



FISHING ACTIVITY: FISH STOCKS

Environmental Report Card
November 2010

Key points

- 424,693 tonnes of fish were caught commercially in the 2009 fishing year, with hoki making up the largest proportion.
- The value of New Zealand's commercial fish stocks under the quota management system (QMS) passed the \$4 billion mark in 2009.¹
- Of the 633 stocks in the QMS, there is currently sufficient information to assess stock status relative to management targets for 119 stocks.²
- Of these 119 stocks of known status, 69 per cent were considered to be at or above the management target³ in 2010. Thirty-one per cent were considered to be below the target, up from 15 per cent in 2006 and 2007.
- In the two years since the introduction of the Harvest Strategy Standard, the percentage of depleted stocks decreased by about 6 per cent, down to 13 per cent, and collapsed stocks have remained relatively unchanged at 6 per cent. Stocks experiencing overfishing have remained relatively unchanged at about 24 per cent.⁴

Fishing is the most widespread human activity in the marine environment. New Zealand's fisheries resources are highly valued economically, recreationally, culturally and environmentally.

This environmental report card is one of a series that provides information on New Zealand's fishing activity from an environmental perspective. Total commercial catch and stock status are used to report on fish stocks under the quota management system (QMS).

Fisheries management

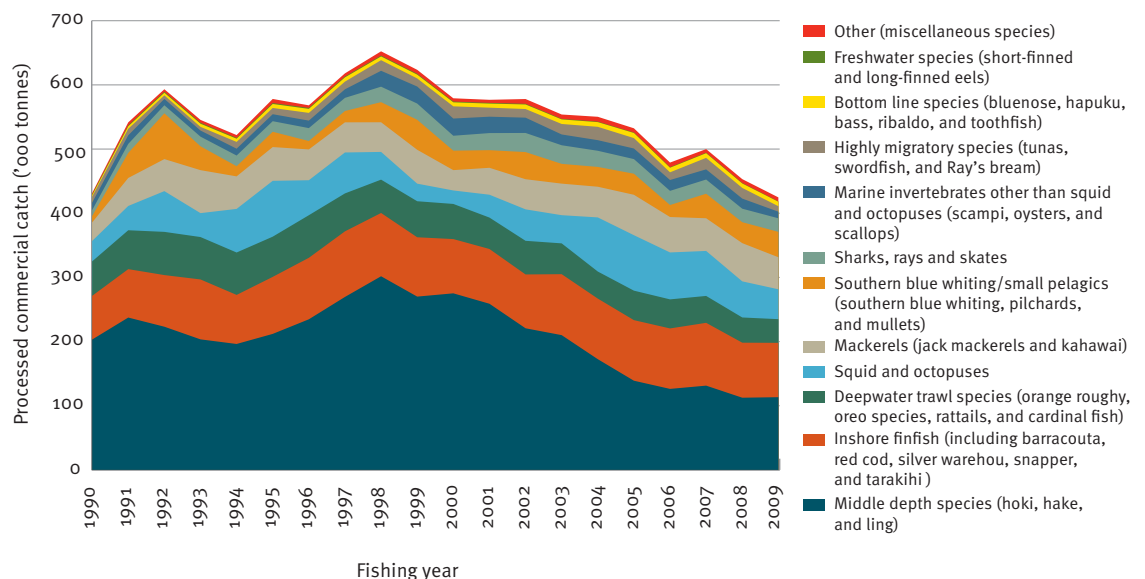
Fisheries in New Zealand waters are a common pool resource. The Government's role is to ensure utilisation and sustainability are appropriately balanced, while also balancing the competing demands of user groups. Commercial fisheries in New Zealand are managed under the quota management system (QMS) where individual transferrable quota for fish stocks is owned by private interests. The quantity of fish that can be taken by commercial fishers, for each stock in a fishing year, is the total allowable commercial catch (TACC).

