

Statistics
NEW ZEALAND
Te Tari Tatau

**Physical Flow Account for
Fish Resources in New Zealand**

1998–2001

Statistics New Zealand

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Environmental Accounts Series

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For further information on the statistics in this report, or on other publications or products, contact our Information Centre.

Auckland

Private Bag 92003
Phone 09 920 2100
Fax 09 920 0859

Wellington

PO Box 2922
Phone 04 931 4600
Fax 04 931 4610

Christchurch

Private Bag 4741
Phone 03 964 8700
Fax 03 964 8864

Internet home page: www.stats.govt.nz

Email: info@stats.govt.nz

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A. Introduction

A.1 Background to Natural Resource and Environmental Accounts

Statistics New Zealand, in association with the Ministry for the Environment, is currently preparing stock and flow estimates for four of New Zealand's significant natural resources: forestry, fishing, water and subsoil resources. Technically, the physical estimates are referred to as natural resource accounts, while the monetary estimates are referred to as environmental accounts. However, these terms are often used interchangeably. The initial impetus to begin compiling natural resource and environmental accounts came about as a result of decisions stemming from the Budget 2000, where it was decided that more information was required on the complex relationship between the economy, environment and society.

Natural resource and environmental accounts are based on an international framework called the System of Environmental and Economic Accounts (SEEA). This framework is an extension of the System of National Accounts (SNA), which Statistics New Zealand uses to compile the national accounts, including gross domestic product (GDP). The SEEA is designed to measure the use of natural resources and the resulting effects on the environment. The SEEA is used by many countries, including Australia, Canada, Japan, the Philippines, and the United Kingdom.

The release of natural resource and environmental accounts reflects an international trend towards compiling information beyond the traditional measures of economic activity. The accounts reflect the view that the environment has a finite capacity to supply materials and absorb the wastes produced when these materials are used in economic activities. The aim of the flow accounts is to measure this supply of natural resources, how the resources are used, and the residuals that are produced, which the environment must absorb.

This report provides physical information on the flow of fish products in New Zealand from 1998 to 2001. The start year of 1998 was chosen due to unresolved data issues for previous years. The tables in the report are presented in tonnes. The account shows the supply of fish products to the economy and fish exports.

Future work on the fish resource accounts will not be undertaken due to limited data availability and data quality issues.

A.2 Background to Flow Accounts

For more background information on New Zealand natural resource accounting, the SEEA and the SNA, see the report [Natural Resource Accounts for New Zealand – Overview Document](#) available from Statistics New Zealand website.

A.3 Development of the Fishing Industry in New Zealand

A.3.1 Historical perspective¹

Whaling and sealing were the first forms of commercial fishing in New Zealand. Whaling stations had been established throughout coastal New Zealand by the 1830s. The sperm whaling grounds to the north of New Zealand were depleted well before the 1840s, and by 1840 the southern fishing grounds of the southern right whale were also depleted. Sealing was established earlier than whaling, from the 1790s. However, the sealing fisheries also became depleted by the 1830s. Both the whaling and sealing fisheries crashed in the 1840s.²

When European settlers arrived in New Zealand, the Crown took ownership of fisheries and established access to commercial fishing based on the English tradition of free and open access to coastal fisheries. Recognition of Māori rights was limited and ambiguous.

The early fishing industry had unrestricted access until the resource, particularly near shore fisheries, began coming under pressure. By 1865, the depletion of fisheries was becoming evident. Various Acts of Parliament were introduced to try to manage the fishery resources, for example, the Oyster Fisheries Act (1866, 1869, and 1892). In 1908 the Fisheries Act was introduced to manage, protect, and conserve the resource. The Act formalised regulatory controls over fishing methods through input controls such as closed areas and seasons, licensing, controls on minimum fish size and requirements to land catch at specific ports. The Act was operational until being replaced with the Fisheries Act 1983.

Between 1908 and 1983, more controls were placed on the commercial fishing industry. In the late 1930s, an investigative committee discovered that a high proportion of exports compared with a lack of domestic fish supply had led to a depletion of fish stocks and low returns to fishers. Controls on vessels, fishers and exports were introduced to further conserve the resource.

In 1945, the Fisheries Amendment Act was introduced to regulate the licensing of vessels and fishers to a three-mile limit offshore. However, domestic and foreign fishers avoided these controls by fishing beyond the three-mile limit.

In the early 1960s, an excess supply of fish products to Australia resulted in export restrictions. In response, the industry was deregulated, and new fishers were encouraged into the industry as a result of the implementation of the Fisheries Amendment Act 1963. A fishing industry board was established to promote and oversee the fishing industry and develop the economic potential of the fishery resource through growth, expansion and diversification.

1. Information contained in this section is largely from Hendy et al. (2002). Information from other sources is footnoted.

2. Brooking and Pawson (2002).

The Territorial and Fishing Zone Act 1965 established an exclusive fishing zone out to 12-miles offshore. The Act also consolidated property rights and limited foreign access to New Zealand fishery resources. The major exports at the time were from a few key inshore species. Expansion of the New Zealand domestic fishing industry was encouraged by Government through guaranteeing loans for vessels and equipment purchases, which assisted the development of large fishing companies. This led to increasing development and exploration of fisheries further offshore.

After the establishment of the 200 nautical mile Exclusive Economic Zone (EEZ) in 1978, New Zealand was obliged under international provisions to allow foreign fishers to harvest the fish resource within the EEZ if domestic fishing fleets were unable to do so. This situation led to the development of the domestic fishing industry through deepwater fishing ventures between New Zealand fishing companies and foreign companies from Japan, Korea, Taiwan and the former USSR. The joint ventures increased the New Zealand fishing industry's expertise, technology, access to international markets, on-shore processing facilities and deepwater fishing exploration.

Government financial aid to the domestic fishing industry for the purposes of stock research and capital investment continued through to the 1980s. This increased the deepwater catch by domestic vessels because the assistance encouraged entry into the fishing industry by New Zealanders; long-term technology and processing development, with larger and more efficient trawlers; and production expansion.

By the mid-1980s, there was growth in the deep-sea export fisheries market for value-added shore processed products, which provided greater economic returns to the New Zealand fishing industry and attracted more fishers into the industry. The effect was a large increase in catch of deepwater species. For example, the Hoki catch went from 2,700 tonnes in 1980 to 46,000 tonnes in 1985.³

A.3.2 Recent picture

A.3.2.1 The Quota Management System

By the 1980s, the need to redesign the fisheries management system and reduce over-capitalisation and over-fishing had become evident because fishing pressure had reduced the size of a number of key fisheries. This was leading to a decline in commercial catch sizes, an economic downturn in the fishing industry and a deterioration of recreational fisheries.⁴

In October 1986, the Quota Management System (QMS) was introduced by the Ministry of Fisheries to enhance the sustainability of fish stocks and improve the economic efficiency of the fishing industry.⁵

3. Hendy et al (2002).

4. Clement & Associates (1997).

5. Clement & Associates (1997).

The QMS divides New Zealand's 200 nautical mile EEZ into 10 Quota Management Areas (QMAs) (see Figure 1). For each quota management species, separate fish stocks have been identified to provide for more effective management. Each fish stock is defined by an area that may be the same as a QMA or a grouping of QMAs, depending on the geographical distribution of that fish stock. For example, the species John Dory has one stock called JDO3, which incorporates the QMAs 3, 4, 5 and 6, while Snapper has a stock called SNA1, which matches QMA1.

