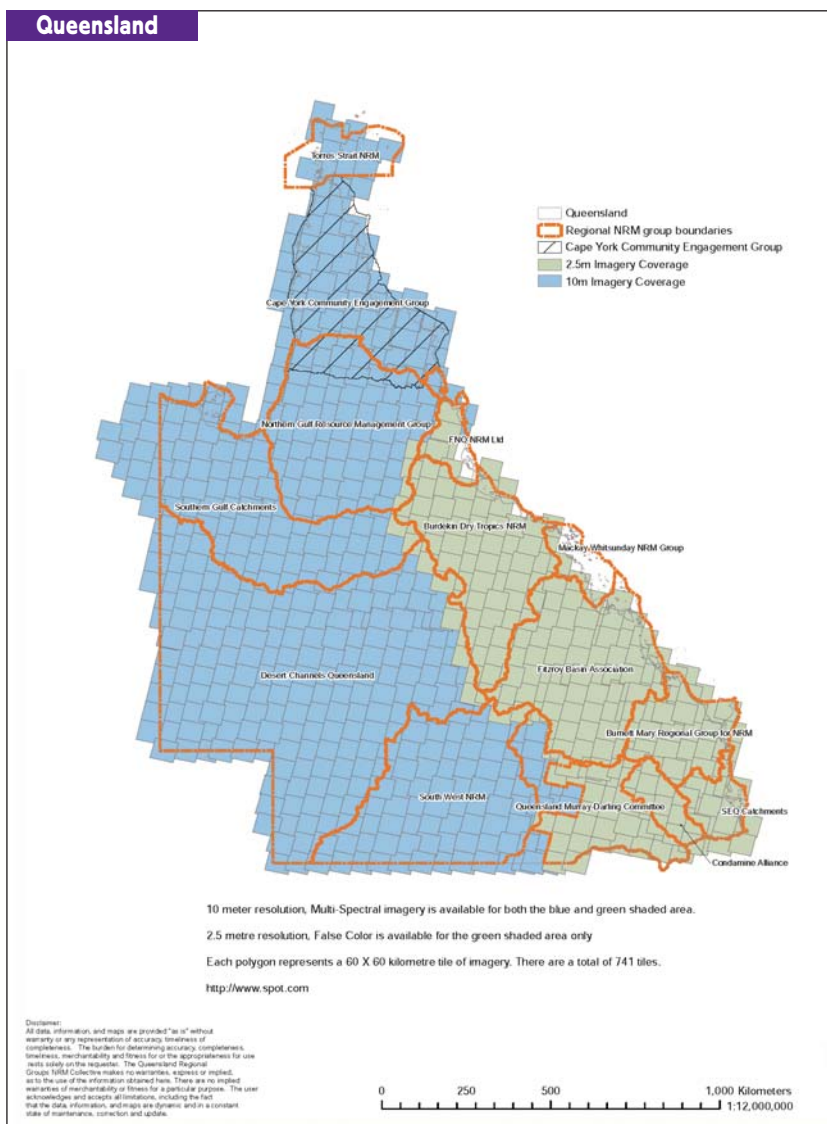


MAPPING

LAND-USE IN AUSTRALIA

Dossier

A collective of Queensland Natural Resource Management (NRM) Groups established the Spatial Imagery Project to coordinate the state-wide purchase of SPOT 5 satellite imagery to support regional projects. A project steering team including representatives from regional groups and state and federal government departments was formed to coordinate the data purchase.



Widely shared database

SPOT 5 imagery was purchased over Queensland by the Regional Groups Collective in 2006/2007. Queensland covers 1.72 million sq.km, stretching from the Torres Strait in the north over 2,000 km south to the New South Wales border (map opposite). This imagery has been distributed to a broad range of users from landholders and research groups to local, state and federal government departments. As one could expect from such a diverse range of organizations, the imagery has been used in many different ways.

