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Contents

Introduction

Staff of the National Institute of Water and Atmospheric Research (NIWA) and, formerly, MAF Fisheries have sampled the length and age compositions of snapper from commercial landings in port (market sampling) intermittently since 1963 (Davies *et al.* 1993). In the 1988–89 fishing year, a structured sampling programme was designed to establish a time series of length and age composition data for the main snapper fisheries in east and west coast stocks, namely SNA 1 and SNA 8. Because of heterogeneity in snapper biology and fishing patterns, SNA 1 is often further subdivided into three substocks: East Northland, Hauraki Gulf, and Bay of Plenty. The time series of length and age information has been summarised in three previous reports for the periods 1988–94, 1994–95, and 1995–96 (Davies & Walsh 1995, Walsh *et al.* 1995, 1997). This report presents the results of market sampling between October 1996 and February 1997, thus continuing the time series. Funding for this project (AKMS01) was provided by the Ministry of Fisheries, New Zealand.

Objective

The objective of the market sampling programme has remained largely unchanged since the programme was established and is as follows.

> To determine the commercial length frequency and age structure of the 4 snapper substocks that comprise SNA 1 and 8 for use in stock assessment models, by market sampling.

The programme may also support other snapper stock assessment programmes that require length and age composition information, e.g., daily egg production method and tagging programme studies for estimating stock biomass. However, no support function was required during the sampling programme in 1996–97.

Methods

Landings from the snapper fishery were stratified hierarchically by stock or substock, fishing method, and quarterly season, e.g., East Northland – longline – spring. The stock and substocks correspond to the four areas: west coast, Hauraki Gulf, Bay of Plenty, and East Northland (Figure 1). Fishing methods sampled were longline (BLL) for the east coast substocks and single trawl (BT) for the west coast stock. Quarterly season strata were defined as spring (September–November), summer (December–February), autumn (March–May), and winter (June–August). The percentage of snapper catch taken by particular methods in each of the stock and substock strata for 1996–97 is given in Table 1, illustrating the dominant methods in respective stock and substock strata during the period of sampling. The total number of landings in certain method–season fisheries, supplied by the Ministry of Fisheries (Tables 2–5), appear to be low relative to the landed weight and the number of landings in previous years and should be treated with caution. Samples were collected in spring and summer when most of the snapper stock becomes vulnerable to fishing. West coast single trawl samples encompass the spring season only.

A two-stage sampling procedure was used to obtain length frequencies (West 1978). The random selection of landings and a random sample of bins within landings represent the first and second stages respectively. The procedure for obtaining a random sample for length frequency was modified to account for the grading of fish according to length and quality by employing a stratified random sampling of bins within a landing (Davies *et al.* 1993). All fish in bins making up the sample were measured to the nearest centimetre below the fork length. As snapper show no differential growth

between sexes (Paul 1976), sex was not determined. A detailed description of the sampling design was given by Davies & Walsh (1995).

Two methods were employed for the collection of otoliths from landings in particular stock and substock areas. Otoliths were collected as a random proportional sample of commercial landings from the Bay of Plenty substock. The proportional allocation for each length class interval was made according to the longline length distribution as estimated for the previous year. To allow for annual variability in the abundance of fish in the 25–27 cm size range, a fixed sample size of about 20 otoliths was obtained per interval. Otoliths from the Bay of Plenty were collected from longline, single trawl, Danish seine, and set net landings to produce an age-length key as described by Davies & Walsh (1995).

The second approach for collecting otoliths was called the random age frequency sampling method (Davies *et al.* unpublished results) and was used for the East Northland and Hauraki Gulf longline fisheries, and the west coast single trawl fishery. The age frequency sample was collected by taking random otolith subsamples from the length frequency samples. This was achieved by selecting fish at regular intervals from each bin sampled for length frequency. The selection interval was set to achieve sample sizes of 40–60 fish from each west coast single trawl landing and 20–40 fish from each East Northland and Hauraki Gulf longline landing. The size of the selection interval between fish in the random subsample was determined from a simulation exercise using data from historical length and age samples. An interval range that achieved a desired level of precision in catch-at-age estimates for an expected number of landings to be sampled was calculated. This range was weighted according to the expected mean number of fish in a bin and the total number of bins in the landing. Given the expected length sampling regime it was likely that between 600 and 800 otoliths would be collected from each fishery, which is an acceptable sample size for the desired precision in estimates of catch-at-age.

A standardised procedure for reading otoliths was followed (Davies & Walsh 1995). Age was defined as whole years from a nominal birth date of 1 January as described by Davies & Walsh (1995), e.g., the 1989 year class was 8 years old when sampled in 1996–97 (aged to 1 January 1997). Age-length keys were derived from the age data collected in each stock and substock area and were assumed to be representative of the seasonal strata of the sample. However, fish in the larger length classes were infrequently sampled and are therefore poorly described by age samples which are small relative to the length samples.

The main assumption that must be satisfied for an otolith sample to be used for deriving an age-length key is that the sample was taken randomly from within each length class (Southward 1976). Given that the random age frequency otolith subsample was collected randomly from the larger length frequency sample of snapper in landings, it can be assumed that individual fish sampled for age were random observations from within each length interval if the length frequency sample was collected in a strictly random manner. Consequently, proportional allocation age-length keys were derived from the random age frequency otolith samples for the East Northland, Hauraki Gulf, and west coast stocks.

The calculation of stratum proportions and variances at length and age from the length frequency samples and age-length keys followed that of Davies & Walsh (1995). The calculation of mean weight at age and variances from the length frequency samples and age-length keys followed that of Quinn II *et al.* (1983). Proportions at age and mean weight at age were calculated for the range of age classes recruited to each stratum, with the maximum age being an aggregate of all age classes over 19 years.

Proportion at age estimates for the East Northland and Hauraki Gulf longline and west coast single trawl fisheries were also calculated from the random age frequency samples from each landing. Essentially, a weighted mean proportion at age for all landings in the sample based on the estimated age frequency, and weighted by the estimated number of fish, in each individual landing was determined. The proportion at age distributions and variances derived from the random age frequency and age length key methods were compared visually for bias and large differences in precision.

Snapper length and age data were stored on the *market* and *age* databases respectively within the NIWA fisheries research databases.

Results

Sample collections

Summaries of the length frequency sample sizes for stock-method-season strata are given in Tables 2–5, and summaries of the otolith sample collections in Table 6. Catch data are provided in Tables 2–5 for all seasons from autumn 1996 to summer 1996–97 to illustrate seasonal patterns in the fisheries. The west coast snapper fishery was mainly concentrated over the spring and summer seasons and fisheries in SNA 1 were more spread over the entire year.

Length and age distributions

Catch-at-age compositions were derived from the combined spring and summer length distributions to compare stock and method strata and identify year class strengths. However, otoliths were not collected consistently in either spring or summer. In combining the seasonal data it is assumed that an age-length key collected from spring and/or summer can be applied to the combined spring and summer length data. Because the growth of snapper over 25 cm long is not considerable between spring and summer, this assumption is probably valid for broad comparisons. This assumption has been accepted for other species with growth rates comparable to snapper (Westrheim & Ricker 1978).

Sample length and age distributions for the 1996–97 season are presented as histograms of length and age compositions for stock-method strata (Figures 2–9). Age distributions derived from both the age-length key and random age frequency approaches are given for the west coast, Hauraki Gulf, and East Northland (Figures 3, 5, and 9). The estimated proportions at length, age, and mean weight at age for the stock-method-season strata are shown in Appendices 1, 2, and 3 respectively. The age-length keys for the stock and substocks are presented in Appendix 4.

The estimated total number of fish caught in a stock-method-season stratum was calculated from the reported total weight landed and the mean fish weight derived from stratum length composition (Appendix 1). Because mean weight is specific to each season, the estimated total number of fish caught for the spring-summer combined stratum may not correspond exactly to the sum of the individual season estimates.

West coast snapper (SNA 8)

The length distribution of the single trawl catch was characterised by one mode which peaked at 32 cm with a broad tail extending to over 60 cm (Figure 2). The mean length of snapper sampled from the fishery was 36.2 cm.

Relative year class strengths were discernible from the age compositions, with the 1993 and 1991 year classes (4 and 6 year olds respectively) appearing strong and the 1992 and 1990 year classes (5 and 7 year olds) particularly weak. No large differences in proportions at age and precision were visible between the age compositions derived from the age-length key and random age frequency approaches. A mean age of snapper from the west coast single trawl fishery of 5.6 years was derived from both the age-length key and random age frequency approaches (Figure 3).

East coast snapper (SNA 1)

Hauraki Gulf

The length distribution of the Hauraki Gulf longline fishery was characterised by a strong mode between 28 and 34 cm with a long tail extending to over 65 cm (Figure 4). The mean length of snapper sampled from the fishery was 34.9 cm.

The Hauraki Gulf longline age distribution was dominated by a strong 1989 year class (8 year olds) (Figure 5). The 1991 and 1981 year classes (6 and 16 year olds, respectively) were also clearly evident with the former apparently not yet fully recruited as it contained a large proportion of 25 cm fish (*see* Appendix 4). No large differences in proportions at age and precision were visible between the age compositions derived from the age-length key and random age frequency approaches. The mean ages of snapper in the Hauraki Gulf longline fishery were 9.2 and 9.1 years for the age-length key and random age frequency approaches, respectively.

Bay of Plenty

The length distribution of the Bay of Plenty longline fishery was characterised by a strong mode between 28 and 34 cm with a tail extending to over 55 cm (Figure 6). The mean length of snapper sampled from the fishery was 33.3 cm.

The longline age distribution consisted mainly of fish less than 14 years old with a mean age of 7.6 years. Most evident were the strong 1991 and 1989 year classes (6 and 8 year olds, respectively) and weak 1987 year class (10 year olds) (Figure 7). The 1991 year class had not yet fully recruited to the fishery.

East Northland

The East Northland longline length distribution showed a broad tail, extending from a mode centred around 32 cm to over 65 cm, with the mean length being 37.0 cm (Figure 8).

The age distributions were broad and characterised by a relatively high proportion of fish 20 years and older with comparatively high mean ages of 10.2 and 10.3 years derived from the age-length key and random age frequency approaches, respectively (Figure 9). Several peaks in the age distributions

indicate strong year classes from 1989, 1986, 1985, 1982, and 1981 which correspond to 8, 11, 12, 15, and 16 year old fish. No large differences in proportions at age and precision were visible between the age compositions derived from the age-length key and random age frequency approaches.

Discussion

The relative year class strengths inferred from the length and age distributions sampled from the SNA 1 and SNA 8 fisheries in the 1996–97 season are consistent with trends observed in previous years (McKenzie *et al.* 1992, Davies & Walsh 1995, Walsh *et al.* 1995, 1997). In 1996–97, however, it was not possible to sample from all sectors of the fishing industry thus reducing the range of fisheries that could be monitored. Consequently, no length frequency samples could be collected from the Hauraki Gulf and Bay of Plenty single trawl fisheries and the west coast pair trawl fishery. Of the fisheries remaining, in some instances not all landings were accessible for sampling. Therefore, estimates of proportion at length and age may not be as representative of entire fisheries as those from previous years, especially in the East Northland longline and west coast single trawl fisheries. The Bay of Plenty and Hauraki Gulf longline fisheries were not affected.

The west coast single trawl age distribution shows the strong recruitment of the 1993 year class (4 year olds) into the fishery. Combined with the fully recruited 1991 year class (6 year olds), these two year classes accounted for over 60% of snapper in single trawl landings in 1996–97. Inferred year class strengths of the older age classes (7–13 years) appear to have declined in their respective dominance as a direct result of the relatively strong 1991 and 1993 year classes. The 1985 and 1986 year classes which were dominant in the early 1990s now account for less than 5% of the 1996–97 single trawl catch. Mean length and age of snapper in the 1996–97 west coast single trawl fishery have increased substantially from last year. This is likely to be a direct result of the growth of the recently recruited strong year classes (Davies 1997).

