Richmond Valley Council

Jabiru Geneebeinga Wetlands

Casino North Eastern NSW

Management Plan (2022)

Prepared by Richmond Valley Council

June 2022

ADOPTED 28 June 2022

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1 INTRODUCTION

The management plan area for the Jabiru Geneebeinga Wetlands is located on part of Lot 7021 DP 1059188 owned by Crown Lands and managed by Richmond Valley Council. The site forms part of D540048 dedicated for public recreation gazetted 20 February 1874 as shown in Figure 1, 2 & 3.

This document focuses specifically the area identified as the current management area of Jabiru Geneebeinga Wetlands as shown in Figure 1. Future expansion of Jabiru Geneebeinga Wetlands with the existing adjoining wetlands within Richmond Park Wildlife Refuge (see Figure 4 and 7) is to be considered through the future development and of a site Master Plan and managed in accordance with the Plan of Management.

Figure 1: Current Management Area of Jabiru Geneebeinga Wetlands

The site is broadly known as Richmond Park managed by Richmond Valley Council as show in Figure 2 & 3, incorporates D540048 dedicated for public recreation gazetted 20 February 1874, and R89614 reserved for promotion of the study and the preservation of native flora and fauna gazetted 10 October 1975. This land includes the parcels including Lot 7021 DP 1059188 and part Lots 237-240 DP755727.

Figure 2. Richmond Park managed by Richmond Valley Council.

Figure 3: Crown Reserve Details

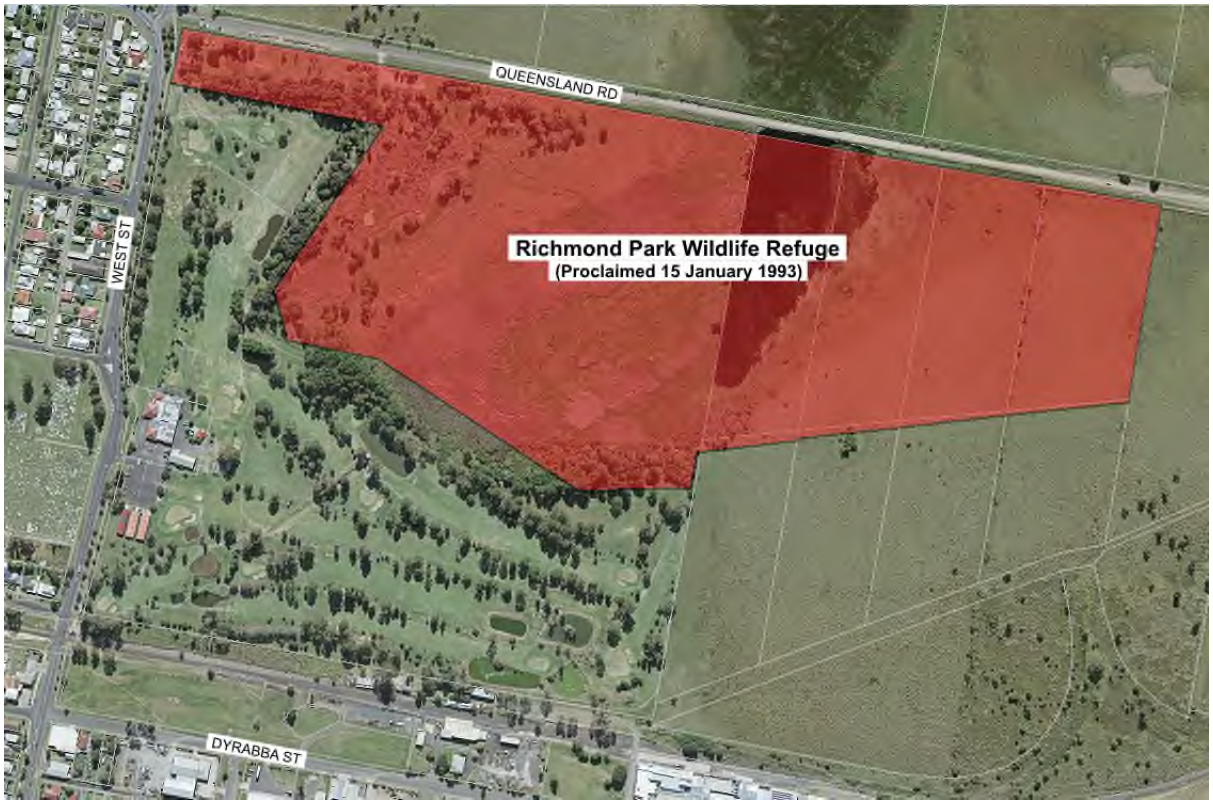

Figure 4: Richmond Park Wildlife Refuge, Proclaimed 15 January 1993

The Casino Municipality Council as trustees for Richmond Park applied to the National Parks and Wildlife Services in 1986 for part of the property to be proclaimed a wildlife refuge. This area was recognised as especially important as it contains seasonal freshwater swamps and meadows which offer refuge to rare and endangered birds such as the Jabiru, Japanese Snipe and Golden-headed Cisticola.

National Parks and Wildlife proclaimed via government gazette 15 January 1993 a total area of 34.63 ha to be known as “Richmond Park Wildlife Refuge” as shown in Figure 4.

The Jabiru Geneebeinga Wetlands forms of the Richmond Park Wildlife Refuge area. This is a natural habitat providing sanctuary for native birds and other wildlife. Jabiru Geneebeinga Wetlands was the subject of a master plan drawing prepared by Mick Thorman in 1987 for development of the site, refer to Figure 5.

Richmond Park was redeveloped in 1988 in a bicentennial project which provided recreational facilities for the local community and visitors. The pond construction adjoining existing wetlands and plantings to enhance and provide a wildlife refuge providing habitat particularly for native animals and birdlife.

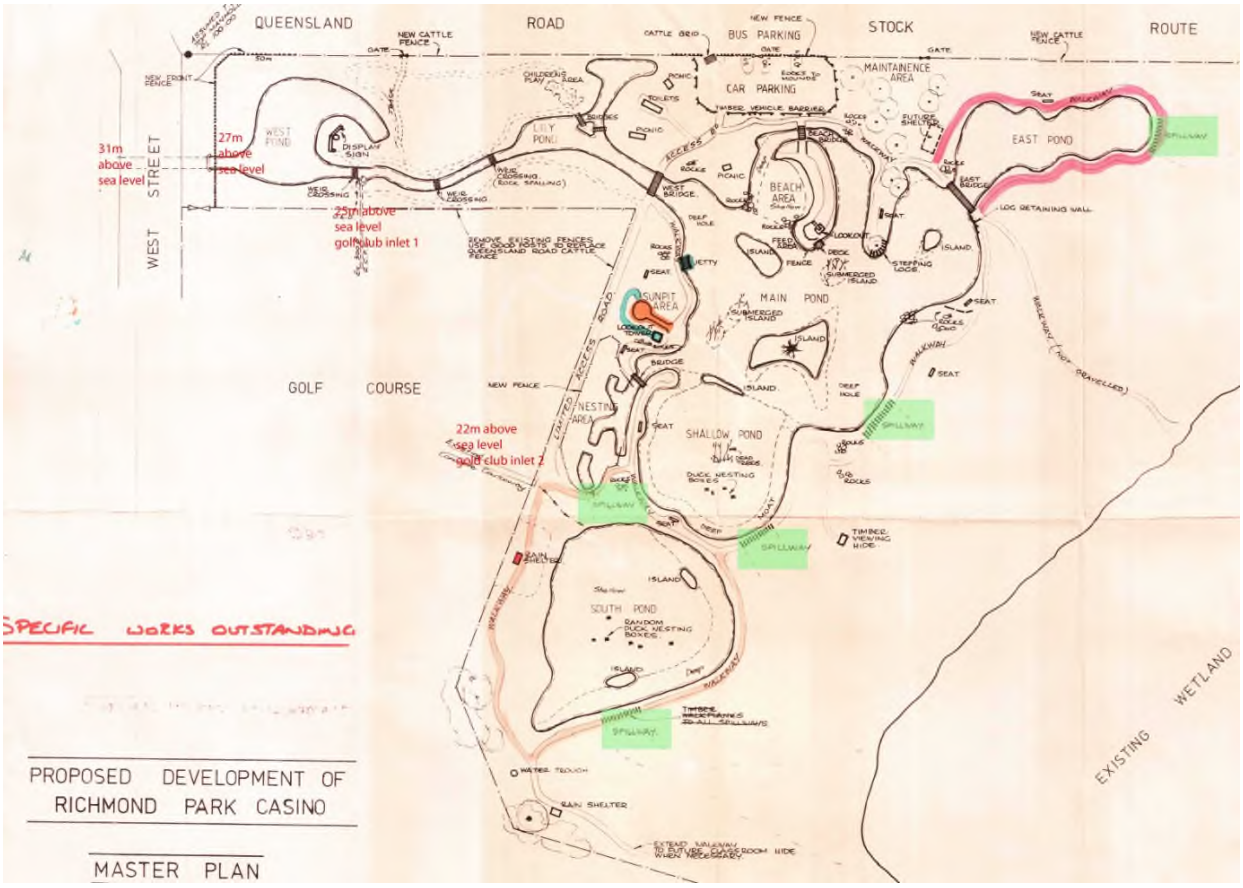

Figure 5. Master plan drawing for Richmond Park prepared by Mick Thorman in 1987

In line with provisions of the NSW *Crown Land Management Act 2016* Richmond Valley Council is required to develop Plans of Management for Crown reserves that they manage on behalf of their communities. Development of these plans of management is separate to this management planning process which focuses on operational management of Jabiru Geneebeinga Wetlands, i.e. part of D540048 (purpose: public recreation) being part lot 7021 DP 1059188, refer to Figure 1.

Richmond Valley Council commissioned preparation of this plan to meet organisational requirements following draft plans prepared for the wetland by Chapman (1995), the Jabiru Geneebeinga Wetlands Restoration Group and Southern Cross Geoscience (2020), and management planning studies by Lovell (2019) and Jesser (2018).

Figure 6. Constructed ponds and surrounding current management area

1.1 Aim

To guide works and activities by Richmond Valley Council and other stakeholders at Jabiru Geneebeinga Wetlands to maintain and improve ecological, hydrological, recreational and educational values and functions.

