A Biodiversity Planning Assessment for the Gulf Plains Bioregion

Summary Report

Version 1.1

Queensland Government

Prepared by: Biodiversity Assessment, Department of Environment and Heritage Protection

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1 Introduction

This report briefly describes the scientific methodology that underpins the production of Biodiversity Planning Assessments (BPA) and summarises the overall results of the BPA for the Gulf Plains Bioregion (GUP). BPAs are usually repeated every few years as new information becomes available or underlying data layers change. This report relates only to the Gulf Plains BPA v1.1.

1.1 Biodiversity Planning Assessments

The Biodiversity Assessment and Mapping Methodology (BAMM) provides a consistent approach for assessing biodiversity values at the landscape scale in Queensland. The BAMM is based on vegetation mapping from the Queensland Herbarium. It incorporates a range of biodiversity-related data and is focused primarily on assessing terrestrial values. The Department of Environment and Heritage Protection (EHP) uses the methodology to generate BPAs for each of Queensland's bioregions.

The BAMM involves two stages. The first stage uses existing data to assess ecological concepts such as rarity, diversity, fragmentation, habitat condition, resilience, threats and ecosystem processes in a uniform and reliable way across a bioregion. These criteria are used to filter available data and provide an initial determination of significance. This part of the assessment is generated using a geographic information system (GIS). The second stage uses expert opinion to refine the first-stage results and identify features such as wildlife corridors and areas with special biodiversity value (e.g. centres of endemism or wildlife refugia).

BPAs have been completed for 10 bioregions within Queensland. They provide a source of baseline conservation and ecological information to support natural resource management and planning processes. They can be used as an independent product or as an important foundation for adding and considering a variety of additional environmental and socio-economic elements (i.e. an early input to broader 'triple-bottom-line' decision-making processes).

The final BPA is a powerful decision support tool that can be broadly interrogated through a GIS platform. A BPA can apply to:

- determining priorities for protection, regulation or rehabilitation of ecosystems
- on-ground investment in ecosystems
- contributing to impact assessment of large-scale development
- providing input to broader social and economic evaluation and prioritisation processes.

BPAs are used by EHP staff, other government departments, local governments, environmental consultants and members of the community to support a range of planning or decision making processes. Information from BPAs has contributed to:

- identifying significant ecological values when assessing tenure dealings
- identifying significant ecological values when assessing possible additions to the protected area estate
- identifying significant ecological values when assessing development applications
- core species habitat identification as part of the Vegetation Management Act 1999 Essential Habitat and Essential Regrowth Habitat
- local government planning schemes
- development of regional plans
- development of Natural Resource Management Plans
- community-based organisations' work to identify and prioritise areas of importance.

While the BAMM methodology does include aquatic biodiversity values, aquatic conservation values are specifically assessed by applying the Aquatic Biodiversity Assessment and Mapping Methodology (AquaBAMM, Clayton et al 2006) to create aquatic conservation assessments.

1.2 Gulf Plains Study Area

Stretching from the Northern Territory border east to the base of Cape York Peninsula, the Gulf Plains Bioregion (Figure 1) encompasses approximately 211,000km^2 of low-lying country and offshore islands of north-west Queensland. Major river systems dissect the broad alluvial plains – the Nicholson, Gregory and Leichhardt drain from the North West Highlands; the Cloncurry, Flinders and Norman from the Mitchell Grass Downs; the Gilbert, Staaten, Nassau and Mitchell from the Einasleigh Uplands.

The coastal edge is dominated by marine plains of clay, silt and sand with mangroves, saltpans and mudflats. Further inland, grasslands and woodlands of eucalypts, melaleuca and acacia cover the landscape of plains and river channels comprising clay and alluvial soils. Similar vegetation dominates the dissected plateaus of sandstones and siltstones that abut the surrounding bioregions (Sattler & Williams 1999).

Fauna of the Gulf Plains has not been widely studied (e.g. Dames & Moore 1994; Vanderduys & Kutt 2011). One of the few iconic animals is the eastern subspecies of the purple-crowned fairy-wren *Malurus coronatus macgillivrayi* which is restricted to the riparian fringe of major rivers in the western part of the bioregion (Rowley 1993). The general impression of the fauna is one of resilience but relatively limited diversity, as one might expect in a landscape prone to extensive flooding with few refugia for dryland species. However the Gulf Plains is critical for wetland taxa. The south-east Gulf of Carpentaria is an internationally important site, and the third most significant site in Australia, for migratory shorebirds using the East Asian-Australasian Flyway (Bamford et al 2008). On the land, the bioregion contains 15 important wetlands (Blackman 2001) which provide vital ecological refugia for waterbirds – waterfowl, herons and ibis.

A major environmental pressure on the bioregional biota is the combination of generally flat country and the monsoonal climate that can result in alternating periods of inundation over much of the region during the summer wet season followed by a long dry season in winter. These conditions restrict access both spatially and temporally – limiting any flora and fauna surveys to dry, cooler times of year.

Land use in the sparsely populated bioregion is primarily cattle grazing and infrastructure support for mines and Gulf of Carpentaria fisheries. The beef industry is based on native grassland pastures and consequently the region has experienced exceptionally little clearing of native vegetation compared to more eastern bioregions. Apart from the Staaten River National Park and two small protected areas, the majority of conservation lands are located on or near the periphery of the bioregion.

There are 10 sub-regions within the Gulf Plains Bioregion (Figure 1). The Department of Science, Information Technology, Innovation and Arts (DSITIA) has mapped and classified regional ecosystems (RE) to a peer reviewed and published mapping and classification methodology . These RE maps were used as a platform for the conservation assessments reported here. BPAs accept the released RE maps unmodified and therefore, are limited by inherent mapping and classification accuracy. Issues to do with RE mapping or classification errors are dealt with by DSITIA's mapping update processes and are not part of a BPA.

Area percentages quoted in this report refer to the percentage of the assessable area, which is all remnant vegetation within the Gulf Plains Bioregion (Table 1).

