ESTIMATION OF THE CATCH-AT-AGE MATRIX OF YELLOWFIN TUNA (*THUNNUS ALBACARES*) FISHERIES IN THE WESTERN INDIAN OCEAN

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ABSTRACT

This is a preliminary paper. There are many different types of gears in many different countries in the western Indian Ocean. As it was sometimes difficult to contact persons-in-charge of the fisheries statistics, not all the description of this paper (such as gear categories, classification and etc) could be checked by them.

Introduction

One of the primary roles for the new Indian Ocean Tuna Commission (IOTC) is to strengthen tuna management. Hence, stock assessment will become more important, as it provides the basic information for the management decision process. Under such circumstances, it is expected that age-based stock assessment methods such as cohort analysis will be conducted as one of the basic stock assessment methodologies. Therefore, the accuracy of the catch-at-age (CAA) matrix input information, needs to be carefully evaluated for age-structure based stock assessments.

Age (or age-group) based stock assessments of yellowfin tuna in the (western) Indian Ocean have been conducted by the multi-cohort analyses of Wang and Tanaka (1988) and by the immature-adult dynamic model by Nishida (1992 and 1993). However, CAA matrices in these papers and also IPTP (1995), were estimated from old information. IOTC (IPTP) has been periodically renewing its database and there is a new growth study by Stequert *et al* (1996). Thus, it is essential to re-estimate the CAA matrix with this new information, so that an updated CAA can be applied.

Because many countries in the western Indian Ocean use many different fishing methods to exploit YFT, the estimation procedures for the CAA are quite complicated and a large number of computation procedures are required. Detailed estimation procedures were not well documented in the above-mentioned papers in the past, and this paper intends to describe the computation process in as much detail as possible, so that the estimation procedure can be reviewed and implementation problems identified for the future.

Data

(1) Source

The western Indian Ocean yellowfin (YFT) stock is assumed to be the one defined by Nishida (1991). The FAO F51 Area is further assumed to be the approximated area of the western stock. Thus, the available data from the FAO F51 Area was used to estimate the CAA. Size, weight and catch data from 1970-95 were used. Sources of the information used in this paper is listed as below:

- IOTC (IPTP) databank
- Maldivian size data (troll, hand line, pole & line, longline from Marine Research Station, Charles Anderson, Marine Research Station, Maldives)
- Japanese catch and size data of longline (LL) and purse seine (PS) (database from NRIFSF, Japan)
- Taiwanese size data (longline data from Taiwan)
- IPTP/91/GEN/21 (Report of the workshop on stock assessment of yellowfin tuna in the Indian Ocean)

(2) Gear type

After careful review of the gears for YFT fisheries in the region, they were classified into eight categories and the CAA matrix for each gear estimated. Table 1 shows eight gear types and corresponding countries.

Methods and results

(1) Estimation procedures

Box 1: Flowchart of the estimation procedures for CAA.

(The CAA is basically created for each gear and country)
(a) Inventory and Collection of data
↓
(b) List of available catch and size data
↓
(c) Separate PS catch into log and free school (estimation of annual catch composition by log and free school)
↓
(d) Decide substitution scheme for unavailable size data
↓
(e) Estimation of age-length-weight key
↓
(f) Estimation of age compositions
↓
(g) Estimation of catch-at-age (in tonnes)
= (b) (catch) x (f)
↓
(h) Estimation of age specific average weight (kg) (to be used to convert from catch in tonnes to catch in number)
↓
(i) Estimation of catch-at-age (number) = (g)*1000/(kg)
↓
(i) CAA by gear (aggregate of CAA by country)
↓
(k) Global annual CAA (CAA for all gears and countries are pooled)

(2) Purse seine catch by free and log school

The original purse seine catch data were not classified by free and log school. Table 2 shows the estimated composition of the free and log school based catch.

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(3) Estimation of age compositions

Annual age compositions were estimated by gear and country. The slicing method was used to convert size to age. The new growth model derived by Stequert *et al* (1996), based on the results of the otolith increment data collected in the western Indian Ocean, was applied. The derived equation is as follows:

$$FL = 272.7 \times (1 - e^{(-0.176(t+0.266)}) \quad)$$

Based on this growth equation and the length/weight relationship (IPTP, 1990), the Age-Length-weight keys were computed (Table 2).

Fork length (FL) < 64 cm Weight = 0.00005313*FL
2.7536661

Fork length (FL) => 64 cm Weight = 0.00001585*FL
3.044983----------(B)

The size frequency distributions were converted to age frequency distributions by gear and country with this age-length key. Age compositions were then estimated. If there were less than 100 size frequency data by year, gear and country available, data from another country were substituted. Appendix A shows the substitution scheme. The results of the estimated age composition are provided in Appendix C.

(4) CAA matrix

The annual CAA matrices (tonnes) were evaluated by multiplying the catch (tonnes) by estimated age compositions for each gear, country and year. Then, the CAA (numbers) were estimated by dividing the CAA (kg) by the annual average weight for each gear, country and year.

For each gear, country and year,

CAA (number) = CAA (tonnes) x 1000 / average weight (kg),

where CAA (tonnes) = catch (tonnes) x age composition

Average fish weight = WT x n 〕/ n

= $a(FL)^b$ x n 〕/ n

a and b are parameters of LW relationship (see the equation (B), page 5).

For the average weight by age, data sets with an insufficient sample size in the length data set in one year (< 100), were not used and the average weight data from other countries were substituted. Where sample sizes in a particular gear and country were insufficient (< 100), we used the weight data derived from the age – length – weight key (Table 2) for each age.

(5) Results

Resultant age compositions, average weight and CAA matrix by gear and country are listed in Appendix C, D and E respectively. In addition, graphs for CAA by gear, catch by age and CAA for all gear combined are shown in Figs. 1-4.

4. Discussion and recommendations

(1) Size data and substitution

Many substitutions were needed to estimate age compositions because of unavailability of size data. Basically, size data corresponding to high annual catch (2,000 t or more) by gear and country are essential. Under this condition, the following size data must be collected:

- Troll (UNCL): Comoros,
- PS : Panama , Belize, Liberia, Iran
- Gillnet: Pakistan, Sri Lanka,
- UNCL: Oman
- Hand: Comoros
- LL: Korea, Iran, Honduras, Oman, Pakistan.

The use of so many substitutions will mask year class strength. However, within the same gear and age, the catch compositions are not significantly different by year and country, and might be used without serious bias. The effects of substitution are discussed more in "(4) Uncertainty".

Seasonal factors

Seasonal factors were not considered in this paper, as the majority of the data sets were only available on an annual basis. However, if seasonal catch and size are available (e.g., industrial longline and purse seine fisheries), seasonal factors should be considered in the future to obtain more realistic CAA.

(3) Average weight

It was realized that the average weight within same gear fluctuates largely by year and country. This is significant in longline fisheries, for example, where the average weight within age 2 fluctuated between 5.6 and 11.7 kg. Therefore, it is suggested to use the real average weight by gear, year and country if the information is available, instead of substituting values from the age-length-weight key.

(4) Uncertainty

We need to find a method to reflect the uncertainty in the estimation of the CAA by incorporating not only the original sampling error, but also the uncertainty derived from substitution schemes and the uncertainty induced by the imperfect mapping from length to age. A Bayesian method could work well for this purpose, by representing the joint probability density function of the length-at-age with a mixture of bivariate t-distributions or perhaps a multivariate version of the Dirichlet probability distribution function (pdf). The Dirichlet has the advantage that it forms a conjugate pair with a multinomial distribution (a natural model for length-frequency sampling).

Next, the substitution schemes can be treated as a statistical image reconstruction problem, with a spatial and temporal dependency on a measure of distance between observed distributions, obviously with gear as a main factor in a GLM or GAM context. Such a model could be used to obtain a predictive posterior distribution for the unobserved quantities. The third factor, the imperfect mapping of the growth curve it is a bit more complicated, since ideally we would want the joint pdf for the lengths and ages, while what we get from the regular estimation procedures of a growth

curve is a conditional pdf at best. We might have to do some Monte Carlo simulations because there are probably no good closed form solutions for a predictive posterior distribution.

(5) Free and log based PS catch data

It is suggested that IOTC make an estimation of the log vs. free school purse seine catch, so that Scientists can use the same information. The ratios between log and free schools in the beginning of the purse seine fishery are realistic. Some investigation is needed.

(6) Longline CAA

As catch (in number) of longlines fisheries are available, it should be used, instead of using the catch (in weight), then re-converting it to numbers (per. comm. Miyabe, NIRIFSF)

(7) UNCL

There are many unclassified gear categories (Comoros, Oman, Seychelles, Sri Lanka, South Africa and Yemen). Descriptions are needed of these gears when substation is concerned.

- Sri Lanka (UNCL) is assumed to GILL (1982-95)
- COM (UNCL) is assumed to be HAND
- SOU (UNCL) is assumed to be HAND
- SEY (UNCL) is assumed to be HAND
- MOZ (UNCL) is assumed to be PL

(8) CAA and stock assessment

It is suggested that data before 1980 should not be used as input information for assessment because (a) data are probably inaccurate due to under reporting, (b) most of the size data are not available and (c) there is significant inconsistency of q (catchability) in 1970's and 1980's-90's.

Because catch in numbers (age 3 or older) is low and not stable (Fig 1), it is suggested that catch of age 3 or older should be pooled and treated as one group (plus group). For the immature-adult dynamic model by Nishida (1993), the adult groups (age 2 or older) are treated as one group to conduct a robust assessment.

In addition, as extensively discussed by Nishida (1995), within age 0, the natural mortality is significantly different by size (see also Hampton, 1995), a model that can handle two size groups within age 0 needs to be developed. This is because, if all the information is pooled within age 0, real dynamics within age 0 will be masked and results of the assessment will be seriously biased.

(9) Slicing method

The boundaries of the age-length key described in Table 2 need to be checked to determine whether they are appropriate for the slicing method.

(10) Growth model

It was realized that the growth model by Stequert *et al* (1996) is appropriate for the age 0-1 fish, but it may not well reflect the mode for the larger fish group because $L\infty$ is too large. This may be from samples mainly composed of young fish. Therefore, the use of the previous model for the lager fish may be re-considered (see IPTP, 1990). Thus, a 2 stanza growth model (younger fish by Stequert and older fish by IPTP) is likely appropriate. This needs to be investigated and further discussed.

5. Acknowledgement

We appreciate Mr. D. Ardill (IOTC) who provided a large amount of the data for the yellowfin tuna fisheries used in this paper and also promptly helped for numbers of questions. We thank also toward Dr. Charles Anderson (Marine Research Section, Maldives), who provided size data of the Maldivian Handline and troll fisheries.