The 1996–97 Hauraki Gulf longline length distribution appears to have changed little from recent years. Relative year class strengths inferred from the 1996–97 longline age distribution, and those of previous years (Davies & Walsh 1995, Walsh *et al.* 1995, 1997), are generally consistent with those predicted from the temperature-recruitment relationship and trawl surveys of 1 year old snapper (Francis *et al.* 1995, 1997). The strong 1989 year class now accounts for about 25% of the Hauraki Gulf longline catch. The strong 1981 year class (16 year olds) is still clearly evident. Although incompletely recruited, the 1991 year class appears stronger relative to the 1990 year class in the Hauraki Gulf longline proportion at age distribution (Figure 5). This relative difference in year class strength may not be significant given the precision of the proportions at age for these year classes (*c.v.*s between 7 and 12 %). However, this difference indicates a discrepancy with the year class strength indices from the published temperature-recruitment relationship that predicts the 1990 year class to be of similar strength to the 1989 year class, i.e., above average, and the 1991 year class to be of below average strength.

The Bay of Plenty length distribution displayed characteristically narrower ranges than those in the Hauraki Gulf and East Northland substocks. The similar age distributions in the Bay of Plenty and Hauraki Gulf substocks may be indicative of consistency in recruitment patterns. Most of the Bay of Plenty length and age samples were collected from the western side of the bay, i.e., the side nearest the Hauraki Gulf. The 1989 year class accounted for 25% of the snapper caught by longline in the Bay of Plenty in 1996–97. The 1991 year class appeared stronger in the Bay of Plenty than in the Hauraki Gulf and is probably a result of the faster growth rates exhibited by snapper in the Bay of Plenty (authors' unpublished data).

As in previous years, the distribution at age of the East Northland longline landings was characterised by a comparatively high proportion of fish over 20 years of age and a broad distribution of fish in older age classes. This may be attributable to this substock's relatively healthy state compared with that of the other east coast substocks (Annala & Sullivan 1996). As in previous years, the 1982 year class was strong in the East Northland substock.

Only small differences were evident in the proportion at age estimates derived from the age-length key and random age frequency approaches. This confirms the similar results obtained with comparisons of the age distributions from the two approaches carried out for the west coast and Hauraki Gulf fisheries in 1995–96 (Davies *et al.* unpublished results). The age-length key approach generally produced age distributions with slightly lower estimated variance, though comparable precision was obtained for the random age frequency distributions. The random age frequency sampling approach was considered to be more cost effective and otolith sample sizes could be increased to improve precision. When the collection of length frequency data is not of priority, the random age frequency sampling approach is recommended for the estimation of snapper proportion at age.

Since 1989–90, broad similarities in relative year class strengths have been evident between the SNA 1 substocks, particularly in extremely strong and weak year classes (Davies & Walsh 1995, Walsh *et al.* 1995, 1997). For example, the strong 1981 year class is evident in both the East Northland and Hauraki Gulf distributions and, historically, in the Bay of Plenty as are the very weak 1983 and strong 1989 year classes. Some exceptions are evident, however, with the 1982 year class being strong only in the East Northland substock age distribution. In the Hauraki Gulf and East Northland substocks, the relative strengths of the 1985 and 1986 year classes appear to have fluctuated over time.

In general, there have been few similarities in relative year class strengths between the SNA 1 and SNA 8 stocks since 1989–90.

Conclusions

1. The length and age distributions sampled from the SNA 1 and SNA 8 fisheries in the 1996–97 season were generally consistent with trends observed in previous years.

2. Strong 1991 and 1993 year classes were evident in the west coast stock.

3. There were broad similarities in the recruitment patterns of the east coast substocks. The 1989 year class was particularly strong. Few similarities in recruitment patterns exist between the SNA 1 and SNA 8 stocks.

4. The age-length key and random age frequency approaches produced similar proportion at age estimates.

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Table 1: **Percentage of snapper catch by fishing method for the stock and substocks in SNA 1 and SNA 8 for the 1996–97 fishing year***

	BPT	BT	BLL	DS	Other
West coast	14	77	3	0	6
Hauraki Gulf	0	18	48	20	14
Bay of Plenty	22	25	24	24	5
East Northland	10	12	71	1	6

* BLL, longline; BT, single trawl; BPT, pair trawl; DS, Danish seine.
1996–97 represents 01/10/96 to 28/02/97 only.

Table 2 : **Summary of the catch (total number and weight of landings) and samples (number of landings and weight sampled, and number of fish measured) in method–season strata for the west coast snapper fisheries from autumn 1996 to summer 1996–97***

		Number of landings			No. of fish	Weight of landings (t)		
Method	Season	Total	Sampled	% of total	measured	Total	Sampled	% of total
BPT	Autumn	8	0	0	0	32	0	0
	Winter	6	0	0	0	10	0	0
	Spring	5	0	0	0	82	0	0
	Summer	8	0	0	0	81	0	0
BT	Autumn	119	0	0	0	183	0	0
	Winter	59	0	0	0	74	0	0
	Spring	95	9	9.5	8 591	426	53	12.4
	Summer	120	0	0	0	391	0	0

* BPT, pair trawl; BT, single trawl.

Table 3 : **Summary of the catch (total number and weight of landings) and samples (number of landings and weight sampled, and number of fish measured) in method–season strata for the Hauraki Gulf snapper fisheries from autumn 1996 to summer 1996–97***

		Number of landings			No. of fish	Weight of landings (t)		
Method	Season	Total	Sampled	% of total	measured	Total	Sampled	% of total
BLL	Autumn	1 014	0	0	0	262	0	0
	Winter	637	0	0	0	130	0	0
	Spring	909	16	1.8	3 449	319	7	2.2
	Summer	1 001	30	3.0	5 925	318	14	4.4
BT	Autumn	15	0	0	0	147	0	0
	Winter	8	0	0	0	31	0	0
	Spring	5	0	0	0	98	0	0
	Summer	10	0	0	0	198	0	0
DS	Autumn	100	0	0	0	94	0	0
	Winter	28	0	0	0	10	0	0
	Spring	84	0	0	0	57	0	0
	Summer	163	0	0	0	192	0	0

* BLL, longline; BT, single trawl; DS, Danish seine.

Table 4: **Summary of the catch (total number and weight of landings) and samples (number of landings and weight sampled, and number of fish measured) in method–season strata for the Bay of Plenty snapper fisheries from autumn 1996 to summer 1996–97***

Method	Season	Number of landings			No. of fish measured	Weight of landings (t)		
		Total	Sampled	% of total		Total	Sampled	% of total
BLL	Autumn	433	0	0	0	126	0	0
	Winter	333	0	0	0	113	0	0
	Spring	260	20	7.7	3 958	87	6	6.9
	Summer	247	26	10.5	4 510	63	5	7.9
BT	Autumn	14	0	0	0	70	0	0
	Winter	18	0	0	0	63	0	0
	Spring	14	0	0	0	76	0	0
	Summer	29	0	0	0	78	0	0
DS	Autumn	28	0	0	0	26	0	0
	Winter	50	0	0	0	58	0	0
	Spring	71	0	0	0	118	0	0
	Summer	30	0	0	0	39	0	0

* BLL, longline; BT, single trawl; DS, Danish seine.

Table 5: **Summary of the catch (total number and weight of landings) and samples (number of landings and weight sampled, and number of fish measured) in method–season strata for the East Northland snapper fishery from autumn 1996 to summer 1996–97***

Method	Season	Number of landings			No. of fish measured	Weight of landings (t)		
		Total	Sampled	% of total		Total	Sampled	% of total
BLL	Autumn	830	0	0	0	213	0	0
	Winter	981	0	0	0	241	0	0
	Spring	867	13	1.5	2 322	298	5	1.7
	Summer	763	40	5.2	6 313	264	13	4.9

* BLL, longline.

Table 6: **Details of snapper otolith samples collected in 1996–97 from the stock and substocks in SNA 1 and SNA 8***

Area	Fishing method	Sampling period	Sample method	Length range (cm)	No. aged
WCNI	BT	Spring	R	24–67	1 006
HAGU	BLL	Spring, summer	R	23–64	962
BPLE	BLL, BT, DS, SN	Spring, summer	SR	24–69	748
ENLD	BLL	Spring, summer	R	26–65	1 019

* BPLE, Bay of Plenty; ENLD, East Northland; HAGU, Hauraki Gulf; WCNI, west coast North Island.

BLL, longline; BT, single trawl; DS, Danish seine; SN, set net.

R, random sample; SR, stratified random sample.

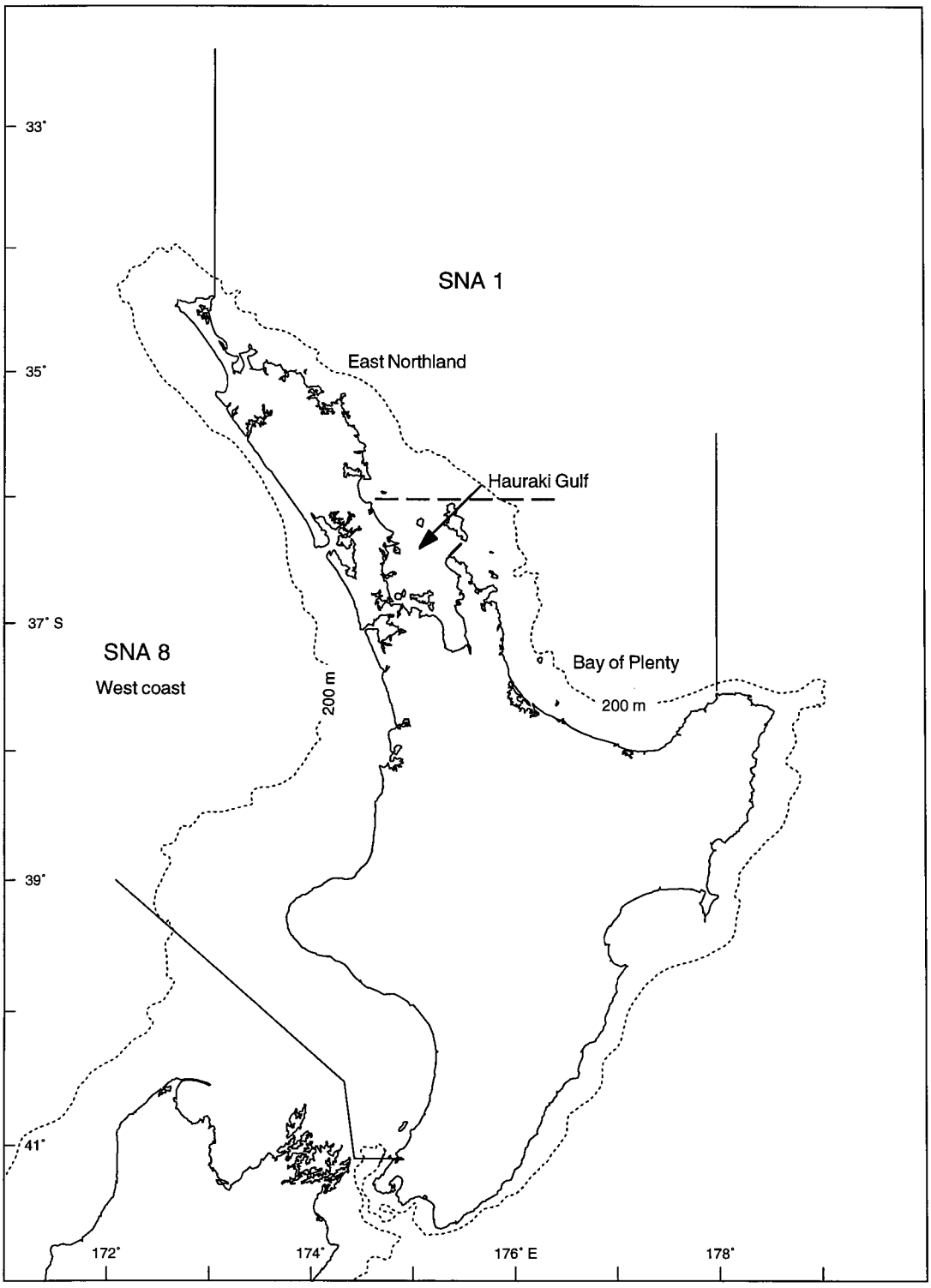

Figure 1: The quota management areas for the east and west coast snapper stocks (SNA 1 and SNA 8 respectively) and the range of the three SNA 1 substocks; East Northland, Hauraki Gulf, and Bay of Plenty.

