



**Northern Australia
Environmental
Resources
Hub**

National Environmental Science Programme

Links between Gulf rivers and coastal productivity

Start-up factsheet

The challenge

The Flinders, Gilbert and Mitchell Rivers 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 study will help us to better understand the downstream impacts of water resource development in Gulf of Carpentaria catchments. Information from the study will enable State and Federal Government decision makers to identify which flows make the biggest contributions to aquatic production, wetland and coastal ecosystems, and biodiversity within the Gulf. The research will help inform future water allocation and improve our ability to ensure that development in the region is sustainable.

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.



The researchers will use banana prawns, which have a well understood life cycle, as an indicator species. Photo: Matthew Whittle. Above: Norman River and floodplain, Gulf of Carpentaria Photo: Michele Burford

How will we achieve this?

1. Identify mangrove and floodplain productivity 'hotspots' in the southern Gulf using remote sensing and other data, and undertake field work to ground truth these.
2. 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.
3. 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'.
4. Examine the flow data from key southern Gulf rivers to quantify how flows from major rivers can affect ecological assets such as banana prawns.
5. Use fisheries data to assess how much of the coastal finfish catch can be explained by patterns of floodplain inundation.
6. Use barramundi earbones to compare barramundi growth rates in different years and in different Gulf rivers.
7. Use trace element and/or isotopic analysis to assess whether high growth rates of barramundi are associated with freshwater or marine/estuarine production.
8. Undertake trade-off analysis using data from fisheries, agriculture and environmental values to determine the relative benefits of river flow.



Above: Water draining off salt flats into Norman River in the Gulf of Carpentaria during flooding. Right: Gulf floodplain. Photos: Michele Burford.

Where is the research happening?

Field work will be undertaken in the southern Gulf of Carpentaria, specifically in the rivers and catchments indicated for possible development, i.e. the Mitchell, Flinders and Gilbert Rivers. The estuaries and coastal areas of these major rivers will be the focus of field work.

Additional research using remote sensing will be undertaken in selected sites in the southern Gulf to determine 'hotspots' of primary production.



Who is involved?

The project is led by Michele Burford from Griffith University, with Jim Smart and Stuart Bunn from Griffith University leading subprojects.

The project leaders will be assisted by researchers from Griffith University, CSIRO, Queensland Department of Agriculture and Fisheries, Charles Darwin University and the Northern Territory Department of Primary Industries and Fisheries.

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