This purchase represents the largest single state-wide acquisition of satellite imagery ever undertaken in Australia, providing a base-level source of imagery to support property planning and regional resource condition monitoring.

There are very few available datasets for Queensland, and those offer only very coarse resolution. Distributing SPOT 5 imagery throughout the state has enabled various groups to map different regions and themes at a large scale. These maps are being used for monitoring and evaluation of natural resources and as a tool supporting managerial decisions.

Property mapping and land management

The Northern Gulf Resource Management Group has distributed 10-metre-resolution SPOT 5 imagery to 88 family properties and 5 company properties. The use of satellite imagery as a primary component of property management and natural-resource mapping has been widely accepted throughout the region.



SPOT 5 imagery cover over Queensland

➤➤➤ The map on page 13 is an illustration of some of the data captured from the imagery. The new imagery has dramatically improved mapping times and detail for the graziers. Initial estimates have indicated that some properties will capture 90-95% of infrastructure from the imagery, which will represent a substantial cost saving to all involved.

The SPOT 5 imagery, in conjunction with the Queensland Department of Primary Industries and Fisheries (DPI&F), has greatly improved the ability of graziers to interpret, classify and map land types at the paddock scale used in the GLM [Grazing Land Management] (Savanna Plan) process, which results in the establishment of on-ground monitoring sites to determine pasture yield, ground cover and land condition.

Whilst this SPOT 5 imagery was purchased primarily for property mapping and to support projects across each region, additional benefits were soon evident.

Supporting safety

In the Northern Gulf region, Queensland Police and State Emergency Services have used the SPOT imagery for terrain and topography interpretation, planning, monitoring and coordination in three successful land searches for missing persons in the last six months. Furthermore, the imagery has also been used for interpretation and analysis of terrain and topography by the Australian Transport Safety Bureau (ATSB) and Queensland Police Forensic Crash Investigators currently investigating a fatal survey plane crash near Georgetown.

Geoscience Australia is using the SPOT imagery to update topographic maps. These maps can then be used in emergency management situations in conjunction with state authorities. Selected theme updates are also being undertaken, including vertical obstructions (towers), electricity, buildings and roads. The imagery is also being used by modellers in the critical infrastructure team wanting to fine-tune their disaster scenarios.



SPATIAL IMAGERY PROJECT

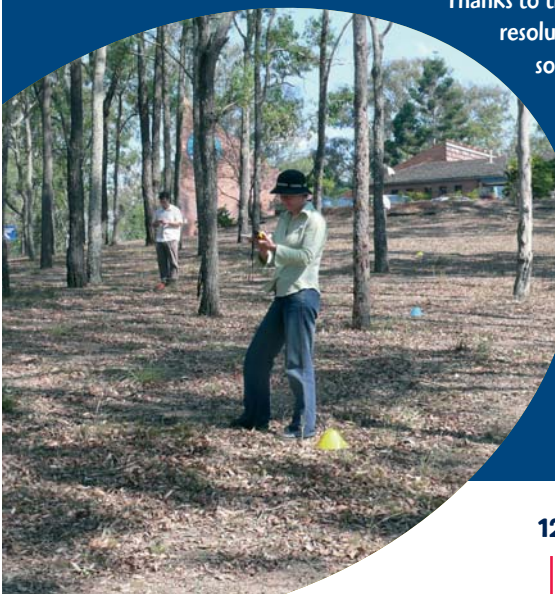
Spatial imagery acquisition and management has been identified as a key issue by the Queensland Regional NRM Groups Collective (RGC). The capacity of NRM bodies to use spatial technology (GIS) varies across the state, with some NRM bodies having more advanced systems in place than others. As part of a conscious effort to enhance spatial analysis capabilities and coordinate the acquisition of satellite imagery, RGC initiated the Spatial Imagery Project in 2005/06.

