

Review of management controls for the South  
Island longfin and shortfin eel fisheries  
**Submission to the Minister for Primary Industries**

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Te Kaitiaki Taiao a Te Whare Pāremata

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## Introduction

In April 2013, I released a report titled *On a pathway to extinction? An investigation into the status and management of the longfin eel*. In this report, I concluded that the longfin eel population is on a long, downward trajectory. I recommended that commercial fishing of longfin eels be suspended until the population is shown to have recovered.

I have been encouraged by the Government's response so far to my recommendations, in particular, the commitment to "*increase the population and improve the long-term sustainability of longfin eels*".<sup>1</sup> I also welcome the recent separation of South Island eel stocks, and the current review of total catch limits for South Island eel fisheries. My submission addresses this review.

## Longfin eels are a taonga, vulnerable, and under pressure

Longfin eels are extraordinary creatures that are found only in New Zealand. They are the largest and longest-lived freshwater eels in the world and the top predator in our lakes, rivers, and streams. Tuna (eels) are a cherished taonga for Māori – they are an important food source and have been interwoven into whakapapa and legends.

Longfin eels can grow as long as two metres and live to more than a hundred years. They breed only once at the end of a perilous migration thousands of kilometres north into the tropical Pacific Ocean. The larvae drift back on ocean currents and are washed into estuaries and river mouths right around New Zealand. The nature of this long slow lifecycle means that the species is particularly vulnerable.<sup>2</sup>

There are three main pressures on the longfin eel population – fishing, loss of habitat, and barriers to their migration up and down rivers. These pressures and the vulnerability of the species mean that decisions about the management of longfins must be made with caution.

## Looking at the weight of evidence

Following the release of my 2013 report, the Ministry for Primary Industries convened a panel of scientists to review the status of longfin eels. The panel did not reach a clear conclusion about the status of the species. However, the panel did conclude that the main measure – catch per unit of effort (CPUE) – “*needed to be interpreted with caution*”. As well as suggesting a number of improvements to this measure, the panel recommended a more comprehensive approach be taken, “*in which classical and alternative data sources are used to the full*”.<sup>3</sup>

Following the panel’s report, the Ministry has improved the quality of the CPUE indicator, and commissioned research that may provide other information to help give a broader understanding of the state and trends in the population. However, the Ministry has continued to base its assessment of the status of the longfin population only on CPUE and landed catches.<sup>4</sup>

In contrast, my conclusion that the species is in trouble was based on a comprehensive weight-of-evidence approach that drew widely on the best available information.

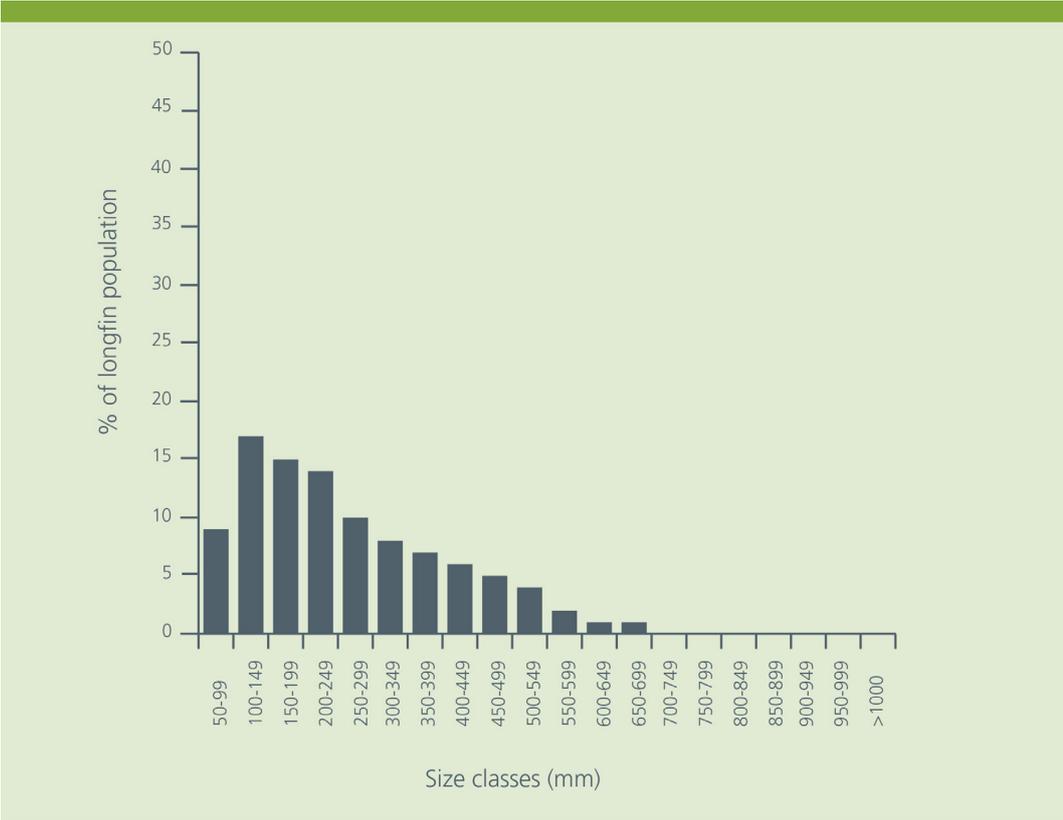
During my investigation, the results of two analyses were key to my conclusion.

