INTERNATIONAL COUNCIL FOR
THE EXPLORATION OF THE SEA

"BESSIE TURF" - A MACINTOSH APPLICATION FOR ON-BOARD REGISTRATION OF SURVEY CATCHES

by

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ABSTRACT

A computer program has been developed for storing information on length distributions of survey catches on a Macintosh computer. The use of this program on board of research vessels replaces scoring information with pencil and paper. The output comprises length distributions by subsample as well as raised length distributions of the total catch by species and haul, as spreadsheet formatted text files. The binary data files produced can be converted to any format required for further processing after the survey is completed. After a testing phase, this program is now routinely used during surveys on board Dutch research vessels.

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Appendix

1. INTRODUCTION

On board research vessels catches are usually too large to measure every individual fish. Therefore the catches are sorted and split into subsamples, from which length measurements are taken. Often, more subsamples of the same species are processed for different size categories e.g.: all of the larger specimens may be measured, whereas a subsample may be taken from the smaller and more abundant ones. In the past, the fish lengths were scored on printed forms, after which the numbers scored had to be raised to numbers in the total catch, and subsequently added by species before they could be punched in the laboratory for further processing. In addition, preliminary figures for the catch of certain species within a specified size range had to be calculated on board for direct exchange between participating countries.

Depending on the type of survey, the numbers sometimes have to be expressed as numbers per standard fishing period, e.g. numbers per hour. Different types of survey, using different gear and different data processing requirements, may even be combined in one cruise. Traditionally, all the additional calculations on the length-frequency distributions were done on board using a pocket calculator, in between hauls or at the end of the day. Obviously, these procedures demand a lot of concentration from the staff involved. In practice, this often resulted in mistakes, particularly since the data forms were not always entirely legible (see genuine example in appendix).

After the survey, the length-frequency distribution and trawl lists were punched at the institute for further processing, stock assessments, and production of files for exchange with other countries within ICES. The data entry program running at our institute frequently "beeped" when it encountered errors in the length-frequencies, after which the original data had to be re-examined to recover the error. Some errors may never have been noticed...

All these problems led to the idea to automate the on-board registration and processing of length measurements. Initially, some attempts were made to use specially prepared spreadsheets (Microsoft Excel) for the purpose. However, these experiments were not very successful, because the spreadsheet program proved to be rather slow in calculating length-frequency distributions from lists of lengths entered, and because of the skill required to work with it. In July 1991, when we were on board R.V. Tridens for the annual echo survey for herring, this problem was brought to our attention. Since there was not much else to do, we decided to start writing a computer program especially for storing and processing length measurements on board, using a Macintosh computer.
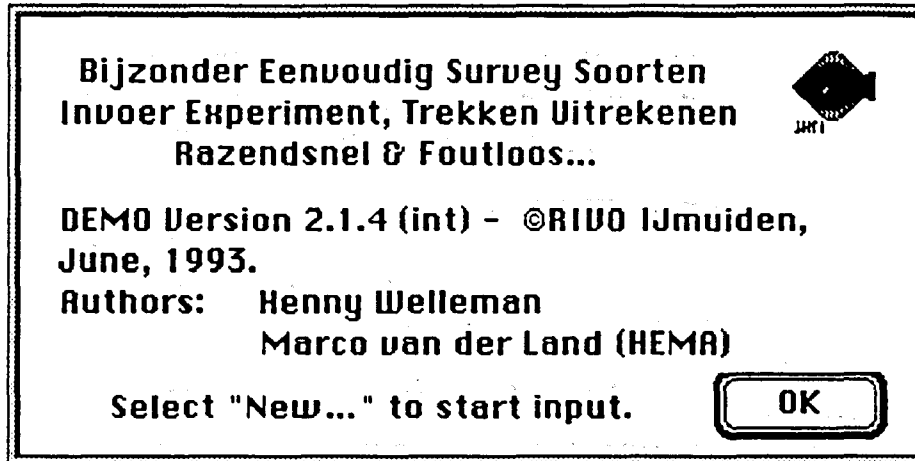
This paper describes first the program, in the form of a "quick reference manual". Some technical notes on its development follow, after which a description is given of the way in which the program is currently being used. A running version will be made available to the theme session.

2. DESCRIPTION OF THE PROGRAM - QUICK REFERENCE MANUAL

Bessie Turf ᴴᴱᴹᴬ has been developed for Dutch research vessels. The version presented here is merely a 'demo', adapted for an international public by translating a couple of names and terms in the resource.
Note: we take no responsibility whatsoever when this version is used for more than demonstration purposes.

