TIMARU DISTRICT SNA SURVEY

Site Name: Lower Rangitata River	**Property**: UCL, LINZ, DOC, ECAN, TDC. ADC[1] (see Attachment 3)
Location (NZTM): Upper reference point: Lower reference point:	**Nearest Locality**: Mount Peel to Rangitata Huts.
Ecological District: Low Plains & High Plains	**Area Size (ha)**: Approximately 4,200ha (see Attachment 1 & 2).
Surveyor(s): Jean Jack	**Survey Duration**: 2hrs
Survey Date: 30.10.2019	**Altitude(m)**: 1 to 300m

General Description:
The SNA survey area covers the active riverbed, floodplain and berm areas of the Rangitata River from the foothills to the river mouth which are of public tenure (see Attachment 1, 2 & 3).

Given the contiguous feature of the river across the territorial boundary and the interdependency and connectivity of the ecological values associated with either district, the report recommends the consideration of an SNA in association with the Ashburton District Council. Of the total area approximately 2,600ha is under the authority of the Ashburton District Council.

The area includes extensive vegetated and unvegetated riverbed of the Rangitata River braid plain and contiguous plant communities across berm areas. Spanning two ecological districts (Low & High Plains) the riverbed provides important habitat to river birds, buffers the river from adjoining land use activities and the contiguous riparian vegetation 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); proposed as SNA 741a & 800a-e, known as Lower Rangitata River. 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 (2 hours) field surveying.

Photographs from site visits are provided within Attachment 4.

Plant Communities:

Dominant vegetation types occurring within the more recently active braidplain include exotic herbfield and grassland; vegetation types within river berms include planted (flood protection) or naturalised exotic forest and treeland; gorse/broom scrub or shrubland and exotic grassland.

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

Riverbed plant communities

Stonefield/gravelfield/sandfield (sparsely vegetated)

The relative extent of densely-vegetated, sparsely-vegetated and un-vegetated bare stones within the active riverbed is directly influenced by riverflows. Common or dominant plant species occurring within these areas include naturalised exotic herbs and grasses, brassica species (*Brassica* spp.), yellow lupin (*Lupinus arboreus*) gorse (*Ulex europaeus*) and broom (*Cytosis scoparium*). Within some more stable areas native stonefield plant communities including mat daisies (*Raoulia australis* (At Risk: Declining) & *R. hookeri*), creeping pōhuehue (*Muehlenbeckia axillaris*) and willowherb (*Epilobium melanocaulon*) occur (Harding, 2014).

These species form a mosaic of grassland, herbfield, shrubland and scrub vegetation within less recently disturbed areas of the active riverbed.

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 and treeland

Exotic canopy species primarily consist of planted (flood protection) and naturalised woody vegetation including crack willow (*Salix fragilis*), poplar species (*Populus* spp.) and sycamore (*Acer pseudoplatanus*).

Sub-canopy species include exotic plum (*Prunus* sp.), elderberry (*Sambucus nigra*) and seedlings of the dominant canopy species. Harding (2014) reported that occasional native trees including cabbage tree (*Cordyline australis*), kanuka (*Kunzea ericoides*) and kowhai (*Sophora microphylla*) occur within the river berm forests and recorded the location of six of these, noting that these trees would be considered ecologically significant given their rarity within the Low Plains Ecological District.

The exotic forest under-storey is principally of exotic gorse, broom, blackberry (*Rubus fruticosus*), old man's beard (*Clematis vitalba*) and ivy (*Hedera helix*), while native ferns occur in places as groundcovers (*Polystichum vestitum*; Austrob*lechnum penna-marina*; *Pteridium esculentum; Zealandia p. pustulata*) alongside common exotic species such as periwinkle (*Vinca major*) and ivy.

Scrub & Shrubland
Areas of exotic scrub and shrubland dominated by gorse and broom occur throughout the river berms. Scattered trees including crack willow and poplar are common within these areas with common exotic herbs including stonecrop (*Sedum acre*), sheep's sorrel (*Rumex acetosella*) and mouse-eared hawkweek (*Pilosella officinarum*).

Grassland
While less extensive than other vegetation types, discrete areas of exotic grassland plant communities occur and are prevalent along the edges of most other vegetation types.