6. References

BOBP/Bay of Bengal Programme (1988): Studies of the tuna resources in the EEZs of Maldives & Sri Lanka. FAO/BOBP/REP/41:143 pp.

IPTP/Indo-Pacific Tuna Development and Management Programme (1990) Report of the expert consultation on stock assessment of tuna in the Indian Ocean, FAO/IPTP/90/ GEN/18:96 pp.

Marsac, F. and Hallier, J.P.(1987) Preliminary yield per recruit analysis of the Indian Ocean yellowfin and bigeye fisheries. FAO/IPTP Coll. Vol. of Work. Doc. 2 (TWS/86/33): 58-72.

Nishida, T. (1992) Development of the stock-fishery model for yellowfin tuna (*Thunnus albacares*) in the Indian Ocean. *Suisankaiyo-kenkyu (Bulletin of the Japan. Society of Fisheries Oceanography)* **56**(3): 236-270 (in *Japanese*)

Nishida, T. (1993) Preliminary analysis of yellowfin tuna (*Thunnus albacares*) resources in the Indian Ocean by the improved immature-adult dynamic model (FAO/IPTP/TWS /95/)

Stequert, B., J. Panfili and M. D. John (1996) Age and growth of yellowfin tuna, Thunnus albacares, from the western Indian Ocean, based on otolith microstructure. *Fishery Bulletin* **14**:124-134.

Shung, S.H., (1973) The sexual activity of yellowfin tuna caught by the longline fishery in the Indian Ocean based on the examination of ovaries. Bull. Far Sea Fish. Lab., **9**: 123-142

Yano, K. (1990): An interim analysis of the data on tuna tagging collected by R/V Nippon Maru in the Indian Ocean, 1980-90. FAO/IPTP/SEAC/90/17:107-124.

Wang, C-H. and Tanaka, S.(1988) Development of a multicohort analysis method and its application to the Indian Ocean yellowfin tuna length composition. Bull. Far Seas Fish. Lab., **25**:1-72.

Table 1 Eight gear types for YFT catch and corresponding countries (these need to be checked by the relevant countries)

Gear type	Artisanal	Industrial
Pole & line (PL)	Madagascar, Maldives, Sri Lanka	Spain
Troll (TROLL)	Comoros, Kenya, Maldives, Mauritius, Seychelles, Sri Lanka, Mozambique, South Africa	France
(3) Purse seine (PS) (free school)	Belize, Cayman Island, Iran, Ivory Coast, Libya, Malta, Seychelles, Sri Lanka	France, Iran, Japan, Panama, Russia, Spain
(4) Purse seine (PS) (log school)	Belize, Cayman Island, Iran, Ivory Coast, Libya, Malta, Mauritius, Seychelles, Sri Lanka	France, Japan (nil), Panama, Russia, Spain
(5) Gillnet (GILL)	Iran, Maldives, Pakistan, Sri Lanka,	Taiwan
(6) Unclassified (UNCL) (a) Sri Lanka type (Gillnet combined) (b) Yemen type (Handline and gillnet) (c) Oman type (troll, small PS & LL)	 Sri Lanka Yemen Oman	
(7) Handline (HAND)	Comoros, Maldives, Seychelles, South Africa, Sri Lanka	
(8) Longline (LL)	(small boat) Honduras, India, Kenya, Mauritius, Oman, Pakistan, Seychelles, Sri Lanka, Unknown	(large boat) France, Japan, Russia, Spain, China(Taiwan), Unknown

(3) List of available information and substitution of the size data

Appendix A lists available catch and size for eight gears. If size data are not available, other size data are substituted, which are also described in Appendix A.

Table 2 Age – Length – Weight keys

Age	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5
Length (cm)	34.4	54.5	72.9	89.7	105.1	119.2	132.2	144.0	154.8	164.8	173.9
Weight (kg)	0.91	3.36	7.45	14.0	22.7	33.3	45.6	59.2	73.8	89.3	105.1

Age	FL (Fork Length) (cm)	Average weight (kg) (at the middle of age)
0	FL < 54.4	0.9
1	54.4 <= FL < 89.7	7.5
2	79.7 <= FL < 119.2	22.7
3	119.2<= FL < 144.0	45.6
4	144.0<= FL < 164.8	73.8
5	164.8<= FL	105.1

