Length and age composition of commercial snapper landings in SNA 1 and SNA 8, 1998–99

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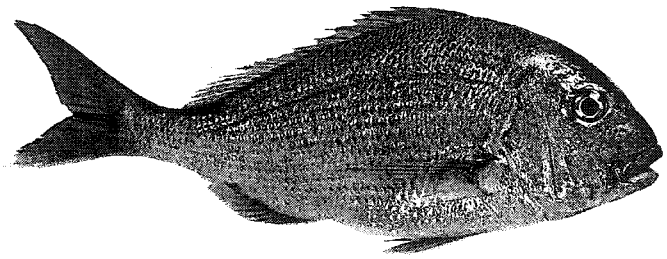

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Abstract

Walsh, C., Hartill, B., & Davies, N. M. 2000: Length and age composition of commercial snapper landings in SNA 1 and SNA 8, 1998–99. *NIWA Technical Report 78*. 30 p.

Two methods were employed in 1998–99 to estimate catch-at-age for snapper for the main fishing method in each stock and substock of SNA 1 and SNA 8. The first approach used data derived from length frequency samples collected from the west coast single trawl and Bay of Plenty longline fisheries combined with age-length keys. The second approach used data derived from random age samples collected from the Hauraki Gulf and East Northland longline fisheries. Target sample sizes for both approaches were achieved from all the fisheries sampled. Year class strengths inferred from the length and age distributions sampled from the SNA 1 and SNA 8 fisheries in the 1998–99 season were generally consistent with trends observed in previous years. Strong 1989 and 1991 year classes were evident in all the SNA 1 substocks. The recently recruited 1995 year class appeared strong in the SNA 8 stock and a strong 1994 year class has recruited into the Bay of Plenty substock. The East Northland substock contained particularly strong year classes not evident in the other substocks and a high proportion of snapper over 15 years of age. This may be a reflection of hydrodynamic and recruitment differences that exist in East Northland and the relative healthy state of the substock. In general, there were broad similarities in the recruitment patterns of the SNA 1 substocks, but few similarities in recruitment patterns exist between the SNA 1 and SNA 8 stocks. A mean weighted coefficient of variation of below 20% was achieved across all age classes in the SNA 1 and SNA 8 catch-at-age compositions.

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 the east and west coast North Island stocks, 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 previous reports (Davies & Walsh 1995, Walsh *et al.* 1995, 1997, 1998, 1999). This report presents the results of market sampling between October 1998 and February 1999, thus continuing the time series. Funding for this project, SNA9803, was provided by the Ministry of Fisheries.

Objective

The objective of the market sampling programme for 1998–99 was to carry out sampling and estimate the relative year class strength of recruited snapper sampled from the commercial longline fishery in SNA 1 and trawl fishery in SNA 8 during spring and summer 1998–99. The target coefficient of variation (*c.v.*) for the catch at age will be 20% (mean weighted *c.v.* across all age classes).

Methods

Landings from the snapper fishery were stratified hierarchically by stock or substock, fishing method, and quarterly season, e.g., Bay of Plenty – longline – spring. The stock and substocks correspond to the four areas: west coast North Island, Bay of Plenty, Hauraki Gulf, 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 percentages of the snapper catch taken by particular methods in each of the stock and substock strata for 1998–99 are given in Table 1, illustrating the dominant methods in respective stock and substock strata during the period of sampling. Samples were collected in spring and summer when most of the snapper stock becomes vulnerable to fishing.

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). Length frequency samples were collected from the west coast single trawl and Bay of Plenty longline fisheries.

Two methods were employed for the collection of otoliths from landings in particular stock and substock areas. The first approach was a collection of otoliths from pair trawl and single trawl landings from the west coast and from Danish seine, longline, and research trawl catches in the Bay of Plenty to produce age-length keys as described by Davies & Walsh (1995). The sample allocation for each length class interval was made according to the west coast single trawl and Bay of Plenty longline proportion at length distributions as estimated for the previous year. To allow for annual variability in the abundance of fish in the 25–26 cm size range, a fixed sample size of 10 otoliths was obtained per centimetre length interval for the Bay of Plenty collection. Similarly, a fixed sample size of 5 otoliths was obtained per interval to allow for fish caught below 25 cm. The otolith sample sizes for the west coast and Bay of Plenty collections were determined from simulations using the previous year's length and age data to derive a mean weighted coefficient of variation (MWCV) of below 20% for catch-at-age estimates.

Age-length keys derived from the age data collected in each stock and substock area are assumed to be representative of the seasonal strata of the sample. 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).

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). Bootstrap mean and variance estimates were not determined for proportion at length and age estimates because the difference between bootstrap and analytical estimates has been found to be negligible (Davies *et al.* unpublished results). Calculation of mean weight-at-age and variances from length frequency samples and age-length keys followed that of Quinn *et al.* (1983). Proportions at age and mean weight-at-age with analytical estimates of coefficient of variation (*c.v.*) 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.

The second approach for collecting otoliths was called the random age frequency sampling method (Davies *et al.* unpublished results) and was used for the Hauraki Gulf and East Northland longline fisheries. The age frequency samples were collected by taking random otolith samples from each stratum of the catch. A systematic selection interval was used in sampling. This involved a random sample of bins from each landing with the systematic selection of every n^{th} fish counted in a continuous sequence from the sampled bins. The optimum selection interval, n, for the random age frequency sample was determined from simulations using data from historical length and age samples that achieved a desired level of precision in catch-at-age estimates. This range took account of the expected mean number of fish in a bin and the total number of bins in landings. Sample sizes

typically ranged from 15 fish being collected from landings of 10 bins, to 45 fish collected from landings of above 100 bins. A total sample size of 1000 otoliths was targeted for collection from each fishery.

Proportion at age and variance (analytical and bootstrap) estimates for the Hauraki Gulf and East Northland longline fisheries were calculated from random age frequency samples collected from each landing. Essentially, a mean proportion at age for all landings in the sample (weighted by the estimated number of fish in each landing) based on the sample age frequencies, was determined. Bootstrap mean estimates are not presented as the difference between analytical and bootstrap means in proportion at age estimates has been found to be negligible (Davies *et al.* unpublished results). Proportions at length and variance estimates were also calculated from the random age frequency samples, as were mean weight-at-age estimates with bootstrap *c.v.* s.

Random age frequency data were collected specifically to derive catch-at-age estimates. However, only small differences in proportion at age estimates were obtained using the age-length key and random age frequency approaches (Walsh *et al.* 1998). Given that the random age frequency otolith sample was collected in a strictly random manner, it can be assumed that individual fish sampled for age were random observations from within each length interval. Consequently, proportional allocation age-length keys were able to be derived from the random age frequency otolith samples for the Hauraki Gulf and East Northland substocks. However, fish in the larger length classes were infrequently sampled and are therefore poorly described.

A standardised procedure for reading otoliths was followed (Davies & Walsh 1995). Age was defined as rounded whole years from a nominal birth date of 1 January as described by Davies & Walsh (1995), e.g., the 1989 year class was recorded as 10 years old whether sampled in December 1998 or February 1999.

Snapper length and age data were stored on the Ministry of Fisheries *market* and *age* databases respectively, held by NIWA.

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 from autumn 1998 to summer 1998–99 are provided in Tables 2–5 to illustrate seasonal patterns in the fisheries. The SNA 8 fishery was mainly concentrated over spring and summer with the single trawl method taking less of the landed catch (66%) than in the past few years (Tables 1 and 2). Considerable differences are apparent between the percentage of number of landings sampled and the percentage of weight of landings sampled in the west coast single trawl fishery (*see* Table 2) because samples were taken only from landings where snapper was the target species of capture. Landings where snapper was a bycatch generally weighed less. The summarised information in Table 2 is for all landings containing snapper (target and bycatch) from the SNA 8 stock. The SNA 1 fishery was more evenly spread over the entire year, with more of the landed catch taken by longline from the Hauraki Gulf substock than in the last few years and less taken in the East Northland and Bay of Plenty substocks respectively (Tables 1 and 3–5). Snapper was almost always the target species in SNA 1 longline landings.

Length and age distributions

For the west coast single trawl and Bay of Plenty longline fisheries, catch-at-age compositions were derived from the combined spring and summer length distributions and used 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 snapper over 25 cm long grow little 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 those of snapper (Westrheim & Ricker 1978).

Sample length and age distributions for the 1998–99 season are presented as histograms for the west coast single trawl and Bay of Plenty longline fisheries (Figures 2–5). Age distributions derived from random age frequency approaches are given for the Hauraki Gulf and East Northland longline fisheries with analytical and bootstrap variance estimates (Figures 6 and 7). The estimated proportions at length and 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 compositions (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, and had a broad tail extending to over 70 cm (Figure 2). The mean length of snapper sampled from the fishery was 36.0 cm, and the MWCV of the proportions was 0.10.

Relative year class strengths were discernible from the age composition, with the 1995 year class (4 year olds) appearing very strong, making up 41% of the catch, and the 1992 year class (7 year olds) particularly weak. The distribution consisted mainly of fish between 3 and 8 years old, with only 8% of fish being 9 years old or greater. The mean age of snapper from the west coast single trawl fishery was 5.5 years (Figure 3). The age distribution had a MWCV of 0.10.

East coast snapper (SNA 1)

Bay of Plenty

The length distribution of the Bay of Plenty longline fishery was characterised by a broad mode between 26 and 38 cm with a tail extending to over 60 cm and MWCV of 0.09 (Figure 4). The mean length of snapper sampled from the fishery was 34.0 cm.

The longline age distribution consisted mainly of fish between 4 and 11 years old, with only 5% of fish being 12 years old or greater. The distribution had a mean age of 7.4 years and a MWCV of 0.16 (Figure 5). Most evident was the strong 1994 year class (5 year olds) which made up 24% of the catch. This year class appears to be incompletely recruited, containing a proportion of 25 cm fish (*see* Appendix 4).

