	18.64	18.66
	2	38.23	38.23	38.23	38.23	38.23	38.23	39.66
Merlangius merlangus	1		43.31	43.31	43.31	43.31	43.31	44.97
	2		113.74	113.74	113.74	113.74	113.74	114.88
	3		142.43	142.43	142.43	142.43	142.43	143.37
	4		164.34	164.34	164.34	164.34	164.34	165.20
	5			164.34	164.34	164.34	164.34	165.90
Trisopterus esmarkii	1	5.23	6.37	6.94	7.03	7.04	7.04	7.06
	2	23.56	22.89	22.66	22.62	22.61	22.61	22.69
	3	37.20	37.20	37.20	37.20	37.20	37.20	37.34
	4							71.40
Clupea harengus	1	14.60	15.17	23.09	24.28	24.55	24.55	24.55
	2		18.25	63.12	69.87	71.37	71.37	71.37
	3		89.50	89.50	89.50	89.50	89.50	89.50
	4			60.90	60.90	60.90	60.90	60.90
Sprattus sprattus	2	9.80	9.80	9.80	9.80	9.80	9.80	9.80
	3	15.10	15.10	15.10	15.10	15.10	15.10	15.10
AMMODYTIDAE	1	1.60	3.57	3.57	3.57	3.57	3.57	3.61
	2		10.56	10.56	10.56	10.56	10.56	10.59
	3		26.12	26.12	26.12	26.12	26.12	25.99
	4		32.98	32.98	32.98	32.98	32.98	32.88
	5			31.36	31.36	31.36	31.36	31.29
	6			33.10	33.10	33.10	33.10	33.32

Predator : SAITHE		Quarter : 2			Area : ALL			
All prey								
Gadus morhua	0	0.82	0.45	0.63	0.67	0.74	0.74	0.74
Melanogrammus aeglef.	0	5.59	5.90	4.56	4.21	3.60	3.67	3.80
	1	20.30	20.40	22.16	22.56	23.25	23.38	23.65
	2		41.62	41.62	41.62	41.62	43.18	46.26
	3						151.35	151.35
Merlangius merlangus	1	24.88	33.70	39.24	39.24			
Trisopterus esmarkii	0	1.31	1.30	0.99	0.92	0.80	0.79	0.79
	1	4.27	6.23	9.38	9.89	10.76	10.75	10.73
	2	17.85	25.37	29.91	29.93	29.96	29.72	29.24
Clupea harengus	1		15.30	15.30	15.30	15.30	15.30	15.30
	2						156.00	156.00
	3						142.70	142.70
	4						155.40	155.40
	5						178.20	178.20
	6						187.00	187.00
Sprattus sprattus	0	1.30						
AMMODYTIDAE	0	0.72	0.77	1.05	1.11	1.21	1.21	1.21
	1	3.15	4.22	3.31	2.90	2.20	2.20	2.20
	2	9.08	7.10	7.10	7.10			
	3	10.04						
	4	16.00						
	5	15.20						

TABLE 13-E Continued

Predator : SAITHE		Quarter : 3			Area : ALL			
	Age class	3	4	5	6	7	8	9+
All prey								
Gadus morhua	0	1.33	0.50	0.64	0.70	0.80	0.81	0.81
Melanogrammus aeglef.	0	6.47	7.07	6.21	5.86	5.22	5.28	5.54
	1		48.98	48.98	48.98	48.98	49.01	49.11
	2						164.74	164.74
Merlangius merlangus	0	23.23	52.16	53.79	53.79			
	1	53.79	53.79	53.79	53.79	53.79		
Trisopterus esmarkii	0	2.52	3.67	5.48	6.21	7.49	7.61	7.78
	1	12.23	20.65	21.65	21.88	22.29	22.26	22.11
	2	38.90	38.90	38.90	38.90	38.90	38.90	38.90
Clupea harengus	0		9.60	9.60	9.60	9.60	9.60	9.60
	2						156.00	156.00
	3						142.70	142.70
	4						155.40	155.40
	5						178.20	178.20
	6						187.00	187.00
Sprattus sprattus	0	3.00						
AMMODYTIDAE	0	1.41	1.90	1.83	1.78	1.71	1.71	1.70
	1	4.49	4.40	3.16	2.62	1.66	1.61	1.60
	2	11.23	8.32	8.32	8.30			
	3	14.50	14.50	14.50				
	4	16.00						
	5	15.20						
Predator : SAITHE		Quarter : 4			Area : ALL			
All prey								
Melanogrammus aeglef.	0	14.99	17.51	16.87	16.16	16.10	16.11	16.13
	1	36.28	36.28	36.28	36.28	37.03	37.77	39.24
	2					92.66	92.66	92.66
Merlangius merlangus	0		19.00	19.00	19.00	20.16	21.32	23.61
	1		109.99	109.99	109.99	110.58	111.16	112.31
	2		173.40	173.40	173.40	173.54	173.68	173.96
	3		173.40	173.40	173.40	173.94	174.48	175.55
	4					298.44	298.44	298.44
Trisopterus esmarkii	0	5.82	6.48	6.75	7.03	7.06	7.07	7.09
	1	26.25	25.59	25.46	25.33	25.34	25.36	25.41
	2	42.10	42.10	42.10	42.10	42.18	42.27	42.43
	3					61.30	61.30	61.30
	4					71.40	71.40	71.40
Clupea harengus	0	15.10	16.39	20.43	24.72	25.15	25.15	25.15
	1		68.66	68.66	68.66	68.66	68.66	68.66
	2		91.10	91.10	91.10	91.10	91.10	91.10
	3			60.90	60.90	60.90	60.90	60.90
Sprattus sprattus	0	10.10	10.10	10.10	10.10	10.10	10.10	10.10
	1	11.70	11.70	11.70	11.70	11.70	11.70	11.70
	2	15.90	15.90	15.90	15.90	15.90	15.90	15.90
	3	20.90	20.90	20.90	20.90	20.90	20.90	20.90
AMMODYTIDAE	0	1.70	3.24	3.24	3.24	3.25	3.26	3.28
	1		13.90	13.90	13.90	13.90	13.90	13.90
	2		16.70	16.70	16.70	16.67	16.65	16.59
	3		26.39	26.39	26.39	26.33	26.26	26.14
	4		32.98	32.98	32.98	32.93	32.88	32.79
	5		31.36	31.36	31.36	31.33	31.29	31.23
	6		33.10	33.10	33.10	33.21	33.32	33.54

