Appendix X Desktop Ecological Assessment

Ashburton Second Urban Bridge

Desktop Ecology Assessment

PREPARED FOR Ashburton District Council | May 2022

We design with community in mind

Stantec

Contents

1 Introduction

The Ashburton District Council (ADC) are developing a Detailed Business Case in relation to the construction of a second road bridge across the Ashburton River / Hakatere as an alternative route to the existing State Highway One (SH1) bridge. For some time, the local community have expressed concerns about the resilience of the existing bridge, as well as traffic volumes and safety along SH1. This was highlighted in May and June 2021 when flooding caused significant damage and closed the SH1 bridge for several days, cutting off all access to the lower South Island. The proposed second bridge will improve connectivity and resilience for the local community and wider regions.

1.1 Background

In 2006, the Ashburton Transportation Study 2006 was jointly commissioned by Waka Kotahi and the Ashburton District Council. The study identified a number of issues with the existing bridge including (ADC, 2022):

- There are significant traffic pressure points from traffic crossing the bridge at peak hours
- These pressure points would become worse as the town continues to grow
- A significant proportion of traffic crossing the bride was local traffic
- Relieving pressure can only be achieved by providing an alternative route between Tinwald and Ashburton for local traffic
- Ashburton was vulnerable should the current bridge stop functioning, as the nearest alternative is approximately 60km away (Thompsons Track).

Between 2010 and 2011, Ashburton District Council completed technical investigations into the possible location for a second bridge. A total of 13 possible bridge locations were considered, with the favoured option being a route to the south of the existing bridge that connects Chalmers Ave to Graham Road in the west. In November 2013, Council lodged a Notice of Requirement (NOR) for land designation for the preferred route. This included a number of technical reports including landscape, terrestrial ecology, lighting, noise and vibration. A successful decision on the NOR application was released on 22 May 2014, whereupon the designation was added to the District Plan.

In 2022 Ashburton District Council commenced a Detailed Business Case for the second bridge, which sets out the reasons why the bridge is needed, what it will look like and how much it will cost. This includes the preliminary bridge design, surveys and other related studies.

1.2 Site Location

The proposed project site is located between Tinwald and the Ashburton town centre (Figure 1-1). The entire project is approximately 2 kilometres (km) long including approximately 1.6 km of highway and a new 400m long bridge, with between 14 to 20 piers to be established in the Ashburton riverbed.

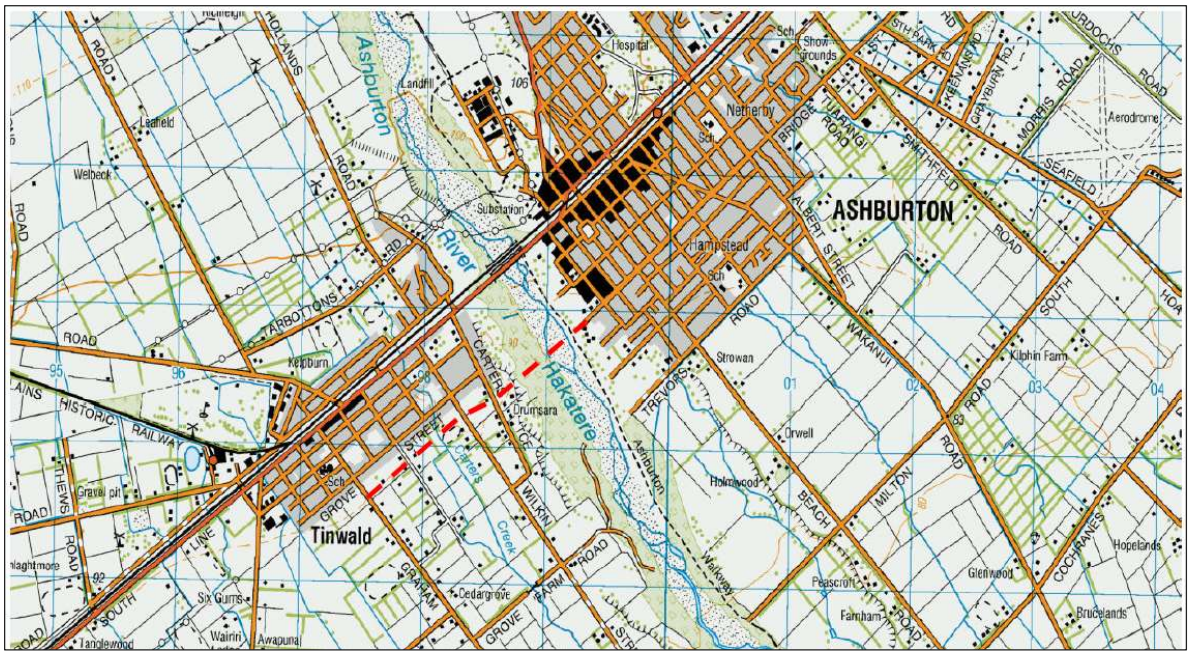

Figure 1-1 Overview Plan (approximate location shown by red dashed line)

2 Aim

Stantec has been requested to provide a desktop ecological assessment to inform the detailed business case. The purpose of this assessment is to characterize the terrestrial and aquatic environments in the vicinity of the project to determine the likely ecological impacts of construction and operation, and to determine if more detailed assessments are required. This report presents the results of the investigation.

3 Methodology

A qualitative ecological assessment was undertaken in order to determine the ecological values of the proposed route. The assessment included a review of publicly available information and technical reports including:

- Regional and District Council plans and planning maps.
- Publicly available reports on the ecology and water quality of the area.
- Biological databases e.g. LAWA, New Zealand Freshwater Fish Database.
- Aerial photographs from Google Earth and Google Maps
- Review of existing Terrestrial Ecology Assessment of Effects report prepared for the Notice of Requirement (Harding, 2013).

This work is limited to a desktop assessment, including the review of data, reports, photos and information produced by third parties. No independent verification of this information was conducted. Field work including terrestrial and aquatic ecology surveys, water quality sampling etc. can be undertaken at a later stage, if required. The assessment excluded marine ecology as no work in the coastal marine area is anticipated.

4 Results

4.1 Ecological Context

The site is located within the Low Plains Ecological District (ED) which is part of the Canterbury Plains Ecological Region (McEwen, 1987). The Low Plains ED extends from the Waipara region north of Christchurch to Washdyke Creek in the south near Timaru. It is characterised by large areas of alluvial fans formed from glacial outwash gravels sourced from large, braided rivers including the Ashley, Waimakariri, Rakaia, Rangitata Rivers, as well as the Ashburton River. There are also pockets of historic swamp deposits, beach gravels, coastal sand, and dunes. The area has low rainfall, warm summers and cool winters.

There are limited protected areas in and around the Ashburton River. In the upper catchment, the Hakatere Conservation Park, managed by the Department of Conservation, includes one of the best intact examples of an inter-montane wetland systems in New Zealand (DOC, 2022). There are also small riparian DOC reserves including the Ashburton River Marginal Strip on the north and south branches. In the vicinity of the Project, the eastern (true left) bank of the Ashburton River south of State Highway 1 is zoned public open space with Robilliard Park, Mania O Roto Park and Grigg Park. Further west, the Harris Scientific Reserve protects one of the last stands of dryland kanuka in Canterbury (ECan, 2022). Downstream, there are riparian DOC reserves near Shannon, Terrace Dale, and Ashton, as well as the Ashburton Mouth Esplanade Reserve and ADC Recreation Reserve.