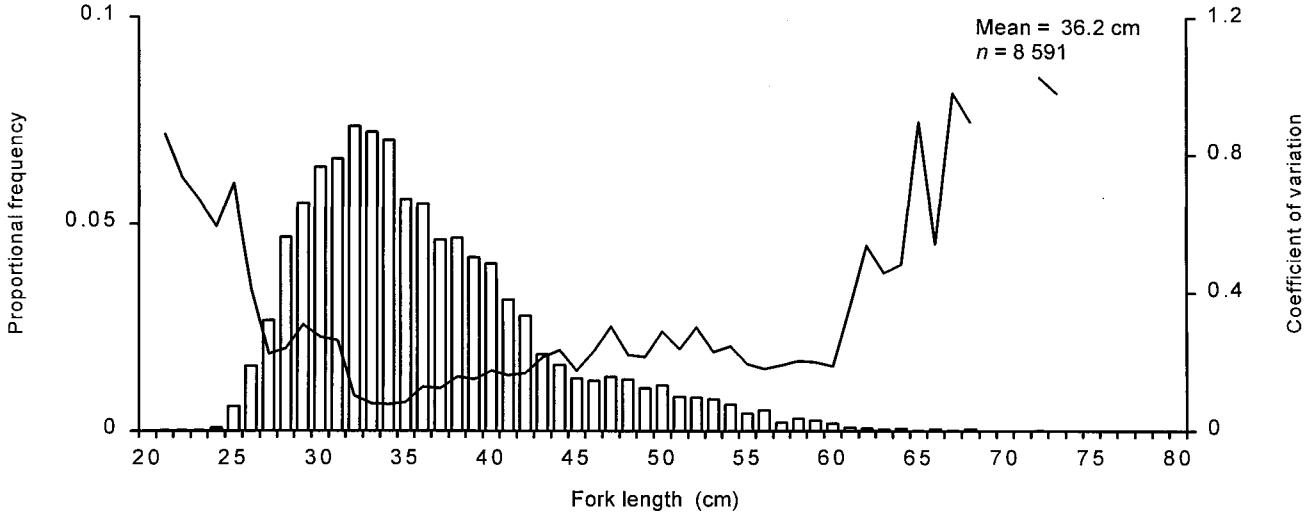

Figure 2: Proportion at length distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the west coast single trawl fishery in 1996–97 (*n* denotes length sample size).

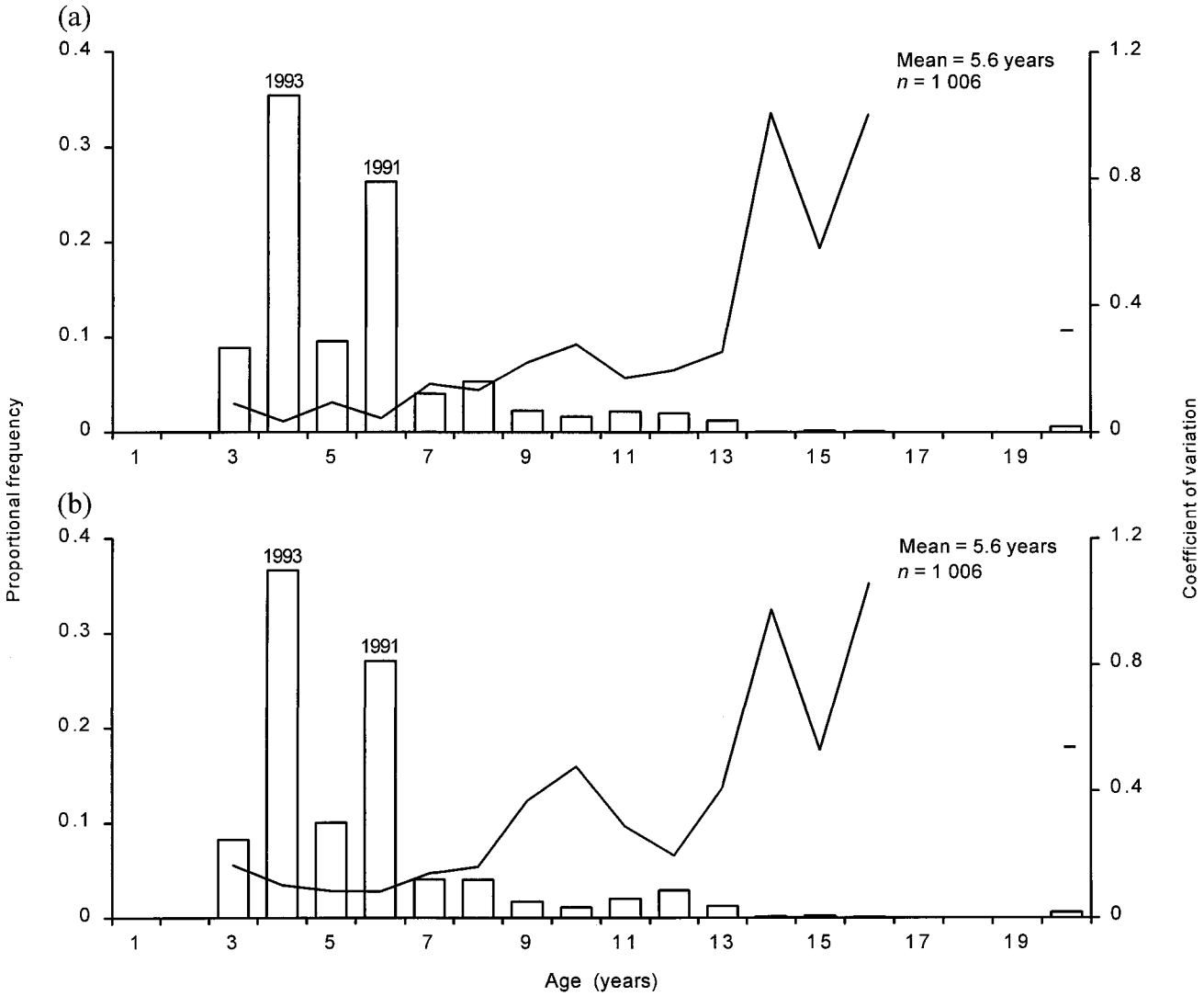

Figure 3: Proportion at age distributions (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the west coast single trawl fishery in 1996–97 (*n* denotes otolith sample size) (a) using age-length key and (b) random age frequency approach.

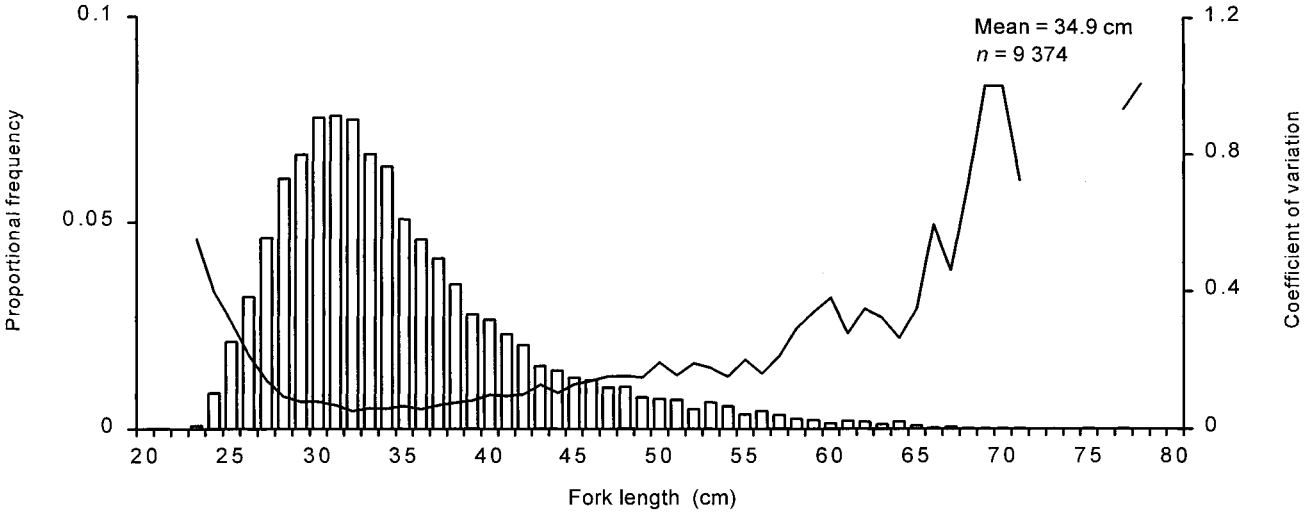

Figure 4: Proportion at length distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the Hauraki Gulf longline fishery in 1996–97 (*n* denotes length sample size).

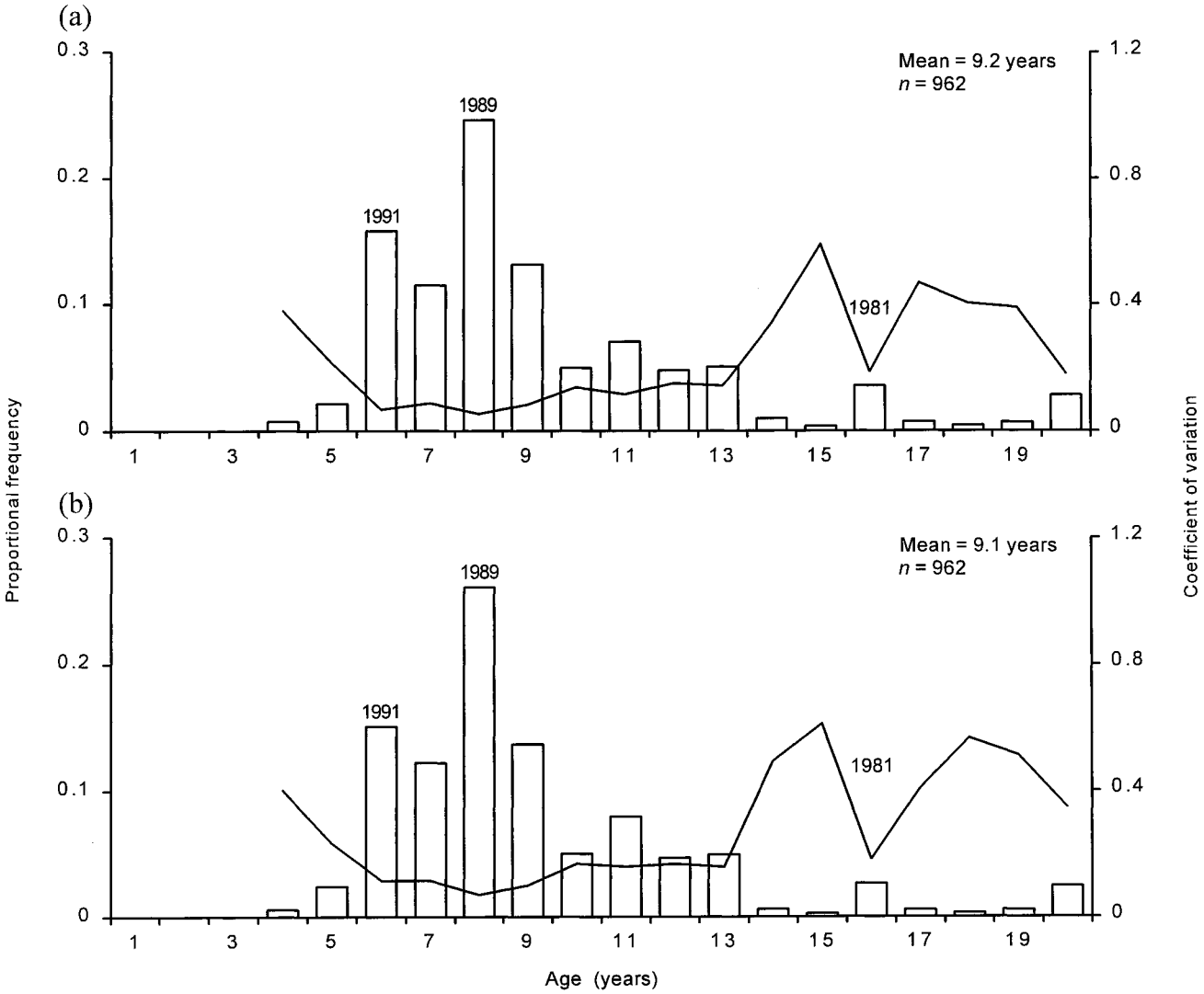

Figure 5: Proportion at age distributions (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the Hauraki Gulf longline fishery in 1996–97 (*n* denotes otolith sample size) (a) using age-length key and (b) random age frequency approach.

