GOVERNMENT OF WESTERN AUSTRALIA

WESTERN AUSTRALIAN museum

SUBMISSION NO. 3
Inquiry into the Role of Science for Fisheries and Aquaculture

27 April 2012

House of Representatives Standing Committee
on Agriculture, Resources, Fisheries and Forestry
PO Box 6021
Parliament House
Canberra ACT 2600

Dear Committee

Re: THE ROLE OF SCIENCE FOR FISHERIES AND AQUACULTURE

One of the fundamental assumptions of ecological, biodiversity and fisheries research is that the species under study are correctly identified. This is the realm of fish taxonomists and systematists. In Australia, fish taxonomy is largely associated with state museums, although some other agencies (CSIRO and some universities) are also major contributors. The knowledge within these institutions is based on many years of experience and on extensive reference collections.

Unfortunately, this resource is often not utilised in other fish research pursuits, yet the quality of the science is only as good as the identification of the species. The importance of accurate identifications cannot be overlooked and there are many examples of how inaccurate identifications can limit other research (for example, see Bickford *et al.* 2007).

One of the great catch-cry phrases of modern conservation biology is biodiversity. Taxonomy is the science that determines what constitutes a species, and therefore how many species there are, i.e. *bio*logical *diversity*. The accuracy of estimates of biodiversity are only as strong as our taxonomic understanding, which also has other effects e.g. in conservation and ecological studies. For example, one 'species' of fish may, in fact, be a complex of several species, each with its own suite of specialised ecological attributes. Each of these species might require different management practices or habitat protection, which would be overlooked without accurate taxonomy (e.g. Geller 1999). In addition, timely recognition of invasive species requires knowledge of not only local fauna, but species in a global context (e.g. Clavero and García-Berthou 2005). Similarly, accurate identification of pathogens and parasites of aquaculture stocks is only possible by detailed taxonomic research in groups such as Crustacea. However, many unfortunate errors are made by ecologists, fish biologists, fisheries managers and others due to misidentification of species. In the interest of sound science, non-taxonomic researchers should be encouraged, and in many instances required, to routinely engage and collaborate with taxonomists and systematists. Most taxonomists also have skills in ecology, evolutionary biology, genetics, fish biology and more.

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Put simply, good taxonomy = good science. Taxonomists are the experts in fish identification, yet the number of staff employed in this field is in decline. Equally alarming is the fact that funding for taxonomy research is critically low, despite it being fundamental to much of the rest of the biological sciences. A synopsis of the role of museum collections and the current state-of-affairs was provided by Hoese (2011 online) and references therein. These issues must be addressed urgently.

Bickford, D., D.J. Lohman, N.S. Sodhi, P.K. Ng, R. Meier, K. Winker, K. Ingram, and I. Das. (2007). Cryptic species as a window on diversity and conservation. *Trends Ecol. Evol.* **22**: 148-155.

Clavero, M. and García-Berthou, E. (2005) Invasive species are a leading cause of animal extinctions. *Trends Ecol. Evol.* **20**, 110.

Geller, J.B. (1999) Decline of a native mussel masked by sibling species invasion. *Conserv. Biol.* **13**, 661–664.

Hoese, D.F. (2011) Museums and the environment. In: Understanding museums. Australian museums and museology. Australian National Museum, Canberra. http://www.nma.gov.au/research/understanding-museums /DHoese_2011.html#_edn1.

If you have any query, please do not hesitate to contact Diana Jones, Executive Director – Collections and Research on

Yours sincerely

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