4.2 Terrestrial Ecology

4.2.1 Vegetation

Vegetation of the Low Plains ED is highly depauperate and modified by agricultural and urban land use. Former vegetation of the ED consisted of lowland short tussock with some floodplain forest; podocarp-hardwood forest; extensive kanuka forest; flax (*Phormium tenax*), sedgeland and cabbage tree (*Cordyline australis*) swampland. Riparian kowhai (*Sophora* sp.) and native hardwood woodlands occurred on the banks of major rivers (DOC, 1987). Several native plant species reach their southern or eastern limit within the Low Plains ED (ibid.).

Within the project area, the site consists of urban, peri-urban and rural land use adjacent to Ashburton and Tinwald. This includes pasture land, planted trees, street trees and existing roads. Alongside the river are areas of exotic vegetation including willows (*Salix babylonica* and *S. fragilis*), pines (*Pinus* spp.), poplars (e.g. *Populus alba*), broom (*Cytisus scoparius*), English ivy (*Hedera helix*) etc. (Plate 4-1). Some native regeneration is also occurring amongst the exotic trees. The Ashburton River channel consists of braided river habitat with sparse, predominantly exotic, groundcovers.

Plate 4-1: Vegetation on the true right bank looking downstream from Ashburton Bridge (Google Earth, 2022)

The New Zealand Landcover Database (LCDB 5.0) lists the following vegetation types within the project area:

- Exotic Forest
- Deciduous hardwoods
- Gorse and/or Broom
- High Producing Exotic Grassland

Non -vegetation types:

- Built-up Area (Settlement)
- Gravel or Rock
- River

The NOR Terrestrial Ecology report confirms that the route consists of a mixture of modified, rural land use dominated by exotic vegetation. No original or intact indigenous plant communities were found to be present. Only five non-planted native species were specifically listed in the report. These are all non-threatened groundcover species: prickly shield fern (*Polystichum vestitum*), rautahi (*Carex coriacea*), Edgar's rush (*Juncus edgariae*), fireweed (*Senecio glomeratus*), and "possibly" *Carex diandra* (Harding, 2013). Planted native species recorded are cabbage trees, matipo (*Pittosporum tenuifolium*), lemonwood (*Pittosporum eugenioides*), koromiko (*Hebe salicifolia*), flax (*Phormiun tenax*), broadleaf (*Griselinia littoralis*) and pukio (*Carex secta*).

A summary of native and exotic vegetation within each section of the proposed route is provided in Table 4-1 below.

Table 4-1: Plant communities of the project area (Harding, 2013)

Project area	Summary
Grahams Road to Carters Terrace	The area is dominated by paddocks with sown pasture, including shelter belts and hedges comprising exotic species. No original or intact indigenous vegetation was observed within this project area. The banks of Carters Creek are dominated by exotic grasses. Some native species have been planted here including cabbage tree and matipo. Just north of the site, flax, broadleaf and pukio have been planted around a small pond.
Carters Terrace to River Berm Forest	The higher river terrace comprises of paddocks with sown pasture. The lower terrace that slopes towards the riparian vegetation, also supports pasture although appears less developed / grazed. There are scattered exotic trees and shrubs on the lower terrace including crack willow (*Salix fragilis*), elder (*Sambucus nigra*), gorse (*Ulex europaeus*), blackberry (*Rubus fruticosus agg.*), old man's beard (*Clematis vitalba*), and stinking iris (*Iris foetidissima*). A shallow swale with an ephemeral stream runs along the lower terrace and is dominated by exotic grasses but also supports native rautahi (*Carex coriacea*) and an unidentified native sedge (*Carex sp.*). A shallow ephemeral pond located to the north of the proposed alignment supports large patches of blackberry with native rautahi, *Carex sp.*, and *Juncus edgariae*.

River Berm Forest to Ashburton River	Riparian vegetation on the true right bank of Ashburton River has been planted as part of flood protection works. It contains rows of tall deciduous trees which are mainly exotic poplar (*Populus sp.*). These form an open forest through to the walking / bicycle track near the river's edge. The understorey supports patches of young cherry plum (*Prunus cerasifera*), with scattered broom (*Cytisus scoparius*), gorse, elder and old man's beard. The forest floor is dominated by blackberry with patches of ivy and periwinkle (*Vinca major*). Other ground-cover species present are stinking iris, male fern (*Dryopteris filix-mas*), hemlock (*Conium maculatum*), cleavers (*Galium aparine*) and occasional native prickly shield fern (*Polystichum vestitum*). Additional species present at the margin of the forest near the track are exotic woolly mullein (*Verbascum thapsus*), viper's bugloss (*Echium vulgare*), velvety nightshade (*Solanum chenopodioides*), bittersweet (*Solanum dulcamara*), fleabane (*Conyza sumatrensis*), broad-leaved dock (*Rumex obtusifolius*), mouse-ear chickweed (*Cerastium fontanum*), cocksfoot (*Dactylis glomerata*), Chewings fescue (*Festuca rubra*), other grasses and native fireweed (*Senecio glomeratus*). The narrow strip between the track and river is dominated by exotic crack willow with blackberry, broom, old man's beard, vetch (*Vicia sativa*) and stinking iris.
Ashburton River Bed	Plant species recorded on the riverbed islands are exotic tree lupin (*Lupinus arboreus*), grey willow (*Salix cinerea*), crack willow, narrow-leaved plantain (*Plantago lanceolata*), stonecrop (*Sedum acre*), Californian poppy (*Eschscholzia californica*), viper's bugloss, cudweed (*Euchiton sp.*), lotus (*Lotus pedunculatus*), St John's wort (*Hypericum perforatum*), jointed rush (*Juncus articulatus*), Yorkshire fog (*Holcus lanatus*), cocksfoot and browntop (*Agrostis capillaris*). Additional plant species at damp sandy sites were exotic toad rush (*Juncus bufonius*), wireweed (*Polygonum sp.*), winter cress (*Barbarea intermedia*) and native clubrush (*Isolepis sp.*).
Ashburton River to Chalmers Avenue	The vegetation on the true left bank between the river and Ashburton Walkway is dominated by exotic crack willow. Other species present are willow hybrids, blackberry, bittersweet, lotus, stinking iris, creeping buttercup (*Ranunculus repens*) and native fireweed. Native shrubs have been planted alongside the walkway, including matipo, lemonwood and koromiko. A road formation and excavated ditch are present between the walkway and Chalmers Avenue. This area is dominated by exotic grasses. Other species present are exotic broom, blackberry, tree mallow (*Malva dendromorpha*), velvety nightshade, broad-leaved dock, hemlock, yarrow (*Achillea millefolium*), cleavers and old man's beard. Additional species present along the ditch are monkey musk (*Mimulus guttatus*), narrow-leaved plantain and umbrella sedge (*Cyperus eragrostis*). Planted trees beside the road formation comprise exotic crack willow and white poplar with broom, blackberry, old man's beard, winter heliotrope (*Petasites fragrans*) and exotic grasses.

