***A methodology for the evaluation of wetlands on the Swan Coastal Plain, Western Australia***

**Wetland evaluation desktop and site assessment form**

The *Wetland evaluation desktop and site assessment form* has been designed to simplify the collection and processing of information required to complete a wetland evaluation on the Swan Coastal Plain. The form includes a general information section and two questionnaires:

* 1. Preliminary desktop and site assessment questions: complete prior to commencement of the preliminary evaluation.
	2. Full site assessment questions: complete if the preliminary evaluation indicates that a secondary evaluation is required. The full site assessment questions should be completed before commencing the secondary evaluation. **It is important** that the information provided justifies the scoring of the selected evaluation criteria.

Information sources to assist in the collection of wetland data are outlined in Appendices B and D.

**GENERAL INFORMATION**

**Assessor details**

Name/s:

Date/s of site visit:

Agency/Company:

Contact number:

Email address:

Weather during site visit:

**Land ownership and contact details**

Landowner:

Land manager (if different to owner):

Consultant (if applicable):

Contact for site visit:

Landowner permission received for site access: yes / no

Landowner consent to a mapping review has been provided: email / letter

**Property details**

Location (e.g. lot, street, suburb):

Latitude and longitude/MGA:

**Wetland details**

Name:

Unique feature identifier number/s:

Hill *et al.* (1996) map sheet number and wetland identification number/s (WIN):

Consanguineous suite:

Area (hectares) of the wetland:

Area (hectares) subject to this evaluation:

Is the wetland being assessed as a portion of a wetland with varying areas of value: yes / no.

Mapped management category: Conservation / Resource Enhancement / Multiple Use.

Wetland type:

|  |  |
| --- | --- |
| **Hydrology** | **Host landform** |
| Basin | Flat | Slope | Channel |
| Marine / tidal influence | Estuary - waterbody | Estuary - peripheral |  | Estuary - waterbody |
| Permanent inundation | Lake |  |  | River |
| Seasonal inundation | Sumpland | Floodplain |  | Creek |
| Seasonal waterlogging | Dampland | Palusplain | Paluslope |  |

**PRELIMINARY DESKTOP AND SITE ASSESSMENT QUESTIONS**

**Land uses**

Current ownership of wetland: private / local government / other government

Current land use:

Past land use:

Surrounding land use:

Existing management:

Fire history / regime:

**International, national or regional significance**

Indicate whether the wetland is identified (permanent or interim) on one of the following international, national or state registers or listings.

|  |  |
| --- | --- |
| **Conservation significance** | **Y/N** |
| *Ramsar Convention on Wetlands* (UNESCO 1971) |  |
| *Directory of Important Wetlands in Australia* (Environment Australia 2001) |  |
| *Conservation Reserves for Western Australia Systems 1, 2, 3, 5* (Department of Conservation and Environment, 1976) |  |
| *Conservation Reserves for Western Australia, The Darling System – System 6* (Department of Conservation and Environment, 1983) |  |
| *A Systematic Overview of Environmental Values of the Wetlands, Rivers and Estuaries of the Busselton – Walpole Region* (Pen 1997) |  |
| *The Environmental Significance of Wetlands in the Perth to Bunbury Region* (Le Provost *et al.* 1987) |  |
| *Bush Forever* (Government of Western Australia 2000) |  |
| *Swan Bioplan* (Environmental Protection Authority 2010a) |  |
| *Environmental Protection (Western Swamp Tortoise Habitat) Policy Approval Order 2002* |  |
| Conservation estate (e.g. national park, nature reserve, A class reserve) |  |
| Other (list): |  |

Does the wetland retain the values for which it was originally registered or listed, describe:

**Fauna**

Note the presence (recorded or observed) or evidence of fauna within and one kilometre surrounding the wetland that is listed by the Australian Government (e.g. *Environment Protection and Biodiversity Conservation Act 1999, CAMBA, RoKAMBA, JAMBA*) or State (e.g. threatened or specially protected fauna under the *Wildlife Conservation Act 1950*) or priority fauna or, priority or threatened ecological communities related to fauna which are listed by the Department of Biodiversity, Conservation and Attractions (DBCA).

