

## Everyone likes fish

Many of the fish species found near the shore and in the estuaries of the Gulf of Carpentaria have iconic status. Species like the barramundi and king threadfin (salmon) are a key component in several fishing sectors such as commercial, charter-boat and recreational fishing and fishing-related tourism. Fish from the coast and estuaries also have a significant Indigenous harvest sector and cultural importance.

## Catchment activity affects estuaries

Our current knowledge suggests that flows of freshwater into estuaries play a significant role in determining the numbers of fish that live there. This project aims to increase our detailed understanding of how freshwater flows affect some key estuarine species. This is crucial if we are to manage water resources in a manner that minimizes negative impacts on estuaries.

Most Australian research into the role of freshwater flows in aquatic ecosystems that support fish and fisheries has occurred in sub-tropical Queensland and southern states. There is a need therefore to investigate whether the processes described currently apply to Gulf estuaries.

An initial review of data suggests some of the ways freshwater flows are significant include:

- Connect and provide access to seasonal habitats through flooding of upland and coastal floodplains
- Distribution of fish larvae (newly hatched fish) through chemical cues
- Stimulation of movement either towards or away from freshwater influences
- A source of nutrients which cause an increase in production up through the food chain – more fish food and more fish.



*Barramundi (Lates calcarifer)*

Photo: Dept of Primary Industries and Fisheries, Qld



*Barramundi otolith*

Photo: Dept of Primary Industries and Fisheries, Qld

## How old is that fish? Counting the rings

Traditional studies of how environmental factors affect the reproduction and survival of estuarine fish populations have been done by studying fish larvae. This requires sampling over a number of years and linking changes in numbers of larvae with events such as droughts.

This project is using a quicker approach. The project team will study the commercial, recreational or Indigenous catch of adult fish from estuaries. They will determine the ages of all the fish by examining their hard parts (scales and otoliths). Otoliths are a sensory organ used by fish in hearing and balance. Each year a ring is deposited on the otolith which can be counted to age the fish.

The scientists can then look at the numbers and sizes of fishes in different age groups. If freshwater flowing into estuaries influences the survival of young fish, then the number of fish of a given age should vary with freshwater flow. This pattern should persist through time and affect the subsequent abundance of adult



fish. For example, if 2003 was a bad year (low flows), the fish population in 2007 will have relatively few 4 year old fish.

### Who is on the team?

The project is lead by researchers from the Queensland Department of Primary Industries and Fisheries. They will be working with researchers from the Northern Territory Department of Primary Industry Fisheries and Mines and Griffith University. The project also has a steering committee made up of Queensland and Northern Territory water and fisheries managers.

Commercial, recreational and community fishers from within the study catchments will be approached to take specimens from their catch over the three years of the study.

### Where is the research happening?



The geographic scope of the project is the Gulf of Carpentaria and western Northern Territory coast. Data collection and analysis of available data will occur in key catchments adjoining the gulf. These include the Roper and Daly rivers in the Northern Territory and the Flinders and Mitchell rivers in Queensland. The project started in July 2007 and will finish in 2010.

### How will this research help?

Decisions made about river management not only affect the rivers themselves but also the estuaries they flow into. This project will provide water resource managers with a better understanding of how river flows influence estuarine fisheries so those needs can be taken into account in Water Resource Plans and other related planning instruments.

For fishing-related industries the project will ultimately help support sustainable fisheries by assisting in the valuations of the ecological assets of estuaries and freshwater related processes. This project will provide a greater understanding of factors important to maintaining the fishery resource.



King salmon (*Polydactylus macrochir*)  
Photo: Dept of Primary Industries and Fisheries, Qld



King salmon otolith  
Photo: Dept of Primary Industries and Fisheries, Qld

### Team contacts

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