

ASSESSMENT OF EFFECTS ON AVIFAUNA FOR THE PROPOSED LONGFORD SHARED PATHWAY OVER THE MATAURA RIVER, GORE



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1. INTRODUCTION

Londpro Ltd is reviewing the potential effects on birds, including taonga species, in relation to the construction of the Longford shared pathway for pedestrians and cycleway bridge over the Matāura River, in the township of Gore.

The Longford shared pathway will cross the Matāura River 500 metres north of the State Highway 1 road bridge and will connect the East Gore bank (Church and Huron streets) with the west bank of the town (Surrey Street), allowing easy access to the CBD and schools, while providing a safe river crossing for walking and cycling (Figure 1). The proposed bridge is a cable-stay design and will be 39 metres high, 90 metres long, and three metres wide. A circular steel mast (32 metres high, 916 millimetres diameter), to be positioned on the western bank, will suspend high-strength spiral strand cables (26.4 millimetres) to support the bridge. The western side of the river is largely undeveloped land (mainly stock grazing), and the eastern side of the river is an earthfill stopbank; approximately four metres high with a steep slope. The bridge will cross the river at one of the narrowest points, where the river is approximately 55 metres wide. This site will minimise effects on the river flow and flood risk. The proposed layout should result in minimal riverbed disturbance. From viewing the site in Google Earth, the proposed area has few trees, extensive open grassland, and a small shingle island on the northwestern side of the river channel.

Gore District Council commissioned Wildland Consultants to provide a desktop ecological assessment of the potential effects of the proposed bridge on avifauna. The purpose of this desktop ecological assessment is to:

- Identify and describe avifauna values in the bridge footprint and wider project area.
- Describe the potential effects of the bridge on avifauna arising from construction, operation and maintenance.
- Provide an ecological assessment of avifauna that addresses the proposed bridge's effects on bird flight paths.
- Identify measures to avoid, remedy, or mitigate potential adverse effects.

2. METHODS

This project was undertaken as a desktop assessment. Relevant literature, reports, and data sets were utilised to provide a basis for the evaluation of the relative significance of avifauna present within c.10 kilometres of the site. These information sources included:

- The eBird database maintained by Cornell University, which has bird records for sites within New Zealand.
- Indigenous and exotic bird and indigenous species records in the on-line iNaturalist database, which is maintained by the California Academy of Science and the National Geographic Society.



- National threat classification lists for birds (Robertson *et al.* 2017).
- Field Guide to the Birds of New Zealand (Heather and Robertson 2015).

A desktop evaluation was undertaken of the current state of knowledge of birds in the Gore area. The eBird database and iNaturalist were searched for bird records within a 10 kilometre radius of the site, and additional species were identified from Heather and Robertson (2015).

3. SPECIES RECORDS

Within a 10 kilometre radius, 53 species of avifauna were identified through eBird and iNaturalist. In addition to various common species, these records include five Threatened species and 11 At Risk species (Table 1):

- Threatened species include: Australasian bittern (*Botaurus poiciloptilus*), banded dotterel (*Charadrius bicinctus bicinctus*), black-billed gull (*Larus bulleri*), black-fronted tern (*Chlidonias albostratus*), and Caspian tern (*Hydroprogne caspia*).
- At Risk species are: black shag (*Phalacrocorax carbo novaehollandiae*), black-fronted dotterel (*Elseyornis melanops*), New Zealand pipit (*Anthus novaeseelandiae novaeseelandiae*), pied shag (*Phalacrocorax varius varius*), red-billed gull (*Larus novaehollandiae scopulinus*), South Island pied oystercatcher (*Haematopus finschi*), marsh crake (*Porzana pusilla affinis*), spotless crake (*Porzana tabuensis tabuensis*), Australian coot (*Fulica atra australis*), long-tailed cuckoo (*Eudynamys taitensis*), and eastern falcon (*Falco novaeseelandiae novaeseelandiae*).

The species observed most commonly within one kilometre of the site - identified through eBird – are listed in Table 1. Of these, the following Threatened and At Risk species were found in eBird observations between 2017 to 2019:

- Thirty-nine observations of black-billed gulls ranging between one individual and a flock of 3,750 birds. Approximately 3,750 black-billed gulls were observed (-46.098765E, 168.9492651N) flying south downriver towards a roost, away from the main highway bridge (30 August 2017) and approximately 1,300 birds were observed (-46.0980434E, 168.9490317N) coming in to roost. but the actual roost site location was not identified (27 September 2018).
- Black-fronted tern were observed in 2018 (1-18 individuals, three observations) and a single bird in 2019. The flock of 18 birds were observed flying down river (10 April 2018; -46.0980434E, 168.9490317N).
- An average of five red-billed gulls (range 2-16, eight observations 2018), two South Island pied oystercatcher (range 1-3, seven observations 2017-2018), a black shag (four observations during 2018), and a single black-fronted dotterel (28 February 2018; -46.0955733E, 168.9493525N), and banded dotterel (20 February 2019; -46.0987923E, 168.9487824N).

