Site assessments of two Canterbury braided rivers to determine the suitability for reintroducing Kakī (*Himantopus novaezelandiae*)

Ashley-Rakahuri River & Upper Rangitata River

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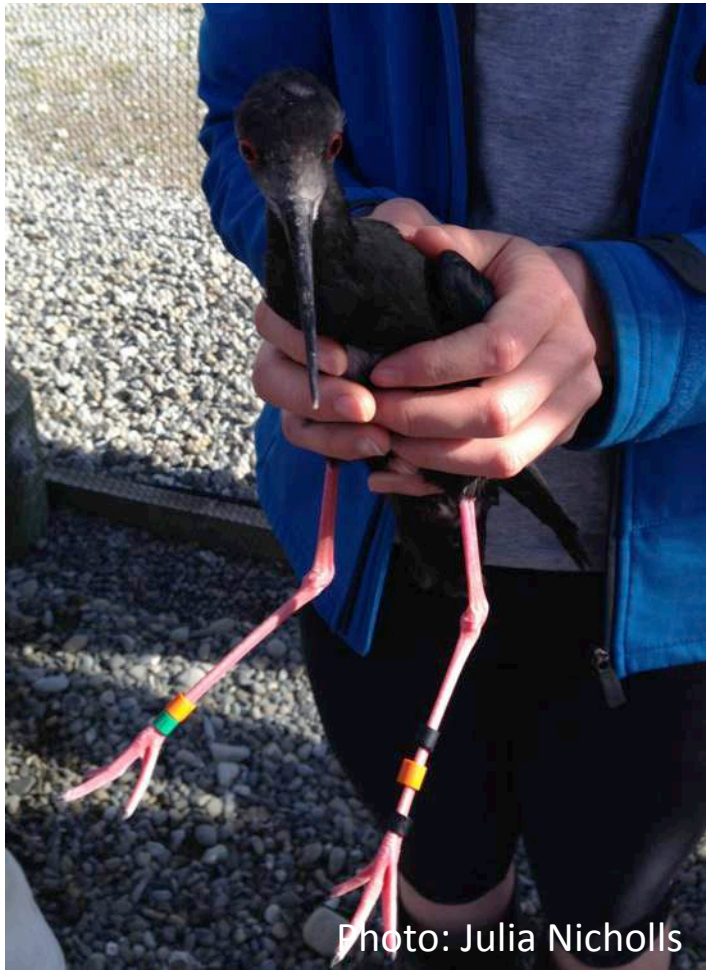
Kakī background

- Wading, insectivorous shorebird
- Inhabits braided rivers of the Mackenzie Basin
- New Zealand's only endemic stilt species
- Critically Endangered (IUCN Red List)
- Formally widespread
- 1980 – low of 23
- 2015 – 77 adults
- Threats include predation, habitat modification and hybridization



Adult kakī

Management

- Recovery Plan (2001) aim: *to increase kakī numbers, breeding success and adult survival in the wild* (Maloney & Murray 2001)

- Management includes:
  - egg manipulation
  - captive breeding and rearing for release
  - controlling the formation of mixed pairs
  - predator control
  - habitat protection and enhancement

- Recruitment:
  - Captive reared & released birds: 20% for juveniles, 24% for sub-adults
  - Wild hatched chicks: 4%

