Identification of High Conservation Value Aquatic Ecosystems (HCVAE) in the Queensland Murray Darling Basin through targeted collection of wetland inventory data across the northern basin

Technical report

This management plan has previously been published by the Queensland Government. The technical information in this publication is still current; however it may contain references to former departmental names.

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Queensland Wetlands Program

This is the final report for the ‘Identification of High Conservation Value Aquatic Ecosystems (HCVAE) in the Queensland Murray Darling Basin (QMDB) through targeted collection of wetland inventory data across the northern basin’ project of the Queensland Wetlands Program, a joint initiative of the Australian and Queensland governments. The Queensland Wetlands Program was established in 2003 to protect and conserve Queensland’s wetlands.

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Copies may be obtained from the:

Regional Director
South West Region
Department of Environment and Heritage Protection
PO Box 318
Toowoomba Qld 4350

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Acronyms and abbreviations

ACA	Aquatic Conservation Assessment
AETG	Aquatic Ecosystems Task Group
AquaBAMM	Aquatic Biodiversity Assessment and Mapping Method
DERM	Department of Environment and Resource Management
DIWA	Directory of Important Wetlands in Australia
EPA	Environmental Protection Agency
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
HCVAE	High Conservation Value Aquatic Ecosystems
MDB	Murray Darling Basin
NCA	*Nature Conservation Act 1992*
NRM	Natural Resource Management (refers to regional management groups)
NWI	National Water Initiative
QMDB	Queensland Murray Darling Basin
WIC	Wetland Inventory Capture system
WIP	Wetland Inventory Pro forma
ha	hectares

Definitions

Lacustrine wetlands are large, open, water-dominated systems (for example, lakes) larger than eight hectares (ha). This definition also applies to modified systems (for example, dams), which are similar to lacustrine systems (for example, deep, standing or slow-moving waters (Wetland*Info*).

Palustrine wetlands are primarily vegetated non-channel environments of less than eight ha. They include billabongs, swamps, bogs, springs, soaks etc., and have more than 30% emergent vegetation (Wetland*Info).*

Executive summary

1. The Queensland Wetlands Program has mapped and classified over 7800 discrete wetlands in the Queensland Murray Darling Basin (QMDB).
2. The project described in this report was undertaken as part of the Queensland Wetlands Program – Phase II and aimed to collect and collate inventory data for identified priority wetlands in the QMDB, and use this information to identify and classify areas of high conservation value.
3. The QMDB Aquatic Conservation Assessment (ACA) and AquaBAMM tool were used as the platform for the selection of sites for targeted wetland inventory and to assess riverine and non-riverine wetlands in the QMDB against the High Conservation Value Aquatic Ecosystems (HCVAEs) framework.
4. The Queensland Wetlands Information Capture system (WIC) and the Wetland Inventory Pro forma (WIP) were adopted in the QMDB HCVAE project to provide a standardised system for the collection and management of inventory data.
5. A total of 62 primary wetlands were surveyed during the targeted inventory and an additional 9 sub-sites were sampled at selected wetlands. The wetland sites were predominantly freshwater non-riverine wetlands including 43 palustrine and 14 lacustrine sites, with five riverine wetlands sampled opportunistically. 14 of the wetlands surveyed were saline.
6. Field surveys for the targeted wetland inventory collected 2853 individual species records from 883 separate species, of which 455 were plant species and 214 were animals.
7. Assessment of all the wetlands within the QMDB ACA against the HCVAE criteria identified a total of 5323 wetland areas (68% of all mapped wetlands) that met the criteria for HCVAEs.
8. The inventory data and spatial datasets developed as part of this project have been captured to corporate databases and decision support tools and will be used to direct future development and planning decisions in the QMDB.
9. The project has demonstrated that the AquaBAMM tool and the measures and indicators it contains, provide both an effective platform for the rigorous assessment of HCVAEs, integrating a range of contemporary data relevant to such an assessment, as well as a means of identifying wetland sites and regions with data deficiencies as a basis for establishing inventory and survey priorities.
10. Recommendations are provided in relation to the future development of both the AquaBAMM tool and the HCVAE framework for the identification and classification of HCVAEs in Queensland.

1 Introduction

The Queensland Wetlands Program has mapped and classified nearly 7800 discrete riverine and non-riverine wetlands in the Queensland Murray Darling Basin (QMDB). Whilst these wetlands are now spatially identified and classified, there is still the requirement to establish baseline information on their ecological values, the fundamental processes that sustain them, and their relative conservation value. Work to identify aquatic values is required to prioritise wetlands for targeting investment in environmental flows (water sharing), on-ground works, data inventory, protection, and rehabilitation.

In addition to processes for mapping and classifying wetlands the Queensland Government developed the Aquatic Biodiversity Assessment and Mapping Methodology (AquaBAMM). AquaBAMM is a decision support tool that utilises existing information and expert input to assess the conservation value of aquatic ecosystems. The product of applying this tool is an Aquatic Conservation Assessment (ACA), which identifies the conservation and ecological values of riverine and non-riverine wetlands within a specified study area. ACAs using the AquaBAMM method have been completed for the Condamine, Baffle, Burnett and Brisbane catchments, and the broader Great Barrier Reef Protection Area and QMDB regions. These assessments form a major component of future planning and management for the protection and conservation of aquatic ecosystems in Queensland.

At a national scale, the Australian Government committed to protecting and enhancing the most important aquatic ecosystems through the National Water Initiative (NWI) and other planning and policy initiatives. The NWI represents a shared commitment by governments to increase the efficiency of Australia's water use for rural and urban communities and for the environment, leading to greater certainty for investment and productivity. Clause 25 of the NWI requires governments to '*identify and acknowledge surface and groundwater systems of high conservation value, and manage these systems to protect and enhance those values'.* To this end, the Australian government is developing the High Conservation Value Aquatic Ecosystems (HCVAEs) Framework to determine the conservation value of freshwater and marine wetlands throughout Australia.

The project described in this report was initiated to contribute to the wetlands management programs for both the Queensland and Australian governments. Specifically, the project sought to improve knowledge of the conservation and ecological values of wetlands in the QMDB through a targeted inventory of identified priority wetlands. These data were also used to support existing wetland projects, including the QMDB ACA and WIC and to provide a preliminary assessment of nationally significant HCVAE wetlands occurring within the QMDB.

1.1 Background to HCVAE framework

As part of its commitment to identify, protect and enhance the values of surface and groundwater systems of high conservation value, the Australian Government has established the Aquatic Ecosystems Task Group (AETG) as a multi-jurisdictional body under the Natural Resource Management Ministerial Council (NRMMC) to:

- provide a nationally coordinated approach to policy development for relevant cross-jurisdictional issues within the aquatic ecosystems context
- develop a national policy framework for the identification, classification and management of HCVAEs.

The national framework includes wetlands, river reaches, estuaries and groundwater dependent ecosystems and is intended to enable decision makers to establish a list of HCVAEs based around classes of aquatic ecosystems within a region (AETG 2009b).

The draft HCVAE Framework is designed to have multiple uses. The Framework will be used to:

- establish a core set of criteria for identifying aquatic ecosystems of high conservation value
- improve knowledge of the extent, distribution and characteristics of HCVAEs
- differentiate between HCVAEs of national and regional importance
- improve information sharing between Nature Resource Management (NRM) bodies, governments, and other stakeholders
- improve cross-jurisdictional coordination and cooperation
- assist meeting national and international obligations for protection of aquatic ecosystems
- guide planning, investment and management decisions (AETG 2009b).

Six biophysical criteria have been agreed as appropriate for the identification of nationally significant HCVAEs. These are:

1. Diversity – It exhibits exceptional diversity of species or habitats, and/or hydrological and/or geomorphological features/processes.
2. Distinctiveness – It is a rare/threatened or unusual aquatic ecosystem; and/or it supports rare/threatened species/communities; and/or it exhibits rare or unusual geomorphological features/processes and/or environmental conditions.
3. Vital habitat – It provides habitat for unusually large numbers of particular species of interest; and/or it supports species of interest in critical life cycle stages or at times of stress; and/or it supports specific communities and species assemblages.
4. Evolutionary history – It exhibits features or processes and/or supports species or communities which demonstrate the evolution of Australia's landscape or biota.
5. Naturalness – The aquatic ecosystem values are not adversely affected by modern human activity to a significant level.
6. Representativeness – It contains an outstanding example of an aquatic ecosystem class within a Drainage Division.

The Framework also specifies that sites listed as Ramsar, and Australasian-East Asian Flyway sites will be recognised as nationally significant wetlands. The current

draft of the Framework states that “an aquatic ecosystem meeting any one of these criteria could be considered an HCVAE”, while recognising that further work is required to determine if refinements to the classification criteria are necessary. Trials have been undertaken to test the applicability of the criteria to different ecosystem types and at a range of spatial scales, including the Namoi catchment (MDBC 2008), Laky Eyre Basin (Hale 2010), and northern Australia (Kennard, 2010). It is expected that the outcomes for this project will also contribute to that process.

1.2 Background to QMDB HCVAE project

This project was undertaken as part of the Queensland Wetlands Program – Phase II, aiming to collect and collate inventory data for identified priority wetlands in the QMDB, and use this information to identify and classify areas of high conservation value. For this project, inventory is defined as a collection of reliable and consistent wetland information that will be used for the management and conservation of wetlands (also refer to Finlayson *et al*., 2002). The project was conducted in two distinct phases:

I. the capture of existing data (including the outputs of the QMDB AquaBAMM project and from WildNet)
II. the collection of new data through targeted inventory of identified priority wetlands (section 3.2).

Information was captured to improve the consistency and geographic distribution of wetland information, to augment data capture by the Data Capture Project (WL EPA 06) linked to the MDB Plan, to inform the review of management of leasehold land associated with the Delbessie Agreement, and to identify and review key threatened areas listed in the Directory of Important Wetlands in Australia (DIWA).

The collection of data used standardised data collection sheets developed for the Wetland Information Capture System (WIC). Data entry quality controls were applied prior to final storage into WIC.

The specific objectives of the project were to:

1. improve the consistency and geographic distribution of baseline information on the ecological values, fundamental processes that sustain wetlands, and the relative conservation value of the wetlands in the QMDB
2. identify HCVAEs within the QMDB using the framework specified by the AETG (2009a)
3. ensure that HCVAEs and associated wetland inventory data are incorporated into appropriate corporate databases and decision support tools to assist future planning and management within the QMDB.

2 Study area

The Murray Darling Basin (MDB) is Australia's largest drainage basin. Located at the southernmost end of Queensland, the Queensland section of the MDB is bounded along its northern and eastern extents by the Great Dividing Range and along its southern boundary by the Queensland–New South Wales border (Figure 1.). The western boundary of the QMDB is a series of indistinct mountain ranges and slightly elevated ground between Cunnamulla and Thargomindah, and between Charleville and Quilpie (Moffatt and Voller, 2002).

The majority of the QMDB lies in Australia's subtropical climate zone with only the New England Tablelands in the Condamine-Balonne and Border Rivers catchments experiencing a temperate climate. There is a general east-west decline in annual rainfall and an increase in rainfall variability. The median annual rainfall of Toowoomba in the central-east of the region is 944 mm per year, while that of Cunnamulla in the south-west is 375 mm per year (Australian Bureau of Meteorology 2011). Most (93 per cent) of the QMDB is classified as either Brigalow (Border Rivers, Moonie and Condamine-Balonne) or mulga country (Nebine, Warrego and Paroo catchments). Approximately 89 per cent of the QMDB is subject to grazing by sheep and cattle, making this the dominant land use for this area (Moffatt and Voller, 2002).

The QMDB includes catchments of the Border Rivers, Moonie River, Condamine-Balonne Rivers, Warrego River, Paroo River and Nebine-Mungalalla Creeks. All of these drainages flow south into the Darling River system. The topography of the QMDB as a whole is generally very flat. The average elevation of river channels in the region is about 250 metres above sea level, and the average slope of river channels is very low, at about 0.5 metres per kilometre. This low slope results in a relatively slow movement of water down river channels, allowing the accumulation of fine sediments. Most of the waterways of the QMDB are naturally turbid, and become more so, with increasing distance from their headwaters (Moffatt and Voller, 2002).

All six QMDB catchments were the subject of ACAs focused on their riverine and non-riverine wetlands. The NSW and the Queensland section of the Border Rivers catchment were assessed as one study area. This hydrological boundary was chosen to provide an ecologically meaningful ACA, despite the split between state jurisdictions, along the Dumaresq-McIntyre River. The QMDB contains a wide range of wetland types within three distinct bioregions: the southern Brigalow Belt, the New England Tablelands, and the Mulga Lands bioregions. As a result, the wetland ecology, geomorphology, hydrology, habitat and species composition vary widely throughout the region. ACAs assess conservation values relative to within the study catchment. Care was taken at the expert panels to ensure that each catchment was considered separately.

