

# **Method for Mapping Ecological State Interests for Land Use Planning and Development Assessment**

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Department of Environment and Resource Management**

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## Attachments

**ATTACHMENT 1 - Guidelines for accepting non-BPA flora and fauna species information for mapping HES / GES areas**

**ATTACHMENT 2 - Method for identifying terrestrial and riparian biodiversity corridors for DERM biodiversity State interests under SPA**

**ATTACHMENT 3 - DERM Back on Track priority species threatened by development**

**ATTACHMENT 4 - Ecological Values of Coastal Dunes**

## 1. Background

The Department of Environment and Resources Management (DERM) is Queensland's lead agency for biodiversity conservation and vegetation management and is responsible for identifying, protecting and managing these values.

To achieve this, DERM participates in a range of statutory and non-statutory planning, development assessment, resource allocation and management programs relating to its biodiversity and vegetation management responsibilities. This methodology outlines a process for mapping the State's biodiversity interests in statutory planning and development assessment activities under the *Sustainable Planning Act 2009* (SPA). Under *Sustainable Planning Regulation 2009*, the State is required to identify its interests using one or more of the four State planning instruments under SPA:

- State planning regulatory provisions
- Regional plans
- State Planning Policies (SPPs)
- Queensland Planning Provisions (standard planning scheme provisions)

In order to do this, DERM's State biodiversity interests are mapped as 'areas of ecological significance' (AES) using the mapping methodology contained in this document. This term is derived from section 89 of SPA which includes *areas that are of ecological significance (such as habitats, wildlife corridors, buffer zones, places supporting biological diversity or resilience)* as 'Core Matters for Planning Schemes'. The term has been incorporated in SPA regional plans under development as AES and includes mapped areas of high ecological significance (HES), areas of marine ecological significance (MES), general ecological significance (GES), strategic rehabilitation areas (SRA) and associated policies. AES areas are expected to be reflected and addressed in the other SPA instruments and processes, where required.

## 2. DERM biodiversity State interests under SPA

DERM's biodiversity conservation State interests under SPA are derived primarily from DERM's legislative responsibilities under the *Nature Conservation Act 1992* (NCA), *Marine Parks Act 2004*, *Environmental Protection Act 1994* (including the *Environmental Protection (Water) Policy 2009* (Water EPP)), *Coastal Protection and Management Act 1995*, *Vegetation Management Act 2009*, *Land Act 1994*, *Water Act 2000* and the *Wet Tropics World Heritage Protection and Management Act 1993*. Additionally DERM has responsibilities for biodiversity conservation under the *Forestry Act 1959*, *Recreation Areas Management Act 2006* a number of national and international agreements. There is also overlap with interests between DERM and the Department of Employment, Economic Development and Innovation for fish habitat and marine plants.

It should be noted that the maps produced using the methodology in this document do not identify all DERM's biodiversity State interests under SPA, such as those which cannot be mapped. Further details of the limitations of this methodology are provided in section 3.1.

## 3. Purpose

This document describes the methodology for mapping biodiversity areas of ecological significance including HES, MES, GES and SRA's for use in the SPA context.

Its purpose is to outline how the relevant components of BAMB, AquaBAMB and other information, maps and datasets are extracted to map the DERM's SPA related biodiversity and conservation State interests. It provides a consistent, robust and transparent approach for mapping, using data sets of the highest available precision and reliability.

It is expected that DERM's AES mapping will be incorporated in the SPA planning instruments including regional plans and planning schemes, and that the instruments will provide appropriate policies for AES areas. HES areas represent the most important State interests which are subject to higher level policies and protection while MES areas identify areas that are important to the State in marine areas. GES areas represent areas other than HES that are of interest to the State and SRA's identify where efforts should be made to establish or re-establish biodiversity corridors. These areas should also be addressed in SPA planning, e.g. through development assessment codes and assessments administered by local government.

### 3.1 Limitations in the scope of use

The AES mapping has the following limitations:

- mapped AES areas do not supersede or replace the maps, information or areas called up in legislation within DERM's jurisdiction. Although AES areas may inform statutory dealings, all relevant legislation and associated maps, information and areas for which DERM is responsible (e.g. State marine parks and marine park zones under the *Marine Parks Act 2004*, High Ecological Value Waters under the Water EPP) must be considered and addressed in all DERM statutory matters, including those under SPA.
- DERM has many non-statutory biodiversity planning and management interests (e.g. assisting regional NRM planning, landholder and community education and capacity building) and the AES methodology is not designed to capture all areas or attributes of biodiversity for which DERM may have an interest or dealing in.
- triggers for DERM advice or concurrence roles under SPA should, where possible, be based on AES areas but are not required to be. Where mapping products are being developed that may trigger an advice or concurrence role, the first consideration should be criteria used to define AES areas. If the AES criteria is not suitable then mapping products may need to be developed independently.
- not all DERM biodiversity State interests can be represented spatially or mapped precisely. Data sources are continually being updated, refined and improved. For example, not all individuals and populations of rare and threatened species under the NCA can be systematically or accurately mapped and recorded in DERM data systems such as Wildnet. Many individuals or populations may only be discovered through future site investigations, such as those undertaken through DERM projects or required as part of development assessment processes.
- DERM (and the State) still has jurisdictional responsibility for these species regardless of whether they are currently mapped, and should endeavour to protect them from various threats. Where DERM State interests in biodiversity cannot be fully represented through mapping, or where there is insufficient data, the interests should still be addressed in SPA processes through other appropriate mechanisms such as definitions of the State interests and survey requirements in relevant policies.
- Other than in marine areas the AES mapping methodology is heavily dependant on the coverage of regional ecosystem mapping and the methodology is only relevant for those parts of the State that have been mapped.

### 4. AES mapping principles

The following principles apply for mapping DERM biodiversity conservation State interests under SPA:

1. DERM AES mapping products should be consistent across the State wherever possible and supported by a documented methodology.
2. All AES areas should be incorporated into the relevant SPA planning processes and instruments, where appropriate, including regional plans, state planning policies, planning schemes.
3. When identifying AES areas, recent information should supplement the species data from BPAs and ACAs, where that information satisfies the mapping rules in Tables 1 to 4 and the guidelines at Attachment 1.
4. The mapping methodology should remain an evolving document and accommodate updates where appropriate, when new data, maps and mapping/assessment methods become available.

These areas represent DERM's mapped biodiversity State interests for planning and development assessment purposes under SPA.

## **5. Method for mapping AES areas**

The method for mapping AES areas is provided in the following tables:

Step 1 – identify areas of HES using the mapping rules contained in Table 1

Step 2 – Identify areas of MES using the mapping rules contained in Table 2

Step 3 – Identify areas of GES using the mapping rules contained in Table 3

Step 4 – Identify areas for strategic rehabilitation using the mapping rules in Table 4

Step 5 – Remove areas of development commitment using the mapping rules in Table 5

These areas represent DERM's mapped biodiversity State interests for planning and development assessment purposes under SPA.

**Table 1: Method for mapping areas of high ecological significance (HES)**

State Interest	Description	HES Mapping Notes/Rules	Current Data Sources
<b>1. TENURE</b>			
<b>1.1 Protected Area Estate</b>	Includes the following classes of protected areas under the <i>Nature Conservation Act 1992</i> : <ul style="list-style-type: none"> <li>National Park (scientific)</li> <li>National Park</li> <li>National Park (Aboriginal land)</li> <li>National Park (Torres Strait Islander land)</li> <li>National Park (Cape York Peninsula Aboriginal land)</li> <li>National Park (recovery)</li> <li>Conservation parks</li> <li>Resources Reserve</li> <li>Forest Reserve</li> </ul>	Include following tenure categories: <ul style="list-style-type: none"> <li>National Park (scientific)</li> <li>National Park</li> <li>National Park (Aboriginal land)</li> <li>National Park (Torres Strait Islander land)</li> <li>National Park (Cape York Peninsula Aboriginal land)</li> <li>National Park (recovery)</li> <li>Conservation parks</li> <li>Resources Reserve</li> <li>Forest Reserve</li> </ul>	Protected Areas of Queensland Estates GIS layer excluding State Forests and Timber Reserves
<b>1.2 World Heritage Areas</b>	<ul style="list-style-type: none"> <li>Includes World Heritage properties listed for biodiversity/ecological values only</li> <li>Properties listed in the World Heritage list established and kept under the World Heritage Convention and listed for biodiversity values.</li> <li>Includes those World Heritage properties which are not part of Queensland's protected area estate.</li> <li>Excludes built and developed areas within the Great Barrier Reef World Heritage Area</li> </ul>	<p>Include only those World Heritage Areas which are listed for their biodiversity and ecological values.</p> <p>Only remnant and non-remnant vegetation (refer to section 7 of Table 1- general mapping rules) within WHAs to be mapped as HES</p>	World Heritage Areas GIS layer
<b>2. WETLANDS</b>			
<b>2.1 High conservation value wetlands assessed using AquaBAMM</b>	Includes 'High' and 'Very High' conservation value wetlands identified in an Aquatic Conservation Assessment (ACA) prepared using AquaBAMM.	<ul style="list-style-type: none"> <li>In areas where a full ACA is available for any wetland type, use ONLY High / Very High aquascore wetlands selected from the ACA (the ACA should include 51-100% wetland polygons and at least unmodified (H1) and modified wetlands with the following modifiers H2M2, H2M3, H2M4, H2M5 and H2M8)</li> <li>Include only those wetlands from dot point 1 above which have been unmodified (H1) or have one of the following modifiers H2M2, H2M3, H2M4, H2M5 and H2M8.</li> <li>Rivers / streams coverage that intersect with H/VH value areas to be included</li> </ul> <p>VMA wetland interests within GBR catchments</p> <ul style="list-style-type: none"> <li>For remnant areas, contains current version of VMA GBR wetland data based on Aquabamm methodology.</li> <li>For regrowth areas, contains current version of VMA GBR wetland protection area data based on Aquabamm methodology.</li> </ul>	<p>ACA layer where aquascore is Very High or High</p> <p>Rivers / streams coverage is the Qld Wetlands Data -Riverine Drainage Lines layer</p> <p>Current version of VMA GBR wetland and VMA GBR wetland protection area data available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a></p>

State Interest	Description	HES Mapping Notes/Rules	Current Data Sources
<p><b>2.2 High conservation value wetlands without an AquaBAMM assessment</b></p>	<p>Where an AquaBAMM ACA is NOT available for a wetland type, 'High value wetlands' are those wetlands accurately mapped under the Qld Wetlands Programme (QWP) that occur within areas that have public and/or legislative acceptance as highly significant wetlands</p>	<p>In areas where a full ACA is NOT available for a wetland type, include:</p> <ul style="list-style-type: none"> <li>• [Modified Qld Wetlands Programme layer* + springs<sup>#</sup>] intersected/clipped^ to any of the following areas: <ul style="list-style-type: none"> <li>- Ramsar</li> <li>- Directory of Important Wetlands Australia (DIWA)</li> <li>- significant coastal wetlands in approved regional coastal plans excluding marine wetlands</li> <li>- High Ecological Values (HEV) under the Water EPP</li> <li>- BPA Criteria I areas that have undergone further assessment and refinement by expert panel to select out wetlands of special outstanding ecological significance</li> </ul> </li> </ul> <p>^ For any wetland polygons that extend across an area boundary - seek opinion from a wetland expert on whether to include the whole polygon using an intersect, or split the polygon by clipping. As some of the RAMSAR and DIWA boundaries are cadastral based, a clip may be necessary, but in some cases it may make more sense to include continuous polygons.</p> <ul style="list-style-type: none"> <li>• Rivers and streams from the Qld Wetlands Data Riverine Drainage Lines layer that occur in HEV areas</li> <li>• Endangered and Of Concern Wetland Regional Ecosystems (RE) (VMA status) - select RE polygons where the endangered and of concern component totals 30% or more, and the polygons contain 50% or more wetland REs</li> </ul> <p>*The following must be excluded from the QWP layer above, before the intersect/clip is done:</p> <ul style="list-style-type: none"> <li>- &lt;50% wetland RE polygons</li> <li>- non wetland RE polygons that 'contain wetlands' (already removed from QWP coverage)</li> <li>- artificial wetlands (all H3)</li> <li>- highly modified wetlands (H2M1, H2M6, H2M7)</li> <li>- marine wetlands</li> <li>- estuarine 'water' RE polygons (select WETRE field = 'estuary', 'shallow-enclosed' or 'water' for removal)</li> <li>- 'canal' RE polygons</li> </ul>	<p>Qld Wetlands Programme (QPW) is the Qld Wetlands Data - Wetlands layer</p> <p>Qld Wetlands Data - Springs layer</p> <p>Ramsar Sites (QLD)</p> <p>Directory of Important Wetlands in Australia</p> <p>Significant coastal wetlands in approved regional coastal plans (currently Wet Tropics, Cardwell/Hinchinbrook, Curtis Coast and SEQ plans)</p> <p>HEV areas under the Water EPP (currently Douglas, Mary, Great Sandy, SEQ) – use the Environmental Values Level of Protection layer</p> <p>BPA Criteria I areas that have undergone further assessment and refinement BPA Criteria I areas that have undergone further assessment and refinement by experts to select wetlands of special outstanding ecological significance</p> <p>Rivers and streams coverage is the Qld Wetlands Data -Riverine Drainage Lines layer</p>
	<p>VMA wetland interests (Remnant and regrowth) for non GBR areas</p> <p>Includes significant wetlands and wetlands as per the VMA definition.</p>	<p># Use the QWP - Springs layer, which is based on Fensom and Fairfax 2006. Buffer the spring point records selected by the clip/intersect with a 200m buffer radius</p> <p>VMA wetland interests outside of the GBR catchments Contains wetland RE data (as per the code) and 250k topographic water bodies data with wetland buffered data clipped to assessable remnant and regrowth vegetation</p> <ul style="list-style-type: none"> <li>• Remnant significant wetlands have a 200m buffer</li> <li>• Remnant and regrowth wetlands have a 100m buffer</li> </ul>	<p>REs (VMA status) layer Presence of Wetland RE; and/or presence of a Ramsar wetland, water body type or spring.</p> <p>This data is generated within DERM using AUS_LAKE_250K AUS_FLATS_250K AUS_WATERHOLE_250K AUS_WATERPOINT_250K</p>