Table 1: Bird species recorded in eBird, iNaturalist, and/or identified in Heather and Robertson (2015). Common names, species names, threat classification are from Robertson *et al.* (2017), and the habitat of the bird species, whether their habitat occurs near the proposed bridge, and sightings within one kilometre of the proposed bridge site.

Common Name	Scientific Name	Threat Classification 2016	Status	Habitat	Observed within 1km	Habitat in Vicinity of Bridge
Australasian bittern	<i>Botaurus poiciloptilus</i>	Threatened-Nationally Critical	Native	Wetland	N	N
Black-billed gull	<i>Larus bulleri</i>	Threatened-Nationally Critical	Native	Rivers, lakes, coastal	Y	Y
Black-fronted tern	<i>Chlidonias albostratus</i>	Threatened-Nationally Endangered	Native	Riverbed, coastal	Y	Y
Banded dotterel	<i>Charadrius bicinctus bicinctus</i>	Threatened-Nationally Vulnerable	Native	Beaches, braided rivers, estuaries, lake margins and short grassland	Y	Y
Caspian tern	<i>Hydroprogne caspia</i>	Threatened-Nationally Vulnerable	Native	Beaches, braided rivers, estuaries, and harbours	Y	N
Marsh crake	<i>Porzana pusilla affinis</i>	At Risk-Declining	Native	Wetland	N	N
New Zealand pipit	<i>Anthus novaeseelandiae novaeseelandiae</i>	At Risk-Declining	Native	Open country, riverbed and farmland	N	Y
Red-billed gull	<i>Larus novaehollandiae scopulinus</i>	At Risk-Declining	Native	Coastal, estuaries, lakes	Y	N
South Island pied oystercatcher	<i>Haematopus finschi</i>	At Risk-Declining	Native	Riverbeds, farmland and estuaries	Y	N
Spotless crake	<i>Porzana tabuensis tabuensis</i>	At Risk-Declining	Native	Wetland	N	N
Australian coot	<i>Fulica atra australis</i>	At Risk-Naturally Uncommon	Native	Lakes	N	N
Black shag	<i>Phalacrocorax carbo novaehollandiae</i>	At Risk-Naturally Uncommon	Native	Rivers, streams, lakes	Y	N
Black-fronted dotterel	<i>Elseya melanops</i>	At Risk-Naturally Uncommon	Native	Riverbeds, gravel pits and bare ground	Y	Y
Long-tailed cuckoo	<i>Eudynamis taitensis</i>	At Risk-Naturally Uncommon	Native	Native and exotic forest	N	N
Eastern falcon	<i>Falco novaeseelandiae novaeseelandiae</i>	At Risk-Recovering	Native	Forest, bush, orchards and tussock land	Y	N
Pied shag	<i>Phalacrocorax varius varius</i>	At Risk-Recovering	Native	Lakes, lagoons	Y	N
Australian magpie	<i>Gymnorhina tibicen</i>	Introduced and Naturalised	Exotic	Farmland, forests, gardens and parks	Y	N
Blackbird	<i>Turdus merula</i>	Introduced and Naturalised	Exotic	Forest, farmland, parks and gardens	Y	N
California quail	<i>Callipepla californica</i>	Introduced and Naturalised	Exotic	Open country	N	N
Canada goose	<i>Branta canadensis</i>	Introduced and Naturalised	Exotic	Lakes, rivers, lagoons, pasture	N	N
Chaffinch	<i>Fringilla coelebs</i>	Introduced and Naturalised	Exotic	Forests, farmland, parks and gardens	Y	N
Dunnock	<i>Prunella modularis</i>	Introduced and Naturalised	Exotic	Forests, parks and gardens	Y	N
Feral (greylag) goose	<i>Anser anser</i>	Introduced and Naturalised	Exotic	Lakes, estuaries, farmland	N	N
Goldfinch	<i>Carduelis carduelis</i>	Introduced and Naturalised	Exotic	Farmland, parks and gardens	Y	N
Greenfinch	<i>Carduelis chloris</i>	Introduced and Naturalised	Exotic	Farmland, parks and gardens	Y	N
House sparrow	<i>Passer domesticus</i>	Introduced and Naturalised	Exotic	Farmland, cities and forests	Y	N
Mute swan	<i>Cygnus olor</i>	Introduced and Naturalised	Exotic	Lakes	N	N