At start up the following text appears:

```
┌─────────────────────────────────────────────┐
│  Bijzonder Eenvoudig Survey Soorten    🐟    │
│  Invoer Experiment, Trekken Uitrekenen  JHFI │
│       Razendsnel & Foutloos...               │
│                                              │
│  DEMO Version 2.1.4 (int) - ©RIVO IJmuiden,  │
│  June, 1993.                                 │
│  Authors:   Henny Welleman                   │
│             Marco van der Land (HEMA)        │
│                                              │
│   Select "New..." to start input.  [  OK  ] │
└─────────────────────────────────────────────┘
```

When running Bessie Turf, the top strip of the screen displays a menu bar that contains pull down menus. 'About Bessie' described above is found under the 🍎 menu item.

```
┌──────────────────────────────────────────────────────┐
│ 🍎  File  Edit  View                            '🐟  │
└──────────────────────────────────────────────────────┘
```

This reference manual will guide you quickly along the major program options, following the sequence of the menus and their commands. Mostly, the selection of a menu command results in the appearance of a dialog box. These boxes contain fields in which information is asked from the user, and different dialog boxes follow after each other.

ᴴᴱᴹᴬ The association with the name of the fat female comic strip character, used as an acronym, can't be explained. We suggest you learn (double) Dutch.

2.1. The File menu

```
File  Edit  View
┌─────────────────────────┐
│ New...              ⌘N  │
│ Open Datafile...    ⌘O  │
│ Continue input      ⌘I  │
│ Close               ⌘W  │
│ Save Raw List...    ⌘R  │
│ Save Final List...  ⌘F  │
├─────────────────────────┤
│ Print Final List... ⌘P  │
├─────────────────────────┤
│ Quit                ⌘Q  │
└─────────────────────────┘
```

Most of the actions within Bessie can be found in the pull down menu of File. It contains items for: creating new data files, reading existing data files and displaying them in the main dialog box; continuation of input after disposal of the main dialog box, converting data to text files and quitting.

• As an example we select New... from the File menu and the main dialog will appear.

```
┌──────────────────────── New ────────────────────────┐
│                                                      │
│  Survey type:   ● IYFS   ○ DFS   ○ SNS   ○ BTS       │
│                 ⊠ Convert data to one hour fishing   │
│                                                      │
│  Haul duration: [999] min        ┌──────────────┐    │
│                                  │  Input Fish...│    │
│                                  └──────────────┘    │
│  Date:          [22- 6-93]        ┌─────────────┐    │
│                                   │Catch Weights..│   │
│  Vessel:        [Tridens]         └─────────────┘    │
│                                  ┌──────────────┐     │
│  Haul number:   [999]            │Bycatch - NO FISH..│ │
│                                  └──────────────┘     │
│  ICES rectangle: [        ]                           │
│                                                       │
│      VALID:     ⊠                ┌─────────────┐      │
│                                  │Save Data ⌘S │      │
│                                  └─────────────┘      │
│                                  ┌─────────────┐      │
│                                  │Exit      ⌘E │      │
│                                  └─────────────┘      │
└──────────────────────────────────────────────────────┘
```

Haul characteristics (e.g., vessel, haul number, survey) can be entered in the main dialog box. The calculation and sampling methods of four different survey types are implemented in the program (radio buttons show which one is selected). Data conversion to one hour fishing is default for the IYFS and BTS and a check appears in front of the string Convert data.... The conversion rule can be changed by clicking on the check box after the survey type is defined.

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Date is an editable text field in which Bessie will generate today's date. Whenever a haul is invalid, make sure you remove the check after **UALID**.

From this main dialog box onwards, the catch data can be given to the program by choosing **Input Fish**, **Catch Weights** or **Bycatch - NO FISH!**. Important options like writing data from memory to hard disk are performed within this dialog box (after saving, the title of the window will change from 'New' to the file name).