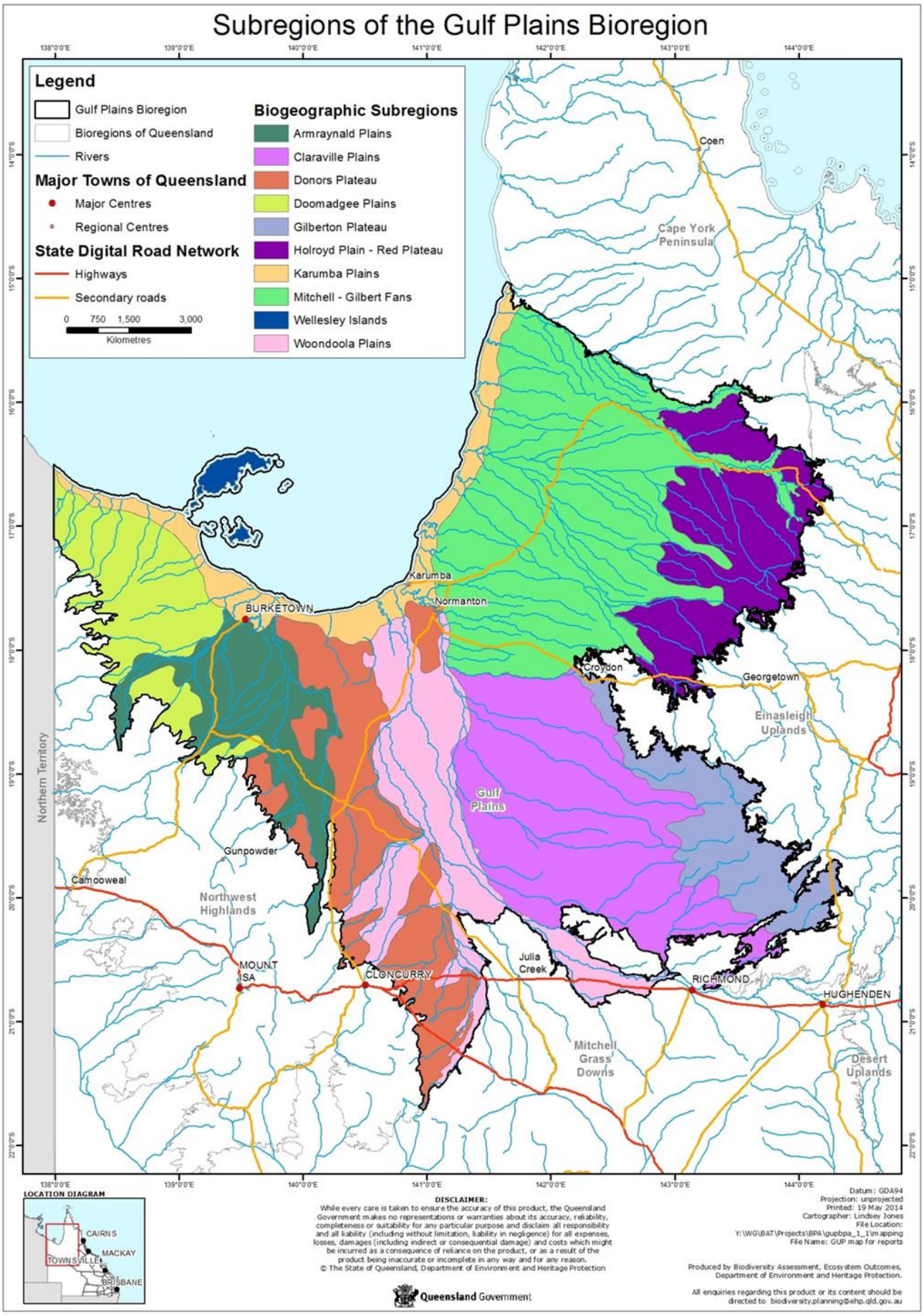

Figure 1. The Gulf Plains bioregion and its subregions

Table 1 Subregions of the Gulf Plains bioregion

Subregion	Subregion area (ha)	Percentage remnant (2011)
Armraynald Plains	1,589,438	99.5%
Claraville Plains	3,738,013	99.2%
Donors Plateau	2,449,965	97.5%
Doomadgee Plains	1,684,753	99.7%
Gilberton Plateau	1,403,937	99.4%
Holroyd Plain - Red Plateau	2,208,468	99.4%
Karumba Plains	1,070,738	97.1%
Mitchell - Gilbert Fans	5,262,816	99.6%
Wellesley Islands	127,711	97.7%
Woondoola Plains	2,375,110	99.6%
Total	**21,910,949**	

2 Methods and implementation

2.1 BAMM

The GUP BPA was undertaken using BAMM version 2.1 (EPA 2002). Many factors contribute to the assessment of biodiversity values. The methodology focuses on consistent and reliable criteria that are transparent, objective and scientifically defensible (Table 2). The criteria are in two groups. The first group is based on existing data, which is relatively uniform and reliable across a bioregion. These diagnostic criteria are used to filter available data and provide an initial determination of significance. This assessment is then refined using a second group of expert panel criteria.

The seven diagnostic criteria in Table 2 use reliable and uniformly available information that is usually accessible in database format, which can be queried to automatically generate significance classes based on individual or combinations of, biodiversity values. While species data are included in the diagnostic criteria, it is acknowledged that fauna and flora surveys are far from complete in Queensland and that existing data do not provide a uniform coverage across any bioregion.

A filtering process is used to assess Remnant Units using criteria A to G (**Error! Reference source not found.**). It can also be used as a series of questions applied to a particular site in the absence of a completed BPA. Although the various data layers are integrated in a BPA, each layer can be interrogated to ensure transparency and allow for any combination of criteria to be used in isolation from others in decision making.

Table 2 BAMM criteria

Diagnostic criteria **For analysis of uniformly available data**	**Expert panel criteria** **Assessed by expert panel using non-uniform data**
A: Habitat for Endangered, Vulnerable and Near-Threatened (EVNT) Taxa B: Ecosystem value: at two scales – B1: State; B2: Regional; and C: Tract size D: Relative size of regional ecosystem: at two scales – D1: State; D2: Regional; and E: Condition F: Ecosystem diversity G: Context & Connection (relationship to water, endangered ecosystems and physical connection between contiguous Remnant Units)	H: Essential and general habitat for priority taxa I: Special biodiversity values J: Corridors K: Threatening process (condition)

Data for the expert panel criteria (H–K, Table 2) are primarily derived through elicitation of accumulated knowledge held by persons considered familiar with the biodiversity values of the bioregion. Such information may not be quantitative in nature nor widely available, e.g. in published reports. The expert's role is to refine existing data and propose additional features not identified through the diagnostic criteria. For inclusion in the BPA, the experts must describe the values, their significance, and where possible their spatial extent of the proposed features.

2.2 Datasets

Typically, a BPA using BAMM draws on a wide range of datasets with a wide range of formats. This will generally include published scientific documents, unpublished data (grey literature) and officially collated data from various Queensland Government sources including data from the Queensland Museum, Queensland Herbarium, and DSITIA. A list of datasets used in the GUP BPA is included in Table 3.

Table 3 List of datasets used in the GUP BPA

Dataset	Version	Release date	Custodian
Regional Ecosystems	8.0	November 2013	DSITIA—Queensland Herbarium
Species	WildNet	May 2013 EVNT May 2014 Priority species	DSITIA
	Corveg	May 2013 EVNT April 2014 Priority species	DSITIA—Queensland Herbarium
	QHFD	May 2013 EVNT June 2014 Priority species	EHP—Biodiversity Assessment
Estates		October 2013	NPRSR
Nature refuges		September 2013	NPRSR
World Heritage Areas		February 2012	Australian Government Department of Sustainability, Environment, Water, Population and Communities
Directory of Important Wetlands		January 2005	EHP

2.3 Expert panels

Expert panels for the GUP BPA were held in Townsville in June 2011 to address fauna, flora and landscape ecological values. Attachment A details the composition, role, findings and recommendations of this panel.

2.4 Implementation

The BAMM version 2.1 (EPA 2002) was followed in the compilation of this assessment. Python scripts and ArcGIS ModelBuilder toolbox was used to apply BAMM and create the BPA.

2.5 Assessment parameters

The tools that are used to produce the BPA calculate a number of criteria parameters 'on the fly' based on the size distribution of remnant polygons. As a result, these will vary between bioregions and versions of a BPA.

For criterion C (tract size), the following thresholds were calculated:

- Low: 428.9 hectares
- Low to medium: 1,942.2 hectares
- Medium to high: 269,156.6 hectares.

For criterion F (ecosystem diversity), the calculated buffer distance was 311.1 metres.

2.6 Transparency of results

After running the BAMM tool, BPA results are available at a range of levels, despite its initial presentation as a single score of biodiversity significance. The results are also available through the use of user-defined queries that may interrogate one or more levels within the assessment in an almost-infinite number of possible combinations. This transparency provides the BPA end user (e.g. scientists, resource managers and conservation organisations) with a unique level of flexibility for BPA interrogation, interpretation and presentation. Links between the BPA results and a GIS environment facilitate this interrogation and provide a means of visualising the BPA results (Figure 2).

This data access and interrogation flexibility enables investigation of how different data contribute to the overall conservation value, investigation of missing data and an ability to tailor the BPA output for a particular purpose.

