

# Western Australian wetland inventory series

## Project summary: *Geomorphic Wetlands Cervantes Eneabba* Stage 1 project



Department of Environment and Conservation



**Australian Government**  
**National Water Commission**



GOVERNMENT OF  
WESTERN AUSTRALIA

Department of **Environment and Conservation**  
Department of **Water**

## Project summary: Cervantes Eneabba Stage 1 wetland mapping project.

### Introduction

This document summarises the Cervantes Eneabba Stage 1 wetland mapping project. This project encompasses the development and application of wetland identification, delineation and classification methodologies to the project area, as outlined in Table 1.

Table 1: Forms of inventory applicable to project

Form of inventory	Methodology	Application
Identification	✓	✓
Delineation	✓	✓
Classification	✓	✓
Evaluation	✗	✗

The project data is presented in the *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset and its associated metadata statement (*Metadata statement: Geomorphic Wetlands Cervantes Eneabba Stage 1 dataset*) (Department of Environment and Conservation 2010).

The mapping was conducted by V & C Semeniuk Research Group (VCSRG) in 2006 using information sources such as hard copy 1:25,000 stereoscopic aerial photographs and topographic maps. Wetland boundaries were traced by superimposing transparent sheets (overlays) on top of 1:50,000 orthophotos. A limited amount of wetlands were visited in the field by VCSRG to groundtruth desktop outputs. The wetlands depicted on these overlays were then digitised by Department of Water (DoW) to produce a draft dataset in 2006 (DoW 2006).

VCSRG concurrently evaluated (assessed the values) these wetlands, however, the evaluation methodology and data has not been included in this project and it is not an attribute of the dataset.

A total of 458 wetlands were mapped in the project area comprising 16,594 ha of mapped wetland extent (approximately 4.6% of total project area).

### Project area

The project area of the *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset ('dataset') coincides with relevant borders of 1:25,000 and 1:50,000 map sheets (Figure 1). It is within the shires of Dandaragan, Coorow and Carnamah on the Midwest coast of Western Australia. It is located partially on the Swan Coastal Plain and partially on the Geraldton Sandplains, in the vicinity of Cervantes, Eneabba and Badgingarra town sites. The project area is approximately 360,000 ha, which is based on the land area encompassed by seven 1:50,000 map sheets and twenty eight 1:25,000 map sheets (Figure 1).

### Project scope

The project scope was to identify, delineate and classify natural wetlands with the following landforms: basins, flats, slopes and highlands. The wetland types shaded in Table 2 are within the scope of the project.

Channel wetlands (rivers, creeks, troughs and wadis), beaches, wetlands on offshore islands, subterranean and artificial wetlands were not within the scope of the project and are not included within the dataset. The Department of Environment and Conservation (DEC) cannot guarantee that all natural wetlands with basin, flat and slope landforms within the project area have been identified in the dataset, and advises that the extent of mapping should be confirmed at the time of use of the data.

Table 2: Geomorphic wetland types formed by combining landform and hydroperiod attributes (after Semeniuk & Semeniuk 1995)

Hydroperiod	Landform				
	Basin	Channel	Flat	Slope	Highland
Permanent Inundation	Lake	River			
Seasonal Inundation	Sumpland	Creek	Floodplain		
Intermittent Inundation	Playa	Wadi	Barlkarra		
Seasonal waterlogging	Dampland	Trough	Palusplain	Paluslope	Palusmont

The number of each wetland type is provided in Table 3.

Table 3: The number of wetlands mapped, by type, in the project area

Wetland type	Number	Percentage of total
Dampland	131	28.6
Sumpland	112	24.4
Playa	83	18.1
Palusplain	31	6.7
Paluslope	29	6.3
Barlkarra	26	5.6
Not classified	32	5.8
Floodplain	12	2.6
Lake	2	0.4
<i>Total</i>	<i>458</i>	<i>100</i>

### Scale

The *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset is suitable for viewing at a scale of 1:50,000. Wetlands were originally identified using 1:25,000 scale source data and subsequently digitally captured at a 1:50,000 scale.

As the mapping was conducted at a 1:50,000 scale, there are wetlands in the project area not included in the dataset as they are too small in size to be detected as individual entities at this scale. It should also be noted that the geomorphic classification attributed to each wetland is based on landform and associated hydroperiod identifiable at a scale of 1:50,000. Mapping conducted at smaller scales may further refine the boundary and attributed classification of a wetland.

