

**CRC for Freshwater Ecology
Scoping Study**

**TROPHIC ECOLOGY OF FRESHWATER FISHES IN
AUSTRALIA**

**PROGRESS REPORT
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Introduction

This report provides a brief outline of progress made to date on the CRCFE Scoping Study "Trophic Ecology of Freshwater Fishes in Australia". The objectives of the study were threefold:

1. To review available information on the diets of freshwater fishes throughout Australia (native and exotic species) and assess major sources of variation in fish diets associated with phylogenetic, ontogenetic, spatial and temporal factors.
2. To develop trophic classifications based on interspecific differences in diet, and evaluate in a quantitative manner sources of variation in fish assemblage trophic structure due to spatial and temporal factors.
3. To evaluate the potential for interaction between exotic and native fish species including identification of: (i) exotic species demonstrated to prey directly on native fish, and (ii) trophic groups and species with a high potential for competition for food resources with exotic species.

Progress to date

Compilation of data on the diets of freshwater fish in Australia is complete (except for three significant dietary data sets - see below). Analyses and interpretation are well underway to address the three major objectives of the study and it is anticipated that final report should be completed by the agreed date of April 31, 2001. It is premature to report on detailed results at this stage but an overview of the diet data quality, quantity and extent of regional and taxonomic coverage is given below.

Data quality & quantity

Dietary information was obtained from a variety of sources including published sources, unpublished reports and personal data sets. The latter were obtained largely as a result of a request for unpublished dietary data posted to the FISH-SCI and ASL email discussion lists, together with personal correspondence. This progress report does not include information from three significant dietary data sets only recently obtained by us or promised but not yet received. We recently obtained diet data for seven northern Australian species for which data was not previously available. This information was obtained from populations present in Papua New Guinea (Storey & Smith 1998). In addition, Stuart Bunn (CCISR) has agreed to provide unpublished diet data for seven species from Cooper Creek in the Lake Eyre drainage and Peter Davies (UWA) is providing unpublished diet data for the Pilbara region, WA. These additional data sets will be provided to us within the next two weeks and will substantially improve the regional and taxonomic coverage from that which is currently available and presented below.

To date, dietary data has been obtained from 91 separate studies. Dietary information can be summarised in a variety of forms (Fig. 1) and each method is subject to varying degrees of bias and inaccuracy in quantifying the relative importance of individual dietary items to the total diet. Volumetric data was the most common method of assessment and this, together with % dry weight and % wet weight were considered to be equally valid methods of assessing fish diets. In the present study, less quantitative abundance and frequency of incidence data were used only if no volumetric data existed for a particular species and/or region.