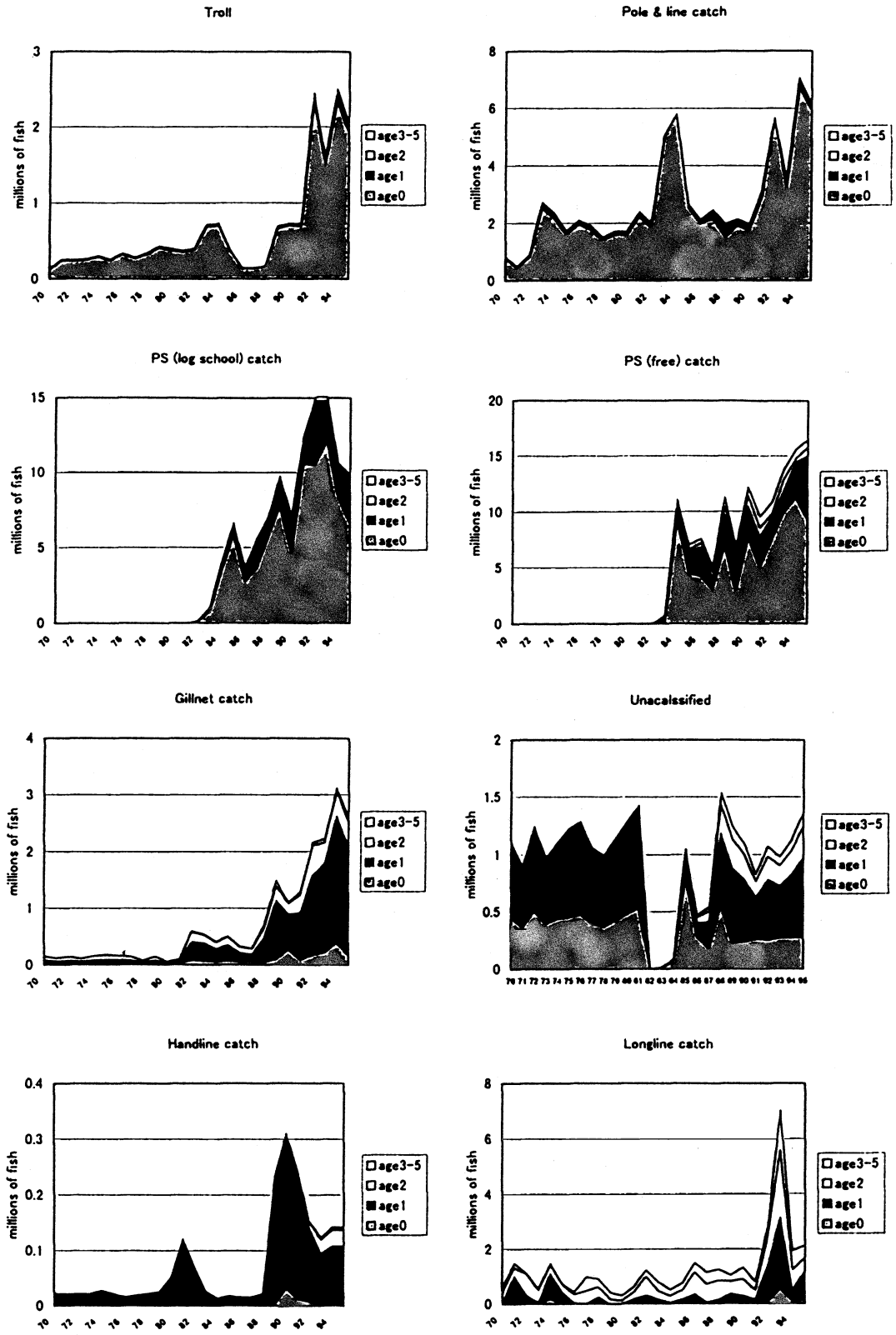

Fig 1 Estimated CAA by gear

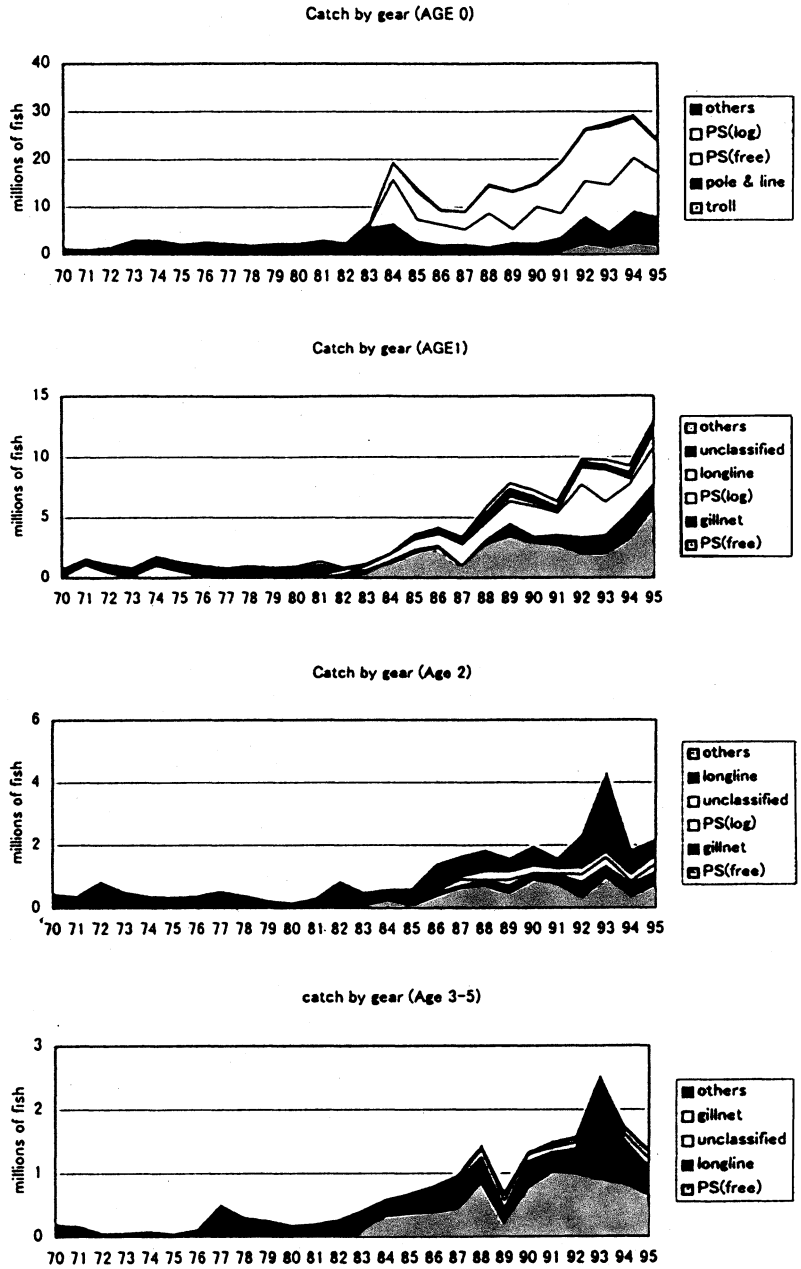

Fig 2. Estimated catch by age and gear

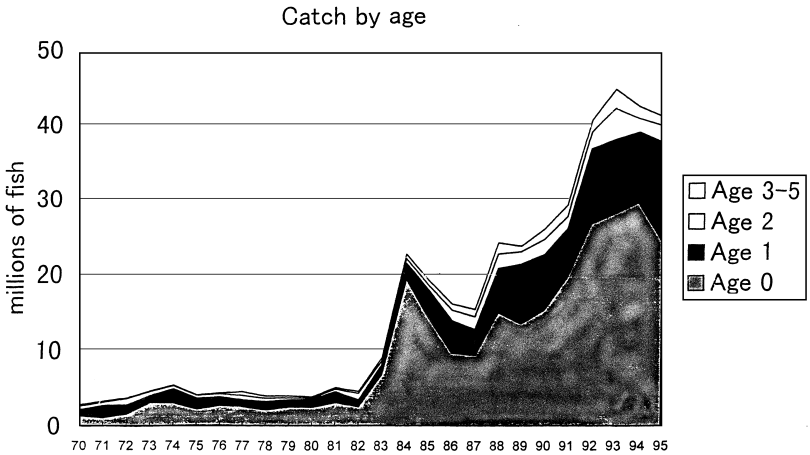

Figure 3 Estimated catch by age (all gears combined)

APPENDIX A
ESTIMATION OF LOG/FREE SCHOOL SPECIFIC PURSE SEINE CATCH

Table A1: Total catch (free & log school combined)

PS	FRA	IVO	SEY	SPA	CAY	JPN	PAN	MAT	MAU	RUS	LIB	SRI	BEL	IRA
81	260	0	0	0	0	0	0	0	0	0	0	0	0	0
82	1224	0	0	0	0	0	0	0	0	0	0	0	0	0
83	10773	0	0	0	0	165	0	0	1057	0	0	0	0	0
84	33611	5107	0	13851	0	161	2441	0	1234	180	0	0	0	0
85	32231	3046	0	16632	0	75	3236	0	914	700	0	0	0	0
86	35519	562	0	17532	0	160	3432	0	661	2882	0	0	0	0
87	37118	0	0	20469	0	154	3831	0	1597	3578	0	0	0	0
88	54149	0	0	43159	0	356	3597	0	1231	4153	0	0	0	0
89	38411	0	0	33852	0	883	1941	0	1679	3128	0	0	0	0
90	44465	0	0	35917	804	2973	10569	2845	1357	2428	0	0	0	0
91	41154	0	362	46339	0	5046	11594	2381	2621	3059	0	0	0	0
92	53212	0	221	42103	0	11837	7021	1625	2130	0	5149	0	0	2081
93	50616	0	0	54259	0	10064	9531	0	2454	0	8079	1	6914	3356
94	34152	0	0	47767	0	1694	7857	0	1777	0	5836	0	10296	2732
95	41185	0	0	70015	0	565	9855	0	1636	0	5836	4	9301	4300

Table 2: Annual composition of free and log school PS catch by country (1), (8)

	France	(2)	Spain	(3)	Japan	(4)	Panama	(5)	Mauritius	(4)	Russia	(6)
	free	log	Free	log	Free	log	free	log	Free	log	free	log
1981	0.62	0.38						.	.	.	.	.
1982	0.62	0.38		.	.	.		.	.	.	.	.
1983	0.68	0.32	.	.	0.02	0.98	.	.	.	.	.	.
1984	0.81	0.19	0.84	0.16	0.02	0.98	0.82	0.18	0	1	.	.
1985	0.71	0.29	0.76	0.24	0.02	0.98	0.75	0.25	0	1	0.73	0.27
1986	0.77	0.23	0.81	0.19	0.02	0.98	0.68	0.32	0	1	0.77	0.23
1987	0.61	0.39	0.75	0.25	0.02	0.98	0.74	0.26	0	1	0.67	0.33
1988	0.83	0.17	0.80	0.20	0.02	0.98	0.86	0.14	0	1	0.82	0.18
1989	0.60	0.40	0.61	0.39	0.02	0.98	0.61	0.39	0	1	0.60	0.40
1990	0.77	0.23	0.83	0.17	0.02	0.98	0.77	0.23	0	1	0.79	0.21
1991	0.71	0.29	0.76	0.24	0.02	0.98	0.77	0.23	0	1	0.79	0.21
1992	0.64	0.36	0.68	0.32	0.02	0.98	0.77	0.23	0	1	0.79	0.21
1993(7)	0.70	0.30	0.76	0.24	0.02	0.98	0.75	0.25	0	1	0.75	0.25
1994(7)	0.70	0.30	0.76	0.24	0.02	0.98	0.75	0.25	0	1	0.75	0.25
1995(7)	0.70	0.30	0.76	0.24	0.02	0.98	0.75	0.25	0	1	0.75	0.25

Note (1) Compositions for 1981-90 are based on Table 2 of page. 14 (IPTP/91/GEN/20).

(2) Ivory coast and Seychelles are assumed to be the same rate. Rates of 1991-92 are based on separate statistics available in the IPTP database.

(3) Cayman Island is assumed to be the same. 1992 rate is based on the separate catch statistics available in the IPTP. database 1991 rate is average between 1990 and 1992.

(4) Rates in the IPTP/91/GEN/20 are applied.

(5) UK and Malta are assumed to be the same rate. 1991-92 rates are same as in 1990.

(6) 1991-92 rates are same as in 1990.

(7) Average (of available rates during 1982-92) are substituted.

(8) Average composition of France and Spain are substituted for all the other countries (Belize, Iran, Liberia, Mauritius, Seychelles, Sri Lanka).

APPENDIX B
LIST OF AVAILABLE CATCH AND SIZE DATA WITH THE SUBSTITUTION SCHEME

Pole & line

	Madagascar Catch	size	Maldives catch	(MAL) size	Spain catch	size	Sri Lanka catch	size
70	0		1799	MAL(Ave)	0		0	
71	0		1081	MAL(Ave)	0		0	
72	0		1940	MAL(Ave)	0		0	
73	550	MAL(Ave)	5234	MAL(Ave)	0		0	
74	1160	MAL(Ave)	3868	MAL(Ave)	0		0	
75	180	MAL(Ave)	3512	MAL(Ave)	0		0	
76	0		4481	MAL(Ave)	0		0	
77	0		4123	MAL(Ave)	0		0	
78	0		3214	MAL(Ave)	0		0	
79	0		3692	MAL(Ave)	0		0	
80	0		3647	MAL(Ave)	0		0	
81	0		4740	MAL(Ave)	363	MAL(Ave)	0	
82	0		3770	MAL(Ave)	55	MAL(Ave)	418	MAL(Ave)
83	0		5984	(A)	0		452	MAL(83)
84	0		6893	(A)	0		258	MAL(84)
85	0		5797	(A)	0		27	MAL(85)
86	0		5200	(A)	0		0	
87	0		6531	(A)	0		0	
88	0		6378	(A)	0		5	
89	0		5831	(A)	0		0	
90	0		5230	(A)	0		0	
91	0		7654	(A)	0		0	
92	0		8414	(A1)	0		0	
93	0		10023	(A)	0		0	
94	0		12889	(A1)	0		0	
95	0		12266	(A)	0		0	

Note Substituted size data are indicated by MAL(83), MAL(Ave) -----.
(A): Size data are from IOTC database.
(A1): Size data are from Charles Anderson, Marine Research Section, Maldives.

Troll

Troll	COM catch	size	FRA catch	size	KEN catch	size	MAL catch	size	MAU catch	size	SEY catch	size	SRI catch	Size	MOZ catch	size	SOU catch	size
70	0		79	(*)	0	(*)	190	(*)	0		0		0		0		0	
71	0		395	(*)	0	(*)	146	(*)	0		0		0		0		0	
72	0		395	(*)	0	(*)	136	(*)	0		0		0		0		0	
73	0		316	(*)	0	(*)	241	(*)	0		0		0		0		0	
74	0		381	(*)	0	(*)	260	(*)	0		0		0		0		0	
75	0		284	(*)	0	(*)	262	(*)	0		0		0		0		0	
76	0		303	(*)	0	(*)	410	(*)	0		0		0		0		0	
77	0		255	(*)	0	(*)	350	(*)	0		0		0		0		0	
78	0		352	(*)	0	(*)	370	(*)	0		0		0		0		0	
79	0		312	(*)	0	(*)	597	(*)	0		0		0		0		0	
80	0		260	(*)	0	(*)	582	(*)	0		0		0		0		0	
81	0		244	(*)	0	(*)	544	(*)	0		0		0		0		0	
82	0		190	(*)	0	(*)	234	(*)	0		0		418	(*)	0		0	
83	0		183	(*)	0	(*)	257	(*)	0		0		452	(*)	15	(*)	161	(*)
84	0		174	(*)	20	(*)	229	(*)	50	(*)	0		386	(*)	188	(*)	0	
85	0		144	(*)	26	(*)	242	(*)	11	(*)	7	(*)	322	(*)	15	(*)	0	
86	0		151	(*)	36	(*)	121		10	(*)	4	(*)	8	(*)	0		0	
87	0		170	(*)	19	(*)	137	(A1)(*)	16	(*)	3	(*)	7	(*)	0		0	
88	0		209	(*)	27	(*)	154		8	(*)	1	(*)	56	(*)	0		0	
89	1206	(*)	198	(*)	39	(*)	245	(*)	48	(*)	0		22	(*)	0		0	
90	1206	(*)	198	(*)	50	(*)	50	(*)	51	(*)	1	(*)	3	(*)	0		0	
91	1206	(*)	244	(*)	71	(*)	55	(*)	49	(*)	1	(*)	59	(*)	0		0	
92	3412	(*)	317	(*)	75	(*)	278	(A2)(*)	82	(*)	0		0		0		0	
93	3412	(*)	463	(*)	80	(*)	83		74	(*)	0		4	(*)	0		0	
94	4036	(*)	463	(*)	80	(*)	220	(A2)	74	(*)	0		7	(*)	0		0	
95	4036	(*)	0		80	(*)	209		74	(*)	0		3	(*)	0		0	

(A1): Size data are available (data are pooled for 1986-88).
(A2): Size data are available, but not used because the there are likely errors in size compositions
(*) : Average of Maldivian size data (1986-88), (A1) are substituted.