• As an example, let's select **Input Fish** in the main dialog. A new dialog will appear.

```
┌─────────────────────────────────────────────────────────────┐
│                                                               │
│  Click fishname...                                      ◆     │
│                                                        JHTI   │
│  ┌──────────────────────────────┐┌─┐                          │
│  │ lumpsucker                   ││⇧│                          │
│  │ mackerel                     ││ │                          │
│  │ megrim                       ││ │  Enter Factor:  ┌─────┐   │
│  │ norway haddock               ││ │                 │     │   │
│  │ norway pout                  ││ │                 └─────┘   │
│  │ pearlside                    ││ │                          │
│  │ pilchard                     ││ │                          │
│  │ pipefish (greater)           ││≡│  Selected species:       │
│  │ pipefish (Nilsson's)         ││ │                          │
│  │ pipefish (snake)             ││ │  pipefish (greater)      │
│  │ pipefishes                   ││ │                          │
│  │ plaice (European)            ││ │  (SYNGNATHUS ACUS)       │
│  │ pollack                      ││ │  8820020120              │
│  │ poor cod                     ││ │              ┌─────────┐ │
│  │ rat-fish / rabbit fish / rat tail ││ │          │ Cancel  │ │
│  │ ray (cuckoo)                 ││⇩│              └─────────┘ │
│  └──────────────────────────────┘└─┘              ┌─────────┐ │
│                                                   │   OK    │ │
│                                                   └─────────┘ │
└─────────────────────────────────────────────────────────────┘
```

Fish species are shown in alphabetic order in a scrollable list. The selected species is displayed to the right of the species list supplemented with the Latin name and the NODC code.

The subsampling factor for the fish to be measured must be entered in the numeric field behind **Enter factor**. For a single species, different subsampling factors may be used. The program will use these subsampling factors when the total catch per species is calculated. Pressing the **OK** button results in a window for entering the length data of the fish measured.

```
┌─────────────────────────────────────┐
│     Length distribution             │
├─────────────────────────────────────┤
│   Measured:  13                     │
│                                     │
│   15   1                            │
│   23   2                            │
│   25   5                            │
│   26   2                            │
│   28   1                            │
│   30   1                            │
│   34   1                            │
│                                     │
└─────────────────────────────────────┘
```

┌───┐
│ ≡≡≡≡≡ pipefish (greater) x 3 ≡≡≡≡≡   │
├───┤
│ Enter length: │
│   │
│   ┌──────┐   ╔═══════════════╗   │
│   │ 36   │   ║   Enter   ║   │
│   └──────┘   ╚═══════════════╝   │
│   ┌───────────────┐   │
│   │   Remove   │   │
│   └───────────────┘   │
│   │
│   ┌───────────────┐   │
│   │   Remove All │   │
│   └───────────────┘   │
│   ┌───────────────┐   │
│   │   OK   │   │
│   └───────────────┘   │
└───┘

This dialog box contains one numeric field in which the fish length (cm) can be typed.
The value in the length field is processed whenever the enter key is pressed or clicked.
The accepted lengths are displayed in the window Length distribution. Lengths can be
removed simply by using Remove instead of Enter. Pressing Remove All does what is
says: removal of the entire subsample.
Pressing the OK button will show the main dialog box again. The two other options,
Catch Weights and Bycatch... NO FISH!, will reveal windows with text fields in which
names, kilo's and/or numbers can be filled.
Since computer memory is vulnerable, interim savings to a Bessie data file is strongly
recommended. The first time you choose Save data, the possibility is offered to change
the data file's name or disk location. Bessie data files are binary files, which contain all
the information of one haul. Only Bessie Turf can read these files, the structure of these
data files will be explained later. The icon of the files is given in the following desktop
snapshot:

IYFS-Haul_1_23-6-93_Data
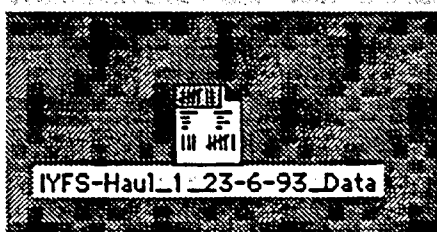
Once the main dialog box has been dismissed by clicking Exit, the file menu options Save
Raw List and Save Final List can be selected. These options produce export text files for
other programs (for instance Microsoft Excel). The difference between them is that for
the Final list all subsamples of one fish species are combined and converted to the catch
per haul or fishing hour. In the Raw list all subsamples are printed separately, just as they
were entered.

2.2.   The Edit menu

```
┌──────────┬──────────
│   Edit   │  View
├──────────┴─┐
│  Cut    ⌘H │
│  Copy   ⌘C │
│  Paste  ⌘U │
└────────────┘
```

The Edit menu matches the Apple Macintosh standard. When System 7.0 or higher is used, the Edit menu allows you to Cut, Copy and Paste text within the dialog boxes. Otherwise, the Edit menu will not be available when dialog boxes are active.