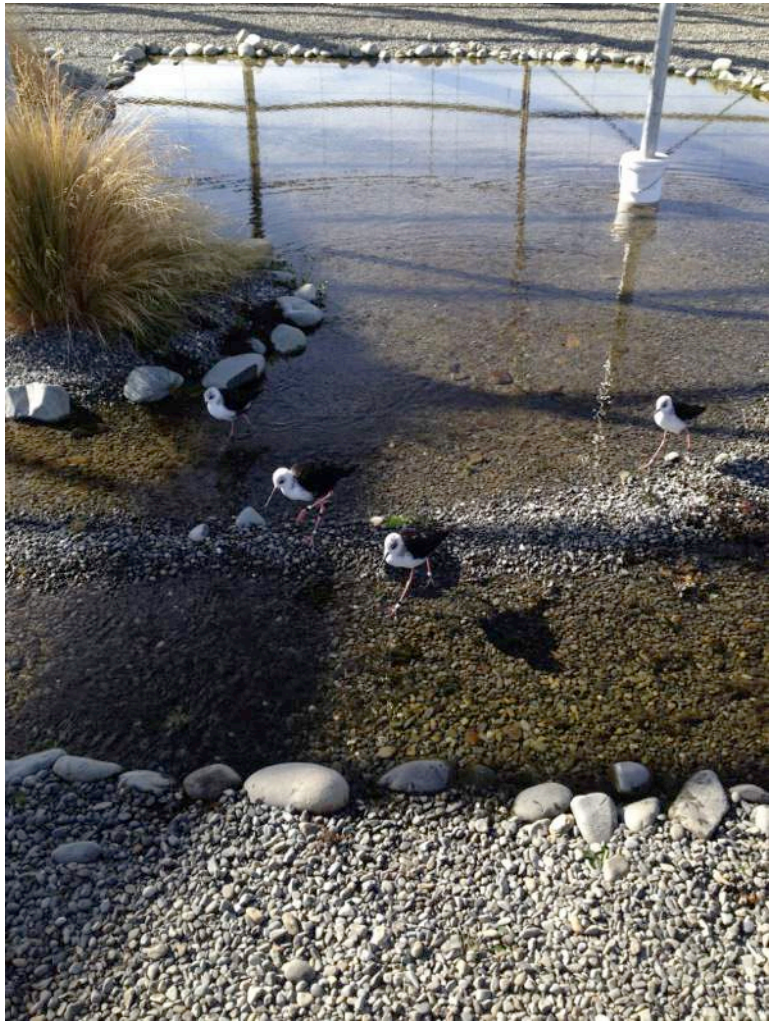


Photo: Julia Nicholls

Rationale & Objectives

Rationale

- Previous recovery plans have considered translocation as an additional management option
- An additional site would be useful as an insurance population, in case of loss of the current small and restricted population through natural or anthropogenic disturbances
- Could be useful to test if other parts of the former kakī range provide better habitat than is available for the current remnant population

