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An age disaggregate index from the sentinel program for cod in NAFO Divisions 2J3KL

D.E. Stansbury, D. Maddock Parsons, P.A. Shelton

Science Branch
Department of Fisheries and Oceans
PO Box 5667
St. John's, Newfoundland
Canada, A1C 5X1

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Abstract

An age disaggregate index of abundance was derived from both the gillnet and linetrawl sectors of the sentinel survey in NAFO Divisions 2J3KL. A generalized linear model was applied to the catch and effort data at age for each gear and survey method with an assumed Poisson distribution for catches. Through the use of different gears which have very specific selectivities, it is possible to track year-classess through the five years the sentinel program has been operational..

Résumé

Un indice de l'abondance par classe d'âge a été tiré des secteurs de la pêche à la senne et de la pêche à la palangre du relevé sentinelle effectué dans les divisions 2J3KL de l'OPANO. À l'aide d'une hypothèse de distribution de Poisson pour les captures, on a appliqué un modèle linéaire généralisé aux données sur les prises et l'effort selon l'âge pour chaque engin et méthode de relevé. L'utilisation de différents engins comportant des sélectivités très particulières permet de suivre les classes d'âge au cours des cinq années d'application du programme des pêches sentinelles.

Introduction

The sentinel program has been running in NAFO Division 2J, 3K and 3L since 1995 giving five complete years of catch and effort data from 60 sites. Lengths and weights have been sampled by quarter in all sites over the portion of the year the program is in operation. . A detail description of the sentinel program is given in Maddock Parsons et al. (2000).

In the last assessment (March 1999) an age-aggregated standardised catch rate series was derived for both the gillnet and line trawl portions of the sentinel program. In this assessment an attempt is made to produce an age-disaggregated index of abundance for the five years of gillnet and linetrawl data.

Methods

Catch-at-age

The catch from the sentinel program in 2J3KL are divided into cells defined by Gear type (gillnet 5 ½ inch, gillnet 3 ¼ inch and line trawl), NAFO Division (2J, 3K, 3L), and Divisions broken down into Statistical unit area (i.e. 3Ki 3Lh etc.), Year (1995-99) and Quarter. Age-length keys are generated for each cell using fish sampled from both fixed and experimental sentinel survey sites. Experimental sites are fished at the discretion of the fishermen in various locations in the general vicinity of the fixed site. There were no fixed sites using 3 ¼ gillnets. Length frequencies and age-length keys were combined by cells. Numbers of fish at length were assigned an age using the age-length key for the cell. When there was a lack of sampling cells were collapsed into larger ones until all fish are assigned an age. For example, if there were non-matches by quarter then quarters were combined to the half-year; and if necessary half-years were combined to the year. If necessary unit areas were combined within division for the year. The last level of collapse is to adjacent 3cm length grouping within gear, division and year survey. Because there are little to no discards in the sentinel program and the fishermen sample all of the fish for line trawl and gillnet sets, catch numbers-at-age can be reliably produced for these two gears.

Standardization

The catch-at-age and catch per unit effort (CPUE) were standardised to remove seasonal and spatial effects. Results from an informal working group at the 1999 Rimouski Zonal Assessment meeting suggested that for gillnet, only sets fished during July to November with a soak time between 18 and 24 hours should be included in the analysis. For line trawl, sets fished during August to November with a soak time less than or equal to 12 hours are selected. Zero catches were generated for ages not observed in a set. Sets with

effort but no catch are valid entries in the model. Ages in the model ranged from 3 to 10 for 5 ½ inch gillnet, 2 to 10 for 3 ¼ inch gillnet and 3 to 9 for linetrawl. A generalized linear model (McCullagh and Nelder 1989) was applied to the catch and effort data for each gear and survey method. The response distribution was specified as Poisson and the link function was chosen to be log. That is, the Poisson mean parameter μ_i is related to the linear predictor by

$$\log(\mu_i) = \mathrm{X}_i'\beta$$

where X_i is a vector of explanatory factors for catch observation *i* (i.e. month, site, age and year) and β is a vector of coefficients to be estimated from the data.

Thus catch is assumed to have a Poisson probability distribution with the mean μ_i related to the factors month nested within site and age nested within year by

$$\log(\mu_i) = \log(E_i) + month_i(j)\beta_j(site_i(k)\beta_k) + age_i(l)\beta_l(year_i(m)\beta_m),$$

where E_i is and offset parameter for fishing effort and j,k,l,m indicate the level for each of the four factors, for example June for the factor *month*, and where

$$month_i(j) = \begin{cases} 1 \text{ if month} = j \\ 0 \text{ if month} \neq j \end{cases}.$$

Fishing effort was measured in terms of number of nets for gillnets and number of hooks for line trawls. Expected catch per unit of effort for each age in each year were computed for the two gear types from the estimated parameters to obtain relative indices of population numbers at age that could be used in further analyses of the status of the stock.

Results

Gillnet 3-¼ inch Experimental Survey

The number of sets and summary statistics for soaktime for 3-¼ inch gillnets are given in Table 1.1. Table 1.2 gives the number of hauls entering the model after applying soak time and season selection limits described under methods. Forty four percent of the set were excluded from the analysis, mainly due to failure to meet soak time criteria. All but one haul used only a single net for sampling out of 486 sets (Table 1.3). Catch at age data for 3-¼ inch gillnets are given by division in Table 1.4 for the period 1996 to 1999. Catch was low in 1995 in all divisions and increased up to 1998 and declined in 1999. The dominate age taken with this gear is age 4 for all years in 2J3K except 1999 in 3K where the modal age was 3. In Division 3L however, the modal age varied from age 6 in 1996 to age 3 in 1997, back to age 6 in 1998 and back to age 3 in 1999. Month and site

combinations that had zero catches for all years in the sentinel survey are listed in Tables 1.5. These cells were removed from the analysis.

In the model output (Table 1.6) SEQCODE is a sequential community (site) code starting with 1 in Black Tickle in Labrador and ending with 60 at Point Lance on the southern Avalon Peninsula. Parameter estimates and standard errors are given in Tables 1.6. The parameters of interest are labelled Age (Year). The values with the high STD. ERR are associated with very low catch numbers at age in that year. The type 3 likelihood ratio statistics show all effects are significant (Table 1.6 page 14). The lsmeans for the Age (Year) parameter estimate are transformed to arithmetic scale in Table 1.7 to give the standardized relative mean numbers per net at age. The scale parameter is estimated to be 3.44 indicating that the data may be over-dispersed as a consequence of outliers. This is of interest and needs to be investigated in further studies. Person residuals, the square root of the *i*th contribution to the Pearson's chi-square, are plotted against predicted values (Fig. 1). The observed pattern is due to a high frequency of zero and ones in the data.

The procedure described above is adopted for the four other gear/survey type combinations. Major differences for each gear/survey type are highlighted below.

Linetrawl Fixed Survey

Forty percent of the sets were excluded from the analysis for failure to meet soak time criteria leaving 628 sets to be used in the analysis (Table 2.2). The overall mean soak time dropped from 15 hours to 3 hours after selection Gear amount ranged from 150 – 1000 hooks per set (Table 2.3). Catch at age data for the Sentinel line trawl by division are given in Tables 2.4. Catch was higher in 1995 and 1997 and lowest in 1999 in Divisions 3KL. Linetrawl was not used to any great extent in the sentinel program in 2J. The dominant age taken with this gear is age 5 except for Division 3K in 1995 for which the modal age was 4. Site locations for this run ranged from Coachman's Cove in White Bay to River Head, St. Mary's Bay. There were only 21 sites using linetrawl in 3KL.

Linetrawl Experimental Survey

Thirty four percent of the set were excluded from the analysis, mainly for failure to meet soak time criteria, leaving 796 sets to be used in the analysis (Table 3.3). The overall mean soak time dropped from 14 hours to 3 hours after selection. Gear amount ranged from 50 –1000 hooks per set,(mode = 350) (Table 3.3). Catch at age are given by division in Table 3.4. Catch was similar to that taken with linetrawl in the fixed survey. For this analysis the most northern site was St. Charles in southern Labrador and ending at River Head St. Mary's Bay. There were 23 sites using linetrawl in 3KL.

Gillnet 5 ½ in. Fixed survey

Forty three percent of the set were excluded from the analysis for failure to meet soak time criteria leaving 2463 sets to be used in the analysis (Table 4.3). Gear amount ranged from 1- 4 nets per set with most using 2 nets (Table 4.3). Catch at age are given by division in Table 4.4. Catch was higher in 1996 and 1998 and lowest in 1995 in all divisions. Division 3L had the highest catch and there was very little catch in 2J. The dominant ages taken with this gear were age 6 and 7. This survey covers the full range of the sentinel survey from southern Labrador to Point Lance on the southern Avalon Peninsula.

Gillnet 5 ½ in. Experimental Survey

Forty three percent of the sets were excluded from the analysis, mainly for failure to meet soak time criteria leaving 3786 sets to be used in the analysis (Table5.2). This survey method had 1323 sets more than the fixed gillnet survey. Gear amount ranged from 1-5 nets per set with most using 2 (Table 5.3). Catch at age are given by division in Table 5.4. Catch was similar to that taken with the 5 ½in. gillnet in the fixed survey.

Age disaggregated indices by Gear and survey method

Age disaggragated indices by Gear and survey type are given in Figure 2. Year-classes can be followed sequentially from 3 ¼ inch gillnets through the linetrawl fishery to 5 ½ inch gillnet. This is illustrated for the 1990 and 1992 year-classes for experimental survey sites (Figure 3). The 3-¼ inch gillnet catches predominately age 4 cod while the linetrawl catches age 5 and 5 ½ inch gillnet catches age 6 and 7.

Discussion

It is the intent to use the gillnet and linetrawl standardized catch rate at age as indices of abundance, at least, for the inshore range of the northern cod stock. For3Ps cod stock on the south coast of Newfoundland an age dissagregate index from the gillnet fishery in the sentinel program was used in the calibration of the SPA (Brattey et al. 1999).

The sentinel survey is the only sampling program that covers a large geographical range for the inshore portion of the stock. The model removes seasonal and spatial effects from the raw data to give a standarized index of cod abundance for the five years the program has been running.

The strength of any index is its ability to track year-classes. The catch rate series derived from the sentinel program using three different fishing gears that have different size selectivity characteristics appears to show year classes that track through the gears. It is important therefore that the Sentinel Program continue using all three gears in order to

track relative weak year classes. There appears to be little difference in the age structure sampled within gear for the different survey methods (Fixed vs. Experimental) although this was not formally tested in the present analyses. The apparent lack of difference is not surprising given the close proximity of the experimental sites to the fixed sites.

Large numbers of fish were sampled for age and length frequencies. However, 42% of the catch/effort data did not enter the model due to failure to meet the selection criteria established by the ad hoc working group at the Zonal cod stock Assessment Meeting in Rimouski in 1999. Most of these data were rejected due to long soak times. No methods have been developed to date to model the sentinel catch/effort data with soak time as a covariate. It was felt at the Rimouski Zonal Assessment that investigations into the functional forms might not be productive but the meeting conceded that the relationship between soak time and abundance remains an unsolved issue.

The five model runs were all over dispersed as indicated by the scale parameter greater than 1. This is a phenomenon that sometimes occurs in models with a Poisson distribution; however all statistics are adjusted appropriately using the deviance divided by degrees of freedom as an estimate of the multiplicative overdispersion factor. (SAS Institute Inc). Nevertheless, alternative models, such as the negative binomial, should be explored and the sensitivity of the estimates to the assumed model examined.

Given that the different kinds of sentinel data are different but not completely independent, and given the ability to track year-classes through survey types, there may be some advantages in putting all the data into a single analysis which includes survey type as a factor. This will be explored in future analyses.

Reference:

Brattey, J., N. G. Cadigan, G.R. Lilly, E. F. Murphy, P. A. Shelton, and D. E. Stansbury. 1999. An assessment of the cod stock in NAFO subdivision 3Ps in October 1999. DFO Can. Stock Assess. Sec. Res. Doc 99/161.

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McCullagh, P. and Nelder, J.A. 1989 Generalized Linear Models, London : Chapman and Hall.

SAS Institute Inc. 1996. SAS/STAT Software Changes and Enhancements through *Release* 6.11 , Cary, N.C.: SAS Institute Inc., 1104 pp.

TABLES

AND

FIGURES

Table 1.1 Number of sets and summary statistics for soak time for 3¼ in. gillnets.

Gill net MESH 3¼ in.			Experimental									Fixed				
			MONTH									MONTH				
			5	6	7	8	9	10	11	12	ALL	7	8	9	10	ALL
YEAR																
1996	Soak Time (hrs)	N	.	.	.	.	9	8	14	.	31	.	.	.	1	1
		MIN	.	.	.	.	17	16	18	.	16	.	.	.	15	15
		MEAN	.	.	.	.	26	23	23	.	24	.	.	.	15	15
		MAX	.	.	.	.	50	30	28	.	50	.	.	.	15	15
1997	Soak Time (hrs)	N	.	6	38	68	72	27	11	.	222	2	.	1	.	3
		MIN	.	12	13	12	13	19	17	.	12	16	.	15	.	15
		MEAN	.	21	23	26	26	32	25	.	26	20	.	15	.	18
		MAX	.	26	46	72	100	74	50	.	100	23	.	15	.	23
1998	Soak Time (hrs)	N	1	16	61	96	95	37	8	2	316	2	3	2	.	7
		MIN	17	9	11	13	12	13	18	25	9	23	21	22	.	21
		MEAN	17	20	23	26	36	25	28	98	28	27	24	73	.	39
		MAX	17	29	48	79	196	69	49	171	196	30	26	124	.	124
1999	Soak Time (hrs)	N	.	16	46	110	89	17	12	5	295	.	.	.	.	.
		MIN	.	14	10	12	11	16	16	22	10	.	.	.	.	.
		MEAN	.	28	23	25	22	43	22	23	25	.	.	.	.	.
		MAX	.	73	48	170	52	215	29	24	215	.	.	.	.	.
ALL	N		1	38	145	274	265	89	45	7	864	4	3	3	1	11

Table 1.2 Summary statistics for soak time and number of sets selected for input to the model.

Gill net MESH 3¼ in.			Experimental						Fixed			
			MONTH						MONTH			
			7	8	9	10	11	ALL	7	8	9	ALL
YEAR												
1996	Soak Time (hrs)	N	.	.	6	3	8	17	.	.	.	.
		MIN	.	.	21	20	18	18	.	.	.	.
		MEAN	.	.	23	22	20	22	.	.	.	.
		MAX	.	.	24	24	23	24	.	.	.	.
1997	Soak Time (hrs)	N	26	36	43	18	5	128	1	.	.	1
		MIN	18	18	18	19	18	18	23	.	.	23
		MEAN	22	23	22	23	21	22	23	.	.	23
		MAX	24	24	24	24	23	24	23	.	.	23
1998	Soak Time (hrs)	N	44	64	48	23	5	184	1	2	1	4
		MIN	18	18	18	18	18	18	23	21	22	21
		MEAN	22	22	22	22	20	22	23	23	22	23
		MAX	24	24	24	24	22	24	23	24	22	24
1999	Soak Time (hrs)	N	25	56	60	7	9	157	.	.	.	.
		MIN	18	18	18	22	19	18	.	.	.	.
		MEAN	23	22	22	23	23	22	.	.	.	.
		MAX	24	24	24	24	24	24	.	.	.	.
ALL	N		95	156	157	51	27	486	2	2	1	5

Table 1.3 Frequency tables for the amount of gear and soak time used in the standardisation for the Experimental Gill net 3¼ in. survey.

GEARAMT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	485	99.8	485	99.8
2	1	0.2	486	100.0

SOAK	Frequency	Percent	Cumulative Frequency	Cumulative Percent
18	29	6.0	29	6.0
19	27	5.6	56	11.5
20	37	7.6	93	19.1
21	39	8.0	132	27.2
22	78	16.0	210	43.2
23	131	27.0	341	70.2
24	145	29.8	486	100.0

MESH	Frequency	Percent	Cumulative Frequency	Cumulative Percent
83	486	100.0	486	100.0

Table 1.4 Catch at age from the sentinel program by NAFO division for

Experimental
Gill net 3¼ in.

	DIV											
	2J				3K				3L			
	YEAR				YEAR				YEAR			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
	number	number	number	number	number	number	number	number	number	number	number	number
AGE												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	1	0	9	42	0	3	0	30
3	5	301	189	83	196	140	450	790	27	874	827	564
4	4	1002	602	201	510	749	602	494	70	525	526	418
5	4	129	267	128	168	130	230	196	60	791	574	387
6	0	68	36	45	148	192	186	52	113	441	1351	183
7	0	5	4	5	3	157	79	34	7	284	617	201
8	0	1	2	1	0	11	38	10	2	70	230	49
9	0	0	0	0	0	0	3	2	1	13	66	16
10	0	0	0	0	0	0	0	1	0	1	2	4
11	0	4	0	0	0	0	0	0	0	0	1	1
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
ALL	13	1511	1100	463	1026	1380	1597	1621	280	3002	4195	1853

Table 1.5 Month and community combination that were removed from the analysis because they had zero catch for all years in the sentinel survey using 3¼ in. gill net at Experimental sites.

OBS	TYPE	GEAR	DIV	community	MONTH
1	E	6	2J	Black Tickle	10
2	E	6	2J	Penny_s Harbour	7
3	E	6	2J	Triangle	7
4	E	6	2J	Triangle	8
5	E	6	3K	Englee	10
6	E	6	3L	Heart_s Content	9

Table 1.6 Model results for

Experimental Gill net 3¼ in.

The GENMOD Procedure

Model Information

Description	Value
Data Set	WORK.USE
Distribution	POISSON
Link Function	LOG
Dependent Variable	N
Offset Variable	LOGAMT
Observations Used	1414

Class Level Information

Class	Levels	Values
SEQCODE	34	1 2 3 4 5 6 7 8 9 10 13 14 15 16 18 22 23 25 26 28 29 30 33 36 38 39 42 43 47 48 50 53 56 59
MONTH	5	7 8 9 10 11
YEAR	4	1996 1997 1998 1999
AGE	7	3 4 5 6 7 8 9

Criteria For Assessing Goodness Of Fit

Criterion	DF	Value	Value/DF
Deviance	1294	15350.9228	11.8632
Scaled Deviance	1294	1294.0000	1.0000
Pearson Chi-Square	1294	17672.4693	13.6572
Scaled Pearson X2	1294	1489.6939	1.1512
Log Likelihood	.	3571.8248	.

