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EXECUTIVE SUMMARY

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This report presents the results of Objectives 1 and 2 of the Ministry of Fisheries project "Estimation of snapper year class strength in SNA 1 and 8" (SNA2000/02). The general objective was to determine the commercial length frequency and age structure of the four snapper stocks that constitute SNA 1 and SNA 8 for use in stock assessment models by market sampling.

The length frequency and age-length key approach was employed in 2000–01 to estimate catch-at-age for snapper for the main fishing methods in each stock of SNA 1 and SNA 8. Data were derived from length frequency samples collected from the west coast single trawl and pair trawl fisheries and the Bay of Plenty, Hauraki Gulf, and East Northland longline fisheries and combined with age-length keys. Age data were collected randomly in the form of proportional allocation age-length keys for the west coast and Bay of Plenty fisheries, and using the random age frequency approach for the Hauraki Gulf and East Northland longline fisheries. Target sample sizes for both sampling approaches were achieved from all the fisheries sampled (apart from Bay of Plenty longline length frequency).

Year class strengths inferred from the age distributions sampled from the SNA 1 longline fisheries in 2000–01 were generally consistent with trends observed in previous years. The recently recruited 1995 year class dominates catches from SNA 1, especially in the Bay of Plenty and East Northland stocks and is expected to dominate catches in the Hauraki Gulf over the next year or two. As a result, the previously strong 1989 and 1991 year classes have decreased in relative strength.

Year class strengths inferred for the SNA 8 stock were similar to those inferred in the previous year but less so for the years before that, either because of recent strong recruitment or the lack of accumulation of older age classes in the fishery. The fully recruited 1996 year class now dominates the age distribution of SNA 8 making up about 40% of the single trawl and pair trawl catch in 2000–01. Apart from the 1995 and 1998 year classes, most other year classes in SNA 8 appear to be of low abundance.

Some variability in relative year class strengths was evident between the SNA 1 stocks. The East Northland stock contained strong year classes not evident in the other SNA 1 stocks and a higher percentage of older fish. This may be a reflection of environmental differences that exist in East Northland and the relatively lower fishing mortality in the stock. Although similarities in recruitment patterns were apparent between the SNA 1 and SNA 8 stocks for the 1995 and 1996 year classes in 2000–01, this is most likely to be coincidental. A mean weighted coefficient of variation (for analytical estimates) of below 20% across all age classes in the SNA 1 and SNA 8 catch-at-age compositions was achieved.

1. 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 respectively. Because of heterogeneity in snapper biology and fishing patterns, SNA 1 is often further subdivided into three substocks (referred to herein as stocks): 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, 2000, 2001). This report presents the results of market sampling between October 2000 and February 2001, thus continuing the time series. Funding for this project, SNA2000/02, was provided by the Ministry of Fisheries.

The objectives of the market sampling programme for 2000–01 were as follows.

1. To carry out sampling and estimate the relative proportion at age and length of recruited snapper sampled from the commercial longline catch in SNA 1 during spring and summer 2000–01. The target coefficient of variation (c.v.) for the catch at age will be 20% (mean weighted c.v. across all age classes).

2. To carry out sampling and estimate the relative proportion at age and length of recruited snapper sampled from the commercial trawl catch in SNA 8 during spring and summer 2000–01. The target coefficient of variation (c.v.) for the catch at age will be 20% (mean weighted c.v. across all age classes).

2. METHODS

Landings from the snapper fishery were stratified hierarchically by stock, fishing method, and quarter, e.g., Bay of Plenty – longline – spring. The stocks 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 SNA 1 stocks, and single trawl (BT) and pair trawl (BPT) for the SNA 8 stock. Samples were collected in the spring (September–November) and summer (December–February) quarters only. The percentages of the snapper catch taken by method in each of the stocks for 2000–01 are given in Table 1, indicating the dominant methods.

A detailed description of the sampling design was given by Davies & Walsh (1995). Length frequency samples were collected from the SNA 1 longline fisheries and the SNA 8 single trawl and pair trawl fisheries using a two-stage sampling procedure (West 1978). The random selection of landings and a random sample of bins within landings represent the first and second stages respectively. The sampling procedure was modified to account for the grading of fish according to length and quality by taking a stratified random sample 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.

Two methods were used for the collection of otoliths from landings. The first was used for collecting otoliths from pair trawl and single trawl catches 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 west coast catch-at-age distribution in 1999–2000 was unusual in that it largely comprised two year classes, 1995 and 1996 (Walsh et al. 2001). It was estimated that the otolith collection for 2000–01, based on a length frequency similar to that from 1999–2000, would be insufficient for describing the population age at length, due to the growth exhibited by snapper from

these year classes. That is, too large a sample would be collected for length classes that were low in abundance. Therefore, the sample allocation for each length class interval used for 2000–01 was based on a combined proportion at length distribution using data from 1989–90 (a year most likely to resemble the 2000–01 length distribution) with that from 1999–2000. For the Bay of Plenty otolith collection, the sample allocation for each length class interval was made according to the proportion at length distribution 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 collected from these length intervals. 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 mean weighted coefficients of variation (MWCV) of below 20% for catch-at-age estimates.

Age-length keys derived from the age data are assumed to be representative of the seasonal strata of the sample. The main assumption that must be satisfied for an age-length key is that the sample was taken randomly with respect to age from within each length class (Southward 1976).

Calculation of proportions at length and age, and variances from length frequency samples and age-length keys followed that of Davies & Walsh (1995). Bootstrap mean and variance estimates were not determined because the difference between bootstrap and analytical estimates for snapper samples has been found to be negligible (Davies et al., unpublished results). Calculation of mean weight-at-age were based on $w\,(\mathrm{g}) = 0.04467 l^{2.793}\,(\mathrm{cm})$ (Paul 1976), and variances followed the method of Quinn II 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, with the maximum age being an aggregate of all age classes over 19 years.

The second method for collecting otoliths was called the random age frequency sampling method and was used for the Hauraki Gulf and East Northland longline fisheries. Age frequency samples were collected by taking random otolith samples from each stratum of the catch using a systematic selection interval. This involved taking a random sample of bins from each stratum, with the systematic selection of every n^{th} fish counted in a continuous sequence from the sampled bins. The optimum selection interval, n, was determined from simulations using data from historical length and age samples that achieved a desired level of precision. 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 over 100 bins. A total sample size of 1000 otoliths was targeted from each fishery.

Proportion at age and variance (analytical and bootstrap) estimates for the Hauraki Gulf and East Northland longline fisheries were calculated from the random age frequency samples collected from each landing. A mean proportion at age across all landings was determined, weighted by the estimated number of fish in each landing. Bootstrap mean estimates were not presented because the difference between analytical and bootstrap means in snapper proportion at age estimates has been found to be negligible (Davies et al., unpublished results).

Random age frequency data were collected primarily to derive catch-at-age estimates. However, it can be assumed that fish sampled randomly for age were also random observations from within each length interval. Consequently, age-length keys could be derived from the random age frequency otolith samples. Together with the length frequency samples, proportions at age and mean weight-at-age with analytical estimates of c.v. were calculated using the derived age-length keys. Generally, only small differences in proportion at age estimates have been found between the age-length key and random age frequency methods (Walsh et al. 1998). However, fish in the larger length classes, collected by the random age frequency method, were infrequently sampled and are likely to be poorly described.

A standardised procedure for reading otoliths was followed (Davies & Walsh 1995). Age was defined as the rounded whole year from a nominal birth date of 1 January, e.g., in 2000–01, the 1991 year class was 10 years old, whether sampled in December 2000 or February 2001.

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

3. RESULTS

3.1 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 2000 to summer 2000–01 are provided in Tables 2–5, displaying seasonal patterns in the fisheries. The SNA 8 single trawl fishery mainly operated over spring and summer, and the pair trawl fishery was concentrated around summer. The relative catch by method over the sampling period (spring–summer) was roughly the same as that for the previous year at 55% for single trawl and 38% for pair trawl (Table 1). Considerable differences are apparent between the percentage of landings sampled and the percentage of weight of landings sampled in the west coast single trawl and pair trawl fisheries (see Table 2). This was because samples were taken mainly from landings where snapper was the target species. Landings where snapper was a bycatch were generally of lower weight. The summarised information given in Table 2 is for all landings containing snapper (target and bycatch) caught from the SNA 8 stock. Catches from the SNA 1 fishery were more evenly spread over the entire year (Tables 3–5). Most of the landed catch from the Hauraki Gulf and East Northland stocks during the sampling period were taken by longline (53% and 73% respectively) (see Table 1). The longline fishery contributed only 18% of the overall Bay of Plenty catch, with single trawl (61%), Danish seine (11%), and pair trawl (10%) being the other methods used. Snapper was the target species in all SNA 1 longline landings sampled.

3.2 Length and age distributions

For all fisheries sampled in 2000–01, catch-at-age compositions (using the length frequency and age-length key approach) 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 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 those of snapper (Westrheim & Ricker 1978).

Sample length and age distributions for the 2000–01 season derived from the length frequency and age-length key approach are presented as histograms (Figures 2–11). Age distributions derived from the random age frequency approach are given for the Hauraki Gulf and East Northland longline fisheries with analytical and bootstrap variance estimates (Figures 9 and 11). The estimated proportions at length, and age, and mean weight-at-age are shown in Appendices 1, 2, and 3. The age-length keys 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). 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 because of rounding error.

3.3 West coast snapper (SNA 8)

The length distribution of the single trawl catch was characterised by two modes, which peaked at 28 and 35 cm, with a tail extending to over 65 cm (Figure 2). The mean length of snapper sampled from the fishery was 37.5 cm, and the MWCV of the proportions was 0.09. The pair trawl length distribution was similar to that of single trawl, with slight differences in the proportion of fish in the smaller length intervals (Figure 4). The length distribution from the pair trawl catch was characterised by two modes which peaked at 30 and 35 cm and a tail extending to over 65 cm. The mean length of snapper from the pair trawl fishery was 37.8 cm, and the MWCV of the proportions was 0.10.

As seen in the previous year of sampling (1999–2000), the 1996 year class (5 year olds) continues to be very strong, making up 42% and 38% of fish in single trawl and pair trawl catches respectively (Figures 3 and 5). The distributions largely comprise fish between 3 and 10 years old, with only 5% and 7% of fish being 11 years or more old in the single trawl and pair trawl catches respectively. The recently recruited 1998 year class (3 year olds) appears to be of above average strength comprising 13% and 15% of the single trawl and pair trawl catches respectively, and the 1997 year class (4 year olds) appears to be of poor strength. The mean age of snapper from the single trawl and pair trawl fisheries was 6.0 and 6.1 years respectively. The age distributions from the respective fisheries had MWCVs of 0.11 and 0.12.

3.4 East coast snapper (SNA 1)

3.4.1 Bay of Plenty

The length distribution of the Bay of Plenty longline fishery was characterised by a mode at 32 cm with a tail extending to 60 cm and MWCV of 0.10 (Figure 6). The mean length was 34.9 cm.

The longline age distribution consisted mainly of fish between 5 and 13 years old, with only 4% of fish being 14 years or more old (Figure 7). The mean age was 7.8 years and the MWCV was 0.17. Most evident were the strong 1995 and 1994 year classes (6 and 7 year olds), which made up 42% of the longline catch. The 1996 year class appears to be relatively strong and incompletely recruited, containing a relatively high proportion of 25 cm fish (see Appendix 4).

3.4.2 Hauraki Gulf

The length distribution of the Hauraki Gulf longline fishery was characterised by a broad mode at 30 cm with a tail extending to over 60 cm and MWCV of 0.12 (Figure 8). The mean length was 34.3 cm.

The Hauraki Gulf longline age distribution in 2000–01 was dominated by the 1995, 1994, 1991, and 1989 year classes – 6, 7, 10, and 12 year old fish respectively (Figure 9). The 1989 and 1991 year classes are now fully recruited to the fishery, while those age classes less than 9 years still contain a proportion of 25 cm fish (see Appendix 4). Excluding the 1996 year class (which appears to be recruiting strongly), and those already mentioned, most of the other year classes are of average to low strength, with only 8% of fish being over 13 years of age. No large differences in estimates of

proportions at age and precision were apparent 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 9.0 and 9.2 years for the age-length key and random age frequency approaches, respectively (see Figure 9). The analytical MWCV for the age-length key approach was 0.11. The analytical and bootstrap MWCVs for the random age frequency approach were 0.18 and 0.21 respectively.

3.4.3 East Northland

The length distribution of the East Northland longline fishery had a mode at 30 cm with a tail extending to over 60 cm and MWCV of 0.13 (Figure 10). The mean length was 34.7 cm.

The East Northland longline age distribution although relatively broad was dominated by the recently recruited 1996 and 1995 year classes (5 and 6 year olds) (Figure 11). These two year classes make up 36% of fish caught and are not yet fully recruited as they contain a proportion of 25 cm fish (see Appendix 4). The abundance of fish 20 years of age or older in the East Northland longline fishery has increased slightly from that of the previous year to 7%, a result of the strong 1981 year class moving into that age group. No large differences in estimates of proportions at age and precision were visible between the age compositions derived from the age-length key and random age frequency approaches. The mean age of snapper in the East Northland longline fishery was 9.1 years for the age-length key and 9.4 years for the random age frequency approaches respectively (see Figure 11). The analytical MWCV for the age-length key approach was 0.11. The analytical and bootstrap MWCVs for the random age frequency approach were 0.19 and 0.24 respectively.

