YELLOWTAIL KINGFISH NEWSLETTER

BlueWater MARINE RESEARCH

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March 2012 **Wrap up of the kingfish ageing study**

Thanks to everyone

The kingfish monitoring project which collected lengths and ages of fish caught by recreational fishers in management area 1 (North Cape to Cape Runaway) is successfully drawing to a close. The final report is with MAF and should be available soon. There were some delays analysing the final results and passing those on to participants in the project, and for that I apologise. Thanks for your support and patience. We have learnt a lot.

Final numbers and brief conclusions

The project set out in early 2010 to collect 2000 kingfish lengths and 500 ages from kingfish. We tried to split samples evenly between East Northland/Hauraki Gulf and the Bay of Plenty and cover a range of habitats within each region. Overall:

- 56 skippers provided data;
- 2091 kingfish were measured;
- 460 kingfish were aged counting growth rings in the otolith (balance bone);
- About 60% of lengths and ages came from East Northland/Hauraki Gulf and 40% from Bay of Plenty;
- The youngest fish were 3 year olds (69 to 78 cm some from commercial catch);
- Most 4 year olds are larger than 75 cm, the recreational legal size;
- The oldest fish was 24 years old, 170 cm from White Island;
- There were few teenage or older fish in East Northland/Hauraki Gulf in 2010;
- Most but not all the older fish in the Bay of Plenty came from White Island;
- Total Mortality estimates from the sample collected in East Northland/Hauraki Gulf is about 0.77 and in the Bay of Plenty about 0.34;
- On face value this means that kingfish in East Northland/Hauraki Gulf may be overfished and fishing mortality in the Bay of Plenty should not be increased;
- Fishing pressure may not be the only reason that there are few older fish in the East Northland/Hauraki Gulf sample. Large fish may prefer habitat further offshore or be harder to catch in inshore areas. This could bias mortality high.
- There was a high proportion of 5 and 6 year olds in the 2010 sample. These medium sized fish (100 to 105 cm or 12 to 16 kg) may stay and help replenish stocks in kingfish area 1 (KIN 1);
- Measuring kingfish lengths at major tournaments would help determine if they stay around and track growth of these fish.

How the fish are aged

The heads with labels identifying the fish are collected from recreational fishers and the largest pair of otoliths (balance bones) are removed from grooves below the brain. In kingfish the otoliths are quite small, fragile and at times elusive. Fast swimming open water fish such and yellowtail kingfish and marlin have smaller otoliths than slower bottom dwelling species, like snapper.

Otoliths from a 99 cm kingfish

Each otolith is set in a block of epoxy resin and cut with a special machine. Thin transverse slices, that pass through the otolith core, are placed on a slide and viewed using a microscope as seen below.

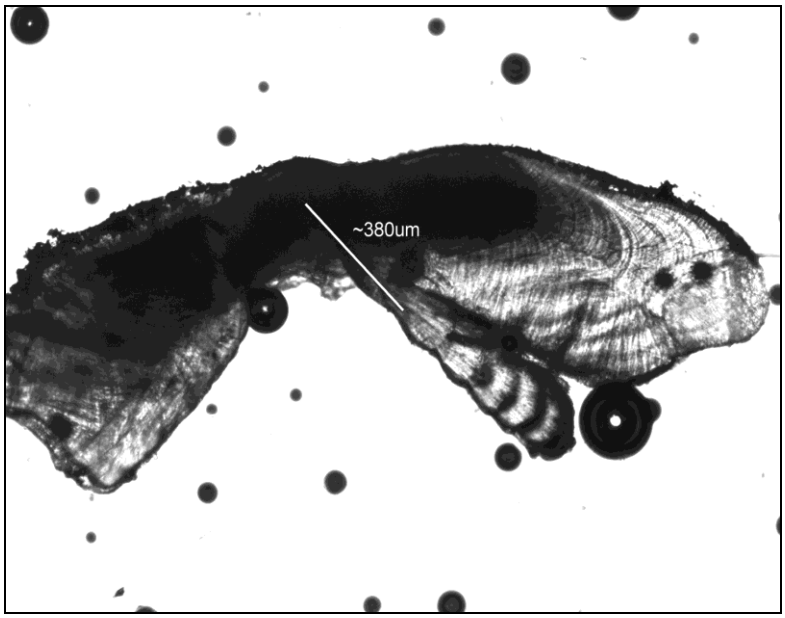


Figure 1: Thin transverse section of an otolith from a 99 cm kingfish captured in the Bay of Plenty, 26 March 2010 (otolith number 11-2, age 6, 40x magnification).

