Stakeholder Communique

A new tool for detecting groundwater-dependent vegetation using the Geoscience Australia Open Data Cube

Mine dewatering is the removal of unwanted groundwater from a mine to allow rock and mineral extraction from beneath the water table. In some circumstances, this can affect the health of groundwater-dependent vegetation (GDV) in the vicinity, which relies on a stable water-table for water requirements. Monitoring the potential impact of mining operations on GDV is an important compliance requirement for mining companies. However, the distribution of GDV species, and the selection of monitoring sites, requires comprehensive knowledge and extensive time to set up.

Narrowing the search space to accurately determine the distribution of GDV species is the first step towards establishing a time saving, cost efficient, and comprehensive monitoring program to monitor and manage dewatering activities. However, to date there is no standard tool to simplify this process.

To address this need Curtin University researchers [Dr. Todd Robinson (Lead), Lewis Trotter (Research Fellow) and Dr. Adam Cross (Research Fellow)] in consultation with mining companies (Roy Hill Iron Ore and BHP) have recently developed GDV likelihood models using weighted seasonal imagery from Digital Earth Australia's (DEA) Open Data Cube to map GDV at the press of a button.

The research team recently trialled their model in June 2019 at the Roy Hill iron ore mine in the Pilbara (Western Australia) using ESRI's Collector application and tablet technology. Initial validation statistics indicate that the model was able to predict GDV at an accuracy of 86%, and the team believe with further improvements accuracy of 95% could be attained.

This sees the team achieve the first milestone towards developing an expanded monitoring project, which will fully exploit the DEA Data Cube to reconstruct the past as well as combine higher resolution imagery such as Sentinel-2 for future applications.

It is expected that the team will deliver likelihood models as well as prototype tools for exploring temporal trajectories for three case studies in Western Australia by December this year. This will lead to opportunities to embed the models into user friendly applications to operationalise and facilitate scalability.

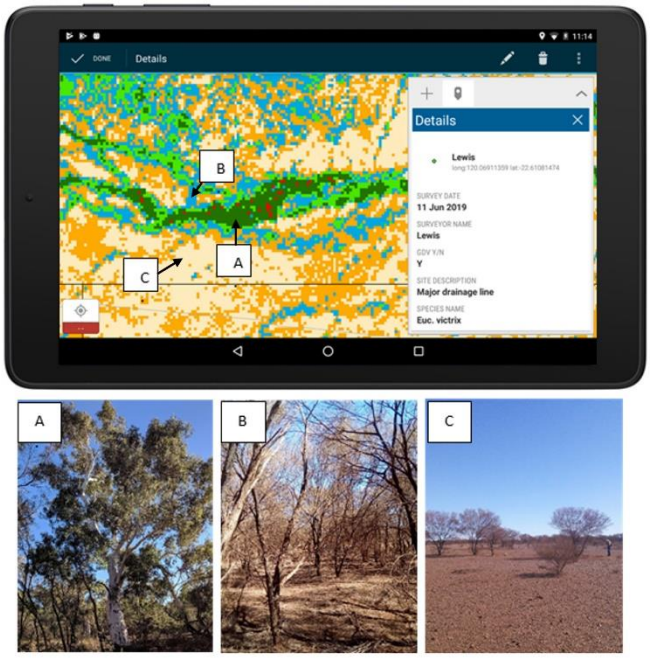

***Figure 1**: Mobile mapping technology used to validate the accuracy of the groundwater dependent vegetation likelihood model. (A) Dark green and red areas highlight potential GDV, (B) light green and blue classes identified mulga woodland (not GDV), and (C) cream and orange locations were stony flats with or without isolated shrubs (not GDV).*

Sarah Blake, Manager Environment from Roy Hill noted, “This model when fully developed will improve the ability to protect groundwater dependent vegetation and provide timely and regular data, which is not obtainable at present.”

Further, David Mickle, Biodiversity Specialist, commented that “a tool that can be used to highlight areas of GDV will allow for a more targeted approach to ground surveys or monitoring programs. This will also aid in the search for control sites for monitoring of vegetation allowing for more scientifically robust programs to be developed.” As regulators, the Department of Water and Environmental Regulation anticipate that successful delivery of this application will represent a useful tool to support GDV assessment in the Pilbara.

FrontierSI will be seeking expressions of interest for an extension project to undertake further ground-truthing in parallel with development of an open-source operational tool in October this year.

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This project has been funded by Geoscience Australia, FrontierSI (formerly the CRC for Spatial Information), Roy Hill Iron Ore, BHP, Curtin University and supported by the Department of Water and Environmental Regulation and the WA Biodiversity and Science Institute.