

# Flora and Fauna Survey and Condition Assessment of the Paynes Road Wetland, Grangefields, Victoria

Client: Melbourne Water      April 2021



*Paynes Road Wetland, October 2020*



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## **1. INTRODUCTION**

Melbourne Water engaged Rakali Ecological Consulting Pty Ltd to conduct a flora and fauna survey and Index of Wetland Condition (IWC) assessment at the Paynes Road Wetland, located adjacent to Paynes Road at Grangefields. The wetland had recently been inundated by diversion of stormwater to the south of the Western Highway.

Melbourne Water is investigating options for managing stormwater runoff in the local drainage scheme and requires further information on the ecological values of the wetland. A previous assessment identified that the wetland supports Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (SHW), an ecological community protected under the Environment Protection and Biodiversity Conservation (EPBC) Act (Rakali 2012).

This report presents the results of an initial assessment conducted on the 27<sup>th</sup> of July 2020, a follow up survey conducted on the 22<sup>nd</sup> of October 2020 and some brief recommendations for protection and management of the site.

### **1.1 Study Area**

The Paynes Road wetland is located to the immediate east of Paynes Road at 1173-1199 Beattys Road, Grangefields. The wetland is approximately 5.58 hectares in size and is bounded by open paddocks to the north, east and south and low-density residential land to the west.

## **2. METHODOLOGY**

### **2.1 Literature and Database Review**

Preliminary to the field survey, the following information sources were reviewed to provide an overview of potential biodiversity values of the study area:

Flora and vegetation information sources:

- Victorian Biodiversity Atlas- VBA (2020) <https://vba.dse.vic.gov.au/vba/index.jsp>, [accessed July 2020]. Department of Environment, Land, Water and Planning, East Melbourne, Victoria.
- Naturekit (DELWP 2020) <http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit>

Fauna information sources:

- Victorian Biodiversity Atlas- VBA (2020) <https://vba.dse.vic.gov.au/vba/index.jsp>, [accessed July 2020]. Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

### **2.2 Wetland Condition Assessment**

The condition of the wetland was determined using the Index of Wetland Condition Assessment Procedure (DELWP 2016). The method includes six sub-indices which assess physical and biotic components occurring within the wetland. The Index of Wetland Condition (IWC) assessment was utilised to capture a snap-shot of the relative health and condition of the wetland. For a detailed description of the IWC methodology see the Index of Wetland Condition Assessment Procedure (DSE 2016).

The IWC was designed to provide a condition score for a wetland at a particular point in time. The wetlands condition is compared against a benchmark which is designed to reflect the characteristics of that wetland type prior to degradation caused by European occupation.

For IWC assessments, the type and extent of EVCs within the wetland is first determined. If an EVC includes areas that differ markedly in quality, these are delineated into separate zones. Each EVC or quality zone is then assessed against the relevant EVC benchmark, to determine the condition of four major components: Critical Lifeform Groups (diversity), Weeds, Indicators of Altered Processes and Canopy

Health. The score of each EVC or quality zone is multiplied by the proportion of the vegetated area it covers within the wetland to provide the final biota score.

### **2.3 Incidental Flora and Fauna Observations**

Overall plant lists for each EVC were collated. Fauna species that were observed while conducting vegetation surveys were recorded, and overall fauna lists are provided. BR indicates that breeding activity was observed. F indicates that birds were observed flying over the wetland.

### **2.4 Wetland Dependence**

Flora and fauna recorded were classified into water dependency categories. These are not formal categories but have been developed by the author to assist wetland managers in understanding which flora and fauna respond to flooding events.

**Table 1 Flora wetland dependence categories**

| Symbol | Functional Group      | Description                                                                                                                                                                                                                 |
|--------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OA     | Obligate Aquatic      | Plants that require free-standing water above the ground surface to complete their life-cycle                                                                                                                               |
| AM     | Amphibious            | Plants which are adapted to survive short to medium term inundation (greater than two weeks duration). Recruitment and periods of rapid growth and productivity of these species is often closely tied to inundation events |
| MF     | Mudflat specialists   | Plants that specialise in colonising the drying mud of wetlands                                                                                                                                                             |
| GD     | Groundwater Dependent | Plants that while not necessarily frequently inundated by flood water would not survive on local rainfall and require access to ground water                                                                                |
| D      | Dampland              | Plants that require damp or saturated, but not inundated, soil to complete their life-cycle                                                                                                                                 |
| T      | Terrestrial           | Plants that survive off local rainfall. These species may survive very short-term inundation but perish if soil remains inundated or waterlogged for longer than approximately two weeks                                    |

**Table 2 Fauna wetland dependence categories**

| Symbol | Functional Group             | Description                                                                                                                                     |
|--------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| A      | Aquatic fauna                | Aquatic species that cannot survive without water                                                                                               |
| WS     | Wetland specialists          | Fauna species that are not strictly aquatic (although many are amphibious) but spend majority of life cycle in or around wetlands               |
| TW     | Terrestrial wetland foragers | Terrestrial species which spend much of their time foraging in wetland habitats if available                                                    |
| TD     | Terrestrial dryland foragers | Terrestrial species that may opportunistically forage around wetlands but that spend the majority of their lives foraging in dryland ecosystems |

## 2.5 Nomenclature

Nomenclature in this report follows the Victorian Biodiversity Atlas (2020). An asterisk (\*) denotes exotic species and a hash sign (#) denotes indigenous species that may occur outside of their natural range. The conservation status of threatened flora and fauna are presented as they are recognised under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the *Flora and Fauna Guarantee Act 1988* (FFG Act) and the Victorian rare or threatened species advisory lists (DEPI 2014, DSE 2013).