4.2.2 Avifauna

The large rivers of the Low Plains ED, including Ashburton River/Hakatere, provide valuable breeding and feeding habitat for coastal and wading bird species such as Threatened wrybill (*Anarhynchus frontalis*), Caspian tern (*Hydroprogne caspia*), black-fronted tern (*Chlidonias albostriatus*), and At Risk black-billed gull (*Larus bulleri*) and black-fronted dotterel (*Elseyornis melanops*). The estuaries of the Low Plains ED are habitat for waders and wetland birds including Threatened Australasian bittern (*Ixobrychus minutus dubius*) and At Risk marsh crake (*Porzana pusilla affinis)*. At Risk southern blue penguin (*Eudyptula minor minor*) breed at Ashburton beach (DOC, 1987).

The Ashburton River/Hakatere is one of the most important braided rivers in the Canterbury region for birdlife (O'Donnell, 1992; McArthur, 2016). It supports nationally and regionally significant populations of black-fronted terns, black-billed gulls, banded dotterels (*Elseyornis melanops*), black-fronted dotterels, wrybill, South Island pied oystercatchers (*Haematopus finschi*), pied stilts (*Himantopus himantopus*) and black-backed gulls (Larus dominicanus) (O'Donnell, 1992). A total of 75 bird species have been recorded on the Ashburton River/Hakatere since 1981 (McArthur, 2016). Particularly high densities of banded dotterel, pied stilts, South Island pied oyster catchers and black-fronted terns are found in the downstream reaches between Blacks Road, Greenstart, approximately 9km upstream of Ashburton, and the coast (McArthur, 2016). The 18 km section between the SH1 Bridge and the coast also provides habitat for the majority of the black-fronted dotterels found on the Ashburton River/Hakatere (Figure 4-1).

The riverbed in the vicinity of SH1 is known to support a large colony of black-billed gulls. Historically, the Ashburton River/Hakatere has had some of the highest abundance of black-billed gulls of any braided river in the country, with just under 11,000 birds recorded in 1986 and over 10,000 birds recorded in 1982, 1984 and 1987 (McArthur, 2016). Gull numbers have declined in more recent years, possibly due to weed invasion, however colonies of several thousand birds still typically establish each summer, usually either immediately upstream, or downstream of the SH1 Bridge (ibid.). Maps and a photo of the colony are shown in Figure 4-2 and Plate 4-2Plate 4-1. There have been proposals to modify the streambed below SH1 to create gravel islands, remove woody weeds and increase pest control, to improve the breeding success for the birds (McArthur, 2016). Options to reduce human and vehicle disturbance have also been mooted. It is unknown if these actions have yet to be implemented.

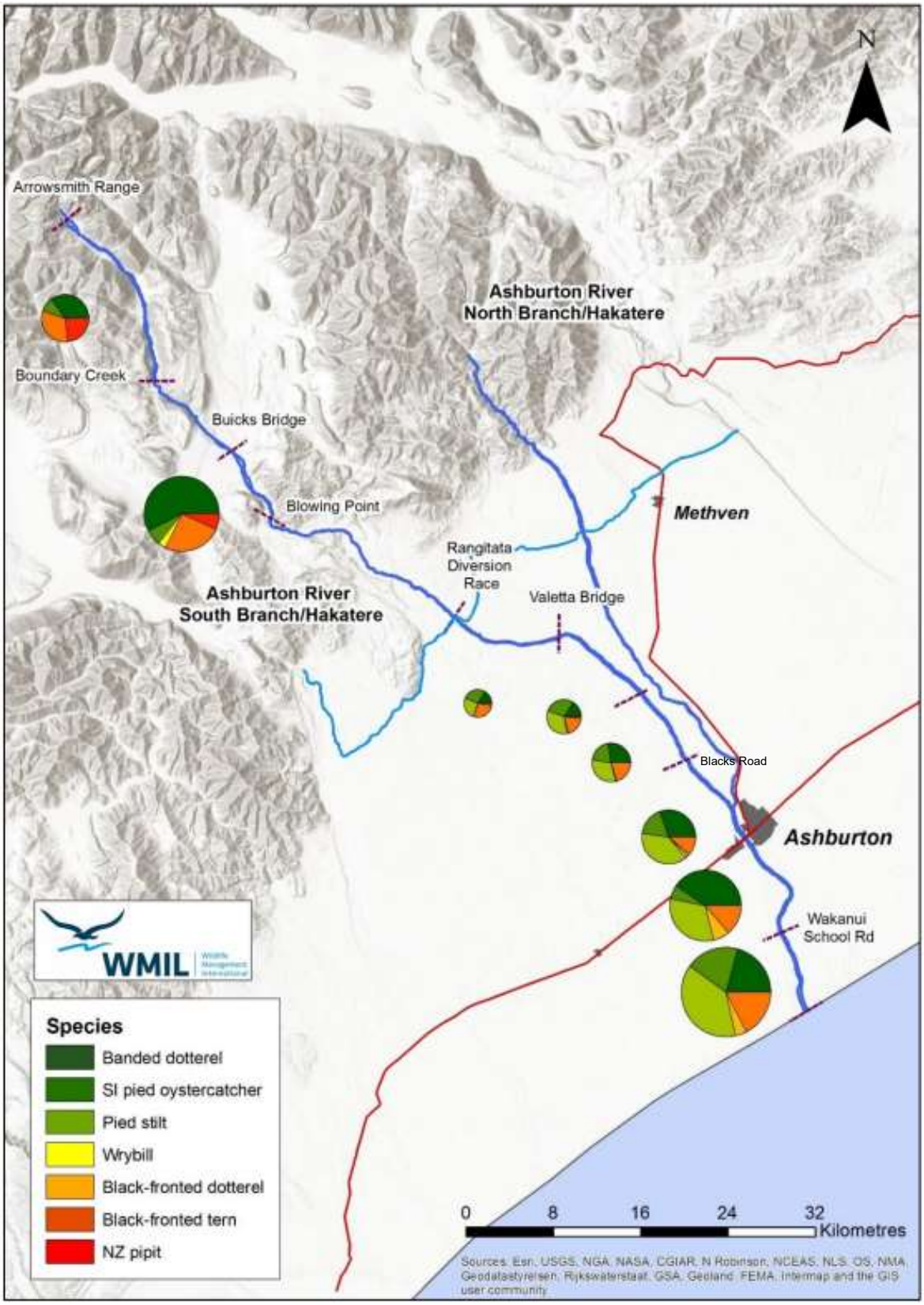

Figure 4-1: Mean relative abundance of shorebirds (excluding gulls) on Ashburton River south branch 2006-2015 (McArthur, 2016)