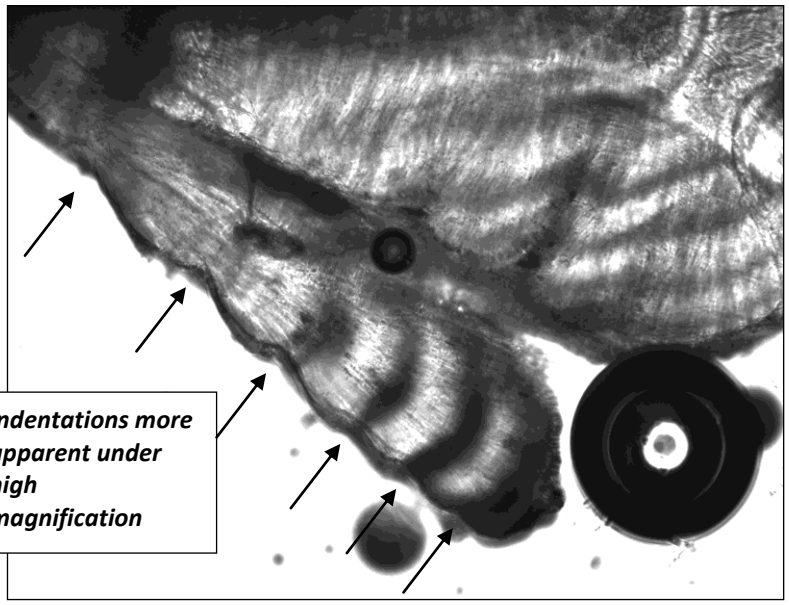


Figure 2: Close up view of the same otolith with annual rings marked (otolith number 11-2, age 6, 100x magnification). The dark circles are air bubbles in the resin.

Age of fish sampled in 2010

NIWA has an experienced team of scientists who determine the best methods for preparing otolith samples and ageing fish. This year they revised and improved the techniques used with help from Stock Monitoring Services. They have accurately identified the location of the first annual ring, which has proved problematic in previous studies in New Zealand and Australia. As a result, kingfish are younger at the minimum legal size, and at maturity, than previously thought. An age-length key was used to allocate ages to all fish measured. The age distribution by region and sex is provided below, with both sexes combined at the bottom. Most kingfish in our sample are relatively young, with 79% less than 7 years of age. The average age for a kingfish caught in East Northland in 2010 was 5 years, and in the Bay of Plenty, 6.5 years.