**Table 3 Key to conservation status for flora and fauna species**

| Status                                                                | Description                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conservation Status in Australia (EPBC Act)</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Extinct (EX)                                                          | A taxon is extinct when there is no reasonable doubt that the last individual of the taxon has died.                                                                                                                                                                                                                                                                                              |
| Critically Endangered (CR)                                            | A taxon is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.                                                                                                                                                                                                                                                                      |
| Endangered (EN)                                                       | A taxon is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.                                                                                                                                                                                                                                                           |
| Vulnerable (VU)                                                       | A taxon is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future                                                                                                                                                                                                                                            |
| <b>Listing under the Flora and Fauna Guarantee Act 1988 (FFG Act)</b> |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Listed (L)                                                            | Listed as threatened                                                                                                                                                                                                                                                                                                                                                                              |
| Nominated (N)                                                         | Nominated for listing as threatened but has not yet been listed. In some cases, the taxon may have received a preliminary or final recommendation indicating that it is eligible or ineligible for listing. In other cases, the nomination might not yet have been considered.                                                                                                                    |
| Invalid or ineligible (I)                                             | Nominated but rejected for listing as threatened on the basis that the taxon was considered to be invalid (either undescribed or not widely accepted) or ineligible (taxon does not satisfy any of the primary listing criteria) by the Scientific Advisory Committee (SAC).                                                                                                                      |
| Delisted (D)                                                          | Previously listed as threatened but subsequently removed from the Threatened List following nomination for delisting.                                                                                                                                                                                                                                                                             |
| <b>Conservation Status in Victoria (Advisory List)</b>                |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Presumed Extinct in Victoria (x)                                      | Not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.                                                                                                                                                                    |
| Endangered in Victoria (e)                                            | At risk of disappearing from the wild state if present land use and other causal factors continue to operate.                                                                                                                                                                                                                                                                                     |
| Vulnerable in Victoria (v)                                            | Not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful. |
| Rare in Victoria (r)                                                  | Rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.                                                                                                                                                                                                                                                  |
| Poorly Known in Victoria (k)                                          | Poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.                                                                                                                                                                                                       |

## **2.6 Limitations**

Due to the seasonal growth cycles and cryptic nature of certain plants and animals, ecological surveys are often unable to detect all species present at a particular site. As fieldwork for this study was carried out over two days in winter and spring 2020, only flora and fauna that were physiologically active or present within the study area over this period were recorded. Ecological surveys can also be limited by project constraints including short survey timeframes (seasons, wetting cycle, climatic conditions etc.), and it is highly probable that additional flora and fauna species would be recorded given a greater sampling effort, particularly over spring and summer.

### **3. RESULTS**

#### **3.1 Flora species**

During the flora survey on the 27<sup>th</sup> of July 2020 a total of 67 flora species were recorded at the Paynes Road Wetland. Four additional species of plants were observed on the 22<sup>nd</sup> of October 2020, bringing the total number of plant species recorded at the site to 71. Of these, 37 (52%) are indigenous and 34 (48%) are introduced. Nineteen of the indigenous species recorded are classified as wetland dependant. No threatened plant taxa were observed during the survey.

A search of the Victorian Biodiversity Atlas found only one record, which was for Serrated Tussock (*Nassella trichotoma*) a species that is widespread around the margins of the wetland.

A list of plant taxa recorded at the site is presented in Appendix 1.

### 3.2 Wetland Ecological Vegetation Classes (EVCs) and quality zones

Ecological Vegetation Classes (EVCs) are distinct associations of plants that grow together because they are adapted to similar environmental conditions, such as soil type, altitude, aspect, wetting and drying regime and water quality parameters including salinity.

The following EVCs were observed at the Paynes Road wetland during field work for this investigation:

#### **Plains Grassy Wetland (EVC 125) - listed as *endangered* in the Victorian Volcanic Plain bioregion**

Plains Grassy Wetland was the dominant EVC of the wetland with the exception of the eastern margin. The vegetation was dominated by Brown-back Wallaby-grass (*Rytidosperma duttonianum*), Common Swamp Wallaby-grass (*Amphibromus nervosus*) and Common Spike-sedge (*Eleocharis acuta*) in association with herbs and ferns such as Common Nardoo (*Marsilea drummondii*), Small Spike-sedge (*Eleocharis pusilla*), Lesser Loosestrife (*Lythrum hyssopifolium*), Swamp Lily (*Ottelia ovalifolia*), Red Pondweed (*Potamogeton cheesemanii*) and Starfruit (*Damasonium minus*). Multicellular submerged aquatic algae Stoneworts (*Chara* and *Nitella* species) were abundant in clear water in the deepest section of the wetland. Although various weeds such as Blanket Weed (*Galenia pubescens*) appeared to be previously locally dominant, inundation of the wetland had reduced weed cover to the outer margins.

#### **Freshwater Lignum Shrubland (EVC 657) - listed as *endangered* in the Victorian Volcanic Plain bioregion**

Freshwater Lignum Shrubland was distributed around the outer eastern margin of the wetland. This vegetation was dominated by Tangled Lignum (*Duma florulenta*) and was divided into two zones:

- Zone 1 was inundated and contained a relatively high cover of Brown-back Wallaby-grass (*Rytidosperma duttonianum*) and Common Spike-sedge (*Eleocharis acuta*).
- Zone 2 was dry and had a much higher cover of terrestrial weeds and a relatively low cover of wetland plants. Native species that were still relatively abundant in this zone included Kneed Spear-grass (*Austrostipa bigeniculata*) and Slender Wallaby-grass (*Rytidosperma racemosum* var. *racemosum*).



Photograph 1 Plains Grassy Wetland with abundant Common Nardoo (*Marsilea drummondii*) and Common Swamp Wallaby-grass (*Amphibromus nervosus*), Paynes Rd Wetland, October 2020



Photograph 2 Close up of Plains Grassy Wetland showing low water turbidity and dense growth of Stoneworts (*Chara* and *Nitella* species), Paynes Rd Wetland, October 2020



Photograph 3 Freshwater Lignum Shrubland with Tangled Lignum (*Duma florulenta*) in the background, Paynes Rd Wetland, July 2020



Photograph 4 Dry area of Freshwater Lignum Shrubland area on stony knoll with abundant Kneed Spear-grass (*Austrostipa bigeniculata*). This area provided habitat for the vulnerable Tussock Skink (see page 21), Paynes Rd Wetland, July 2020

Terrestrial EVCs adjacent to the wetland include Plains Grassland dominated by Slender Wallaby-grass (*Rytidosperma racemosum* var. *racemosum*) and Stony Knoll Shrubland dominated by Hedge Wattle (*Acacia paradoxa*), both of which are listed as endangered in the Victorian Volcanic Plain bioregion.

