

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
FISHERIES BRANCH**

89/31

CENTRAL AGEING FACILITY

REPORT TO DPFGR 33

October 1992



MARINE SCIENCE LABORATORIES

CENTRAL AGEING FACILITY

REPORT TO DPFRG 33

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General

The Central Ageing Facility has now been in full operation for just over 15 months. The workload is split between three areas:

- 1 "Routine ageing" for the SET, GAB and Southern Shark Fisheries.
2. Specific ageing and training tasks for a number of institutions
3. Research projects

The "routine" or production ageing has been and will continue to be the major component of the facilities work. Details are given in the next section.

The Central Ageing Facility uses microscopes linked via video camera to computer monitors for routine age determinations. Image analysis software has been customised at the Central Ageing Facility to allow the rapid marking and recording of the position and type of growth increments. Images of the otoliths are displayed on the screen and growth increments and the edge are marked along a selected line using the screen cursor controlled by a mouse. This information is then recorded directly to disc together with specimen and reader identification details and any annotations made. Details of length, sex and area caught are entered into separate files and later combined with the ageing data to produce age-length keys and tabulations of mean length for each age class.

Age estimates are made as objective as possible in that otoliths were read "blind", i.e. without knowledge of the size or sex of the fish and without any scale markings on the image to indicate the size of the otolith.

At present, image analysis files are written in binary format. These are then converted to text (ascii) files prior to storage in a SAS database using the CAFs Sun Workstation. Considerable time has been spent this year refining the customised image analysis software and the interfaces between this and the databases used. The priority now is to automate the links between all software used.

Work to Date

Production Ageing

To date we have received almost 9000 samples for age determination and have undertaken about 14,000 readings (Table 1). The high number of readings for these samples is due to:

- for some species, eg blue grenadier all otoliths are read sectioned and whole.
- at least 25% of all samples are routinely read by a second reader for precision estimates.

- the difficulty factor for some species, eg gemfish, and the continuing need for calibration and training in interpretation.

SET

Samples received by species and location are shown in Table 2. Results for SET species are given in separate reports.

Southern Shark

1600 vertebrae have been received, prepared and read at least once. Close liaison with the Shark Research Program at MSL as well as validation studies (see below) ensure results are of a high quality.

GAB

843 deepwater flathead were re-read this year following our concerns at inconsistencies in the original dataset. These data together with results from previously read Bight redfish samples were analysed, and growth and mortality rates calculated. Results were presented at the GAB Stock Assessment Workshop (see report to DPFRG.).

Specific Ageing Tasks

These included:

- freshwater species, small samples of golden perch, trout cod and murray cod.
- preparation techniques, method evaluation and training for QLDDPI and NT fisheries scientists. Species included dusky flathead, stout whiting, barramundi and tropical trawl species.
- orange roughy, samples for FRI/CSIRO fecundity studies.
- southern bluefin tuna, evaluation of the "Thorogood method" for CSIRO.
- shark ageing, comparison of inter and intra-readability with the MSL Southern Shark Program and Melbourne University

The CAF expertise and image analysis software has also been used to support and assist a number of projects based at MSL:

- development of methods to age oreos and dories.
- blue-eye trevalla ageing
- warehou ageing

1992/93 Work Program

The proposed 1992/93 work program for the the three major fisheries was circulated earlier this year (Table 3). As we have had no comments to the contrary we assume that this program will be endorsed by DPFRG members.

In addition to the production ageing, we will also be undertake ageing of:

- barramundi, examination of a precocious stock. QLDPI
- snapper, comparison of techniques. FRI, NSW

- orange roughy, samples from east and south Tasmania (3,000 otoliths received). Partially funded by GITLC.
- orange roughy, samples for FRI/CSIRO fecundity studies.
- southern bluefin tuna, in conjunction with CSIRO Fisheries.
- continue ageing oreos and dorries, and blue-eye trevalla. FRDC funded projects at MSL

Other ageing tasks are also likely to be requested throughout the year.