A number of threatened plant species within the dry channels and fringes of the lower Rangitata river are recorded by Benn (2010) including leafless pōhuehue (*Muehlenbeckia ephedroides)* and a mat daisy (*Raoulia monroi*). The occurrence of an area of silver tussock

at the river mouth is also mentioned by the author which would be considered uncommon within the ED today.

Wetlands

Small riparian wetlands are common within the river berms. While generally dominated by exotic willows (and therefore difficult to distinguish from adjoining riparian willow forest) native wetland plants (e.g. *Carex* spp.) are present in these habitats. Examples of wetlands within berm habitats include Ealing Spings & Thornton Wetland[2].

Two wetland areas near to the Rangitata Huts settlement were identified and described by Harding (2014). Dominated by native vegetation (flax (*Phormium tenax*) and saltmarsh ribbonwood (*Plagianthus regius*)) these areas were of moderate to high ecological value when assessed against significance criteria.

An area of the Rangitata river hapua was described by the Regional Council in 2010 (Parker, 2010); see Attachment 5) and determined to have high ecological significance.

Birds / Fauna Observed:

Native birds observed within the river-berms included pīwakawaka / South Island fantail (*Rhipidura f. fuliginosa*), silvereye (*Zosterops lateralis*) & grey warbler (*Gerygone igata*). Introduced or naturalised species included chaffinch (*Fringilla coelebs*), European greenfinch (*Carduelis chloris*), European goldfinch (*Carduelis carduelis*), California quail (*Callipepla californica*), Eurasian blackbird (*Turdus merula*).

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 albostriata*), spur-winged plover (*Vanellus miles*), pied stilt (*Himantopus himantopus leucocephalus*), paradise shelduck (*Tadorna variegata*), & swamp harrier (*Circus approximan*).

Notable Flora, Fauna and Habitats:

Riverbed bird habitat

The site encompasses typical river habitats of river bird species including backwaters, seeps, shallow & major channels, active shingle bars and flats, river terraces and terrestrial riparian areas.

Threatened, At-Risk and Uncommon indigenous river bird species which have been recorded to occur within these habitats of the lower Rangitata river include:
Wrybill (*Anarhynchus frontalis*), banded dotterel (*Charadrius b. bicinctus*), black-fronted dotterel (*Charadrius melanops*), black-billed gull (*Larus bulleri*), red-billed gull (*Larus scopulinus*), South Island pied oystercatcher (*Haematopus unicolor*), black-fronted tern, Caspian tern (*Sterna caspia*), white-fronted tern (*Sterna striata*), white-winged black tern (*Chlidonias leucopterus*) and the eastern bar-tailed godwit (*Limosa lapponica baueri*).
Other native species include pied stilt, little shag (*Phalacrocorax sulcirostris*), grey duck (*Anas s. superciliosa*), New Zealand pipit (*Anthus novaeseelandiae*), New Zealand shoveler

[2] *Thornton Wetland is* a wetland on the north bank of the Rangitata River, immediately downstream of State Highway 1. In 2017/2018 ecological enhancements to the site were funded by ECan's Immediate Steps biodiversity fund. A species list for the site including naturally occurring and planted taxa is available (C19C/36223).

(*Anas rhynchotis*), paradise duck, southern-black backed gull (*Larus dominicanus*) and welcome swallow (*Hirundo neoxena*) (A. Grant, DOC *pers. comm*.).

Several reports have considered the habitat values of the Rangitata River. In the 1980s the New Zealand Wildlife Service listed the Opihi River as a Significant Site of Wildlife Interest (SSWI) with a rating of Moderate-High (Imboden, 1978). O'Donnell (2000) evaluated the significance of the Rangitata River for river bird habitat and determined the area to have National-International significance due to the number of guilds present; the level of endemism of species using the site; the diversity of microhabitats; and the habitat being of a relatively large size and not being represented in other regions of the country. And in 2010 Hughey et al. (2010) assessed the river to be of National importance with a ranking of 1.

Riparian avifauna habitat

Harding (2014) observed that fantail and grey warbler were common throughout the berm forests while silvereye, black shag, white-face heron, harrier and kingfisher were also noted using this habitat. The relatively large size of these berm forests, particularly within the context of the Low Plains ED is of note, as is its inherent provision of connectivity between foothill and plain habitats. Many of the bird species noted above for riverbed habitats would utilise suitable parts of the riparian habitats. The assemblage of avifauna would be considered representative for the habitat type (riparian willow forest) within the Low Plains ED (Crossland, 2014).

