Student research grants for threatened and rare fish and marine vegetation in NSW

Information for applicants

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Contents

Background

The Fisheries Scientific Committee (FSC) is established under Part 7A of the *Fisheries Management Act 1994* (the Act), as an independent scientific body. One of the main functions of the FSC is to assess nominations for listing (or de-listing) threatened species, threatened populations and endangered ecological communities of fish and marine vegetation. The FSC also assesses the listing of key threatening processes (KTPs). At times, this task is made difficult by the absence of important scientific data on species distribution, abundance, habitat and ecology. This information is also important for the preparation of the Priority Action Statement and Recovery Plans by the NSW Department of Primary Industries.

The FSC will award research funding totalling $3,000 aimed at filling gaps in research information for threatened (or potentially threatened), protected and rare species of fish and marine vegetation in NSW. Grants are intended for use by undergraduate third-year major project students, or as part of an Honours, Masters or PhD project.

Applicants may wish to propose a project based on:

1) a species identified in this guide as having a specific research gap in NSW;
2) a species listed as either threatened or protected in NSW; or
3) a species that has not been mentioned but that the applicant thinks may be under threat in NSW and adequate information is not available.

Grant applications addressing points 1 and 2 above will be considered as the highest priority by the FSC. Applications falling into point 3 however, are also encouraged, but should be accompanied by evidence of threat to the species. Grants will not be issued for work on common or alien species or to students applying from institutions outside Australia.

APPLICATIONS CLOSE 12th February 2016
Please note: Late applications will not be accepted.

Research priorities

The following species are identified as having significant research gaps relating to their distribution, abundance, habitat or ecology. Grant applications addressing research gaps for these species will be given the highest priority.

- The Marine Brown Algae – *Nereia lophocladia*
- Macquarie Perch – *Macquaria australasica*
- Olive Perchlet – *Ambassis agassizii*
- Murray Hardyhead – *Craterocephalus fluviatilis*
- Flathead Galaxias - *Galaxias rostratus*
- The Seagrass – *Posidonia australis*
- Alpine Redspot Dragonfly - *Austropetalia tonyana*
- Oxleyan Pygmy Perch – *Nannoperca oxleyana*
- Soft coral – *Dendronephthya australis*
- Marine Slug - *Smeagol hilaris*
- Fitzroy Falls Spiny Crayfish - *Euastacus dharawalus*
- Australian Grayling - *Prototroctes maraena*
- Stocky Galaxias – *Galaxias tantangara*
- Aquatic fauna of Great Artesian Basin springs
- Shark species

The Marine Brown Alga

Scientific name: *Nereia lophocladia*

Family or group: Sporochnaceae

Status: Critically endangered

Research Gap:

The Marine Brown Alga *Nereria lophocladia* was first recorded from Port Phillip Head in Victoria in the late 1800's and despite concerted effort, the species has not been found there since. In 1980 *Nereia lophocladia* was discovered at Muttonbird Island, Coffs Harbour in New South Wales and in 2005 listed as a vulnerable species by the FSC. The FSC reviewed information on the threats and likelihood of extinction for this species in 2008 and subsequently listed *Nereia lophocladia* as critically endangered.

An appropriate research proposal for this species would be to conduct a systematic search for the species in and around Coffs Harbour.

Macquarie Perch

Scientific name: *Macquaria australasica*

Family or group: Percichthyidae

Status: Endangered

Research Gap:

Macquarie Perch populations continue to decline in catchments in the Murray-Darling Basin and remain in a threatened state to various degrees in coastal catchments. The causes of the decline of Macquarie Perch are likely to include sedimentation, water extraction, overfishing, Epizootic haematopoietic necrosis disease, spawning failures due to cold water pollution, barriers to migration, habitat degradation and competition with and predation by introduced fish species.

Important research needed on the species includes:

- Identifying factors associated with recruitment failure (or success) within a Macquarie Perch population.
- Behavioural and trophic (predation) interactions with introduced salmonids.

Olive Perchlet

Scientific name: *Ambassis agassizii*

Family or group: Ambassidae

Status: Endangered western NSW population

Research gap:

Little is known about the biology and ecology of Olive Perchlet in the Murray-Darling Basin. The FSC has a particular interest in understanding the factors that led to population declines and that may be inhibiting population recovery, as well as general life history, habitat requirements, fecundity, reproductive biology and movements. The FSC continues to monitor the status of the endangered population and requires up to date information on the current distribution and abundance for the species.