4. DISCUSSION

The relative year class strengths inferred from the length and age distributions sampled from the SNA 1 fisheries in the 2000–01 season are generally consistent with trends observed in previous years (McKenzie et al. 1992, Davies & Walsh 1995, Walsh et al. 1995, 1997, 1998, 1999, 2000, 2001). In 2000–01, it was possible to sample from all sectors of the snapper fishing industry.

The west coast single trawl and pair trawl age distributions were dominated by the very strong 1996 year class, accounting for about 40% (by number) of all snapper in trawl landings. Year class strength indices for the west coast stock, calculated from six trawl surveys undertaken from 1987 to 1999, place the 1996 year class as the second highest recorded in the series (Morrison & Parkinson 2001). Combined with the partially recruited 1998 year class (3 year olds) and the 1995 year class (6 year olds), they make up a total of about 70% of all snapper caught by trawl. Consequently, the relative abundance of all other age classes, especially those 11 years of age or older, has lessened considerably from previous years, now contributing 5% and 7% by number in the single trawl and pair trawl catches respectively. Although the 1996 year class appears strong, there seems to be a lack of accumulation of fish in the older age classes in the fishery. The interpretation of the SNA 8 age distribution in 2000–01 may be the same as that reached in 1999–2000 by Walsh et al. (2001) and indicates two possible scenarios. Either high fishing mortality has reduced the relative abundance of older fish, or recent year classes have recruited with above average strength and dominated the distribution. A tagging programme to estimate the SNA 8 biomass is to be conducted in 2001–02 and should help clarify the uncertainty.

The partially recruited 1998 year class (3 year olds) appears to be of above average strength in the west coast age distributions in 2000–01. As the growth rate of snapper from the west coast is relatively fast in the first few years, three year old age classes that are of above average strength

usually appear in the length frequency distribution, either by broadening the distribution below 30 cm or appearing independently as a strong length mode dominating the 25–30 cm size classes (see Davies & Walsh 1995, Walsh et al. 1997, 1999, 2000). This trend is clearly evident in both the single trawl and pair trawl length distributions collected in 2000–01. However, it is also likely that the relative strength of the 1998 year class may be inferred incorrectly due to the poor relative strength of the adjacent 1997 year class. A comparison of a fully recruited 1998 year class relative to other year classes in 2001–02 may give a better indication to its relative strength.

The length frequency distributions for the west coast single trawl and pair trawl fisheries were relatively similar in 2000–01, with pair trawl catching slightly more smaller fish. Single trawl samples were collected in spring and summer, but pair trawl samples were collected in summer only. A comparison of the summer length frequency estimates for snapper from the west coast fishery for both methods show even more resemblance (see Appendix 1). This may be related to increased growth of the 1998 year class (3 year olds) through time between the two seasons, and possibly the fishing of aggregations of similar sized fish later in the season. As few year classes are abundant in the fishery at present, it appears they are similarly selected for by both single trawl and pair trawl, based on a comparison of the length and age distributions by method. Differences in the selectivity patterns between single trawl and pair trawl were evident in previous length distributions when larger and older snapper were more abundant in catches.

The Bay of Plenty length distribution in 2000–01 was similar to that seen in the previous year, but with a slight increase in mean length. The age distribution is dominated by the 1995 and 1994 year classes (6 and 7 year olds). These year classes have fully recruited to the fishery, whereas the 1996 year class has not. As a result of these strong year classes progressing through the fishery, the abundance of all other year classes in catches has been reduced, with the mean age increasing slightly. The abundance of fish greater than 13 years of age is low in the Bay of Plenty, currently making up only 4% of the longline catch.

The Hauraki Gulf longline length and age distributions in 2000–01 were very similar to those seen in the previous year. The strong recruiting 1995 and 1994 and year classes (6 and 7 year olds) have increased in their respective dominance in the age distribution, resulting in most of the other year classes being reduced, and a small decrease in mean length and mean age. Full recruitment of both these year classes is likely to occur by about age 9 or 10. The strong 1991 and 1989 year classes (10 and 12 year olds) have dominated the fishery for the past five years and make up a considerable proportion of the longline catch in 2000–01. It is expected that they will remain relatively strong for the next few years and therefore broaden the distribution. The 1981 year class, one of the strongest year classes to recruit into the Hauraki Gulf over the last 20 years, has merged with the aggregate (over 19) age class and boosted the aggregate (over 19) age class abundance slightly to about 3%.

The age distribution of snapper from the East Northland longline fishery in 2000–01 was broad with almost all year classes showing moderate levels of abundance, except 1984 and 1983 (17 and 18 year olds). The recently recruiting 1996 and 1995 year classes (5 and 6 year olds) dominate the fishery and combined make up 36% of the longline catch. They are especially dominant in the 27–31 cm size range (0.4–0.7 kg) where at least two of every three fish landed in this range is either 5 or 6 years old. The occurrence of these year classes is also supported by anecdotes from longline fishers remarking on the very high abundance of small fish in catches from some areas of the East Northland stock in 2000–01 (pers. comm. with fishers). Neither of these year classes is fully recruited and their relative strength should increase over the next few years. The proportion of fish over 19 years of age has increased from that of the previous year to 7% due to the once strong 1981 year class moving into the aggregate (over 19) age class.

Since 1989–90, broad similarities in relative year class strengths and recruitment patterns have been evident between the SNA 1 stocks, particularly for extremely strong and weak year classes (Davies & Walsh 1995, Walsh et al. 1995, 1997, 1998, 1999, 2000, 2001). The 1989 and 1991 year classes remain relatively strong in the Hauraki Gulf stock, but are now less evident in the Bay of Plenty and East Northland stocks. The relative strength of the 1989 and 1991 year classes in all SNA 1 stocks has been reduced by the strongly recruiting 1995 year class that now dominates all SNA 1 stocks as the most abundant year class in the fishery. The 1995 year class is predicted from a published relationship between sea surface temperature and snapper recruitment to be the strongest year class spawned in the Hauraki Gulf since 1989, and is expected to be important in sustaining the SNA 1 fishery (Morrison & Francis 1999). The 1983, 1987, 1992, and 1993 year classes, as in past years, appear as below average strength in all SNA 1 stocks. The 1994 year class appears to be of average strength in the Hauraki Gulf and Bay of Plenty catch-at-age distributions, but of lower strength in East Northland. The 1996 year class, although not yet fully recruited, may be of above average strength in all the SNA 1 stocks. The relative abundance of the 1995 and 1996 year classes should increase over the next year or two to dominate the SNA 1 catch-at-age distributions. 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 stocks may result from the closeness of the two fishing grounds and the level of mixing that is thought to occur (Annala & Sullivan 1996). However, some minor differences in year class strengths are evident between these two areas (Gilbert 1999). In 2000–01, a decline in the relative abundance of moderate to older age classes (i.e., 1991 and 1989 year classes) in the Bay of Plenty was evident, but not in the Hauraki Gulf stock. This may be a result of increased trawling effort in the Bay of Plenty in recent years (see Tables 1 & 3). Alternatively, this is also likely to be influenced by the recently recruited strong 1995 and 1996 year classes that have reduced the relative proportions of other age classes in the stock. Because of the faster growth rates inherent in the Bay of Plenty stock, the 1995 and 1996 year classes are likely to have recruited sooner than that observed in the other stocks. As in previous years, the 1982 and 1990 year classes and the aggregate (over 19) age class appear to be more abundant in the East Northland stock only. These differences in year class strength may reflect environmental conditions unique to East Northland and the relatively lower fishing mortality likely in the stock.

The 1995, 1996, and 1998 year classes currently dominate the SNA 8 fishery, with most of the older year classes either fished down, or of low abundance. The 1995 and 1996 year classes also dominate the age distributions of the SNA 1 stocks. Given the differences in year class strengths that have been observed over the past decade between the SNA 1 and SNA 8 stocks (Davies & Walsh 1995, Walsh et al. 1995, 1997, 1998, 1999, 2000, 2001), as well as the geographic and environmental differences that exist, any current similarities in recruitment strength are most likely to be coincidental.

Differences were apparent between the analytical and bootstrap variances of proportion-at-age estimates from random age frequency samples 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 due to the clustering of fish in bins, which is more apparent for the shorter and longer (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 2000–01 ranged between 0.09 and 0.19.

5. CONCLUSIONS

1. The length and age distributions sampled from the SNA 1 and SNA 8 fisheries in 2000–01 were generally consistent with trends observed in previous years.

2. The 1996 year class dominates the age distribution from the SNA 8 stock making up about 40% of the single trawl and pair trawl catch in 2000–01. Apart from the 1995 and 1998 year classes, most other year classes in the SNA 8 stock now appear to be of low abundance.

3. There were some similarities in the recruitment patterns of the SNA 1 stocks. All SNA 1 stocks are dominated by the 1995 year class. The variability in year class strengths between stocks in SNA 1 is mainly due variable recruitment specific to a stock, inherent stock growth differences and related fishing mortality. Although similarities in recruitment patterns exist between the SNA 1 and SNA 8 stocks for the 1995 and 1996 year classes, this is most likely to be coincidental.

4. The strongly recruiting 1995 and 1996 year classes currently dominate longline catches from the Bay of Plenty and East Northland stocks and are expected to do the same in the Hauraki Gulf over the next few years. As a direct result of this recruitment, the once dominant 1989 and 1991 year classes have decreased in their respective strength.

5. The East Northland stock is the only area in SNA 1 and SNA 8 with a considerable proportion of snapper over 19 years of age.

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Table 1: Percentage of snapper catch by fishing method* for the stocks in SNA 1 and SNA 8 for the 2000–01 sampling period.†

	BPT	BT	BLL	DS	Other
West coast	38	55	5	0	2
Bay of Plenty	10	61	18	11	0
Hauraki Gulf	1	30	53	16	0
East Northland	8	16	73	1	2

* BPT, pair trawl; BT, single trawl; BLL, longline; DS, Danish seine.
† 2000–01 represents 01/10/00 to 28/02/01 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 2000 to summer 2000–01.*

		Number of landings			No. of fish	Weight of landings (t)		
Method	Season	Total	Sampled	% of total	measured	Total	Sampled	% of total
BPT	Autumn	6	0	0	0	14	0	0
	Winter	11	0	0	0	25	0	0
	Spring	10	0	0	0	95	0	0
	Summer	46	17	37.0	11 562	295	170	57.6
BT	Autumn	230	0	0	0	230	0	0
	Winter	129	0	0	0	115	0	0
	Spring	128	6	4.7	4 921	275	59	21.5
	Summer	217	9	4.1	5 705	310	74	23.9

* 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 2000 to summer 2000–01.*

		Number of landings			No. of fish	Weight of landings (t)		
Method	Season	Total	Sampled	% of total	measured	Total	Sampled	% of total
BLL	Autumn	403	0	0	0	86	0	0
	Winter	377	0	0	0	99	0	0
	Spring	379	17	4.5	3 758	90	5	5.6
	Summer	350	7	2.0	1 972	62	3	4.8
BT	Autumn	353	0	0	0	188	0	0
	Winter	292	0	0	0	82	0	0
	Spring	310	0	0	0	305	0	0
	Summer	306	0	0	0	133	0	0
DS	Autumn	111	0	0	0	143	0	0
	Winter	100	0	0	0	128	0	0
	Spring	68	0	0	0	53	0	0
	Summer	57	0	0	0	37	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 2000 to summer 2000–01.*

Method	Season	Number of landings			No. of fish measured	Weight of landings (t)		
		Total	Sampled	% of total		Total	Sampled	% of total
BLL	Autumn	815	0	0	0	247	0	0
	Winter	560	0	0	0	152	0	0
	Spring	845	20	2.4	4 643	354	12	3.4
	Summer	847	22	2.6	5 237	332	11	3.3
BT	Autumn	240	0	0	0	53	0	0
	Winter	235	0	0	0	50	0	0
	Spring	270	0	0	0	262	0	0
	Summer	252	0	0	0	121	0	0
DS	Autumn	137	0	0	0	54	0	0
	Winter	80	0	0	0	15	0	0
	Spring	156	0	0	0	104	0	0
	Summer	145	0	0	0	98	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 2000 to summer 2000–01.*

Method	Season	Number of landings			No. of fish measured	Weight of landings (t)		
		Total	Sampled	% of total		Total	Sampled	% of total
BLL	Autumn	880	0	0	0	156	0	0
	Winter	891	0	0	0	178	0	0
	Spring	925	22	2.4	4 678	224	11	4.9
	Summer	792	20	2.5	5 071	223	16	7.2

* BLL, longline.

Table 6: Details of snapper otolith samples collected in 2000–01 from the stocks in SNA 1 and SNA 8.*

Area	Fishing method †	Sampling period	Sample method ††	Length range (cm)	No. aged
WCNI	BPT, BT	Spring, summer	SR	24–80	522
BPLE	BLL, DS, RT	Spring, summer	SR	25–70	318
HAGU	BLL	Spring, summer	R	24–72	989
ENLD	BLL	Spring, summer	R	25–74	1 007

* 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.