Lizard habitat

Lizard habitat of the lower Rangitata River is poorly understood (Benn, 2010; DOC Geraldine staff *pers. comm*. 2020). However discrete stony areas and shrubland within river berms away from flood zones offer habitat that would be suitable to native lizard species including McCann's skink (*Oligosoma maccanni*; Not Threatened), Southern grass skink (*Oligosoma aff. polychroma* Clade 5; At Risk, Declining), Southern Alps gecko (*Woodworthia* "Southern Alps"; Not Threatened) and possibly other threatened species (Hermann Frank, *pers. comm*. 2020 See Attachment 6).

No observations of these lizards were made during site visits; however, river berms likely provide some habitat to lizards. 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, however surveys of areas would be required to confirm habitat quality. While lizard numbers may be low 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 berm areas of the true right of the upper reaches of the Rangitata River Area (Attachment 7). While no roosts have been located to date in the Rangitata river environs, it is likely that the berm forests offer suitable feeding and roosting habitat to long-tailed bats (DOC Geraldine staff *pers. comm*. 2020).

Notable Plant and Animal Pests:

Mammalian browsers, predators and invasive weed species threaten terrestrial ecological values across Canterbury. Rabbits, hares, rats, possum, stoats, hedgehogs and feral cats will be common within the Rangitata River area, and it is likely that they will be having an impact upon indigenous plants and animals.

Weeds including: Trees (e.g. pines (*Pinus radiata*) & grey willow (*Salix cinerea*)); shrubs (scotch broom) & climbers (old man's beard, English ivy and blackberry) are common throughout the river berms. Where indigenous vegetation persists, or has good potential to regenerate, these weed species are of particular concern.

Note that exotic willow swamp forests can provide a nursery environment for natural regeneration of indigenous vegetation communities.

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

The area 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 widely from only a few meters to more than 800 meters. The majority of the site's boundaries with stocked areas appear to be fenced.

Condition and Management Issues:

<u>Indigenous faunal habitats</u>

River bird habitat

Pressures common to all river bird habitat in Canterbury threaten the river bird values of the Rangitata 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 pressures[3].

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.

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[3] 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 (NIWA, 2020) 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 on the alpine rivers such as the Rangitata river.

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). Research currently being undertaken by the National Institute of Water and Atmospheric Research (NIWA) may provide models which could be used to understand how flow modifications impact indigenous faunal habitats (Burrell, unpublished report, 2019).

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. An extensive predator control programme for braided riverbird conservation is implemented by DOC in the upper reaches of the Rangitata river. If such a programme was initiated in the lower reaches of the area described here, alignment with the Department's existing programme is recommended.

Forest bird habitat

The river berm provides forest bird 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 requires further investigation (survey). Subsequent areas could then be prioritised for management. In general areas throughout the proposed SNA site could be enhanced for lizard habitat through provisions within operational river berm management. 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 although challenging, 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 at the very upper extent of the Rangitata river area has been identified for long-tailed bat habitat (O'Donnell 2000b; see Attachment 7). 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.

Note that effective control of mammalian predators for the purposes of indigenous fauna conservation will always be challenging, particularly within the river margin landscape.

Indigenous vegetation

Indigenous vegetation or some individual plants located within the area require protection from clearance and loss from invasive weed pressures if they are to be maintained (i.e. those trees identified by Harding (2014)). 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.

Note that exotic vegetation including gorse, broom, conifers and deciduous hardwoods (willow, poplars etc.) are known to provide habitat to indigenous fauna[4], consequently it is often recommended these habitats are retained in preference to more intensive land use. Consideration should also be given to control requirements under the Regional Pest Management Plan.

Careful consideration to determine the objectives & outcomes sought by any predator, pest or weed control operation as well as identifying monitoring requirements is recommended.

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

[4] Exotic vegetation may also provide habitat to pest species, however until such provisions are better understood the precautionary approach to retain the habitat which is known to support indigenous species is recommended.

