WATER SECURITY FOR NORTHERN AUSTRALIA PROGRAM (WSNA)

DALY RIVER CATCHMENT

Northern Territory

Node contact: Dr Dylan Irvine
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Project 2.1 Investigating multi-catchment climate change models

Timeline: 2023 to 2026



WSNA program locations



The Daly River catchment is one of the four nodes in the Water Security for Northern Australia program. The region includes the Daly River and its tributaries, along with the Katherine, Flora, King and Douglas rivers. These rivers and waterways sustain diverse environmentally and culturally significant ecosystems as well as important agricultural production in mango and broad-acre crops.

Effective water resource management is vital to sustain communities, industries and the environments that support them. Global climate change creates uncertainty into the future availability of water resources.

Project (2.1) This project will examine the potential impacts of climate change on groundwater and surface water resources in Northern Australia. The project team is made up of groundwater, vegetation and climate science experts who are investigating a range of future projections for water availability using a combination of simple and complex hydrological models. While the study will generate insights relevant to Northern Australia, it includes detailed case studies, such as the Daly River catchment in the NT. By examining the spectrum of potential climate futures, it's expected this knowledge will enable more informed water resource management, equipping planners to consider and prepare for future climate impacts.

research topics

- Working with temporally downscaled projections of key hydrological drivers including rainfall, temperature and evapotranspiration at sites across Northern Australia.
- Identifying optimal models to project hydrological impacts from global climate change.
- Identifying potential changes to diffuse groundwater recharge using soil-vegetation-atmospheric simulations.
- Conducting case studies to identify the range of future hydrological conditions of catchments and their associated groundwater resources.

did you know?

With climate change some regions that receive less rainfall may actually see an increase in groundwater recharge, while others may receive more rain, but less recharge. Rainfall intensity, and evapotranspiration are important factors in influencing groundwater recharge.



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Project 2.2 Improved understanding of the Oolloo Dolostone springs and the coupled groundwater-surface water model

Timeline: 2023 to 2026



WSNA program locations


Oolloo Crossing credit Trevor Page

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Understanding complex hydrological systems, like those in the Oolloo Dolostone aquifer region, is crucial for effective water management to ensure that the balance between water for agricultural, cultural and environmental needs is protected.

Project (2.2) This project aims to enhance the understanding of the origins of water from springs that discharge into the Daly River in the NT by working closely with Traditional Owners and researchers. The goal is to inform the allocation of groundwater in catchment areas of the springs, while respecting and integrating Indigenous cultural values. By improving the understanding of the origins of spring water flows it can potentially improve the numerical ground-and-surface water model which informs the Annual Announced Allocations for the region.

research topics

- Documentation of water requirements to maintain the health of springs in the region.
- Exploration of a wide range of groundwater tracers like radioisotopes and microbial source tracking to determine water origins.
- Analysis of surface and groundwaters to inform water resources management of the area.

what's happening

- Project engagement with the Northern Land Council for Traditional Owner involvement.
- Wide range of tracer techniques being used to understand the age and origin of water in the region.
- Adoption of crossover techniques being applied from the Gilbert River catchment in north Queensland.

did you know?

The Daly River is fed by 100s, if not 1000s of springs and flows all year round.



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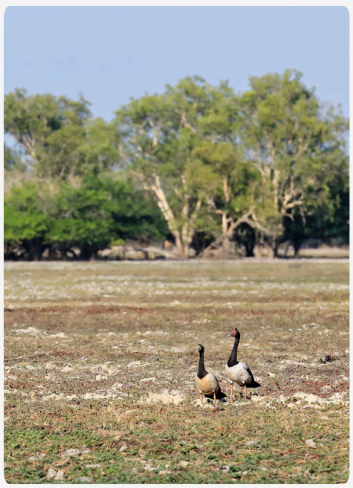
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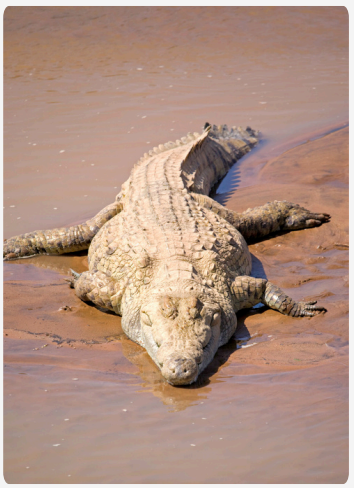


WSNA program locations

Project 2.3 Investigation of wet season water take on floodplains and water requirements of ecosystems

Timeline: 2023 to 2026





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The wet/dry season dynamics of tropical Australia means that river systems support vital floodplain and wetland ecosystems, particularly in the wet season.

Project (2.3) Surface water flows in Northern Australia, including perennial rivers like the Daly River, exhibit significant variability. For example, the Daly River's flow varied dramatically between 2018 and 2019, ranging from 23 times to 4 times the volume of Sydney Harbor.
This project is investigating the impact of these changes on the Daly River catchment's floodplains using remotely sensed water inundation data to understand the relationships between rainfall, river flow and floodplain water availability. Water needs of key species and the importance of dry-season refuge pools is critical to improving the understanding of these ecosystems and the ecological functioning to guide decisions on water management that safeguards the region's biodiversity and sustainable water use.

research topics

- Review of the implications of surface water extraction on riverine floodplains and wetlands.
- Use of remote sensing products to document the extent of floodplain ecosystems through time.
- Exploring relationships between floodplain areas, rainfall and river flows.
- Potential impacts of surface water extraction on floodplain areas, and the potential implications this can have on ecosystems.

what's happening

- This project is a collaboration of freshwater ecology and hydrology experts from Charles Darwin University and James Cook University.
- Extensive remote sensing data resources are being utilised, provided by Geoscience Australia.
- A literature review is informing the potential impacts of wet season extraction of surface water on associated ecosystems.

did you know?

The Daly River is home to one of the largest remaining populations of freshwater sawfish in the world. With over 100 different fish species recorded, the Daly River plays an integral role in sustaining the NT's aquatic ecosystem.



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Project 2.4 Cropping systems in the Daly River catchment, present and future

Timeline: 2023 to 2026



WSNA program locations



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Current agriculture in the region focuses on crops like hay, cotton seed, melons, and mangoes. The goal is to understand existing farming systems and assess interest in diversifying crop mixes towards higher value alternatives, and the barriers which prevent uptake.

Project (2.4) Using a mixed-method social science approach, this study seeks to understand the factors influencing the trajectory of agricultural growth and water use policies and how this can support the NT agricultural sector adapting and contributing to the planned $40 billion NT economy by 2030. The project will delve into the current farming systems and explore approaches to sustainable development and social license to operate. It will also explore the potential introduction of water pricing and how this can influence farming choices. By illuminating the intricate interplay of economic, environmental, and socio-cultural aspects that shape agriculture, producers can be more informed to adapt into the future.

research topics

- Gaining a deeper understanding of what factors influence current farming systems through engagement and literature reviews.
- Exploring barriers and facilitators for crop diversification in the Daly River catchment.
- Understanding the implications from the introduction of a price on water and other possible water policy changes.

what's happening

- A multidisciplinary research team of agricultural and hydrological scientists and economists has been formed.
- Engagement with the NT Gov and local growers for in-depth, practical understandings of the agricultural landscape.
- Refining research strategies and methodologies tailored to the unique catchment area and local farming practices.

did you know?

The Daly River catchment is one of the most important agricultural regions in the NT.
It's known for its mango production, growing around 3.5 million trays of mangoes annually, contributing significantly to the Australian mango industry!



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