Hauraki Gulf

The Hauraki Gulf longline age distribution was dominated by the strong 1991 and 1989 year classes (8 and 10 year olds respectively) which made up almost 50% of the catch (Figure 6). The 1989 year class is now fully recruited to the fishery, but the 1991 year class still contains a proportion of 25 cm fish (*see* Appendix 4). Most of the other year classes appear relatively weak, with few fish over 15 years of age. The mean age of snapper in the Hauraki Gulf longline fishery was 9.2 years. The analytical and bootstrap MWCVs for the random age frequency approach were 0.14 and 0.19 respectively.

East Northland

The East Northland longline age distribution was broad and characterised by a noticeable proportion of fish 20 years and older (7.9%), and a high mean age of 10.6 years. The distribution was dominated by several strong year classes; 1991, 1990, and 1989 which correspond to 8, 9, and 10 year old fish, respectively (Figure 7). The 1992 year class (7 year olds), although incompletely recruited, appears weak. As in previous years, the strong 1982 and 1981 year classes (17 and 18 year olds, respectively) are evident. The analytical and bootstrap MWCVs for the random age frequency approach were 0.15 and 0.20 respectively.

Discussion

The relative year class strengths inferred from the length and age distributions sampled from the SNA 1 and SNA 8 fisheries in the 1998–99 season are generally consistent with trends observed in previous years (McKenzie *et al.* 1992, Davies & Walsh 1995, Walsh *et al.* 1995, 1997, 1998, 1999). In 1998–99, it was possible to sample from all sectors of the fishing industry, although particular areas within the Hauraki Gulf substock still had seasonal closures.

The west coast single trawl age distribution was dominated by the very strong 1995 year class (4 year olds) which accounted for over 40% of snapper in single trawl landings in 1998–99. As a result of this strong recruitment, the relative year class strengths of all other age classes appear to have lessened. Consequently, mean length and age have decreased. The previously strong 1993 and 1991 year classes (6 and 8 year olds) now account for about 25% of the 1998–99 single trawl catch, and fish over 8 years old account for only 8%.

The Bay of Plenty length and age distributions in 1998–99 have broadened slightly from those obtained in the previous year, while mean length and age have slightly decreased. The main reason for this change is the recruitment of the strong 1994 year class into the fishery causing an increase in the number of smaller fish in the length frequency distribution. This year class accounted for 63% of fish on average in the 25–30 cm length classes, and 24% of the Bay of Plenty longline catch overall. As such, the 1989 and 1991 year classes have lessened in their relative strength, accounting for just 28% of the snapper caught by longline in the Bay of Plenty. The fishery contains low numbers of old fish, only 5% being 12 years of age or older.

As in 1996–97 and 1997–98, the strong 1989 and 1991 year classes continue to account for a high proportion of the Hauraki Gulf longline catch. The 1993 and 1992 year classes (6 and 7 year olds, respectively), although not yet fully recruited, appear to be of low strength. The once very strong 1981 year class (18 year olds) now accounts for little of the catch, as do the number of fish over 19 years of age. As a result, the mean age of snapper landed has reduced slightly. Relative year class strengths inferred from the Hauraki Gulf longline age distribution in 1998–99, and those of previous years (Davies & Walsh 1995, Walsh *et al.* 1995, 1997, 1998, 1999), are generally consistent with

those predicted from the temperature-recruitment relationship and trawl surveys of 1 year old snapper (Francis *et al.* 1995, 1997). However, a difference in the predicted relative strengths of the 1990 and 1991 year classes, apparent since 1996–97, is also evident in 1998–99. The temperature-recruitment relationship predicts that the 1989 and 1990 year classes are of similar strength and the 1991 year class is below average. In the 1998–99 Hauraki Gulf longline age distribution, the 1989 and 1991 year classes are of similar strength and the 1990 year class is of low strength. Although some of these year classes are not fully recruited, complete recruitment in the future is likely to confirm this disagreement.

The distribution at age for snapper from the East Northland longline fishery in 1998–99 was typical of distributions seen in past years, except for the 1997–98 catch-at-age sample. Access to a company that contributes a considerable amount to the overall East Northland catch was achieved in 1998–99 allowing landings to be sampled from all areas of the substock. The longline age distribution was broad and contained many fish over 19 years of age. The 1982 year class (17 year olds) was relatively strong, something unique to the East Northland substock, and the 1990 year class was of greater relative strength than in the adjacent Hauraki Gulf and Bay of Plenty substocks. Unlike the other SNA 1 substocks, a considerable number of the 1981 year class (18 year olds) still remains in the East Northland fishery. Such differences in year class strength may reflect hydrodynamic and recruitment processes unique to East Northland and the relative healthy state of the substock.

Since 1989–90, broad similarities in relative year class strengths and recruitment patterns have been evident between the SNA 1 substocks, particularly in extremely strong and weak year classes (Davies & Walsh 1995, Walsh *et al.* 1995, 1997, 1998, 1999). The strong 1989 and 1991 year classes are clearly evident in all three substocks of SNA 1, as are the weak 1987 and 1992 year classes. The strong 1994 year class is most evident in the Bay of Plenty catch-at-age distribution, probably because of a faster growth rate relative to the other SNA 1 substocks (Walsh 1997). As seen in previous years, most of the Bay of Plenty length and age samples were collected from the western side of the Bay, the area nearest the Hauraki Gulf. Similarities in proportion at age estimates between these two substocks may result from the close proximity of the two fishing grounds and the level of mixing that is thought to occur (Annala & Sullivan 1996). However, some differences in year class strengths are evident between these two areas (Gilbert 1999). The 1981, 1982, and 1990 year classes and the over 19 years of age group appear strong in the East Northland substock only.

Apart from the strong 1991 and weak 1992 year classes, few similarities in relative year class strengths are apparent between the SNA 1 and SNA 8 stocks.

Differences were apparent between the analytical and bootstrap solutions for the variances of proportion-at-age estimates for snapper in landings sampled from the Hauraki Gulf and East Northland longline fisheries. The bootstrap variances were higher, particularly in the less abundant age classes, i.e., young and old classes. It is possible that this is caused by the clustering of fish with respect to bins which is more apparent for the smaller and larger length intervals (hence younger and older fish). This effect would not be adequately accommodated in the analytical solution for variance that assumes a normal distribution for the mean proportion-at-age between landings. Given the sizes of the random age frequency samples collected from these fisheries, the bootstrap solutions most likely provide more accurate variance estimates.

The MWCV (analytical estimates only) for the length and age distributions sampled from the SNA 1 and SNA 8 fisheries in 1998–99 ranged between 0.09 and 0.16.

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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 1998–99 sampling period (01/10/98 to 28/02/99)**

	BPT	BT	BLL	DS	Other
West coast	29	66	2	0	3
Bay of Plenty	1	41	19	37	2
Hauraki Gulf	1	19	64	13	3
East Northland	0	16	79	0	5

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

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 1998 to summer 1998–99***

		Number of landings			No. of fish	Weight of landings (t)		
Method	Season	Total	Sampled	% of total	measured	Total	Sampled	% of total
BPT	Autumn	3	0	0	0	4	0	0
	Winter	0	0	0	0	0	0	0
	Spring	16	0	0	0	66	0	0
	Summer	45	0	0	0	238	0	0
BT	Autumn	262	0	0	0	211	0	0
	Winter	216	0	0	0	105	0	0
	Spring	235	10	4.3	7 247	396	83	21.0
	Summer	337	3	0.9	2 129	345	25	7.2

* 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 Bay of Plenty snapper fisheries from autumn 1998 to summer 1998–99***

		Number of landings			No. of fish	Weight of landings (t)		
Method	Season	Total	Sampled	% of total	measured	Total	Sampled	% of total
BLL	Autumn	221	0	0	0	60	0	0
	Winter	194	0	0	0	63	0	0
	Spring	206	21	10.2	4 132	45	5	11.1
	Summer	221	13	5.9	2 686	56	3	5.4
BT	Autumn	116	0	0	0	91	0	0
	Winter	95	0	0	0	87	0	0
	Spring	87	0	0	0	83	0	0
	Summer	114	0	0	0	127	0	0
DS	Autumn	49	0	0	0	70	0	0
	Winter	68	0	0	0	85	0	0
	Spring	79	0	0	0	101	0	0
	Summer	46	0	0	0	82	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 Hauraki Gulf snapper fisheries from autumn 1998 to summer 1998–99***

Method	Season	Number of landings			No. of fish measured	Weight of landings (t)		
		Total	Sampled	% of total		Total	Sampled	% of total
BLL	Autumn	748	0	0	0	216	0	0
	Winter	611	0	0	0	171	0	0
	Spring	791	23	2.9	518	347	15	4.3
	Summer	795	20	2.5	458	336	12	3.6
BT	Autumn	124	0	0	0	230	0	0
	Winter	44	0	0	0	50	0	0
	Spring	65	0	0	0	152	0	0
	Summer	31	0	0	0	57	0	0
DS	Autumn	86	0	0	0	103	0	0
	Winter	49	0	0	0	24	0	0
	Spring	69	0	0	0	48	0	0
	Summer	88	0	0	0	86	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 1998 to summer 1998–99***

Method	Season	Number of landings			No. of fish measured	Weight of landings (t)		
		Total	Sampled	% of total		Total	Sampled	% of total
BLL	Autumn	710	0	0	0	163	0	0
	Winter	759	0	0	0	194	0	0
	Spring	731	19	2.6	473	199	13	6.5
	Summer	620	24	3.9	548	165	14	8.5

* BLL, longline.