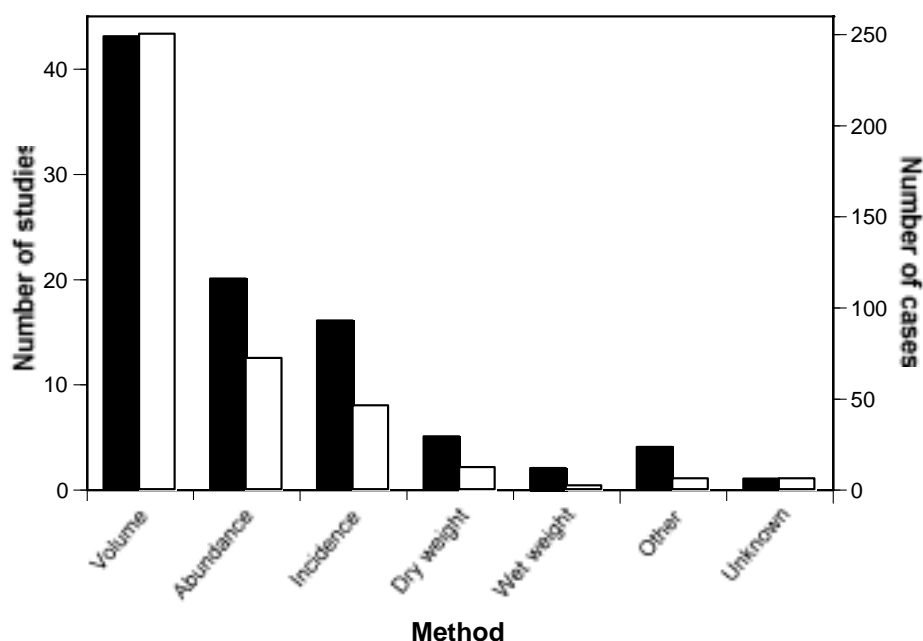


Figure 1. Methods used for estimating dietary composition. For each method, the number of studies (closed bars) and the number of cases (each species & region) (open bars) is shown. Note that numerous studies with anecdotal observations of fish diets were not included.

Regional & taxonomic coverage

We have obtained diet data for 46132 individual fish from the 91 dietary studies. The majority of diet data available was derived from studies in coastal Queensland, New South Wales and Victoria (Fig. 2). Relatively few dietary studies are available from the Pilbara region of Western Australia, Lake Eyre and internal drainages of central Australia, and the Gulf of Carpentaria. These regions are also extremely poorly represented in terms of species coverage (Fig. 3). The provision of data by Davies and Bunn for the Pilbara and central Australia, respectively, will help to alleviate these major data gaps.

