

NAWRA progress report

CSIRO delivers progress reports as part of the Northern Australia Water Resources Assessment project. Here is the latest update from the October 2017 report.

21st century science for a 21st century landscape

The Northern Australia Water Resources Assessment is ambitious, accounting for the water and soil resources across three catchments – the Fitzroy River catchment in Western Australia, the Darwin catchments in the Northern Territory and the Mitchell River catchment in Queensland.

It's more than that. There are 10 activity areas, one in particular which addresses the 21st century cultural landscape – indigenous engagement.

CSIRO indigenous engagement activity leader Dr Marcus Barber says there is a shift in understanding which makes the project embedded in the 21st century. Indigenous communities are, and are keen to be seen as, partners in development projects.

The activity is providing information to identify and understand indigenous values, rights, interests and development objectives.

The first catchment-wide meeting with Traditional Owners in the Mitchell River catchment was held in August, a collaboration between CSIRO's NAWRA indigenous activity team and the Northern Gulf Resource Management Group, Gulf Cattleman's Association, the Mitchell River Watershed Management Group and the Northern Queensland Land Council.

The meeting, in Chillagoe, provided the first opportunity to share perspectives among Traditional Owners, scientists, members of the cattleman's association and the Resource Management Group:

- Sharing views and ideas about development
- Learning about natural resource management activities and plans in the catchment
- Traditional Owners presenting their views about the type of acknowledgement and engagement they would like on their country and in the catchment.



The three-year, \$15 million Northern Australia Water Resources Assessment involves more than 120 contributors from CSIRO, state governments and subcontractors, working across 10 activity areas, and draws on expertise from across the entire country.

The indigenous engagement activity is a two-way process where the Assessment project is asking for information from indigenous communities about their country, in return scientific results from the Assessment will be communicated directly to help in their future decision making.

The Assessment is enormous in scope and well on the way to producing a holistic picture of the river systems, the catchments and the potential for sustainable development.

Water availability and storage

The surface water hydrology team has completed landscape and river models for all regions for baseline and all climate scenarios.

Dams are part of the picture. Models for Manton Dam, Darwin River Dam and Lake Mitchell have been completed and will be incorporated into the river models to estimate the effect of development

scenarios on dam behaviour and the water users they supply.

Work has been done to estimate the flood rise at potential dam sites and the impact this would have on dam selection and cost. Cost estimates, hydroelectric power generation analysis and dam conceptual layouts have been completed for a number of potential sites.

Dams aren't the only part of the picture. We have also analysed water harvesting analysing pump rates, pump start thresholds, levels of development and end-of-system flow requirements – the water the river needs to sustain flow and river life. This has also included understanding not just of surface water but also how it is recharged by groundwater, and the availability of groundwater.

Underground, conceptual models for key aquifers in all three study areas are under development. That work has included drilling and installation of monitoring bores, field sampling trips, developing regional-scale spatial estimates of groundwater recharge, developing regional-scale Managed Aquifer Recharge opportunity maps, and modelling to estimate aquifer water balances and how they change with groundwater extraction.

Soils and crops – and business analytics

Validation work on land suitability has been completed, providing whole-of-catchment soil physical and chemical data for jurisdictional and national databases, and finalised Digital Soil Modelling models. Land suitability maps for a range of crops under various management routines are being developed.

There is also the economic assessment of development options – increased development might be possible but is it economically feasible? For the Darwin catchments, gross margin spreadsheet templates have been developed for tree crops (mangoes, cashews citrus), field crops (Cucurbits, Asian vegetables), broadacre crops (maize, rice, peanuts) and forages.

In the Fitzroy and Mitchell, the team is focused on a range of irrigated forages for integration into beef enterprises, with a more limited array of field and horticultural crops. The work has involved linking forage production to beef breeding and fattening systems, investigating the enterprise economics to determine the technical feasibility and financial implications of irrigated forage investment.

Crop modelling work has also examined risks of nutrient run-off and pest risks.

Ecosystems and sustainability

The ecology activity team has drafted a list of significant 'assets', including freshwater and marine assets in the three catchment areas. Assets are indicators of species of conservation, recreational or commercial significance; important habitats; or ecosystem processes. These are used to assess the potential impacts of development.

This work has been done with the Earth Observation activity team to identify the persistent water holes and wetlands in the landscapes and have mapped existing vegetation, to identify the connectivity between rivers and wetlands.

This knowledge will be critical in understanding the impact of water use on water availability and ecosystems throughout the catchments.

NAWRA is due to report to the Commonwealth Government in June 2018.

Mapping more efficient transport system

CSIRO has delivered its latest TraNSIT report as part of the White Paper on Agricultural Competitiveness. The project has mapped the transport routes of 98 per cent of Australia's agricultural volume. Read more in *On the road to mapping a more efficient transport future for Australian agriculture* via [ECOS](#).

Read more about [NAWRA](#).

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