Table 1.6 Model results for

Experimental Gill net 3¼ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
INTERCEPT			0	0.0000	0.0000	.	.
MONTH(SEQCODE)	8	1	1	-2.9325	0.9000	10.6162	0.0011
MONTH(SEQCODE)	9	1	1	-3.6579	0.9168	15.9197	0.0001
MONTH(SEQCODE)	8	2	1	-3.2470	0.9285	12.2301	0.0005
MONTH(SEQCODE)	9	2	1	-1.9900	0.8866	5.0382	0.0248
MONTH(SEQCODE)	8	3	1	-4.5045	1.4904	9.1346	0.0025
MONTH(SEQCODE)	9	3	1	-4.2041	1.2854	10.6976	0.0011
MONTH(SEQCODE)	10	3	1	-4.0071	1.1443	12.2631	0.0005
MONTH(SEQCODE)	9	4	1	-1.7258	0.8720	3.9165	0.0478
MONTH(SEQCODE)	10	4	1	-2.3025	1.0457	4.8482	0.0277
MONTH(SEQCODE)	8	5	1	-4.3036	1.0432	17.0198	0.0001
MONTH(SEQCODE)	9	5	1	-4.6875	1.0789	18.8768	0.0001
MONTH(SEQCODE)	8	6	1	-4.7250	1.3143	12.9236	0.0003
MONTH(SEQCODE)	9	6	1	-2.8396	0.9104	9.7283	0.0018
MONTH(SEQCODE)	10	6	1	-3.6240	0.9825	13.6051	0.0002
MONTH(SEQCODE)	7	7	1	-4.1338	1.0404	15.7872	0.0001
MONTH(SEQCODE)	8	7	1	-1.9057	0.8732	4.7627	0.0291
MONTH(SEQCODE)	9	7	1	-2.5163	0.8756	8.2578	0.0041
MONTH(SEQCODE)	7	8	1	-4.9805	1.3496	13.6194	0.0002
MONTH(SEQCODE)	8	8	1	-3.1475	0.9411	11.1862	0.0008
MONTH(SEQCODE)	9	8	1	-1.6720	0.8813	3.5998	0.0578
MONTH(SEQCODE)	7	9	1	-3.9127	1.0553	13.7474	0.0002
MONTH(SEQCODE)	8	9	1	-2.2454	1.0364	4.6936	0.0303
MONTH(SEQCODE)	9	9	1	-3.8086	1.2019	10.0411	0.0015
MONTH(SEQCODE)	8	10	1	-0.2876	0.8895	0.1046	0.7464
MONTH(SEQCODE)	9	10	1	-1.8035	0.9222	3.8243	0.0505
MONTH(SEQCODE)	8	13	1	-1.6141	0.9060	3.1744	0.0748
MONTH(SEQCODE)	9	13	1	-2.3440	0.8909	6.9227	0.0085
MONTH(SEQCODE)	7	14	1	-4.1057	1.1126	13.6183	0.0002
MONTH(SEQCODE)	8	14	1	-3.5394	1.5598	5.1487	0.0233
MONTH(SEQCODE)	10	14	1	-2.5319	0.9031	7.8599	0.0051
MONTH(SEQCODE)	11	14	1	-2.4959	1.0561	5.5847	0.0181
MONTH(SEQCODE)	7	15	1	-4.0371	1.6498	5.9881	0.0144
MONTH(SEQCODE)	8	15	1	-1.7017	0.9167	3.4464	0.0634
MONTH(SEQCODE)	8	16	1	-1.8418	0.8827	4.3534	0.0369
MONTH(SEQCODE)	9	16	1	-2.9176	0.9481	9.4710	0.0021
MONTH(SEQCODE)	10	16	1	-2.5330	1.0881	5.4192	0.0199
MONTH(SEQCODE)	9	18	1	-1.9888	1.0478	3.6028	0.0577
MONTH(SEQCODE)	7	22	1	-1.4324	0.8889	2.5971	0.1071
MONTH(SEQCODE)	10	22	1	-3.3633	0.9972	11.3758	0.0007
MONTH(SEQCODE)	11	22	1	-1.4880	0.8689	2.9326	0.0868
MONTH(SEQCODE)	7	23	1	-3.1999	0.9423	11.5310	0.0007
MONTH(SEQCODE)	10	23	1	-2.7026	0.9340	8.3730	0.0038
MONTH(SEQCODE)	11	23	1	-0.9894	0.8679	1.2995	0.2543
MONTH(SEQCODE)	7	25	1	-1.7154	0.9133	3.5280	0.0603
MONTH(SEQCODE)	8	25	1	-2.3230	0.9005	6.6550	0.0099
MONTH(SEQCODE)	9	25	1	-1.3065	0.8738	2.2354	0.1349
MONTH(SEQCODE)	11	25	1	-2.6521	1.0427	6.4690	0.0110
MONTH(SEQCODE)	8	26	1	-2.6392	0.9399	7.8846	0.0050
MONTH(SEQCODE)	8	28	1	-3.4205	1.1683	8.5720	0.0034
MONTH(SEQCODE)	9	28	1	-2.5807	1.0050	6.5934	0.0102

Table 1.6 Model results for

Experimental Gill net 3¼ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	7	29	1	-2.6820	1.0478	6.5517	0.0105
MONTH(SEQCODE)	8	29	1	-2.3324	1.0508	4.9271	0.0264
MONTH(SEQCODE)	9	29	1	-2.3553	0.9442	6.2224	0.0126
MONTH(SEQCODE)	8	30	1	-2.1826	0.9207	5.6190	0.0178
MONTH(SEQCODE)	7	33	1	-2.7243	0.8798	9.5880	0.0020
MONTH(SEQCODE)	8	33	1	-1.7805	0.8706	4.1823	0.0408
MONTH(SEQCODE)	9	33	1	-2.0841	0.9675	4.6401	0.0312
MONTH(SEQCODE)	7	36	1	-3.5949	1.1561	9.6681	0.0019
MONTH(SEQCODE)	8	36	1	-1.9195	0.8887	4.6651	0.0308
MONTH(SEQCODE)	9	36	1	-1.2102	0.8845	1.8721	0.1712
MONTH(SEQCODE)	7	38	1	-1.3883	0.8751	2.5169	0.1126
MONTH(SEQCODE)	8	38	1	-1.2929	0.8712	2.2022	0.1378
MONTH(SEQCODE)	9	38	1	-1.6771	0.8753	3.6709	0.0554
MONTH(SEQCODE)	7	39	1	-1.7813	0.9234	3.7210	0.0537
MONTH(SEQCODE)	9	39	1	-1.2260	0.8690	1.9903	0.1583
MONTH(SEQCODE)	10	39	1	-1.3202	0.8719	2.2925	0.1300
MONTH(SEQCODE)	8	42	1	-2.7108	0.8844	9.3956	0.0022
MONTH(SEQCODE)	10	42	1	-4.1241	1.1331	13.2481	0.0003
MONTH(SEQCODE)	7	43	1	-2.1711	0.9768	4.9408	0.0262
MONTH(SEQCODE)	8	43	1	-2.6653	0.9258	8.2880	0.0040
MONTH(SEQCODE)	9	43	1	-1.1678	0.8773	1.7720	0.1831
MONTH(SEQCODE)	7	47	1	-2.4541	0.8833	7.7200	0.0055
MONTH(SEQCODE)	8	47	1	-2.8972	0.9341	9.6193	0.0019
MONTH(SEQCODE)	9	47	1	-1.3885	0.9035	2.3615	0.1244
MONTH(SEQCODE)	7	48	1	-1.7410	0.8861	3.8602	0.0494
MONTH(SEQCODE)	8	48	1	-1.6892	0.8800	3.6847	0.0549
MONTH(SEQCODE)	9	48	1	-2.3943	1.1303	4.4869	0.0342
MONTH(SEQCODE)	10	48	1	-2.6508	1.1131	5.6718	0.0172
MONTH(SEQCODE)	11	48	1	-3.3225	1.2618	6.9339	0.0085
MONTH(SEQCODE)	7	50	1	-2.2664	0.9104	6.1981	0.0128
MONTH(SEQCODE)	8	50	1	-3.8029	1.0861	12.2602	0.0005
MONTH(SEQCODE)	9	50	1	-1.7855	0.8937	3.9919	0.0457
MONTH(SEQCODE)	10	50	1	-2.1351	0.9130	5.4689	0.0194
MONTH(SEQCODE)	7	53	1	-4.7303	2.1677	4.7617	0.0291
MONTH(SEQCODE)	8	53	1	-5.9616	3.5508	2.8189	0.0932
MONTH(SEQCODE)	9	53	1	-2.5492	0.9333	7.4611	0.0063
MONTH(SEQCODE)	10	53	1	-5.4853	3.5499	2.3877	0.1223
MONTH(SEQCODE)	7	56	1	-1.3766	0.9305	2.1890	0.1390
MONTH(SEQCODE)	8	56	1	-1.1952	0.8917	1.7963	0.1802
MONTH(SEQCODE)	7	59	1	-2.1681	0.8901	5.9333	0.0149
MONTH(SEQCODE)	8	59	1	-2.6611	0.8930	8.8804	0.0029
MONTH(SEQCODE)	9	59	1	-2.4673	0.8772	7.9122	0.0049
MONTH(SEQCODE)	10	59	1	-2.7551	0.9034	9.2998	0.0023
AGE(YEAR)	3	1996	1	4.3048	0.8937	23.2009	0.0001
AGE(YEAR)	4	1996	1	5.2454	0.8758	35.8712	0.0001
AGE(YEAR)	5	1996	1	4.3179	0.8933	23.3618	0.0001
AGE(YEAR)	6	1996	1	4.4323	0.8902	24.7887	0.0001
AGE(YEAR)	7	1996	1	1.0727	1.4370	0.5573	0.4554
AGE(YEAR)	8	1996	1	-0.4314	2.5842	0.0279	0.8674

Table 1.6 Model results for

Experimental Gill net 3¼ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
AGE(YEAR)	9	1996	1	-17.3192	11316.9458	0.0000	0.9988
AGE(YEAR)	3	1997	1	4.4647	0.8670	26.5170	0.0001
AGE(YEAR)	4	1997	1	5.0144	0.8648	33.6205	0.0001
AGE(YEAR)	5	1997	1	4.2375	0.8683	23.8145	0.0001
AGE(YEAR)	6	1997	1	3.8349	0.8716	19.3600	0.0001
AGE(YEAR)	7	1997	1	3.3774	0.8772	14.8243	0.0001
AGE(YEAR)	8	1997	1	1.6533	0.9449	3.0613	0.0802
AGE(YEAR)	9	1997	1	-0.3183	1.3495	0.0556	0.8135
AGE(YEAR)	3	1998	1	4.2823	0.8666	24.4185	0.0001
AGE(YEAR)	4	1998	1	4.4497	0.8659	26.4091	0.0001
AGE(YEAR)	5	1998	1	3.9671	0.8683	20.8734	0.0001
AGE(YEAR)	6	1998	1	4.3534	0.8663	25.2551	0.0001
AGE(YEAR)	7	1998	1	3.5466	0.8717	16.5551	0.0001
AGE(YEAR)	8	1998	1	2.5911	0.8870	8.5326	0.0035
AGE(YEAR)	9	1998	1	1.2122	0.9578	1.6017	0.2057
AGE(YEAR)	3	1999	1	4.4991	0.8658	27.0005	0.0001
AGE(YEAR)	4	1999	1	4.2395	0.8673	23.8968	0.0001
AGE(YEAR)	5	1999	1	3.7955	0.8707	19.0022	0.0001
AGE(YEAR)	6	1999	1	2.8658	0.8852	10.4798	0.0012
AGE(YEAR)	7	1999	1	2.7163	0.8891	9.3344	0.0022
AGE(YEAR)	8	1999	1	1.2879	0.9726	1.7533	0.1855
AGE(YEAR)	9	1999	0	0.0000	0.0000	.	.
SCALE			0	3.4443	0.0000	.	.

NOTE: The scale parameter was estimated by the square root of DEVIANCE/DOF.

Table 1.6 Model results for

Experimental Gill net 3¼ in.

Lagrange Multiplier Statistics

Parameter	ChiSquare	Pr>Chi
Intercept	.	.

LR Statistics For Type 3 Analysis

Source	NDF	DDF	F	Pr>F	ChiSquare	Pr>Chi
MONTH(SEQCODE)	92	1294	9.7573	0.0001	897.6704	0.0001
AGE(YEAR)	27	1294	43.1539	0.0001	1165.1564	0.0001

Table 1.7 Standardized relative Catch Rate for

Experimental Gill net 3¼ in.

	Year			
	1996	1997	1998	1999
age				
3	5.513	6.469	5.390	6.696
4	14.122	11.210	6.373	5.165
5	5.586	5.154	3.933	3.313
6	6.263	3.446	5.788	1.307
7	0.218	2.181	2.583	1.126
8	0.048	0.389	0.993	0.270
9	0.000	0.054	0.250	0.074
ALL	31.750	28.903	25.310	17.951

Table 2.1 Number of sets and summary statistics for soak time for line trawl.

Line trawl			Experimental							Fixed						
			MONTH							MONTH						
			7	8	9	10	11	12	ALL	7	8	9	10	11	12	ALL
YEAR																
1995	Soak Time (hrs)	N	2	32	142	208	28	1	413	2	36	139	193	27	1	398
		MIN	15	1	1	1	2	5	1	12	1	1	1	2	2	1
		MEAN	18	14	16	13	8	5	14	18	13	17	14	8	2	15
		MAX	21	51	176	169	48	5	176	23	47	190	143	67	2	190
1996	Soak Time (hrs)	N	1	35	176	73	.	.	285	1	32	141	59	.	.	233
		MIN	4	1	1	1	.	.	1	23	1	1	1	.	.	1
		MEAN	4	13	15	15	.	.	15	23	17	17	17	.	.	17
		MAX	4	47	192	169	.	.	192	23	45	191	168	.	.	191
1997	Soak Time (hrs)	N	.	15	156	63	6	.	240	.	15	134	56	5	.	210
		MIN	.	1	1	1	20	.	1	.	1	1	1	2	.	1
		MEAN	.	11	15	9	24	.	13	.	11	16	11	15	.	15
		MAX	.	26	146	72	30	.	146	.	26	146	74	28	.	146
1998	Soak Time (hrs)	N	.	21	96	43	16	3	179	.	21	71	37	10	3	142
		MIN	.	1	1	1	1	1	1	.	1	1	1	2	1	1
		MEAN	.	9	11	18	10	2	12	.	14	17	23	10	3	17
		MAX	.	70	189	220	26	3	220	.	70	194	218	26	5	218
1999	Soak Time (hrs)	N	.	33	27	24	8	.	92	.	20	26	22	6	.	74
		MIN	.	1	1	1	1	.	1	.	1	1	2	3	.	1
		MEAN	.	12	10	14	40	.	14	.	17	15	20	29	.	18
		MAX	.	60	31	75	76	.	76	.	60	31	75	67	.	75
ALL	N		3	136	597	411	58	4	1209	3	124	511	367	48	4	1057

Table 2.2 Summary statistics for soak time and number of sets selected for input to the model.

Line trawl												
			Experimental					Fixed				
			MONTH					MONTH				
			8	9	10	11	ALL	8	9	10	11	ALL
YEAR												
1995	Soak Time (hrs)	N	16	82	138	23	259	18	77	121	22	238
		MIN	1	1	1	2	1	1	1	1	2	1
		MEAN	3	3	3	4	3	3	3	3	3	3
		MAX	11	12	9	7	12	11	9	11	7	11
1996	Soak Time (hrs)	N	18	124	50	.	192	11	93	38	.	142
		MIN	1	1	1	.	1	1	1	1	.	1
		MEAN	3	3	3	.	3	3	3	3	.	3
		MAX	5	6	5	.	6	5	6	7	.	7
1997	Soak Time (hrs)	N	9	99	50	.	158	9	86	42	2	139
		MIN	1	1	1	.	1	1	1	1	2	1
		MEAN	2	3	3	.	3	2	4	4	3	4
		MAX	5	10	9	.	10	4	12	9	3	12
1998	Soak Time (hrs)	N	17	77	27	10	131	13	42	17	6	78
		MIN	1	1	1	1	1	1	1	1	2	1
		MEAN	3	3	2	3	3	2	3	2	4	3
		MAX	7	7	5	6	7	7	12	5	5	12
1999	Soak Time (hrs)	N	19	18	17	2	56	8	11	11	2	32
		MIN	1	1	1	1	1	1	1	2	3	1
		MEAN	2	3	3	3	3	2	4	3	4	3
		MAX	4	9	6	5	9	4	9	5	4	9
ALL	N		79	400	282	35	796	59	309	229	32	629

Table 2.3 Frequency tables for the amount of gear and soak time used in the standardisation for the fixed line trawl survey.

GEARAMT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
150	6	1.0	6	1.0
200	20	3.2	26	4.1
250	47	7.5	73	11.6
293	1	0.2	74	11.8
300	101	16.1	175	27.9
350	150	23.9	325	51.8
360	30	4.8	355	56.5
400	109	17.4	464	73.9
450	9	1.4	473	75.3
453	6	1.0	479	76.3
500	144	22.9	623	99.2
600	1	0.2	624	99.4
700	2	0.3	626	99.7
1000	2	0.3	628	100.0

Frequency Missing 1

SOAK	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	73	11.6	73	11.6
2	206	32.8	279	44.4
3	169	26.9	448	71.2
4	85	13.5	533	84.7
5	35	5.6	568	90.3
6	21	3.3	589	93.6
7	17	2.7	606	96.3
8	10	1.6	616	97.9
9	6	1.0	622	98.9
10	3	0.5	625	99.4
11	2	0.3	627	99.7
12	2	0.3	629	100.0

MESH	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	629	100.0	629	100.0

Table 2.4 Catch at age from the sentinel program by NAFO division for

Fixed
Line trawl

	DIV											
	2J		3K					3L				
	YEAR		YEAR					YEAR				
	1996	1997	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	number	number	number	number	number	number	number	number	number	number	number	number
AGE												
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	37	0	7	24	14	95	59	8	41
3	0	0	309	745	502	382	87	468	344	368	218	50
4	0	0	2877	1154	1851	594	209	990	569	874	393	49
5	0	0	2563	1694	2062	426	272	1136	326	1142	221	45
6	0	0	735	802	1235	243	83	736	265	875	342	22
7	0	0	202	78	805	101	5	371	300	661	46	30
8	0	0	16	8	100	90	13	35	74	140	99	7
9	0	0	24	2	28	11	14	82	9	24	54	4
10	0	0	3	0	0	0	0	5	16	29	4	1
11	0	0	0	0	0	0	0	1	4	5	1	0
12	0	0	0	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
ALL	0	0	6727	4521	6582	1855	707	3838	2001	4177	1394	248

Table 2.5 Month and community combination that were removed from the analysis because they had zero catch for all years in the sentinel survey using line trawl at fixed sites.

