



Terrestrial ecology

EIS information guideline



Queensland
Government

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Introduction

This guideline advises proponents about the information and assessment requirements in relation to terrestrial ecology when preparing an environmental impact statement (EIS).

The Department of Environment and Science (the department) has published separate, but related, [EIS information guidelines](#) (DES 2022) that provide additional and more detailed information about assessing aquatic ecology, groundwater dependent ecosystems including subterranean aquatic animals (stygo fauna), matters of national environmental significance (MNES), biosecurity (i.e. weeds and pests) and coastal protection and management.

What are terrestrial ecological values?

Terrestrial ecology includes biodiversity, vegetation communities, native plant and animal species and their habitats. Terrestrial ecological values include sites or features important to ecosystem function and the viability of populations of native species (e.g. wildlife corridors).

This guideline focusses on terrestrial ecological matters landward of highest astronomical tide. There will necessarily be some overlap and connection between terrestrial and aquatic ecology values, with the latter including wetlands, waterbodies, groundwater dependent ecosystems, and tidal estuaries. The EIS must address the interconnection and dependence of terrestrial and aquatic ecological values. The department's [EIS information guidelines—Aquatic ecology](#) (DES 2022) focusses on aquatic ecological matters.

In Queensland, a number of terrestrial ecological values are formally recognised by legislation, policy, plans and guidelines, including but not limited to the following matters:

- regional ecosystems as defined under the *Vegetation Management Act 1999* (VM Act)
- plant species and their habitat, particularly plants listed as endangered or vulnerable under the *Nature Conservation Act 1992* (NC Act)
- animal species and their habitat, particularly animals listed as endangered, vulnerable or special least concern
- animal breeding places under the NC Act
- environmental values as defined under the *Environmental Protection Act 1994* (EP Act) and the Environmental Protection Regulation 2019 (EP Regulation)
- matters of national environmental significance (MNES) as defined under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- matters of state environmental significance (MSES) as defined by the Environmental Offsets Regulation 2014
- matters of local environmental significance (MLES) as defined by a local government planning scheme
- bioregional terrestrial and riparian corridors identified in biodiversity planning assessments
- strategic environmental areas under the *Regional Planning Interests Act 2014*.

Legislation and policy

This section provides an overview of the legislation that is most relevant when assessing terrestrial ecology for an EIS, and explains why it is relevant. The EIS must describe what permits and licences would be required under all relevant legislation, and describe why and when they would be required for the construction, operation or rehabilitation of the proposed project and its site. However, the legislation does not necessarily address all features and values of terrestrial ecology potentially impacted by the project. These matters must be addressed in the EIS in terms of: describing and identifying impacts; assessing the acceptability or otherwise of impacts; and the measures that can be taken to avoid and mitigate adverse impacts.

Nature Conservation Act 1992

The NC Act regulates the conservation of nature through such mechanisms as declaring protected areas (e.g. national parks), and the protection of native wildlife and its habitat. The NC Act defines several terms that are relevant when preparing an EIS, such as *biological diversity*, *ecologically sustainable use*, *threatening process*, and *critical habitat*.

The NC Act is supported by several pieces of subordinate legislation, including regulations and plans that address particular issues of conservation. Importantly, the Nature Conservation (Wildlife) Regulation 2006 assigns individual species of native wildlife (plants and animals) to classes according to the determined level of threat to the

species' survival in the wild. The classification of species determines the management intent and defines the action that should be taken to protect the species. Classes of wildlife include: *extinct in the wild*, *endangered*, *vulnerable*, *near threatened*, *least concern*, and *special least concern* wildlife. The plants and animals described in these classes are considered to be *protected wildlife*.

The NC Act restricts activities relating to protected wildlife unless the person is authorised to undertake the activities. Restricted activities include catching and moving native animals, and removing all or part of protected plants. The Nature Conservation (Administration) Regulation 2017 establishes the various licences and permits that a person needs to undertake restricted activities, while the Nature Conservation (Wildlife Management) Regulation 2006 sets out the requirements and restrictions for activities that have been authorised under a licence or permit.

For example, species management programs under the NC Act assess the impacts of the proposed project on animal breeding places and authorises activities that will impact on breeding places of protected animals that are classified as extinct in the wild, endangered, vulnerable, near threatened, special least concern, or least concern.