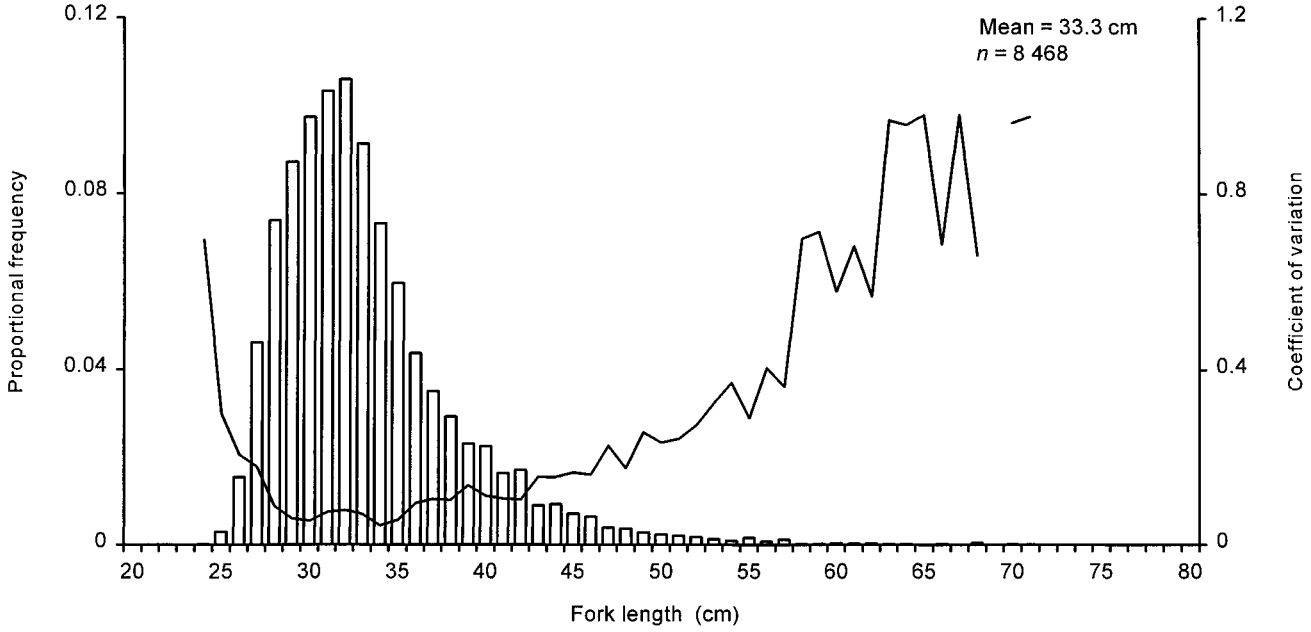

Figure 6: Proportion at length distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the Bay of Plenty longline fishery in 1996–97 (*n* denotes length sample size).

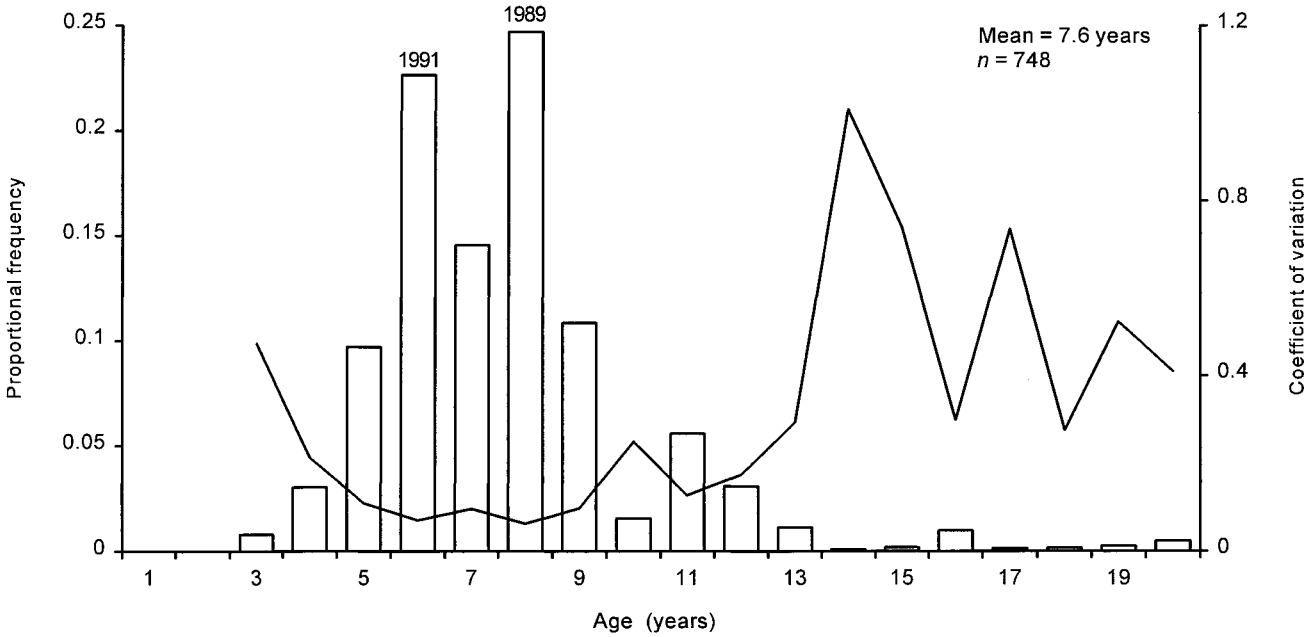

Figure 7: Proportion at age distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the Bay of Plenty longline fishery in 1996–97 (*n* denotes otolith sample size) using age-length key approach.

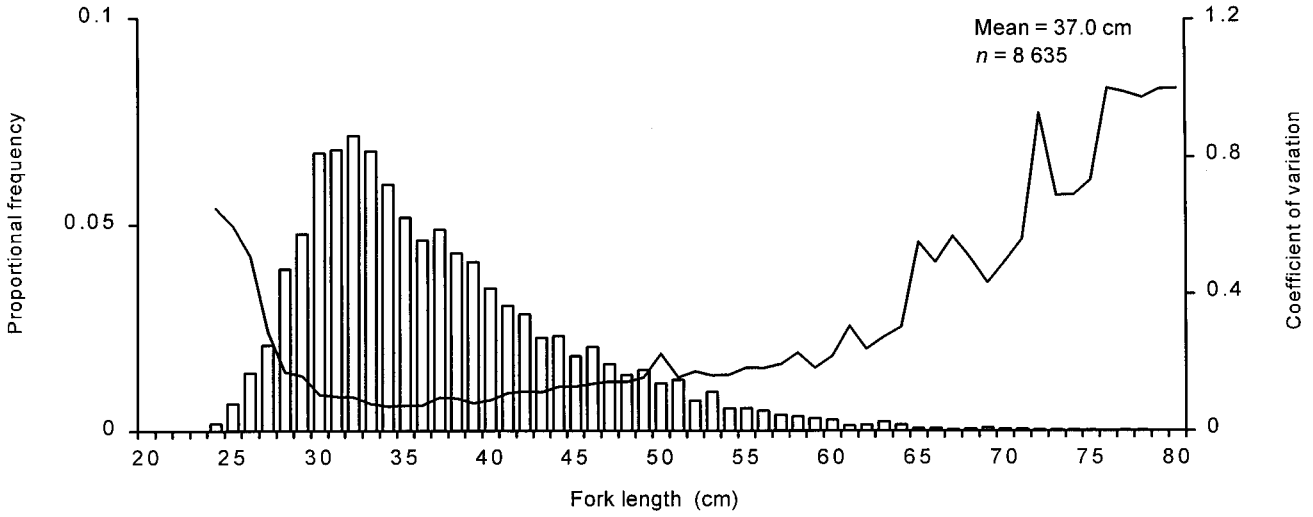

Figure 8: Proportion at length distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the East Northland longline fishery in 1996–97 (*n* denotes length sample size).

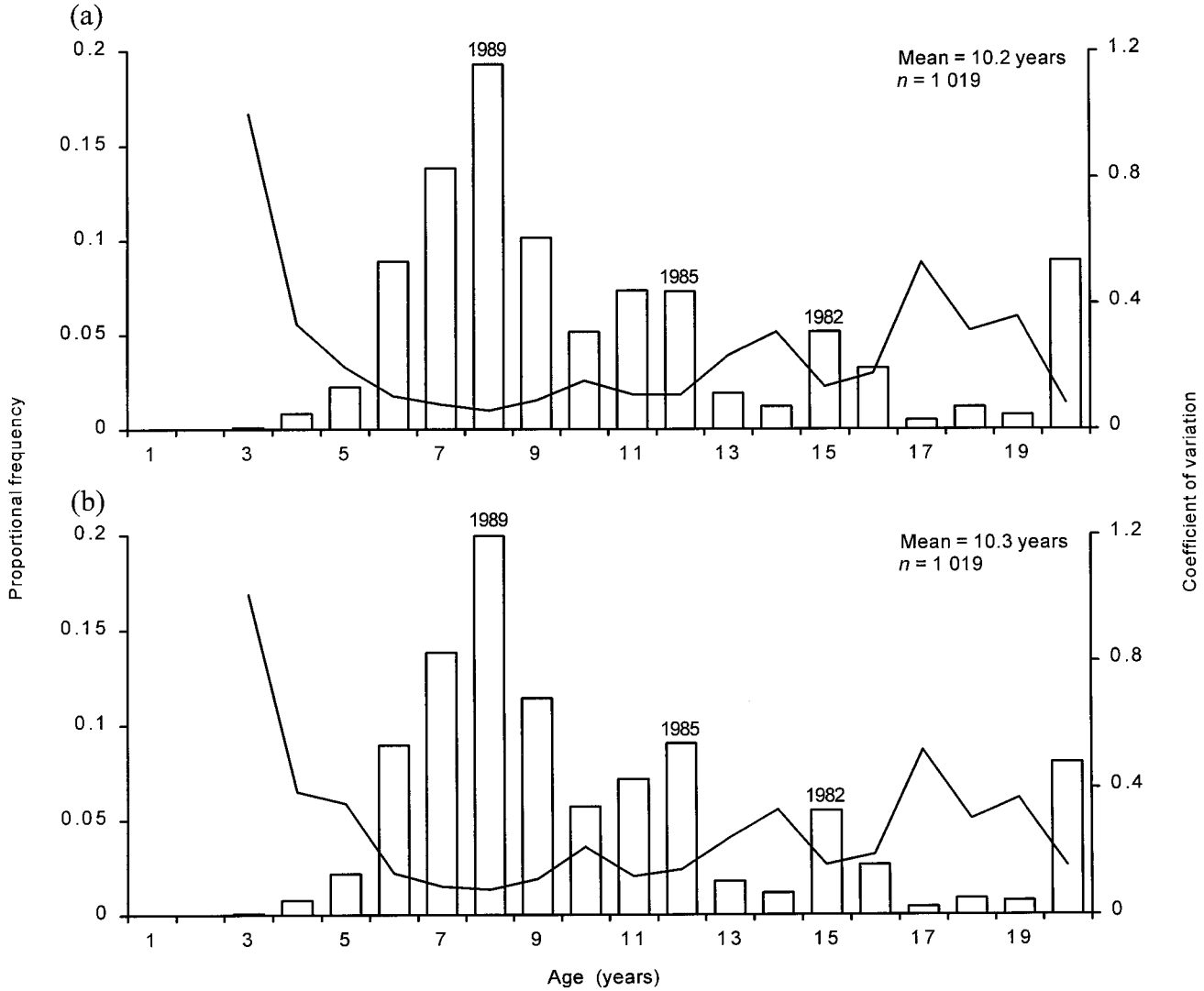

Figure 9: Proportion at age distributions (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the East Northland longline fishery in 1996–97 (*n* denotes otolith sample size) (a) using age-length key and (b) random age frequency approach.

