ERIC
RESOURCE APPLICATIONS

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Regional Development

Application

ERIC resource intelligence represents a comprehensive suite of products and services developed to address regional development and environmental compliance. Spatially detailed information on natural, built and social resources is developed, integrated and analysed to provide intelligence to improve planning and management. Modern technologies are used to provide high quality and reliable information and reduce costs. Support is provided to ensure effective uptake and application of the detailed information.

The information is provided as digital maps in GIS to ensure effective and efficient access and facilitate application. This presentation also allows rapid production of purpose specific reports and maps as desired. The visual presentation aids in statutory presentations and public promotion as well as business planning. A staged approach can be used whereby requirements are re-evaluated at each stage of a project.

Approach

Spatially detailed information on natural, built and social resources are developed, integrated and analysed to provide intelligence to improve planning and management. Modern technologies are used to provide high quality and reliability and reduce costs. Support is provided to ensure effective uptake and application of the highly detailed information.

The range of products is comprehensive to address all needs for resource intelligence and to allow selection of products that best address identified requirements. A staged approach is often used whereby the requirements are re-evaluated at each stage of a project.

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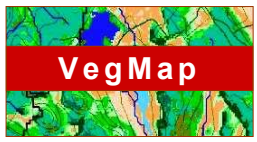
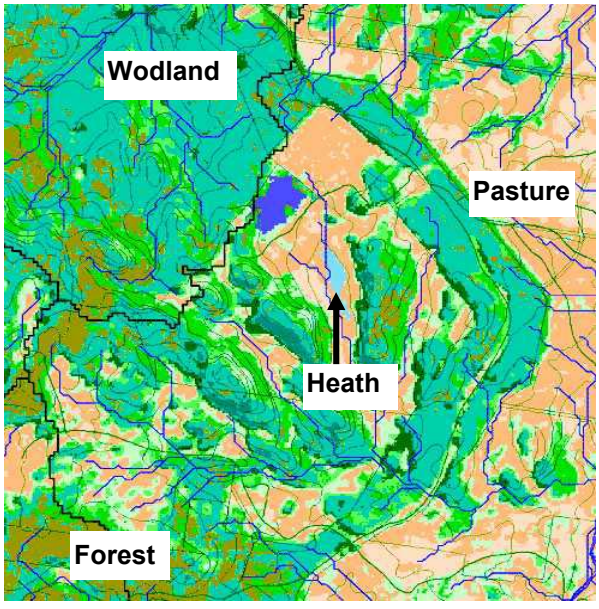
Product Range

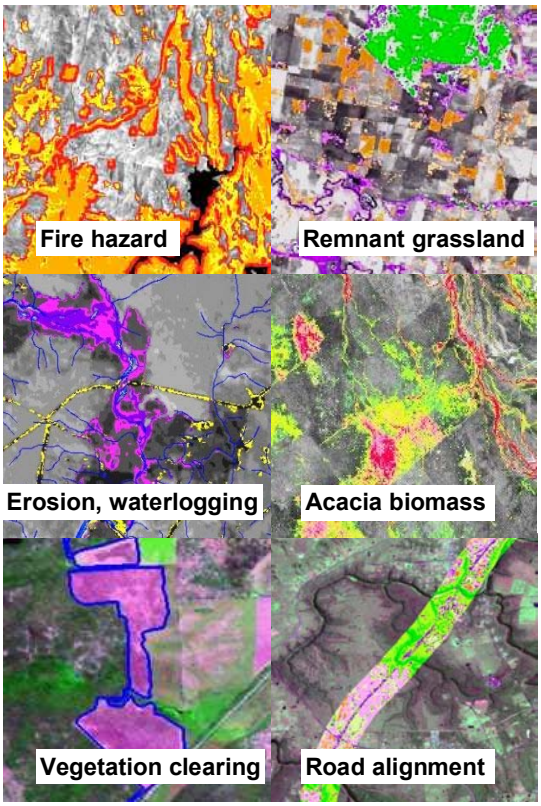
ERIC develops new information on vegetation, soils, and groundwater resources from remotely sensed data. New information is also derived from existing information, such as climate records. This is integrated with existing information on natural and social resources to address specific needs.