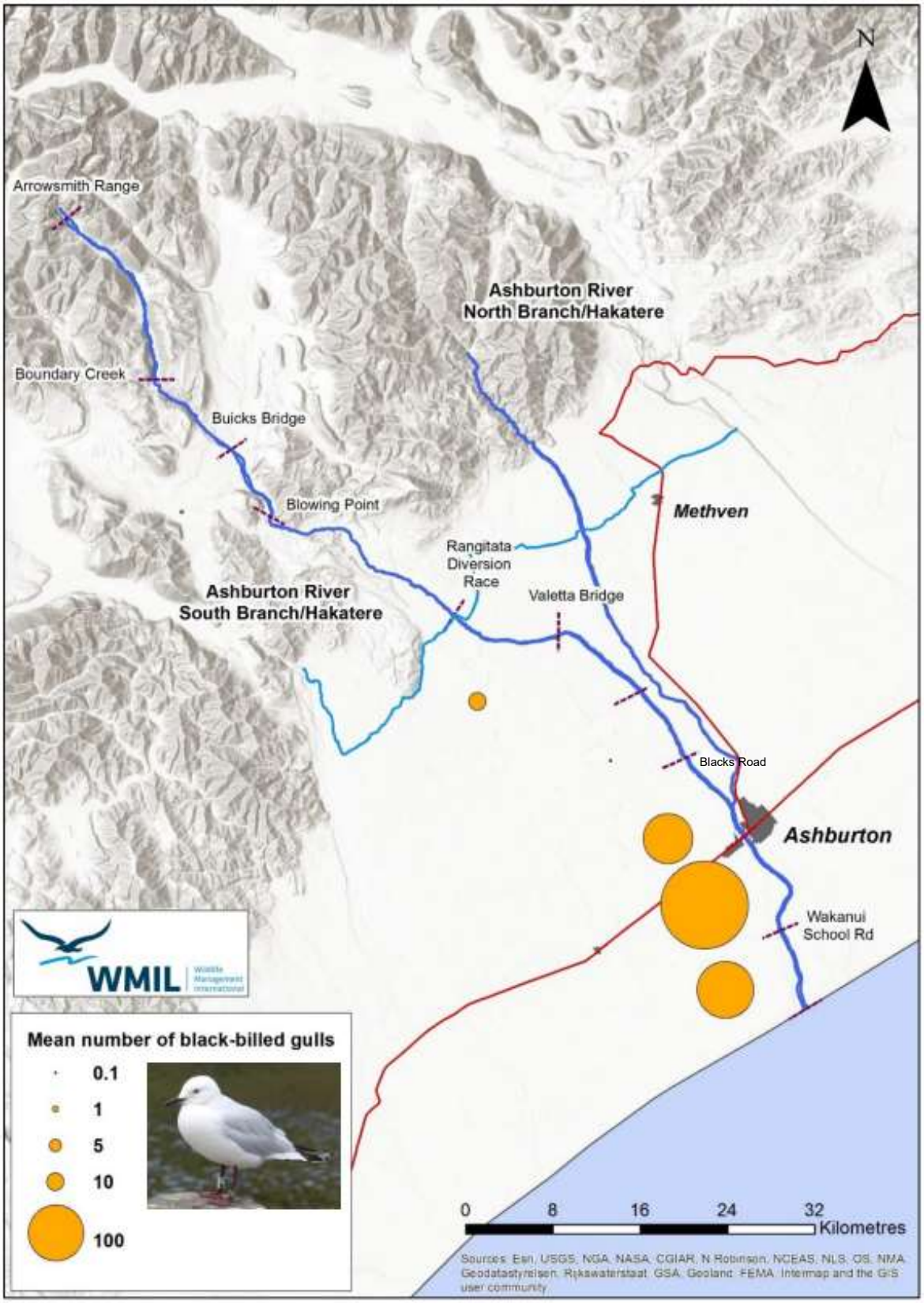

Figure 4-2: Mean annual counts of black-billed gulls along the Ashburton River/Hakatere south branch 2006-2015 (McArthur, 2016)

Plate 4-2: Tree lupin infestation and prospecting black-billed gulls near SH1 bridge, September 2015 (McArthur, 2016) (photo credit E. Smith, Forest & Bird)

Avifauna of the Ashburton River are regularly surveyed by agencies including the Department of Conservation, Ornithological Society of New Zealand and Forest and Bird. Table 4-2 outlines indigenous bird species that were observed above and below State Highway 1, between Blacks Road and Wakanui School Road, in 2012. The most numerous species recorded in 2012 were black-billed gulls. A total of 9,600 gulls were observed, almost all of which were recorded in three separate (but close) colonies in the vicinity of the State Highway 1 bridge, at or near the proposed project site (Harding, 2013). Two black-billed gull colonies, comprising approximately 5000 birds, were also observed in the vicinity of the State Highway 1 bridge during the 2010 survey (ibid.). The Ashburton River SH1 bridge colony is estimated to support 5-10% of the national population of approximately 90,000 adult individuals as per 2008 (data from McClellan and Habraken, 2013 in Harding, 2013).

Table 4-2 Indigenous bird species recorded above and below SH1 in 2012 (Harding, 2013)

Scientific Name	**Common Name**	**Threat Status** (Robertson, et al., 2021)
Circus approximans	Australasian harrier	Not Threatened
Charadrius bicinctus bicinctus	Banded dotterel	At Risk: Declining
Chlidonias albostriatus	Black-fronted tern	Threatened: Nationally Endangered
Egretta novaehollandiae	White-faced heron	Not Threatened
Elseyornis melanops	Black-fronted dotterel	At Risk: Naturally Uncommon
Haematopus finschi	South Island pied oystercatcher	At Risk: Declining
Himantopus himantopus leucocephalus	Pied stilt	Not Threatened
Hydroprogne caspia	Caspian tern	Threatened: Nationally Vulnerable
Larus bulleri	Black-billed gull	At Risk: Declining
Larus dominicanus	Black-backed gull	Not Threatened
Larus novaehollandiae scopulinus	Red-billed gull	At Risk: Declining
Phalacrocorax carbo novaehollandiae	Black shag	At Risk: Relict
Porphyrio melanotus melanotus	Pukeko	Not Threatened
Sterna striata striata	White-fronted tern	At Risk: Declining

Scientific Name	Common Name	Threat Status (Robertson, et al., 2021)
Circus approximans	Australasian harrier	Not Threatened
Charadrius bicinctus bicinctus	Banded dotterel	At Risk: Declining
Chlidonias albostriatus	Black-fronted tern	Threatened: Nationally Endangered
Egretta novaehollandiae	White-faced heron	Not Threatened
Elseyornis melanops	Black-fronted dotterel	At Risk: Naturally Uncommon
Haematopus finschi	South Island pied oystercatcher	At Risk: Declining
Himantopus himantopus leucocephalus	Pied stilt	Not Threatened
Hydroprogne caspia	Caspian tern	Threatened: Nationally Vulnerable
Larus bulleri	Black-billed gull	At Risk: Declining
Larus dominicanus	Black-backed gull	Not Threatened
Larus novaehollandiae scopulinus	Red-billed gull	At Risk: Declining
Phalacrocorax carbo novaehollandiae	Black shag	At Risk: Relict
Tadorna variegata	Paradise shelduck	Not Threatened
Todiramphus sanctus vagans	Kingfisher	Not Threatened
Vanellus miles novaehollandiae	Spur-winged plover	Not Threatened

The ecological assessment for the NOR recorded seven native bird species (Table 4-3), during field surveys in April 2010 and August 2013. Targeted avifauna surveys, including for nesting black-billed gulls, were not conducted. It is noted that April and August are not the ideal time for surveying braided rivers, as nests are not established and the river can be in high flow.