OBS	TYPE	GEAR	DIV	community	MONTH
1	F	7	2J	Tub Harbour	9
2	F	7	2J	Cape Charles	9
3	F	7	2J	Cape Charles	10
4	F	7	3L	Renews	8

Table 2.6 Model results for

Fixed Line trawl

The GENMOD Procedure

Model Information

Description	Value
Data Set	WORK.USE
Distribution	POISSON
Link Function	LOG
Dependent Variable	N
Offset Variable	LOGAMT
Observations Used	889
Missing Values	7

Class Level Information

Class	Levels	Values
SEQCODE	21	16 17 18 19 24 26 28 30 31 32 33 37 42 45 47 51 52 54 55 57 58
MONTH	4	8 9 10 11
YEAR	5	1995 1996 1997 1998 1999
AGE	7	3 4 5 6 7 8 9

Criteria For Assessing Goodness Of Fit

Criterion	DF	Value	Value/DF
Deviance	801	10261.1379	12.8104
Scaled Deviance	801	801.0000	1.0000
Pearson Chi-Square	801	11903.8636	14.8613
Scaled Pearson X2	801	929.2337	1.1601
Log Likelihood	.	8708.2927	.

Table 2.6 Model results for

Fixed Line trawl

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
INTERCEPT			0	0.0000	0.0000	.	.
MONTH(SEQCODE)	9	16	1	-7.6531	0.8956	73.0200	0.0001
MONTH(SEQCODE)	10	16	1	-9.4117	1.8217	26.6932	0.0001
MONTH(SEQCODE)	8	17	1	-7.3862	0.9041	66.7401	0.0001
MONTH(SEQCODE)	9	17	1	-7.0446	0.8742	64.9389	0.0001
MONTH(SEQCODE)	10	17	1	-6.9322	0.8762	62.5962	0.0001
MONTH(SEQCODE)	11	17	1	-7.0611	0.9166	59.3511	0.0001
MONTH(SEQCODE)	8	18	1	-6.5046	0.9614	45.7721	0.0001
MONTH(SEQCODE)	9	18	1	-6.1729	0.8711	50.2187	0.0001
MONTH(SEQCODE)	10	18	1	-6.3685	0.8740	53.0950	0.0001
MONTH(SEQCODE)	11	18	1	-6.7209	1.0268	42.8457	0.0001
MONTH(SEQCODE)	8	19	1	-6.1037	0.9256	43.4896	0.0001
MONTH(SEQCODE)	9	19	1	-6.2852	0.8696	52.2455	0.0001
MONTH(SEQCODE)	10	19	1	-6.2834	0.8713	52.0003	0.0001
MONTH(SEQCODE)	11	19	1	-6.1326	0.8902	47.4545	0.0001
MONTH(SEQCODE)	9	24	1	-6.1823	0.8735	50.0881	0.0001
MONTH(SEQCODE)	10	24	1	-6.3152	0.8727	52.3599	0.0001
MONTH(SEQCODE)	11	24	1	-5.8765	0.8768	44.9190	0.0001
MONTH(SEQCODE)	9	26	1	-6.9851	1.1357	37.8255	0.0001
MONTH(SEQCODE)	10	26	1	-6.9492	1.0235	46.1024	0.0001
MONTH(SEQCODE)	8	28	1	-6.4914	1.0117	41.1658	0.0001
MONTH(SEQCODE)	9	28	1	-6.4024	0.8902	51.7264	0.0001
MONTH(SEQCODE)	10	28	1	-6.2504	0.9103	47.1423	0.0001
MONTH(SEQCODE)	10	30	1	-6.2313	0.9719	41.1097	0.0001
MONTH(SEQCODE)	10	31	1	-6.4993	1.1460	32.1636	0.0001
MONTH(SEQCODE)	8	32	1	-5.1697	0.9177	31.7348	0.0001
MONTH(SEQCODE)	9	32	1	-6.0048	0.8813	46.4284	0.0001
MONTH(SEQCODE)	10	32	1	-6.5761	0.9201	51.0834	0.0001
MONTH(SEQCODE)	8	33	1	-6.0356	0.9267	42.4149	0.0001
MONTH(SEQCODE)	9	33	1	-6.0264	0.8815	46.7397	0.0001
MONTH(SEQCODE)	10	33	1	-6.1383	0.9749	39.6434	0.0001
MONTH(SEQCODE)	9	37	1	-6.5241	0.8996	52.5950	0.0001
MONTH(SEQCODE)	10	37	1	-6.2756	0.8814	50.6953	0.0001
MONTH(SEQCODE)	11	37	1	-6.1797	0.9098	46.1384	0.0001
MONTH(SEQCODE)	8	42	1	-6.9521	1.0415	44.5526	0.0001
MONTH(SEQCODE)	9	42	1	-7.1833	0.8821	66.3202	0.0001
MONTH(SEQCODE)	10	42	1	-8.0096	0.8865	81.6384	0.0001
MONTH(SEQCODE)	11	42	1	-8.8239	1.7004	26.9283	0.0001
MONTH(SEQCODE)	10	45	1	-7.2608	0.9306	60.8718	0.0001
MONTH(SEQCODE)	11	45	1	-6.8954	1.0593	42.3718	0.0001
MONTH(SEQCODE)	9	47	1	-6.9266	0.8807	61.8506	0.0001
MONTH(SEQCODE)	10	47	1	-6.7432	0.8716	59.8486	0.0001
MONTH(SEQCODE)	11	47	1	-7.2332	0.8944	65.4000	0.0001
MONTH(SEQCODE)	10	51	1	-6.3989	0.8901	51.6785	0.0001
MONTH(SEQCODE)	8	52	1	-7.1937	0.8781	67.1084	0.0001
MONTH(SEQCODE)	9	52	1	-6.5371	0.8725	56.1294	0.0001
MONTH(SEQCODE)	10	52	1	-6.7113	0.8810	58.0325	0.0001
MONTH(SEQCODE)	10	54	1	-6.4914	1.1360	32.6525	0.0001
MONTH(SEQCODE)	10	55	1	-6.8860	0.9989	47.5193	0.0001
MONTH(SEQCODE)	9	57	1	-7.5330	0.8853	72.3971	0.0001
MONTH(SEQCODE)	10	57	1	-7.4483	0.8850	70.8373	0.0001

Table 2.6 Model results for

Fixed Line trawl

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	11	57	1	-7.8852	1.2485	39.8880	0.0001
MONTH(SEQCODE)	8	58	1	-9.5688	1.0811	78.3391	0.0001
MONTH(SEQCODE)	9	58	1	-8.3458	0.8995	86.0869	0.0001
MONTH(SEQCODE)	10	58	1	-8.3456	0.9286	80.7787	0.0001
AGE(YEAR)	3	1995	1	2.0141	0.8784	5.2569	0.0219
AGE(YEAR)	4	1995	1	3.6212	0.8709	17.2894	0.0001
AGE(YEAR)	5	1995	1	3.5765	0.8710	16.8624	0.0001
AGE(YEAR)	6	1995	1	2.6543	0.8740	9.2235	0.0024
AGE(YEAR)	7	1995	1	1.7125	0.8817	3.7723	0.0521
AGE(YEAR)	8	1995	1	-0.7281	1.0057	0.5241	0.4691
AGE(YEAR)	9	1995	1	0.0513	0.9342	0.0030	0.9562
AGE(YEAR)	3	1996	1	2.8920	0.8755	10.9117	0.0010
AGE(YEAR)	4	1996	1	3.3508	0.8730	14.7317	0.0001
AGE(YEAR)	5	1996	1	3.5109	0.8724	16.1957	0.0001
AGE(YEAR)	6	1996	1	2.8716	0.8756	10.7548	0.0010
AGE(YEAR)	7	1996	1	1.8313	0.8881	4.2519	0.0392
AGE(YEAR)	8	1996	1	0.3057	0.9544	0.1026	0.7487
AGE(YEAR)	9	1996	1	-1.5360	1.3191	1.3559	0.2443
AGE(YEAR)	3	1997	1	2.6498	0.8773	9.1233	0.0025
AGE(YEAR)	4	1997	1	3.7884	0.8716	18.8938	0.0001
AGE(YEAR)	5	1997	1	3.9494	0.8712	20.5521	0.0001
AGE(YEAR)	6	1997	1	3.5318	0.8724	16.3911	0.0001
AGE(YEAR)	7	1997	1	3.1654	0.8739	13.1202	0.0003
AGE(YEAR)	8	1997	1	1.3585	0.8991	2.2831	0.1308
AGE(YEAR)	9	1997	1	-0.1709	1.0006	0.0292	0.8644
AGE(YEAR)	3	1998	1	2.7767	0.8806	9.9430	0.0016
AGE(YEAR)	4	1998	1	3.2734	0.8758	13.9692	0.0002
AGE(YEAR)	5	1998	1	2.8318	0.8799	10.3569	0.0013
AGE(YEAR)	6	1998	1	2.7077	0.8814	9.4364	0.0021
AGE(YEAR)	7	1998	1	1.3565	0.9178	2.1843	0.1394
AGE(YEAR)	8	1998	1	1.6162	0.9068	3.1769	0.0747
AGE(YEAR)	9	1998	1	0.5229	0.9785	0.2856	0.5931
AGE(YEAR)	3	1999	1	2.0940	0.9200	5.1809	0.0228
AGE(YEAR)	4	1999	1	2.7197	0.8962	9.2094	0.0024
AGE(YEAR)	5	1999	1	2.9257	0.8910	10.7809	0.0010
AGE(YEAR)	6	1999	1	1.8207	0.9357	3.7863	0.0517
AGE(YEAR)	7	1999	1	0.7503	1.0533	0.5074	0.4762
AGE(YEAR)	8	1999	1	0.1625	1.1807	0.0189	0.8905
AGE(YEAR)	9	1999	0	0.0000	0.0000	.	.
SCALE			0	3.5792	0.0000	.	.

NOTE: The scale parameter was estimated by the square root of DEVIANCE/DOF.

Table 2.6 Model results for

Fixed Line trawl

Lagrange Multiplier Statistics

Parameter	ChiSquare	Pr>Chi
Intercept	.	.

LR Statistics For Type 3 Analysis

Source	NDF	DDF	F	Pr>F	ChiSquare	Pr>Chi
MONTH(SEQCODE)	53	801	14.8314	0.0001	786.0663	0.0001
AGE(YEAR)	34	801	62.8285	0.0001	2136.1675	0.0001

Table 2.7 Standardized relative Catch Rate for

Fixed Line trawl

	Year				
	1995	1996	1997	1998	1999
age					
3	0.008	0.019	0.015	0.017	0.009
4	0.040	0.031	0.047	0.028	0.016
5	0.038	0.036	0.056	0.018	0.020
6	0.015	0.019	0.037	0.016	0.007
7	0.006	0.007	0.025	0.004	0.002
8	0.001	0.001	0.004	0.005	0.001
9	0.001	0.000	0.001	0.002	0.001
ALL	0.110	0.113	0.186	0.091	0.056

Table 3.1 Number of sets and summary statistics for soak time for line trawl.

Line trawl																
			Experimental							Fixed						
			MONTH							MONTH						
			7	8	9	10	11	12	ALL	7	8	9	10	11	12	ALL
YEAR																
1995	Soak Time (hrs)	N	2	32	142	208	28	1	413	2	36	139	193	27	1	398
		MIN	15	1	1	1	2	5	1	12	1	1	1	2	2	1
		MEAN	18	14	16	13	8	5	14	18	13	17	14	8	2	15
		MAX	21	51	176	169	48	5	176	23	47	190	143	67	2	190
1996	Soak Time (hrs)	N	1	35	176	73	.	.	285	1	32	141	59	.	.	233
		MIN	4	1	1	1	.	.	1	23	1	1	1	.	.	1
		MEAN	4	13	15	15	.	.	15	23	17	17	17	.	.	17
		MAX	4	47	192	169	.	.	192	23	45	191	168	.	.	191
1997	Soak Time (hrs)	N	.	15	156	63	6	.	240	.	15	134	56	5	.	210
		MIN	.	1	1	1	20	.	1	.	1	1	1	2	.	1
		MEAN	.	11	15	9	24	.	13	.	11	16	11	15	.	15
		MAX	.	26	146	72	30	.	146	.	26	146	74	28	.	146
1998	Soak Time (hrs)	N	.	21	96	43	16	3	179	.	21	71	37	10	3	142
		MIN	.	1	1	1	1	1	1	.	1	1	1	2	1	1
		MEAN	.	9	11	18	10	2	12	.	14	17	23	10	3	17
		MAX	.	70	189	220	26	3	220	.	70	194	218	26	5	218
1999	Soak Time (hrs)	N	.	33	27	24	8	.	92	.	20	26	22	6	.	74
		MIN	.	1	1	1	1	.	1	.	1	1	2	3	.	1
		MEAN	.	12	10	14	40	.	14	.	17	15	20	29	.	18
		MAX	.	60	31	75	76	.	76	.	60	31	75	67	.	75
ALL	N		3	136	597	411	58	4	1209	3	124	511	367	48	4	1057

Table 3.2 Summary statistics for soak time and number of sets selected for input to the model

Line trawl												
			Experimental					Fixed				
			MONTH					MONTH				
			8	9	10	11	ALL	8	9	10	11	ALL
YEAR												
1995	Soak Time (hrs)	N	16	82	138	23	259	18	77	121	22	238
		MIN	1	1	1	2	1	1	1	1	2	1
		MEAN	3	3	3	4	3	3	3	3	3	3
		MAX	11	12	9	7	12	11	9	11	7	11
1996	Soak Time (hrs)	N	18	124	50	.	192	11	93	38	.	142
		MIN	1	1	1	.	1	1	1	1	.	1
		MEAN	3	3	3	.	3	3	3	3	.	3
		MAX	5	6	5	.	6	5	6	7	.	7
1997	Soak Time (hrs)	N	9	99	50	.	158	9	86	42	2	139
		MIN	1	1	1	.	1	1	1	1	2	1
		MEAN	2	3	3	.	3	2	4	4	3	4
		MAX	5	10	9	.	10	4	12	9	3	12
1998	Soak Time (hrs)	N	17	77	27	10	131	13	42	17	6	78
		MIN	1	1	1	1	1	1	1	1	2	1
		MEAN	3	3	2	3	3	2	3	2	4	3
		MAX	7	7	5	6	7	7	12	5	5	12
1999	Soak Time (hrs)	N	19	18	17	2	56	8	11	11	2	32
		MIN	1	1	1	1	1	1	1	2	3	1
		MEAN	2	3	3	3	3	2	4	3	4	3
		MAX	4	9	6	5	9	4	9	5	4	9
ALL	N		79	400	282	35	796	59	309	229	32	629

Table 3.3 Frequency tables for the amount of gear and soak time used in the standardisation for the experimental . line trawl survey.

GEARAMT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
30	1	0.1	1	0.1
150	35	4.4	36	4.5
151	1	0.1	37	4.7
156	1	0.1	38	4.8
200	42	5.3	80	10.1
213	6	0.8	86	10.8
238	6	0.8	92	11.6
240	30	3.8	122	15.3
250	58	7.3	180	22.6
300	145	18.2	325	40.9
350	228	28.7	553	69.6
400	93	11.7	646	81.3
450	9	1.1	655	82.4
500	137	17.2	792	99.6
600	1	0.1	793	99.7
1000	2	0.3	795	100.0

Frequency Missing 1

SOAK	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	110	13.8	110	13.8
2	257	32.3	367	46.1
3	180	22.6	547	68.7
4	140	17.6	687	86.3
5	42	5.3	729	91.6
6	28	3.5	757	95.1
7	14	1.8	771	96.9
8	10	1.3	781	98.1
9	8	1.0	789	99.1
10	4	0.5	793	99.6
11	2	0.3	795	99.9
12	1	0.1	796	100.0

MESH	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	796	100.0	796	100.0

Table 3.4 Catch at age from the sentinel program by NAFO division for

Experimental
Line trawl

	DIV												
	2J			3K					3L				
	YEAR			YEAR					YEAR				
	1996	1997	1999	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	number	number	number	number	number	number	number	number	number	number	number	number	number
AGE													
1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	39	0	42	40	12	86	46	5	32
3	0	0	0	384	792	801	641	116	593	583	364	125	72
4	0	0	0	3428	1398	2561	926	241	1269	1144	870	335	126
5	1	0	0	3067	2284	2945	708	274	1564	747	1300	394	113
6	0	0	0	851	1164	1725	413	104	1096	589	940	777	79
7	0	0	0	206	163	1233	189	8	441	632	744	142	105
8	0	0	0	24	21	136	148	30	52	152	207	312	24
9	0	0	0	33	10	32	23	32	99	16	39	153	15
10	0	0	0	8	0	0	0	3	7	35	28	76	5
11	0	0	0	0	0	0	0	0	5	10	1	24	0
12	0	0	0	0	0	0	0	0	0	0	0	26	2
13	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0
ALL	1	0	0	7999	5872	9433	3089	849	5139	3995	4539	2370	573

Table 3.5 Month and community combination that were removed from the analysis because they had zero catch for all years in the sentinel survey using line trawl at experimental sites.