Significance Assessment[5]: Lower Rangitata River Site (Low Plains and High Plains ED)[6] *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.*				
Criteria	**#**		**Rank - High, Mod, Low, N/A**	**Notes**
Representativeness	1	**Representative, typical or characteristic**	**H**	**Riverbed:** Indigenous river bird habitat – high value. Guilds of birds typical of Canterbury braided river ecosystems including waders, waterfowl, divers, swamp specialists, gulls & terns and riparian wetland species.
			H	**River berm:** Riparian vegetation provides good habitat to indigenous forest birds. Areas of wetland present; good examples of coastal wetland vegetation.
	2	Relatively large example (size)	**H**	**Riverbed:** Relatively large area of river bird habitat within the Low Plains ED.
			H	**River berm:** Relatively large area of forest bird habitat within the Low Plains ED.
Rarity/ Distinctiveness	3	Habitat or vegetation that has been reduced to less than 20% of Region / ED	**-**	**Riverbed:** Braided river bird habitat of Canterbury has been reduced; a 20% threshold has yet to be determined by the author.

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

[6] Recently Burrell (unpublished report, 2019) summarised the conservations of the Rangitata River as the river was identified as a priority for freshwater conservation due in part to the residual values of its lower reaches. The report provides a summary of many ecological values (including terrestrial values) which would supplement many of the Notes provided within this significance assessment.

			-	**River berm**: n/a
	4	**Supports nationally threatened, at risk or uncommon species (or within ED)**	**H**	**Riverbed**: Ten or more threatened river bird species observed on the Rangitata during bird surveys (DOC archive). Important habitat for black-fronted tern.
			M	**River berm:** Occasional native trees including cabbage tree, kanuka and kowhai occurring within the river berm forests considered rare/uncommon within the Low Plains Ecological District.
	5	**Distributional limit [TDC criteria iv]**	**Met**	**Riverbed & berm:** Upper reach of area: Long-tailed bat distribution northern limit (of estimated habitat area – see Attachment 7). Limited data.
	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.
			M/H	**River berm:** Locally important habitat for an uncommon bird species (black shag); wetland plant (oioi at coastal wetland) (Harding 2014).
Diversity and pattern	7	**High diversity of habitat types or taxa, or reflects diverse features or ecological gradients or processes [TDC criteria iv]**	**H**	**Riverbed & berm (considered one area):** High diversity of habitat types encompassing young alluvial surfaces (often disturbed by flooding) and more mature (less disturbed) surfaces. Active riverbed, more stable terraces and riparian margins, forested river berms; springs and wetlands. Though reduced, a relatively diverse number of plant species for the ED (Harding 2014 recorded 18 native plant species within the berms).

Ecological context	8	Important ecological linkages or network or buffering	**H**	**Riverbed:** Connectivity to and support of lower river & lagoon habitats and ecological processes.
			H	**River berm:** Contiguous plant communities with the lower river berms; a corridor of habitat facilitating dispersal of fauna into Low Plains ED. Riparian vegetation provides direct buffering (point source) of instream 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 area has not been assessed as a wetland, however riverine wetlands occur within the river berms (notable are Ealing Springs & Thornton Wetland) and the value of these have been considered under criterion 1 & 7.
	10	**Provides important habitat for species (including seasonally) [TDC criteria iv]**	**H**	**Riverbed:** High value. Contributes to the network of river bird habitat providing resilience to the environment which supports several threatened river bird species.
			H	**River berm:** Moderate value. Known to provide some habitat to long-tailed bat (upper reaches) and extensive habitat to indigenous forest bird species (particularly in lower reaches).

Assessment summary:

The Lower Rangitata River area met multiple criteria of the RPS for ecological significance; rating high under Criteria 1, 2 (Representativeness), 4 (Rarity & Distinctiveness), 7 (Diversity and Pattern), 8 and 10 (Ecological Context) relating to both the riverbed and river berms. Notably the area represents an uncommon ecosystem type (braided rivers) of high habitat diversity and provides important habitat to threatened fauna including several braided river bird species.

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.

Such scheduling of the entire area as identified here, and to enable the practical implementation of many of the recommended management provisions, collaboration with the Ashburton District Council would be required.

Resources Cited:

Benn, J. 2010. Instream intrinsic values of the Rangitata River catchment. Department of Conservation internal report, Document No. DOCDM-128172, August 2010. *Cited in:* Burrell. 2019. Rangitata River Catchment Values. Instream Consulting Ltd. Unpublished Report Commissioned by the Department of Conservation.

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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.

