

NAWRA progress report

CSIRO delivers progress reports as part of the Northern Australia Water Resources Assessment. 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 study areas – the Fitzroy catchment in Western Australia, the Darwin catchments in the Northern Territory and the Mitchell catchment in Queensland.

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

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.

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 catchment was held in August, a collaboration between CSIRO's Assessment 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 2 ½ year, \$15 million Northern Australia Water Resources Assessment involves more than 120 contributors from CSIRO, the jurisdictions, universities and consultants, 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 is asking for information from communities about their country, in return scientific results 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, catchments and potential for sustainable development.

Water availability and storage

The surface water hydrology team has completed landscape and river models for the three study areas under historical and future climate scenarios.

Large dams are part of the picture. Both existing and potential dam sites have been incorporated into the river models to estimate how much water they could provide and how flow in the river downstream may be altered.

Work has been done to estimate the flood rise at potential dam sites in the Darwin and Mitchell catchments 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.

Large dams aren't the only part of the picture. We are also looking at farm-scale gully dams and have examined harvesting water into ring tanks, analysing different pump rates, pump start thresholds, levels of development and end-of-system flow requirements – minimum flows to help sustain river life.

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 near shore marine assets in the three study 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 riparian vegetation. Flood modelling and mapping has sought to identify the connectivity between rivers and wetlands.

This knowledge will be critical in understanding how water extraction and use may change ecosystems throughout the catchments.

The Northern Australia Water Resource Assessment 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](#).

CONTACT US

t 1300 363 400
+61 3 9545 2176
e csiroenquiries@csiro.au
w www.csiro.au

AT CSIRO, WE DO THE EXTRAORDINARY EVERY DAY

We innovate for tomorrow and help improve today – for our customers, all Australians and the world. We imagine. We collaborate. We innovate.

FOR FURTHER INFORMATION

CSIRO Land and Water
Chris Chilcott
t +61 8 8944 8422
e chris.chilcott@csiro.au
w www.csiro.au/nawra