State Interest	Description	HES Mapping Notes/Rules	Current Data Sources
			AUS_SPRING_250K QLD_SPRINGS QLD_RAMSARSITE QLD_VEG_REGIONECOSYS_100 K_CUR QLD_VEG_REGROWTH_100K_C URRANT
<b>Marine areas</b>	Marine Parks <ul style="list-style-type: none"> <li>• Marine National Park Zone</li> <li>• Scientific Zone</li> <li>• Preservation Zone</li> </ul>	State and Commonwealth Marine Parks: <ul style="list-style-type: none"> <li>• green 'Marine National Park',</li> <li>• orange 'Scientific Research'</li> <li>• pink 'Preservation' zones</li> </ul>	State and Commonwealth Marine Parks green 'Marine National Park', orange 'Scientific Research' and pink 'Preservation' zones
<b>3. SPECIES</b>			
<b>3.1 Threatened species</b> under <i>Nature Conservation Act 1992</i> and/or <i>Environment Protection and Biodiversity Conservation Act 1999</i>	<ul style="list-style-type: none"> <li>• Threatened species are:               <ul style="list-style-type: none"> <li>– Endangered, Vulnerable, and Near-Threatened species as defined under the <i>Nature Conservation Act 1992</i> (NCA) and/or Critically Endangered, Endangered or Vulnerable species as defined under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)</li> </ul> </li> <li>• Note: Some EPBC Act threatened species are not listed under the NCA.</li> <li>• For mapping purposes only this category picks up all EPBC Act threatened species whether listed or not under the NCA. The Australian Government has an assessment role under the EPBC Act for those species not listed under the NCA</li> <li>• Note: Exclude highly mobile fauna species from point records used for HES except where they are a known breeding or roosting site. Note DERM still has legislative obligations under the NCA for highly mobile species and should be able to deal with these species in a planning and development assessment context should the need arise.</li> </ul>	<ul style="list-style-type: none"> <li>• Base mapping layers from the BPA where Criterion A = VH or H to be HES.</li> <li>• If any new non-BPA data is used for NCA / EPBC threatened flora and fauna it must comply with the following rules:               <ul style="list-style-type: none"> <li>○ <u>For species point records:</u> <ul style="list-style-type: none"> <li>– use only high precision (ie &lt;500m accuracy) point records.</li> <li>– exclude records with precision &gt;500m</li> <li>– exclude records that pre-date 1975 for fauna and 1950 for flora.</li> <li>– exclude highly mobile fauna species records except where the record is a known breeding or roosting site. Highly mobile species are identified in Appendix 1 of the BAMM.</li> <li>– exclude duplicates and dubious records eg cultivated flora records.</li> </ul> </li> <li>○ <u>For habitat mapping:</u> <ul style="list-style-type: none"> <li>– any mapping used must comply with the guidelines in Attachment 1 and must meet the BAMM definition of core habitat to be included in HES</li> <li>– any non-core habitat is to be GES</li> </ul> </li> </ul> </li> <li>• Point records which satisfy the above rules are to be buffered with a radius of twice the precision of the record (with a minimum buffer of 300m)</li> <li>• remnant and non-remnant vegetation (excluding cleared areas) (refer to section 7 of Table 1- general mapping rules) captured within the buffer area of point records to be mapped as HES. Note this selection has not been performed in existing BPAs, so this mapping will need to be done for all BPA species point records</li> <li>• Any core habitat for threatened species identified through BPA Criterion H to be HES (note the majority of BPA criteria H applies to non-EVR taxa – only use areas that apply to threatened species).</li> <li>• Areas identified for a threatened species in an approved conservation plan/recovery plan that qualify as 'core habitat' according to the guidelines at Attachment 1 may</li> </ul>	BPA – Criterion A = Very High or High mapping layer (includes buffered species points and habitat models)  BPA Criterion H for threatened species  Wildnet data  Other reliable data which complies with the guidelines in attachment 1.  Australian Government EPBC data if available  Requests for essential habitat or essential regrowth habitat data can be made by emailing <a href="mailto:essential.habitat@epa.qld.gov.au">essential.habitat@epa.qld.gov.au</a> .

State Interest	Description	HES Mapping Notes/Rules	Current Data Sources
		<ul style="list-style-type: none"> <li>be HES. Any 'non-core habitat' will be GES</li> <li>Include essential habitat layers to ensure all VMA essential habitat is captured. These areas are additional to the threatened species area and will be added as HES</li> </ul>	
<b>3.2 Other significant species</b>	<ul style="list-style-type: none"> <li>Includes the DERM Back on Track priority species threatened by development</li> <li>See attachment 3 for a list of DERM Back on Track priority species threatened by development</li> </ul>	<ul style="list-style-type: none"> <li>Apply the same mapping rules as for Threatened Species, excluding the use of BPA Criterion A.</li> </ul>	<ul style="list-style-type: none"> <li>Wildnet data</li> <li>Regional studies and reliable data from experts which complies with the guidelines in attachment 1</li> </ul>
<b>4. REGIONAL ECOSYSTEMS</b>			
<b>4.1 Endangered REs</b>	<ul style="list-style-type: none"> <li>Vegetation Management Act Regional Ecosystem remnant endangered REs (using VMA conservation status).</li> </ul>	<p>Contains Vegetation Management Act (VMA) Regional Ecosystem (RE) mapping with "endangered" conservation status. Includes dominant and sub dominant REs</p> <p>Use vegetation management conservation status NOT biodiversity status</p>	Current VMA RE mapping available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a>
<b>4.2 Of concern REs</b>	<ul style="list-style-type: none"> <li>VMA remnant of concern REs using VMA conservation status.</li> </ul> <p>Of concern REs for an urban purpose in an urban area are exempt under VMA. These REs aren't able to be removed spatially and are present in these exempt urban areas.</p>	<p>Contains VMA RE mapping with "of concern" conservation status. Includes dominant and sub dominant REs</p> <p>Use vegetation management conservation status NOT biodiversity status</p>	Current VMA RE mapping available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a>
<b>4.3 VMA regrowth vegetation with endangered and of concern conservation status</b>	Vegetation Management Act high value regrowth vegetation with endangered and of-concern pre clear conservation status	<p>Contains VMA high value regrowth mapping with "endangered and of concern" pre clear conservation status. Includes dominant and sub dominant REs</p> <p>Use vegetation management conservation status NOT biodiversity status</p>	<p>Current VMA high value regrowth mapping, current pre clear RE mapping</p> <p>Regrowth data available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a></p> <p>Preclear data available from the Qld Herbarium</p>
<b>4.4 Other significant RE values</b>	<p><b><u>4.4.1 Poorly conserved remnant REs in subregions with &lt;30% remnant vegetation remaining</u></b></p> <ul style="list-style-type: none"> <li>Poorly conserved REs are defined as having &lt;4% of total pre-clearing extent in conservation reserves (Sattler and Williams 1999).</li> <li>This criteria may capture some Not of Concern REs, as well as endangered and of concern REs that have also been caught as HES under the rules in 4.1 and 4.2</li> <li>These REs constitute a priority for nature conservation as they are currently unrepresented or poorly represented in conservation reserves.</li> </ul>	<p>Select REs from Regional Ecosystem Description Database (REDD) where EXT_RES = "Low" or EXT_RES = "No" in subregions with &lt;30% remnant vegetation remaining</p> <p>Apply Sattler and Williams definition of &lt;4% of total pre-clearing extent in conservation reserves instead of current BPA approach.</p> <p>If using the Regional Ecosystem Description Database, ensure the poorly conserved status is up to date – contact Rosemary Niehus at the Herbarium.</p>	<p>VMA RE mapping</p> <p>RE Description Database available from <a href="http://www.derm.qld.gov.au/wildlife-ecosystems/biodiversity/regional_ecosystems/how_to_download_redd.html">http://www.derm.qld.gov.au/wildlife-ecosystems/biodiversity/regional_ecosystems/how_to_download_redd.html</a></p>

State Interest	Description	HES Mapping Notes/Rules	Current Data Sources
	<p><b>4.4.2 Remnant REs that are rare or depleted in subregions</b></p> <ul style="list-style-type: none"> <li>The VMA status of REs is based on consideration of extent and the degree of depletion from clearing of REs in the context of an entire bioregion,</li> <li>However, REs have been subject to varying rates of clearing across their ranges eg. a RE that remains relatively common overall may be extensively depleted within part of its range.</li> <li>The natural distribution and extent of REs can also be significant in conservation ecology e.g. small isolated occurrences of REs may occur in suitable habitats well away from their main area of distribution.</li> <li>The rules for determining REs that are rare or depleted in a subregional context follow EPA (2002) - &lt;300ha <u>or</u> &lt;10% of the pre-clearing extent remains in the subregion.</li> <li>This criteria may capture some not of concern REs, as well as endangered and of concern REs that have also been caught as HES under the rules in 4.1 and 4.2</li> </ul>	<p>Select from the BPAs where B2_RATING = "VERY HIGH"</p> <p>Use VMA RE mapping where a BPA is not available</p>	<p>Biodiversity Planning Assessments available from <a href="http://www.derm.qld.gov.au/bamm">http://www.derm.qld.gov.au/bamm</a></p> <p>VMA RE mapping</p>
	<p><b>4.4.3 Remnant vegetation in subregions with &lt;30% remnant vegetation</b></p> <ul style="list-style-type: none"> <li>Remnant vegetation provides refugia from clearing in fragmented subregions and should be retained to maintain biodiversity.</li> <li>The threshold of a minimum of 30% of pre-clearing remnant vegetation remaining in a subregion is based on James, C.D. &amp; Saunders, D.A. (2001) in "A Framework for Terrestrial Biodiversity Targets in the Murray Darling Basin" CSIRO Sustainable Ecosystems and Murray-Darling Basin Commission, Canberra (James. and Saunders, 2001(104pp)). whose review of research across Australia indicates that when remnant vegetation is reduced to around 30%, significant declines in biodiversity have occurred and are continuing to occur.</li> <li>This criteria may capture some not of concern REs, as well as endangered and of concern REs that have also been caught as HES under the rules in 4.1 and 4.2.</li> </ul>	<p>Map remnant vegetation in fragmented subregions where fragmented = subregions with less than 30% of pre-clearing remnant vegetation remaining</p> <p>At present the following bioregions are the only ones containing subregions with &lt;30% vegetation:</p> <ul style="list-style-type: none"> <li>Brigalow Belt</li> <li>SEQ</li> <li>Mulga (eastern sub-region)</li> <li>NET (Nandewar subregion)</li> </ul>	<p>VMA RE mapping and statistics</p>
	<p><b>4.4.4 Coastal dune ecosystems</b></p> <ul style="list-style-type: none"> <li>Remnant and regrowth REs on coastal dunes (Land Zone 2).</li> <li>See attachment 4 for a description of the ecological values of coastal dunes.</li> </ul>	<p>Map areas of 'Land Zone 2' that contain remnant REs and high value regrowth vegetation.</p>	<p>1:100,000 Geology REs</p>
<p><b>4.5 Nationally threatened ecological communities</b></p>	<ul style="list-style-type: none"> <li>REs that are listed threatened ecological communities under the EPBC Act.</li> <li>The VMA and EPBC are not necessarily aligned. Some threatened ecological communities listed under the EPBC Act in Queensland have a Not of Concern status under VMA.</li> <li>Including these within HES addresses this inconsistency.</li> <li>Note that not all listed threatened ecological communities translate into REs (eg Brigalow is assessable under EPBC Act if regrowth is 15 years or older). Any assessable communities under EPBC should be included in HES where mapping is available.</li> </ul>	<p>Refer to EPBC Act list of threatened ecological communities located in Queensland.</p> <p>Translate to relevant Queensland REs.</p>	<p>EPBC Act listed threatened ecological communities – Refer to Department of the Environment, Water, Heritage and the Arts website: <a href="http://www.environment.gov.au/epbc/about/lists.html#species">http://www.environment.gov.au/epbc/about/lists.html#species</a></p> <p>Other relevant mapping e.g. 1:50 000 beach scrub mapping from Whitsunday Coalfields region</p>