### 3.3 Vegetation condition (Index of Wetland Condition)

An assessment of the Paynes Road wetland using the Index of Wetland Condition (IWC) found that the overall score was 8/10, which has a linguistic descriptor of *Good*. The Wetland Catchment sub-index scored *Poor*, largely due to the high cover of weeds in the surrounding buffer and use of the site for stock grazing, whilst Physical Form scored *Excellent* due to the original shape and bathymetry of the wetland only being slightly modified. Hydrology scored *Excellent*, for at this point there has been no significant shift in the season or duration of inundation, Water Properties scored *Good*, a slightly reduced score due to the nutrient loads of the stormwater and Soils scored *Very Poor* due to past cropping of much of the wetland.

Table 4 Index of Wetland Condition Score for the Paynes Road wetland, assessed 22<sup>nd</sup> October 2020

| Wetland                  | Paynes Rd                |                    |        |                |
|--------------------------|--------------------------|--------------------|--------|----------------|
| Bioregion                | Victorian Volcanic Plain |                    |        |                |
| Sub-index                | Score                    | Condition Category | Weight | Adjusted score |
| Wetland catchment        | 7                        | Poor               | 0.26   | 1.82           |
| Physical form            | 17.6                     | Excellent          | 0.08   | 1.408          |
| Hydrology                | 20                       | Excellent          | 0.31   | 6.2            |
| Water properties         | 17                       | Good               | 0.47   | 7.99           |
| Soils                    | 2.75                     | Very Poor          | 0.07   | 0.1925         |
| Biota                    | 17                       | Good               | 0.73   | 12.41          |
| <b>Total</b>             |                          |                    |        | <b>30.0205</b> |
| <b>Overall IWC Score</b> |                          | <b>Good</b>        |        | <b>8</b>       |

The Biota score, which is based on the condition of the vegetation, scored 17 (which is regarded as *Good*). This result was due to several factors including:

- Some lifeforms were absent or modified from both wetland EVCs present
- Weed cover was relatively high in Freshwater Lignum Shrubland Zone 2
- There were minor altered processes identified, including invasion of the wetland by terrestrial plants.

The 2020 biota score was a significant improvement from the last assessment undertaken in 2012 when the wetland was dry. At that time, the area of Plains Grassy Wetland that dominates the wetland received a score of 11.5, largely due to higher weed cover and reduced structural health. The increase in the score is a direct result of recent inundation and the accompanying decrease in weed cover and increase in indigenous plant species cover and diversity.

The 2020 Biota results are presented in Table 5 below.

**Table 5 Results IWC Biota assessment at the Paynes Road wetland, assessed in July 2020**

| Sub-Index                             | EVC#: Name | Plains<br>Grassy<br>Wetland (EVC<br>125) | Freshwater Lignum<br>Shrubland (EVC 657)<br>Zone 1 (wet) | Freshwater Lignum<br>Shrubland (EVC 657)<br>Zone 2 (dry) |
|---------------------------------------|------------|------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
| Max. Possible<br>Score                |            | Score                                    | Score                                                    | Score                                                    |
| Critical Life form groupings          | 25         | 17.5                                     | 18.75                                                    | 18.75                                                    |
| Weeds                                 | 25         | 22                                       | 22                                                       | 7                                                        |
| Indicators of altered processes       | 25         | 20                                       | 25                                                       | 25                                                       |
| Vegetation structure and<br>health    | 25         | 25                                       | 25                                                       | 25                                                       |
| EVC Sub-total                         | 100        | 84.5                                     | 90.75                                                    | 75.75                                                    |
| Adjusted EVC Score (EVC/5)            | 20         | 16.9                                     | 18.15                                                    | 15.15                                                    |
| Area of wetland covered by<br>EVC (%) |            | 86%                                      | 6%                                                       | 8%                                                       |
| Wetland EVC Score                     |            | 14.534                                   | 1.089                                                    | 1.212                                                    |
|                                       |            |                                          | Total Wetland Biota<br>Score                             | Total Wetland Biota<br>Score                             |
|                                       |            |                                          |                                                          | 17                                                       |

### 3.4 Comparison of site characteristics with the listing advice of the critically endangered Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (SHW) community

A previous assessment identified the SHW community at the Paynes Road wetland, which is an ecological community protected under the Environment Protection and Biodiversity (EPBC) Act 1999 (Cook et. al. 2012). The wetland was reassessed during the current project using the scientific determination criteria (TSCC 2012, see Table 7), which confirmed that the ecological community is present at the site. The wetland has now been confirmed to meet the criteria of a ‘high quality’ site and is therefore considered as a matter of national environmental significance.

**Table 6 Scientific determination criteria for Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains at the Paynes Road wetland**