Appendix 1: Estimated seasonal proportion at length and *c.v.* s for snapper fisheries in SNA 1 and SNA 8 in 1996–97

P.i. = proportion of fish in length class. *Nt* = total number of fish caught.
c.v. = coefficient of variation. *n* = total number of fish sampled.

Estimates of the proportion at length of snapper from the west coast single trawl fishery in 1996–97

	Single trawl	
Length	Spring	
(cm)	*P.i.*	*c.v.*
20	0.0000	0.00
21	0.0002	0.86
22	0.0002	0.73
23	0.0002	0.67
24	0.0008	0.59
25	0.0059	0.72
26	0.0157	0.41
27	0.0266	0.22
28	0.0468	0.24
29	0.0550	0.31
30	0.0636	0.27
31	0.0657	0.26
32	0.0736	0.10
33	0.0721	0.08
34	0.0701	0.08
35	0.0558	0.08
36	0.0548	0.13
37	0.0461	0.12
38	0.0466	0.16
39	0.0419	0.15
40	0.0405	0.17
41	0.0317	0.16
42	0.0278	0.17
43	0.0185	0.21
44	0.0160	0.23
45	0.0126	0.17
46	0.0121	0.23
47	0.0130	0.30
48	0.0124	0.22
49	0.0103	0.21
50	0.0110	0.29
51	0.0082	0.24
52	0.0080	0.30
53	0.0077	0.23
54	0.0064	0.25
55	0.0042	0.19
56	0.0050	0.18
57	0.0020	0.19
58	0.0029	0.20
59	0.0025	0.20
60	0.0018	0.19
61	0.0009	0.36
62	0.0006	0.54
63	0.0004	0.46
64	0.0007	0.48
65	0.0001	0.90
66	0.0005	0.54
67	0.0001	0.98
68	0.0005	0.90
69	0.0000	0.00
70	0.0000	0.00
71	0.0000	0.00
72	0.0001	1.03
73	0.0001	0.98
74	0.0000	0.00
75	0.0000	0.00
76	0.0000	0.00
77	0.0000	0.00
78	0.0000	0.00
79	0.0000	0.00
80	0.0000	0.00
Nt	348 779	
n	8 591	

Appendix 1 – continued:
Estimates of the proportion at length of snapper from the Hauraki Gulf longline fishery in 1996–97

	Longline					
Length	Spring		Summer		Spr-sum	
(cm)	*P.i.*	*c.v.*	*P.i.*	*c.v.*	*P.i.*	*c.v.*
20	0.0000	0.00	0.0000	0.00	0.0000	0.00
21	0.0000	0.00	0.0000	0.00	0.0000	0.00
22	0.0000	0.00	0.0000	0.00	0.0000	0.00
23	0.0012	0.79	0.0004	0.69	0.0007	0.55
24	0.0110	0.56	0.0073	0.56	0.0086	0.40
25	0.0297	0.42	0.0159	0.45	0.0210	0.31
26	0.0341	0.34	0.0305	0.28	0.0319	0.22
27	0.0485	0.21	0.0448	0.19	0.0462	0.14
28	0.0618	0.14	0.0598	0.13	0.0606	0.10
29	0.0691	0.08	0.0649	0.12	0.0664	0.08
30	0.0759	0.08	0.0752	0.12	0.0755	0.08
31	0.0788	0.08	0.0742	0.11	0.0759	0.07
32	0.0750	0.07	0.0750	0.07	0.0750	0.05
33	0.0723	0.10	0.0632	0.07	0.0666	0.06
34	0.0668	0.06	0.0616	0.09	0.0635	0.06
35	0.0500	0.11	0.0511	0.09	0.0507	0.07
36	0.0462	0.09	0.0456	0.08	0.0458	0.06
37	0.0443	0.12	0.0395	0.08	0.0413	0.07
38	0.0326	0.14	0.0362	0.09	0.0349	0.08
39	0.0285	0.12	0.0272	0.11	0.0276	0.08
40	0.0270	0.15	0.0261	0.13	0.0264	0.10
41	0.0210	0.12	0.0241	0.13	0.0229	0.10
42	0.0168	0.22	0.0223	0.10	0.0203	0.10
43	0.0170	0.17	0.0141	0.18	0.0152	0.13
44	0.0130	0.15	0.0147	0.14	0.0141	0.10
45	0.0098	0.28	0.0139	0.14	0.0124	0.13
46	0.0124	0.19	0.0114	0.19	0.0118	0.14
47	0.0079	0.16	0.0113	0.22	0.0100	0.15
48	0.0074	0.22	0.0117	0.20	0.0101	0.15
49	0.0068	0.29	0.0082	0.18	0.0077	0.15
50	0.0035	0.32	0.0096	0.22	0.0073	0.19
51	0.0060	0.21	0.0077	0.21	0.0071	0.16
52	0.0026	0.26	0.0062	0.23	0.0048	0.19
53	0.0034	0.41	0.0082	0.18	0.0064	0.18
54	0.0036	0.30	0.0066	0.18	0.0055	0.15
55	0.0024	0.30	0.0042	0.26	0.0035	0.20
56	0.0030	0.25	0.0052	0.20	0.0044	0.16
57	0.0026	0.30	0.0037	0.28	0.0033	0.21
58	0.0014	0.40	0.0030	0.37	0.0024	0.29
59	0.0016	0.54	0.0023	0.43	0.0020	0.34
60	0.0004	0.79	0.0019	0.43	0.0013	0.38
61	0.0012	0.62	0.0024	0.31	0.0019	0.28
62	0.0003	1.00	0.0025	0.37	0.0017	0.35
63	0.0003	0.96	0.0015	0.35	0.0011	0.32
64	0.0010	0.48	0.0021	0.31	0.0017	0.26
65	0.0010	0.49	0.0006	0.49	0.0008	0.35
66	0.0002	1.04	0.0003	0.73	0.0003	0.59
67	0.0002	1.04	0.0006	0.51	0.0004	0.46
68	0.0000	0.00	0.0002	0.72	0.0001	0.71
69	0.0000	0.00	0.0001	1.01	0.0001	1.00
70	0.0000	0.00	0.0001	1.01	0.0001	1.00
71	0.0003	1.01	0.0001	1.02	0.0002	0.72
72	0.0000	0.00	0.0000	0.00	0.0000	0.00
73	0.0001	1.05	0.0000	0.00	0.0001	1.01
74	0.0000	0.00	0.0000	0.00	0.0000	0.00
75	0.0000	0.00	0.0002	0.90	0.0002	0.93
76	0.0000	0.00	0.0000	0.00	0.0000	0.00
77	0.0000	0.00	0.0002	0.90	0.0002	0.93
78	0.0000	0.00	0.0001	1.02	0.0001	1.01
79	0.0000	0.00	0.0000	0.00	0.0000	0.00
80	0.0000	0.00	0.0000	0.00	0.0000	0.00
Nt	338 480		298 245		624 515	
n	3 449		5 925		9 374	

Appendix 1 – continued:
Estimates of the proportion at length of snapper from the Bay of Plenty longline fishery in 1996–97

	Longline					
Length	Spring		Summer		Spr-sum	
(cm)	*P.i.*	*c.v.*	*P.i.*	*c.v.*	*P.i.*	*c.v.*
20	0.0000	0.00	0.0000	0.00	0.0000	0.00
21	0.0000	0.00	0.0000	0.00	0.0000	0.00
22	0.0000	0.00	0.0000	0.00	0.0000	0.00
23	0.0000	0.00	0.0000	0.00	0.0000	0.00
24	0.0003	0.75	0.0000	0.00	0.0002	0.70
25	0.0040	0.42	0.0018	0.43	0.0030	0.30
26	0.0217	0.28	0.0084	0.27	0.0154	0.21
27	0.0467	0.32	0.0455	0.15	0.0461	0.18
28	0.0785	0.11	0.0686	0.15	0.0739	0.09
29	0.0922	0.05	0.0815	0.11	0.0872	0.06
30	0.1020	0.05	0.0922	0.09	0.0974	0.05
31	0.1093	0.10	0.0965	0.09	0.1032	0.07
32	0.1130	0.12	0.0981	0.07	0.1060	0.08
33	0.0988	0.09	0.0830	0.09	0.0913	0.07
34	0.0728	0.07	0.0737	0.06	0.0732	0.04
35	0.0585	0.08	0.0608	0.08	0.0596	0.06
36	0.0376	0.14	0.0506	0.09	0.0437	0.10
37	0.0329	0.17	0.0373	0.10	0.0350	0.11
38	0.0254	0.11	0.0336	0.14	0.0293	0.10
39	0.0152	0.15	0.0319	0.13	0.0231	0.14
40	0.0171	0.15	0.0285	0.10	0.0225	0.11
41	0.0145	0.20	0.0184	0.12	0.0163	0.11
42	0.0157	0.09	0.0185	0.18	0.0170	0.10
43	0.0070	0.23	0.0111	0.16	0.0090	0.15
44	0.0069	0.23	0.0120	0.17	0.0093	0.16
45	0.0049	0.26	0.0096	0.19	0.0071	0.17
46	0.0049	0.24	0.0081	0.18	0.0064	0.16
47	0.0028	0.39	0.0052	0.22	0.0039	0.23
48	0.0034	0.24	0.0041	0.24	0.0037	0.18
49	0.0025	0.48	0.0033	0.22	0.0029	0.26
50	0.0016	0.43	0.0031	0.26	0.0023	0.23
51	0.0014	0.41	0.0028	0.24	0.0020	0.24
52	0.0015	0.41	0.0021	0.35	0.0017	0.27
53	0.0006	0.63	0.0019	0.30	0.0012	0.32
54	0.0008	0.56	0.0009	0.50	0.0008	0.37
55	0.0013	0.33	0.0019	0.45	0.0016	0.29
56	0.0007	0.65	0.0008	0.49	0.0008	0.40
57	0.0010	0.63	0.0014	0.39	0.0012	0.36
58	0.0004	0.75	0.0000	0.00	0.0002	0.70
59	0.0001	1.01	0.0003	0.94	0.0002	0.71
60	0.0000	0.00	0.0008	0.54	0.0004	0.58
61	0.0002	1.02	0.0003	0.92	0.0002	0.68
62	0.0004	0.74	0.0003	0.94	0.0003	0.57
63	0.0000	0.00	0.0003	0.94	0.0001	0.97
64	0.0000	0.00	0.0003	0.92	0.0001	0.96
65	0.0001	1.04	0.0000	0.00	0.0001	0.98
66	0.0002	1.01	0.0003	0.94	0.0002	0.69
67	0.0000	0.00	0.0002	0.97	0.0001	0.98
68	0.0006	0.71	0.0002	0.96	0.0004	0.66
69	0.0000	0.00	0.0000	0.00	0.0000	0.00
70	0.0002	1.00	0.0000	0.00	0.0001	0.96
71	0.0002	1.03	0.0000	0.00	0.0001	0.98
72	0.0000	0.00	0.0000	0.00	0.0000	0.00
73	0.0000	0.00	0.0000	0.00	0.0000	0.00
74	0.0000	0.00	0.0000	0.00	0.0000	0.00
75	0.0000	0.00	0.0000	0.00	0.0000	0.00
76	0.0000	0.00	0.0000	0.00	0.0000	0.00
77	0.0000	0.00	0.0000	0.00	0.0000	0.00
78	0.0000	0.00	0.0000	0.00	0.0000	0.00
79	0.0000	0.00	0.0000	0.00	0.0000	0.00
80	0.0000	0.00	0.0000	0.00	0.0000	0.00
Nt	106 985		70 723		176 526	
n	3 958		4 510		8 468	