Appendix I

Specification of record format for exchange of stomach content data.

POSITION	NAME	TYPE ¹	M/O ²	RANGE	COMMENTS
1 - 2	Record type	2 A	M		Fixed value SS
3	Quarter	1 N	M	1 to 4	
4 - 6	Country	3 A	M		ICES alpha code ³ ; default XXX
7 - 9	Ship	3 A	M		ICES alpha code ³ ; default XXX
10- 12	Gear	3 A	M		ICES alpha code ³ ; default XXX
13- 14	Year	2 N	M	65 to 99	
15- 16	Month	2 N	M	1 to 12,99	Not known: 99
17- 18	Day	2 N	O	1 to 31,99	Not known: 99
19- 22	Time hauled	4 N	M	0 to 2400,9999	In GMT; not known 9999
23- 25	Fishing depth	3 N	O	0 to 999	In metre, 0 decimal
26- 29	Square	4 AN	M		ICES statistical rectangle
30- 39	Predator code	10 N	M		NODC 10 digit code
40- 44	Predator size code	5 N	M	-1 to 99999	See Appendix II
45- 51	N/hr fishing	7 N	O		
52- 54	Number with food	3 N	M		
55- 57	Number regurgitated	3 N	M		
58- 60	Number empty	3 N	M		
61- 70	Prey species code	10 N	M		NODC 10 digit code
71- 77	Prey size code	7 N	M	-1 to 99999	See Appendix II
78- 85	Prey weight	8 N	M		In mg
86- 91	Number of prey	6 N	O		No information: space filled
92-100	Paddingfield	9 N			Space filled

1) All numeric fields (N) right justified, zero filled;

All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

2) M : mandatory; O : optional.

3) Cf ICES IYFS exchange tape specifications.

Appendix II

Size class codes to be used on exchange tapes for stomach content data.

CODE	SIZE CLASS	CODE	SIZE CLASS	CODE	SIZE CLASS
-1	nauplii				
0	eggs				
1	.01 - .02 cm				
2	.02 - .03 cm				
3	.03 - .04 cm				
4	.04 - .05 cm				
5	.05 - .06 cm				
6	.06 - .07 cm				
7	.07 - .08 cm				
8	.08 - .09 cm				
10	.10 - .15 cm				
15	.15 - .20 cm	150	1.5 - 2.0 cm	1500	15 - 20 cm
20	.20 - .25 cm	200	2.0 - 2.5 cm	2000	20 - 25 cm
25	.25 - .30 cm	250	2.5 - 3.0 cm	2500	25 - 30 cm
30	.30 - .4 cm	300	3 - 4 cm	3000	30 - 40 cm
40	.4 - .5 cm	400	4 - 5 cm	4000	40 - 50 cm
50	.5 - .7 cm	500	5 - 7 cm	5000	50 - 70 cm
70	.7 - 1.0 cm	700	7 - 10 cm	7000	70 - 100 cm
100	1.0 - 1.5 cm	1000	10 - 15 cm	10000	100 - 150 cm
				99999	UNKNOWN

Indication of spine colours

Reports of the Advisory Committee on Fishery Management	Red
Reports of the Advisory Committee on Marine Pollution	Yellow
Fish Assessment Reports	Grey
Pollution Studies	Green
Others	Black

-O-O-O-