Commercial fish catch

Current situation

There were 424,693 tonnes of fish caught commercially in the 2009 fishing year, as shown in Figure 1.⁵ Middle-depth fish⁶ (ie, hoki, hake and ling) made up more than a quarter of this total catch, with 113,342 tonnes caught in 2009 (around 80 per cent of which was hoki). Inshore finfish⁶ (including barracouta, red cod, silver warehou, snapper and tarakihi) made up almost 20 per cent of the total catch at 84,687 tonnes and mackerels⁶ made up around 12 per cent of the total catch at 49,948 tonnes.

+ FIGURE 1
PROCESSED COMMERCIAL CATCH BY SPECIES GROUPS, 1990–2009



Notes: (1) Catch data is reported by 'fishing year', which runs from 1 October to 30 September. A fishing year takes its name from the second of the two calendar years because this is the year in which most of the fishing year lies. (2) Please refer to [species groupings](#) for more detailed information.

Data source: Ministry of Fisheries.

New Zealand fisheries and the economy

Inshore (eg, rock lobster, pāua, snapper or blue cod) and offshore fisheries (eg, hoki, ling, hake and orange roughy) are affected by different issues, pressures and values. For example, customary and recreational fish catch can make up a larger proportion of the total allowable catches for inshore fisheries. The potential for benthic impact and the bycatch of protected species (including seabirds and marine mammals) is present for both inshore and offshore fisheries. The protected species at risk may differ. For example, Hector's and Maui dolphin captures occur in some inshore fisheries, whereas New Zealand sea lions are most at risk from some offshore fisheries, as are deep sea corals. In addition, inshore fisheries may be affected by land-based effects.

Trend⁷

The commercial fish catch increased from 431,389 tonnes in 1990 to a peak of 652,311 tonnes in 1998 (Figure 1). Since then, the annual total catch has generally decreased, to 424,693 tonnes in 2009.

Changes in commercial catches may result from variation in the abundance and location of fish, environmental conditions, and economic factors affecting the fishing industry such as fuel, labour, and equipment costs, and domestic and international market demands.

The trends in commercial catch are driven mainly by the catch of middle-depth fish (primarily hoki). Middle-depth fish accounted for about 40 per cent of total catch in the early to mid-1990s and, on average, over 45 per cent in the peak years between 1998 and 2000. In more recent years, however, middle-depth fish accounted for about 25 per cent of total catch. Figure 1 shows that the annual commercial catch of middle depth species in 2009 (113,342 tonnes) was almost half that in 1990 (203,140 tonnes).

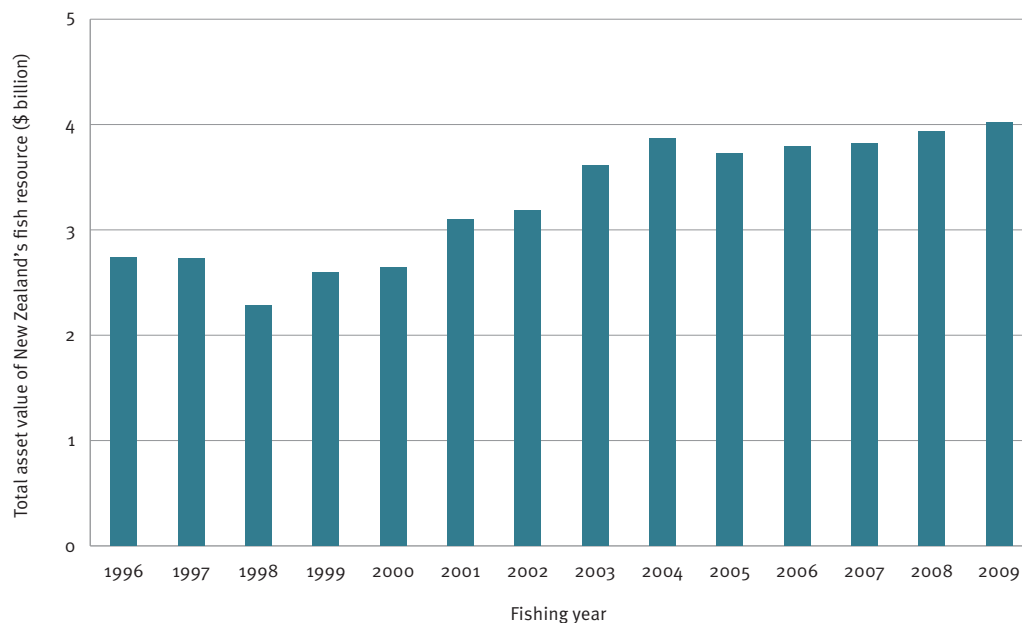
Inshore finfish catches remained relatively constant between 1997 and 2009, whereas catches for deepwater species decreased, from a peak of 67,317 tonnes in 1992 to 36,887 tonnes in 2009. The annual squid catch fluctuated between about 31,821 tonnes and 46,559 tonnes over the 20 years, with peaks in 1995, 2004, and 2005.

