

TIMARU DISTRICT SNA SURVEY

Area Name: Orari River

Property: UCL, DOC, LINZ and Ecan¹ tenure occurs within the area (see Attachment 1 & 2).

Location (NZTM): Upper reference point: 1455259, 5133110; lower reference point: 1472816, 5099957

Nearest Locality: Temuka & Geraldine

Ecological District: Orari, Geraldine & Low Plains

Area Size (ha): 1,725ha

Surveyor(s): Jean Jack

Survey Duration: 6hrs (across dates)

Survey Date: 30-31.10.2019

Altitude(m): <5m – 260m

General Description

This 1,725ha area covers the Orari River from the gorge to the river mouth and includes both the riverbed and river berms including flood protection plantings (see Attachment 1 & 2).

The area includes extensive vegetated and unvegetated riverbed of the Orari River braid plain and contiguous plant communities across berm areas. Spanning three ecological districts (Orari, Geraldine & Low Plains) the riverbed provides important habitat to river birds and the contiguous riparian vegetation buffers the river from adjoining land use activities and provides a corridor of habitat facilitating both the dispersal of fauna and provision of now rare forest habitat particularly within the Low Plains Ecological District (ED).

The site includes those areas previously surveyed by Harding (2014)². This larger area is recommended for SNA consideration as ecological values are common across the wider area and interdependent. This assessment was made based largely on desktop information with only limited (6 hours) field surveying.

Photographs from site visits and from the Orari rivercare group are provided within Attachment 3.

¹ Acronyms: UCL: Unallocated Crown Land; LINZ: Land Information New Zealand; DOC: Department of Conservation; ECAN: Environment Canterbury Regional Council; TDC: Timaru District Council.

² Proposed site reference numbers are known to the author as 632b, 83b and 83c; known by name as Orari River: SH79-SH1.

Plant Communities

Braidplain plant communities

Various leading plant species³ occur within the stonefields, gravelfields and sandfields of the riverbed with more extensive areas of these species forming herbfield, grassland, shrubland and, where more stable, scrub.

Stonefield/gravelfield/sandfield (sparsely vegetated)

The extent of vegetated and un-vegetated bare stones within the riverbed is directly influenced by the flow regimes of the river. Leading plant species occurring within these areas include naturalised exotic grasses, plantain (*Plantago* spp.), yellow lupin (*Lupinus arboreus*) and broom (*Cytosia scoparium*).

These species form grassland, herbfield, shrubland and scrub within less recently disturbed areas of the floodplain.

River berm plant communities

Three main vegetation structures occur within river berms including planted (flood protection) or naturalised forest and treeland; gorse (*Ulex europaeus*) or broom-scrub and shrubland and naturalised exotic grassland.

Forest & treeland

Exotic forest is the most common vegetation structure along the river berms. Canopy species primarily consist of planted (flood protection) and naturalised woody exotic vegetation including crack willow (*Salix fragilis*), poplar species (*Populus* sp.) and sycamore (*Acer pseudoplatanus*).

Sub-canopy species include exotic broom, plum (*Prunus* sp.), elderberry (*Sambucus nigra*) and black-berry (*Rubus fruticosus*). Very occasional native trees including kowhai (*Sopohra microphylla*) cabbage tree (*Cordyline australis*), kanuka (*Kunzea ericoides*) and lowland ribbonwood (*Plagianthus regius*) are present⁴.

Exotic herbs and grasses dominate the under-storey alongside climbers including ivy (*Hedera helix*), old man's beard (*Clematis vitalba*), periwinkle (*Vinca major*) and native pohuehue (*Muehlenbeckia australis*). Other very occasional native species include kohuhu (*Pittosporum tenuifolium*), small-leaved pohuehue (*Muehlenbeckia complexa*), prickly shield fern (*Polystichum vestitum*), hounds tongue (*Zealandia pustulata*) and small-leaved coprosma (*Coprosma* spp.).

Scrub & shrubland

Where forest is not present, exotic scrub and shrubland is the next most common vegetation. Scotch broom and gorse are the dominant species. Scattered emergent trees including crack willow, elderberry, poplar and sycamore can also occur, commonly accompanied by vines of old man's beard, ivy, and pohuehue.

³ Stonefields, gravelfields and Sandfields as defined by Atkinson 1985 where the area of unconsolidated bare stones (20-200 mm diam.) and/or gravel (2-20 mm diam.) exceeds the area covered by anyone class of plant growth form.

⁴Harding (2014) reported approximately 20 indigenous plant species occur within the Orari river berms and provided the locations of 11 notable native trees which were recommended for specific protection under the District Plan.

Grassland

While less extensive than other vegetation types, exotic grassland plant communities occur at the edge or within spaces unoccupied by the vegetation structures reported above.

Wetlands

Small riparian wetlands occur within river berms. These areas were not visited; however, it is likely that some native plants (i.e. *Carex* spp.) are associated with these areas.