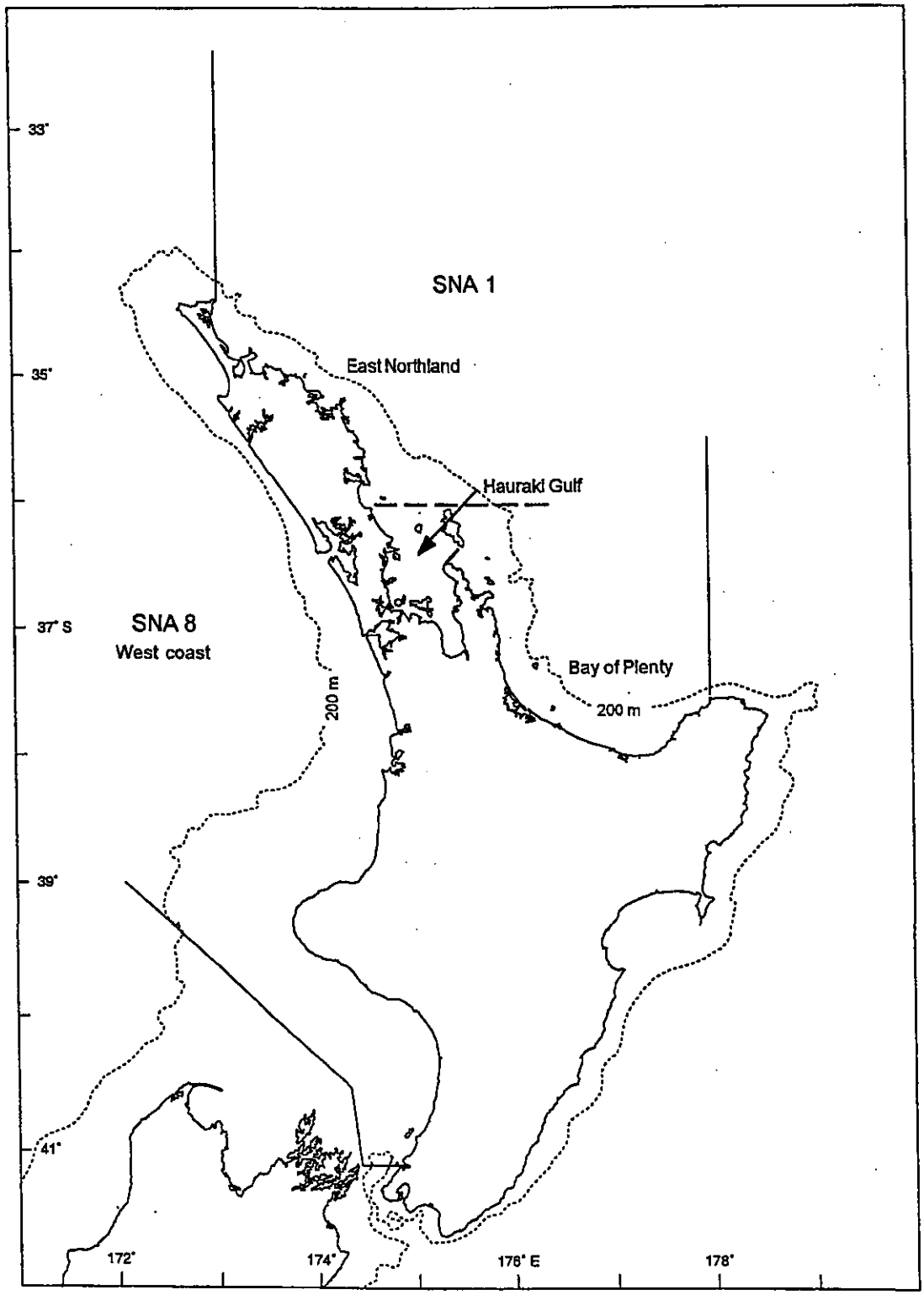

Figure 1: Quota management areas for the east and west coast North Island snapper stocks (SNA 1 and SNA 8 respectively) and the range of the three SNA 1 substocks; East Northland, Hauraki Gulf, and Bay of Plenty.

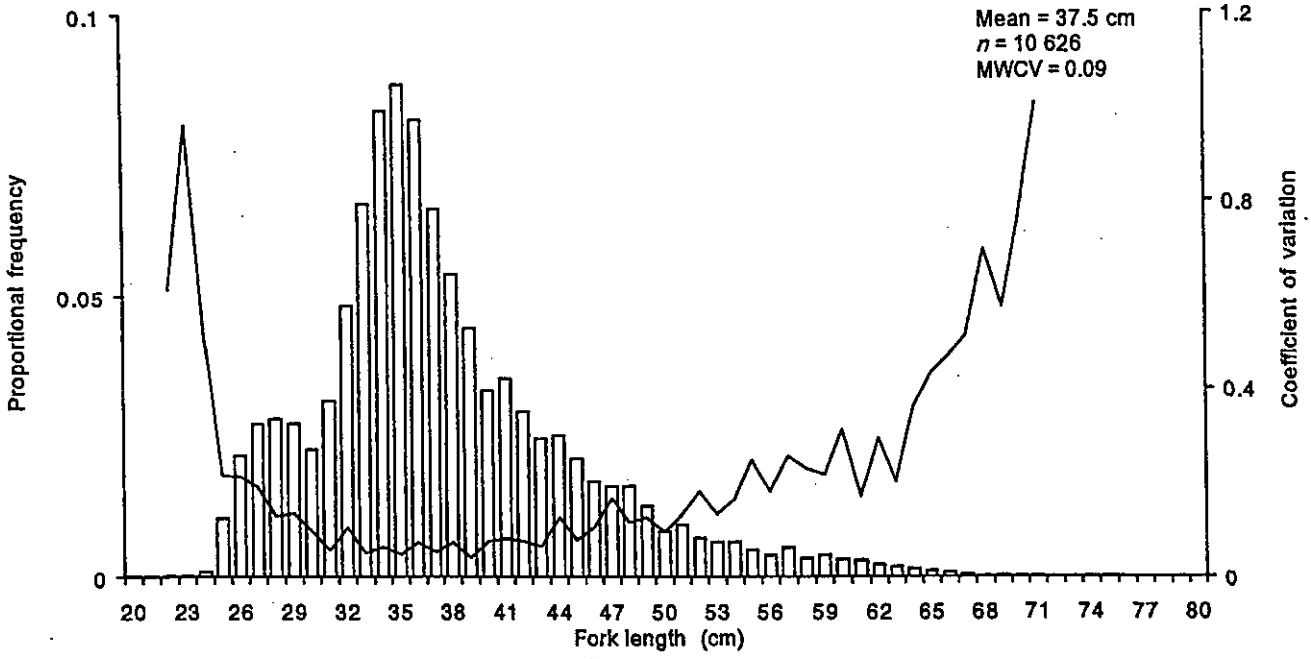

Figure 2: Proportion at length distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the west coast single trawl fishery in 2000–01 (*n*, length sample size; MWCV, mean weighted c.v.).

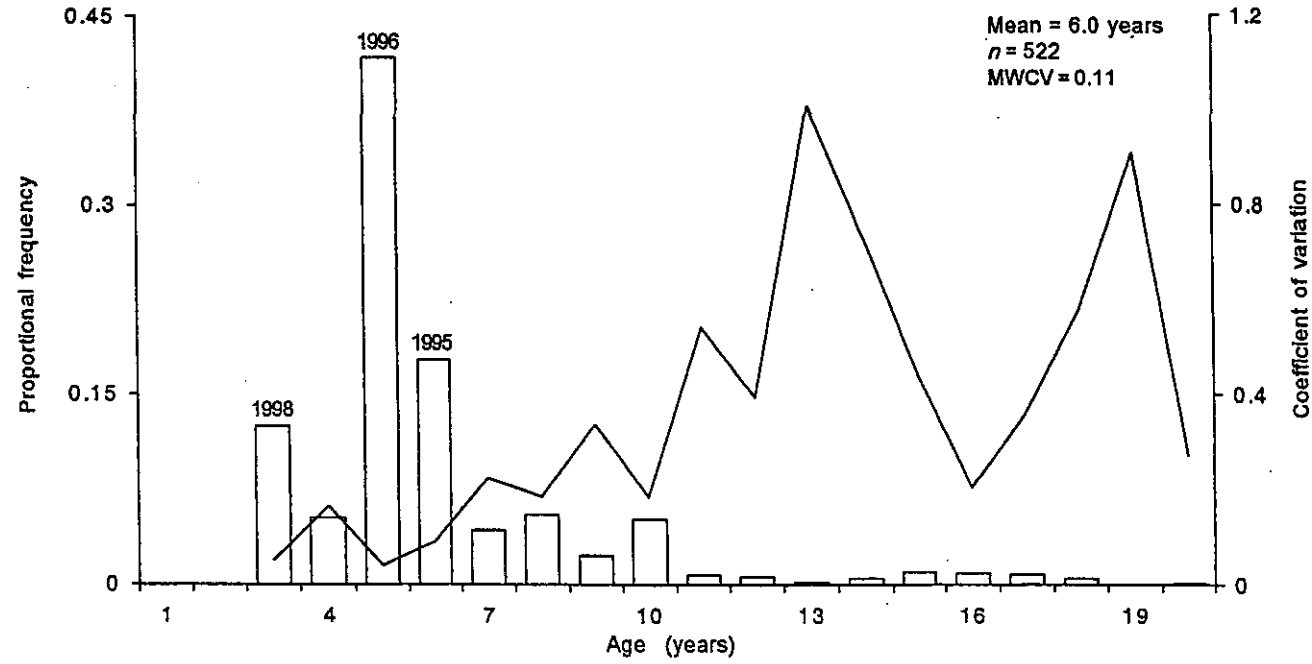

Figure 3: Proportion at age distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the west coast single trawl fishery in 2000–01 using the age-length key approach (*n*, otolith sample size; MWCV, mean weighted c.v.).

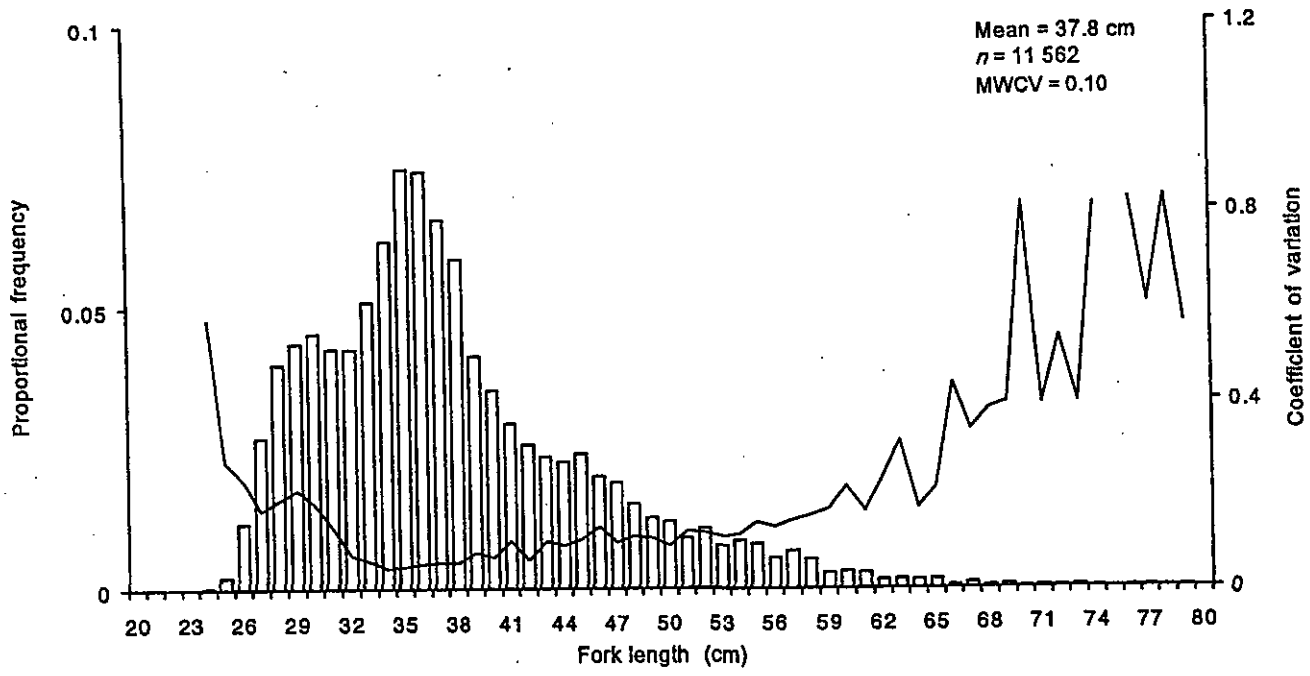

Figure 4: Proportion at length distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the west coast pair trawl fishery in 2000–01 (*n*, length sample size; MWCV, mean weighted c.v.).