The New Zealand fishing industry is a significant primary industry, contributing an average of over \$1.3 billion in export earnings to the economy each year since 2000, and generating 8310 direct full-time equivalent jobs in the 2009/10 financial year. The highest levels of marine fishery employment occur in Northland, Auckland, Tasman, Nelson, and parts of Otago, Canterbury, and Southland.

The asset value¹ of New Zealand's commercial fish stocks under the QMS passed the \$4 billion mark in 2009 (Figure 2). Expressed in current prices, the asset value grew 47 per cent between 1996 and 2009, from \$2.7 billion to \$4.0 billion. The effect of inflation over 1996 to 2009 has not been removed from these values.

+ FIGURE 2

TOTAL ASSET VALUE OF NEW ZEALAND'S FISH RESOURCE, 1996–2009 (IN CURRENT PRICES)



Note: The 'fishing year' runs from 1 October to 30 September. A fishing year takes its name from the second of the two calendar years because this is the year in which most of the fishing year lies.

Source: Statistics New Zealand, 2009.

In this same period, the number of species managed under the QMS rose from 26 to 96. Between 1996 and 2009, the asset value of the original 26 QMS species increased by 18 per cent (in current prices), while the total allowable commercial catch (TACC) for these species decreased by 41 per cent.

The increase in the asset value (in current prices) of New Zealand’s commercial fish resource between 2005 and 2009 was driven primarily by increases in the value of hoki and rock lobster. In 2009, 10 species (hoki, rock lobster, pāua, orange roughy, snapper, ling, hake, scampi, arrow squid, and silver warehou) comprised 78 per cent of the fish stocks’ total value. Hoki contributed the highest value at \$815 million (in current prices), or 20 per cent of the total asset value.

