



Bioregional guidance planning and spatial conservation analyses – Methods

MAY 2026

Purpose of this fact sheet

This fact sheet is intended to help stakeholders, who have experience in spatial data, understand how the spatial conservation analyses have been developed. This includes the input data, processing applied and the outputs. Another fact sheet explains how to interpret and apply the spatial conservation analyses and can be accessed [on our website](#).

It should be read in conjunction with other information about bioregional guidance planning:

www.environment.qld.gov.au/management/planning-guidelines/bioregional-planning.

What do the spatial conservation analyses do?

Spatial conservation analyses supports the development of bioregional guidance planning. It also provides guidance to improve decision-making.

Bioregional guidance planning is a strategic approach established under Australia's *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) which guides how cumulative impacts to the environment should be managed in an area of economic importance. EPBC Act decision-makers must have regard to the Plan when making a relevant decision, including project decisions and landscape-scale approaches.

Bioregional guidance planning considers the impacts of possible development on the Matters of National Environmental Significance (MNES), under the EPBC Act. Bioregional guidance planning has a specific focus industry: urban development in south-eastern Queensland, minerals mining in north-western Queensland and wind farm developments in northern Queensland.

Spatial conservation analyses are developed specifically to inform the pilot bioregional guidance planning; however, the robust scientific method means that they could have broader applicability as guidance tools for a range of users. This includes developers, regulators, strategic planners, conservation groups, and natural resource management groups.

Spatial conservation analyses contribute to bioregional guidance planning by producing analyses linked to three objectives:

- Important conservation areas
- High restoration potential areas
- Representative protection areas.

To support implementation of the draft bioregional guidance plans, the Department of the Environment, Tourism, Science and Innovation (DETSI) has shared a draft [Bioregional Planning Interactive Tool](#), available on our website. This tool shows:

- The Spatial Conservation Analysis, which identify areas important for MNES and the reasons they are significant
- The results of the cumulative impact assessment, such as interactive information on protected matters, their sensitivity to impacts, and the effectiveness of mitigation measures.

1. Important conservation areas

The important conservation area analysis identifies areas that contain important MNES values that are difficult or impossible to recreate or restore, such as old growth forests. They also show critical bottlenecks or 'pinch points' between important conservation areas that, for example, native animals need to pass through. These areas need to be investigated further to determine the specific location of features that have been identified as difficult or impossible to recreate or restore.

Figure 1 outlines the steps used to identify important conservation areas.

Source data

Important conservation areas are identified using data on ecological values and site-based values. Ecological values include threatened ecological communities represented by relevant regional ecosystems, MNES species habitat stability under future climates (the extent of a species' potential habitat that remains stable through time based on climate modelling) and the Department of the Environment, Tourism, Science, Innovation (DETSI) Biodiversity Planning Assessments (BPA) and Aquatic Conservation Assessments (ACA) that are linked to irreplaceable values and threatened species. Site-based values include World and National Heritage areas and Ramsar wetlands, which are internationally recognised for their importance.

Processing

Processing the source data involves assessing BPA and ACA areas against important conservation areas criteria for inclusion as ecological values. Factors considered include: restoration timeframe capability; uniqueness/rarity; high condition state; non-recreatability; and critical refugial value. All ecological values and site-based values are combined to indicate the presence of important conservation areas.

Modelling

Modelling includes circuit-based connectivity analysis (using vegetation condition) between important conservation areas and providing locations of connectivity pinch-points for supporting important conservation areas. The vegetation condition layer used is a combination of the DETSI Spatial BioCondition layer, the DETSI Vegetation Assets, States and Transitions (VAST) layer, and the Habitat Condition Assessment System layer, ensuring statewide coverage using the best available data.

Outputs

The output shows where important conservation areas exist and the critical connectivity pinch-points between important conservation areas. This is aggregated into tiles representing percentage coverage to allow quick assessment of the relative importance of areas and extraction of information about what MNES values may occur in that area.