OBS	TYPE	GEAR	DIV	community	MONTH
1	E	7	2J	Tub Harbour	8
2	E	7	2J	Tub Harbour	9
3	E	7	2J	Cape Charles	10
4	E	7	3L	Renews	8

Table 3.6 Model results for

Experimental Line trawl

The GENMOD Procedure

Model Information

Description	Value
Data Set	WORK.USE
Distribution	POISSON
Link Function	LOG
Dependent Variable	N
Offset Variable	LOGAMT
Observations Used	931
Missing Values	7

Class Level Information

Class	Levels	Values
SEQCODE	23	8 11 16 17 18 19 24 26 28 29 30 32 33 37 42 45 47 51 52 54 55 57 58
MONTH	4	8 9 10 11
YEAR	5	1995 1996 1997 1998 1999
AGE	7	3 4 5 6 7 8 9

Criteria For Assessing Goodness Of Fit

Criterion	DF	Value	Value/DF
Deviance	839	14804.3216	17.6452
Scaled Deviance	839	839.0000	1.0000
Pearson Chi-Square	839	16815.2037	20.0420
Scaled Pearson X2	839	952.9620	1.1358
Log Likelihood	.	9071.7479	.

Table 3.6 Model results for

Experimental Line trawl

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
INTERCEPT			0	0.0000	0.0000	.	.
MONTH(SEQCODE)	9	8	1	-12.8499	4.2462	9.1578	0.0025
MONTH(SEQCODE)	9	11	1	-9.2815	1.8243	25.8860	0.0001
MONTH(SEQCODE)	10	11	1	-7.9548	0.9295	73.2439	0.0001
MONTH(SEQCODE)	11	11	1	-7.8281	1.7052	21.0740	0.0001
MONTH(SEQCODE)	9	16	1	-7.0937	0.6528	118.0974	0.0001
MONTH(SEQCODE)	10	16	1	-6.2876	0.7531	69.7119	0.0001
MONTH(SEQCODE)	8	17	1	-6.5962	0.6447	104.6862	0.0001
MONTH(SEQCODE)	9	17	1	-6.1228	0.6252	95.8967	0.0001
MONTH(SEQCODE)	10	17	1	-6.2069	0.6292	97.3191	0.0001
MONTH(SEQCODE)	11	17	1	-6.4018	0.7006	83.4931	0.0001
MONTH(SEQCODE)	8	18	1	-5.7609	0.7747	55.3034	0.0001
MONTH(SEQCODE)	9	18	1	-5.8239	0.6251	86.7940	0.0001
MONTH(SEQCODE)	10	18	1	-6.1099	0.6302	93.9863	0.0001
MONTH(SEQCODE)	11	18	1	-6.7678	0.8141	69.1090	0.0001
MONTH(SEQCODE)	8	19	1	-5.9376	0.7207	67.8783	0.0001
MONTH(SEQCODE)	9	19	1	-5.7229	0.6227	84.4765	0.0001
MONTH(SEQCODE)	10	19	1	-5.5171	0.6249	77.9530	0.0001
MONTH(SEQCODE)	11	19	1	-5.5929	0.6615	71.4792	0.0001
MONTH(SEQCODE)	9	24	1	-5.4115	0.6258	74.7700	0.0001
MONTH(SEQCODE)	10	24	1	-5.6723	0.6246	82.4713	0.0001
MONTH(SEQCODE)	11	24	1	-4.9506	0.6342	60.9262	0.0001
MONTH(SEQCODE)	9	26	1	-6.2926	0.8343	56.8863	0.0001
MONTH(SEQCODE)	10	26	1	-7.1349	1.1078	41.4789	0.0001
MONTH(SEQCODE)	9	28	1	-5.9499	0.6645	80.1704	0.0001
MONTH(SEQCODE)	10	28	1	-5.8687	0.7110	68.1353	0.0001
MONTH(SEQCODE)	9	29	1	-5.3673	0.7760	47.8339	0.0001
MONTH(SEQCODE)	10	29	1	-4.8182	0.7972	36.5252	0.0001
MONTH(SEQCODE)	10	30	1	-5.9412	0.7415	64.1913	0.0001
MONTH(SEQCODE)	8	32	1	-5.1183	0.7380	48.1025	0.0001
MONTH(SEQCODE)	9	32	1	-5.3667	0.6408	70.1491	0.0001
MONTH(SEQCODE)	10	32	1	-4.9815	0.6565	57.5830	0.0001
MONTH(SEQCODE)	8	33	1	-5.5717	0.6779	67.5469	0.0001
MONTH(SEQCODE)	9	33	1	-5.4980	0.6525	71.0039	0.0001
MONTH(SEQCODE)	10	33	1	-5.9454	0.8779	45.8668	0.0001
MONTH(SEQCODE)	9	37	1	-5.6078	0.6601	72.1615	0.0001
MONTH(SEQCODE)	10	37	1	-5.4616	0.6412	72.5453	0.0001
MONTH(SEQCODE)	11	37	1	-5.6305	0.6534	74.2622	0.0001
MONTH(SEQCODE)	8	42	1	-6.6277	0.9779	45.9356	0.0001
MONTH(SEQCODE)	9	42	1	-6.4268	0.6432	99.8269	0.0001
MONTH(SEQCODE)	10	42	1	-6.8443	0.6394	114.5788	0.0001
MONTH(SEQCODE)	11	42	1	-6.0012	0.8314	52.0983	0.0001
MONTH(SEQCODE)	10	45	1	-6.4502	0.6611	95.1874	0.0001
MONTH(SEQCODE)	9	47	1	-6.6610	0.6488	105.4010	0.0001
MONTH(SEQCODE)	10	47	1	-5.7911	0.6242	86.0674	0.0001
MONTH(SEQCODE)	11	47	1	-5.9941	0.6469	85.8655	0.0001
MONTH(SEQCODE)	10	51	1	-5.7205	0.6696	72.9911	0.0001
MONTH(SEQCODE)	8	52	1	-6.8150	0.6412	112.9611	0.0001
MONTH(SEQCODE)	9	52	1	-5.9459	0.6250	90.4982	0.0001
MONTH(SEQCODE)	10	52	1	-5.4565	0.6347	73.9003	0.0001
MONTH(SEQCODE)	10	54	1	-7.1775	1.1266	40.5864	0.0001

Table 3.6 Model results for

Experimental Line trawl

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	9	55	1	-6.6692	0.6815	95.7653	0.0001
MONTH(SEQCODE)	10	55	1	-6.4767	0.7018	85.1687	0.0001
MONTH(SEQCODE)	9	57	1	-6.3629	0.6400	98.8335	0.0001
MONTH(SEQCODE)	10	57	1	-6.5127	0.6542	99.0965	0.0001
MONTH(SEQCODE)	11	57	1	-5.7912	0.8123	50.8281	0.0001
MONTH(SEQCODE)	8	58	1	-7.6539	0.7216	112.4990	0.0001
MONTH(SEQCODE)	9	58	1	-7.1215	0.6562	117.7767	0.0001
MONTH(SEQCODE)	10	58	1	-6.8366	0.6704	104.0013	0.0001
AGE(YEAR)	3	1995	1	1.4740	0.6354	5.3811	0.0204
AGE(YEAR)	4	1995	1	3.0440	0.6241	23.7913	0.0001
AGE(YEAR)	5	1995	1	3.0299	0.6241	23.5673	0.0001
AGE(YEAR)	6	1995	1	2.1631	0.6283	11.8519	0.0006
AGE(YEAR)	7	1995	1	1.0634	0.6426	2.7386	0.0979
AGE(YEAR)	8	1995	1	-1.0930	0.7880	1.9237	0.1654
AGE(YEAR)	9	1995	1	-0.5277	0.7207	0.5361	0.4641
AGE(YEAR)	3	1996	1	2.3606	0.6309	13.9985	0.0002
AGE(YEAR)	4	1996	1	2.9759	0.6262	22.5805	0.0001
AGE(YEAR)	5	1996	1	3.1521	0.6254	25.4075	0.0001
AGE(YEAR)	6	1996	1	2.6054	0.6287	17.1718	0.0001
AGE(YEAR)	7	1996	1	1.8160	0.6383	8.0953	0.0044
AGE(YEAR)	8	1996	1	0.2999	0.6972	0.1851	0.6670
AGE(YEAR)	9	1996	1	-1.5326	1.0077	2.3133	0.1283
AGE(YEAR)	3	1997	1	2.1524	0.6328	11.5708	0.0007
AGE(YEAR)	4	1997	1	3.2337	0.6248	26.7865	0.0001
AGE(YEAR)	5	1997	1	3.4460	0.6240	30.4971	0.0001
AGE(YEAR)	6	1997	1	2.9804	0.6260	22.6681	0.0001
AGE(YEAR)	7	1997	1	2.6821	0.6278	18.2511	0.0001
AGE(YEAR)	8	1997	1	0.9247	0.6610	1.9566	0.1619
AGE(YEAR)	9	1997	1	-0.6587	0.7983	0.6809	0.4093
AGE(YEAR)	3	1998	1	1.8567	0.6387	8.4510	0.0036
AGE(YEAR)	4	1998	1	2.3475	0.6317	13.8116	0.0002
AGE(YEAR)	5	1998	1	2.1660	0.6339	11.6762	0.0006
AGE(YEAR)	6	1998	1	2.2045	0.6334	12.1140	0.0005
AGE(YEAR)	7	1998	1	0.9919	0.6630	2.2382	0.1346
AGE(YEAR)	8	1998	1	1.3279	0.6511	4.1592	0.0414
AGE(YEAR)	9	1998	1	0.3675	0.6978	0.2774	0.5984
AGE(YEAR)	3	1999	1	1.4131	0.6906	4.1867	0.0407
AGE(YEAR)	4	1999	1	2.0767	0.6570	9.9909	0.0016
AGE(YEAR)	5	1999	1	2.1375	0.6549	10.6543	0.0011
AGE(YEAR)	6	1999	1	1.3808	0.6928	3.9723	0.0463
AGE(YEAR)	7	1999	1	0.8809	0.7366	1.4302	0.2317
AGE(YEAR)	8	1999	1	0.1603	0.8428	0.0362	0.8491
AGE(YEAR)	9	1999	0	0.0000	0.0000	.	.
SCALE			0	4.2006	0.0000	.	.

NOTE: The scale parameter was estimated by the square root of DEVIANCE/DOF.

Table 3.6 Model results for

Experimental Line trawl

Lagrange Multiplier Statistics

Parameter	ChiSquare	Pr>Chi
Intercept	.	.

LR Statistics For Type 3 Analysis

Source	NDF	DDF	F	Pr>F	ChiSquare	Pr>Chi
MONTH(SEQCODE)	57	839	12.0570	0.0001	687.2513	0.0001
AGE(YEAR)	34	839	58.9693	0.0001	2004.9572	0.0001

Table 3.7 Standardized relative Catch Rate for

Experimental Line trawl

	Year				
	1995	1996	1997	1998	1999
age					
3	0.007	0.016	0.013	0.010	0.006
4	0.032	0.030	0.038	0.016	0.012
5	0.031	0.035	0.047	0.013	0.013
6	0.013	0.020	0.030	0.014	0.006
7	0.004	0.009	0.022	0.004	0.004
8	0.001	0.002	0.004	0.006	0.002
9	0.001	0.000	0.001	0.002	0.002
ALL	0.088	0.113	0.155	0.064	0.044

Table 4.1 Number of sets and summary statistics for soak time.

Gill net MESH 5½ in.			Experimental									Fixed								
			MONTH									MONTH								
			5	6	7	8	9	10	11	12	ALL	5	6	7	8	9	10	11	12	ALL
YEAR																				
1995	Soak Time (hrs)	N	.	.	29	227	283	278	67	.	884	.	.	28	223	279	284	67	.	881
		MIN	.	.	11	2	12	13	13	.	2	.	.	11	11	11	13	13	.	11
		MEAN	.	.	23	23	25	25	29	.	25	.	.	23	24	25	25	29	.	25
		MAX	.	.	47	78	112	91	143	.	143	.	.	47	129	113	95	144	.	144
1996	Soak Time (hrs)	N	.	40	341	470	324	170	38	4	1387	.	29	221	278	196	90	21	6	841
		MIN	.	12	9	10	11	3	16	17	3	.	12	10	12	12	4	16	17	4
		MEAN	.	22	22	23	25	27	25	21	24	.	23	22	23	25	26	25	20	23
		MAX	.	51	48	56	100	144	71	24	144	.	51	49	55	97	143	70	24	143
1997	Soak Time (hrs)	N	.	63	360	447	347	143	47	.	1407	.	39	229	272	215	79	24	.	858
		MIN	.	11	1	10	11	11	17	.	1	.	12	9	9	11	11	16	.	9
		MEAN	.	21	22	24	26	29	27	.	24	.	24	22	24	26	28	27	.	25
		MAX	.	27	75	97	117	198	57	.	198	.	71	49	95	102	197	51	.	197
1998	Soak Time (hrs)	N	8	95	349	468	355	150	56	14	1495	4	57	215	285	197	81	28	7	874
		MIN	16	9	9	9	2	12	16	23	2	16	11	10	10	12	12	18	21	10
		MEAN	20	20	23	25	29	25	25	58	26	21	21	23	24	30	25	25	66	25
		MAX	24	38	117	79	196	70	70	171	196	25	36	64	79	196	71	48	222	222
1999	Soak Time (hrs)	N	8	161	292	520	355	116	89	19	1560	4	92	179	296	187	58	45	9	870
		MIN	15	10	9	10	11	1	2	18	1	19	9	9	10	11	14	3	19	3
		MEAN	20	24	23	24	23	36	28	30	25	23	24	23	24	23	36	32	31	25
		MAX	24	123	99	171	73	216	168	72	216	25	121	95	171	71	217	168	71	217
ALL		N	16	359	1371	2132	1664	857	297	37	6733	8	217	872	1354	1074	592	185	22	4324

Table 4.2 Summary statistics for soak time and number of sets selected for input to the model

Gill net MESH 5½ in.			Experimental						Fixed					
			MONTH						MONTH					
			7	8	9	10	11	ALL	7	8	9	10	11	ALL
YEAR														
1995	Soak Time (hrs)	N	15	126	163	170	50	524	11	135	169	185	47	547
		MIN	18	18	18	18	18	18	20	18	18	18	18	18
		MEAN	22	22	23	23	23	23	23	22	23	23	23	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1996	Soak Time (hrs)	N	233	313	192	82	24	844	143	183	124	41	14	505
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	23	22	22	22	22	22	23	23	22	23	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1997	Soak Time (hrs)	N	218	251	205	95	29	798	128	163	131	52	15	489
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	22	22	22	22	22	22	22	22	22	22	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1998	Soak Time (hrs)	N	235	263	196	80	35	809	132	165	113	50	21	481
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	22	22	22	22	22	22	22	22	22	22	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1999	Soak Time (hrs)	N	164	309	236	47	55	811	96	172	118	25	30	441
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	22	22	21	22	22	22	22	22	22	22	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
ALL		N	865	1262	992	474	193	3786	510	818	655	353	127	2463

Table 4.3 Frequency tables for the amount of gear and soak time used in the standardisation for the fixed Gill net 5½ in. survey.

GEARAMT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	50	2.0	50	2.0
2	1315	53.4	1365	55.4
3	1097	44.5	2462	100.0
4	1	0.0	2463	100.0

SOAK	Frequency	Percent	Cumulative Frequency	Cumulative Percent
18	151	6.1	151	6.1
19	151	6.1	302	12.3
20	152	6.2	454	18.4
21	193	7.8	647	26.3
22	298	12.1	945	38.4
23	719	29.2	1664	67.6
24	799	32.4	2463	100.0

MESH	Frequency	Percent	Cumulative Frequency	Cumulative Percent
140	2463	100.0	2463	100.0

Table 4.4 Catch at age from the sentinel program by NAFO division for

Fixed
Gill net 5½ in.

	DIV														
	2J					3K					3L				
	YEAR					YEAR					YEAR				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	number	number	number	number	number	number	number	number	number	number	number	number	number	number	number
AGE															
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	4	0	0	3	1	1	0	0	0
3	0	3	6	4	1	0	33	11	47	23	4	31	26	42	16
4	10	1	22	23	8	43	94	35	87	81	64	246	165	122	143
5	10	2	10	22	35	1303	903	252	731	469	1174	1401	3235	1868	1916
6	0	2	73	27	37	660	4432	1302	2570	750	2455	8429	3884	10005	3117
7	12	5	49	21	12	315	878	3118	2336	1183	956	4728	6380	5603	4363
8	7	2	12	6	5	150	160	426	1441	331	540	1528	1956	2808	1344
9	3	0	2	1	1	24	15	30	206	238	136	367	274	973	665
10	1	0	2	0	1	0	9	26	27	39	35	95	97	131	174
11	0	0	0	0	0	0	2	11	8	3	6	16	18	46	47
12	1	0	0	0	0	0	1	0	0	0	0	27	14	13	21
13	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
14	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
ALL	43	15	177	104	101	2494	6532	5211	7454	3121	5372	16870	16050	21612	11809

Table 4.5 Month and community combination that were removed from the analysis because they had zero catch for all years in the sentinel survey using 5½ in. gill nets at fixed sites.

OBS	TYPE	GEAR	DIV	community	MONTH
1	F	5	2J	Black Tickle	10
2	F	5	2J	Tub Harbour	8
3	F	5	2J	Triangle	7
4	F	5	2J	Triangle	8
5	F	5	2J	Williams Harbour	8
6	F	5	2J	Williams Harbour	10
7	F	5	2J	St. Lewis	8
8	F	5	2J	St. Lewis	10
9	F	5	2J	Spear Harbour	7
10	F	5	2J	Spear Harbour	10
11	F	5	2J	Cape Charles	7
12	F	5	3K	Great Brehat	10
13	F	5	3K	Goose Cove	9
14	F	5	3K	Englee	11
15	F	5	3K	Ming_s Bight	9
16	F	5	3L	Renews	11

Table 4.6 Model results for

Fixed Gill net 5½ in.

The GENMOD Procedure

Model Information

Description	Value
Data Set	WORK.USE
Distribution	POISSON
Link Function	LOG
Dependent Variable	N
Offset Variable	LOGAMT
Observations Used	5544

Class Level Information

Class	Levels	Values
SEQCODE	60	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
MONTH	5	7 8 9 10 11
YEAR	5	1995 1996 1997 1998 1999
AGE	8	3 4 5 6 7 8 9 10

Criteria For Assessing Goodness Of Fit

Criterion	DF	Value	Value/DF
Deviance	5282	40054.4064	7.5832
Scaled Deviance	5282	5282.0000	1.0000
Pearson Chi-Square	5282	50396.2791	9.5411
Scaled Pearson X2	5282	6645.7893	1.2582
Log Likelihood	.	41382.8810	.