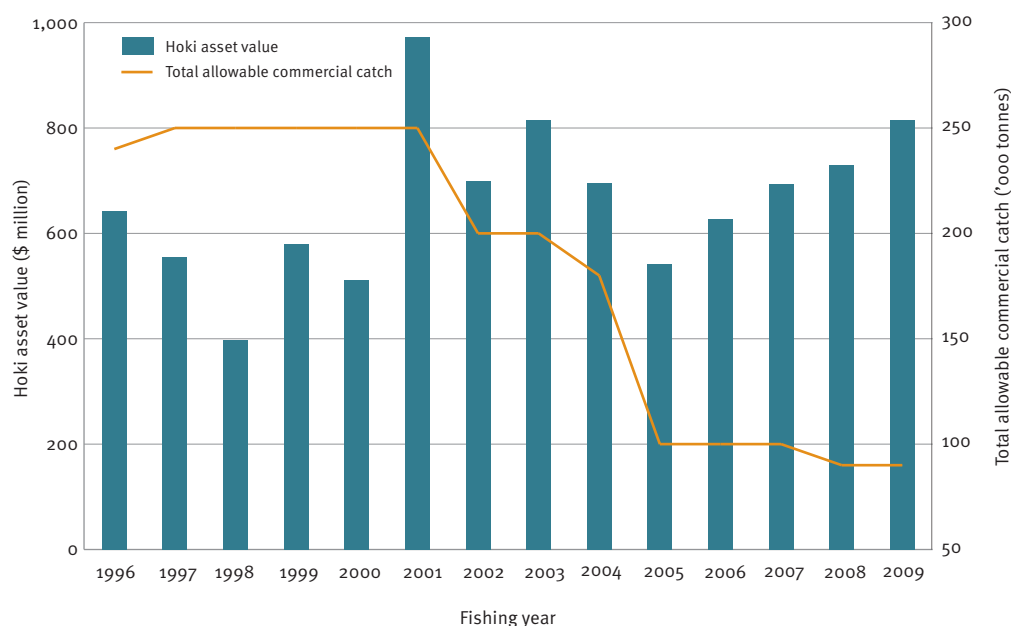
Asset value of hoki

Expressed in current prices, the asset value of hoki in 2009 at \$815 million was 27 per cent higher than that in 1996, but lower than the peak in 2001 (Figure 3). In recent years, the asset value has steadily increased after a low in 2005 when it was valued at \$541 million.

In contrast, the TACC in 2009 was 62 per cent less than that set in 1996. Between the 1997 and 2001 fishing years,⁵ the hoki TACC was set at 250,010 tonnes. In subsequent years, it was lowered to:

- 200,010 tonnes (for the 2002 and 2003 fishing years)
- 180,010 tonnes (for the 2004 fishing year)
- 100,010 tonnes (for the 2005 fishing year)
- 90,010 tonnes (for the 2008 fishing year).

+ FIGURE 3
HOKI ASSET VALUE (IN CURRENT PRICES) AND TOTAL ALLOWABLE COMMERCIAL CATCH (TACC)



Note: The ‘fishing year’ runs from 1 October to 30 September. A fishing year takes its name from the second of the two calendar years because this is the year in which most of the fishing year lies.

Data source: Ministry of Fisheries and Statistics New Zealand, 2009.

These measures were aimed at rebuilding the fishery to a target level – stock assessments showed that the western hoki stock was depleted during the period 2003 to 2006.

The TACC was increased to 110,010 tonnes for the 2010 fishing year.⁵ Stock assessments in 2010 indicate that the fishery is within the target range and TACC has been raised to 120,010 tonnes for the 2011 fishing year.

For more information on fisheries and the economy refer to Statistics New Zealand’s [Fish Monetary Stock Account: 1996–2009](#).

Assessing stocks

Assessments of fish stock status are one of the key information sources for reviewing catch limits for species subject to quota. Safe fishing levels are worked out by determining the largest average annual catch that can be taken over time without decreasing a stock's productive potential (maximum sustainable yield). Science working groups estimate the status of each stock, to determine whether current TACs and actual catch levels are meeting targets and avoiding limits. When new information results in substantial changes to previous assessments, a report is referred to the Fishery Assessment Plenary for further consideration and a document is prepared summarising the state of each stock. Economic, social and environmental considerations are then taken into account to determine whether TACs should be adjusted, and if so how quickly. Ongoing assessments and management actions are needed to respond to fluctuations in stock size.