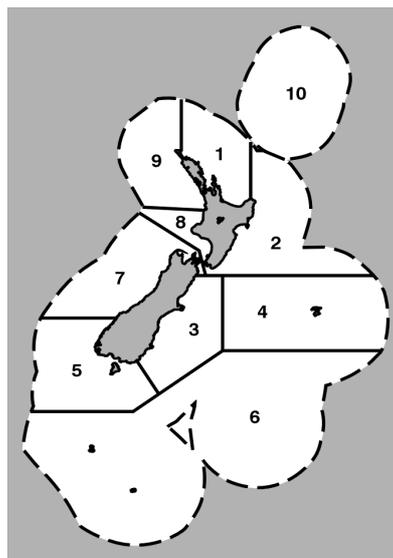
As at May 2003, 55 species were included in the QMS. Over the next few years the Ministry of Fisheries intends to add approximately 40 more species to the QMS.

Under the QMS, commercial catch limits (in tonnes) are set annually by the Minister of Fisheries as Total Allowable Commercial Catch (TACC). The Minister sets the TACC on advice provided by the Ministry of Fisheries for each fish stock and from submissions from the fishing industry and other interested groups. The TACCs may be altered from the previous year if assessments into stock sizes show change. For most stocks, the fishing year is from 1 October to 30 September the following year.

Commercial fishers own or lease Individual Transferable Quota (ITQ). This entitles them to fish a proportion of the TACC of a fish stock, ie the ITQ, owned or leased, is a proportion of the total quota for that stock that translates into tonnage of the TACC at the start of the fishing year.⁶ For example, if a fisher owns 10 percent of quota shares for Snapper, and the TACC for Snapper is set at 10,000 tonnes for a given fishing year, then the quota owner can catch 1,000 tonnes of Snapper that year.

Owning ITQ does not mean that the commercial fisher owns the fish in the sea, rather the right to harvest fish is owned. Under the current QMS system, only New Zealand residents can own quota. However, quota owners can contract overseas companies to harvest fish.

Figure 1. Exclusive Economic Zone and Quota Stock Management Areas



Source: Ministry of Fisheries Stock Assessment Reports
 Note: management areas may vary between species.

6. Refer to Annual Catch Entitlement (ACE) in the Glossary for a more detailed explanation.

A.3.2.2 Aquaculture

Aquaculture is the fisheries equivalent of agriculture. Aquaculture is the “propagation and husbandry of aquatic plants and animals to supplement natural supply”.⁷ Aquaculture is based both in salt water and fresh water, and takes place in natural water and artificial enclosures.

The first marine farms were developed north of Auckland in the 1960s. Since then, production has increased significantly and approximately 1,000 marine farms have been established in New Zealand.⁸

The major types of aquaculture in New Zealand include GreenshellTM mussels and pacific oysters. Other important species that are farmed are King (quinnat) Salmon and paua. Scientific organisations, such as NIWA, are also developing programmes to further enhance current aquaculture production and research new potential aquaculture species, such as seahorses, kingfish and freshwater eels.

The high standards of New Zealand aquaculture production have meant that export earnings from aquaculture have become significant. GreenshellTM mussel exports alone were valued at \$169 million in the year ended December 2000.⁹ Aquaculture makes up approximately 20 percent of the total fisheries production value.

A.3.3 Ongoing industry development

Developments in value-added products, such as marinated GreenshellTM mussels, and improvements in storage and handling techniques for live and fresh seafood, important due to the large distances to New Zealand’s export markets, have added to increased export returns.¹⁰ In the year ended March 1989, export values for seafood were approximately \$734 million; by the year ended March 2001, export values had risen to \$1.46 billion. The seafood industry is forecasting total exports returns for fish and fish products to be \$2 billion by 2010.¹¹

7. Ministry of Fisheries website: www.fish.govt.nz.

8. Ministry of Fisheries and Ministry for the Environment (2000).

9. SeaFIC website [www.seafood.co.nz].

10. SeaFIC website [www.seafood.co.nz].

11. SeaFIC website [www.seafood.co.nz].

A.4 Overview of the fish products and residuals

Once fish are caught, they are processed into various cuts of fish. The main cuts that cover the basic products used to derive the export and greenweight export totals by species in this physical fish flow account are summarised in the following text.

A.4.1 Types of processed fish¹²

Gutted:

Gutted fish are whole fish that have been gutted and sometimes scaled with head and fins intact. A gutted fish has a longer storage life than a fish stored just as it comes from the water because entrails cause rapid spoilage.

Headed and gutted:

As gutted, but with the head removed.

Dressed:

Dressed fish have been scaled, gutted, and had gills removed. Head and fins are intact. A dressed fish is often cooked in one piece by baking, poaching, or barbecuing.

Filleted:

Fillets are the boneless or 'pinbone-in' sides of a fish, cut away from the backbone and removed in one piece. In some fish there may be pinbones radiating at right angles from the backbone. When these are removed, the fillet is boneless.

Surimi (or fish paste):

Surimi is a processed form of fish that has been headed and gutted, skinned, deboned, minced, and washed.

Species-specific:

Rock Lobster can come in several different processed states, including live, whole, and tails.

Squid can also come in several different processed states, including whole, tubes, steaks, tentacles, dried, and salted or in brine.

A.4.2 Residuals

Residuals can be defined as the part of the fish discarded by initial processing. However, residuals may become useful products with further processing, such as oil and fishmeal.

12. Definitions of fish cuts are taken from the SeaFIC website [www.seafood.co.nz].

Fish waste is produced as a result of commercial catch processing. The waste is turned into fishmeal and oil by onshore or onboard meal and oil plants. Originally, fish waste was poured into the sea by factory trawlers or deposited in landfills, but now most commercial fishing waste is processed into fishmeal and fish oil. Some is used within New Zealand (no data was available regarding domestic use) while approximately 30,000 tonnes of fishmeal and 2,500 tonnes of fish oil are exported for use in aquaculture industries as feed. Other uses include production of pet food and bait for recreational fishing.¹³ Data on the total tonnage of waste is not available.

13. Stevens (2002).

B. Classifications and Description of the Tables

B.1 Classifications

B.1.1 SEEA asset classification

The SEEA refers to aquatic resources as covering “fish, shellfish, and other aquatic resources such as sponges and seaweeds as well as aquatic mammals such as whales”.¹⁴ The broad SEEA asset classification is shown below, with italics highlighting the areas that relate to fish. Statistics New Zealand is preparing the fish account under EA.143 Aquatic resources. The tables have been prepared using tonnes as the units of measurement.

A complementary classification to the EA.143 Aquatic resources classification is the EA.32 Aquatic ecosystems classification. Aquatic ecosystems refer to all aquatic resources as well as the environment they inhabit. The EA.32 classification is used for classifying the environmental services that aquatic ecosystems provide, such as spawning habitats for fish and the dispersion of pollution. These ecosystems are not measured in the fish physical flow account.

See appendix 1 for the full SEEA asset classification.

