

Fishing Industry Research Trust Account

Progress Report 1979/80

72/031 no

1. Title of Proposal:- Investigation of Mercury and Other Heavy Metal Contamination of Shark and Other Commercial Marine Fish.

2. Name of Applicant:- Fisheries and Wildlife Division, Ministry for Conservation, Victoria.

3. Division, Department or Section:- Commercial Fisheries Section

4. Proposal:-

To treat samples provided by the applicant for the determination of concentrations of mercury and other heavy metals in the edible flesh of commercial fish and to determine the effects of factors such as locality, sex and length on the concentrations.

5. Name of Person Responsible for the Programme:-

Mr. T.I. Walker (Acting Officer-in-Charge, Marine Fisheries).

6. Qualifications of Staff to be employed on the Programme:-

Not applicable.

7. Objectives:-

Part I: Establish the relationship of concentrations of mercury in the ova, embryos and juveniles of school and gummy sharks and in the whole stomach contents and intestinal contents of these species.

Part II: Establish the levels of concentrations of mercury in the diets of school shark and gummy shark.

Part III: Determine concentrations of mercury in commercial shark species other than school shark and gummy shark.

Part IV: Determine the degree of mercury contamination of the sediments and biota found on the shark grounds, with respect to area, within the continental shelf waters of south-eastern Australia.

Part V: Determine concentrations of other heavy metals in the edible flesh of school shark and gummy shark.

Part VI: Determine concentrations of other heavy metals in the edible flesh of commercial shark species other than school shark and gummy shark.

Part VII: Determine the degree of mercury contamination of the sediments and biota, with respect to area, within Port Phillip Bay.

Part VIII: Determine concentrations of mercury and other heavy metals in the major commercial fish species of Victoria.

8. Justification, including Practical Application:-

The primary justification of the programme was to accumulate information on the heavy metal, particularly mercury, contamination of the marine fish resources of south-eastern Australia in order that management policies be suitably modified if problems of public health become apparent.

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The availability for analysis of samples, as a by-product of the Shark Investigations, finances from F.I.R.T.A., and the Port Phillip Bay Environmental Study, provided an excellent opportunity to investigate this matter in depth at low cost.

9. Location of Operations:-

Originally, the programme was based at the Arthur Rylah Institute for Environmental Research, Heidelberg, Victoria, and the Division of Agricultural Chemistry, Parliament Place, Melbourne, Victoria.

Sampling was conducted in Port Phillip Bay and off-shore continental shelf waters of south-eastern Australia. Samples of the important Victorian commercial marine species were collected by personnel employed in the principal fishing ports of Victoria.

The programme is now based at the Commercial Fisheries Section's new head office at 232 Victoria Parade, East Melbourne, 3002. Current operations involve computer analysis of the data and reporting.

10. Proposal in Detail:-

Not applicable. See progress report for details of work that still needs to be done.

11. Commencement Date:- 1 January, 1973.

Completion Date:- F.I.R.T.A. funding ceased 31 December, 1976; however approval was granted to finance employment of a Chemist to complete chemical analyses until 30 June, 1977 from State resources. It is anticipated that most of the required computer data analyses and reporting will be completed by 30 June, 1981.

12. Funds Requested:- No funds are being requested.

13. Funds to be Provided by the Applicant or Sought from other Sources:-

The applicant is currently providing all facilities and meeting all costs to continue data processing and reporting.

14. Co-operating Agencies and their Functions:-

All work is conducted by the applicant.

15. Is Similar Work being Undertaken in Australia?:-

Similar data have been collected by most of the State and Commonwealth fisheries and health agencies of Australia.

16. Plans for Reporting or Publishing Results:-

Brief progress reports are given to the Victorian Ad hoc Heavy Metals in Fish Committee which comprises personnel of the Department of Health, Victoria and the Ministry for Conservation, Victoria.

Along with all other heavy metals data on marine fish held by the Division, the results of this study were made available to the Mercury in Fish Working Committee. The Committee partially analysed the data using standard statistical packages and a summary of the mercury results appear in the report prepared by that Committee.

As the data are analysed the results will be published in appropriate scientific journals.

17. Progress Report:-

Although a final report for this project is now due only a progress report is provided because the work is still incomplete. The field work, laboratory work, computer data entry and computer data validation are complete; however, analysis of the data and reporting are incomplete.

A computer system has been developed on the Victorian E.D.P. Burroughs 1600 computer to archive, retrieve, validate and partially analyse the data. Some stages of the analyses will be done using standard computer statistical packages. In addition a system which integrates the results of heavy metal analyses with fish morphometrics data and commercial catch sampling data is fully operational on the Fisheries and Wildlife Division's PDP11/03 computer.

It is intended that the data will be completely analysed within the ensuing 12 months and that considerable progress with preparation of the material for scientific publication will have been made.

Items specified in the Objectives which were not undertaken are firstly, determination of the mercury content of species comprising the diets of school and gummy sharks (Part II) and secondly, determination of the mercury content of sediments (sub-sections of Parts IV and VII). These were deleted from the programme because they represented large work loads in terms of collecting specimens in the case of the former, and developing appropriate chemical analytical techniques in the latter.

Progress since the 1976/77 Progress Report includes development of the computer systems mentioned above and completion of a number of chemical analyses relating to Parts I, IV and VIII. The results of these analyses are not discussed here because they do not alter the conclusions that were stated in the last progress report.

The results of Part V recently appeared in the scientific publication:

Glover, J.W. (1979) Concentrations of arsenic, selenium and other heavy metals in school shark Galeorhinus australis (Macleay) and gummy shark Mustelus antarcticus Gunther from south-eastern Australian waters.  
Aust. J. Mar. Freshwater Res. 30, 505-10.

Some of the results of Part VIII will appear in the following paper in preparation:-

Walker, T.I., Glover, G.W., and Powell, D.G.M.  
Mercury and cadmium content of scallops from Port Phillip Bay. (In preparation: will be submitted to Australian Journal of Marine and Freshwater Research early 1980.)