Common Name	Scientific Name	Threat Classification 2016	Status	Habitat	Observed within 1km	Habitat in Vicinity of Bridge
Redpoll	<i>Carduelis flammea</i>	Introduced and Naturalised	Exotic	Farmland, forests, scrub, parks and gardens	Y	N
Rock pigeon	<i>Columba livia</i>	Introduced and Naturalised	Exotic	Parks, gardens and farmland	Y	N
Skylark	<i>Alauda arvensis</i>	Introduced and Naturalised	Exotic	Open country	Y	N
Song thrush	<i>Turdus philomelos</i>	Introduced and Naturalised	Exotic	Forest, farmland, parks and gardens	Y	N
Starling	<i>Sturnus vulgaris</i>	Introduced and Naturalised	Exotic	Farmland, forests, parks and garden	Y	N
Yellowhammer	<i>Emberiza citrinella</i>	Introduced and Naturalised	Exotic	Open country, farmland, parks and gardens	Y	N
Little pied cormorant	<i>Phalacrocorax melanoleucos melanoleucos</i>	Non-resident Native - Vagrant	Native	Lakes, rivers, streams and estuaries	Y	Y
Australasian shoveler	<i>Anas rhynchotis</i>	Not Threatened	Native	Wetlands and estuaries	Y	N
Bellbird	<i>Anthornis melanura melanura</i>	Not Threatened	Native	Native and exotic forest, parks and gardens	Y	N
Black swan	<i>Cygnus atratus</i>	Not Threatened	Native	Lakes, estuaries	N	N
Grey duck - mallard hybrid	<i>Anas superciliosa</i> × <i>platyrhynchos</i>	Not Threatened	Native	Wetlands, estuaries, rivers	Y	Y
Grey teal	<i>Anas gracilis</i>	Not Threatened	Native	Lakes, lagoons, estuaries	Y	N
Morepork	<i>Ninox novaeseelandiae novaeseelandiae</i>	Not Threatened	Native	Forest, open country, parks and gardens	N	N
Kereru	<i>Hemiphaga novaeseelandiae</i>	Not Threatened	Native	Forest, rural and city parks	N	N
Paradise shelduck	<i>Tadorna variegata</i>	Not Threatened	Native	Lakes, ponds, rivers	Y	Y
Pied stilt	<i>Himantopus himantopus leucocephalus</i>	Not Threatened	Native	Riverbeds, lake margins	Y	N
Pukeko	<i>Porphyrio melanotus melanotus</i>	Not Threatened	Native	Wetland, estuaries, parks and pasture	N	Y
Shining cuckoo	<i>Chrysococcyx lucidus lucidus</i>	Not Threatened	Native	Forest, parks and gardens	N	N
Silvereye	<i>Zosterops lateralis lateralis</i>	Not Threatened	Native	Forest, scrub, parks and gardens	Y	N
South Island fantail	<i>Rhipidura fuliginosa fuliginosa</i>	Not Threatened	Native	Forest, scrub, river margins, parks and gardens	Y	N
Southern black-backed gull	<i>Larus dominicanus dominicanus</i>	Not Threatened	Native	Rivers, coastal, lakes	Y	Y
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	Not Threatened	Native	Grassland, farmland, wetlands and estuaries	Y	Y
Swamp harrier	<i>Circus approximans</i>	Not Threatened	Native	Farmland, tussock land, swamps and forest edges	Y	N
Tui	<i>Prosthemadera novaeseelandiae novaeseelandiae</i>	Not Threatened	Native	Forest, farmland, parks and gardens	N	N

Common Name	Scientific Name	Threat Classification 2016	Status	Habitat	Observed within 1km	Habitat in Vicinity of Bridge
Welcome swallow	<i>Hirundo neoxena neoxena</i>	Not Threatened	Native	Open country near water	Y	N
White-faced heron	<i>Egretta novaehollandiae</i>	Not Threatened	Native	Estuaries, lagoons, rivers	N	N

- New Zealand falcon (1 May 2017; -46.0980434E, 168.9490317N) have also been noted within one kilometre of the bridge.