State Interest	Description	HES Mapping Notes/Rules	Current Data Sources
4.6 Threshold REs	<ul style="list-style-type: none"> <li>Threshold REs</li> </ul>	Contains threshold RE's which are at the threshold of their conservation status	Threshold REs as defined in the VM Regulation
<b>5. LANDSCAPE LEVEL</b>			
5.1 Large tracts of remnant vegetation in fragmented subregions	<ul style="list-style-type: none"> <li>A tract is defined as discrete patch of mapped vegetation (ie. it is isolated to varying degrees by cleared/developed country).</li> <li>The size of a tract is a major indicator of ecological significance, and is also strongly correlated with the long-term viability of biodiversity values (EPA, 2002).</li> <li>Larger tracts are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller tracts.</li> <li>The delineation of large tracts is restricted to fragmented subregions that are defined as having experienced greater than 40% loss of remnant vegetation (McIntyre and Hobbs 2000).</li> </ul>	Select from the BPAs where C_PROV_PRP > 0 and C_PROV_PRP <=0.6 and C_RATING = "VERY HIGH"	Biodiversity Planning Assessments available from <a href="http://www.derm.qld.gov.au/bamm">http://www.derm.qld.gov.au/bamm</a>
5.2 Terrestrial Biodiversity corridors	<ul style="list-style-type: none"> <li>Refer to attachment 2 - Method for identifying terrestrial and riparian biodiversity corridors for DERM State interests under SPA</li> </ul>	<ul style="list-style-type: none"> <li>Refer to attachment 2</li> <li>Remnant corridor vegetation will be HES</li> <li>Non-remnant corridor vegetation will be GES.</li> <li>Cleared areas will be shown as strategic rehabilitation areas</li> </ul>	Refer to attachment 2
5.3 Riparian corridors	<ul style="list-style-type: none"> <li>Refer to attachment 2 - Method for identifying terrestrial and riparian biodiversity corridors for DERM State interests under SPA</li> </ul>	<ul style="list-style-type: none"> <li>Refer to attachment 2</li> <li>Remnant corridor vegetation will be HES</li> <li>Non-remnant corridor vegetation will be GES.</li> <li>Cleared areas will be shown as strategic rehabilitation areas</li> </ul>	Refer to attachment 2
5.4 Watercourses	VMA Watercourses (remnant and regrowth vegetation)	<ul style="list-style-type: none"> <li>Contains all VMA Watercourses, buffered to code distances, where stream order is available, and clipped to assessable vegetation.</li> <li>Buffer distances are defined in the regional vegetation management codes and regrowth code.</li> </ul>	Presence of assessable watercourse vegetation available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a>
<b>6. SPECIAL AREAS</b>			
6.1 Special Biodiversity Areas identified by expert panels	<ul style="list-style-type: none"> <li>Identified by expert panels as part of BPAs. important because they contain multiple species in a unique ecological and often highly biodiverse environment (EPA 2002). They can include one, or as is often the case several of the following: <ul style="list-style-type: none"> <li>a) Centres of endemism – areas where concentrations of taxa are endemic to a bioregion or subregion are found.</li> <li>b) Wildlife refugia (Morton <i>et al.</i> 1995), for example, islands, mound springs, caves, wetlands, gorges, mountain ranges and topographic isolates, ecological refuges, refuges from exotic animals, and refuges from clearing. The latter may include large areas that are not suitable for clearing because of land suitability/capability.</li> <li>c) Areas with concentrations of disjunct populations.</li> <li>d) Areas with concentrations of taxa at the limits of their geographic ranges.</li> <li>e) Areas with high species richness.</li> <li>f) Areas with concentrations of relictual populations (ancient and primitive taxa).</li> <li>g) Areas containing REs with distinct variation in species composition associated with geomorphology and other environmental variables.</li> </ul> </li> </ul>	<p>Only BPA – Criterion I - State identified areas to be mapped as HES.</p> <p>BPA – Criterion I - Regional identified areas to be mapped as GES</p>	BPA – Criterion I = <b>State only</b>

State Interest	Description	HES Mapping Notes/Rules	Current Data Sources
	<ul style="list-style-type: none"> <li>h) An artificial waterbody or managed/manipulated wetland considered by the panel(s) to be of ecological significance.</li> <li>i) Areas with a high density of hollow-bearing trees that provide habitat for animals.</li> <li>j) Breeding or roosting sites used by a significant number of individuals.</li> </ul>		
<b>7. GENERAL MAPPING RULES</b>		<ul style="list-style-type: none"> <li>• HES mapped areas should not be included in GES.</li> <li>• Do not snap to cadastre.</li> <li>• The Vegetation Management Act Regional Ecosystem Vers 6.0 data set should be used to generate the following State interest data sets: <ul style="list-style-type: none"> <li>• HES - 4.1 Endangered regional ecosystems</li> <li>• HES - 4.2 Of concern regional ecosystems</li> <li>• HES – 4.6 Threshold regional ecosystems</li> </ul> </li> <li>• The Queensland Herbarium (2009) Survey and Mapping of 2006b Vegetation Communities and Regional Ecosystems of Queensland, Version 6.0b should be used to generate all other data sets including those relating to BPA's.</li> <li>• Any selections of non-remnant vegetation should include 'RE field' populated as: regrowth, disturbed, small and small island (and sand, where appropriate); and regrowth.</li> <li>• These mapping rules also apply to GES.</li> </ul>	
<b>7.1 Offsets</b>	<ul style="list-style-type: none"> <li>• VMA Offsets</li> <li>• 'Queensland Government Environmental Offsets Policy' (QGEOP) offsets</li> </ul>	<ul style="list-style-type: none"> <li>• Contains VMA offset areas.</li> <li>• Contains QGEOP offsets</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of VMA offset areas</li> <li>• Presence of offsets under the QGEOP</li> </ul>
<b>7.2 VMA - PMAV</b>	<ul style="list-style-type: none"> <li>• Contains HES PMAV categories</li> </ul>	<ul style="list-style-type: none"> <li>• PMAV Cat A,</li> <li>• PMAV Cat B and C with End and OC pre clear status</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of all PMAV cat A and</li> <li>• Presence of PMAV cat B with end and OC pre clear status</li> <li>• Presence of PMAV cat C with end and OC pre clear status available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a></li> </ul>

**Table 2: Method for mapping areas of marine ecological significance (MES)**

State Interest	Description	MES Mapping Notes/Rules	Current Data Sources
<b>1. Marine Areas</b>			
<b>1.1 Marine Parks (State and Commonwealth)</b>	<ul style="list-style-type: none"> <li>• Conservation Park zone</li> <li>• Habitat protection zone</li> <li>• Estuary conservation zone</li> </ul>	<ul style="list-style-type: none"> <li>• All State marine Park yellow 'Conservation Park' dark blue 'Habitat Protection', brown 'Estuary Conservation Zone'</li> </ul>	<ul style="list-style-type: none"> <li>• All State marine Park yellow 'Conservation Park' dark blue 'Habitat Protection', brown 'Estuary Conservation Zone'</li> </ul>
<b>1.2 Designated protected area</b>	<ul style="list-style-type: none"> <li>• Dugong protection zones</li> <li>• Fish Habitat Areas</li> </ul>	<ul style="list-style-type: none"> <li>• All Dugong protection zones</li> <li>• All fish habitat areas</li> </ul>	<ul style="list-style-type: none"> <li>• All Dugong Protection Zone 'A' and Zone 'B' Areas</li> <li>• All Fish habitat Management 'A' and Management 'B' Areas</li> </ul>

**Table 3: Method for mapping areas of general ecological significance (GES)**

State Interest	Description	GES Mapping Notes/Rules	Current Data Sources
<b>1. TENURE</b>			
<b>1.1 State Forests and Timber Reserves</b>	<ul style="list-style-type: none"> <li>State forests and timber reserves (other than State Plantation Forests) under the <i>Forestry Act 1959</i>.</li> </ul>	<p>Include State Forests (other than State Plantation Forests) and timber reserves using the estates layer minus the Plantation layer.</p> <p>Use the most accurate and up to date plantation layer (e.g. DPI plantation layer) and only remove plantation areas.</p>	<p>Protected Areas of Queensland Estates layer</p> <p>DPI plantation layer</p>
<b>1.2 Local Government/conservation area</b>	<ul style="list-style-type: none"> <li>Land owned/managed by local governments for nature conservation purposes</li> <li>Land reserved for environmental purposes under the <i>Land Act 1994</i></li> </ul>		
<b>1.3 Private conservation reserves</b>	<p>Privately owned conservation reserves including:</p> <ul style="list-style-type: none"> <li>areas funded under the Federal National Reserve System</li> <li>Nature refuges under the <i>Nature Conservation Act 1992</i></li> <li>State leasehold land used for conservation purposes</li> </ul>		<p>Nature Refuges and Coordinated Conservation Areas layer</p> <p><i>Other private reserves layer will be collated by Central Office - to be provided</i></p>
<b>1.4 Coordinated conservation areas</b>	<ul style="list-style-type: none"> <li>Coordinated Conservation Areas are a class of protected areas under the <i>Nature Conservation Act 1992</i></li> </ul>		Nature Refuges and Coordinated Conservation Areas layer
<b>2. WETLANDS</b>			
<b>2.1 General conservation value wetlands assessed using AquaBAMM</b>	Includes the balance of wetlands not assessed as 'High' and 'Very High' conservation value wetlands identified in an Aquatic Conservation Assessment (ACA) prepared using AquaBAMM.	<ul style="list-style-type: none"> <li>In areas where a full ACA is available for any wetland type, use the balance of wetlands that do not have a High / Very High Aquascore (the ACA should include 51-100% wetland polygons, natural wetlands (H1) and modified wetlands with the following modifiers H2M2, H2M3, H2M4, H2M5 and H2M8)</li> <li>Include only those wetlands from dot point 1 above which have been unmodified (H1) or have one of the following modifiers H2M2, H2M3, H2M4, H2M5 and H2M8.</li> <li>Rivers/streams coverage that intersect with values other than High Very High/ High values to be included</li> </ul>	<p>ACA layer where aquascore is a value other than Very High or High</p> <p>Rivers/streams coverage is the Qld Wetlands Data -Riverine Drainage Lines layer</p>
<b>2.2 Other wetlands of State interest</b>	Where an aquaBamm ACA is NOT available for a wetland type, General value wetlands' are those wetlands accurately mapped under the QWP that occur in areas that have public and/or legislative acceptance as generally significant wetlands. These are the other important accurately mapped wetlands of State interest that have not been included in the HES layer	<p>In areas where a full ACA is NOT available for a wetland type, exclude HES wetlands, and include:</p> <ul style="list-style-type: none"> <li>Qld Wetlands Programme layer, excluding: <ul style="list-style-type: none"> <li>&lt;50% RE polygons</li> <li>'contains wetlands' polygons (already excluded)</li> <li>artificial wetlands (all H3)</li> <li>highly modified wetlands (H2M6, H2M7)</li> <li>marine wetlands</li> <li>estuarine 'water' RE polygons</li> </ul> </li> <li>The balance of Ramsar wetlands not included in HES</li> <li>Rivers and streams coverage which do not overlap with</li> </ul>	<p>Qld Wetlands Programme layer</p> <p>Ramsar Sites (QLD)</p> <p>Directory of Important Wetlands in Australia</p> <p>Significant coastal wetlands in approved regional coastal plans (ie Wet Tropics, Cardwell / Hinchinbrook, Curtis Coast and SEQ plans except</p>