Vegetation map from satellite imagery



Vegetation



Reference information developed by ERIC from imagery includes detailed maps of:

- Vegetation / Land cover
- Soil
- Subsoil constraints

Existing information accessed, compiled, and developed to allow for integration includes:

- Terrain
- Climate
- Infrastructure
- Social constraints

Products developed from this information include maps of:

- Salinity hazard & risk
- Fire hazard
- Surface water and cold air drainage

Services based on the information include:

- Peri-urban development concept planning
- Groundwater bore location
- Waste water disposal
- Enterprise site selection
- Environmental risk assessment
- Environmental impact assessment
- Management information systems
- GIS development

Vegetation / Land Cover

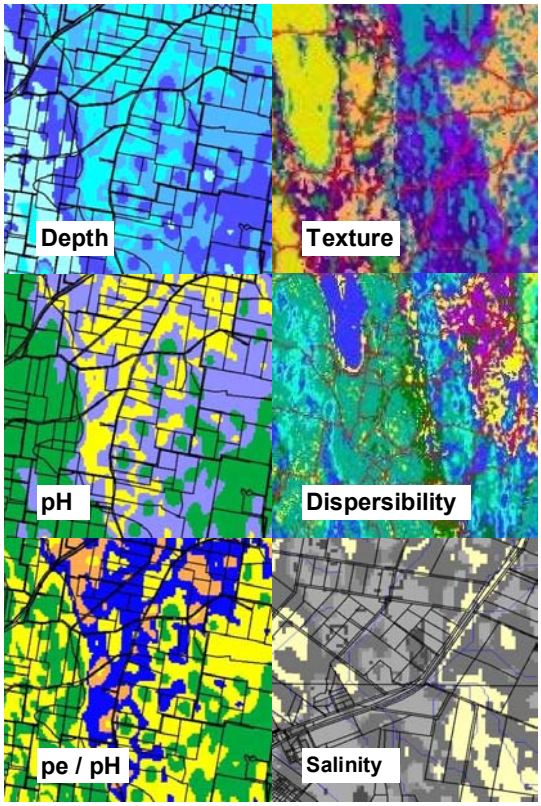
Satellite imagery is used to map current and historic patterns of vegetation and land use. Field observations are used to label the map categories. Client participation in the field observations facilitates information transfer.

The fire hazard map illustrates development of information from a reference vegetation map to address specific requirements. The reference map can also be used to map attributes such as urban spread, native woody vegetation, remnant grasslands, waterlogging and bare ground. The information can be cost effectively used to monitor changes in land use and land condition.

Soil Mapping

Soil maps are cost effectively developed from radiometric images using technology developed and commercialised by ERIC. The maps give information on soil properties important for land management such as pH, texture and salinity. Paddock level detail is

Soils Properties



achieved with regional coverage where regional information is used in site selection and planning.

The detailed information on soil properties is obtained through field sampling and laboratory analysis and maps produced to address specific needs.

Information on soil properties allows production of purpose specific maps, such as salinity risk and hazard. Such maps have been used to identify how adverse salinity impacts have arisen. Together with other information on soil properties the salinity results allow identification of hazard and risks and provide the information needed to plan and implement remediation.

Subsoil Constraints

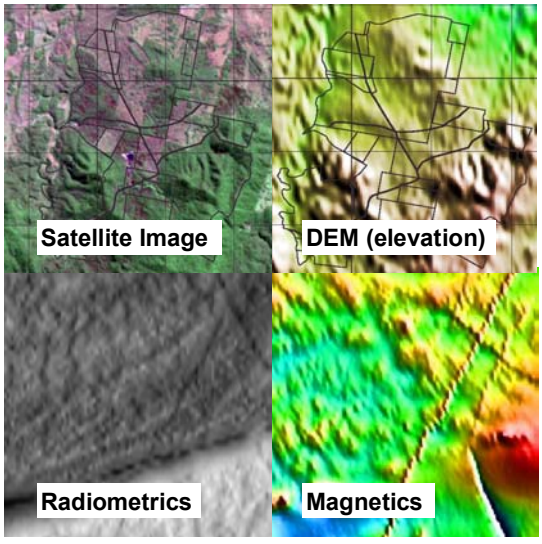
Airborne geophysical and satellite imagery are used to provide information on subsoil conditions. Airborne radiometrics identify fractures associated with preferred pathways for water flow while magnetics identify deep subsurface structures.

The data allow identification of subsurface geological structures such as fault lines, fractures and boundaries between geological formations. This information is used to target ground observations for locating sites prospective for groundwater bores.

Climate

Climate products address general constraints on land uses such as crop selection, fire risk and waste water disposal. Maps of climate surfaces for rainfall, temperature etc. are sourced from the Bureau of Meteorology or developed from station records, terrain and other information. The data are analysed to develop further information such as frost risk.