The wetlands associated with the river mouth are extensively modified with stopbanks, drains, weirs and culverts and the vegetation dominated by exotics. Small patches of native herbfield, rushland, reedland, open water and unvegetated gravel also occur (Parker, 2011).

Parker (2011) mapped the wetlands hydrologically connected to the Orari river and while these are outside of the proposed SNA area their High ecological significance is partly based on the context of the river mouth as an important habitat in the life cycle of migratory bird and fish species.

Bird Observed

Native birds observed within the river-berms included pīwakawaka / South Island fantail (*Rhipidura f. fuliginosa*), silvereye (*Zosterops lateralis*) & grey warbler (*Gerygone igata*).

Introduced and naturalised species included chaffinch (*Fringilla coelebs*), European greenfinch (*Carduelis chloris*), European goldfinch (*Carduelis carduelis*), California quail (*Callipepla californica*), Eurasian blackbird (*Turdus merula*), song thrush (*Turdus philomelos*), Common redpoll (*Carduelis flammea*) & yellowhammer (*Emberiza citronella*).

Native birds observed on or above the open riverbed during the site visits included those observed within the berms as well as black-fronted tern (*Sterna albobriata*), spur-winged plover (*Vanellus miles*), paradise shelduck (*Tadorna variegata*), pied stilt (*Himantopus himantopus leucocephalus*) & swamp harrier (*Circus approximans*). Introduced mallard were also observed.

During the 2019 river bird survey conducted in November by the local Orari Rivercare group the following bird species were observed on or above the open riverbed. Those observed breeding are indicated with an asterisk:

Threatened avifauna included banded dotterel* (*Charadrius b. bicinctus*), black-billed gull* (*Larus bulleri*), South Island pied oystercatcher (*Haematopus unicolor*), black-fronted tern* (over 300 recorded nesting on the river) and white-fronted tern (*Sterna striata*). Other species paradise shelduck, southern black-backed gull (*Larus dominicanus*), white-faced heron (*Egretta novaehollandiae*), kingfisher (*Halcyon sancta*), pied shag (*Phalacrocorax v. varius*), black shag (*Phalacrocorax carbo novaehollandiae*) (Naturally Uncommon) spur-winged plover and pied stilt*.

Other Species Observed

Invertebrate species recorded during site visits included red & yellow admiral (*Vanessa gonerilla*; *V. itea*) & white cabbage butterfly (*Pieris rapae*).

Notable Flora, Fauna and Habitats

Riverbed bird habitat

The site includes habitats of specialised river bird species including seeps, shallow & major channels, active shingle bars and flats, small river terraces. While the river bird habitat is not the largest, most intact or representative of those found in the region, as for other smaller hill-fed rivers it contributes to the network of habitats; providing resilience to this network which support an assemblage of river bird species including several threatened species.

Threatened and At-Risk river bird species which have been recorded on the Orari River site include banded dotterel, South Island pied oystercatcher, black-fronted terns, black-billed gull, Caspian tern (*Sterna caspia*), red-billed gull, white-fronted tern, white-winged black tern (*Chlidonias leucopterus*) and wrybill (*Anarhynchus frontalis*). The black-fronted dotterel (*Charadrius melanops*), a Naturally Uncommon species, also breeds on the lower reaches of the Orari river. Both black-fronted tern (Threatened: Nationally Endangered) and black-billed gulls (Threatened: Nationally Critical) frequently form breeding colonies upstream of South Highway One. The upper Orari River (above the gorge beyond the proposed subject area) has been known to provide habitat for blue duck/whio (*Hymenolaimus malacorhynchos*) (Harding, 2014).

Several reports have considered the habitat values of the Orari River. In the 1980s the New Zealand Wildlife Service listed the Orari River as a Significant Site of Wildlife Interest (SSWI) with a rating of Moderate-High (Imboden, 1978). O'Donnell (2000) noted that the river provided important habitat in some years for black-billed gulls, black-fronted terns, banded dotterel and black-fronted dotterels. Later Hughey et al. (2010) assessed the river to be of Regional importance to birdlife and Parker (2011) assessed the contiguous wetlands of the Orari lagoon to be of High ecological significance. A report commissioned by the Forest & Bird Protection Society of New Zealand determined the Orari River to be an Important Bird Area (Gaskin, 2016) due to the use of the river by a threshold numbers of threatened species as assessed under Ramsar Convention criteria.