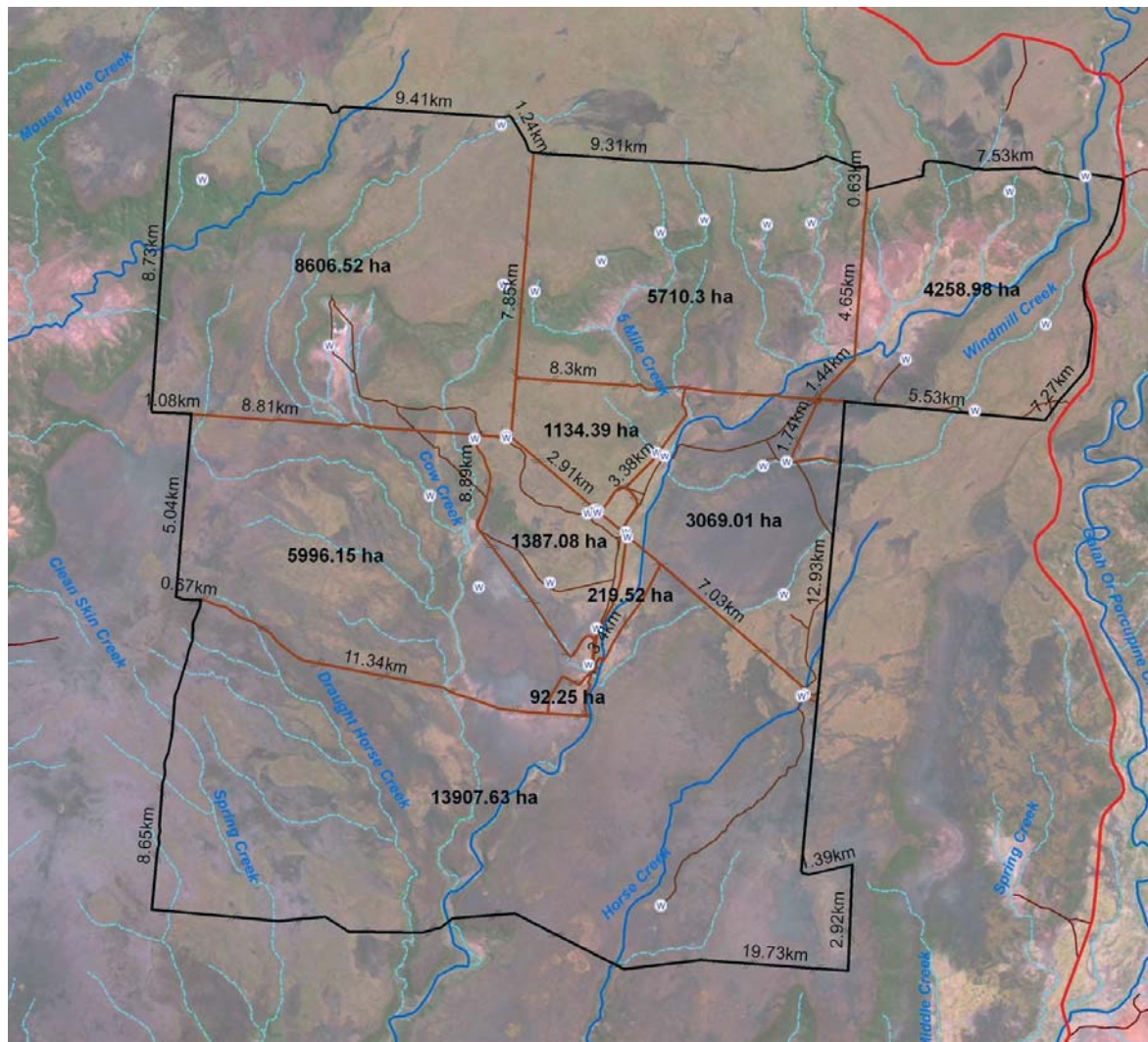
The specific goals of the project are to:

- strengthen spatial data management skills within regional bodies
- improve knowledge and use of spatial data and technology in the community
- facilitate integration of spatial analysis into planning and investment strategies
- support improved monitoring of resource condition
- coordinate acquisition of critical spatial imagery to support regional delivery.