State Interest	Description	GES Mapping Notes/Rules	Current Data Sources
		<p>HES areas and which intersect with any of the following areas:</p> <ul style="list-style-type: none"> <li>- DIWA</li> <li>- significant coastal wetlands in approved regional coastal plans except for marine and estuarine water bodies.</li> <li>- BPA Criteria I areas that have undergone further assessment and refinement by experts to select wetlands of special outstanding ecological significance (at present no such assessments have been conducted)</li> <li>- Ramsar areas</li> </ul>	<p>for marine and estuarine water bodies.</p> <p>HEV areas under the Water EPP (ie Douglas, Mary, Great Sandy, SEQ HEV areas) – use the Environmental Values Level of Protection layer</p> <p>BPA Criteria I areas that have undergone further assessment and refinement by experts to select wetlands of special outstanding ecological significance (at present no such assessments have been conducted)</p> <p>Rivers and streams coverage is the Qld Wetlands Data -Riverine Drainage Lines layer</p>
2.3 Marine areas	Balance of Marine Parks not picked up as HES and MES including Marine Park general use and buffer ones	<p>State and Commonwealth Marine Parks including:</p> <ul style="list-style-type: none"> <li>• Olive green 'Buffer' Zone</li> <li>• Light blue 'General Use' Zone</li> </ul>	State and Commonwealth Marine including parks olive green 'Buffer' Zone and light blue 'General Use' Zone
<b>3. SPECIES</b>			
<b>3.1 Threatened species and other significant species</b>	<ul style="list-style-type: none"> <li>• Threatened species are: <ul style="list-style-type: none"> <li>- Endangered, Vulnerable, Rare* or Near-Threatened species as defined under the <i>Nature Conservation Act 1992</i> (NCA) and/or</li> <li>- Critically Endangered, Endangered or Vulnerable species as defined under the EPBC Act</li> </ul> <p>* Note: The status of 'rare' under the NCA will be removed in 2010. Rare species will be individually reassigned to appropriate categories</p> </li> <li>• Other Significant Species are: <ul style="list-style-type: none"> <li>- the DERM Back on Track priority species threatened by development</li> <li>- see attachment 3 for a list of DERM Back on Track priority species threatened by development</li> </ul> </li> <li>• Note: Some EPBC Act threatened species are not listed under the NCA.</li> <li>• For mapping purposes only this category picks up all EPBC Act threatened species whether listed or not under the NCA. The Australian Government has an assessment role under the EPBC Act for those species not listed under the NCA</li> </ul>	<ul style="list-style-type: none"> <li>• Any mapped non-core habitat for Threatened or Other Significant Species to be GES</li> <li>• Use base mapping layers from the BPA where Criterion A = Med or Low AND Noncore_hab = Y to be GES.</li> <li>• Base mapping layers from the BPA where BPA Criterion H or I has been identified for an Other Significant species to be GES, regardless of whether the layer is core / non-core habitat or State or regional significance</li> <li>• If any new non-BPA data is used for Threatened or Other Significant Species it must comply with the following rules: <ul style="list-style-type: none"> <li>○ <u>For habitat mapping:</u> <ul style="list-style-type: none"> <li>▪ any mapping used must comply with the guidelines in attachment 1 and must meet the BAMM definition of non-core habitat to included in GES <ul style="list-style-type: none"> <li>• Areas identified as a Threatened or Other Significant Species in an approved Conservation Plan/Recovery Plan that qualify as 'non-core habitat' according to the guidelines at attachment 1 may be GES</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<p>BPA selection where Criterion A = Medium or Low AND Noncore_hab = Y</p> <p>BPA Criterion H for Threatened or Other Significant Species</p> <p>Other reliable data which complies with the guidelines in attachment 1.</p> <p>Australian Government EPBC data if available</p>

State Interest	Description	GES Mapping Notes/Rules	Current Data Sources
<p><b>3.2 Priority species</b></p>	<p>Priority species are those species not listed as Threatened or as Other Significant Species in section 3.1 section above, which are:</p> <p>A. identified through BPA expert panels and meet the following criteria:</p> <ul style="list-style-type: none"> <li>• taxa at risk or of management concern</li> <li>• taxa of scientific interest as relictual (ancient or primitive)</li> <li>• endemic taxa or locally significant populations (such as a flying fox camp or heronry)</li> <li>• highly specialised taxa whose habitat requirements are complex and distributions not well correlated with any particular RE</li> <li>• taxa important for maintaining genetic diversity (such as complex spatial patterns of genetic variation, geographic range limits, highly disjunct populations)</li> <li>• taxa critical for management or monitoring of biodiversity (functionally important or ecological indicators)</li> <li>• economic and culturally important taxa</li> </ul> <p>OR</p> <p>B. Back on Track priority species not threatened by development</p> <p>See the BAMM method for further info and BPA expert panel reports for lists of BPA priority species.</p> <p>Contact the threatened species strategy unit for the most up to date listing of other Back on Track priority species</p>	<ul style="list-style-type: none"> <li>• Species which are identified as 'other significant species' in HES criteria 3.2 or GES criteria 3.1 should not be regarded as Priority species within this section</li> <li>• Base mapping layers from the BPA where BPA Criterion H or I has been identified for a priority species to be GES, regardless of whether the layer is core / non-core habitat or State or Regional Significance</li> <li>• If any new non-BPA data is used for priority species it must comply with the following rules: <ul style="list-style-type: none"> <li>○ <u>For species point records:</u> <ul style="list-style-type: none"> <li>- use only high precision (ie &lt;500m accuracy) point records.</li> <li>- exclude records with precision &gt;500m</li> <li>- exclude records older than 1975 for fauna and 1950 for flora.</li> <li>- exclude highly mobile fauna species records except where the record is a known breeding or roosting site. Highly mobile species are identified in Appendix 1 of the BAMM.</li> <li>- exclude duplicates and dubious records e.g. cultivated flora records.</li> </ul> </li> <li>○ <u>For habitat mapping:</u> <ul style="list-style-type: none"> <li>- any mapping used must comply with the guidelines in attachment 1.</li> <li>- any core or non-core habitat is to be GES <ul style="list-style-type: none"> <li>• Point records which satisfy the above rules are to be buffered with a radius of twice the precision of the record (with a minimum buffer of 300m)</li> <li>• remnant and non-remnant vegetation (refer to section 7 general mapping rules) captured within the buffer area of point records to be mapped as GES. Note this selection may not have been performed in existing BPAs, so this mapping will may to be done for all BPA species point records</li> <li>• Areas identified for a priority species in an approved conservation plan/recovery plan that meet the guidelines at attachment 1 and qualify as core or non-core habitat may be GES.</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<p>BPA Criterion H = State or regional for priority species</p> <p>Species listed in Appendix 7 of BAMM and in BPA expert panel reports</p> <p>Wildnet data</p> <p>Other reliable data which complies with the guidelines in attachment 1.</p>
<p><b>4. REGIONAL ECOSYSTEMS</b></p>			
<p><b>4.1 Remnant REs not captured in HES</b></p>	<ul style="list-style-type: none"> <li>• Include <u>all</u> remnant REs not captured as HES</li> <li>• VMA RE least concern REs using VMA conservation status</li> </ul>	<p>Contains current version of VMA RE mapping "least concern" conservation status. Includes dominant and sub dominant REs</p>	<p>VMA RE mapping Current VMA RE mapping Current Landcover mapping</p>

State Interest	Description	GES Mapping Notes/Rules	Current Data Sources
	<ul style="list-style-type: none"> <li>This will mainly capture 'not of concern' remnant REs but may also capture some 'endangered' or 'of concern' remnant REs not picked up in HES, e.g. where they are less than 30% in a heterogeneous RE polygon (such as an RE polygon that was 'Sand/12.3.4' and where the VMA status was '-/Of Concern' and the percent break up of this polygon was 75% / 25%).</li> <li>VMA remnant least concern REs using VMA conservation status</li> <li>Landcover mapping (where applicable)</li> </ul>	<p>Use vegetation management conservation status NOT biodiversity status</p> <ul style="list-style-type: none"> <li>Landcover mapping (where there is no RE mapping)</li> </ul>	available at <a href="http://dds.information.qld.gov.au/DDS/Search.asp">http://dds.information.qld.gov.au/DDS/Search.asp</a>
<b>4.2 VMA Regrowth vegetation with least concern conservation status</b>	VMA high value regrowth vegetation with least concern pre clear conservation status	<p>Contains VMA high value regrowth mapping with "least concern" pre clear conservation status</p> <p>Use vegetation management conservation status NOT biodiversity status</p>	<p>Current VMA high value regrowth mapping Current pre clear RE mapping</p> <p>Regrowth data available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a></p> <p>Preclear data available from the Qld Herbarium</p>
<b>5. LANDSCAPE LEVEL</b>			
<b>5.1 Terrestrial biodiversity corridors</b>	<ul style="list-style-type: none"> <li>Refer to attachment 2 - Method for identifying terrestrial and riparian biodiversity corridors for DERM State interests under SPA</li> </ul>	<ul style="list-style-type: none"> <li>Refer to attachment 2</li> <li>Non-remnant corridor vegetation will be GES.</li> </ul>	Refer to attachment 2
<b>5.2 Riparian corridors</b>	<ul style="list-style-type: none"> <li>Refer to attachment 2 - Method for identifying terrestrial and riparian biodiversity corridors for DERM State interests under SPA</li> </ul>	<ul style="list-style-type: none"> <li>Refer to attachment 2</li> <li>Non-remnant corridor vegetation will be GES.</li> </ul>	Refer to attachment 2
<b>6. SPECIAL AREAS</b>			
<b>6.1 Special biodiversity areas</b>	Special Biodiversity Areas identified by expert panels as part of the DERM's biodiversity planning assessment (BPAs) for relevant bioregions.	<p>Only BPA – Criterion I - Regional identified areas to be mapped as GES.</p> <p>Only BPA – Criterion I - State identified areas to be mapped as HES.</p>	BPA – Criterion I = <b>Regional</b> only
<b>7. GENERAL MAPPING RULES</b>			
<b>7.1 VMA PMAV</b>	<ul style="list-style-type: none"> <li>Contains GES PMAV categories</li> </ul>	<ul style="list-style-type: none"> <li>HES mapped areas should not be included in GES</li> <li>The Vegetation Management Act Regional Ecosystem Vers 6.0 data set should be used to generate the following State interest data sets: <ul style="list-style-type: none"> <li>GES – 4.1 Remnant regional ecosystems not captured in HES</li> </ul> </li> <li>The Queensland Herbarium (2009) Survey and Mapping of 2006b Vegetation Communities and Regional Ecosystems of Queensland, Version 6.0b should be used to generate all other data sets including those relating to BPA's.</li> </ul>	<p>Presence of PMAV cat B with least concern pre clear status Presence of PMAV cat C with least concern pre clear status</p> <p>PMAV data available at <a href="http://dds.information.qld.gov.au/DDS/Search.aspx">http://dds.information.qld.gov.au/DDS/Search.aspx</a></p>

State Interest	Description	GES Mapping Notes/Rules	Current Data Sources
			Preclear data available from the Qld Herbarium

**Table 4: Method for mapping Strategic Rehabilitation Areas (SRA)**

State Interest	Description	GES Mapping Notes/Rules	Current Data Sources
<b>1. Strategic Rehabilitation Areas</b>			
<b>1.1 Corridor Special Rehabilitation Areas</b>	<ul style="list-style-type: none"> <li>Cleared, disturbed or modified areas or areas containing non-remnant and regrowth within a terrestrial riparian corridor</li> </ul>	<ul style="list-style-type: none"> <li>Refer to "Corridor Special Rehabilitation Areas" in attachment 2 – Method for identifying terrestrial and riparian biodiversity corridors</li> </ul>	<ul style="list-style-type: none"> <li>Refer to attachment 2</li> <li>The latest urban zones should be obtained from individual local governments.</li> </ul>

**Table 5: Areas of Committed Development**

Step	Process
1	Extract parcels of less than a specified urban size (say 2000m <sup>2</sup> ) and within the area of interest (e.g. regional plan area) from the DCDB (parcel type = lot and cover type = base) whilst excluding lots which were reserves, NP, SF, FR etc.
2	Dissolve the parcels
3	Buffer by a selected width which is approximately a little more than half the width of a major road (say 25m)
4	Re-buffer using (a flat buffer) the same negative distance (ie. -25m)
5	This layer is then used to clip any roads with which it intersects
6	Union this dataset with the original dissolved parcels in step 2
7	Dissolve the dataset in step 6
8	For a cleaner layer, reverse the selection in step 1 from the DCDB and use this as an erase feature on the dataset created in step 7
9	Multi-part split

## ATTACHMENT 1

### Guidelines for accepting non-BPA flora and fauna species information for mapping HES / GES areas

The purpose of this guideline is to enable reliable species information from sources other than DERM Biodiversity Planning Assessments (BPAs) to be accepted for use in mapping areas of high ecological significance (HES) and general ecological significance (GES).