Table 4.6 Model results for

Fixed Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
INTERCEPT			0	0.0000	0.0000	.	.
MONTH(SEQCODE)	8	1	1	-5.3758	0.8510	39.9007	0.0001
MONTH(SEQCODE)	9	1	1	-5.5566	0.7862	49.9496	0.0001
MONTH(SEQCODE)	7	2	1	-6.9222	1.9562	12.5219	0.0004
MONTH(SEQCODE)	8	2	1	-5.1118	0.6434	63.1280	0.0001
MONTH(SEQCODE)	9	2	1	-4.6258	0.4898	89.1770	0.0001
MONTH(SEQCODE)	10	2	1	-4.4526	0.9374	22.5601	0.0001
MONTH(SEQCODE)	9	3	1	-3.8725	0.7592	26.0208	0.0001
MONTH(SEQCODE)	10	3	1	-4.1409	0.6437	41.3803	0.0001
MONTH(SEQCODE)	9	4	1	-4.5305	0.5617	65.0463	0.0001
MONTH(SEQCODE)	10	4	1	-4.2900	0.7136	36.1425	0.0001
MONTH(SEQCODE)	9	5	1	-6.7469	1.1396	35.0502	0.0001
MONTH(SEQCODE)	7	6	1	-7.2506	2.7601	6.9007	0.0086
MONTH(SEQCODE)	9	6	1	-6.4683	1.3895	21.6704	0.0001
MONTH(SEQCODE)	8	7	1	-5.0451	0.6038	69.8220	0.0001
MONTH(SEQCODE)	9	7	1	-3.1541	0.2639	142.8699	0.0001
MONTH(SEQCODE)	8	8	1	-6.2770	1.9560	10.2980	0.0013
MONTH(SEQCODE)	9	8	1	-5.8768	1.2455	22.2627	0.0001
MONTH(SEQCODE)	10	8	1	-5.6848	1.6012	12.6043	0.0004
MONTH(SEQCODE)	7	9	1	-5.5109	1.1396	23.3846	0.0001
MONTH(SEQCODE)	8	9	1	-3.0644	0.2928	109.5086	0.0001
MONTH(SEQCODE)	9	9	1	-3.3086	0.3362	96.8416	0.0001
MONTH(SEQCODE)	10	9	1	-5.3791	1.2456	18.6479	0.0001
MONTH(SEQCODE)	11	9	1	-4.0108	1.9565	4.2025	0.0404
MONTH(SEQCODE)	7	10	1	-5.7889	0.8907	42.2390	0.0001
MONTH(SEQCODE)	8	10	1	-3.4177	0.3134	118.8903	0.0001
MONTH(SEQCODE)	9	10	1	-3.9446	0.4129	91.2817	0.0001
MONTH(SEQCODE)	7	11	1	-4.5771	0.9368	23.8700	0.0001
MONTH(SEQCODE)	8	11	1	-4.5822	0.5362	73.0156	0.0001
MONTH(SEQCODE)	7	12	1	-2.9228	0.3045	92.1578	0.0001
MONTH(SEQCODE)	8	12	1	-3.1679	0.2798	128.2052	0.0001
MONTH(SEQCODE)	9	12	1	-3.7238	0.4430	70.6688	0.0001
MONTH(SEQCODE)	10	12	1	-3.5258	0.5218	45.6528	0.0001
MONTH(SEQCODE)	11	12	1	-2.7580	1.0581	6.7946	0.0091
MONTH(SEQCODE)	7	13	1	-1.6540	0.2527	42.8402	0.0001
MONTH(SEQCODE)	8	13	1	-2.4877	0.2733	82.8325	0.0001
MONTH(SEQCODE)	9	13	1	-2.8189	0.2436	133.9138	0.0001
MONTH(SEQCODE)	10	13	1	-4.5047	0.5018	80.6052	0.0001
MONTH(SEQCODE)	7	14	1	-2.6269	0.2787	88.8721	0.0001
MONTH(SEQCODE)	8	14	1	-2.5853	0.5281	23.9646	0.0001
MONTH(SEQCODE)	9	14	1	-4.2985	0.9374	21.0251	0.0001
MONTH(SEQCODE)	10	14	1	-3.8214	0.3745	104.1229	0.0001
MONTH(SEQCODE)	11	14	1	-3.5902	0.5622	40.7747	0.0001
MONTH(SEQCODE)	7	15	1	-1.6786	0.2318	52.4383	0.0001
MONTH(SEQCODE)	8	15	1	-1.8214	0.2188	69.2722	0.0001
MONTH(SEQCODE)	9	15	1	-1.7291	0.2462	49.3137	0.0001
MONTH(SEQCODE)	10	15	1	-3.1781	0.3874	67.2900	0.0001
MONTH(SEQCODE)	11	15	1	-4.4127	1.1395	14.9953	0.0001

Table 4.6 Model results for

Fixed Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	8	16	1	-1.7094	0.2146	63.4585	0.0001
MONTH(SEQCODE)	9	16	1	-4.1210	0.9913	17.2818	0.0001
MONTH(SEQCODE)	10	16	1	-2.6753	0.3775	50.2339	0.0001
MONTH(SEQCODE)	11	16	1	-2.6891	0.7361	13.3468	0.0003
MONTH(SEQCODE)	7	17	1	-2.9057	0.7347	15.6410	0.0001
MONTH(SEQCODE)	8	17	1	-3.0488	0.7859	15.0510	0.0001
MONTH(SEQCODE)	10	17	1	-3.0097	0.5140	34.2851	0.0001
MONTH(SEQCODE)	7	18	1	-1.2810	0.2286	31.3957	0.0001
MONTH(SEQCODE)	8	18	1	0.2400	0.2250	1.1373	0.2862
MONTH(SEQCODE)	9	18	1	-3.1289	0.8162	14.6950	0.0001
MONTH(SEQCODE)	7	19	1	-1.5957	0.2738	33.9644	0.0001
MONTH(SEQCODE)	9	19	1	-2.7234	0.6750	16.2809	0.0001
MONTH(SEQCODE)	7	20	1	-1.2986	0.2046	40.2748	0.0001
MONTH(SEQCODE)	8	20	1	-1.2329	0.2016	37.3970	0.0001
MONTH(SEQCODE)	9	20	1	-1.3401	0.2105	40.5353	0.0001
MONTH(SEQCODE)	10	20	1	-1.8856	0.3865	23.7951	0.0001
MONTH(SEQCODE)	11	20	1	-0.8328	0.3394	6.0186	0.0142
MONTH(SEQCODE)	7	21	1	-1.0162	0.2075	23.9751	0.0001
MONTH(SEQCODE)	8	21	1	-1.4394	0.1994	52.1264	0.0001
MONTH(SEQCODE)	9	21	1	-2.2489	0.2367	90.2571	0.0001
MONTH(SEQCODE)	10	21	1	-2.5785	0.3238	63.4112	0.0001
MONTH(SEQCODE)	11	21	1	-2.0649	0.7602	7.3783	0.0066
MONTH(SEQCODE)	7	22	1	-2.4483	0.2455	99.4300	0.0001
MONTH(SEQCODE)	8	22	1	-3.4073	0.4600	54.8718	0.0001
MONTH(SEQCODE)	9	22	1	-3.0457	0.4656	42.7911	0.0001
MONTH(SEQCODE)	10	22	1	-1.7190	0.2211	60.4594	0.0001
MONTH(SEQCODE)	11	22	1	-1.3224	0.1991	44.1187	0.0001
MONTH(SEQCODE)	7	23	1	-2.0850	0.2290	82.9252	0.0001
MONTH(SEQCODE)	8	23	1	-2.9122	0.4656	39.1213	0.0001
MONTH(SEQCODE)	9	23	1	-1.5685	0.3020	26.9794	0.0001
MONTH(SEQCODE)	10	23	1	-1.6556	0.2203	56.4747	0.0001
MONTH(SEQCODE)	11	23	1	-0.7996	0.1981	16.2973	0.0001
MONTH(SEQCODE)	7	24	1	-2.0564	0.3088	44.3502	0.0001
MONTH(SEQCODE)	8	24	1	-1.0221	0.3698	7.6385	0.0057
MONTH(SEQCODE)	9	24	1	-1.6621	0.4463	13.8698	0.0002
MONTH(SEQCODE)	10	24	1	-2.9992	0.8518	12.3968	0.0004
MONTH(SEQCODE)	7	25	1	-1.9043	0.3258	34.1692	0.0001
MONTH(SEQCODE)	8	25	1	-2.2534	0.2505	80.9307	0.0001
MONTH(SEQCODE)	9	25	1	-1.5855	0.2126	55.6086	0.0001
MONTH(SEQCODE)	10	25	1	-1.8877	0.3179	35.2649	0.0001
MONTH(SEQCODE)	11	25	1	-1.8737	0.3181	34.6969	0.0001
MONTH(SEQCODE)	7	26	1	-2.8389	0.6296	20.3313	0.0001
MONTH(SEQCODE)	8	26	1	-1.5879	0.2129	55.6428	0.0001
MONTH(SEQCODE)	9	26	1	-3.6924	0.8518	18.7889	0.0001
MONTH(SEQCODE)	10	26	1	-4.0108	1.9565	4.2025	0.0404
MONTH(SEQCODE)	7	27	1	-2.2816	0.7589	9.0386	0.0026

Table 4.6 Model results for

Fixed Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	7	28	1	0.0904	0.2337	0.1495	0.6990
MONTH(SEQCODE)	8	28	1	-2.2695	0.2520	81.0788	0.0001
MONTH(SEQCODE)	9	28	1	-2.5452	0.5285	23.1943	0.0001
MONTH(SEQCODE)	7	29	1	-1.0634	0.2961	12.8979	0.0003
MONTH(SEQCODE)	8	29	1	-1.5097	0.2153	49.1672	0.0001
MONTH(SEQCODE)	9	29	1	-1.5060	0.2303	42.7772	0.0001
MONTH(SEQCODE)	7	30	1	-1.4175	0.3500	16.4076	0.0001
MONTH(SEQCODE)	8	30	1	-2.5606	0.3079	69.1661	0.0001
MONTH(SEQCODE)	9	30	1	-2.9649	0.3088	92.1896	0.0001
MONTH(SEQCODE)	10	30	1	-3.3177	0.7143	21.5745	0.0001
MONTH(SEQCODE)	7	31	1	-2.6254	0.7865	11.1416	0.0008
MONTH(SEQCODE)	8	31	1	-1.4677	0.2252	42.4821	0.0001
MONTH(SEQCODE)	9	31	1	-2.6902	0.3633	54.8385	0.0001
MONTH(SEQCODE)	7	32	1	-1.0608	0.2028	27.3489	0.0001
MONTH(SEQCODE)	8	32	1	-1.0893	0.2019	29.1088	0.0001
MONTH(SEQCODE)	9	32	1	-1.6248	0.5614	8.3774	0.0038
MONTH(SEQCODE)	11	32	1	-1.2071	0.4682	6.6461	0.0099
MONTH(SEQCODE)	7	33	1	-1.3904	0.2009	47.9036	0.0001
MONTH(SEQCODE)	8	33	1	-1.0376	0.2009	26.6775	0.0001
MONTH(SEQCODE)	9	33	1	-1.7220	0.4348	15.6859	0.0001
MONTH(SEQCODE)	8	34	1	-1.7946	0.2125	71.3123	0.0001
MONTH(SEQCODE)	9	34	1	-1.3128	0.2097	39.1881	0.0001
MONTH(SEQCODE)	10	34	1	-1.2848	0.2351	29.8703	0.0001
MONTH(SEQCODE)	11	34	1	0.3929	0.3253	1.4587	0.2271
MONTH(SEQCODE)	7	35	1	-2.2978	0.2320	98.0818	0.0001
MONTH(SEQCODE)	8	35	1	-1.4630	0.2106	48.2572	0.0001
MONTH(SEQCODE)	9	35	1	-1.3124	0.2250	34.0309	0.0001
MONTH(SEQCODE)	10	35	1	-1.4230	0.3054	21.7167	0.0001
MONTH(SEQCODE)	11	35	1	-2.1390	0.7871	7.3849	0.0066
MONTH(SEQCODE)	7	36	1	-0.8494	0.2100	16.3622	0.0001
MONTH(SEQCODE)	8	36	1	-0.5766	0.1982	8.4645	0.0036
MONTH(SEQCODE)	9	36	1	-0.9976	0.2076	23.0890	0.0001
MONTH(SEQCODE)	10	36	1	-1.0251	0.2730	14.0999	0.0002
MONTH(SEQCODE)	7	37	1	0.3506	0.2174	2.6014	0.1068

Table 4.6 Model results for

Fixed Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	8	37	1	-0.6386	0.2046	9.7445	0.0018
MONTH(SEQCODE)	9	37	1	-0.8974	0.2138	17.6190	0.0001
MONTH(SEQCODE)	7	38	1	-0.0356	0.1924	0.0342	0.8532
MONTH(SEQCODE)	8	38	1	0.0755	0.1922	0.1543	0.6944
MONTH(SEQCODE)	9	38	1	-0.9227	0.2125	18.8613	0.0001
MONTH(SEQCODE)	10	38	1	-2.2025	0.4007	30.2160	0.0001
MONTH(SEQCODE)	11	38	1	-4.0108	1.9565	4.2025	0.0404
MONTH(SEQCODE)	7	39	1	-0.7979	0.2301	12.0246	0.0005
MONTH(SEQCODE)	8	39	1	-2.8322	0.7871	12.9466	0.0003
MONTH(SEQCODE)	9	39	1	-2.2105	0.2194	101.4846	0.0001
MONTH(SEQCODE)	10	39	1	-2.2639	0.2285	98.1864	0.0001
MONTH(SEQCODE)	11	39	1	-1.9959	0.7361	7.3529	0.0067
MONTH(SEQCODE)	7	40	1	-2.5521	0.3115	67.1437	0.0001
MONTH(SEQCODE)	8	40	1	-2.8988	0.3022	92.0108	0.0001
MONTH(SEQCODE)	9	40	1	-3.0251	0.3266	85.7821	0.0001
MONTH(SEQCODE)	10	40	1	-3.1398	0.3298	90.6370	0.0001
MONTH(SEQCODE)	11	40	1	-3.5428	0.3961	79.9946	0.0001
MONTH(SEQCODE)	7	41	1	-2.2351	0.6156	13.1820	0.0003
MONTH(SEQCODE)	8	41	1	-2.5851	0.2344	121.6665	0.0001
MONTH(SEQCODE)	9	41	1	-2.5864	0.2229	134.6182	0.0001
MONTH(SEQCODE)	10	41	1	-3.2810	0.3542	85.8259	0.0001
MONTH(SEQCODE)	11	41	1	-3.0945	1.2461	6.1667	0.0130
MONTH(SEQCODE)	7	42	1	-0.3075	0.2713	1.2847	0.2570
MONTH(SEQCODE)	8	42	1	-0.5273	0.1933	7.4399	0.0064
MONTH(SEQCODE)	9	42	1	-3.7420	0.7859	22.6725	0.0001
MONTH(SEQCODE)	10	42	1	-1.0729	0.2381	20.3040	0.0001
MONTH(SEQCODE)	7	43	1	0.2660	0.1980	1.8046	0.1792
MONTH(SEQCODE)	8	43	1	-0.4549	0.1937	5.5165	0.0188
MONTH(SEQCODE)	9	43	1	-1.0144	0.2067	24.0788	0.0001
MONTH(SEQCODE)	7	44	1	-2.4288	0.3375	51.7817	0.0001
MONTH(SEQCODE)	8	44	1	-2.3109	0.2444	89.4160	0.0001
MONTH(SEQCODE)	9	44	1	-2.3342	0.2678	76.0007	0.0001
MONTH(SEQCODE)	10	44	1	-2.9992	0.6172	23.6144	0.0001
MONTH(SEQCODE)	11	44	1	-4.7040	2.7603	2.9041	0.0884
MONTH(SEQCODE)	7	45	1	-1.8273	0.2546	51.5072	0.0001
MONTH(SEQCODE)	8	45	1	-1.4260	0.2109	45.7173	0.0001
MONTH(SEQCODE)	9	45	1	-2.1805	0.2936	55.1709	0.0001
MONTH(SEQCODE)	10	45	1	-2.9992	0.8518	12.3968	0.0004
MONTH(SEQCODE)	7	46	1	-1.0801	0.2014	28.7548	0.0001
MONTH(SEQCODE)	8	46	1	-0.7768	0.2346	10.9634	0.0009
MONTH(SEQCODE)	9	46	1	-2.3321	0.3161	54.4292	0.0001
MONTH(SEQCODE)	10	46	1	-3.9308	0.7871	24.9388	0.0001
MONTH(SEQCODE)	11	46	1	-0.2892	0.2465	1.3759	0.2408
MONTH(SEQCODE)	7	47	1	-0.9771	0.1946	25.2010	0.0001
MONTH(SEQCODE)	8	47	1	-1.6209	0.2134	57.6886	0.0001
MONTH(SEQCODE)	9	47	1	-2.3059	0.3703	38.7698	0.0001