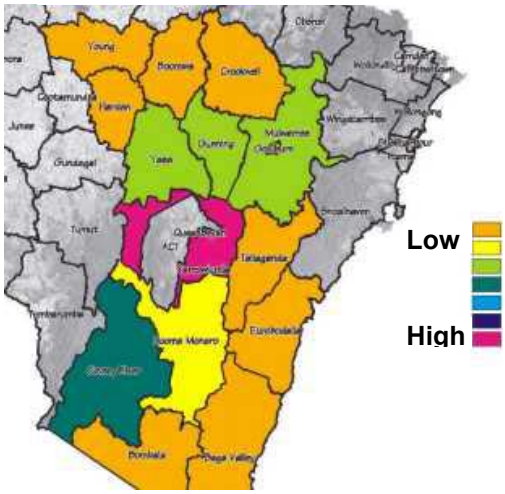
This intelligence is used with information on terrain to address issues such as frost risk and surface water yields. It is combined with knowledge of plant performance for crop site selection.



Social Context

Social and economic information is obtained from existing records and presented in a spatial context. This is integrated with information on infrastructure and natural resources to identify opportunities and constraints to development.

Household incomes for shires surrounding the ACT



Application

Uncertainties when addressing enterprise development relate to the suitability of the land for the purpose. Is the land suitable for the intended purpose by way of production and environmental sustainability? Do sites exist that are better suited? With existing landholdings, what are the alternate potential profitable and sustainable alternate land uses?

Many decisions with enterprise development have been pragmatic in reflecting a single

factor, such as proximity to existing business or the availability of water. This simple approach to decisions has largely arisen because of deficiencies in information. The resource intelligence needed for an informed decision either does not exist or is dispersed and difficult to assemble and use.

The ERIC range of products provides information to identify potential opportunities and identify the best locations for particular activities. The scope can be broad, such as mapping areas of Australia climatically best suited to high value tree species, or highly specific, as with identifying the sites best suited to viticulture and the most appropriate grape varieties.

The environmental and social resource information can be used in meeting statutory environmental requirements as well as for business planning. Provision of high quality resource intelligence reduces risk by improving business and environmental outcomes.

Peri-urban development

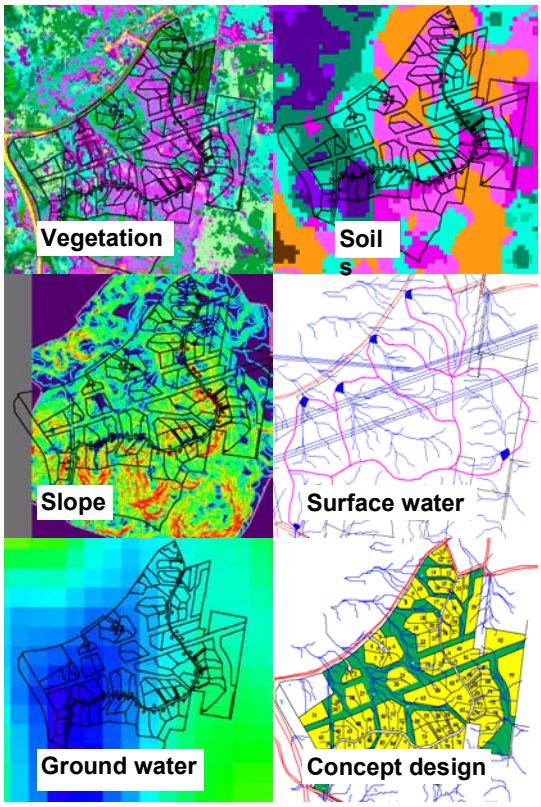
The information produced for peri-urban development includes the detailed information on soils, vegetation, terrain and climate identified above. The main differences relate to the need for additional analyses to address water yields and disposal. Groundwater assessment is usually also conducted as this provides a cost-effective means of addressing the requirement for water supply.