Table 6: **Details of snapper otolith samples collected in 1998–99 from the stock and substocks in SNA 1 and SNA 8***

Area	Fishing method †	Sampling period	Sample method #	Length range (cm)	No. aged
WCNI	BPT, BT	Spring, summer	SR	25–70	502
BPLE	BLL, DS, RT	Spring, summer	SR	23–68	312
HAGU	BLL	Spring, summer	R	24–76	976
ENLD	BLL	Spring, summer	R	23–74	1 021

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

† BPT, pair trawl; BT, single trawl; BLL, longline; DS, Danish seine; RT, research trawl.

SR, stratified random sample; R, random sample.

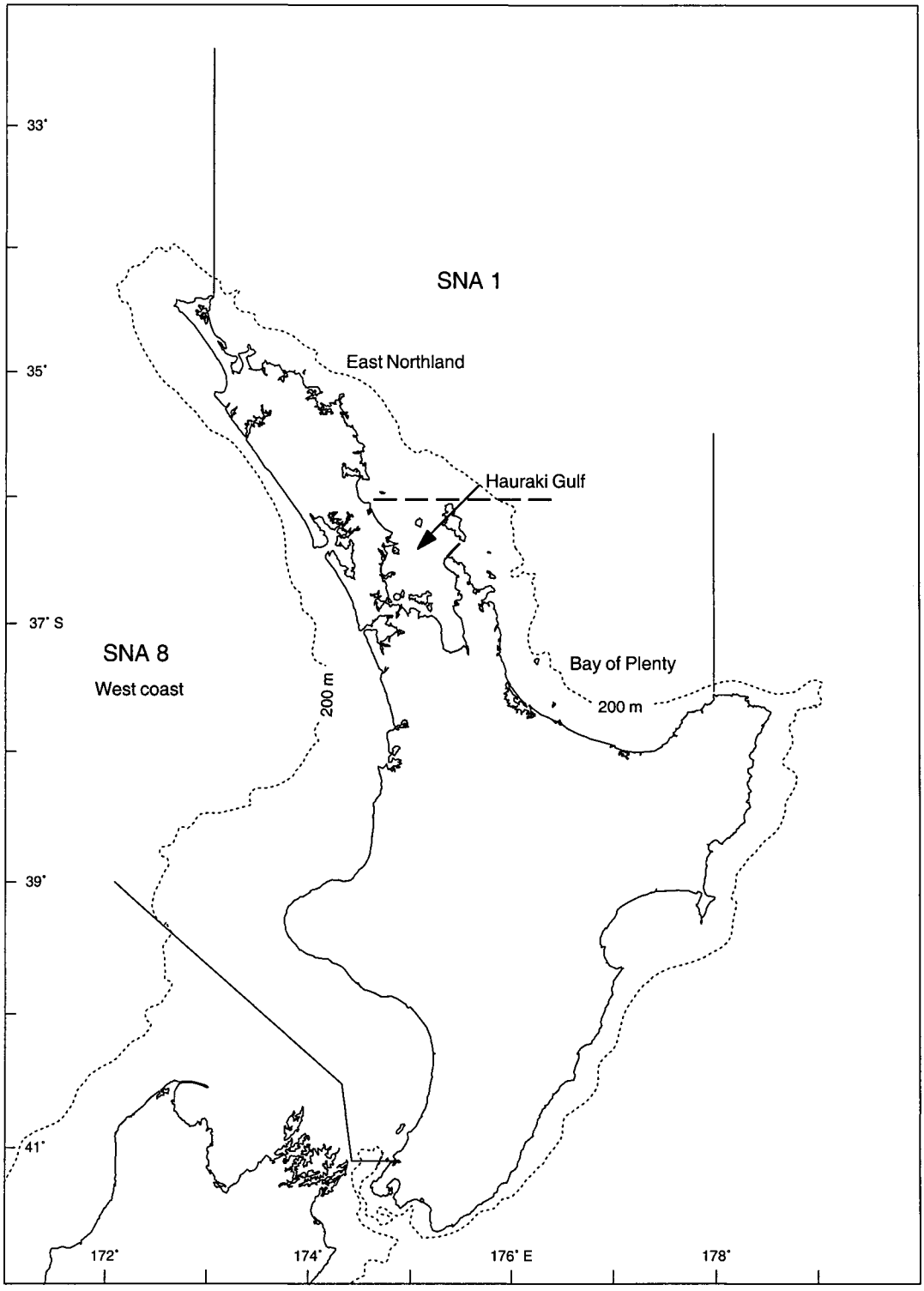

Figure 1: **Quota management areas for the east and west coast North Island snapper stocks (SNA 1 and SNA 8 respectively) and the range of the three SNA 1 substocks; East Northland, Hauraki Gulf, and Bay of Plenty.**

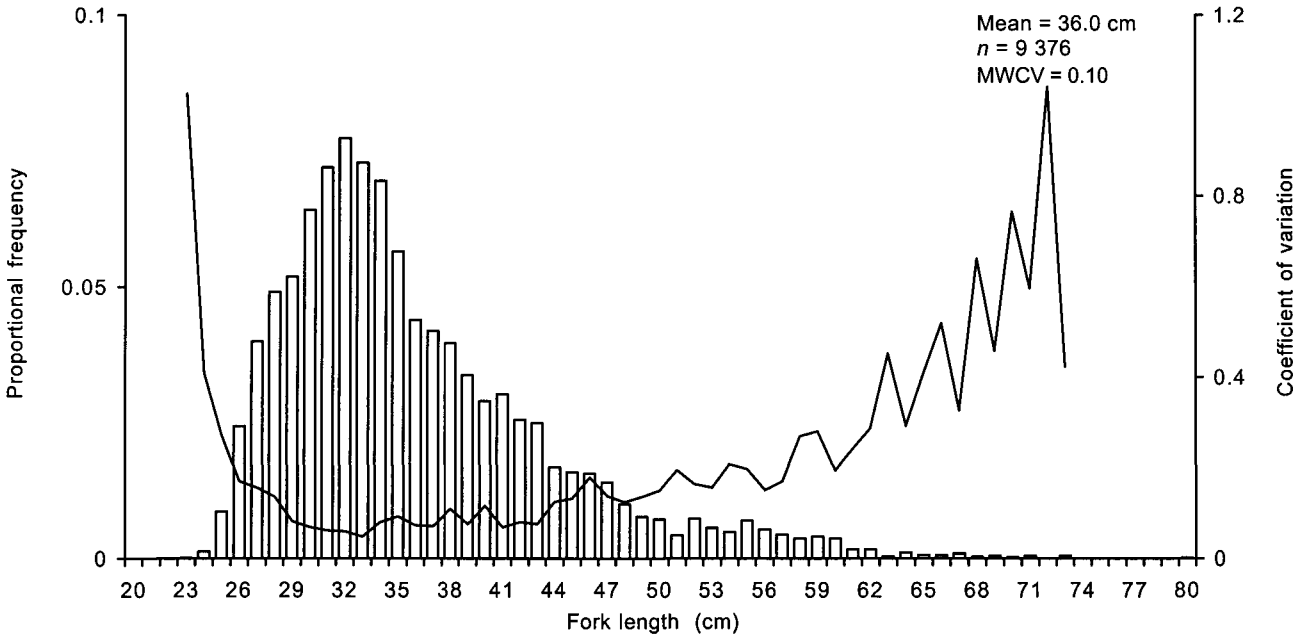

Figure 2: **Proportion at length distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the west coast single trawl fishery in 1998–99 (*n* denotes length sample size, MWCV denotes mean weighted *c.v.*).**

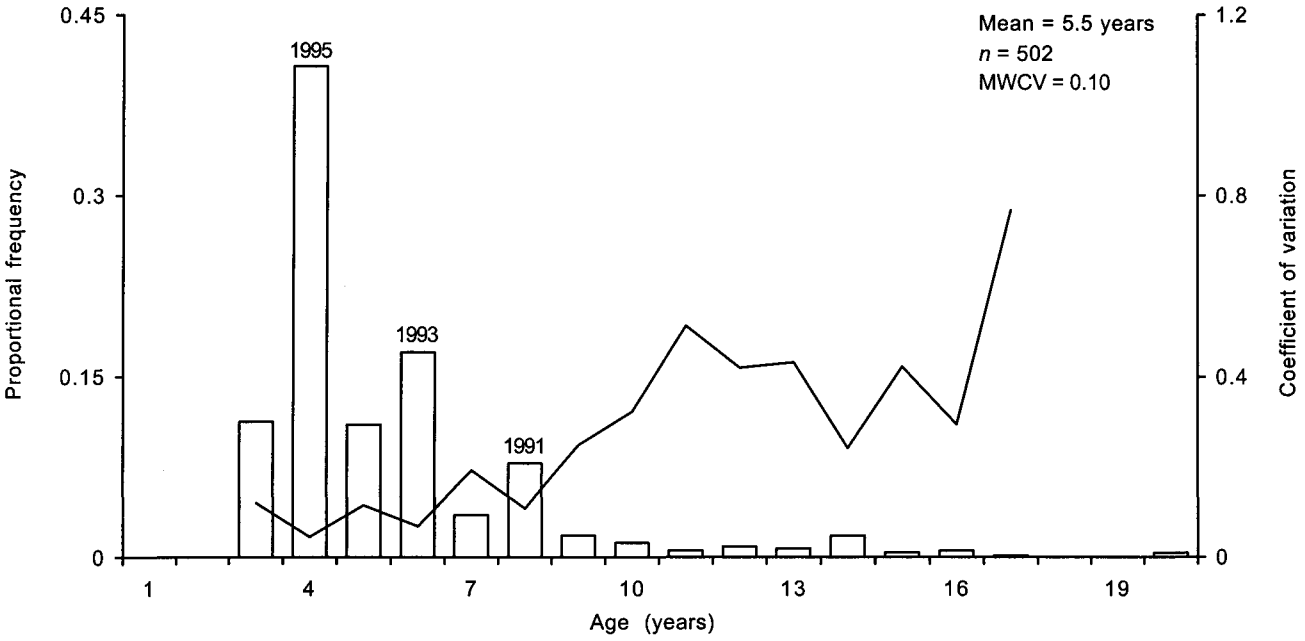

Figure 3: **Proportion at age distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the west coast single trawl fishery in 1998–99 using the age-length key approach (*n* denotes otolith sample size, MWCV denotes mean weighted *c.v.*).**