Riparian avifauna habitat

Harding (2014) observed that fantail and grey warbler were common throughout the berm forests while silveryeye, rifleman (*Acanthisitta chloris*), white-face heron, black shag and kingfisher were also noted using this habitat. Other avifauna records from the Orari river environs which are associated with riparian willow forest of the Low Plains ED (Crossland, 2014) include paradise duck, swamp harrier, little black shag (*Phalacrocorax sulcirostris*), grey duck (*Anas s. superciliosa*), grey teal (*Anas gracilis*), marsh crake (*Porzana pusilla affinis*), welcome swallow (*Hirundo neoxena*), spotted shag (*Stictocarbo punctatus*) (at river mouth), Australasian bittern (*Botaurus poiciloptilus*) (at river mouth), black swan (*Cygnus atratus*), shining cuckoo (*Chrysococcyx l. lucidus*), pūkeko (*Porphyrio melanotus*)⁵, Australasian shoveler (*Anas rhynchotis*) and New Zealand scaup (*Aythya novaeseelandiae*) (Gaskin, 2016). This assemblage represents over 85% of the species typical of exotic riparian willow habitat.

Within the Low Plains ED context this bird assemblage of species would be considered highly representative of bird assemblages expected in this type of habitat today.

A more representative assemblage for the Low Plains ED might include nectivores such as the bellbird and within the Geraldine ED other forest birds such as brown creeper (*Finschia*

⁵ Record made on eBird (2004) for observation at Orari Bridge: <https://ebird.org/checklist/S43384215>

novaeseelandiae) and kereru (*Hemiphaga novaeseelandiae*) might be present where indigenous forest is more prevalent in the surrounding landscape.

The relatively large size of forest bird habitat of the subject area, particularly within the context of the Low Plains ED, is of note, as is its potential provision of connectivity between foothill and plain forest bird habitats.

Lizard habitat

Discrete areas within river berms were observed which may provide suitable habitat to two native lizard species including McCann's skink (*Oligosoma maccanni*; Not threatened) and Southern grass skink (*Oligosoma aff. polychroma* Clade 5; At Risk, Declining). This latter species has been recorded to occur within grassland areas adjacent to the Orari-Rangitata Highway bridge in 2010 and 2011 (DOC Herpetofauna database). No observations of these lizards were made during site visits; however, river berms likely provide some habitat to lizards, albeit of low quality. A history of disturbance, likely predation pressures and the extensive shading by the riparian forest structure (which reduces basking opportunities, critical for the biology of these lizards) lessens the quality of lizard habitat provided by the berms. While lizards are likely to be in low numbers and the habitat degraded, the river berms do provide some of the last remaining habitat connecting populations which have otherwise become highly isolated across their natural ranges particularly within the Low Plains.

Long-tailed bat habitat

The only known long-tailed bat (*Chalinolobus tuberculatus*; Threatened: Nationally Critical) population on the East Coast of the South Island is known from Peel Forest in the north, southwards through the foothill rivers to Pleasant Point, including the upper reaches of the Orari River. Long-tailed bats are known to utilise older cavity-bearing trees including riparian willow & forage over riverbeds (O'Donnell, 2000b). While no roosts have been located to date in the the Orari river environs, it is likely that the berm forests and riverbed offer suitable feeding and roosting habitat to long-tailed bats particularly upstream of Flatman road (DOC Geraldine staff *pers. comm.* December 2019).

Notable Plant and Animal Pests

Plant pests occurring within functional river protection plantings which most threaten indigenous biodiversity values are the vines including old man's beard and ivy. Sycamore also poses a significant threat to native forest regeneration on the river berms. Exotic vegetation which may provide a better nursery environment for natural regeneration of indigenous vegetation than other exotic cover includes blackberry, willow and gorse.

Animal pests were not observed but likely include those that threaten indigenous biodiversity values through predation including feral cats (*Felis catus*), hedgehog (*Erinaceus europaeus*), mustelids (*Mustela* sp.) and rodents (Muridae). Wild deer (*Cervus elaphus*) and possum (*Trichosurus vulpecula*), particularly in the upper river site may limit indigenous vegetation regeneration.

Boundaries (buffering, fencing, adjoining plant communities and habitats)

The Orari river site is bounded by land developed for agricultural use including dairying, arable crops and sheep and beef. Distances between these surrounding land uses, and the active riverbed gravels vary from only a few meters to more than 300 meters. Generally, a distance of 50-100 meters occurs. All site boundaries were not observed during site visits, however aerial imagery indicate boundaries with stocked areas are fenced.

Condition and Management Issues

Indigenous faunal habitats

River bird habitat

Pressures common to all river bird habitat in Canterbury threaten the river bird values of the Orari river. These include predation, weed encroachment of open gravels and disturbance of various sources (vehicles, people, dogs etc). Modified flows and hydrology are also linked to ecosystem functions which support river bird species. Climate change also presents challenges as it will exacerbate these pressures⁶.

Management actions to address these pressures, or the issues they create, will be required if existing river bird habitat is to be maintained and protected.