|  |  |  |  |
| --- | --- | --- | --- |
| **Species / name of ecological community** | **Significance** (e.g. *EPBC Act, CAMBA)* | **Observations** (e.g. population size, age, evidence, activities, habitat requirements) | **Source of information** (e.g. observation, literature, DBCA) |
|  |  |  |  |
|  |  |  |  |

**Scientific value**

List any scientific values including geoheritage or geoconservation values that the wetland may contain (e.g. important sediments or geological features, fossils, pollen records, stromatolites, thrombolites, evidence of evolutionary processes, evidence of a change in climate, unique flora or fauna adaptations).

|  |  |  |
| --- | --- | --- |
| **Scientific, geoheritage or geoconservation values**  | **Significance and observations** | **Source of information** (e.g. observation, literature, DBCA, WA Museum) |
|  |  |  |
|  |  |  |

**Flora**

Use aerial photography and a site visit to determine the condition of the vegetation within and 50 metres surrounding the wetland. Using the *Bush Forever* vegetation condition scale (Appendix B) provide a map delineating the vegetation condition within the wetland and calculate the percentage area.

|  |  |  |
| --- | --- | --- |
| **Vegetation condition** | **Total area (%) within the wetland** | **Area (%) 50 metres surrounding the wetland** |
| Pristine |  |  |
| Excellent |  |  |
| Very good |  |  |
| Good  |  |  |
| Degraded  |  |  |
| Completely degraded |  |  |

Using this information is the wetland dominated by vegetation in a good or better condition: yes / no

What vegetation complex (Heddle *et al.* 1980) does the wetland belong to:

Using the information sources outlined in Appendix B, what extent of the vegetation complex is remaining on the Swan Coastal Plain: < 10% / 10-30% / >30%

List any occurrences of priority and threatened ecological communities related to flora and wetland systems which are known to occur within and five kilometres surrounding the wetland. If they are located within or adjacent to the wetland display their boundary in the attached map.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of ecological community** | **Significance** (e.g. priority, threatened) | **Observations**(e.g. condition, area, habitat type) | **Source of information** (e.g. observation, literature, DBCA) |
|  |  |  |  |
|  |  |  |  |

List any occurrences of declared rare flora or priority flora known to occur within and one kilometre surrounding the wetland and display their location in the attached map.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species** | **Significance**(e.g. declared rare, priority 1) | **Population measure** (number, abundance comment) | **Observations** (e.g. habitat type, flowering season) | **Source of information**(e.g. literature, DBCA, surveyed population, Herbarium record) |
|  |  |  |  |  |
|  |  |  |  |  |

**Representativeness**

Using the data in Appendix D record the corresponding area.

|  |  |
| --- | --- |
|  | **% area** |
| What is the % area of wetlands with the same classification assigned a Conservation management category on the Swan Coastal Plain (Table 7) |  |
| What is the % area of wetlands in the same consanguineous suite assigned a Conservation management category (Table 8) |  |
| What is the % area of wetlands with the same classification in the same consanguineous suite assigned a conservation management category (Table 9) |  |

Is the wetland rare? (e.g. only wetland in its consanguineous suite, best wetland example in its consanguineous suite or region, only Conservation management category wetland in the consanguineous suite or region, primary saline wetland within a consanguineous suite predominated by freshwater):

**Photographs and maps**

The following material should be submitted:

* on-ground colour photographs of the wetland from all directions, including within the wetland core, across the wetland boundary and across lot boundaries showing:
	+ all vegetation units throughout the wetland
	+ the range of vegetation condition across the wetland
	+ any other relevant features of the wetland, including any alterations to geomorphology (e.g. drains, fill)
* a clear, recent (i.e. less than two years old, if available) colour aerial photograph/s of the area (with the date noted), overlaid with the following:
	+ the current wetland mapping with the location and direction of photograph points illustrated
	+ the current and proposed wetland mapping, including wetland boundaries and management categories
* a description and map of the vegetation units and condition in accordance with a reconnaissance survey (Environmental Protection Authority 2016).

