

Monitoring Yellowtail Kingfish Stocks

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Kingfish are a popular and challenging target species for many recreational fishers. They form a valuable component of the charter boat business with clients coming from around New Zealand and around the world to test their angling skills against these hard fighting fish. Now there is growing demand for guided fly fishing trips sight fishing for kingfish in shallow water.

In New Zealand most popular fish stocks are monitored using commercial catch records and catch rates. However, most of commercial catch is taken as small component of longline and setnet fishing targeting other species. Kingfish is in the unique position of having a higher documented recreational landed catch (around 660 tonnes a year nation-wide) than commercial landed catch (around 250 t). Only the recreational fishery targets kingfish and catches the full size range available. NIWA investigated the options for monitoring kingfish stocks and as a result the Ministry for Primary Industries (MPI) monitor the age structure of the charter boat kingfish catch in north eastern New Zealand every five years.

In 2009–10 a total of 2091 kingfish were measured aboard charter and selected private boats and 460 were aged. All fish were assigned an age based on their length. East Northland had a lot of five year old fish and very few teenagers. In the Bay of Plenty six year olds formed the largest age class and there were more older fish. The oldest fish aged was a 170 cm fish caught at White Island which was 24 years old. The oldest and largest fish sampled in East Northland was a 156 cm fish (41.6 kg) caught in Bream Bay aged at 22 years.

The estimates of fishing mortality that year lead MPI to conclude that kingfish in the Bay of Plenty were fully exploited and over fishing was occurring in East Northland. The 2010 NZSFC club records however, showed increasing availability and catch of mid-sized kingfish from 80 to 105 cm, probably from good spawning success in 2004 and 2005. This pulse of fish could be the start of the stock rebuild we were all hoping for after the management decisions in 2003.

Thanks to the cooperation of the Bay of Islands Swordfish Club and anglers in the Yellowtail International Tournament we were able to measure a good number of kingfish in July each year since 2010. There was clear evidence that the pulse of fish would turn up in subsequent years a few kilos larger but reducing in number.

Results from the 2014-15 catch-at age study

The real test of whether the kingfish stock was rebuilding came when MPI funded a repeat aging study of charter boat catch. Again this was a joint project by Blue Water Marine Research and NIWA which got excellent support from many charter skippers. The main change was the inclusion of additional offshore areas in the sample. These were the Three Kings area and Ranfurly Bank, which are part of the same habitat as other areas in Northland and Bay of Plenty contained within the East Auckland current and East Cape current.

During the 2014–15 study, a total of 2833 kingfish were measured including some undersized fish that were not part of the catch-at-age analysis. The kingfish sample from the Northland/Hauraki Gulf region achieved 1183 length measurements and 271 otolith pairs from fish over 75 cm, while in the Bay of Plenty/East Cape region, 1039 fish were measured and 213 otolith pairs collected. Kingfish

otoliths, or balance bones, are small and fragile for the size of the fish (Figure 1). The NIWA aging team fixes them in resin and slices them thinly to read the annual growth rings.



A pair of otoliths (balance bones) from a 146 cm, 17 year old kingfish speared by Nat Davie at the Three Kings.

Northland/Hauraki Gulf catches were largely dominated by young kingfish from the 2011 to 2008 year classes (4- to 7-year-olds), the 2010 year class (5-year-olds) singularly the most dominant, accounting for more than one-third of the total catch by number (Figure 2). The catch from the Bay of Plenty/East Cape region comprised a slightly broader age composition, with the 2009 year class (6-year-olds) being the most dominant and making up about one-quarter of the total catch by number. The strong 2005 Northland year class and a strong 2004 Bay of Plenty year class first seen in the 2009–10 study can be seen in 2014–15 as 10 and 11 year olds (Figure 2).