Agriculture

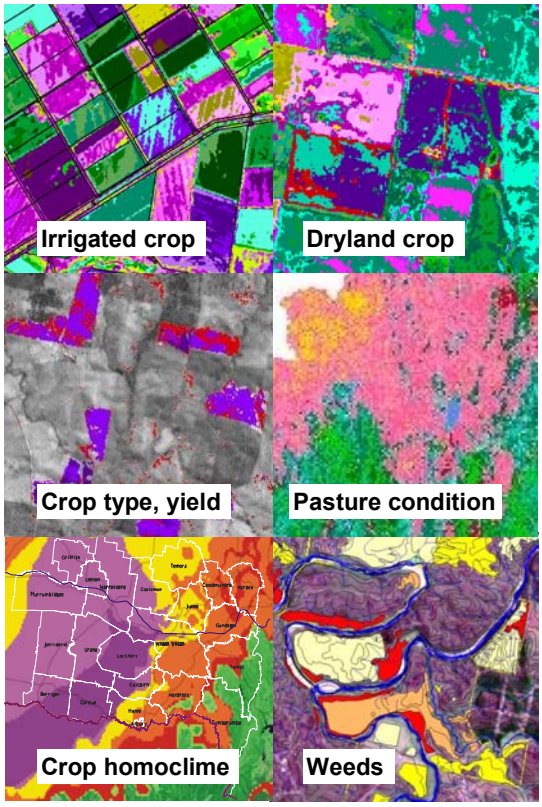
Many of the products addressing agriculture represent specific applications of vegetation and land cover mapping. Maps can identify the land use and condition of crops. Specific crops can often be identified from the imagery and variations in yield mapped. This information is combined with ground observations to determine the reasons for yield variations to provide for improvements in management performance.

The imagery also allows monitoring of pasture condition and can be used for mapping weeds. In this example the imagery provided the reference for detailed field observations. In other situations a weed can be mapped directly from the satellite imagery when the ecology of

Peri-urban development



Agriculture



the species is known, as with prickly acacia.

Other agricultural products address site selection. Homoclimes are used to match climates with locations where particular crops are known to perform well. Detailed site selection is achieved by combining this with information on soils and terrain.

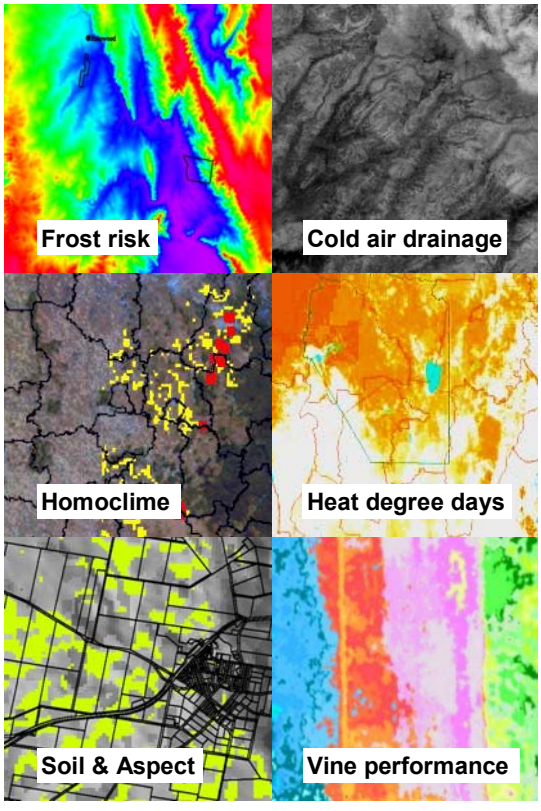
Viticulture

Viticulture represents a special agricultural case. Grape vines can grow under a wide range of conditions but the risks, fruit quality and profitability of enterprises are highly site dependent. Frost risk and cold air drainage identify the potential risk from frost early in the season.

Homoclime analysis can be used to compare climates for premium vineyards in Europe with those in Australia. A more sensitive analysis is given by heat degree days where this allows selection of varieties appropriate to the climate at potential sites. This is combined with information on soil properties and terrain to identify the most suitable sites for particular varieties.

Satellite and airborne imagery can be used to monitor the development of viticultural regions and vine performance.