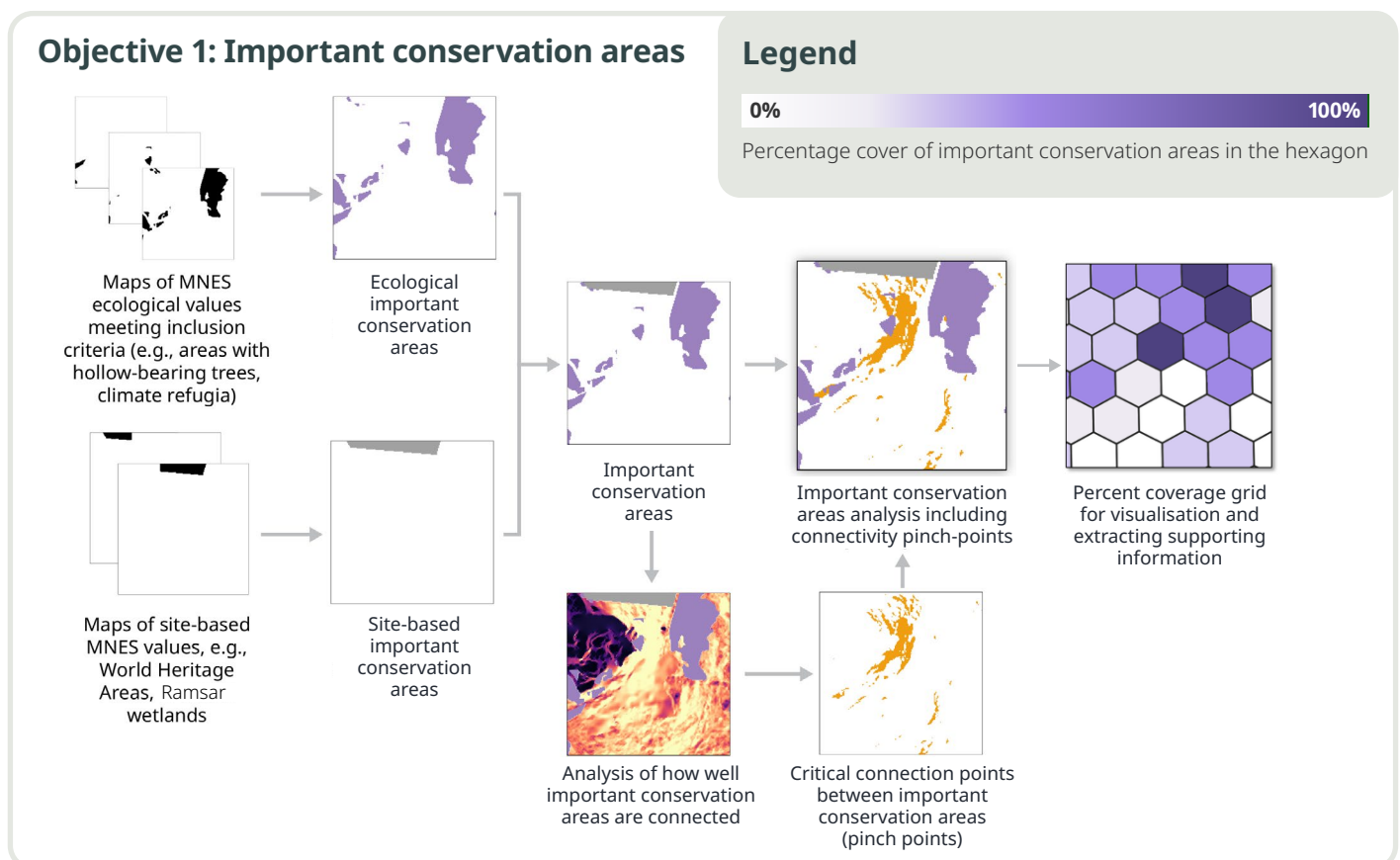


Figure 1. Process to undertake important conservation areas analysis

2. High restoration potential areas

The restoration potential analysis identifies the areas with the highest restoration potential in the landscape, especially through improving vegetation condition. The results show the top 30% of areas for restoration of MNES values. The restoration potential areas analysis aligns with Australia's national restoration targets and the Global Biodiversity Framework target to have at least 30% of degraded ecosystems under effective restoration by 2030.

Restoration is crucial for re-establishing critical or threatened ecosystems, improving the connections between fragmented ecosystems to support the movement of animals and spread of plants between areas, and improving degraded land to benefit multiple MNES.

If areas of high restoration potential are lost, it is likely to increase the future cost of offsets and other restoration actions to achieve net positive outcomes and could mean that, for some values, net positive outcomes cannot be achieved.

Figure 2 (page 4) outlines the steps used to identify high restoration potential areas.