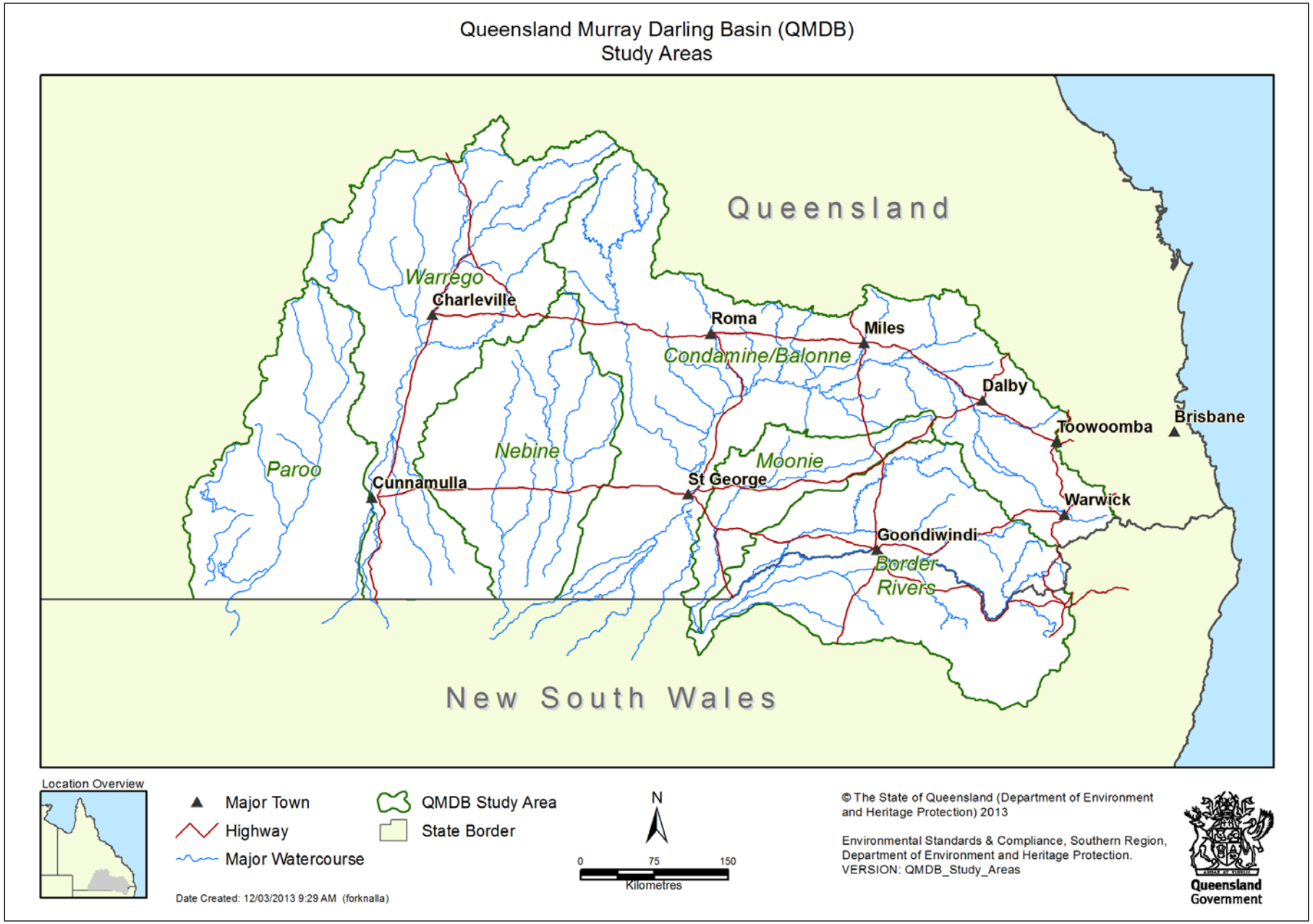

Figure 1. The study area of the project

3 Methodology

3.1 Aquatic conservation assessment of riverine and non-riverine wetlands within the Queensland Murray Darling Basin using AquaBAMM

During 2008-2009 the Queensland Environmental Protection Agency (EPA) commenced a project with funding from the Murray Darling Basin Authority, to conduct preliminary ACAs of riverine and non-riverine wetlands across a study area incorporating the Condamine-Balonne Rivers (including the Maranoa River), Border Rivers, Moonie River, Nebine Creek, Warrego River and the Paroo River catchments. The project collated and analysed a range of available datasets to identify and classify aquatic assets in the QMDB using the AquaBAMM tool. The outcome of this analysis is a landscape scale classification of the relative conservation values of riverine and non-riverine wetlands in the QMDB. These results were used to guide the selection of candidate wetland areas for inclusion in surveys, associated with a proposed expansion of the EPA wetland inventory project to identify HCVAEs in the QMDB.

The QMDB ACA and AquaBAMM tool were used as the platform for the selection of sites for the targeted wetland inventory, and to assess riverine and non-riverine wetlands in the QMDB against the HCVAE framework. Specific queries were developed to interrogate the outputs of the QMDB ACA project, consistent with the HCVAE criteria, enabling HCVAEs to be identified within each of the catchments in the QMDB region.

3.2 Identification of wetlands sites for the targeted inventory across the northern basin

The process of identifying candidate areas for the targeted inventory was based on an information gap analysis of the QMDB catchments using the outputs from the QMDB ACA. These outputs were interrogated using detailed spatial queries to identify wetland areas that were deficient in species data. Only non-riverine wetlands were included in this analysis, as the AquaBAMM method automatically applies species values from non-riverine spatial units to riverine spatial units. A set of decision rules were then applied to prioritise wetlands for survey. These rules specify that:

- the candidate area was not located within an area with an existing protected status (e.g. Ramsar, DIWA, National Park), or if protected, inclusion should be justified on the basis of the presence of threatening processes (e.g. from upstream sources), or a lack of wetland data
- the candidate area could be upstream of protected or well surveyed areas
- the candidate area lacked sufficient information to accurately assign wetland characteristics, processes and values, in the absence of a more detailed survey
- the focus was on palustrine and lacustrine wetlands (refer definitions section)
- wetlands that form aggregates of wetland habitats or systems (including dependent riverine reaches) of ≥100 ha were included
- the candidate areas were located on leasehold land, especially if they were due for renewal within the next five years
- candidate areas were located on Unallocated State Land

- new acquisitions of land for crown protection that lack biodiversity data may have been selected.

Some exceptions were made to include several sites that did not conform to these guidelines, particularly where these sites filled knowledge gaps of highly biodiverse ecosystems or presented the opportunity to contribute to concurrent QWP projects. For example, several gilgai wetlands were surveyed opportunistically within the Glencoe Nature Refuge and Barakula State Forest. These wetlands were surveyed when preceding climatic conditions provided a rare opportunity to survey the gilgai when they contained water. Survey of these sites also contributed to the QWP project 'Developing wetland conceptual models for use at a local and regional level', in which gilgai were targeted as a case study wetland type.

Following this analysis, 1425 of the 6562 non-riverine wetlands in the QMDB, were identified as priority sites for targeted inventory (Figure 2.). From this group a subset of sites were selected during fieldwork planning, and opportunistically in the field, based on the following factors:

- gaining permission from landholders to access the site
- indication of potential inventory sites containing significant wetland values by landholders and other stakeholders
- ability to access the site by vehicle
- the effect of preceding and prevailing weather conditions enabling access to the site
- travel time restrictions between field sites.

3.3 Design and conduct of the wetland inventories

The goal for the wetland inventory was to substantially improve recorded information about wetland biodiversity values, including population processes (e.g. breeding), and provide a current characterisation of wetland type, condition, modification and threats for key representative wetlands across the main QMDB catchments.

The surveys were not intended to be censuses; instead a comparatively rapid assessment of the characteristics, processes and values was conducted to represent the range of values and characteristics linked to or dependent on the wetland. Observations focussed on dominant species and community structure with additional effort applied to identify the occurrence of priority species including those listed as endangered, vulnerable and near threatened under the *Nature Conservation Act 1992* (NCA).

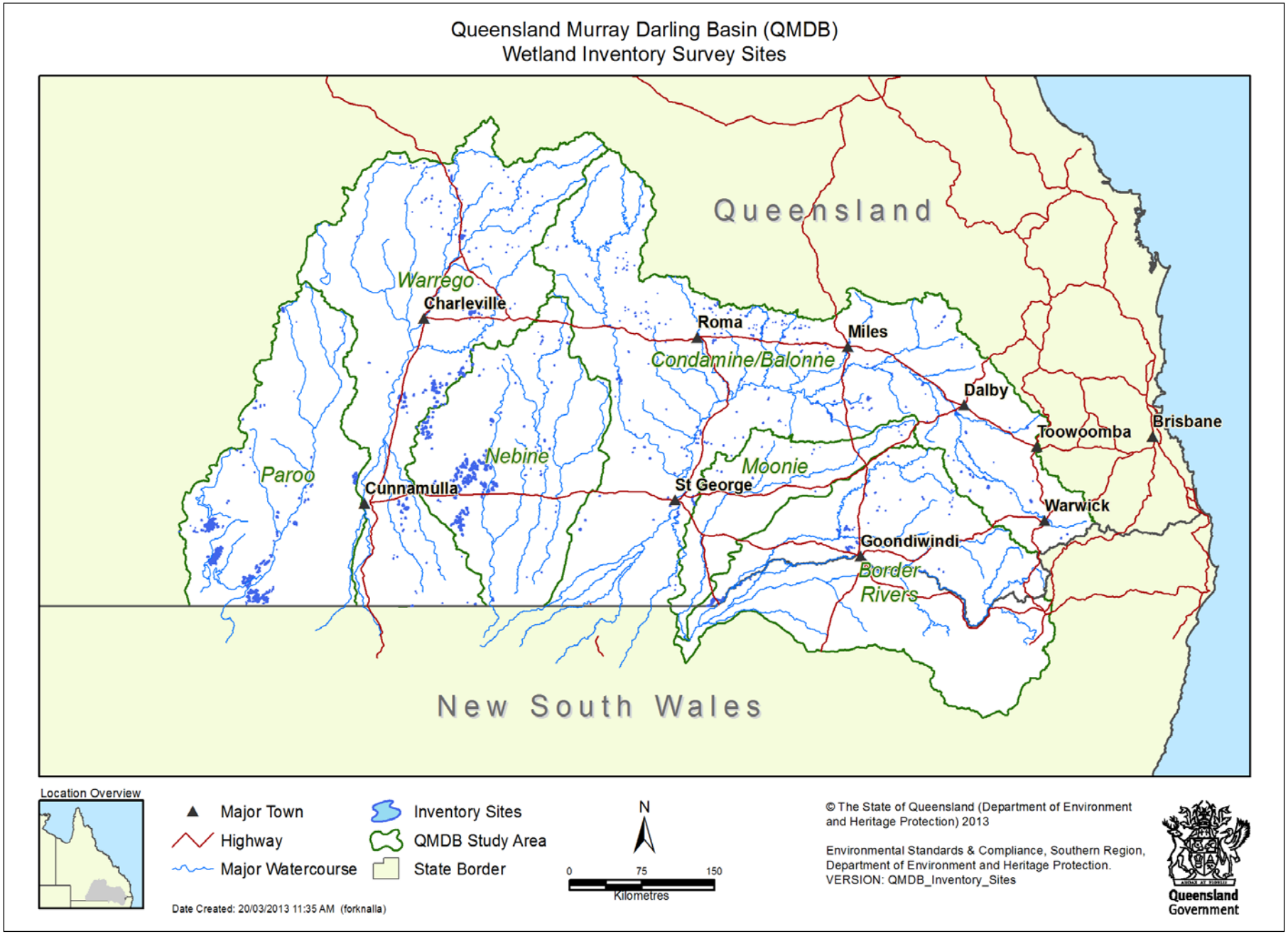

Figure 2. Potential sites identified for targeted inventory of wetlands in the QMDB

At each site a minimum of core wetland inventory, fauna and flora data were recorded consistent with the Wetland Inventory Pro forma (WIP). Sampling effort for different fauna groups varied between sites due to the different nature of the wetlands surveyed and time restrictions. Flora and bird area searches were conducted at each of the wetland sites visited, sampling an area that varied relative to the size of the wetland site. These surveys were supplemented by: fish sampling using fish traps, fyke nets and seine nets; herpetofauna sampling using pitfall traps, visual and aural observation; interpretation of scats and other signs; and collection of specimens (i.e. road kill), where possible. Photos were also taken at each site of general site characteristics and to aid identification of specimens.

3.4 Application of the HCVAE framework to identify HCVAEs in the QMDB

The HCVAE framework was applied to assess the conservation value of aquatic ecosystems in the QMDB using the AquaBAMM decision support tool developed by Clayton *et al.* (2006). The AquaBAMM tool is a non-social, non-economic assessment tool that uses available data, including expert opinion, to determine the conservation and ecological values of wetlands at a user-defined scale. The tool uses a nested framework of criteria, indicators and measures to calculate and attribute ecological/conservation values to riverine and non-riverine wetland units that are summarised as an AquaScore. The AquaScore is the product of combining the results from numerous measures that are grouped into indicators and criteria. The decision support tool then uses a decision filter, based on expert knowledge, to combine and prioritise the criteria scores on a five category scale that represents the relative conservation value of a specifies wetland unit. The advantage of the AquaBAMM tool is that the output analysis can be interrogated at several levels (AquaScore, criteria, indicator, measure) allowing the data to be queried in a manner that is consistent with the HCVAE framework.

The data collected during the wetland inventory were combined with the existing QMDB ACA and analysed using the AquaBAMM tool. The AquaBAMM criteria were then mapped against the HCVAE criteria, as shown in Table 1, to construct a query to interrogate the AquaBAMM output against the HCVAE framework. As the current version of the HCVAE framework does not specify thresholds for each criterion a conservative approach was taken to this interrogation, with only sites scoring ‘Very High’ in the AquaBAMM query being considered as meeting the respective HCVAE criteria. Consistent with the HCVAE framework, any riverine or non-riverine spatial units that met any one of the HCVAE criteria was assessed as being a HCVAE (AETG 2009a). No further assessment was undertaken to rank or prioritise the HCVAEs through this process, as this would have required the development of both specific relative weightings and ranks, for each of the HCVAE criteria, and a decision filter table to integrate and rate the various criteria scores, for each spatial unit. Whilst this will be critical to the future application of the AquaBAMM tool to identify HCVAEs, it was beyond the scope of the current project.

3.5 Queensland Wetlands Information Capture Project

The Queensland Wetlands Information Capture Project was developed, to provide mechanisms for the collation and integration of existing and new wetland inventory data, from a variety of sources, and to provide information in a useable format to users. A significant component of the project was the development of the

Queensland Wetlands Information Capture System (WIC) and its associated tools, which include the WIP and Coastal Bird Atlas Pro forma (CBAP).

The Queensland WIC and the WIP were adopted in the QMDB HCVAE project to provide a standardised system for the collection and management of inventory data. The application enables the capture of data relating to the following themes: Core Inventory (site, survey and wetland attributes), Geology (including soils), Fauna, Flora, and Water Quality. Once fully functional it is intended that validated data would be delivered, to internal and external parties, via portals such as WetlandMaps and WildNet.