Harding. 2014. Timaru district SNA survey – Lower Rangitata River - SNA sites 800a – e. 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.

National Institute of Water & Atmospheric Research Ltd (NIWA). 2020.Climate change projections for the Canterbury Region. A report prepared for Environment Canterbury February 2020.

O'Donnell. 2000. Environment Canterbury 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.

Parker, M. 2010. Environment Canterbury Unpublished report. Rangitata river mouth hapua, ecological significance assessment. C15C/584.

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 the Rangitata River area shown with ecological district (ED) boundaries.

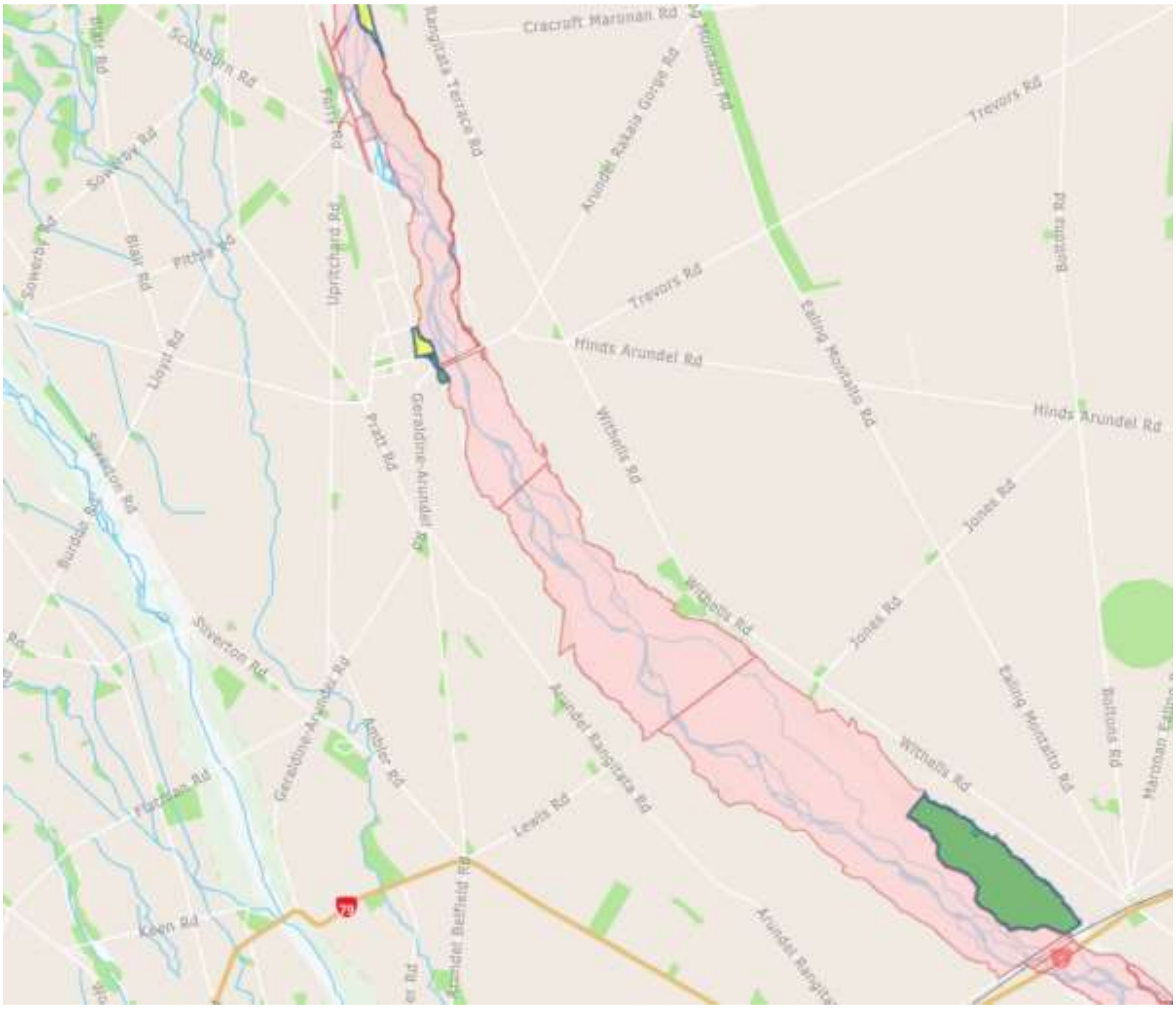
The total area is approximately 4,200ha.