1.2 Objectives

- To promote community visitation and use
- To maintain and improve Jabiru biodiversity values
- To control exotic weeds which displace native plant species
- To undertake plantings of locally-occurring native species
- To maintain and improve infrastructure for the benefit of site users
- To promote management partnerships and source funds to implement priority activities
- To promote educational use and research for improved understanding of wetland processes and functions

1.3 Key Stakeholders

- Richmond Valley Council as land manager
- NSW Department of Planning, Industry and Environment, Crown Lands as landowner of Jabiru Geneebeinga Wetlands and adjoining lands

1.4 Other Stakeholders

- Jabiru Geneebeinga Wetlands Restoration Group with members who voluntarily work to rehabilitate the wetlands
- Casino Boolangle Local Aboriginal Land Council and Galibal People within the Bundjalung Nation who are traditional owners of the land and have a cultural attachment to it having contributed to its design and construction. A registered Aboriginal Land Claim has been registered by the traditional owners over land which includes Jabiru Geneebeinga Wetlands
- Southern Cross University (SCU)
- NSW Biodiversity Conservation Trust
- Casino Mini Rail, a volunteer group which operate trains from Jabiru Geneebeinga Wetlands on weekends as part of a tourist operation
- Casino Golf Club which adjoins Jabiru Geneebeinga Wetlands as part of the same Crown Land lot
- Adjoining private landholders
- Rous County Council is the regional weed biosecurity authority which monitors an Alligator Weed infestation located to the northeast of the Main Pond
- Corrective Services NSW which conducts coordinated site maintenance activities
- Site users including local birdwatching individuals and groups that take a keen interest in birdlife at the wetland and visit periodically, e.g. Brunswick Valley Birdwatchers and Byron Bird Buddies
- The Border Ranges - Richmond Valley Landcare Network (BRRVLN). An incorporated non-profit alliance of community based Landcare, farming and natural resource management groups. BRRVLN supports and works with groups for effective natural resource stewardship (potential future stakeholder)
- Richmond Landcare Inc., acts as an umbrella and lobby group for regional Landcare and natural resource management groups, provides information on natural resource management issues, provides environmental training and educational opportunities (potential future stakeholder).

1.5 Consultation

Consultation is recognised as being essential for the success of this plan. All stakeholders are to be invited to make submissions on draft/s of this plan. Importantly, continued consultation in decision-making around site improvements is essential with traditional owners of the land, i.e. the Casino Boolangle Local Aboriginal Land Council and Galibal People within the Bundjalung Nation.

1.6 Wetland values

Wetlands are areas of land that are wet by surface water or groundwater, or both, for long enough periods that the plants and animals in them are adapted to, and depend on, moist conditions for at least part of their lifecycle. They include areas that are inundated cyclically, intermittently or permanently with fresh, brackish or saline water, which is generally still or slow moving. Many wetlands are ephemeral, i.e. they are not always wet. Ephemeral wetlands occur on many riverine systems where temporary flood retention leads to significant flood supported ecosystems (DECCW 2010).

Wetlands are among the most valuable and productive ecosystems in the world. They are significant for their ecological, hydrological, social and economic values. Functioning wetlands can be a critical part of the environment as they support a high level of biological productivity and diversity, provide habitat for flora and fauna including rare and threatened communities and species, maintain local and regional hydrological regimes, remove nutrients and pollutants, act as stores for rain, sediment and flood waters and support human activities and values (DEC 2008).

Jesser (2018) and Lovell (2019) provide comprehensive literature reviews of wetland values and environmental services with a focus on Jabiru Geneebeinga Wetlands.

2 THE NATURAL ENVIRONMENT

Jabiru Geneebeinga Wetlands are located on the Richmond River floodplain in northeast NSW which is the largest coastal floodplain on the NSW coast. Floodplains are dynamic environments and the wetland is subject to periodic flooding and periods of drought which cause dramatic variations in water levels. Floodplains are generally rich in biodiversity and the wetland site supports a range of flora and fauna which can be expected to vary over time in line with climate conditions.

Casino experiences an average annual rainfall of 1098mm with the highest mean rainfall concentrated mostly over the warmer months between December and March and lowest mean rainfall between July and September (BoM 2020).

Floodplain soils at Jabiru Geneebeinga Wetlands are classed as Vertosols (Morrand D., Senior Scientist; Land and Soil Assessment, Environment, Energy and Science; NSW Department of Planning, Industry and Environment; Pers. Comm., 03/11/20). Vertisol soils, often referred to as cracking, expansive or reactive clays. These are clay soils with shrink-swell properties that exhibit strong cracking when dry. The surface soil is often a light clay (greater than 35% clay) and the subsoil usually ranges from a light medium to heavy clay (CSIRO 2016).

2.1 Flora

Vegetation within ponds is influenced by factors such as pond size, nutrient levels and waterlogging frequency, duration and depth. Species abundances within ponds are likely to vary over time in response to varying water levels associated with varying rainfall and stormwater inflow.

A range of herbaceous freshwater wetland waterplants occur within ponds, refer to Appendices 1 and 2 which list naturally occurring native and exotic plant species recorded on site and indications of relative cover and abundance.

Broad-leaved Cumbungi (*Typha orientalis*) and emergent sedges, rushes and knotweeds dominate pond edges and relatively shallow areas. Free floating, e.g. Red Azolla (*Azolla pinnata*) and rooted (attached) floating waterplants, e.g. Water Snowflake (*Nymphoides indica*) dominate relatively deep ponded areas. Mostly dry areas surrounding ponds are dominated by grassland with a range of native and exotic grass species suited to varying levels of inundation. There are currently insufficient resources available for the control of the aquatic weed species Glush Weed and Parrots Feather which are considered to be naturalised in ponds. A survey of submerged aquatic plants within ponds has not been conducted.

The aquatic vegetation community within ponds is considered to be suitably located within the floodplain landscape and have the structural and floristic integrity to be described as the NSW listed Endangered Ecological Community (EEC) Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, hereafter referred to as Freshwater Wetlands EEC, (NSW DPIE 2019). Naturally-occurring native species recorded within and verging ponds that are consistent with Freshwater Wetlands EEC include Broad-leaved Cumbungi (*Typha orientalis*), Jointed Twig-rush (*Baumea articulata*), Common Spikerush (*Eleocharis acuta*), Tassel Sedge (*Carex fascicularis*), Hairy Knotweed (*Persicaria attenuata*), Slender Knotweed (*Persicaria decipiens*), Water Primrose (*Ludwigia peploides subsp. montevidensis*), Water Snowflake (*Nymphoides indica*) and Red Azolla (*Azolla pinnata*).

Note that only a preliminary vegetation assessment has been done of ponds. More Freshwater Wetlands EEC species will be recorded following more detailed survey within ponds.

The NSW Scientific Committee confirmed that the constructed nature of the ponds does not exclude their plant communities from the Freshwater Wetland EEC. NSW DPIE (2019) note that 'Artificial wetlands created on previously dry land specifically for purposes such as sewerage treatment, stormwater management and farm production, are not regarded as part of this community'.

Much of the vegetation community verging ponds is similarly considered to be suitably located within the floodplain landscape and have the structural and floristic integrity to be described as the NSW listed EEC Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions, hereafter referred to as Swamp Sclerophyll Forest EEC, (NSW DPIE 2019b). Swamp Sclerophyll Forest EEC often fringes floodplain lagoons or wetlands with semi-permanent standing water.

Naturally-occurring native species recorded adjoining ponds that are consistent with Swamp Sclerophyll Forest EEC include Swamp Mahogany (*Eucalyptus robusta*), Black She-oak (*Allocasuarina littoralis*), Swamp Oak (*Casuarina glauca*), Narrow-leaved Paperbark (*Melaleuca linariifolia*), Broad-leaved Paperbark (*Melaleuca quinquenervia*), Prickly-leaved Paperbark (*Melaleuca styphelioides*), Common Silkpod (*Parsonsia straminea*), Jointed Twig-rush (*Baumea articulata*), Soft Bracken (*Calochlaena dubia*), Coffee Bush (*Breynia oblongifolia*) and Indian Pennywort (*Centella asiatica*). Note that only a preliminary vegetation assessment has been undertaken and there is likely to be more Swamp Sclerophyll Forest EEC species recorded following more detailed site survey.

Scattered environmental weeds occur throughout Jabiru Geneebeinga Wetlands both within constructed ponds (e.g. Groundsel Bush and Chinese Tallow Tree) and surrounding areas including on vegetated pond excavation spoil mounds (e.g. Asparagus and Passionfruit species). Any weed control within ponds by volunteers is proposed to be conducted in line with a Work Health and Safety (WHS) Plan to be prepared due to potential hazards of working in inundated areas.

A list of exotic plant species recorded on site, indications of relative cover abundance, weed status and control priorities are outlined in Appendix 2. North Coast Regional Strategic Weed Management Plan 2017-2022 (North Coast Local Land Services, 2017) identifies regional priority weeds of risk and outlines recommended responses to achieve desirable weed management outcomes in line with NSW Biosecurity Act 2015 following repeal of the Noxious Weeds Act 1993. Supporting detailed information regarding specific weeds is provided on the NSW Department of Primary Industries WeedWise website. Where

relevant, priority weeds and associated responses are noted in Appendix 2 in line with North Coast Local Land Services (2017).

2.2 Fauna

The wetland site was established as a wildlife refuge and supports a range of fauna. Shallow ponds with dense stands of Broad-leaved Cumbungi and land islands provide potential fauna foraging, roosting, nesting and sheltering habitats. Bird species records from the wetland by Brunswick Valley Birdwatchers between 2011 and 2017 are listed in Appendix 3. Continued interest in birdlife use and occupation are expected to see bird records updated by Brunswick Valley Birdwatchers (J. Lyons, Pers. Comm. 16/11/20).

The site supports a diversity of micro-invertebrates and macro-invertebrates within ponds and in vegetation verging ponds. The Eastern Snake-necked Turtle occupy pond environments and a range of snakes have been observed at the wetlands.

A number of threatened fauna species have been recorded at the site and in surrounding areas as per Bionet Atlas of NSW Wildlife threatened species records (Appendix 4). Threatened bird species include Black-necked Stork, Comb-crested Jacana, Freckled Duck, Blue-billed Duck and Magpie Goose. Threatened mammal species include the Koala and the Grey-headed Flying-fox.

Koala plantings to provide food resources for koalas was integral to redevelopment of the wetlands in 1988 as part of the bicentennial project. No koala scats were observed near the bases of preferred koala food tree species during October 2020 site inspections, although recent community sightings of koalas at the wetlands have been reported.

Threatened Grey-headed Flying-fox recorded in the locality roost in Richmond River riverine vegetation 2km to the south of the wetland. The species is considered likely to feed on flowering eucalypts and Broad-leaved Paperbark within the wetland, at least from time to time.

A single hollow-bearing dead tree with no obvious signs of fauna occupation was observed in the northeast portion of the site adjoining the East Pond. Fauna species that use and occupy the site and their habitat management would be informed by fauna surveys which may include formal scat searches (e.g. Koala), nocturnal spotlighting mammal surveys, diurnal tadpole and fish (including Mosquito Fish) surveys within ponds and nocturnal amphibian surveys in association with summer rainfall. Fauna surveys may follow or be guided by Survey Techniques for Citizen Scientists (Cleary et al, 2015).