The Ashburton River was found to support five native bird species: Threatened black-fronted tern (*Chlidonias albostriatus*), At risk black shag (*Phalacrocorax carbo novaehollandiae*), as well as Not Threatened spur-winged plover (*Vanellus miles novaehollandiae*), paradise shelduck (*Tadorna variegata*) and welcome swallow (*Hirundo tahitica*). Riparian vegetation supported two common indigenous bird species: grey warbler (*Gerygone igata*) and fantail (*Rhipidura fuliginosa*), as well as “numerous” introduced bird species.

The Ashburton riverbed was considered to be “outstanding” habitat for native avifauna. The riparian vegetation on the banks of the river were not considered to be significant, but are part of a larger area of planted forest that forms a vegetation corridor along the river. Planted native and exotic trees and shrubs within the open farmland along the project route provide habitat for common native and exotic birds that inhabit open ground and modified landscapes. No native forest, wetland or wading bird habitat was located within the project area.

Table 4-3 Indigenous bird species recorded in the project area in 2010 and 2013 (Harding, 2013)

Scientific Name	Common Name	Threat Status (Robertson, et al., 2021)
Gerygone igata	Grey warbler	Not Threatened
Hirundo tahitica	Welcome swallow	Not Threatened
Chlidonias albostriatus	Black-fronted tern	Threatened: Nationally Endangered
Phalacrocorax carbo novaehollandiae	Black shag	At Risk: Relict
Rhipidura fuliginosa	Fantail	Not Threatened
Tadorna variegata	Paradise shelduck	Not Threatened
Vanellus miles novaehollandiae	Spur-winged plover	Not Threatened

4.2.3 Herpetofauna

A search of the Department of Conservation New Zealand Herpetofauna Database found no records within 10 km of the proposed project. The closest record is located 28km away. This has two records of Waitaha geckos (*Woodworthia* cf. *brunnea*), classified as At Risk: Declining (Hitchmough, et al., 2021).

The lack of data is likely due to an absence of surveys in or near the project, rather than a lack of lizard species or suitable habitat. It is therefore recommended that surveys for lizards be undertaken as part of the assessment of effects stage in the project, particularly in the less-modified banks and riparian vegetation along the river.

4.2.4 Terrestrial Mammals

There is suitable habitat for bats, such as mature exotic willow trees located within the zone of works. However, bats are not known to occur in the Ashburton River catchment. The closest record of Threatened: Nationally Critical long-tailed bats (*Chalinolobus tuberculatus*) (O'Donnell, et al., 2018) is at Mt Peel Forest, which is approximately 50 kms to the west of Ashburton (ECan, 2022).

Introduced mammalian pests known to be widespread in the Ashburton River/Hakatere. Species include feral cats (*Felis catus*), ferrets (*Mustela furo*), stoats (*M. erminea*) and hedgehogs (*Erinaceus europaeus*) (McArthur, 2016). Mice and rats are also likely to be present. Introduced mammals are known to have a major impact on the survival and productivity of riverbed-nesting birds and are thought to be contributing to the decline in shorebird numbers in the lowland section of Ashburton River/Hakatere from the Valetta Bridge downstream to the sea (McArthur, 2016).

4.3 Aquatic Ecology

Stormwater from the project is proposed to be discharged into the Ashburton River, either directly or via existing drains. In the southwest of the project, the receiving environment is Carters Creek, including the main stem and an unnamed tributary known locally as Keddies Stream (Figure 4-3). The concept stormwater design for the project includes a network of swales, soak-pits and attenuation basins to treat water quality and quantity (Opus, 2013).

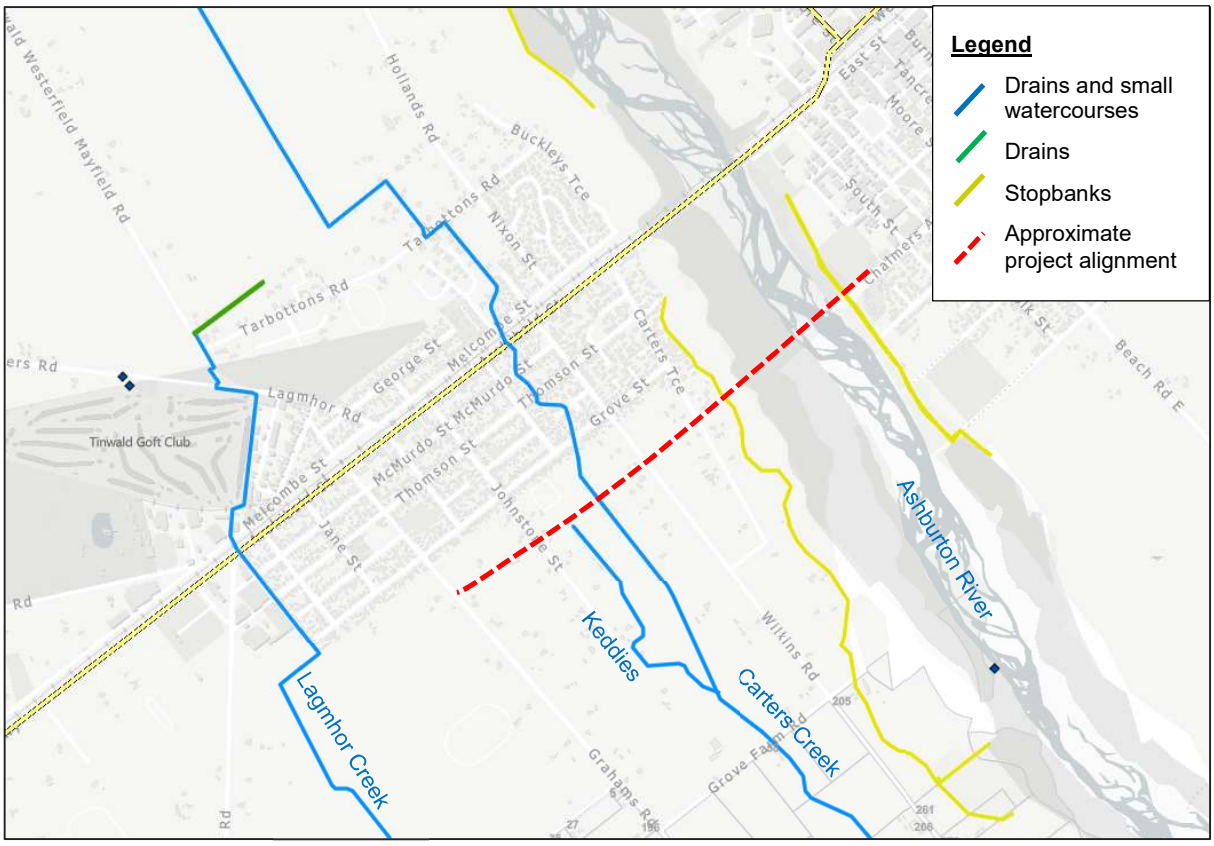

Figure 4-3: ECan stormwater data showing surface water receiving environment (ECan, 2022)

4.3.1 Water Quality and Quantity

The site is located within the Ashburton Zone of the Canterbury Water Management Strategy (CWMS). The Ashburton River is subject to a number of pressures due to land use intensification, water abstraction, pollution and introduced weeds and pests. The CWMS indicates that the river is significantly over-allocated, in the order of 173% of its mean flow, with the groundwater aquifer similarly overallocated (Canterbury Water, 2019).

