

**REPORT ON THE EAST COAST TUNA AND BILLFISH
SIZE MONITORING PROGRAM 2006/2007**

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Summary

This year (2006 – 2007) is the tenth consecutive year that the individual size data for the three main species for the East Coast Tuna and Billfish Longline Fishery have been collected. The species are yellowfin tuna, bigeye tuna and broadbill swordfish. A scientifically robust coverage both geographically and numerically has been achieved and the data have been transferred to the CSIRO data base in Hobart. Catch by size breakdowns are essential for all population studies in these types of fisheries and long term data sets are also required.

Real time albacore and broadbill individual size data are delivered in three-monthly batches to CSIRO and individual size data for several secondary target and by catch species are also collected and transferred to CSIRO.

Introduction and Background

The individual size data collection for the east coast longline fishery commenced in 1997-98. Initially it was a pilot study to ascertain what data were available in processor records and what could be gained from sampling systems put in place over a longer term. This period coincided with the fishery undergoing rapid expansion and major structural and geographical changes.

The research priorities identified by the Eastern Tuna Management Advisory Committee in recent years listed issues concerning stock structure, catch impacts and age compositions as being very important.

In 2005-06 and 2006-07 ETMAC specifically listed the collection and analysis of data as being central to, but standing above all other research priorities. One of the data requirements included size monitoring. Additionally, amongst the research priorities for 2006-07 several of these are reliant on or gain some benefit from an accurate size matrix of the landed catch. The information collected in a scientifically well managed size monitoring program will contribute to several research priorities listed, including:

Item 1: Determination of the relationship between the fish caught in the ET & BF with fish caught in other regions of the Pacific with respect to stock structure, recruitment, mixing rates etc.

Item 2: Assessment of the resource status of the key ET & BF species, including stock assessment and modeling, development of indices of abundance, development of alternative stock assessment methodologies.

Having established that extensive, scientifically useful size data sets were available in landed catch records - in various formats - work commenced in 1997/98 to access and computerise these data into suitable databases for use by CSIRO. The main thrust of the work since then has been to formalise access to both hard copy and electronic records over the entire geographical area of the fishery; to determine the extent of coverage necessary for effective scientific analyses and to collate suitable size data into appropriate data bases for use by scientific agencies.

Comprehensive catch by size (and therefore age) data are required (essential) in any stock assessment process in almost every fishery. As well as being essential for population analyses, good size data are necessary for following cohorts through the fishery, both in time and geographically and also for creating indices of abundance by year class.

Routine long term data collection systems have now been established to collect data at processing factories based throughout the geographic range of the fishery. The major unloading points/processing establishments are the main sources of data for the size monitoring program from Cairns (Nth Qld) in the north to southern NSW.

Objectives

The main objectives of the program in 2006-07 were to:

- continue the collection of individual weight data for a scientifically representative sample of the three main species - yellowfin tuna, bigeye tuna and broadbill swordfish - within the ET & BF fishery,
- collect individual weight data on important secondary target species e.g. striped marlin and albacore tuna where possible,
- continue the sampling regimes where reasonably possible and logistically feasible for length/weight data-set collections for the three main species at the principal landing points to develop suitable length/weight relationships for the conversion of weight to length (and hence age),
- ensure all data is incorporated into a suitable size database for use by AFMA and CSIRO. Liaise with CSIRO in the set-up and maintenance of this database,
- provide a suitable size distribution summary to ETMAC for the year's data for the three main species.

The secondary objectives were to:

- as time permits, enter data available through processor records on by-catch individual size into a suitable database,
- collect (opportunistically) data on entire landed catch of single trips by east coast longline vessels - 50 to 100 offloadings,
- liaise with CSIRO, AFMA, BRS and industry bodies, particularly the processing sector in matters to do with the field programs.
- additionally, AFMA/CSIRO via the MAC requested real time albacore and broadbill data which are being sent three-monthly to CSIRO.

Methods, Results and Discussion

Data Collection

The make-up of operators in the processing/packing sector changes often, hence decisions are made regularly on the nature and extent of data collection to ensure effective scientific coverage. The collection of a suitable (large) representative sample of the landed catch by size is the aim. It is not necessary or indeed cost effective to try and sample from every processor at every unloading point. This will be reassessed as circumstances and events unfold. Major structural changes are occurring in the processing/packing sector continually and tactical changes are undertaken in sampling systems as deemed necessary by the operator or the scientific agencies liaising with the operator. Again some changes took place during 2006-2007 in the mix of processing establishments and unloading points, however similar ports and processors made up the bulk of the collection as in previous years.

Additionally, several processors indicate local and export distribution of the fish in their data. This is entered into the database. Some others list entire unloadings without reference to final distribution. These are also indicated in the database. A large source of domestic sales occurs through the network of the Sydney Fish Market. These data are accessed, and size and area of catch sorted. These data are screened extensively and corrected for any listings for which size data has been obtained directly from suppliers to the Sydney Fish Market.