PS (Free school)

free	France Ivory C. Seychelles		Spain Cayman I.		Japan		Panama Malta		Russia		Others	
	catch	size	catch	size	catch	size	catch	size	catch	size	catch	size
70	0		0		0		0		0		0	
71	0		0		0		0		0		0	
72	0		0		0		0		0		0	
73	0		0		0		0		0		0	
74	0		0		0		0		0		0	
75	0		0		0		0		0		0	
76	0		0		0		0		0		0	
77	0		0		0		0		0		0	
78	0		0		0		0		0		0	
79	0		0		0		0		0		0	
80	0		0		0		0		0		0	
81	161	(F82)	0		0		0		0		0	
82	758	(A)	0		0		0		0		0	
83	7325	(A)	0		3	ave83	0		0		0	
84	31361	(A)	11634	(A)	3	ave84	2001	ave84	0		0	
85	25046	(A)	12640	(A)	1	ave85	2427	ave85	511	ave85	0	
86	27782	(A)	14200	(A)	3	ave86	2333	ave86	2219	ave86	0	
87	22641	(A)	15351	(A)	3	ave87	2834	ave87	2397	ave87	0	
88	44943	(A)	34527	(A)	7	ave88	3093	ave88	3405	ave88	0	
89	23046	(A)	20649	(A)	17	ave89	1184	ave89	1876	ave89	0	
90	34238	(A)	30478	(A)	59	ave90	10328	ave90	1918	ave90	0	
91	29476	(A)	35217	(A)	100	ave91	10760	ave91	2416	ave91	0	
92	34197	(A)	28630	(A)	236	ave92	6657	ave92	0		4771	ave92
93	35431	(A)	41236	(A)	201	ave93	7148	ave93	0		3395	ave93
94	23906	(A)	36302	(A)	33	ave94	5892	Ave94(A)	0		3770	ave94(A)
95	28829	(A)	53211	(A)	11	ave95	7391	Ave95	0		4191	ave95

(A): size data are available
(ave): overall average by the available data
others : Liberia, Sri Lanka, Belize and Iran

(4) PS (log school)

YR	France Ivory C.		Spain Cayman I		Japan		Panama Malta		Mauritius		Russia		Others	
	catch	size	catch	size	catch	size	catch	size	catch	size	catch	size	catch	size
70	0		0		0		0		0		0		0	
71	0		0		0		0		0		0		0	
72	0		0		0		0		0		0		0	
73	0		0		0		0		0		0		0	
74	0		0		0		0		0		0		0	
75	0		0		0		0		0		0		0	
76	0		0		0		0		0		0		0	
77	0		0		0		0		0		0		0	
78	0		0		0		0		0		0		0	
79	0		0		0		0		0		0		0	
80	0		0		0		0		0		0		0	
81	98	(F82)	0		0		0		0		0		0	
82	465	(A)	0		0		0		0		0		0	
83	3447	(A)	0		161	ave83	0		0		0		0	
84	7356	(A)	2216	(A)	157	ave84	439	ave84	1234	ave84	0		0	
85	10230	(A)	3991	(A)	73	ave85	809	ave85	914	ave85	189	ave85	0	
86	8298	(A)	3331	(A)	156	ave86	1098	ave86	661	ave86	662	ave86	0	
87	14476	(A)	5117	(A)	150	ave87	996	ave87	1597	ave87	1180	ave87	0	
88	9205	(A)	8631	(A)	348	ave88	503	ave88	1231	ave88	747	ave88	0	
89	15364	(A)	13202	(A)	865	ave89	756	ave89	1679	ave89	1251	ave89	0	
90	10226	(A)	6242	(A)	2913	ave90	3085	ave90	1357	ave90	509	ave90	0	
91	12039	(A)	11121	(A)	4945	ave91	3214	ave91	2621	ave91	642	ave91	0	
92	19235	(A)	13472	(A)	11600	ave92	1988	ave92	2130	ave92	0		2458	ave92
93	15184	(A)	13022	(A)	9862	ave93	2382	ave93	2454	ave93	0		4954	ave93
94	10245	(A)	11464	(A)	1660	ave94	1964	ave94 (A)	1777	ave94 (A)	0		5093	ave94 (A)
95	12355	(A)	16803	(A)	553	ave95	2463	ave95	1636	ave95	0		5249	ave95

(A): size data are available
(ave): overall average by the available data
others : Liberia, Sri Lanka, Belize and Iran

(5) Gillnet

GILL	IRA		MAL		PAK		SRI		TAI	
	catch	size	catch	size	catch	size	catch	size	catch	size
70	0		0		2827	PAK(Ave)	0		0	
71	0		0		2306	PAK(Ave)	0		0	
72	0		0		2750	PAK(Ave)	0		0	
73	0		0		2162	PAK(Ave)	0		0	
74	0		0		2965	PAK(Ave)	0		0	
75	0		0		3272	PAK(Ave)	0		0	
76	0		0		3070	PAK(Ave)	0		0	
77	0		0		2743	PAK(Ave)	0		0	
78	0		0		1598	PAK(Ave)	0		0	
79	0		0		2762	PAK(Ave)	0		0	
80	0		0		1275	PAK(Ave)	0		0	
81	0		0		1958	PAK(Ave)	0		0	
82	0		0		2450	PAK(Ave)	6680	AVE(IRA+PAK)	0	
83	0		0		827	PAK(Ave)	7237	AVE(IRA+PAK)	0	
84	0		0		893	PAK(Ave)	5151	AVE(IRA+PAK)	0	
85	0		0		1487	PAK(Ave)	6145	AVE(IRA+PAK)	0	
86	0		0		2517	PAK(Ave)	2693	AVE(IRA+PAK)	28	AVE(IRA+PAK)
87	0		0		2336	(A)	2124	AVE(IRA+PAK)	45	AVE(IRA+PAK)
88	0		0		3733	(A)	8076	AVE(IRA+PAK)	1	AVE(IRA+PAK)
89	980	IRA(Ave)	0		8560	(A)	9273	AVE(IRA+PAK)	2	AVE(IRA+PAK)
90	2280	IRA(Ave)	0		3156	(A)	7166	AVE(IRA+PAK)	4	AVE(IRA+PAK)
91	3238	IRA(Ave)	0		4780	(A)	10952	AVE(IRA+PAK)	0	
92	12104	IRA(Ave)	0		3913	(A)	9984	AVE(IRA+PAK)	0	
93	13300	IRA(Ave)	0		2629	PAK(Ave)	10427	AVE(IRA+PAK)	0	
94	19450	(A)	1	AVE(IRA+PAK)	2426	PAK(Ave)	11069	AVE(IRA+PAK)	0	
95	22495	(A)	1	AVE(IRA+PAK)	2110	PAK(Ave)	7831	AVE(IRA+PAK)	0	

(A): Size data are available.

Unclassified

UNCL		OMAN	SRI LANKA (SL)		YEMEN	
	catch	size	catch	size	catch	size
70	0		5800	Ave(SL)	0	
71	0		4700	Ave(SL)	0	
72	0		6500	Ave(SL)	0	
73	0		5100	Ave(SL)	0	
74	0		6070	Ave(SL)	0	
75	0		6611	(A)	0	
76	0		6915	(A)	0	
77	0		5720	(A)	0	
78	0		5369	(A)	0	
79	0		6166	(A)	0	
80	0		6906	(A)	16	Ave(Yemen)
81	0		7662	(A)	12	Ave(Yemen)
82	0		0		5	Ave(Yemen)
83	0		0		44	Ave(Yemen)
84	0		0		222	Ave(Yemen)
85	2237	Ave(Oman)	0		2367	Ave(Yemen)
86	2520	Ave(Oman)	0		824	Ave(Yemen)
87	5842	Ave(Oman)	0		519	Ave(Yemen)
88	15485	(A)	0		1628	Ave(Yemen)
89	16877	Ave(Oman)	0		667	Ave(Yemen)
90	14084	Ave(Oman)	0		695	Ave(Yemen)
91	8996	Ave(Oman)	0		771	Ave(Yemen)
92	13419	Ave(Oman)	0		748	Ave(Yemen)
93	11386	Ave(Oman)	4	Ave(SL)	804	Ave(Yemen)
94	13921	Ave(Oman)	7	Ave(SL)	804	Ave(Yemen)
95	18008	Ave(Oman)	5	Ave(SL)	800	Ave(Yemen)

SIZE COMPOSITION FOR 75-81 (Sri Lanka) are identical.
Data are available: Size data of Oman (1988) are substituted (Figure 11, page 30, IPTP/91/GEN/20)
Ave(Yemen) is based on Figure 3 (page 54) (Saeed,1995) (IPTP Collective Volume 9)

(7) Handline

HAND	COMORES (**)		MALDIVES		SEYCHELLES (**)		SRI LANKA	
	catch	size	catch	size	catch	size	catch	size
70	100		0		100		0	
71	100		0		100		0	
72	100		0		100		0	
73	100		0		100		0	
74	100		0		150		0	
75	100		0		100		0	
76	100		0		50		0	
77	100		0		80		0	
78	100		0		100		0	
79	100		0		128		0	
80	100		0		357		0	
81	110		0		949		0	
82	110		0		518		0	
83	120		0		114		0	
84	130		1	(*)	0		0	
85	140		27	(*)	0		0	
86	140		0		6	(*)	6	(*)
87	140		2	(*)	5	(*)	5	(*)
88	150		3	(*)	2	(*)	43	(*)
89	2115	(*)	6	(A)	0		2	(B)
90	2115	(*)	2	(A)	14	(*)	51	(B)
91	2115	(*)	1	(*)	9	(*)	0	(*)
92	1330	(*)	2	(*)	4	(*)	3	(*)
93	1330	(*)	3		0		41	
94	1573	(*)	1	(A)	0		7	(B)
95	1573	(*)	1		0		5	

Note (A): Data are available.
(B): Maldivian data are substituted.
(*): Average Moldavian size frequency data are substituted.
(**) UNCL is included.