| SCIENTIFIC DETERMINATION CRITERIA                                                                                                                                                                                  |                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Key Diagnostic Characteristics                                                                                                                                                                                     |                                                                                                |
| Landscape                                                                                                                                                                                                          |                                                                                                |
| Limited to the temperate zone of mainland south-eastern Australia.                                                                                                                                                 | Yes                                                                                            |
| The ecological community occurs in south-east SA, Victoria and southern NSW.                                                                                                                                       | Yes                                                                                            |
| On flat plains grading into slopes, below 500 m asl.                                                                                                                                                               | Yes                                                                                            |
| Associated soils are generally fertile but poorly draining clays derived from a range of geologies.                                                                                                                | Yes                                                                                            |
| Typically in rainfall zones with a Winter seasonal rainfall pattern, extending into a Uniform seasonal rainfall pattern at the edge of its range.                                                                  | Yes                                                                                            |
| Hydrology                                                                                                                                                                                                          |                                                                                                |
| Rainfall is the main water source. These wetlands are not dependent on overbank flooding from riverine systems.                                                                                                    | Yes, rainfall is the main water source                                                         |
| Salinity of the water is fresh to slightly brackish.                                                                                                                                                               | Yes                                                                                            |
| Biota                                                                                                                                                                                                              |                                                                                                |
| Trees and shrubs are sparse to absent. When present, they mostly occur as fringing or scattered individuals. The cover of woody species accounts for no more than 10% projective foliage cover across the wetland. | Yes, there is a sparse cover of Tangled Lignum ( <i>Duma florulenta</i> ) on the eastern side. |
| The vegetative cover of the ecological community is dominated by a ground layer of native wetland graminoids and/or native wetland forbs.                                                                          | Yes                                                                                            |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A range of graminoids is often present and typically includes one or more of the following taxa: <i>Amphibromus</i> spp., <i>Carex tereticaulis</i> , <i>Deyeuxia</i> spp., <i>Glyceria</i> spp., <i>Lachnagrostis</i> spp., <i>Poa labillardieri</i> , and <i>Rytidosperma duttonianum</i> . Note that other graminoid taxa may also occur, though are not necessarily common.                                                                                                                             | Species recorded included: <i>Amphibromus nervosus</i> , <i>Eleocharis acuta</i> , <i>Juncus flavidus</i> <i>Rytidosperma duttonianum</i> , <i>Lachnagrostis filiformis</i> . |
| At least one native wetland forb species must be present (preferably more) after the ecological community is inundated. The suite of forbs that may occur within the ecological community's range is variable and potentially large. Refer to Appendix A for a plant species list.                                                                                                                                                                                                                          | Species recorded included: <i>Haloragis aspera</i> , <i>Damasonium minus</i> , <i>Marsilea drummondii</i> and <i>Lythrum hyssopifolia</i>                                     |
| Freshwater algae often are present when the wetland is, or recently has been, wet. The most evident representatives are green algae from the groups Charales (stoneworts) and Zygnematales (pond scums).                                                                                                                                                                                                                                                                                                    | None                                                                                                                                                                          |
| Characteristic fauna that may be associated with the ecological community include invertebrate groups that are temporary water specialists. The types of fauna present can be highly variable, depending on the inundation history, current conditions and other factors.                                                                                                                                                                                                                                   | Species recorded included: Grey Teal, Pacific Black Duck, Hardhead, Australasian Shoveler, Black Swan.                                                                        |
| <b>Modified wetlands</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                               |
| Modifications to other types of wetland may result in the ecological community being present where it was formerly absent. These modified wetland sites are included as part of the national ecological community, if they remain a functional natural wetland and conform to the description of the ecological community.                                                                                                                                                                                  | Natural SHW                                                                                                                                                                   |
| <b>Condition Thresholds</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                               |
| <b>Part A) Condition during 'typical' wet cycles</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                               |
| Step A1) Is the wetland consistent with the key diagnostic characteristics, noted above? - If yes, go to Step A2.<br>- If no, the wetland is of a different type to the Seasonal Herbaceous Wetlands                                                                                                                                                                                                                                                                                                        | Yes                                                                                                                                                                           |
| Step A2) Is 50% or more of the total cover of plants in the ground layer of the wetland dominated by native species characteristic of the Seasonal Herbaceous Wetlands ecological community? the Seasonal Herbaceous Wetlands ecological community?<br>- If the answer is yes, the wetland retains sufficient native cover. Go to Part C Minimum wetland size.<br>- If the answer is no, the wetland no longer retains sufficient natural values to be considered part of the national ecological community | Yes                                                                                                                                                                           |
| <b>Part B) For dry conditions (e.g. drought):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                               |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <p>Step B1. Determine landscape position, including any modifications of the surrounds.</p> <ul style="list-style-type: none"> <li>- If the landscape does not, or is no longer able to, support a seasonal wetland, then the ecological community is unlikely to be present. to its hydrology.</li> <li>- If the landscape is consistent with the formation of a functional seasonal wetland, then go to Step B2.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N/A                                                                                                                                |
| <p>Step B2. Investigate the known or inferred history of the likely wetland.</p> <ul style="list-style-type: none"> <li>- If yes, and the information on plant species composition is sufficiently detailed, then the site may be assessed according to Parts C and D, below, using the existing information.</li> <li>- If no, or not as above, then go to Step B3.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | N/A                                                                                                                                |
| <p>Step B3. Determine the nature of the vegetation surrounding the wetland.</p> <p>Is the wetland surrounded by or adjoining a native vegetation remnant?</p> <ul style="list-style-type: none"> <li>- If yes, the wetland ecological community is likely to be present. Go to Part C Minimum wetland size, below.</li> <li>- If no, and the area immediately around and within the wetland is cropped, then the wetland ecological community is unlikely to be present.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | N/A                                                                                                                                |
| <b>Part C) Minimum wetland size</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                    |
| <p>If the wetland occurs as a single isolated wetland, then it must be 0.5 ha or larger in size;</p> <p>OR</p> <p>If the wetland occurs as a cluster of many small wetlands in reasonably close proximity, then the cluster effectively functions as a single unit. The wetlands within the cluster must total at least 0.5 ha and this area of wetland must lie across a polygon (i.e. total area of wetland plus non-wetland in the cluster site) of at least 5ha. This means the area of wetland proper accounts for 10% or more of the total cluster area; OR</p> <p>If an individual wetland or wetland cluster is smaller than 0.5 ha, it may be included as part of the national ecological community if:</p> <ul style="list-style-type: none"> <li>i) the actual wetland or wetland cluster is 0.1 ha or more in size; AND</li> <li>ii) the wetland is contiguous with a native vegetation remnant; AND</li> <li>iii) the total area of the wetland plus other native vegetation remnant or type of natural wetland is 1 ha or more.</li> </ul> <p>- If the wetland meets the size and other thresholds above, it is part of the Seasonal Herbaceous Wetlands ecological community. Go to Part D Very high-quality wetlands to determine if the wetland is of very high quality.</p> <p>- If the wetland falls outside of the situations described above, the wetland is too small for consideration as a matter of national environmental significance.</p> | Yes; patch >0.5ha                                                                                                                  |
| <b>Part D. Very high-quality wetlands</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                    |
| <p>Are three or more native plant taxa listed in Table 1 of (TSSC 2012) present within the wetland?</p> <ul style="list-style-type: none"> <li>- If yes, the wetland is considered to be of very high quality.</li> <li>- If no, the ecological community is still present if the criteria under Parts A to C are met but is not considered to be of very high quality. A wetland may merit further consideration for protection as outlined in the Additional considerations: surrounding environmental and landscape context in (TSSC 2012).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes, three indicator species recorded- <i>Marsilea drummondii</i> , <i>Ottelia ovalifolia</i> and <i>Potamogeton cheesemanii</i> . |
| <b>FINAL DETERMINATION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Present                                                                                                                            |
| <b>Matter of National Environmental Significance</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Yes                                                                                                                                |