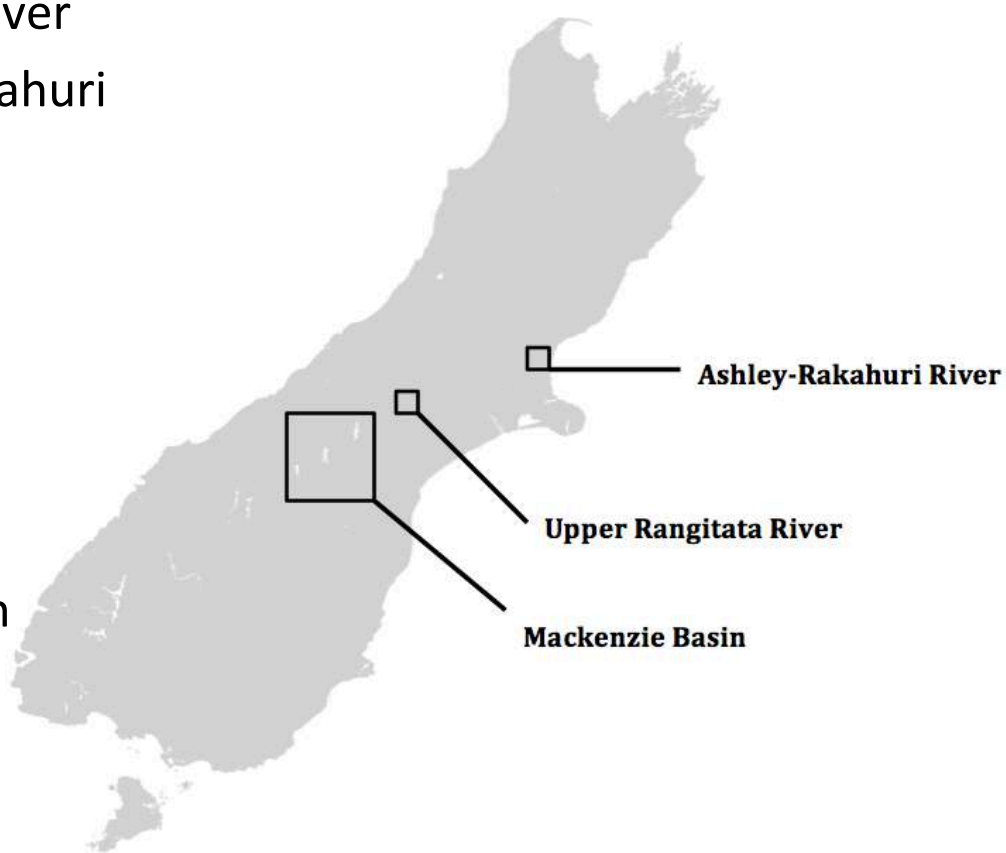
Objectives

- To determine whether the two sites, the Ashley-Rakahuri River or the Upper Rangitata are suitable reintroduction sites for kakī
- Select criteria to be assessed at each site

Methods – Study Sites

- Ashley-Rakahuri river
  - North Canterbury lowland river
  - Managed by the Ashley-Rakahuri Rivercare Group

- Upper Rangitata river
  - Mid Canterbury
  - Managed by the Department of Conservation



Methods - Assessment Criteria

Criteria	Justification
1. Habitat Availability	• Breeding occurs on shingle islands, absent of weeds • Additional habitat includes river deltas, estuaries or wetlands, used during the winter and flooding • Flooding during the breeding season can destroy nests
2. Food Availability	• Kakī feed primarily on aquatic invertebrates • Opportunistic, generalist feeders
3. Predators	• Mammalian predators are the main cause of population decline • Predator control can increase fledging success and adult survival

Additional criteria: 4. Human disturbance 5. Hybridization, 6. Migration, 7. Size of site, 8. Conflict of Conservation use, 9. Geographic range, 10. Monitoring

Methods - Data Collection

Field observations

- Ashley-Rakahuri River
  - Weed coverage estimates
  - Pied stilt observations

Additional sources

- Communications with ARRG and DOC, additional information from Environment Canterbury, the scientific literature, internal reports and raw data

Criteria assessment

- Discussion with and guidance from the Kakī Recovery Programme DOC officers on the suitability of each site, based on each criterion
- Each criterion was assigned a ranking of 1-5 (1=not suitable, 5=suitable)

Assessment – Habitat & Food Availability

- Ashley-Rakahuri River

Map source: Canterbury Maps – Latest Imagery


Photo: Julia Nicholls

Habitat & Food availability: Ashley-Rakahuri River

- Weed coverage estimates
  - Dense vegetation: 35%, light vegetation: 41%, open gravel: 15%, water: 9%
- Flooding (past 20 years)
  - Over 100 m^3s^{-1}: 51 flood events
  - Flood every year, except 1998 and 2005
  - 45% during breeding season, 55% outside breeding season
- Variety of habitat
  - Estuary, various ponds and wetlands (Tūhaitara Coastal Park)
  - Provides foraging habitat during floods and outside breeding season