Vegetation Management Act 1999

The VM Act regulates the clearing of woody native vegetation, particularly broad-scale clearing. The VM Act establishes classes of regional ecosystems as either *endangered*, *of concern*, or *least concern*, while the Vegetation Management Regulation 2012 assigns particular regional ecosystems to each class. The VM Act's objectives include conservation of remnant regional ecosystems, prevention of the loss of biodiversity, maintenance of ecological processes, and conservation of vegetation in areas of high nature conservation value or lands vulnerable to land degradation. The VM Act classes are used for determining offset requirements for significant residual impacts to regional ecosystems under provisions of the *Environmental Offsets Act 2014*. Projects assessed by EIS will have to assess any clearing of regulated vegetation or connectivity areas under the environmental offsets framework.

Regulated vegetation comprises five elements:

- endangered regional ecosystems
- of concern regional ecosystems
- a regional ecosystem that intersects with a wetland on the vegetation management wetlands map
- an area of essential habitat on the essential habitat map for an animal or plant that is endangered wildlife or vulnerable wildlife.
- a regional ecosystem to the extent the ecosystem is located within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature.

The [Environmental offset landscape connectivity assessment tool \(Landscape Fragmentation and Connectivity Tool\)](#) is available as a decision support tool to quantify any significant impact on connectivity areas.

Environmental Protection Act 1994

Resource projects need an environmental authority to operate, which is issued under the EP Act. A project's environmental authority includes 'conditions' that detail what impacts on the environment will be allowed. For example, the conditions may specify where vegetation clearing would be allowed. The conditions may also specify what must be done to avoid, mitigate or offset impacts to prescribed environmental matters. One of the main purposes of an EIS is to provide sufficient detail about impacts and mitigation measures for the department to decide whether to issue an environmental authority and, if so, recommend conditions for the environmental authority.

Environmental Protection Regulation 2019

The EP Regulation, Chapter 2, sets out the matters to be addressed in an EIS for a project that is a *controlled action* under the Commonwealth EPBC Act and that will be assessed under a bilateral agreement between the Australian Government and the State of Queensland.

The EP Regulation further specifies the regulatory requirements for environmental management decisions, including, but not limited to:

- the environmental values declared under that regulation (e.g. wetlands)
- assessment against the environmental objectives and performance outcomes mentioned in Schedule 8, Part 3.

Environmental Offsets Act 2014

The main purpose of the Environmental Offsets Act is ‘to counterbalance the significant residual impacts of particular [prescribed] activities on prescribed environmental matters through the use of environmental offsets’. The Environmental Offsets Act, Environmental Offsets Regulation, and the [Queensland Environmental Offsets Policy](#) (DES 2018) provide detail of when offsets may be required, and how they are calculated. The Queensland Government has also published additional advice on its website that may be accessed through the [Environmental offsets](#) webpage. Proponents should access and understand that advice, which is not repeated in this guideline.

The development activities that offsets can be applied to (defined as *prescribed activities*) are listed in Schedule 1 of the Environmental Offsets Regulation, and include resource activities carried out under the EP Act.

Prescribed environmental matters are defined by section 10(1) of the Environmental Offsets Act as an MNES, MSES, or MLES. Schedule 2 of the Environmental Offsets Regulation is particularly relevant when preparing an EIS as it lists the MSES regulated under Queensland legislation.

An offset condition may be applied to an authority for a prescribed activity where there is a significant and unavoidable impact on a matter of state environmental significance. Before deciding to impose an offset condition, the administering authority must be satisfied that all efforts have been made to avoid and minimise the impacts on MSES and that an offset is a suitable outcome, i.e. an offset can actually achieve a conservation outcome for the matter.

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the Australian Government’s central piece of environmental legislation. It provides a legal framework to protect and manage MNES, which include: listed threatened species and communities, listed migratory species, and Ramsar wetlands of international importance. Controlled actions need approval from the Australian Government’s Minister for the environment.

The EIS must determine the presence or likelihood of any MNES in the vicinity of the study area through database searches and field surveys. An assessment of the likely impacts on MNES is needed if they are present or are likely to be present.

The Queensland and Australian governments have an agreement (*the bilateral agreement*) that allows a Queensland EIS process to also assess the potential impacts of a project on MNES. This avoids duplication and allows proponents to produce just one EIS for both the Queensland and Australian Governments. However, the Queensland and Australian Governments’ subsequent approval processes remain separate.

There is often some overlap when assessing ecological impacts that are relevant under state or Commonwealth legislation. Nevertheless, the EIS should contain a separate section or chapter with an assessment of the impacts on MNES. The department has published an EIS information guideline that specifically addresses how to assess impacts on MNES.