Table 4.6 Model results for

Fixed Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	7	48	1	-0.4157	0.2003	4.3064	0.0380
MONTH(SEQCODE)	8	48	1	-0.6255	0.1981	9.9708	0.0016
MONTH(SEQCODE)	9	48	1	-1.6294	0.2591	39.5376	0.0001
MONTH(SEQCODE)	10	48	1	-2.6281	0.3573	54.1023	0.0001
MONTH(SEQCODE)	11	48	1	-1.9626	0.5819	11.3746	0.0007
MONTH(SEQCODE)	7	49	1	-0.6722	0.2365	8.0758	0.0045
MONTH(SEQCODE)	8	49	1	-1.5751	0.2602	36.6567	0.0001
MONTH(SEQCODE)	7	50	1	-2.5785	0.3621	50.7141	0.0001
MONTH(SEQCODE)	8	50	1	-1.5174	0.2180	48.4639	0.0001
MONTH(SEQCODE)	9	50	1	-1.8722	0.2114	78.4506	0.0001
MONTH(SEQCODE)	10	50	1	-2.4345	0.2668	83.2562	0.0001
MONTH(SEQCODE)	11	50	1	-3.1480	0.4746	44.0054	0.0001
MONTH(SEQCODE)	7	51	1	-1.0609	0.1984	28.6007	0.0001
MONTH(SEQCODE)	8	51	1	-1.1410	0.2042	31.2227	0.0001
MONTH(SEQCODE)	9	51	1	-1.5281	0.2451	38.8587	0.0001
MONTH(SEQCODE)	10	51	1	-4.3491	0.6437	45.6466	0.0001
MONTH(SEQCODE)	7	52	1	-0.1765	0.1975	0.7985	0.3715
MONTH(SEQCODE)	7	53	1	-1.2356	0.3692	11.1990	0.0008
MONTH(SEQCODE)	8	53	1	-2.3750	0.3188	55.4896	0.0001
MONTH(SEQCODE)	9	53	1	-1.9138	0.2318	68.1672	0.0001
MONTH(SEQCODE)	10	53	1	-2.2748	0.2921	60.6712	0.0001
MONTH(SEQCODE)	11	53	1	-3.9147	0.4959	62.3214	0.0001
MONTH(SEQCODE)	7	54	1	-0.5748	0.1977	8.4536	0.0036
MONTH(SEQCODE)	8	54	1	-1.4735	0.2079	50.2267	0.0001
MONTH(SEQCODE)	9	54	1	-1.8589	0.2126	76.4594	0.0001
MONTH(SEQCODE)	10	54	1	-1.9550	0.3530	30.6708	0.0001
MONTH(SEQCODE)	11	54	1	-2.7580	0.7602	13.1631	0.0003
MONTH(SEQCODE)	7	55	1	-1.1830	0.2416	23.9830	0.0001
MONTH(SEQCODE)	8	55	1	-2.4413	0.2434	100.6101	0.0001
MONTH(SEQCODE)	9	55	1	-2.3606	0.2458	92.2027	0.0001
MONTH(SEQCODE)	7	56	1	-0.8169	0.1958	17.4120	0.0001
MONTH(SEQCODE)	8	56	1	-0.9218	0.1955	22.2334	0.0001
MONTH(SEQCODE)	9	56	1	-1.0909	0.3036	12.9146	0.0003
MONTH(SEQCODE)	7	57	1	-0.9862	0.1937	25.9139	0.0001
MONTH(SEQCODE)	8	57	1	-2.0456	0.2103	94.6355	0.0001
MONTH(SEQCODE)	9	57	1	-1.9170	0.2401	63.7634	0.0001
MONTH(SEQCODE)	10	57	1	-4.8938	1.9562	6.2582	0.0124
MONTH(SEQCODE)	7	58	1	-2.0287	0.3511	33.3876	0.0001
MONTH(SEQCODE)	8	58	1	-2.8357	0.2931	93.6221	0.0001
MONTH(SEQCODE)	9	58	1	-3.3258	0.4315	59.3921	0.0001
MONTH(SEQCODE)	10	58	1	-1.2239	0.2892	17.9143	0.0001
MONTH(SEQCODE)	7	59	1	-1.0511	0.2015	27.2177	0.0001
MONTH(SEQCODE)	8	59	1	-1.3135	0.2072	40.1871	0.0001
MONTH(SEQCODE)	9	59	1	-1.2475	0.2002	38.8193	0.0001
MONTH(SEQCODE)	10	59	1	-2.0772	0.2375	76.5090	0.0001
MONTH(SEQCODE)	7	60	1	-0.2637	0.1985	1.7654	0.1839

Table 4.6 Model results for

Fixed Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	8	60	1	-1.5135	0.2391	40.0576	0.0001
MONTH(SEQCODE)	9	60	1	-2.3011	0.3035	57.4777	0.0001
MONTH(SEQCODE)	10	60	1	-3.2303	0.2959	119.2022	0.0001
MONTH(SEQCODE)	11	60	1	-6.6915	2.7601	5.8773	0.0153
AGE(YEAR)	3	1995	1	-4.2695	1.6009	7.1123	0.0077
AGE(YEAR)	4	1995	1	-0.5974	0.3155	3.5860	0.0583
AGE(YEAR)	5	1995	1	2.4487	0.1958	156.4440	0.0001
AGE(YEAR)	6	1995	1	2.6765	0.1942	189.9920	0.0001
AGE(YEAR)	7	1995	1	1.7849	0.2030	77.3180	0.0001
AGE(YEAR)	8	1995	1	1.1815	0.2148	30.2682	0.0001
AGE(YEAR)	9	1995	1	-0.2992	0.2880	1.0792	0.2989
AGE(YEAR)	10	1995	1	-1.8128	0.5019	13.0438	0.0003
AGE(YEAR)	3	1996	1	-1.3128	0.3786	12.0254	0.0005
AGE(YEAR)	4	1996	1	0.2558	0.2399	1.1373	0.2862
AGE(YEAR)	5	1996	1	2.1820	0.1956	124.4064	0.0001
AGE(YEAR)	6	1996	1	3.9006	0.1886	427.7188	0.0001
AGE(YEAR)	7	1996	1	3.0712	0.1906	259.6038	0.0001
AGE(YEAR)	8	1996	1	1.8700	0.1987	88.5886	0.0001
AGE(YEAR)	9	1996	1	0.3841	0.2342	2.6912	0.1009
AGE(YEAR)	10	1996	1	-0.9662	0.3340	8.3658	0.0038
AGE(YEAR)	3	1997	1	-1.7203	0.4597	14.0057	0.0002
AGE(YEAR)	4	1997	1	-0.0699	0.2623	0.0710	0.7899
AGE(YEAR)	5	1997	1	2.6770	0.1927	193.0169	0.0001
AGE(YEAR)	6	1997	1	3.0858	0.1908	261.6017	0.0001
AGE(YEAR)	7	1997	1	3.6821	0.1891	379.2362	0.0001
AGE(YEAR)	8	1997	1	2.2950	0.1953	138.1067	0.0001
AGE(YEAR)	9	1997	1	0.2421	0.2444	0.9808	0.3220
AGE(YEAR)	10	1997	1	-0.6775	0.3116	4.7266	0.0297
AGE(YEAR)	3	1998	1	-0.8967	0.3426	6.8496	0.0089
AGE(YEAR)	4	1998	1	0.0240	0.2603	0.0085	0.9266
AGE(YEAR)	5	1998	1	2.4548	0.1945	159.2564	0.0001
AGE(YEAR)	6	1998	1	4.0228	0.1886	455.1821	0.0001
AGE(YEAR)	7	1998	1	3.5635	0.1895	353.6878	0.0001
AGE(YEAR)	8	1998	1	2.9379	0.1917	234.9790	0.0001
AGE(YEAR)	9	1998	1	1.6540	0.2034	66.1073	0.0001
AGE(YEAR)	10	1998	1	-0.3686	0.2891	1.6258	0.2023
AGE(YEAR)	3	1999	1	-1.6956	0.4737	12.8144	0.0003
AGE(YEAR)	4	1999	1	0.0708	0.2592	0.0747	0.7847
AGE(YEAR)	5	1999	1	2.4062	0.1947	152.6790	0.0001
AGE(YEAR)	6	1999	1	2.8835	0.1917	226.3577	0.0001
AGE(YEAR)	7	1999	1	3.2390	0.1901	290.2264	0.0001
AGE(YEAR)	8	1999	1	2.0391	0.1983	105.7632	0.0001
AGE(YEAR)	9	1999	1	1.4179	0.2079	46.5261	0.0001
AGE(YEAR)	10	1999	0	0.0000	0.0000	.	.
SCALE			0	2.7538	0.0000	.	.

Table 4.6 Model results for

Fixed Gill net 5½ in.

Lagrange Multiplier Statistics

Parameter	ChiSquare	Pr>Chi
Intercept	.	.

LR Statistics For Type 3 Analysis

Source	NDF	DDF	F	Pr>F	ChiSquare	Pr>Chi
MONTH(SEQCODE)	222	5282	49.2274	0.0001	10928.4936	0.0001
AGE(YEAR)	39	5282	475.9054	0.0001	18560.3104	0.0001

Table 4.7 Standardized relative Catch Rate for

Fixed Gill net 5½ in.

	Year				
	1995	1996	1997	1998	1999
age					
3	0.001	0.022	0.014	0.033	0.015
4	0.045	0.105	0.075	0.083	0.087
5	0.937	0.717	1.177	0.942	0.898
6	1.176	4.000	1.771	4.520	1.447
7	0.482	1.745	3.215	2.856	2.064
8	0.264	0.525	0.803	1.528	0.622
9	0.060	0.119	0.103	0.423	0.334
10	0.013	0.031	0.041	0.056	0.081
ALL	2.978	7.264	7.201	10.441	5.547

Table 5.1 Number of sets and summary statistics for soak time.

Gill net MESH 5½ in.			Experimental									Fixed								
			MONTH									MONTH								
			5	6	7	8	9	10	11	12	ALL	5	6	7	8	9	10	11	12	ALL
YEAR																				
1995	Soak Time (hrs)	N	.	.	29	227	283	278	67	.	884	.	.	28	223	279	284	67	.	881
		MIN	.	.	11	2	12	13	13	.	2	.	.	11	11	11	13	13	.	11
		MEAN	.	.	23	23	25	25	29	.	25	.	.	23	24	25	25	29	.	25
		MAX	.	.	47	78	112	91	143	.	143	.	.	47	129	113	95	144	.	144
1996	Soak Time (hrs)	N	.	40	341	470	324	170	38	4	1387	.	29	221	278	196	90	21	6	841
		MIN	.	12	9	10	11	3	16	17	3	.	12	10	12	12	4	16	17	4
		MEAN	.	22	22	23	25	27	25	21	24	.	23	22	23	25	26	25	20	23
		MAX	.	51	48	56	100	144	71	24	144	.	51	49	55	97	143	70	24	143
1997	Soak Time (hrs)	N	.	63	360	447	347	143	47	.	1407	.	39	229	272	215	79	24	.	858
		MIN	.	11	1	10	11	11	17	.	1	.	12	9	9	11	11	16	.	9
		MEAN	.	21	22	24	26	29	27	.	24	.	24	22	24	26	28	27	.	25
		MAX	.	27	75	97	117	198	57	.	198	.	71	49	95	102	197	51	.	197
1998	Soak Time (hrs)	N	8	95	349	468	355	150	56	14	1495	4	57	215	285	197	81	28	7	874
		MIN	16	9	9	9	2	12	16	23	2	16	11	10	10	12	12	18	21	10
		MEAN	20	20	23	25	29	25	25	58	26	21	21	23	24	30	25	25	66	25
		MAX	24	38	117	79	196	70	70	171	196	25	36	64	79	196	71	48	222	222
1999	Soak Time (hrs)	N	8	161	292	520	355	116	89	19	1560	4	92	179	296	187	58	45	9	870
		MIN	15	10	9	10	11	1	2	18	1	19	9	9	10	11	14	3	19	3
		MEAN	20	24	23	24	23	36	28	30	25	23	24	23	24	23	36	32	31	25
		MAX	24	123	99	171	73	216	168	72	216	25	121	95	171	71	217	168	71	217
ALL		N	16	359	1371	2132	1664	857	297	37	6733	8	217	872	1354	1074	592	185	22	4324

Table 5.2 Summary statistics for soak time and number of sets selected for input to the model

Gill net MESH 5½ in.			Experimental						Fixed					
			MONTH						MONTH					
			7	8	9	10	11	ALL	7	8	9	10	11	ALL
YEAR														
1995	Soak Time (hrs)	N	15	126	163	170	50	524	11	135	169	185	47	547
		MIN	18	18	18	18	18	18	20	18	18	18	18	18
		MEAN	22	22	23	23	23	23	23	22	23	23	23	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1996	Soak Time (hrs)	N	233	313	192	82	24	844	143	183	124	41	14	505
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	23	22	22	22	22	22	23	23	22	23	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1997	Soak Time (hrs)	N	218	251	205	95	29	798	128	163	131	52	15	489
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	22	22	22	22	22	22	22	22	22	22	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1998	Soak Time (hrs)	N	235	263	196	80	35	809	132	165	113	50	21	481
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	22	22	22	22	22	22	22	22	22	22	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
1999	Soak Time (hrs)	N	164	309	236	47	55	811	96	172	118	25	30	441
		MIN	18	18	18	18	18	18	18	18	18	18	18	18
		MEAN	22	22	22	21	22	22	22	22	22	22	22	22
		MAX	24	24	24	24	24	24	24	24	24	24	24	24
ALL	N		865	1262	992	474	193	3786	510	818	655	353	127	2463

Table 5.3 Frequency tables for the amount of gear and soak time used in the standardisation for the Experimental gill net 5½ in. survey.

GEARAMT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	531	14.0	531	14.0
2	2211	58.4	2742	72.4
3	1038	27.4	3780	99.8
4	4	0.1	3784	99.9
5	2	0.1	3786	100.0

SOAK	Frequency	Percent	Cumulative Frequency	Cumulative Percent
18	204	5.4	204	5.4
19	212	5.6	416	11.0
20	232	6.1	648	17.1
21	318	8.4	966	25.5
22	556	14.7	1522	40.2
23	1124	29.7	2646	69.9
24	1140	30.1	3786	100.0

MESH	Frequency	Percent	Cumulative Frequency	Cumulative Percent
140	3786	100.0	3786	100.0

Table 5.4 Catch at age from the sentinel program by NAFO division for

Experimental
Gill net 5½ in.

	DIV														
	2J					3K					3L				
	YEAR					YEAR					YEAR				
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999
	number	number	number	number	number	number	number	number	number	number	number	number	number	number	number
AGE															
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	1	0	0	0	2	0	2	5	4	7	1	0	0
3	0	2	7	4	2	0	57	24	39	28	6	29	33	47	8
4	3	0	27	20	11	36	178	85	104	202	57	355	252	156	157
5	6	5	14	21	49	1893	2186	376	1072	1322	1195	2381	4221	2662	2983
6	0	6	49	33	81	1048	10248	2005	4048	2098	2768	13417	5127	14204	5404
7	9	15	25	30	29	479	2054	4728	3580	3034	1052	6044	7630	7955	7559
8	7	5	7	8	17	232	292	613	2207	848	692	2101	2401	3826	2268
9	3	3	1	2	5	30	32	43	327	522	136	545	349	1410	1131
10	0	1	1	0	3	0	28	30	44	142	48	93	135	213	277
11	0	0	1	0	0	0	2	12	12	6	5	17	24	69	70
12	1	0	0	0	0	0	0	0	0	0	0	41	16	25	28
13	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2
14	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
ALL	29	36	133	118	197	3716	15079	7916	11434	8206	5962	25032	20190	30569	19887

Table 5.5 Month and community combination that were removed from the analysis because they had zero catch for all years in the sentinel survey using 5½ in. gill net at experimental sites.

OBS	TYPE	GEAR	DIV	community	MONTH
1	E	5	2J	Black Tickle	10
2	E	5	2J	Triangle	7
3	E	5	2J	Triangle	8
4	E	5	2J	Williams Harbour	8
5	E	5	2J	Williams Harbour	10
6	E	5	2J	St. Lewis	7
7	E	5	2J	Spear Harbour	10
8	E	5	2J	Cape Charles	7
9	E	5	3K	Lunaire	11
10	E	5	3K	Englee	11
11	E	5	3L	Ochre Pitt Cove	11
12	E	5	3L	Renews	11

Table 5.6 Model results for

Experimental Gill net 5½ in.

The GENMOD Procedure

Model Information

Description	Value
Data Set	WORK.USE
Distribution	POISSON
Link Function	LOG
Dependent Variable	N
Offset Variable	LOGAMT
Observations Used	5054
Missing Values	7

Class Level Information

Class	Levels	Values
SEQCODE	60	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
MONTH	5	7 8 9 10 11
YEAR	5	1995 1996 1997 1998 1999
AGE	7	3 4 5 6 7 8 9

Criteria For Assessing Goodness Of Fit

Criterion	DF	Value	Value/DF
Deviance	4790	56925.1019	11.8842
Scaled Deviance	4790	4790.0000	1.0000
Pearson Chi-Square	4790	72262.4574	15.0861
Scaled Pearson X2	4790	6080.5718	1.2694
Log Likelihood	.	44301.9692	.