Appendix 1 – continued:
Estimates of the proportion at length of snapper from the East Northland longline fishery in 1996–97

	Longline					
Length	Spring		Summer		Spr-sum	
(cm)	*P.i.*	*c.v.*	*P.i.*	*c.v.*	*P.i.*	*c.v.*
20	0.0000	0.00	0.0000	0.00	0.0000	0.00
21	0.0000	0.00	0.0000	0.00	0.0000	0.00
22	0.0000	0.00	0.0000	0.00	0.0000	0.00
23	0.0000	0.00	0.0000	0.00	0.0000	0.00
24	0.0003	1.05	0.0023	0.66	0.0018	0.65
25	0.0003	1.04	0.0089	0.59	0.0066	0.60
26	0.0030	0.50	0.0182	0.53	0.0141	0.51
27	0.0180	0.39	0.0219	0.35	0.0208	0.29
28	0.0501	0.28	0.0353	0.22	0.0392	0.17
29	0.0542	0.29	0.0454	0.19	0.0477	0.16
30	0.0874	0.21	0.0601	0.11	0.0674	0.11
31	0.0658	0.20	0.0690	0.12	0.0682	0.10
32	0.0643	0.23	0.0743	0.11	0.0716	0.10
33	0.0544	0.13	0.0728	0.09	0.0679	0.08
34	0.0478	0.09	0.0642	0.08	0.0598	0.07
35	0.0466	0.11	0.0537	0.09	0.0518	0.07
36	0.0441	0.11	0.0471	0.09	0.0463	0.08
37	0.0423	0.13	0.0513	0.12	0.0489	0.10
38	0.0405	0.09	0.0442	0.12	0.0432	0.09
39	0.0341	0.11	0.0435	0.09	0.0410	0.08
40	0.0333	0.17	0.0351	0.11	0.0346	0.09
41	0.0317	0.24	0.0299	0.12	0.0304	0.11
42	0.0345	0.25	0.0261	0.11	0.0283	0.12
43	0.0235	0.25	0.0223	0.12	0.0226	0.11
44	0.0234	0.29	0.0229	0.14	0.0231	0.13
45	0.0186	0.29	0.0180	0.14	0.0182	0.13
46	0.0256	0.28	0.0186	0.15	0.0205	0.14
47	0.0201	0.28	0.0148	0.16	0.0162	0.14
48	0.0163	0.33	0.0126	0.14	0.0136	0.14
49	0.0201	0.23	0.0129	0.19	0.0148	0.16
50	0.0175	0.31	0.0094	0.29	0.0115	0.23
51	0.0152	0.28	0.0114	0.18	0.0124	0.16
52	0.0102	0.30	0.0063	0.20	0.0073	0.17
53	0.0116	0.34	0.0086	0.17	0.0094	0.16
54	0.0066	0.28	0.0051	0.20	0.0055	0.16
55	0.0058	0.49	0.0054	0.18	0.0055	0.19
56	0.0065	0.38	0.0044	0.18	0.0049	0.18
57	0.0042	0.33	0.0038	0.24	0.0039	0.20
58	0.0054	0.24	0.0028	0.32	0.0035	0.23
59	0.0039	0.29	0.0028	0.23	0.0031	0.18
60	0.0025	0.43	0.0026	0.26	0.0026	0.22
61	0.0004	0.97	0.0016	0.32	0.0013	0.31
62	0.0024	0.29	0.0011	0.36	0.0015	0.24
63	0.0013	0.61	0.0026	0.30	0.0023	0.27
64	0.0011	1.02	0.0017	0.29	0.0015	0.30
65	0.0020	0.62	0.0001	0.99	0.0006	0.55
66	0.0003	1.04	0.0007	0.53	0.0006	0.49
67	0.0007	0.72	0.0002	0.96	0.0003	0.57
68	0.0000	0.00	0.0006	0.50	0.0005	0.51
69	0.0006	0.99	0.0009	0.48	0.0008	0.43
70	0.0004	1.03	0.0005	0.57	0.0005	0.50
71	0.0009	0.67	0.0002	0.99	0.0004	0.56
72	0.0000	0.00	0.0004	0.89	0.0003	0.93
73	0.0000	0.00	0.0003	0.68	0.0003	0.69
74	0.0004	0.98	0.0002	0.98	0.0002	0.69
75	0.0000	0.00	0.0002	0.73	0.0001	0.73
76	0.0000	0.00	0.0001	0.99	0.0001	1.00
77	0.0000	0.00	0.0002	0.98	0.0001	0.99
78	0.0000	0.00	0.0002	0.96	0.0001	0.97
79	0.0000	0.00	0.0001	0.99	0.0001	1.00
80	0.0000	0.00	0.0001	0.99	0.0001	1.00
Nt	235 935		223 173		466 728	
n	2 322		6 313		8 635	

Appendix 2: Estimated seasonal proportion at age and *c.v.* s for snapper fisheries in SNA 1 and SNA 8 in 1996–97

P.j. = proportion of fish in age class. *c.v.* = coefficient of variation.

Estimates of proportion at age of snapper from the west coast single trawl fishery in 1996–97

Otolith sample size = 1 006

Age (years)	Age-length key Single trawl Spring *P.j.*	Age-length key Single trawl Spring *c.v.*	Random age frequency Single trawl Spring *P.j.*	Random age frequency Single trawl Spring *c.v.*
1	0.0000	0.00	0.0000	0.00
2	0.0000	0.00	0.0000	0.00
3	0.0889	0.09	0.0821	0.17
4	0.3538	0.03	0.3663	0.10
5	0.0956	0.09	0.1001	0.09
6	0.2631	0.04	0.2708	0.08
7	0.0407	0.15	0.0405	0.14
8	0.0537	0.13	0.0402	0.16
9	0.0225	0.22	0.0172	0.37
10	0.0166	0.28	0.0112	0.48
11	0.0218	0.17	0.0203	0.29
12	0.0197	0.20	0.0289	0.20
13	0.0123	0.25	0.0123	0.41
14	0.0005	1.01	0.0011	0.97
15	0.0014	0.58	0.0023	0.53
16	0.0010	1.00	0.0007	1.06
17	0.0000	0.00	0.0000	0.00
18	0.0000	0.00	0.0000	0.00
19	0.0000	0.00	0.0000	0.00
>19	0.0059	0.33	0.0060	0.56

Estimates of proportion at age of snapper from the Hauraki Gulf longline fishery in 1996–97

Otolith sample size = 962

Age (years)	Age-length key Longline Spring *P.j.*	Spring *c.v.*	Summer *P.j.*	Summer *c.v.*	Spr-sum *P.j.*	Spr-sum *c.v.*	Random age frequency Longline Spr-sum *P.j.*	Spr-sum *c.v.*
1	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
2	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
3	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
4	0.0081	0.38	0.0070	0.38	0.0074	0.38	0.0058	0.40
5	0.0237	0.21	0.0199	0.22	0.0213	0.21	0.0242	0.23
6	0.1695	0.07	0.1509	0.07	0.1579	0.07	0.1509	0.12
7	0.1206	0.09	0.1112	0.09	0.1147	0.09	0.1222	0.11
8	0.2517	0.05	0.2425	0.05	0.2459	0.05	0.2609	0.07
9	0.1316	0.08	0.1314	0.08	0.1315	0.08	0.1369	0.10
10	0.0512	0.14	0.0491	0.14	0.0499	0.14	0.0501	0.17
11	0.0699	0.12	0.0706	0.12	0.0704	0.12	0.0795	0.16
12	0.0456	0.15	0.0493	0.15	0.0479	0.15	0.0468	0.17
13	0.0458	0.14	0.0534	0.15	0.0505	0.14	0.0494	0.16
14	0.0094	0.34	0.0098	0.34	0.0097	0.34	0.0060	0.49
15	0.0034	0.58	0.0039	0.60	0.0037	0.59	0.0024	0.61
16	0.0281	0.20	0.0399	0.19	0.0355	0.19	0.0264	0.18
17	0.0065	0.47	0.0077	0.47	0.0072	0.47	0.0053	0.41
18	0.0037	0.46	0.0048	0.40	0.0044	0.40	0.0032	0.57
19	0.0051	0.46	0.0078	0.37	0.0068	0.39	0.0054	0.51
>19	0.0214	0.20	0.0321	0.18	0.0281	0.18	0.0243	0.35

Appendix 2 – continued:

Estimates of proportion at age of snapper from the Bay of Plenty longline fishery in 1996–97

Otolith sample size = 748

	Age-length key					
					Longline	
Age	Spring		Summer		Spr-sum	
(years)	*P.j.*	*c.v.*	*P.j.*	*c.v.*	*P.j.*	*c.v.*
1	0.0000	0.00	0.0000	0.00	0.0000	0.00
2	0.0000	0.00	0.0000	0.00	0.0000	0.00
3	0.0085	0.46	0.0076	0.49	0.0080	0.47
4	0.0345	0.20	0.0256	0.24	0.0303	0.21
5	0.1045	0.11	0.0885	0.11	0.0970	0.11
6	0.2392	0.07	0.2120	0.07	0.2264	0.07
7	0.1511	0.10	0.1392	0.10	0.1455	0.10
8	0.2468	0.06	0.2468	0.06	0.2468	0.06
9	0.1005	0.10	0.1173	0.10	0.1084	0.10
10	0.0133	0.25	0.0183	0.25	0.0157	0.25
11	0.0475	0.13	0.0652	0.13	0.0558	0.13
12	0.0255	0.18	0.0368	0.17	0.0308	0.17
13	0.0097	0.30	0.0135	0.29	0.0115	0.29
14	0.0007	1.03	0.0012	1.01	0.0009	1.01
15	0.0013	0.77	0.0024	0.74	0.0018	0.74
16	0.0080	0.30	0.0120	0.31	0.0099	0.30
17	0.0008	0.81	0.0020	0.74	0.0014	0.74
18	0.0010	0.50	0.0022	0.32	0.0016	0.28
19	0.0019	0.54	0.0029	0.55	0.0024	0.52
>19	0.0037	0.43	0.0060	0.41	0.0048	0.41

Estimates of proportion at age of snapper from the East Northland longline fishery in 1996–97

Otolith sample size = 1 019

	Age-length key						Random age frequency	
					Longline		Longline	
Age	Spring		Summer		Spr-sum		Spr-sum	
(years)	*P.j.*	*c.v.*	*P.j.*	*c.v.*	*P.j.*	*c.v.*	*P.j.*	*c.v.*
1	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
2	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00
3	0.0008	1.00	0.0009	1.00	0.0008	1.00	0.0008	1.01
4	0.0094	0.34	0.0080	0.34	0.0084	0.33	0.0076	0.39
5	0.0226	0.20	0.0224	0.20	0.0224	0.20	0.0216	0.35
6	0.0885	0.10	0.0892	0.11	0.0890	0.11	0.0893	0.13
7	0.1376	0.08	0.1384	0.08	0.1382	0.08	0.1380	0.09
8	0.1850	0.06	0.1957	0.06	0.1928	0.06	0.1994	0.08
9	0.0969	0.09	0.1032	0.09	0.1015	0.09	0.1139	0.11
10	0.0447	0.14	0.0541	0.17	0.0516	0.15	0.0571	0.21
11	0.0723	0.11	0.0740	0.11	0.0736	0.11	0.0714	0.12
12	0.0731	0.11	0.0730	0.11	0.0730	0.11	0.0903	0.14
13	0.0203	0.24	0.0186	0.23	0.0191	0.23	0.0176	0.24
14	0.0133	0.31	0.0114	0.31	0.0119	0.31	0.0115	0.33
15	0.0550	0.14	0.0503	0.13	0.0516	0.13	0.0549	0.16
16	0.0339	0.19	0.0318	0.18	0.0324	0.18	0.0263	0.19
17	0.0051	0.55	0.0047	0.53	0.0048	0.53	0.0042	0.52
18	0.0132	0.32	0.0111	0.31	0.0117	0.31	0.0085	0.30
19	0.0084	0.36	0.0073	0.36	0.0076	0.36	0.0072	0.37
>19	0.1077	0.09	0.0827	0.09	0.0893	0.08	0.0803	0.16

Appendix 3: Estimated mean weight at age (kg) and *c.v.* s for snapper fisheries in SNA 1 and SNA 8 in 1996–97

P.j. = proportion of fish in age class. *c.v.* = coefficient of variation.