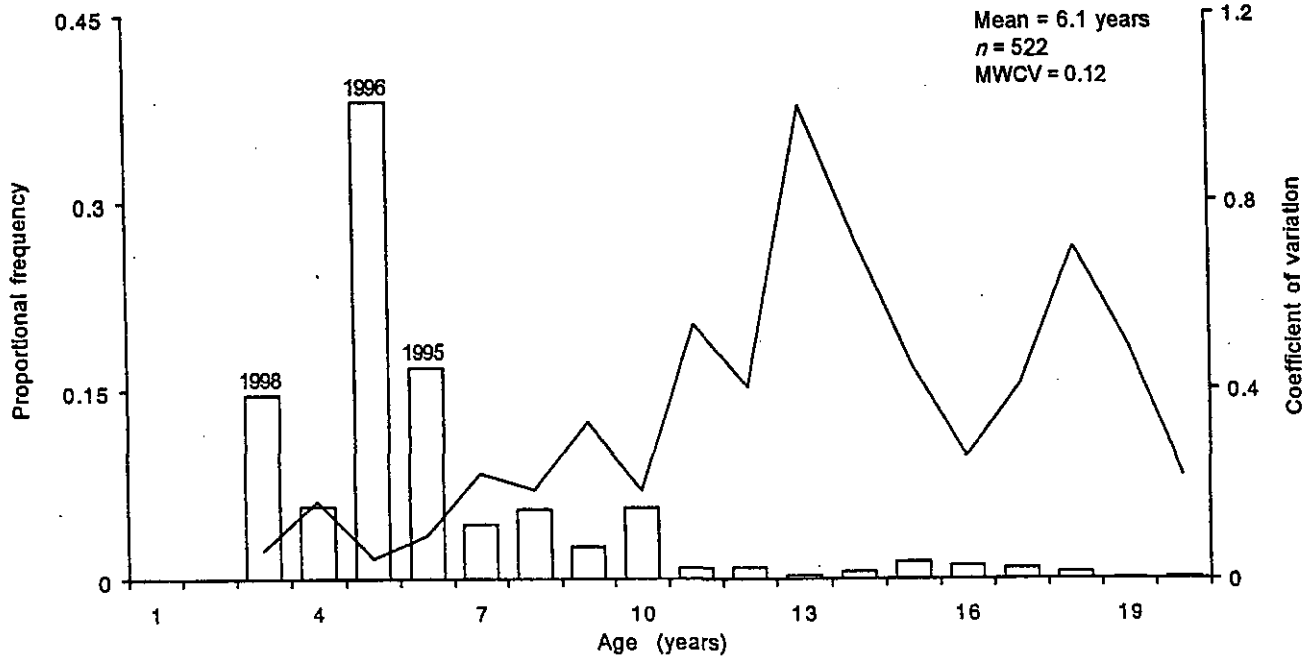

Figure 5: Proportion at age distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the west coast pair trawl fishery in 2000–01 using the age-length key approach (*n*, otolith sample size; MWCV, mean weighted c.v.).

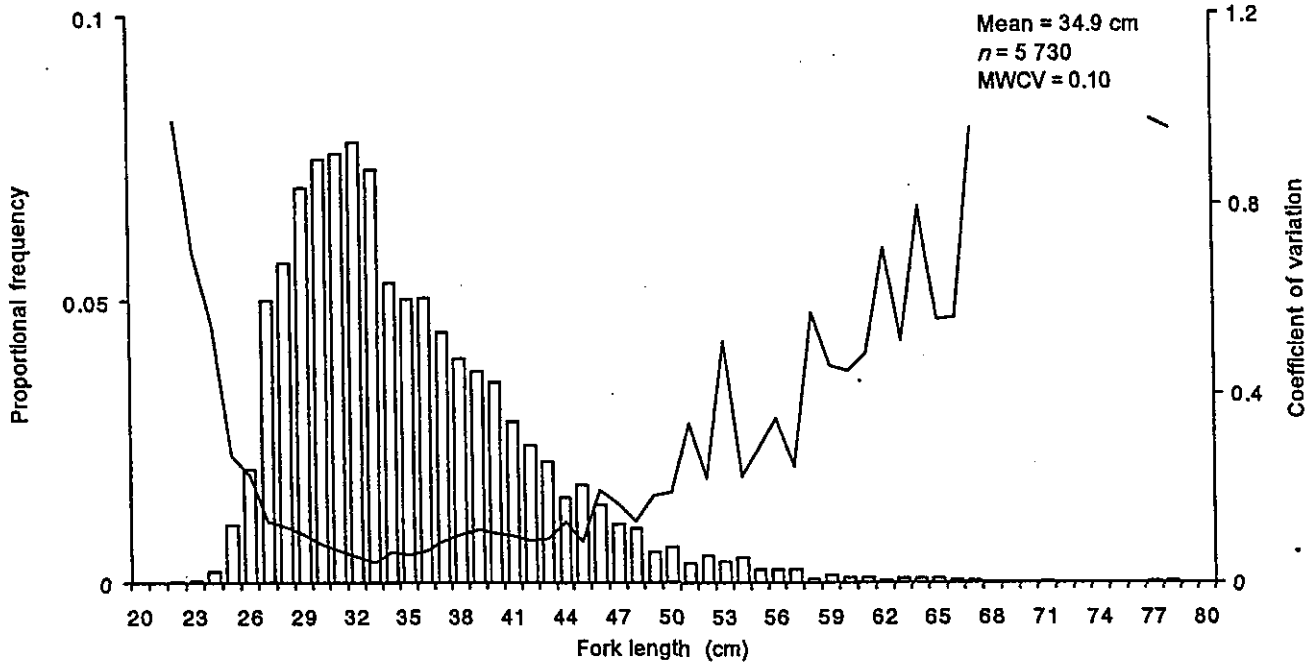

Figure 6: Proportion at length distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the Bay of Plenty longline fishery in 2000–01 (*n*, length sample size; MWCV, mean weighted c.v.).

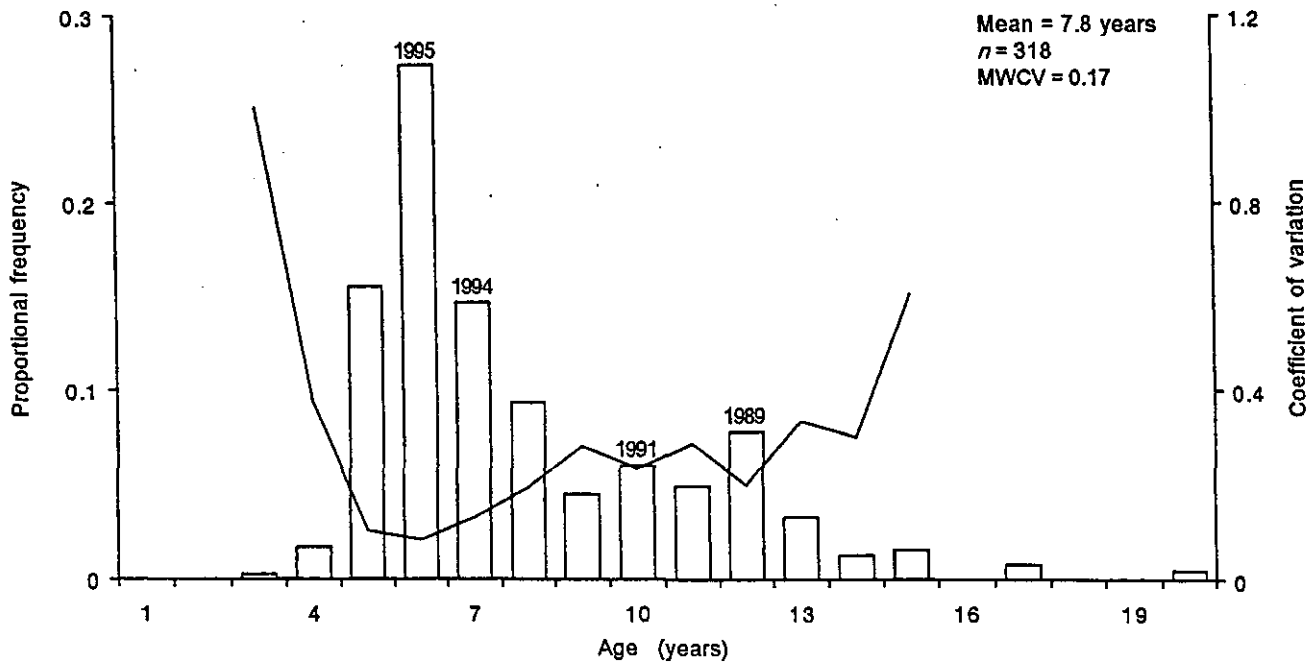

Figure 7: Proportion at age distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the Bay of Plenty longline fishery in 2000–01 using the age-length key approach (*n*, otolith sample size; MWCV, mean weighted c.v.).

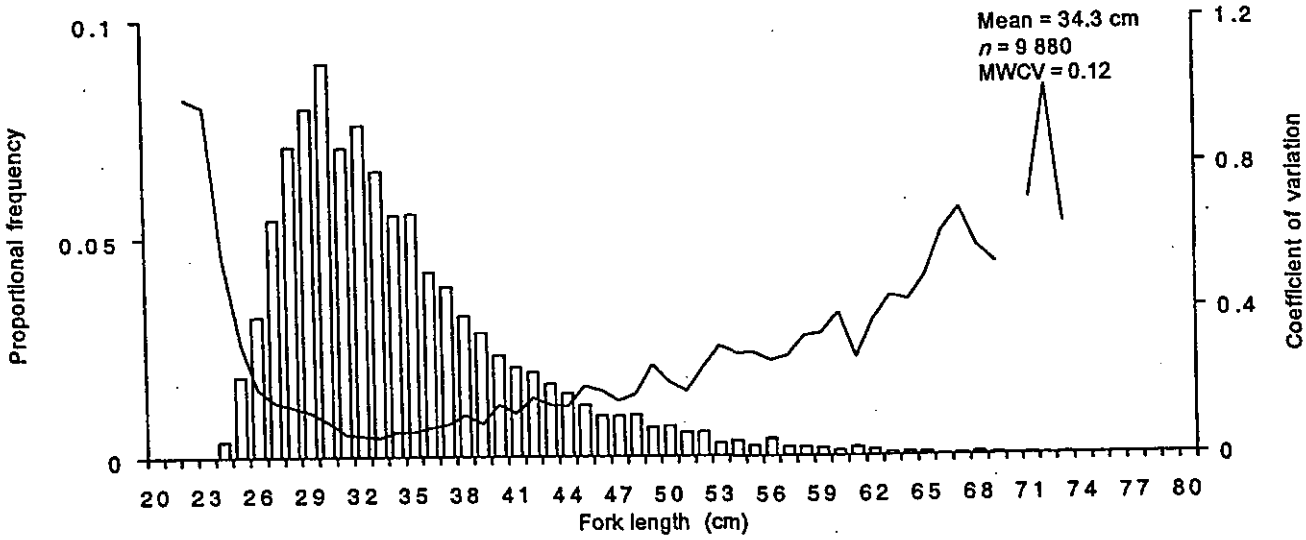

Figure 8: Proportion at length distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the Hauraki Gulf longline fishery in 2000–01 (*n*, length sample size; MWCV, mean weighted c.v.).

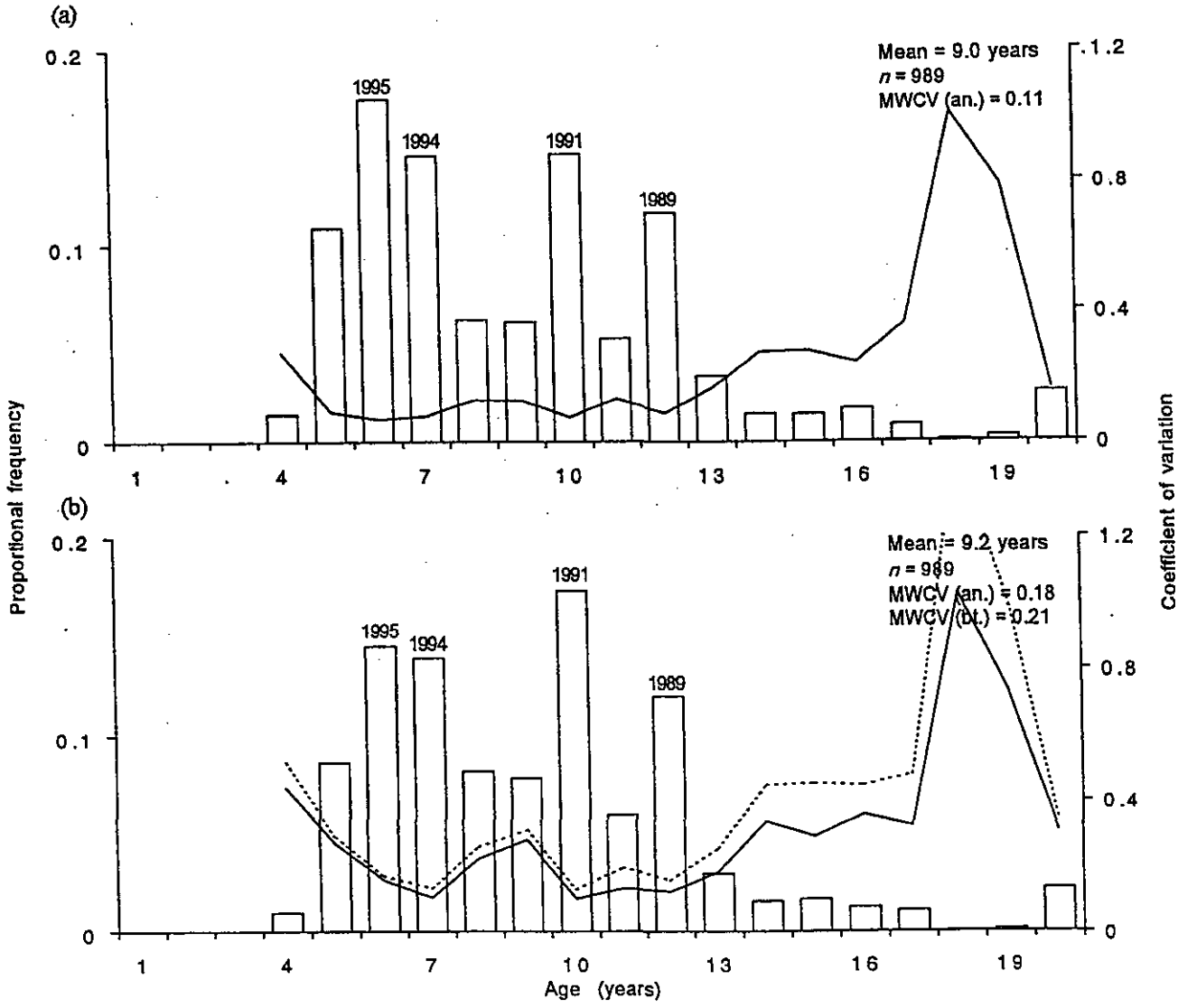

Figure 9: Proportion at age distributions (histogram) and c.v.s (solid and dashed lines represent analytical and bootstrap estimates respectively) determined from snapper landings sampled from the Hauraki Gulf longline fishery in 2000–01 using (a) the age-length key and (b) the random age frequency approaches (*n*, otolith sample size; MWCV, mean weighted c.v. calculated using analytical, an., and bootstrap, bt. c.v.s).