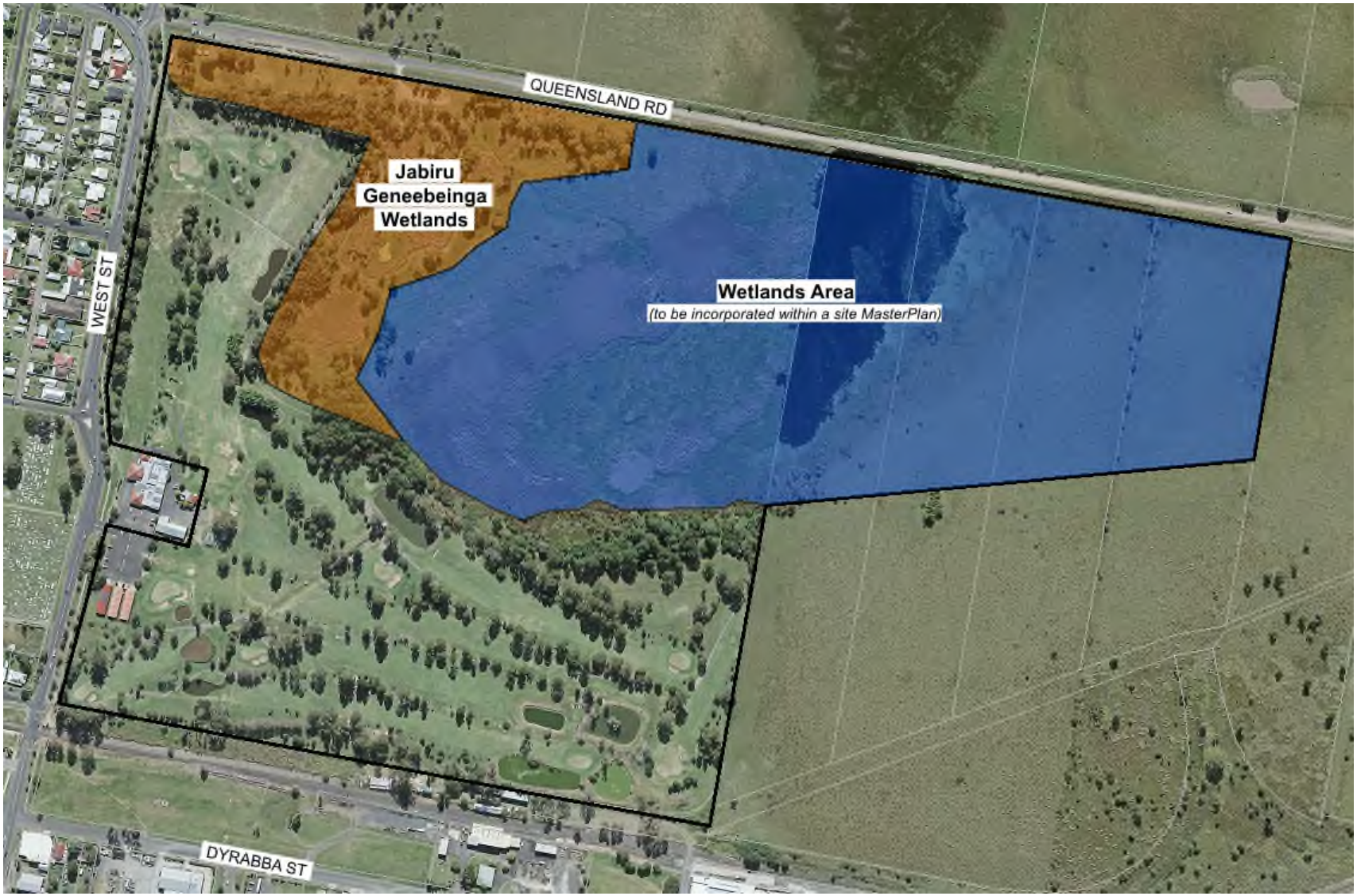

Figure 7 – Existing Jabiru Geneebeinga Wetlands and Natural Wetland Area.

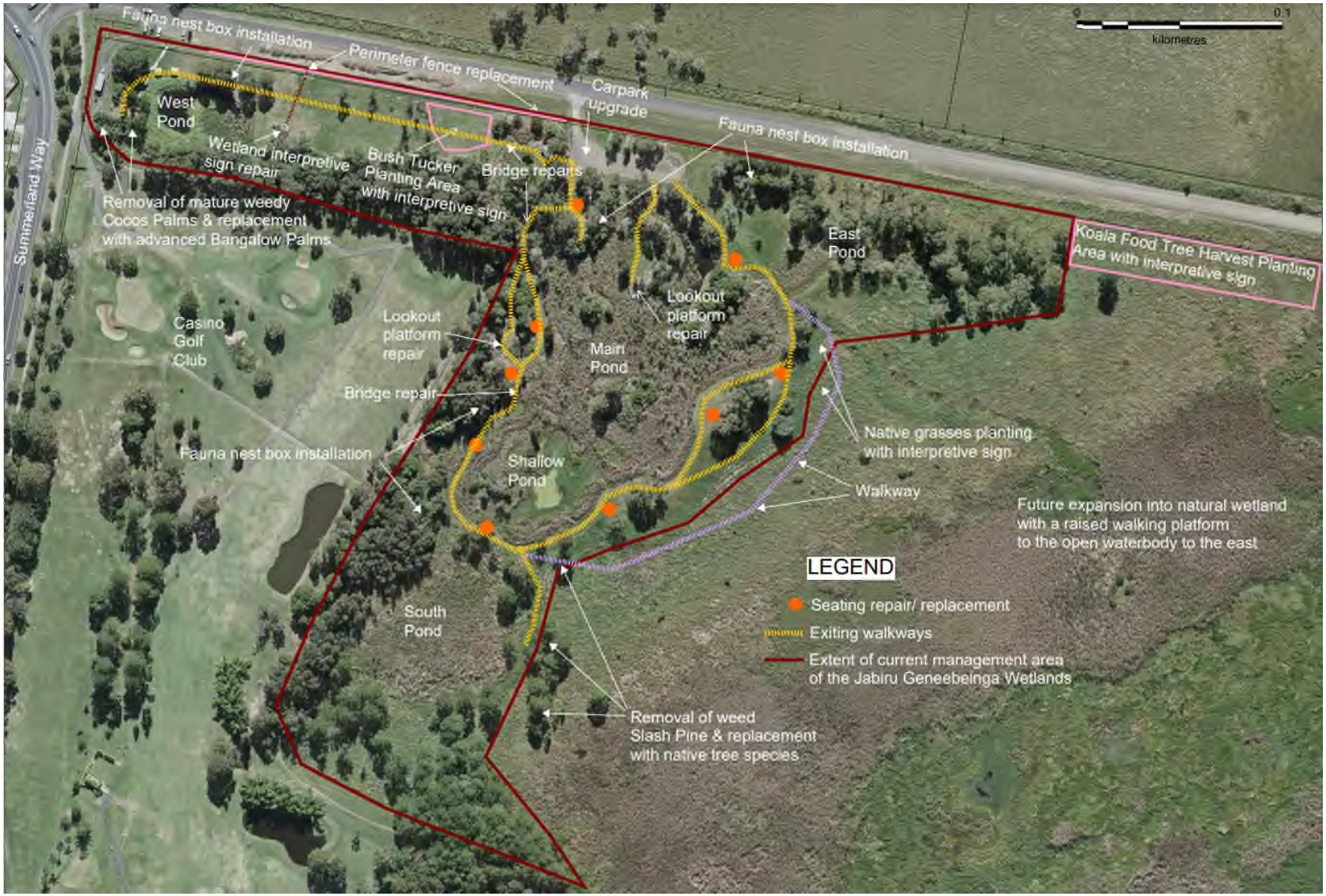

Figure 8. Proposed current and future works subject to funding availability and prioritisation

3 MANAGEMENT ISSUES AND ACTIVITIES

3.1 High nutrient and pollution loads in stormwater

The wetland is fed by stormwater runoff from urban areas, the adjoining golf course and land managed by the Northern Co-operative Meat Company. The stormwater inflow locations to the wetland site are shown in Figure 6. High nutrient loads cause algal blooms and eutrophication resulting in oxygen depletion of water in ponds after the bacterial degradation of algae in ponds. An algal bloom was evident in mid October 2020 in the West Pond which receives stormwater runoff from the urban area to the west.

Water quality monitoring was undertaken at the site between 2017 and 2020. Jesser (2018) found elevated levels of nitrogen, phosphorus and faecal coliforms in ponds. Lovell (2019) advocates for any upgrades to include pollutant traps and other Water Sensitive Urban Design measures for stormwater management.

Council budget funding and external funding will continue to be sought for Water Sensitive Urban Design (WSUD) measures and pollutant traps as part of upgrades of stormwater infrastructure flowing to the site.

3.2 Pond siltation and shallowing

Stormwater flowing to Jabiru Geneebeinga Wetlands from urban areas, the golf course and land managed by the Northern Co-operative Meat Company contributes to pond sediment loads. Concern has been raised that pond shallowing has reduced habitat values for the Jabiru (Black-necked Stork) and Black Swan. The extent of siltation and shallowing in ponds and potential ecological impacts of pond excavation are however unclear.

Funds have been sourced from a successful funding application to control weeds, mechanically excavate ponds and replant native species. Environmental impact mitigation measures were prepared by Arbor Ecological (2020) to assist with proposed mechanical excavation of sediments and weeds within ponds as part of a successful funding application. However, the proposed mechanical excavation works were not approved by Council due to the ecological sensitivity of pond environments and potential ecological impacts.

Chapman (1995, pers. comm.) noted a substantial decline in bird species and their habitats associated with mechanical dredging of sediments, weeds and reeds in 1995.

A precautionary approach is proposed future sediment excavation with any benefits weighed up against the loss of native fauna habitats. This issue has been identified as a priority research matter requiring further information.

3.3 Maintenance and improvement of biodiversity values

Construction of ponds and plantings has created conditions suitable for a diverse range of flora and fauna, particularly birdlife. Preliminary lists of native and exotic flora and fauna species are included in Appendices 1, 2 and 3. It is anticipated that these lists will be added to over time, particularly as there is currently a lack of comprehensive information on fauna habitat use and occupation which can be expected to vary over time in line with changing conditions at the wetland.