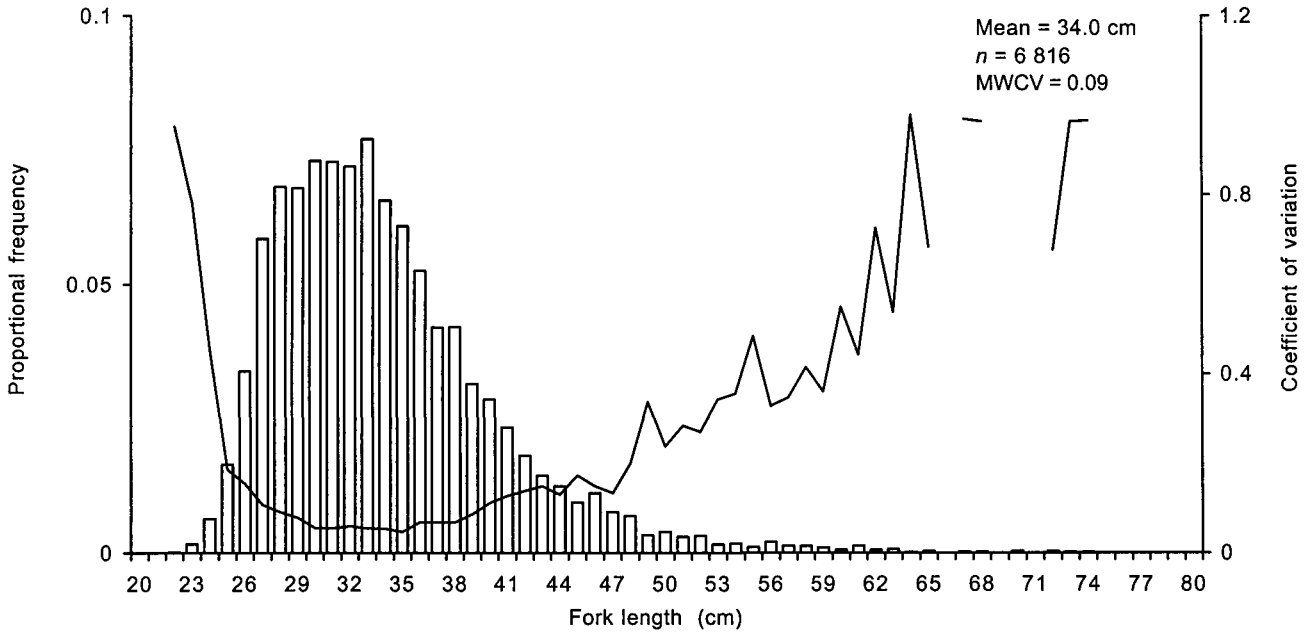

Figure 4: **Proportion at length distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the Bay of Plenty longline fishery in 1998–99 (*n* denotes length sample size, MWCV denotes mean weighted *c.v.*).**

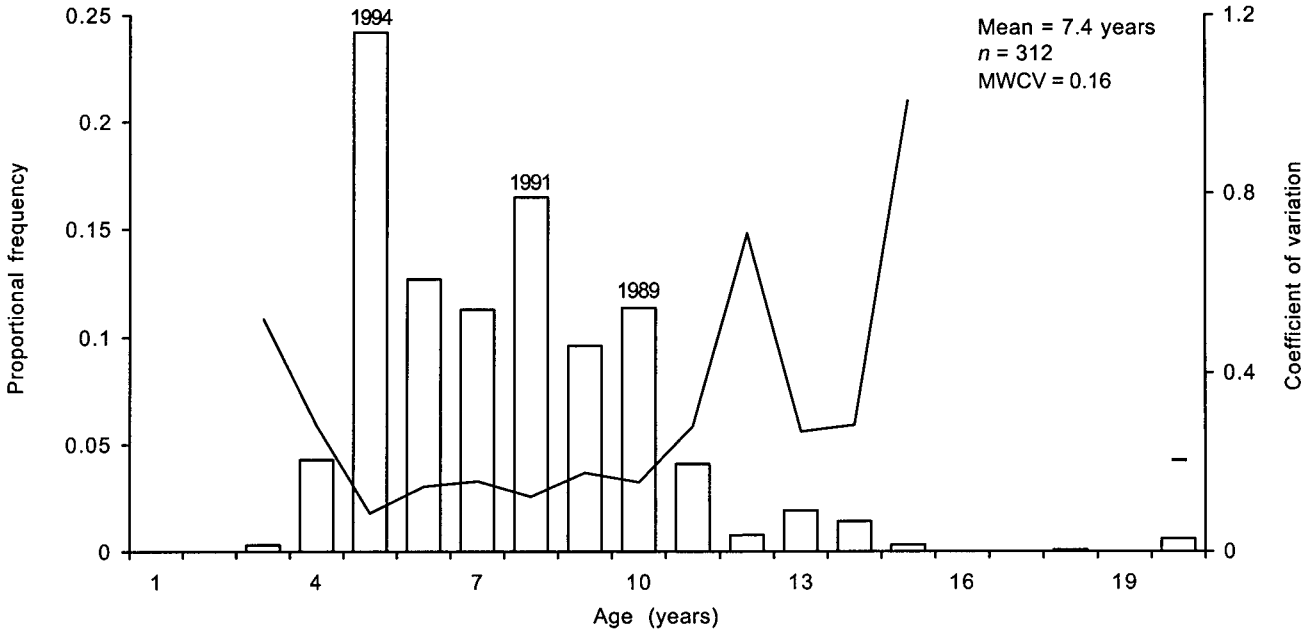

Figure 5: **Proportion at age distribution (histogram) and *c.v.*s (solid line) determined from snapper landings sampled from the Bay of Plenty longline fishery in 1998–99 using the age-length key approach (*n* denotes otolith sample size, MWCV denotes mean weighted *c.v.*).**

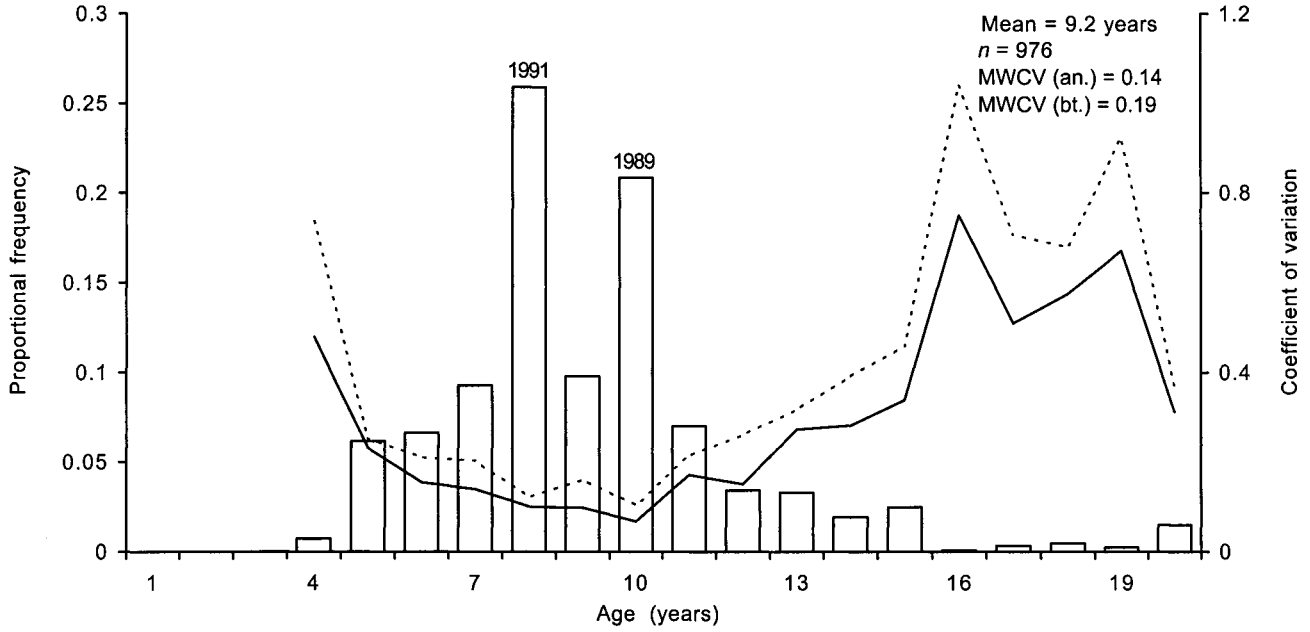

Figure 6: **Proportion at age distribution (histogram) and *c.v.*s (solid and dashed lines represent analytical and bootstrap estimates respectively) determined from snapper landings sampled from the Hauraki Gulf longline fishery in 1998–99 using the random age frequency approach (*n* denotes otolith sample size, MWCV denotes mean weighted *c.v.* calculated using the analytical, an., and bootstrap, bt. *c.v.*s).**