Estimates of mean weight at age (kg) of snapper from the west coast single trawl fishery in 1996–97

Otolith sample size = 1 006

Age	Spring		
(years)	Mean	*c.v.*	*n*
1	–	–	–
2	–	–	–
3	0.52	0.02	88
4	0.73	0.01	353
5	0.94	0.02	99
6	1.17	0.02	271
7	1.43	0.05	41
8	1.63	0.06	48
9	1.45	0.11	22
10	2.12	0.08	14
11	2.75	0.02	19
12	2.77	0.04	23
13	3.22	0.06	14
14	2.63	0.01	1
15	3.74	0.03	3
16	1.53	0.01	1
17	–	–	–
18	–	–	–
19	–	–	–
>19	3.44	0.08	9

Estimates of mean weight at age (kg) of snapper from the Hauraki Gulf longline fishery in 1996–97

Otolith sample size = 962

Age	Spring		Summer		Spr-sum		
(years)	Mean	*c.v.*	Mean	*c.v.*	Mean	*c.v.*	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	–	–	–	–	–	–	–
4	0.45	0.06	0.46	0.05	0.45	0.05	7
5	0.48	0.06	0.51	0.05	0.50	0.05	21
6	0.56	0.02	0.57	0.02	0.57	0.02	154
7	0.68	0.03	0.69	0.03	0.68	0.03	114
8	0.77	0.02	0.78	0.02	0.77	0.02	243
9	0.94	0.03	0.97	0.04	0.96	0.04	126
10	1.05	0.05	1.05	0.05	1.05	0.05	51
11	1.15	0.04	1.18	0.05	1.17	0.05	72
12	1.32	0.08	1.48	0.08	1.42	0.08	47
13	1.49	0.07	1.66	0.08	1.60	0.07	44
14	1.21	0.12	1.25	0.11	1.23	0.11	9
15	1.54	0.12	1.52	0.10	1.53	0.11	3
16	1.99	0.07	2.22	0.06	2.15	0.07	29
17	1.90	0.11	1.99	0.10	1.96	0.11	6
18	2.75	0.19	2.93	0.15	2.87	0.15	3
19	2.01	0.21	2.61	0.14	2.44	0.16	6
>19	2.12	0.10	2.52	0.07	2.40	0.08	27

Appendix 3 – continued:

Estimates of mean weight at age (kg) of snapper from the Bay of Plenty longline fishery in 1996–97

Otolith sample size = 748

Age	Spring		Summer		Spr-sum		
(years)	Mean	*c.v.*	Mean	*c.v.*	Mean	*c.v.*	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	0.46	0.03	0.46	0.02	0.46	0.02	8
4	0.46	0.03	0.48	0.03	0.47	0.03	33
5	0.50	0.02	0.51	0.02	0.50	0.02	67
6	0.61	0.01	0.61	0.01	0.61	0.01	130
7	0.71	0.02	0.73	0.02	0.72	0.02	89
8	0.83	0.01	0.86	0.02	0.85	0.02	176
9	1.02	0.03	1.07	0.03	1.04	0.03	95
10	1.23	0.06	1.29	0.07	1.26	0.07	16
11	1.29	0.04	1.33	0.04	1.31	0.04	55
12	1.40	0.06	1.46	0.05	1.44	0.05	31
13	1.69	0.11	1.74	0.09	1.72	0.10	12
14	1.97	0.01	1.97	0.01	1.97	0.01	1
15	2.04	0.15	2.08	0.15	2.06	0.14	2
16	1.86	0.09	1.87	0.09	1.87	0.08	14
17	2.64	0.06	2.70	0.06	2.68	0.06	2
18	3.58	0.01	3.79	0.02	3.72	0.02	2
19	3.27	0.10	3.17	0.10	3.21	0.09	5
>19	2.72	0.15	2.78	0.15	2.75	0.15	10

Estimates of mean weight at age (kg) of snapper from the East Northland longline fishery in 1996–97

Otolith sample size = 1 019

Age	Spring		Summer		Spr-sum		
(years)	Mean	*c.v.*	Mean	*c.v.*	Mean	*c.v.*	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	0.71	0.01	0.71	0.01	0.71	0.01	1
4	0.54	0.04	0.55	0.05	0.55	0.05	9
5	0.57	0.04	0.58	0.05	0.58	0.05	24
6	0.66	0.03	0.66	0.04	0.66	0.03	93
7	0.73	0.03	0.74	0.03	0.74	0.03	147
8	0.82	0.03	0.83	0.02	0.83	0.02	215
9	0.99	0.04	0.98	0.03	0.98	0.04	106
10	1.07	0.05	0.99	0.08	1.01	0.07	52
11	1.26	0.04	1.23	0.04	1.24	0.04	78
12	1.40	0.05	1.31	0.04	1.34	0.04	77
13	1.73	0.08	1.62	0.08	1.65	0.08	19
14	1.86	0.12	1.80	0.11	1.82	0.11	11
15	1.71	0.05	1.65	0.05	1.66	0.05	51
16	1.62	0.07	1.50	0.06	1.53	0.07	32
17	2.33	0.18	2.30	0.19	2.31	0.18	4
18	2.02	0.11	1.90	0.12	1.93	0.11	11
19	1.80	0.10	1.71	0.11	1.74	0.11	8
>19	2.61	0.03	2.55	0.03	2.57	0.03	81

Appendix 4: Age-length keys derived from otolith samples collected from snapper fisheries in SNA 1 and SNA 8 in 1996–97

Estimates of proportion of length at age for snapper sampled from the west coast, spring 1996
(Note: Aged to 01/01/97)

Length	Age (years)																				No.
(cm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	>19	aged
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0.67	0	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
25	0	0	0.43	0	0.14	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
26	0	0	0.20	0.20	0	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
27	0	0	0.55	0.10	0.06	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
28	0	0	0.60	0.30	0	0.02	0.02	0.04	0.02	0	0	0	0	0	0	0	0	0	0	0	50
29	0	0	0.39	0.50	0.05	0	0	0.05	0.02	0	0	0	0	0	0	0	0	0	0	0	44
30	0	0	0.21	0.68	0.03	0.04	0.03	0	0.01	0	0	0	0	0	0	0	0	0	0	0	68
31	0	0	0.06	0.78	0.09	0.05	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0	65
32	0	0	0.01	0.78	0.10	0.03	0.01	0.03	0.03	0	0	0	0	0	0	0	0	0	0	0	68
33	0	0	0.01	0.77	0.07	0.07	0.03	0	0.04	0	0	0	0	0	0	0	0	0	0	0	69
34	0	0	0	0.71	0.16	0.08	0	0.04	0.01	0	0	0	0	0	0	0	0	0	0	0	77
35	0	0	0	0.52	0.25	0.17	0.02	0	0.02	0.03	0	0	0	0	0	0	0	0	0	0	60
36	0	0	0	0.20	0.29	0.45	0	0.06	0	0	0	0	0	0	0	0	0	0	0	0	51
37	0	0	0	0.15	0.22	0.57	0.03	0.03	0	0	0	0	0	0	0	0	0	0	0	0	60
38	0	0	0	0.05	0.18	0.75	0.02	0	0	0	0	0	0	0	0	0	0	0	0	0	44
39	0	0	0	0	0.12	0.67	0.14	0.05	0	0.02	0	0	0	0	0	0	0	0	0	0	43
40	0	0	0	0	0.07	0.80	0.05	0.07	0.02	0	0	0	0	0	0	0	0	0	0	0	44
41	0	0	0	0	0.03	0.79	0.13	0.03	0.03	0	0	0	0	0	0	0	0	0	0	0	39
42	0	0	0	0	0.04	0.75	0.14	0.04	0	0	0	0	0	0	0	0.04	0	0	0	0	28
43	0	0	0	0	0.05	0.45	0.25	0.15	0.05	0.05	0	0	0	0	0	0	0	0	0	0	20
44	0	0	0	0	0	0.64	0.18	0.18	0	0	0	0	0	0	0	0	0	0	0	0	11
45	0	0	0	0	0	0.08	0.33	0.33	0.08	0.08	0	0	0.08	0	0	0	0	0	0	0	12
46	0	0	0	0	0	0.10	0	0.50	0.10	0.10	0	0.20	0	0	0	0	0	0	0	0	10
47	0	0	0	0	0	0.10	0	0.60	0.10	0	0.10	0	0.10	0	0	0	0	0	0	0	10
48	0	0	0	0	0	0	0.17	0.33	0.17	0.33	0	0	0	0	0	0	0	0	0	0	6
49	0	0	0	0	0	0	0.11	0	0.11	0.11	0.44	0.11	0	0	0	0	0	0	0	0.11	9
50	0	0	0	0	0	0	0	0	0.15	0.15	0.31	0.38	0	0	0	0	0	0	0	0	13
51	0	0	0	0	0	0	0.07	0.07	0.13	0.07	0.20	0.33	0	0.07	0	0	0	0	0	0.07	15
52	0	0	0	0	0	0	0	0	0	0.25	0.75	0	0	0	0	0	0	0	0	0	4
53	0	0	0	0	0	0	0	0.40	0	0	0	0.40	0.20	0	0	0	0	0	0	0	5
54	0	0	0	0	0	0	0	0.10	0	0	0.30	0.50	0	0	0	0	0	0	0	0.10	10
55	0	0	0	0	0	0	0	0	0	0.25	0	0	0.50	0	0	0	0	0	0	0.25	4
56	0	0	0	0	0	0	0	0	0	0	0	0.40	0.60	0	0	0	0	0	0	0	5
57	0	0	0	0	0	0	0	0	0	0	0	0	0.60	0	0.40	0	0	0	0	0	5
58	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0	0	1
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0.75	4
60	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	0	0	0	0	2
61	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	1
62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	1
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total																					1 006

Appendix 4 – continued:
Estimates of proportion of length at age for snapper sampled from the Hauraki Gulf, spring and summer 1996–97 (Note: Aged to 01/01/97)