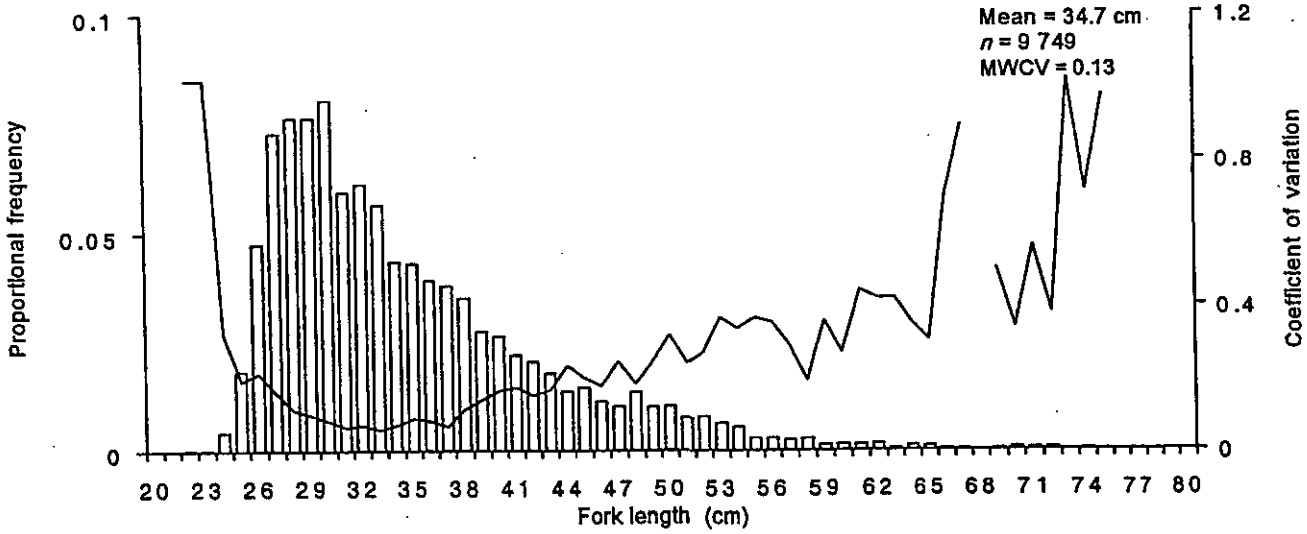

Figure 10: Proportion at length distribution (histogram) and c.v.s (solid line) determined from snapper landings sampled from the East Northland longline fishery in 2000–01 (*n*, length sample size; MWCV, mean weighted c.v.).

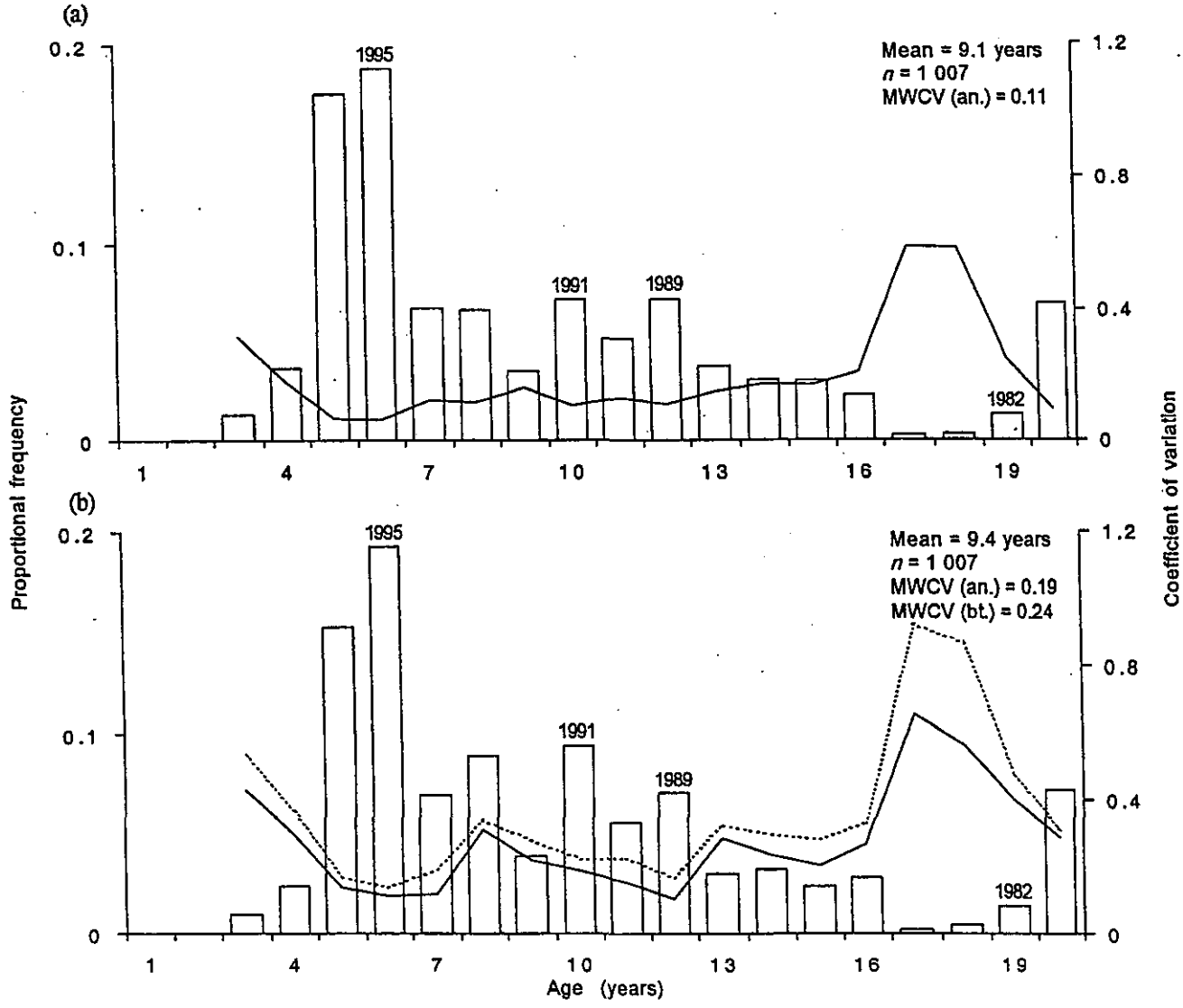

Figure 11: Proportion at age distributions (histogram) and c.v.s (solid and dashed lines represent analytical and bootstrap estimates respectively) determined from snapper landings sampled from the East Northland longline fishery in 2000–01 using (a) the age-length key and (b) the random age frequency approaches (*n*, otolith sample size; MWCV, mean weighted c.v. calculated using 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 2000–01

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 and pair trawl fisheries in 2000–01

Length	Single trawl						Pair trawl	
	Spring		Summer		Spr-sum		Summer	
(cm)	*P.i.*	c.v.	*P.i.*	c.v.	*P.i.*	c.v.	*P.i.*	c.v.
20	0.0000	0.00	0.0002	0.97	0.0001	0.98	0.0000	0.00
21	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0001	0.82
22	0.0003	0.81	0.0002	0.97	0.0003	0.61	0.0000	0.00
23	0.0005	0.96	0.0000	0.00	0.0002	0.96	0.0000	0.00
24	0.0011	0.55	0.0007	0.97	0.0009	0.51	0.0001	0.58
25	0.0068	0.38	0.0137	0.20	0.0105	0.22	0.0021	0.27
26	0.0133	0.34	0.0286	0.19	0.0215	0.21	0.0117	0.23
27	0.0268	0.32	0.0275	0.25	0.0271	0.19	0.0268	0.17
28	0.0218	0.19	0.0336	0.15	0.0281	0.13	0.0401	0.19
29	0.0209	0.22	0.0324	0.16	0.0271	0.14	0.0437	0.21
30	0.0229	0.20	0.0223	0.08	0.0226	0.10	0.0455	0.18
31	0.0336	0.10	0.0291	0.06	0.0312	0.06	0.0428	0.13
32	0.0505	0.07	0.0460	0.19	0.0481	0.10	0.0427	0.07
33	0.0701	0.04	0.0631	0.08	0.0663	0.05	0.0509	0.06
34	0.0921	0.05	0.0749	0.09	0.0828	0.06	0.0616	0.04
35	0.0941	0.05	0.0819	0.05	0.0875	0.05	0.0743	0.05
36	0.0950	0.09	0.0693	0.08	0.0812	0.07	0.0739	0.05
37	0.0743	0.06	0.0577	0.04	0.0654	0.05	0.0655	0.06
38	0.0617	0.10	0.0469	0.05	0.0538	0.07	0.0585	0.05
39	0.0459	0.05	0.0426	0.05	0.0442	0.04	0.0414	0.08
40	0.0393	0.05	0.0278	0.10	0.0331	0.08	0.0353	0.07
41	0.0361	0.05	0.0343	0.16	0.0351	0.08	0.0294	0.10
42	0.0292	0.03	0.0294	0.14	0.0293	0.08	0.0256	0.06
43	0.0209	0.08	0.0274	0.07	0.0244	0.06	0.0235	0.10
44	0.0199	0.10	0.0294	0.14	0.0250	0.13	0.0226	0.09
45	0.0169	0.06	0.0243	0.07	0.0209	0.08	0.0240	0.10
46	0.0160	0.10	0.0176	0.17	0.0168	0.10	0.0199	0.13
47	0.0111	0.13	0.0203	0.17	0.0160	0.17	0.0188	0.10
48	0.0130	0.17	0.0185	0.12	0.0160	0.12	0.0152	0.11
49	0.0122	0.25	0.0128	0.12	0.0125	0.13	0.0127	0.11
50	0.0081	0.10	0.0082	0.16	0.0082	0.10	0.0119	0.09
51	0.0068	0.21	0.0113	0.11	0.0092	0.13	0.0090	0.12
52	0.0047	0.14	0.0088	0.26	0.0069	0.18	0.0107	0.12
53	0.0054	0.24	0.0069	0.17	0.0062	0.13	0.0076	0.11
54	0.0057	0.29	0.0066	0.21	0.0062	0.17	0.0085	0.12
55	0.0034	0.35	0.0061	0.32	0.0049	0.25	0.0080	0.14
56	0.0027	0.39	0.0047	0.17	0.0038	0.18	0.0054	0.13
57	0.0032	0.22	0.0069	0.27	0.0052	0.26	0.0067	0.15
58	0.0013	0.50	0.0047	0.11	0.0032	0.23	0.0052	0.16
59	0.0022	0.38	0.0051	0.21	0.0037	0.22	0.0028	0.17
60	0.0024	0.39	0.0036	0.45	0.0030	0.31	0.0030	0.22
61	0.0024	0.23	0.0032	0.24	0.0028	0.17	0.0027	0.16
62	0.0017	0.18	0.0025	0.49	0.0021	0.29	0.0015	0.24
63	0.0014	0.45	0.0020	0.19	0.0018	0.20	0.0016	0.31
64	0.0003	0.71	0.0024	0.24	0.0014	0.36	0.0015	0.17
65	0.0004	0.91	0.0017	0.39	0.0011	0.43	0.0015	0.22
66	0.0009	0.79	0.0007	0.56	0.0008	0.47	0.0004	0.44
67	0.0004	0.91	0.0006	0.63	0.0005	0.51	0.0009	0.34
68	0.0002	0.88	0.0000	1.10	0.0001	0.70	0.0004	0.38
69	0.0000	0.00	0.0005	0.57	0.0003	0.57	0.0006	0.40
70	0.0000	0.00	0.0003	0.75	0.0002	0.76	0.0001	0.81
71	0.0000	0.00	0.0002	1.02	0.0001	1.01	0.0004	0.39
72	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0002	0.53
73	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0003	0.40
74	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0001	0.81
75	0.0000	0.00	0.0002	0.97	0.0001	0.98	0.0000	0.00
76	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0001	0.82
77	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0002	0.60
78	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0001	0.83
79	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0002	0.56
80	0.0000	0.00	0.0001	1.08	0.0001	1.04	0.0000	0.00
Nt	234 433		243 604		476 917		232 076	
n	4 921		5 705		10 626		11 562	

Appendix 1 – continued:
Estimates of the proportion at length of snapper from the Bay of Plenty longline fishery in 2000–01