Table 1. HCVAE criteria and key attributes, and the corresponding AquaBAMM criteria and indicators used to conduct the HCVAE analysis

HCVAE criterion	Key attributes	AquaBAMM equivalent criterion	Indicators
1. Diversity	• Diversity of aquatic ecosystem classes or types	3. Diversity and Richness	3.3 Habitat
	• Species diversity		3.1 Species
	• Diversity of communities		3.2 Communities/assemblages
	• Diversity of geomorphology		3.4 Geomorphology
2. Distinctiveness	• Rare, unusual and/or threatened aquatic ecosystem classes	8. Representativeness	8.2 Wetland uniqueness (non-riverine)
	• Support rare and threatened species and communities	4. Threatened species and ecosystems	4.1 Species
			4.2 Communities and assemblages
		5. Priority species and ecosystems	5.1 Species
			5.2 Ecosystems
3. Vital habitat	• A major location for very large numbers of species	5. Priority species and ecosystems	5.1 Species
			5.2 Ecosystems
	• A location of intensive breeding activity, notably for birds or fish. It may attract species that do not inhabit the area in all life stages, but use the area solely for breeding	6. Special features	6.3 Habitat 6.2 Ecological Processes
	• A place that is the most utilised by migratory birds at regional scale		
	• Habitat for large numbers and/or diversity of migratory species [especially *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) listed]		
	• A location that typically sustains aquatic ecosystem species under conditions of stress, as shown by the large numbers of individuals that are attracted to that asset, under conditions such as drought		6.4 Hydrological features 6.1 Geomorphic features
	• Considered significant for the life cycle of some species if it maintains a natural regime of drying and wetting, which is critical for the existence of those species and/or communities		
4. Evolutionary history	• Habitat for an unusually high diversity of endemic taxa with limited geographical distribution	No equivalent AquaBAMM criterion	
5. Naturalness	• Most components and processes that describe the ecological character of its ecosystem class, or	1. Naturalness Aquatic	1.1 Exotic flora/fauna
			1.2 Aquatic communities/assemblages

HCVAE criterion	Key attributes	AquaBAMM equivalent criterion	Indicators
	classes, remain close to pre-European condition, or in outstanding condition for the drainage division		1.3 Habitat features modification
			1.4 Hydrological modification
			1.5 Water quality
	• An ecosystem with all or most of the components and processes that define its ecological character, in outstanding condition for the Drainage Division	2. Naturalness Catchment	2.1 Exotic flora/fauna
			2.2 Riparian disturbance
			2.3 Catchment disturbance
			2.4 Flow modification
7. Representativeness	• An ecosystem that is assessed as an outstanding representative example, of a particular aquatic ecosystem type, when compared with similar aquatic ecosystems, of the same classification in the Drainage Division	8. Representativeness (non-riverine wetlands only).	8.1 Wetland Protection
	• An ecosystem may be recognized as a representative HCVAE, at a national scale, if it is of a spatial scale that illustrates the full characteristics of its class, for example, a river intact from headwater to ocean, or a major convergence, or an aquatic ecosystem that responds periodically to cycles of water availability, and is either: ➢ in natural or near-natural condition with the processes that sustain it intact, or ➢ a rare example of such a system on a continental scale		8.2 Wetland uniqueness

4 Results

4.1 Results of the targeted wetland inventory

A total of 62 primary wetlands were surveyed during the targeted inventory (Figure 3.), and an additional 9 sub-sites were sampled at selected wetlands. Wetland sites were predominantly freshwater non-riverine wetlands, including 43 palustrine and 14 lacustrine sites, with five riverine wetlands sampled opportunistically. A total of 14 of the wetlands surveyed were saline.

Field surveys for the targeted wetland inventory collected 2853 individual species records, from 883 separate species. Of these, 455 were plant species, and 214 were animal species (Table 2). A detailed summary of the species recorded at each survey location, can found in Appendix 3. Two of the species recorded were listed as Threatened under the NCA - the endangered grey snake *Hemiaspis damelii* and the near threatened rough-collared frog *Cyclorana verrucosa*.

Table 2. Summary of taxonomic groups sampled during the wetland inventory project

Taxonomic group	Number of species
Birds	161
Fishes	8
Amphibians	23
Mammals	11
Reptiles	11
Plants	455
Total	**883**

The wetland surveys also recorded 20 priority species nominated in the QMDB ACA. Priority species are species that are currently not recognised under existing legislation, but have been identified by an expert panel process as having conservation significance, based on endemism, reduction of habitat, and/or distribution, or have experienced, or are suspected of experiencing, a population decline.

Priority fauna species recorded include: three fish [(Agassiz's glassfish *Ambassis agassizii*, river blackfish *Gadopsis marmoratus*, mountain galaxias *Galaxias olidus*, four amphibians (striped burrowing frog *Litoria alboguttata*, water-holding frog *Cyclorana platycephala*, salmon striped frog *Limnodynastes salmini*, holy cross frog *Notaden bennettii*, and three birds (musk duck *Biziura lobata*, brolga *Grus rubicunda*, barking owl *Ninox connivens*). Nine priority plant species were recorded: *Eleocharis blakeana*, *Cyperus concinnus*, starfruit *Damasonium minus*, black box *Eucalyptus largiflorens*, water primrose *Ludwigia peploides*, common nardoo *Marsilea drummondi*, nardoo *Marsilea mutica*, black tea tree *Melaleuca bracteata*, *Melaleuca densispicata*, and *Vallisneria nana*. In addition, two significant macroinvertebrate species were recorded; *Euastacus sulcatus* is a freshwater crayfish, nominated as a priority species in the QMDB ACA, and a fairy shrimp *Streptocephalus queenslandicus* was collected in a gilgai wetland north of Chinchilla. This is the second location and the only location outside of fish breeding ponds, in the Atherton Tableland that this species of fairy shrimp has been recorded (D. Potter pers. comm. 23 May 2011).

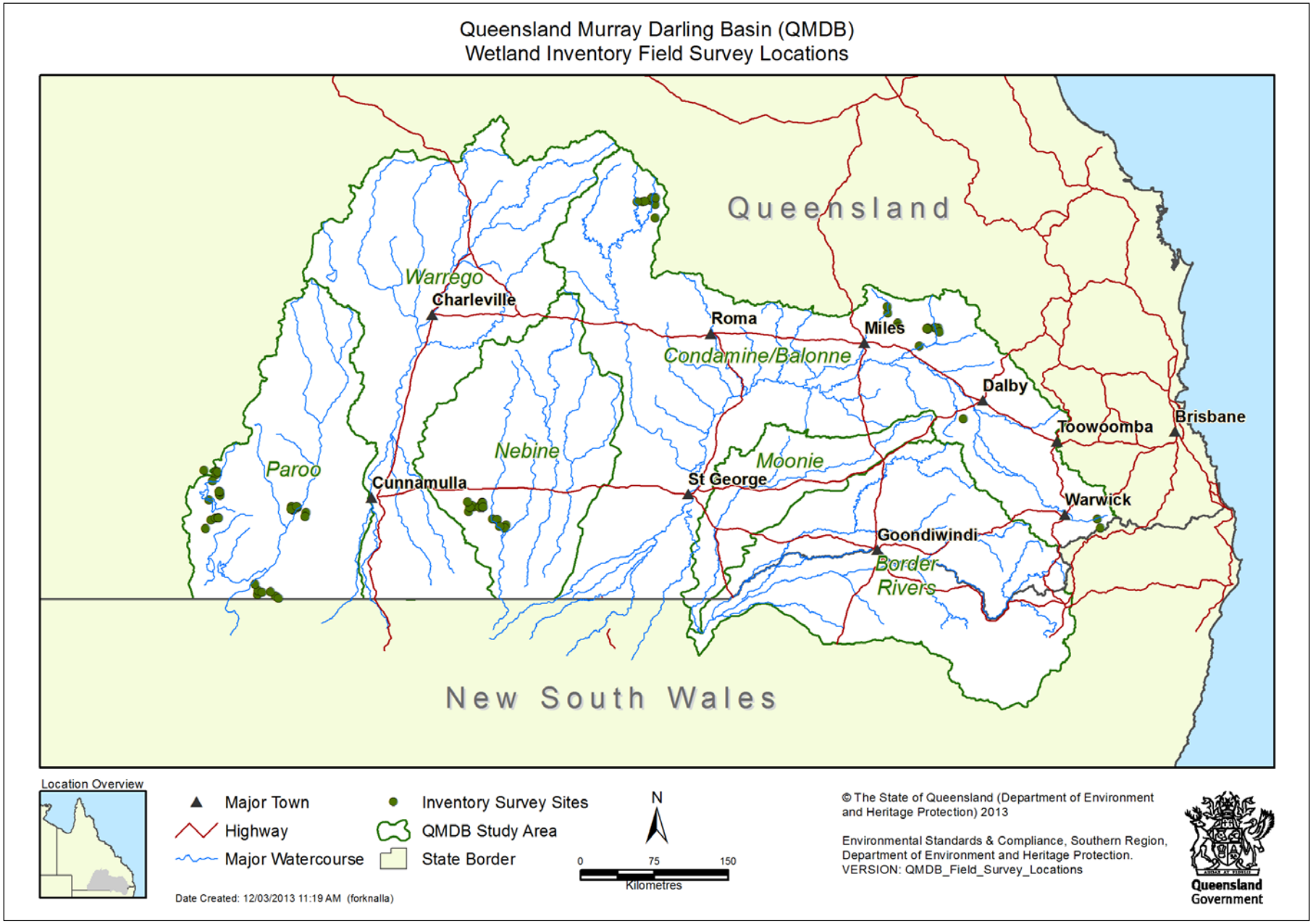

Figure 3. Field survey locations for the QMDB wetland inventory project

4.2 Identification of high conservation value aquatic ecosystems in the QMDB

The application of the HCVAE criteria using the AquaBAMM tool identified 5323 HCVAE wetlands in the QMDB (Figure 4 and Figure 5). More than one third (447) of the 1267 riverine wetlands, identified in the QMDB, met the criteria for classification as HCVAEs (Table 3). Of the 6562 non-riverine wetlands identified in the QMDB, three quarters (4876) met the criteria for classification as HCVAE wetlands. The proportion of HCVAE riverine and non-riverine wetlands, identified during this assessment, is significantly greater than the 'Very High' conservation value wetlands (17% and 57% respectively), identified in the QMDB ACA (Fielder, Davidson and Barratt, 2011). This can primarily be attributed to wetland units only having to meet one criterion to be classified as a HCVAE. In contrast the ACA uses a complex decision filter table to evaluate wetlands against multiple criteria and to calculate a conservation value.

Analysis of the number of HCVAE identified wetlands in each catchment shows an increasing proportion across catchments, from east to west. This reflects a general trend of increasing naturalness, and decreased modification of wetland systems, in catchments from east to west, and is confirmed by the number of wetlands, identified by the 'Naturalness' criterion (Table 3). The 'Vital Habitat' and 'Diversity' criteria also had a significant influence on the identification of HCVAEs, most likely as a result of greater data dependability for these criteria.

Whilst these analyses represent spatial areas within the QMDB study area, which have been assessed as meeting any of the HCVAE criteria, it is, at best, a preliminary assessment of HCVAEs in the QMDB. More detailed assessment including both the development of relative weightings, and ranks, for each criterion, and the derivation of a decision filter table, would be required to confidently delineate the most significant wetland areas in the basin.

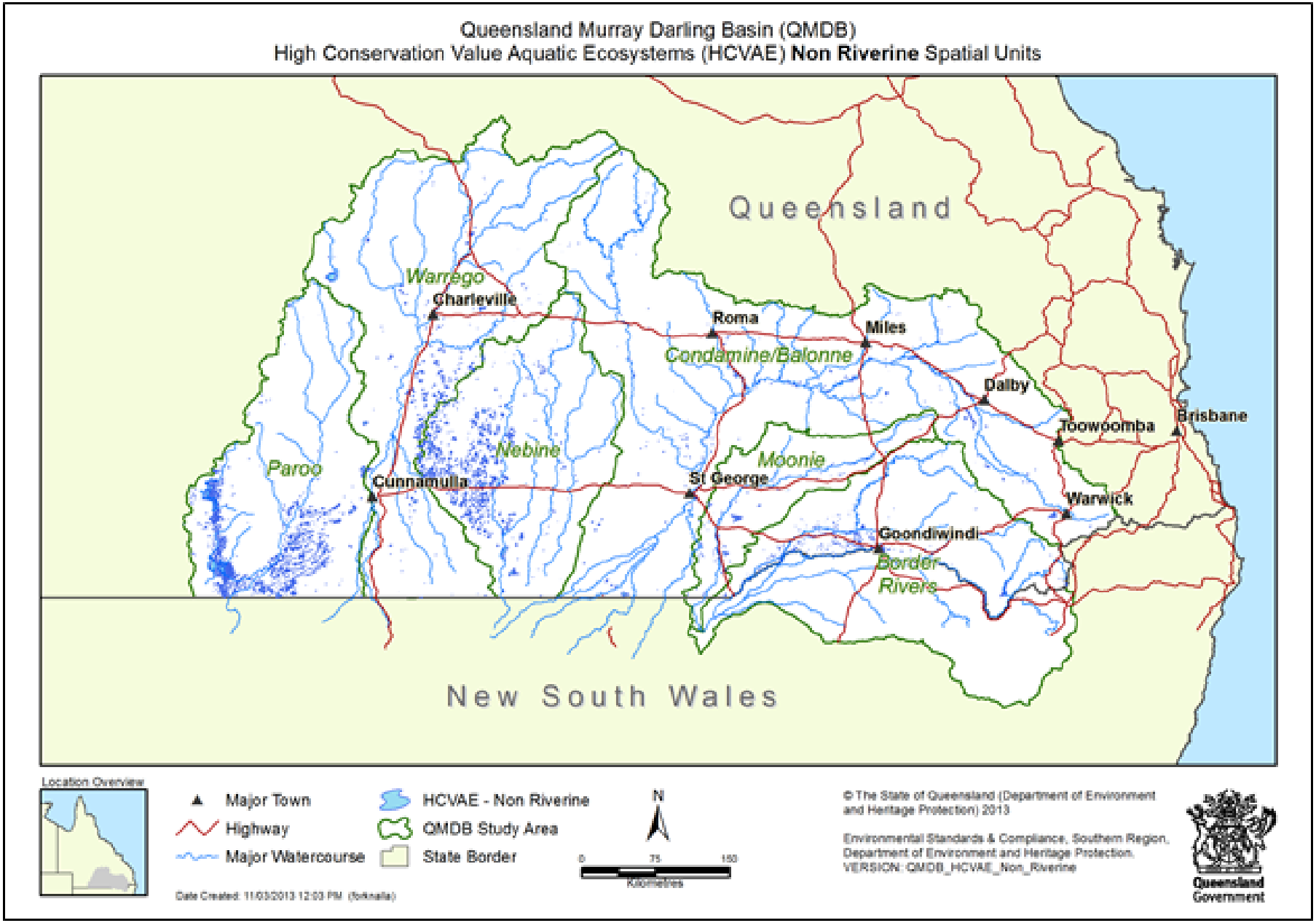

Figure 4. Riverine spatial units within QMDB identified as containing HCVAEs based on interrogation of the outputs from the Aquatic Conservation Assessment of the QMDB