EA.1 Natural Resources

- EA.11 Mineral and energy resources
- EA.12 Soil resources (cubic metres, tonnes)
- EA.13 Water resources (cubic metres)
- EA.14 Biological resources*
 - EA.141 Timber resources (cubic metres, tonnes)
 - EA.143 Aquatic resources*
 - EA.1431 Cultivated*
 - EA.1432 Non-cultivated*

EA.2 Land and surface water (hectares)

EA.3 Ecosystems

- EA.31 Terrestrial ecosystems
- EA.32 Aquatic ecosystems*
 - EA.321 Marine ecosystems*
 - EA.322 Coastal ecosystems*
 - EA.323 Riverine ecosystems*
 - EA.324 Lacustrine ecosystems*
 - EA.325 Other aquatic ecosystems*

EA.M Memorandum item – Intangible environmental assets

14. United Nations (2000) (draft).

B.1.2 Industry classification

The Australian and New Zealand Standard Industrial Classification (ANZSIC) would normally be the industry classification used, but no industry detail is included in the tables, due to unavailability of detailed industry consumption and production data.

B.1.3 Commodity classification

The commodities chosen to be included in the physical fish flow account were determined by an assessment of their practicality in terms of data availability.

The commodity classification for fish used by the 1996 inter-industry study, undertaken by Statistics New Zealand, was initially considered.

1996 inter-industry commodity classification for fish:

041.00 Fishes live, fresh or chilled
042.00 Crustaceans, not frozen; oysters; other aquatic invertebrates, live fresh or chilled
049.00 Other aquatic products
212.00 Prepared and preserved fish

However, the commodities used in the inter-industry study do not provide any detail regarding particular species, which would restrict any analysis of physical flow tables to broad categories.

The commodities used in the physical fish flow account are the individual fish species because management and monitoring of fish stocks is done at the species level. Theoretically, this enables more detailed analysis of individual species contribution to the fishing industry and the New Zealand economy and therefore highlights the importance of maintaining the individual fisheries resources.

B.1.3.1 Species commodities

There are several hundred different fish species and each can potentially be a stand-alone commodity. To reduce the number of commodities, fourteen species were chosen that cumulatively provide approximately 70 percent of total fish export values and volumes annually.¹⁵ The remaining species are grouped together in a commodity called 'other'. However, the 'other' commodity is not included in this physical fish flow account, and only 12 of the 14 species are included. Reasons for these exclusions are discussed in section C.1.

The species commodities are:

- Hake
- Hoki
- Jack Mackerel
- Ling
- Orange Roughy
- Oreos
- Rock Lobster (includes Spiny Rock Lobster and Packhorse Rock Lobster).

15. *Source:* Statistics New Zealand.

- Southern Blue Whiting
- Snapper
- Squid (includes Arrow, Broad, Giant, Warty).
- Tuna (includes Southern Bluefin, Albacore, Big Eye, Butterfly, Frigate, Northern Bluefin, Skipjack, Slender, Yellowfin).
- Warehouse (includes Blue, Silver, White).
- Mussels (not included in flow account, see section C.1).
- Salmon (not included in flow account, see section C.1).
- Other (not included in flow account, see section C.1).

B.1.3.2 Residuals

In this account, residuals are calculated for each species (commodity). The residuals are not split into individual components, likely to be waste, fish oil, and fishmeal, because there is no information regarding the proportions actually produced by processing of fish discards. The residuals presented in the tables are derived using a calculation. See section C.2.1.6, for more information on the calculation for residuals.

B.2 Description of the tables

The structure of the physical flow account is restricted to a simplified combination of a supply and use table due to limited data. Detailed data is not available for intermediate consumption by industry, production by industry, household consumption, and changes in capital and inventories. There are also no data for domestic consumption of recreational catch. For more discussion on data issues refer to section C.

B.2.1 Simplified structure of the fish physical flow account

The structure of the table used in this fish physical flow account is as follows.

Commodities	Total Commercial Catch	Domestic Consumption of Commercial Catch	Imports	Exports	Converted Greenweight Exports	Residuals
Tonnes						
Species 1						
Species 2						
Species 3						
Species 4						
Species 5						

B.2.1.1 Explanation of the column headings

Total commercial catch:

The total commercial catch of each fish species from wild stocks, comprising of both Quota Management and non-Quota Management species. This excludes aquaculture production.

Domestic Consumption of Commercial Catch:

This comprises intermediate consumption by industries, consumption by households of the commercial catch of fish, and some domestic consumption of residuals for a given year. Data constraints do not permit the individual consumption categories to be calculated.

Imports:

This comprises the import of individual fish species in their processed states. The fish are not disaggregated into different processed states, but are expressed as a total import volume for the species.

Exports:

This comprises the export of individual fish species in their processed states. The fish are not disaggregated into different processed states, but are expressed as a total export volume for the species.

Converted Greenweight Exports:

This comprises export data for fish that has been converted into greenweight¹⁶ tonnes to be able to calculate domestic consumption of commercial catch and residuals.

Residuals:

Residuals comprise fish waste, fish oil and fishmeal. Data constraints do not permit the individual residual categories to be calculated (see section A.4.2).

16. Greenweight is the unprocessed weight of a fish.

C. Sources and Methods

C.1 Details of data sources

A number of data sources were used for this physical flow account for fish. Monthly catch data from FishServe was used for the commercial catch figures. Conversion factors from the Ministry of Fisheries and Statistics New Zealand's export data were used to calculate domestic consumption of commercial catch and residuals. Imports have also been included to provide an indication of the scale of fish imports into New Zealand as compared with exports.

C.1.1 Quarterly catch statistics from FishServe

The monthly commercial catch series from FishServe was used instead of the annual series for the quota management species as used in the physical stock account. The reasons for this are:

- Southern Blue Whiting was not included in the QMS until the 2001 fishing year, so the data was not available from the QMS data series for all years included in this flow account.
- Some Orange Roughy catch occurs outside of the EEZ that is not included in the QMS series, but is included in the monthly catch data. This catch from outside the EEZ still contributes to export figures, however, which would lead to significant calculation errors in domestic consumption of commercial catch if the QMS data series were used. For example, the QMS data records a commercial catch of 14,321 tonnes for the year ended September 2000, but the monthly catch data totals 23,285 tonnes for the same period (approximately 40 percent difference between data series).
- The monthly catch statistics were used for consistency of data across all species due to the Orange Roughy and Southern Blue Whiting data issues. However, it is important to note that inconsistency exists between the QMS and catch data series. The data from the monthly catch statistics has catch totals slightly different from the QMS data series. This is because the monthly catch data comes from Licensed Fish Receiver (LFR) returns and the QMS stock data comes from fishers catch return data, and according to FishServe some minor inconsistencies can occur. For example, commercially caught Snapper for the year ended September 2000 totalled 6,677.3 tonnes in the QMS data series, and 6744.6 in the LFR series (approximately 1 percent difference between data series).

- Catch/harvest data for mussels and salmon were not included in the flow account due to a lack of comprehensive aquaculture production data. Where data is available, it is based on estimates, available only for calendar years, and of unknown quality. Mussels and salmon are largely produced by aquaculture¹⁷ and without these production figures, the calculations of greenweight exports and domestic consumption of commercial catch are distorted and unrealistic. Import and export data for mussels and salmon are included in the flow tables.

C.1.2 Statistics New Zealand physical trade statistics

Overseas Merchandise Trade statistics provide statistical information on the importing and exporting of merchandise between New Zealand and other countries. Exporters/importers and their agents supply data on overseas merchandise trade to the New Zealand Customs Service. The New Zealand Customs Service processes and passes the data to Statistics New Zealand for compilation into statistics.

Statistics New Zealand produces monthly trade statistics in both monetary and physical units. Commodities are classified using the harmonised system.

Import and export volume data for fish is used in this fish account.