The following activities are proposed to address maintenance and improvement of biodiversity values:

- Conduct fauna surveys which may include formal koala scat searches, nocturnal spotlighting mammal surveys, diurnal tadpole and fish (including Mosquito Fish) surveys within ponds and nocturnal amphibian surveys in association with summer rainfall. Fauna surveys may follow or be guided by Survey Techniques for Citizen Scientists (Cleary et al, 2015)
- Source, install and monitor suitable fauna nest boxes in prominent strategic locations targeting locally-occurring hollow-dependant bird species (including ducks) and arboreal mammals such as possums and gliders, refer to Figure 8
- Continued control of priority weeds (see below)
- Volunteers will gain approval from Council's Coordinator-Open Spaces in regard to any tree removal
- Liaise with traditional owners of the land, i.e. Galibal People within the Bundjalung Nation, to develop a bush tucker planting area
- Continue to conduct endemic native plantings and infill plantings in strategic locations
- Expand koala habitat plantings at the wetland and establish a koala food tree harvest planting area in association with Friends of the Koala (FoK) in open areas adjoining the north eastern site boundary, refer to Figure 8
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3.4 Exotic weed infestations

Numerous weeds persist at Jabiru Geneebeinga Wetlands in varying levels of abundance and cover, refer to Appendix 2. Some weed species are considered to be naturalised since their control is not practical with available resources, particularly pond weeds. Weed control continues to be undertaken volunteers at the site. Control priorities are identified in Appendix 2.

A funding application to the NSW Government was submitted in mid October 2020 for control of Chinese Tallow, Coral Tree, Climbing Asparagus, and Groundsel Bush at Jabiru Geneebeinga

Wetlands and adjoining land. Due to safety hazards, professional weed control is proposed of weeds such as Chinese Tallow, Groundsel Bush and Lantana in relatively inaccessible areas within ponded areas.

A noxious Alligator Weed infestation located to the northeast of the Main Pond is monitored and periodically controlled by Rous County Council, the regional weed biosecurity authority, particularly during Summer and Autumn active growth periods.

The following activities are proposed to address exotic weed infestations:

- Source chemical-use training for volunteers applying herbicides for best practice weed control
- Contract a professional bush regenerator to work with volunteers in best practice weed control methods
- Continue to liaise with Rous County Council over the Alligator Weed infestation and its control in the Main Pond
- Continued control of priority weeds

3.5 Increasing abundance of Broad-leaved Paperbark

The locally-occurring wetland species Broad-leaved Paperbark (*Melaleuca quinquenervia*) is opportunistically encroaching into shallow inundated areas of the Main Pond and potentially reducing plant diversity by displacing reeds and rushes. Concern has been raised that Broad-leaved Paperbark transpire large amounts of water from the ponds and trap sediment causing the ponds to become dryer and shallower than they would otherwise be.

Broad-leaved Paperbark supply a rich source of nectar and pollen, particularly for native birds, bees, butterflies and mammals including the locally-occurring threatened Grey-headed Flying-fox. The food source is especially valuable over the winter period when nectar and pollen food resources may be scarce. Broad-leaved Paperbark is also recognised as a koala food tree species.

The following activities are proposed to address the increasing abundance of Broad-leaved Paperbark:

- Identify and map locations in the Main Pond where Broad-leaved Paperbark are excessively reproducing and dominating plant cover
- Prepare and communicate a method guideline for staged removal of only young sapling Broad-leaved Paperbark, i.e. not semi-mature and mature trees
- Remove young sapling Broad-leaved Paperbark in line with the guideline and photo monitor (before and after photos) any obvious changes in vegetation cover. Works are planned to follow removal of Chinese Tallow, Groundsel Bush and Lantana in the Main Pond

There is currently a lack of comprehensive information on fauna habitat use and occupation of Jabiru Geneebeinga Wetlands. A precautionary approach is proposed, and any benefits of mature Broad-leaved Paperbark removal need to be weighed up against the loss of native fauna habitats. This issue has been identified as a priority research matter requiring further information.

3.6 Loss of bird habitat from grass removal

Native and exotic grasses provide food and shelter resources for birds such as finches (e.g., Plum-headed Finch, Red-browed Finch, Chestnut-breasted Mannikin and Double-barred Finch) rails and crakes (e.g. Buff-banded Rail, Lewin's Rail and Spotless Crake), and herons and bitterns (e.g. Little Bittern and White-faced Heron).

A best practice guideline for mechanical and chemical grass control (i.e. grassland mowing, brush-cutting/ whipper-snipping and herbicide spraying) has been prepared (refer to Appendix 5) for Council maintenance staff and volunteers working at the wetland to promote bird habitat by retaining native and exotic grasses adjacent to ponds. Allowing for a 500mm (50Cm) grass buffer around the ponds will act as a barrier to cane toads gaining entry to the ponds.

3.7 Infrastructure maintenance and improvements

Much of the infrastructure at the wetland requires maintenance, repair or replacement to improve visitor experiences. This includes timber bird-viewing platforms, bird-hides, seating, shelters/ picnic areas and bridges. Figure 5 and Lovel (2019) show the locations of wetland infrastructure from the 1988 Richmond Park redevelopment bicentennial project.

Development of new infrastructure at Jabiru Geneebeinga Wetlands is limited by available funding and provisions of the *Aboriginal Land Rights Act 1983* following a registered Aboriginal Land Claim over land which includes Jabiru Geneebeinga Wetlands.

Activities proposed to address infrastructure maintenance and improvements are as follows:

- Prioritise and cost maintenance and repairs to existing infrastructure
- Council maintenance budget reviewed, and priority infrastructure items included for funding
- Continued maintenance, repairs and replacement to existing infrastructure, refer to Figure 8
- External funding opportunities identified, and funding applications prepared and submitted for priority infrastructure improvements
- Develop a proposal with costings for interpretive signage of site values and natural features including sign installation

- Review visitor safety around ponds including signage

Richmond Valley Council continues to conduct routine maintenance at Jabiru Geneebeinga Wetlands by way of grass mowing, removal of rubbish and debris, carpark maintenance and servicing of toilets.

3.8 Vandalism and rubbish dumping

Vandalism and illegal fires have degraded timber structures and other infrastructure assets. Rubbish dumping continues to be a maintenance issue for Council and the dumping of garden waste contributes to the introduction and spread of garden escapee exotic weeds.

Effective signage and community education initiatives has potential to greatly reduce vandalism and rubbish dumping. It is proposed that signage and community education opportunities and initiatives be reviewed by Council to reduce vandalism and rubbish dumping.

3.9 Limited funding availability

Available funds are limited for site maintenance and improvements such as infrastructure repairs and weed control within ponds and for bulky weeds such as mature Cocos Palms. Partnered and supported funding applications between stakeholders has potential to substantially progress plan objectives and priority activities in these regards.

3.10 Impacts of Climate Change

Increasingly extreme weather events are expected to bring more severe temperatures, droughts and floods in the future in association with climate change. Vegetation communities and fauna habitats are likely to be altered as a consequence.

Vegetation communities throughout the region have recently experienced two years of below average rainfall which have impacted pond water levels and habitat conditions at the wetland. While managers need to be mindful of climate change impacts, planning for climate change is beyond the scope of this plan.

3.11 Volunteers working in the Wetlands (WHS)

Council will induct suitable individuals and groups working in the wetlands. It will be the responsibility of the group coordinators/leaders to ensure all volunteers have been inducted prior to commencing work within the wetland area.

Risk assessments are to be conducted by group coordinators/leaders being responsible to communicate WHS requirements and risks to volunteers working in the wetland on any given day.
Group coordinators/leaders are to ensure volunteers have the appropriate chemical use training prior to the use and the handling of any chemicals.

Appropriate personal protection equipment (PPE) shall be worn by all volunteers. It is the responsibility of the group coordinators/leaders to supervise PPE in accordance with Councils WHS policies and procedures.

4 MANAGEMENT ACTIVITIES IMPLEMENTATION

Table 1 outlines management activities along with priorities and indications of timeframes and performance criteria. Richmond Valley Council is primarily responsible for implementation of management activities in partnership with stakeholders. Implementation of several activities is subject to funding availability as indicated.

Table 1. Implementation of management activities

Objective/s	Management Activity	Priority & Timeframe	Performance Criteria
To promote community visitation and use To maintain and improve infrastructure for the benefit of site users	Review visitor safety around ponds including signage	High	Visitor safety around ponds reviewed and safety measures implemented
	Council maintenance budget reviewed and priority infrastructure items included for funding	High Annually	Priority infrastructure maintenance funds secured within Council's budget
	Continued maintenance and repairs to existing infrastructure, refer to Figure 8	High Ongoing	Existing infrastructure maintained and repaired in line with priorities, Council's budget and funding availability
	External funding opportunities identified and funding applications prepared and submitted for priority infrastructure improvements	High Ongoing	Funding applications prepared and submitted for priority infrastructure improvements External funds sourced and priority projects implemented
	Develop a proposal with costings for interpretive signage of site values and natural features including sign installation	Medium 18 months (proposal) 2 years (installation)	Proposal prepared Interpretive signage installed subject to funding availability
	Prioritise and cost maintenance and repairs to existing infrastructure	Medium 6 months	Priority infrastructure maintenance and repairs identified and costed
	Review signage and community education initiatives and opportunities to reduce vandalism and rubbish dumping	Medium Ongoing	Problematic vandalism and rubbish dumping reduced

Objective/s	Management Activity	Priority & Timeframe	Performance Criteria
To maintain and improve biodiversity values	Develop and communicate a Work Health and Safety (WHS) Plan for volunteers working at the wetlands	High 6 months	Work Health and Safety (WHS) Plan developed and communicated for volunteers working at the wetlands
	Volunteers to liase with Council's Coordinator-Open Spaces in regard to any tree removal at the wetlands	Medium Ongoing	Tree removal at the wetlands only to occur in liaison with Council's Coordinator-Open Spaces
	Conduct fauna surveys which may include formal koala scat searches, nocturnal spotlighting mammal surveys, diurnal tadpole and fish (including Mosquito Fish) surveys within ponds and nocturnal amphibian surveys in association with summer rainfall	Medium 1 year	Fauna surveys conducted to inform management activities
	Remove young sapling Broad-leaved Paperbark in line with the guideline and photo monitor (before and after photos) impacts following removal of Chinese Tallow, Groundsel Bush and Lantana in the Main Pond	Medium 2 years Ongoing	Sapling Broad-leaved Paperbark removed in line with the guideline and photo monitoring conducted