The guidelines apply to non-BPA threatened and priority species information being considered for use as a data source under sections 3.1, 3.2 and 6.1 of Table 1 and sections 3.1, 3.2 and 3.3 and 6.1 of Table 3 in the '*Method for mapping DERM terrestrial biodiversity and wetland conservation State Interests in SPA Planning*' (Biodiversity State Interest Mapping Method).

Wherever possible, species point records or habitat mapping information should be included in the relevant bioregional BPA through the expert panel process. This enables peer review of the information and ensures outputs consistent with the DERM's Biodiversity Assessment and Mapping Methodology (BAMM) for producing BPAs. This information can then be incorporated into HES / GES mapping.

If inclusion of the species information in a BPA is not possible, then the following guidelines should be used to determine whether the information is acceptable for use in HES / GES mapping or any future BPA:

#### ***For point records and habitat mapping:***

- Only information that is verified from a person/s with expertise in the relevant species should be accepted.
- The person/s supplying the information must be informed that its intended use is to represent a DERM State interest for planning and development assessment purposes under the *Sustainable Planning Act 2009*. Their written consent for the use of the information for this purpose must be obtained and kept on record (e.g. an email confirming the above would suffice).

#### ***For species point records:***

- The rules in 3.1 and 3.2 of Tables 1 and 3 of the Biodiversity State Interest Mapping Method must be satisfied before species point records are accepted.
- Species point data records must be submitted to Wildnet. As much detail as possible on the record should be provided, including any information on breeding, important roost sites or camps (especially for mobile taxa such as raptors, owls and flying-foxes).

#### ***For species habitat mapping:***

- The results from any habitat mapping to be used must be such that areas identified as habitat can be assigned as 'core' or 'non-core' habitat as defined under the BAMM. See BAMM Criteria H and BAMM Appendix 2 for further details. 'Core' areas will be assigned where there is a high level of confidence about the appraisal of the area. Areas where there is less confidence about the appraisal will be assigned as 'non-core'.
- Full documentation must be kept on file on the method used to produce the original habitat mapping and on how the method was applied to produce the taxon's habitat map of core and non-core areas. How areas were assigned to either of these categories must be included in the documentation. In many cases a DERM officer will be responsible for documenting the latter step – i.e. recording how the original information was translated into areas of core and non-core habitat.

## **ATTACHMENT 1**

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- The documentation provided **MUST** be of sufficient detail that anyone using just the documentation could reconstruct the habitat mapping (core and non-core areas) from the original information. Any valid methodology can be used, e.g. expert knowledge or statistical modelling.
- Both the supplier of the original information and the person who applies it to assign core and non-core habitat must be confident that the respective methodologies and results are adequate for use in the SPA context.

Note that BPA Criterion I Special Areas should only be identified through the BPA expert panel process. Non-BPA information should **NOT** be used to identify Criterion I areas for HES or GES mapping purposes.

## ATTACHMENT 2

### Method for identifying terrestrial and riparian biodiversity corridors for DERM biodiversity State interests under SPA

#### **1. Background**

This document outlines the method for identifying and mapping terrestrial and riparian biodiversity corridors that represent a DERM biodiversity conservation State interest under the *Sustainable Planning Act 2009* (SPA). The method incorporates the use of other existing biodiversity corridor products.

Biodiversity corridors have been identified in the DERM's Biodiversity Planning Assessments (BPAs). There has been some variability in the method used for their determination, mainly due to the differences in landscape connectivity between in-tact and fragmented bioregions. In fragmented bioregions or subregions, BPA corridors largely focus on large remnant tracts of vegetation that maintain landscape scale connectivity, while corridors in intact bioregions such as the Desert Uplands focus on gaps or weaknesses in corridor connectivity.

Biodiversity corridors are also identified in other existing planning initiatives such as regional natural resource management plans, regional vegetation management plans and habitat mapping and plans for specific species.

The DERM is commencing an update of its method for identifying BPA corridors, and will consider a greater focus on continuity within and between broad suites of similar or associated habitats, particularly in intact landscapes. The corridors identified using this document may need to be reviewed once any new BPA method is established.

As the corridors developed using this method will be reflected in SPA planning instruments including regional plans, any subsequent mapping updates would need to be negotiated and managed through the appropriate review and update processes for these instruments.

#### **2. Method**

##### **2.1 Terrestrial Corridors**

###### **2.1.1 Identifying corridor centrelines**

Corridor centrelines will be used to identify the full distance along which a corridor is perceived to be a functional unit for biodiversity. The methods used to identify centrelines vary between fragmented and intact landscapes.

###### ***For fragmented bioregions with a current BPA***

The corridor centrelines from existing BPAs are to be used in the following bioregions that contain many fragmented sub-regions: New England Tableland, Southeast Queensland, Brigalow Belt, Central Queensland Coast and Mulga Lands. Generally these centrelines have been delineated based primarily on the continuity and the extent of remnant vegetation which provide key linkages between large tracts and conservation areas. Note that it may be desirable to update the centrelines once a new BPA corridor method is established.

###### ***For intact bioregions and subregions***

The following method should be used in largely intact bioregions/subregions without a BPA and in bioregions / subregions where BPA corridors only identify significant weaknesses in habitat connectivity between areas of intact vegetation (such as the Desert Uplands BPA corridors):

- Any existing habitat corridors should be used as a starting point, such as corridors identified in BPAs, NRM plans, vegetation management plans and species specific corridors such as cassowary corridors in the Wet Tropics. Note that different methods may have been used in their delineation, e.g. the corridors may have been selected primarily to connect large remnant tracts, to connect similar habitat, or to identify gaps and weaknesses in habitat connectivity.
- An expert panel process must be used to undertake corridor assessments and determine corridor centrelines.

- Using an expert panel process, assess habitat type and habitat connectivity across the region of interest using the most current certified version of regional ecosystem mapping (currently Version 6 at the time of this document) and best available imagery (eg most recent SLATS TM images). Contour, digital elevation, waterways and catchment boundaries mapping may also assist.
- Create a centreline that delineates the entire length of each corridor. Each centreline should primarily trace habitat continuity within and between broad suites of similar or associated habitats. Examples include ecotone forests and woodlands associated with the boundary between the Wet Tropics and Einasleigh Uplands; or tracts of woodlands on sandstone or granite country that may have their own suite of biodiversity including endemic species.
- In extensive intact areas of habitat, the centreline should primarily follow the middle of the habitat type, or follow ridges, watersheds, scarps or other features where appropriate (e.g. along a range where the range country supports particular significant species which only disperse along it).
- Identify major north-south corridors using centrelines that follow broad habitat types or habitat complexes.
- Identify east-west corridors using centrelines that follow habitat continuity between major north-south corridors (where they serve as a corridor in their own right) or which represent altitudinal or climatic gradients, or coast to inland connectivity.
- Where centrelines pass through cleared or disturbed areas they should generally follow a line of best fit between larger proximate areas of intact habitat. Some flexibility in their shape and location should be applied, e.g. if possible avoiding areas with known built infrastructure or agricultural development where there may be less potential for corridor re-establishment.

### 2.1.2 Assigning corridor categories

Each corridor centreline should be assigned one of the following corridor categories:

1. *State corridors*: Where a corridor crosses two or more bioregions.
2. *Bioregional corridors*: Where the corridor crosses subregions within a bioregion.
3. *Sub-regional corridors*: Where the corridor is contained within a subregion.
4. *Local corridors*: Local corridors should not be identified as a State interest.

The above categories should not be confused with corridor types or significance ratings from BPA corridors. For example not all corridors assigned 'State' significance in a BPA will be a Category 1 State Corridor above – they may be categories 1, 2 or 3. Note that some 'local' BPA corridors may be significant and designated as a Category 3 Sub-regional corridor when assessed in a broader context.

### 2.1.3 Determining corridor widths

The width of each indicative corridor area must be determined before the vegetation associated with the corridor is selected. When determining appropriate widths, consider any key factors such as the following which can be used to establish appropriate biodiversity corridors: patch size, distance between patches, corridor length, vegetation quality, context, relevant fauna and flora studies.

The following buffering rules should be applied to determine the width of each corridor:

- *State Corridors*: A buffer of up to 5km (maximum) either side of the centreline. The buffer may be modified to suit the particular landscape context where the corridor is situated. For example, a smaller buffer of 2.5km either side of the centreline may be appropriate for a coastal corridor.
- *Bioregional Corridors*: A buffer of up to 5km (maximum) either side of the centreline. The corridor buffer may be modified to suit the particular landscape context where the corridor is situated. For example, for areas of less intense settlement and fragmentation, a larger buffer may be appropriate. In more fragmented bioregions, where habitat connectivity is greatly reduced and these corridors assume greater significance for habitat continuity, a narrower width may capture the remaining continuity and associated habitat "stepping stones".
- *Subregional Corridors*: Apply the same buffer rules as for bioregional corridors.
- *Local Corridors*: Local corridors should not be identified as a State Interest.

In situations where corridor buffers have undergone extensive assessment by experts and stakeholders (such as the community, industry and state / local government) and the extent of the buffers have been

negotiated and identified and do not compromise ecological values or corridor functionality, the negotiated buffered areas may be adopted.

### ***Corridor widths in urban areas***

Within urban footprints (ie urban footprints identified in SPA Regional Plans, including: existing urban areas indicated by urban, industrial, commercial, residential and rural residential planning schemes zones; and areas 'committed' to urban development), the width of the buffer may need be substantially reduced to be 'workable' within an urban planning context. Any such adjustments to the corridor buffer width need only be made where corridor maps will be used for SPA planning and development assessment purposes. The extent of any reductions should be determined according to local conditions. If an area is heavily or fully developed, or extensively committed to urban development, it may not be appropriate to show any indicative corridors or strategic rehabilitation areas through that area.

Appendix A is an example of a process which can be used where appropriate to exclude certain vegetation from corridors in urban areas, where the area is or will become built up for urban purposes. The process may be run following the identification of urban corridor buffers, and prior to the selection of corridor vegetation using corridor buffers.

### **2.1.4 Selecting corridor vegetation using centrelines and buffers**

#### ***For fragmented bioregions and subregions***

In fragmented landscapes it is essential that habitat connectivity is maintained to the greatest extent possible. Due to the extent of habitat loss in these landscapes, and the often tenuous nature of the remaining habitat connectivity, it is also important to retain connected areas of habitat along the corridor to provide refugia and 'stepping stones' of habitat for species using the corridor. The selection rules are designed to ensure that all remnant vegetation associated with identified corridors are selected and their corridor values clearly identified.

The following vegetation selection rules should be used for both new centrelines and for the centrelines adopted from existing BPAs.

- Generally, 'remnant' and 'disturbed' polygons (from the most recent regional ecosystem coverage where available for the bioregion) associated with a corridor centreline should be selected by an intersect with each buffered centreline
- Only remnant and disturbed polygons with 70% or more of their area within the buffer should be selected, rather than the 30% rule used in BPAs. Further, all remnant and disturbed which is not triggered by the 70% rule vegetation but which falls inside the corridor buffer area should be clipped to and included in the buffer area. Any polygons created through the latter step which are located only in the outer margins of the buffer and are smaller than an appropriate threshold (e.g. 5ha) should be excluded
- Any regrowth vegetation that falls within a buffered corridor centreline should be selected by clipping the regrowth to the buffered area.

In addition:

- RE polygons associated with the corridors but split by map sheet boundaries should be merged prior to applying the selection rules
- All polygons fully enclosed by larger polygons selected using the previous rules should also be included in the corridor coverage, whether they are partly or entirely outside the buffer area
- Corridor buffers should be dissolved prior to the selection process so that remnant patches which span between corridors or are located at the intersection of two corridors and which do not have 70% of their area within a single corridor, but do have more than 70% within two or more corridor buffers, are still triggered (i.e. the corridor should be treated as one continuous network when selecting remnant patches)

#### ***For intact bioregions and subregions***

In intact landscapes, where habitat connectivity at a landscape scale remains, it is still necessary to identify the major elements of habitat continuity, particularly of distinctive habitat types, so that these values are recognised and maintained through land use planning and management. Examples of these distinctive

elements include belts of stony timbered ranges across extensive grasslands, and continuous or semi-continuous deep-soiled plateau surfaces surrounded by skeletal soils on steep hills.