C.1.3 Ministry of Fisheries conversion factors

Conversion factors are used to convert weights of processed fish back into their original catch weight (greenweight). For example, Snapper that is headed and gutted has a processed weight (eg 3.75kg) less than that of a whole unprocessed Snapper (eg 6kg). The conversion factor for headed and gutted Snapper is 1.6. Multiplying the headed and gutted Snapper weight by the appropriate conversion factor will convert the processed weight back to the weight of the whole Snapper ($3.75 \times 1.6 = 6\text{kg}$).

The original catch weight conversion is needed so that fish weights can be recorded against the QMS and ordinary catch data recorded in consistent units. The conversion factors are used when fish are processed at sea and weighed after processing, for example.

The conversion factors are legally defined by the Minister of Fisheries, after consultation with the fishing industry. The majority of conversion factors have been unchanged since 1996, with only minor amendments and additions to different species.

The conversion factors are only available for key fish species. The 'other' commodity would comprise approximately 200 different fish species for which there are only a few conversion factors and so the greenweight for all of these species cannot be calculated. Therefore, the 'other' commodity category is not included in this flow account.

17. For example, for the year ended September 1998, 4.6 tonnes of salmon were commercially caught in the wild, compared to an estimated 5,800 tonnes produced by salmon farms for the 1998 calendar year.

C.2 Methodology

The fish physical flow account is produced for the years 1998 to 2001, with the data applying to September years. For example, the data for year ended September 1998 refers to the year 1 October 1997 to 30 September 1998.

This year format was chosen because the physical fish stock account is compiled using September years. Also, the Ministry of Fisheries and the fishing industry use the September year format as a basis for stock assessments and allowable commercial catch allocations.

C.2.1 Simplified supply and use table compilation method

C.2.1.1 Commercial catch data

FishServe provides the commercial catch data to Statistics New Zealand for all commercially caught species. The monthly statistics are aggregated together into quarters initially, then aggregated into fishing years (1 October–30 September). The raw catch data is in kilograms, but is converted to tonnes for the flow account.

Unlike the physical stock account, the QMS total catch is not used in the flow account for reasons explained in section C.1.1, even though the species/commodities are QMS species.

For some species commodities several different species are included. For example, Warehou comprises Blue Warehou, Silver Warehou, and White Warehou. The full list of species commodities and the species included under each are listed in section A.4.1 and in appendix 2.

C.2.1.2 Imports

Fish import data was extracted from the Statistics New Zealand trade database for the species included in the flow account. The data was extracted for fishing years at the most detailed classification level and aggregated to the species level. The unit of measurement is tonnes.

C.2.1.3 Exports

Fish export data was extracted from the Statistics New Zealand trade database for the species included in the flow account. The data was extracted for fishing years at the most detailed classification level and aggregated to the species level. The unit of measurement is tonnes.

C.2.1.4 Greenweight exports

The calculation of greenweight exports is necessary to derive domestic consumption data for commercial catch, due to no domestic consumption data being available from existing data sources. The domestic consumption of domestic commercial catch is calculated by subtracting the greenweight exports data from the catch data.

The greenweight export data are produced by multiplying the export data by the conversion factors per species. For each species there can be several conversion factors for different states of processed fish. Once the data is converted to greenweight, the different processing totals are added together per species.

Before the conversions to greenweight could be calculated assumptions had to be made regarding the conversion factor that should be used for each export classification. The different processed states of fish have different conversion factors, and not all of the classifications used for exports clearly match the processed states the conversion factors are based on. For some export classifications there is no conversion factor.

Appendix 2 contains the full list of conversion factors applied to the export data.

Notable assumptions:

- All species, with the exception of Oreos, use the skin off conversion factor to convert the processed weight of fillets to greenweight. The skin off conversion factor was used as the default conversion factor because there is no data available to accurately assess the proportion of skin off to skin on fillets. Using the larger skin off conversion factor will tend to overestimate the derived export greenweight tonnage of fish because some exports of fish fillets will have the skin on and therefore the actual greenweight figure will be lower than the one derived.
- Oreo fillet exports are converted to greenweight tonnes by using the skin on conversion factor. This is because when the skin off conversion factor is used some of the greenweight export figures are larger than the commercial catch, leading to a negative domestic consumption figure. There is no existing data to verify if this assumption is correct. It is likely that the greenweight export data for Oreos is underestimated when the skin on conversion factor is used, because some of the Oreo fillet exports may be skin off. The skin off conversion factor is larger than skin on, and therefore less weight is added to the greenweight calculation when the skin on conversion factor is used, leading to a lower greenweight figure than may actually occur in reality.

- The Seafood Industry Council (SeaFIC) assumes that all frozen fish fillet blocks and minced fillet blocks are made from Hoki. Some Southern Blue Whiting is also manufactured into block product, but it is assumed to be a minor proportion of the total block product and is ignored. The assumptions have been used in this flow account to avoid understating the total for Hoki exports and overestimating domestic consumption. For the purposes of this flow account, the export categories of “Fish: Fillet blocks, fresh, chilled or frozen” and “Fish: Minced blocks, fresh, chilled or frozen” are included in the Hoki export totals. The conversion factors of 3.10 and 2.25, respectively, are applied to calculate the greenweight figures.
- The conversion factors used for Squid do not easily match the export categories. Statistics New Zealand considered the conversion factors used where the most appropriate. It is also important to note that not all export categories had conversion factors applied. Where two categories could be aggregated to reflect a whole squid then these were deemed to cancel each other out and no conversion factor was needed. Unfortunately, the conversions of processed Squid exports to greenweight exports have resulted, for some years, in larger figures for greenweight exports than commercial catch. For example, the year ended September 1998 recorded a total commercial catch of 42,595 tonnes compared with converted greenweight exports of 48,949 tonnes. This means that some domestic consumption figures are negative (eg domestic consumption for the year ended September 1998 was –6,354 tonnes). The conversion process and data were analysed, including catch and export data, but no improvements could be made and no reason was found as to why the greenweight figures were larger. Possible problems are that the conversion factors are wrong, the export volumes are too high or the catch data is too low. It is unlikely to be a data timing problem, ie data coded to the wrong years, as there are negative values two years in a row.
- Rock Lobster uses a conversion factor of 3.00 for Rock Lobster tails. No other conversion factors are available for Rock Lobster, but the export classification includes a category that can be summarised as 'Other than tails'. Theoretically, if both the tails and remainder are exported then no conversion factors need to be applied, as the whole Rock Lobster is accounted for. In reality, export weights for the remainder part of the lobster are low; therefore, it has been assumed that the conversion factor for the tails must still be applied. This may result in some overestimation of greenweight exports and a lower figure for domestic consumption of commercial catch because there is likely to be a proportion of Rock Lobster catch that is completely accounted for by exports.
- The conversion factors for Tuna are limited, so the “All other species of fin fish” conversion factors were used for the export categories that do not match the available conversion factors. The results of the conversion calculation cannot be verified, so the accuracy of the derived data is unknown.

The accuracy of greenweight exports data is unknown, as there is no way to verify the derived data. The results for all species should, therefore, be treated with caution.

C.2.1.5 Domestic consumption of domestic commercial catch

The domestic consumption of domestic commercial catch is calculated by subtracting the greenweight exports data from the catch data. This calculation can be made because the export data has been converted into greenweight tonnes, which are the same units as the catch data. The accuracy of this calculation cannot be verified due to a lack of domestic consumption volume data.