Source data

Restoration opportunities are identified as subregional priorities using a combination of ecological and landscape data. This includes threatened ecological communities (represented by relevant regional ecosystems) and MNES species distribution data. Where multiple data sources are available for MNES species distributions, the order of priority is: DETSI Habitat Suitability Models; DETSI Potential Habitat Models; National Environmental Science Program (NESP) Northern Australia Hub Species Models; Department of Climate Change, Energy, the Environment and Water (DCCEEW) Species of National Environmental Significance Models; and DETSI Flora and Fauna Records Database records (Criteria A and H).

The landscape context includes vegetation condition data (a combination of DETSI Spatial BioCondition where available, DETSI Vegetation Assets, States and Transitions (VAST), and Habitat Condition Assessment System (HCAS)); areas of low flow surrounding pinch points between important conservation areas (from the important conservation areas analysis); an Interim Biogeographical Regionalisation for Australia subregion mask for prioritisation at a subregional scale; and a land-use intensity mask (based on the DETSI VAST) to exclude intense land uses (such as irrigated cropping and built up urban areas).

Processing

Source data is processed to prioritise areas for restoration based on ecological importance and regeneration potential. Processing involves assigning a weighting to each MNES to adjust their priority in the modelling based on endemism and threat status. For endemism, higher scores are given to MNES with a high proportion of their total range in Queensland occurring within the subregion, while for threat status, higher scores are given to more endangered MNES (e.g., critically endangered species score higher than vulnerable species).

The landscape context is adjusted to show regeneration potential, with the condition layer adjusted based on a human-induced regeneration vegetation condition benefit function, where low and intermediate condition scores have the highest potential restoration benefit. This function was developed by DETSI for use in the [Land Restoration Fund](#).

Modelling

Modelling involves systematic conservation prioritisation using Zonation 5, with prioritisation occurring at a subregional scale based on confluences of MNES, scaled condition, and connectivity, while excluding areas with intense land use.

Outputs

The output shows the areas in the top 30% for restoration potential, once areas of intense land use are excluded. This is aggregated into tiles representing percentage coverage to allow quick assessment of the relative importance of areas and extraction of information about what MNES values may occur in that area.