Identifying these corridors by their associated RE map polygons is less important than ensuring the continuity is recognised and valued, connectivity is maintained, and any areas of weakness or discontinuity identified for targeted planning and management.

In intact landscapes individual RE polygons are often extensive, and selection rules such as outlined above for fragmented landscapes can lead to perverse outcomes. These outcomes are usually most simply resolved by clipping the larger polygons to the buffer. Rather than developing a set of complex rules to address all circumstances, in intact landscapes the identified corridors are simply clipped to remnant vegetation within the nominated buffer width. The resulting corridors indicate the core route of significant elements of habitat continuity, and show any weaknesses due to clearing.

## 2.2 Riparian Corridors

In fragmented landscapes remnant and disturbed vegetation associated with major watercourses (riparian vegetation) often provides the major remaining element of habitat connectivity. In some cases even riparian vegetation has been so fragmented that its role as a corridor for terrestrial species, while important, may be less significant than its value as remnant habitat representative of once widespread ecosystems. Most of the remaining riparian vegetation in fragmented landscapes consequently has a status under the VMA of Endangered or Of Concern.

In intact landscapes riparian corridors are also particularly significant for biodiversity, both as a refuge and as a major element of habitat continuity.

### 2.2.1 Identifying riparian corridors

Riparian vegetation should only be identified as a riparian corridor where it can be demonstrated that a corridor has significant biodiversity values and a specific ecological corridor function, rather than identifying a corridor on the general basis that it contains vegetation adjacent to waterways.

Where this can be demonstrated, the centrelines/banks of riparian corridors should be delineated by generally adopting centrelines/banks of stream order of 3 or greater mapped at a scale of 1:100 000 topographic coverage, using the Strahler (1952) stream ordering method<sup>1</sup> (this method is used in AquaBAMM). Note there should be no variation from the 1:100 000 scale, as stream ordering for 1:100 000 is very different to 1:50 000 and 1:25 000. Smaller stream orders may only be adopted if they provide an effective link to a large remnant tract/estate/reserve. Finer scale mapping (e.g. 1:25 000) may be used to identify watercourse positions more accurately.

Irrespective of this, corridors need not be solely based on their magnitude, but can also be based on the areas which they link. Sections of a waterway can be identified as a corridor where good remnant/regrowth vegetation is present and where that section of the waterway provides a vegetated link between two large tracts/protected areas.

Stream line buffers should be based on the riparian setbacks specified in the Regional Vegetation Management Codes, unless otherwise determined by an expert panel. Generally speaking, stream orders 3 and 4 have a buffer either side of the high bank of 25m (coastal subregions) or 100m (inland subregions), and stream order 5 or greater have 50m (coastal) or 200m (inland), although there are some subregional variations. As centrelines are used for delineating riparian corridors, allowance needs to be made for the stream beds. For example in the coastal subregions of the Wet Tropics, the bed of watercourses with a stream order of 5 or greater is on average about 100m wide, or 50m either side of their centreline. The current Regional Vegetation Management Code for Coastal Bioregions prohibits clearing within 50m of the high bank, therefore a 100m buffer should be applied either side of the centreline to represent the minimum width of the riparian corridor consistent with current policy. Apply this general policy direction, using the appropriate distances for the relevant bioregion/subregion.

Each riparian corridor identified may also be assigned a corridor category of State, Bioregional or Sub-regional, as the rules in per 2.1.2.

### 2.2.2 Selecting riparian corridor vegetation

The rules for selecting corridor vegetation in 2.1.4 should be used for selecting vegetation associated with riparian corridors unless otherwise decided by expert panel. For example in undeveloped inland subregions

<sup>1</sup> Strahler, A. N. (1952). Dynamic basis of geomorphology. Geological Society of America Bulletin, 63, 923-938.  
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riparian regional ecosystems could be used in combination with buffered streamlines to create a comprehensive riparian corridor network.

## 2.3 Corridor - Strategic Rehabilitation Areas

### 2.3.1 Purpose

Strategic Rehabilitation Areas (SRAs) may be identified within corridors where there are gaps or weaknesses in habitat continuity (such as disturbed, cleared or modified areas), but where focussed planning, management and rehabilitation can play a significant role in enhancing special ecological values associated with the area. These areas are identified to provide a focus for protecting existing vegetation, for consolidating habitat and for increasing habitat connectivity across areas of identified weakness.

The objectives for SRAs are to limit land use intensification, promote compatible uses, and retain all remaining remnant and disturbed vegetation. The restoration of habitat and habitat continuity in cleared parts of the SRAs should be facilitated through detailed planning and negotiation.

There are no SRAs explicitly identified in existing BPAs, although the corridors identified in the Desert Uplands BPA are essentially equivalent in that they focus on weaknesses in habitat continuity in an otherwise largely intact landscape. SRAs have been identified in the Wet Tropics bioregion as part of the FNQ 2025 planning process.

### 2.3.2 Criteria for identifying corridor Strategic Rehabilitation Areas (SRAs)

The designation of strategic rehabilitation areas (SRAs) is optional, and designations should only be made by an expert panel or staff with expertise in biodiversity corridors. Ideally SRAs should also be identified and agreed to by stakeholders including the community, industry and state / local government. SRAs must only be designated where an area meets all the following criteria:

- it has an ecological relationship with, or contains special ecological values associated with the corridor areas it connects (e.g. SRAs may be areas associated with connectivity between lowlands and hills; essential habitat for significant species; significant regional ecosystems or transitional ecotones; or special biodiversity values such as BPA Criterion I)
- it has the potential to significantly contribute to the ecological values of the corridor it is within if focused corridor planning, management or rehabilitation is feasible and was applied.
- SRAs should not be identified in areas:
- that are cleared, modified / disturbed or associated with a land use such that future management or rehabilitation would not be feasible to re-establish corridor connectivity, or significantly enhance the special values mentioned in the dot points above
- where there are relatively minor gaps in habitat in an otherwise continuous corridor (eg gaps of less than 5 ha).

### 2.3.3 Mapping Strategic Rehabilitation Areas

SRAs will be identified by determining a polygon of appropriate shape and size to consolidate long-term habitat connectivity and other biodiversity values within the associated corridor. Their shape should not be constrained by any fixed corridor buffer distance but should rather take into account the location and extent of the important corridor habitat values and special values they can enhance. They should be of sufficient shape to allow for flexibility in achieving habitat connectivity and enhancement of special values in the future.

Where the SRA boundaries identified do not exactly correspond with cadastral boundaries of the area they are intended to connect (e.g. national parks and state forests boundaries), the SRA polygon should be rectified to the DCDB by:

- intersecting the SRA with the DCDB
- removing land parcels that are largely outside (ie. by more than 30%) the SRA or identified corridor and that do not contain remnant or disturbed vegetation contributing to the value of the SRA or corridor.
- where more than 70% of a land parcel is within the SRA or corridor, the entire parcel should be retained.
- where a land parcel is excluded even though it partly contains the SRA value, or falls within the corridor buffer area, the section of the parcel containing these features should be included in the SRA by clipping the parcel to the feature
- the resulting land parcels should then be merged to form a single SRA.

A mapped example of an SRA is provided in Appendix B.

### **3. Assigning ecological significance to vegetation associated with corridors**

#### **3.1 Terrestrial and Riparian Corridors**

Where corridors are used as part of ecological significance mapping (ie maps showing HES and/or GES areas) – all remnant corridor vegetation associated with a State, Regional and Subregional terrestrial corridors or riparian corridors (selected in 2.1.4 and 2.2.2) will be HES areas for DERM State Interest purposes under SPA. Non-remnant vegetation associated with the corridors, that is 'disturbed' and regrowth polygons selected using 2.1.4, 2.2.2, will be GES. Cleared areas within corridors will have no designated significance.

Any vegetation associated with a Local Corridor is not a State Interest and should not be identified as a corridor for SPA State Interest planning and mapping purposes.

#### **3.2 Strategic Rehabilitation Areas**

Provided a SRA is identified or endorsed by an expert panel or staff with expertise in biodiversity corridors, remnant vegetation within an SRA will be HES for DERM State Interest purposes under SPA. Non-remnant vegetation ('disturbed' vegetation and regrowth selected through the rules above) within an SRA will also be GES. Cleared areas within SRAs will have no designated significance, but will indicate priority areas for rehabilitation and may provide a focus for regional or local revegetation activities.

### **4. Final corridor mapping product**

Final corridor mapping products should have the following components shown on a map (see Appendix B):

- the full length of each terrestrial and riparian corridor, delineated by the 2 margins of the buffered centreline<sup>2</sup>
- corridor margins will be shown through cleared areas, to mark the indicative corridor location<sup>5</sup>. These will serve as a guide for locating any general rehabilitation works (e.g. works by local catchment groups).
- the vegetation polygons associated with each corridor, identified in 2.1.4 and 2.2.2
- corridor strategic rehabilitation areas identified in 2.3.

The following information should be recorded as attributes in the GIS coverage:

- for each centreline (or its indicative area) and all vegetation polygons associated with each corridor:
  - a unique corridor number (and/or name)
  - the corridor type (ie. terrestrial or riparian)
  - the designated corridor category (ie.State, Bioregional, Subregional or Local)
- for each strategic rehabilitation area:
  - a unique SRA number.

A report should be publicly available which provides the values and justification for each corridor and SRA. The values and justification in the report should be matched with each unique SRA or corridor number (or name) in the GIS coverage.

Clear guidelines are required about GIS dataset design (including attribute/field names and types) to produce consistent GIS datasets across the state that can be easily compared and merged. Further direction may be provided from Planning Coordination, Natural Resource and Environment, Environment Planning. In the interim the following example may be used:

<b>Description</b>	<b>Field Name</b>	<b>Field Type</b>
Unique corridor number	COR_NUMBER	Short integer
Unique corridor name	COR_NAME	Text
Corridor type (terrestrial or riparian)	COR_TYPE	Text
Corridor category (state, regional, subregional, local)	COR_CAT	Text
Unique SRA number	SRA_NUMBER	Short integer

<sup>2</sup> Note that If an area is heavily or fully developed, or extensively committed to urban development, it may not be appropriate to show any indicative corridor margins through such areas for SPA mapping purposes  
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Unique SRA name	SRA_NAME	Text
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## Appendix A – Process for excluding corridor vegetation from the ‘urban footprint’

The following general procedure can be adopted to exclude corridor vegetation from the ‘urban footprint’ (some flexibility and variations may be needed to suit local situations). It is preferable to have the involvement of regional DERM staff who are working with regional councils and DIP on schemes and regional plans.

- Produce a ‘built up areas’ layer by the following method:
  1. Extract parcels of less than a specified urban size (2000m<sup>2</sup> was used in SEQ) from the DCDB (parcel type = lot and cover type = base, whilst excluding any lots which were reserves, NP, SF, FR etc);
  2. Dissolve the parcels;
  3. Buffer by a selected width (approximately a little more than half the width of a major road (25m was used in SEQ);
  4. Then re-buffer using (a flat buffer) the same negative distance (i.e. -25m);
  5. This layer is then used to clip any roads which intersect with 2000m<sup>2</sup> parcels;
  6. Union this dataset with the original dissolved parcels in step 2;
  7. Dissolve the dataset in step 6;
  8. For a cleaner layer, reverse the selection in step 1 from the DCDB and use this as an erase feature on the dataset created in step 7;
  9. Multi-part split.

The result is a relatively clean dataset showing ‘Urbanised’ areas which also include internal road parcels, but which excludes cadastral waterway boundaries.

- Dissolve Bioregional corridor buffers and intersect with the Urban Footprint; (Note: only areas which intersect the Urban Footprint are amended)
- Perform an erase on the corridor buffers, using the modified ‘built up area’ dataset (the original dataset clipped to the UF) as the erase feature (i.e. built up areas are removed);
- Multi-part split the new dataset ;
- Each part of the corridor network which intersects with part of the UF is then assessed and the following manual amendments/decisions made:
  - Isolated areas of the corridor buffers are removed (i.e. polygons which were severed due to being isolated by urban areas);
  - The remaining buffered areas are ‘cleaned up’ using SPA zoning, imagery, local government corridor mapping (if of a better quality), local area/structure/master plans and the DCDB to identify parts of the buffer which provide potential strategic rehabilitation areas / rehabilitation areas. (Note be as conservative as possible and retain areas under SPA zoning which reflect future Urban / Industrial Areas etc and which have not yet been subdivided for this purpose – the reason being that such areas may still be subject to future structure / master planning processes and may provide for some conservation opportunities during the consultation phase).