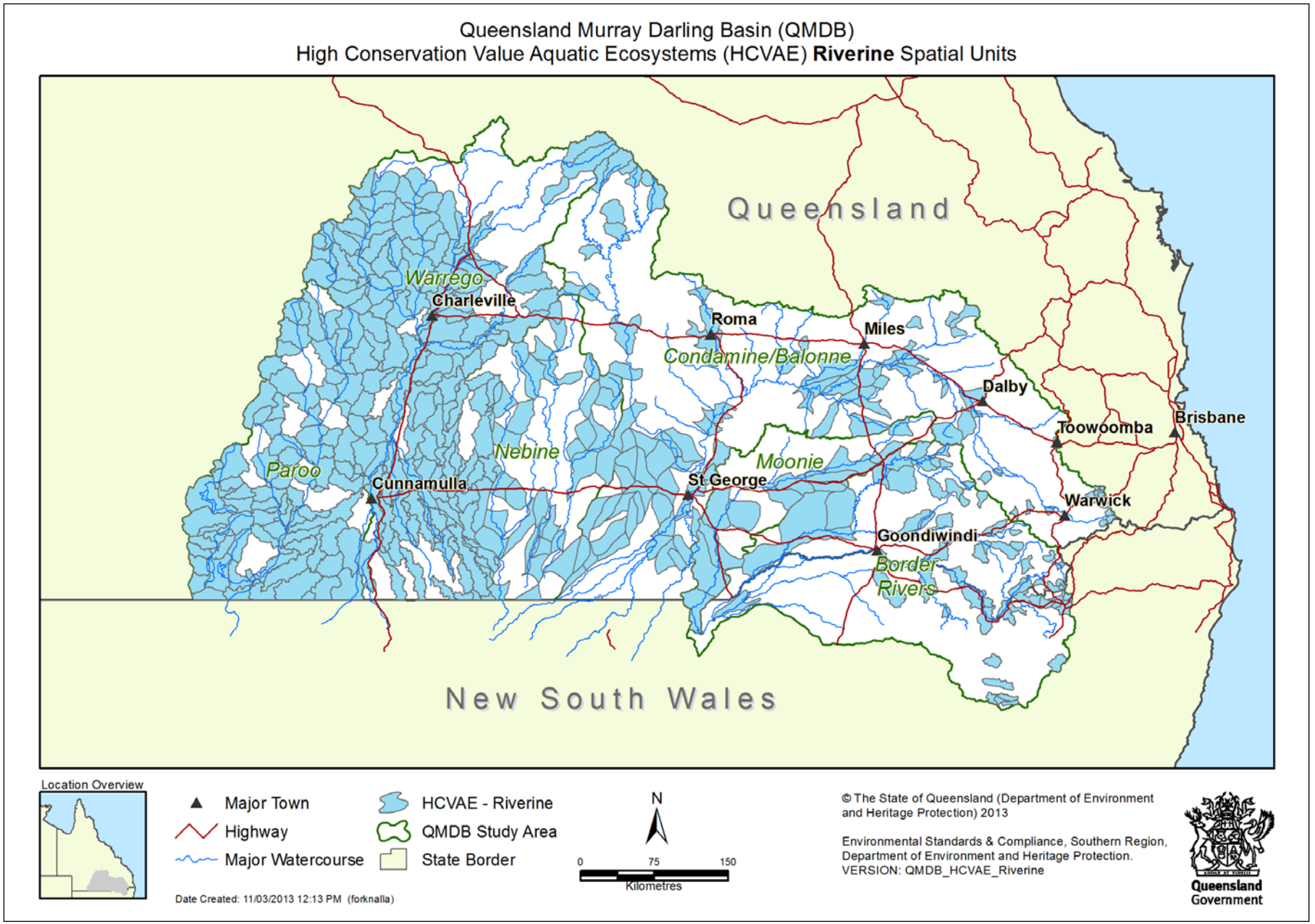

Figure 5. Non-riverine spatial units within QMDB identified as containing HCVAEs based on interrogation of the outputs from the Aquatic Conservation Assessment of the QMDB

Table 3. Number of wetlands meeting the HCVAE criteria in the QMDB

		HCVAE Criteria					Total HCVAE wetlands	Number of all wetlands in catchment
	Catchment	Representativeness	Diversity	Distinctiveness	Vital habitat	Natural-ness		
Riverine	Border Rivers	0	17	22	17	13	58	286
	Condamine Balonne	0	6	29	29	54	98	563
	Moonie	0	9	2	5	3	12	30
	Nebine	0	17	0	1	61	69	118
	Paroo	0	11	0	2	81	85	98
	Warrego	0	14	0	1	116	125	172
	All QMDB	0	74	53	55	328	447	1267
Non-riverine	Border Rivers	69	389	1	294	11	565	891
	Condamine Balonne	93	188	0	172	204	546	1435
	Moonie	45	206	0	6	11	227	312
	Nebine	65	535	0	224	532	767	858
	Paroo	25	1504	0	1340	1633	2454	2602
	Warrego	96	108	0	3	249	317	464
	All QMDB	393	2930	1	2039	2640	4876	6562

5 Discussion

The current project has successfully demonstrated that the AquaBAMM Tool, and the measures and indicators it contains provide an effective platform for the rigorous assessment of HCVAEs. By utilising the outputs from the QMDB ACA project, complemented with specific inventory data collected during the project, this analysis has integrated a range of contemporary data, to both identify wetland sites and regions with data deficiencies and to calculate relative conservation values using accepted metrics. The outputs are arguably one of the most rigorous quantitative applications of the HCVAE to a major drainage basin in Australia.

The project has highlighted some refinement that is required in relation to the existing HCVAE framework. In particular, the lack of defined thresholds and weights for the HCVAE criteria means that there is currently no consistency between regional assessments, with respect to the differentiation and classification of HCVAEs. Additional development of the framework is required to improve the application of the framework for the relative prioritisation of wetlands. Further work is also required to examine the scales at which the HCVAE framework can be applied. Whilst the current project has successfully applied the HCVAE criteria at a catchment scale, it is questionable as to how the criteria might be applied at either a broader national scale or a finer sub-catchment scale.

The species data derived from targeted inventories, undertaken during this project, significantly enhanced/supplemented deficiencies in the data sets used in the aquatic conservation assessment. As such, this data also enhanced the assessment of relative conservation values for wetlands, across the study area. The use of the AquaBAMM tool, to specifically identify areas with poor dependability in species measures, was a new application for the tool, and will assist in informing future survey and inventory effort.

Plant records contributed the most significant source of “new” data derived from the targeted inventory work and more than justified the engagement of specialist botanists to assist in the field work. Whilst the returns for effort associated with other biota sampled during the inventory was less, it is clear that rapid assessment of wetland sites with appropriately trained staff can return significant data in terms of assessing relative conservation value.

The WIP, whilst providing a consistent and standardised template for the collation of inventory data, was not ideally suited to the broad-scale inventory work undertaken during the current project. The lack of a bulk upload facility, within the WIC, meant that individual pro formas had to be completed for the 62 primary sites and 9 sub-sites surveyed during the field work. The entry and uploading process for the pro forma is both repetitive and time consuming for collation of data from multiple sites. In order to successfully upload the data records from the inventory project it was necessary to direct funds to employment of a specific data entry operator.

Whilst the assessment process for HCVAE used in this project was considered rigorous, the HCVAEs identified by these analyses only represent a pilot study in relation to the application of the HCVAE using the AquaBAMM tool. Significant refinement of the queries undertaken during this study, and further development of

the HCVAE framework, would be required to confidently complete a full assessment of HCVAEs for the QMDB.

Overall the project has successfully delivered the following primary outcomes:

- completed inventories of priority wetlands in the QMDB
- comprehensive corporate datasets of the ecological values and fundamental processes that sustain wetlands, and the relative conservation value of the wetlands in the QMDB
- GIS maps and decision support tools delineating and prioritizing wetlands within the QMDB, including the identification of HCVAEs
- preparation of reports and associated maps identifying HCVAEs in the QMDB.

In addition to these primary outcomes the project has resulted in the following unintended or supplementary outcomes:

- engagement and communication with private landholders in relation to the values and management of wetlands
- enhancement of internal Department of Environment and Resource Management (DERM) capacity to undertake rapid inventories of wetlands.

The outcomes of the project will also have implications for several important Queensland planning and policy areas, including:

- the review of management of leasehold land associated with the Delbessie Agreement (Queensland State Rural Leasehold Land Strategy)
- the assessment and conditioning of Coal Seam Gas and coal mining activities in the Southern Surat Basin.

6 Recommendations

1. Further development should be undertaken to enhance the use of the AquaBAMM Tool as a platform for the rigorous assessment of HCVAEs. This would include engaging an expert panel to develop appropriate relative weightings and ranks for each criterion, and to derive a decision filter table to be more specific to the assessment of HCVAEs.
2. Additional development of the HCVAE framework is required to improve the application of the framework to the relative prioritisation of wetlands, including the definition of thresholds and weights, which would provide for a consistent differentiation and classification of HCVAEs.
3. Further work is required to examine the scales at which the HCVAE framework can be applied at a catchment scale. It is questionable as to how the criteria might be applied at either a broader national scale, or a finer sub-catchment scale.
4. Further assessment should be undertaken to support additional targeted inventories in order to enhance/supplement data deficiencies for wetlands.
5. A bulk upload facility should be developed for the WIC to assist in the capture and upload of data from broad-scale inventory programs, covering a number of different wetlands.
6. The HCVAEs identified during the current project should be considered to represent only a preliminary assessment of the HCVAEs for the QMDB.

7 Acknowledgments

This project has benefited significantly from advice, input and support from a long list of dedicated staff, consultants, volunteers and landholders.

This reported was prepared by Geoff Lundie-Jenkins and Brent Tangey and reviewed by Plaxy Barratt, Clare Davies and Darren Fielder. Considerable assistance was provided by Wes Davidson and Jason DeChastel for spatial services and data analysis. The wetland inventory was conducted by Plaxy Barratt and Sonja Wapstra, with various assistants participating on several of the surveys. We thank Paul Grimshaw for his invaluable field expertise, particularly with plant identification, on surveys in the western QMDB. We also thank Rod Hobson, Bruce Lawrie and Rohan Wallace for their knowledge and assistance on various field surveys. Special thanks go to Craig Eddie for providing invaluable site information, and for contributing significant datasets for wetlands in the Nebine catchment. Thanks go to QPWS, for accommodation and assistance in Barakula State Forest, and to rangers Mark and Jenny Handley, for their hospitality, and local knowledge of the Paroo catchment. We are grateful to Birds Australia Southern Queensland for sharing their bird species data for several sites.

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9 Appendices

Appendix 1. Criteria for High Conservation Value Aquatic Ecosystems and examples of attributes, from (AETG 2009)

Criterion	Description	Key attributes for significance as a HCVAE at national level	Attributes – selected examples
1. Diversity	The asset exhibits exceptional diversity of species or habitats, and/or geomorphological features/processes	• diversity of aquatic ecosystem classes or types ➢ incorporate at least three aquatic ecosystem classes, habitats or types within a drainage division that are hydrologically connected and interdependent, usually large scale and with high integrity • species diversity ➢ have a natural species diversity that significantly exceeds the expected diversity within the Drainage division, or ➢ have a high natural diversity of taxa at higher taxonomic levels (genus, family) • diversity of communities ➢ include several or many of the communities typical of that ecosystem class including a diversity of communities significantly above expected diversity for that ecosystem class • diversity of geomorphology ➢ includes several geomorphic features that could provide habitats supporting a species diversity that significantly exceeds the expected diversity within the Drainage division	• High diversity of habitats, communities or species • Important for sustaining significant floodplain habitats and diversity • Diversity of geomorphological features or processes • Important for bio- or geo-diversity at regional or local scales
2. Distinctiveness	The asset is a rare/threatened or unusual aquatic ecosystem, and/or supports rare/threatened species/communities, and/or exhibits rare or unusual geomorphological or hydrological features/ processes and/or environmental conditions, and	• Rare, unusual and/or threatened aquatic ecosystem classes ➢ Threatened aquatic ecosystem classes or habitats will be identified by analysis of key threatening processes, with impacts across a national scale, the rate of progress of change and scale of impact, together with an assessment of pre 1790 distribution of these classes or features • To meet the national level of significance as a HCVAE under this criterion, threatened ecosystem classes or habitats must:	• Species listed under respective legislation as rare, threatened, vulnerable or at risk • Geomorphic features of limited occurrence and/or fragile and vulnerable to stressors • Habitats that are uncommon or specialised in form, character, hydrology

Criterion	Description	Key attributes for significance as a HCVAE at national level	Attributes – selected examples
	is likely to support unusual assemblages of species adapted to these conditions	➢ have been lost to a significant degree within the Drainage Division, or ➢ be an uncommon type that is specifically under threat, resulting in a decline in occurrence or condition within the Drainage Division • Support rare and threatened species and communities ➢ These must meet national thresholds for listing under EPBC, either by their listing under the EPBC Act, or by rigorous application of the EPBC guidelines (criteria and indicator thresholds) • Contain rare or threatened geomorphological or hydrological features ➢ These will be assessed by expert opinion using available data sets. In future, these attributes will be assessed systematically through a regional and classification analysis. To meet the national level of significance under this criterion, the ecosystem classes and features must be rare within the Drainage Division at national level	• Rare or threatened geomorphic, hydrological or ecological features or processes • Conservation dependent (priority) flora and fauna species
3. Vital habitat	An asset provides vital habitat for flora and fauna species if it supports unusually large numbers of a particular natural species, and/or maintenance of specific species at critical life cycle stages, and/or key/significant refugia during times of stress	• A major location for very large numbers of individuals (e.g. 20 000 waterbirds), either of one species or a number of species • Is a location for intensive breeding activity, notably for birds or fish. It may attract species that do not inhabit the area in all life stages, but use the area solely for breeding • A place that is the most utilised by migratory birds at a regional scale • Considered significant for life cycle of some species if it maintains a natural regime of drying and wetting, which is critical for the existence of those species and/or communities • A location that typically sustains aquatic ecosystem species under conditions of stress, as shown by the large numbers of individuals that are attracted to that asset under conditions such as drought • Habitat for large numbers and/or diversity of migratory species	• Provides resources for large numbers of birds for feeding and/or breeding • Important site for fish breeding and/or nursery area • Habitat for priority species or communities • Refugia in time of stress e.g. drought, habitat loss • Stopover or seasonal sites for migratory species • Critical corridor, dispersal or re-colonization route • Habitat for unusually large numbers of particular species

Criterion	Description	Key attributes for significance as a HCVAE at national level	Attributes – selected examples
		(especially EPBC listed)	
4. Evolutionary history	Exhibits features or processes and/or supports species or communities which are important in demonstrating key features of the evolution of Australia's landscape, riverscape or biota, especially in a world context	• Habitat for an unusually high diversity of endemic taxa with limited geographical distribution • Habitat for a diversity of taxa endemic at higher taxonomic levels (genus or above) • Habitat for a group of endemic species suggesting a centre of speciation • Habitat for a sequence of related taxa indicative of evolutionary processes • Habitat for iconic species recognized as 'living fossils', relictual species which appear as key links in evolution • Species that are endemic at high taxonomic level (e.g. order or above) • Habitat for large number of individual endemic species, including hot spots of diversification • Species of worldwide evolutionary significance apparently of great antiquity, having Pangaean or Gondwana origins • Ecosystem morphology or hydrology that demonstrates evolution of Australia's continental landscape	• High percentage of endemic species • Species with Gondwanic affinities or of taxonomic significance • Species demonstrating biogeographic patterns for Australia • Demonstrates hydrological and geomorphological processes important in Australia's landscape history and development
5. Naturalness	The ecological character of the aquatic ecosystem is not adversely affected by modern human activity	• Most components and processes that describe the ecological character of its ecosystem class, or classes, remain close to pre-European condition or in outstanding condition in the drainage division • An asset with all or most of the components and processes that define its ecological character in outstanding condition for the Drainage Division	• Components of the ecosystem are intact • Processes are maintained without modification by human intervention • Exotic species absent or do not appear to alter balance or health of biota • Connectivity maintained between the ecosystem and its water supplies and corridors
6. Representativeness	The asset is an outstanding example of an aquatic ecosystem class to which it	• An asset that is assessed as an outstanding representative example of a particular aquatic ecosystem type, when compared with similar aquatic ecosystems of the same classification in the Drainage Division	• Representative examples of ecosystem types, selecting those in best condition at