Biosecurity Act 2014

In Queensland, the *Biosecurity Act 2014* regulates biosecurity risks related to the presence, introduction or spread of declared plant and animal pests. The Biosecurity Act also places a *general biosecurity obligation* on anyone involved in an activity (such as developing or operating a resource project) to take all reasonable and practical measures to prevent or minimise biosecurity risks.

Every EIS must assess whether weeds and pest animals are present in the proposed project area, and whether any of the proposed project’s activities could introduce or spread weeds and pests. The EIS must also propose measures that would ensure everyone involved in the proposed project meets their general biosecurity obligation. See the department’s [EIS information guideline—Biosecurity](#) (DES 2022) for additional information.

What should the EIS address?

The EIS must identify and quantify terrestrial ecological values and the potential impacts on them. The assessment and detail provided by the EIS should be proportionate to the size of the proposed project area, the scale of the proposed project, and the extent of its impacts both on and off the project site.

An EIS would typically address the following matters:

- the proposed project’s location and context within the local and regional landscape
- all ecological values present or likely to be present within an area potentially affected either directly or indirectly by the proposed project

- the level of certainty about the presence or absence of each ecological value
- the significance and sensitivity of the ecological values, including actual or potentially threatening processes
- the likelihood and nature of potential impacts on identified ecological values
- the cumulative impacts of the proposed project in conjunction with other existing and proposed activities
- measures to avoid, minimise and mitigate potential impacts
- criteria that will be used to gauge the success of mitigation measures
- residual impacts on ecological values after all avoidance, mitigation and management measures have been implemented
- offsets as a last resort for significant residual impacts that, after avoidance, mitigation and management options have been demonstrated, cannot be avoided.

The following sections of this guideline provide advice on how to achieve these requirements. Adapt the matters as necessary to suit the site and potential impacts of the proposed project.

The assessment of terrestrial ecology will necessarily overlap with the assessment of aquatic ecology (including wetlands), groundwater dependent ecosystems, and subterranean aquatic species. Integrate the various parts of the EIS that assess those areas of ecology so that the relationships are clear.

When this guideline requires a matter to be described, it also means using appropriate maps, diagrams, charts and/or photographs. Multiple graphics may be needed to adequately illustrate a matter.

If a particular matter is not relevant, rather than being silent, the EIS should demonstrate why the matter(s) are not relevant to the proposed project.

Ecological surveys

To prepare for the EIS, undertake ecological surveys of the project site and any other locations or areas that may be impacted by the project.

Who may undertake ecological surveys and prepare the EIS

The study of ecology is a highly specialised field. Flora surveys (protected plants) must be undertaken by a *suitably qualified person*—see [Flora survey guidelines—Protected plants](#) (EHP 2016) and ss. 564–566 of the EP Act. Furthermore, the department may allow an EIS to proceed to the public notification stage only if the chief executive considers it addresses the final terms of reference in an acceptable form. The department would not consider an EIS addresses the final terms of reference in an acceptable form unless (among other things) the ecology section was prepared by ecologists with sufficient expertise in the relevant issues for the project. For example, proponents should engage an experienced specialist to deal with matters related to an endangered species rather than using only a junior or relatively inexperienced ecologist. Consequently, proponents must provide the department a list all the ecologists who undertook field studies and/or wrote the ecology sections of the EIS. Proponents must also provide details of each ecologist’s contribution and the issues they worked on.

Desktop assessment

Undertake a comprehensive desktop assessment in the early stages of the proposed project’s planning. Desktop assessments must include: database searches; analysis of maps, satellite images and aerial photographs; and a literature review of the ecological values that are known to occur, or potentially occur in the survey area. Use GIS and remote sensing technology wherever it is available.

Publicly available Queensland and Australian Government databases and mapping sources include the following resources:

- [Regional Ecosystem Description Database \(REDD\)](#)
- [protected plants flora survey trigger map](#)
- [Queensland Globe](#)
- species lists, [Biomaps](#), and [Species profile search](#), which access data from the [WildNet database](#)
- Queensland Herbarium’s [CORVEG database](#)
- [Maps of environmentally sensitive areas](#)
- [WetlandInfo](#)
- [South East Queensland koala habitat maps](#)
- [biodiversity status or broad vegetation group mapping](#)
- [regulated vegetation management mapping](#)

- [Queensland Spatial Catalogue \(QSpatial\)](#)
- [Australian wetlands database \(DAWE 2020\)](#)
- [Species Profile and Threats Database \(SPRAT\) \(DAWE 2020\)](#)
- [MSES mapping methodology \(DES 2020\)](#)
- [offsets register](#).