Length	Longline					
	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	0.0004	0.99	0.0001	0.98
23	0.0003	0.98	0.0004	0.99	0.0003	0.70
24	0.0007	0.70	0.0043	0.67	0.0019	0.54
25	0.0104	0.30	0.0096	0.59	0.0101	0.27
26	0.0179	0.25	0.0241	0.44	0.0200	0.23
27	0.0453	0.14	0.0590	0.23	0.0500	0.13
28	0.0574	0.15	0.0548	0.19	0.0566	0.12
29	0.0664	0.13	0.0762	0.15	0.0697	0.10
30	0.0721	0.09	0.0796	0.16	0.0746	0.08
31	0.0776	0.09	0.0720	0.10	0.0757	0.07
32	0.0805	0.06	0.0721	0.11	0.0776	0.05
33	0.0738	0.04	0.0710	0.11	0.0729	0.04
34	0.0561	0.08	0.0473	0.08	0.0531	0.06
35	0.0530	0.05	0.0445	0.14	0.0501	0.06
36	0.0531	0.08	0.0448	0.11	0.0503	0.07
37	0.0495	0.07	0.0344	0.23	0.0444	0.09
38	0.0368	0.11	0.0448	0.20	0.0395	0.10
39	0.0403	0.12	0.0314	0.20	0.0373	0.11
40	0.0308	0.16	0.0442	0.12	0.0354	0.10
41	0.0307	0.08	0.0238	0.25	0.0284	0.10
42	0.0231	0.13	0.0263	0.11	0.0242	0.09
43	0.0184	0.13	0.0270	0.11	0.0213	0.09
44	0.0145	0.17	0.0157	0.20	0.0149	0.13
45	0.0157	0.13	0.0199	0.11	0.0172	0.09
46	0.0145	0.26	0.0119	0.23	0.0136	0.19
47	0.0102	0.20	0.0102	0.30	0.0102	0.17
48	0.0108	0.13	0.0067	0.24	0.0095	0.13
49	0.0051	0.18	0.0057	0.43	0.0053	0.18
50	0.0056	0.28	0.0073	0.24	0.0061	0.19
51	0.0032	0.40	0.0039	0.63	0.0034	0.34
52	0.0056	0.27	0.0030	0.22	0.0047	0.22
53	0.0042	0.65	0.0024	0.26	0.0036	0.51
54	0.0031	0.24	0.0069	0.31	0.0044	0.22
55	0.0019	0.35	0.0029	0.51	0.0022	0.28
56	0.0024	0.47	0.0022	0.45	0.0023	0.35
57	0.0023	0.25	0.0020	0.57	0.0022	0.24
58	0.0006	0.69	0.0004	1.01	0.0005	0.57
59	0.0012	0.66	0.0013	0.53	0.0013	0.46
60	0.0004	0.91	0.0016	0.52	0.0008	0.45
61	0.0006	0.69	0.0010	0.74	0.0008	0.48
62	0.0004	0.71	0.0000	0.00	0.0002	0.71
63	0.0003	0.96	0.0013	0.53	0.0006	0.51
64	0.0008	0.93	0.0004	1.06	0.0007	0.79
65	0.0006	0.69	0.0006	1.03	0.0006	0.56
66	0.0002	1.00	0.0009	0.69	0.0004	0.56
67	0.0004	0.93	0.0000	0.00	0.0003	0.96
68	0.0000	0.00	0.0000	0.00	0.0000	0.00
69	0.0000	0.00	0.0000	0.00	0.0000	0.00
70	0.0000	0.00	0.0000	0.00	0.0000	0.00
71	0.0002	1.00	0.0000	0.00	0.0001	1.00
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	0.0003	0.96	0.0000	0.00	0.0002	0.98
78	0.0004	0.93	0.0000	0.00	0.0003	0.96
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	90 046		61 829		151 833	
n	3 758		1 972		5 730	

Appendix 1 – continued:
Estimates of the proportion at length of snapper from the Hauraki Gulf longline fishery in 2000–01

Length	Spring		Summer		Longline 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	0.97	0.0001	0.99
23	0.0003	0.95	0.0000	0.00	0.0002	0.96
24	0.0011	0.55	0.0065	0.64	0.0037	0.55
25	0.0098	0.56	0.0275	0.38	0.0183	0.31
26	0.0267	0.25	0.0375	0.27	0.0319	0.18
27	0.0498	0.19	0.0595	0.24	0.0545	0.15
28	0.0765	0.21	0.0654	0.14	0.0712	0.14
29	0.0853	0.19	0.0741	0.09	0.0799	0.12
30	0.0947	0.16	0.0856	0.08	0.0904	0.10
31	0.0694	0.11	0.0727	0.06	0.0709	0.06
32	0.0729	0.05	0.0797	0.10	0.0762	0.06
33	0.0666	0.07	0.0647	0.08	0.0657	0.05
34	0.0545	0.04	0.0565	0.13	0.0554	0.07
35	0.0572	0.07	0.0541	0.12	0.0557	0.07
36	0.0398	0.13	0.0445	0.09	0.0420	0.08
37	0.0410	0.15	0.0363	0.09	0.0388	0.09
38	0.0284	0.20	0.0358	0.08	0.0320	0.11
39	0.0290	0.13	0.0274	0.13	0.0282	0.09
40	0.0214	0.25	0.0250	0.12	0.0231	0.14
41	0.0194	0.20	0.0214	0.11	0.0204	0.12
42	0.0182	0.28	0.0204	0.16	0.0193	0.16
43	0.0156	0.24	0.0176	0.14	0.0166	0.14
44	0.0171	0.22	0.0111	0.19	0.0143	0.14
45	0.0142	0.30	0.0090	0.20	0.0117	0.19
46	0.0104	0.27	0.0083	0.23	0.0094	0.18
47	0.0098	0.24	0.0085	0.18	0.0092	0.15
48	0.0089	0.26	0.0100	0.22	0.0095	0.17
49	0.0088	0.35	0.0043	0.25	0.0066	0.25
50	0.0099	0.28	0.0038	0.23	0.0069	0.20
51	0.0062	0.30	0.0047	0.18	0.0055	0.18
52	0.0053	0.41	0.0055	0.24	0.0054	0.24
53	0.0031	0.52	0.0027	0.21	0.0029	0.30
54	0.0040	0.46	0.0030	0.25	0.0035	0.28
55	0.0030	0.41	0.0018	0.41	0.0024	0.28
56	0.0043	0.41	0.0034	0.30	0.0039	0.26
57	0.0028	0.42	0.0016	0.30	0.0022	0.27
58	0.0025	0.44	0.0013	0.43	0.0019	0.33
59	0.0019	0.54	0.0017	0.37	0.0018	0.34
60	0.0011	0.54	0.0015	0.56	0.0013	0.39
61	0.0023	0.43	0.0015	0.25	0.0019	0.27
62	0.0016	0.54	0.0012	0.50	0.0014	0.37
63	0.0008	0.53	0.0005	0.79	0.0006	0.44
64	0.0010	0.56	0.0004	0.63	0.0007	0.42
65	0.0007	0.66	0.0004	0.73	0.0005	0.49
66	0.0001	1.04	0.0003	0.78	0.0002	0.62
67	0.0000	0.00	0.0005	0.60	0.0002	0.68
68	0.0011	0.67	0.0002	1.01	0.0007	0.57
69	0.0005	0.65	0.0002	1.00	0.0003	0.53
70	0.0000	0.00	0.0000	0.00	0.0000	0.00
71	0.0005	0.68	0.0000	0.00	0.0003	0.71
72	0.0000	0.00	0.0002	1.02	0.0001	1.01
73	0.0002	1.05	0.0002	0.75	0.0002	0.64
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	353 401		354 427		706 830	
n	4 643		5 237		9 880	

Appendix 1 – continued:
Estimates of the proportion at length of snapper from the East Northland longline fishery in 2000–01

Length	Longline					
	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	0.0003	1.02	0.0000	0.00	0.0001	1.02
23	0.0005	1.02	0.0000	0.00	0.0002	1.02
24	0.0049	0.53	0.0037	0.38	0.0042	0.32
25	0.0196	0.30	0.0175	0.26	0.0184	0.19
26	0.0362	0.21	0.0556	0.27	0.0477	0.21
27	0.0628	0.13	0.0797	0.22	0.0729	0.16
28	0.0768	0.10	0.0763	0.18	0.0765	0.11
29	0.0710	0.11	0.0802	0.14	0.0765	0.10
30	0.0760	0.07	0.0835	0.13	0.0805	0.08
31	0.0589	0.09	0.0598	0.10	0.0595	0.07
32	0.0597	0.08	0.0625	0.11	0.0614	0.07
33	0.0597	0.09	0.0546	0.08	0.0567	0.06
34	0.0495	0.09	0.0395	0.08	0.0435	0.07
35	0.0516	0.09	0.0373	0.12	0.0431	0.09
36	0.0413	0.10	0.0379	0.12	0.0393	0.08
37	0.0390	0.11	0.0374	0.09	0.0380	0.07
38	0.0408	0.11	0.0313	0.17	0.0352	0.11
39	0.0298	0.12	0.0259	0.22	0.0275	0.14
40	0.0230	0.16	0.0284	0.25	0.0262	0.17
41	0.0246	0.15	0.0202	0.28	0.0220	0.17
42	0.0233	0.14	0.0184	0.24	0.0204	0.15
43	0.0190	0.11	0.0170	0.28	0.0178	0.17
44	0.0155	0.19	0.0122	0.40	0.0136	0.24
45	0.0127	0.18	0.0157	0.30	0.0145	0.20
46	0.0125	0.18	0.0105	0.28	0.0113	0.18
47	0.0090	0.17	0.0112	0.38	0.0103	0.25
48	0.0131	0.19	0.0135	0.28	0.0134	0.18
49	0.0112	0.18	0.0093	0.42	0.0101	0.25
50	0.0092	0.23	0.0110	0.49	0.0103	0.32
51	0.0072	0.20	0.0077	0.38	0.0075	0.24
52	0.0083	0.19	0.0076	0.45	0.0079	0.27
53	0.0046	0.27	0.0075	0.52	0.0063	0.37
54	0.0045	0.18	0.0060	0.51	0.0054	0.34
55	0.0032	0.31	0.0026	0.63	0.0028	0.37
56	0.0025	0.21	0.0030	0.56	0.0028	0.36
57	0.0027	0.20	0.0022	0.50	0.0024	0.29
58	0.0039	0.22	0.0019	0.27	0.0027	0.19
59	0.0007	0.55	0.0015	0.44	0.0012	0.36
60	0.0012	0.39	0.0015	0.36	0.0014	0.27
61	0.0011	0.42	0.0017	0.63	0.0014	0.44
62	0.0015	0.44	0.0016	0.64	0.0016	0.42
63	0.0006	0.57	0.0004	0.65	0.0005	0.42
64	0.0014	0.49	0.0009	0.53	0.0011	0.35
65	0.0014	0.32	0.0006	0.55	0.0009	0.30
66	0.0003	0.97	0.0003	0.96	0.0003	0.70
67	0.0000	0.00	0.0004	0.84	0.0002	0.89
68	0.0000	0.00	0.0000	0.00	0.0000	0.00
69	0.0007	0.52	0.0002	0.99	0.0004	0.50
70	0.0007	0.51	0.0007	0.46	0.0007	0.34
71	0.0004	0.92	0.0005	0.73	0.0004	0.56
72	0.0010	0.44	0.0004	0.70	0.0007	0.38
73	0.0000	0.00	0.0001	1.06	0.0001	1.02
74	0.0000	0.00	0.0005	0.73	0.0003	0.71
75	0.0003	0.90	0.0000	0.00	0.0001	0.97
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	217 345		222 364		440 778	
n	4 678		5 071		9 749	

Appendix 2: Estimated seasonal proportion at age and c.v.s for snapper fisheries in SNA 1 and SNA 8 in 2000–01

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 and pair trawl fisheries in 2000–01
Otolith sample size = 522

	Age-length key Single trawl						Age-length key Pair trawl	
	Spring		Summer		Spr-sum		Summer	
Age (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	0.1037	0.06	0.1433	0.05	0.1250	0.05	0.1458	0.06
4	0.0540	0.17	0.0522	0.17	0.0530	0.17	0.0575	0.17
5	0.4565	0.04	0.3827	0.04	0.4168	0.04	0.3806	0.04
6	0.1933	0.09	0.1649	0.09	0.1780	0.09	0.1680	0.09
7	0.0425	0.23	0.0434	0.23	0.0430	0.22	0.0438	0.22
8	0.0502	0.19	0.0601	0.19	0.0555	0.19	0.0556	0.19
9	0.0194	0.34	0.0266	0.34	0.0233	0.34	0.0255	0.33
10	0.0439	0.19	0.0595	0.19	0.0523	0.18	0.0565	0.19
11	0.0059	0.55	0.0100	0.54	0.0081	0.54	0.0088	0.54
12	0.0043	0.41	0.0076	0.41	0.0061	0.39	0.0090	0.41
13	0.0019	1.02	0.0022	1.01	0.0021	1.01	0.0028	1.00
14	0.0030	0.74	0.0054	0.73	0.0043	0.73	0.0058	0.71
15	0.0053	0.51	0.0132	0.43	0.0095	0.44	0.0137	0.45
16	0.0059	0.21	0.0114	0.24	0.0088	0.20	0.0106	0.26
17	0.0054	0.41	0.0105	0.35	0.0082	0.36	0.0086	0.41
18	0.0030	0.57	0.0050	0.61	0.0041	0.58	0.0051	0.70
19	0.0002	1.00	0.0000	2.14	0.0001	0.91	0.0004	0.49
>19	0.0009	0.46	0.0016	0.33	0.0013	0.27	0.0018	0.22