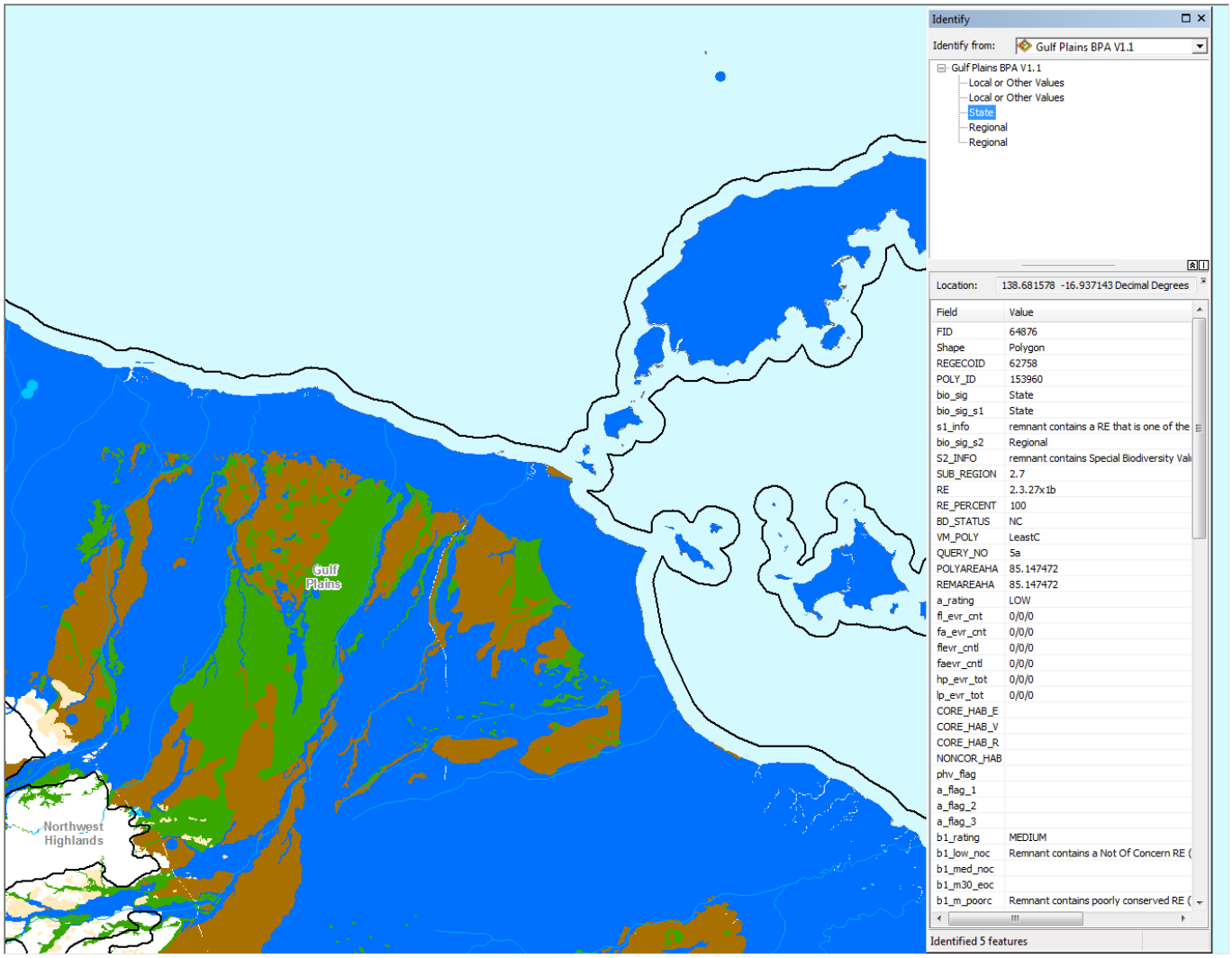

Figure 2. Interrogating the BPA results for a spatial unit in the GIS environment.

2.7 Filter table

For each assessment unit, a single diagnostic biodiversity significance is derived by combining all of the diagnostic criteria scores/ratings. This diagnostic significance is then combined with the expert panel significance and the maximum value assigned as the overall biodiversity significance.

BAMM uses a criterion rating combination table (or filtering decision table) that provides an ordered series of decisions that are tested against the final criterion ratings for each spatial unit (**Error! Reference source not found.**). Each decision is a unique combination of criterion ratings that is associated with a final conservation significance category. The decisions are effectively a number of 'if-then' statements and are tested in sequence for each spatial unit. A score is assigned immediately when a match is achieved between the criterion rating combination of the decision and that of the assessment unit.

The filtering combination table was not changed for the GUP BPA.

Table 4 Filter table as used for the GUP BPA.

Biodiversity significance of Remnant Units	Query No.	A: Essential habitat for EVNT spp.		B: Ecosystem value		C: Tract size		D: Relative size of ecosystem		E: Condition		F: Ecosystem diversity		G: Context & connection
S: State	**1**	A: very high	or	B1: very high		n/r		n/r		n/r		n/r		n/r
Or	**2**	n/r		B1: high		n/r	&	D1: very high		n/r		n/r		n/r
Or	**3**	n/r		B1: high	&	C: high	&	D1: high	&	E: very high[1]	or	F: very high[1]	or	G: very high[1]
Or	**4**	n/r		n/r		C: very high	&	D1: very high	&	E: very high		n/r		n/r
Or	**5**	n/r		n/r		n/r		D1: very high	&	E: very high[1]	or	F: very high[1]	or	G: very high[1]
R: Regional	**6**	A: high	or	B1: high		N/r		n/r		n/r		n/r		n/r
Or	**7**	n/r		B2: very high		N/r		n/r		n/r		n/r		n/r
Or	**8**	n/r		B2: high	&	C: very high	or	D2: very high		n/r		n/r		n/r
Or	**9**	n/r		n/r		C: very high	&	D2: very high	&	E: very high		n/r		n/r
Or	**10**	n/r		n/r		C: very high		n/r	&	E: very high	&	F: very high	or	G: very high
Or	**11**	n/r		B2: high	&	C: high	&	D2: high[2]	or	E: vh or high[2]	or	F: vh or high[2]	or	G: vh or high[2]
Or	**12**	n/r		N/r		n/r		D2: very high	&	E: vh or high[2]	or	F: vh or high[2]	or	G: vh or high[2]

L: Local	**13**	n/r		B2: high		n/r		n/r		n/r		n/r		n/r
Or	**14**	n/r		B3: very high		n/r		n/r		n/r		n/r		n/r
Or	**15**	n/r		B3: high	&	C: very high	or	D3: very high		n/r		n/r		n/r
Or	**16**	n/r		n/r		C: very high	&	D3: very high	&	E: very high		n/r		n/r
Or	**17**	n/r		n/r		C: very high		n/r	&	E: vh or high[2]	or	F: vh or high[2]	or	G: vh or high[2]
Or	**18**	A: medium	or	B3: high	or	C: high	&	D3: high[2]	or	E: vh or high[2]	or	F: vh or high[2]	or	G: vh or high[2]
Or	**19**	n/r		n/r		n/r		D3: very high	&	E: vh or high[2]	or	F: vh or high[2]	or	G: vh or high[2]

Notes:

The assessment is progressive, i.e. a query is 'triggered' only if the preceding set has not been satisfied.

Criteria B & D vary according to the scale (State, Regional, Local)—all other criteria are independent of scale.

N/R: Not Relevant.

Very High[1]: A single 'Very High' score is not sufficient—at least two of the criteria marked as Very High[1] must be rated as Very High to qualify as significant.

High[2]: A single 'High' score is not sufficient— at least two of the criteria marked as High[2] must be rated as 'High' to qualify as significant.

'or': Options which apply only to the query immediately preceding the 'or' (i.e. A & B or C or D means A+B or A+C or A+D; A or B & C means A+C or B+C; A or B & C or D means A+C or A+D or B+C or B+D).

3 Results

3.1 Conservation value categories

The conservation value results are referential within each bioregion, but each value category has characteristics in common. BAMM uses combinations of criterion level scores to determine the final biodiversity significance and based on these combinations, the following descriptions provide context for each value category.

State significance—Areas assessed as being significant for biodiversity at the bioregional or state scales. They also include areas assessed as being significant at national or international scales.

Regional significance—Areas assessed as being significant for biodiversity at the sub-bioregional scale. These areas have lower significance for biodiversity than areas assessed as being of State significance.

Local significance and or other values—Areas assessed as not being significant for biodiversity at State or Regional scales. Local values are of significance at the local government scale.

Non bioregional ecosystem—A regional ecosystem outlier from an adjacent bioregion.

3.2 Positional accuracy

The positional accuracy of the BPA results is primarily dependant on the accuracy of the Herbarium Regional Ecosystem (RE) Mapping Version 8 (November 2013), which is recorded in that metadata as a scale of 1:100,000. The RE data has a minimum remnant polygon area of five hectares or minimum remnant width of 75 metres. The precision of polygon boundaries or positional accuracy of linework is 100 metres. Positional accuracies of other datasets are unknown, but at 1:100,000 scale, at least 100 metres should be anticipated.

3.3 GUP bioregion overall results

A BPA was conducted for the GUP bioregion. A summary of the results is provided below.