Spatial data managers within regional NRM groups maintain spatial data and provide services to distribute products to various stakeholders within their NRM region. These spatial data relate to a range of generic NRM themes in a variety of forms to support improved delivery of NRM programmes.

Thanks to the RGC Spatial Imagery Capture Project, regional groups now have access to high-resolution SPOT 5 imagery and have invested in spatial information technology and GIS software. The training has provided an excellent opportunity for regional NRM Groups to increase their spatial data management skills and pass these skills onto the community. Landholders that have attended the training have continued using the technology to assist in the running of their properties and managing their land. To ensure the achievements of the last two years are continued through future regional arrangements like Caring for Country, the Regional NRM Groups and RGC have developed the Spatial Imagery Capture Project Strategic Plan. This plan documents many of the achievements from the project and provides guidance for initiatives, such as training and data standards. As well as providing future strategies and actions, Regional NRM Groups, industries and government can use the strategy to guide future sustainable investment in spatial technologies and data management.





Property-scale data
captured from SPOT 5
imagery

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Monitoring high-risk zones

The Queensland Environmental Protection Agency (EPA) has used the SPOT imagery to assist the wetlands mapping and classification project. This project provides comprehensive coverage of wetlands, mapped at an appropriate scale and level of detail to guide the implementation of management actions and to support management decision-making. Mapped areas of beach scrub along the Queensland coast were a priority for many groups. Beach scrub is an endangered coastal community that supports many important ecosystem processes. As a result of the mapping project, funding has been allocated to 12 priority remnant beach scrub areas in order to protect and improve their condition. Field project work such as fencing, weed control, revegetation and interpretive activities has also been funded.

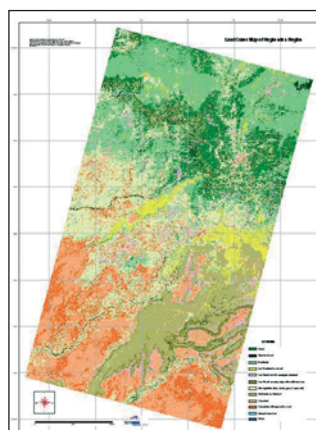
Another theme that has been mapped is riparian land use in the Condamine catchment. In collaboration with the University of Southern Queensland, the Condamine Alliance group used SPOT 5 imagery along with relevant spatial datasets (e.g. QLUMP land-use map, recent thematic maps and field data) to extract information for land-use/cover maps, woody vegetation maps and land-use

maps of the riparian buffer area. Similarly, as part of the Qscape project, NR&W in collaboration with the University of Queensland are investigating the use of SPOT 5 imagery to map and monitor riparian attributes (water body extent, bank stability, woody vegetation extent and density, overhanging vegetation in the South-East Queensland and Fitzroy Basin regions).

The Burdekin Dry Tropics NRM has funded the update of the Brigalow Belt regional ecosystem data. SPOT 5 satellite imagery is being used with SLATS imagery and aerial photography to capture this data. In the Fitzroy region, the imagery is also being used to validate the regional ecosystem mapping.

The datasets obtained from these projects are valuable for a state that has very little large-scale data. Spatial datasets are especially important for a state as large as Queensland, where it is a lot more efficient and cost-effective to use remote sensing as a tool for NRM management rather than field inspections.