Imports are not included in this calculation because there are no applicable conversion factors available. If imports were able to be converted to greenweight and included in the calculation then the result would be domestic consumption (less recreational catch consumption) rather than domestic consumption of commercial catch only. Note that imports of fish into New Zealand are small when compared with exports.

As previously noted, Squid has negative domestic consumption values for some years and Oreos has negative values depending what conversion factor is used. This data has been left in the flow account to highlight the questionable quality of the estimates calculated. The derived values rely on the quality of the source data, which comprises the catch and export data, and the accuracy and appropriate application of the conversion factors. There is no way to determine if the conversion factors have been accurately applied to the export data and, therefore, assuming that catch and export data are correct, it is likely that greenweight exports have been over- or underestimated and therefore domestic consumption over- or underestimated.

C.2.1.6 Residuals

The residuals are calculated by subtracting the export data from the greenweight export data, which equates to the weight of the applied conversion factor. This calculation assumes that the difference between the different export figures to be the fish waste that is turned in to meal and oil. The accuracy of the residual data cannot be verified due to a lack of actual residuals data, although estimates of fishmeal and fish oil exports are lower (approximately 30,000 tonnes for meal and 2,500 for oil¹⁸) than the calculated residual totals included in the flow account. However, it should be noted that the residual estimates probably include an unknown amount of waste and domestic consumption.

Also, the residuals data presented in the table should not be considered the total produced residuals. Some domestically consumed residuals are, by default, included under domestic consumption of commercial catch. This is due to the calculation method of subtracting converted greenweight exports from commercial catch, also in greenweight. The result of the calculation gives a domestic consumption figure that is in greenweight, not processed, and therefore includes residuals.

If the residual flows in the tables could be expanded, the residual data would likely be disaggregated into domestic consumption and exports of fish oil and fishmeal and dumped waste.

18. Stevens (2002).

D. Future Developments

D.1 Future development of the fish physical flow account

No further work on fish accounts is currently planned due to the limited availability and quality of existing data to develop a full physical flow account. Even the simplified account presented in this report has numerous data problems. However, should demand for the development of a more comprehensive physical flow account for fish arise, then a comprehensive review of data needs would likely be undertaken. This would be the first step in recommending the development of data sources for the production of a full physical flow account for fish.

D.1.1 Ideal structure of a fish physical flow account

The ideal structure of the physical supply and use tables for fish would be as follows.

Use Table

Commodities	Intermediate Consumption			Total Intermediate Consumption	Total Household Consumption	Changes in Capital & Inventories	Total Consumption	Exports	Total Use
	Industry 1	Industry 2	Industry 3						
Tonnes									
Species 1									
Species 2									
Species 3									
Other									
Total									
Residuals									
Fish waste									
Fish oil									
Fishmeal									

Supply Table

Commodities	Industry output			Total Production	Imports	Total Supply
	Industry 1	Industry 2	Industry 3			
Tonnes						
Species 1						
Species 2						
Species 3						
Other						
Total						
Residuals						
Fish waste						
Fish oil						
Fishmeal						

E. Glossary

Annual Catch Entitlement (ACE): Under the 1996 Fisheries Act, a new system was introduced in October 2001 called Annual Catch Entitlement. Property right of the quota is separated from the harvesting right. On the first day of each fishing year, Individual Transferable Quota (ITQ) generates a harvesting right – ACE. The ownership of ACE will provide the harvesting right, and will be traded quite separately from quota during the fishing year. For example, if a fisher owns 100,000,000 quota shares, having the quota weight equivalent of 10 tonnes of ITQ, those quota shares will generate 10 tonnes of ACE at the beginning of each new fishing year. The ITQ may be traded separately at any time during the fishing year, but has no fishing rights attached to it. New fishing rights will be generated by the ITQ at the beginning of each fishing year. During each year, ACE can be used to balance catch, satisfy or obtain a remission of deemed value liability or be transferred to the Crown as a part of by-catch trade off. (See also Individual Transferable Quota).

Cultivated: Also known as ‘produced’. Refers to aquaculture. The Food and Agriculture Organisation of the United Nations describe aquaculture as: “The farming of aquatic organisms, including fish, molluscs, crustaceans, and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated. For statistical purposes, aquatic organisms which are harvested by an individual or corporate body which has owned them throughout their rearing period contribute to aquaculture, while aquatic organisms which are exploitable by the public as a common property resource, with or without appropriate licences, are the harvest of fisheries.”

Depletion: Refers to the reduction in the *quantity* of a natural resource. For fish, depletion refers to the part of the harvest above the sustainable level of the resource stock. For non-renewable resources, such as minerals, depletion refers to the quantity of resources extracted.

Environmental accounting: Under the SEEA framework, this refers to the combination of natural resource accounts, which consists of stock and flow accounts in physical terms, and the monetary valuation of these accounts.

Fishmeal: Waste product of processed fish.

Greenweight: The weight of a landed fish before the fish is processed, ie the whole fish weight. After processing the waste product is recorded as ‘fishmeal’.

Gross domestic product (GDP): A measure of the total economic activity occurring within the national boundary of a country.

Individual Transferable Quota (ITQ): The commercial catch is divided among fishers in the form of ITQs. An ITQ permits the holder to catch a specified percentage of the TACC for a particular stock. Many fishing companies and independent fishers buy, sell, or lease their ITQs in the same way property is bought, sold and leased. ITQs are owned in perpetuity unless sold. Provisional quotas were allocated (in 1986) to fishers in proportion to their catch history. To reduce the provisional quotas, so that the total quota issued equalled the desired Total Allowable Commercial Catch (TACC) for each fish stock, the Government had to buy up provisional quotas from commercial fishers by a tender system. Initially, quotas were issued in tonnage, but in 1990 the Government moved to proportional quotas. Quotas are now a percentage of the TACC for each species. ITQs can be set for species outside of the Quota Management System – either by allocating TACC or as competitive TACC. Foreign ownership of ITQs within New Zealand's EEZ is not allowed.

Natural assets: Assets of the natural environment. These consist of biological assets (cultivated or non-cultivated), land and water areas with their ecosystems, subsoil assets and air. Fish are considered biological assets, and may be cultivated or non-cultivated.

Natural resource accounting: An accounting system that deals with stocks and flows of natural assets, comprising biota (produced or wild), subsoil assets (proved reserves), water and land with their aquatic and terrestrial ecosystems. The term is used frequently in the sense of physical accounting as distinguished from monetary (environmental) accounting. However, the terms natural resource accounting and environmental accounting are often interchangeable.

Non-cultivated natural assets: Naturally occurring assets, such as land and certain uncultivated forests, and deposits of minerals, which are used in production but have not themselves been produced. They can be economic or environmental.

Non-cultivated fish: Also known as non-produced. These have occurred naturally. The distinction between cultivated and non-cultivated is based on the amount of human intervention.

Quota Management System (QMS): This system has been in place since 1986. Catch limits for each stock are set by the Government and allocated to commercial fishers through individual quotas.

System of Environmental and Economic Accounts (SEEA): The SEEA was developed by the United Nations Statistical Division as a satellite system to the System of National Accounts (SNA), for the incorporation of environmental concerns (environmental costs, benefits and assets) in the national accounts. The SEEA is intended to be a system with global application and standards suitable for all countries and all aspects of the environment.

