



Sustainable Fisheries and Ecosystem Management in the Gulf of Carpentaria

CSIRO have been supporting sustainable fisheries and ecosystem management in the Gulf of Carpentaria since the 1960s. In addition to exploring the biology and sustainability assessment of commercial prawn species, our researchers are also contributing to understanding impacts of water extraction and climate change on coastal fisheries, habitats and endangered species. In November 2024, Rob Kenyon obtained support from the Laynhapuy Homelands Aboriginal Corporation and the Anindilyakwa Land Council to conduct a seagrass habitat and juvenile prawn survey in the western Gulf of Carpentaria to further support ongoing research in this region.

A new FRDC project (co-funded by CSIRO and AFMA) [2023-062](#) is titled: **Methods to account for climate impacts in fisheries models and management: Case study example of environmental contributors that affect Tiger Prawn population dynamics**. The project team are working to understand how environmental variability and climate change influences tiger prawns and other tropical species, and to suggest ways in which climate impacts on the stocks and dependent industries and communities can be managed.

We have commenced connecting with Traditional Owners from Groote Eylandt and Blue Mud Bay to advance data collection and understanding of the vital roles of coastal seagrass habitat. Our team are busy comparing 2024 seagrasses and resident prawns with 1980s data from the same habitats to gauge ecosystem resilience. Results of the FRDC-CSIRO-AFMA funded project will be communicated back to Homeland communities once available. The project will also provide guidance to other Australian fisheries around preparing for and adapting to climate change

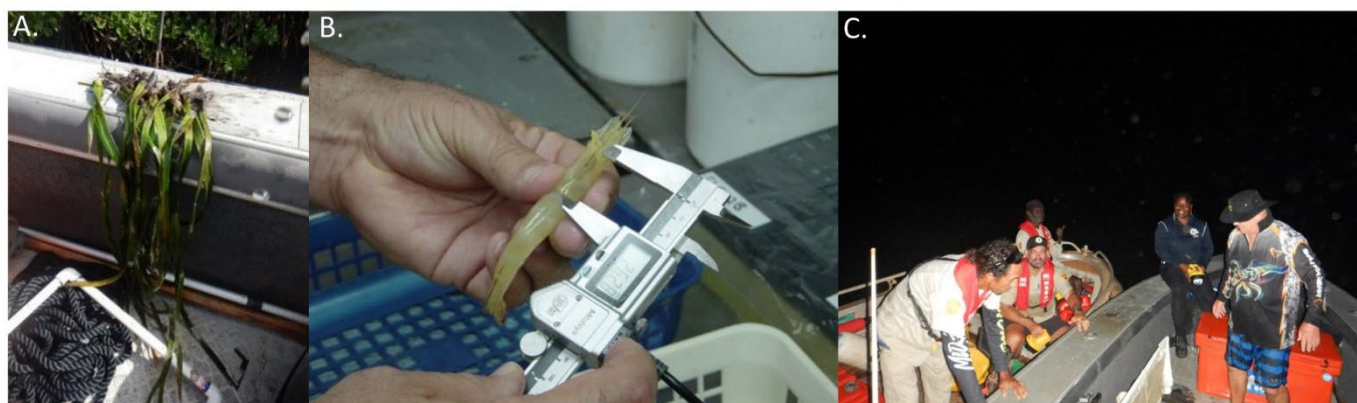


Image: Samples collected from recent surveys included (A) seagrass and (B) prawns. (C) Surveys were carried out between CSIRO and Yirrkala rangers in the western Gulf of Carpentaria.