The first analysis is of the age structure of the population.

In a healthy eel population, the number of eels in each age class falls with increasing age. Figure 1 shows the lengths of thousands of longfin eels measured in surveys undertaken by NIWA. (The length of an eel is a good proxy for its age.) The first bar in this graph should be higher than the second, but it is not. There is a ‘hole’ in the population that will not show up in catch data for many years. In contrast, Figure 2 shows that the age structure of the shortfin eel population is as it should be.<sup>5</sup>

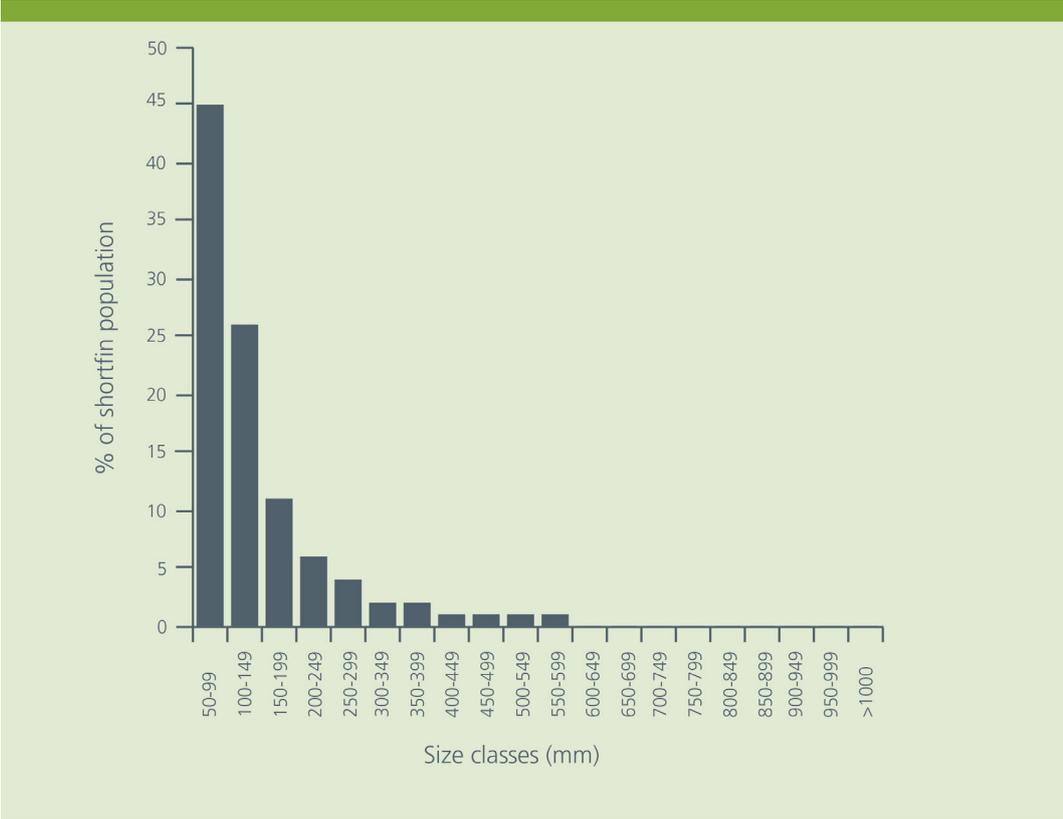
The Ministry has suggested two reasons for the difference between the age structure of the two eel populations. Neither is convincing.<sup>6</sup>

The second key analysis is based on the Freshwater Fish Database. It shows that the probability of finding at least one longfin eel in its natural habitat has fallen from 70% to 45% in the last 30 years. The Ministry also suggests that this is not meaningful – again I am not convinced.<sup>7</sup>



Data source: Jellyman, 2012.

**Figure 1. For longfins, the proportion of elvers (shown in the first bar) is much lower than would be expected and strongly points to a reduction in the resilience of the population.**



Data source: Jellyman, 2012.