Viticulture

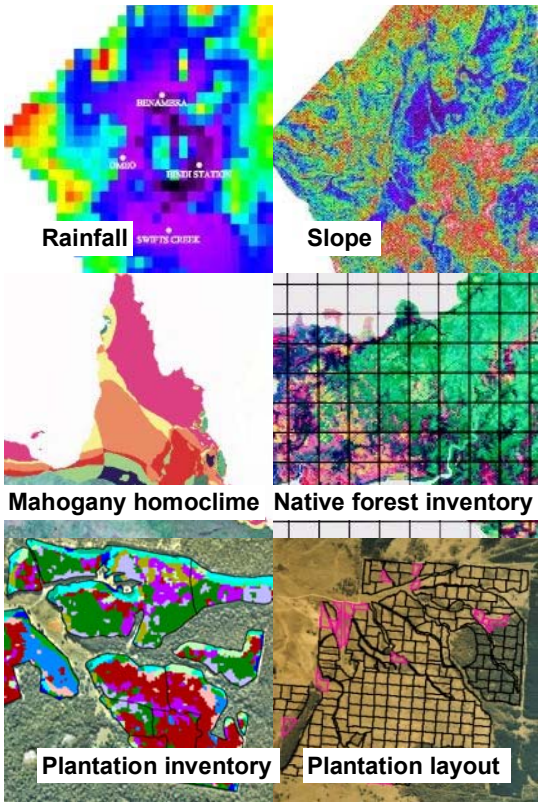


Forestry

The information developed for forestry is similar to viticulture but is usually much more extensive. It involves regional assessment of the suitability of soils and climates and the occurrence of exclusions such as high slopes and native woody vegetation. This information identifies the extent and suitability of available land. Detailed plantation development maps are produced for compliance and development.

Satellite imagery can be used to improve the cost effectiveness of plantation inventory. In remote areas this often provides the only means of obtaining a reliable assessment of the native forest resource.

Forestry



Information Management

Environmental Management Information Systems

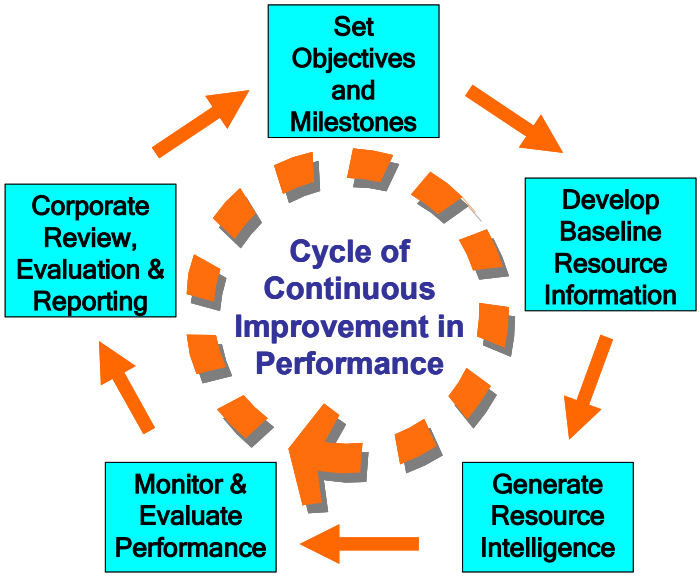
The Generic Environment Management Methodology was designed to cost-effectively

address environmental issues. Modules are linked in a feedback cycle to achieve continuous improvement in performance. The ERIC products and services provide the basic components for implementing this management system that incorporate the ISO1404 principles for environment management.

Risk Management Assessment

A risk assessment methodology that provides a rapid and comprehensive means of ensuring all planning and management issues are identified and addressed. The method pinpoints deficiencies and can provide a statistical evaluation of performance. Such assessment provides the basis for the development of plans and actions to demonstrate environmental and management compliance. The risk assessment method allows for self assessment and the result can be used to monitor performance.

Environment Management Information System



Environmental Impact Assessment

Landscape Element	Landuse Activity	Economic	Social	Environment
Urban Land	Agriculture	Production	Employment	Vegetation
Rural Land	Forestry	Supply	Health	Native plants
Industrial Land	Horticulture	Transport	Social Services	Weeds
Waterways	Housing	Demand	Education	Native animals
Littoral	Retail	Personnel	Communications	Vermin
Offshore Marine	Manufacturing	Power	Public Transort	Water yield
	Tourism	Water	Heritage	Water quality
	Recreation	Sewage	Noise	Soil health
	Fishing	Roads	Dust	Soil erosion
	Mining	Communications	Air pollution	Soil salinity

The economic, social and environmental attributes are evaluated for every combination of Land Use Activity and Landscape Element. Each cell is scored with a +1, 0 or -1 (an impact can be positive, neutral, or negative). Inapplicable cells (na) are nulls.

The scores can be variously presented as:

- average score for all entries
- average score for combined positive and negative entries
- separate totals for positive and negative scores.

Results are given as a proportion for each category when comparing between the social, economic and environmental categories.