Objective/s	Management Activity	Priority & Timeframe	Performance Criteria
	Identify and map locations in the Main Pond where Broad-leaved Paperbark are excessively reproducing and dominating plant cover	Medium 1 year	Problematic Broad-leaved Paperbark areas identified and mapped
	Prepare and communicate a method guideline for staged removal of only young sapling Broad-leaved Paperbark, i.e. not semi-mature and mature trees	Medium 1 year	Method guideline prepared and communicated for staged removal of encroaching sapling Broad-leaved Paperbark
	Continue to conduct endemic native plantings and infill plantings in strategic locations	Medium 2 years Ongoing	Endemic native plantings and infill plantings established in line with Planting Methods Guideline below
	Source, install and monitor suitable fauna nest boxes in prominent strategic locations targeting locally-occurring hollow-dependant bird species (including ducks) and arboreal mammals such as possums and gliders	Low 2 years	Suitable fauna nest boxes installed in prominent strategic locations at Jabiru Geneebeinga Wetlands subject to funding availability
To control exotic weeds which displace native plant species	Source chemical-use training for volunteers applying herbicides for best practice weed control	High 6 months	Volunteer workers applying herbicides appropriately trained in safe chemical use subject to funding availability

Objective/s	Management Activity	Priority & Timeframe	Performance Criteria
To maintain and improve biodiversity values	Contract a professional bush regenerator/s to work with volunteers in best practice weed control methods	Medium 1 year	Professional bush regenerator/s to work with volunteers in best practice weed control methods subject to funding availability
	Continue to liaise with Rous County Council over the Alligator Weed infestation and its control in the Main Pond	Medium Ongoing	Alligator Weed continues to be controlled and infestation is reduced or eliminated
	Continued control of priority weeds in the wetland	Medium Ongoing	Problematic weeds continue to be controlled and infestations reduced in line with control priorities
To establish plantings of locally-occurring native species	Liaise with traditional owners of the land, i.e. Galibal People within the Bundjalung Nation, to develop a bush tucker planting area	Low 2 to 3 years	Bush tucker planting area established in suitable location subject to funding availability
	Establish a Koala Food Tree Harvest planting area in association with Friends of the Koala (FoK) in open area adjoining the northern site boundary, refer to Figure 8	Low 2 to 3 years	Koala Food Tree Harvest planting area established in open area adjoining the northern site boundary
	Continue to conduct endemic native plantings and infill plantings in strategic locations	Medium 2 years Ongoing	Endemic native plantings and infill plantings established in line with Planting Methods Guideline below
To promote educational use and research for improved understanding of wetland processes and functions	Develop priority research projects in partnership with Southern Cross University and SCU students	Medium Ongoing	Research partnership projects with educational facilities such as Southern Cross University

Objective/s	Management Activity	Priority & Timeframe	Performance Criteria
	Develop a proposal with costings for interpretive signage of site values including installation	Medium 18 months (proposal) 2 years (installation)	Proposal prepared Interpretive signage installed
To promote management partnerships and source funds to implement priority activities	External funding opportunities to implement priority activities identified and funding applications prepared	High Ongoing	Funding applications prepared and submitted for priority activities. External funds sourced and priority projects implemented
	Expression of interest advertised for local environmental groups and community groups to be involved in the future care of the wetland	Medium 1 year	Volunteers working at the site remain informed of relevant Natural Resource Management issues and practices
	Annually review implementation of management activities and new and changing priorities	Medium Annually Ongoing	Activity implementation and outcomes highlighted and new and changing priorities identified

4.1 Environmental Weed Control

- Weed control is to continue in line with best practice methods detailed in CRC for Australian Weed Management (2005), BSRLG (2019) and DPI (2018), and undertaken by or under the supervision of appropriately trained and experienced personnel
- Only glyphosate that is registered for aquatic situations is to be used for weed control,
- Any use of herbicides within and directly adjoining ponds should be supervised by persons trained in safe chemical use and herbicides used should be formulated for use around waterways, e.g. Roundup® Bioactive™ or Weedmaster® Duo™ which contain surfactant of low toxicity for aquatic fauna such as fish, tadpoles and daphnids.
- Volunteer workers conducting weed control are encouraged to undertake chemical use training as a minimum
- Volunteer workers are encouraged to work with professional bush regenerator/s in line with Work Health and Safety measures where funds have been secured to contract professional bush regenerator/s to undertake weed control works, e.g. within ponds

4.2 Planting Methods Guideline

Planting methods of native species endemic to the local area are to follow Best Management Practices as recommended in relevant parts of Section 5 Rainforest Restoration Planting in BSRLG (2019). The following planting management guidelines are proposed:

Site preparation including spot-spraying around planting holes with glyphosate herbicide. Use of tree guards should be considered for protection against any problematic browsing fauna

Sourcing planting stock. Tubestock is to be sourced where practical from nurseries in the Casino district (or adjoining areas) growing local provenance nursery stock. High quality tubestock should be used between 50mm diameter x 125mm deep and 100mm diameter x 140mm deep, depending on local nursery availability

Planting, water crystals and fertiliser. Planting holes should be approximately twice as large as the pot. Plants should be placed approximately 1cm below the natural soil surface and back-filled leaving a rim of soil formed around the plant to allow water to be retained. Saturated water crystals and slow release fertiliser with a NPK ratio in the order of 1:1:1 are recommended to be added to planting holes at the recommended rate to promote early root growth. Fertiliser should not be added to species sensitive to fertiliser, e.g. Proteaceae and wattle species.

Watering & mulching – Water should be applied liberally following planting and during dry periods until the plant becomes established and is actively growing. Baled straw, tea-tree mulch or weathered forest/ chipper mulch which is free of weed and grass seed is recommended be used around all plantings at a thickness of up to 150mm and kept free from the planting stem

Maintenance, Monitoring and Evaluation, and Adaptive Management. Supplementary watering; weed and grass control; and follow-up mulching and fertilising is recommended as required to support healthy plant growth and development. Regular inspections are recommended for any animal grazing of plantings or diseased and dead plantings which should be replaced as required.

5 MANAGEMENT PLAN REVIEW AND UPDATE

This management plan is intended to be periodically reviewed and updated as required so that it continues to remain current and meet management needs. Reviews and updates may be triggered by new information coming to hand and changing management issues and priority activities. An annual review is proposed of activities achieved and any new and changed plans for activities and priorities. This will inform requirements for management plan updates.

6 FUTURE PLANS FOR JABIRU GENEEBEINGA WETLAND

A full design of the future plans for the Jabiru Geneebeinga Wetland is proposed to be captured within a site masterplan in consultation with the community and relevant stakeholders. Future plans for the Jabiru Geneebeinga wetland management area shown in Figure 7 and 8 which include proposals such as but not limited to:-

- Jabiru Geneebeinga Wetland to incorporate the management responsibility of the natural wetland currently adjacent to the existing area.
- Koala food tree harvest area
- Fence replacement along Queensland Rd
- Bush tucker planting areas
- Interpretive signage
- A new walkway with native grass plantings
- Viewing platform
- Installation or repair of new seating, platforms and hides
- Nest box installation
- Removal of exotic vegetation i.e. coccus palms and pines trees
- Car park upgrade
- Repair of Jabiru Geneebeinga wetland sign

These future plans and activities will be reliant on sufficient funding being available via grant successful applications. In regards to Richmond Park Wildlife Refuge, future plans for this area will need further consideration but it represents an opportunity to expand environmental works to the benefit of flora and fauna species in the area. The generation of a master plan for the refuge would be part of these considerations to allow for funding and expansions to be applied for.

7 REFERENCES

Arbor Ecological, 2020, *Environmental Impact Mitigation Measures for Pond Excavations*, Jabiru Geneebeinga Wetlands, Casino

Bureau of Meteorology (BoM), 2020, *Climate statistics for Australian locations*, accessed 05/11/20, www.bom.gov.au/

Big Scrub Rainforest Landcare Group (BSRLG) 2019, *Subtropical Rainforest Restoration – A practical manual and data source for Landcare groups, land managers and rainforest regenerators*, 3rd Ed., Big Scrub Rainforest Landcare Group, Mullumbimby NSW.

Chapman R. 1995, *Draft management plan for Jabiru Geneebeinga Wetlands Casino Northern New South Wales*. Undergraduate Integrated Project report, unpublished; School of Environment, Science and Engineering; Southern Cross University, Lismore.

Cleary G, Ortac G, Proft K, Law M, 2015, *Survey Techniques for Citizen Scientists*, National Parks Association of NSW (NPA), NPA Publications Pty Ltd, NSW.

Cooperative Research Centre (CRC) for Australian Weed Management, 2005, *Herbicides: guidelines for use in and around water*, Ref: 01/2005/gl

CSIRO, 2016, *The Australian Soil Classification*, 2nd Ed., CSIRO Publishing, Victoria.

Western Australian Department of Environment and Conservation, 2008, *Guidelines checklist for preparing a wetland management plan*, Western Australian Department of Environment and Conservation, Perth.

Jabiru Geneebeinga Wetlands Group and Southern Cross Geoscience, 2020, *Draft Plan of Management for the Maintenance and Rehabilitation Works: Jabiru Geneebeinga Wetlands Casino North Eastern NSW*, unpublished, September 2020

Jesser E. 2018, *A baseline study on the aquatic health of Jabiru Geneebeinga Wetlands and management recommendations*. Undergraduate Integrated Project report, unpublished; School of Environment, Science and Engineering; Southern Cross University, Lismore.

Lovell S. 2019, *Jabiru Geneebeinga Wetlands: Optimising a degraded constructed wetland for public utility*. Undergraduate Integrated Project report, unpublished; School of Environment, Science and Engineering; Southern Cross University, Lismore.

NSW Department of Environment, Climate Change and Water (DECCW), 2010, *NSW Wetlands Policy*, March 2010, DECCW Sydney NSW.

NSW Department of Planning, Industry and Environment (DPIE), 2019, *Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions – endangered ecological community listing*, NSW Scientific Committee - final determination, page last updated 27/05/19, accessed 20/10/20, www.environment.nsw.gov.au/

NSW Department of Planning, Industry and Environment (DPIE), 2019b, *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions – endangered ecological community listing*, NSW Scientific Committee - final determination, page last updated 27/05/19, accessed 20/10/20, www.environment.nsw.gov.au/

NSW Department of Primary Industries (DPI) 2018, *NSW Weed Control Handbook, A guide to weed control in non-crop, aquatic and bushland situations*, 7th Ed., Department of Primary Industries.