Murray Hardyhead

Scientific name: *Craterocephalus fluviatilis*

Family or group: Atherinidae

Status: Critically endangered

Research Gap:

Recent research on remnant populations in Victoria and South Australia suggest that Murray Hardyhead have specific habitat requirements and are largely specialists residing in saline floodplain wetlands of the Murray-Darling Basin. These habitat types have been largely un-surveyed by past and current fish community sampling within the Murray-Darling Basin. The FSC considers it a high priority to undertake targeted surveys of these habitats using standardised sampling procedures in order to more effectively assess the status of Murray Hardyhead in NSW (as well as other taxa co-existing with them in these specific ecosystems).

Flathead Galaxias

Scientific name: *Galaxias rostratus*

Family or group: Galaxiidae

Status: Critically endangered

Research Gap:

Little is known about the biology and ecology of Flathead Galaxias. This species has declined dramatically across all of its former range. The FSC has a particular interest in understanding the factors that led to declines and that may be inhibiting population recovery, as well as general life history, habitat requirements, fecundity, reproductive biology and movements. The FSC continues to monitor the status of the species and requires up to date information on the current distribution and abundance for the species. Recent reports of the species in NSW have all been from floodplain wetland habitats. Wetland habitats have generally been poorly surveyed by past and current fish community sampling within the Murray-Darling Basin. The FSC considers it a high priority to undertake targeted surveys of these habitats using standardised sampling procedures in order to more effectively assess the status of Flathead Galaxias in NSW.

The Seagrass

Scientific name: *Posidonia australis*

Family or group: Posidoniaceae

Status: Endangered populations – Botany Bay, Port Hacking, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie.

Research gap:

Little is known about the life history of the seagrass *Posidonia australis*, populations of which are found in about 30 locations (estuaries) along the NSW coast. Large losses in distribution of *P. australis* have occurred in Botany Bay, Port Hacking, Sydney Harbour, Pittwater, Brisbane Water and Lake Macquarie. The spread of this seagrass appears to be a vegetative process operating over long time scales, and whether meadows in a particular estuary represent genetically distinct populations is not known. Suitable projects might include resolving the genetic diversity of *P. australis* along the NSW coast, and the development of restoration methods for blowout holes in *P. australis* meadows caused by boat swing moorings

Alpine Redspot Dragonfly

Scientific name: *Austropetalia tonyana*

Family or group: Austropetaliidae

Status: Vulnerable

Research gap:

The Alpine Redspot Dragonfly is one of only three species in the genus *Austropetalia* which are all endemic to Australia. It is a rare species, thought to be restricted to extremely specific habitat areas in the higher altitudinal areas of south-eastern Australia. Due to its specialised habitat requirements and restricted geographic distribution, very little is known about the Alpine Redspot Dragonfly. Anthropogenic threats continue to degrade suitable habitat for the species, raising concerns for its future conservation status. The FSC considers it a high priority to undertake targeted surveys of this species to determine its distribution and abundance.

Oxleyan Pygmy Perch

Scientific name: *Nannoperca australis*

Family or group: Percichthyidae

Status: Endangered

Research gap:

Oxleyan pygmy perch have specialised habitat requirements and are confined to wallum heath upon the coastal plain on northern NSW. Surveys by NSW DPI in 2012 suggested that the population has declined in prevalence and abundance. The FSC considers it a high priority to undertake targeted surveys of the species to quantify changes in its distribution and abundance.

Soft Coral

Scientific name: *Dendronephthya australis*

Family or group: Nephtheidae

Status: Nil - potentially threatened

Research gap:

This species of soft coral is endemic to NSW and is only known to occur in Port Stephens and Sydney Harbour. The Port Stephens population has declined significantly in recent years as a result of smothering by sand. The FSC considers it a high priority to determine the distribution of the species in Sydney Harbour and in any other locations in NSW.

Marine Slug

Scientific name: *Smeagol hilaris*

Family or group: Smeagolidae

Status: Critically endangered

Research gap:

This species of marine mollusc is only known from a single location on the south coast of NSW. Even within that location, its habitat is limited. *Smeagol* sp. are restricted to the upper littoral zone of gravel or cobble beaches. The FSC considers it a high priority to identify potentially viable habitats for *Smeagol* and if possible to survey these habitats for the species.

Fitzroy Falls Spiny Crayfish

Scientific name: *Euastacus dharawalus*

Family or group: Parastacidae

Status: Critically endangered

Research gap:

The Fitzroy Falls Spiny Crayfish is endemic to NSW and is only known to occur in Wildes Meadow Creek, a sub-catchment of the Shoalhaven River. The inland yabby (*Cherax destructor*) has invaded this waterway and is believed to impact upon the spiny crayfish. The FSC considers it a high priority to experimentally characterise the nature of interactions between these two species, collect data on the basic biological attributes of the Fitzroy Falls Spiny Crayfish (e.g. population size, age at first breeding, longevity, movement) and determine the feasibility of potential captive breeding-reintroduction or translocation programs to mitigate the risk of extinction.