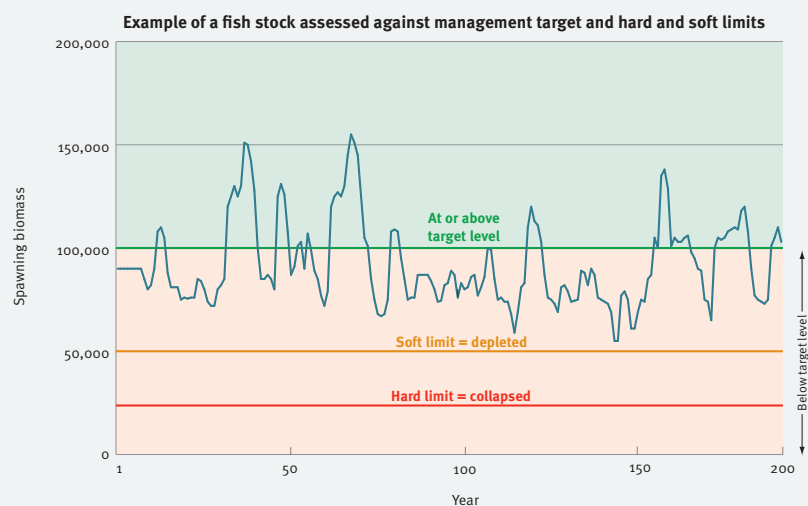
Status classes

The 2009 fishing year was the first year for assessing status of stocks relative to soft and hard limits and overfishing. The New Zealand [Harvest Strategy Standard 2008](#) defines two biomass limits: a soft limit as a trigger for a formal, time-constrained rebuilding planning and a hard limit, below which managers should consider closing a fishery. Additionally, overfishing is said to be occurring when the rate at which fish are extracted exceeds the rate associated with maximum sustainable yield.

The number of stocks assessed against the soft and hard limits differs from the number assessed relative to management targets. All stocks determined to be at or above the target are, by definition, also above both the soft and hard limits. However, stocks that are below targets or of unknown status relative to targets may or may not be able to be assessed against the soft and hard limits. In general, it is easier to assess the status of stocks relative to the hard limit than relative to management targets.

Stock status indicators describe the present status of the stock relative to its target level (usually the biomass needed to produce maximum sustainable yield or an appropriate surrogate), and to soft and hard biomass limits. Management targets represent a balance between what we can take from the current population, and what we leave in the water to grow and breed for the future. Catch limits are set to ensure fish stocks fluctuate around target levels while avoiding falling below limits. The status of New Zealand fish stocks are classified as:

- **at or above target levels:** at or above the biomass needed to produce maximum sustainable yield (or, in some cases, at or below the fishing mortality needed to produce maximum sustainable yield)
- **below target levels:** below the biomass or above the fishing mortality needed to produce maximum sustainable yield
- **depleted:** below the soft limit, which is 20 per cent of the pre-fishing biomass or half of the biomass needed to produce maximum sustainable yield, whichever is higher
- **collapsed:** below the hard limit, which is 10 per cent of the pre-fishing biomass, or quarter of the biomass needed to produce maximum sustainable yield, whichever is higher
- **overfishing:** overfishing is said to be occurring when the rate at which fish are extracted exceeds the rate that produces maximum sustainable yield.