River flows are monitored at the State Highway 1 bridge by ECan. The mean flow at this location is 20.70 m^3/sec. The highest flow recorded at this site was during the May 2021 floods where the river peaked at 1,794 m^3/sec (LAWA, 2022).

Table 4-4: Ashburton River at State Highway 1 (LAWA, 2022)

Parameter	Flow (m^3/sec)
Mean Flow	20.70
Median Flow	12.56
7 day Median Annual Low Flow	3.93
Lowest Recorded Flow	1.64
Highest Recorded Flow	1,793.81
1 in 5 year Annual Exceedence Probability Flow	390.00
1 in 10 year Annual Exceedence Probability Flow	540.00

The Land, Air and Water Aotearoa (LAWA) database records 12 surface water monitoring sites within the Ashburton River / Hakatere catchment. This includes one site at the SH1 bridge, and two sites upstream and downstream. Water quality at SH1 is characterised by high bacteria (*E. coli*) levels that make it generally unsuitable for swimming (LAWA, 2022). Over the past five years, *E.coli* bacteria has ranged from 172 to >2,420 cfu/100 mL, with five year median of 114 cfu/100 mL. The attribute band is “D” for this monitoring site, the second to worst category. This site also has elevated and declining turbidity, poor water clarity, and very high nitrogen levels (total nitrogen, total oxidised nitrogen, dissolved inorganic nitrogen) (LAWA, 2022). Ammoniacal nitrogen and dissolved reactive phosphorus show improvements (ibid.), possibly due to the cessation of wastewater discharges to the river by ADC. These two parameters classify the site as the highest “A” attribute band, with nitrate nitrogen as “B” attribute band under the NPS FM 2020. Downstream of SH1, the Ashburton River is characterised by elevated nitrogen, phosphorus, and faecal contamination, making the river unsuitable for swimming and contact recreation (Kelly, 2011).

The Ashburton River and Carters Creek receive discharges of urban stormwater from Ashburton and Tinwald, as well as discharges from rural landuse (Opus, 2013). It is reported that elevated turbidity causes issues downstream at Lake Hood (ibid.). There are no identified water quality or quantity monitoring sites located on Carters Creek.

4.3.2 Fish

A search of the New Zealand freshwater Fish Database (NZFFD) found 884 records for the Ashburton River catchment. A total of 21 fish species have been recorded in the catchment, comprising of 15 native species and 6 exotic species, plus native koura/freshwater crayfish (*Paranephrops zealandicus*) (Table 4-5). This includes three Threatened fish species: alpine galaxias (*Galaxias paucispondylus*), lamprey (*Geotria australis*), and Canterbury mudfish (*Neochanna burrowsius*); as well as seven At Risk species; and five Not Threatened species. According to past research, the most frequently recorded fish in the catchment are Not Threatened upland bully (*Gobiomorphus breviceps*), Introduced brown trout (*Salmo trutta*) and At Risk Canterbury galaxias (*Galaxias vulgaris*) (ECan, 2001). The river is known to support a regionally significant sports fishery, due to the presence of brown trout, rainbow trout (*Oncorhynchus mykiss*) and Chinook salmon (*O. tshawytscha*) (ibid.).

A total of 13 fish species are recorded between SH1 and the river mouth (NZFFD). The NZFFD has three records for surveys at or near the SH1 bridge. This has recorded five species: longfin and shortfin eel (*Anguilla dieffenbachia* and *A. australis*), torrentfish (*Cheimarrichthys fosteri*), upland bully, and introduced brown trout. Longfin eel and torrentfish are classified as At Risk: Declining. The most recent survey was from 2011.

There have been at least two, likely three, surveys undertaken in Carters Creek and Keddies Stream.[1] Two species have been recorded: upland bully and the Threatened Canterbury mudfish. The two mudfish records are located within or near the site, however both records are old, being from 1939 and 1977. It is therefore unknown if this species still occurs

[1] One record (card no. 50620) is named Ashburton River tributary, but the location indicates in or near Carters Creek, Tinwald.

in Carters Creek, or if it has been eliminated due to wetland drainage and rural land intensification. More recent records of Canterbury mudfish are located downstream at Lake Hood, Huntingdon, and upstream at an unnamed wetland near Sheates Road and Mill Road, Westerfield. The site is hydrologically connected to Lake Hood which is located at the downstream end of Carters Creek.

Canterbury mudfish are the most threatened of New Zealand's mudfish species. They are found in a limited number of waterways in the Canterbury Plains, between the Ashley River in the north and the Waitaki River in the south. Natural habitats are seepage wetlands, however they can be found in a wide range of artificial and modified habitats including dams, farm ponds, soakage pits, scour holes, under road culverts and in stock water races (O'Brien, no date). The species do not occur in the main stem of the Ashburton River (ECan, 2001).

Table 4-5: Fish species recorded in the Ashburton River catchment 688.000 (NZFFD, 05/05/2022)

Species Name	**Common Name**	**Threat Status** (Dunn, et al., 2018; Grainger, et al., 2018)	**Ashburton at SH1**	**Ashburton D/S SH1**	**Carters Creek**
Anguilla australis	Shortfin eel	Not Threatened	✓	✓	-
Anguilla dieffenbachii	Longfin eel	At Risk – Declining	✓	✓	-
Carassius auratus	Goldfish	Introduced and Naturalised	-	-	-
Cheimarrichthys fosteri	Torrentfish	At Risk – Declining	✓	✓	-
Galaxias brevipinnis	Koaro	At Risk – Declining	-	-	-
Galaxias maculatus	Inanga	At Risk – Declining	-	✓	-
Galaxias paucispondylus	Alpine galaxias	Threatened - Nationally Endangered	-	-	-
Galaxias vulgaris	Canterbury galaxias	At Risk – Declining	-	✓	-
Geotria australis	Lamprey	Threatened - Nationally Vulnerable	-	✓	-
Gobiomorphus breviceps	Upland bully	Not Threatened	✓	-	✓
Gobiomorphus cotidianus	Common bully	Not Threatened	-	✓	-
Gobiomorphus gobioides	Giant bully	At Risk - Naturally Uncommon	-	✓	-
Gobiomorphus hubbsi	Bluegill bully	At Risk – Declining	-	✓	-
Neochanna burrowsius	Canterbury mudfish	Threatened - Nationally Critical	-	✓	✓
Oncorhynchus mykiss	Rainbow trout	Introduced and Naturalised	-	-	-
Oncorhynchus tshawytscha	Chinook salmon	Introduced and Naturalised	-	-	-
Paranephrops zealandicus	Koura	At Risk - Declining	-	-	-
Perca fluviatilis	Perch	Introduced and Naturalised	-	-	-
Retropinna retropinna	Common smelt	Not Threatened	-	✓	-
Rhombosolea retiaria	Black flounder	Not Threatened	-	-	-
Salmo trutta	Brown trout	Introduced and Naturalised	✓	✓	-
Salvelinus fontinalis	Brook char	Introduced and Naturalised	-	-	-