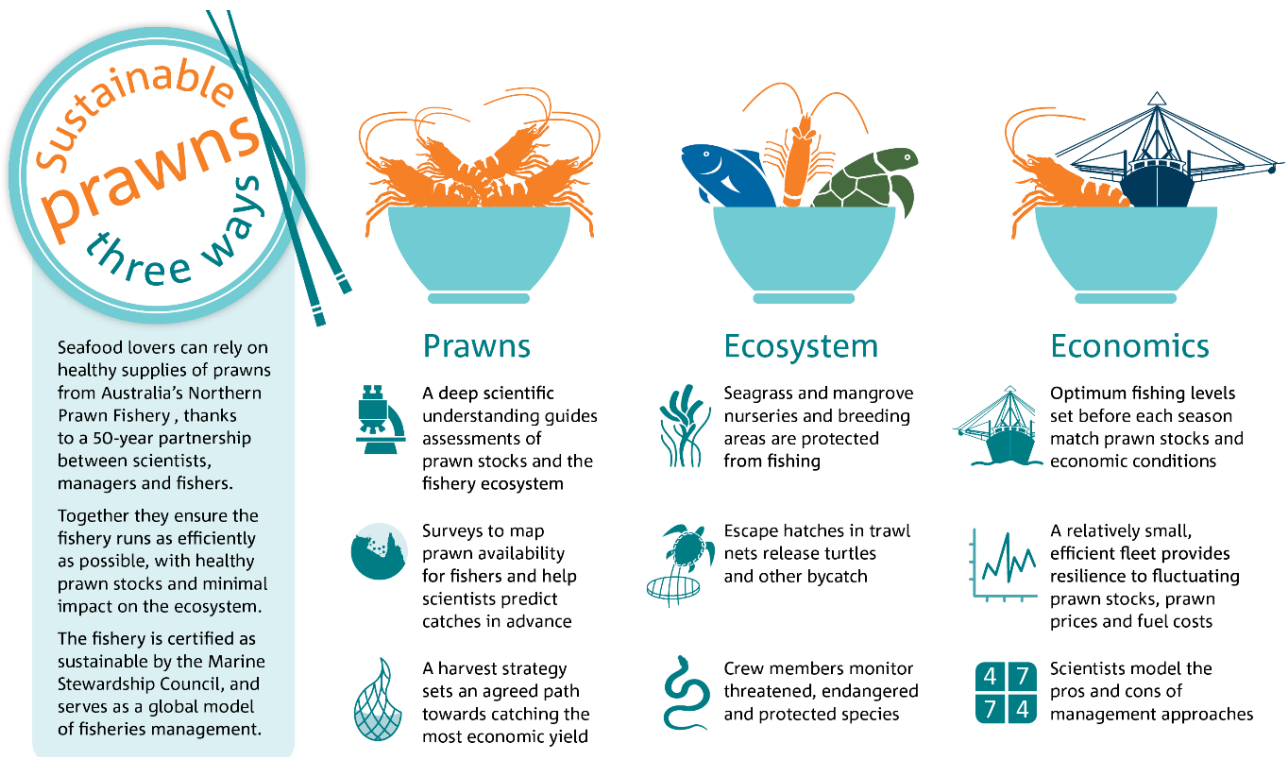


Image: CSIRO and partners contribute to the sustainability of fisheries and ecosystems in the Gulf of Carpentaria.

Our approach

Through a longstanding research partnership between industry, CSIRO and fishery managers since the 1960s, the Northern Prawn Fishery (NPF) has evolved into a globally recognised example of economically efficient and environmentally sustainable fisheries management. Insights from managing the NPF offer valuable lessons applicable to fisheries, and broader resource management, both in Australia and internationally. Our approach integrates various management tools and procedures, developed in collaboration between the Australian Fisheries Management Authority, CSIRO and NPF Industry Pty Ltd to guide informed decision-making. These include:

- A co-management agreement between AFMA and NPF Industry Pty Ltd.
- A formal harvest strategy outlining the biological and economic objectives of the NPF and the management required to achieve these, including fishing regulations, monitoring requirements and assessment methods.
- A bio-economic model to determine optimal fishing effort levels that maintain healthy prawn stocks and maximise economic returns.
- A management strategy evaluation framework for comparing potential harvest strategies.
- Independent surveys to assess the relative abundance and size composition of prawn stocks.
- Ecological risk assessments supporting environmental accreditation.
- Crew member observer programs collecting data on threatened, endangered and protected species.
- Permanent and seasonal fishing closures, located and timed to protect pre-spawning and juvenile prawns.