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

Maps were collated in Ecan Maps and Arc Map. The extent of the Rangitata 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 Rangitata River area. UCL (the majority of parcels), ECAN, LINZ and District Council tenure were converted to graphics and merged. This graphic was then used ('clipped') to identify the public land area for SNA consideration.

Key: Cream fill: Combined UCL, ECAN, LINZ and District Council tenure; Yellow 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 the ecological boundaries of features.

Attachment 3: Rangitata River Area land parcels associated with the Rangitata River Area. Indicative tenure: UCL: pink; ECAN: light green; DOC: dark green; TDC or ADC: yellow; LINZ: purple.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Trevors Rd
Trevors Rd
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Hinds Arundel Rd
Withells Rd
Withells Rd
Withells Rd
Ealing Montalto Rd
Ealing Montalto Rd
Jones Rd
Jones Rd
Boltons Rd
Boltons Rd
Scotsburn Rd
Sowerby Rd
Sowerby Rd
Blair Rd
Blair Rd
Pithie Rd
Lloyd Rd
Upritchard Rd
Parry Rd
Pratt Rd
Geraldine-Arundel Rd
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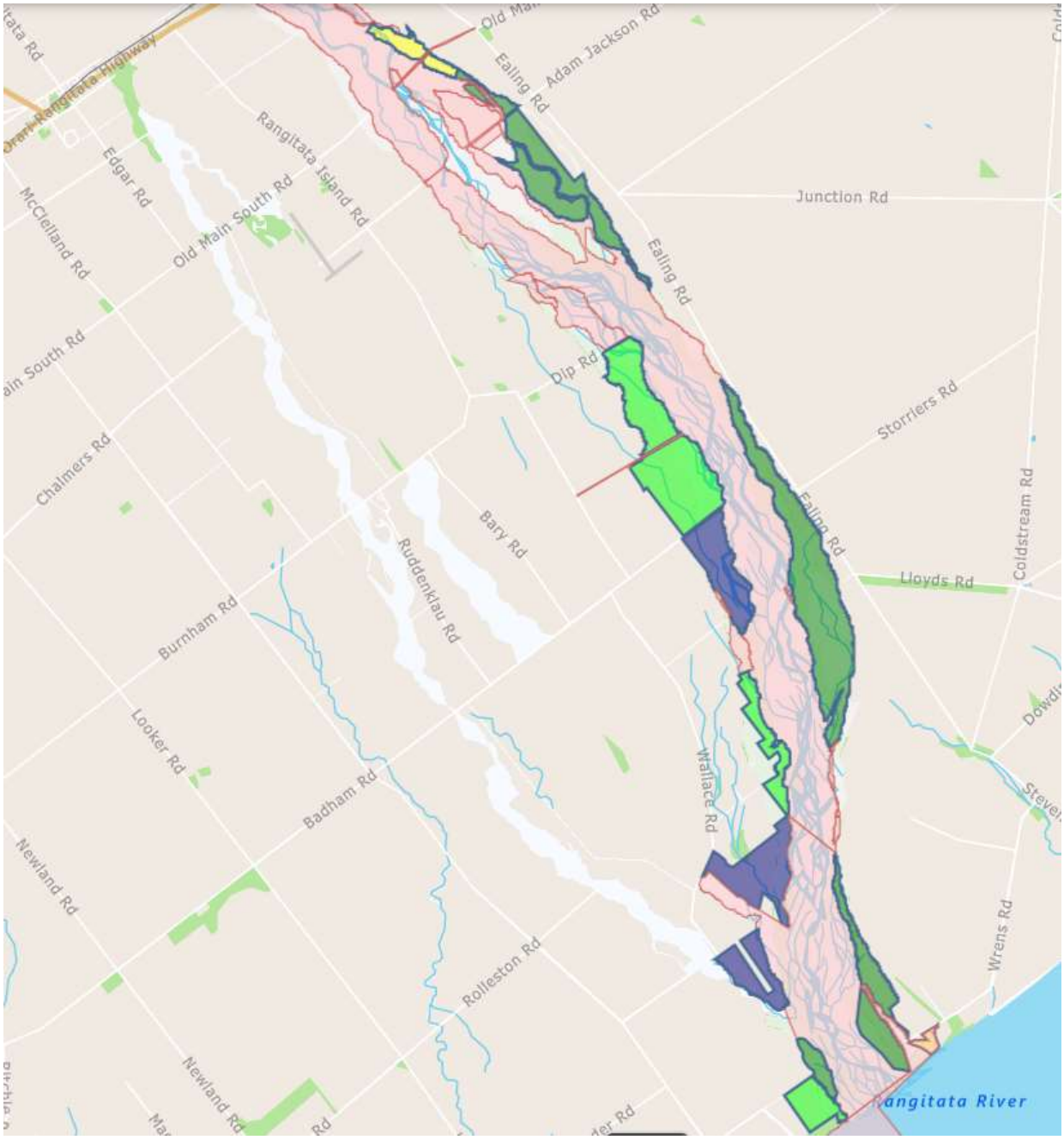
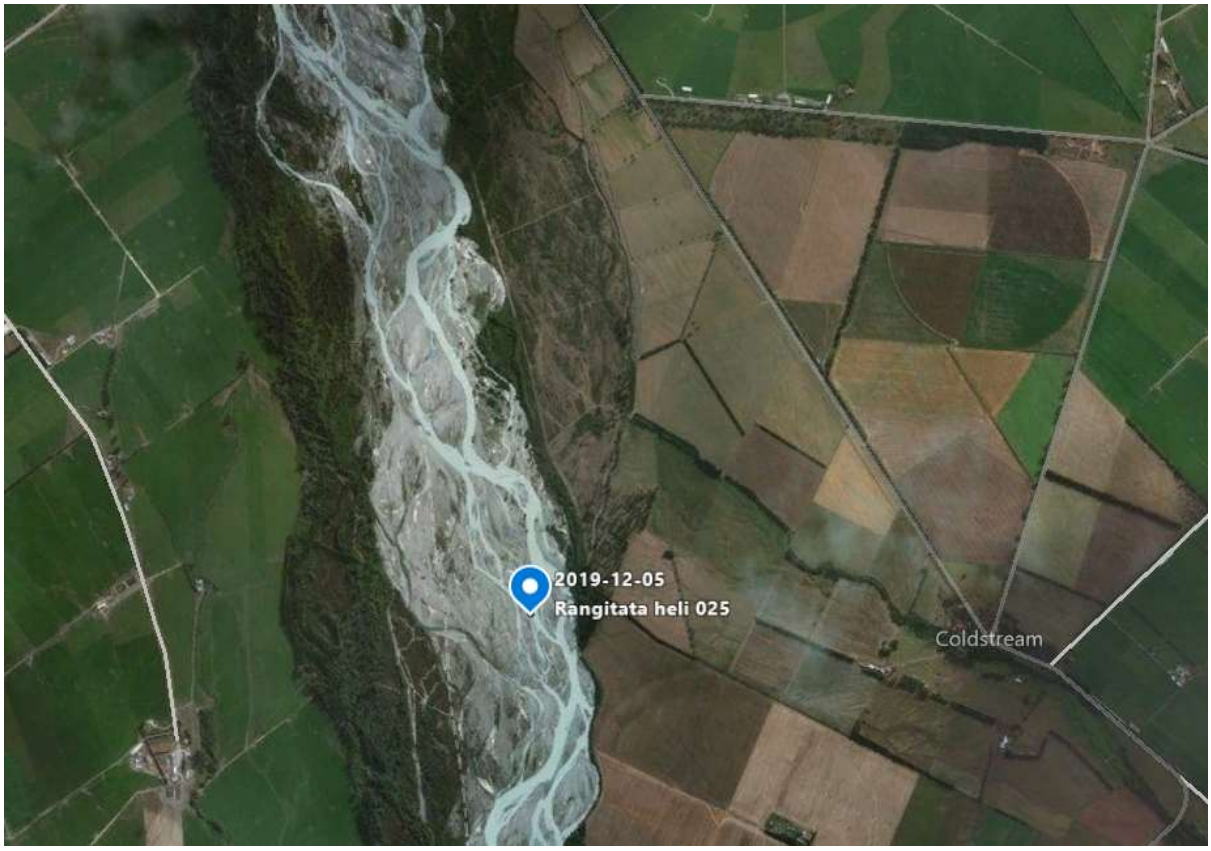
Ambler Rd
Arundel Rangitata Rd
Lewis Rd
Arundel Belfield Rd
Koen Rd
79