Wrybill
Photo: Julia Nicholls

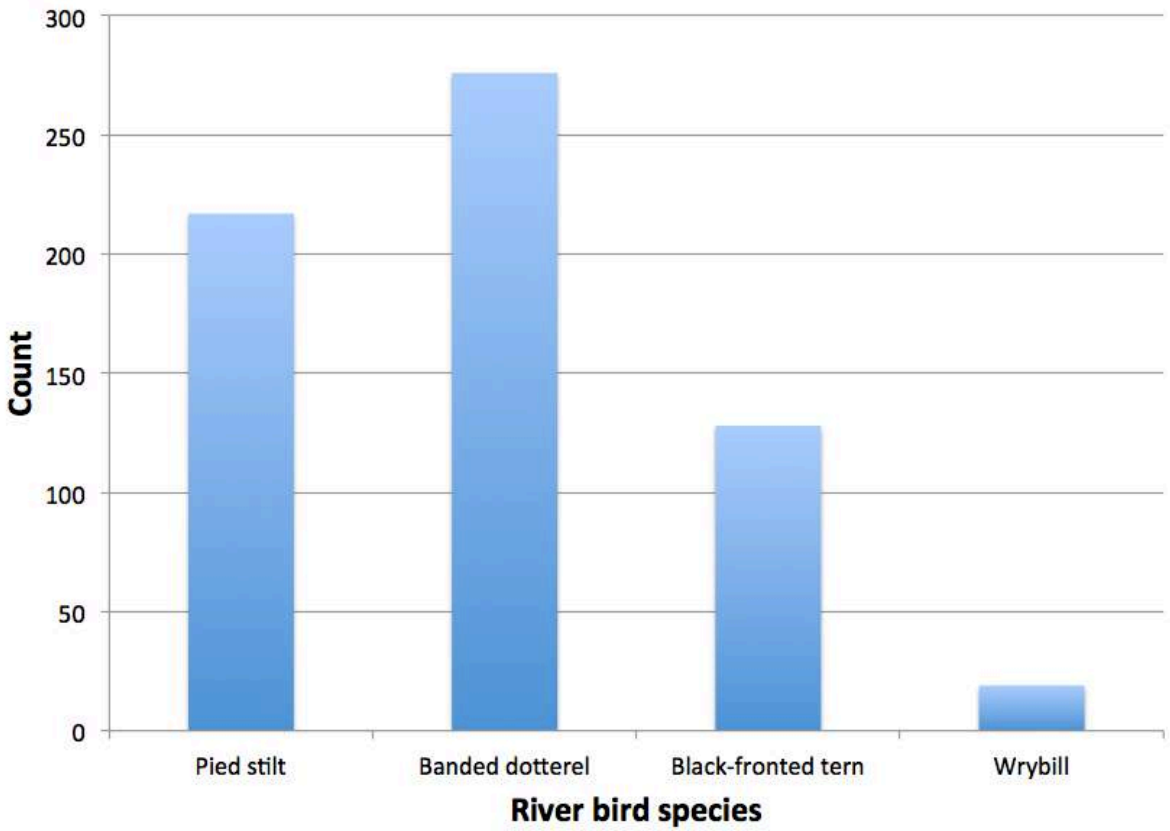


Figure 1: Counts of river bird species on the Ashley-Rakahuri River during a single, one day survey in 2015

- 2014 breeding pairs: 60-80 black-fronted tern pairs, 10 wrybill pairs, many pied stilts pairs
- Pied stilt feeding observations: 30 feeding from 118 observations

Habitat & Food Availability: Ashley-Rakahuri River

Criteria Rankings (1=not suitable, 5=suitable)

- Habitat availability – 3
  - Weeds are abundant
  - Floods occur frequently, but island creation would ensure increased nesting habitat
  - Other species indicate nesting habitat available
  - Diverse habitat types

- Food availability – 4
  - Presence & observations of pied stilts
  - Presence of other river bird species
  - Diverse habitat types

Habitat & Food Availability

- Upper Rangitata River
  - Weeds are localized
  - Russell lupin, yellow tree lupin, gorse & broom
  - Annual weed control

Map source: Canterbury Maps – Latest Imagery

Habitat & Food Availability: Upper Rangitata River

- Flooding (past 20 years)
  - Over 400 m^3s^{-1}: 190 days of flooding, 89 flood events
  - At least 1 flood occurred every year
  - 69% during breeding season, 31% outside breeding season