When requesting data from those sources, ensure the search radius is large enough to assess the potential impacts. Use a radius of at least 50km around the project area when considering migratory, rare, threatened, or cryptic species, or in areas where few field studies have been undertaken. Never use a search radius of less than 10km outside the project area, even for locations where extensive field studies have already been reported. If the project might impact downstream waterways, estuarine or marine environments, ensure the search includes those areas.

Base the assessment of the likelihood that species and communities are present in the survey area on:

- the general habitat requirements of a species or community
- habitat representation in the survey area
- records of known occurrence(s)
- knowledge of distribution.

Use the searched data and maps to preliminarily assess the ecosystems, species of interest, and habitats that are known to occur, or are likely to be, on and around the project area. Identify potential animal habitat through aerial photography, vegetation mapping (e.g. regional ecosystem mapping), and in the case of large scale proposed projects, remote sensing technology. Identify locations that have a high likelihood of occurrence of listed threatened plant and animal species and communities based on available habitat and desktop assessment.

With the help of SPRAT, identify recovery plans and conservation advice for species that might be in the wider region (e.g. Natural Resource Management Region).

Include the latest version of the MSES spatial layer. QSpatial can provide mapping data for use in a geographic information system. There are two layers for legally secured offset areas—one for areas secured under the environmental Offsets Act, and one for areas secured under the Vegetation Management Act. Also, search the Offsets register. The MSES mapping methodology can be located on the department's website.

Knowledge gaps

Use the desktop searches to identify gaps in the knowledge of the distribution of biodiversity, especially in areas where detailed studies have not been undertaken or reliable field data is not available. In these instances, widen the search radius or broaden the search to include similar ecosystems and/or species. In the EIS, clearly explain these gaps to allow the department to consider the adequacy of the assessment in the context of existing knowledge. Ensure any gaps that are relevant to assessing the project's impacts are address by field surveys for the EIS.

Field surveys

Planning terrestrial ecological surveys

Use the information gained by the desktop studies to plan and design ecological surveys. The surveys must be sufficient to identify relevant ecological values, verify the findings from the comprehensive desktop review, and address any critical knowledge gaps. Set specific objectives for the field surveys, and state them in the EIS.

Survey area and effort

The survey area must cover the entire project area and any potentially impacted surrounding area. Use the information gathered during the desktop assessment to refine the size of the survey area and the field survey methodology in order to target potentially occurring species, habitat and vegetation communities.

Extend the survey area outside the proposed project area in the following circumstances:

- impacts might occur outside the proposed project area (e.g. downstream of the proposed project area)
- more information is needed about the occurrence of species or communities outside the proposed project area
- non-impacted reference sites are required.

An extended survey area must include any groundwater dependent ecosystems or springs that may be impacted by groundwater drawdown downstream or upstream of the impact area. In many cases, terrestrial and aquatic ecological values are interconnected and will need to be surveyed and assessed in combination.

Target representative plant and animal habitats, vegetation communities and regional ecosystems throughout the defined area of potential impact of the proposed project. Sampling should be generally proportional to the total area of each vegetation type.

Timing of surveys

Use the desktop assessment to identify the most effective timing (seasonality) and duration of the survey work.

Decide when and how often field trips will be needed to ensure that seasonal effects are adequately studied for both plants and animals. The timing must take account of such matters as flowering and fruiting periods, growth cycles, breeding cycles, and migrations.

In particular, demonstrate that the selected timing and frequency of animal surveys provides the highest chance of detecting threatened, migrant, and vagrant species. However, the optimal time(s) of year to undertake terrestrial ecology surveys will vary across bioregions, taxa and ecosystems and this should be taken into account in designing the survey strategy.

Identification of suitable survey locations, equipment and personnel

Develop suitable terrestrial field surveys for the project area and the potentially impacted wider vicinity. Use the following guidelines when developing the survey program:

- *BioCondition—a condition assessment framework for terrestrial biodiversity in Queensland. Assessment manual* (Eyre et al. 2015)
- *Biodiversity assessment and mapping methodology (BAMM)* (EHP 2014a)
- *Flora survey guidelines—protected plants* (DES 2019)
- *Guide to determining terrestrial habitat quality—Methods for assessing habitat quality under the Queensland Environmental Offsets Policy* (DES 2020)
- *Guideline for the environmental assessment of subterranean aquatic fauna* (DSITI 2015)
- *Method for the establishment and survey of reference sites for BioCondition* (Eyre et al. 2017)
- *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* (Neldner et al. 2020)
- *Significant residual impact guideline—Queensland Environmental Offsets Policy* (EHP 2014)
- *Terrestrial vertebrate fauna survey guidelines for Queensland* (Eyre et al. 2018)
- Targeted species survey guidelines (various guidelines available for selected threatened species).