### 3.5 Fauna

Incidental fauna observed at the site on the 27<sup>th</sup> of July 2020 and 22<sup>nd</sup> of October 2020 included a total of 37 bird, three frog and one reptile species. This included three species listed as vulnerable under the Victorian Advisory List: three individual Tussock-skinks (*Pseudemoia pagenstecheri*) located on the stony knoll on the eastern side of the wetland and four Hardhead (*Aythya australis*) and two Australasian Shoveler (*Anas rhynchotis*) that were foraging within the wetland. Wetland bird species recorded breeding at the site included Black Swan (*Cygnus atratus*), Black-winged Stilt (*Himantopus leucocephalus*), Grey Teal (*Anas gracilis*), Hoary-headed Grebe (*Poliiocephalus poliocephalus*) and White-fronted Chat (*Epthianura albifrons*).

Table 7 Fauna species recorded at the Paynes Road wetland

| Origin       | Common name             | Scientific name                     | Count 27 July 2020 | Count 22 Oct 2020 | Breeding Oct 2020 |
|--------------|-------------------------|-------------------------------------|--------------------|-------------------|-------------------|
| <b>Birds</b> |                         |                                     |                    |                   |                   |
|              | Australasian Grebe      | <i>Tachybaptus novaehollandiae</i>  | 1                  | 2                 |                   |
|              | Australasian Shoveler   | <i>Anas rhynchotis</i>              | 2                  | 1                 |                   |
|              | Australian Magpie       | <i>Cracticus tibicen</i>            | 2                  |                   |                   |
|              | Black Falcon            | <i>Falco subniger</i>               |                    | 1                 |                   |
|              | Black Swan              | <i>Cygnus atratus</i>               | 6                  | 4                 | YOON              |
|              | Black-fronted Dotterel  | <i>Euseyonis melanops</i>           | 4                  | 3                 |                   |
|              | Black-shouldered Kite   | <i>Elanus axillaris</i>             | 1                  |                   |                   |
|              | Black-winged Stilt      | <i>Himantopus leucocephalus</i>     |                    | 16                | NWE               |
|              | Chestnut Teal           | <i>Anas castanea</i>                | 2                  |                   |                   |
| *            | Common Blackbird        | <i>Turdus merula</i>                | 1                  |                   |                   |
| *            | Common Greenfinch       | <i>Chloris chloris</i>              |                    | 2                 |                   |
| *            | Common Starling         | <i>Sturnus vulgaris</i>             | 14                 | 9                 |                   |
|              | Eurasian Coot           | <i>Fulica atra</i>                  |                    | 2                 |                   |
| *            | Eurasian Skylark        | <i>Alauda arvensis</i>              | 1                  |                   |                   |
|              | Grey Teal               | <i>Anas gracilis</i>                | 32                 | 16                | YOON              |
|              | Hardhead                | <i>Aythya australis</i>             | 4                  |                   |                   |
|              | Hoary-headed Grebe      | <i>Poliiocephalus poliocephalus</i> |                    | 14                | YOON              |
| *            | House Sparrow           | <i>Passer domesticus</i>            | 6                  | 11                |                   |
|              | Little Grassbird        | <i>Megalurus grammurus</i>          | 1                  | 5                 |                   |
|              | Little Pied Cormorant   | <i>Microcarbo melanoleucos</i>      | 4                  |                   |                   |
|              | Little Raven            | <i>Corvus mellori</i>               | 2                  | 14                |                   |
|              | Magpie-lark             | <i>Grallina cyanoleuca</i>          | 2                  | 4                 |                   |
|              | Masked Lapwing          | <i>Vanellus miles</i>               | 2                  | 2                 |                   |
|              | Musk Lorikeet           | <i>Glossopsitta concinna</i>        | 4                  |                   |                   |
|              | Pacific Black Duck      | <i>Anas superciliosa</i>            | 65                 | 5                 |                   |
|              | Purple Swamphen         | <i>Porphyrio porphyrio</i>          |                    | 8                 |                   |
|              | Purple-crowned Lorikeet | <i>Glossopsitta porphyrocephala</i> |                    | 2                 |                   |
|              | Red Wattlebird          | <i>Anthochaera carunculata</i>      | 1                  |                   |                   |

| Origin          | Common name             | Scientific name                   | Count 27 July 2020 | Count 22 Oct 2020 | Breeding Oct 2020 |
|-----------------|-------------------------|-----------------------------------|--------------------|-------------------|-------------------|
|                 | Superb Fairy-wren       | <i>Malurus cyaneus</i>            | 6                  | 6                 |                   |
|                 | Welcome Swallow         | <i>Hirundo neoxena</i>            | 102                | 12                |                   |
|                 | White-faced Heron       | <i>Egretta novaehollandiae</i>    | 3                  | 1                 |                   |
|                 | White-fronted Chat      | <i>Epthianura albifrons</i>       | 6                  |                   | RFY               |
|                 | White-necked Heron      | <i>Ardea pacifica</i>             |                    | 3                 |                   |
|                 | White-plumed Honeyeater | <i>Lichenostomus penicillatus</i> | 8                  | 3                 |                   |
|                 | Willie Wagtail          | <i>Rhipidura leucophrys</i>       | 1                  | 3                 |                   |
|                 | Yellow-rumped Thornbill | <i>Acanthiza chrysorrhoa</i>      | 4                  | 4                 |                   |
|                 | Zebra Finch             | <i>Taeniopygia guttata</i>        |                    | 2                 |                   |
| <b>Frogs</b>    |                         |                                   |                    |                   |                   |
|                 | Banjo Frog              | <i>Limnodynastes dumerilii</i>    |                    |                   |                   |
|                 | Common Froglet          | <i>Crinia signifera</i>           |                    |                   |                   |
|                 | Spotted Marsh-frog      | <i>Limnodynastes tasmaniensis</i> |                    |                   |                   |
| <b>Reptiles</b> |                         |                                   |                    |                   |                   |
|                 | Tussock Skink           | <i>Pseudemoia pagenstecheri</i>   |                    |                   |                   |