Criterion	Description	Key attributes for significance as a HCVAE at national level	Attributes – selected examples
	has been assigned, within a Drainage Division	• An asset may be recognized as a representative HCVAE at a national scale if it is of a spatial scale that illustrates the full characteristics of its class, for example, a river intact from headwater to ocean or major convergence, or an aquatic ecosystem, that responds periodically to cycles of water availability, and is either: ➢ in natural or near-natural condition with the processes that sustain it intact, or ➢ a rare example of such a system on a continental scale	appropriate spatial scale • Representative examples of ecosystem types demonstrating particular adaptations to Australian conditions (variable hydrology, ephemeral systems, salinity)

Appendix 2. Wetlands subject to targeted inventory in the current study

Site ID	Name/nickname	Latitude	Longitude	Survey date	System type
cb_00019Sp	Spring Creek	-28.34744	152.34325	24/02/2010	Riverine
cb_00077FC	Farm Creek	-28.26594	152.31909	25/02/2010	Riverine
cb_00248GG	Glencoe Gilgais	-26.52840	150.76111	8/04/2010	Palustrine
cb_00248SG	Small Glencoe Swamp	-26.52730	150.76805	8/04/2010	Palustrine
cb_00248TT	Tea Tree Swamp	-26.53554	150.76688	7/04/2010	Palustrine
cb_00273BG	Bellara Park Gilgais	-26.52574	150.86661	6/04/2010	Palustrine
cb_00273CC	Charleys Creek	-26.56370	150.87448	7/04/2010	Riverine
cb_00285GP	Goanna Pond	-26.52004	150.83199	7/04/2010	Palustrine
cb_00317BG	Barakula Gilgais	-26.47906	150.49263	21/04/2010	Palustrine
cb_00336DL	Dingo Lagoon	-26.51593	150.49634	21/04/2010	Palustrine
cb_00351SC	Smith Creek	-25.51766	148.27763	4/06/2010	Riverine
cb_w00006	Indian Ocean	-26.32911	150.40030	20/04/2010	Palustrine
cb_w00086	Old Man Lagoon	-26.69002	150.69205	23/04/2010	Palustrine
cb_w00334	Pacific Ocean	-26.38767	150.40445	20/04/2010	Palustrine
cb_w00548	Myrtleville Wetland 1	-25.33668	148.24455	2/06/2010	Palustrine
cb_w00549	Myrtleville Wetland 2	-25.35780	148.23250	1/06/2010	Palustrine
cb_w00551	Myrtleville Wetland 3	-25.33600	148.28300	2/06/2010	Palustrine
cb_w00552	Glendonnell Wetland 4	-25.37200	148.16600	3/06/2010	Palustrine
cb_w00553	Glendonnell Wetland 3	-25.36979	148.18329	4/06/2010	Palustrine
cb_w00555	Glendonnell Wetland 6	-25.37500	148.11600	4/06/2010	Palustrine
cb_w00557	Punchbowl	-25.39631	148.28006	2/06/2010	Lacustrine
ne_00071CS	Coolabah Swamp	-28.33258	146.85709	1/07/2010	Palustrine
ne_00071Ne	Nebine Waterhole of Homestead	-28.26784	146.79488	28/06/2010	Riverine
ne_w00668	Foxes Lake	-28.11638	146.69722	29/06/2010	Palustrine
ne_w00676	Apostlebird Swamp Bendee Downs	-28.11229	146.56554	1/07/2010	Palustrine
ne_w00695	Cane Grass Swamp	-28.14340	146.60785	29/06/2010	Palustrine
ne_w00700	Windmill Swamp	-28.14633	146.67305	29/06/2010	Palustrine
ne_w00709	Emu Swamp Bendee Downs	-28.16296	146.70396	1/07/2010	Palustrine
ne_w00710	Gate Swamp	-28.16081	146.58286	29/06/2010	Palustrine
ne_w00711	Woolshed Lake	-28.16222	146.67442	29/06/2010	Palustrine
ne_w00714	Gidyea Lake	-28.15664	146.61926	29/06/2010	Palustrine
ne_w00726	Turkey Nest Swamp	-28.19561	146.57225	29/06/2010	Palustrine
ne_w00785	Salt Lake	-28.31978	146.91470	30/06/2010	Palustrine
ne_w00790	Dead Tree Swamp	-28.34993	146.90196	30/06/2010	Palustrine
ne_w11741B	Brumby Lake	-28.27321	146.83539	30/06/2010	Lacustrine
pa_00050_36	Besm Wetland #36	-27.91810	144.23375	3/07/2010	Palustrine
pa_w00059	Besm Wetland #8	-27.83466	144.27968	3/07/2010	Palustrine
pa_w00065	Besm Wetland #7	-27.83361	144.26529	3/07/2010	Palustrine
pa_w00069	Besm Wetland #10	-27.84700	144.27400	3/07/2010	Palustrine
pa_w00071	Homestead Lake (#12)	-27.85904	144.26521	3/07/2010	Palustrine
pa_w00087	Lake Bindegolly	-28.09263	144.20070	4/07/2010	Lacustrine
pa_w00193	Fantail Swamp Denevor Downs	-28.01385	144.29396	4/07/2010	Lacustrine
pa_w00199	Nardoo Swamp Denevor Downs	-28.01836	144.30328	4/07/2010	Palustrine
pa_w00254	Brolga Swamp Denevor Downs	-28.04162	144.29749	4/07/2010	Lacustrine
pa_w00273	Wetland #13 Denevor Downs	-28.05318	144.30116	4/07/2010	Palustrine
pa_w00388	Woodswallow Swamp	-28.15100	145.00108	7/07/2010	Lacustrine
pa_w00401	Mud Springs	-28.15295	144.95616	5/07/2010	Lacustrine
pa_w00408	Bunded Swamp	-28.17706	144.96045	7/07/2010	Lacustrine
pa_w00412	Nature Billabong Drive	-28.15969	145.01126	5/07/2010	Palustrine
pa_w00426	Goose Swamp	-28.18488	144.96980	7/07/2010	Lacustrine

Site ID	Name/nickname	Latitude	Longitude	Survey date	System type
pa_w00446	Open Coolabah Swamp	-28.20698	145.09105	5/07/2010	Palustrine
pa_w00490	Lake Uko	-28.27406	144.21919	6/07/2010	Lacustrine
pa_w00528	Gidgee Gilgai Swamp	-28.24181	145.08090	5/07/2010	Lacustrine
pa_w00559	Hakea Swamp	-28.25184	144.28654	6/07/2010	Palustrine
pa_w00564	Long Gidgee Swamp	-28.25700	144.28900	6/07/2010	Palustrine
pa_w00778	Whistling Duck Swamp	-28.35491	144.16980	6/07/2010	Lacustrine
pa_w02217	Koolapitara	-28.86097	144.62198	8/07/2010	Palustrine
pa_w02295	River Coobah Swamp	-28.92101	144.64980	8/07/2010	Palustrine
pa_w02419	Lake Thorlindah	-28.92698	144.76418	8/07/2010	Lacustrine
pa_w02541	Lake Wombah	-28.96832	144.80878	8/07/2010	Lacustrine
pa_w02542	House Lake	-28.95421	144.64359	8/07/2010	Palustrine
pa_w4WN34	Quilpie Road Swamp	-27.82071	144.15614	3/07/2010	Palustrine

Appendix 3. Fauna and flora species identified during inventories at targeted wetlands

Table 4. Fish species identified during targeted wetland inventories

Scientific name	Wetland number										
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00273BG	cb_00273CC	cb_00317BG	cb_00336DL	cb_w00006	cb_w00086	cb_w00334	cb_w00557
Ambassis agassizii							●	●		●	●
Craterocephalus stercusmuscarum										●	
Gadopsis marmoratus	●	●									
Galaxias olidus	●										
Gambusia holbrooki			●	●				●	●	●	
Hypseleotris sp.		●			●			●		●	
Leiopotherapon unicolor						●	●	●		●	●
Melanotaenia fluviatilis								●		●	
Number of species	2	2	1	1	1	1	2	5	1	6	2

Table 5. Amphibian species identified during targeted wetland inventories

Scientific name	Wetland number																		
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00285GP	cb_00317BG	cb_00336DL	cb_w00006	cb_w00086	cb_w00549	cb_w00551	cb_w00552	cb_w00557	ne_00071Ne	ne_w00668	ne_w00676	pa_w00199	pa_w00426
Crinia parinsignifera						●														
Crinia signifera		●																		
Cyclorana brevipes							●													
Cyclorana platycephala			●			●														
Cyclorana verrucosa			●			●														
Limnodynastes fletcheri						●														
Limnodynastes salmini			●		●	●		●	●	●										
Limnodynastes tasmaniensis													●		●					●
Limnodynastes terraereginae						●	●	●	●		●	●		●						
Litoria alboguttata			●		●	●		●	●	●										
Litoria caerulea			●	●		●		●	●	●										
Litoria fallax	●																			
Litoria latopalmata								●	●	●										
Litoria peronii						●				●	●					●				
Litoria rubella										●			●		●			●		●
Litoria wilcoxii	●																			
Mixophyes fasciolatus	●	●																		
Neobatrachus sudellae						●														
Notaden bennettii					●	●											●			
Platyplectrum ornatum			●			●		●		●										
Rhinella marina			●			●	●	●	●	●		●			●					
Uperoleia laevigata						●														
Uperoleia sp.										●									●	
Number of species	3	2	7	1	3	14	3	7	6	9	2	2	2	1	3	1	1	1	1	2

Table 6. Mammal species identified during targeted wetland inventories

Scientific name	Wetland number													
	cb_00273BG	cb_w00086	cb_w00552	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00700	ne_w00710	ne_w00711	ne_w11741Bb	pa_0005036	pa_w00254	pa_w00490	pa_w02295b
Bos taurus			●											
Capra hircus												●		●
Felis catus										●				
Hydromys chrysogaster					●									
Macropus giganteus		●												
Macropus rufus							●	●	●				●	
Oryctolagus cuniculus											●			●
Ovis aries												●		
Sus scrofa				●		●								
Tachyglossus aculeatus	●													
Trichosurus vulpecula	●													
Number of species	2	1	1	1	1	1	1	1	1	1	1	2	1	2

Table 7. Reptile species identified during targeted wetland inventories

Scientific name	Wetland number							
	cb_00248GG	cb_00273BG	cb_00285GP	cb_00336DL	cb_00006	cb_00548	cb_00557	pa_w00069
Amphibolurus burnsi				●				
Carlia pectoralis					●			
Carlia vivax					●			
Chelodina longicollis							●	
Cryptoblepharus virgatus	●		●	●	●	●		
Denisonia devisi		●						
Gehyra dubia				●				
Hemiaspis damelii #		●			●			
Oedura robusta					●			
Tiliqua rugosa aspera								●
Varanus panoptes			●					
Number of species	1	2	2	3	5	1	1	1

Table 8. Bird species identified during targeted wetland inventories

Species	Wetland Number																																																										
	cb_00077FC	cb_00248GG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Acanthagenys rufogularis																				•					•	•				•		•		•		•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•			•		•		
Acanthiza apicalis																										•														•		•											•							
Acanthiza uropygialis																						•												•		•		•		•		•						•		•	•		•				•			
Accipiter cirrocephalus																							•																																					
Accipiter fasciatus																																		•								•								•										
Acrocephalus australis																																	•						•																					
Ceyx azureus	•																																																											
Anas gracilis				•							•									•		•	•	•	•	•	•		•		•	•	•					•	•	•		•				•	•	•		•				•			•		•	•
Anas rhynchotis																						•			•		•		•	•	•		•																											
Anas superciliosa											•					•			•			•	•							•	•	•	•																										•	
Anhinga novaehollandiae																			•												•			•				•	•							•	•			•				•				•		•
Anser anser																					•																											•												
Anthochaera carunculata	•																																																											
Anthus novaeseelandiae			•																									•																						•										
Aprosmictus erythropterus																					•											•																			•									
Aquila audax										•						•			•			•	•						•		•		•				•								•					•						•		•	•	
Ardea ibis																																																		•										
Ardea intermedia																			•												•																	•												
Ardea modesta										•	•								•	•											•	•	•			•		•	•								•			•										•
Ardea pacifica											•					•				•	•		•								•	•	•											•		•	•	•		•		•			•					•
Artamus cinereus																																					•													•								•		
Artamus cyanopterus												•																																																
Artamus leucorynchus																							•																																					
Artamus minor																																								•																				
Artamus personatus																																					•																							
Artamus superciliosus																																		•			•					•		•	•	•	•	•							•	•	•	•		
Aythya australis																														•			•						•											•				•				•		
Barnardius zonarius																				•	•													•														•					•		•	•				
Biziura lobata																							•																																					
Cacatua galerita					•				•	•	•					•			•																																									
Cacatua leadbeateri																																																								•				
Cacatua sanguinea			•																																			•	•									•								•	•		•	
Cacomantis pallidus																																•																												
Certhionyx niger																																		•																			•							
Charadrius ruficapillus																										•																																		
Chenonetta jubata									•	•	•	•										•					•		•	•	•			•	•			•		•		•				•	•			•		•					•	•	•	
Cheramoeca leucosterna																																•																		•										
Chlamydera maculata																																																								•	•			
Chlidonias hybrida																																																		•							•	•		
Chroicocephalus novaehollandiae																																							•											•								•		
Chalcites basalis					•	•																																																						