Plan survey locations to cover all potentially impacted ecological communities, species and species habitats. For plants, select locations where meanders, transects, and/or plots will be surveyed. For animals, select locations and equipment for such activities as trapping, spotlight searching, call detection, roost searching, and so on. The field surveys must be sufficient to provide accurate mapping of ecosystems and habitat, and to target plant and animal species of particular interest (e.g. because they are threatened). Ensure that survey locations are adequately positioned within the habitat; that is, not adjacent to roads or cleared areas.

Identify any constraints that would result in less than optimal field surveys. Then, when subsequently assessing the survey data, take a conservative approach. For example, if the desk-top studies indicate a threatened species or community is likely to be present, but the field surveys are constrained in some way from adequately confirming their presence or absence, then the EIS must assume the threatened species or community is present.

Undertake a reconnaissance visit to check that the desktop studies provided an adequate basis for designing the field survey program, particularly with regard to threatened species and communities. The reconnaissance visit should confirm that the proposed survey sites are accessible.

The reconnaissance visit should also check how accurate the Regional Ecosystem Description Database (REDD) mapping of the area is. That is because the REDD mapping was originally developed from a combination of field surveys, remote sensing and aerial photography, and not all the mapped areas have been 'ground-truthed'. The differences in scale between REDD mapping and field survey mapping can also cause differences in ecosystem boundaries. Consequently, some REDD mapping may need to be changed. Adjust the field survey program for the EIS as necessary to ensure that regional ecosystems at the site are accurately mapped. This is particularly important if the project may require offsets for residual impacts—see the *Offsets* section below for additional information.

Ensure that the survey team will have permission to access the selected sites at the appropriate seasons, and that they have all necessary permits and approvals (e.g. for trapping and handling of fauna).

Consultation pre-survey

Members of the field survey team should meet with the department's EIS coordinator to discuss the field survey program before it goes ahead. The meeting will provide feedback on the apparent adequacy of the field survey program, and might highlight where improvements can be made or mistakes avoided.

Nevertheless, the survey team should not necessarily rigidly follow the predetermined program if circumstances at the site indicate that other actions are needed to properly survey the ecology. The proponent has responsibility for demonstrating that the survey strategy used was appropriate.

Conducting terrestrial ecological surveys

Conduct the plant and animal surveys in accordance with relevant guidelines, including those listed above. Record locations and survey boundaries in decimal degrees of latitude and longitude based on the Geocentric Datum of Australia 2020 (GDA2020).

Use the certified regional ecosystem mapping as a basis to identify ecosystem/community values, and to provide a basis for identifying prescribed environmental matters, such as potential threatened species habitat. Sample as much of the environmental variability across the landscape as possible, consistent with assessment requirements identified in the planning stage.

Quantify the area of potential habitat for threatened species within the proposed project area and the quality/condition of the habitat. When a listed threatened species is found, determine the population extent and density of the species within the impact area.

Plant surveys

When a listed threatened plant species is found, record the total number of plants comprising the population. If the population is too dense or dispersed for this to be practical, estimate the density of the overall population, e.g. by calculating the average number of plants within quadrats. This plot-based assessment is required to determine the species abundance, distribution and habitat associations.

If a plant species cannot be identified, submit a sample of the plant to the Queensland Herbarium for identification. Ensure specimen collection and vouchering is done in accordance with Queensland Herbarium procedures.

Quantify the presence and location of weeds, including weeds of national significance due to their invasiveness, potential for spread and environmental, social and economic impacts. See the department's [Biosecurity—EIS information guideline](#) (DES 2022) for additional information.

Animal surveys

Use multiple survey techniques to survey the diversity of animal species (Eyre et al. 2018).

Ensure the survey results are compatible with the Queensland WildNet Database.

Quantify the presence of pest animal species on the proposed project area. See the department's [Biosecurity—EIS information guideline](#) (DES 2022) for additional information.