2.3.   The View menu

```
┌──────────────────────┐
│        View          │
├────────────────────┬─┴────────
│  lumpsucker      ▶ │
│  plaice (European) ▶│  ⌘ 72
│  pipefish (greater) ▶│  ⌘ 2
└────────────────────┴──────────
```

The View menu is unique for Bessie Turf. It is used as a synopsis of fish species and subsampling factors entered for the particular haul one has selected. In the example haul above, the View menu shows that three species were entered (lumpsucker, plaice (European), and pipefish(greater)). A closer look with the mouse will reveal the different subsamples with associated factors entered. By selecting one, a confirmation dialog box will appear. This dialog box offers the possibility to change the sampling factor and it recalls the length distribution of the sample, which may also be modified.

3. DEVELOPMENT

3.1. Macintosh programs and programming

An application program for Macintosh computers should be seen as a collection of so-called "resources" of different types. Each resource contains a coded description of a part of the program: for example, the description of a dialog box and the items it contains, the description of a menu, a sound, version information or a list of strings (e.g. the species names in Bessie Turf). In fact, the compiled program code itself is stored in a number of resources. Basically, Macintosh programmers therefore need two tools: a resource editor for designing the various user interface elements (or stealing them from other programs: games are a great source of weird sounds), and a compiler program for converting the program code into a resource.

Several resource editors for Apple Macintosh are available, as well as compiler programs for various programming languages. We wrote the program in the "C" programming language, a language we were familiar with because of our involvement in the development of image processing applications at RIVO (in the fields of plankton and otolith analysis). We used the compiler program THINK C (version 5.0.4, from Symantec Corporation), and the resource editor ResEdit (version 2.1.1, from Apple Computer, Inc.).

From the "C" programming environment calls can be made to standard commands or routines which are built into each Macintosh computer, either in ROM (read only memory, stored in a chip) or in the system software. These commands and routines are documented in the "Inside Macintosh" series. Recently, Apple introduced a new version of the system software (version 7). Bessie Turf was designed to run under system software version 6, it will also function under the new system 7.
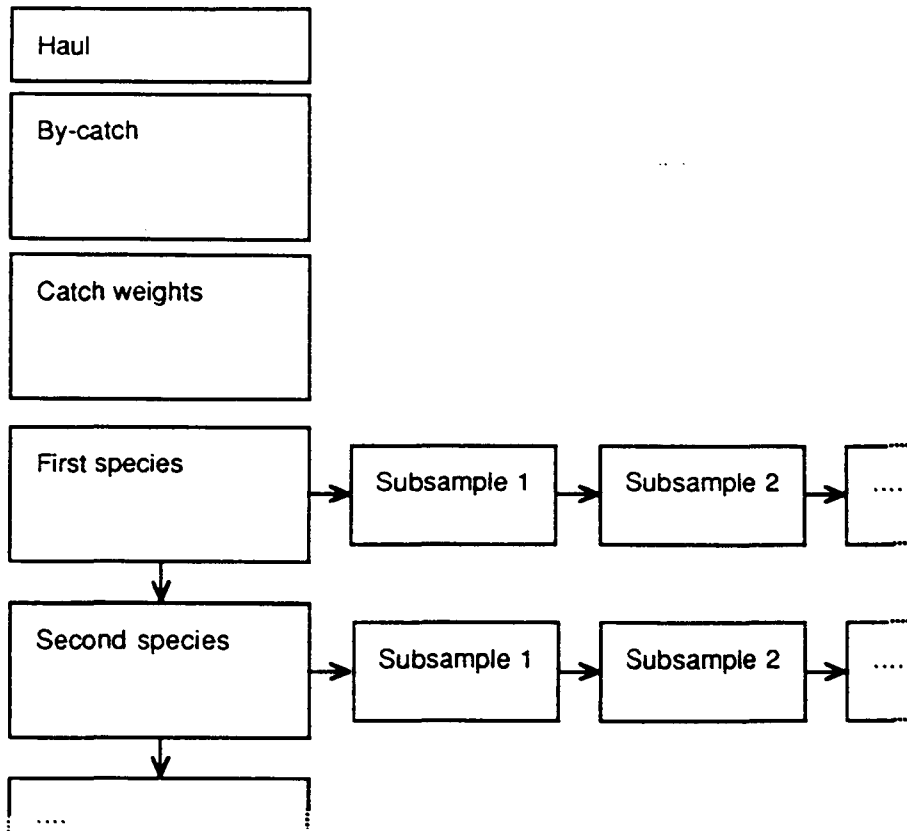
3.2. Data structure