(8) Longline

LL	FRA		HON		IND		IRA		JPN		KEN		KOR		MAU	
	C	S	C	S	C	S	C	S	C	S	C	S	C	S	C	S
70	0		0		0		0		6800	(A)	0		7045	(J)	0	
71	0		0		0		0		9500	(A)	0		7475	(J)	0	
72	0		0		0		0		5400	(A)	0		11040	(J)	0	
73	0		0		0		0		2000	(A)	0		10580	(J)	0	
74	0		0		0		0		1943	(A)	0		13297	(J)	0	
75	0		0		0		0		2195	(A)	0		10236	(J)	0	
76	0		0		0		920	(J)	1342	(A)	0		9144	(J)	0	
77	0		0		0		719	(J)	1146	(A)	0		28549	(J)	0	
78	0		0		0		0		2822	(A)	0		20741	(J)	17	(J)
79	0		0		0		392	(J)	810	(A)	0		12218	(J)	0	
80	0		0		0		370	(J)	1784	(A)	77	(J)	8159	(J)	1	(J)
81	0		0		0		0		2856	(A)	197	(JT)	11513	(J)	1	(JT)
82	0		0		0		0		4755	(A)	235	(JT)	20830	(J)	0	
83	0		0		3	(JTK)	0		4814	(A)	370	(JTK)	16727	(A)	0	
84	0		0		10	(JTK)	0		4559	(A)	0		10503	(A)	0	
85	0		0		26	(JTK)	0		6435	(A)	0		13104	(A)	0	
86	0		0		354	(JT)	0		8239	(A)	0		16171	(JT)	219	(JT)
87	0		0		182	(JT)	0		4985	(A)	0		13481	(JT)	81	(JT)
88	0		0		119	(JT)	0		6090	(A)	0		14228	(JT)	113	(JT)
89	0		70	(JT)	24	(JT)	0		2336	(A)	0		8304	(JT)	121	(JT)
90	0		69	(JT)	8	(JT)	0		3560	(A)	0		7583	(JT)	26	(JT)
91	18		90	(JT)	42	(JT)	0		2968	(A)	0		3325	(JT)	71	(JT)
92	71		94	(JT)	19	(JT)	380	(JT)	3299	(A)	0		3740	(JT)	73	(JT)
93	156	(JT)	1665	(JT)	249	(JT)	4980	(JT)	2969	(A)	0		3730	(JT)	9	(JT)
94	156	(JT)	259	(JT)	192	(JT)	4980	(JT)	6222	(A)	0		4149	(JT)	7	(JT)
95	156	(JT)	625	(JT)	192	(JT)	380	(JT)	5573	(A)	0		2800	(JT)	15	(JT)

LL	OMA		PAK		RUS		SEY		SPA		SRI		TAI		UNK	
	C	S	C	S	C	S	C	S	C	S	C	S	C	S	C	S
70	0		0		0		0		0		0		4959	(J)	0	
71	0		0		0		0		0		0		6800	(J)	0	
72	0		0		0		0		0		0		6786	(J)	0	
73	0		0		0		0		0		0		2211	(J)	0	
74	0		0		0		0		0		0		1500	(J)	0	
75	0		0		0		0		0		0		1337	(J)	0	
76	0		0		0		0		0		0		899	(J)	0	
77	0		0		0		0		0		0		4094	(J)	0	
78	0		0		0		0		0		0		2093	(J)	0	
79	0		0		0		0		0		0		1692	(J)	0	
80	0		0		0		0		0		0		920	(J)	0	
81	0		0		0		0		0		0		1464	(A)	0	
82	0		0		0		0		0		834	(JT)	2111	(A)	0	
83	0		0		0		49	(JTK)	0		905	(JTK)	1380	(A)	0	
84	0		0		0		131	(JTK)	0		644	(JTK)	1120	(A)	0	
85	0		0		0		170	(JTK)	0		222	(JTK)	1523	(A)	2	(JTK)
86	0		0		0		0		0		199	(JT)	10610	(A)	693	(JT)
87	0		0		0		0		0		157	(JT)	15491	(A)	391	(JT)
88	0		0		8	(JT)	0		0		424	(JT)	13764	(A)	518	(JT)
89	0		0		2	(JT)	0		0		837	(JT)	10026	(A)	2387	(JT)
90	4212	(JT)	0		0		0		0		683	(JT)	11068	(A)	8548	(JT)
91	1229	(JT)	1700	(JT)	0		0		0		1119	(JT)	7745	(A)	5050	(JT)
92	1976	(JT)	19481	(JT)	0		0		0		459	(JT)	19388	(A)	5906	(JT)
93	10471	(JT)	28188	(JT)	0		0		5	(JT)	1138	(JT)	72566	(A)	11762	(JT)
94	8082	(JT)	2178	(JT)	0		0		25	(JT)	852	(JT)	23074	(A)	0	
95	10576	(JT)	3030	(JT)	0		0		0		852	(JT)	17634	(A)	0	

Appendix C
Comparison of the growth curves between the two stanza and the Stequert model

(to be completed)

APPENDIX D
ESTIMATED AGE COMPOSITION

Basically, age compositions are computed by gear and country. However, Tables in Appendix D list overall average age composition (all countries combined).

(1) PL

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
71	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
72	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
73	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
74	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
75	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
76	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
77	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
78	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
79	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
80	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
81	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
82	0.79321	0.16574	0.026436	0.01331	0.001236	0.0000722
83	0.99793	0.00207	0	0	0	0
84	0.99913	0.00087	0	0	0	0
85	0.76501	0.13937	0.054934	0.038657	0.002035	0
86	0.72128	0.17097	0.059923	0.046179	0.001649	0
87	0.66667	0.28732	0.029652	0.013804	0.002556	0
88	0.53889	0.43486	0.018744	0.00656	0.000937	0
89	0.71714	0.27113	0.011737	0	0	0
90	0.61	0.29375	0.06625	0.0275	0.0025	0
91	0.76437	0.18227	0.038588	0.012315	0.002463	0
92	0.99432	0.00568	0	0	0	0
93	0.71831	0.18873	0.061972	0.026291	0.003756	0.000939
94	0.90225	0.09775	0	0	0	0
95	0.91644	0.07979	0.001868	0.001725	0.000176	0

(2)Troll

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0.82609	0.13043	0.028986	0.014493	0	0
71	0.82609	0.13043	0.028986	0.014493	0	0
72	0.82609	0.13043	0.028986	0.014493	0	0
73	0.82609	0.13043	0.028986	0.014493	0	0
74	0.82609	0.13043	0.028986	0.014493	0	0
75	0.82609	0.13043	0.028986	0.014493	0	0
76	0.82609	0.13043	0.028986	0.014493	0	0
77	0.82609	0.13043	0.028986	0.014493	0	0
78	0.82609	0.13043	0.028986	0.014493	0	0
79	0.82609	0.13043	0.028986	0.014493	0	0
80	0.82609	0.13043	0.028986	0.014493	0	0
81	0.82609	0.13043	0.028986	0.014493	0	0
82	0.82609	0.13043	0.028986	0.014493	0	0
83	0.82609	0.13043	0.028986	0.014493	0	0
84	0.82609	0.13043	0.028986	0.014493	0	0
85	0.82609	0.13043	0.028986	0.014493	0	0
86	0.82609	0.13043	0.028986	0.014493	0	0
87	0.82609	0.13043	0.028986	0.014493	0	0
88	0.82609	0.13043	0.028986	0.014493	0	0
89	0.82609	0.13043	0.028986	0.014493	0	0
90	0.82609	0.13043	0.028986	0.014493	0	0
91	0.82609	0.13043	0.028986	0.014493	0	0
92	0.82609	0.13043	0.028986	0.014493	0	0
93	0.82609	0.13043	0.028986	0.014493	0	0
94	0.82609	0.13043	0.028986	0.014493	0	0
95	0.82609	0.13043	0.028986	0.014493	0	0

(4) PS(FREE)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
81	0.12452	0.06292	0.46094	0.33515	0.01648	0
82	0.12452	0.06292	0.46094	0.33515	0.01648	0
83	0.07824	0.31458	0.23932	0.34919	0.01868	0
84	0.34668	0.15712	0.09793	0.29609	0.10103	0.001147
85	0.23335	0.26889	0.03979	0.32767	0.12858	0.001728
86	0.17903	0.27416	0.17191	0.30723	0.06676	0.000912
87	0.13394	0.13123	0.29549	0.38913	0.04956	0.00065
88	0.19839	0.18097	0.18997	0.3605	0.06944	0.000727
89	0.14368	0.4559	0.19576	0.16877	0.03529	0.000603
90	0.21878	0.16214	0.24714	0.33416	0.03763	0.000144
91	0.12733	0.12175	0.22255	0.44906	0.07656	0.002746
92	0.21054	0.15186	0.0871	0.45336	0.09551	0.00163
93	0.20895	0.11054	0.24466	0.34673	0.08779	0.001336
94	0.3062	0.1534	0.08979	0.3313	0.11637	0.002943
95	0.19937	0.33586	0.17272	0.25005	0.04165	0.000358

(5) PS(LOG)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
81	0.82534	0.09986	0.06187	0.0128	0.000123	0
82	0.82534	0.09986	0.06187	0.0128	0.000123	0
83	0.47438	0.4426	0.05711	0.02475	0.001155	0
84	0.5856	0.27774	0.06714	0.05231	0.016983	0.00022198
85	0.69715	0.25181	0.03158	0.01558	0.003844	0.00002972
86	0.4196	0.32665	0.1079	0.14043	0.005352	0.00006406
87	0.38193	0.38471	0.16007	0.06993	0.003325	0.00002309
88	0.65399	0.27425	0.04229	0.02798	0.001439	0.00004396
89	0.52399	0.33337	0.10638	0.03414	0.002121	0
90	0.42013	0.51944	0.03422	0.02556	0.000647	0
91	0.6764	0.24522	0.03541	0.03984	0.003118	0.00000629
92	0.46344	0.40652	0.0989	0.02968	0.001457	0.00000228
93	0.56208	0.26291	0.13065	0.04295	0.001413	0.00000035
94	0.50953	0.3142	0.0658	0.08244	0.02785	0.00018059
95	0.41122	0.39914	0.15062	0.03761	0.001332	0.00006929

(2) GILL

YR	COM0	COM1	COM2	COM3	COM4	COM5
70	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
71	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
72	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
73	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
74	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
75	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
76	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
77	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
78	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
79	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
80	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
81	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
82	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
83	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
84	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
85	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
86	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
87	0.016782	0.45991	0.40646	0.10615	0.010688	0
88	0.010372	0.46662	0.32255	0.18103	0.008066	0.011364
89	0.011851	0.50232	0.27629	0.19047	0.019071	0
90	0.02924	0.54059	0.33498	0.08148	0.013712	0
91	0.010372	0.4763	0.37726	0.12253	0.013537	0
92	0.012249	0.36994	0.53017	0.08224	0.005404	0
93	0.015144	0.46928	0.37462	0.12732	0.011746	0.001894
94	0.019843	0.48509	0.3662	0.11473	0.012242	0.001894
95	0.010445	0.45347	0.38303	0.13991	0.01125	0.001894