#### Breeding Codes

YOON = Young out of nest

RFY = Recently fledged young

NWE = Nest with eggs



Photograph 5 Black Swan on nest, Paynes Road Wetland, July 2020



Photograph 6 Black-winged Stilt nest, Paynes Road Wetland, Oct 2020



Photograph 7 The vulnerable Tussock-skink (*Pseudemoia pagenstecheri*), male in breeding condition at the Paynes Rd wetland, July 2020



Photograph 8 Banjo Frog (*Limnodynastes dumerilii*) at the Paynes Rd wetland, July 2020



Photograph 9 Spotted Marsh-frog (*Limnodynastes tasmaniensis*) at the Paynes Rd wetland, July 2020

#### 4. DISCUSSION

NatureKit is DELWP's biodiversity web mapping and reporting tool (DELWP 2020).

NatureKit displays information on Victoria's:

- Biodiversity values
- Investment prospects
- Flora and fauna distribution
- Native vegetation
- Marine bathymetry and habitat
- Disturbance
- Land administration and classification

NatureKit was developed as a planning tool to allow land managers, planning authorities and other statutory bodies to access information on biodiversity values and the condition of native vegetation to inform decision making and to increase compliance with policies and laws that were designed to protect natural values including the Victorian Native Vegetation Framework. Naturekit displays EVC mapping and a strategic biodiversity value ranking value for each area of the state of Victoria.

NatureKit was developed using computer modelling and is not always accurate. For example, NatureKit EVC mapping does not show any of the endangered EVCs present at the Payne's Road Wetland site and only gives it a strategic biodiversity value of 43 out of 100 (it is estimated that this should be more like 90 out of 100).

DELWP have also developed computer modelling to predict the occurrence of seasonal herbaceous wetlands in south-east Australia (see Papas 2016). This model shows that there is likely to be a wetland at the Paynes Road site, but only predicts a likelihood of 5 to 14.5% that is part of the EPBC Act-list SHW community (see Figure 1).

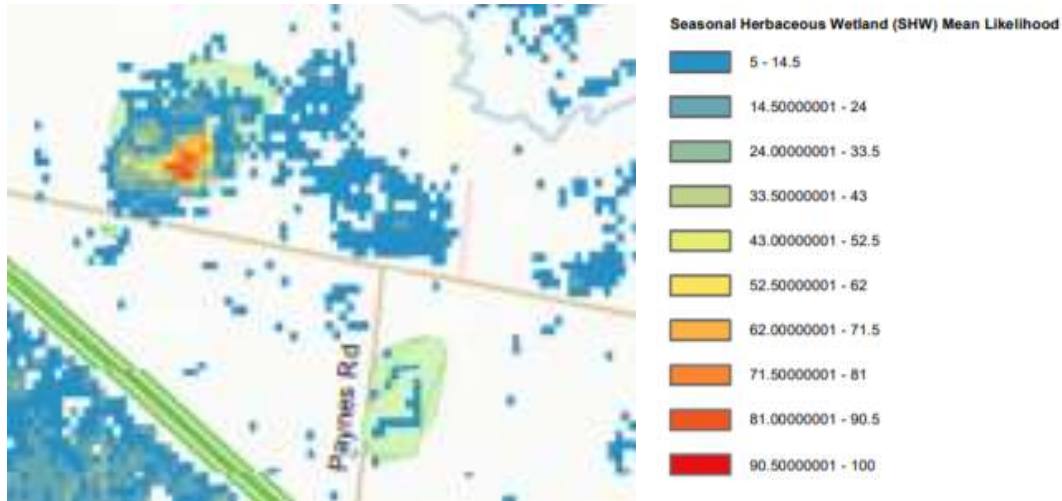


Figure 1 Extract from model predicting the likelihood of occurrence of SHW (Papas 2016).

When inspected by the then Department of Sustainability and Environment (DSE) in August 2012 the study area was deemed “clearly not referable to SHW” (DSE unpublished).



Photograph 10 Paynes Road Wetland when inspected by DSE on 13<sup>th</sup> August 2012 (from DSE unpublished)

The facts that a high value site such as the Paynes Road Wetland

1. is not shown at all on NatureKit,
2. was not recognised as a SHW by a highly experienced DSE botanist from a site inspection during a dry phase
3. that the SHW predictive modelling only estimates a low likelihood of the site being SHW

clearly demonstrate the necessity of on ground site assessments during periods when environmental conditions are suitable to accurately determine the values of examples of the SHW community.

While government modelling and surveys failed to identify the potential value of the Paynes Road Wetland it was identified as potentially being a site of very high quality SHW (and therefore a matter of national environmental significance) and habitat for the national vulnerable Growling Grass Frog by Cook et al (2012).

During the site inspection on the 27<sup>th</sup> July 2020 it was noticed that Black Swans had been selectively uprooting and grazing plant species they find palatable. To increase the likelihood of thoroughly documenting the indigenous wetland plant diversity on the site a rigid wire guard 2x1x1 m high with a roof was installed in the public roadside within the wetland to protect palatable species from being grazed off. An additional high quality indicator species, *Ottelia ovalifolia*, was recorded on the 22<sup>nd</sup> of October 2020 inside this guard.

If runoff from the urban area to the south of the Western Highway continues to top up the Paynes Road wetland into late spring and early summer it is likely that native species adapted to seasonal inundation such as Brown-back Wallaby-grass (*Rytidosperma duttonianum*) will drown and that high threat weeds such as Paspalum (\**Paspalum dilatatum*) and Water Couch (\**Paspalum distichum*) and invasive native species such as Broad-leaf Cumbungi (*Typha orientalis*) will spread and severely impact the quality of the wetland and important ecological processes such as recruitment and nutrient cycling will be substantially impaired. It is therefore critical that the wetland is **slowly** pumped out to below the level of where *Rytidosperma duttonianum* is dominant by mid-October to early November 2020 and in future years, which is approximately 30 cm below the level it was at on the 27<sup>th</sup> of July 2020. (Note that using a large pump to rapidly draw down water levels will have detrimental impacts on wetland fauna such as frogs and wetland birds).