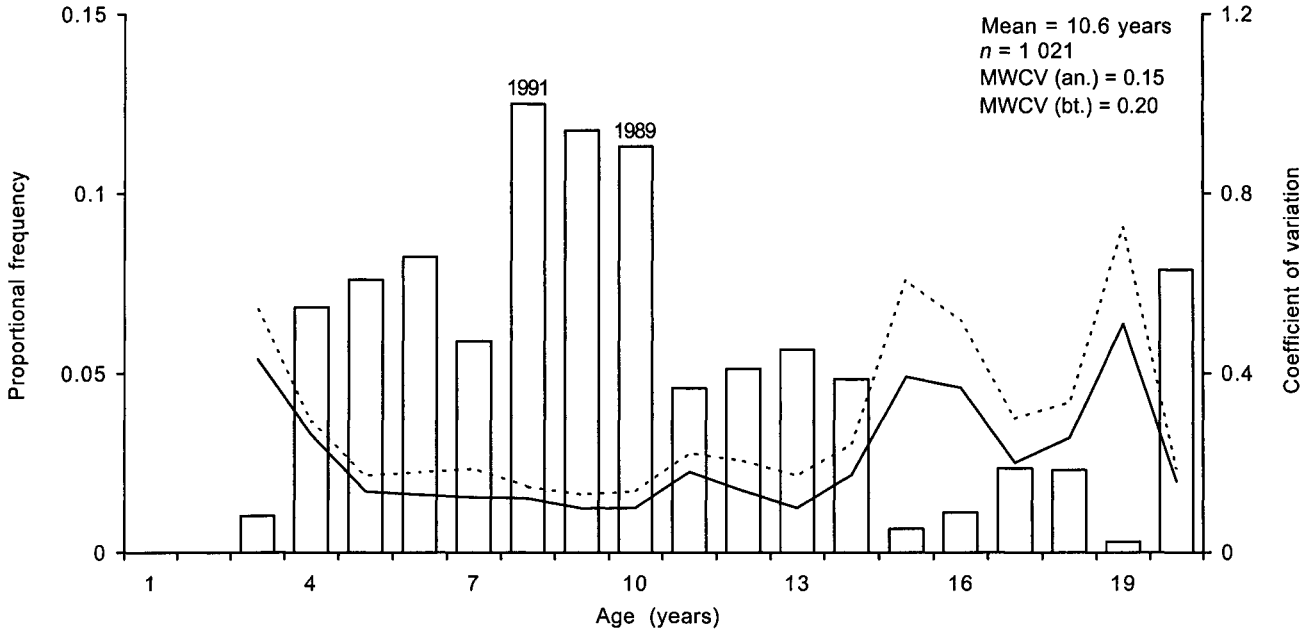

Figure 7: **Proportion at age distribution (histogram) and *c.v.*s (solid and dashed lines represent analytical and bootstrap estimates respectively) determined from snapper landings sampled from the East Northland longline fishery in 1998–99 using the random age frequency approach (*n* denotes otolith sample size, MWCV denotes mean weighted *c.v.* calculated using the analytical, an., and bootstrap, bt. *c.v.*s).**

Appendix 1: **Estimated seasonal proportion at length and *c.v.* s for snapper fisheries in SNA 1 and SNA 8 in 1998–99**

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 1998–99

	Single trawl					
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	0.0001	1.03	0.0000	0.00	0.0001	1.02
24	0.0011	0.54	0.0018	0.41	0.0012	0.41
25	0.0090	0.32	0.0066	0.23	0.0085	0.27
26	0.0252	0.19	0.0206	0.39	0.0243	0.17
27	0.0422	0.17	0.0302	0.24	0.0398	0.15
28	0.0492	0.15	0.0481	0.36	0.0490	0.14
29	0.0540	0.09	0.0430	0.08	0.0518	0.08
30	0.0661	0.08	0.0564	0.14	0.0641	0.07
31	0.0748	0.07	0.0603	0.08	0.0719	0.06
32	0.0797	0.07	0.0671	0.10	0.0772	0.06
33	0.0735	0.05	0.0693	0.10	0.0727	0.05
34	0.0723	0.09	0.0578	0.10	0.0693	0.08
35	0.0600	0.10	0.0424	0.07	0.0564	0.09
36	0.0445	0.08	0.0411	0.17	0.0438	0.07
37	0.0437	0.08	0.0341	0.17	0.0418	0.07
38	0.0424	0.10	0.0285	0.41	0.0396	0.11
39	0.0323	0.08	0.0390	0.22	0.0336	0.08
40	0.0282	0.13	0.0314	0.32	0.0289	0.12
41	0.0293	0.07	0.0333	0.21	0.0301	0.07
42	0.0244	0.10	0.0296	0.15	0.0254	0.08
43	0.0238	0.08	0.0290	0.18	0.0249	0.08
44	0.0141	0.11	0.0269	0.12	0.0167	0.12
45	0.0129	0.11	0.0272	0.04	0.0158	0.13
46	0.0122	0.19	0.0289	0.06	0.0155	0.18
47	0.0129	0.16	0.0178	0.22	0.0139	0.14
48	0.0084	0.13	0.0159	0.08	0.0099	0.12
49	0.0069	0.17	0.0104	0.07	0.0076	0.14
50	0.0069	0.18	0.0082	0.20	0.0072	0.15
51	0.0035	0.23	0.0071	0.39	0.0042	0.19
52	0.0066	0.21	0.0098	0.29	0.0073	0.16
53	0.0053	0.21	0.0068	0.15	0.0056	0.16
54	0.0035	0.23	0.0104	0.27	0.0049	0.21
55	0.0053	0.11	0.0135	0.24	0.0069	0.20
56	0.0048	0.15	0.0075	0.31	0.0053	0.15
57	0.0039	0.22	0.0059	0.16	0.0043	0.17
58	0.0029	0.36	0.0064	0.06	0.0036	0.27
59	0.0028	0.25	0.0086	0.33	0.0040	0.28
60	0.0031	0.19	0.0058	0.36	0.0036	0.19
61	0.0015	0.30	0.0025	0.37	0.0017	0.24
62	0.0013	0.36	0.0031	0.29	0.0017	0.29
63	0.0003	0.60	0.0007	0.76	0.0004	0.45
64	0.0014	0.24	0.0000	0.00	0.0011	0.29
65	0.0007	0.44	0.0006	1.24	0.0007	0.41
66	0.0004	0.61	0.0014	0.75	0.0006	0.52
67	0.0009	0.40	0.0010	0.47	0.0009	0.33
68	0.0004	0.65	0.0000	0.00	0.0003	0.66
69	0.0003	0.72	0.0011	0.27	0.0005	0.46
70	0.0003	0.75	0.0000	0.00	0.0002	0.77
71	0.0002	0.84	0.0014	0.75	0.0005	0.60
72	0.0000	0.00	0.0003	1.24	0.0001	1.04
73	0.0002	0.74	0.0014	0.06	0.0005	0.42
74	0.0000	0.00	0.0000	0.00	0.0000	0.00
75	0.0001	1.01	0.0000	0.00	0.0001	1.01
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	0.0002	0.98	0.0000	0.00	0.0001	0.99
Nt	370 511		268 035		665 648	
n	7 247		2 129		9 376	

Appendix 1 – **continued:**
Estimates of the proportion at length of snapper from the Bay of Plenty longline fishery in 1998–99

	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	0.0003	0.95	0.0001	0.95
23	0.0000	0.00	0.0042	0.77	0.0016	0.78
24	0.0012	0.39	0.0145	0.49	0.0063	0.46
25	0.0112	0.19	0.0248	0.26	0.0164	0.18
26	0.0312	0.19	0.0379	0.26	0.0338	0.15
27	0.0564	0.15	0.0616	0.15	0.0584	0.11
28	0.0641	0.11	0.0745	0.16	0.0680	0.09
29	0.0674	0.11	0.0687	0.11	0.0679	0.08
30	0.0713	0.07	0.0754	0.08	0.0729	0.06
31	0.0751	0.07	0.0688	0.09	0.0727	0.05
32	0.0752	0.08	0.0664	0.08	0.0718	0.06
33	0.0824	0.06	0.0681	0.11	0.0769	0.05
34	0.0675	0.07	0.0625	0.09	0.0656	0.05
35	0.0624	0.04	0.0582	0.11	0.0608	0.05
36	0.0588	0.08	0.0423	0.09	0.0525	0.07
37	0.0442	0.08	0.0384	0.12	0.0420	0.07
38	0.0458	0.07	0.0361	0.14	0.0421	0.07
39	0.0320	0.11	0.0305	0.14	0.0315	0.09
40	0.0285	0.17	0.0287	0.10	0.0286	0.11
41	0.0205	0.17	0.0279	0.19	0.0233	0.13
42	0.0178	0.20	0.0183	0.16	0.0180	0.14
43	0.0154	0.19	0.0124	0.20	0.0143	0.15
44	0.0119	0.15	0.0132	0.25	0.0124	0.13
45	0.0095	0.20	0.0089	0.33	0.0093	0.17
46	0.0102	0.23	0.0124	0.17	0.0110	0.15
47	0.0072	0.19	0.0081	0.18	0.0075	0.13
48	0.0081	0.25	0.0046	0.26	0.0068	0.20
49	0.0032	0.44	0.0034	0.54	0.0033	0.34
50	0.0038	0.26	0.0039	0.48	0.0039	0.24
51	0.0029	0.27	0.0030	0.61	0.0029	0.28
52	0.0037	0.34	0.0021	0.37	0.0031	0.27
53	0.0015	0.42	0.0017	0.60	0.0016	0.34
54	0.0012	0.40	0.0026	0.54	0.0017	0.36
55	0.0005	0.91	0.0019	0.59	0.0011	0.48
56	0.0016	0.44	0.0025	0.51	0.0020	0.33
57	0.0006	0.51	0.0023	0.42	0.0013	0.35
58	0.0009	0.45	0.0019	0.65	0.0013	0.41
59	0.0010	0.47	0.0009	0.57	0.0010	0.36
60	0.0007	0.67	0.0004	0.93	0.0006	0.55
61	0.0013	0.62	0.0013	0.57	0.0013	0.44
62	0.0002	0.94	0.0010	0.97	0.0005	0.73
63	0.0004	0.95	0.0010	0.63	0.0006	0.54
64	0.0002	0.98	0.0000	0.00	0.0001	0.98
65	0.0005	0.67	0.0000	0.00	0.0003	0.68
66	0.0000	0.00	0.0000	0.00	0.0000	0.00
67	0.0002	0.96	0.0000	0.00	0.0001	0.97
68	0.0000	0.00	0.0003	0.99	0.0001	0.96
69	0.0000	0.00	0.0000	0.00	0.0000	0.00
70	0.0002	0.95	0.0006	0.71	0.0003	0.56
71	0.0000	0.00	0.0000	0.00	0.0000	0.00
72	0.0000	0.00	0.0008	0.66	0.0003	0.68
73	0.0000	0.00	0.0003	0.99	0.0001	0.96
74	0.0000	0.00	0.0003	0.99	0.0001	0.97
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	48 400		61 424		109 768	
n	4 132		2 686		6 818	