Maintaining or enhancing the natural character of braided rivers and the biodiversity of these ecosystems might be most effectively achieved by ensuring management allows for their natural processes to respond to climate change (flows and braid plain extent), while also preparing to implement relevant management actions where processes have been put at risk by climate change (i.e. weed management). A report by Golder Associates (2013) prepared to inform the Land and Water Regional Plan for Canterbury noted that specialist waders, gulls and terns should be given particular consideration when managing river flows especially during the nesting and fledging season between August and the end of December.

⁶ Climate change will alter underlying drivers of river morphology and ecosystems; adaptive management approaches will be required to address key issues as they develop. Expected climate change trends within Canterbury such as increased precipitation (alpine fed rivers), reduced precipitation (foothill rivers), higher temps, more extreme weather events and the interactions of these changes with biotic components (indigenous & exotic) will have wide ranging consequences. Braided rivers are dynamic systems with high flows being part of what shapes their form and contributes to their natural character. Increased flows expected from climate change can reset and restore natural character – braided channels, alter habitat and remove (exotic) vegetation. Such flows however if more frequent and within constrained braid plains, may adversely affect river bird nesting success; heightening the importance of the more stable nesting environments of foothill rivers such as the Orari. The ability of the Orari to provide such surrogate habitat may be limited however if lower flows from climate change reduce dynamic braid processes (more stable channels) which will facilitate greater extent of vegetated riverbeds – which will have consequences for the ecology on the river – e.g. reducing braided river nesting bird habitat.

Riverbed bird breeding habitat could be further protected through the implementation of predator control programmes, habitat creation and consideration of reduced vehicle access during the nesting season. Recent works supported by Environment Canterbury and the Orari Rivercare group have sought to enhance river bird nesting habitat through the creation of islands within the riverbed and the establishment of public signage; such initiatives should be supported.

Forest bird habitat

The river berm provides avifauna habitat of a relatively large size in the Low Plains ED and provides connection between foothill habitats and the plains. Forests could be managed to further support forest bird populations, such as the increased use of suitable native vegetation within river protection plantings and ensuring the extent of the forests are maintained.

Lizard habitat

Habitat for lizard species occurring within the river berms could be enhanced through provisions within operational river berm management practices. This could entail identifying suitable north-facing refuge strips within berm areas which would remain undisturbed by ongoing berm forest management. Predator control programmes for lizard conservation may also be feasible at discrete prioritised sites and could potentially be aligned with river bird predator control programmes.

Bat habitat

The river berm forest vegetation of the very upper Orari river has been identified for long-tailed bat habitat (O'Donnell 2000b; see Attachment 4). Provisions within operational river berm management practices, such as the purposeful retention of dead or older trees with suitable resting and breeding cavities, could enhance the provision of habitat to bats. Consultation with Department of Conservation staff implementing DOC's bat (pekapeka) recovery plan for South Canterbury is recommended.

Indigenous vegetation

Indigenous vegetation or some individual plants located within the sites require protection from clearance and loss from invasive weed pressures if they are to be maintained. Provisions within plans or river engineering Codes of Practice to facilitate an awareness of this vegetation, its location and provisions to protect such areas. Localised (prioritised area) weed management actions, particularly of exotic vine species, would protect areas of existing/regenerating indigenous vegetation.

Overall the existing habitat values are likely to persist, and has considerable potential for enhancement (Harding, 2014).

Any allocation of resources towards conservation management initiatives should consider any relevant regional or national conservation priorities.

Significance Assessment

Significance Assessment⁷: Orari River Site				
<i>Where relevant riverbed and river berms have been assessed separately to clarify which habitat the ecological value relates to, or where value between habitats differ. Where unspecified, both habitats are relevant to the assessment criterion. The proposed SNA area comprises of both habitats.</i>				
Criteria Matter	#	Regional Policy Statement Criteria	Rating - High, Mod, Low, Met	Notes
Representativeness	1	Representative, typical or characteristic	M	Riverbed: Indigenous river bird habitat - moderate value. Guilds of birds typical of present-day braided river ecosystems of the Region including waders, waterfowl, divers, gulls & terns. Modified flows/hydrology and reduced habitat extent due to stop banks and vegetation (weed) establishment.
			M	River berm: Indigenous avifauna assemblage includes 86% of expected species; representing 7 of the 8 guilds known within riparian willow forest habitat (Low Plains) –mod value (moderated across EDs).
	2	Relatively large example (size)	L/M	Riverbed: Indigenous river bird habitat - relative to other hill-fed braided river bird habitat within the Ecological Region; Low-Moderate.
			M	River berm: A large area of avifauna habitat in the Low Plains ED reach; (and potential bat habitat).
Rarity/ Distinctiveness	3	Habitat or vegetation that has been reduced to less than 20% of ED	-	Riverbed: Braided river bird habitat of Canterbury has been reduced; Limited historical imagery. Foothill fed braided river bird habitat of the Orari reduced by river protection works however a 20% threshold is unclear.
			-	River berm: n/a

⁷ Significance criteria from CRPS with reference to guidelines (Wildlands, 2013). Bold type indicates 'Primary' criteria as identified by Timaru District Plan Part B.