As described in the manual above, the data for each haul are stored in a data file in a compressed form, which cannot be displayed or printed. The program can only handle one haul at a time. The figure below is a schematic representation of the format of the data files, which is also the format in which the data are kept in the computer's memory when the program is running.
The first three records contain haul information, information on by-catch (non-fish) species, and catch weights. These three records are always present in a data file and have a fixed size. After these records, the actual length distribution data follow. For each species for which data are present, a species record is created, each species record linked with one or more subsample records. The contents of the haul, species and subsample records is given in the following table:

Record type		
Haul	Species	Subsample
- survey type	- name	- subsampling factor
- vessel's name	- Lmin / Lmax	
- date	- total number	
- haul number	- total number measured	- number measured
- haul duration	- total numbers per length	- numbers measured per
etc.	class	length class

The way in which the species and subsample records are kept is known as a "linked-list" structure. It would go beyond the scope of this paper to describe the structure in detail. In short: each species record contains a field representing the address (in memory) of the

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next species, and a field representing the address of the first subsample record. Each subsample record includes a field representing the address of the next subsample. The main advantages of this linked-list structure are its efficient use of memory space (memory for a species or a subsample record is allocated only when needed) and its flexibility (species and subsamples can be added to or removed from the list at any time).

```
┌─────────────────┐
│ Haul            │
├─────────────────┤
│ By-catch        │
│                 │
│                 │
├─────────────────┤
│ Catch weights   │
│                 │
│                 │
├─────────────────┤     ┌─────────────┐     ┌─────────────┐     ┌──── 
│ First species   │──▶  │ Subsample 1 │──▶  │ Subsample 2 │──▶  │ ....
│                 │     │             │     │             │     │ ──── 
├─────────────────┤     └─────────────┘     └─────────────┘     └
│       ▼         │
│ Second species  │──▶  │ Subsample 1 │──▶  │ Subsample 2 │──▶  │ ....
│                 │     │             │     │             │     │ ──── 
├─────────────────┤     └─────────────┘     └─────────────┘
│       ▼         │
│ ....            │
└─────────────────┘
```

Schematic representation of the data structure used by Bessie Turf.

4. THE USE OF THE PROGRAM

After a testing phase, and initial hesitation from some senior scientists responsible for the surveys carried out by RIVO, Bessie Turf is now routinely used on board the Dutch research vessels. This chapter describes the procedures currently followed, on board and at the institute, and the advantages of using Bessie Turf.

4.1 On board

When the catch is brought on board, it is first sorted on the conveyor belt and subsequently laid out subsample by subsample and marked with the associated factor (a subsample in this context can also be the total catch for a certain species). One of the staff then washes his or her hands and takes a seat behind the computer in a dry area of the ship. Someone else measures the fish which are lying ready. Both people are communicating through head-sets, headphones and microphones, connected by wire.

After all the fish have been measured, Bessie Turf provides the so-called raw and final lists (the data in readable form), which are then both printed on an ink-jet printer (Hewlett-Packard Deskwriter 500). By doing this immediately after each haul, and before the fish are discarded, the data are always safely printed on paper in case anything might go wrong with the computer, and the files are also backed up on diskettes. After printing, the raw and final lists may be deleted because they can always be generated again by Bessie Turf. The binary data file must always be kept.

4.2. At home

After the survey, the data have to be fed into the RIVO's central computer system (VAX). In the past, the data had to be typed into the computer at this stage, but now the Bessie Turf data files are converted into a format, which can be read by the VAX-based programs for further processing. For this conversion, a separate program was developed. Using this conversion utility, it takes about ten minutes before the results of a 50-haul survey are ready for transfer.

4.3. Advantages

The advantages of using a program especially designed for the task of storing and processing length distribution data are quite clear. There are much less errors in calculating length distributions for the total catch from subsamples, and this step does not take any time any-more. The lists produced are readable (see appendix) and the data are available for further processing immediately after the survey. Unique names and obligatory subsampling factors remove some uncertainties that exist in respect of hand written information, which are often in shorthand (e.g. gurnard instead of red or grey gurnard)

4.4. Disadvantages

There are no apparent disadvantages, with one exception: the data typist cannot oversee what is done by the person identifying and measuring the fish. Therefore a second check, which may prevent possible mis-identifications or overlooking individual fish, is lacking. In practice this is solved by assigning a general overview task to another staff member during this stage.