The bridge is likely to only affect species that use riparian or river habitat, so this assessment focusses on these species, as set out in Table 1.

4. POTENTIAL ECOLOGICAL EFFECTS

4.1 Overview

Potential effects are addressed below under the following headings for each bird species observed within the area and with habitat near the proposed bridge:

- Construction disturbance.
- Operation.
- Maintenance.
- Flight paths.
- Lighting.

4.2 Construction disturbance

The proposed 10 month construction phase could potentially disturb foraging and roosting birds through the movement of trucks and machinery. Potentially-affected species could include:

- Grey duck-mallard hybrid (*Anas superciliosa* × *platyrhynchos*, Not Threatened), and paradise shelduck (*Tadorna variegata*, Not Threatened), both of which require cover to breed.
- Spur-winged plover (*Vanellus miles novaehollandiae*, Not Threatened) will nest in open areas with a clear view.
- Black-billed gulls (*Larus bulleri*, Threatened-Nationally Critical), banded dotterel (*Charadrius bicinctus bicinctus*, Threatened-Nationally Vulnerable), black-fronted dotterel (*Elseyornis melanops*, At Risk-Naturally Uncommon), black-fronted tern, and southern black-backed gulls (*Larus dominicanus dominicanus*, Not Threatened) will nest and roost on shingle sections, riverbed islands and may be found within the riverbed adjacent to the structure or upriver from the site.

Although this may be a short-term effect, construction can displace birds. Construction effects can be avoided by:

- Checking bird use of the area prior to construction.
- Avoiding the bird breeding season.

The proposed bridge will cross a deep channel and a small area of gravel on the western bank. It is possible that the gravel bank could be used by endemic braided river bird species, and this area should be checked if construction is undertaken during the breeding season.

Avoidance of the release of sediment is essential as this will affect the river ecosystem and potential food resources for the aquatic foraging birds (Glenjarmon 2017; Matthaei *et al.* 2006). Suspended sediment increases turbidity and reduces visibility for foraging birds, which will impact aquatic species in the area and downstream from the construction site.

Noise levels should be kept as low as possible, and activities should be confined to day-time hours. As this is a populated urban area, the bird species within the immediate construction site will be familiar with anthropogenic disturbance (c.f. Parris and Schneider 2008). Levels of potential disruption should be minor during the construction phase.

If impacts on breeding Threatened or At Risk braided river bird species are avoided the effects of bridge construction will be less than minor. Any impacts on breeding Threatened braided river bird species would be considered to comprise more than minor adverse effects.

4.3 Operational

Upon completion of the Longford bridge, types and levels of activity in the area will be predominantly pedestrian and cycling use. In general, the level of disturbance will be higher than previously, as this is a new public facility, but the overall impact on relevant bird species will be less than minor. Signage should be installed advising that all dogs should remain 'under control at all times' (Dog Control Policy 2004), to avoid chasing or displacing birds that are foraging or roosting.

4.4 Maintenance

General maintenance under and around the bridge is unlikely to result in significant disturbance. As the structure is to be used as a high human traffic area for movement between the two sides of the township, it is unlikely that many bird species will take up roosting or nesting sites around the structure's footprint, e.g. grey duck-mallard hybrid, paradise shelduck, spur-winged plover, pukeko. However, welcome swallow (*Egretta novaehollandiae*, Not Threatened), house sparrow (*Passer domesticus*, Introduced and Naturalised), and starling (*Sturnus vulgaris*, Introduced and Naturalised) may nest within the support structures under the bridge. Many species start laying eggs from August though to November-December (Heather and Robertson 2015). Any maintenance should be undertaken outside of the breeding season, to prevent issues with potential nest abandonment. To minimise nesting birds under the bridge structure, bird exclusion netting could be considered to prevent nest establishment.

Any maintenance that requires vehicle or heavy machinery access into the river bed should be undertaken outside the braided river bird breeding season. If this is not possible, a survey should be undertaken by a suitably qualified ecologist and appropriate avoidance measures should be addressed, if required, as described in Section 4.1.

