

Product solution for: Australian National Water Commission



## A monitoring technique for the springs of the Great Artesian Basin

Encompassing 1.7 million square kilometers, the Great Artesian Basin (GAB) is one of the only reliable sources of fresh water throughout much of inland Australia. The basin supports a diverse range of groundwater-dependent wetland ecosystems, located in what is known as Australia's arid zone. The sustainable management of these ecosystems is becoming increasingly important due to the growing impact of groundwater extraction for mining and by encroaching populations.

### Acquiring a baseline of surface characteristics

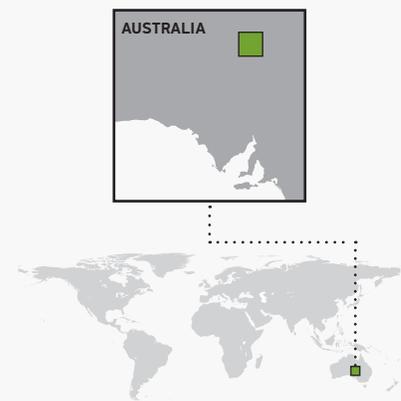
Despite the economic and ecological importance of the GAB springs, as well as their cultural significance to indigenous Australian populations, the location and condition of many of the springs has not been well documented. Consequently, the National Water Commission initiated a study to monitor the temporal response of permanent wetland vegetation changes in spring flow rates over time in an area of South Australia. The University of Adelaide and the South Australian Arid Lands Natural Resources Management Board were charged with the task.

The study required the acquisition of baseline information to understand the surface characteristics of the springs, assess groundwater flow rate, and monitor vegetation ecology. A solution to develop a repeatable mapping process that assesses the extent and spatial distribution of the spring wetlands over space and time—critical decision-making information for natural resources managers—was fundamental to the study.

High-resolution imagery from DigitalGlobe's satellite constellation was tapped for the task as it readily provided the necessary spatial detail to delineate the extent of wetland vegetation for individual springs as well as clustered groups and larger complexes.

### Company information

The National Water Commission is responsible for driving progress towards the sustainable management and use of Australia's water resources.



## The dynamic nature of the springs revealed

A number of new tools were developed to address the need to map and monitor the groundwater flows over time from the springs and the extent and distribution of their wetlands. DigitalGlobe multispectral imagery enabled researchers to discriminate spring wetland vegetation from the surrounding dry-land vegetation with the use of vegetation indices.

“Consequently, wetland areas can be used as a surrogate for spring flow volume, providing a new, objective, and cost-effective means for monitoring a spring’s response to aquifer changes,” researcher Dr. Davina White explains. “The high-resolution mapping over time revealed the dynamic nature of the springs in fine detail.”

## An objective baseline— for the first time

DigitalGlobe’s high-resolution imagery has provided an objective baseline of GAB spring wetland extent and distribution and a measuring tool of how to understand variance over time—invaluable for comparison with future assessments.

For example, the imagery helped quantify the wetland area/flow relationship for a grouping of springs located at Freeling North and South where a nearby bore was freely flowing. The bore, which flowed for 93 years, was capped in October 2011. A repeat of the image-based assessment of the area is planned to monitor the response to local increases in aquifer pressure.

The study has not gone unnoticed. In 2012 the study received the South Australian Spatial Excellence Industry Award for Innovation.

*“DigitalGlobe high-resolution satellite imagery products were a natural choice for this study, particularly in light of the dispersed distribution of the springs within large areas of arid landscape and their varying spatial extent from a few meters to several kilometers.”*

**DR. DAVINA WHITE**, UNIVERSITY OF ADELAIDE POSTDOCTORAL RESEARCH FELLOW

### INDUSTRIES

- » Civil government
- » Natural resources

### USES

- » Environment
- » Administration/management
- » Planning
- » Change detection

### PRODUCTS USED

- » OrthoReady standard bundle (panchromatic and multispectral imagery)

### Challenge

Develop a mapping and monitoring solution to delineate the extent of wetland vegetation for individual springs as well as clustered groups over a vast geographic area.

### Solution

DigitalGlobe multispectral imagery identified spring wetland vegetation from surrounding dry-land vegetation, helping to provide a new cost-effective means to monitor response to aquifer changes.

### Results

Researchers now have an objective baseline of the extent of GAB wetland distribution and how it varies over time—information critical for development of future resource management strategies.

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