(6a) UNCL(SRI LANKA)

Yr	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
71	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
72	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
73	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
74	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
75	0.16239	0.76048	0.068202	0.00873	0.000192	0
76	0.16239	0.76048	0.068206	0.00873	0.000192	0
77	0.16239	0.7605	0.068194	0.00873	0.000192	0
78	0.16239	0.76051	0.068184	0.00872	0.000192	0
79	0.16239	0.76049	0.068203	0.00872	0.000192	0
80	0.16239	0.76047	0.068213	0.00874	0.000192	0
81	0.16239	0.76047	0.068211	0.00873	0.000192	0
82	0.16239	0.76047	0.068213	0.00874	0.000192	0
83	0.16239	0.76045	0.068219	0.00874	0.000192	0
84	0.16239	0.7605	0.068196	0.00872	0.000191	0
85	0.16248	0.76032	0.068227	0.00878	0.000194	0
86	0.0431	0.88833	0.04392	0.02401	0.000502	0.000143
87	0.06748	0.83567	0.072383	0.02428	0.000171	0.0000187
88	0.16323	0.68553	0.089013	0.05712	0.004918	0.000189
89	0.32191	0.55329	0.07403	0.04702	0.003699	0.0000597
90	0.27307	0.50568	0.098084	0.11019	0.012945	0.0000306
91	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
92	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
93	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
94	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735
95	0.17188	0.7048	0.074276	0.04523	0.003738	0.0000735

(6b)UNCL (OMAN)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
71	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
72	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
73	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
74	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
75	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
76	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
77	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
78	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
79	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
80	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
81	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
82	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
83	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
84	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
85	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
86	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
87	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
88	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
89	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
90	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
91	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
92	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
93	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
94	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764
95	0.000525	0.31234	0.30131	0.15643	0.13963	0.089764

(6c) UNCL(YEMEN)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0.30463	0.34319	0.21979	0.084833	0.047558	0
71	0.30463	0.34319	0.21979	0.084833	0.047558	0
72	0.30463	0.34319	0.21979	0.084833	0.047558	0
73	0.30463	0.34319	0.21979	0.084833	0.047558	0
74	0.30463	0.34319	0.21979	0.084833	0.047558	0
75	0.30463	0.34319	0.21979	0.084833	0.047558	0
76	0.30463	0.34319	0.21979	0.084833	0.047558	0
77	0.30463	0.34319	0.21979	0.084833	0.047558	0
78	0.30463	0.34319	0.21979	0.084833	0.047558	0
79	0.30463	0.34319	0.21979	0.084833	0.047558	0
80	0.30463	0.34319	0.21979	0.084833	0.047558	0
81	0.30463	0.34319	0.21979	0.084833	0.047558	0
82	0.30463	0.34319	0.21979	0.084833	0.047558	0
83	0.30463	0.34319	0.21979	0.084833	0.047558	0
84	0.30463	0.34319	0.21979	0.084833	0.047558	0
85	0.30463	0.34319	0.21979	0.084833	0.047558	0
86	0.30463	0.34319	0.21979	0.084833	0.047558	0
87	0.30463	0.34319	0.21979	0.084833	0.047558	0
88	0.30463	0.34319	0.21979	0.084833	0.047558	0
89	0.30463	0.34319	0.21979	0.084833	0.047558	0
90	0.30463	0.34319	0.21979	0.084833	0.047558	0
91	0.30463	0.34319	0.21979	0.084833	0.047558	0
92	0.30463	0.34319	0.21979	0.084833	0.047558	0
93	0.30463	0.34319	0.21979	0.084833	0.047558	0
94	0.30463	0.34319	0.21979	0.084833	0.047558	0
95	0.30463	0.34319	0.21979	0.084833	0.047558	0

(7) HAND

AGE0	AGE1	AGE2	AGE3	AGE4	AGE5	YR
0.012444	0.77429	0.15105	0.05536	0.006862	0	70
0.012444	0.77429	0.15105	0.05536	0.006862	0	71
0.012444	0.77429	0.15105	0.05536	0.006862	0	72
0.012444	0.77429	0.15105	0.05536	0.006862	0	73
0.012444	0.77429	0.15105	0.05536	0.006862	0	74
0.012444	0.77429	0.15105	0.05536	0.006862	0	75
0.012444	0.77429	0.15105	0.05536	0.006862	0	76
0.012444	0.77429	0.15105	0.05536	0.006862	0	77
0.012444	0.77429	0.15105	0.05536	0.006862	0	78
0.012444	0.77429	0.15105	0.05536	0.006862	0	79
0.012444	0.77429	0.15105	0.05536	0.006862	0	80
0.012444	0.77429	0.15105	0.05536	0.006862	0	81
0.012444	0.77429	0.15105	0.05536	0.006862	0	82
0.012444	0.77429	0.15105	0.05536	0.006862	0	83
0.012444	0.77429	0.15105	0.05536	0.006862	0	84
0.012444	0.77429	0.15105	0.05536	0.006862	0	85
0.012444	0.77429	0.15105	0.05536	0.006862	0	86
0.012444	0.77429	0.15105	0.05536	0.006862	0	87
0.012444	0.77429	0.15105	0.05536	0.006862	0	88
0.004545	0.89091	0.05909	0.03636	0.009091	0	89
0.032787	0.9377	0.02623	0.00328	0	0	90
0.012444	0.77429	0.15105	0.05536	0.006862	0	91
0.012444	0.77429	0.15105	0.05536	0.006862	0	92
0	0.49425	0.36782	0.12644	0.011494	0	93
0	0.49425	0.36782	0.12644	0.011494	0	94
0	0.49425	0.36782	0.12644	0.011494	0	95

(8) LL

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0	0.00365	0.58394	0.39234	0.02007	0
71	0.000341	0.43801	0.24659	0.29802	0.01703	0
72	0	0.1664	0.7506	0.07454	0.00806	0.000403
73	0	0.03698	0.7892	0.15237	0.02145	0
74	0.024089	0.31254	0.45398	0.18345	0.02594	0
75	0	0.33236	0.53899	0.11988	0.00877	0
76	0	0.03443	0.5643	0.31623	0.08433	0.000703
77	0.000453	0.00272	0.30059	0.53871	0.15663	0.000905
78	0	0.13233	0.331	0.446	0.08588	0.004792
79	0	0.00085	0.29514	0.66934	0.03383	0.000846
80	0	0.01287	0.23316	0.57078	0.18092	0.002271
81	0.000632	0.11808	0.35386	0.44284	0.08324	0.001353
82	0.001069	0.1095	0.5105	0.30469	0.0647	0.009544
83	0.00053	0.07177	0.27899	0.49676	0.14481	0.007134
84	0.000189	0.03329	0.33053	0.47838	0.15111	0.006498
85	0.001457	0.07436	0.35659	0.43252	0.12963	0.005443
86	0.003053	0.07639	0.53101	0.35726	0.03165	0.000637
87	0.000035	0.02241	0.45715	0.48454	0.03476	0.001114
88	0.000144	0.04281	0.46846	0.44235	0.04089	0.005353
89	0.000637	0.14666	0.41887	0.38462	0.04769	0.00152
90	0.0004	0.07792	0.40411	0.47276	0.04347	0.001338
91	0.001968	0.05662	0.31953	0.54122	0.06798	0.012693
92	0.002329	0.25652	0.4116	0.30052	0.02721	0.001812
93	0.008947	0.15479	0.39643	0.38963	0.04789	0.002317
94	0.004245	0.07215	0.32213	0.51905	0.07955	0.002861
95	0.006879	0.23597	0.23886	0.36421	0.14988	0.004205

APPENDIX E

ANNUAL AVERAGE WEIGHT BY GEAR

BASICALLY, AVERAGE WEIGHTS ARE COMPUTED BY GEAR AND COUNTRY. HOWEVER, TABLES IN APPENDIX E LIST OVERALL AVERAGE (ALL COUNTRIES COMBINED).

(1) Pole & line

YR	AVE0	AVE1	AVE2	AVE3	AVE4	AVE5
70	1.93874	5.87357	21.2415	43.1886	73.8	105.1
71	1.93874	5.87357	21.2415	43.1886	73.8	105.1
72	1.93874	5.87357	21.2415	43.1886	73.8	105.1
73	1.93874	5.87357	21.2415	43.1886	73.8	105.1
74	1.93874	5.87357	21.2415	43.1886	73.8	105.1
75	1.93874	5.87357	21.2415	43.1886	73.8	105.1
76	1.93874	5.87357	21.2415	43.1886	73.8	105.1
77	1.93874	5.87357	21.2415	43.1886	73.8	105.1
78	1.93874	5.87357	21.2415	43.1886	73.8	105.1
79	1.93874	5.87357	21.2415	43.1886	73.8	105.1
80	1.93874	5.87357	21.2415	43.1886	73.8	105.1
81	1.93874	5.87357	21.2415	43.1886	73.8	105.1
82	1.93874	5.87357	21.2415	43.1886	73.8	105.1
83	1.93874	5.87357	21.2415	43.1886	73.8	105.1
84	1.93874	5.87357	21.2415	43.1886	73.8	105.1
85	1.76471	6.53507	21.2433	43.1886	73.8	105.1
86	1.88669	6.90999	20.951	43.1886	73.8	105.1
87	2.02746	5.89742	21.2433	43.1886	73.8	105.1
88	2.26578	5.93288	21.2433	43.1886	73.8	105.1
89	2.20212	6.27067	21.2433	43.1886	73.8	105.1
90	1.8303	6.9402	21.2433	43.1886	73.8	105.1
91	2.00396	6.10775	21.2433	43.1886	73.8	105.1
92	1.47949	4.6655	21.2433	43.1886	73.8	105.1
93	2.24328	6.8659	21.2433	43.1886	73.8	105.1
94	1.72625	3.95023	21.2433	43.1886	73.8	105.1
95	1.8961	4.5337	21.5155	43.1886	73.8	105.1