Appendix 1 – **continued:**
Estimates of the proportion at length of snapper from the Hauraki Gulf longline fishery in 1998–99

	Longline	
Length	Spr-sum	
(cm)	*P.i.*	*c.v.*
20	0.0000	0.00
21	0.0000	0.00
22	0.0000	0.00
23	0.0000	0.00
24	0.0006	1.02
25	0.0173	0.40
26	0.0333	0.50
27	0.0214	0.21
28	0.0444	0.25
29	0.0748	0.15
30	0.0746	0.21
31	0.0548	0.12
32	0.0726	0.12
33	0.0987	0.10
34	0.0835	0.18
35	0.0645	0.18
36	0.0447	0.20
37	0.0402	0.23
38	0.0454	0.14
39	0.0287	0.28
40	0.0325	0.22
41	0.0276	0.22
42	0.0249	0.26
43	0.0223	0.26
44	0.0158	0.28
45	0.0127	0.24
46	0.0183	0.33
47	0.0054	0.44
48	0.0056	0.42
49	0.0016	0.55
50	0.0070	0.39
51	0.0058	0.60
52	0.0025	0.51
53	0.0015	0.64
54	0.0023	0.63
55	0.0019	0.56
56	0.0056	0.57
57	0.0008	0.75
58	0.0000	0.00
59	0.0011	0.74
60	0.0009	0.74
61	0.0000	0.00
62	0.0004	1.02
63	0.0018	0.62
64	0.0005	1.02
65	0.0005	1.02
66	0.0000	0.00
67	0.0000	0.00
68	0.0011	0.75
69	0.0000	0.00
70	0.0000	0.00
71	0.0000	0.00
72	0.0000	0.00
73	0.0000	0.00
74	0.0000	0.00
75	0.0000	0.00
76	0.0006	1.02
77	0.0000	0.00
78	0.0000	0.00
79	0.0000	0.00
80	0.0000	0.00
Nt	690 038	
n	976	

Appendix 1 – **continued:**
Estimates of the proportion at length of snapper from the East Northland longline fishery in 1998–99

	Longline	
Length	Spr-sum	
(cm)	*P.i.*	*c.v.*
20	0.0000	0.00
21	0.0000	0.00
22	0.0000	0.00
23	0.0007	1.00
24	0.0037	0.58
25	0.0142	0.38
26	0.0243	0.27
27	0.0502	0.23
28	0.0392	0.16
29	0.0600	0.16
30	0.0748	0.16
31	0.0764	0.15
32	0.0676	0.17
33	0.0842	0.11
34	0.0469	0.15
35	0.0501	0.16
36	0.0386	0.17
37	0.0433	0.17
38	0.0451	0.14
39	0.0324	0.17
40	0.0311	0.20
41	0.0338	0.20
42	0.0285	0.21
43	0.0188	0.25
44	0.0131	0.23
45	0.0135	0.29
46	0.0209	0.24
47	0.0069	0.37
48	0.0112	0.28
49	0.0088	0.31
50	0.0104	0.30
51	0.0076	0.48
52	0.0103	0.38
53	0.0031	0.54
54	0.0036	0.52
55	0.0034	0.76
56	0.0040	0.55
57	0.0022	0.58
58	0.0039	0.59
59	0.0026	0.70
60	0.0010	0.72
61	0.0027	0.70
62	0.0025	0.71
63	0.0015	0.71
64	0.0004	1.01
65	0.0000	0.00
66	0.0000	0.00
67	0.0000	0.00
68	0.0000	0.00
69	0.0000	0.00
70	0.0000	0.00
71	0.0008	0.99
72	0.0000	0.00
73	0.0000	0.00
74	0.0017	0.95
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	336 974	
n	1 021	

Appendix 2: **Estimated seasonal proportion at age and *c.v.* s for snapper fisheries in SNA 1 and SNA 8 in 1998–99**
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 1998–99
Otolith sample size = 502

					Age-length key Single trawl	
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	0.1162	0.12	0.0970	0.13	0.1123	0.12
4	0.4209	0.05	0.3523	0.05	0.4070	0.04
5	0.1136	0.12	0.0961	0.12	0.1101	0.12
6	0.1710	0.07	0.1678	0.08	0.1704	0.07
7	0.0339	0.19	0.0403	0.20	0.0352	0.19
8	0.0700	0.11	0.1092	0.11	0.0779	0.11
9	0.0158	0.25	0.0277	0.26	0.0182	0.25
10	0.0107	0.32	0.0175	0.34	0.0121	0.32
11	0.0049	0.51	0.0087	0.54	0.0057	0.51
12	0.0076	0.41	0.0147	0.45	0.0091	0.42
13	0.0064	0.43	0.0102	0.45	0.0071	0.43
14	0.0150	0.25	0.0299	0.26	0.0180	0.24
15	0.0033	0.42	0.0063	0.49	0.0039	0.42
16	0.0041	0.36	0.0106	0.27	0.0054	0.29
17	0.0012	0.76	0.0033	0.82	0.0016	0.77
18	0.0000	0.00	0.0000	0.00	0.0000	0.00
19	0.0000	0.00	0.0000	0.00	0.0000	0.00
>19	0.0035	0.20	0.0035	0.37	0.0035	0.17

Estimates of proportion at age of snapper from the Bay of Plenty longline fishery in 1998–99
Otolith sample size = 312

					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	0.0005	0.76	0.0075	0.51	0.0031	0.52
4	0.0375	0.31	0.0514	0.26	0.0428	0.28
5	0.2329	0.09	0.2565	0.08	0.2419	0.09
6	0.1300	0.15	0.1218	0.15	0.1269	0.15
7	0.1154	0.16	0.1091	0.16	0.1130	0.16
8	0.1716	0.12	0.1538	0.13	0.1648	0.12
9	0.0988	0.18	0.0915	0.18	0.0961	0.18
10	0.1177	0.16	0.1071	0.16	0.1137	0.16
11	0.0422	0.28	0.0390	0.29	0.0410	0.28
12	0.0076	0.71	0.0077	0.71	0.0077	0.71
13	0.0188	0.29	0.0201	0.27	0.0193	0.27
14	0.0140	0.32	0.0145	0.26	0.0142	0.28
15	0.0032	1.01	0.0030	1.02	0.0031	1.01
16	0.0000	0.00	0.0000	0.00	0.0000	0.00
17	0.0000	0.00	0.0000	0.00	0.0000	0.00
18	0.0008	1.08	0.0008	1.10	0.0008	1.05
19	0.0000	0.00	0.0000	0.00	0.0000	0.00
>19	0.0044	0.28	0.0085	0.23	0.0059	0.20

Appendix 2 – **continued:**

Estimates of proportion at age with coefficients of variation (analytical & bootstrap estimates, *c.v. (an.)* & *c.v. (bt.)* respectively), for snapper from the Hauraki Gulf longline fishery in 1998–99

Otolith sample size = 976

	Random age frequency		
			Longline
Age			Spr-sum
(years)	*P.j.*	*c.v. (an)*	*c.v. (bt)*
1	0.0000	0.00	0.00
2	0.0000	0.00	0.00
3	0.0000	0.00	0.00
4	0.0073	0.48	0.74
5	0.0615	0.23	0.25
6	0.0664	0.15	0.21
7	0.0927	0.14	0.20
8	0.2589	0.10	0.12
9	0.0979	0.10	0.16
10	0.2085	0.07	0.10
11	0.0702	0.17	0.21
12	0.0341	0.15	0.26
13	0.0329	0.27	0.32
14	0.0192	0.28	0.39
15	0.0246	0.34	0.46
16	0.0008	0.75	1.04
17	0.0032	0.51	0.71
18	0.0047	0.57	0.68
19	0.0024	0.67	0.92
>19	0.0149	0.31	0.37

Estimates of proportion at age with coefficients of variation (analytical & bootstrap estimates, *c.v. (an.)* & *c.v. (bt.)* respectively), for snapper from the East Northland longline fishery in 1998–99

Otolith sample size = 1 021

	Random age frequency		
			Longline
Age			Spr-sum
(years)	*P.j.*	*c.v. (an)*	*c.v. (bt)*
1	0.0000	0.00	0.00
2	0.0000	0.00	0.00
3	0.0102	0.43	0.54
4	0.0684	0.26	0.29
5	0.0761	0.14	0.17
6	0.0824	0.13	0.18
7	0.0590	0.12	0.19
8	0.1250	0.12	0.15
9	0.1176	0.10	0.13
10	0.1132	0.10	0.14
11	0.0459	0.18	0.22
12	0.0513	0.14	0.20
13	0.0567	0.10	0.17
14	0.0483	0.17	0.24
15	0.0066	0.39	0.61
16	0.0111	0.37	0.52
17	0.0234	0.20	0.30
18	0.0230	0.26	0.34
19	0.0030	0.51	0.72
>19	0.0787	0.16	0.19

Appendix 3 : **Estimated mean weight at age (kg) and *c.v.* s for snapper fisheries in SNA 1 and SNA 8 in 1998–99**
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 1998–99
Otolith sample size = 502