Species	Wetland Number																																																										
	cb_00077FC	cb_00248GG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Chalcites lucidus										•																																																		
Chthonicola sagittata							•																																																					
Cincloramphus mathewsi																									•				•	•		•			•		•									•		•		•					•	•				
Circus assimilis																																																		•										
Climacteris affinis																																																										•		•
Climacteris picumnus																																•									•			•		•	•			•					•	•				
Colluricincla harmonica		•																		•	•											•										•	•				•	•		•					•	•				
Coracina novaehollandiae					•						•																															•	•				•			•	•									•
Corcorax melanorhamphos							•																																																					
Corvus bennetti																								•																																				
Corvus coronoides		•						•	•			•		•	•				•	•	•	•	•			•					•			•	•			•	•		•	•				•	•		•			•		•		•	•		•	•
Corvus orru	•	•		•	•				•						•	•	•																																											
Corvus sp.																															•																													
Cracticus nigrogularis									•					•		•	•			•		•			•				•	•	•	•	•													•						•	•							
Cracticus tibicen				•	•						•		•		•	•	•		•							•					•	•	•																•		•			•			•	•	•	
Cracticus torquatus					•							•				•			•										•																								•							
Cacomantis pallidus																				•																												•												
Cygnus atratus											•					•			•						•						•	•	•					•	•											•								•		
Dacelo novaeguineae		•		•				•			•	•	•					•	•																																									
Dendrocygna eytoni				•							•											•											•	•				•				•												•						•
Dicaeum hirundinaceum					•			•													•														•	•			•					•		•					•						•			
Dromaius novaehollandiae																						•		•			•	•	•		•	•	•	•	•	•		•						•	•					•	•	•			•	•				
Egretta novaehollandiae																•				•								•			•		•		•		•						•							•				•						•
Elseyornis melanops																						•			•		•			•		•	•		•			•										•		•									•	•
Entomyzon cyanotis													•				•		•																																								•	
Eolophus roseicapillus					•				•		•					•				•		•		•		•				•			•					•	•					•								•				•				
Falco berigora				•																																•	•	•						•		•	•		•											
Falco cenchroides																												•										•																					•	
Falco longipennis																																						•		•		•																		
Fulica atra																•			•				•		•					•		•	•						•											•				•				•		
Gallinula tenebrosa																									•																																			
Gelochelidon nilotica																																						•	•											•							•			
Geopelia cuneata						•																												•	•	•	•	•		•	•					•	•			•					•	•				•
Geopelia striata								•		•	•									•	•																	•					•																	
Gerygone albogularis		•			•			•		•	•																																																	
Grallina cyanoleuca	•	•						•		•	•	•		•	•	•	•		•	•	•	•	•	•		•	•	•	•	•	•	•	•	•			•		•	•		•	•	•		•	•	•		•				•		•	•	•	•	•
Grantiella picta																																					•											•			•									
Grus rubicunda																•		•		•		•								•	•	•						•				•		•		•	•					•					•			
Haliastur sphenurus																•			•				•								•	•	•	•	•			•	•			•		•			•	•		•		•				•	•			
Hieraaetus morphnoides																																•																												
Himantopus himantopus																						•					•	•	•		•		•					•	•											•							•		•	
Hirundo ariel																•																																												

Species	Wetland Number																																																										
	cb_00077FC	cb_00248GG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Hirundo neoxena																							•				•				•		•					•																					•	
Hydroprogne caspia																																							•											•								•		
Lalage sueurii																																					•														•									
Lichenostomus penicillatus											•									•	•				•	•						•			•		•				•			•			•	•	•	•					•	•		•		•
Lichenostomus virescens								•		•																			•	•				•		•			•			•								•		•	•				•	•		•
Lichmera indistincta		•		•				•																											•	•	•					•	•		•		•	•	•		•		•							
Lophochroa leadbeateri																											•																																	•
Macropygia amboinensis	•																																																											
Malacorhynchus membranaceus																						•		•			•		•	•										•		•								•				•			•			•
Malurus lamberti																																		•						•																				
Malurus leucopterus																															•								•																					
Manorina flavigula																						•				•	•		•	•	•		•		•						•		•	•	•	•	•		•	•		•	•	•		•			•	•
Manorina melanocephala	•				•			•	•	•		•	•	•	•		•		•																																									
Melanodryas cucullata																																•																												
Melopsittacus undulatus																																														•				•			•			•				
Microeca fascinans																				•	•									•		•		•											•			•	•		•									
Milvus migrans																																						•	•			•		•		•				•										•
Myiagra inquieta											•	•								•							•					•						•										•												
Myzomela sanguinolenta								•		•																																																		
Nematalosa erebi																					•																																							
Neochmia modesta																							•		•																							•												
Neopsephotus bourkii																																																		•										
Ninox connivens							•																																																					
Ninox boobook						•																																																						
Northiella haematogaster																						•																												•							•			
Nycticorax caledonicus																																															•													
Nymphicus hollandicus									•		•			•				•																																										
Ocyphaps lophotes																			•	•		•								•			•				•	•																		•	•	•	•	
Oreoica gutturalis	•																			•		•										•		•		•		•			•	•	•				•				•	•	•			•			•	
Oriolus sagittatus											•										•																																							
Pachycephala rufiventris								•		•										•			•													•						•									•									
Pardalotus rubricatus																																																			•									
Pardalotus striatus					•	•	•	•	•	•	•		•	•						•		•			•						•		•		•							•			•	•		•												
Pelecanus conspicillatus																			•												•							•									•			•				•		•	•	•		
Petrochelidon ariel																			•													•																												
Petrochelidon nigricans																				•		•	•		•						•	•	•	•						•			•							•										•
Petroica goodenovii																					•	•												•		•						•																•		
Phalacrocorax carbo																																						•	•											•		•			•	•				
Phalacrocorax melanoleucos											•																				•	•																												
Phalacrocorax sulcirostris																			•												•	•	•					•	•								•	•		•										•
Phalacrocorax varius																															•		•						•									•		•					•	•		•	•	

Species	Wetland Number																																																											
	cb_00077FC	cb_00248GG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Phaps chalcoptera					•									•							•																																							
Phaps elegans																•																																												
Philemon citreogularis												•																															•	•		•	•			•	•									•
Philemon corniculatus					•			•		•		•														•																		•		•							•							
Platalea flavipes																					•													•	•				•						•	•	•	•		•				•			•			•
Platalea regia																															•	•						•								•	•	•		•							•			
Platycercus adscitus									•				•			•	•		•																																									
Plectorhyncha lanceolata																								•								•														•														
Plegadis falcinellus																						•									•												•							•									•	
Podiceps cristatus																																							•																					
Pomatostomus ruficeps																																															•									•		•		
Pomatostomus superciliosus																																					•													•										
Pomatostomus temporalis																				•				•						•		•	•												•						•								•	
Porphyrio porphyrio																																•																		•										
Psephotus haematonotus				•																																											•													
Psephotus varius																																•																		•	•			•						
Ptilonorhynchus maculatus																					•																										•													
Purnella albifrons																																																			•									
Recurvirostra novaehollandiae																										•																																		
Rhipidura albiscapa		•					•	•		•																														•								•												
Rhipidura leucophrys			•				•			•	•		•			•				•	•	•	•	•	•	•	•	•		•	•	•		•		•		•	•	•	•		•			•				•	•					•	•	•		•
Rhipidura rufifrons		•																																																										
Smicrornis brevirostris													•																													•			•			•												
Strepera graculina										•		•		•		•								•																																				
Struthidea cinerea				•				•	•			•	•	•				•	•				•	•							•		•					•						•									•							
Sugomel niger																																									•																			
Tachybaptus novaehollandiae											•			•		•			•			•	•		•		•		•				•	•				•	•	•								•												
Taeniopygia bichenovii		•					•				•																																																	
Taeniopygia guttata																				•	•				•					•				•	•	•	•	•	•	•	•	•	•			•		•		•	•	•	•			•	•	•	•	•
Threskiornis molucca											•									•											•	•		•	•			•								•	•	•		•										
Threskiornis spinicollis																•															•	•	•		•				•								•	•		•		•		•					•	
Todiramphus pyrrhopygius																																																	•	•	•									
Todiramphus sanctus				•							•									•			•																																					•
Trichoglossus haematodus										•	•	•																																																
Vanellus miles										•	•					•			•	•		•	•					•		•	•	•					•								•					•			•						•	
Vanellus tricolor																																																											•	
Zosterops lateralis		•					•	•																																																				
Number of Species	7	11	3	10	13	4	8	16	11	19	28	13	9	10	5	23	7	4	24	28	19	27	20	11	16	13	14	8	14	21	36	39	31	25	17	14	18	36	29	16	10	25	14	17	11	27	31	32	9	58	21	15	16	15	11	27	24	24	23	25

Table 9. Plant species identified during targeted wetland inventories

Scientific name	Wetland number																																																												
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Abutilon otocarpum																																																												•		•
Abutilon oxycarpum									•																																																					
Abutilon oxycarpum var. oxycarpum			•			•																																																								
Acacia ammophila																																				•					•				•							•										
Acacia aneura																								•							•	•					•			•			•		•	•	•				•					•				•		
Acacia cambagei																						•														•	•							•	•	•	•		•				•	•	•							
Acacia excelsa							•																																																							
Acacia harpophylla			•			•			•																																																					
Acacia oswaldii																											•					•														•																
Acacia rigens																																																												•		
Acacia salicina																							•																																							
Acacia stenophylla																							•																	•						•	•	•	•			•					•	•	•	•		
Acacia stowardii																																																												•		
Acacia tetragonophylla																																								•	•		•																	•		
Acacia victoriae																																										•																				
Actinobole uliginosum																																																														•
Adiantum aethiopicum	•																																																													
Adiantum hispidulum	•																																																													
Aeschynomene indica															•												•	•		•	•	•	•		•					•				•	•				•		•	•			•	•						
Alectryon subcinereus	•																																																													
Alternanthera denticulata			•	•					•	•																																						•														
Alternanthera nana	•																•																																													
Alternanthera nodiflora																						•			•									•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Alternanthera pungens																							•																																							
Alternanthera sp.			•																																																											
Alyxia ruscifolia		•																																																												
Ammannia multiflora									•	•																											•			•						•		•		•		•		•			•					
Amphipogon caricinus																								•										•																												
Amphipogon caricinus var. caricinus																										•																																				
Amyema congener subsp. Rotundifolia						•																																																								
Amyema quandang																																					•							•																		
Ancistrachne uncinulata						•																																																							
Arabidella eremigena																																				•				•																						
Araucaria bidwillii		•																																																												
Araucaria cunninghamii	•																																																													
Araujia sericifera		•																																																												
Aristida calycina							•																																																							
Aristida contorta																										•		•		•													•		•							•		•	•	•				•		
Aristida holathera																												•			•									•	•											•			•	•						
Aristida jerichoensis																														•																																
Aristida jerichoensis var. jerichoensis																										•																																				
Aristida latifolia																																																								•				•		

Scientific name	Wetland number																																																												
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Aristida leptopoda																										●																																				
Aristida personata																												●																																	●		
Aristida ramosa																																																					●									
Aristida sp.																					●																																									
Arundinella nepalensis							●					●				●																																														
Atalaya hemiglauca																							●																													●							●		
Atriplex muelleri																																																										●		●		
Atriplex spongiosa																																																										●				
Austrostipa ramosissima	●																																																													
Austrostipa verticillata																	●	●		●																																										
Azolla pinnata								●					●																																																	
Bergia sp.																																																														●
Bidens pilosa		●									●							●		●																																										
Blyxa aubertii									●																																																					
Bothriochloa bladhii subsp. bladhii											●						●																																													
Bothriochloa decipiens												●																																																		
Brachyscome ciliaris																																																				●										
Brachyscome ciliocarpa																																						●		●																						
Brachyscome whitei																																																		●												
Bromus catharticus	●																																																													
Brunoniella australis									●																																																					
Bulbine alata																																				●		●																								
Bulbine bulbosa																																				●			●				●						●													
Bulbostylis barbata																																	●			●	●	●										●				●		●								
Bursaria spinosa		●																																																												
Calandrinia ptychosperma																										●	●	●			●			●		●	●	●	●	●					●			●		●		●		●	●	●				●		●
Calandrinia pumila																																																											●			
Callitriche sonderi																																													●																	
Calocephalus platycephalus																																						●																								
Calotis cuneifolia								●				●																									●																									
Calotis hispidula																												●								●																						●				
Calotis lappulacea											●																●																																			
Calotis plumulifera																																																							●							
Capparis lasiantha						●																																																								
Carex inversa			●	●	●	●						●																																																		
Carissa ovata		●			●																																																									
Cassinia laevis		●																																																												
Casuarina cristata										●																																																				
Casuarina pauper			●			●	●		●																																																			●		
Cayratia clematidea	●																																																													
Cenchrus ciliaris											●												●				●								●		●				●										●	●	●		●							
Cenchrus echinatus		●											●																																																	
Centipeda cunninghamii																										●			●		●							●						●								●		●				●				
Chamaesyce drummondii																										●	●	●										●		●						●				●		●		●								
Chamaesyce prostrata																																																										●				
Cheilanthes distans					●																																																									
Cheilanthes sieberi			●																					●		●																																				

Scientific name	Wetland number																																																												
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Chenopodium auricomum																																																										●		●		
Chenopodium melanocarpum																																																				●										●
Chenopodium pumilio			●																																																											
Chloris divaricata																																																					●									
Chloris gayana													●																																																	
Chloris pectinata																									●								●				●															●				●		●				●
Chloris ventricosa																	●									●							●	●	●																											
Chloris virgata											●																																																			
Chrysopogon fallax																																																				●										
Chrysopogon filipes														●																																																
Cirsium vulgare									●																																																					
Cissus antarctica	●	●																																																												
Citrullus colocynthis																																									●							●					●									
Clematis aristata	●																																																													
Commelina diffusa									●			●																																																		
Commelina lanceolata			●																																																											
Convolvulus arvensis																				●																																										
Convolvulus erubescens																																																			●		●		●							
Corymbia tessellaris																																			●																											
Crassula colorata																																				●																										
Cucumis myriocarpus									●																		●																								●	●	●		●	●			●			
Cucumis myriocarpus subsp. myriocarpus																													●												●																					
Cyclospermum leptophyllum		●																																																												
Cymbopogon refractus							●									●																																														
Cynodon dactylon																							●				●													●																						
Cyperus aquatilis																								●																																						
Cyperus betchei subsp. betchei										●				●																																																
Cyperus bifax																				●																																										
Cyperus concinnus				●	●										●													●										●																								
Cyperus conicus var. conicus							●																																																							
Cyperus dactylotes											●																																																			
Cyperus difformis										●		●		●								●					●					●	●		●	●	●		●	●			●	●	●				●	●		●		●							●	●
Cyperus eragrostis		●																																																												
Cyperus exaltatus											●																																					●	●	●		●		●		●	●					
Cyperus flaccidus										●														●																																						
Cyperus gilesii																									●												●																									
Cyperus gracilis															●		●																																													
Cyperus gymnocaulos																																●	●	●																												
Cyperus iria				●	●					●																		●									●			●				●								●		●								●
Cyperus isabellinus			●		●	●		●																																																						
Cyperus leiocaulon																	●																																													
Cyperus nervulosus																								●												●			●	●					●					●		●										●
Cyperus procerus										●																																																				
Cyperus pygmaeus																																				●																		●								
Cyperus rigidellus																						●						●								●																		●								
Cyperus sp.																																			●		●																									