Length	Age (years)																			No.
(cm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	>19	aged
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
24	0	0	0	0	0.29	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
25	0	0	0	0.04	0.09	0.61	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	23
26	0	0	0	0.04	0.04	0.54	0.13	0.08	0.17	0	0	0	0	0	0	0	0	0	0	0	24
27	0	0	0	0.07	0.07	0.29	0.18	0.27	0.09	0	0	0	0	0	0	0	0	0	0	0	45
28	0	0	0	0.02	0.04	0.31	0.21	0.35	0.04	0.02	0	0	0.02	0	0	0	0	0	0	0	52
29	0	0	0	0	0.03	0.34	0.16	0.25	0.11	0.01	0.04	0.05	0	0	0	0	0	0	0	0	73
30	0	0	0	0.01	0.05	0.23	0.15	0.35	0.10	0.05	0.02	0.01	0.02	0	0	0	0	0	0	0	82
31	0	0	0	0	0.04	0.23	0.22	0.24	0.10	0.04	0.06	0.05	0.01	0.01	0	0	0	0	0	0	79
32	0	0	0	0	0.02	0.18	0.09	0.38	0.14	0.03	0.08	0.02	0.05	0.02	0	0.02	0	0	0	0	66
33	0	0	0	0	0	0.11	0.16	0.35	0.16	0.03	0.06	0.03	0.02	0.02	0	0.02	0	0	0.02	0.02	62
34	0	0	0	0	0	0.09	0.12	0.39	0.14	0.07	0.06	0.06	0.06	0	0	0	0	0	0	0.01	69
35	0	0	0	0	0	0.04	0.11	0.37	0.20	0.06	0.11	0.06	0	0	0	0.02	0	0.02	0	0.02	54
36	0	0	0	0	0	0.02	0.17	0.38	0.17	0.13	0.06	0.02	0	0	0	0	0	0	0	0.06	48
37	0	0	0	0	0	0.06	0.06	0.19	0.21	0.15	0.13	0.11	0	0.02	0	0.04	0	0	0	0.02	47
38	0	0	0	0	0	0.03	0.03	0.33	0.23	0.07	0.13	0	0.07	0.03	0.03	0	0	0	0	0.03	30
39	0	0	0	0	0	0	0.04	0.25	0.21	0.13	0.13	0.08	0.13	0	0	0.04	0	0	0	0	24
40	0	0	0	0	0	0	0.11	0.11	0.16	0.21	0.11	0.11	0.11	0	0	0	0.05	0	0.05	0	19
41	0	0	0	0	0	0	0	0.07	0.30	0.04	0.30	0.07	0.04	0	0	0.15	0.04	0	0	0	27
42	0	0	0	0	0	0	0	0.15	0.31	0	0	0	0.15	0.08	0.08	0.15	0	0	0	0.08	13
43	0	0	0	0	0	0	0	0.04	0.04	0.14	0.29	0.18	0.21	0.04	0	0	0.04	0	0	0.04	28
44	0	0	0	0	0	0	0	0	0.33	0.08	0.25	0.08	0	0.17	0	0.08	0	0	0	0	12
45	0	0	0	0	0	0	0	0	0.33	0	0.33	0	0	0	0	0.17	0	0	0	0.17	6
46	0	0	0	0	0	0	0	0	0	0.17	0.25	0.08	0.17	0	0.08	0.08	0.08	0	0	0.08	12
47	0	0	0	0	0	0	0	0	0	0	0	0.20	0.80	0	0	0	0	0	0	0	5
48	0	0	0	0	0	0	0	0	0	0	0	0.33	0.33	0	0	0.17	0	0	0	0.17	6
49	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0.33	0.33	0	0	0	3
50	0	0	0	0	0	0	0	0	0	0	0	0.13	0	0	0	0.25	0.13	0	0.13	0.38	8
51	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0	0	0.40	0	0.20	0.20	0	5
52	0	0	0	0	0	0	0	0	0	0	0.20	0.20	0.20	0	0	0.20	0	0	0	0.20	5
53	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0.67	0	0	0	0	3
54	0	0	0	0	0	0	0	0	0	0	0	0.33	0.17	0	0	0	0	0	0.17	0.33	6
55	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0	0	0.20	0	0	0	0.60	5
56	0	0	0	0	0	0	0	0	0	0	0	0.25	0.25	0	0	0.50	0	0	0	0	4
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0.50	2
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	1
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0.67	3
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	1
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total																					962

Appendix 4 – continued:
Estimates of proportion of length at age for snapper sampled from the Bay of Plenty, spring and summer 1996–97 (Note: Aged to 01/01/97)

Length	Age (years)																				No.
(cm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	>19	aged
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0.20	0.40	0.20	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
25	0	0	0.15	0.50	0.25	0.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
26	0	0	0	0.43	0.48	0.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
27	0	0	0.10	0.20	0.45	0.20	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	20
28	0	0	0.04	0.08	0.48	0.34	0.06	0	0	0	0	0	0	0	0	0	0	0	0	0	50
29	0	0	0	0.06	0.19	0.52	0.17	0.02	0.04	0	0	0	0	0	0	0	0	0	0	0	52
30	0	0	0	0	0.12	0.55	0.20	0.10	0.02	0	0	0	0	0	0	0	0	0	0	0	49
31	0	0	0	0.02	0.04	0.42	0.23	0.29	0	0	0	0	0	0	0	0	0	0	0	0	52
32	0	0	0	0	0	0.20	0.35	0.33	0.09	0	0.02	0	0	0	0	0	0	0	0	0	54
33	0	0	0	0	0	0.18	0.18	0.51	0.09	0	0.02	0.02	0	0	0	0	0	0	0	0	55
34	0	0	0	0	0	0.10	0.12	0.56	0.17	0	0.04	0	0.02	0	0	0	0	0	0	0	52
35	0	0	0	0	0	0.04	0.12	0.47	0.22	0.04	0.06	0.04	0	0	0	0	0	0	0	0	49
36	0	0	0	0	0	0	0.10	0.42	0.28	0.04	0.10	0.04	0.02	0	0	0	0	0	0	0	50
37	0	0	0	0	0	0	0.12	0.26	0.33	0.07	0.12	0.09	0	0	0	0.02	0	0	0	0	43
38	0	0	0	0	0	0	0.10	0.30	0.27	0.10	0.2	0.03	0	0	0	0	0	0	0	0	30
39	0	0	0	0	0	0	0	0.20	0.24	0	0.36	0.16	0	0	0	0.04	0	0	0	0	25
40	0	0	0	0	0	0	0.06	0.22	0.28	0.11	0.17	0.11	0	0	0	0	0	0	0	0.06	18
41	0	0	0	0	0	0	0	0.23	0.31	0	0.15	0.15	0.08	0	0	0.08	0	0	0	0	13
42	0	0	0	0	0	0	0	0.18	0.29	0	0.29	0.06	0.06	0	0	0.12	0	0	0	0	17
43	0	0	0	0	0	0	0	0	0.18	0.18	0.18	0.27	0.09	0	0	0.09	0	0	0	0	11
44	0	0	0	0	0	0	0	0	0.13	0	0.50	0.13	0.13	0	0.13	0	0	0	0	0	8
45	0	0	0	0	0	0	0	0	0.17	0.17	0	0.50	0	0	0	0.17	0	0	0	0	6
46	0	0	0	0	0	0	0	0	0.14	0	0.29	0.14	0.29	0.14	0	0	0	0	0	0	7
47	0	0	0	0	0	0	0	0	0.20	0.20	0.20	0	0.20	0	0	0.20	0	0	0	0	5
48	0	0	0	0	0	0	0	0	0	0	0.6	0.20	0.20	0	0	0	0	0	0	0	5
49	0	0	0	0	0	0	0	0	0	0	0.25	0.50	0.25	0	0	0	0	0	0	0	4
50	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0	0	0.33	0	0.33	0	3
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0.33	0	0	0	0.33	3
52	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0.50	2
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	2
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0.25	0.25	4
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	2
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	2
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	1
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	1
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	1
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	1
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	1
67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total																					748

Appendix 4 – continued:
Estimates of proportion of length at age for snapper sampled from East Northland, spring and summer 1996–97
(Note: Aged to 01/01/97)

Length	Age (years)																			No.
(cm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	>19	aged
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0.33	0.33	0	0	0.33	0	0	0	0	0	0	0	0	0	0	3
27	0	0	0	0.06	0.29	0.24	0.12	0.18	0.12	0	0	0	0	0	0	0	0	0	0	0	17
28	0	0	0	0.07	0.11	0.29	0.31	0.20	0	0.02	0	0	0	0	0	0	0	0	0	0	45
29	0	0	0	0.04	0.04	0.24	0.39	0.22	0	0.04	0	0	0	0	0.02	0	0	0	0	0	49
30	0	0	0	0.01	0.03	0.18	0.28	0.26	0.15	0	0.06	0.01	0	0.01	0	0	0	0	0	0	68
31	0	0	0	0.01	0.05	0.18	0.26	0.36	0.08	0	0.02	0.01	0	0	0.02	0	0	0	0	0	87
32	0	0	0	0.01	0	0.15	0.19	0.40	0.15	0.01	0.04	0.02	0	0	0.01	0	0	0	0	0	85
33	0	0	0	0	0.05	0.06	0.11	0.40	0.13	0.08	0.06	0.04	0.02	0	0	0.02	0	0.01	0	0.01	93
34	0	0	0	0	0.02	0.10	0.22	0.33	0.18	0.12	0.02	0	0	0	0	0	0	0	0	0	49
35	0	0	0	0	0	0.11	0.13	0.25	0.15	0.06	0.11	0.09	0	0.02	0.02	0.06	0	0	0	0	53
36	0	0	0	0	0	0	0.13	0.19	0.17	0.11	0.08	0.19	0.02	0	0	0.09	0	0.02	0	0	53
37	0	0	0	0	0	0.02	0.08	0.11	0.21	0.08	0.19	0.15	0.04	0	0.02	0.08	0	0	0.02	0.02	53
38	0	0	0	0	0	0.05	0.05	0.10	0.20	0.08	0.10	0.23	0.03	0	0.08	0	0	0.03	0.03	0.05	40
39	0	0	0	0	0	0	0.10	0.16	0.08	0.10	0.18	0.16	0	0	0.08	0.04	0.02	0	0	0.06	49
40	0	0	0	0	0	0	0.07	0.07	0.10	0.07	0.19	0.24	0.07	0.02	0.05	0.05	0	0	0.02	0.05	42
41	0	0	0	0	0	0.05	0.05	0.15	0	0.13	0.13	0.08	0.03	0	0.23	0.05	0	0.03	0.03	0.05	39
42	0	0	0	0	0	0	0.08	0.04	0.12	0.12	0.16	0.12	0.04	0	0.16	0.04	0	0.04	0	0.08	25
43	0	0	0	0	0	0	0	0.07	0.07	0	0.13	0.07	0.07	0.13	0.33	0.07	0	0	0	0.07	15
44	0	0	0	0	0	0	0	0.20	0.13	0	0.13	0	0.07	0.07	0.07	0.13	0	0.07	0	0.13	15
45	0	0	0	0	0	0	0	0	0	0.10	0.19	0.05	0	0	0.38	0	0.05	0	0	0.24	21
46	0	0	0	0	0	0	0	0	0.19	0	0.13	0.19	0	0	0.06	0.13	0.06	0	0.06	0.19	16
47	0	0	0	0	0	0	0	0.05	0	0	0.05	0.11	0.11	0.11	0.05	0	0	0.05	0.11	0.37	19
48	0	0	0	0	0	0	0	0	0	0	0	0.17	0.08	0.08	0	0.17	0	0.08	0	0.42	12
49	0	0	0	0	0	0	0	0	0	0	0.10	0.20	0.10	0	0.10	0.10	0	0.10	0	0.30	10
50	0	0	0	0	0	0	0	0	0	0	0	0.09	0	0	0.09	0.09	0	0	0	0.73	11
51	0	0	0	0	0	0	0	0	0	0	0	0	0.17	0	0.25	0.08	0	0	0.08	0.42	12
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.13	0.13	0	0	0	0.75	8
53	0	0	0	0	0	0	0	0	0	0	0	0.11	0	0.11	0	0	0	0	0	0.78	9
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0.75	4
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0.33	0	0	0.33	3
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0	0	0	0.14	0	0.71	7
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	2
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total																					1 019