Age	Spring		Summer		Spr-sum		
(years)	Mean	*c.v.*	Mean	*c.v.*	Mean	*c.v.*	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	0.47	0.02	0.48	0.02	0.48	0.02	41
4	0.70	0.01	0.71	0.01	0.70	0.01	144
5	0.93	0.02	0.95	0.03	0.94	0.02	61
6	1.23	0.02	1.28	0.02	1.24	0.02	111
7	1.50	0.04	1.56	0.04	1.52	0.04	24
8	1.80	0.02	1.85	0.02	1.82	0.02	57
9	2.09	0.04	2.07	0.03	2.09	0.03	14
10	2.35	0.06	2.30	0.06	2.33	0.06	9
11	3.12	0.10	3.15	0.11	3.13	0.10	4
12	2.93	0.08	3.00	0.08	2.95	0.08	6
13	3.51	0.06	3.55	0.06	3.52	0.06	5
14	3.52	0.04	3.42	0.03	3.48	0.03	14
15	3.46	0.10	3.47	0.08	3.46	0.09	3
16	3.83	0.02	3.88	0.02	3.85	0.02	2
17	3.53	0.11	3.44	0.11	3.50	0.10	2
18	–	–	–	–	–	–	–
19	–	–	–	–	–	–	–
>19	5.40	0.02	5.69	0.02	5.45	0.02	5

Estimates of mean weight at age (kg) of snapper from the Bay of Plenty longline fishery in 1998–99
Otolith sample size = 312

Age	Spring		Summer		Spr-sum		
(years)	Mean	*c.v.*	Mean	*c.v.*	Mean	*c.v.*	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	0.32	0.01	0.31	0.02	0.31	0.02	4
4	0.55	0.06	0.48	0.06	0.52	0.06	17
5	0.55	0.03	0.53	0.02	0.54	0.02	66
6	0.70	0.04	0.69	0.04	0.70	0.04	38
7	0.75	0.04	0.74	0.05	0.75	0.05	36
8	0.92	0.04	0.92	0.04	0.92	0.04	53
9	1.11	0.06	1.13	0.06	1.12	0.06	28
10	1.20	0.05	1.21	0.05	1.20	0.05	35
11	1.48	0.09	1.48	0.08	1.48	0.08	12
12	1.42	0.05	1.42	0.05	1.42	0.05	2
13	1.94	0.06	1.91	0.05	1.93	0.05	5
14	2.20	0.14	2.37	0.12	2.27	0.13	6
15	1.85	0.01	1.85	0.01	1.85	0.01	1
16	–	–	–	–	–	–	–
17	–	–	–	–	–	–	–
18	2.92	0.01	2.92	0.01	2.92	0.01	1
19	–	–	–	–	–	–	–
>19	3.67	0.06	3.53	0.04	3.59	0.04	8

Appendix 3 – **continued:**

Estimates of mean weight at age (kg) of snapper from the Hauraki Gulf longline fishery in 1998–99

Otolith sample size = 976

Age (years)	Spr-sum Mean	*c.v.*	*n*
1	–	–	–
2	–	–	–
3	–	–	–
4	0.44	0.19	7
5	0.53	0.07	72
6	0.59	0.08	66
7	0.72	0.07	72
8	0.78	0.04	233
9	0.94	0.07	93
10	1.05	0.05	194
11	1.23	0.08	77
12	1.39	0.11	36
13	1.30	0.17	44
14	1.46	0.25	25
15	2.06	0.13	15
16	2.85	0.62	2
17	2.48	0.27	5
18	2.09	0.25	6
19	3.12	0.47	3
>19	3.75	0.09	26

Estimates of mean weight at age (kg) of snapper from the East Northland longline fishery in 1998–99

Otolith sample size = 1 021

Age (years)	Spr-sum Mean	*c.v.*	*n*
1	–	–	–
2	–	–	–
3	0.50	0.11	12
4	0.52	0.06	63
5	0.58	0.04	78
6	0.60	0.04	84
7	0.73	0.07	60
8	0.78	0.04	122
9	0.88	0.05	134
10	0.99	0.05	114
11	1.04	0.06	57
12	1.29	0.09	47
13	1.28	0.09	59
14	1.60	0.08	46
15	1.54	0.32	8
16	1.52	0.22	10
17	1.74	0.17	22
18	1.77	0.12	20
19	2.64	0.50	4
>19	2.67	0.09	81

Appendix 4: **Age-length keys derived from otolith samples collected from snapper fisheries in SNA 1 and SNA 8 in 1998–99**

Estimates of proportion of length at age for snapper sampled from the west coast, spring and summer 1998–99 (Note: Aged to 01/01/99)

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	0.90	0.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
26	0	0	0.80	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
27	0	0	0.62	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
28	0	0	0.71	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
29	0	0	0.31	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
30	0	0	0.08	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
31	0	0	0.06	0.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
32	0	0	0	0.83	0.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
33	0	0	0	0.75	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
34	0	0	0	0.67	0.19	0.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36
35	0	0	0	0.34	0.54	0.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
36	0	0	0	0.37	0.17	0.43	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	30
37	0	0	0	0.21	0.21	0.52	0.03	0.03	0	0	0	0	0	0	0	0	0	0	0	0	29
38	0	0	0	0	0.12	0.77	0.12	0	0	0	0	0	0	0	0	0	0	0	0	0	26
39	0	0	0	0	0.23	0.68	0.05	0.05	0	0	0	0	0	0	0	0	0	0	0	0	22
40	0	0	0	0.05	0.16	0.58	0.11	0.11	0	0	0	0	0	0	0	0	0	0	0	0	19
41	0	0	0	0	0.06	0.61	0.11	0.22	0	0	0	0	0	0	0	0	0	0	0	0	18
42	0	0	0	0	0	0.56	0.11	0.28	0.06	0	0	0	0	0	0	0	0	0	0	0	18
43	0	0	0	0	0	0.11	0.33	0.50	0	0.06	0	0	0	0	0	0	0	0	0	0	18
44	0	0	0	0	0	0.07	0.29	0.50	0.14	0	0	0	0	0	0	0	0	0	0	0	14
45	0	0	0	0	0	0.09	0	0.82	0.09	0	0	0	0	0	0	0	0	0	0	0	11
46	0	0	0	0	0	0.11	0	0.44	0.22	0.22	0	0	0	0	0	0	0	0	0	0	9
47	0	0	0	0	0	0.29	0.29	0.29	0	0.14	0	0	0	0	0	0	0	0	0	0	7
48	0	0	0	0	0	0	0	0.29	0.43	0	0.14	0.14	0	0	0	0	0	0	0	0	7
49	0	0	0	0	0	0	0	0.57	0.29	0	0	0.14	0	0	0	0	0	0	0	0	7
50	0	0	0	0	0	0	0	0.43	0.43	0	0	0	0	0	0.14	0	0	0	0	0	7
51	0	0	0	0	0	0	0	0.50	0	0.17	0	0	0	0.33	0	0	0	0	0	0	6
52	0	0	0	0	0	0	0	0.17	0	0.17	0	0.33	0.17	0.17	0	0	0	0	0	0	6
53	0	0	0	0	0	0	0	0	0	0.60	0.20	0	0	0.20	0	0	0	0	0	0	5
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.25	0	0.25	0	0	0	4
55	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0.67	0	0	0	0	0	0	3
56	0	0	0	0	0	0	0	0	0	0	0.25	0	0.50	0.25	0	0	0	0	0	0	4
57	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0.33	0	0.33	0	0	0	0	3
58	0	0	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	0	0	0	0	0	2
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	0.50	0.50	0	0	0	0	0	0	2
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	1
62	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	1
63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	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	1.00	0	0	0	0	0	0	1
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	1.00	1
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	1.00	0	0	0	0	0	0	1
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																					502

Appendix 4 – **continued:**

Estimates of proportion of length at age for snapper sampled from the Bay of Plenty, spring and summer 1998–99 (Note: Aged to 01/01/99)

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	0.40	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
24	0	0	0.40	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
25	0	0	0	0.20	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
26	0	0	0	0.10	0.80	0	0.10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
27	0	0	0	0.08	0.69	0.08	0.08	0	0.08	0	0	0	0	0	0	0	0	0	0	0	13
28	0	0	0	0.08	0.75	0	0.08	0.08	0	0	0	0	0	0	0	0	0	0	0	0	12
29	0	0	0	0.13	0.50	0.25	0	0.06	0.06	0	0	0	0	0	0	0	0	0	0	0	16
30	0	0	0	0	0.45	0.35	0.20	0	0	0	0	0	0	0	0	0	0	0	0	0	20
31	0	0	0	0.10	0.10	0.35	0.20	0.20	0.05	0	0	0	0	0	0	0	0	0	0	0	20
32	0	0	0	0.04	0.23	0.23	0.19	0.15	0	0.08	0.08	0	0	0	0	0	0	0	0	0	26
33	0	0	0	0.04	0.11	0.18	0.18	0.36	0.11	0.04	0	0	0	0	0	0	0	0	0	0	28
34	0	0	0	0	0	0.17	0.26	0.35	0.09	0.13	0	0	0	0	0	0	0	0	0	0	23
35	0	0	0	0	0.09	0.04	0.30	0.26	0.04	0.26	0	0	0	0	0	0	0	0	0	0	23
36	0	0	0	0	0.12	0.06	0.06	0.24	0.18	0.35	0	0	0	0	0	0	0	0	0	0	17
37	0	0	0	0	0	0	0	0.50	0.29	0.14	0.07	0	0	0	0	0	0	0	0	0	14
38	0	0	0	0	0	0.17	0	0.17	0.25	0.17	0.17	0	0	0.08	0	0	0	0	0	0	12
39	0	0	0	0	0	0	0	0.33	0.11	0.44	0.11	0	0	0	0	0	0	0	0	0	9
40	0	0	0	0	0	0	0.14	0.14	0.29	0.29	0	0.14	0	0	0	0	0	0	0	0	7
41	0	0	0	0	0	0	0	0.20	0.20	0.40	0.20	0	0	0	0	0	0	0	0	0	5
42	0	0	0	0	0	0	0	0	0.40	0	0.20	0.20	0.20	0	0	0	0	0	0	0	5
43	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0	0	0	0	0	0	0	0	0	4
44	0	0	0	0	0	0	0	0	0.67	0.33	0	0	0	0	0	0	0	0	0	0	3
45	0	0	0	0	0	0	0	0	0	0.33	0	0	0.33	0	0.33	0	0	0	0	0	3
46	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	2
47	0	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	0	0	0	0	0	0	2
48	0	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	0	0	0	0	0	0	2
49	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	1
50	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	1
51	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0	0	1
52	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	0	0	0	2
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0.50	2
54	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	1
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
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	0	0
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	0.50	0	0	0	0	0	0.50	2
63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	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	1.00	1
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
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																					312