## Appendix B – Example of Final Corridor Mapping Products

Figure 1 – Example of an indicative corridor area and selected corridor vegetation

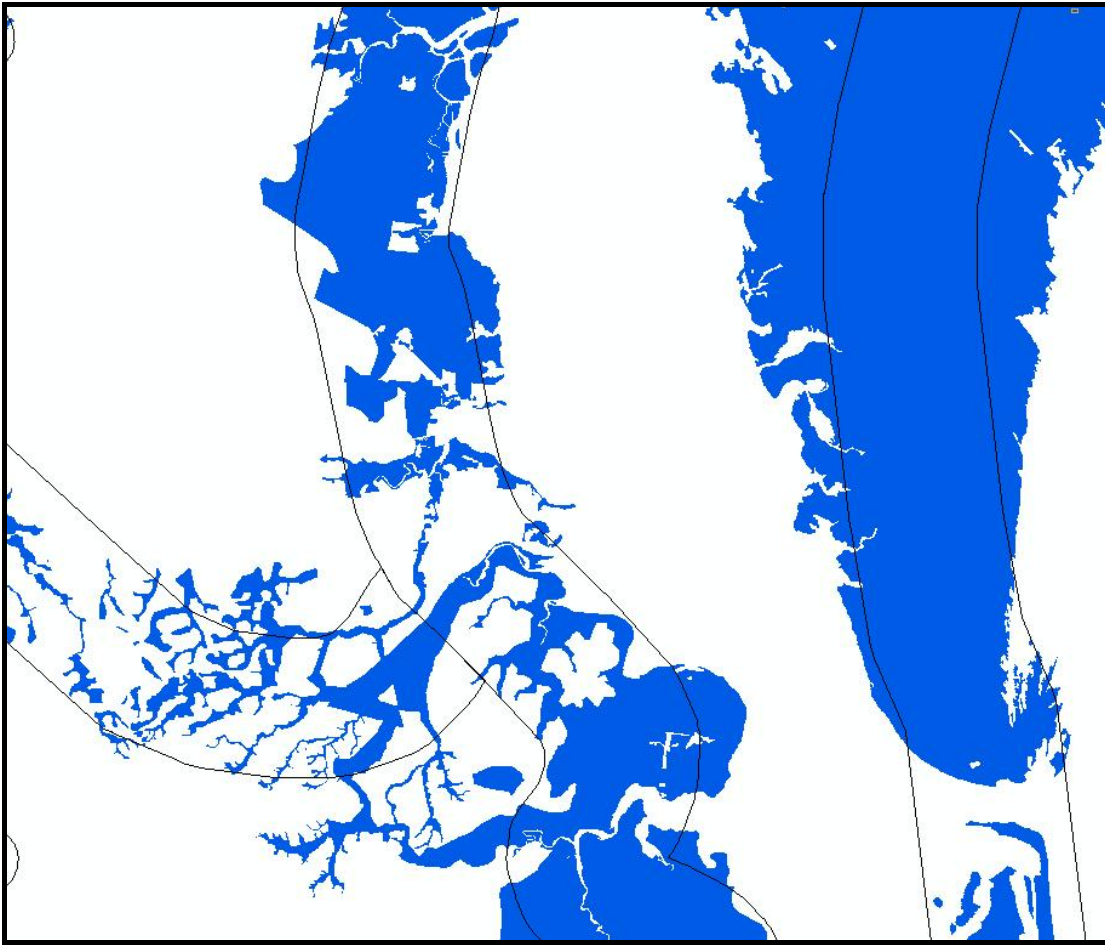
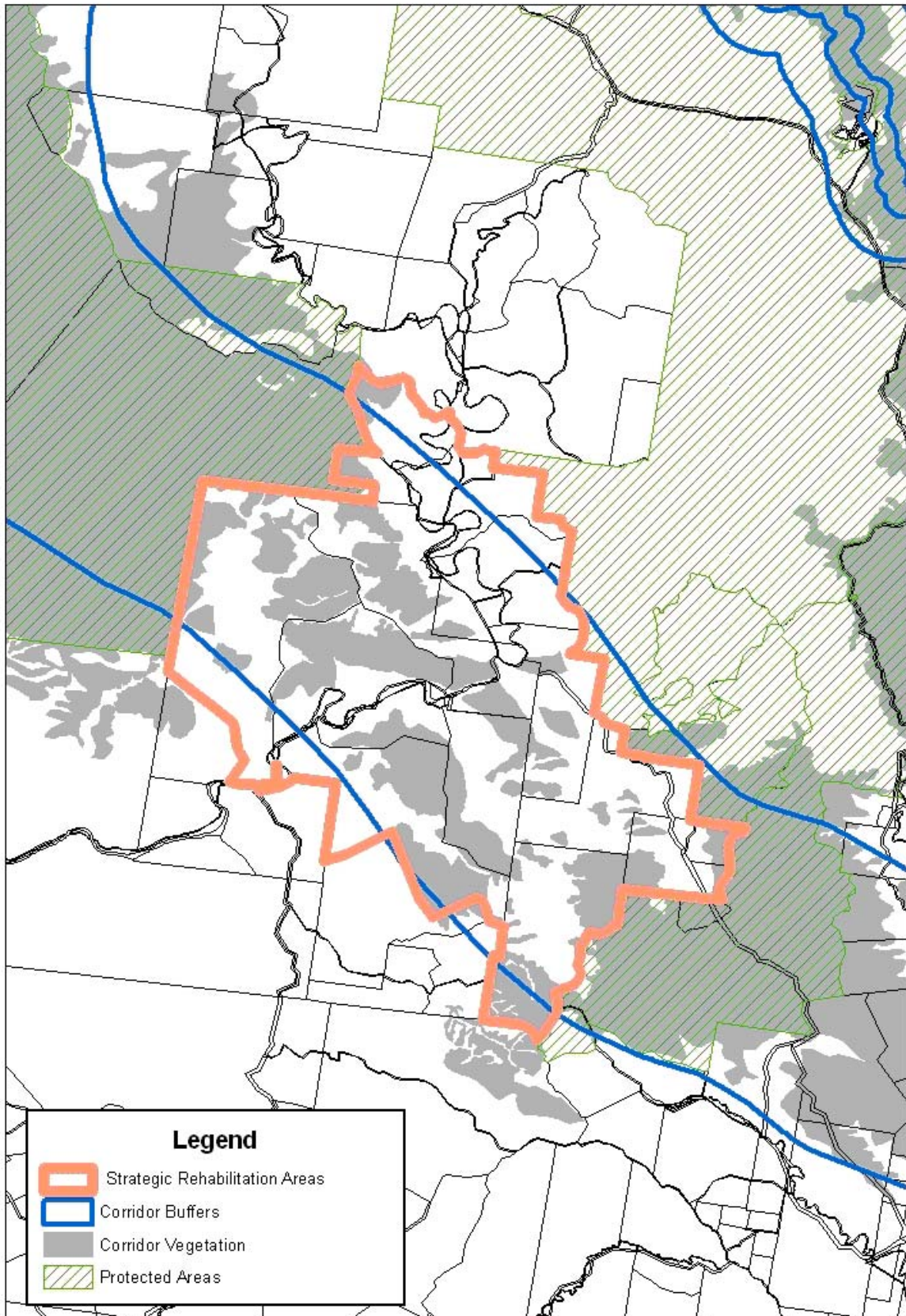


Figure 2 – Example of a Strategic Rehabilitation Area



## ATTACHMENT 3

### DERM Back on Track priority species threatened by development

Plant or Animal type	Species name	Common name
Plants	<i>Acacia attenuata</i>	
Plants	<i>Acacia maranoensis</i>	
Plants	<i>Acacia tingoorensis</i>	
Plants	<i>Acalypha lyonsii</i>	
Fish	<i>Achoerodus viridis</i>	eastern blue groper
Butterflies and moths	<i>Acrodipsas illidgei</i>	Illidge's ant-blue
Plants	<i>Alectryon ramiflorus</i>	
Reptiles	<i>Anomalopus brevicollis</i>	
Reptiles	<i>Anomalopus mackayi</i>	long-legged worm-skink
Plants	<i>Aponogeton bullosus</i>	
Plants	<i>Aponogeton lancesmithii</i>	
Plants	<i>Aponogeton proliferus</i>	
Plants	<i>Archontophoenix myolensis</i>	
Plants	<i>Arthropodium sp. (Mt Cordeaux P.I.Forster+ PIF22065)</i>	
Reptiles	<i>Aspidites ramsayi</i>	woma
Birds	<i>Atrichornis rufescens</i>	rufous scrub-bird
Crustaceans	<i>Austrochiltonia sp. AMS P68165</i>	a freshwater amphipod
Mammals	<i>Bettongia tropica</i>	northern bettong
Plants	<i>Blandfordia grandiflora</i>	christmas bells
Plants	<i>Boronia keysii</i>	Key's boronia
Plants	<i>Boronia repanda</i>	
Plants	<i>Bowenia serrulata</i>	Byfield fern
Plants	<i>Brunoniella spiciflora</i>	
Plants	<i>Cadellia pentastylis</i>	ooline
Plants	<i>Callitris baileyi</i>	Bailey's cypress
Plants	<i>Calochilus psednus</i>	
Birds	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)
Molluscs	Camaenidae BL 18	Mundubbera forest snail
Molluscs	Camaenidae BL 4	Lotus Creek banded snail
Molluscs	Camaenidae BL 64	Jimbour black-soil snail
Fish	<i>Carcharodon carcharias</i>	white shark
Reptiles	<i>Caretta caretta</i>	loggerhead turtle
Crustaceans	<i>Caridina thermophila</i>	hotwater shrimp
Birds	<i>Casuaris casuaris johnsonii (southern population)</i>	southern cassowary (southern population)
Plants	<i>Caustis blakei subsp. macrantha</i>	
Plants	<i>Chamaecrista maritima</i>	
Reptiles	<i>Chelonia mydas</i>	green turtle
Crustaceans	<i>Cherax cartalacoolah</i>	a freshwater crayfish
Fish	<i>Chlamydogobius micropterus</i>	Elizabeth Springs goby
Fish	<i>Chlamydogobius squamigenus</i>	Edgbaston goby
Plants	<i>Clausena smyrelliana</i>	
Plants	<i>Comesperma oblongatum</i>	
Plants	<i>Commersonia inglewoodensis</i>	
Plants	<i>Commersonia pearnii</i>	

<b>Plant or Animal type</b>	<b>Species name</b>	<b>Common name</b>
Plants	<i>Crepidomanes aphlebioides</i>	
Frogs	<i>Crinia tinnula</i>	wallum froglet
Plants	<i>Cupaniopsis shirleyana</i>	
Plants	<i>Cycas cairnsiana</i>	
Plants	<i>Cycas couttsiana</i>	
Plants	<i>Cycas megacarpa</i>	
Plants	<i>Cycas ophiolitica</i>	Marlborough blue
Plants	<i>Cycas platyphylla</i>	
Plants	<i>Cycas semota</i>	
Birds	<i>Cyclopsitta diophthalma coxeni</i>	Coxen's fig-parrot
Fish	<i>Dasyatis fluviorum</i>	estuary stingray
Birds	<i>Dasyornis brachypterus</i>	eastern bristlebird
Mammals	<i>Dasyurus maculatus gracilis</i>	spotted-tailed quoll (northern subspecies)
Mammals	<i>Dasyurus maculatus maculatus</i>	spotted-tailed quoll (southern subspecies)
Plants	<i>Davidsonia johnsonii</i>	smooth Davidsonia
Molluscs	<i>Delinitesta gayndahensis</i>	Gayndah glass-snail
Reptiles	<i>Delma inornata</i>	
Reptiles	<i>Delma torquata</i>	collared delma
Plants	<i>Dendrobium bigibbum</i>	
Plants	<i>Dendrobium lithocola</i>	dwarf Cooktown orchid
Plants	<i>Dendrobium mirbelianum</i>	mangrove orchid
Plants	<i>Dendrobium nindii</i>	blue orchid
Plants	<i>Dendrobium phalaenopsis</i>	
Plants	<i>Denhamia parvifolia</i>	
Reptiles	<i>Dermochelys coriacea</i>	leatherback turtle
Plants	<i>Diuris parvipetala</i>	
Mammals	<i>Dugong dugon</i>	dugong
Plants	<i>Durringtonia paludosa</i>	durringtonia
Molluscs	<i>Edgbastonia alanwillsi</i>	
Reptiles	<i>Elseya albagula</i>	southern snapping turtle
Reptiles	<i>Elseya irwini</i>	Irwin's turtle
Reptiles	<i>Elseya stirlingi</i>	Johnstone River snapping turtle
Reptiles	<i>Elusor macrurus</i>	Mary River turtle
Birds	<i>Epthianura crocea macgregori</i>	yellow chat (Dawson)
Reptiles	<i>Eretmochelys imbricata</i>	hawksbill turtle
Plants	<i>Eriocaulon carsonii</i>	
Plants	<i>Eryngium fontanum</i>	
Birds	<i>Erythrotriorchis radiatus</i>	red goshawk
Birds	<i>Esacus magnirostris</i>	beach stone-curlew
Plants	<i>Eucalyptus argophloia</i>	Queensland western white gum
Plants	<i>Eucalyptus pachycalyx subsp. waajensis</i>	
Plants	<i>Eucalyptus raveretiana</i>	black ironbox
Plants	<i>Euphrasia bella</i>	Lamington eyebright
Molluscs	<i>Gabbia fontana</i>	
Plants	<i>Genoplesium tectum</i>	
Fish	<i>Glyphis glyphis</i>	Bizant River shark
Birds	<i>Grantiella picta</i>	painted honeyeater
Plants	<i>Grevillea scortechinii subsp. scortechinii</i>	