Overall, 56.1% (12.3 million ha) of the GUP bioregion was found to have biodiversity values that are of State significance of which 0.04% (8107 ha) is State Habitat for EVR (EVNT) taxa. Regional significance was attributed to 18.45% (4 million ha), with the remaining 25% Local or Other Values or Non Bioregion Ecosystem (Figure 3 and Figure 4).

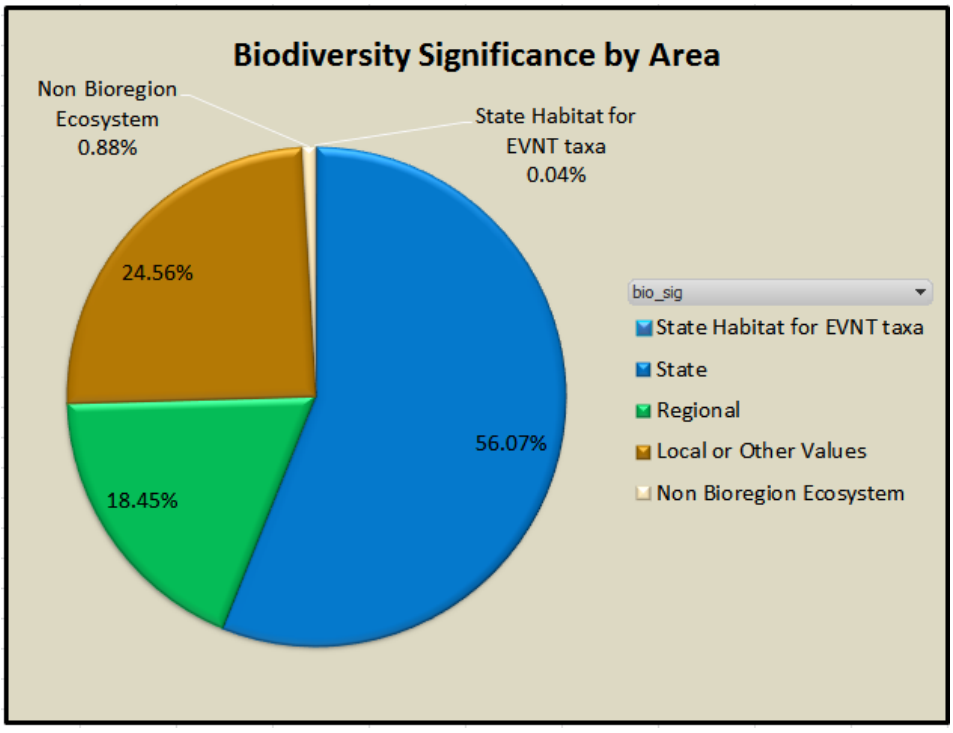

Figure 3. Summary of biodiversity assessment overall results

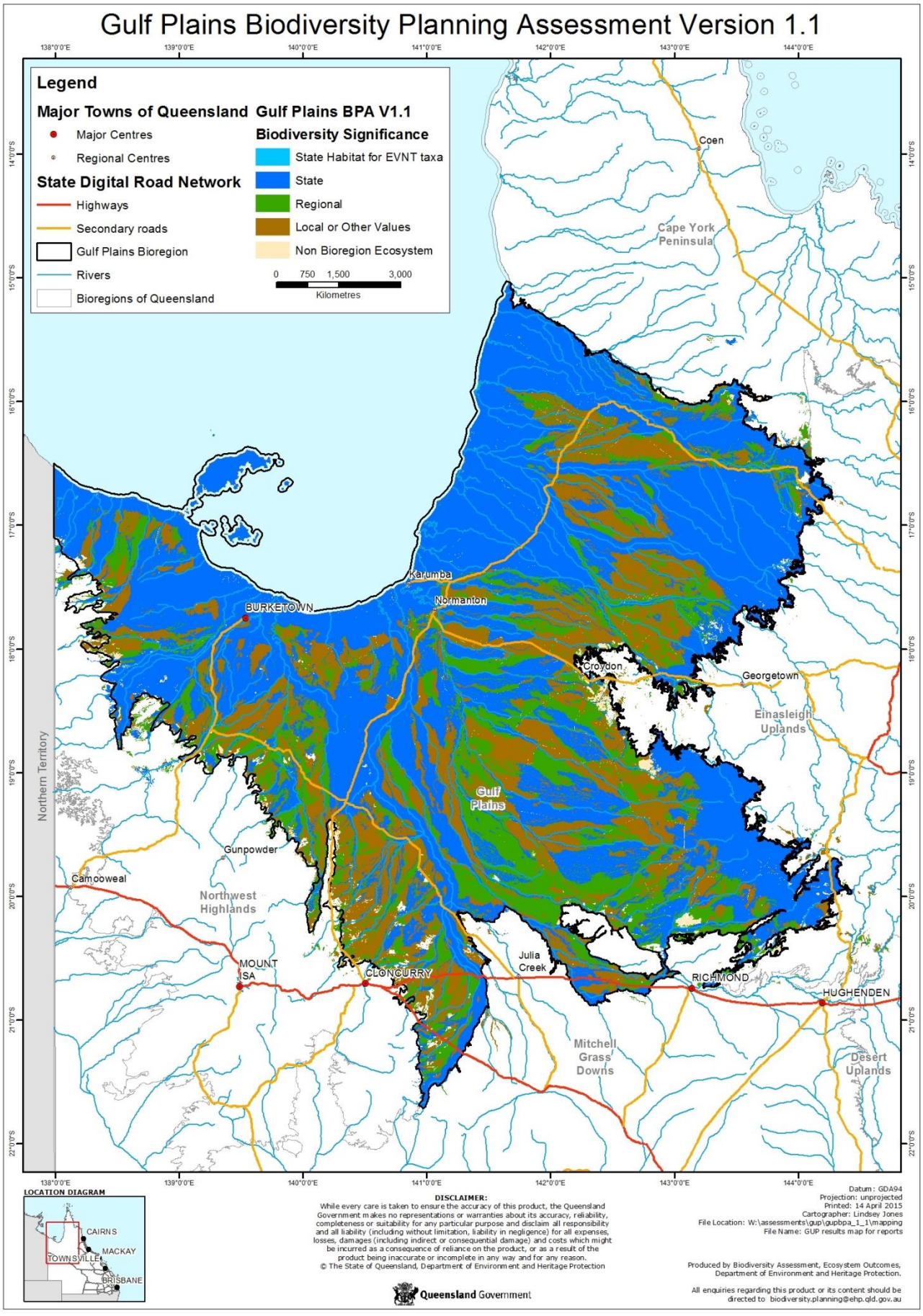

Figure 4. Overall biodiversity significance

As outlined in Table 2, the overall biodiversity significance is the results of a number of criteria which are assessed separately. Figure 5 shows the results for the individual criteria within the diagnostic and expert panel criteria.