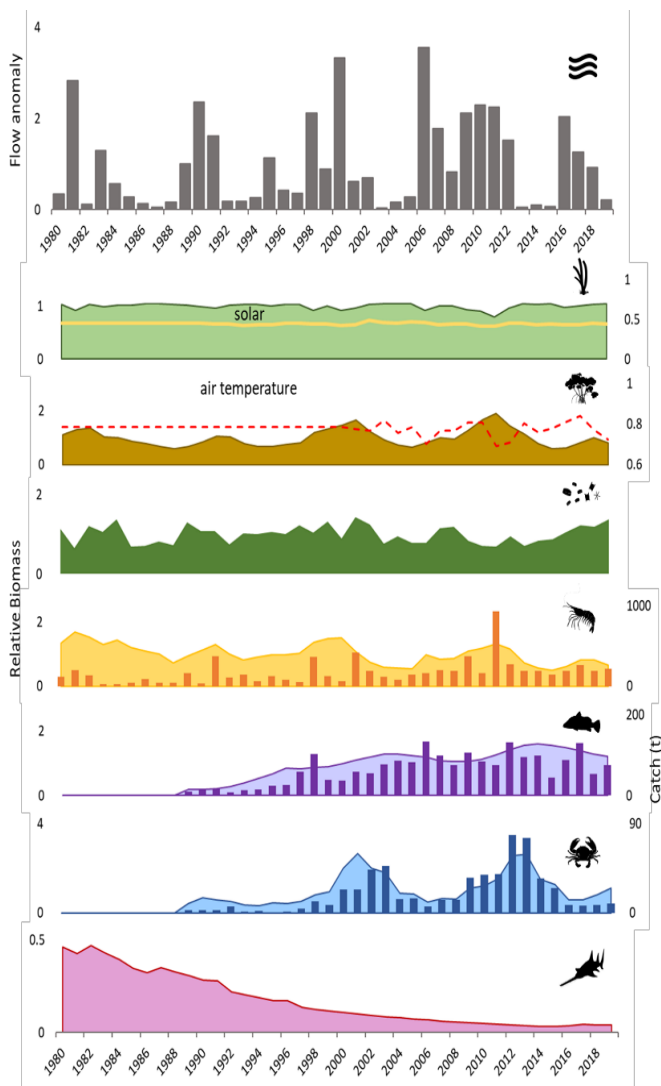


Fig. 3: Example of MICE physical drivers and changes in the relative biomass and catch (t) of the model groups under baseline flow for Region 4 (Norman River) to illustrate interannual variability over 1980 to 2019.

Image: Fig. 3 source: Plagányi et al. (2023) [Nature Sustainability](#).

See also

<https://www.frdc.com.au/new-decision-making-tool-helps-fisheries-managers-navigate-sweet-spot>

<https://theconversation.com/an-el-nino-hit-this-banana-prawn-fishery-hard-heres-what-we-can-learn-from-their-experience-139852>

Coming soon

The new FRDC climate change project will also be featured briefly as part of the next Northern Australia Climate Briefing (on 3 April 12-1pm AEST) – see <https://www.frdc.com.au/climate-change> for past and upcoming briefings.

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Assessing impacts of river modification

Working with colleagues from the NPF Industry Pty Ltd (NPF), Griffith University and Queensland Department of Agriculture and Fisheries, CSIRO completed an FRDC study in 2022 to quantify the impacts and risks to the Gulf of Carpentaria (GoC) ecosystem of water resource developments (anthropogenic alteration of freshwater discharge), applied in particular to the Mitchell, the Flinders and the Gilbert River catchments of northern Australia. Key model species include common banana prawns, barramundi, mud crabs, largemouth sawfish as well as key habitats such as mangroves and seagrass.

First, we analysed the influence of past natural variability in flows (see image on left) and then we quantified impacts of human alterations on various species. We found substantial impacts on marine ecosystems and fisheries and tested ways to mitigate some of the impacts. [Link to summary article below.](#)

<https://theconversation.com/taming-wild-northern-rivers-could-harm-marine-fisheries-and-threaten-endangered-sawfish-212690>

For further information

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