**Figure 2. For shortfins, the age structure does not show a similar reduction of elvers, and indicates a healthier population.**

## In conclusion

I have not seen any evidence that alters my assessment that the longfin eel population is in serious trouble and on a slow path to extinction. We must be cautious in our management of this extraordinary creature.

Fishing is not the only pressure on the species.<sup>8</sup> However, reducing the catch is the only action with immediate potential to reverse the decline of the species.

I acknowledge that the Minister for Primary Industries must provide for the utilisation of the fishery, but this must not jeopardise the sustainability of the species.<sup>9</sup> In this consideration it is important to remember that longfin eels represent much more than a fishery. They are found only in New Zealand and are a taonga to tangata whenua. They sit at the top of the food chain in freshwater ecosystems. Our children and grandchildren would be poorer for their loss.

Based on the weight of evidence, it remains my firm conclusion that the longfin eel population is in trouble, and that the commercial catch should be suspended until it is clear that the species is recovering.

The recommended approach by the Ministry for Primary Industries is to set catch limits at the average annual catch. This will not achieve the Minister's goal to "*improve the long-term sustainability of longfin eels*".<sup>10</sup> Much more is needed.

1. Hon Nathan Guy, Cabinet paper, *Proposed management measures for longfin eel fisheries*, 1 August 2014, p.2.
2. In contrast, there is less concern about shortfin eels. They grow faster and breed at an earlier age, and can thrive in the still and often muddy waters of lowland waterways. Their movement along rivers is less likely to be blocked by dams because they generally live nearer the coast. And, unlike longfin eels which are found only in New Zealand, the shortfin eel is found elsewhere in the South Pacific, allowing for a buffer of extra breeding stock.
3. The independent science panel stated "*From our experience in the assessment of (northern) temperate eel stocks we know that eels are difficult to assess. This is not only because many of the eels' biological characteristics are unknown or atypical amongst exploited fish species, but also because eels cut across governance structures, span environments as different as the open ocean and the mountain creek, are impacted by land, river and fisheries activities, and can be monitored and assessed using a range of diverse methodologies.*" Haro et al., 2013. p.22.
4. *Review of Management Controls for the South Island Longfin and Shortfin Eel Fisheries (LFE 11-16 & SFE 11-16) in 2016*. Ministry for Primary Industries Discussion Paper No: 2016/15. p.3.
5. Note that these surveys do not provide information on the numbers of glass eels, as any young eels have grown into elvers and are longer than 70mm by the time they reach the survey sites.
6. The first suggestion is that because the data comes from many different rivers and streams, it is unreliable. However, it is *because* over 10,000 longfins have been measured in many different sites across the country that the evidence for the overall pattern is so strong.  
  
The second suggestion is that the method used to catch the eels in order to measure them may be more effective at catching shortfin elvers than longfin elvers. The hypothesis is that longfin elvers may burrow deeper into the stream bed and therefore not be stunned by the electric current. Research has been commissioned to test this theory, but so far no evidence has been found to support it. Further, the *New Zealand Freshwater Fish Sampling Protocols* for wadeable rivers and streams state that electric fishing is an unbiased method and does not under-sample either species (Joy, M., David, B., and Lake, M. 2013. *New Zealand Freshwater Fish Sampling Protocols. Part 1 - Wadeable Rivers and Streams*. Massey University Publishing, p.8). These protocols were developed in consultation with 16 fish experts.
7. One criticism that has been made of this analysis is that changes over time, such as the kinds of sites surveyed or the effort expended, could have introduced bias into the results. However, the data was screened for such bias and none that affected the conclusions was found. (Jellyman 2012, p.39).  
  
Another criticism was that there has been an increase in the recording of sites that are dry at some times of the year and would then contain no fish of any kind. However, these amount to 1% of the sites in the database and do not affect the strong trend detected in the analysis (NIWA Database Administrator, pers. comm., 12 March 2013).  
  
NIWA are currently reanalysing information in the Freshwater Fish Database as part of the national environmental reporting programme run by the Ministry for the Environment and Statistics New Zealand.
8. Incidentally, the large-scale commercial fishing of eels began in the 1960s with the arrival of Dutch fishermen with their efficient fyke nets must have been instrumental in changing the pakeha view of eels as vermin.
9. Fisheries Act 1996, section 8. Also see *NZ Recreational Fishing Council v Sandford Limited*, SC 40/2008, [2009] NZSC 54, 28 May 2009, para. 39
10. Hon Nathan Guy, Cabinet paper *Proposed management measures for longfin eel fisheries*, 1 August 2014, p.2.