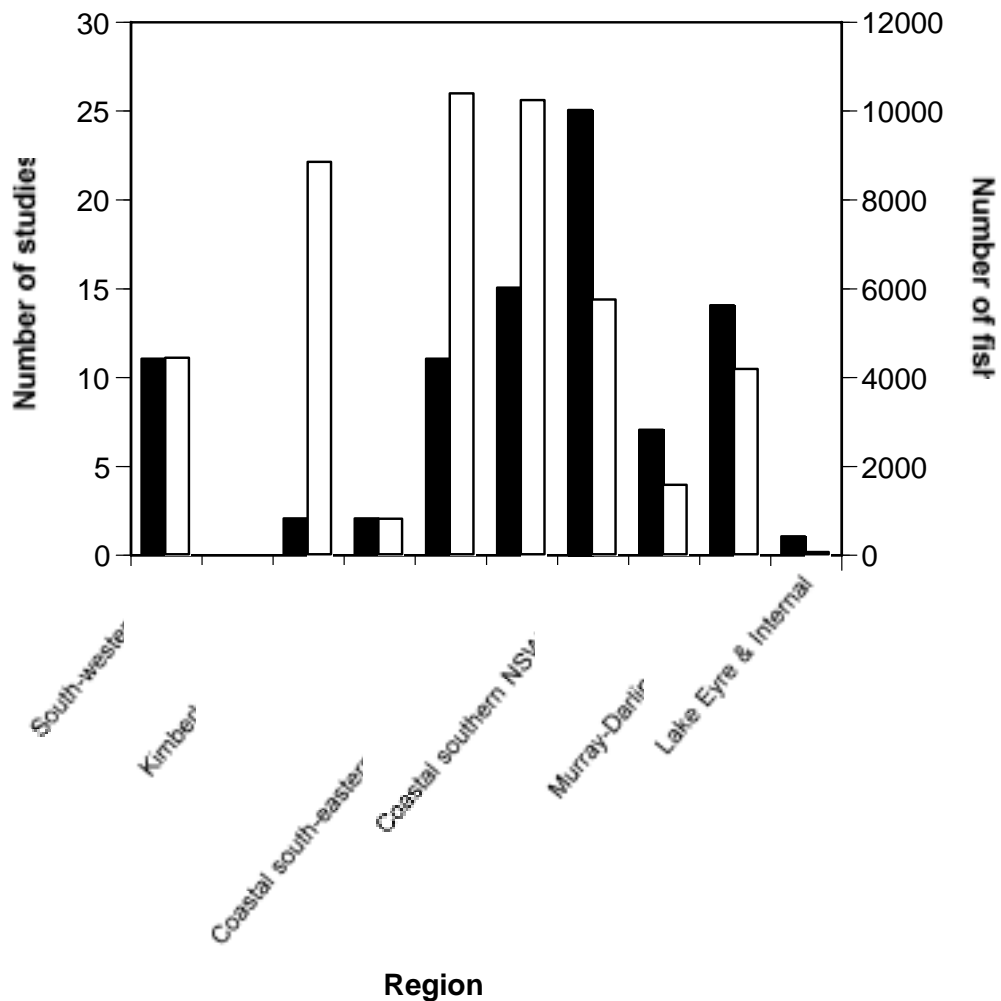


Figure 2. Number of dietary studies (closed bars) and the total number of individual fish (open bars) in each region for which dietary information was available.

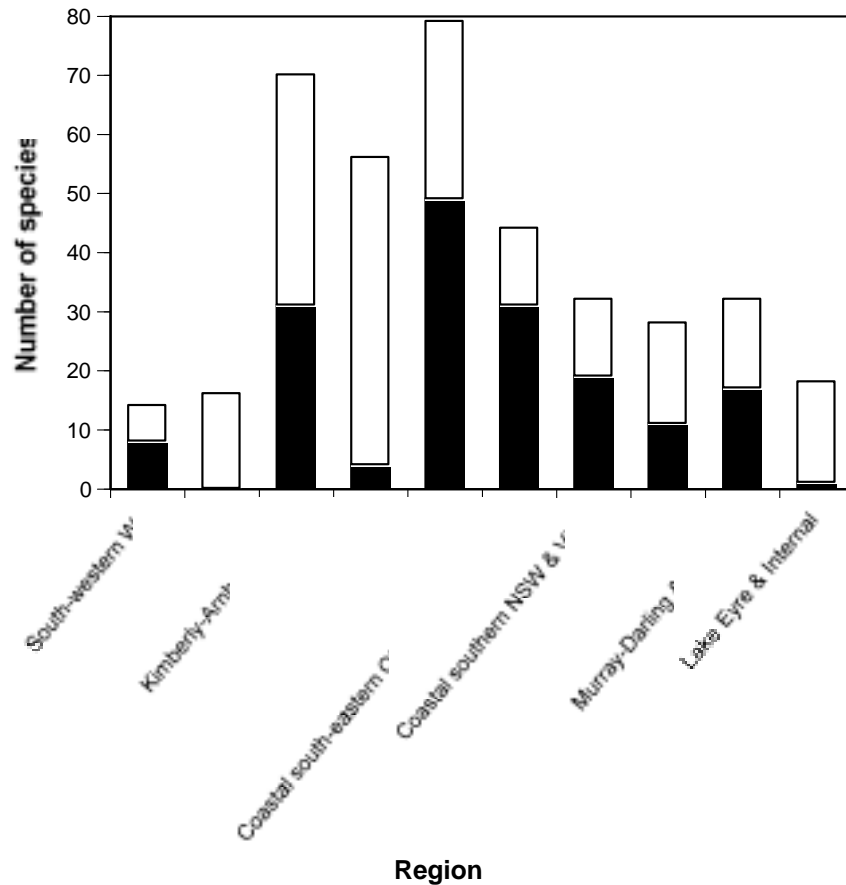


Figure 3. Number of fish species for which dietary information was available in each region (closed bars) and the total number of species known to be present in each region (closed bars plus open bars).

To date, diet data is available for 29 of the 36 native fish families present in Australian freshwaters (Fig. 4). Data is available for 111 native fish species, representing approximately two thirds of the total number of Australian freshwater fish species. We expect to obtain diet data for a further 10 - 15 native species from three additional families in the coming weeks. Diet data is also available for Australian populations of 13 exotic species from five families (Fig. 5). Data is not currently available for an additional seven exotic species and two families known to be present in Australia.