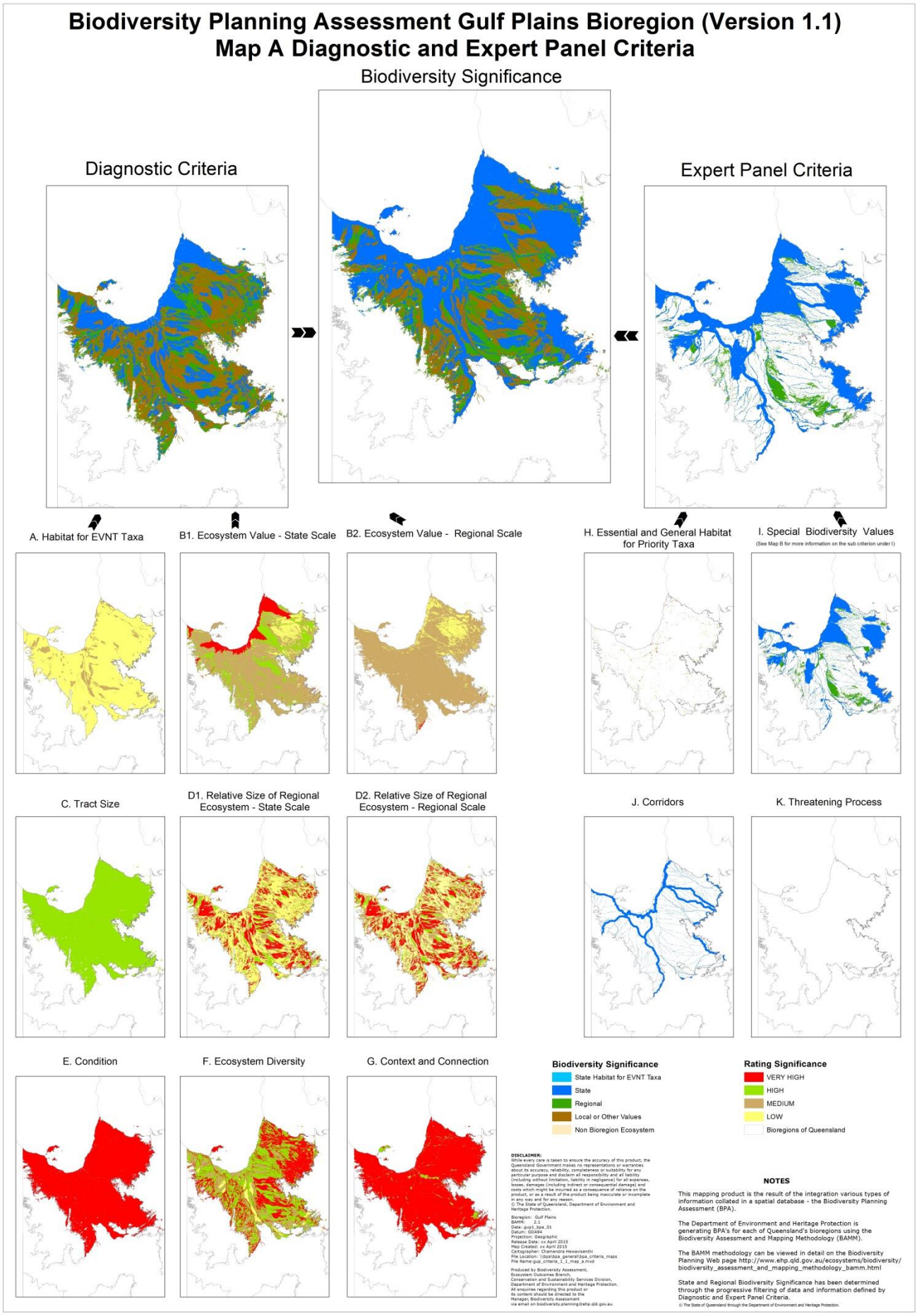

Figure 5. Diagnostic and expert panel criteria

3.4 Diagnostic results

3.4.1 Overall diagnostic criteria results

From the diagnostic criteria, 32.5% of the GUP bioregion (7.1 million ha) was found to have biodiversity values that are of State significance. Regional significance was attributed to 25.5% (5.6 million ha), and Local or Other Values was attributed to 41% (9 million ha) of the Gulf Plains bioregion (Figure 6 and Figure 7).

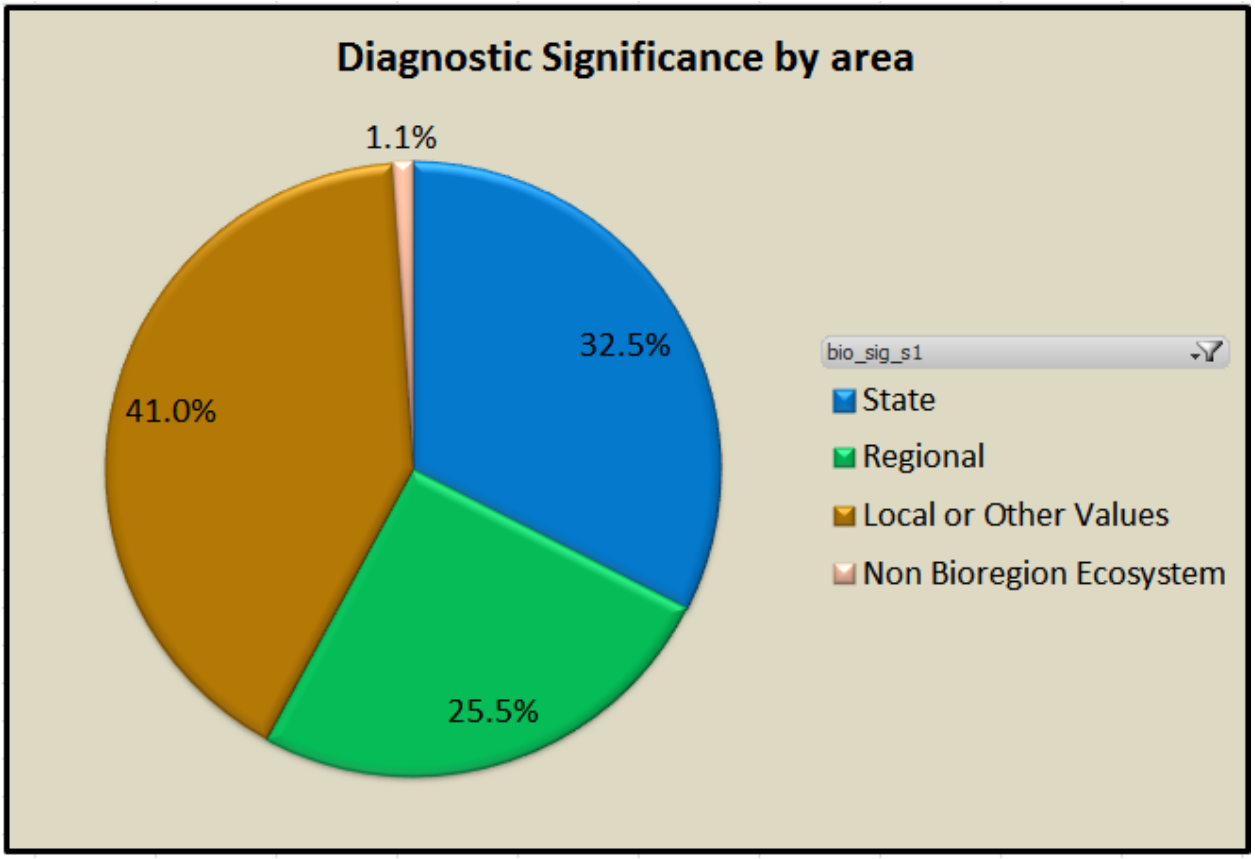

Figure 6. Summary of biodiversity assessment diagnostic criteria results as proportion of total assessment area.

3.4.2 Hit analysis

To determine which biodiversity criteria were contributing to the extent of GUP bioregion being assessed as of State or Regional significance a hit analysis was performed. For this analysis hits equate to the area of land assigned significance under the various individual or combinations of criteria as defined in the queries of **Error! Reference source not found.**. The results of the hit analysis for the diagnostic criteria are as follows:

Table 5 Diagnostic criteria hit analysis results. Query number as per Table 4

Query No.[1]	Area (ha)	Significance	Percentage of total area	Percentage of total query no. frequency (99,925)
1a	8,106.73	State	0.06%	0.60%
1b	2,158,688.39	State	17.00%	34.60%
2a	838,161.08	State	6.60%	3.98%
3a	219,859.35	State	1.73%	1.17%
3b	137,357.20	State	1.08%	0.58%
5a	835,392.13	State	6.58%	1.71%
5b	2,921,250.50	State	23.00%	3.53%
6a	22,402.95	Regional	0.18%	1.35%
6b	3,222,956.58	Regional	25.37%	47.28%
7a	59,555.05	Regional	0.47%	0.48%
8b	9,653.34	Regional	0.08%	0.05%
11f	105.96	Regional	<0.01 %	<0.01 %
11g	8,399.78	Regional	0.07%	0.12%
11i	1,505,441.84	Regional	11.85%	2.95%
12c	2,073.14	Regional	0.02%	0.01%
12d	752,396.07	Regional	5.92%	1.57%

[1] The variations (a - i) of the queries refer to specific combinations of the criteria within the query.