System of National Accounts (SNA): An international accounting framework consisting of a coherent, consistent and integrated set of macro-economic accounts, balance sheets and tables based on a set of internationally-agreed concepts, definitions, classifications and accounting rules. It provides a comprehensive accounting framework within which economic data can be compiled and presented in

a format that is designed for the purposes of economic analysis, and decision and policy making. (System of National Accounts, 1993)

Total Allowable Catch (TAC): Total removals from the stock including: commercial, recreational, Māori customary, illegals and other mortality caused by fishing.

Total Allowable Commercial Catch (TACC): The total allowable commercial harvest of fish. This is set once per year by the Minister of Fisheries.

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G. Appendices

Appendix 1: System of Environmental and Economic Accounts Asset Classification

EA.1 Natural Resources

EA.11 Mineral and energy resources

EA.111 Fossil fuels (cubic metres, tonnes, tonnes of oil equivalent, joules)

EA.112 Metallic minerals (tonnes)

EA.113 Non-metallic minerals (tonnes)

EA.12 Soil resources (cubic metres, tonnes)

EA.121 Agricultural

EA.122 Non-agricultural

EA.13 Water resources (cubic metres)

EA.131 Surface water

EA.1311 In artificial reservoirs

EA.13111 For human use

EA.13112 For agricultural use

EA.13113 For electric power generation

EA.13114 For mixed use

EA.1312 In natural waterbodies

EA.13121 Lakes

EA.13122 Rivers and streams

EA.132 Groundwater

EA.1321 Aquifers

EA.1322 Other groundwater

EA.14 Biological resources

EA.141 Timber resources (cubic metres, hectares)

EA.1411 Cultivated

EA.1412 Non-cultivated

EA.142 Crop and plant resources, other than timber (cubic metres, tonnes, number)

EA.1421 Cultivated

EA.14211 Yielding repeat products (vineyards, orchards, etc)

EA.14212 Yielding one-time harvests (crops, etc)

EA.1422 Non-cultivated

EA.143 Aquatic resources (tonnes, number)

EA.1431 Cultivated

EA.1432 Non-cultivated

EA.144 Animal resources, other than aquatic (number)

EA.1441 Cultivated

EA.14411 Livestock for breeding purposes

EA.14412 Livestock for slaughter
EA.1442 Non-cultivated

EA.2 Land and surface water (hectares)

Of which, recreational land

EA.21 Land underlying buildings and structures

EA.211 In urban areas

EA.2111 For dwellings

EA.2112 For non-residential buildings

EA.2113 For transportation and utilities

EA.212 Outside urban areas

EA.2121 For dwellings

EA.21211 Farm

EA.21212 Non-farm

EA.2122 For non-residential buildings

EA.21221 Farm

EA.21222 Non-farm

EA.2123 For transportation and utilities

EA.21231 Roads

EA.21232 Railways

EA.21233 Electric power grids

EA.21234 Pipelines

EA.22 Agricultural land and associated surface water

EA.221 Cultivated land

EA.2211 For temporary crops

Of which, drained

Of which, irrigated

EA.2212 For permanent plantations

Of which, drained

Of which, irrigated

EA.2213 For kitchen gardens

EA.2214 Temporarily fallow land

EA.222 Pasture land

EA.2221 Improved

EA.2222 Natural

EA.223 Other agricultural land

EA.23 Wooded land and associated surface water

EA.231 Cultivated timber plantations

EA.232 Non-cultivated wooded land

EA.2321 Previously harvested

EA.2322 Not previously harvested

EA.24 Major waterbodies

EA.241 Lakes

EA.242 Rivers

EA.243 Wetlands

- EA.244 Artificial reservoirs
 - EA.2441 For drinking water
 - EA.2442 For irrigation
 - EA.2443 For electric power generation
 - EA.2444 For multiple purposes

- EA.25 Other land
 - EA.251 Prairie and grassland
 - EA.252 Tundra
 - EA.253 Sparsely vegetated/Barren land
 - EA.254 Permanent snow and ice

EA.3 Ecosystems

- EA.31 Terrestrial ecosystems
 - EA.311 Urban ecosystems
 - EA.312 Agricultural ecosystems
 - EA.313 Forest ecosystems
 - EA.314 Prairie and grassland ecosystems
 - EA.315 Tundra ecosystems
 - EA.316 Dryland ecosystems
 - EA.317 Other terrestrial ecosystems

- EA.32 Aquatic ecosystems
 - EA.321 Marine ecosystems
 - EA.322 Coastal ecosystems
 - EA.323 Riverine ecosystems
 - EA.324 Lacustrine ecosystems
 - EA.325 Other aquatic ecosystems

EA.33 Atmospheric systems

- EA.M Memorandum item – Intangible environmental assets
 - EA.M1 Mineral exploration
 - EA.M2 Transferable licences and concessions for the exploitation of natural resources
 - EA.M3 Tradable permits allowing the emission of residuals
 - EA.M4 Other intangible non-produced environmental assets

Appendix 2: Conversion factors and related Harmonised System Classification

Species	Summarised Harmonised System Classification (HSC) description	HSC code	Conversion factor fish cuts	Conversion factor
Snapper				
	Live	301990001	No conversion needed	1
	Whole chilled fresh	302690135	Gutted	1.1
	Whole frozen	303790155	Gutted	1.1
	Headed & gutted fresh chilled	302691135	Headed & Gutted	1.6
	Headed & gutted frozen	303791155	Headed & Gutted	1.6
	Other than whole or headed & gutted fresh chilled	302691935	Dressed	1.8
	Other than whole or headed & gutted frozen	303791965	Dressed	1.8
	Fillets & other fresh or chilled	304100061	Fillets (skin off)	2.7
	Fillets frozen	304200067	Fillets (skin off)	2.7
	Fillets smoked	305490049	Fillets (skin off)	2.7
Orange Roughy				
	Whole frozen	303790143	Gutted	1.1
	Headed & gutted frozen	303791143	Headed & Gutted	2
	Other than whole or headed & gutted frozen	303791953	Dressed	2
	Fillets & other fresh or chilled	304100049	Fillets	3.5
	Fillets frozen	304200049	Fillets	3.5
Hoki				
	Whole frozen	303790121	Gutted	1.1
	Headed & gutted frozen	303791121	Headed & Gutted	1.5
	Other than whole or headed & gutted frozen	303791921	Dressed	1.8
	Fillets & other fresh or chilled	304100029	Fillets (skin off, trimmed)	3
	Fillets frozen	304200023	Fillets (skin off, trimmed)	3
	Surimi fresh chilled or frozen	304900012	Surimi or fish paste	5.8
	Smoked (including fillets)	305490021	Fillets (skin off, trimmed)	3
	Fish: Fillet blocks, fresh, chilled or frozen	304900001	Fillet block	3.1
	Fish: Minced blocks, fresh, chilled or frozen	304900009	Minced block	2.25