Objective 2: Areas with high restoration potential

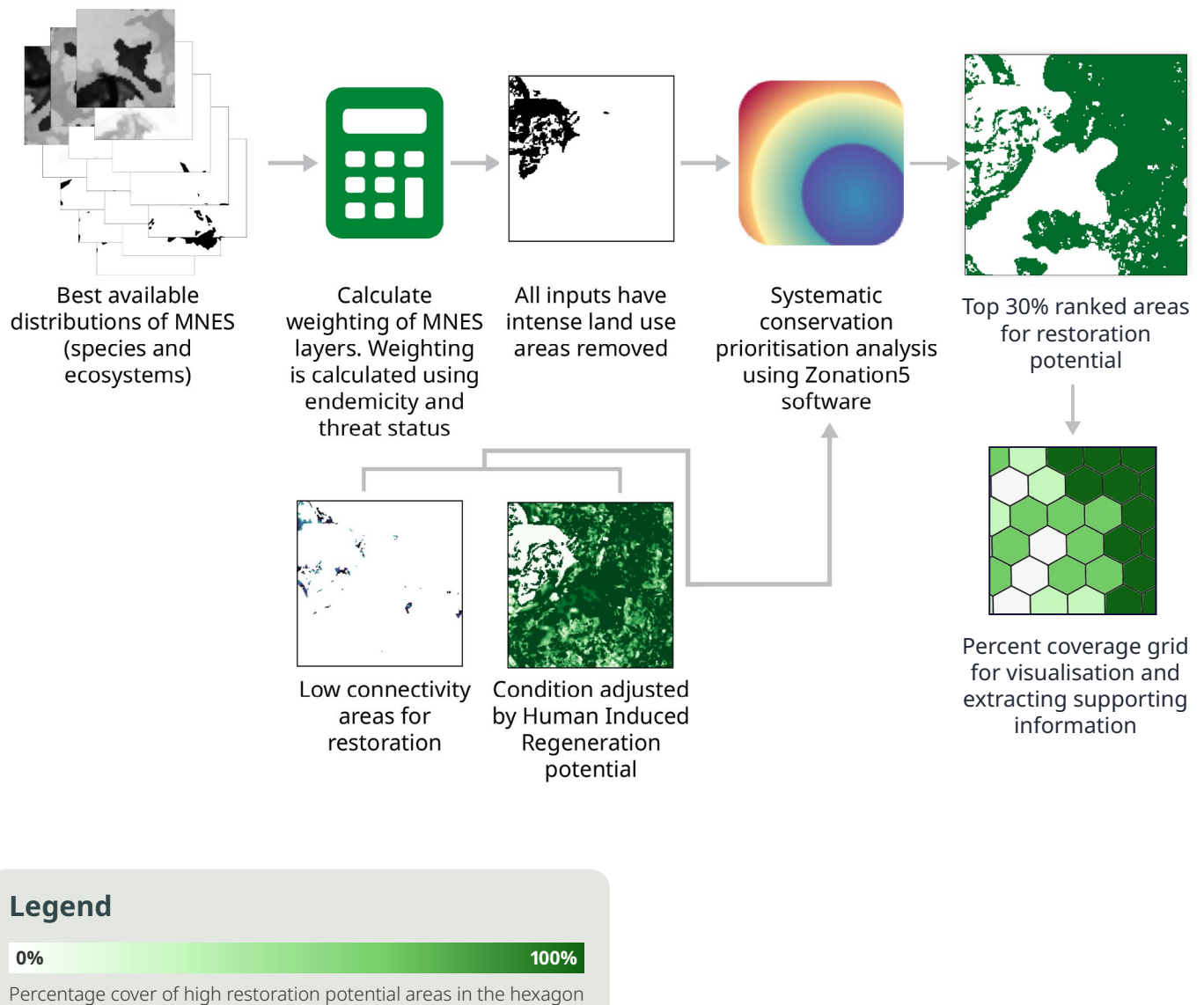


Figure 2. Process to undertake spatial conservation analysis for restoration potential areas.

3. Representative protection areas

The representative protection analysis identifies areas where protection of existing habitat could most benefit MNES. This protection could be given through, for example, planning schemes, covenant, or protected areas such as national parks. The results show the top 30% of areas that are representative of MNES values outside existing protection. Representative protection analysis aligns with Australia's national target to conserve 30% of the landmass by 2030, with representative protection areas covering 30% of the remaining land in each subregion after excluding existing protected areas.

Figure 3 (page 6) outlines the steps used to identify representative protection areas.

Source data

Representative protection uses similar ecological and landscape data to restoration priorities; however, this data is tailored for representative analysis. This includes MNES such as threatened ecological communities (represented by relevant regional ecosystems) and MNES species distribution data in order of priority. Data sources include DETSI Habitat Suitability Models; DETSI Potential Habitat Models; National Environmental Science Program (NESP) Northern Australia Hub Species Models; DCCEE Species of National Environmental Significance Models; and DETSI Flora and Fauna Records Database records (Criteria A and H).

The landscape context includes an Interim Biogeographic Regionalisation of Australia (IBRA) subregion mask to ensure the modelling prioritises within each subregion, a natural areas mask (based on DETSI remnant, high-value regrowth, and natural wetlands cover data) to exclude non-natural land uses, and a land-use hierarchical mask (based on the DETSI Vegetation Assets, States and Transitions (VAST) layer and various protection mechanism layers) to exclude intense land uses and separate prioritisation of areas under different levels of protection.

Processing

Source data is processed to prioritise areas for protection based on ecological importance and land-use context. Processing involves assigning a weighting to each MNES to adjust their priority in the modelling based on endemism and threat status. For endemism, higher scores are given to MNES with a high proportion of their total range in Queensland occurring within the subregion, while for threat status, higher scores are given to more endangered MNES (e.g., critically endangered species score higher than vulnerable species).

Modelling

Modelling involves systematic conservation prioritisation using Zonation5, with prioritisation occurring at a subregional scale based on confluences of MNES and hierarchical mask level, while excluding non-natural areas. Areas that are already protected are removed, and the priority ranking is rescaled back to 0-100.

Outputs

The output shows the areas in the top 30% for representative protection, once areas that are already protected are removed. This is aggregated into tiles representing percentage coverage to allow quick assessment of the relative importance of areas and extraction of information about what MNES values may occur in that area.