Table 5.6 Model results for Experimental Gill net 5½in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
INTERCEPT			0	0.0000	0.0000	.	.
MONTH(SEQCODE)	8	1	1	-5.2851	1.7258	9.3787	0.0022
MONTH(SEQCODE)	9	1	1	-5.7539	1.7258	11.1161	0.0009
MONTH(SEQCODE)	7	2	1	-6.4407	3.4484	3.4884	0.0618
MONTH(SEQCODE)	8	2	1	-4.3941	0.7238	36.8514	0.0001
MONTH(SEQCODE)	9	2	1	-4.0981	0.8660	22.3933	0.0001
MONTH(SEQCODE)	10	2	1	-3.3401	1.5446	4.6760	0.0306
MONTH(SEQCODE)	8	3	1	-3.7356	2.4390	2.3458	0.1256
MONTH(SEQCODE)	9	3	1	-5.5477	3.4484	2.5882	0.1077
MONTH(SEQCODE)	10	3	1	-4.9130	2.4392	4.0569	0.0440
MONTH(SEQCODE)	9	4	1	-1.7220	0.2877	35.8152	0.0001
MONTH(SEQCODE)	10	4	1	-3.1236	0.9601	10.5848	0.0011
MONTH(SEQCODE)	9	5	1	-2.8071	0.3814	54.1793	0.0001
MONTH(SEQCODE)	8	6	1	-3.4463	0.8660	15.8354	0.0001
MONTH(SEQCODE)	9	6	1	-4.4566	1.0430	18.2585	0.0001
MONTH(SEQCODE)	10	6	1	-6.4819	3.4484	3.5332	0.0602
MONTH(SEQCODE)	7	7	1	-5.6763	1.9922	8.1182	0.0044
MONTH(SEQCODE)	8	7	1	-2.8563	0.3733	58.5459	0.0001
MONTH(SEQCODE)	9	7	1	-3.4883	0.4726	54.4779	0.0001
MONTH(SEQCODE)	8	8	1	-4.7605	1.7257	7.6099	0.0058
MONTH(SEQCODE)	9	8	1	-5.6661	2.4391	5.3966	0.0202
MONTH(SEQCODE)	10	8	1	-3.3809	1.7263	3.8357	0.0502
MONTH(SEQCODE)	7	9	1	-2.8248	0.6459	19.1296	0.0001
MONTH(SEQCODE)	8	9	1	-1.4884	0.2082	51.1038	0.0001
MONTH(SEQCODE)	9	9	1	-1.5502	0.2544	37.1431	0.0001
MONTH(SEQCODE)	10	9	1	-4.3316	1.9921	4.7279	0.0297
MONTH(SEQCODE)	7	10	1	-1.7174	0.2617	43.0824	0.0001
MONTH(SEQCODE)	8	10	1	-1.9826	0.2936	45.6010	0.0001
MONTH(SEQCODE)	9	10	1	-2.7173	0.4609	34.7632	0.0001
MONTH(SEQCODE)	10	10	1	-1.8768	0.8181	5.2635	0.0218
MONTH(SEQCODE)	7	11	1	-0.0061	0.1677	0.0013	0.9710
MONTH(SEQCODE)	8	11	1	-1.0234	0.1566	42.6774	0.0001
MONTH(SEQCODE)	9	11	1	-1.4453	0.2464	34.4133	0.0001
MONTH(SEQCODE)	10	11	1	-2.6704	0.5210	26.2661	0.0001
MONTH(SEQCODE)	7	12	1	-1.6286	0.2526	41.5732	0.0001
MONTH(SEQCODE)	8	12	1	-0.7889	0.1481	28.3587	0.0001
MONTH(SEQCODE)	9	12	1	-1.5949	0.2950	29.2374	0.0001
MONTH(SEQCODE)	10	12	1	-1.1902	0.4499	6.9981	0.0082
MONTH(SEQCODE)	11	12	1	-0.5187	0.6583	0.6207	0.4308
MONTH(SEQCODE)	7	13	1	-0.9225	0.2475	13.8896	0.0002
MONTH(SEQCODE)	8	13	1	-0.8600	0.1931	19.8408	0.0001
MONTH(SEQCODE)	9	13	1	-1.2305	0.1767	48.4768	0.0001
MONTH(SEQCODE)	10	13	1	-2.0698	0.3050	46.0666	0.0001
MONTH(SEQCODE)	7	14	1	-0.1020	0.1466	0.4843	0.4865
MONTH(SEQCODE)	8	14	1	-0.6307	0.3305	3.6425	0.0563
MONTH(SEQCODE)	9	14	1	-2.5700	1.1530	4.9680	0.0258
MONTH(SEQCODE)	10	14	1	-0.6628	0.1498	19.5761	0.0001
MONTH(SEQCODE)	11	14	1	-0.7507	0.3053	6.0455	0.0139
MONTH(SEQCODE)	7	15	1	0.1147	0.1689	0.4610	0.4971
MONTH(SEQCODE)	8	15	1	0.0539	0.1393	0.1494	0.6991
MONTH(SEQCODE)	9	15	1	0.3852	0.1623	5.6351	0.0176

Table 5.6 Model results for

Experimental Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	10	15	1	-1.9291	0.7241	7.0973	0.0077
MONTH(SEQCODE)	11	15	1	-1.9308	0.8167	5.5887	0.0181
MONTH(SEQCODE)	8	16	1	0.3623	0.1182	9.3955	0.0022
MONTH(SEQCODE)	9	16	1	-0.4171	0.1868	4.9843	0.0256
MONTH(SEQCODE)	10	16	1	-0.9437	0.3189	8.7549	0.0031
MONTH(SEQCODE)	11	16	1	-0.1620	0.5533	0.0857	0.7697
MONTH(SEQCODE)	7	17	1	-1.1376	0.5321	4.5706	0.0325
MONTH(SEQCODE)	8	17	1	0.7572	0.2198	11.8700	0.0006
MONTH(SEQCODE)	9	17	1	-1.5956	0.5969	7.1453	0.0075
MONTH(SEQCODE)	10	17	1	-1.7356	0.4491	14.9364	0.0001
MONTH(SEQCODE)	7	18	1	0.1417	0.1396	1.0312	0.3099
MONTH(SEQCODE)	8	18	1	1.6014	0.2252	50.5529	0.0001
MONTH(SEQCODE)	9	18	1	-1.1277	0.5652	3.9800	0.0460
MONTH(SEQCODE)	7	19	1	-0.3659	0.1827	4.0137	0.0451
MONTH(SEQCODE)	9	19	1	-1.5666	0.6566	5.6916	0.0170
MONTH(SEQCODE)	7	20	1	-0.4273	0.1513	7.9787	0.0047
MONTH(SEQCODE)	8	20	1	0.2963	0.1275	5.3993	0.0201
MONTH(SEQCODE)	9	20	1	-0.0145	0.1633	0.0079	0.9291
MONTH(SEQCODE)	10	20	1	-0.2898	0.3795	0.5833	0.4450
MONTH(SEQCODE)	11	20	1	-0.1873	0.5601	0.1119	0.7380
MONTH(SEQCODE)	7	21	1	0.3037	0.1470	4.2704	0.0388
MONTH(SEQCODE)	8	21	1	0.2066	0.1200	2.9644	0.0851
MONTH(SEQCODE)	9	21	1	-0.0892	0.1669	0.2853	0.5932
MONTH(SEQCODE)	10	21	1	-0.5882	0.2880	4.1703	0.0411
MONTH(SEQCODE)	11	21	1	-0.0222	0.7250	0.0009	0.9755
MONTH(SEQCODE)	7	22	1	-0.0543	0.1344	0.1635	0.6860
MONTH(SEQCODE)	8	22	1	-0.0561	0.2246	0.0623	0.8028
MONTH(SEQCODE)	9	22	1	-0.5277	0.3407	2.3991	0.1214
MONTH(SEQCODE)	10	22	1	-0.3952	0.1551	6.4956	0.0108
MONTH(SEQCODE)	11	22	1	0.0918	0.1109	0.6850	0.4079
MONTH(SEQCODE)	7	23	1	-0.7303	0.1500	23.7083	0.0001
MONTH(SEQCODE)	8	23	1	-0.5498	0.3662	2.2543	0.1332
MONTH(SEQCODE)	9	23	1	-0.0850	0.3450	0.0608	0.8053
MONTH(SEQCODE)	10	23	1	-0.0817	0.1458	0.3143	0.5750
MONTH(SEQCODE)	11	23	1	0.5068	0.1141	19.7240	0.0001
MONTH(SEQCODE)	7	24	1	-0.9985	0.3719	7.2072	0.0073
MONTH(SEQCODE)	8	24	1	-0.0678	0.5095	0.0177	0.8942
MONTH(SEQCODE)	9	24	1	-0.2037	0.4123	0.2441	0.6213
MONTH(SEQCODE)	10	24	1	-1.2118	1.3064	0.8604	0.3536
MONTH(SEQCODE)	7	25	1	0.6570	0.1549	17.9992	0.0001
MONTH(SEQCODE)	8	25	1	0.2283	0.1209	3.5654	0.0590
MONTH(SEQCODE)	9	25	1	0.1818	0.1265	2.0636	0.1509
MONTH(SEQCODE)	10	25	1	0.1804	0.2816	0.4104	0.5218
MONTH(SEQCODE)	11	25	1	-0.1453	0.2542	0.3265	0.5677
MONTH(SEQCODE)	7	26	1	-0.4405	0.3462	1.6187	0.2033

Table 5.6 Model results for

Experimental Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	8	26	1	-0.0856	0.1347	0.4034	0.5254
MONTH(SEQCODE)	9	26	1	-1.0932	0.4771	5.2514	0.0219
MONTH(SEQCODE)	10	26	1	-0.4497	0.8951	0.2524	0.6154
MONTH(SEQCODE)	7	27	1	-0.2291	0.3941	0.3378	0.5611
MONTH(SEQCODE)	7	28	1	2.0051	0.1321	230.2480	0.0001
MONTH(SEQCODE)	8	28	1	-0.0764	0.1529	0.2494	0.6175
MONTH(SEQCODE)	9	28	1	-0.8494	0.3924	4.6864	0.0304
MONTH(SEQCODE)	10	28	1	-2.0084	1.1520	3.0392	0.0813
MONTH(SEQCODE)	7	29	1	0.6147	0.2123	8.3793	0.0038
MONTH(SEQCODE)	8	29	1	0.3353	0.1244	7.2707	0.0070
MONTH(SEQCODE)	9	29	1	0.1584	0.1411	1.2603	0.2616
MONTH(SEQCODE)	7	30	1	0.4720	0.2603	3.2880	0.0698
MONTH(SEQCODE)	8	30	1	0.3565	0.1505	5.6098	0.0179
MONTH(SEQCODE)	9	30	1	-0.5133	0.1578	10.5788	0.0011
MONTH(SEQCODE)	10	30	1	-0.9713	0.4498	4.6631	0.0308
MONTH(SEQCODE)	11	30	1	0.7070	0.3068	5.3104	0.0212
MONTH(SEQCODE)	7	31	1	-0.2676	0.4432	0.3647	0.5459
MONTH(SEQCODE)	8	31	1	-0.3319	0.1525	4.7353	0.0295
MONTH(SEQCODE)	9	31	1	-0.5306	0.2615	4.1181	0.0424
MONTH(SEQCODE)	7	32	1	0.2731	0.1150	5.6446	0.0175
MONTH(SEQCODE)	8	32	1	0.4609	0.1098	17.6221	0.0001
MONTH(SEQCODE)	9	32	1	-0.3555	0.3649	0.9488	0.3300
MONTH(SEQCODE)	11	32	1	0.0571	0.4173	0.0187	0.8912
MONTH(SEQCODE)	7	33	1	0.3422	0.1095	9.7696	0.0018
MONTH(SEQCODE)	8	33	1	0.4480	0.1153	15.1077	0.0001
MONTH(SEQCODE)	9	33	1	0.0333	0.3479	0.0092	0.9237
MONTH(SEQCODE)	8	34	1	-0.4513	0.1954	5.3325	0.0209
MONTH(SEQCODE)	9	34	1	0.0136	0.1546	0.0077	0.9301
MONTH(SEQCODE)	10	34	1	0.1131	0.2198	0.2647	0.6069
MONTH(SEQCODE)	11	34	1	1.6544	0.3923	17.7840	0.0001
MONTH(SEQCODE)	7	35	1	0.0059	0.1188	0.0025	0.9602
MONTH(SEQCODE)	9	35	1	-0.1942	0.1667	1.3570	0.2441
MONTH(SEQCODE)	10	35	1	-0.5428	0.3250	2.7898	0.0949
MONTH(SEQCODE)	11	35	1	-0.9605	1.1530	0.6940	0.4048
MONTH(SEQCODE)	7	36	1	0.3993	0.1351	8.7281	0.0031
MONTH(SEQCODE)	8	36	1	0.4303	0.1200	12.8596	0.0003
MONTH(SEQCODE)	9	36	1	-0.0684	0.1487	0.2114	0.6457
MONTH(SEQCODE)	10	36	1	-0.1788	0.2759	0.4200	0.5169
MONTH(SEQCODE)	11	36	1	-0.0667	0.7411	0.0081	0.9283
MONTH(SEQCODE)	7	37	1	1.5627	0.1525	104.9964	0.0001
MONTH(SEQCODE)	8	37	1	0.6469	0.1258	26.4389	0.0001
MONTH(SEQCODE)	9	37	1	0.4929	0.1853	7.0742	0.0078
MONTH(SEQCODE)	7	38	1	1.3145	0.1046	157.8669	0.0001
MONTH(SEQCODE)	8	38	1	1.4779	0.1053	196.9379	0.0001

Table 5.6 Model results for

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Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	8	35	1	0.0985	0.1174	0.7040	0.4014
MONTH(SEQCODE)	9	38	1	0.9451	0.1370	47.5781	0.0001
MONTH(SEQCODE)	10	38	1	-0.1721	0.3592	0.2294	0.6319
MONTH(SEQCODE)	11	38	1	-1.0783	1.2225	0.7780	0.3778
MONTH(SEQCODE)	7	39	1	0.2069	0.1920	1.1604	0.2814
MONTH(SEQCODE)	9	39	1	0.9162	0.1012	81.8817	0.0001
MONTH(SEQCODE)	10	39	1	1.0047	0.1120	80.4065	0.0001
MONTH(SEQCODE)	11	39	1	1.2611	0.3901	10.4515	0.0012
MONTH(SEQCODE)	7	40	1	-0.4047	0.1796	5.0742	0.0243
MONTH(SEQCODE)	8	40	1	-0.0668	0.1532	0.1901	0.6628
MONTH(SEQCODE)	9	40	1	-0.6641	0.1867	12.6557	0.0004
MONTH(SEQCODE)	10	40	1	-1.1034	0.2291	23.2033	0.0001
MONTH(SEQCODE)	11	40	1	-1.3863	0.2584	28.7888	0.0001
MONTH(SEQCODE)	7	41	1	0.1251	0.4639	0.0727	0.7874
MONTH(SEQCODE)	8	41	1	-0.3126	0.1430	4.7821	0.0288
MONTH(SEQCODE)	9	41	1	-0.4368	0.1333	10.7317	0.0011
MONTH(SEQCODE)	10	41	1	-1.2038	0.3255	13.6764	0.0002
MONTH(SEQCODE)	11	41	1	-1.3660	1.4106	0.9378	0.3328
MONTH(SEQCODE)	7	42	1	-0.0800	0.4650	0.0296	0.8634
MONTH(SEQCODE)	8	42	1	0.6367	0.1096	33.7295	0.0001
MONTH(SEQCODE)	9	42	1	-2.1687	0.7235	8.9854	0.0027
MONTH(SEQCODE)	10	42	1	-0.3640	0.2427	2.2494	0.1337
MONTH(SEQCODE)	7	43	1	1.4748	0.1214	147.5875	0.0001
MONTH(SEQCODE)	8	43	1	0.7875	0.1097	51.5445	0.0001
MONTH(SEQCODE)	9	43	1	0.6125	0.1295	22.3773	0.0001
MONTH(SEQCODE)	7	44	1	-1.2299	0.3058	16.1816	0.0001
MONTH(SEQCODE)	8	44	1	-0.2536	0.1373	3.4130	0.0647
MONTH(SEQCODE)	9	44	1	-0.8631	0.1907	20.4774	0.0001
MONTH(SEQCODE)	10	44	1	-1.4838	0.8670	2.9286	0.0870
MONTH(SEQCODE)	7	45	1	-0.6219	0.1661	14.0191	0.0002
MONTH(SEQCODE)	8	45	1	-0.0544	0.1333	0.1664	0.6833
MONTH(SEQCODE)	9	45	1	-0.8244	0.2319	12.6355	0.0004
MONTH(SEQCODE)	10	45	1	-2.2414	1.5446	2.1058	0.1467
MONTH(SEQCODE)	7	46	1	0.6621	0.1068	38.4025	0.0001
MONTH(SEQCODE)	8	46	1	0.7944	0.1310	36.7574	0.0001
MONTH(SEQCODE)	9	46	1	0.0417	0.1531	0.0743	0.7851
MONTH(SEQCODE)	10	46	1	-1.8456	0.6827	7.3081	0.0069
MONTH(SEQCODE)	11	46	1	0.8018	0.1746	21.0808	0.0001
MONTH(SEQCODE)	7	47	1	0.2112	0.1264	2.7920	0.0947
MONTH(SEQCODE)	8	47	1	0.2408	0.1413	2.9046	0.0883
MONTH(SEQCODE)	9	47	1	-1.5247	0.6577	5.3749	0.0204
MONTH(SEQCODE)	7	48	1	1.1674	0.1094	113.7972	0.0001
MONTH(SEQCODE)	8	48	1	0.5195	0.1197	18.8297	0.0001

Table 5.6 Model results for

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Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	9	48	1	-0.6598	0.2678	6.0714	0.0137
MONTH(SEQCODE)	10	48	1	-0.5876	0.2506	5.4987	0.0190
MONTH(SEQCODE)	11	48	1	-1.8980	1.2220	2.4124	0.1204
MONTH(SEQCODE)	7	49	1	1.4649	0.1222	143.6197	0.0001
MONTH(SEQCODE)	8	49	1	0.3200	0.1480	4.6775	0.0306
MONTH(SEQCODE)	7	50	1	-0.5821	0.3698	2.4786	0.1154
MONTH(SEQCODE)	8	50	1	0.0709	0.1796	0.1559	0.6930
MONTH(SEQCODE)	9	50	1	-0.2561	0.1636	2.4491	0.1176
MONTH(SEQCODE)	10	50	1	-1.2478	0.3415	13.3505	0.0003
MONTH(SEQCODE)	11	50	1	-0.4836	0.3816	1.6064	0.2050
MONTH(SEQCODE)	7	51	1	0.2226	0.1237	3.2389	0.0719
MONTH(SEQCODE)	8	51	1	-0.2639	0.1608	2.6912	0.1009
MONTH(SEQCODE)	9	51	1	0.3886	0.1900	4.1849	0.0408
MONTH(SEQCODE)	10	51	1	-3.4128	1.0431	10.7048	0.0011
MONTH(SEQCODE)	7	52	1	0.3695	0.1326	7.7661	0.0053
MONTH(SEQCODE)	7	53	1	1.0364	0.1712	36.6333	0.0001
MONTH(SEQCODE)	8	53	1	-0.7822	0.2374	10.8599	0.0010
MONTH(SEQCODE)	9	53	1	-0.2824	0.1590	3.1545	0.0757
MONTH(SEQCODE)	10	53	1	-0.3629	0.2239	2.6279	0.1050
MONTH(SEQCODE)	11	53	1	-2.1202	0.4649	20.7964	0.0001
MONTH(SEQCODE)	7	54	1	0.6500	0.1198	29.4505	0.0001
MONTH(SEQCODE)	8	54	1	-0.5960	0.1675	12.6653	0.0004
MONTH(SEQCODE)	9	54	1	-0.1721	0.1418	1.4723	0.2250
MONTH(SEQCODE)	10	54	1	-0.1485	0.2976	0.2491	0.6177
MONTH(SEQCODE)	11	54	1	-1.5483	1.0943	2.0020	0.1571
MONTH(SEQCODE)	7	55	1	-0.0467	0.2988	0.0245	0.8757
MONTH(SEQCODE)	8	55	1	-2.0085	0.4689	18.3461	0.0001
MONTH(SEQCODE)	9	55	1	-0.8646	0.2504	11.9256	0.0006
MONTH(SEQCODE)	10	55	1	-1.2694	0.8945	2.0141	0.1558
MONTH(SEQCODE)	7	56	1	1.2749	0.1033	152.2828	0.0001
MONTH(SEQCODE)	8	56	1	1.1945	0.1038	132.3575	0.0001
MONTH(SEQCODE)	9	56	1	0.5014	0.2713	3.4165	0.0645
MONTH(SEQCODE)	7	57	1	0.9374	0.1017	84.9732	0.0001
MONTH(SEQCODE)	8	57	1	0.1271	0.1274	0.9945	0.3186
MONTH(SEQCODE)	9	57	1	1.0825	0.1194	82.1461	0.0001
MONTH(SEQCODE)	10	57	1	0.2538	0.2218	1.3093	0.2525
MONTH(SEQCODE)	7	58	1	-1.1416	0.3607	10.0166	0.0016
MONTH(SEQCODE)	8	58	1	0.2229	0.1487	2.2466	0.1339
MONTH(SEQCODE)	9	58	1	0.6461	0.1513	18.2399	0.0001
MONTH(SEQCODE)	7	59	1	0.7839	0.1195	43.0206	0.0001
MONTH(SEQCODE)	8	59	1	0.2380	0.1432	2.7621	0.0965
MONTH(SEQCODE)	9	59	1	0.3058	0.1247	6.0100	0.0142
MONTH(SEQCODE)	10	59	1	0.0691	0.1465	0.2223	0.6373
MONTH(SEQCODE)	7	60	1	1.3399	0.1031	168.9912	0.0001
MONTH(SEQCODE)	8	60	1	0.7620	0.1474	26.7405	0.0001
MONTH(SEQCODE)	9	60	1	0.7150	0.1428	25.0793	0.0001

Table 5.6 Model results for

Experimental Gill net 5½ in.