### Wetland mapping stage

The Wetlands Coordinating Committee, with the advice of its Wetland Status Working Group, has determined that the *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset fulfils the requirements of a Stage 1 mapping project as defined in the *Framework for mapping, classification and evaluation of wetlands in Western Australia* (DEC 2007). The recognition of the dataset as a Stage 1 mapping product indicates that it is a broad baseline wetland inventory (as highlighted in Table 4). While the dataset is commensurate with Stage 1, some elements of the project were recognised as exceeding Stage 1 requirements. These include the use of aerial photography to delineate wetlands, the 1:50,000 scale of capture and the classification of wetland types using the geomorphic classification system.

In order to be considered for endorsement as a Stage 2 product, additional information such as more detailed methodologies for wetland identification and delineation, and detailed

methodologies plus data for the field assessment of positional accuracy, attribute accuracy and inclusiveness are required.

It should be noted that:

- the suitable viewing scale of the dataset is 1:50,000;
- not all wetland types are mapped;
- the inclusiveness (percentage of wetland area mapped) of the mapped types is unknown; and
- significant groundtruthing of the accuracy of the identification, delineation and classification has not been conducted.

The full description of dataset limitations is outlined in the following section.

Table 4. Primary stages of wetland mapping adapted from DEC (2007).

Stage	Purpose/objective	Scale	Approach	Mapping	Mapped classification	Outcome
1	Broad wetland distribution	Regional	Reconnaissance Desktop 'Drive by'	Satellite imagery, aerial photographs, topography Map 'centroid' or approximate boundary 1:250,000 to 1:100,000 scale	Wetland vs. dryland	Quantify wetland resource
2	Asset evaluation, priority setting	Group of wetlands	Field sampling of sub-set and extrapolation of information	Aerial photograph. Precise or approximate boundaries 1:50,000 to 1:10,000 scale	Geomorphic wetland type	Preliminary evaluation and prioritisation for future detailed assessment
3	Protection, management, environmental impact assessment	Individual	Individual wetland assessment in field	Aerial photographs (stereoscopic analysis). Precise boundaries 1:25,000 to 1:5,000 scale	Geomorphic wetland type	Identification of values of individual wetlands as basis for protection, management and/or nomination.

## Dataset Limitations

### *Completeness (wetland types mapped)*

The identification of natural wetlands with basin, flat and slope landforms were within the scope of this project. Wetlands with channel landforms (rivers, creeks, wadis and troughs), beaches, wetlands on offshore islands, estuaries, subterranean and artificial wetlands were not in the scope of this project.

### *Inclusiveness (percentage of wetland area mapped)*

No data is available on the inclusiveness of wetlands within the scope of the project (i.e. how many wetlands within the scope of the project that have been missed). Wetlands may not have been identified as they are too small in size to be detected at the scale at which mapping was undertaken, or other reasons, and therefore may be missing from the dataset entirely or combined with other wetland polygons. The minimum wetland polygon size is 823 m<sup>2</sup> (0.08 ha); however this is not consistent across the project area or by wetland type. It is likely that there are natural wetlands of basin, flat and slope landform of a size suitable for the viewing scale within the project area that have not been mapped. Seasonally waterlogged wetlands (e.g. damplands, palusplains, paluslopes and palusmonts) as well as intermittently inundated wetlands (e.g. playas, barkarras) are more likely to be underrepresented because they are more difficult to detect using the methods applied.

During the review of the draft dataset (described in 'Dataset development' below), a number of wetlands with basin landforms in the north of the project area were added to the dataset. These are wetlands listed in *A Directory of Important Wetlands in Australia* (Environment Australia 2001). Due to a limitation in resources, flow areas between these basins and a thorough review of the rest of the project area was not possible.

*Positional accuracy (boundary precision)*

Quantified positional accuracy of mapped boundaries is not available. Boundaries of wetlands are approximate and to be used at a scale of 1:50,000.

Both delineation and digitisation processes may generate positional inaccuracy. The extent to which these inaccuracies have been minimised within the Cervantes Eneabba mapping is not documented, nor is any verification of positional accuracy available; therefore the accuracy of the wetland boundaries provided in this dataset is unknown.

A detailed methodology used for delineating wetland boundaries within the dataset is not documented. In addition the methodology and results of any on-ground verification during the 2006 mapping phase of the project has not been reported. DEC has not subsequently assessed the positional accuracy as this was beyond the scope of the project DEC was funded to undertake in 2010.