5. RIVO SURVEY SUITE

Bessie Turf is one in a series (suite) of programs in use or under development at RIVO for facilitating the collection, processing and display of survey data using Macintosh computers.

"NeptuNet" is used for logging data from R.V. Tridens' central computer system (Hydraut). The data provided by Hydraut include nautical information, such as the ship's position, course, speed, air and water temperatures, etc.

"FishMap" is a program designed to display and print maps of the geographical distribution of fish species. In practice, it could be used to display any kind of numerical data, fitting into (sub-divisions of) ICES statistical rectangles. This program will also be demonstrated in this theme session.

Currently, a prototype of a program for processing data on sex, maturity, age, length and weight of fish on board research vessels is nearing its completion. In its use, this program will be similar to Bessie Turf.

ACKNOWLEDGEMENTS

APPENDIX

Example output from Bessie Turf, and an old IYFS form.

	KAB.	SCHELVIS	WIJTING	MAKR.	KEVER	HARING
N_T	386	7292	23062	20		8214
N_m	67	138	296	10		54
L_{mi}	7	8	6	29		12
L_{ma}	55	49	39	36		28
x	9x / 1x	9 / 36x	72 9x	1	x	72 / 1x

4			4			4	45
5			5			5	50
6			6		288	6	5
7	18		7		1296	7	60
8		72	8	1	2892	8	5
9			9		4896	9	70
10	90		10			10	5
11	126	504	11		3744	11	80
12	18	5762	12		1452	12	5
13	54	720	13		864	13	90
14		1224	14		144	14	5
15		1368	15			15	100
16		576	16		144	16	5
17		5047	17			17	110
18		90	18		18	18	5
19			19		18	19	120 144
20		18	20		36	20	5 432
21			21		198	21	130 1152
22			22		504	22	5 1440
23			23		522	23	140 1708
24	2		24		730	24	5 720
25		18	25		468	25	150 432
26	2		26		108		5 288
27	8	36	27		90	160 144	
28	4	100	28	SPROT		5	
29	10	54	29	54 4	N_T	170	
30	10	144	30	18 2	N_m	5	
31	18	54	31	2	L_{mi}	180 288	
32	2	58	32	2	L_{ma}	5	
33	4	92	33	4	x	190	
34	2	20	34		45	5	
35		22	35	2	50	200	
36	4	20	36	4	5	5 144	
37			37	2	60	210	
38			38		5	5	
39		2	39	2	70	220	
40		2	40		5	5	
41	2	2	41		80	230	
42			42		5	5	
43			43		90	240 2	
44			44		5	5	
45	2		45		100	250	
46			46		5	5	
47	2		47		110	260 4	
48	2		48		5	5	
49	2		49		120	270 10	
50			50		5	5 2	
51			51		130	280 4	
52	2		52		5	5	
53			53		140	290	
54	2		54		5	5	
55	2		55		150	300	
56			56		5	5	
57			57		160	310	
58			58		5	5	
59			59		170	320	
60-64			60		180	5	
65-69						330	
70-74						5	
75-79						340	
80-84						5	
85-89						350	
90-94						5	
95-99						360	
100-104						5	
105-109						370	
110-114						5	
115-119						380	
120-124							

VISSOORT   N MANDEN á ...... kg

BIJVANGST

Aantal soorten: 12

		Schm	G.Pom	Houm	L.Scha.	SCHOL	SCHAR	TONG	SCHAR	PITVIS
N$_T$	N$_T$	N$_T$ 1892	N$_T$ 34	N$_T$ 8	N$_T$ 72	N$_T$ 34	N$_T$ 6	N$_T$ 20	N$_T$ 9	
N$_m$	N$_m$	N$_m$ 47	N$_m$ 17	N$_m$ 4	N$_m$ 4	N$_m$ 17	N$_m$ 3	N$_m$ 10	N$_m$ 4	
L$_{mi}$	L$_{mi}$	L$_{mi}$ 8	L$_{mi}$ 13	L$_{mi}$ 23	L$_{mi}$ 13	L$_{mi}$ 27	L$_{mi}$ 27	L$_{mi}$ 14	L$_{mi}$ 10	
L$_{ma}$	L$_{ma}$	L$_{ma}$ 27	L$_{ma}$ 31	L$_{ma}$ 23	L$_{ma}$ 23	L$_{ma}$ 40	L$_{ma}$ 22	L$_{ma}$ 36	L$_{ma}$ 22	
x	x	x 18	x	x	x 9	x 1	x 1	x 1	x 1	