	4	Supports nationally threatened, at risk or uncommon species (or within ED)	H	Riverbed: Ten threatened river bird species observed on the Orari during bird surveys occurring between 1983 & 2019. River berm: Two species: Southern grass skink (At Risk-Declining) present within berms. Black shag roosting habitat (Uncommon) (Harding, 2014).
	5	Distributional limit [TDC criteria iv]	-	The author knows of no species distributional limits associated with the site.
	6	Distinctive, restricted occurrence, naturally uncommon ecosystem, result of unusual environmental factor/s [TDC criteria iv]	M/H	Riverbed: Braided riverbed ecosystem type ('Naturally Uncommon' and classified as 'endangered') with distinctive assemblage of river bird species. River berm: -
Diversity and pattern	7	High diversity of habitat types or taxa, or reflects diverse features or ecological gradients or processes [TDC criteria iv]	L	Riverbed & berm (considered one area): Riverine habitats including some discrete springs and wetlands. Modified flows/hydrology and reduced habitat extent due to stop banks and vegetation (weed) establishment. Typical braided river terraces creating habitat gradients are not present.
Ecological context	8	Important ecological linkages or network or buffering	H	Riverbed: Riverbird habitat network. Connectivity to and support of river mouth lagoon habitats and ecological processes.
			H	River berm: The site provides contiguous plant communities which may provide a corridor of habitat facilitating dispersal of fauna otherwise isolated within Low Plains ED. Riparian vegetation provides direct buffering (point source) of instream (or where present wetland) values from contaminants or nutrients from surrounding land uses.
	9	Wetland with important role in natural functioning of river or coastal system	n/a	The site is not a wetland however discrete areas of riparian wetland occur within the river berms and the value of these have been considered under criterion 7.

	10	Provides important habitat for species (including seasonally) [TDC criteria iv]	M	Riverbed: Moderate value. Contributes to and provides resilience to the network of braided river bird habitats which support several threatened river bird species.
			L	River berm: Low value. Provides some known habitat to long-tailed bat in upper reaches and grass skink.

Assessment summary:

The Orari River area met multiple criteria of the RPS for ecological significance; rating high under Criteria 4 (Rarity) and 8 (Ecological Context) for both riverbed and river berm habitats. The area includes an uncommon ecosystem type (braided rivers); provides habitat to threatened fauna including several braided river bird species and grass skink and, in the upper reach, the native long-tailed bat.

The scheduling of this area as an SNA within the Timaru district plan has the potential to improve the protection of these significant ecological values and with additional management indigenous vegetation and habitats of indigenous fauna could be enhanced.

Resources Cited:

Atkinson, I.A.E. 1985. Derivation of vegetation mapping units for an ecological survey of Tongariro National North Island, New Zealand. *New Zealand Journal of Botany*, 1985, Vol. 23: 361-378

Crossland, 2014. Association of indigenous species; All species that are residents or regular visitors to a given habitat type in Christchurch / Banks Peninsula. Christchurch City Council Unpublished Report.

Gaskin, C. 2016. Important areas for New Zealand seabirds; Sites on land, rivers, estuaries, coastal lagoons & harbours. Forest & Bird Protection Society of New Zealand. The reports (3) are available on line at <http://www.forestandbird.org.nz/important-bird-areas>.

Parker, M. 2011. Environment Canterbury Unpublished report. Orari River Mouth Lagoons ecological significance assessment. C16C/98277.

Golder Associates. 2013. Orari river catchment: Ecological values and flow requirements. Submitted to Canterbury Regional Council. Report Number 0978110107-001-R-RevB.

Harding. 2014. Timaru district SNA survey – Orari River SH79- SH1- SNA sites 83b and 83c. Unpublished report prepared for Timaru District Council. Report Number 153958.

Hughey et al. 2010. Native Birdlife: Application of the River significance assessment method to the Canterbury region. In book: *The River Values Assessment System: Volume 2: Application to cultural, production and environmental values*, Chapter: 10, Publisher: LEaP Report No.24B, Lincoln University, New Zealand., Editors: K.F.D. Hughey, M-A Baker, Available online: https://www.researchgate.net/publication/282330073_Native_Birdlife_Application_of_the_River_significance_assessment_method_to_the_Canterbury_region

Imboden. 1978. The valuation of wildlife habitats. *Wildlife – A Review*, No.9 NZ Wildlife Service, Department of Internal Affairs, Wellington.

O'Donnell. 2000. Environment Canterbury Unpublished Report U00/37 - The significance of river and open water habitats for indigenous birds in Canterbury, New Zealand (June 2000). Report by Dr Colin F. J. O'Donnell, Science & Research Unit, Department of Conservation

O'Donnell. 2000b. Environment Canterbury Unpublished Report U00/38 - Distribution, status and conservation status of long-tailed bat.