APPENDIX 1. NATURALLY OCCURRING NATIVE PLANT SPECIES

Scientific Name	Common Name	Cover Abundance[1]	Observations & Comments
Native Trees, Shrubs & Palms			
Allocasuarina littoralis	Black She-oak	2	
Alphitonia excelsa	Red Ash	3	
Callistemon viminalis	Weeping Bottlebrush	2	Planted and naturally occurring
Casuarina glauca	Swamp Oak	2	
Breynia oblongifolia	Coffee Bush	1	
Centella asiatica	Indian Pennywort	2	
Cupaniopsis anacardioides	Tuckeroo	4	
Eucalyptus microcorys	Tallowwood	1	Preferred koala food tree species; no koala scats detected near base
Eucalyptus robusta	Swamp Mahogany	3	Preferred koala food tree species; no koala scats detected near base
Eucalyptus siderophloia	Grey Ironbark	3	Preferred koala food tree species; no koala scats detected near base
Eucalyptus tereticornis	Forest Red Gum	3	Preferred koala food tree species; no koala scats detected near base
Ficus watkinsiana	Watkin's Fig	1	Juvenile trees near north-eastern carpark; may have been planted
Hymenosporum flavum	Native Frangipani	1	Trees near north-eastern carpark; may have been planted
Jagera pseudorhus	Foambark Tree	1	
Macaranga tanarius	Macaranga	1	
Melaleuca linariifolia	Snow-in-Summer, Narrow-leaved Paperbark	1	
Melaleuca quinquenervia	Broad-leaved Paperbark	5	Increasing abundance within and bordering constructed ponds

Scientific Name	Common Name	Cover Abundance[1]	Observations & Comments
Melaleuca styphelioides	Prickly-leaved Paperbark	1	
Melia azedarach	White Cedar	1	Northeast portion
Native Forbs, Sedges, Rushes, Grasses, Ferns, Vines, Mistletoes & Aquatic Plants			
Alternanthera denticulata	Lesser Joyweed	1	
Amyema congener	Variable Mistletoe	2	
Amyema sp.	A Mistletoe	2	
Alternanthera denticulata	Lesser Joyweed	2	
Azolla pinnata	Red Azolla	5	
Baumea articulata	Jointed Twig-rush	3	Mostly in northeast portion
Bothriochloa decipiens	Pitted Bluegrass	3	
Calochlaena dubia	Common Ground-Fern, Soft Bracken	1	
Carex fascicularis	Tassel Sedge	3	
Cassytha glabella	Slender Devil's Twine	2	Mostly in southeast portion
Centella asiatica	Indian Pennywort	4	
Chloris truncata	Windmill Grass	1	
Commelina cyanea	Blue Commelina/ Native Wandering Jew	3	
Cyperus difformis	Dirty Dora	1	
Cyperus exaltatus	Giant Sedge	2	
Cyperus polystachyos	Bunchy Sedge	1	
Einadia hastata	Berry Saltbush	3	
Eleocharis acuta	Common Spikerush	2	
Eriochloa procera	Spring Grass	2	
Juncus mollis	A Rush	1	In ponds
Juncus usitatus	Common Rush	2	In ponds and drainage lines
Lachnagrostis filiformis	Blowngrass	2	
Lobelia purpurascens	Whiteroot	1	
Ludwigia octovalvis	Willow Primrose	2	
Ludwigia peploides subsp. montevidensis	Water Primrose	4	In ponds and drainage lines
Microlaena stipoides	Weeping Grass	2	
Nymphoides indica	Water Snowflake	2	In ponds
Panicum decompositum	Native Millet	2	
Parsonsia straminea	Common Silkpod	3	
Persicaria attenuata	Hairy Knotweed	3	In ponds and drainage lines
Persicaria decipiens	Slender Knotweed	3	In ponds

Scientific Name	Common Name	Cover Abundance[1]	Observations & Comments
Platycerium bifurcatum	Elkhorn Fern	1	Epiphtic on Black She-Oak
Ricciocarpus natans	Liverwort	2	
Rumex brownii	Swamp Dock	2	
Typha orientalis	Broad-leaved Cumbungi	5	In ponds

Table Key

[1] **Cover abundance** assessment is indicative only and based on a modified version of the Braun-Blanquet scale (Poore 1955) using a five-point scale to express the relative abundance and/ or cover of plants for comparative purposes where 1 = < 3% (i.e. one or two individuals, very rare or very low cover); 2 = 4% to 15%; 3 = 16% to 30%; 4 = 31% to 45%; 5 = > 45% (i.e. common, abundant or high cover).

APPENDIX 2. EXOTIC PLANT SPECIES

Scientific Name	Common Name	Cover Abundance[1]	Control Priority[2]	Observations & Comments
Exotic Trees, Shrubs & Palms				
[C] *Baccharis halimifolia*	Groundsel Bush	2	High	Mostly in pond identified as *Shallow Pond*
[C] *Cestrum parqui*	Green Cestrum	1	High	Eastern portion/ edge
[NQ] *Corymbia torelliana*	Cadaghi	1	Low	Planted shade tree in the northwest corner near mini rail station; does not appear to be spreading; consider long-term replacement with native endemic ornamental shade species
[AP] *Duranta erecta*	Duranta	1	Medium	Several mature planted shrubs in the northwest corner near mini rail station; spreading; consider replacement with native endemic ornamental species
Jacaranda mimosifolia	Jacaranda	1	Low	Single planted tree near toilets; does not appear to be spreading; consider long-term replacement with native endemic ornamental species
[APS] [W] *Lantana camara*	Lantana	2	High	
Morus alba	White Mulberry	1	Low	
[AP] *Murraya paniculata*	Murraya/ Mock Orange	2	High	Northwest corner near mini rail station; spreading

Scientific Name	Common Name	Cover Abundance[1]	Control Priority[2]	Observations & Comments
[AP] *Ochna serrulata*	Ochna/ Mickey Mouse Plant	1	Medium	
[AP] *Pinus elliottii*	Slash Pine	2	Medium	Trees to be removed in south-eastern portion; large infestation in the natural wetland to the southeast
Senna pendula	Cassia	2	Medium	
Solanum mauritianum	Wild Tobacco Bush	1	Low	
[AP] *Syagrus romanzoffiana*	Cocos Palm	2	Low	Several mature planted palms in the northwest corner near mini rail station; spreading; consider replacement with native endemic ornamental species
[C] *Triadica sebifera*	Chinese Tallow Tree	2	High	Eastern portion; large infestation in wetland to the east
Exotic Forbs, Sedges, Grasses, Vines & Aquatic Plants				
Ageratum houstonianum	Blue Billygoat Weed	1	Medium	Mostly in northwest portion
[CS] *Alternanthera philoxeroides*	Alligator Weed	1	High	Isolated infestation in northeast of pond identified as *Main Pond*; FNCW to continue monitoring and treating this infestation
Ambrosia artemisiifolia	Annual Ragweed	4	Low	Annual
[APS] *Anredera cordifolia*	Madeira Vine	1	High	Isolated infestation northwest of South Pond
Apium leptophyllum	Wild Celery	3	N	
[AP] *Asparagus aethiopicus*	Ground Asparagus	1	Medium	Mostly in northwest portion
[AP] *Asparagus africanus*	Climbing Asparagus	3	High	Mostly in northwest portion
Bidens pilosa	Cobbler's Pegs, Farmer's Friend	4	Low	Annual
Canna indica	Canna Lily	1	Medium	Northwest corner in urban stormwater inlet; spreading locally
Cirsium vulgare	Spear Thistle	2	Low	Annual; mainly in northwest portion
Chloris gayana	Rhodes Grass	4	N	Naturalised; not practical to control; soil stabilising

Scientific Name	Common Name	Cover Abundance[1]	Control Priority[2]	Observations & Comments
Conyza bonariensis	Flaxleaf Fleabane	3	Low	Annual
Crassocephalum crepidioides	Thickhead	2	Low	Annual
Cyperus brevifolius	Mullumbimby Couch	1	Low	
Cyperus eragrostis	Umbrella Sedge	1	Low	
Euphorbia sp.	A Spurge	2	Low	
[C] *Hygrophila costata*	Glush Weed	5	N	Naturalised; not currently practical to control with available resources
Hyparrhenia hirta	Coolatai Grass	2	N	
Hypochaeris radicata	Cat's Ear/ Flatweed	2	N	
[C] *Ipomoea alba*	White Morning Glory/ Moonflower	1	High	Northeast; isolated
Lepidium sp.	A Peppercress	2	N	Naturalised; growing within grass clumps
[AP] *Myriophyllum aquaticum*	Parrots Feather	2	N	Infestations in northeast of Main Pond and South Pond. Not currently practical to control with available resources
Paspalum urvillei	Vasey Grass	2	Low	
[AP] *Passiflora suberosa*	Corky Passionflower	2	Medium	
[AP] *Passiflora subpeltata*	White Passionflower	1	Medium	
Setaria pumila	Pale Pigeon Grass	1	N	Naturalised; soil stabilising
Setaria sphacelata	South African Pigeon Grass	2	N	Naturalised; soil stabilising
Sida rhombifolia	Paddy's Lucerne	2	Low	
Solanum nigrum	Black-berry Nightshade	1	Medium	
[AP] *Solanum seaforthianum*	Climbing Nightshade	2	Medium	
Tradescantia zebrina	Purple Wandering Jew	3	Medium	
Trifolium repens	White Clover	3	N	Naturalised; growing within grass clumps
Verbena bonariensis	Purpletop	2	Low	

Table Key

[1] **Cover abundance** assessment is indicative only and based on a modified version of the Braun-Blanquet scale (Poore 1955) using a five-point scale to express the relative abundance and/ or cover of plants for comparative purposes where 1 = < 3% (i.e. one or two individuals, very rare or very low cover); 2 = 4% to 15%; 3 = 16% to 30%; 4 = 31% to 45%; 5 = > 45% (i.e. common, abundant or high cover).

[2] **Control Priority** (High, Medium and Low) based on factors such as invasiveness, toxicity and control practicability.

N refers to naturalised on the site and not currently desirable to control or practical to control with available resources.

[NQ] **Weed species endemic to North Queensland**.

[W] **Weeds of National Significance (WoNS)** are the most problematic plant species in Australia as determined by the federal government.

[AP] **Asset Protection** Weed Management Category: These species are a high priority for asset protection. Many are actively managed under a number of current programs, or are commercial species with a manageable biosecurity risk. It is not feasible to contain or eradicate these species, however minimising their impacts is reasonably practical (North Coast Local Land Services, 2017).

[APS] **Asset Protection – State** Weed Management Category: State level determined priority weeds. A person must not move, import into the State or sell. Regional Strategic Response where required (North Coast Local Land Services, 2017).

[C] **Contain** Weed Management Category: These weeds are widely distributed in parts of the region. While broad scale elimination is not practical, minimisation of the biosecurity risk posed by these weeds is reasonably practical. The plant or parts of the plant are not traded, carried, grown or released into the environment. Land managers reduce impacts from the plant on priority assets (North Coast Local Land Services, 2017).

[CS] **Contain– State** Weed Management Category: State level determined priority weeds. These weeds are widely distributed in some parts of the state. While broad scale elimination is not practical, minimisation of the biosecurity risk posed by these weeds is reasonably practical (North Coast Local Land Services, 2017).

[WA] **Watch** Weed Management Category: These species have been identified as having a potential biosecurity risk to the region. However, they have not been subjected to a weed risk assessment due to a lack of appropriate information (North Coast Local Land Services, 2017).