The results of the hit analysis (Table 5) reveal that the most widespread (by area) combination to trigger State significance is query 5b (23% or 2.9 million ha). This query is due to a Very High criterion D1 rating, indicating that it is one of the largest examples of an RE in the bioregion, and Very High for criterion G, indicating that the remnant is connected to its surrounding remnants by over 75% of its perimeter, or borders an endangered RE or wetland. This is expected due to the intact landscape of well-connected remnants, and proximity of most remnants to wetlands. However, this decision was only triggered in 3.53% of remnant units, which demonstrates the relative size of those remnants.

The second most widespread (by area) combination to trigger State significance is query number 1b, which accounts for 17% of remnant area (2.1 million ha). Criterion B1 is Very High, due to the presence of an Endangered RE, Nationally Important Wetland or World Heritage Area. Again, this result is expected given the large number of Directory of Important Wetland sites, many of a substantial size in the GUP. This query is the most common decision that resulted in State significance, with 34.6% of remnant units containing these values.

The most widespread (by area) combination to trigger Regional significance is query 6b, with 25.37% (3.2 million ha) being triggered. This query is due to a High rating for criterion B1, indicating that the remnant contains an Of Concern RE. This query was also the most commonly triggered decision that resulted in Regional significance, with 47.28% of all remnant units containing this combination.

The second most widespread combination to trigger Regional significance is query 11i, with 11.85% (1.5 million ha) being triggered. This query is due to a High rating for criterion B2 (high conservation RE or significant wetland), High rating for C (large tract) and Very High for Criterion G. Again, though widespread in area, only 2.95% of remnant units were triggered for this decision.

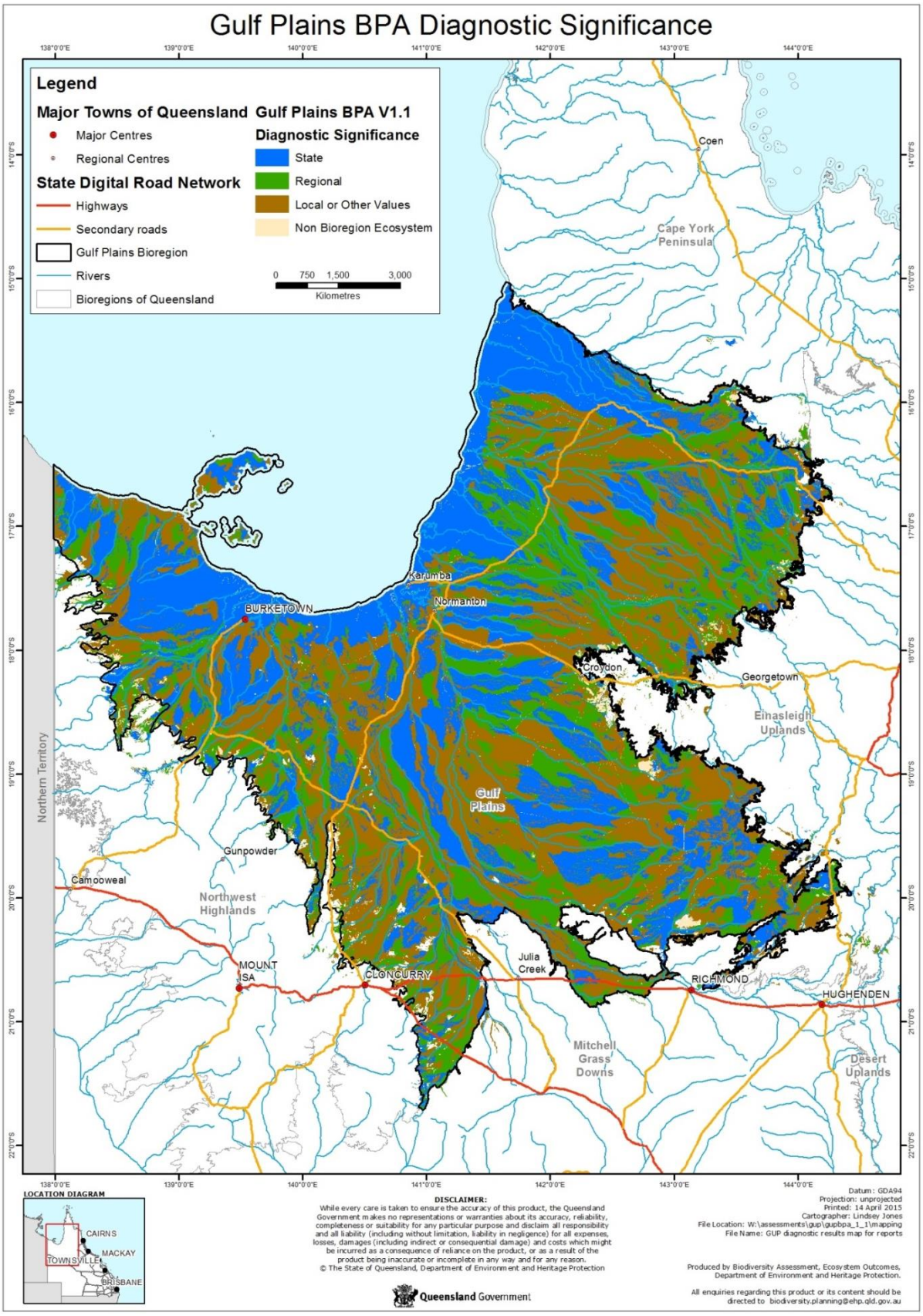

Figure 7. Diagnostic significance

3.5 Expert panel results

3.5.1 Overall expert panel results

Overall, 46.3% of the GUP bioregion was seen to have significance by the expert panel. The expert panel found 38.7% (8.5 million ha) of the GUP bioregion to have biodiversity values that are of State significance. Regional significance was attributed to 7.6% (1.7 million ha) (Figure 8 and Figure 9). While there is a high level of confidence that the most important areas of the GUP bioregion were identified by consulting experts and using existing data, it is possible that not all areas were identified.

