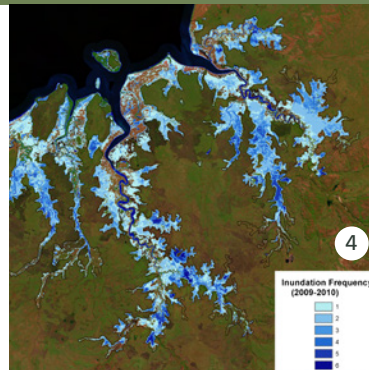




Floodplain food web hotspots

The Northern Australia Hub is one of five hubs informing the Australian Government's National Environmental Research Program. The hub brings together more than 100 researchers and land managers, drawing on expertise from a range of disciplines and backgrounds. The Northern Australia Hub aims to improve biodiversity conservation in northern Australia through sound planning, innovative policy and strong partnerships.

- 1 Floodplains are important areas for producing plants, algae and animals that support aquatic food webs throughout the region.
- 2 The research team is investigating habitat types across the floodplain to determine if some floodplain habitats are more important than others to aquatic biodiversity.
- 3 Researchers are investigating the importance of floodplains to food webs from the plants, algae and small animals at the bottom of food webs all the way up to the large predatory fish and crocodiles at the top of food webs.
- 4 Satellite images from different times of year have been used to determine which areas flood and for how long. This map shows the flooding areas of the Alligator rivers region within Kakadu National Park.





WHY THIS RESEARCH IS NEEDED

While good progress has been made in understanding freshwater ecosystems in northern Australia, there is still much to learn about biodiversity and the key factors that sustain aquatic species.

Floodplains are very important to aquatic food webs, because it is here that small fish feed on microscopic plants and animals, later providing sustenance for larger species when they move to connected waterways and the coast.

Some key questions about these systems remain:

- › Are there 'hotspots' of floodplain productivity and how do these compare with productivity in main river channels?
- › Do longer periods of flooding and higher productivity sustain higher biodiversity?
- › How dependent are large animals, like predatory fish, on floodplains?
- › How much do these animals move around?

Understanding the importance of linkages between rivers, floodplains and estuaries will allow us to predict how natural and man-made changes to connectivity or flows could affect aquatic biodiversity.

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3.1 River to landscape connections and biodiversity

● How will this research help?

The project will provide a detailed understanding of the importance of floodplains to freshwater biodiversity in northern Australian river systems, and inform water resource management.

Researchers are identifying which areas flood, how deep, and for how long, and developing landscape-scale models to show connectivity and flows between floodplains, river channels and coasts.

They are also measuring the amount of microscopic aquatic plants produced in different floodplain habitats, identifying where fish and other animals get their food for growth and reproduction, and measuring the movement of large predators, such as sawfish, between habitats.

These activities will help quantify the importance of floodplain resources to food webs in adjacent waterways and coastal areas.

● Project activities

Where is the water on the floodplain?

Satellite images taken at different times of year are being used to work out which floodplain areas are inundated, how much water they are holding and for how long. This will help to predict which floodplain areas are 'hotspots' for supporting food webs.

How much microscopic plant material is growing on floodplains?

Experiments measuring primary production, light availability and plant mass are being used to work out how much food is being produced in different floodplains habitats while they are flooded.

Are animals eating then moving?

Plants, algae, leaf litter, plankton, insects, prawns, and fish are being collected at a variety of sites. The chemical signatures of animal tissues will be used to show where animals are feeding and how important these food resources are for growth and reproduction.

How much are fish moving?

Acoustic tags are being implanted in large-bodied fishes including bull sharks and sawfish in Kakadu National Park. A fixed array of receivers in the lower reaches of these rivers is being used to monitor their daily movements from fresh to salt water.

● Research outputs

- › Tools and techniques to map and monitor water movement between floodplains, river channels and coasts using satellite images.
- › A quantified understanding of the importance of floodplains in supporting the food webs of adjoining waterways.
- › An understanding of how key fish species move between floodplains, rivers, and the freshwater-saltwater interface in estuaries.
- › An understanding of the relationship between floodplain flows, biodiversity and biomass which will help guide water resource management.

Researchers will also take the opportunity to talk about the project's progress at public forums, community meetings, work-based seminars, and conferences.

● Who is on the team?

The project is being led by Professor Stuart Bunn from Griffith University, with researchers from Griffith University, Charles Darwin University, the University of Western Australia, NT Fisheries and the Environmental Research Institute of the Supervising Scientist.

● Where is the research happening?

On the rivers and floodplains of Kakadu National Park (Alligator rivers region), the Daly River and the southern Gulf of Carpentaria.

GET INVOLVED

Traditional Owners are encouraged to provide small samples of fish, turtles, crocodiles and other animals caught in the study region. Traditional Owners can also assist with sampling and provide local knowledge on ecological and cultural values.