Estimates of proportion at age of snapper from the Bay of Plenty longline fishery in 2000–01
Otolith sample size = 318

	Age-length key Longline					
	Spring		Summer		Spr-sum	
Age (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	0.0023	1.00	0.0022	1.00	0.0023	1.00
4	0.0163	0.37	0.0176	0.38	0.0168	0.37
5	0.1510	0.10	0.1651	0.10	0.1558	0.10
6	0.2745	0.08	0.2716	0.08	0.2735	0.08
7	0.1512	0.13	0.1392	0.13	0.1471	0.13
8	0.0955	0.19	0.0895	0.20	0.0935	0.19
9	0.0442	0.28	0.0451	0.29	0.0445	0.28
10	0.0604	0.23	0.0581	0.24	0.0596	0.23
11	0.0498	0.29	0.0469	0.30	0.0488	0.29
12	0.0761	0.20	0.0807	0.20	0.0777	0.20
13	0.0322	0.33	0.0333	0.37	0.0326	0.33
14	0.0126	0.33	0.0127	0.29	0.0126	0.30
15	0.0152	0.59	0.0154	0.66	0.0152	0.61
16	0.0000	0.00	0.0000	0.00	0.0000	0.00
17	0.0077	0.62	0.0078	0.61	0.0077	0.60
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	0.0047	0.63	0.0044	0.46	0.0046	0.54

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 2000–01

Otolith sample size = 989

	Age-length key						Random age frequency		
							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. *(an)*	c.v. *(bt)*
1	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.00
2	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.00
3	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.00
4	0.0143	0.27	0.0133	0.27	0.0138	0.27	0.0095	0.44	0.52
5	0.1063	0.09	0.1115	0.09	0.1088	0.09	0.0863	0.27	0.29
6	0.1738	0.07	0.1765	0.07	0.1751	0.07	0.1450	0.16	0.17
7	0.1403	0.08	0.1529	0.08	0.1463	0.08	0.1391	0.10	0.13
8	0.0604	0.13	0.0637	0.13	0.0620	0.13	0.0817	0.22	0.26
9	0.0602	0.13	0.0616	0.12	0.0608	0.12	0.0783	0.28	0.31
10	0.1467	0.08	0.1482	0.07	0.1474	0.07	0.1729	0.10	0.13
11	0.0520	0.13	0.0529	0.13	0.0524	0.13	0.0596	0.13	0.20
12	0.1207	0.09	0.1126	0.09	0.1168	0.08	0.1200	0.12	0.16
13	0.0347	0.16	0.0314	0.16	0.0331	0.16	0.0295	0.18	0.25
14	0.0153	0.28	0.0123	0.27	0.0138	0.27	0.0154	0.34	0.45
15	0.0136	0.28	0.0136	0.28	0.0136	0.27	0.0163	0.29	0.45
16	0.0184	0.25	0.0146	0.25	0.0166	0.24	0.0124	0.36	0.45
17	0.0086	0.36	0.0080	0.36	0.0083	0.36	0.0105	0.32	0.48
18	0.0006	1.01	0.0005	1.01	0.0005	1.01	0.0003	1.03	1.46
19	0.0024	0.80	0.0025	0.79	0.0025	0.79	0.0013	0.73	1.01
>19	0.0278	0.16	0.0213	0.18	0.0247	0.16	0.0220	0.31	0.34

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 2000–01

Otolith sample size = 1 007

	Age-length key						Random age frequency		
							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. *(an)*	c.v. *(bt)*
1	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.00
2	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.00
3	0.0117	0.31	0.0142	0.32	0.0132	0.32	0.0099	0.43	0.53
4	0.0321	0.18	0.0403	0.18	0.0369	0.18	0.0235	0.30	0.37
5	0.1640	0.07	0.1823	0.07	0.1749	0.07	0.1526	0.14	0.17
6	0.1835	0.06	0.1905	0.06	0.1877	0.06	0.1927	0.12	0.14
7	0.0668	0.12	0.0680	0.12	0.0675	0.12	0.0693	0.12	0.19
8	0.0672	0.11	0.0664	0.12	0.0667	0.11	0.0887	0.31	0.34
9	0.0375	0.16	0.0333	0.16	0.0350	0.16	0.0386	0.22	0.28
10	0.0769	0.11	0.0687	0.11	0.0720	0.11	0.0935	0.19	0.23
11	0.0548	0.13	0.0492	0.13	0.0515	0.13	0.0555	0.15	0.23
12	0.0763	0.11	0.0693	0.11	0.0721	0.11	0.0703	0.11	0.17
13	0.0389	0.15	0.0370	0.15	0.0378	0.15	0.0300	0.29	0.33
14	0.0314	0.17	0.0300	0.18	0.0306	0.17	0.0323	0.24	0.30
15	0.0323	0.17	0.0291	0.17	0.0304	0.17	0.0236	0.20	0.28
16	0.0228	0.21	0.0233	0.21	0.0231	0.21	0.0280	0.27	0.33
17	0.0027	0.59	0.0023	0.59	0.0025	0.59	0.0021	0.66	0.93
18	0.0029	0.59	0.0026	0.58	0.0027	0.58	0.0043	0.56	0.86
19	0.0142	0.24	0.0126	0.25	0.0132	0.24	0.0137	0.40	0.47
>19	0.0685	0.10	0.0705	0.10	0.0697	0.09	0.0716	0.29	0.31

Appendix 3: Estimated mean weight at age (kg) and c.v.s for snapper fisheries in SNA 1 and SNA 8 in 2000–01

c.v. = coefficient of variation.

Estimates of mean weight at age (kg) of snapper from the west coast single trawl and pair trawl fisheries in 2000–01
Otolith sample size = 522

Age	Single trawl						Pair trawl		
	Spring		Summer		Spr-sum		Summer		
(years)	Mean	c.v.	Mean	c.v.	Mean	c.v.	Mean	c.v.	*n*
1	–	–	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–	–	–
3	0.50	0.01	0.48	0.01	0.49	0.01	0.52	0.01	80
4	0.72	0.04	0.69	0.04	0.71	0.04	0.67	0.04	34
5	0.94	0.01	0.93	0.01	0.93	0.01	0.93	0.01	221
6	1.20	0.02	1.23	0.02	1.22	0.02	1.22	0.02	79
7	1.61	0.06	1.66	0.05	1.64	0.05	1.66	0.06	18
8	1.81	0.04	1.85	0.04	1.83	0.04	1.87	0.04	22
9	2.11	0.06	2.08	0.05	2.09	0.06	2.11	0.06	8
10	2.37	0.04	2.40	0.05	2.39	0.04	2.40	0.05	20
11	1.96	0.05	1.98	0.05	1.97	0.05	1.99	0.04	3
12	3.18	0.05	3.16	0.05	3.17	0.05	3.16	0.05	3
13	3.08	0.01	3.08	0.01	3.08	0.01	3.08	0.01	1
14	2.53	0.16	2.52	0.15	2.52	0.15	2.62	0.16	2
15	3.37	0.06	3.63	0.06	3.56	0.06	3.49	0.06	5
16	4.25	0.02	4.35	0.03	4.32	0.03	4.41	0.04	7
17	3.51	0.09	3.56	0.08	3.54	0.08	3.56	0.08	5
18	3.71	0.14	3.58	0.14	3.62	0.14	3.37	0.13	2
19	5.86	0.02	5.86	0.02	5.86	0.02	5.86	0.02	1
>19	5.40	0.02	6.32	0.06	6.01	0.05	7.00	0.04	11

Estimates of mean weight at age (kg) of snapper from the Bay of Plenty longline fishery in 2000–01
Otolith sample size = 318

Age	Spring		Summer		Spr-sum		
(years)	Mean	c.v.	Mean	c.v.	Mean	c.v.	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	0.49	0.01	0.49	0.01	0.49	0.01	1
4	0.50	0.07	0.51	0.06	0.51	0.07	7
5	0.56	0.04	0.54	0.04	0.55	0.04	60
6	0.69	0.03	0.68	0.03	0.69	0.03	92
7	0.81	0.03	0.80	0.03	0.80	0.03	45
8	1.01	0.06	1.05	0.07	1.02	0.06	25
9	1.16	0.05	1.19	0.05	1.17	0.05	12
10	1.15	0.06	1.17	0.06	1.15	0.06	17
11	1.42	0.09	1.44	0.09	1.43	0.09	12
12	1.73	0.05	1.78	0.05	1.75	0.05	19
13	1.83	0.06	1.86	0.07	1.84	0.06	8
14	2.53	0.14	2.48	0.11	2.51	0.13	3
15	1.92	0.08	1.82	0.08	1.89	0.08	3
16	–	–	–	–	–	–	–
17	2.23	0.07	2.27	0.07	2.24	0.07	3
18	–	–	–	–	–	–	–
19	–	–	–	–	–	–	–
>19	2.96	0.04	3.08	0.04	3.00	0.04	3

Appendix 3 – continued:

Estimates of mean weight at age (kg) of snapper from the Hauraki Gulf longline fishery in 2000–01

Otolith sample size = 989

Age	Spring		Summer		Spr-sum		
(years)	Mean	c.v.	Mean	c.v.	Mean	c.v.	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	–	–	–	–	–	–	–
4	0.51	0.04	0.51	0.05	0.51	0.05	13
5	0.55	0.02	0.53	0.02	0.54	0.02	97
6	0.63	0.02	0.62	0.02	0.63	0.02	161
7	0.69	0.02	0.67	0.03	0.68	0.02	132
8	0.76	0.05	0.75	0.05	0.76	0.05	60
9	0.92	0.05	0.92	0.04	0.92	0.04	62
10	0.96	0.03	0.96	0.03	0.96	0.03	149
11	1.12	0.05	1.09	0.05	1.11	0.05	58
12	1.27	0.04	1.20	0.04	1.24	0.04	123
13	1.47	0.06	1.41	0.06	1.44	0.06	39
14	1.80	0.10	1.65	0.10	1.74	0.10	15
15	1.60	0.15	1.59	0.16	1.59	0.15	12
16	2.08	0.09	1.94	0.10	2.02	0.09	18
17	2.47	0.12	2.36	0.13	2.42	0.12	10
18	1.97	0.01	1.97	0.01	1.97	0.01	1
19	2.42	0.15	2.40	0.16	2.41	0.16	2
>19	3.20	0.05	3.03	0.06	3.13	0.05	37

Estimates of mean weight at age (kg) of snapper from the East Northland longline fishery in 2000–01

Otolith sample size = 1 007

Age	Spring		Summer		Spr-sum		
(years)	Mean	c.v.	Mean	c.v.	Mean	c.v.	*n*
1	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–
3	0.43	0.04	0.43	0.03	0.43	0.04	10
4	0.48	0.04	0.47	0.03	0.47	0.03	29
5	0.54	0.02	0.53	0.02	0.53	0.02	158
6	0.64	0.02	0.62	0.02	0.63	0.02	187
7	0.70	0.04	0.67	0.04	0.68	0.04	67
8	0.78	0.03	0.77	0.04	0.77	0.03	69
9	0.91	0.04	0.89	0.05	0.90	0.04	38
10	1.02	0.03	1.01	0.03	1.01	0.03	78
11	1.19	0.05	1.19	0.05	1.19	0.05	57
12	1.23	0.05	1.23	0.06	1.23	0.05	78
13	1.21	0.05	1.28	0.06	1.25	0.05	42
14	1.68	0.06	1.75	0.08	1.72	0.07	35
15	1.47	0.05	1.49	0.05	1.48	0.05	34
16	1.81	0.08	1.90	0.09	1.86	0.08	25
17	1.90	0.23	1.94	0.23	1.92	0.23	3
18	1.26	0.14	1.27	0.12	1.27	0.13	3
19	2.26	0.09	2.12	0.08	2.18	0.08	16
>19	2.29	0.03	2.39	0.03	2.35	0.03	78

Appendix 4: Age-length keys derived from otolith samples collected from snapper fisheries in SNA 1 and SNA 8 in 2000–01

Estimates of proportion of length at age for snapper sampled from the west coast, spring and summer 2000–01 (Note: Aged to 01/01/2001)