**FULL SITE ASSESSMENT QUESTIONS**

**Geomorphology**

What geomorphic unit does the wetland belong to (e.g. Pinjarra Plain, Bassendean Dune):

Can all areas of the wetland be visited? yes / no. Comment:

Describe the wetland’s surface soil (e.g. peat, quartz sand):

What is the slope of the wetland: flat / gentle undulations / steep banks / other

Indicate whether any of the following human induced alterations have occurred to the wetland’s geomorphology.

|  |  |
| --- | --- |
| Human induced alterations | Y/N - describe |
| fill |  |
| excavation |  |
| partition |  |
| alienation along boundaries |  |
| damming |  |
| structural control |  |
| mining |  |
| dredging |  |
| drains |  |
| other |  |

What extent (%) of the wetland’s geomorphology is altered: < 10 / 10-25 / 25-50 / 50-75 / 75-90 / > 90

Note: clearing of vegetation in itself does not constitute a change in geomorphology.

Compare the wetland’s geomorphology to other wetlands of the same type in the same consanguineous suite domain. List any differences, similarities or unusual characteristics observed:

Additional notes:

**Wetland processes**

The wetland is: fresh (< 1,000 mg/L) / hyposaline (1,000-10,000 mg/L) / saline (10,000-100,000 mg/L) / hypersaline (> 100,000 mg/L) / unknown

The wetland is: groundwater dependant / perched / both / unknown. State whether inferred or based on data:

Did the wetland contain surface water at the time of the survey or evidence of inundation: yes / no.

Explain:

Does the wetland contain artificial attributes and functions that alter the natural hydrological regime (e.g. detention basins, artificial drains or channels (inflow or outflow), water bores or pumps): yes / no. Describe the features / functions, their impact on the hydrology and show on the map:

Identify the processes occurring in the wetland (e.g. sedimentological, hydrological, hydrogeological, chemical). Describe whether they are inferred or observed:

To what extent have each of these processes been altered : negligible / low / medium / high / unknown. Describe:

Have alterations to the processes affected the wetland’s natural attributes and functions: no / low impacts / high impacts. Describe:

Compare the wetland’s processes to other wetlands of the same type. List any differences, similarities or unusual characteristics observed:

**Linkages**

Describe if the wetland is part of a hydrological link in a larger or more complex system (e.g. wetland linked to estuary ecology, wetland linked to river system, part of a wetland chain):

Is the wetland part of an ecological linkage or wildlife corridor or, is it connected by vegetation or waterways to other nearby bushland or wetlands? If yes, describe:

Is a portion of the wetland vegetated and as a result functions as a fragmented ecological linkage or wildlife corridor? If yes, describe:

**Habitats**

List any native fauna (e.g. frogs, oblong turtle) or flora (e.g. macrophytes, algae) observed to be dependent on the wetland’s surface water.

|  |  |
| --- | --- |
| **Species** | **Observations (e.g. form, population size, location in the substrate, habitat type)** |
|  |  |
|  |  |

Is the wetland important for maintaining the genetic and ecological diversity in a regional or local context: yes / no. Describe:

Describe whether the wetland supports or is likely to support fauna populations at a vulnerable stage of their life cycle (e.g. turtle eggs, tadpoles) or provides a nursery for fauna (e.g. nursery for waterbirds):

Select the various habitats located within and 50 metres surrounding the wetland.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| large trees with canopy | trees with hollows | dead wood | low dense shrubland | scattered shrubland |
| fringing sedges / rushes  | scattered sedges / rushes  | inundated sedges / rushes  | submerged aquatic vegetation  | samphire / salt marsh |
| seasonally inundated grasslands  | mud flats  | shallow open water  | deep open water  | islands (natural or artificial) |
| rocky outcrops  | sandy substrate  | heavy leaf litter  | feral fauna burrows  | thickets / scrub |
| other: | other: | other: | other: | other: |

Compare the wetland’s habitats to other habitats of wetlands of the same type, consanguineous suite or the surrounding area. Describe any differences, similarities or unusual characteristics observed:

Determine whether habitat diversity is the result of disturbance or natural complexity (i.e. is the diversity evident in the wetland a result of disturbance e.g. fire, sedimentation, excavations or drains). Describe these habitat features:

Additional notes:

**Flora**

Confirm the occurrence or believed to be occurrence of threatened or priority ecological communities, declared rare flora and priority flora recorded during the desktop assessment. Note any additional observations or occurrences and include advice on search effort in any area of suitable habitat for these communities or species:

