



## Project 1.4: Links between Gulf rivers and productivity

Project leader: Michele Burford, Griffith University  
Project update, May 2017

### What's new?

In the first year of the project there were a number of activities in the three key estuaries of interest in the Gulf—the Flinders, Gilbert and Mitchell Rivers. These activities were: 1. use trace element methods to differentiate which estuaries and wetlands are the most important areas for banana prawns and fish that are subsequently caught in the fishery, 2. measure the productivity of estuaries fueling the growth of significant species such as migratory shorebirds, and 3. gather data to determine the economic value of freshwater flows in these rivers.

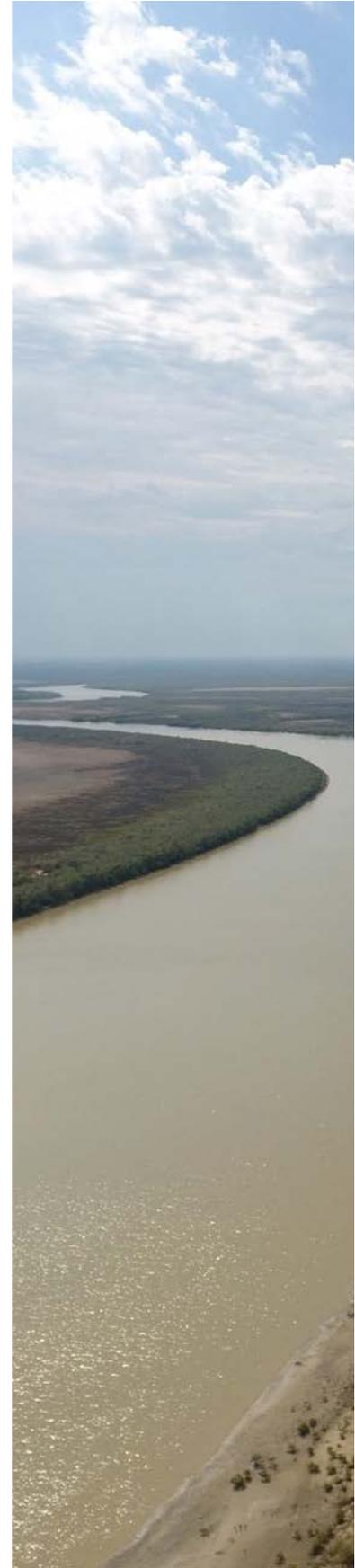
#### Our activities and achievements in the first year of the project include:

- We employed a Griffith University researcher, Stephen Faggotter, on the project in July 2016 to coordinate the field and laboratory studies.
- A number of project meetings have been conducted to coordinate research activities within the project, and between this project and the other southern Gulf project (1.3.1) which is looking at the effect of flow on floodplain productivity and flows needed for the Mitchell River freshwater ecosystem. Additionally, meetings have been had with the CSIRO-led Northern Australia Waters Resources Assessment project on the Mitchell River.
- The first field trip to Gulf of Carpentaria was undertaken in November 2016. This trip sampled prawns and sediment from three estuaries: Mitchell, Gilbert and Flinders Rivers. Juvenile prawns were collected from multiple sites in each river for analysis of their trace elements, to see if different rivers vary in their trace element fingerprints. Prawns are currently being sorted, counted, measured and will then be analysed. In addition, analysis of the data will show the density of prawns in each estuary. These prawns subsequently are pushed out into the prawn fishery when the river flows in the wet season.
- Additionally, on this field trip, the productivity of the estuarine mudflats was measured. Mudflats provide an important food source for prawns, shorebirds and other aquatic animals. We found that all three rivers were equally productive but the area of mudflat is higher in the Mitchell River estuary compared to the two other estuaries. This is currently being quantified using remote sensing methods.
- Samples were also taken on the November field trip to quantify the density of small animals living in the mud. They are a food source for shorebirds and larger animals living on the mudflat. Analyses are still to be undertaken.
- Data is being gathered for economic tradeoff analysis for the southern Gulf. Additional information is being gathered for flow-fisheries relationships. Analysis is ongoing.

### Upcoming activities

#### Planned project activities over the next six months include:

- Determine if the trace element fingerprints can be used to determine which southern Gulf estuaries are most important for the fishery.





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## Further information

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The project page can be found on the Hub website, along with the project start-up factsheet.



Northern Australia Environmental Resources Hub  
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 providing important fisheries 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 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, wildlife 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 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 baroque prawn, a freshwater flow indicator species.

4. Economic trade-off analysis on the benefits of allocating water for agricultural irrigation versus the downstream use of water to support ecosystems and fisheries in the southern Gulf of Carpentaria.



The baroque prawn and other indicator species, which have a very distinctive blue and white striped pattern. Photo: Andrew Hinde, James Hutton Reef and Islands, Gulf of Carpentaria. Photo: Andrew Burford



- Complete a field trip to the Gulf of Carpentaria in November 2017 to repeat the measures from the previous year.
- Analyse economic value gained from downstream use of water vs. upstream use of water for agriculture in the southern Gulf under different flow scenarios.
- Completion of a map of hotspots of aquatic production for river floodplain and wetland systems across southern Gulf catchments at risk of water development.

## Project summary

River catchments of the Gulf of Carpentaria support many ecological assets of high value which are likely to be threatened by intensive water resource development and climate change. This project aims to quantify the importance of a range of river flows to flood-driven aquatic production, with environmental and economic implications. This project is examining 1. the relative contribution of major southern Gulf of Carpentaria rivers to floodplain and coastal productivity, and key species that depends on the flow, and 2. predict the consequences of changes in flow regimes on flood-driven subsidies in specific rivers, and better understand other potential risks associated with these changes. This will provide key information needed for prioritising rivers for development as part of future water planning.