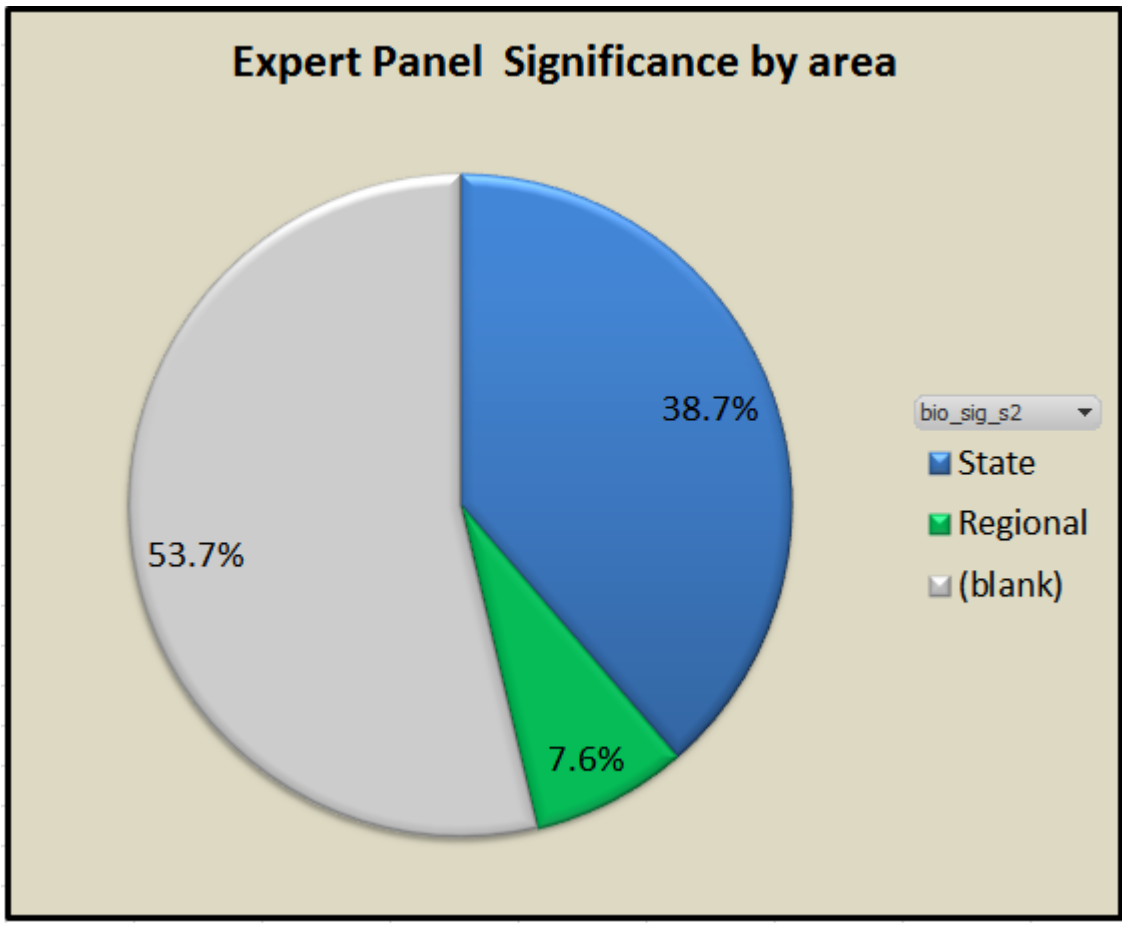

Figure 8. Summary of biodiversity assessment expert panel criteria results

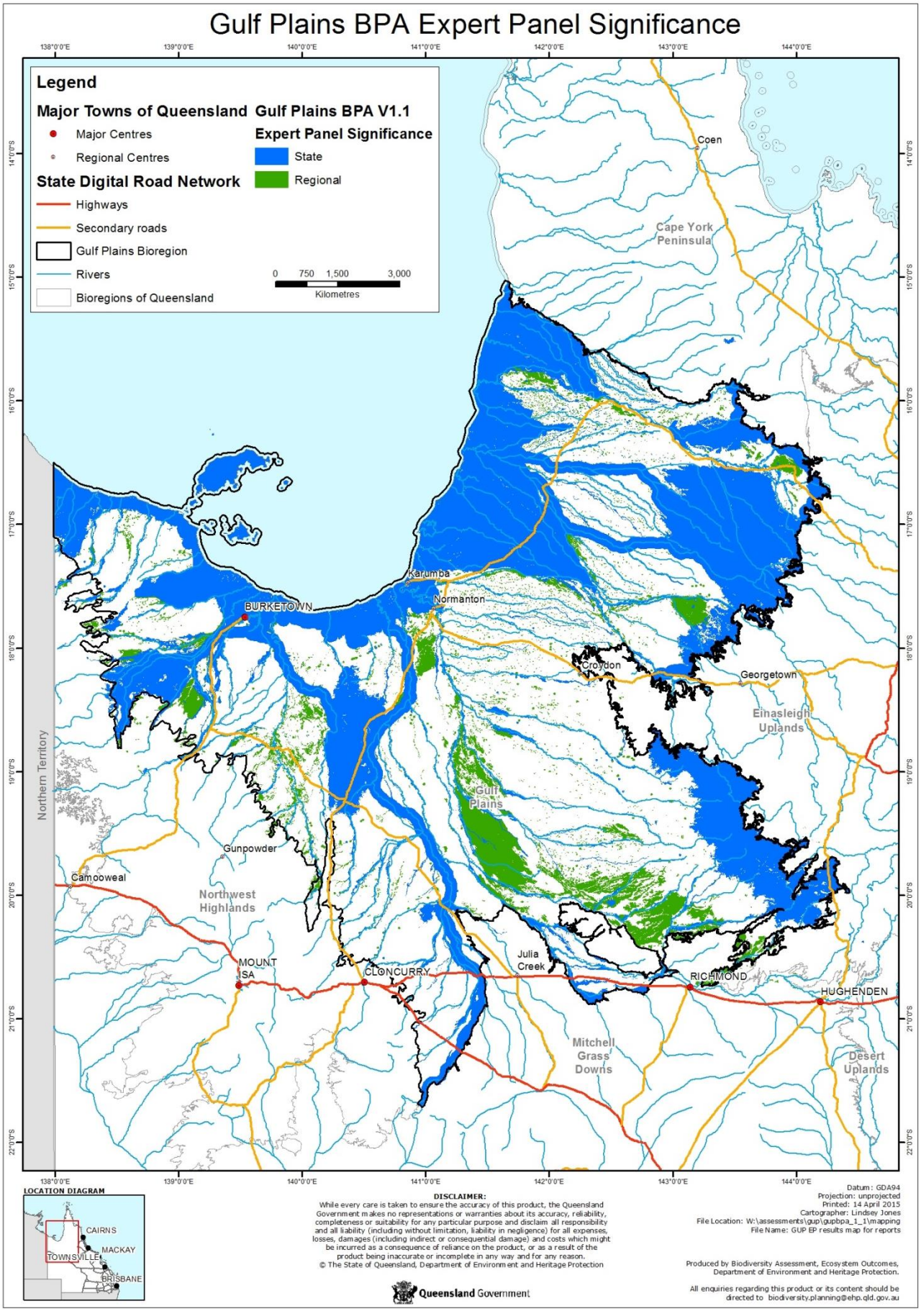

Figure 9.Expert panel significance

3.5.2 Criterion H (priority species habitat) results

Priority species are those NOT listed as Endangered, Vulnerable or Near Threatened, however, are considered to be of particular conservation significance by the flora and fauna expert panels (see flora and fauna reports in Attachment A). Priority species habitat is based on buffered species records. While the proportion of total area identified as habitat for these species is relatively small, these areas nevertheless hold important conservation values for long-term sustainability of priority species populations. Two factors determine the H rating for an area: species significance (State or Regional as defined by expert panel) and record precision (high or low). There were 42 priority species identified in the GUP (21 flora, 21 fauna), and 2,233 total records for these species. Due to the relatively small buffer size attributed to point records and the large size of the bioregion, only a small proportion of the GUP (316,671 ha, 1.44%) contained these values (Table 6).

Table 6 Criterion H (Priority species habitat) results as percentage of total assessment area

	Very High	High	Medium
H rating	0.33%	0.86%	0.25%

3.5.3 Other expert panel criteria

Criterion I (special areas) and Criterion J (corridors) were identified by flora, fauna, and landscape expert panel members. Criterion K (threatening processes) was not assessed by the GUP expert panel.

Approximately 40% of the total assessment area has been identified as having Criterion I special biodiversity values (State or Regional). The characteristics of these areas are described in section 3.5.4 below. Figure 10 illustrates the general coverage of all the special areas and their biodiversity rating.

Landscape scale corridors have been defined and mapped at a statewide level for most of the state. The network is being expanded as BPAs are completed for additional bioregions. Their broad purpose is to provide for ecological and evolutionary processes at a landscape scale. Corridors that form part of the statewide network were assigned State significance. This mapped network comprises approximately 16% of assessment area (Table 7).

Table 7 Criteria I, J, K Biodiversity Significance results as percentage of total assessment area.

	State	Regional
I rating (Special Areas)	32.84%	7.81%
J rating (Corridors)	15.93%	
K rating (Threatening Process)	N/A	N/A

3.5.4 Criterion I sub-criteria results

Areas exhibiting special biodiversity features are identified by flora, fauna and landscape expert panel members based on their own subjective knowledge and experience. Expert panel members were tasked with identifying what they considered to be the most important areas in the bioregion - hence only Very High and High category values were identified overall. These identified areas are determined by selection and assignment of specific sub-criteria values as defined in Table 8 below. Areas exhibiting characteristics of wildlife refugia, high species diversity and variable species composition account for the greatest proportion of total area identified as "Very High" value (Ib, Ie, Ig respectively).The flora, fauna and landscape reports will have detailed information relating to these areas. Most areas exhibited more than one sub-criteria value, with many exhibiting up to five sub-criteria values. The three most widespread special area criteria were Ib (wildlife refugia - 6.75 million ha, 30.73%), Ie (high species diversity - 6.39 million ha, 29.11%), and Ig (REs show distinct variation in species composition - 5.99 million ha, 27.26%). Each of the sub-criteria were assessed and valued separately by the expert panel and the results are shown in Figure 10.