(2) Troll

YR	AVE0	AVE1	AVE2	AVE3	AVE4	AVE5
70	1.89296	6.44749	21.1459	43.1886	73.8	105.1
71	1.89296	6.44749	21.1459	43.1886	73.8	105.1
72	1.89296	6.44749	21.1459	43.1886	73.8	105.1
73	1.89296	6.44749	21.1459	43.1886	73.8	105.1
74	1.89296	6.44749	21.1459	43.1886	73.8	105.1
75	1.89296	6.44749	21.1459	43.1886	73.8	105.1
76	1.89296	6.44749	21.1459	43.1886	73.8	105.1
77	1.89296	6.44749	21.1459	43.1886	73.8	105.1
78	1.89296	6.44749	21.1459	43.1886	73.8	105.1
79	1.89296	6.44749	21.1459	43.1886	73.8	105.1
80	1.89296	6.44749	21.1459	43.1886	73.8	105.1
81	1.89296	6.44749	21.1459	43.1886	73.8	105.1
82	1.89296	6.44749	21.1459	43.1886	73.8	105.1
83	1.89296	6.44749	21.1459	43.1886	73.8	105.1
84	1.89296	6.44749	21.1459	43.1886	73.8	105.1
85	1.76471	6.53507	21.2433	43.1886	73.8	105.1
85	1.89296	6.44749	21.1459	43.1886	73.8	105.1
86	1.88669	6.90999	20.951	43.1886	73.8	105.1
86	1.89296	6.44749	21.1459	43.1886	73.8	105.1
87	2.02746	5.89742	21.2433	43.1886	73.8	105.1
87	1.89296	6.44749	21.1459	43.1886	73.8	105.1
88	1.89296	6.44749	21.1459	43.1886	73.8	105.1
89	1.89296	6.44749	21.1459	43.1886	73.8	105.1
90	1.89296	6.44749	21.1459	43.1886	73.8	105.1
91	1.89296	6.44749	21.1459	43.1886	73.8	105.1
92	1.89296	6.44749	21.1459	43.1886	73.8	105.1
93	1.89296	6.44749	21.1459	43.1886	73.8	105.1
94	1.89296	6.44749	21.1459	43.1886	73.8	105.1
95	1.89296	6.44749	21.1459	43.1886	73.8	105.1

(3) PS(FREE)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
82	2.22781	4.99217	24.5361	41.0516	64.7102	94.0253
83	2.20602	5.93697	23.5124	42.0656	63.974	94.0253
84	2.16225	5.75998	23.3491	44.9261	66.0745	96.1089
85	2.46195	5.953	25.491	46.2977	66.1859	92.531
86	2.45211	6.06734	23.2524	43.3305	66.3288	93.2879
87	2.27853	9.08237	22.3882	43.2558	65.1173	93.446
88	2.64913	6.08193	24.5027	44.2999	66.0647	94.5067
89	2.5695	6.56154	20.7034	44.5413	65.3346	95.1774
90	2.46378	5.26543	24.8199	42.3018	65.6072	93.1463
91	2.4215	4.60958	26.365	44.3549	66.41	96.0469
92	2.3725	6.56571	23.8747	45.8425	65.231	92.9655
93	2.14554	5.42345	24.445	44.8662	66.1115	94.0429
94	2.23972	4.30723	25.6372	46.662	66.8522	94.8473
95	2.36451	5.81187	24.2149	45.159	65.4527	93.5509

(4) PS (LOG)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
82	2.5582	5.70946	22.2094	37.7853	64.7648	94.0253
83	2.27614	5.14229	21.4425	42.2307	61.7831	94.0253
84	2.20919	4.61004	22.6417	44.6143	66.7727	95.9955
85	1.99273	4.94355	24.0182	41.6776	65.5408	93.6499
86	2.26423	5.40405	24.5381	40.135	65.7298	94.0253
87	2.34815	5.40305	22.2058	39.488	64.8735	94.0253
88	2.39072	4.21707	24.2556	40.9219	65.1514	93.08
89	2.23542	6.05404	21.3326	40.5093	63.08	94.0253
90	2.24521	5.08085	23.1071	41.9517	62.4234	94.0253
91	2.21231	4.78876	25.8237	39.1988	64.9718	94.0253
92	2.22804	4.80702	22.92	40.3641	65.1848	94.0253
93	2.21789	4.72074	23.3357	39.9977	65.0693	94.0253
94	2.32893	4.20247	25.218	43.9334	66.0895	94.0253
95	2.43724	5.11728	25.0319	40.1168	65.2725	93.4198

(5) GILL

YR	AVE0	AVE1	AVE2	AVE3	AVE4	AVE5
70	1.80807	11.0564	23.3748	44.3648	73.8	105.1
71	1.80807	11.0564	23.3748	44.3648	73.8	105.1
72	1.80807	11.0564	23.3748	44.3648	73.8	105.1
73	1.80807	11.0564	23.3748	44.3648	73.8	105.1
74	1.80807	11.0564	23.3748	44.3648	73.8	105.1
75	1.80807	11.0564	23.3748	44.3648	73.8	105.1
76	1.80807	11.0564	23.3748	44.3648	73.8	105.1
77	1.80807	11.0564	23.3748	44.3648	73.8	105.1
78	1.80807	11.0564	23.3748	44.3648	73.8	105.1
79	1.80807	11.0564	23.3748	44.3648	73.8	105.1
80	1.80807	11.0564	23.3748	44.3648	73.8	105.1
81	1.80807	11.0564	23.3748	44.3648	73.8	105.1
82	1.80807	11.0564	23.3748	44.3648	73.8	105.1
83	1.80807	11.0564	23.3748	44.3648	73.8	105.1
84	1.80807	11.0564	23.3748	44.3648	73.8	105.1
85	1.80807	11.0564	23.3748	44.3648	73.8	105.1
86	1.80807	11.0564	23.3748	44.3648	73.8	105.1
87	1.80807	11.0564	23.3748	44.3648	73.8	105.1
88	1.80807	11.0564	23.3748	44.3648	73.8	105.1
89	1.80807	8.0132	21.8404	44.3648	73.8	105.1
90	1.80807	11.0564	23.3748	44.3648	73.8	105.1
91	1.80807	11.0564	23.3748	44.3648	73.8	105.1
92	1.80807	9.4736	21.7364	44.3648	73.8	105.1
93	1.80807	11.0564	23.3748	44.3648	73.8	105.1
94	1.69943	10.9685	23.1088	44.5842	73.8	105.1
95	1.80807	11.441	24.2883	43.8543	73.8	105.1

(6a) UNCL(SRI LANKA)

YR	AVE0	AVE1	AVE2	AVE3	AVE4	AVE5
70	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
71	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
72	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
73	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
74	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
75	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
76	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
77	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
78	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
79	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
80	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
81	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
82	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
83	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
84	2.36501	6.70591	18.8837	40.4789	59.5658	94.0943
85	2.36476	6.70625	18.8859	40.4788	59.5727	94.0943
86	2.51195	6.53221	19.9599	40.607	63.4888	94.0943
87	2.68225	6.45852	19.3392	39.6419	65.7844	94.0943
88	2.1383	6.48093	21.9156	41.5317	64.1556	94.0943
89	1.82838	5.91302	22.166	41.8959	65.5313	94.0943
90	2.36675	6.35319	24.9854	43.8002	66.513	94.0943
91	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
92	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
93	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
94	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943
95	2.19982	6.48688	20.9314	42.0429	65.5583	94.0943

(6b) UNCL (OMAN)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
71	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
72	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
73	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
74	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
75	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
76	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
77	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
78	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
79	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
80	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
81	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
82	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
83	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
84	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
85	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
86	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
87	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
88	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
89	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
90	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
91	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
92	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
93	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
94	2.82248	8.39863	20.7113	42.6862	70.8042	105.1
95	2.82248	8.39863	20.7113	42.6862	70.8042	105.1

(6c) UNCL(YEMEN)

Not completed

(7) HAND

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
71	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
72	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
73	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
74	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
75	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
76	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
77	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
78	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
79	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
80	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
81	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
82	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
83	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
84	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
85	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
86	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
87	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
88	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
89	2.97448	8.46029	24.597	36.7145	63.0193	105.1
90	2.17434	7.44363	19.1388	34.8398	63.0193	105.1
91	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
92	2.24708	7.71214	21.0372	38.7663	63.0193	105.1
93	2.24708	7.1707	20.7134	39.3827	63.0193	105.1
94	2.24708	7.1707	20.7134	39.3827	63.0193	105.1
95	2.24708	7.1707	20.7134	39.3827	63.0193	105.1

(8) LL

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	2.21502	9.1496	28.7094	40.9721	66.6061	105.64
71	2.21502	10.2202	18.6029	44.828	66.6061	105.64
72	2.21502	11.6791	22.8266	41.4905	66.6061	105.64
73	2.21502	9.1496	25.8969	43.8933	66.6061	105.64
74	2.21502	5.5506	25.5269	45.8259	66.6061	105.64
75	2.21502	10.6591	27.3987	40.8877	66.6061	105.64
76	2.21502	9.1496	23.0861	42.8809	66.0551	105.64
77	2.21502	9.1496	22.1099	44.5233	67.8315	105.64
78	2.21502	12.5854	24.0277	42.2978	66.89	105.64
79	2.21502	9.1496	26.738	41.2543	66.6061	105.64
80	2.21502	9.1496	22.1232	43.8877	65.4763	105.64
81	2.21502	9.6635	22.9405	39.99	65.7043	105.64
82	2.21502	9.8417	21.7923	41.7316	68.2188	96.136
83	2.21502	9.865	23.5641	43.1397	67.2751	99.171
84	2.21502	9.836	24.1115	43.8066	66.9702	98.121
85	2.21502	9.5459	23.3281	42.2009	67.2086	98.052
86	2.10417	8.9354	24.188	40.3662	65.7964	105.64
87	2.21502	10.7764	24.4994	40.6582	64.2825	105.64
88	2.21502	8.8952	24.0272	40.5033	66.6102	112.734
89	2.21502	9.5053	23.0984	42.5733	66.7094	105.64
90	2.21502	9.5304	23.924	42.1891	65.6939	105.64
91	2.21502	8.7495	23.7696	43.4805	66.1347	118.578
92	2.21502	10.5118	21.6851	43.7495	63.924	105.64
93	2.25724	8.2237	22.287	40.8469	65.7533	125.557
94	2.13003	9.0904	21.994	40.7222	66.0025	119.076
95	2.2417	9.192	20.4299	44.2231	66.7354	96.067

APPENDIX F
ESTIMATED CATCH-AT-AGE MATRIX

(1) Pole and line

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	784186	63907	2238	554	30	1
71	471209	38401	1345	333	18	0
72	845648	68916	2414	597	32	1
73	2521253	205469	7197	1782	96	3
74	2191711	178613	6257	1549	84	3
75	1609347	131153	4594	1137	61	2
76	1953273	159181	5576	1380	75	3
77	1797221	146464	5130	1270	69	2
78	1400986	114173	3999	990	53	2
79	1609347	131153	4594	1137	61	2
80	1589732	129555	4538	1123	61	2
81	2224404	181277	6350	1572	85	3
82	1849529	150727	5280	1307	71	2
83	5020795	2853	0	0	0	0
84	5807891	1330	0	0	0	0
85	2524711	124204	15060	5212	160	0
86	1987939	128663	14872	5560	116	0
87	2147514	318188	9116	2087	226	0
88	1518134	467856	5632	969	81	0
89	1898907	252116	3221	0	0	0
90	1743046	221364	16310	3330	177	0
91	2919453	228408	13903	2182	255	0
92	5654793	10246	0	0	0	0
93	3209409	275515	29239	6101	510	89
94	6736615	318956	0	0	0	0