Draw down of the wetland, whether natural caused by evaporation or artificial caused by pumping, will stimulate the germination of native mudflat plant species which can then be added to the sites plant species list.

Stormwater runoff that has been directed under the Western Highway exits a pipe then flows overland to the Paynes Road wetland. This runoff is causing unnaturally high levels of erosion which is leading to

sediments being washed into the wetland, increasing turbidity and accelerating sediment accretion (see Photograph 11). This does not comply with best practice storm water management principles and a more suitable engineering solution is required to rectify this situation.



Photograph 11 Erosion scour on the western side of Paynes Road caused by storm water runoff. This erosion is the result of poor water management and is causing excessive amounts of sediment to be washed into the wetland.

When inspected on the 22<sup>nd</sup> of October 2020 the wetland had very low turbidity (<10 NTU). This enabled aquatic plants such as Stoneworts (*Nitella* and *Chara* species) to flourish, and this water quality must be maintained post-development if the wetland is to continue to support its high ecological values.

Some modelling of the water balance of the Paynes Rd wetland has been completed (Spiire memo reference 303737). This shows that with the current and future expected quantities of water that will enter the wetland from it's now developed catchment the wetland will be predominantly wet, fluctuating between full and half full. No geotechnical investigation has occurred on infiltration rates, and this is definitely recommended, however observations indicate there is little infiltration from the wetland into the ground water.

If the wetland fluctuates between full and half full its ecological values will be severely compromised. For the ecological values of the wetland to survive the water regime of the wetland should be;

1. Mostly inundated in autumn, winter and spring and mostly dry in summer
2. Not be inundated for longer than 18 months consecutively.
3. If inundated for a period of longer than 12 months, have a following dry period of at least 6 months over a summer and autumn.
4. In 9 out of 10 years the wetland should be dry from January to April
5. If being pumped out the water level should not fall more rapidly than 5 cm per day

## **5. CONCLUSION**

After remaining dry for nearly a decade, the Paynes Road wetland has been filled by diversion of stormwater from south of the Western Highway. This has drowned terrestrial environmental weeds, reinvigorated indigenous wetland vegetation and attracted numerous waterbird and frog species, some which have commenced breeding. The wetland supports a high quality example of a nationally threatened ecological community, habitat for several threatened species and is a matter of national environmental significance. Unless the hydrological regime of the wetland is carefully managed now and into the future as the wetland's catchment is further urbanised these highly significant values will be compromised in contravention of the EPBC Act.

## **6. RECOMENDATIONS**

- Accurately map the extent of EVCs on the site
- Establish an ecological monitoring methodology for the site, including vegetation monitoring quadrats and transects, bird and frog transects and photo points
- Develop a management plan for the site that details hydrological and ecological management

## 7. REFERENCES

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## Appendix 1 VASCULAR FLORA SPECIES RECORDED AT THE PAYNES ROAD WETLAND

Wetland Dependence Categories: OA = Obligate Aquatic; AM = Amphibious; MF = Mudflat specialists; GD = Groundwater Dependent; D = Dampland; T = Terrestrial

Origin: an asterisk (\*) denotes exotic species

X = recorded in this EVC during this study (note that for dominant species an approximate % cover value for the EVC is given; this is used when calculating IWC biota scores).

| Origin | Wetland Category | Scientific Name                             | Common Name                | Plains Grassy Wetland | Freshwater Lignum Shrubland | Plains Grassland |
|--------|------------------|---------------------------------------------|----------------------------|-----------------------|-----------------------------|------------------|
|        | T                | <i>Acacia paradoxa</i>                      | Hedge Wattle               |                       |                             | x                |
|        | AM               | <i>Amphibromus nervosus</i>                 | Common Swamp Wallaby-grass | 10                    | x                           |                  |
| *      | T                | <i>Arctotheca calendula</i>                 | Cape Weed                  | x                     |                             |                  |
|        | T                | <i>Atriplex semibaccata</i>                 | Berry Saltbush             |                       |                             | x                |
|        | T                | <i>Austrostipa bigeniculata</i>             | Knead Spear-grass          | x                     | x                           | x                |
| *      | T                | <i>Avena spp.</i>                           | Oat                        | x                     |                             |                  |
| *      | T                | <i>Bromus catharticus</i>                   | Prairie Grass              | x                     |                             |                  |
|        | T                | <i>Carex breviculmis</i>                    | Common Grass-sedge         |                       | x                           |                  |
|        | AM               | <i>Carex tereticaulis</i>                   | Poong'ort                  | x                     |                             |                  |
| *      | T                | <i>Cassinia sifton</i>                      | Drooping Cassinia          | x                     | x                           |                  |
|        | OA               | <i>Chara sp</i>                             | Stonewort                  | x                     |                             |                  |
|        | T                | <i>Cotula australis</i>                     | Common Cotula              |                       |                             | x                |
|        | T                | <i>Crassula colorata</i>                    | Dense Crassula             |                       |                             | x                |
|        | T                | <i>Crassula decumbens var. decumbens</i>    | Spreading Crassula         | x                     | x                           |                  |
|        | MF               | <i>Crassula peduncularis</i>                | Purple Crassula            | x                     |                             |                  |
|        | T                | <i>Crassula sieberiana s.s.</i>             | Sieber Crassula            |                       |                             | x                |
| *      | T                | <i>Cynara cardunculus subsp. flavescent</i> | Artichoke Thistle          | x                     |                             |                  |