List any significant flora confirmed to be present within the wetland or whether it is a known location for significant flora.

|  |  |  |
| --- | --- | --- |
| **Species** | **Observations** (e.g. population’s size, percentage cover, flowering/fruiting activity) | **Known or new occurrence?** |
|  |  |  |
|  |  |  |

List the dominant flora species located within the wetland in each growth form layer and estimate their cover in the wetland. Provide a map delineating the vegetation units within the wetland in accordance with a reconnaissance flora survey (Environmental Protection Authority 2016).

|  |  |  |
| --- | --- | --- |
| **Growth form layer** | **Dominant species** | **Percentage cover** (to the nearest 10%) |
| Trees over 30 m |  |  |
| Trees 10-30 m |  |  |
| Trees under 10 m |  |  |
| Mallee over 8 m |  |  |
| Mallee under 8 m |  |  |
| Shrub over 2 m |  |  |
| Shrubs 1-2 m |  |  |
| Shrubs under 1 m |  |  |
| Herbs |  |  |
| Sedges / rushes |  |  |
| Grasses |  |  |
| Open water |  |  |
| Bare ground |  |  |
| Other  |  |  |

List the most common weed species occurring in the wetland:

Use aerial photography and the site visit to determine the percentage of the wetland boundary which is surrounded by land dominated by native vegetation. Describe any observations: 100-75% / 75-50% / 50-10% / < 10%

Using site observations, compare the diversity of native flora in the wetland to other wetlands of the same type. List reference sites used. Does the wetland have a high diversity of native flora: yes / no / similar Explain:

Has the vegetation been changed by direct disturbance during the last 24 months? For example, grazing, clearing, ploughing, fire: yes / no.

If yes, provide details, including information regarding the type of disturbance, extent and nature of the impact to the vegetation e.g. continuous or periodic, and if periodic, the last known occasion.

Identify whether any form of clearing is legal. If yes, is regeneration evident? If regeneration is not evident, outline the potential for regeneration and rehabilitation of vegetation if disturbance (a) continues and (b) ceases.

Has the flora diversity or composition changed in the last 24 months due to human induced disturbances? If yes, provide information.

**Fauna**

Document all other observations and evidence (e.g. tracks and scats) of native fauna species utilising the wetland as a feeding, breeding, roosting or refuge site.

|  |  |  |  |
| --- | --- | --- | --- |
| **Species** | **Native / introduced** | **Observations** (e.g. habitat type, populations size, age) | **Source of information** (e.g. observation, literature, DBCA) |
|  |  |  |  |
|  |  |  |  |

Does the wetland function or have the potential to function as an ecological refuge: yes / no.

Comment on whether fauna are residing in the wetland for feeding, breeding and roosting purposes or if they migrate between other natural wetlands or bushlands.

Using site observations compare the fauna occurring in the wetland to other wetlands of the same type.

Does the wetland support a variety of fauna species compared to the other wetlands: yes / no / similar. Explain:

**Cultural**

Is the wetland identified (either interim or permanently) on a national (e.g. National Heritage List), state (e.g. Heritage Council of Western Australia), regional or local heritage list: yes / no.

Document all heritage values for the wetland and its immediate surrounds. Display their location on the attached map.

Is the wetland identified for its Aboriginal cultural value (interim or permanently) e.g. by the Department of Planning, Lands and Heritage: yes / no

Document the Aboriginal cultural values of the wetland and its immediate surrounds. Display the location on the attached map.

Are there any important social values of the wetland to the national, state, regional or local community (e.g. friends group, iconic picnic area):

Select the passive and active recreational based activities which currently or potentially occur in or directly surrounding the wetland.

|  |  |  |
| --- | --- | --- |
| bushwalking | dog walking | bird watching |
| photography | spiritual | picnic |
| play equipment | bike riding | horse riding |
| swimming | canoeing | boating |
| wind sailing | hunting | fishing |
| 4 wheel driving |  |  |

Additional notes:

**Education and scientific**

Is there a primary, secondary or tertiary education institution or scientific organisation which is known or is previously known to use the wetland for educational or scientific purposes: yes / no / unknown. Details:

Is there potential for the wetland to be used in the future for education by one of these institutions: yes / no / unknown.