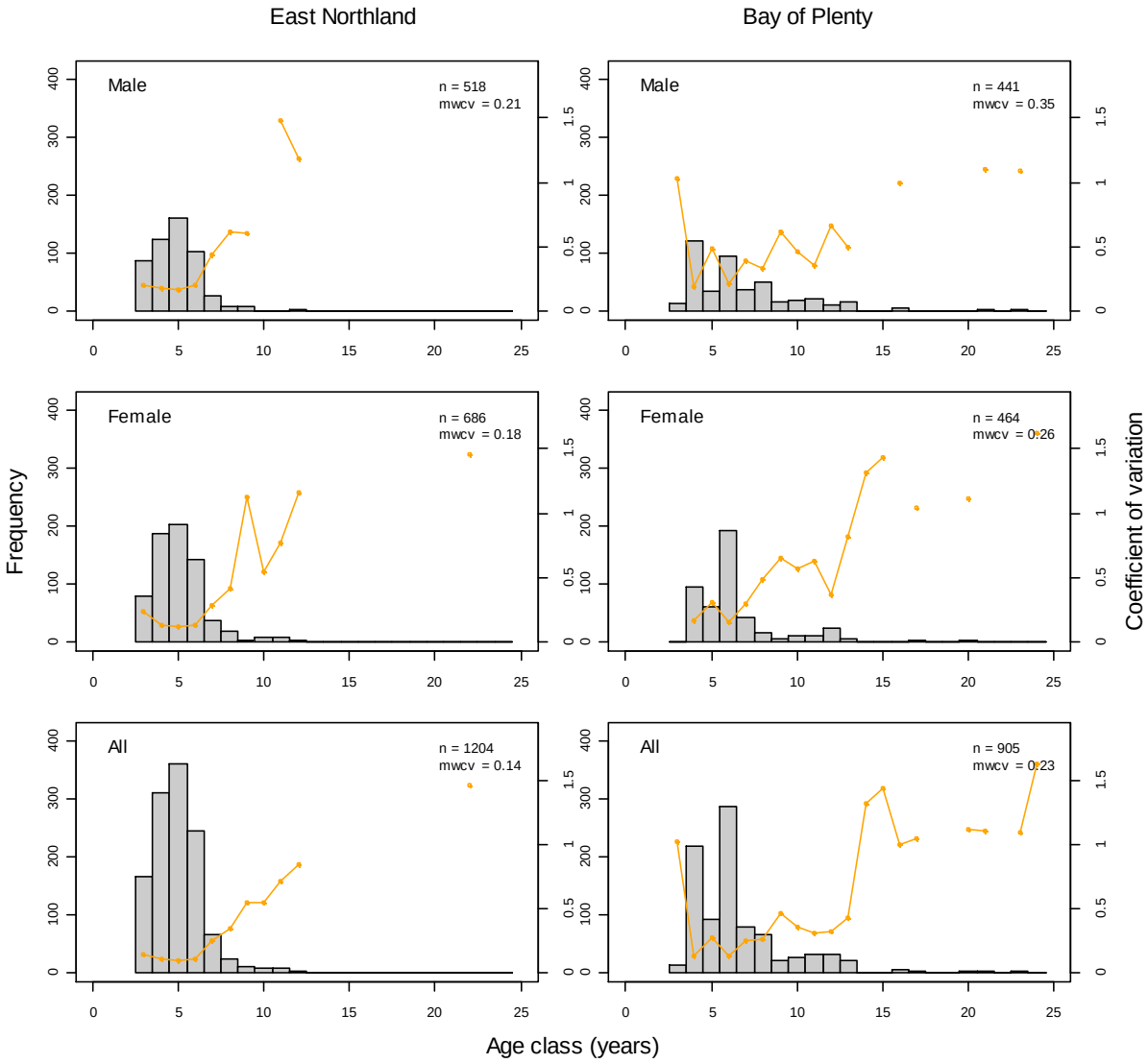


Figure 3: Age frequency distributions of recreational kingfish sampled in 2010 separated by sex and region; East Northland/Hauraki Gulf and Bay of Plenty. The line represents the precision for each age class estimate.

Length at age of kingfish in 2010

Growth curves can be generated by plotting length against age to see how fast kingfish grow, for comparisons over time and between stocks. Some small fish caught around fish aggregation devices (FADs) less than a year old were used to shape the left hand side of the curve, with the legal sized fish contributed from recreational fishers, shaping the right hand side. There is considerable variation in length for fish of the same age and overlap between ages for fish at the same length. This is a result of variations in growth rate between individual fish. The Bay of Plenty sample had more teenage fish than East Northland/Hauraki Gulf.