Analysis Of Parameter Estimates

Parameter			DF	Estimate	Std Err	ChiSquare	Pr>Chi
MONTH(SEQCODE)	8	35	1	0.0985	0.1174	0.7040	0.4014
MONTH(SEQCODE)	10	60	1	0.5470	0.1205	20.6216	0.0001
MONTH(SEQCODE)	11	60	1	0.0503	0.2674	0.0353	0.8509
AGE(YEAR)	3	1995	1	-5.5069	1.5442	12.7174	0.0004
AGE(YEAR)	4	1995	1	-2.5212	0.3575	49.7389	0.0001
AGE(YEAR)	5	1995	1	0.9216	0.1077	73.2632	0.0001
AGE(YEAR)	6	1995	1	1.1299	0.1043	117.4394	0.0001
AGE(YEAR)	7	1995	1	0.2213	0.1244	3.1619	0.0754
AGE(YEAR)	8	1995	1	-0.2747	0.1430	3.6898	0.0547
AGE(YEAR)	9	1995	1	-1.9746	0.2779	50.4746	0.0001
AGE(YEAR)	3	1996	1	-3.0602	0.3715	67.8413	0.0001
AGE(YEAR)	4	1996	1	-1.2907	0.1723	56.0857	0.0001
AGE(YEAR)	5	1996	1	0.8557	0.1002	72.8722	0.0001
AGE(YEAR)	6	1996	1	2.5010	0.0892	786.8173	0.0001
AGE(YEAR)	7	1996	1	1.4305	0.0944	229.6234	0.0001
AGE(YEAR)	8	1996	1	0.2105	0.1114	3.5702	0.0588
AGE(YEAR)	9	1996	1	-1.2081	0.1671	52.2384	0.0001
AGE(YEAR)	3	1997	1	-3.2026	0.4394	53.1212	0.0001
AGE(YEAR)	4	1997	1	-1.4644	0.2001	53.5509	0.0001
AGE(YEAR)	5	1997	1	1.0749	0.0999	115.8699	0.0001
AGE(YEAR)	6	1997	1	1.5177	0.0951	254.5202	0.0001
AGE(YEAR)	7	1997	1	2.0626	0.0914	509.2060	0.0001
AGE(YEAR)	8	1997	1	0.6505	0.1065	37.3349	0.0001
AGE(YEAR)	9	1997	1	-1.3928	0.1944	51.3357	0.0001
AGE(YEAR)	3	1998	1	-2.8362	0.3774	56.4753	0.0001
AGE(YEAR)	4	1998	1	-1.6823	0.2236	56.6235	0.0001
AGE(YEAR)	5	1998	1	0.9168	0.1027	79.6301	0.0001
AGE(YEAR)	6	1998	1	2.5003	0.0897	777.7834	0.0001
AGE(YEAR)	7	1998	1	2.0421	0.0917	495.5287	0.0001
AGE(YEAR)	8	1998	1	1.3916	0.0967	206.9577	0.0001
AGE(YEAR)	9	1998	1	0.1492	0.1192	1.5675	0.2106
AGE(YEAR)	3	1999	1	-3.8006	0.5730	43.9890	0.0001
AGE(YEAR)	4	1999	1	-1.5008	0.1985	57.1831	0.0001
AGE(YEAR)	5	1999	1	0.9675	0.0995	94.4640	0.0001
AGE(YEAR)	6	1999	1	1.5228	0.0935	265.1008	0.0001
AGE(YEAR)	7	1999	1	1.8587	0.0911	416.2589	0.0001
AGE(YEAR)	8	1999	1	0.6356	0.1048	36.7845	0.0001
AGE(YEAR)	9	1999	0	0.0000	0.0000	.	.
SCALE			0	3.4473	0.0000	.	.

NOTE: The scale parameter was estimated by the square root of DEVIANCE/DOF.

Table 5.6 Model results for Experimental Gill net 5½ in.

Lagrange Multiplier Statistics

Parameter	ChiSquare	Pr>Chi
Intercept	.	.

LR Statistics For Type 3 Analysis

Source	NDF	DDF	F	Pr>F	ChiSquare	Pr>Chi
MONTH(SEQCODE)	229	4790	40.0445	0.0001	9170.2012	0.0001
AGE(YEAR)	34	4790	465.8703	0.0001	15839.5909	0.0001

Table 5.7 Standardized relative Catch Rate for

Experimental Gill net 5½ in.

	Year				
	1995	1996	1997	1998	1999
age					
3	0.002	0.021	0.018	0.027	0.010
4	0.037	0.125	0.105	0.085	0.101
5	1.143	1.070	1.333	1.138	1.197
6	1.408	5.547	2.075	5.543	2.085
7	0.568	1.902	3.578	3.506	2.918
8	0.346	0.561	0.872	1.829	0.859
9	0.063	0.136	0.113	0.528	0.455
ALL	3.566	9.362	8.094	12.655	7.626

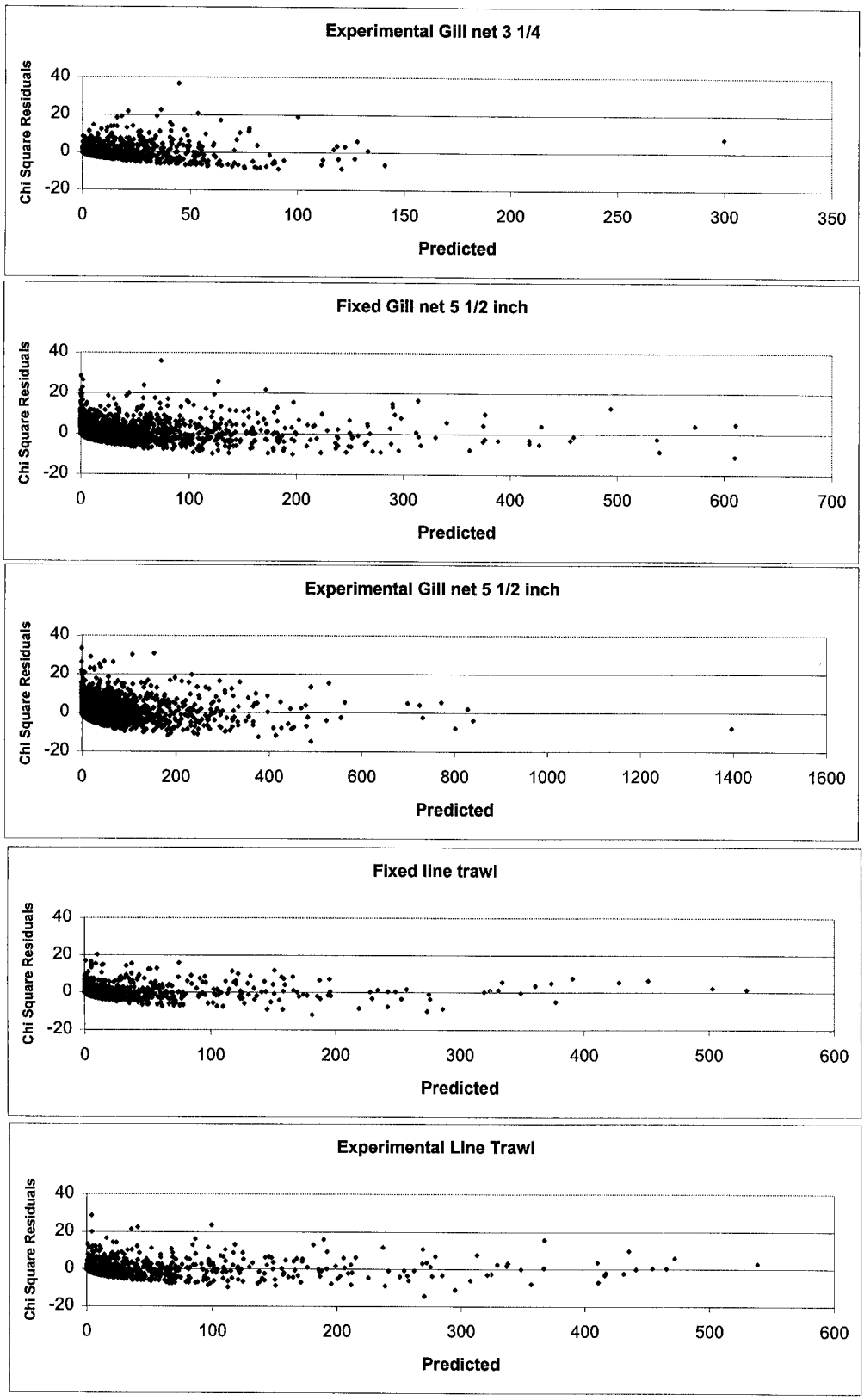

Fig. 1. Chi square residuals vs. predicted values for each gear and survey method.

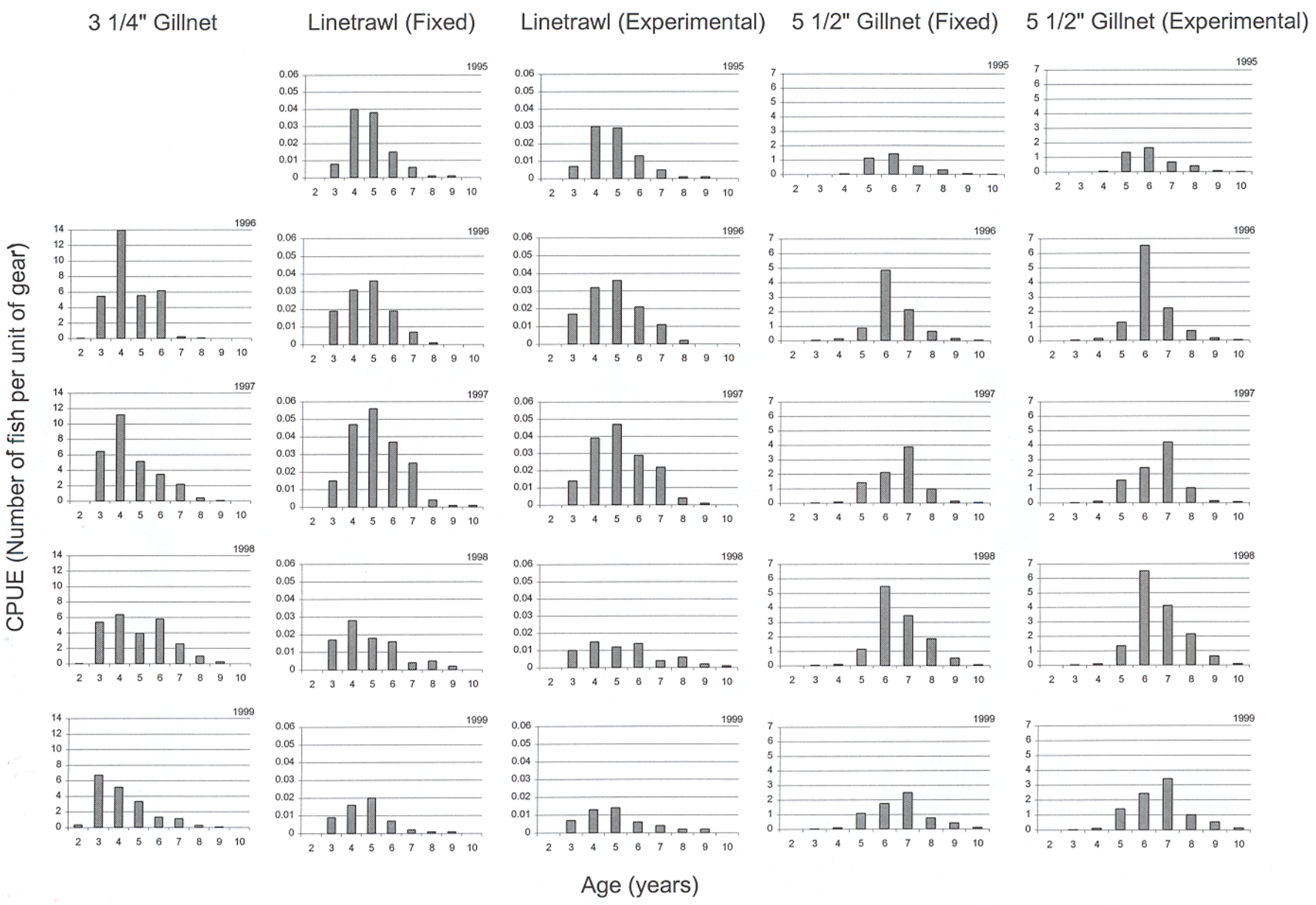

Fig. 2. Age disaggragated indecies for the three gears and two survey types used in the sentinel program.

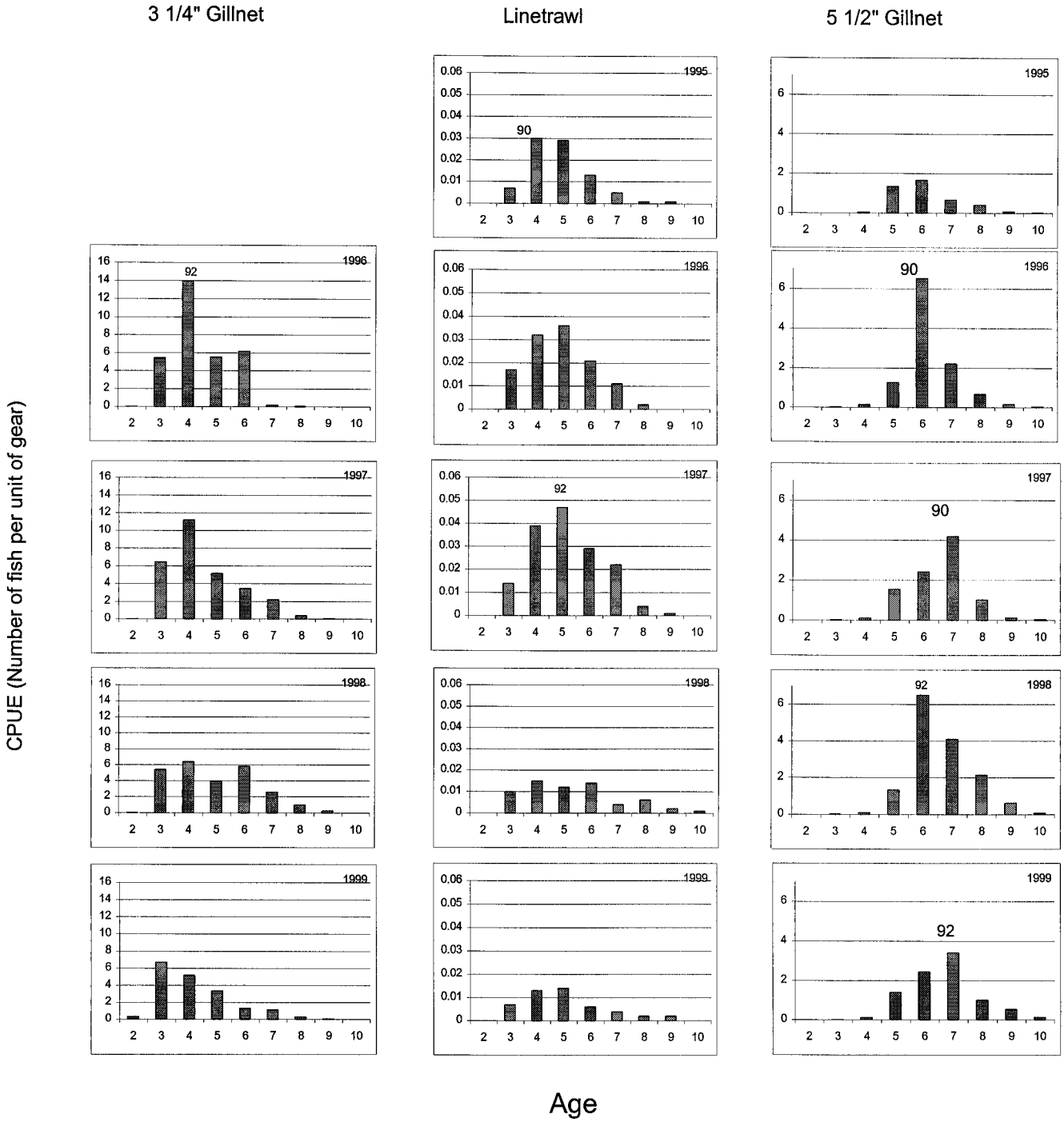

Fig. 3. Age disaggragated indecies by gear for the experimental survey used in the sentinel program.