Wildland Consultants. 2013. Guidelines for the application of ecological significance criteria for indigenous vegetation and habitats of indigenous fauna and wetlands in Canterbury. Contract Report No. 2289c prepared for Environment Canterbury.

Attachment 1: Extent of Orari River site⁸ (blue) assessed shown with ecological district boundaries (green) and district council boundary (red).



⁸ Rivermouth area excluded from site assessment.

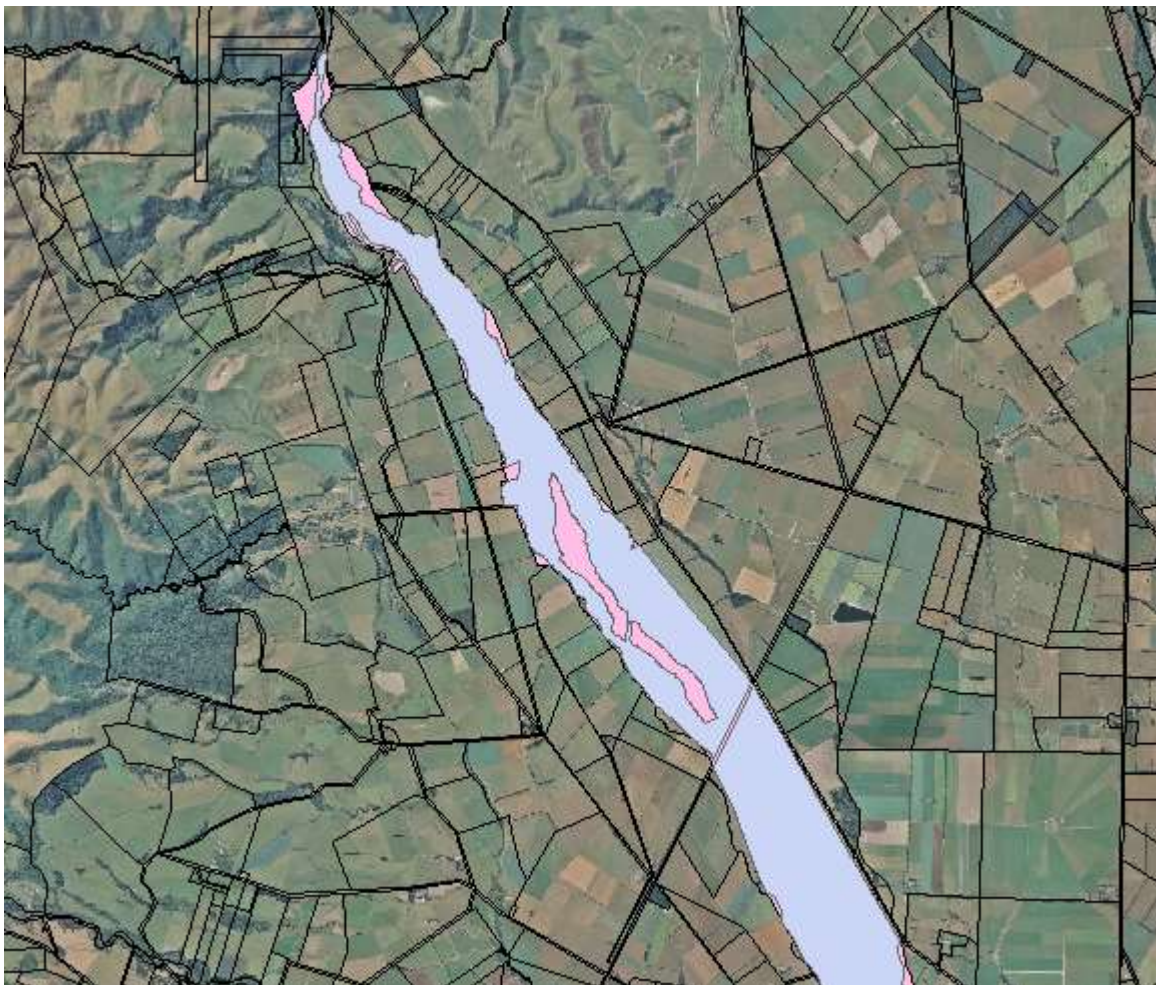
Attachment 2: Determination of the extent of the assessed SNA area with contiguous private land.

