



Norman River and floodplain in the Gulf of Carpentaria, photo Michele Burford.



Northern Australia  
Environmental  
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Hub

National Environmental Science Programme

# Links between Gulf rivers and coastal productivity

Start-up factsheet

## The challenge

The Flinders, Gilbert and Mitchell Rivers in Queensland flow into the Gulf of Carpentaria, supporting healthy ecosystems and nationally significant wetlands as well as important recreational and commercial fisheries. With increasing interest in developing water resources in northern Australia, further information is needed to understand how such developments will impact on the health and productivity of floodplains and coastal areas. Specifically, we need to know which flow characteristics of the rivers earmarked for future development are most important for the region's plants and animals so we can make informed management decisions.

## How will this research help?

**This project will help us to better understand the downstream impacts of water resource development in Gulf of Carpentaria catchments.** Information from this research will contribute to supporting sustainable development in northern Australia by helping to ensure that aquatic production in coastal and floodplain areas of the southern Gulf is maintained to support fish, fisheries, migratory birds, and other animals and ecosystems that depend on river flows. This includes planning and managing water allocations, protecting regional biodiversity and sustainably managing Gulf commercial and recreational fisheries.



The Flinders, Gilbert and Mitchell Rivers catchments in the Gulf of Carpentaria.



The researchers will use banana prawns, which have a well understood life cycle, as an indicator species, photo Matthew Whittle.

## Key project activities

- Identify mangrove and floodplain productivity 'hotspots' in the southern Gulf using remote sensing and other data, and undertake field work to ground truth these.
- Determine the extent of feeding areas for migratory shorebirds and fisheries species in estuaries and coastal areas, and measure the rates of primary productivity that underpin their food supply.
- Measure the densities of juvenile banana prawns in estuaries and determine if banana prawns in Gulf fisheries can be linked to their estuary of origin using trace element 'fingerprinting'.
- Examine the flow data from key southern Gulf rivers to quantify how flows from major rivers can affect ecological assets such as banana prawns.
- Use fisheries data to assess how much of the coastal finfish catch can be explained by patterns of floodplain inundation.
- Use barramundi earbones to compare barramundi growth rates in different years and in different Gulf rivers.
- Use trace element and/or isotopic analysis to assess whether high growth rates of barramundi are associated with freshwater or marine/estuarine production.
- Undertake trade-off analysis using data from fisheries, agriculture and environmental values to determine the relative benefits of river flow.



Gulf floodplain, photo Michele Burford.

## Anticipated research outputs

1. Maps of key hotspots for primary production in floodplains and coastal waters in the southern Gulf of Carpentaria that are important for sustaining healthy populations of fish, birds, turtles, crocodiles and other aquatic plants and animals in the region.
2. Information on the relative importance of southern Gulf rivers in delivering nutrients that fuel coastal productivity, and their importance for the migratory shorebirds that rely on coastal habitats in summer months.
3. Quantitative information on the relative importance of different estuaries in the southern Gulf of Carpentaria to the banana prawn, a freshwater flow indicator species.
4. Economic trade-off analysis on the benefits of extracting water for agricultural irrigation, versus the downstream use of water to support ecosystems and fisheries in the southern Gulf of Carpentaria.

## Who is involved?

This project will be led by [Professor Michele Burford](#) at [Griffith University](#), with [Dr Jim Smart](#) and [Professor Stuart Bunn](#) from [Griffith University](#) leading sub-projects.

The project leaders will be assisted by researchers from [Griffith University](#), [CSIRO](#), [Queensland Department of Agriculture & Fisheries](#), [Charles Darwin University](#) and the [Northern Territory Department of Primary Industry and Resources](#).

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For further information and project updates, visit the project webpage at [www.nespnorthern.edu.au/projects/nesp/links-gulf-rivers-coastal-productivity](http://www.nespnorthern.edu.au/projects/nesp/links-gulf-rivers-coastal-productivity)



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