Vegetation community (regional ecosystem) mapping

Ground-truth the regional ecosystems of the area. Ensure that the survey results are compatible with the Queensland CORVEG Database, particularly if there is a possibility that the certified regional ecosystem mapping will need to be adjusted.

As previously mentioned, the differences in scale between the certified Queensland Herbarium REDD mapping and field-survey mapping can cause differences in ecosystem boundaries. If the field survey finds the REDD mapping is not accurate on the ground, the proponent must propose changes to the regional ecosystem mapping and adjust the field surveys to ensure that regional ecosystems at the project area are accurately mapped. This is particularly important if the project may require offsets for residual impacts. The department can only accept the REDD's certified mapping as the basis for setting offset requirements.

Changes to REDD mapping must be approved by the Queensland Herbarium **prior** to submission of the EIS. Timeframes for approving revised mapping require that proposed changes to the certified regional ecosystem mapping should be initiated as early as possible through the department's EIS coordinator. Supporting information must include:

- appropriate site-level information as detailed in the survey and mapping methodology (Neldner et al. 2020)
- spatial datasets of site locations and proposed new regional ecosystem polygons
- site data sheets (DES 2019)
- site photographs.

Where current mapping disagrees with surveyed findings, the proponent must provide information on species composition(s) with georeferenced locations. If the proponent wishes to dispute the remnant status of any vegetation, they must provide canopy height and cover transect data. Further explanatory notes and associated assessment sheets are available in the Queensland Herbarium's *Regional Ecosystem Assessment Kit*. The kit details the information required to verify an assessment of the regional ecosystems of an area and/or to verify and update existing regional ecosystem mapping of an area. The kit can be requested through the department's EIS coordinator.

Vegetation/habitat condition

Ensure the methodology and data are sufficient to assess biodiversity, BioCondition, and habitat quality (including species habitat) of each vegetation community. Use the assessment framework outlined in Eyre et al. (2015 and 2017), Neldner et al. (2020) and BAMM (EHP 2014).

Adequacy of field surveys

Clearly describe the objectives, design, constraints, and findings of the ecological field surveys. For larger projects, it may be appropriate to include a concise summary of the main findings of the field surveys and outcomes in the main text of the EIS, and attach the full details of the field surveys and their results as an appendix. Show the field survey sites, transects and area on maps and figures and support it with a detailed justification on survey method and effort. Where proposed project timeframes were constrained, such that the flora or fauna surveys could not be undertaken at optimal times, intensity and frequency, state the reasons and justify the adequacy of the survey effort. This should include statements about the effect of the limited survey on the likelihood of occurrence of species that may be present.

When assessing the survey data, take a conservative approach. For example, if the desktop studies indicate a terrestrial ecological value (e.g. threatened species or community) is *likely to* or *potentially* be present, but detailed field surveys were either not undertaken or constrained in some way from adequately confirming their presence or absence (e.g. due poor weather or seasonality), then the EIS must assume the ecological value is present. Explain the conclusion reached as to whether the ecological value is present or not present.

Quantify the level of certainty about the presence or absence of each ecological value using a conservative approach.

Describe existing terrestrial ecological values

List the ecosystems, habitat, and plant and animal species (common and significant species) identified in the desktop studies. Include any groundwater dependent ecosystems and potential habitat for subterranean aquatic fauna (stygofauna).

Identify, describe and map all terrestrial ecological values present or likely to be present within an area potentially affected either directly or indirectly by the proposed project. Base the description on the desktop assessment, vegetation surveys, plant and animal species surveys, and the assessment of the condition of the vegetation communities and species habitats. Address all significant species and ecological communities, including MSES and MNES, listed plant and animal species, and regional ecosystems.

Describe the potential for significant species (e.g. listed threatened, near threatened or special least-concern species) to occur, or potentially occur, within the area potentially affected either directly or indirectly by the project. Show the location of significant species found during field surveys on suitable maps and figures, and describe their habitat.

Include any other environmental value(s) that the desktop studies identified as occurring or potentially occurring in, and adjacent to, the project area (e.g. wildlife corridors, environmentally sensitive areas) and display them on maps and figures.

Describe the connectivity of habitats and ecosystems.

Describe, with photographs and detailed mapping at suitable scales, the current extent of regional ecosystems, species habitat, threatened ecological communities, groundwater dependent ecosystems, wetlands and springs at the proposed project area(s).

Define the condition of each vegetation community (which may also be habitat for a listed threatened species) in terms of how well it functions for the maintenance of the biodiversity values it supports. Provide mapping of the habitat condition of regional ecosystems, threatened ecological communities, and potential threatened species habitat.