Scientific name	Wetland number																													
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714
Cyperus trinervis			•																												
Cyperus victoriensis					•																										
Dactyloctenium radulans		•														•															
Damasonium minus									•				•									•									
Dianella sp.																															
Dichanthium sericeum						•					•						•								•						
Dichelachne inaequiglumis	•																														
Dichondra repens																		•		•											
Digitaria brownii							•																								
Digitaria ciliaris																•															
Dioscorea transversa	•																														
Diplachne fusca																															
Dissocarpus latifolius																															
Dissocarpus paradoxus																													•		
Dodonaea viscosa subsp. angustissima																												•			
Doodia aspera	•																														
Drosera indica												•												•		•		•			
Dysphania glomulifera																															
Dysphania kalpari																											•				
Dysphania littoralis																															
Dysphania melanocarpa forma melanocarpa																															
Echinochloa colona					•	•				•																					
Echinopogon ovatus		•																													
Eclipta platyglossa								•																							
Einadia hastata									•																		•				
Einadia nutans																															
Elacholoma hornii																															
Elattostachys xylocarpa	•																														
Eleocharis acuta								•														•		•			•	•			
Eleocharis blakeana										•																					
Eleocharis cylindrostachys				•																											
Eleocharis pallens																						•								•	
Elytrophorus spicatus																						•									
Enchylaena tomentosa						•			•																						
Enneapogon gracilis						•																									
Enneapogon polyphyllus																									•						
Enneapogon robustissimus																					•										
Enneapogon sp.																															•
Enteropogon acicularis																															
Enteropogon unispiceus									•																						
Epaltes australis												•																			
Eragrostis alveiformis																•					•										
Eragrostis australasica																								•					•		

Scientific name	Wetland number																													
	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Cyperus trinervis																															
Cyperus victoriensis																															
Dactyloctenium radulans																					•										
Damasonium minus	•								•					•				•			•										
Dianella sp.																	•														
Dichanthium sericeum																					•										
Dichelachne inaequiglumis																															
Dichondra repens																															
Digitaria brownii																															
Digitaria ciliaris																															
Dioscorea transversa																															
Diplachne fusca		•																									•				
Dissocarpus latifolius										•																					
Dissocarpus paradoxus										•	•			•						•								•	•		
Dodonaea viscosa subsp. angustissima			•							•											•				•						
Doodia aspera																															
Drosera indica																					•										•
Dysphania glomulifera	•								•																		•	•			
Dysphania kalpari							•																				•		•		
Dysphania littoralis									•																						
Dysphania melanocarpa forma melanocarpa									•																						
Echinochloa colona																															
Echinopogon ovatus																															
Eclipta platyglossa																															
Einadia hastata																															
Einadia nutans		•								•																					
Elacholoma hornii					•																										
Elattostachys xylocarpa																															
Eleocharis acuta	•	•	•	•					•									•	•								•			•	
Eleocharis blakeana																															
Eleocharis cylindrostachys																															
Eleocharis pallens						•		•				•	•	•				•			•	•	•		•					•	•
Elytrophorus spicatus					•			•	•			•								•											•
Enchylaena tomentosa										•	•		•																		
Enneapogon gracilis																															
Enneapogon polyphyllus									•			•																			
Enneapogon robustissimus																															
Enneapogon sp.																						•	•						•		
Enteropogon acicularis																								•							
Enteropogon unispiceus																															
Epaltes australis																															
Eragrostis alveiformis																															
Eragrostis australasica	•												•	•					•	•	•		•		•		•				

Scientific name	Wetland number																																																												
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Eragrostis basedowii																																			•						•									•	•	•						•	•		•	
Eragrostis brownii				•																•																																•										
Eragrostis cilianensis																•				•																																										
Eragrostis dielsii																																	•				•		•						•		•					•		•	•				•			
Eragrostis elongata																•																																		•												
Eragrostis eriopoda																																						•		•					•					•		•	•		•	•						
Eragrostis kennedyae																						•			•			•								•	•		•	•			•	•	•			•				•		•								•
Eragrostis lacunaria																																				•					•																					•
Eragrostis leptocarpa																										•			•											•																						
Eragrostis leptostachya		•												•	•																																															
Eragrostis microcarpa																																																			•											
Eragrostis parviflora																																	•		•		•			•			•																			•
Eragrostis setifolia																								•		•	•	•		•	•			•	•	•	•	•					•			•	•	•		•	•	•	•		•			•	•			
Eragrostis sororia										•		•					•									•		•								•			•		•									•		•		•								•
Eragrostis spartinoides															•																																															
Eragrostis tenellula																																								•													•						•			
Eragrostis trichophora											•																																																			
Eremophila bignoniiflora																																																										•		•		
Eremophila bowmanii																																						•		•																						
Eremophila debilis									•	•					•																																															
Eremophila deserti																											•							•	•		•				•	•	•	•							•	•		•	•			•	•			
Eremophila divaricata																																																											•			
Eremophila gilesii																												•									•						•																			
Eremophila gilesii subsp. gilesii																																		•																												
Eremophila glabra																										•		•	•						•	•	•														•		•							•		
Eremophila longifolia																						•					•																		•	•						•					•					•
Eremophila maculata																																														•			•		•											
Eremophila mitchellii						•																				•																				•							•							•		
Eremophila polyclada																																																									•					
Eremophila sturtii																																	•			•	•	•			•			•	•		•			•		•		•	•	•		•		•		•
Eriachne aristidea																																							•																							
Eriochlamys cupularis																										•								•																												
Eriochloa pseudoacrotricha																																																	•													
Erodium crinitum																													•																																	
Erodium cygnorum																													•																																	
Eucalyptus argophloia						•	•																																																							
Eucalyptus camaldulensis							•	•			•			•									•	•																									•													
Eucalyptus coolabah																						•												•		•	•	•		•		•	•	•		•			•	•	•							•				•
Eucalyptus largiflorens																																																				•										
Eucalyptus ochrophloia																																														•	•	•	•	•							•	•				•
Eucalyptus populnea						•		•			•			•	•	•					•			•	•	•	•	•	•		•	•	•	•	•	•	•	•				•	•	•	•		•		•	•	•			•		•						
Eucalyptus tereticornis												•	•		•																																															
Euphorbia drummondii																																					•																									
Euroschinus falcatus	•																																																													
Eustrephus latifolius	•																																																													
Evolvulus alsinoides																																																				•										

Wetland number

Scientific name	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557
Fimbristylis dichotoma							•					•									
Flindersia maculosa																					
Frankenia serpyllifolia																					
Gamochaeta americana		•																			
Geijera parviflora			•			•			•												
Geranium solanderi	•	•																			
Glossostigma diandrum																					
Glycine tabacina		•																		•	
Gomphocarpus fruticosus						•															
Gomphrena celosioides					•					•		•									
Goodenia berardiana																					
Goodenia cycloptera																					
Goodenia fascicularis																					
Goodenia glabra							•														
Goodenia gracilis										•											
Goodenia sp.																					
Gratiola pedunculata									•												
Grevillea robusta		•																			
Grevillea striata																					
Hakea leucoptera																					
Hakea sp.																					
Halosarcia pergranulata																					
Harmsiodoxa blennodioides																				•	
Heliotropium curassavicum																					
Heteropogon contortus							•				•						•			•	•
Hybanthus stellarioides		•																			
Hydrocotyle sp.																					
Hydrocotyle tripartita																					
Hypericum gramineum																					
Indigofera hirsuta															•	•	•				
Ipomoea lonchophylla																					
Isoetes muelleri									•												
Isoetes sp.																					
Isolepis hookeriana																					
Juncus continuus																		•			
Juncus subsecundus															•						
Juncus usitatus	•			•				•													
Leersia hexandra										•											
Leptochloa digitata																•					
Leptochloa fusca subsp. fusca				•																	
Leptochloa fusca subsp. muelleri																					
Lipocarpha microcephala																					

Scientific name	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B
Fimbristylis dichotoma					•		•							
Flindersia maculosa														
Frankenia serpyllifolia													•	
Gamochaeta americana														
Geijera parviflora		•												
Geranium solanderi														
Glossostigma diandrum														
Glycine tabacina														
Gomphocarpus fruticosus														
Gomphrena celosioides														
Goodenia berardiana														
Goodenia cycloptera														
Goodenia fascicularis														
Goodenia glabra						•			•					
Goodenia gracilis														
Goodenia sp.			•						•					
Gratiola pedunculata														
Grevillea robusta														
Grevillea striata					•									
Hakea leucoptera														
Hakea sp.														
Halosarcia pergranulata												•		
Harmsiodoxa blennodioides														
Heliotropium curassavicum														
Heteropogon contortus														
Hybanthus stellarioides														
Hydrocotyle sp.														
Hydrocotyle tripartita									•					
Hypericum gramineum														
Indigofera hirsuta														
Ipomoea lonchophylla														
Isoetes muelleri												•		
Isoetes sp.														
Isolepis hookeriana									•					
Juncus continuus														
Juncus subsecundus														
Juncus usitatus		•												•
Leersia hexandra														
Leptochloa digitata														
Leptochloa fusca subsp. fusca												•	•	
Leptochloa fusca subsp. muelleri												•		
Lipocarpha microcephala														

Scientific name	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Fimbristylis dichotoma																	•										
Flindersia maculosa																									•		
Frankenia serpyllifolia																											
Gamochaeta americana																											
Geijera parviflora														•			•										
Geranium solanderi																											
Glossostigma diandrum				•						•																	
Glycine tabacina																											
Gomphocarpus fruticosus																											
Gomphrena celosioides																											
Goodenia berardiana					•																						
Goodenia cycloptera																	•										
Goodenia fascicularis																							•				
Goodenia glabra															•								•				
Goodenia gracilis																											
Goodenia sp.																											
Gratiola pedunculata																											
Grevillea robusta																											
Grevillea striata			•					•					•														
Hakea leucoptera	•					•											•		•				•				
Hakea sp.																•											
Halosarcia pergranulata																											
Harmsiodoxa blennodioides																								•			
Heliotropium curassavicum						•																					
Heteropogon contortus																											
Hybanthus stellarioides																											
Hydrocotyle sp.														•													
Hydrocotyle tripartita																											
Hypericum gramineum	•																•										
Indigofera hirsuta																											
Ipomoea lonchophylla																•											
Isoetes muelleri					•												•										
Isoetes sp.															•												
Isolepis hookeriana																											
Juncus continuus																											
Juncus subsecundus																											
Juncus usitatus													•	•													
Leersia hexandra																											
Leptochloa digitata																											
Leptochloa fusca subsp. fusca								•						•		•					•						
Leptochloa fusca subsp. muelleri																			•								
Lipocarpha microcephala										•																	

Scientific name	Wetland number																													
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714
Livistona australis																							•								
Lobelia darlingensis																															
Lobelia membranacea	•																														
Lobelia stenophylla										•																					
Lomandra longifolia	•						•																								
Lomandra multiflora																					•										
Lonicera japonica		•																													
Lophostemon confertus	•																														
Lotus cruentus																															
Ludwigia peploides											•		•	•				•			•										
Ludwigia peploides subsp. montevidensis							•					•																			
Lysiana exocarpi																															
Maireana georgei																															
Maireana microphylla						•										•														•	
Maireana schistocarpa																															
Maireana sp.																															
Maireana triptera																															
Malva parviflora															•																
Malvastrum americanum																															
Marsilea costulifera																															
Marsilea drummondii																								•				•			
Marsilea mutica												•										•								•	
Marsilea sp.					•										•	•			•								•				•
Medicago polymorpha																															
Megathyrsus maximus		•																													
Megathyrsus maximus var. pubiglumis													•																		
Melaleuca bracteata					•	•																									
Melaleuca densispicata																															
Melinis repens							•																								
Mimulus repens																															
Minuria cunninghamii																												•			•
Minuria denticulata																												•			
Minuria integerrima																						•									
Monachather paradoxus																															
Monochoria cyanea												•																			
Muehlenbeckia florulenta																•						•			•	•		•	•		
Murdannia graminea					•																										
Myoporum acuminatum																															
Myoporum montanum																															
Myriocephalus pluriflorus																												•			
Myriophyllum sp.								•				•												•			•				
Myriophyllum variifolium																						•									
Myriophyllum verrucosum																															
Nicotiana velutina																															
Nitella sp.													•	•										•	•						

Scientific name	Wetland number																													
	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Livistona australis																															
Lobelia darlingensis						•	•				•		•	•	•		•						•				•				
Lobelia membranacea																															
Lobelia stenophylla																															
Lomandra longifolia																															
Lomandra multiflora																															
Lonicera japonica																															
Lophostemon confertus																															
Lotus cruentus										•											•							•			
Ludwigia peploides				•													•	•													
Ludwigia peploides subsp. montevidensis																															
Lysiana exocarpi														•																	
Maireana georgei														•															•		
Maireana microphylla																															
Maireana schistocarpa										•																					
Maireana sp.														•																	
Maireana triptera																													•		
Malva parviflora																															
Malvastrum americanum						•				•	•	•					•			•		•		•	•						•
Marsilea costulifera														•				•													
Marsilea drummondii	•	•	•	•	•			•	•			•	•	•				•	•	•	•	•	•		•					•	
Marsilea mutica				•														•													
Marsilea sp.																															
Medicago polymorpha																												•			
Megathyrsus maximus																															
Megathyrsus maximus var. pubiglumis																															
Melaleuca bracteata																															
Melaleuca densispicata											•																				
Melinis repens																															
Mimulus repens					•								•																	•	
Minuria cunninghamii		•																										•			
Minuria denticulata																															
Minuria integerrima					•	•		•										•						•							
Monachather paradoxus							•																								
Monochoria cyanea				•																											
Muehlenbeckia florulenta	•		•			•					•	•	•	•	•	•	•	•	•	•	•		•				•				
Murdannia graminea																															
Myoporum acuminatum		•				•					•	•																			
Myoporum montanum		•				•																									
Myriocephalus pluriflorus														•							•		•	•			•	•			•
Myriophyllum sp.		•							•												•									•	
Myriophyllum variifolium																															
Myriophyllum verrucosum																					•								•		
Nicotiana velutina							•			•											•							•			
Nitella sp.														•							•										

Scientific name	Wetland number																																																												
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Nymphoides crenata								•				•		•																•					•					•					•																•	
Nymphoides sp.																								•																																						
Nyssanthes diffusa	•																																																													
Oenothera indecora		•																																																												
Opuntia sp.			•				•		•			•	•	•	•	•																																														
Opuntia stricta																				•																																										
Opuntia tomentosa									•																																																					
Ottelia ovalifolia												•		•				•																	•										•																	
Owenia acidula																																																				•								•		
Oxalis corniculata		•																																																												
Oxalis radicans								•																																																						
Pandorea pandorana	•	•																																																												
Panicum decompositum																														•																					•											
Panicum effusum var. effusum																										•					•																															
Panicum queenslandicum													•																																																	
Paraneurachne muelleri																										•																										•			•							
Paspalidium distans			•																																																											
Paspalidium gracile									•																																																					
Paspalidium jubiflorum						•																•																					•			•		•		•							•	•				
Paspalum distichum								•											•		•																																									
Passiflora subpeltata	•	•																																																												
Pellaea falcata	•																																																													
Peplidium foecundum																								•															•						•							•						•				
Peplidium sp.																																								•																						
Persicaria decipiens																																			•																											
Persicaria lapathifolia		•																																																												
Philydrum lanuginosum												•		•																																																
Phyllanthus virgatus																															•						•																									
Physalis ixocarpa		•																																																												
Pimelea elongata																													•																																	
Pimelea simplex subsp. simplex																									•																																					
Pimelea sp.																																			•																											
Pimelea trichostachya																													•																							•										
Plantago debilis																															•																					•										
Plantago turrifera																												•																																		
Plectranthus parviflorus		•							•																																																					
Pluchea rubelliflora																																					•																									
Polycarpaea breviflora																																				•	•																									
Polygonum plebeium																																					•																									
Portulaca filifolia																																					•																									
Portulaca intraterranea																																					•			•						•			•			•	•					•	•	•		•
Portulaca oleracea																																										•																		•		
Portulaca pilosa												•																																																		
Potamogeton tricarinatus						•			•																										•																											