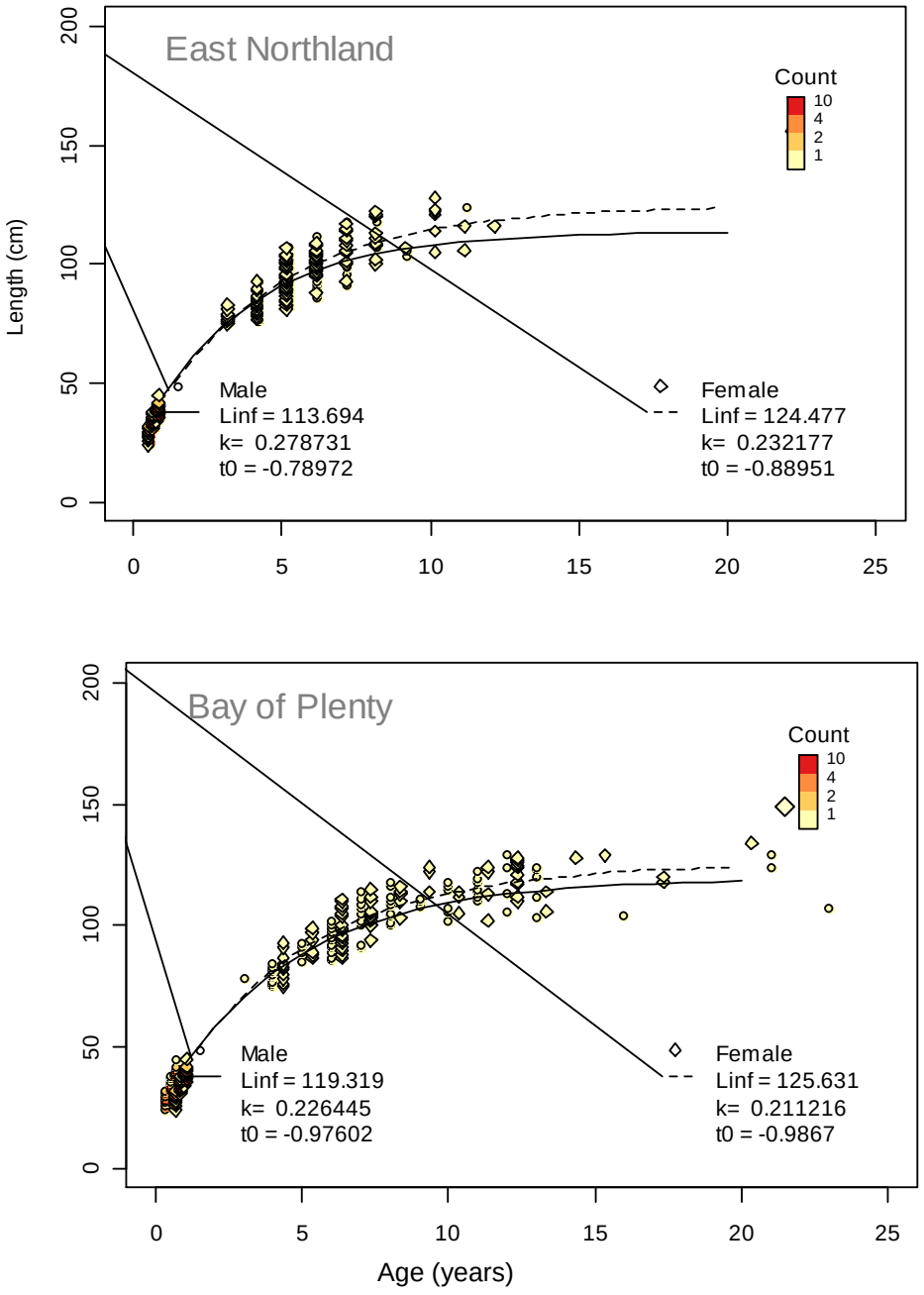
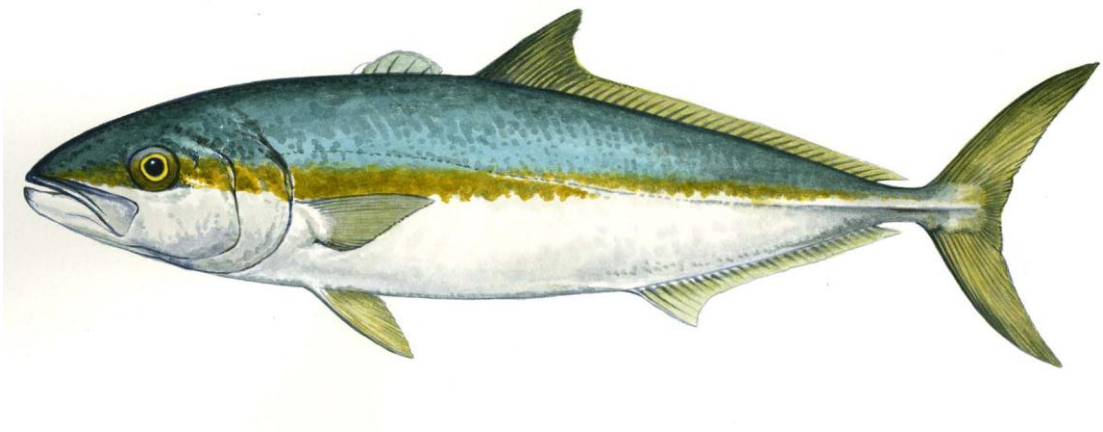


Figure 4: Length at age for all fish sampled in East Northland/Hauraki Gulf and Bay of Plenty with growth curves for females (dashed) and males (solid line).

Bay of Islands Yellowtail Tournament

This tournament has been running for 42 years and has always attracted anglers from around New Zealand and Australia. Ninety kingfish were measured at this tournament in June 2010 and they had a similar size and age distribution to other fish sampled in East Northland throughout this year, the majority of fish between 95 and 108 cm (10 to16 kg). The opportunity to measure 136 kingfish at the tournament in the following year (June 2011) was taken. Although no resources were available to age the fish from 2011, there was evidence of a shift in the length distribution toward larger fish with the mode now measuring between 98 cm and 110 cm. While there were few 7 year olds in the age distribution in 2010 the implication is that good numbers of 6 and 7 year olds were present in the Bay of Islands area in 2011. Length samples from future tournaments may show a progressive increase of the proportion of larger/older fish in the catch.



Thanks to all those clubs, anglers and skippers who contributed to this project. The Northern Inshore Working Group provided guidance and peer reviewed this work. This project (KIN2009/01) was funded by MAF.

The final report **Holdsworth, J.C.; McKenzie, J.R.; Walsh, C.; van der Straten, K.M.; Ó Maolagáin, C. (2012). Catch-at-age of yellowtail kingfish (*Seriola lalandi*) caught by recreational fishers in KIN 1 in 2010** will be available on line in a few months at http://fs.fish.govt.nz (under Documents & Information, Research Reports).

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