Table 8 Criterion I sub-criteria results as percentage of total assessment area

Criterion I sub-rating	Very High	High
Ia rating (centre of endemism)	8.55%	1.14%
Ib rating (wildlife refugia)	30.73%	8.80%
Ic rating (disjunct populations)	7.63%	5.28%
Id rating (species at geographic range limit)	11.55%	15.71%
Ie rating (high species diversity)	29.11%	10.28%
If rating (areas with concentrations of relictual populations - ancient and primitive taxa)		0.84%
Ig rating (REs show distinct variation in species composition)	27.26%	10.66%
Ih rating (artificial waterbody or managed/manipulated wetland of ecological significance)	0.84%	0.01%
Ii rating (high density of hollow-bearing habitat trees)	20.82%	3.55%
Ij rating (significant breeding or roosting sites)	17.16%	9.23%

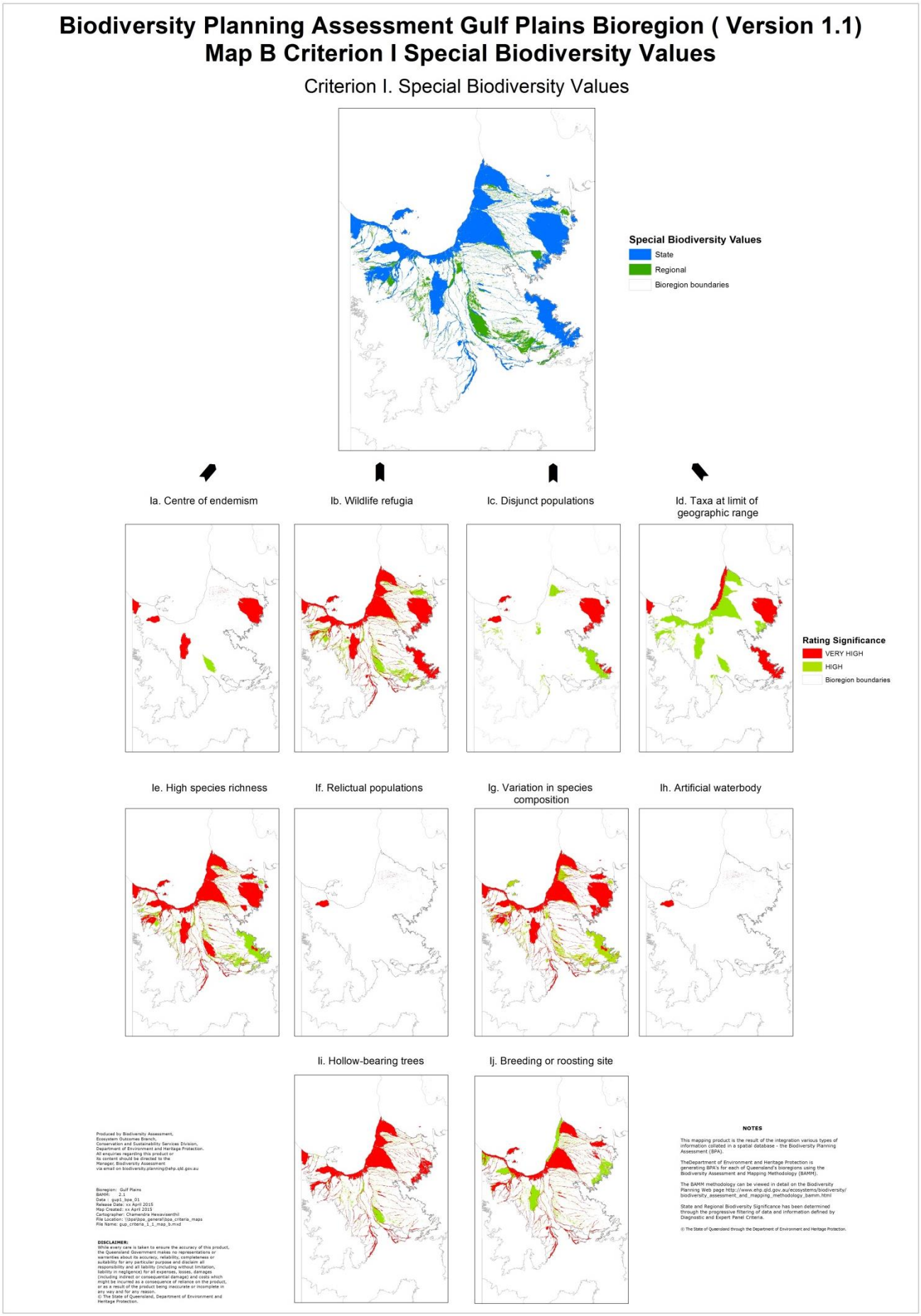

Figure 10. Criterion I Special Biodiversity Values

3.6 Assessment caveats and limitations

Some data layers are not spatially uniform across the bioregion, e.g. species records. Many areas are under-surveyed relative to areas with high densities of records and known values. Poorly sampled areas can be identified relatively easily using species record datasets. Areas such as roads are clearly more heavily sampled, while ranges, escarpments and interior parts of major floodplain wetland systems are under-represented and should be the focus of future survey effort. Access to private lands may be more achievable in the future by forming joint projects with the Northern and Southern Gulf Natural Resource Management (NRM) Groups or Indigenous groups.

Whenever lines are drawn on a map, e.g. from the expert panels or extracted from datasets produced as part of other assessments (e.g. Blackman 2001), there is a risk that the boundary may be approximate at the scale of the individual spatial unit. For these types of decisions the boundary should always be considered at the appropriate scale. The RE mapping is the fundamental spatial input into this BPA and the polygons are mapped at a scale of 1:100,000.

4 Summary and recommendations

Over 74% of the Gulf Plains bioregion was assessed as being of either State or Regional significance. This high proportion is not unexpected. The region is large, relatively undisturbed and contains a wide range of habitat types that reflect the variable underlying geomorphology and climatic gradients. It also contains large Directory of Important Wetland areas that have been recognised nationally for their significant wetland values.

The diagnostic criteria accounted for a third of the assessment area as having State biodiversity significance. A relatively undisturbed landscape with large vegetation tracts would have contributed to high values for diagnostic criteria C, D and G (tract size, regional ecosystem size and connectivity).

The expert panel identified 46.3% of the GUP bioregion as having biodiversity values of State or Regional significance. This was a combination of Criterion I special biodiversity values and State significant bioregional corridors. Approximately a third of the overall assessment area was identified as exhibiting State significance special feature biodiversity values.

The results of a BPA can be used in a number of ways and for a number of purposes. Well founded ecological or conservation values for ecosystems are a useful input to many natural resource management decision making processes including regional planning, development assessment, tenure negotiations or protected area estate review. In addition to BPA scores, subordinate elements from each assessment may also be used for management and planning purposes. An example of this is prioritising spatially natural resource actions within a bioregion for surveys, changes in land management practices and weed eradication/rehabilitation.

Interpretation of the GUP BPA results for the purposes of management priority or for development of management actions can be undertaken as part of future regional planning.

An analysis of the filtering table and how many spatial units triggered at each decision was performed. There does not appear to be any major inconsistencies in the hit analysis. In the longer term the hit analysis for all the BPAs should be compared to see if there are any redundant decisions or decisions that are inconsistent.

Species records were used in the BPA. However future BPA versions should incorporate habitat models and pest habitat mapping. This would partly address the major concern over the lack of species data/survey effort in the bioregion, both for threatened and non-listed species. Scientifically, the bioregion is largely unknown and systematic flora and fauna surveys away from main roads and iconic locations are needed to understand taxon distributions and the ecology of the area.

Despite its intact nature, the GUP is facing several threats including land degradation due to inappropriate grazing pressure and invasions by exotic plants, e.g. rubber vine in riparian areas and ponded pasture species in wetlands (Sattler & Williams 1999). Both of these could be exacerbated by climate change that could result in more extreme conditions in the already wide-ranging wet-dry monsoonal environment. Also an unknown rise in sea level will impact on the large areas of low-lying marine plains. More information is needed to determine what impacts these threats are having and are likely to have on the biodiversity values of the bioregion. It would be useful to incorporate this information into a BPA or an ancillary assessment of condition and threat risk.

5 References

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6 Attachments

Attachment A Flora, fauna and landscape expert panel reports