Appendix 4 – **continued:**

Estimates of proportion of length at age for snapper sampled from the Hauraki Gulf, spring and summer 1998–99 (Note: Aged to 01/01/99)

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	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
25	0	0	0	0	0	0.40	0.20	0.30	0.10	0	0	0	0	0	0	0	0	0	0	0	10
26	0	0	0	0.05	0.25	0.20	0.15	0.30	0.05	0	0	0	0	0	0	0	0	0	0	0	20
27	0	0	0	0.05	0.32	0.27	0	0.23	0	0.14	0	0	0	0	0	0	0	0	0	0	22
28	0	0	0	0.05	0.38	0.03	0.14	0.16	0.08	0.16	0	0	0	0	0	0	0	0	0	0	37
29	0	0	0	0.02	0.25	0.13	0.17	0.23	0.08	0.11	0.02	0	0	0	0	0	0	0	0	0	53
30	0	0	0	0.01	0.14	0.24	0.15	0.22	0.04	0.11	0.03	0.05	0	0.01	0	0	0	0	0	0	74
31	0	0	0	0	0.16	0.16	0.05	0.36	0.05	0.18	0.02	0	0	0.02	0	0	0	0	0	0	56
32	0	0	0	0	0.07	0.08	0.13	0.42	0.10	0.11	0.07	0.01	0.01	0	0	0	0	0	0	0	72
33	0	0	0	0.01	0.03	0.07	0.11	0.33	0.12	0.16	0.10	0.04	0	0.01	0.01	0	0	0	0	0	91
34	0	0	0	0	0.04	0.03	0.10	0.33	0.10	0.27	0.07	0.04	0.01	0	0	0	0	0	0	0	70
35	0	0	0	0	0.03	0	0.07	0.36	0.16	0.26	0.08	0	0	0.02	0.02	0	0	0	0	0	61
36	0	0	0	0	0	0	0.02	0.27	0.12	0.37	0.14	0.02	0.04	0.02	0	0	0	0	0	0	49
37	0	0	0	0	0	0	0.09	0.38	0.15	0.28	0.06	0.02	0.02	0	0	0	0	0	0	0	47
38	0	0	0	0	0	0.02	0.04	0.31	0.20	0.29	0.09	0	0.02	0.02	0	0	0	0	0	0	45
39	0	0	0	0	0	0.03	0.06	0.11	0.14	0.25	0.17	0.08	0.08	0.03	0.06	0	0	0	0	0	36
40	0	0	0	0	0	0.03	0	0.11	0.21	0.39	0.13	0.03	0.03	0.03	0	0	0	0.05	0	0	38
41	0	0	0	0	0	0	0	0.14	0.10	0.38	0.14	0.07	0.10	0	0.07	0	0	0	0	0	29
42	0	0	0	0	0	0	0	0	0.04	0.33	0.21	0.04	0.29	0	0	0	0.04	0	0.04	0	24
43	0	0	0	0	0	0	0	0.13	0.09	0.26	0.09	0.13	0.17	0.13	0	0	0	0	0	0	23
44	0	0	0	0	0	0	0	0	0.07	0.07	0.21	0.29	0.29	0.07	0	0	0	0	0	0	14
45	0	0	0	0	0	0	0	0	0.08	0	0.08	0.31	0.15	0.15	0.15	0	0	0	0	0.08	13
46	0	0	0	0	0	0	0	0	0	0.30	0.25	0.05	0.20	0.05	0.05	0	0	0.05	0	0.05	20
47	0	0	0	0	0	0	0	0	0	0.22	0	0.11	0.22	0.33	0.11	0	0	0	0	0	9
48	0	0	0	0	0	0	0	0	0	0.14	0.14	0	0.29	0.14	0.14	0	0	0.14	0	0	7
49	0	0	0	0	0	0	0	0	0	0	0	0.25	0.75	0	0	0	0	0	0	0	4
50	0	0	0	0	0	0	0	0	0	0	0.33	0.11	0	0.22	0.22	0	0.11	0	0	0	9
51	0	0	0	0	0	0	0	0	0	0	0	0	0.40	0.20	0.20	0	0.20	0	0	0	5
52	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0.40	0	0.20	0	0	0	0.20	5
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0.33	0	0.33	3
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0.33	0	0.33	3
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0.75	4
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0	0.29	0.57	7
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0.50	2
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	2
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	2
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	3
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	1.00	2
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	1.00	1
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																					976

Appendix 4 – **continued:**

Estimates of proportion of length at age for snapper sampled from East Northland, spring and summer 1998–99 (Note: Aged to 01/01/99)

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	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
24	0	0	0	0.75	0	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
25	0	0	0	0.46	0.15	0.23	0.08	0.08	0	0	0	0	0	0	0	0	0	0	0	0	13
26	0	0	0.13	0.21	0.33	0.21	0.08	0.04	0	0	0	0	0	0	0	0	0	0	0	0	24
27	0	0	0.09	0.23	0.30	0.17	0.09	0.04	0.06	0.02	0	0	0	0	0	0	0	0	0	0	47
28	0	0	0.02	0.14	0.29	0.19	0.07	0.17	0.05	0.07	0	0	0	0	0	0	0	0	0	0	42
29	0	0	0	0.13	0.21	0.22	0.05	0.11	0.06	0.14	0.02	0.02	0.03	0	0	0	0.02	0	0	0	63
30	0	0	0.01	0.14	0.11	0.19	0.09	0.19	0.11	0.07	0.03	0.01	0.03	0.01	0	0	0.01	0	0	0	74
31	0	0	0.01	0.06	0.10	0.15	0.10	0.21	0.10	0.06	0.10	0.03	0.04	0	0	0	0	0.01	0	0	67
32	0	0	0	0.10	0.07	0.03	0.14	0.23	0.14	0.14	0.06	0.04	0	0	0	0.01	0.03	0	0	0	70
33	0	0	0.01	0.01	0.04	0.14	0.08	0.17	0.15	0.14	0.06	0.05	0.10	0.01	0.01	0	0.01	0	0.01	0	84
34	0	0	0	0.02	0.06	0.04	0.10	0.25	0.21	0.10	0.06	0.08	0.04	0.02	0.02	0	0.02	0	0	0	52
35	0	0	0	0.02	0	0.04	0.02	0.17	0.20	0.26	0.15	0.02	0.06	0	0	0.04	0.02	0	0	0.02	54
36	0	0	0	0	0.05	0	0.12	0.10	0.24	0.17	0.05	0.05	0.10	0.05	0	0	0.02	0.02	0	0.02	41
37	0	0	0	0	0	0.02	0.02	0.14	0.27	0.18	0.12	0.06	0.06	0.06	0	0	0	0.04	0	0.04	51
38	0	0	0	0	0	0	0.02	0.11	0.23	0.17	0.17	0.06	0.13	0.02	0	0	0.04	0	0	0.04	47
39	0	0	0	0	0	0	0	0.03	0.23	0.29	0.11	0.11	0.11	0.09	0	0	0	0	0	0.03	35
40	0	0	0	0	0.03	0.03	0.06	0.06	0.13	0.09	0.03	0.16	0.19	0.06	0	0.03	0	0.06	0	0.06	32
41	0	0	0	0	0	0.03	0.03	0.06	0.06	0.18	0	0.15	0.12	0.15	0	0.03	0.03	0.09	0	0.06	33
42	0	0	0	0	0	0	0	0.08	0.31	0.08	0.04	0.15	0.04	0.19	0	0	0	0.12	0	0	26
43	0	0	0	0	0	0	0	0.05	0.15	0.05	0.05	0.05	0.10	0.20	0.05	0.05	0.10	0	0	0.15	20
44	0	0	0	0	0	0	0	0	0.07	0.07	0.14	0.07	0	0.36	0.07	0.07	0	0	0	0.14	14
45	0	0	0	0	0	0	0	0	0.06	0	0	0.06	0.06	0.06	0.06	0.06	0.19	0.13	0	0.31	16
46	0	0	0	0	0	0	0	0	0.09	0.13	0.09	0	0.09	0.09	0	0	0	0.04	0.04	0.43	23
47	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0.14	0	0	0.14	0.14	0	0.43	7
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	0	0.09	0.27	0.09	0	0.45	11
49	0	0	0	0	0	0	0	0	0	0	0	0.11	0.22	0.44	0.11	0	0	0	0	0.11	9
50	0	0	0	0	0	0	0	0	0.10	0	0	0.10	0	0.10	0.10	0	0	0	0.10	0.50	10
51	0	0	0	0	0	0	0	0	0	0.14	0	0	0	0.14	0	0	0	0.14	0	0.57	7
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0.13	0	0	0.13	0.13	0	0.63	8
53	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0.50	4
54	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0.20	0	0	0	0	0	0.60	5
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0.33	0	0.33	3
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0	0	0	0	0.80	5
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	3
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	3
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0.50	2
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	2
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	2
62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	2
63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	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	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	1.00	1
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	1.00	1
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																					1 021