WATER SECURITY FOR NORTHERN AUSTRALIA PROGRAM (WSNA)

GILBERT RIVER CATCHMENT

North Queensland

Node contact: Assoc Prof Nathan Waltham
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Project 1.1 Floodplain, river and tributary aquatic flora and fauna inventory in the Gilbert River catchment

Timeline: 2023 to 2026



WSNA program locations


Image credit G. Cranitich Qld Museum

The Gilbert River catchment is one of the four nodes in the Water Security for Northern Australia program. The catchment holds environmental, cultural and economical values, which is mostly attributed to the river system and permanent waterholes throughout the catchment.

Limited data on the aquatic flora and fauna (including water quality) in the Gilbert River and the tributaries, presents a challenge with water planning and management in the catchment.

Project (1.1) will survey the catchment to build an understanding of species and where they're found in the mosaic of available water habitats. Data is important for managers and planners when assessing the expansion of agricultural development, and will be used to test and set flow hydrometrics for species as part of the Gulf Water Plan review.
Data from this research will inform future water planning and support the monitoring and evaluation of development, as well as guide any restoration and protection of sensitive ecological areas in the catchment.

research topics

- Survey aquatic species in river, floodplain and tributaries of the Gilbert River to map spatial extent of species.
- Using Environmental DNA methods, survey distribution and extent of the freshwater sawfish in the catchment, which is listed as critically endangered under the *EPBC Act 1999.*
- Define waterhole typology based on species functional, lifecycle and traits.

what's happening

Floodplain, rivers and tributaries field studies to identify aquatic species using a combination of traditional science methods, digital technology and eDNA sampling.

Track species change over time at sites in the catchment for seasonal and interannual changes.

Map the extent of sawfish in the catchment using eDNA sampling technology.

did you know?

The freshwater sawfish can grow up to 6m in length (tail tip to the rostrum) and has a lifecycle ecology requiring it to move between rivers and estuaries. Impediments to this requirement to move from man-made barriers, has impacted the protection of this species in Northern Australia.



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Project 1.2 Persistence and extent of waterholes in the Gilbert River and tributaries, groundwater contribution to permanency

Timeline: 2023 to 2026



WSNA program locations


Image credit N.Waltham

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Permanent waterholes are critical to broader ecosystem services, however they're susceptible to poor water quality conditions, particularly in the dry season. This means that any changes in their use, and runoff during the wet season might impact important water quality processes or change the cycling of oxygen and temperature.

Project (1.2) is examining the surface and groundwater contribution to waterhole permanency, using a range of scientific methodologies, to assist with future management and protection of the catchments' river ecosystems and values. Extraction of water from sensitive waterholes increases the risk of degradation of critical ecosystem services. Using field surveys to measure water and habitat quality of waterholes in the catchment, and groundwater tracers, this project investigates the level of risk to waterhole refugia, and aims to assist managers with the assessment of developments in the catchment.

research topics

- Using spatial satellite and river system hydrology data to examine the size ranges between waterholes in wet and dry seasons.
- Examine water quality and ecology with different dry-down rates to understand the underlying processes and responses to waterhole changes.
- Define the groundwater contribution to waterhole permanency using water chemistry tracers like stable isotopes and radioisotopes.

what's happening

Surveying waterhole water quality and aquatic ecology.

Deploying high frequency loggers at focus study waterholes to examine more subtle changes in water quality conditions.

Working with landholders and local groups, undertake extensive water sampling to examine changes in nutrients, turbidity and groundwater trace elements.

did you know?

The permanency of waterholes in Northern Australia depends upon a combination of groundwater and surface water inputs. We can examine this relationship, and changes over time, by using water chemistry tracers to decipher groundwater from surface contribution to waterholes.


Image credit N.Waltham

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Project 1.3 Examine the ecosystem services gained and lost for proposed development areas

Timeline: 2023 to 2026



WSNA program locations



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Farmers consider the biggest barrier to expanding cropping land in the catchment, and access to water for irrigation, is the legislation and amount of information needed for approval. This project combines expertise and skills in soil and vegetation carbon, biodiversity (terrestrial and aquatic), cultural values and waterway/hydrology services with the aim of providing data and information that road-tests development in the catchment which can assist with approval processes.

Project (1.3) will work with farmers on current and future development plans, examining the trade-offs that development proposes to catchment ecosystem services like biodiversity, cultural and water quality. Research will involve determining: carbon stocks in soil and above-ground biomass, biodiversity services including vegetation and habitat assessments, cultural values and waterway/hydrology services that would be protected, modified or lost in place of expanding irrigated agriculture in the catchment. Improved data, baseline information and hypothetical development will help build confidence for planners, managers and developers.

did you know?

Water extraction for agricultural development in the Gilbert River catchment is approx. 10% of the total allocation. This means more agricultural development is possible in the catchment, utilising the remaining water allocation.

research topics

- Examine local agricultural development considerations in the catchment and implications on environmental services.
- Habitat provision provided by agricultural development land use, e.g. farm dams as productive habitat for aquatic and terrestrial species.
- Examine data requirements for development to recognise the approval barriers in the catchment.

what's happening

- Partnering with farmers to measure environmental services gained and lost in developed areas of the catchment.
- Assessing the opportunities and constraints to water resource and associated agricultural development based on values.
- Consolidation of available data for the catchment, including data generated from this project for downstream use for NRM planning and assessment agencies.



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Project 1.4 Indigenous values mapping and water resource enterprise product identification

Timeline: 2023 to 2026



WSNA program locations

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Tagalaka Country, credit Jeanie Govan, Tagalaka Aboriginal Corporation

Understanding the values of the region's waters from the perspectives of the Traditional Owners is vital if we are to ensure the best use of the water resources, ensuring Traditional Owners are able to take advantage of the opportunities available to help achieve their goals.

Project (1.4) is about mapping out Indigenous cultural areas of the Gilbert River catchment, and developing a plan of enterprise opportunities for water use for Indigenous groups. Whilst the Gilbert catchment is known to have many natural resource values, high conservation areas and critically important waterways for a broad range of species and services, what is not known is how these relate to cultural values and desires of the local Traditional Owners of the region. Currently there is an allocation of water in the Gilbert River catchment for Indigenous use, however, access and use of the allocated water has not progressed. It's important that work occurs with Traditional Owner groups to drive forward the identification and documentation of cultural values in the catchment.

research topics

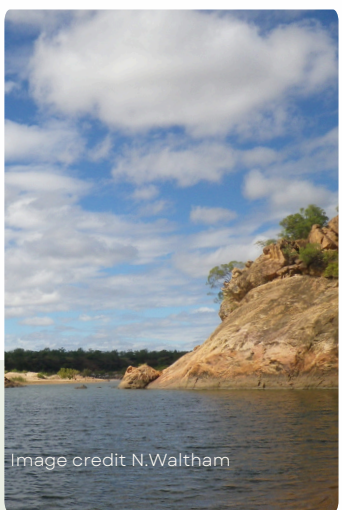
- Understanding and mapping of cultural values within the catchment.
- Understanding the potential for water resource development by Indigenous groups in the catchment.

what's happening

- Following best practice for collaborating with Traditional Owners, to co-design all stages of the research.
- Ensuring appropriate two way knowledge sharing with 'Our Knowledge Our Way' guidelines.
- Building the capacity of partner organisations and Indigenous ranger groups in water sampling and monitoring.

did you know?

Waterholes in dry tropical rivers in northern Australia are culturally important – they are places for meeting, resting, as food sources and for celebration.
The Gulf of Carpentaria holds incredible Indigenous values and connection with Country.


Image credit N.Waltham

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