Status of fish stocks

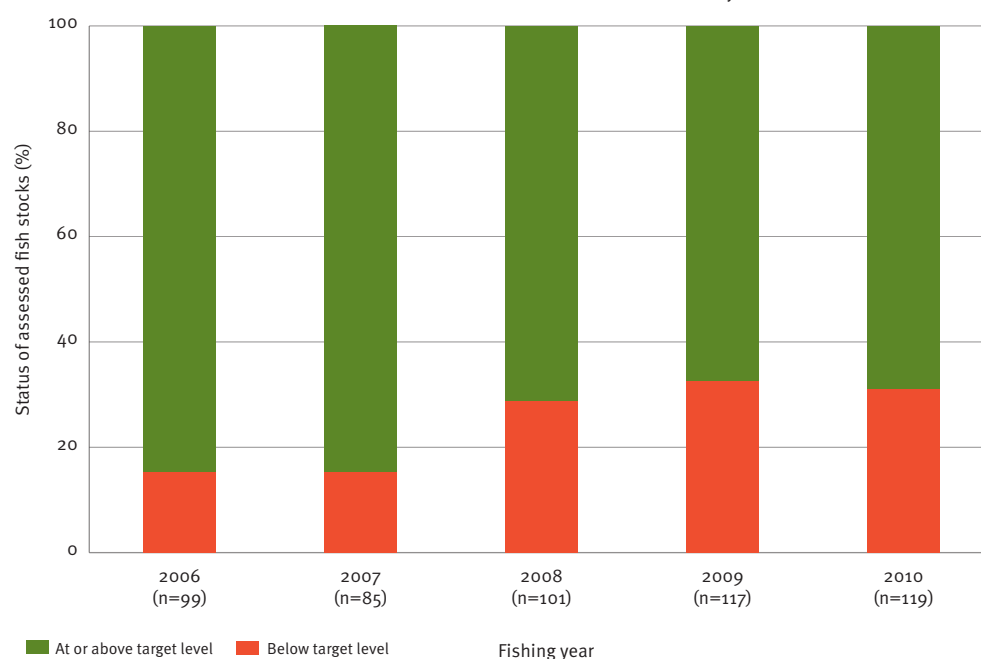
Current situation

In 2010, of the 633 stocks in the QMS, there is currently sufficient information to assess stock status relative to management targets for 119 stocks, up from 117 stocks a year ago. Evaluating the status of fish stocks is inherently difficult due to the vast areas of ocean involved and the migratory nature of some species. Although the number of stocks of known status represents about 20 per cent of the stocks under the QMS, these account for 66 per cent of the total landings by weight and value – and represent most of the main commercial species.

Of the 119 stocks with known status relative to management targets, 69 per cent have been determined to be at or above target levels. The remaining 31 per cent of fish stocks of known status relative to management targets were considered to be below target levels (see the text box on status classes on page 4) (Figure 4).

+ FIGURE 4

STOCK STATUS FOR FISH STOCKS ASSESSED RELATIVE TO MANAGEMENT TARGETS, 2006–2010



Note: The 'fishing year' runs from 1 October to 30 September. A fishing year takes its name from the second of the two calendar years because this is the year in which most of the fishing year lies.

Data source: Ministry of Fisheries

In 2010, 13 per cent of the 105 fish stocks that were assessed against the soft limit were considered to be depleted and 6 per cent of 146 stocks that were assessed against the hard limit were considered to be collapsed. Almost a quarter (24 per cent) of fish stocks experienced overfishing (see the text box on status classes on page 4) (Figure 5).

Southern bluefin tuna, six stocks or sub-stocks of orange roughy, three stocks of black cardinalfish and one stock or sub-stock each of pāua, rock lobster, scallop, and snapper comprise the 14 stocks considered to be depleted. Despite these stocks being depleted, they had an export value of around \$75 million in 2009 (about 5 per cent of total export earnings). Nine of these 14 stocks are also considered to be collapsed.

The Ministry of Fisheries or the fishing industry have rebuilding strategies in place for all depleted/collapsed stocks. Of the nine collapsed stocks, around a third are currently closed to fishing. One of the collapsed orange roughy stocks, which was closed in 2000, is considered to have rebuilt sufficiently to allow a cautious re-opening from 1 October 2010.

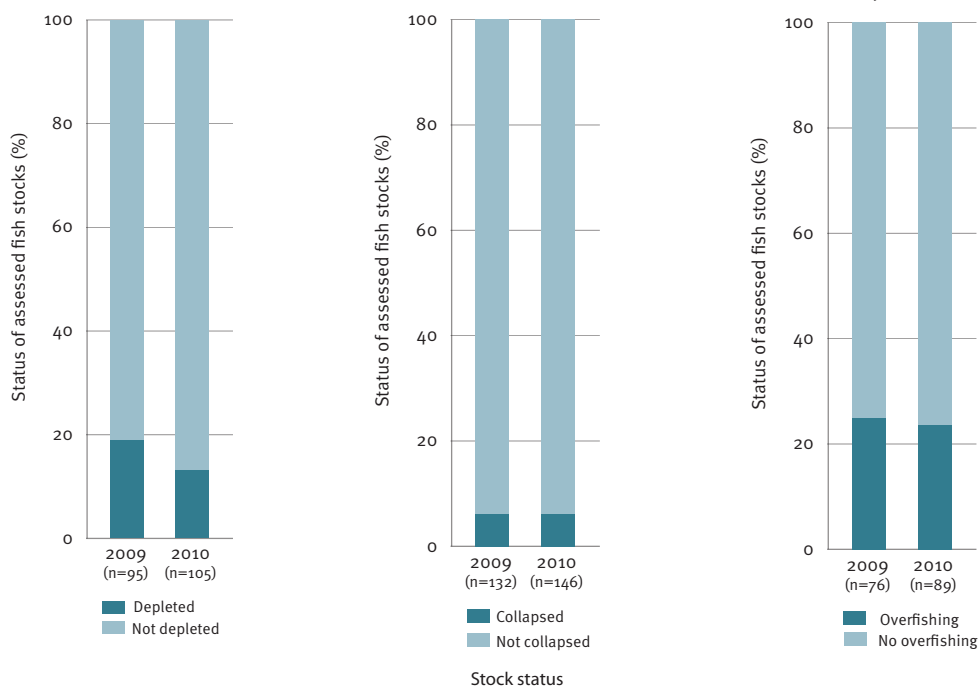
An example of the success of recent rebuilding efforts is the western hoki stock, which began to decline below target levels around the year 2001 and was depleted during the period 2003–06. As a result, the hoki TACC was substantially reduced in several stages and reported catches for the western hoki stock decreased from 100,600 tonnes in 2001 to 20,500 tonnes in 2009. The latest stock assessment which was finalised in May 2010 indicates that the western stock has now rebuilt to within the target range.