APPENDIX 3. FAUNA SPECIES RECORDS

Scientific Name	Common Name	Observations & Comments
Amphibians		
Bufo marinus	Cane Toad	Pest species
Limnodynastes peronii	Brown-striped Frog	
Litoria caerulea	Green Tree Frog	
Litoria fallax	Eastern Dwarf Tree Frog	
Litoria peronii	Peron's Tree Frog	
Reptiles		
Chelodina longicollis	Eastern Snake-necked Turtle	
Dendrelaphis punctulate	Green Tree Snake	
Intellagama lesueurii	Eastern Water Dragon	
Morelia spilota	Carpet Python	
Notechis scutatus	Tiger Snake	
Pseudechis porphyriacus	Red-bellied Black Snake	
Pseudonaja textilis	Eastern Brown Snake	

Mammals		
Phascolarctos cinereus	Koala	Two sightings of a koala on the site in recent months
Wallabia bicolor	Swamp Wallaby	
Birds		
Dendrocygna arcuata	Wandering Whistling Duck	
Pelecanus conspicillatus	Australian Pelican	
Taeniopygia bichenovii	Double-barred Finch	

Birdlife records, Brunswick Valley Birdwatchers, 2011 - 2014

Species List

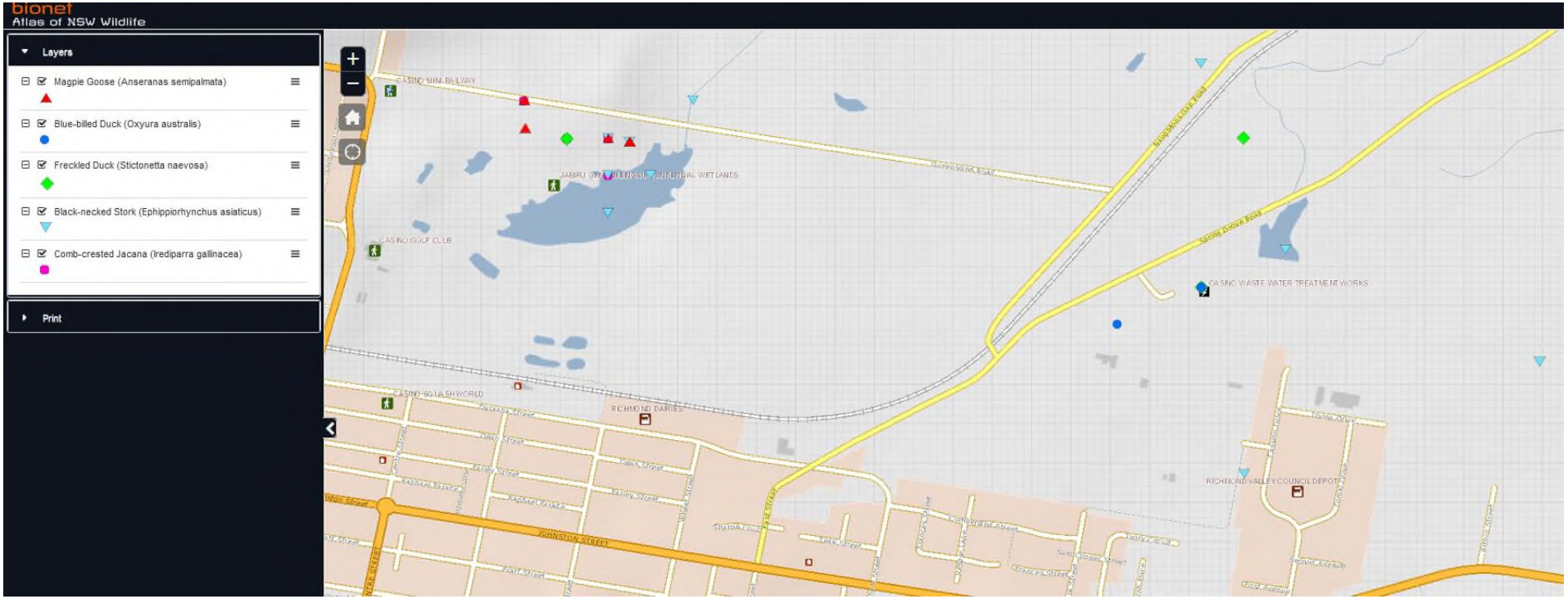
Species	Scientific Name	Family
Magpie Goose	Anseranas semipalmata	**Goose,Ducks & Swans**
Pink-eared Duck	Malacorhynchus membranaceus	Goose,Ducks & Swans
Black Swan	Cygnus atratus	Goose,Ducks & Swans
Hardhead	Aythya australis	Goose,Ducks & Swans
Pacific Black Duck	Anas superciliosa	Goose,Ducks & Swans
Grey Teal	Anas gracilis	Goose,Ducks & Swans
Chestnut Teal	Anas castanea	Goose,Ducks & Swans
Musk Duck	Biziura Lobata	Goose,Ducks & Swans
Australian Wood Duck	Chenonetta jubata	Goose,Ducks & Swans
Brown Quail	Coturnix ypsilophora	**Mound-Builders & Quail**
Australasian Grebe	Tachybaptus novachollandiae	**Grebes**
Spotted Dove	Streptopella chinensis	**Pigeons & Doves**
Crested Pigeon	Ocyphaps lophotes	Pigeons & Doves
Peacful Dove	Geopelia striata	Pigeons & Doves
Bar- shouldered Dove	Geopelia humeralis	Pigeons & Doves
Pheasant Coucal	Centropus phasianinus	**Cuckoos**
Horsfield's Bronze-Cuckoo	Chrysococcyx basalis	Cuckoos
Shining Bronze-Cuckoo	Chalcties lucidus	Cuckoos
Little Bronze--Cuckoo	Chakeites minutillus	Cuckoos
Fan-tailed Cuckoo	Cacomantis flabelliformis	Cuckoos
Buff-banded Rail	Gallirallus philippensis	**Crakes, Rails & Swamphens**
Purple Swamphen	Porphyrio porphyrio	Crakes, Rails & Swamphens
Dusky Moorhen	Gallinula tenebrosa	Crakes, Rails & Swamphens
Eurasian Coot	Fulica atra	Crakes, Rails & Swamphens
Black-winged Stilt	Himantopus himantopus	**Shorebirds**
Black-fronted Dotterel	Elseyornis melanops	Shorebirds
Banded Lapwing	Vanellus tricolor	Shorebirds
Masked lapwing	Vanellus miles	Shorebirds
Red-kneed Dotterel	Erythrogonys cinctus	Shorebirds

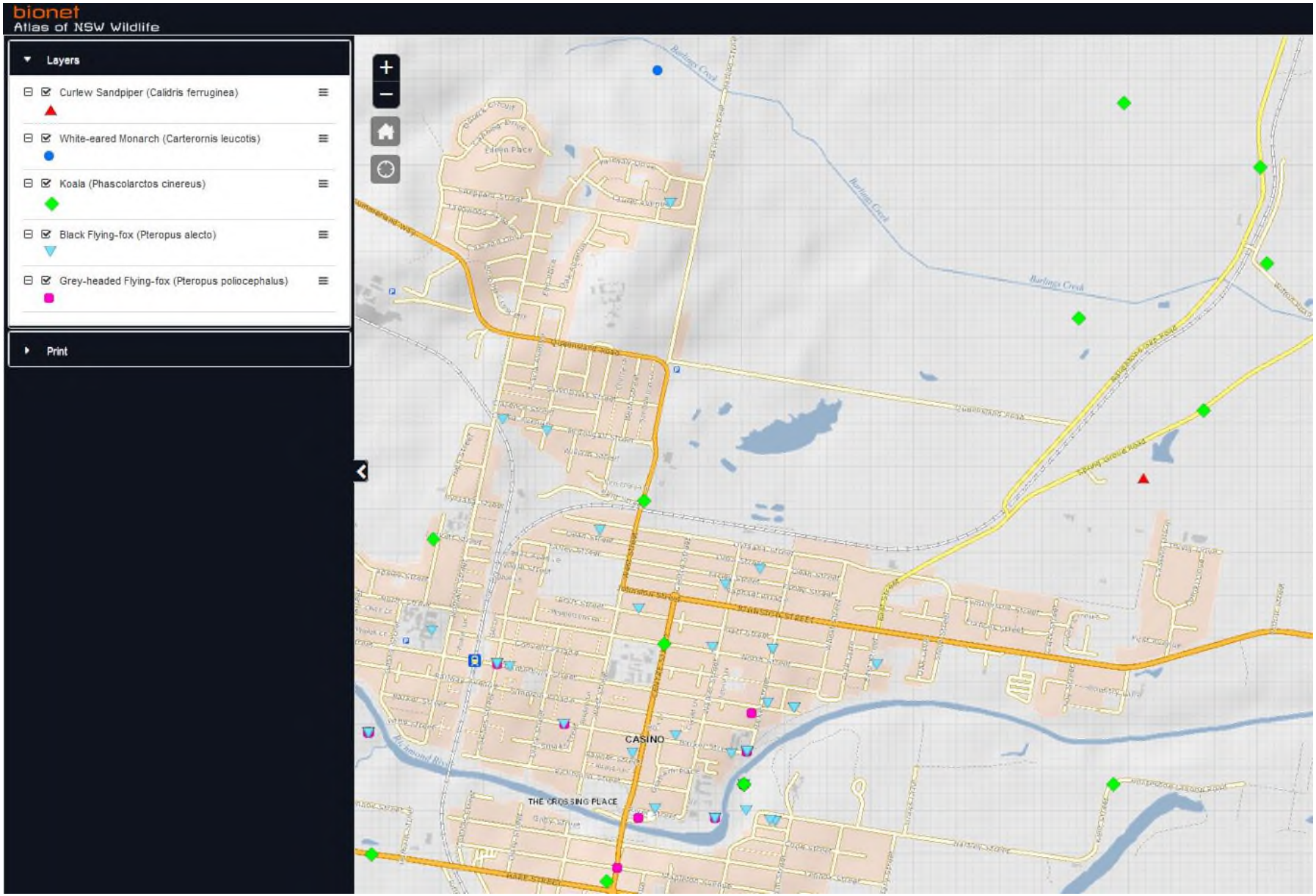
Australian Painted Snipe	Rostrratula australis	Shorebirds
Comb-crested Jacana	Irediparra gallinacea	Shorebirds
Sharp-tailed Sandpiper	Calidris acuminata	shorebirds
Latham's Snipe	Calidris hardwickii	shorebirds
Whiskered Tern	Childonias hybridus	**Gulls and Terns**
Australian Pelican	Pelecanus conspicillatus	**Heron,Ibis,Spoonbills & Allies**
Nankeen Night Heron	Nycticorax caledonicus	Heron,Ibis,Spoonbills & Allies
Cattle Egret	Ardea ibis	Heron,Ibis,Spoonbills & Allies
White-necked Heron	Ardea pacifica	Heron,Ibis,Spoonbills & Allies
Eastern Great Egret	Ardea modesta	Heron,Ibis,Spoonbills & Allies
Intermediate Egret	Ardea intermedia	Heron,Ibis,Spoonbills & Allies
White-faced Heron	Egretta novaehollandiae	Heron,Ibis,Spoonbills & Allies
Little Egret	Egretta garzetta	Heron,Ibis,Spoonbills & Allies
Australian White Ibis	Threskiornis molucca	Heron,Ibis,Spoonbills & Allies
Straw-necked Ibis	Threskiornis spinicollis	Heron,Ibis,Spoonbills & Allies
Royal Spoonbill	Platalea regia	Heron,Ibis,Spoonbills & Allies
Glossy Ibis	Plegadis falcinellus	Heron,Ibis,Spoonbills & Allies
Little Pied Cormorant	Microcarbo melanoleucos	**Cormorants**
Great Cormorant	Phalacrocorax carbo	Cormorants
Little Black Cormorant	Phalacrocorax sulcirostris	Cormorants
Pied Cormorant	Pied Cormorant	Cormorants
Australasian Darter	Anhinga novaehollandiae	Cormorants
Black-shouldered Kite	Elanus axillaris	**Eagles,Kites & Goshawks**
Pacific Baza	Aviceda subcristata	Eagles,Kites & Goshawks
Little Eagle	**Hieraaetus morphnoides**	Eagles,Kites & Goshawks
Swamp Harrier	Circus approximans	Eagles,Kites & Goshawks
Spotted Harrier	**Circus assimilis**	Eagles,Kites & Goshawks
Brown Goshhawk	Accipiter fasciatus	Eagles,Kites & Goshawks
Collard Sparrowhawk	Accipiter cirrrocephalus	Eagles,Kites & Goshawks
White-bellied Sea Eagle	Haliaeetus leucogaster	Eagles,Kites & Goshawks
Whistling Kite	Haliastur sphenurus	Eagles,Kites & Goshawks
Brahminy Kite	Haliastur indus	Eagles,Kites & Goshawks
Southern Boobook	Ninox novaeseelandiae	**Owls**
Rainbow Bee-eater	Merops ornatus	**Kingfishers,Roller & Bee-eater**
Dollarbird	Eurystomus orientalis	Kingfishers,Roller & Bee-eater
Forest Kingfisher	Todiramphus macleayii	Kingfishers,Roller & Bee-eater
Sacred Kingfisher	Todiramphus sanctus	Kingfishers,Roller & Bee-eater
Laughing Kookaburra	Dacelo novaeguineae	Kingfishers,Roller & Bee-eater
Nankeen Kestrel	Falco cenchroides	**Falcons**
Australian Hobby	Falco longipennis	Falcons
Brown Falcon	Falco berigora	Falcons
Galah	Eolophus roseicapillus	**Cockatoos and Parrots**
Little Corella	Cacatua sanguinea	Cockatoos and Parrots
Sulphur-crested Cockatoo	Cactua galerita	Cockatoos and Parrots
Australian King Parrot	Alisterus scapularis	Cockatoos and Parrots