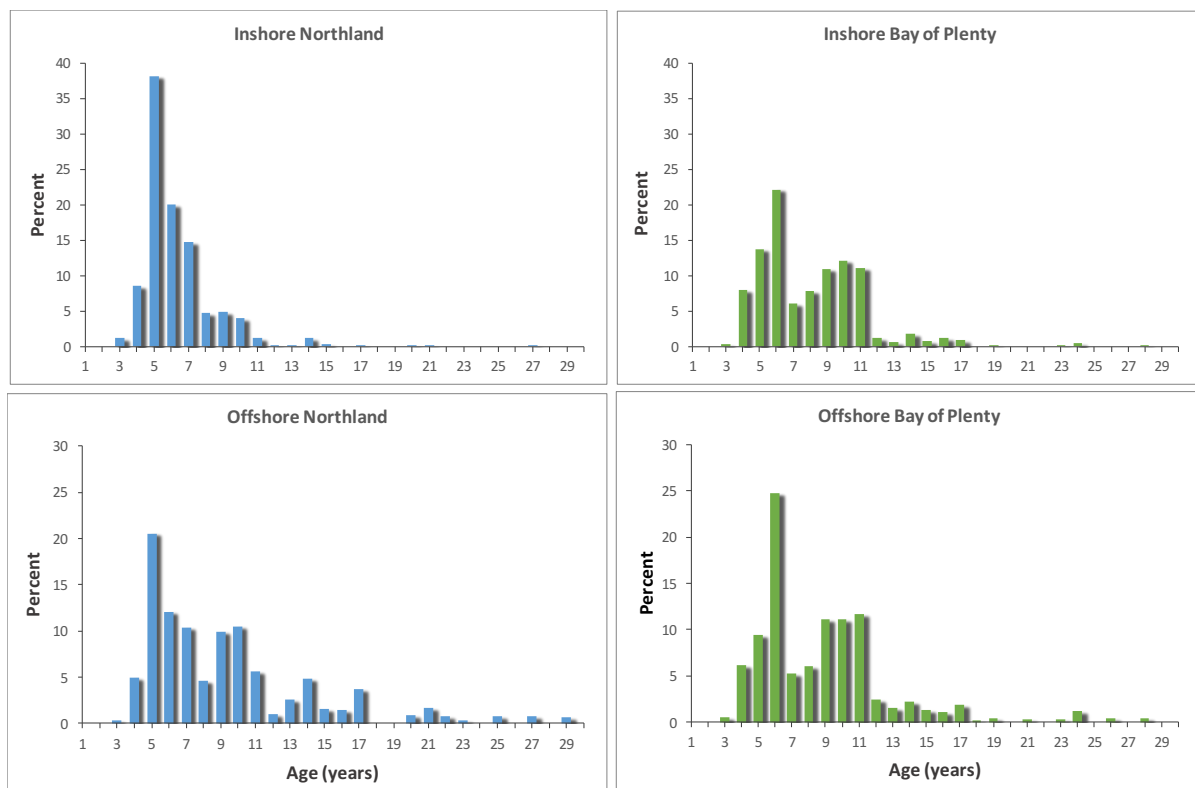


Figure 2: Kingfish age composition by region for inshore (top) and offshore (bottom) samples in 2014–15. All fish are over 75 cm with few 3 year olds, but most 4 and 5 year olds of legal size.

Kingfish growth rates can vary between individuals and we found that female kingfish grow to a larger maximum size than males. A 29 year old, 134 cm female kingfish was caught at the King Bank and a 28 year old, 130 cm male fish weighing 29 kg was caught at Ranfurly Bank. These are new maximum age estimates recorded for this species in New Zealand and possibly worldwide.

Spatial differences in age composition were evident between inshore and offshore samples in each region, with fish older than 15 years poorly represented in inshore areas compared the Three Kings area, White Island and Ranfurly Bank in the offshore sample. Although movement has been recorded between inshore and offshore areas, the relationship between these areas is unquantified. The Northern Inshore Fisheries Working Group accepted that the inshore and offshore samples were from the same population in each region, but concluded that there was no valid approach for combining inshore and offshore age frequencies by region for the purpose of estimating regional total mortality. Both inshore areas and the BOP offshore area had lower total mortality estimates in 2014-15 than those obtained in 2009-10. The Northland offshore area was not sampled in the first survey but had the lowest total mortality estimate of any area in 2014-15.

The bottom line is that kingfish stocks have improved over the last 5 years. The working group concluded that kingfish populations in the Bay of Plenty and Northland regions of KIN 1 were unlikely to have been in an over-exploited state in 2014-15.