Any positional inaccuracy is likely to have been compounded by the digitisation process as the creation of digital data from the original hard copy data involved separate operators. Subsequent quality control was undertaken by a third party (DEC 2010) four years after the digitisation process.

Use of the dataset overlaid on up-to-date aerial photography may indicate wetland boundaries that are skewed.

*Attribute accuracy (applied attributes)*

Attribute accuracy refers to the accuracy of information attributed to each wetland in the dataset (e.g. wetland type). No data exists in regards to the accuracy of each classification. VCSRG (2006) report that aerial photography, published or database information as well as limited field work was undertaken to verify attributes. The attributing of wetland type should be taken as a guide only.

Wetlands were classified according to the prevailing hydrological conditions at the time. This classification may need to be re-examined if hydrological conditions are altered by irreversible anthropological effects or by cyclic climatic variability.

*Temporal resolution*

The temporal resolution of the information used to determine wetland boundaries and classification is 10 years, based on dates of aerial photography used (1996–2006). The mapping may therefore underestimate or overestimate wetland extent or hydroperiod over a longer climatic period.

**Funding**

The mapping was funded through the Natural Heritage Trust. The development of the draft dataset was initially managed by Department of Environment (DoE) and Northern Agricultural Catchments Council (NACC) and subsequently, following restructuring of government departments, by DoW.

A review of the draft dataset was conducted by DEC and DoW in 2010. DEC Wetlands Section managed the review project and the development of the final dataset with funding from DoW through the National Water Commission's Groundwater Action Plan Fund.

## **Dataset development**

V & C Semeniuk Research Group (VCSR) conducted the mapping in 2006 and produced polygons and attribute information on overlays. This information was then digitised by Department of Water (DoW) GIS Branch to produce a dataset, the draft *Geomorphic Wetlands Cervantes Eneabba* dataset (DoW 2006).

A limited amount of wetlands were visited in the field by VCSR to groundtruth desktop outputs. Quantified positional accuracy of mapped boundaries is not available.

In 2010 the draft dataset was reviewed by DEC and DoW to ensure it accurately reflected information depicted on the VCSR overlays. The methodology and results of this review are documented in *Review of the digitisation of the Geomorphic Wetlands Cervantes Eneabba dataset DoW 2006* (DEC and DoW 2010 unpublished). A revised dataset was developed which incorporated changes that included the correction of previously incorrectly digitised boundaries and wetland types, the correction of duplicate wetland numbers and correction of geometry errors. Wetlands that were attributed a classification based on anthropogenic alteration to the wetlands (e.g. artificial lakes and palusvales in the project area) were re-attributed a classification of 'not classified' to ensure consistency with the project scope. A number of wetlands listed in the *Directory of Important Wetlands in Australia* (Environment Australia 2001) ('DIWA') that were not identified on the overlays were also added to this revised dataset. The resulting product is the *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset (DEC 2010).

It is important to note that this review did not review the accuracy of the wetland identification or delineation undertaken. Hence, no data is available on wetland extent that may not be identified in the dataset and VCSR overlays.

## **Endorsement**

The *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset (DEC 2010) and associated metadata statement has been endorsed by:

- Department of Environment and Conservation
- Department of Water
- Wetland Status Working Group of the Wetlands Coordinating Committee
- Wetlands Coordinating Committee