Eastern Rosella	Platycercus eximius	Cockatoos and Parrots
Rainbow Lorikeet	Trichoglossus haematodus	Cockatoos and Parrots
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	Cockatoos and Parrots
Vanegated Fairy-wren	Malurus lamerti	**Fairy-Wrens**
Superb Fairy-wren	Malurus cyancus	Fairy-Wrens
Red-backed Fairy wren	Malurus melanocephalus	Fairy-Wrens
Scarlet Honeyeater	Myzomela sanguinolenta	**Honeyeaters**
Striped Honeyeater	Plectorhyncha lanceolata	Honeyeaters
Noisy Friarbird	Philemon corniculatus	Honeyeaters
Little Friarbird	Philemon citreogularis	Honeyeaters
Brown Honeyeater	Licmera indistincta	Honeyeaters
Blue-faced Honeyeater	Entomyzon cyanotis	Honeyeaters
White-throated Honeyeater	Melithreptus albogularis	Honeyeaters
Lewin's Honeyeater	Meliphaga lewinii	Honeyeaters
Yellow-faced Honeyeater	Lichenostomus chrysops	Honeyeaters
Noisy Miner	Manorina melanocephala	Honeyeaters
Striated Pardalote	Pardaltus striatus	**Pardalotes,Thornbills & Greygone**
White-throated Greygone	Greygone albogularis	Pardalotes,Thornbills & Greygone
Yellow-rumped Thornbill	Acanthiiza chrysorrhoa	Pardalotes,Thornbills & Greygone
Yellow Thornbill	Acanthiza nana	Pardalotes,Thornbills & Greygone
Brown Thornbill	Acanthiza pusilla	Pardalotes,Thornbills & Greygone
Grey-crowned Babbler	**Pomatostomus temporalis**	**Babblers,Cuckoo-shikes & Trillers**
Black-faced Cuckoo-shrike	Coracina novaehollandiae	Babblers,Cuckoo-shikes & Trillers
Cicadabird	Coracina tenuirostris	Babblers,Cuckoo-shikes & Trillers
White-winged Triller	Lalage sueurii	Babblers,Cuckoo-shikes & Trillers
Rufous Whistler	Pachycephala rufiventris	**Whistlers, Shrike-thrushes & Allies**
Golden Whistler	Pachycephala pectoralis	Whistlers, Shrike-thrushes & Allies
Eastern Whipbird	Psophodes olivaceus	**Whipbirds**
Australasian Figbird	Sphecotheres vieilloti	**Orioles & Figbirds**
Olive-backed Oriole	Oriolus sagittatus	Orioles & Figbirds
Pied Currawong	Strepera graculina	**Woodswallow,Currawong,Butcherbird & Magpie**
Australian Magpie	Cracticus tibicen	Woodswallow,Currawong,Butcherbird & Magpie
Pied Butcherbird	Cracticus nigrogularis	Woodswallow,Currawong,Butcherbird & Magpie
Grey Butcherbird	Cracticus torquatus	Woodswallow,Currawong,Butcherbird & Magpie
White-breasted Woodswallow	Artamus leucorhynchus	Woodswallow,Currawong,Butcherbird & Magpie
Spangled Drongo	Dicrurus bracteatus	**Drongos**
Willy Wagtail	Rhipidura leucophrys	**Fantail**
Grey Fantail	Rhipidura albiscapa	Fantail
Torresian Crow	Corvus orru	**Crows**
Restless Flycatcher	Myiagra inquieta	**Monarchs & Flycatcher**
Magpie-lark	Grallina cyanoleuca	Monarchs & Flycatcher

Mistletoebird	Dicaeum hirundinaceum	**Flowerpecker**
Chestnut-breasted Mannikin	Lonchura castaneothorax	**Weaver Finches**
Red-browed Finch	Neochmia temporalis	Weaver Finches
House Sparrow	Passe domesticus	Weaver Finches
Golden-headed Cisticola	Cisticola exilis	**Cisticolas**
Rufous Songlark	Cinclorhamphus mathewsi	**Grassbirds & Reed-warblers**
Tawny Grassbird	Megalurus timoriensis	Grassbirds & Reed-warblers
Little Grassbird	Megalurus gramineus	Grassbirds & Reed-warblers
Australian Reed-Warbler	Acrocephalus australis	Grassbirds & Reed-warblers
Fairy Martin	Petrochelidon ariel	**Swallows & Martins**
Tree Martin	Petrochelidon nigricans	Swallows & Martins
Welcome Swallow	Hirundo neoxina	Swallows & Martins
Silvereye	Zosterops laterlis	**Tree Babblers**
Common Starling	Sturnus vulgaris	**Starlings**
Common Myna	Sturnus tristis	Starlings

APPENDIX 4. THREATENED FAUNA SPECIES RECORDS IN THE LOCALITY




bionet
Atlas of NSW Wildlife
Layers
Curlew Sandpiper (Calidris ferruginea)
White-eared Monarch (Carterornis leucotis)
Koala (Phascolarctos cinereus)
Black Flying-fox (Pteropus alecto)
Grey-headed Flying-fox (Pteropus poliocephalus)
Print
CASINO
THE CROSSING PLACE

APPENDIX 5. BEST PRACTICE GUIDELINE FOR GRASSLAND MECHANICAL AND CHEMICAL CONTROL

Richmond Valley Council outdoor staff regularly mow and brush-cut grassland along paths and public recreation areas at the Jabiru Geneebeinga Wetlands. Volunteers work to control weeds at the wetlands including herbicide spraying and brush-cutting/ whipper-snipping of grasses.

Native and exotic grasses grow abundantly and provide food and shelter resources for birds at the Wetlands such as finches (e.g., Plum-headed Finch, Red-browed Finch, Chestnut-breasted Mannikin and Double-barred Finch); rails and crakes (e.g. Buff-banded Rail, Lewin's Rail and Spotless Crake); and herons and bitterns (e.g. Little Bittern and White-faced Heron). The grassy area between ponds and access pathways provides excellent food and shelter resources for birdlife as a buffer between densely vegetated pond edges and open grassy pathways.

This best practice guideline has been prepared in liaison with Council staff and volunteer workers and following a review of maintenance works undertaken around pond edges.

The aims of this guideline are as follows:

- To review grass mowing, whipper snipping and herbicide spraying at the site, including on land sloping from walking tracks toward pond edges
- To retain and promote grass development and growth in strategic locations, particularly adjacent to ponds, as bird food and shelter resources
- To maintain pedestrian walkways and access around the site
- To manage fire and snake hazards balanced against promoting grass growth in identified priority areas

This guideline is to be communicated to all Council maintenance staff and volunteers working at the wetland to help retain and promote grasses (native and exotic) in strategic locations for bird habitat.

Best practice grassland management measures adjacent to ponds are as follows:

- Grasses are to be retained and not mowed, brush-cut/ whipper-snipped or herbicide sprayed within 50 cm of the top of pond banks, refer to Plates. This will allow grasses to mature, set seed and provide valuable bird habitat in the areas directly adjoining ponds
- Any use of herbicides within and directly adjoining ponds should be supervised by persons trained in safe chemical use and herbicides used should be formulated for use around waterways, e.g. Roundup® Bioactive™ or Weedmaster® Duo™ which contain surfactant of low toxicity for aquatic fauna such as fish, tadpoles and daphnids

Plates

Plate 1. Adequate unmown grass buffer retained on the right hand side adjoining the main pond

Plate 2. Poor practice of whipper-snipping grasses adjoining the main pond