Scientific name	Wetland number																																																													
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Pseuderanthemum variabile	•								•																																																					
Pseudognaphalium luteoalbum																																				•																•										
Pseudoraphis spinescens																																			•																											
Psydrax oleifolia																																			•																											
Pterocaulon sphacelatum																												•						•			•													•		•			•							
Ptilotus leucocoma																																						•																								
Ptilotus polystachyus																																						•														•										
Rhodanthe moschata																																																				•							•			
Roepera apiculata						•			•																																																					
Roepera similis																																																											•			
Rorippa laciniata						•																																																							
Rostellularia adscendens		•										•																																																	
Rotala diandra																																							•																							
Rotala mexicana										•																																																				
Rumex crispus																																																				•										
Salix babylonica		•																																																												
Salsola kali																												•																								•								•		
Salvia reflexa						•																																																							
Santalum lanceolatum																																										•		•											•				•			
Scaevola spinescens																										•																																	•	•		
Schizachyrium sp.																			•																																											
Schoenoplectus dissachanthus																												•	•								•		•					•	•				•			•							•		•	•
Schoenus sp.																																													•																	
Sclerolaena anisacanthoides																																	•																													
Sclerolaena bicornis																													•																										•							
Sclerolaena birchii															•	•						•		•		•	•	•	•	•	•			•	•																		•								•	
Sclerolaena decurrens																																																				•										
Sclerolaena diacantha																																																				•			•							
Sclerolaena lanicuspis																																								•																						
Sclerolaena muricata																																									•										•											
Senecio glossanthus	•																																																													
Senecio murrayanus									•																																																					
Senecio runcinifolius																																				•																•										
Senna artemisioides subsp. filifolia																																																		•												
Senna artemisioides subsp. helmsii																																																							•							
Senna artemisioides subsp. nemophila																															•																															
Senna artemisioides subsp. sturtii																															•																															
Senna artemisioides subsp. zygophylla																										•				•	•					•			•				•								•		•							•		
Setaria surgens												•																																																		
Sida cunninghamii																																								•																						
Sida fibulifera																																									•														•							
Sida platycalyx																																					•			•			•		•							•				•						

Scientific name	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714
Sida rhombifolia															•	•															
Sida rohlenae																															
Sida trichopoda																															
Sigesbeckia orientalis	•																														
Silybum marianum																	•			•	•										
Solanum esuriale																															
Solanum ferocissimum			•			•																									
Solanum parvifolium			•					•	•																						
Solanum sp.																													•		
Soliva pterosperma																												•		•	
Sonchus oleraceus									•																						
Spergularia rubra																															
Spirodela sp.													•																		
Sporobolus caroli																									•	•	•	•			
Sporobolus creber															•																
Sporobolus mitchellii																															
Sporobolus scabridus									•																						
Sporobolus sp.																•															
Stellaria angustifolia					•																										
Stemodia florulenta																															
Stenopetalum nutans																															
Streblus brunonianus	•																														
Swainsona affinis																															
Syzygium australe	•	•																													
Taraxacum officinale		•																													
Tecticornia halocnemoides																															
Tecticornia indica subsp. leiostachya																															
Tecticornia pergranulata																															
Tecticornia pergranulata subsp. divaricata																															
Tetragonia tetragonioides																															
Themeda avenacea																															
Themeda triandra		•															•	•		•	•				•						
Trianthema triquetra																															
Tribulus terrestris																															
Triglochin multifructa														•																	
Triraphis mollis																															
Utricularia aurea													•																		
Vallisneria nana																					•										
Vallisneria sp.																															
Velleia glabrata																															
Verbena aristigera		•				•						•	•		•	•															
Verbena bonariensis																		•													
Verbena officinalis																	•														
Verbena rigida		•																													
Verbena tenuisecta											•						•	•		•											
Verbesina encelioides													•																		
Vittadinia cuneata															•																
Vittadinia sulcata																															

Scientific name	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Sida rhombifolia																															
Sida rohlenae																															
Sida trichopoda																					•			•							
Sigesbeckia orientalis																															
Silybum marianum																															
Solanum esuriale																					•	•									
Solanum ferocissimum																															
Solanum parvifolium																															
Solanum sp.																															
Soliva pterosperma																		•			•										
Sonchus oleraceus																															
Spergularia rubra																											•				
Spirodela sp.																					•										
Sporobolus caroli	•	•	•		•			•	•	•					•	•		•		•				•							
Sporobolus creber																															
Sporobolus mitchellii																											•				
Sporobolus scabridus																															
Sporobolus sp.																															
Stellaria angustifolia																															
Stemodia florulenta						•																									
Stenopetalum nutans									•																						
Streblus brunonianus																															
Swainsona affinis									•																						
Syzygium australe																															
Taraxacum officinale																															
Tecticornia halocnemoides		•																													
Tecticornia indica subsp. leiostachya		•																													
Tecticornia pergranulata										•	•	•																•			
Tecticornia pergranulata subsp. divaricata										•																					
Tetragonia tetragonioides																											•				
Themeda avenacea																				•											
Themeda triandra																					•	•			•						
Trianthema triquetra																	•				•			•					•		
Tribulus terrestris							•																								
Triglochin multifructa																															
Triraphis mollis					•					•											•			•				•			
Utricularia aurea				•																											
Vallisneria nana																															
Vallisneria sp.				•																											
Velleia glabrata									•																						
Verbena aristigera																															
Verbena bonariensis																															
Verbena officinalis																															
Verbena rigida																															
Verbena tenuisecta																															
Verbesina encelioides																															
Vittadinia cuneata																															
Vittadinia sulcata																								•							

Scientific name	Wetland number																													
	cb_00019Sp	cb_00077FC	cb_00248GG	cb_00248SG	cb_00248TT	cb_00273BG	cb_00273CC	cb_00285GP	cb_00317BG	cb_00336DL	cb_00351SC	cb_w00006	cb_w00086	cb_w00334	cb_w00548	cb_w00549	cb_w00551	cb_w00552	cb_w00553	cb_w00555	cb_w00557	ne_00071CS	ne_00071Ne	ne_w00668	ne_w00676	ne_w00695	ne_w00700	ne_w00709	ne_w00710	ne_w00711	ne_w00714
Wahlenbergia communis														•											•						
Wahlenbergia sp.																									•						
Wahlenbergia tumidifructa																															
Walwhalleya proluta						•																									
Wedelia spilanthoides		•																													
Xanthium pungens																															
Xanthorrhoea australis		•																													
Zinnia peruviana		•											•				•														
Zygophyllum apiculatum																															
Number of species	30	38	16	8	13	27	16	13	29	17	14	24	15	14	18	18	15	9	3	14	11	17	10	19	14	26	21	32	16	16	17

Scientific name	ne_w00726	ne_w00785	ne_w00790	ne_w11741B	pa_0005036	pa_w00059	pa_w00065	pa_w00069	pa_w00071	pa_w00087	pa_w00193	pa_w00199	pa_w00254	pa_w00273	pa_w00388	pa_w00401	pa_w00408	pa_w00412	pa_w00426	pa_w00446	pa_w00490	pa_w00528	pa_w00559	pa_w00564	pa_w00778	pa_w02217	pa_w02295	pa_w02419	pa_w02541	pa_w02542	pa_w4WN34
Wahlenbergia communis							•																								
Wahlenbergia sp.																															
Wahlenbergia tumidifructa						•											•				•										
Walwhalleya proluta																															
Wedelia spilanthoides																															
Xanthium pungens		•		•																											
Xanthorrhoea australis																															
Zinnia peruviana																															
Zygophyllum apiculatum																													•		
Number of species	13	27	20	30	35	43	24	19	43	28	15	26	21	37	18	11	21	30	26	28	80	22	28	31	21	8	33	26	34	11	25

Appendix 4. Field survey photographs

Plate 1. Fairy shrimp, *Streptocephalus queenslandicus*, specimen collected from gilgai wetlands north of Chinchilla. This is only the second record for this species in Queensland. Photo: Plaxy Barratt, DERM

Plate 2. Crayfish, *Euastacus sulcatus*, recorded at Main Range, in the headwaters of the Condamine catchment. Species in this genus are nominated as priority species in the QMDB ACA. Photo: Plaxy Barratt, DERM

Plate 3. The rough collared frog *Cyclorana verrucosa* is listed as Near Threatened (Qld NCA). It is a burrowing frog found in heavy soil habitat, emerging only after heavy summer rains. This species was recorded at several gilgai sites north of Chinchilla. Photo: Plaxy Barratt, DERM

Plate 4. The crucifix or holy cross frog, *Notaden bennettii*, is listed as a priority species in the QMDB ACA. This burrowing frog is usually only found after heavy rain. Several individuals were recorded at gilgai sites north of Chinchilla. Photo: Plaxy Barratt, DERM

Plate 5. The waterholding frog *Cyclorana platycephala* was recorded in gilgai wetlands north of Chinchilla. This is a priority species in the QMDB ACA. Photo: Plaxy Barratt, DERM

Plate 6. Several individuals of salmon-striped frog, *Limnodynastes salmini*, were found in gilgai wetlands north of Chinchilla. This is a priority species in the QMDB ACA. Photo: Plaxy Barratt, DERM

Plate 7. The striped burrowing frog *Litoria alboguttata* was recorded in gilgai wetlands north of Chinchilla. This is a priority species in the QMDB ACA. Photo: Plaxy Barratt, DERM

Plate 8. Mountain galaxias, *Galaxias olidus*, were recorded at Main Range. This species has a restricted distribution and is listed as a priority species in the QMDB ACA. Photo: Plaxy Barratt, DERM

Plate 9. Several river blackfish, *Gadopsis marmoratus*, were recorded at a site in Main Range. This is a priority species in the QMDB ACA. Photo: Plaxy Barratt, DERM

Plate 10. Agassiz's glassfish or olive perchlet, *Ambassis agassizii*, is listed as a priority species in the QMDB ACA. This species was recorded in good numbers at 'Pacific Ocean', Barakula State Forest. Photo: Plaxy Barratt, DERM

Plate 11. Grey snake, *Hemiaspis damelii*, is considered an aquatic-dependant reptile in the QMDB ACA and is listed as Endangered (Qld NCA). Several specimens were recorded in or near gilgai wetlands north of Chinchilla. Photo: Plaxy Barratt, DERM

Plate 12. DeVis' banded snake, *Denisonia devisi*, is considered an aquatic-dependant reptile in the QMDB ACA. Several specimens were recorded in or near gilgai wetlands, north of Chinchilla. Photo: Plaxy Barratt, DERM

Plate 13. Common nardoo, *Marsilea drummondii*, listed as a priority species in the QMDB ACA, was flourishing at many sites due to good rainfall events throughout 2010. Photo: Plaxy Barratt, DERM

Plate 14. Lignum, *Muehlenbeckia florulenta*, provides the dominant understorey at this palustrine wetland west of Eulo. Lignum provides important habitat and is critical to several species of waterbirds for nesting.
Photo: Paul Grimshaw

Plate 15. A number of waterbird species were recorded breeding at survey sites. A pair of black swans, *Cygnus atratus*, was seen with cygnets on 'Brumby Lake', in the Nebine catchment. Photo: Paul Grimshaw

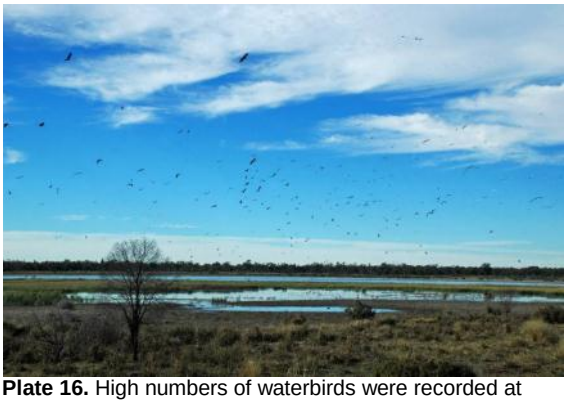

Plate 16. High numbers of waterbirds were recorded at several sites, seen here taking flight at this freshwater palustrine wetland in the Nebine catchment. Photo: Paul Grimshaw

Plate 17. Charley's Creek was one of the few riverine wetland sites surveyed.

Plate 18. Tannin-stained gilgai wetlands in Brigalow woodland, north of Chinchilla. Gilgai site surveys recorded an abundance of threatened and priority species, particularly frog and reptile species. Photo: Plaxy Barratt, DERM

Plate 19. Gilgai wetlands in Brigalow woodland regrowth, Barakula State Forest. These sites contained a high diversity of macrophyte species. Photo: Plaxy Barratt, DERM

Plate 20. 'Indian Ocean' at Barakula State Forest supported an abundance of aquatic-dependant flora. Photo: Plaxy Barratt, DERM

Plate 21. Freshwater palustrine wetland, 'Old Man Lagoon', near Chinchilla. Photo: Plaxy Barratt, DERM

Plate 22. Flooded lacustrine wetland at a homestead in the Paroo catchment. Extensive flooding during 2010 prevented access to many sites for much of the project period. Photo: Plaxy Barratt, DERM

Plate 23. A variety of aquatic-dependant flora species occurred at 'Brumby Lake' in the Nebine catchment. Photo: Plaxy Barratt, DERM

Plate 24. Freshwater palustrine wetland in the Nebine catchment, dominated by sedges, ***Eleocharis*** spp. This site had prolific waterbird numbers, including many juveniles. Photo: Plaxy Barratt, DERM

Plate 25. Sunset at Lake Wombah, a large saline lacustrine wetland in the Paroo catchment. This site had a diverse variety of fringing terrestrial flora, and abundant waterbirds, including several thousand Eurasian coot, *Fulica atra*. Photo: Paul Grimshaw

Plate 26. An active artesian mound spring, west of Eulo. Photo: Paul Grimshaw

Plate 27. Threats and disturbances were noted at sites when present. Extensive feral pig diggings were recorded throughout much of this Coolabah swamp in the Nebine catchment. Photo: Plaxy Barratt, DERM