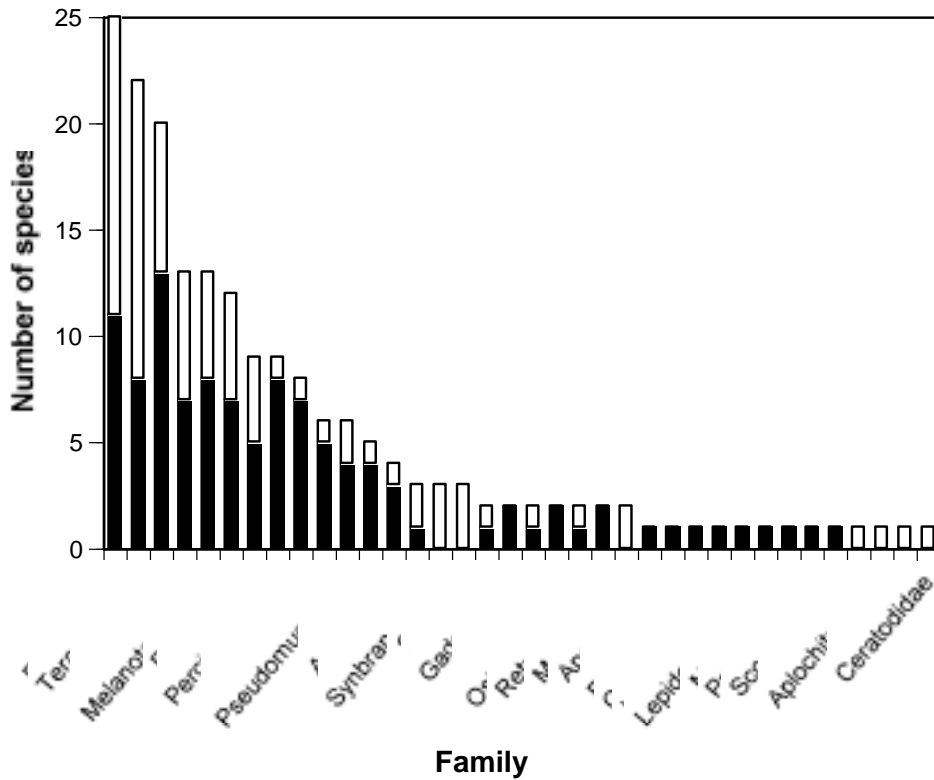


Figure 4. Number of native fish species for which dietary information was available in each family (closed bars) and the total number of species from each family known to be present in Australia (closed bars plus open bars).

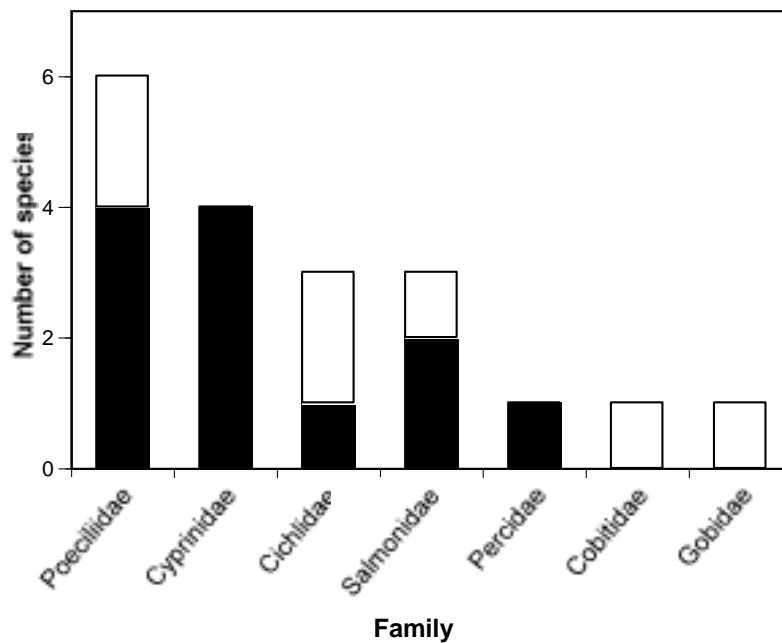


Figure 5. Number of exotic fish species for which dietary information was available in each family (closed bars) and the total number of species from each family known to be present in Australia (closed bars plus open bars).