Land-cover map

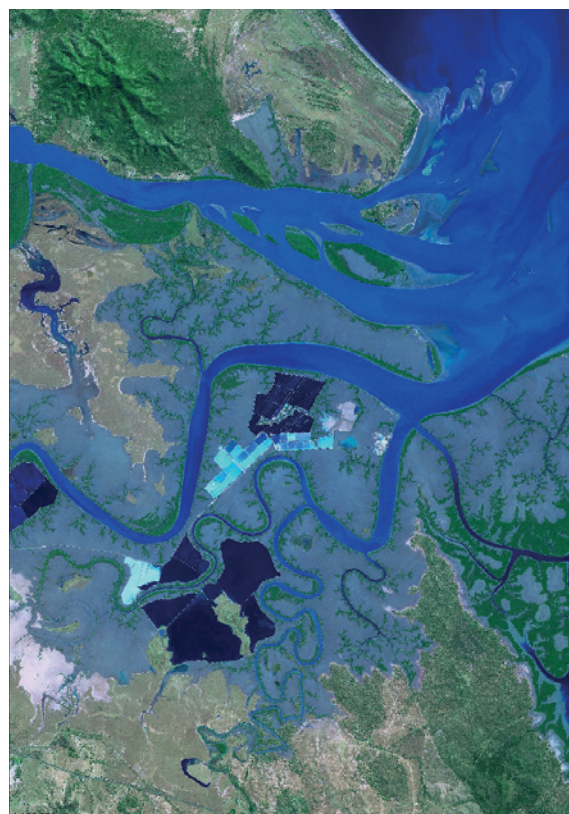
of Hughenden developed by Southern Gulf using SPOT 5 imagery.



Rural leases are using the SPOT imagery to create Property Maps of Assessable Vegetation (PMAV), which are required by the government before land can be cleared. The SPOT imagery has been used to obtain information on the land management conditions of leasehold land and also in the assessment of PMAV applications, and has proved to be a lot more accurate than previous methods.

Southern Gulf Catchments commissioned Terranean Mapping Technologies to assess the potential of using SPOT 5 imagery to map land cover within the Southern Gulf region. The land-cover maps were derived using supervised spectral classification of two 10-metre SPOT images over Mount Isa and Hughenden. High-resolution data and field observations were used to verify the results of the classifications and increase accuracy. The resulting maps have a resolution better than 30 metres, suitable for mapping at a scale of 1:25 000. The conclusion of this study was that supervised classification of SPOT 10-metre imagery, supported by field observations, is an efficient method for land-cover mapping. The resulting maps are valuable for assessing resource condition, provide a means for comparing different areas at a specific time and assist

Fitzroy
Basin



© Cnes - Distribution Spot Image

in assessing change in land cover and condition at times of similar environmental conditions. Graziers also benefit from these products, as knowing the land cover per paddock can enhance stock management and stocking rates. ■

MORE INFORMATION:

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THE SPOT 5 IMAGERY OF THE STATE OF QUEENSLAND HAS SERVED MULTIPLE APPLICATIONS:

1. NR&W uses the imagery to support the development of Property Maps of Assessable Vegetation (PMAV), to help rural land holders better manage their land holdings and observe government regulations on land clearing.
2. EPA uses the imagery to support the wetlands mapping project.
3. EPA uses the imagery to assist regional ecosystem update and validation.
4. Geoscience Australia uses the imagery to update topographic maps.
5. Emergency services use the imagery in disaster management and investigations.
6. Regional Groups use the imagery for property management and land-use/land-cover mapping.

Other uses of SPOT imagery around the state include:

- Pest management at Kroombit Tops National Park
- Investigation of land-clearing extents, both legal and illegal, on public and private land
- Permit evaluations in state forests
- Identifying suitable land to offset loss of endangered ecosystems through mining
- Assessment of biodiversity values for nature refuge proposals and potential park acquisitions
- Biodiversity assessment of mining and other development proposals and tenure renewals
- Assessing development applications, tenure dealings and state land assessments
- Determining whether subject parcels are triggered for assessment
- Park planning and infrastructure development (roads, fences, building locations etc.)

The recipients of the SPOT imagery have benefited greatly from the purchase. As a result, many new datasets have been created, providing NRM managers with the tools to better manage their natural resources.