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	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
25	0	0	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
26	0	0	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
27	0	0	0.92	0.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
28	0	0	0.81	0.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
29	0	0	0.78	0.17	0.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
30	0	0	0.70	0.05	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
31	0	0	0.15	0.30	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
32	0	0	0.06	0.26	0.65	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
33	0	0	0	0.05	0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
34	0	0	0	0.10	0.78	0.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
35	0	0	0	0.05	0.83	0.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42
36	0	0	0	0.03	0.62	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
37	0	0	0	0	0.61	0.36	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	33
38	0	0	0	0	0.52	0.30	0.13	0.04	0	0	0	0	0	0	0	0	0	0	0	0	23
39	0	0	0	0	0.55	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
40	0	0	0	0	0.33	0.60	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	15
41	0	0	0	0	0.07	0.64	0.07	0.21	0	0	0	0	0	0	0	0	0	0	0	0	14
42	0	0	0	0	0.08	0.33	0.25	0.25	0	0.08	0	0	0	0	0	0	0	0	0	0	12
43	0	0	0	0	0.10	0.30	0.20	0.10	0.10	0.20	0	0	0	0	0	0	0	0	0	0	10
44	0	0	0	0	0	0.11	0.22	0.56	0	0	0.11	0	0	0	0	0	0	0	0	0	9
45	0	0	0	0	0	0.14	0	0.29	0.43	0.14	0	0	0	0	0	0	0	0	0	0	7
46	0	0	0	0	0	0.13	0.38	0.25	0	0.25	0	0	0	0	0	0	0	0	0	0	8
47	0	0	0	0	0	0	0	0	0.17	0.33	0.33	0	0	0.17	0	0	0	0	0	0	6
48	0	0	0	0	0	0	0	0	0.25	0.75	0	0	0	0	0	0	0	0	0	0	4
49	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0	0	0	0	0	0	0	0	0	0	4
50	0	0	0	0	0	0	0.25	0.50	0	0.25	0	0	0	0	0	0	0	0	0	0	4
51	0	0	0	0	0	0	0	0.50	0	0.25	0	0	0	0	0	0	0.25	0	0	0	4
52	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0	0.33	0	0	0.33	0	0	3
53	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0	0	0	3
54	0	0	0	0	0	0	0	0	0.33	0.33	0	0	0.33	0	0	0	0	0	0	0	3
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0.33	0	0.33	0	0	0	3
56	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0	2
57	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0.50	0	0	0	0	0	2
58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0.50	0	0	0	0	2
59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	1.00	0	0	0	2
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	2
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	1
62	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	0	0	0	1
63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	1
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	1
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	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	1.00	0	0	0	1
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	1
69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	1
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
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	1.00	0	0	0	0	1
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
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	1.00	1
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	1.00	1
78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
Total																					522

Appendix 4 – continued:
Estimates of proportion of length at age for snapper sampled from the Bay of Plenty, spring and summer 2000–01. (Note: Aged to 01/01/01)

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	0.33	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
26	0	0	0	0	0.92	0.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
27	0	0	0	0.06	0.69	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
28	0	0	0.04	0.04	0.52	0.36	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0	25
29	0	0	0	0	0.36	0.56	0.08	0	0	0	0	0	0	0	0	0	0	0	0	0	25
30	0	0	0	0.11	0.07	0.68	0.11	0	0	0.04	0	0	0	0	0	0	0	0	0	0	28
31	0	0	0	0	0.11	0.56	0.30	0.04	0	0	0	0	0	0	0	0	0	0	0	0	27
32	0	0	0	0	0.09	0.41	0.23	0.23	0	0	0.05	0	0	0	0	0	0	0	0	0	22
33	0	0	0	0	0.05	0.37	0.42	0.11	0.05	0	0	0	0	0	0	0	0	0	0	0	19
34	0	0	0	0	0.11	0.26	0.37	0.16	0	0.11	0	0	0	0	0	0	0	0	0	0	19
35	0	0	0	0	0.17	0.11	0.39	0.17	0.06	0.06	0.06	0	0	0	0	0	0	0	0	0	18
36	0	0	0	0	0	0.20	0.13	0.27	0.13	0.13	0	0.13	0	0	0	0	0	0	0	0	15
37	0	0	0	0	0	0.18	0.09	0.18	0.09	0.27	0.18	0	0	0	0	0	0	0	0	0	11
38	0	0	0	0	0.08	0.08	0.17	0.08	0.25	0.33	0	0	0	0	0	0	0	0	0	0	12
39	0	0	0	0	0	0.11	0.11	0.11	0.11	0.11	0.11	0.22	0.11	0	0	0	0	0	0	0	9
40	0	0	0	0	0	0	0	0.14	0.14	0.14	0.29	0.29	0	0	0	0	0	0	0	0	7
41	0	0	0	0	0	0.13	0	0.13	0	0	0.25	0.25	0.13	0.13	0	0	0	0	0	0	8
42	0	0	0	0	0	0	0	0.17	0.33	0.17	0	0.33	0	0	0	0	0	0	0	0	6
43	0	0	0	0	0	0	0	0.33	0	0	0	0	0.33	0	0.33	0	0	0	0	0	3
44	0	0	0	0	0	0	0	0	0	0	0	0.33	0.67	0	0	0	0	0	0	0	3
45	0	0	0	0	0	0	0	0	0	0	0.33	0.67	0	0	0	0	0	0	0	0	3
46	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0.25	0	0.25	0	0	0	4
47	0	0	0	0	0	0	0	0	0	0.33	0	0.33	0.33	0	0	0	0	0	0	0	3
48	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0.50	0	0	0	0	0	2
49	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0.50	0	0	0	2
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	0	0.50	0	0	0	0	0.50	0	0	0	2
52	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0.50	2
53	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	0	1
54	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	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	1.00	0	0	0	0	0	0	0	0	1
57	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	0	0	0	0	0	0	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	1.00	0	0	0	0	0	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	0	0
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	1.00	0	0	0	0	0	0	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	1.00	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																					318

Appendix 4 – continued:
Estimates of proportion of length at age for snapper sampled from the Hauraki Gulf, spring and summer 2000–01 (Note: Aged to 01/01/01)

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	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	1
25	0	0	0	0	0.36	0.27	0.27	0.09	0	0	0	0	0	0	0	0	0	0	0	0	11
26	0	0	0	0	0.32	0.18	0.25	0.11	0.04	0.04	0.07	0	0	0	0	0	0	0	0	0	28
27	0	0	0	0.05	0.23	0.32	0.12	0.09	0.05	0.12	0	0	0	0	0.02	0	0	0	0	0	57
28	0	0	0	0.11	0.30	0.30	0.09	0.09	0.02	0.06	0.03	0	0	0	0	0	0	0	0	0	66
29	0	0	0	0.03	0.28	0.29	0.20	0.04	0.04	0.09	0	0.03	0	0	0	0	0	0	0	0	69
30	0	0	0	0	0.14	0.30	0.19	0.05	0.06	0.08	0.04	0.10	0.03	0	0.01	0	0	0	0	0	79
31	0	0	0	0	0.14	0.30	0.25	0.05	0.05	0.10	0.05	0.06	0	0	0	0	0	0	0	0	63
32	0	0	0	0	0.07	0.21	0.28	0.12	0.05	0.10	0.03	0.10	0	0	0.02	0.02	0	0	0	0	58
33	0	0	0	0.02	0.08	0.15	0.17	0.02	0.10	0.28	0.02	0.13	0.02	0	0.02	0	0	0	0	0	60
34	0	0	0	0	0.04	0.22	0.19	0.13	0.06	0.10	0.09	0.12	0.01	0.01	0	0.01	0	0	0	0	68
35	0	0	0	0	0	0.17	0.07	0.07	0.11	0.35	0.04	0.13	0.02	0.02	0	0.02	0	0	0	0	54
36	0	0	0	0	0	0.11	0.19	0.06	0.11	0.23	0.04	0.21	0.02	0.02	0	0	0	0	0	0	47
37	0	0	0	0	0	0.05	0.13	0.03	0.08	0.26	0.13	0.18	0.10	0	0.05	0	0	0	0	0	39
38	0	0	0	0	0	0	0.08	0.08	0.14	0.32	0.11	0.14	0.08	0	0	0.03	0	0	0	0.03	37
39	0	0	0	0	0	0	0.04	0.08	0	0.24	0.08	0.28	0.16	0.08	0	0	0	0	0	0.04	25
40	0	0	0	0	0	0	0.05	0.05	0.18	0.32	0.18	0.14	0.05	0.05	0	0	0	0	0	0	22
41	0	0	0	0	0	0	0.03	0.06	0.13	0.26	0.19	0.19	0.06	0	0	0	0	0	0.03	0.03	31
42	0	0	0	0	0	0	0	0.05	0.09	0.18	0.23	0.23	0.09	0	0.05	0	0.09	0	0	0	22
43	0	0	0	0	0	0	0	0	0.06	0.28	0.06	0.28	0.06	0.06	0.06	0.06	0.06	0	0	0.06	18
44	0	0	0	0	0	0	0	0.05	0.10	0.15	0.10	0.30	0.10	0.10	0	0.10	0	0	0	0	20
45	0	0	0	0	0	0	0	0	0	0.07	0	0.53	0.13	0.07	0	0.13	0	0	0	0.07	15
46	0	0	0	0	0	0	0	0	0.06	0.06	0.17	0.17	0.28	0	0	0	0.11	0.06	0	0.11	18
47	0	0	0	0	0	0	0	0	0	0.14	0	0.29	0.29	0	0	0.14	0	0	0	0.14	7
48	0	0	0	0	0	0	0	0	0	0	0	0.38	0	0.13	0.13	0.13	0.13	0	0	0.13	8
49	0	0	0	0	0	0	0	0	0	0.08	0.08	0.31	0.23	0.08	0.08	0	0	0	0	0.15	13
50	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0.25	0	0.25	0	0	0	0	4
51	0	0	0	0	0	0	0	0	0	0	0.13	0.38	0.13	0.13	0	0.13	0.13	0	0	0	8
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.67	0	0	0	0.33	0	3
53	0	0	0	0	0	0	0	0	0	0	0.14	0.14	0.14	0	0	0.14	0.14	0	0	0.29	7
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.67	0	0	0	0.33	3
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.40	0	0	0	0.60	5
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0.50	2
57	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0	0	0.75	4
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	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	1.00	1
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0	0	0.80	5
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	0	1.00	2
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	2
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	0	0
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	1.00	1
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																					989

Appendix 4 – continued:
Estimates of proportion of length at age for snapper sampled from East Northland, spring and summer 2000–01
(Note: Aged to 01/01/01)

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	0.13	0.06	0.75	0.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
26	0	0	0.11	0.25	0.50	0.07	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	28
27	0	0	0.04	0.17	0.38	0.30	0.08	0.02	0	0	0.02	0	0	0	0	0	0	0	0	0	53
28	0	0	0.03	0.03	0.38	0.31	0.13	0.07	0.04	0	0	0.03	0	0	0	0	0	0	0	0	72
29	0	0	0.01	0.07	0.37	0.32	0.05	0.08	0.02	0.01	0.01	0.04	0.01	0	0	0	0	0	0	0	84
30	0	0	0	0.01	0.23	0.42	0.13	0.08	0	0.07	0.01	0.01	0.01	0	0.01	0.01	0	0	0	0	86
31	0	0	0	0.02	0.21	0.45	0.10	0.09	0.03	0.02	0	0.03	0.03	0	0	0	0	0	0	0.02	58
32	0	0	0	0.02	0.17	0.26	0.13	0.23	0.04	0.08	0.02	0.06	0	0	0	0	0	0	0	0	53
33	0	0	0	0	0.07	0.31	0.07	0.12	0.06	0.13	0.09	0.06	0.06	0	0.01	0.01	0	0	0	0	68
34	0	0	0	0.02	0.05	0.18	0.15	0.09	0.07	0.11	0.11	0.11	0.04	0.02	0.02	0	0	0.02	0	0.02	55
35	0	0	0	0	0.04	0.15	0.04	0.15	0.11	0.17	0.09	0.11	0.06	0	0.02	0	0	0	0.02	0.04	47
36	0	0	0	0	0.08	0.03	0.08	0.08	0.13	0.26	0.10	0.13	0.10	0.03	0	0	0	0	0	0	39
37	0	0	0	0	0	0	0.05	0.03	0.08	0.30	0.14	0.16	0.14	0.03	0.03	0.03	0	0	0.03	0	37
38	0	0	0	0	0	0.02	0.07	0.02	0.10	0.20	0.07	0.24	0.10	0.05	0.07	0	0.02	0	0	0.02	41
39	0	0	0	0	0	0.03	0	0.03	0.06	0.13	0.23	0.19	0.06	0.10	0.10	0.03	0	0	0	0.03	31
40	0	0	0	0	0	0	0.03	0.20	0	0.03	0.10	0.13	0.13	0.13	0.07	0.07	0	0.03	0.03	0.03	30
41	0	0	0	0	0	0.04	0	0	0	0.04	0.17	0.17	0.09	0.17	0.13	0.09	0	0	0	0.09	23
42	0	0	0	0	0	0.05	0	0	0	0.11	0.11	0.05	0	0.05	0.26	0.16	0	0.05	0.05	0.11	19
43	0	0	0	0	0	0	0	0	0.07	0.07	0.03	0.14	0.14	0.21	0.10	0.10	0.03	0	0	0.10	29
44	0	0	0	0	0	0	0	0	0	0.16	0.16	0.11	0	0.21	0.16	0	0	0	0.05	0.16	19
45	0	0	0	0	0	0	0	0	0	0	0	0.13	0.13	0	0.25	0.06	0	0	0.06	0.38	16
46	0	0	0	0	0	0	0	0	0	0	0	0.20	0	0.10	0.10	0	0	0	0.10	0.50	10
47	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0	0	0.13	0	0	0	0.63	8
48	0	0	0	0	0	0	0	0	0	0.08	0.17	0.08	0	0.08	0.08	0.17	0	0	0	0.33	12
49	0	0	0	0	0	0	0	0	0	0	0.06	0.06	0	0	0	0.12	0	0	0.24	0.53	17
50	0	0	0	0	0	0	0	0	0	0	0.07	0	0.07	0.14	0	0.07	0	0	0.14	0.50	14
51	0	0	0	0	0	0	0	0	0	0	0.11	0	0	0.11	0.11	0.11	0	0	0.11	0.44	9
52	0	0	0	0	0	0	0	0	0	0	0	0.13	0	0.13	0	0.13	0.13	0	0.13	0.38	8
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33	0	0.33	0	0	0	0.33	3
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0	0	0	0	0	0.86	7
55	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0.50	2
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	2
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	0.33	0	0	0	0.67	3
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	1
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	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	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.00	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	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	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																					1 007