

EASTERN TUNA AND BILLFISH FISHERY

**SIZE MONITORING
PROGRAM 2002/2003**

R2001/1155

FINAL REPORT

**KEVIN WILLIAMS
WW FISHERIES (AUST) P/L**

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INTRODUCTION AND BACKGROUND

The individual size data collection in 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 2002-03 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 2002/03 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 of the 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, 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.

AIMS

The main aims of the program in 2002-03 were to:

- continue to collect 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 where possible,
- continue the sampling regimes 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 aims 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 -100 offloadings,
- liaise with CSIRO, AFMA, BRS and industry bodies, particularly the processing sector in matters to do with the field programs.

DATA COLLECTION

The make-up of operators in the processing/packing sector changes often, hence decisions have to be 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 in 2002-2003 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 in the 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 market. These data are also screened to edit out all overseas and interstate suppliers.

The number of records in the individual weight database increased by 20% over last year. This resulted from an increase in catches of yellowfin tuna (by number) although the other two species fell slightly (AFMA log book data). Also some extra data was collected as a result of new processor electronic records becoming available.

The length-weight sampling system at the main unloading port is continuing and the length-weight pairs for the three main species have been forwarded to CSIRO in an Excel spreadsheet to keep them separate from the main database and prevent double counting.

DATA INCORPORATION

All data are now in the MS Access database and CSIRO is in possession of the 2002-2003 individual size (weight) database which contains nearly 120,000 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 the database. Comparisons with the AFMA log book data system would seem to suggest something in the order of 65–90% 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.

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.

This year has seen several major changes in processor electronic data storage systems. It has taken a great deal of extra time and effort in eliminating all the problems involved with these changes. However, now that these difficulties have been overcome, a much more timely incorporation of the electronic records into the data base should be possible.

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 has become an important secondary target species. The data for striped marlin has been entered into a separate Excel spreadsheet which contains over 5,000 individual weights.

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 has been forwarded to CSIRO. It contains over 42,000 records.

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.

SUMMARY

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 increase in samples compared to last year's database is probably a reflection of the increased landings of yellowfin and access to extra processor electronic records.

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.)

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 and scientifically robust.

Problems in the transfer of the new electronic data formats have now been overcome. This should lead to the more timely incorporation of the data provided a couple of in-house program changes to the CSIRO input program can be achieved. Initial investigations in this area suggest the changes can be undertaken.

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

One of the largest processors, where data had been collected in hard copy format, has updated to a fully computerized fish unloading and tracking system. This now allows partial direct electronic incorporation into our database and eliminates the need for extensive hard-copy record collections. This has resulted in a totally different data incorporation procedure and some saving in data entry time and effort has been achieved. However there is still extensive sorting and editing of data required.

One other processor has also moved to an electronic data storage system but again the editing and transfer of data to a suitable format is significant. There has been some saving in data entry time although a complete direct electronic transfer is not possible.

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

As requested, a summary of the size distribution of the catch of the three key species is provided as an attachment. These graphs show the size distribution for yellowfin tuna, bigeye tuna and broadbill swordfish for each month of the 2002-2003 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 year for the east coast.

(Graphs 1 – 39 attached).