Molluscs	<i>Gyraulus edgbastonensis</i>	
Plants	<i>Hakea trineura</i>	
Plants	<i>Homoranthus decumbens</i>	
Plants	<i>Homoranthus sp. (Wyaga D.Jermyn+ HM25)</i>	
<b>Plant or Animal type</b>	<b>Species name</b>	<b>Common name</b>
Reptiles	<i>Hoplocephalus stephensii</i>	Stephens' banded snake
Plants	<i>Huperzia carinata</i>	keeled tassell fern
Plants	<i>Huperzia dalhousieana</i>	blue tassel fern
Plants	<i>Huperzia filiformis</i>	rat's tail tassel fern
Plants	<i>Huperzia lockyeri</i>	
Plants	<i>Huperzia marsupiiiformis</i>	
Plants	<i>Huperzia phlegmaria</i>	coarse tassel fern
Plants	<i>Huperzia phlegmarioides</i>	layered tassel fern
Plants	<i>Huperzia squarrosa</i>	rock tassel fern
Plants	<i>Huperzia tetrastichoides</i>	
Butterflies and moths	<i>Hypochrysops apollo apollo</i>	Apollo jewel (Wet Tropics subspecies)
Butterflies and moths	<i>Hypochrysops piceata</i>	bulloak jewel
Molluscs	<i>Jardinella acuminata</i>	
Molluscs	<i>Jardinella colmani</i>	
Molluscs	<i>Jardinella corrugata</i>	
Molluscs	<i>Jardinella edgbastonensis</i>	
Molluscs	<i>Jardinella eulo</i>	
Molluscs	<i>Jardinella exigua</i>	
Molluscs	<i>Jardinella isolata</i>	
Molluscs	<i>Jardinella jesswiseae</i>	
Molluscs	<i>Jardinella pallida</i>	
Molluscs	<i>Jardinella zeidlerorum</i>	
Plants	<i>Lasiopetalum sp. (Proston J.A.Baker 17)</i>	
Reptiles	<i>Lepidochelys olivacea</i>	olive ridley turtle
Plants	<i>Lepidosperma quadrangulatum</i>	
Plants	<i>Lilaeopsis brisbanica</i>	
Plants	<i>Lissanthe brevistyla</i>	
Frogs	<i>Litoria myola</i>	Kuranda treefrog
Plants	<i>Livistona concinna</i>	
Plants	<i>Logania diffusa</i>	
Plants	<i>Macarthuria complanata</i>	
Fish	<i>Maccullochella peelii mariensis</i>	Mary River cod
Fish	<i>Maccullochella peelii peelii</i>	Murray cod
Mammals	<i>Macroderma gigas</i>	ghost bat
Mammals	<i>Macrotis lagotis</i>	greater bilby
Plants	<i>Macrozamia conferta</i>	
Plants	<i>Macrozamia crassifolia</i>	
Plants	<i>Macrozamia lomandroides</i>	
Plants	<i>Macrozamia longispina</i>	
Plants	<i>Macrozamia machinii</i>	
Plants	<i>Macrozamia parcifolia</i>	
Plants	<i>Macrozamia pauli-guilielmi</i>	
Plants	<i>Macrozamia platyrhachis</i>	
Plants	<i>Macrozamia serpentina</i>	
Birds	<i>Malurus coronatus</i>	purple-crowned fairy-wren
Plants	<i>Marsdenia brevifolia</i>	
Birds	<i>Melanodryas cucullata cucullata</i>	hooded robin (south-eastern)

Plants	<i>Micromyrtus delicata</i>	
Mammals	<i>Murina florium</i>	tube-nosed insectivorous bat
Plants	<i>Musa jackeyi</i>	
Plants	<i>Myriophyllum artesium</i>	

Plant or Animal type	Species name	Common name
Plants	<i>Myrmecodia beccarii</i>	
Fish	<i>Nannoperca oxleyana</i>	Oxleyan pygmy perch
Reptiles	<i>Natator depressus</i>	flatback turtle
Fish	<i>Neoceratodus forsteri</i>	Australian lungfish
Reptiles	<i>Nephurus sphyrurus</i>	border thick-tailed gecko
Plants	<i>Ochrosia moorei</i>	southern ochrosia
Plants	<i>Olearia macdonnellensis</i>	
Mammals	<i>Onychogalea fraenata</i>	bridled naitail wallaby
Mammals	<i>Orcaella heinsohni</i>	Australian snubfin dolphin
Butterflies and moths	<i>Ornithoptera richmondia</i>	Richmond birdwing
Plants	<i>Pararistolochia praevenosa</i>	
Mammals	<i>Petaurus australis australis</i>	yellow-bellied glider (southern subspecies)
Mammals	<i>Petaurus australis unnamed subsp.</i>	yellow-bellied glider (northern subspecies)
Mammals	<i>Petaurus gracilis</i>	mahogany glider
Mammals	<i>Petrogale penicillata</i>	brush-tailed rock-wallaby
Mammals	<i>Petrogale persephone</i>	Proserpine rock-wallaby
Mammals	<i>Petrogale xanthopus celeris</i>	yellow-footed rock-wallaby
Birds	<i>Pezoporus wallicus wallicus</i>	ground parrot
Plants	<i>Phaius australis</i>	
Plants	<i>Phaius bernaysii</i>	yellow swamp orchid
Plants	<i>Phebalium distans</i>	
Plants	<i>Picris conyzoides</i>	
Plants	<i>Picris evae</i>	
Plants	<i>Pisonia grandis</i>	
Plants	<i>Plectranthus amoenus</i>	
Plants	<i>Plectranthus gratus</i>	
Birds	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)
Plants	<i>Pomaderris clivicola</i>	
Fish	<i>Pristis clavata</i>	dwarf sawfish
Fish	<i>Pristis microdon</i>	freshwater sawfish
Fish	<i>Pristis zijsron</i>	green sawfish
Fish	<i>Pseudomugil mellis</i>	honey blue eye
Mammals	<i>Pteropus conspicillatus</i>	spectacled flying-fox
Mammals	<i>Pteropus poliocephalus</i>	grey-headed flying-fox
Fish	<i>Rhadinocentrus ornatus</i>	ornate rainbowfish
Plants	<i>Rhaponticum australe</i>	
Reptiles	<i>Rheodytes leukops</i>	Fitzroy River turtle
Mammals	<i>Rhinolophus philippinensis</i>	greater large-eared horseshoe bat
Plants	<i>Sarcochilus weinthalii</i>	blotched sarcochilus
Fish	<i>Scaturiginichthys vermeilipinnis</i>	redfin blue eye
Spiders	<i>Selenotypus plumipes</i>	
Plants	<i>Seringia sp. (Chermside S.T.Blake 23068)</i>	
Plants	<i>Solanum adenophorum</i>	

Plants	<i>Solanum stenopterum</i>	
Mammals	<i>Sousa chinensis</i>	Indo-Pacific humpback dolphin
Molluscs	<i>Sphaerospira mossmani</i> (Brazier, 1875)	Dawson River dark snail
Birds	<i>Stagonopleura guttata</i>	diamond firetail
Birds	<i>Sternula albifrons</i>	little tern
Fish	<i>Stiphodon sp.</i>	Daintree cling-goby
<b>Plant or Animal type</b>	<b>Species name</b>	<b>Common name</b>
Crustaceans	<i>Stomatolepas dermochelys</i>	a barnacle
Mammals	<i>Taphozous australis</i>	coastal sheath-tail bat
Plants	<i>Trachymene geraniifolia</i>	
Plants	<i>Trioncinia retroflexa</i>	
Plants	<i>Triunia robusta</i>	
Birds	<i>Turnix melanogaster</i>	black-breasted button-quail
Reptiles	<i>Varanus semiremex</i>	rusty monitor
Reptiles	<i>Wollumbinia belli</i>	Bell's turtle
Mammals	<i>Xeromys myoides</i>	false water-rat
Plants	<i>Zieria furfuracea subsp. gymnocarpa</i>	

NOTE: The table lists Back on Track priority species for DERM which are threatened by one or more of the following threats: Aquaculture, Artificial watering points, Barriers to migration, Boat strike, Boating activities, Change in land use, Clearing of vegetation, Clearing of vegetation (resulting in fragmentation of habitat), Crabbing gear, Deliberate disturbance by people, Drainage of habitat, Dredging, Extractive industry, Firewood collection, Fishing gear, Fishing nets, Flow regime, Ground water extraction, Impoundments, Killed by people when encountered, Light pollution, Linear infrastructure development, Marine debris, Mining, Recreation / tourism, Recreational fishing, Road maintenance, Rural-residential development, Seagrass dieback, Shark Control Program, Stainless steel hooks, Surface water extraction, Urban development and Water quality. For the most up-to-date list of priority species and their threats, contact the Threatened Species Strategy Unit or consult the online Recovery Actions Database.

## ATTACHMENT 4

### Ecological Values of Coastal Dunes

#### Fore-dunes

These are the most geomorphically active part of the coastal dunes, and it is for this reason they are typically picked up in the erosion prone zone. Ecological values include endemic species such as the beach she oak, coastal Spinifex and the coastal Ipomea. There are also beach specialist birds, nesting sea turtles and crustaceans and many invertebrates which live at a considerable depth, especially in areas where there is freshwater discharge.

#### Hind dunes

The ecological values of hind dunes relate to their loose sandy soils and their diverse floristics and structure. Typically there are contrasts with the estuarine/marine areas on one side, and alluvial woodlands/forest on the other, with the latter usually having grassy communities with harder soils. The vegetation is characterized by species including sclerophyll and vine thicket which provides critical habitat for fruit eating birds migrating along the coast and seasonal resources for others.

There are diverse structures in vegetation with a shrub layer and at least one lower tree layer in addition to a tree layer. This diverse structure supports a higher diversity of fauna than adjacent alluvial habitat, particularly bird species. Many of the smaller migratory bird species which normally favour rainforest or dense sclerophyll forests with complex structures use these dunes as stepping stones to move long distances to preferred breeding areas. The dune vegetation is also used by resident fauna that must have access to a large range of resources which is provided by the combination of both alluvial plains vegetation and dune vegetation. The lower strata include herbaceous and shrub species that are restricted to the dunes, or for which the dunes are a stronghold.

Hind dunes act as local refugia, and are the preferred habitat for a suite of species. The loose soils also mean they are habitat for a wide range of burrowing creatures including frogs, lizards, and burrowing snakes. Hind dunes are typically characterised by sparse grasses and open areas which make them preferred habitat for sun loving fast moving lizards. The sparse grasses over these dunes means they are less prone to frequent fires so the well developed woody litter provides preferred habitat for species like geckoes, legless lizards, snakes, giant cockroaches and small burrowing mammal.

#### Swales

The nature and origin of swales is of high ecological and scientific value. Variations in substrate including pure silica sand, grain size, amount of shell and organic matter, stage of soil development and landform, can all be related to Pleistocene/Holocene climatic/sea level cycles. Swales can also provide an important insight into the coastal processes which have played and continue to play a major role in our understanding of past and likely future coastal processes.

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