| Origin | Wetland Category | Scientific Name                            | Common Name         | Plains Grassy Wetland | Freshwater Lignum Shrubland | Plains Grassland |
|--------|------------------|--------------------------------------------|---------------------|-----------------------|-----------------------------|------------------|
| *      | AM               | <i>Cyperus eragrostis</i>                  | Drain Flat-sedge    | x                     |                             |                  |
| *      | T                | <i>Dactylis glomerata</i>                  | Cocksfoot           | x                     |                             |                  |
|        | AM               | <i>Damasonium minus</i>                    | Star Fruit          | x                     |                             |                  |
|        | AM               | <i>Duma florulenta</i>                     | Tangled Lignum      | x                     | 5                           |                  |
| *      | T                | <i>Echium plantagineum</i>                 | Paterson's Curse    | x                     |                             |                  |
| *      | T                | <i>Ehrharta longiflora</i>                 | Annual Veldt-grass  |                       | x                           |                  |
|        | T                | <i>Einadia nutans</i>                      | Nodding Saltbush    |                       | x                           | x                |
|        | AM               | <i>Eleocharis acuta</i>                    | Common Spike-sedge  | 1                     | x                           |                  |
|        | AM               | <i>Eleocharis pusilla</i>                  | Small Spike-sedge   | 2                     |                             |                  |
| *      | T                | <i>Erodium botrys</i>                      | Big Heron's-bill    |                       |                             | x                |
| *      | T                | <i>Erodium cicutarium</i>                  | Common Heron's-bill |                       | x                           | x                |
|        | T                | <i>Erodium crinitum</i>                    | Blue Heron's-bill   |                       | x                           | x                |
| *      | T                | <i>Galenia pubescens var. pubescens</i>    | Galenia             | x                     | x                           |                  |
|        | T                | <i>Glycine tabacina s.s.</i>               | Variable Glycine    |                       | x                           |                  |
|        | AM               | <i>Haloragis aspera</i>                    | Rough Raspwort      | x                     | x                           |                  |
| *      | T                | <i>Hirschfeldia incana</i>                 | Buchan Weed         | x                     |                             |                  |
| *      | T                | <i>Hordeum leporinum</i>                   | Barley-grass        | x                     |                             |                  |
|        | AM               | <i>Juncus flavidus</i>                     | Gold Rush           | x                     | x                           |                  |
|        | AM               | <i>Juncus subsecundus</i>                  | Finger Rush         | x                     |                             |                  |
|        | AM               | <i>Lachnagrostis filiformis s.s.</i>       | Common Blown-grass  | x                     |                             |                  |
|        | MF               | <i>Laphangium luteoalbum</i>               | Jersey Cudweed      | x                     |                             |                  |
| *      | T                | <i>Lepidium africanum</i>                  | Common Peppercross  | x                     |                             |                  |
| *      | T                | <i>Lolium rigidum</i>                      | Wimmera Rye-grass   | x                     |                             |                  |
| *      | T                | <i>Lycium ferocissimum</i>                 | African Box-thorn   |                       | x                           | x                |
|        | MF               | <i>Lythrum hyssopifolia</i>                | Small Loosestrife   | 2                     | x                           |                  |
| *      | T                | <i>Marrubium vulgare</i>                   | Horehound           | x                     |                             |                  |
|        | AM               | <i>Marsilea drummondii</i>                 | Common Nardoo       | 10                    |                             |                  |
|        | T                | <i>Microlaena stipoides var. stipoides</i> | Weeping Grass       |                       | x                           | x                |

| Origin | Wetland Category | Scientific Name                              | Common Name              | Plains Grassy Wetland | Freshwater Lignum Shrubland | Plains Grassland |
|--------|------------------|----------------------------------------------|--------------------------|-----------------------|-----------------------------|------------------|
| *      | T                | <i>Modiola caroliniana</i>                   | Red-flower Mallow        |                       | x                           |                  |
| *      | T                | <i>Nassella neesiana</i>                     | Chilean Needle-grass     | x                     |                             |                  |
| *      | T                | <i>Nassella trichotoma</i>                   | Serrated Tussock         | x                     | x                           |                  |
|        | OA               | <i>Nitella sp.</i>                           | Stonewort                | x                     |                             |                  |
|        | OA               | <i>Ottelia ovalifolia</i>                    | Swamp Lily               | x                     |                             |                  |
|        | AM               | <i>Oxalis exilis</i>                         | Shade Wood-sorrel        | x                     |                             |                  |
|        | T                | <i>Oxalis perennans</i>                      | Grassland Wood-sorrel    |                       |                             | x                |
| *      | AM               | <i>Paspalum dilatatum</i>                    | Paspalum                 | x                     |                             |                  |
|        | AM               | <i>Persicaria prostrata</i>                  | Creeping Knotweed        |                       | x                           |                  |
| *      | T                | <i>Phalaris aquatica</i>                     | Toowoomba Canary-grass   | x                     |                             |                  |
| *      | T                | <i>Physalis hederifolia</i>                  | Sticky Ground-cherry     | x                     |                             |                  |
|        | AM               | <i>Potamogeton cheesemanii</i>               | Red Pondweed             | x                     |                             |                  |
| *      | T                | <i>Reseda luteola</i>                        | Weld                     | x                     |                             |                  |
| *      | T                | <i>Romulea minutiflora</i>                   | Small-flower Onion-grass | x                     |                             |                  |
| *      | T                | <i>Romulea rosea</i>                         | Onion Grass              |                       |                             | x                |
| *      | AM               | <i>Rumex crispus</i>                         | Curled Dock              | x                     |                             |                  |
|        | T                | <i>Rytidosperma bipartitum s.s.</i>          | Leafy Wallaby-grass      | x                     |                             | x                |
|        | T                | <i>Rytidosperma caespitosum</i>              | Common Wallaby-grass     | x                     | x                           | x                |
|        | AM/D             | <i>Rytidosperma duttonianum</i>              | Brown-back Wallaby-grass | 5                     | 10                          |                  |
|        | T                | <i>Rytidosperma racemosum var. racemosum</i> | Slender Wallaby-grass    | x                     | x                           | x                |
| *      | T                | <i>Schinus molle</i>                         | Pepper Tree              |                       |                             | x                |
| *      | T                | <i>Sonchus oleraceus</i>                     | Common Sow-thistle       | x                     |                             |                  |
| *      | T                | <i>Stellaria pallida</i>                     | Lesser Chickweed         |                       |                             | x                |
| *      | AM               | <i>Symphyotrichum subulatum</i>              | Aster-weed               | x                     |                             |                  |
| *      | T                | <i>Triticum aestivum</i>                     | Wheat                    | x                     |                             |                  |
| *      | MF               | <i>Xanthium spinosum</i>                     | Bathurst Burr            | x                     |                             |                  |