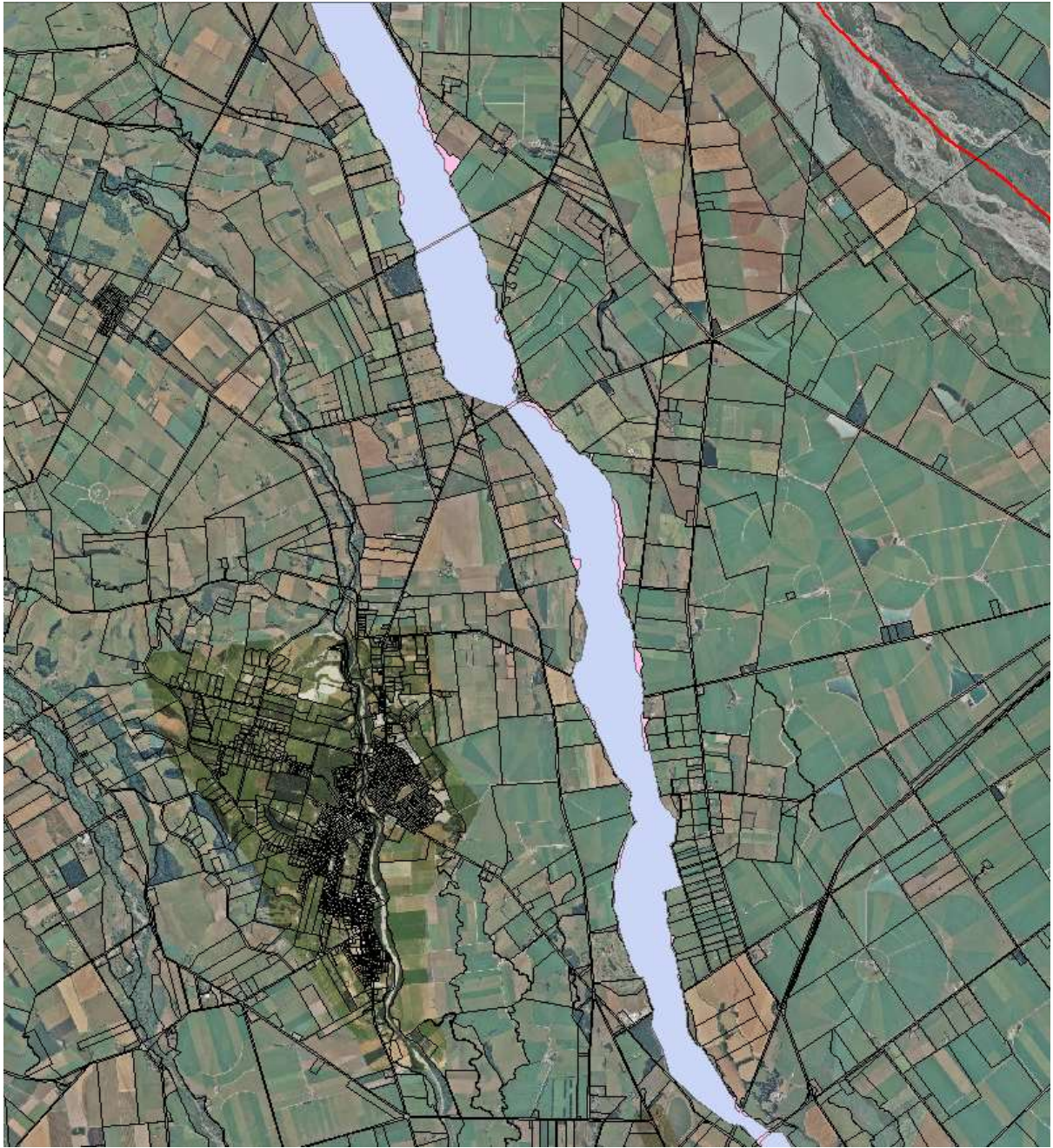
Maps were collated in Arc Map. The extent of the Orari River area was determined by desktop assessment of aerial imagery. Site boundaries were drawn to include the riverbed and river berms where vegetation was contiguous with the river berms. The Land Parcel feature in Base Layers was used to identify public land relevant to the Orari River area assessed within this report. Unallocated land parcels (the majority of parcels), Ecan, LINZ and District Council were converted to graphics and merged. This graphic was then used ('clipped') to identify the public land for SNA consideration.