Assess the habitat quality of each vegetation community using the department's [Guide to determining terrestrial habitat quality](#) (DES 2020). Assess the site-based condition attributes and the landscape attributes, and apply the

relevant weightings to derive a final BioCondition score. Determine and assess the levels of the three key indicators of habitat quality (site-based attributes, landscape-based attributes, and species habitat attributes), and determine relevant habitat quality scores. The habitat quality scores are important when assessing the need for land based offsets.

Describe the presence and significance of any weed or pest species at or near to the proposed project area. See the department's separate [EIS information guideline—Biosecurity](#) (DES 2022) for more information.

Potential impacts

Assess, describe, quantify and illustrate all potential direct and indirect significant impacts on terrestrial ecological values. Assess the impacts on all potentially affected areas, whether on or off the project site. Include all stages of the proposed project from initial development through to rehabilitation.

Address in the assessment:

- all significant species and ecological communities (MNES, MSES, MLES, listed threatened flora and fauna species and regional ecosystems)
- the conservation status of each identified ecological value under the Nature Conservation Act, Vegetation Management Act and the Environmental Protection Act
- the integrity of ecological processes, including habitats of listed threatened, near threatened or special least-concern species
- interactions between terrestrial and aquatic ecosystems (including groundwater dependent ecosystems and stygofauna)
- connectivity of habitats and ecosystems
- the integrity of landscapes and places, including wilderness and similar natural places
- biological diversity
- chronic, low-level exposure to contaminants or the bio-accumulation of contaminants
- direct and indirect impacts on terrestrial and aquatic species and ecosystems whether due to: vegetation clearing; hydrological changes; discharges of contaminants to water, air or land; noise; and other relevant matters.

Describe and tabulate the direct and indirect impacts of clearing and/or alteration on regional ecosystems and fauna habitats. Assess all proposed project activities and their effects (e.g. subsidence, groundwater drawdown, or change of surface water flows).

Assess the potential edge effects from changes to habitat patterns (e.g. due to clearing, fragmentation or because an area of land would be rehabilitated to a different ecosystem than present). Also address the potential impacts of acute, or chronic, low-level exposure to contaminants or the bio-accumulation of contaminants.

Assess impacts on species or communities covered by state or Commonwealth legislation or policy or international treaty obligations, such as the China–Australia Migratory Bird Agreement, Japan–Australia Migratory Bird Agreement, and Republic of Korea–Australia Migratory Bird Agreement.

Assess the potential impacts of the proposed project on the spread of pest animals, weed species and diseases.

Integrate and cross-reference those parts of the EIS that address ecology with other parts that address impacts (including cumulative impacts) from interrelated matters, such as aquatic ecology, water resources, water quality, groundwater, noise, and air quality. Ensure that the ecology assessment work is coordinated with the work of specialists from other relevant disciplines. For example, ecologists should liaise with hydrologists and mining engineers to help determine what ecological impacts (terrestrial and aquatic) might result from groundwater drawdown, changes to stream flow, or subsidence. The EIS must demonstrate that such crossover matters have been assessed.

Cumulative impact assessment

Assess the cumulative impacts on terrestrial ecological values that could potentially occur because of the impacts of the proposed project added to the past, present and reasonably foreseeable impacts of other activities in the region. Assess cumulative impacts at a local, subregional and bioregional scale and over time.

Avoidance and mitigation measures

The EIS must detail measures that will be applied to manage the project's impacts by giving priority to the following hierarchy:

- avoid impacts wherever possible
- minimise unavoidable impacts
- where necessary, offset residual impacts (see the Offsets section below).

Describe the practicality, effectiveness and risks for each avoidance and mitigation measure. Including the time frames in which the results will be delivered; for example, immediately in the case of avoidance, but possibly much longer term for re-establishing habitat.

Justify how applying all proposed avoidance and management measures would result in acceptable outcomes for terrestrial ecology. Describe how achieving the measures successfully will be monitored, measured and audited. Include provisions to regularly evaluate all the mitigation measures so that improvements may be made as new technologies and best practices evolve.

Propose strategies to avoid, minimise and mitigate impacts from existing and new weed or pest species threats. See the department's separate [EIS information guideline—Biosecurity](#) (DES 2022) for more information.

Propose conditions that should be applied to ensure the avoidance and minimisation measures proposed will be delivered and achieve the desired outcome.