1992/93 Operating Cost

We are now costing the facility using "work units". These are calculated for each species based upon the following:

- the type of preparation required (eg sectioning)
- species difficulty (eg gemfish are more difficult to age than school whiting)
- precision (all read once, 25% by a 2nd reader)

The cost per unit is based on the operating cost of the facility divided by the total number of work units. With a total budget of about \$222,000 and anticipated 31,500 work units processed, the cost per unit is \$7 (see Table 3 for costs per species).

Costs for the major fisheries are shown in Table 4. There is a shortfall of \$46,000 which we will make-up from other users. Overall costs to the SET, although more species will be covered, are less than in 1991/92. We understand that these estimates have been approved by AFMA.

Reports

Cottier, J, Morison A.K. and Coutin P. (1991). Preliminary report on the age and growth of gummy shark, *Mustelus antarcticus* Gunther, and school shark, *Galeorhinus galeus* (Linnaeus) from vertebrate collected in 1990/91.

Morison, A.K (1992). Age determinations for gemfish *Rexea solandri*, from samples submitted to the Central Ageing Facility: Nov 1991 - Aug 1992. Marine Science Laboratories Internal Report No 204

Morison, A.K. and Robertson, S.G. (1991). Preliminary report on age determination of gemfish sampled from the 1991 season. Report to DPFRRG 32.

Morison, A.K, Smith D.C and Robertson S.G. (1992). Age determinations for blue grenadier *Macruronus novaezalandiae*, from samples submitted to the Central Ageing Facility: June 1991 - July 1992. Marine Science Laboratories Internal Report No 202

Morison, A.K , Robertson, S.G. and Smith, D.C. (1992). Age determinations for jackass morwong *Nemadactylus macropterus*, tiger flathead *Neoplatycephalus richardsoni* and eastern school whiting *Sillago bassensis flindersi*, from samples submitted to the Central Ageing Facility: June 1991 - July 1992. Marine Science Laboratories Internal Report No 201

Smith, D.C., and A.K. Morison (1992). Fish ageing facility boosts knowledge of sustainable yields. Australian Fisheries February 1992 pp16-17.

Smith, D.C and Robertson, S.G. (1992). Age determinations for redfish, *Centroberyx affinis*, from samples submitted to the Central Ageing Facility: 1991/92. Marine Science Laboratories Internal Report No 203

Table 1. Number of samples submitted to and read by Central Ageing Facility by fishery - as at October 1992: includes repeat readings and readings of whole and sectioned specimens

| Fishery | Species | No. submitted | No. of readings |
|------------------|----------------------|----------------------|------------------------|
| Southern Shark | Gummy & School shark | 1750 | 2800 |
| South-east Trawl | Redfish | 799 | 2400 |
| | Gemfish | 1782 | 2600 |
| | Blue grenadier | 1049 | 2289 |
| | Jackass morwong | 721 | 821 |
| | Tiger flathead | 864 | 1068 |
| | School whiting | 704 | 806 |
| G.A.B. | Jackass morwong | 99 | 99 |
| | Deepwater flathead | 834 | 834 |

Table 2. Batches of otoliths of SET species submitted to the Central Ageing Facility for reading 1991-Aug 1992.