## **Associated datasets**

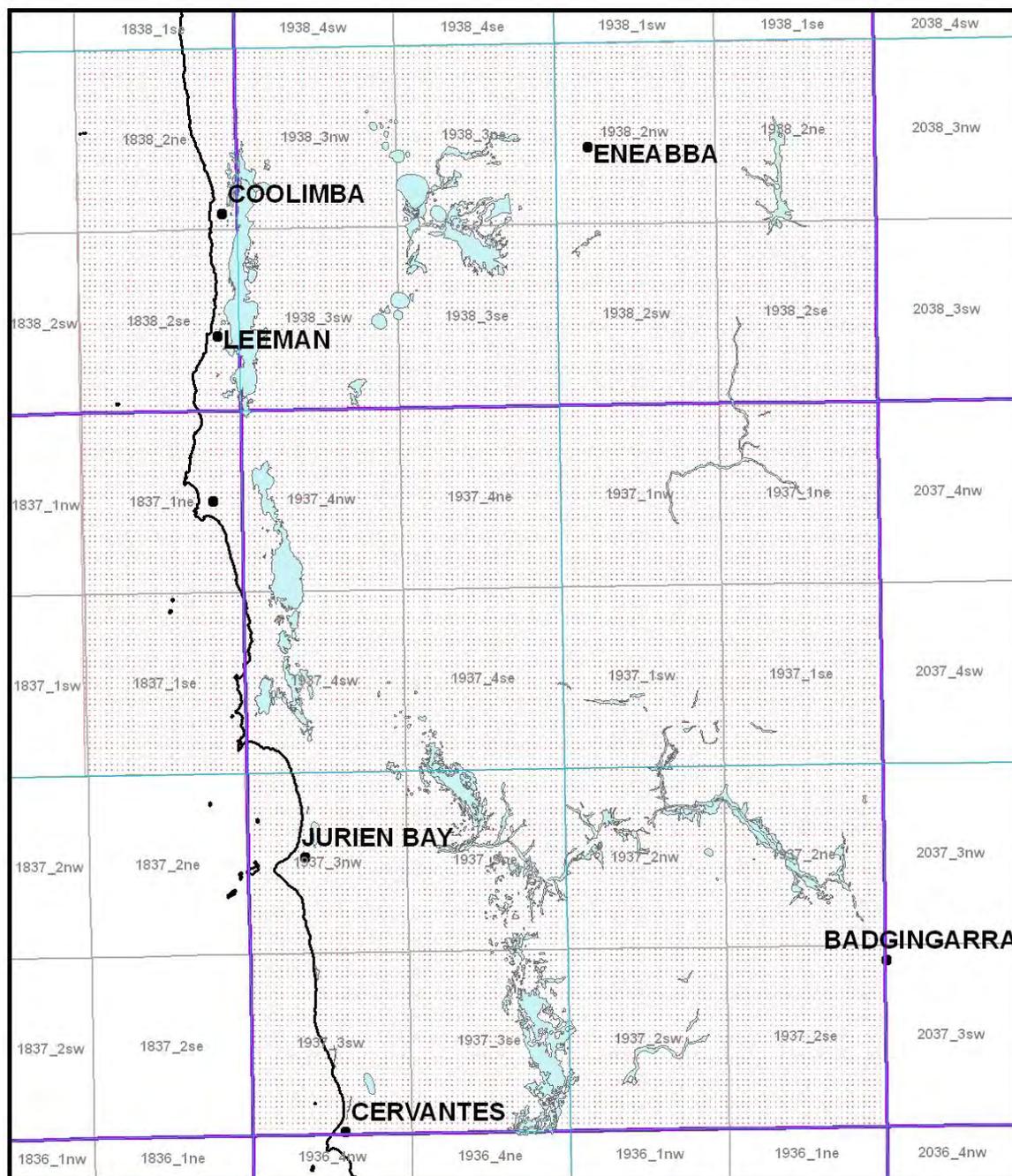
The southern boundary of the *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset coincides with the northern boundary of the *Geomorphic Wetlands Cervantes South Stage 2* dataset (DEC 2010). These projects had very differing scopes thus the datasets should not be considered to be an extension of each other. In particular, the *Geomorphic Wetlands Cervantes South Stage 2* dataset (DEC 2010) is suitable to be viewed at a scale of 1:25,000 and has some data available for positional accuracy, while the *Geomorphic Wetlands Cervantes Eneabba Stage 1* dataset is suitable to a scale of 1:50,000 with no related data on positional accuracy.

## **Recommended reference**

The recommended reference for this publication is: Department of Environment and Conservation (2010), *Project summary: Cervantes Eneabba Stage 1 wetland mapping project*. Department of Environment and Conservation, Western Australia.

## **Custodial information**

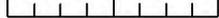
The Principal Coordinator of the Wetlands Section, DEC is the custodian of this dataset. For more information on the project or dataset, contact DEC Wetlands Section on 9334 0333.



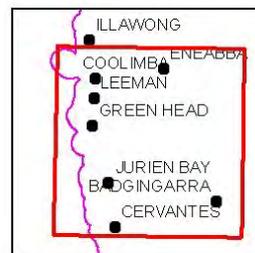
**Legend**

-  Project Area
-  Geomorphic Wetlands Cervantes Eneabba
-  1:100,000 mapsheets
-  1:50,000 map sheets
-  1:25,000 mapsheets
-  WA Townsites

0 3.5 7 14 Kilometers




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**Figure 1: Geomorphic Wetlands Cervantes Eneabba project area.**