(2)Troll

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	122117	7520	367	90	0	0
71	245597	15124	738	181	0	0
72	241057	14845	724	178	0	0
73	252860	15572	760	186	0	0
74	290994	17920	874	215	0	0
75	247867	15264	744	183	0	0
76	323679	19933	972	239	0	0
77	274651	16914	825	203	0	0
78	327765	20185	985	242	0	0
79	412657	25413	1240	305	0	0
80	382241	23540	1148	282	0	0
81	357727	22030	1075	264	0	0
82	382241	23540	1148	282	0	0
83	689688	29858	1457	358	0	0
84	703074	29271	1428	351	0	0
85	359043	15308	1046	257	0	0
86	144490	6229	456	110	0	0
87	143422	7785	480	118	0	0
88	165889	10003	620	152	0	0
89	659483	36567	2398	589	0	0
90	703638	29300	2127	523	0	0
91	694602	35984	2299	565	0	0
92	2325012	116414	5681	1397	0	0
93	1515712	78193	5616	1381	0	0
94	2335302	161135	6658	1637	0	0
95	1917852	126645	5930	1477	0	0

(3) PS(FREE)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0	0	0	0	0	0
71	0	0	0	0	0	0
72	0	0	0	0	0	0
73	0	0	0	0	0	0
74	0	0	0	0	0	0
75	0	0	0	0	0	0
76	0	0	0	0	0	0
77	0	0	0	0	0	0
78	0	0	0	0	0	0
79	0	0	0	0	0	0
80	0	0	0	0	0	0
81	0	0	0	0	0	0
82	42366	9553	14239	6188	193	0
83	259895	388279	74587	60828	2138	0
84	9279968	1221005	239420	270382	60595	299
85	4504671	2100256	69781	287514	79660	750
86	4229331	2567762	382244	333356	47692	458
87	3038327	935493	637933	407413	34860	317
88	6960900	2769056	702834	755606	97762	726
89	2774066	3470548	469522	188232	26746	310
90	7649657	2835346	904259	721124	51905	131
91	5003705	2750648	748074	913999	105541	2467
92	7503796	1992735	318173	860306	127893	1557
93	9918397	2000516	979432	753405	132464	1447
94	11219242	3242668	338995	666790	155215	2827
95	9206013	5845119	748969	594543	67373	327

(4) PS (LOG)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0	0	0	0	0	0
71	0	0	0	0	0	0
72	0	0	0	0	0	0
73	0	0	0	0	0	0
74	0	0	0	0	0	0
75	0	0	0	0	0	0
76	0	0	0	0	0	0
77	0	0	0	0	0	0
78	0	0	0	0	0	0
79	0	0	0	0	0	0
80	0	0	0	0	0	0
81	0	0	0	0	0	0
82	150021	8133	1295	157	0	0
83	751960	310544	9608	2114	67	0
84	3471902	510228	23354	15864	3436	52
85	5815506	776387	23206	7301	1251	6
86	2733103	897057	58857	43077	1245	8
87	3607169	1704658	177112	44730	1600	6
88	5649877	1343863	36275	14179	452	8
89	7736465	1827601	166828	28044	1108	0
90	4578158	2452322	41285	15556	255	0
91	10560388	1768755	47434	34983	1591	1
92	10500416	4331026	220555	37040	1107	0
93	12109510	2704192	266956	50372	1022	0
94	8237857	2268888	86208	28869	6157	22
95	6566691	3037400	236615	37718	785	30

(5) GILL

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	29981	59582	58544	9777	572	101
71	24455	48602	47754	7975	466	83
72	29164	57959	56949	9511	556	99
73	22928	45567	44772	7477	437	77
74	31444	62491	61402	10255	600	106
75	34700	68961	67759	11317	662	117
76	32558	64704	63576	10618	621	110
77	29090	57812	56804	9487	555	98
78	16947	33679	33093	5527	323	57
79	29291	58212	57198	9553	559	99
80	13521	26872	26403	4409	258	45
81	20765	41267	40548	6772	396	70
82	81933	335162	157794	27643	1558	208
83	69386	324596	133110	23628	1318	159
84	52614	237449	101046	17870	999	124
85	67239	292157	129277	22777	1278	163
86	49483	168538	95732	16513	942	139
87	53408	136391	92095	11099	719	0
88	46332	418157	173074	54664	1265	1680
89	96416	1044815	252653	95338	5940	0
90	265690	634052	182511	22861	2402	0
91	87553	840585	311557	53053	3582	0
92	176394	1410258	523543	51505	2253	0
93	216789	1579652	364446	68902	3732	281
94	389596	2239059	424548	68902	4843	286
95	161581	1938410	406243	97508	3925	217

(6a) UNCL (SRI LANKA)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	453172	630172	20581	6239	330	4
71	367226	510656	16678	5056	267	3
72	507865	706227	23065	6992	370	5
73	398479	554117	18097	5486	290	3
74	441141	637967	23875	6782	380	4
75	453948	749713	23876	1426	21	0
76	474810	784194	24976	1491	22	0
77	392751	648690	20656	1233	18	0
78	368654	608893	19386	1156	17	0
79	423379	699261	22269	1328	19	0
80	474186	783162	24946	1490	22	0
81	526106	868895	27676	1653	24	0
82	0	0	0	0	0	0
83	0	0	0	0	0	0
84	0	0	0	0	0	0
85	0	0	0	0	0	0
86	0	0	0	0	0	0
87	0	0	0	0	0	0
88	0	0	0	0	0	0
89	0	0	0	0	0	0
90	0	0	0	0	0	0
91	0	0	0	0	0	0
92	0	0	0	0	0	0
93	312	434	14	4	0	0
94	546	760	24	7	0	0
95	390	543	17	5	0	0

(6b) UNCL(OMAN)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0	0	0	0	0	0
71	0	0	0	0	0	0
72	0	0	0	0	0	0
73	0	0	0	0	0	0
74	0	0	0	0	0	0
75	0	0	0	0	0	0
76	0	0	0	0	0	0
77	0	0	0	0	0	0
78	0	0	0	0	0	0
79	0	0	0	0	0	0
80	0	0	0	0	0	0
81	0	0	0	0	0	0
82	0	0	0	0	0	0
83	0	0	0	0	0	0
84	0	0	0	0	0	0
85	416	83191	32544	8197	4411	1910
86	468	93716	36661	9234	4969	2152
87	1086	217257	84990	21408	11520	4989
88	2879	575870	225278	56747	30537	13225
89	3138	627637	245529	61848	33283	14414
90	2619	523768	204896	51613	27774	12028
91	1673	334551	130875	32967	17740	7683
92	2495	499038	195221	49176	26463	11460
93	2117	423433	165645	41725	22454	9724
94	2589	517707	202525	51015	27453	11889
95	3349	669698	261983	65993	35513	15380

(6c) UNCL(YEMEN)

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0	0	0	0	0	0
71	0	0	0	0	0	0
72	0	0	0	0	0	0
73	0	0	0	0	0	0
74	0	0	0	0	0	0
75	0	0	0	0	0	0
76	0	0	0	0	0	0
77	0	0	0	0	0	0
78	0	0	0	0	0	0
79	0	0	0	0	0	0
80	562	285	80	19	7	0
81	421	213	60	14	5	0
82	175	89	25	6	2	0
83	1546	783	222	53	20	0
84	7801	3955	1123	270	102	0
85	83180	42169	11978	2884	1091	0
86	28956	14679	4170	1004	379	0
87	18238	9246	2626	632	239	0
88	57210	29003	8238	1983	750	0
89	23439	11882	3375	812	307	0
90	24423	12381	3517	846	320	0
91	27094	13735	3901	939	355	0
92	26286	13326	3785	911	344	0
93	28253	14323	4068	979	370	0
94	28253	14323	4068	979	370	0
95	28113	14252	4048	974	368	0

(7) Hand

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	1107	20079	1435	285	21	0
71	1107	20079	1435	285	21	0
72	1107	20079	1435	285	21	0
73	1107	20079	1435	285	21	0
74	1384	25099	1794	357	27	0
75	1107	20079	1435	285	21	0
76	830	15059	1076	214	16	0
77	996	18071	1292	257	19	0
78	1107	20079	1435	285	21	0
79	1262	22890	1637	325	24	0
80	2530	45882	3281	652	49	0
81	5864	106322	7603	1512	115	0
82	3477	63050	4508	896	68	0
83	1295	23493	1680	334	25	0
84	725	13152	940	187	14	0
85	924	16766	1199	238	18	0
86	841	15260	1091	217	16	0
87	841	15260	1091	217	16	0
88	1096	19878	1421	282	21	0
89	3244	223561	5100	2102	306	0
90	32902	274875	2990	205	0	0
91	11768	213347	15257	3034	231	0
92	7415	134433	9613	1912	145	0
93	0	94705	24398	4411	250	0
94	0	108973	28074	5075	288	0
95	0	108835	28038	5069	287	0

(8) LL

YR	AGE0	AGE1	AGE2	AGE3	AGE4	AGE5
70	0	7500	382468	180061	5666	0
71	3655	1018932	315153	158060	6078	0
72	0	330913	763738	41724	2809	88
73	0	59784	450751	51344	4763	0
74	182052	942579	297712	67012	6519	0
75	0	429296	270843	40367	1813	0
76	0	46309	300775	90745	15709	81
77	7052	10244	469143	417526	79683	295
78	0	269932	353663	270703	32962	1164
79	0	1396	166808	245189	7674	120
80	0	15909	119206	147104	31254	243
81	4572	195879	247277	177522	20310	205
82	13881	320029	673841	210019	27280	2855
83	5801	176414	287091	279220	52193	1744
84	1446	57425	232591	185286	38283	1123
85	14133	167334	328366	220171	41435	1192
86	52929	311927	800973	322909	17548	220
87	544	72295	648752	414345	18798	366
88	2296	169696	687539	385134	21645	1674
89	6928	371945	437165	217791	17233	346
90	6464	292347	603987	400681	23661	453
91	20751	151134	313983	290732	24007	2500
92	57715	1339397	1041784	377022	23362	941
93	546557	2595371	2452658	1315293	100423	2544
94	99992	398266	734902	639550	60478	1205
95	128376	1073896	489090	344529	93951	1831