Objective 3: Areas important for representative protection

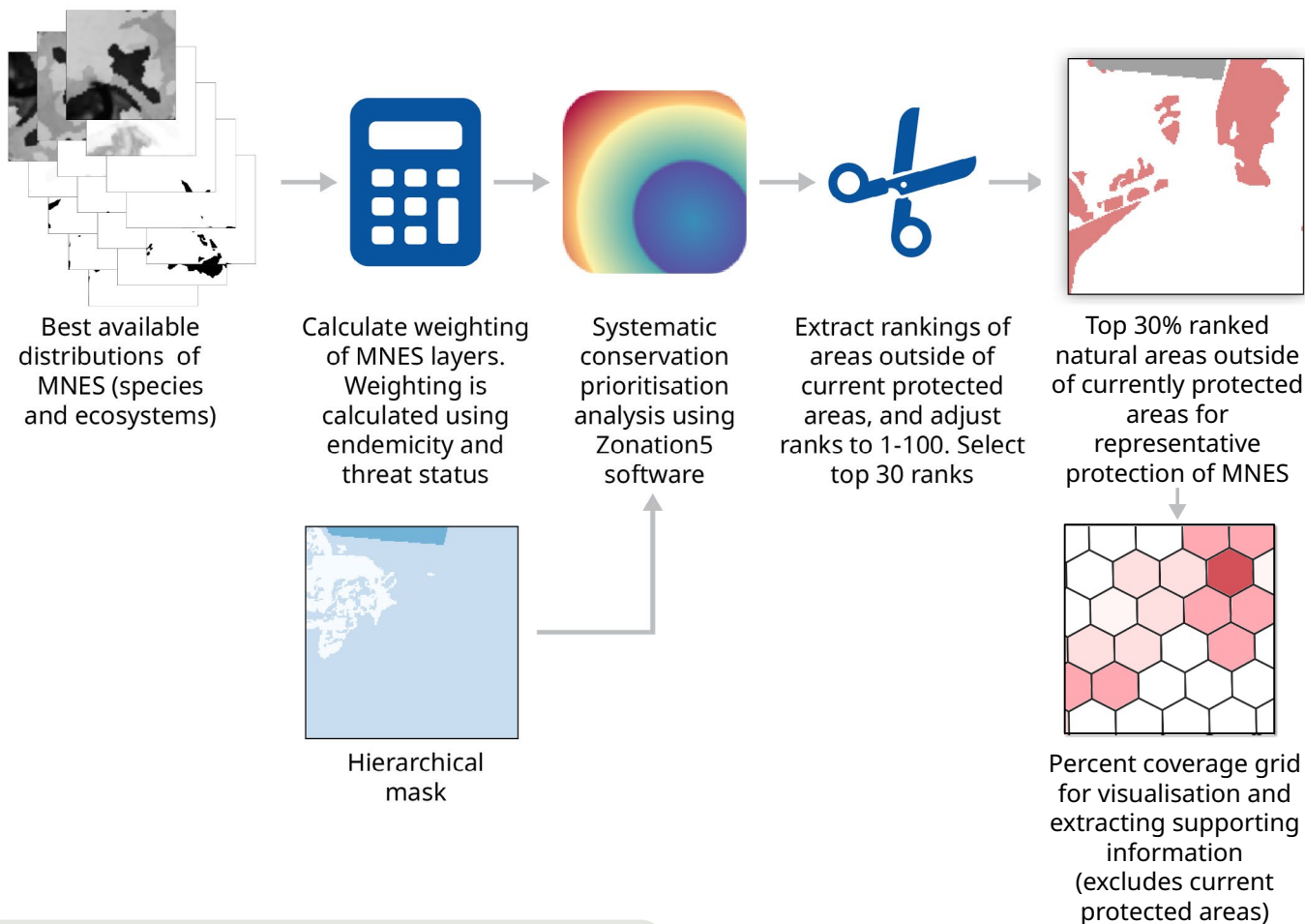


Figure 3. Process to undertake spatial conservation analysis for representative protection areas.

Further information

For information about bioregional guidance planning in Queensland visit [Detsi](https://detsi.qld.gov.au) website or contact us at bioregional.planning@detsi.qld.gov.au.

For information about Australian Government bioregional planning visit [Bioregional planning: Department of Climate Change, Energy, the Environment and Water \(DCCEEW\)](https://www.dcceew.gov.au/bioregional-planning).



Australian Government



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