4.5 Flight paths

Birds will use various flight paths depending on the species, destinations, and flight heights, e.g. starling <173 metres, plover (*Vanellus* spp.) <428 metres, gull (*Larus* spp.) <575 metres (Shamoun-Baranes *et al.* 2006). Waterbirds will predominantly associate with the river area and use the banks for roosting or nesting. Flight movements during the day will be marginally affected once the structure is completed, and some disturbance or displacement will occur during the construction phase. During daylight hours, most bird species will be able to avoid the steel mast and spiral strand cables due to the visibility and size of the structures. However, issues or strikes could potentially occur during low light or poor weather conditions, especially during foggy conditions or at night (Ashley Rakahuri Rivercare Group 2020; Shamoun-Baranes *et al.* 2006, Manville 2005). In addition, many bird species fly at night, e.g. spur-winged plover, black-backed gulls, banded dotterel and pukeko (Bell and Harborne 2018, Heather and Robertson 2015; Rohweder and Lewis 2004). For example, 20 black-billed gulls were found dead under powerlines on the Ashley River, presumably due to hitting the wires during flight (Ashley Rakahuri Rivercare Group 2020).

Nevertheless, flight behaviour of ducks and geese which were tracked migrating through an offshore wind farm found that less than 1% of birds flew close enough to the turbines to be at risk of a collision with the structure or turbine blades (Desholm and Kahlert 2005). As the proposed Longford shared pathway is a static structure, there is a minor risk of bird strike with the bridge structure for waterfowl as they are slow-flying. Faster-flying species, including passerines, could potentially have a higher strike rate risk, especially during conditions of low visibility. However, the general illumination of the township, lighting on the bridge structure, and previous experience of the bridge structure by birds will help these species to avoid the structure (c.f. Desholm 2006).

The high-strength spiral strand cables could pose a risk as these support wires will be mostly invisible to birds, especially at night. To aid birds identifying and avoiding these structures UV lights (Leber 2019), luminous tape or spherical aerial markers could be used.

4.6 Lighting

Many bird species fly at night, and some species can become disorientated or are attracted to lights, which can lead to injury or death through collision with structures (Horton *et al.* 2019). Downward-facing lights which illuminate the steel mast will operate between 6 am and 11 pm, which will help to reduce any strike hazard at night due to lighting (C Perkins, Landpro Ltd, pers. comm.). Also, artificial lighting along the pathway should be visible in a vertical spill onto the bridge structure and with minimal illumination in a horizontal plane (c.f. Gehring, Kerlinger and Manville 2009; Gauthreaux and Belser).

5. OPTIONS TO AVOID OR MITIGATE POTENTIALLY ADVERSE EFFECTS

Construction of the bridge should, if possible commence outside of the breeding season for braided river birds (July-March). This would help to avoid disturbance or displacement of birds in the immediate area. If this is not possible a suitably qualified ecologist should survey the area no sooner than five days prior to the commencement of works and identify whether or not any nesting is occurring, and if so, whether avoidance measures should be implemented.

To ensure that the bridge will have less than minor effects on avifauna, the following steps should be implemented:

- Construction work should not commence until a survey has been undertaken to determine whether there are any nests of ground-nesting indigenous species within the bridge footprint area.
- Best practice measures should be implemented to avoid or minimise sediment entering the waterway as this will potentially affect river fauna and birds that forage in-stream.
- Noise levels should be kept as low as possible during construction as disturbance may cause bird species to leave the area.
- To avoid displacement or disturbance of foraging or roosting birds, all dogs should remain under effective control at all times.
- Maintenance should generally be undertaken outside of the breeding season, to reduce disturbance, or alternatively, any nests should be identified and avoided.
- To reduce the potential for bird strikes and bird attraction to the bridge structure, all lighting should be downward-facing with minimal horizontal spill. Birds can be attracted to or disorientated by lighting. Similarly, the spiral strand cables could be made more visible to birds flying by the use of UV lights, luminous tape, or aerial markers.

6. CONCLUSION

The proposed Longford shared path will cross the Matāura River and will connect the East Gore bank (Church and Huron streets) with the west bank of the town (Surrey Street), allowing easy access to the township and schools, while providing a safe river crossing for pedestrians and cyclists. The proposed bridge is a cable-stay design and will be 39 metres high, 90 metres long and three metres wide. The circular steel mast (32 metres high, 916 millimetre diameter), positioned on the western bank, will suspend high strength spiral strand cables (26.4 millimetre) to support the bridge.

The construction phase should preferably be implemented outside of the nesting period, to minimise potential disturbance or displacement of bird species. However, construction probably cannot avoid the breeding period, in which case, an ecologist should be commissioned to undertake a survey and advise on nest avoidance, if

required. General use and public movement through and around the area upon completion should have only very minor effects on bird species, and any maintenance should follow the protocols identified for bridge construction. Birds will become accustomed to the presence of the bridge, and it is unlikely to have an adverse effects on bird flight paths.

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