| Species | Batch no. | No. Specimens | Area | Date collected | |
|------------------------|----------------|---------------|-----------------------|----------------|----------|
| Jackass morwong | 001 | 100 | Portland | 24/9/91 | |
| | 002 | 100 | SE Tasmania | 18/11/91 | |
| | 003 | 153 | Eden | 7/11/91 | |
| | 004 | 68 | Eden | 12/3/92 | |
| | 005 | 93 | Eden | 20/3/92 | |
| | 006 | 63 | Beachport | 3/7/92 | |
| | 009 | 144 | Eden | 9/6/92 | |
| | Tiger flathead | 001 | 102 | Lakes Entrance | 2/10/91 |
| | | 002 | 230 | Eden | 13/11/91 |
| 003 | | 53 | Lakes Entrance | 1/4/92 | |
| 004 | | 102 | Lakes Entrance | 1/4/92 | |
| 005 | | 96 | SE Tasmania | 9/12/91 | |
| 006 | | 198 | Eden | 9-10/4/92 | |
| 007 | | 83 | Lakes Entrance | 30/6/92 | |
| 008 | | 100 | Lakes Entrance | 27/8/92 | |
| Eastern school whiting | 001 | 100 | Lakes Entrance | 1/10/91 | |
| | 002 | 302 | Lakes Entrance | 31/3/92 | |
| | 003 | 302 | Lakes Entrance | 3/7/92 | |
| Blue grenadier | 001 | 100 | W Tasmania | 17/7/91 | |
| | 002 | 100 | SE Tasmania | 26/11/91 | |
| | 003 | 103 | E Tasmania | 3/4/92 | |
| | 004 | 116 | Portland | 27/4/92 | |
| | 005 | 52 | Portland | 10/4/92 | |
| | 006 | 100 | Portland | 1/7/92 | |
| | 007 | 146 | Portland | 29/6/92 | |
| | 008 | 112 | W Tasmania | 14/6/92 | |
| | 009 | 120 | W Tasmania | 21/6/92 | |
| | 010 | 100 | W Tasmania | 29/6/92 | |
| Redfish | 001 | 348 | Sydney and Wollongong | 26 / 11 / 91 | |
| | 002 | 245 | Ulladulla | 1 / 4 / 92 | |
| | 003 | 206 | Ulladulla | 15 / 6 / 92 | |
| Gemfish | 001 | 763 | NSW (various ports) | 27/4-9/7/91 | |
| | 005 | 67 | Portland | 25/10/91 | |
| | 006 | 53 | Portland | 31/10/91 | |
| | 007 | 6 | SE Tasmania | 18/11/91 | |
| | 008 | 893 | NSW (various ports) | 3-16/7/92 | |

Table 3.

CAF - WORK PROGRAM 1992/93 COMMONWEALTH FISHERIES

| SPECIES | SAMPLE SIZE | *UNITS/ SAMPLE | TOTAL UNITS | TOTAL COST (\$) |
|---------------------------------|-------------|-------------------|-------------|-----------------|
| FISHERY - SET | | | | |
| GEMFISH | 1500 | 1.56 | 2340 | 16380 |
| BLUE GRENADIER | 2000 | 2.68 | 5360 | 37520 |
| MORWONG | 2000 | 1.56 | 3120 | 21840 |
| TIGER FLATHEAD | 1000 | 1.25 | 1250 | 8750 |
| REDFISH | 1000 | 2.00 | 2000 | 14000 |
| SCHOOL WHITING | 750 | 1.25 | 938 | 6563 |
| SPOTTED WAREHOU | 1000 | 1.25 | 1250 | 8750 |
| BLUE WAREHOU | 500 | 1.25 | 625 | 4375 |
| FISHERY - SOUTHERN SHARK | | | | |
| SCHOOL SHARK | 1000 | 2.06 | 2060 | 14420 |
| GUMMY SHARK | 1000 | 2.06 | 2060 | 14420 |
| BLUE WAREHOU | 500 | 1.25 | 625 | 4375 |
| FISHERY - GAB | | | | |
| DEEPWATER FLATHEAD | 750 | 1.25 | 938 | 6563 |
| BIGHT REDFISH | 1000 | 2.56 | 2560 | 17920 |

* NOTE: UNITS PER SAMPLE INCLUDE PREPARATION, SPECIES DIFFICULTY AND PRECISION (BASED ON 25% READ TWICE). TOTAL COST IS CALCULATED FROM A BASE RATE OF \$7.00 PER UNIT.

Table 4.**CENTRAL AGEING FACILITY****1992/93 Budget****Fishery Breakdown**

| | |
|--|----------------|
| A -1992/93 Total Running Costs | \$ |
| Total running costs | 221,920 |
| By fishery (see Table 3) | |
| South East Trawl Fishery | 118,178 |
| Southern Shark Fishery | 33,215 |
| Great Australian Bight Trawl Fishery | 24,483 |
| Total | 175,876 |
| Balance to be sought from other sources | 46,044 |
| | |
| B - 1992/93 Revised Costing per Fishery (adjusted for 1991/92 carry-over) | |
| 1991/92 unexpended carry-over | 38,000 |
| Revised costing by fishery | |
| South East Trawl Fishery | 90,178 |
| Southern Shark Fishery | 23,215 |
| Great Australian Bight Trawl Fishery | 24,483 |
| | |
| Total Requested | 137,876 |