Mapping priorities
Planning re-vegetation in southern NSW using a new decision-support tool

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Where to re-vegetate for NRM benefit?

Deciding where to invest in natural resources management is not a simple process. Apparently straightforward questions such as ‘Where should we invest in re-vegetation?’ raise complex issues of equity, economic performance, and biophysical impact. Usually there is no ‘right’ answer. Re-vegetation, for example, may have benefits for biodiversity, water quality and amenity, and costs associated with reduced water supply and agricultural production. An informed decision requires the combination of disparate data and information (environmental, social and economic), value judgements, opinion, and policy and management goals. In the end, justifiable conclusions depend on systematic and transparent analysis.

Facilitating the decision-making process

A practical catchment scale natural resource management planning process needs to focus on indicative zones for investment in landscape change, consistent with maximising multiple environmental outcomes. In a regional context an effective prioritisation process provides for:

- the best possible use of existing data sets and the technical expertise of participants
- integrating knowledge and balancing landscape options in a transparent and objective way and at a level that allows prioritisation of on-ground works
- incremental improvement over time, bringing together new information to help decision-making.

Putting theory into practice – assessing re-vegetation options

CSIRO Land and Water and the Murray Catchment Management Authority (CMA) recently worked together to identify priority areas for re-vegetation in the West Hume region of southern NSW (Hill et al. 2006). The project showed how to prioritise locations for regional NRM investment using a simple MCA approach, readily available data and a strong participatory process. The project also took advantage of an innovative new spatial multi-criteria decision support tool developed by the Bureau of Rural Sciences – the Multi-criteria Analysis Shell for Spatial Decision Support (MCAS-S).

MCAS-S

MCAS-S is an easy-to-use spatial multi-criteria decision support tool specifically designed to help people with a stake in land use and investment decision-making – this includes natural resource management groups, agricultural scientists, policy makers and land management researchers.

The tool is freely available, reads standard data formats, is easy to use by non-specialists, and is designed for use in participatory processes. GIS (geographic information systems) programming is not required, removing the usual technical obstacles to non-GIS users.

MCAS-S promotes:

- insightful desktop combination and study of different types of mapped information
- understanding of the relationships between the decision-making process and the available spatial data
- interactive live-update and mapping of alternative project scenarios.
- investigating suitable landscapes for acquisition of areas for conservation

This work translated the Murray CMA regional investment strategy into mapped priorities by focusing on identifying where multiple environmental outcomes and production benefits could be achieved at minimal cost.

Results of the West Hume study provide a basis for allocating investment according to relative suitability in a catchment context. Further decisions on string re-vegetation work are made in the context of local farm plans and farmer land management objectives.

New plantings on the West Hume study area have benefits for both biodiversity and salinity management. Photos: Mark Glover, CSIRO
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- highly flexible
- able to capture quantitative and qualitative data and issues
- relatively simple for clients and stakeholders to use
- allow the development of many alternative scenarios
- allow the exploration of tradeoffs
- enable stakeholders to factor results into their decision-making process to the desired degree.

Figure 1. Prioritisation for re-vegetation in the West Hume area (Murray CMA)

MCAS-S

Mediator of multi-criteria analysis for spatial decision support (MCAS-S) is an easy-to-use spatial multi-criteria decision-support tool specifically designed to help people with a stake in land use and investment decision-making – this includes natural resource management groups, agricultural scientists, policy makers and land management researchers.

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Can the West Hume process be translated to other regions?

Skills and technology

Implementation of a regional MCA similar to that applied in the West Hume area requires staff with some GIS skills (or access to GIS support), awareness of multi-criteria analysis procedures and technical understanding of relevant land management principles. Staff should also be capable of running a local community participation, reporting and communication process.

Data preparation, guideline formulation, and criteria weighting can generally be competed by local agency and regional staff with minimal external support.

Technical input in disciplinary areas requires a technical reference group.

Data needs

The West Hume study demonstrates that sound outcomes can be achieved with commonly available spatial datasets. Key spatial data requirements include:

- historical rainfall and temperature;
- elevation (and derivatives, e.g. slope);
- soil landscapes and profile classes;
- soil water holding capacity;
- current (or recent) land use;
- pre-settlement vegetation;
- threatened species (point) data;
- groundwater pressure and quality data;
- groundwater flow systems mapping;
- drainage networks, stream flow and water quality;
- cadastre and the location of important assets or infrastructure such as towns and roads.

The relative importance of each data set is dependent on the particular mix of themes and guidelines in the analysis. Good quality climate, soil, land use, and hydrological data will usually be important.

Outcomes

The adoption of a regional planning process such as that used in West Hume can substantially improve the effectiveness of investment in natural resource management through improved targeting of on-ground works expenditure. The process relied on readily available data inputs. Guidelines were generic and may be applied to other areas with minimal change.

The use of MCAS-S also makes spatial MCA much more straightforward, reducing the cost of implementation. MCAS-S means the investment decision-making process can be incrementally updated or improved, and is transparent to users. The cost of analysis is very small in comparison to the potential advantages from improved targeting of investment.

Figure 2. Using MCAS-S to link spatial criteria prioritising re-vegetation in West Hume for biodiversity and salinity outcomes.

Can the West Hume process be translated to other regions? The adoption of a regional planning process such as that used in West Hume can substantially improve the effectiveness of investment in natural resource management through improved targeting of on-ground works expenditure. The process relied on readily available data inputs. Guidelines were generic and may be applied to other areas with minimal change.

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Figure 3. An MCAS-S ‘two-way’ analysis combining biodiversity and salinity to show where there is a co-incidence of re-vegetation priorities.

References


More information on MCAS-S, including software download and user guide, can be found at www.brs.gov.au/mcass

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