Species	Summarised Harmonised System Classification (HSC) description	HSC code	Conversion factor fish cuts	Conversion factor
Hake				
	Whole frozen	303780001	Gutted	1.1
	Headed & gutted frozen	303780011	Headed & Gutted	1.5
	Other than whole or headed & gutted frozen	303780019	Dressed	1.8
	Fillets & other fresh or chilled	304100027	Fillets (skin off, trimmed)	2.75
	Fillets frozen	304200021	Fillets (skin off, trimmed)	2.75
Warehou				
<i>White Warehou</i>				
	Whole frozen	303790179	Gutted	1.1
	Headed & gutted frozen	303791179	Headed & Gutted	1.5
	Other than whole or headed & gutted frozen	303791989	Dressed	1.75
	Fillets & other fresh or chilled	304100089	Fillets (skin off)	3.1
	Fillets frozen	304200089	Fillets (skin off)	3.1
<i>Silver Warehou</i>				
	Whole frozen	303790175	Gutted	1.1
	Headed & gutted frozen	303791175	Headed & Gutted	1.55
	Other than whole or headed & gutted frozen	303791985	Dressed	1.7
<i>Blue Warehou</i>				
	Whole frozen	303790171	Gutted	1.1
	Headed & gutted frozen	303791171	Headed & Gutted	1.4
	Other than whole or headed & gutted frozen	303791981	Dressed	1.55
Squid				
	Whole or Head & Gutted fresh chilled	307410011	Gutted	1.35
	Tubes or steaks fresh chilled	307410019	No conversion used	1
	Not tubes or steaks, not whole or headed & gutted fr	307410029	No conversion used	1
	Whole frozen	307490011	Gutted	1.35
	Headed & gutted frozen	307490019	Dressed	1.9
	Tubes & steaks frozen	307490021	No conversion used	1
	Heads & tentacles frozen	307490029	Dressed	1.35
	Not tubes or steaks, not whole or headed & gutted fr	307490039	No conversion used	1
	Dried	307490051	Gutted	1.35
	Salted or in Brine	307490059	Gutted	1.35

Species	Summarised Harmonised System Classification (HSC) description	HSC code	Conversion factor fish cuts	Conversion factor
Southern Blue Whiting				
	Whole frozen	303790161	No conversion factor	1
	Headed & gutted frozen	303791161	Dressed	1.7
	Other than whole or headed & gutted frozen	303791971	Dressed	1.7
	Fillets & other fresh or chilled	304100065	Fillets (skin off, trimmed)	3.25
	Fillets frozen	304200069	Fillets (skin off, trimmed)	3.25
	Surimi fresh chilled or frozen	304900015	Surimi or fish paste	5.4
Rock Lobster				
<i>(palinurus spp., panulinus spp., jасus spp.)</i>				
	Whole frozen	306110001	No conversion needed	1
	Tails frozen	306110011	Rock Lobster tails	3
	Other than tails frozen	306110019	No conversion needed	1
	Whole cooked	306210200	No conversion needed	1
	Live	306210801	No conversion needed	1
	Not frozen not live	306210809	No conversion needed	1
<i>(homarus spp.)</i>				
	Lobster frozen	306120000	No conversion needed	1
	Lobster whole cooked	306220200	No conversion needed	1
	Lobster live	306220801	No conversion needed	1
	Lobster not whole not live	306220809	No conversion needed	1
Oreos				
<i>Black Oreo Dory</i>				
	Whole frozen	303790145	Gutted	1.1
	Headed & gutted frozen	303791145	Headed & Gutted	2.15
	Other than whole or headed & gutted frozen	303791955	Dressed	2.25
	Fillets & other fresh or chilled	304100051	Fillets (skin on)	5.3
	Fillets frozen	304200051	Fillets (skin on)	5.3
<i>Smooth (& other than black) Oreo Dory</i>				
	Whole frozen	303790149	Gutted	1.1
	Headed & gutted frozen	303791149	Headed & Gutted	2.15
	Other than whole or headed & gutted frozen	303791959	Dressed	2.25
	Fillets & other fresh or chilled	304100055	Fillets (skin on)	5.3
	Fillets frozen	304200059	Fillets (skin on)	5.3

Species	Summarised Harmonised System Classification (HSC) description	HSC code	Conversion factor fish cuts	Conversion factor
Ling				
	Whole frozen	303790133	Gutted	1.15
	Headed & gutted frozen	303791133	Headed & Gutted	1.45
	Other than whole or headed & gutted frozen	303791143	Dressed	1.85
	Fillets & other fresh or chilled	304100039	Fillets (skin off)	2.85
	Fillets frozen	304200033	Fillets (skin off)	2.85
Jack Mackerel				
	Whole frozen	303790123	Gutted	1.1
	Headed & gutted frozen	303791123	Headed & Gutted	1.5
	Other than whole or headed & gutted frozen	303791923	Dressed	1.6
	Fillets frozen	304200039	Fillets (skin off)	3.1
Tunas				
<i>Albacore Tuna</i>				
	Whole fresh or chilled	302310001	Gutted	1.1
	Headed & gutted fresh or chilled	302310011	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted fresh chilled	302310019	Dressed (all other species)	1.8
	Whole frozen	303410001	Gutted	1.1
	Headed & gutted frozen	303410011	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted frozen	303410019	Dressed (all other species)	1.8
<i>Bigeye Tuna</i>				
	Whole fresh or chilled	302340010	Gutted	1.1
	Headed & gutted fresh or chilled	302340012	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted fresh chilled	302340019	Dressed (all other species)	1.8
	Whole frozen	303440010	Gutted	1.1
	Headed & gutted frozen	303440012	Head & Gutted (all other species)	1.5
	Other than whole or headed & gutted frozen	303440019	Dressed (all other species)	1.8
<i>Bluefin Tunas</i>				
	Whole frozen	303450010	Gutted	1.1
	Headed & gutted frozen	303450012	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted frozen	303450019	Dressed (all other species)	1.8
	Whole fresh or chilled	302350010	Gutted	1.1
	Headed & gutted fresh or chilled	302350012	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted fresh chilled	302350019	Dressed (all other species)	1.8

Species	Summarised Harmonised System Classification (HSC) description	HSC code	Conversion factor fish cuts	Conversion factor
<i>Southern Bluefin Tunas</i>				
	Whole frozen	303460010	Gutted	1.1
	Headed & gutted frozen	303460012	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted frozen	303460019	Dressed (all other species)	1.8
	Whole fresh or chilled	302360010	Gutted	1.1
	Headed & gutted fresh or chilled	302360012	Head & Gutted (all other species)	1.5
	Other than whole or headed & gutted fresh chilled	302360019	Dressed (all other species)	1.8
	Fillets & other fresh or chilled	304100081	Fillets (all other species)	2.5
	Fillets frozen	304200077	Fillets (all other species)	2.5
<i>Tuna not elsewhere classified</i>				
	Whole frozen	303490010	Gutted	1.1
	Headed & gutted frozen	303490012	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted frozen	303490018	Dressed (all other species)	1.8
	Whole fresh or chilled	302390010	Gutted	1.1
	Headed & gutted fresh or chilled	302390012	Head & Gutted (all other species)	1.5
	Other than whole or headed & gutted fresh chilled	302390018	Dressed (all other species)	1.8
<i>Yellowfin Tunas</i>				
	Whole fresh or chilled	302320001	Gutted	1.1
	Headed & gutted fresh or chilled	302320011	Head & Gutted (all other species)	1.5
	Other than whole or headed & gutted fresh chilled	302320019	Dressed (all other species)	1.8
	Whole frozen	303420001	Gutted	1.1
	Headed & gutted frozen	303420011	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted frozen	303420019	Dressed (all other species)	1.8
<i>Other than southern bluefin</i>				
	Fillets & other fresh or chilled	304100083	Fillets (all other species)	2.5
	Fillets frozen	304200079	Fillets (all other species)	2.5
<i>Skipjack Tuna</i>				
	Whole fresh or chilled	302330001	Gutted	1.1
	Headed & gutted fresh or chilled	302330011	Head & Gutted (all other species)	1.5
	Other than whole or headed & gutted fresh chilled	302330019	Dressed (all other species)	1.8
	Whole frozen	303430001	Gutted	1.1
	Headed & gutted frozen	303430011	Headed & Gutted (all other species)	1.5
	Other than whole or headed & gutted frozen	303430019	Dressed (all other species)	1.8

H. Tables

Please note that the years in the tables refer to years ending 30 September. For example, figures for the year 1998 cover the period 1 October 1997 to 30 September 1998.