Australian Grayling

Scientific name: *Prototroctes maraena*

Family or group: Retropinnidae

Status: Endangered

Research gap:

Populations of Australian Grayling in NSW have declined substantially, with a substantial southward range contraction and a decline in prevalence at sites occupied as recently as the mid 1990s. The species is obligately diadromous, with adults occupying freshwater habitats, spawning occurring in the lower freshwater reaches of rivers and then larvae occupying marine habitats for 5 - 6 months before migrating back into freshwaters where they remain for the remainder of their lives. Almost nothing is known about their biology during the marine phase of the life cycle. It is suspected that much of the decline in grayling populations is a result of climate induced changes in temperature, river discharge (particularly in autumn-winter) and oceanography. However, it is also likely that climate change and fishery induced changes in marine food webs are impacting on the species during its marine larval phase. Any research that investigates any aspect of the marine phase of the life cycle and/or quantifies the scale of threatening processes is of value. Information on the susceptibility of the species to common fish pathogens may also be informative.

Stocky Galaxias

Scientific name: *Galaxias tantangara*

Family or group: Galaxiidae

Status: Draft Determination to list as critically endangered

Research Gap:

Almost nothing is known about the biology and ecology of Stocky Galaxias. A recently described species, it is only known from a single population in a sub-catchment above Tantangara Reservoir in southern NSW, where the major threat is invasion by trout. The sub-catchment has not been thoroughly surveyed, and information is required on whether additional populations of Stocky Galaxias or trout-free waters for reintroduction are present. The FSC is also interested in general life history, habitat requirements, fecundity, reproductive biology and movements of this species.

Aquatic fauna of Great Artesian Basin springs

The NSW Threatened Species Committee is assessing the conservation status of ecological communities associated with Great Artesian Basin springs based largely on terrestrial botanic components of these discrete and uncommon habitats. The Fisheries Scientific Committee seeks data on the aquatic faunal communities associated with these springs.

Shark species

Information is lacking for many species of sharks in NSW. The FSC has a focus on studies relating to the Smooth Hammerhead, Dusky Whaler, Bull, Sandbar, Longfin Mako and Shortfin Mako sharks. The FSC considers it a priority to undertake targeted surveys of these species or other potentially threatened shark species.

Other research gaps

Research on physical processes affecting threatened species

There are several processes that affect, or have the potential to affect, the abundances and recovery of threatened aquatic species and populations. The most recent high-profile example is climate change and associated changes in water temperatures, distributions of species, sea-levels, etc. Other processes include environmental flows in rivers, impacts of pollution from land run-off and point-sources. The FSC is interested in supporting projects that address such processes and how they influence threatened and endangered aquatic species and populations.

Table 1: The current list of threatened species, populations and ecological communities in NSW

Critically endangered species	
Carcharias taurus (Rafinesrue, 1810)	Greynurse Shark
Craterocephalus fluviatilis (McCulloch, 1913)	Murray Hardyhead
Euastacus dharawalus (Morgan, 1997)	Fitzroy Falls Spiny Crayfish
Nereia lophocladia (Agardh, 1897)	Marine Brown Alga
Galaxias rostratus (Klunzinger, 1872)	Flathead Galaxias
Smeagol hilaris (Tillier & Ponder, 1992)	Marine Slug
Endangered species	
Archaeophya adamsi (Fraser, 1959)	Adams Emerald Dragonfly
Austrocordulia leonardi (Theischinger, 1973)	Sydney Hawk Dragonfly
Maccullochella ikei (Rowland, 1986)	Eastern Freshwater Cod
Maccullochella macquariensis (Cuvier, 1829)	Trout Cod
Macquaria australasica (Cuvier, 1830)	Macquarie Perch
Mogurnda adspersa (Castelnau, 1878)	Purple-Spotted Gudgeon
Nannoperca australis (Gunther, 1861)	Southern Pygmy Perch
Nannoperca oxleyana (Whitley)	Oxleyan Pygmy Perch
Notopala sublineata (Conrad, 1850)	River Snail
Prototroctes maraena (Gunther, 1864)	Australian Grayling
Sphyrna lewini (Griffith & Smith, 1834)	Scalloped Hammerhead Shark
Vulnerable species	
Bidyanus bidyanus (Mitchell, 1838)	Silver Perch
Branchinella buchananensis (Geddes, 1981)	Buchanan's Fairy Shrimp
Carcharodon carcharias (Linnaeus, 1758)	White Shark
Epinephelus daemelii (Günther, 1876)	Black Rockcod
Euastacus armatus (von Martens 1866)	Murray Crayfish
Microchestia bousfieldi (Lowry & Peart, 2010)	Bousfields Marsh-Hopper
Sphyrna mokarran (Ruppell, 1837)	Great Hammerhead Shark
Endangered populations	
Murray-Darling Basin population of *Tandanus tandanus* (Mitchell, 1838)	Eel-Tailed Catfish
Population of *Posidonia australis* (Hook.*f*.,1858) seagrass in Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie	Strapweed
Snowy River population of *Gadopsis marmoratus*	River Blackfish
Western NSW population of *Ambassis agassizii* (Steindachner, 1866)	Olive Perchlet