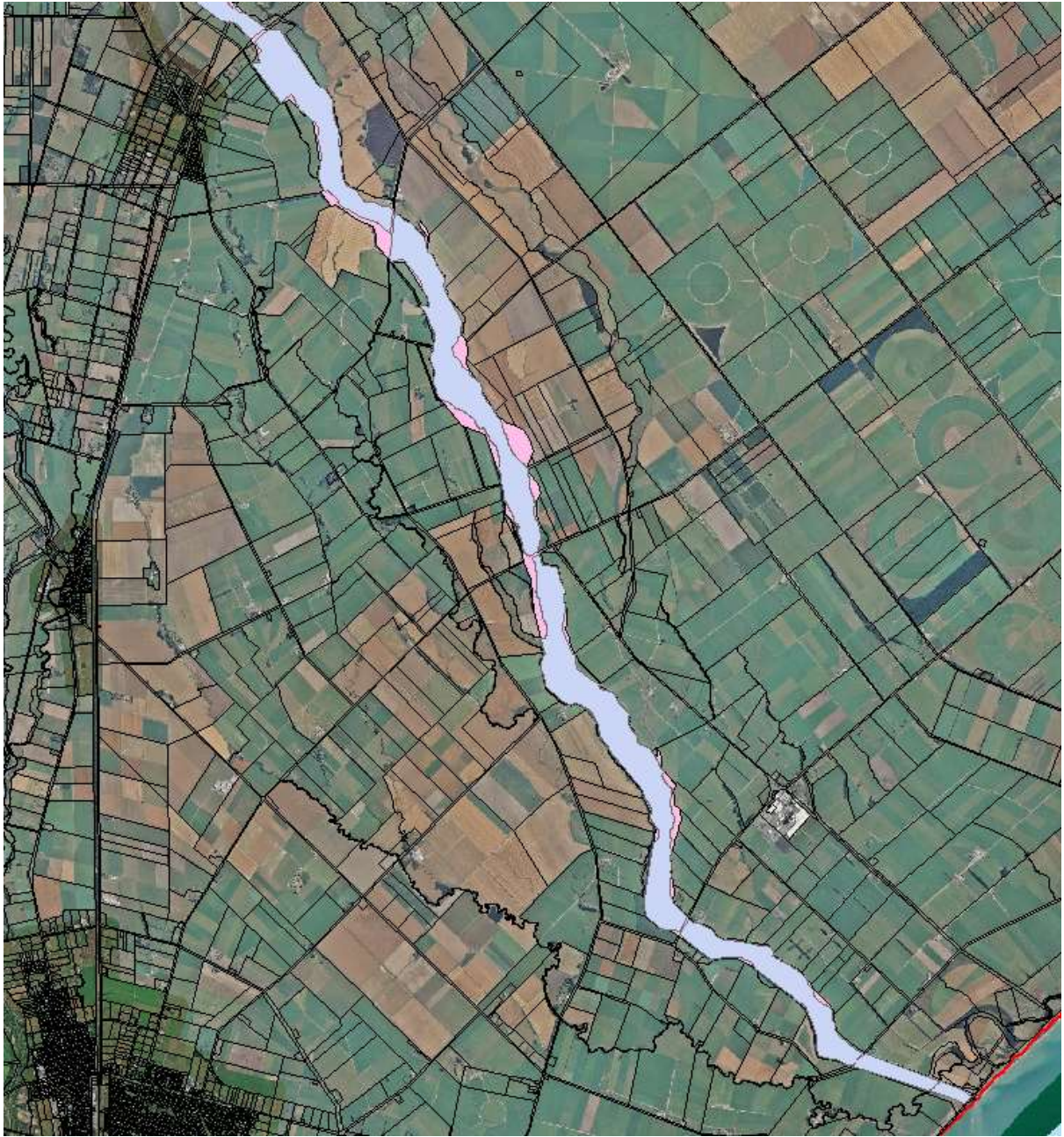
Key:

Purple fill: Combined unallocated, Ecan, LINZ and TDC tenure;

Pink fill: Private land captured by initial desktop assessment of apparently contiguous riverbed and berm features. This is shown to explain the boundaries of the proposed SNA boundaries which may appear incongruous with ecological boundaries.







Additional tenure maps for transparency of aerial imagery. Unallocated, Ecan, LINZ and TDC (blue hash) and private tenure (pink hash) within or adjacent to the assessed SNA area. If required, refer to spatial files for greater boundary clarity.









Attachment 3: Photographs

Orari River Site



Above and Below: Riverbed looking downstream and upstream of the Orari-Rangitata Highway. Typical river berm vegetation structure of willow and poplar forest fringed by exotic grasses and shrubs. Approximate image locations: NZTM 1464782, 5112065.





Above: A colony of Tarāpuka / black-billed gull on the upper reaches of the Orari River photographed by the Orari river care group in 2019⁹.

Below: Areas of the native puhuehue vine (*Muehlenbeckia australis*) are common, here occurring across exotic scrub and sycamore treeland. Approximate location of image: NZTM 1465374, 5111572



⁹ Report from the Orari Rivercare group is available online here: <https://braidedrivers.org/rivers/orari/>



Above: Typical river berm vegetation of poplar-willow-sycamore forest with ivy and broom prevalent within the understory.

Below: Small waterways occur within the river berms linked to the main river. Approximate location of image: NZTM 1467955, 5106143



Attachment 4: Long-tailed bat habitat area including the upper Orari river and surrounds
(Source: Department of Conservation. 2019. Known roosting habitats long-tailed bat populations in Canterbury. Accompanies Environment Canterbury Unpublished Report U00/38).