4.3.3 Aquatic Macroinvertebrates

Aquatic macroinvertebrates are monitored at the State Highway 1 bridge, as well as 5 other locations in the upstream catchment (LAWA, 2022). Data at SH1 for the last 10 years shows the macroinvertebrate community is indicative of moderate organic pollution or nutrient enrichment. There is a mix of taxa sensitive and insensitive to organic pollution/nutrient enrichment (median number of taxa of the last 5 years is 15, MCI 5-year median of 107.6, EPT median of the last 5 years of 48%).

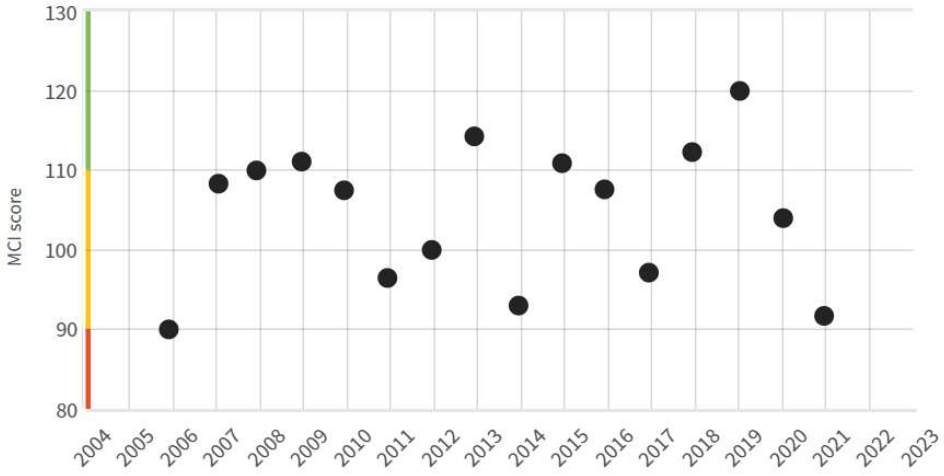

Figure 4-4: MCI results at SH1 bridge (LAWA, 2022)

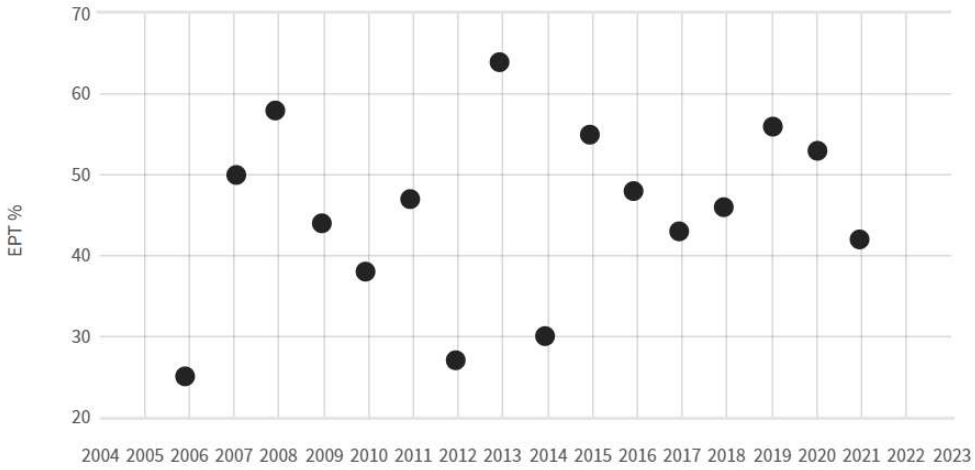

Figure 4-5: Percentage EPT results for SH1 bridge (LAWA, 2022)

4.3.4 Wetlands

Wetlands are among the most threatened ecosystems in New Zealand and have been reduced significantly from their former extent. Only 10 percent of the original wetlands of New Zealand now remain (Dymond, et al., 2021). The Canterbury region has an estimated 19,851 hectares of wetlands remaining, or approximately 10.6% of the historic wetland extent of 187,115 hectares (Ausseil, et al., 2008).

Wetlands are defined in the Resource Management Act (1991) as follows:

> **Wetland** includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.

The National Policy Statement for Freshwater Management (NPS FM) 2020 defines wetlands as follows:

> **Natural wetland** means a wetland (as defined in the Act) that is not:
>
> (a) a wetland constructed by artificial means (unless it was constructed to offset impacts on, or restore, an existing or former natural wetland); or
> (b) a geothermal wetland; or
> (c) any area of improved pasture that, at the commencement date, is dominated by (that is more than 50% of) exotic pasture species and is subject to temporary rain derived water pooling.
>
> **Natural inland wetland** means a natural wetland that is not in the coastal marine area.

The National Environmental Standards for Freshwater (NES F) 2020 place very strict rules on development in or near wetlands. If any earthworks are occurring in a wetland, resulting or likely to result in complete or partial drainage, then this would be prohibited under regulation 53 of the NES F. Any earthworks outside, but within 100m from a natural wetland resulting or likely to result in complete or partial drainage is a non-complying activity under regulation 52 of the NES F. However, there are special rules for the construction of regionally significant infrastructure and maintenance of specified infrastructure, which includes public roads.

No wetland surveys are known to have been undertaken within the project area. Aerial photography does not indicate the presence of extensive wetland habitat, however this does not preclude the presence of small areas of wetland, particularly in the western portion of the project area between Grahams Road and the Ashburton River. This is supported by the ecological assessment undertaken for the NOR, which found a shallow ephemeral pond in this area, located north of the proposed alignment (Harding, 2013). It is not clear whether this is a natural or artificial pond. The area was said to support large patches of blackberry with native rautahi, *Carex sp*., and *Juncus edgariae* (Harding, 2013).

The historic records of Canterbury mudfish in the vicinity of Carters Creek indicates that this area once supported wetland habitat, and remnants may remain. The site is hydrologically connected to Lake Hood where populations of this species remain.

5 Discussion and Conclusions

The desktop ecological assessment has identified that the project area potentially contains nationally significant habitat for braided river birds, with the area in and around the existing SH1 bridge supporting approximately 5-10% of the national population of nesting black-billed gulls. The river is also regionally significant for other braided river birds, including Threatened and At Risk species. The Ashburton River supports Threatened and At Risk fish and is regionally significant for recreational fishers. Carters Creek and Keddies Stream have historic records of Canterbury mudfish, a Nationally Threatened wetland species. More detailed ecological assessments are justified in order to more accurately assess the baseline conditions and ecological values, and the magnitude and level of any potential adverse effects (Roper-Lindsay, et al., 2018).