New Zealand's aquaculture

New Zealand's marine environment will continue to provide an opportunity for growth. Aquaculture is the fastest growing sector of the seafood industry. As a producer of premium seafood, aquaculture is set to become the nation's next major primary industry. In the past 30 years aquaculture in New Zealand has grown from very small beginnings to a significant primary industry, currently estimated to be worth in excess of \$360 million per year, with a target goal of \$1 billion in sales by 2025.

+ FIGURE 5

STOCK STATUS FOR FISH STOCKS ASSESSED RELATIVE TO SOFT AND HARD LIMITS AND OVERFISHING, 2009–2010



Note: The 'fishing year' runs from 1 October to 30 September. A fishing year takes its name from the second of the two calendar years because this is the year in which most of the fishing year lies.

Data source: Ministry of Fisheries

Long-term trend

In New Zealand's first state of the environment report in 1997, 10 per cent of the 74 fish stocks of known status were reported as below target level. In 2010, the percentage of stocks below target level was about 31 per cent of 119 stocks of known status. However, it is difficult to directly compare these figures as the QMS now has new stocks and sub-stocks and more species are being assessed using improved methodologies.

Recent trend

Since 2006, the percentage of stocks below target level has doubled, from 15 per cent in 2006 to 31 per cent in 2010.⁸ Since 2009, the number of depleted stocks has decreased by about 6 per cent and collapsed stocks remained relatively unchanged. Stocks experiencing overfishing decreased slightly from 25 per cent to 24 per cent.

Fisheries management actions

Steps are being taken to prevent the further decline of our fish stocks through fishing restrictions, including catch limits. Steps are also being taken to protect special and representative habitats through area closures such as the establishment of marine reserves.

The health of fisheries depends not only on how much we catch each year, but also on the health of the marine environment. The combined effects of bottom trawling and land runoff over many years have damaged some of our inshore fisheries and ecosystems. Snapper, trevally, tarakihi, John Dory, blue cod and mullet all rely on habitats like mussel beds and sub-tidal seagrass meadows that are sensitive to sediment impacts. These habitats provide important nursery and rearing areas, rich feeding grounds, and safe havens from predators.

In some places where land-based effects are a particular issue, community and local government groups have begun fencing and planting waterways to protect harbours from sediment runoff. For example, in Whaingaroa (Raglan) Harbour waterways leading into the harbour have been fenced off to improve water quality.