Darling River hardyhead population in the Hunter River catchment (Crowley & Invanstoff 1990)	Darling River Hardyhead
Endangered ecological communities	
Aquatic ecological community of the natural drainage system of the lower Murray River catchment	
Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River	
Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River	
Aquatic ecological community in the catchment of the Snowy River in NSW	

Protected species

Some species are protected as they are naturally rare or have become rare from over-fishing or environmental pressures. For this reason there is often insufficient information on the habitat requirements, environmental tolerances, population dynamics and other aspects of the life history and ecology of rare species. In particular the FSC is interested in the distribution and abundance of rare species, to assess species conservation status.

The current list of fish protected under section 19 of the *Fisheries Management Act 1994* is as follows. In addition, all marine vegetation is protected in NSW.

Table 2: Current list of protected fish in NSW

Protected species	
Anampses elegans	Elegant Wrasse
Chaetodontoplus ballinae	Ballina Angelfish
Crenoicus harrisoni	Isopod
Epinephelus coioides	Goldspotted Rockcod, Estuary Cod
Epinephelus lanceolatus	Queensland Groper, Giant Queensland Groper
Girella cyanea	Blue Drummer, Bluefish
Odontaspis ferox	Sandtiger Shark, Herbsts Nurse Shark
Paraplesiops bleekeri	Eastern Blue Devil, Bleekers Devil Fish
All species of the family *Solenostomidae*	Ghostpipefish
All species of the family *Syngnathidae*	Pipefish, Pipehorse. Seadragon, Seahorse
All species of the family *Pegasidae*	Seamoth

STUDENT RESEARCH GRANTS FOR THREATENED AND RARE FISH AND MARINE VEGETATION IN NSW

APPLICATION FORM 2015/16

Project Details

Project title

Short description of the project (300 words maximum)

Objectives

Methods (500 words maximum)

Proposed timeline and milestones

Expected report date

Has ethics approval been granted for this project? If not, please explain

Expenditure breakdown
E.g. 1. Travel to field sites (3 trips x $200) = $600

What information will your study provide about NSW threatened or rare species? (200 words maximum)

Research project/studies e.g. Honours, Masters, PhD (200 words maximum)
If the research project is part of another research project/study, please outline this context.

Additional information/references

Program details
Program title:
University name and address:
Program stage (e.g. 3rd year):

Applicant details
Name:
Address:
Telephone number:
Email:
Signature:

Academic supervisor's name and contact details (essential)
Name:
Telephone number:
Email:
Signature:

Referees (please provide at least one)
1) Name and contact details:
2) Name and contact details:

Applications are to be submitted by <u>Friday 12th February 2016.</u>

Please send completed applications to:

Executive Officer
Fisheries Scientific Committee
c\- NSW Department of Primary Industries
PO Box 1305
CROWS NEST NSW 1585

Or Email: fsc@dpi.nsw.gov.au

Fisheries Scientific Committee Student Research Grant Terms and Conditions

1) The following terms and conditions apply to funding provided by the Fisheries Scientific Committee (FSC) for the purposes of funding student research projects. Additional terms and conditions may be made at the time the grant/s is awarded to the successful applicant/s, but not without prior writing.

2) The FSC retains the right to decide priorities for research and to award grants accordingly.

3) The FSC retains the right to partially fund projects for certain components of a project.

4) To be eligible for a research grant, applicants must be currently enrolled at a recognised Australian tertiary institution.

5) Grants will not be made to individuals but to the University for administration by the appropriate supervisor.

6) It is the FSC's intention that all funds granted will be for research purposes only and no overheads shall be taken out by the University.

7) Successful applicants must provide due recognition to the FSC for their financial involvement in the project, including (but not limited to) acknowledgement in any publication, seminar or talk that results from the FSC-funded research.

8) Successful applicants must supply the FSC with a copy of their final report within one month of the completion of the grant including details of all financial expenditure from the grant.

9) Failure to complete objectives set out for the grant may render the grant void and all funds awarded to be returned to the FSC.

10) The FSC must be notified in writing prior to any modifications made to the project or time frame and may agree to renew the term of the funding agreement.

11) All unused funds are to be returned to the FSC at the completion of the project.