The construction of the Ashburton Second Bridge project will result in short-term construction impacts as well longer-term operational impacts to terrestrial and aquatic ecology in and around the project area.

Potential impacts during construction include but are not limited to:

- Loss of native flora, fauna and associated habitat during vegetation clearance;
- Disturbance to nesting birds, eggs and chicks in the Ashburton Riverbed;
- Impacts to aquatic ecology during river diversions, excavation and piling;
- Potential loss in stream area in Carters Creek and Keddies Stream due to culverting (to be confirmed);
- Releases of sediment and contaminants to surface water, soil and/or groundwater;
- Noise, air and light pollution from construction vehicles.

Potential impacts during operation include but are not limited to:

- The permanent presence of bridge piers in the Ashburton Riverbed, altering sediment deposition and potential nesting and feeding habitat for black-billed gulls and other braided river birds;
- Potential changes in recreational access to the Ashburton Riverbed (as yet unknown if access will be improved or restricted);
- Stormwater discharges to the Ashburton River, Carters Creek and Keddies Stream, affecting water quality and quantity;
- Disturbance to fauna from traffic and pedestrians using the bridge;
- Vehicle strike;
- Noise, air and light pollution from vehicles and street lights;
- Increase in edge effects due to habitat fragmentation, particularly in riparian vegetation along the Ashburton River;
- Potential increases in native habitat from native revegetation and stormwater treatment wetlands, depending upon the design, location and plant species used.

The nature and extent of these impacts will largely depend upon the detailed design and construction methodology, as well as potential environmental management and mitigation.

It is recommended that further field surveys be conducted in order to more accurately determine baseline conditions and assess potential impacts of the project. The following actions are recommended:

- Consultation with stakeholders including DOC and Forest and Bird to determine the spatial extent of the black-billed gull colony (noting that the extent varies annually), likely impacts of the bridge, and if the proposed project can facilitate restoration of the area as previously proposed (McArthur, 2016), such as by creating gravel islands, funding weed control, pest control, and restricting access for people and/or vehicles to the riverbed;
- Field surveys of the Ashburton River, riparian vegetation, and wider project area for avifauna during the nesting season;
- Field surveys of for herpetofauna, particularly in riparian vegetation along the Ashburton River and remnant habitats (if present) to the west;
- Aquatic ecology surveys, including potential Stream Ecological Valuation assessments (or similar) if piping or culverting of streams is proposed;
- Targeted mudfish surveys in Carters Creek and Keddies Stream;
- Assessment of the presence and extent of wetlands under the RMA 1991 and NPS FM 2020;
- Ground truth and more accurately map areas of vegetation and habitat be removed for the proposed project;
- Consideration of potential light pollution on avifauna and aquatic macroinvertebrates based on detailed design;
- Update the ecological assessment on the basis of the additional field surveys, including providing input into the detailed design and construction methodology to avoid, minimise and mitigate potential adverse effects.

6 References

ADC, 2022. *Ashburton Second Urban Bridge*. [Online]
Available at: https://www.ashburtondc.govt.nz/ashburton-district/projects/ashburton-second-urban-bridge
Ausseil, A. et al., 2008. *Wetland Ecosystems of National Importance for Biodiversity: Criteria, methods and candidate list of nationally important inland wetlands,* Palmerston North: Prepared for the Department of Conservation by Landcare Research.
Canterbury Water, 2019. *Canterbury Water Management Strategy: Strategic Framework November 2009 (targets updated 2010 and 2019),* Christchurch: Canterbury Water.
DOC, 2022. *Ō Tū Wharekai.* [Online]
Available at: https://www.doc.govt.nz/otuwharekai
Dunn, N. et al., 2018. *Conservation Status of New Zealand Freshwater Fishes, 2017,* Wellington: Department of Conservation.
Dymond, J. et al., 2021. Revised Extent of Wetlands in New Zealand. *New Zealand Journal of Ecology,* p. 45(2): 3444.
ECan, 2001. *Ashburton River: Instream and Amenity Values, and Flow Management Regime,* Christchurch: Environment Canterbury.
ECan, 2022. *Ashburton Zone biodiversity.* [Online]
Available at: https://www.ecan.govt.nz/your-region/your-environment/our-natural-environment/nature-in-your-area/ashburton-zone/
ECan, 2022. *Biodiversity - Roosting Habitat of Long-Tailed Bat.* [Online]
Available at: https://opendata.canterburymaps.govt.nz/datasets/ecan::biodiversity-roosting-habitat-of-long-tailed-bat/about
ECan, 2022. *ECan Flood Protection Maps.* [Online]
Available at: https://mapviewer.canterburymaps.govt.nz/?webmap=457322d308d24f64925f9d9fa0712594
Grainger, N. et al., 2018. *Conservation Status of New Zealand Freshwater Invertebrates,* Wellington: Department of Conservation.
Harding, M., 2013. *Ashburton Second Urban Bridge: Site Description (Terrestrial Ecology) and Assessment of Effects,* Canterbury: Mike Harding Environmental Consultant.
Hitchmough, R. et al., 2021. *Conservation Status of New Zealand Reptiles, 2021,* Wellington: Department of Conservation.
Kelly, D., 2011. *Ashburton/Hakatere River Surface Water Quality & Ecosystem Health,* Christchurch: Environment Canterbury.
LAWA, 2022. *Ashburton River/Hakatere at SH1.* [Online]
Available at: https://www.lawa.org.nz/explore-data/canterbury-region/river-quality/ashburton-riverhakatere-catchment/ashburton-riverhakatere-at-sh1/
[Accessed 2022 May 2022].
McArthur, N. a. B. M., 2016. *Ashburton River/Hakatere shorebird habitat management plan. Client report prepared for Environment Canterbury.,* Blenheim: Wildlife Management International Ltd..
NIWA, 2022. *NZ Freshwater Fish Database.* [Online]
Available at: https://nzffdms.niwa.co.nz/
O'Donnell, C. et al., 2018. *Conservation status of New Zealand bats, 2017,* Wellington: Department of Conservation.
O'Brien, L., no date. *50 Facts About Canterbury Mudfish,* Christchurch: Ichthyo-niche.
O'Donnell, 1992. *Birdlife of the Ashburton River, Canterbury, New Zealand,* Christchurch: Department of Conservation.
Opus, 2013. *Ashburton Second Urban Bridge and Associated New Road: Stormwater Concept Report,* Christchurch: Opus International Consultants.
Robertson, H. et al., 2021. *Conservation status of birds in Aotearoa New Zealand, 2021. New Zealand Threat Classification Series 36.,* Wellington: Department of Conservation.
Roper-Lindsay, J. et al., 2018. *Ecological Impact Assessment (EcIA) EIANZ Guidelines for use in New Zealand: terrestrial and freshwater ecosystems,* Melbourne: Environment Institute of Australia and New Zealand.
Stäger, I., 2019. *Ashburton / Hakatere River Mouth Management Strategy,* Geraldine: Lucas Associates.

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