Adam Jackson Rd
Ealing Rd
Rangitata Island Rd
Edgar Rd
McClelland Rd
Old Main South Rd
Junction Rd
Ealing Rd
Dip Rd
Storriers Rd
Chalmers Rd
Barry Rd
Ruddenklau Rd
Ealing Rd
Coldstream Rd
Lloyds Rd
Burnham Rd
Looker Rd
Badham Rd
Wallace Rd
Newland Rd
Rolleston Rd
Wrens Rd
Newland Rd
angitata River

Attachment 4: Photographs

Above: Looking upstream from near the Arundel Rakaia Gorge Road bridge. Typical forest margin assemblage of river protection plantings of willow and poplar within naturalised woody vegetation; exotic scrub at margins. Approximate image location: NZTM 1463485, 5129750.

Below: Just upstream of the Arundel Rakaia Gorge Road bridge. Typical understorey or river berms including sycamore seedlings and exotic vines such as ivy and old man's beard. Occasional areas of native *Blechnum* and *Microsorum* ferns. Approximate image location: NZTM 1463299, 5130048.



Above: Looking upstream during a flight over the Rangitata river during the December 2019 flood flow event. Such flows are a key driver of the river's morphology, maintaining the diversity of habitat types found within this braided river ecosystem. Note the area upstream on the true left which during this flood event was not inundated. Such elevated areas of the river berms offer more stable habitats to terrestrial fauna such as lizards.

Attachment 5: River mouth wetlands previously assessed by the Regional Council[7]

The wetland record sheet for the Rangitata River mouth hapua drafted in 2010 noted the following:

At time of survey, the Rangitata hapua combined an area of lacustrine freshwater 'lagoon' hydrosystem at its northern end with riverine hydrosystem at its southern end. Relative extent of these two main hydrosystems shifts with location of the hapua outlet along the beach barrier. Both lacustrine and riverine sections of the hapua are subject to tidal influence, but due to the volume of inflows, remain largely freshwater habitats. Due to its highly dynamic nature, the Rangitata River hapua supports little wetland vegetation, with limited areas of freshwater marsh along the margins of the hapua, and an adjoining area of estuarine saltmarsh habitat. Most of wetland area is un-vegetated shallow water or bare ground, as hapua extent and water levels are constantly changing. Native fauna: Rangitata River mouth hapua is a regionally-significant habitat for native water birds. It supports a diversity of species: coromorants, waders, waterfowl, gulls and terns. It is feeding and roosting habitat for threatened wrybill, banded dotterel and black-fronted tern (O'Donnell 2000). Hapua is habitat for diverse range of native fish: eels, inanga, bullies, smelt, torrentfish, lamprey, black flounder (Daly 2004).

The Rangitata River mouth hapua was assigned an overall ecological significance ranking of ***High****.*

The map below shows the area of river mouth assessed by Regional Council staff.

References:
Daly, A 2004. Inventory of instream values for rivers and lakes of Canterbury New Zealand. A desktop review. Environment Canterbury Report U04/13.
O'Donnell CFJ. 2000. The significance of river and open water habitats for indigenous birds in Canterbury, New Zealand. Environment Canterbury Unpublished Report U00/37.

[7] Council file: C19C/55020 Rangitata River Hapua

Attachment 6: Examples of lizard habitat within Rangitata river berm (Hermann Frank, *pers. comm.* February 2020).

The photographs below were taken in September 2014 and depict lizard habitat within the north bank of the Rangitata River. Approximate location: NZTM 1468900 5124600 (near Jones Road). A lizard was observed at the site depicted and was thought to be a Southern Alps gecko. The area was noted to be typical for Southern grass skink though no observations of this species was made at the time, and this was accounted to the unfavourable survey conditions (too warm). Note also the Kanuka vegetation within the first image. The habitat shown is thought to be common throughout the Rangitata river berms.

Attachment 7: Proximity of long-tailed bat habitat area to the Rangitata river (Source: Department of Conservation. 2019. Known roosting habitats long-tailed bat populations in Canterbury. Accompanies Environment Canterbury Unpublished Report U00/38).