SOORTEN waarvan 1 of 2 gevangen	tot	N gem.	LENGTE
ZEEWOLF x1	2	1	59
2 N. Koolvis	4	2	30, 30
Tarbot	2	1	61
Heek	6	3	49, 49, 50

RESTANT (geen vis!!!!)

	stuks	liter		stuks	liter
x			x		
x			x		
x			x		
x			x		

Survey	Datum:	Schip.	Trek:	Trekduur:	Kwadrant
IYFS	24-8-90	Tridens		13.30 min	43F7

FINAL	Hoofdsoorten	AANTAL/UUR				
Soort	kabeljauw	schelvis	wijting	makreel	Soort	haring
Nt:	406	7292	23062	20	Nt:	6214
Nm	67	138	296	10	Nm:	54
Lmi:	7	8	6	29	Lmi:	12
Lma:	55	49	39	36	Lma:	28

	kabeljauw	schelvis	wijting	makreel		haring
1					0.5	
2					1	
3					1.5	
4					2	
5					2.5	
6			288		3	
7	18		1296		3.5	
8		72	2592		4	
9			4896		4.5	
10	90		5184		5	
11	126	504	3744		5.5	
12	18	576	1152		6	
13	54	1728	864		6.5	
14		1224	144		7	
15		1368			7.5	
16		576	144		8	
17		504			8.5	
18		90	18		9	
19			18		9.5	
20		18	36		10	
21			198		10.5	
22			504		11	
23			522		11.5	
24	2		720		12	144
25		18	468		12.5	432
26	2		108		13	1152
27	8	36	90		13.5	1440
28	4	108			14	1008
29	20	54	54	4	14.5	720
30	20	144	18	2	15	432
31	18	54		2	15.5	288
32	2	56		2	16	144
33	4	92		4	16.5	
34	2	20			17	
35		22		2	17.5	
36	4	20		4	18	288
37			2		18.5	
38					19	
39		2	2		19.5	
40		2			20	
41	2	2			20.5	144
42					21	
43					21.5	
44					22	
45	2				22.5	
46					23	
47	2				23.5	
48	2				24	2
49		2			24.5	
50					25	
51					25.5	
52	2				26	4
53					26.5	
54	2				27	10
55	2				27.5	2
56					28	4
57					28.5	
58					29	
59					29.5	
60					30	
65					30.5	
70					31	
75					31.5	
80					32	
85					32.5	
90					33	
95					33.5	
100					34	
105					34.5	
110					35	
115					35.5	
120					36	
125					36.5	
130					37	
135					37.5	
140					38	

SOORT	N MANDEN	KILO'S				

Survey.	Datum:	Schip:	Trek:	Trekduur:	Kwadrant:					
IYFS	24- 8-90	Tridens		13:30 min	43F7					
FINAL	Bycatch	N soorten:		11 in AANTAL/UUR						
Soort:	heek	tarbot	koolvis (zwarte zeewolf)	pitvis	tongschar	schol	lange schar	horsmakreel	poon (grauwe)	schar
Nt.	6	2	4	2	8	20	34	72	8	34	1698
Nm:	3	1	2	1	4	10	17	4	4	17	50
Lmi	49	60	30	59	16	14	27	13	33	18	8
Lma	50	60	30	59	22	36	40	23	38	31	32
1										
2										
3										
4										
5										
6										
7										
8										36
9										
10										
11										108
12										108
13								18		144
14						2				108
15										144
16					2					144
17										144
18					2			18	4	72
19					2					252
20						2			2	108
21									6	144
22					2			18		108
23						2		18	8	36
24									2	
25									2	
26						2				
27						4	2		4	38
28							2			
29							6		2	
30			4						2	
31							6		2	
32						4	2			4
33							2	2		
34						2	4	2		
35										
36						2	2	2		
37							2			
38								2		
39							2			
40							2			
41										
42										
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46										
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48										
49	4									
50	2									
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RESTANT	geen vis!!									
Aantal	Faktor	Naam	AANTAL/UUR Liter							