Table 1: Simplified Flow Table for Selected Fish Species, for year ended September 1998

Commodities	Total Commerical Catch (greenweight)	Domestic Consumption of Commerical Catch (greenweight)	Imports	Exports ⁽¹⁾	Converted Greenweight Exports	Residuals
	Tonnes					
Hake	14,067	736	0.0	7,448	13,332	5,884
Hoki	261,504	15,301	2.4	91,735	246,203	154,468
Jack Mackerel	37,206	10,870	0.1	19,485	26,336	6,851
Ling	23,220	2,095	0.0	9,391	21,125	11,802
Orange Roughy	20,660	850	0.0	5,685	19,810	14,125
Oreos	21,170	3,482	0.0	4,928	17,688	12,761
Rock Lobster	2,659	127	17.2	2,393	2,532	138
Southern Blue Whiting	32,633	11,077	0.0	5,859	21,555	15,696
Snapper	6,589	670	18.7	5,283	5,919	636
Squid ⁽²⁾	42,595	-6,354	347.2	34,692	48,949	14,257
Tunas	14,697	3,216	73.3	10,289	11,481	1,192
Warehou	16,757	4,478	0.0	8,086	12,279	4,193
Subtotal	493,755		459	205,273		
All other species	146,031		2,632	104,902		
Grand total ⁽³⁾	639,786		3,091	310,175		
Mussels			22.8	24,567		
Salmon			5.6	1,400		

(1) Export grand total refers to the New Zealand Harmonised System Classification chapter 3 only (See <http://www.stats.govt.nz/domino/external/web/carsweb.nsf/Classifications?openview>).

(2) Refer to page 20 of this report for a discussion regarding the negative value.

(3) Imports and exports for Mussels and Salmon (and all other species) are included in the grand total.

Table 2: Simplified Flow Table for Selected Fish Species, for year ended September 1999

Commodities	Total Commerical Catch (greenweight)	Domestic Consumption of Commerical Catch (greenweight)	Imports	Exports ⁽¹⁾	Converted Greenweight Exports	Residuals
Hake	15,322	1,985	0.0	7,809	13,337	5,527
Hoki	241,475	16,982	169.4	82,179	224,493	142,314
Jack Mackerel	34,105	5,297	0.5	22,431	28,808	6,377
Ling	20,978	1,904	0.0	8,788	19,073	10,504
Orange Roughy	23,271	4,495	6.5	5,588	18,776	13,188
Oreos	22,131	1,773	72.6	5,585	20,358	14,774
Rock Lobster	2,965	82	3.9	2,645	2,884	239
Southern Blue Whiting	41,338	13,114	222.3	7,631	28,224	20,594
Snapper	6,484	1,028	5.5	4,912	5,456	544
Squid ⁽²⁾	27,424	-5,108	1,202.8	23,959	32,532	8,573
Tunas	10,221	1,611	61.3	7,674	8,610	936
Warehou	14,772	4,282	0.0	6,841	10,490	3,649
Subtotal	460,486		1,745	186,041		
All other species	154,810		4,512	106,850		
Grand total ⁽²⁾	615,296		6,257	292,890		
Mussels			19.3	28,073		
Salmon			9.3	1,222		

(1) Export grand total refers to the New Zealand Harmonised System Classification chapter 3 only (See <http://www.stats.govt.nz/domino/external/web/carsweb.nsf/Classifications?openview>).

(2) Refer to page 20 of this report for a discussion regarding the negative value.

(3) Imports and exports for Mussels and Salmon (and all other species) are included in the grand total.

Table 3: Simplified Flow Table for Selected Fish Species, for year ended September 2000

Commodities	Total Commerical Catch (greenweight)	Domestic Consumption of Commerical Catch (greenweight)	Tonnes			
			Imports	Exports ⁽¹⁾	Converted Greenweight Exports	Residuals
Hake	13,527	3,475	0.0	5,529	10,051	4,523
Hoki	235,518	66,093	462.5	64,683	169,425	104,742
Jack Mackerel	21,053	3,492	0.6	12,780	17,561	4,781
Ling	21,279	4,293	43.6	7,819	16,986	9,347
Orange Roughy	18,756	2,663	40.0	4,689	16,094	11,405
Oreos	23,963	3,524	25.2	5,466	20,439	14,972
Rock Lobster	2,774	301	19.0	2,310	2,473	162
Southern Blue Whiting	27,558	5,202	272.8	7,735	22,356	14,621
Snapper	6,665	1,712	13.0	4,390	4,952	562
Squid	20,822	4,756	1,745.2	11,969	16,066	4,097
Tunas	16,297	1,201	221.1	13,627	15,096	1,468
Warehou	17,749	7,166	10.6	6,885	10,582	3,697
Subtotal	425,960		2,854	147,883		
All other species	139,926		4,826	86,066		
Grand total ⁽²⁾	565,886		7,680	233,949		
Mussels			6.0	22,800		
Salmon			22.1	614		

(1) Export grand total refers to the New Zealand Harmonised System Classification chapter 3 only (See <http://www.stats.govt.nz/domino/external/web/carsweb.nsf/Classifications?openview>).

(2) Imports and exports for Mussels and Salmon (and all other species) are included in the grand total.

Table 4: Simplified Flow Table for Selected Fish Species, for year ended September 2001

Commodities	Total Commerical Catch (greenweight)	Domestic Consumption of Commerical Catch (greenweight)	Tonnes			
			Imports	Exports ⁽¹⁾	Converted Greenweight Exports	Residuals
Hake	13,796	3,007	0.0	6,030	10,789	4,759
Hoki	228,845	28,493	91.2	75,221	200,351	125,130
Jack Mackerel	26,548	8,493	0.4	12,963	18,055	5,092
Ling	20,753	1,833	35.5	9,160	18,920	9,949
Orange Roughy	15,048	355	959.6	4,376	14,694	10,318
Oreos	23,216	5,764	129.8	4,242	17,452	13,210
Rock Lobster	2,621	283	9.3	2,167	2,338	171
Southern Blue Whiting	31,360	8,753	299.0	5,626	22,607	16,981
Snapper	6,546	2,040	18.0	4,029	4,507	477
Squid	35,128	7,440	1,834.1	19,283	27,688	8,405
Tunas	10,149	1,974	1,779.1	7,407	8,175	768
Warehou	16,896	6,721	0.1	6,591	10,175	3,584
Subtotal	430,908		5,156	157,094		
All other species	145,367		6,082	88,010		
Grand total ⁽²⁾	576,275		11,238	245,105		
Mussels			28.6	23,011		
Salmon			15.9	1,065		

(1) Export grand total refers to the New Zealand Harmonised System Classification chapter 3 only (See <http://www.stats.govt.nz/domino/external/web/carsweb.nsf/Classifications?openview>).

(2) Imports and exports for Mussels and Salmon (and all other species) are included in the grand total.