The number of records in the individual weight database in 2006-2007 was up by 10% on the previous year reflecting a stabilization in the industry following a period of change and adjustment.

This year as in the previous year, following requests from AFMA for more timely incorporation of the broadbill swordfish and albacore data we sent three monthly updates of all broadbill and albacore data to CSIRO. This will continue as requested.

Data Incorporation

All size data for yellowfin tuna, bigeye tuna and broadbill swordfish are now in the MS Access database and CSIRO is in possession of the 2006-2007 individual size (weight) database which contains more than 70,000 records.

Encouragingly, changes in the numbers of individual weights for each species over the years tracks quite closely with recorded landed numbers in the AFMA log book system.

We had anticipated that we might be collecting data on 70-90% of all landed fish of the three major species as individual weights in our database. Comparisons with the AFMA log book data system would seem to suggest something in the order of 75–85% is correct. The largest variation is in the representation of yellowfin tuna in the database. A large amount of this variation is, I suspect, due to the private sale of bulk lots of small to medium yellowfin tuna direct from the vessel. For example, even before the Sydney Fish Market system was made more flexible, it was possible and legal to sell fish in bulk to retailers and only record the transaction as a bulk weight e.g. 1,000kg. Access to individual weights in cases like these is impossible. Also some smaller yellowfin caught by longline are occasionally sold whole in box lots on the general market floor. Again individual size data is impossible to collect.

All individual weight data is entered by area of catch (landing) and some degree of latitude must be inherently read into these classifications. For example some of the fish passing through Brisbane processors will come from NSW North Coast ports.

Once again there have been changes in some processor's data recording systems and as these changes take place we adapt our collection routine. In one case electronic transfers have been replaced by hard copy collection which is working better in that instance, while another processor has upgraded their computer system and now sends their data electronically. There has however, been no deterioration to the quality of the data collection as a whole.

Secondary Target and By Catch Species

Some of the data collected included accurate breakdowns by size of several other species. These include striped marlin which is an important secondary target species. The data for striped marlin has been entered into a separate Excel spreadsheet which contains nearly 2,700 individual weights.

The catch of albacore has increased significantly and become a target species in the last year or so. We are establishing a separate albacore data base with individual weights for this species similar to the striped marlin database.

Other genuine by-catch species are sometimes weighed in bulk, reflecting their non-preferential status. However some by-catch data is still available, whether individually or in bulk and may still be useful. The by-catch individual weight data spreadsheet is prepared at opportunity and is forwarded to CSIRO when complete as priority is given to the main species. It is estimated that it will contain around 10 - 15,000 records excluding albacore.

Additionally many entire boat unloadings for the trip are held in hard copy format. No attempt has been made to enter individual trip unloadings. All the data from such trip data is entered in the species summaries.

Benefits / Management Outcomes

Benefits flow to the industry and the broader community as a result of quality data being used in population modeling and stock assessments. The use of the data in these analyses is an indication of the success of the program.

Conclusions

The size monitoring program has successfully gathered a scientifically representative sample of the east coast longline catch for the three major species - yellowfin tuna, bigeye tuna and broadbill swordfish - by individual size. The numbers of individual weights in the database decreased this year as was pointed out. This is probably a reflection of a reduction in the fishery overall.

The numerically extensive and large geographical range of the coverage included in the database wholly satisfies the major scientific objectives. Analyses of the data on a wider front (Western Pacific) seem to suggest the collection of such large numbers of individual weights is proving very successful (John Hampton, SPC Noumea pers. com.). It is also more cost effective and logistically simpler than running length/weight data collections over extensive geographical areas, many unloading ports and time periods.

The structure of any future programs will focus on the main processing points and extensive contact with these participants is essential. The number of processors accessed and the extent of contact with these players will vary as the fishery changes and develops, and as the needs of the program coverage are re-assessed periodically. Several changes have taken place recently and steps were taken to make allowances for these changes in this year's program so the overall coverage remains at least similar to, and as scientifically robust as previous years.

All data has now been incorporated successfully into the database and CSIRO has transferred the data onto their Oracle data base without problem.

As mentioned above some extensive changes have taken place in several data collection systems. We are confident this will now allow much more timely incorporation of data, even though it involves the more widespread use of hard copy records. Some changes to the database input process were undertaken in conjunction with CSIRO in Hobart last year and that part of the operation worked extremely well and has continued.

The secondary target and general by-catch data collected is entered separately into Excel spreadsheets and forwarded to CSIRO. These by-catch records are now a considerable part of the data set.

Appendices

As requested, a summary of the size distribution of the catch of the three key species is provided as appendices. These graphs show the size distribution for yellowfin tuna, bigeye tuna and broadbill swordfish for each month of the 2006-2007 fiscal year. There are also three graphs showing the complete size distribution of the three main species for the entire sampled landed catch for the East Coast for the period July 2006 to June 2007.

(Graphs 1 – 39 attached).