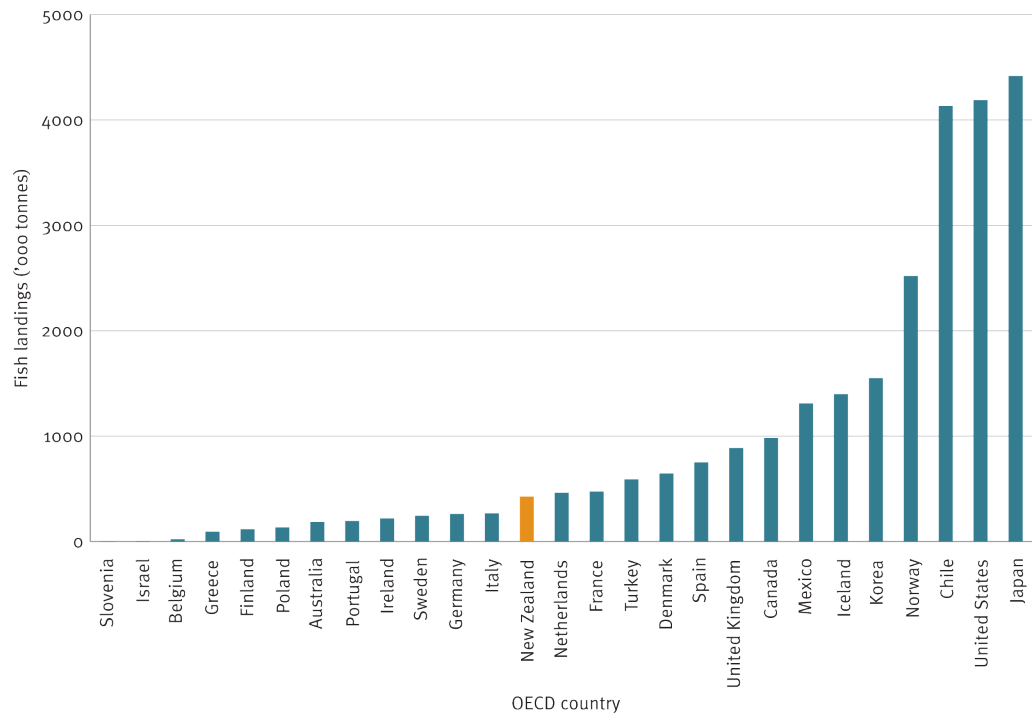
Actions are also being taken to reduce seabird and marine mammal deaths in our fisheries. As a result, seabird deaths in some fishery sectors have decreased, for example fewer small seabirds are caught in the ling auto-line fisheries and fewer large seabirds die in squid trawl fisheries.

These actions, among others, aim to ensure that New Zealand waters remain in a suitable state for future generations.

International comparison

In 2007, New Zealand had the 15th highest fish landings out of 27 OECD countries that had data available (figure 6).

+ FIGURE 6
FISH LANDINGS IN DOMESTIC AND FOREIGN PORTS, 2007



Data source: OECD, 2010. [OECD Factbook 2010](#). Paris: OECD.

Endnotes

1. Asset values are derived from average quota values per tonne as transferred under the QMS. The values are in current prices.
2. Although the number of stocks of known status only represents about 20 per cent of the stocks under the QMS, these account for 66 per cent of the total landings by weight and value – and represent most of the main commercial species.
3. The management target represents a balance between what we can take from the current population, and what we leave in the water to grow and breed for the future. Catch limits are set to ensure fish stocks fluctuate around target levels while avoiding falling below limits.
4. The number of stocks with known status relative to the new depleted or collapsed [Harvest Strategy Standard 2008](#) categories differs from the number with known status relative to management targets. All stocks determined to be at or above the target are, by definition, also above both the soft and hard limits. However, stocks that are below targets or of unknown status relative to targets may or may not be able to be assessed against the soft and hard limits. In general, it is easier to assess a stock relative to the hard limit than it is to assess a stock against management targets.
5. Catch data is reported by 'fishing year', which runs from 1 October to 30 September. A fishing year takes its name from the second of the two calendar years because this is the year in which most of the fishing year lies.
6. Please refer to [species groupings](#) for more detailed information.
7. Trends in commercial fish catch are not necessarily indicative of fish stock abundance.
8. Stock assessments are not necessarily made up of the same set of stocks and sub-stocks each year.



FOR MORE INFORMATION:

- about the state of New Zealand's environment – see www.mfe.govt.nz/environmental-reporting
- about the Ministry for the Environment's reporting on New Zealand's oceans – contact Janine Smith at janine.smith@mfe.govt.nz
- about New Zealand fisheries – see <http://fs.fish.govt.nz/Page.aspx?pk=91>

This report card has been independently peer reviewed by the National Institute of Water and Atmospheric Research.



New Zealand Government

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