Rehabilitation

The rehabilitation of resource projects is regulated through the Environmental Protection Act (particularly Chapter 5). The proponent must use the department's [Progressive rehabilitation and closure plans \(PRC plans\)](#) guideline (DES 2019) when preparing the EIS as the information is not repeated in this guideline. The EIS must address and provide all the requirements of the progressive rehabilitation and closure (PRC) plan process that would be necessary for an environmental authority application.

Where proposed rehabilitation outcomes include outcomes for terrestrial ecology, propose appropriate reference sites in accordance with the [Method for the establishment and survey of reference sites for BioCondition](#) (Eyre et al. 2017). Use baseline data identified during field surveys to propose benchmarks for relevant indicators and completion criteria.

Explain in detail how and why the chosen reference sites are appropriate for comparison with impacted sites to assess the success of rehabilitation. Similarly, detail how and why the milestone criteria and completion criteria for rehabilitation were chosen.

Assess the need for and, if relevant, propose buffer zones and the retention, rehabilitation or planting of movement corridors. Take account of the role of buffer zones in maintaining and enhancing riparian vegetation to increase water quality and habitat connectivity.

Offsets

An environmental offset may be required where a *prescribed activity* is likely to result in a significant residual impact on a *prescribed environmental matter*. The Queensland Government's [Environmental offsets](#) website provides detailed information about what an offset is, when it is required, and how it is quantified. That information is not repeated in this guideline; consequently, you should make use of those online resources when preparing the EIS.

Describe, quantify, and assess the significance of any potential residual impacts on prescribed matters. Use the [Significant residual impact guideline](#) (EHP 2014) to decide whether the proposed project might have a significant residual impact on MSES. Account for the cumulative impact of the proposed project in conjunction with other proposed projects when assessing whether an offset for the significant residual impacts of the proposed project could achieve a conservation outcome (as defined by the *Environmental Offsets Act 2014*).

Where there are significant impacts on prescribed matters, assess the offsets requirements in accordance with the Environmental Offsets Act and the latest version of the [Queensland Environmental Offsets Policy](#) (DES 2018). Describe in detail how the offsets were determined, or explain why no offsets are proposed.

Use certified regional ecosystem maps when determining the required offsets. Where field studies for the EIS have found discrepancies between the certified regional ecosystem maps and ground-truthed maps, the changes must be reviewed and accepted by the Queensland Herbarium prior to developing an offset strategy so that offsets can be accurately determined.

Consider habitat quality and BioCondition scores of the vegetation when determining the required offsets.

Quantify the availability of offsets for each MNES and each MSES in the bioregion. For both proponent-driven offsets and financial settlement offsets, conservation outcomes for an impacted matter can only occur if an offset area is available. In some cases, an offset is not a viable outcome, and so impacts may need to be further reduced.

For example, the project might need to avoid impacting a vegetation community that is difficult to replicate elsewhere and is considered the last remaining habitat for a species.

Provide an offset strategy that details where and how the offsets would be delivered and audited. Offsets must meet the seven offset principles outlined in the latest version of the Queensland Environmental Offsets Policy (DES 2018). For projects that are controlled actions being assessed under the bilateral agreement, the offset strategy must reflect both Commonwealth and state legislation requirements. If the Commonwealth and state requirements duplicate offsets for the same impacts on the same, or substantially the same, matter, the Commonwealth's EPBC Act approval condition(s) would take precedence and the state's condition(s) would not be included in the environmental authority.

Commitments and conditions

Provide a consolidated description of commitments in regard to nature conservation (including monitoring programs and management plans).

Propose conditions for nature conservation that may be placed on the environmental authority and any other required approvals or licenses. Explain where and how you would modify any of the department's existing model conditions and eligibility criteria, or develop new ones, to suit site-specific and project specific issues. Conditions for terrestrial ecology will necessarily overlap with those for aquatic ecology, wetlands, groundwater dependent ecosystems, and subterranean aquatic species. Integrate the proposed conditions for all areas of nature conservation.

Matters of national environmental significance (MNES)

Provide a separate section in the EIS that addresses the requirements for the environmental assessment of MNES under the EPBC Act. Refer to relevant guidelines on field survey requirements and impact assessment available on the Australian Government website. See the department's separate [EIS information guideline—MNES](#) (DES 2022).

References

Note: These references were correct at the time of publication. Where more recent versions are available, these must be used. For all Department of Environment and Science publications, the latest version of a publication can be found by using the publication number as a search term at the [Queensland Government website](#) <www.qld.gov.au>.

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