- Species counts in 2012

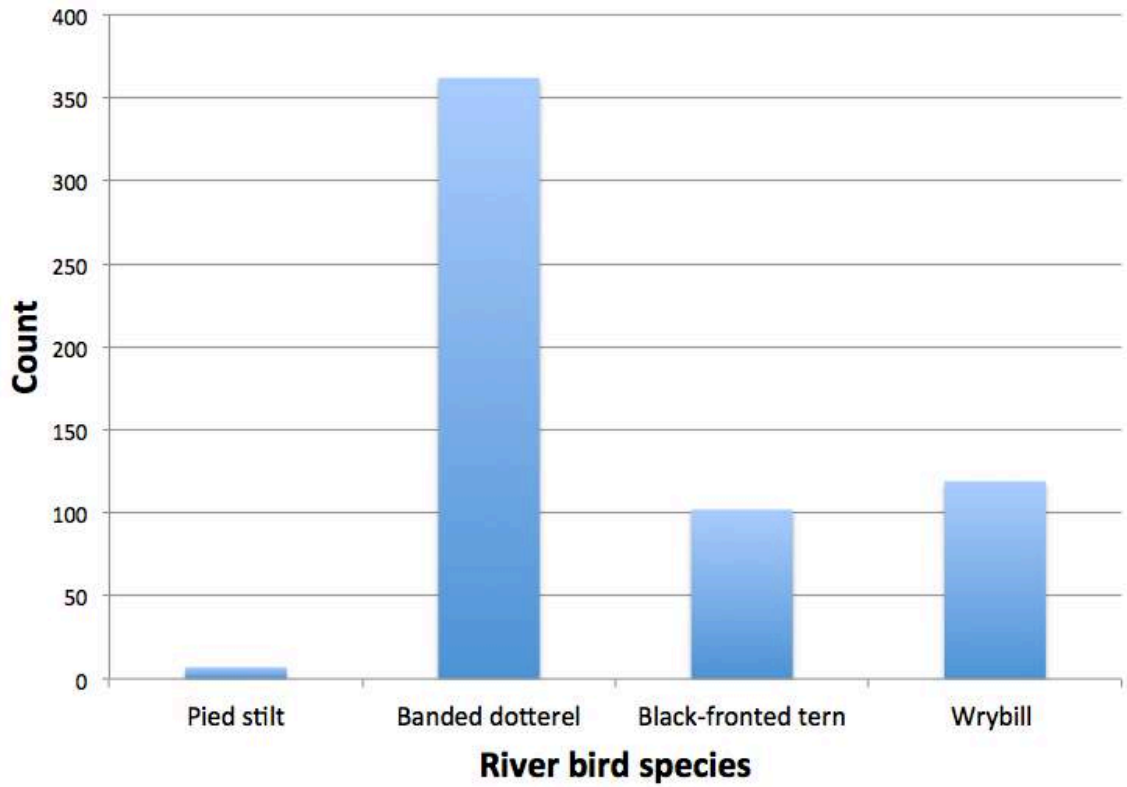


Figure 2: Counts of river bird species on the Upper Rangitata in 2012

- Ashburton Lakes
  - Small areas of foraging habitat e.g. Lake Heron
  - 2 pied stilts observed on 14/11/15
  - Majority of lakes unsuitable for large numbers of stilts due to deep water and steep edges

Lake Heron

Photo: Julia Nicholls

Habitat & Food Availability: Upper Rangitata River

Criteria Rankings (1=not suitable, 5=suitable)

- Habitat Availability – 4
  - Weeds are scarce & localized
  - Efficient annual weed control
  - Presence of other species
  - Limited foraging habitat outside breeding season and during floods

- Food Availability – 3
  - Other species abundant
  - Lacking habitat diversity
  - Food may be limiting during floods or winter

Predators: Ashley-Rakahuri River

Map source: MapToaster

Figure 3: Pied stilt observations – red stars (n = 118). Trap Types: light blue triangles – Timms (n=57), light green circles – DOC200s (n = 53), dark blue circles – DOC250's (n = 2), magenta circles – Tunnel traps (n = 2).

Predators: Ashley-Rakahuri River

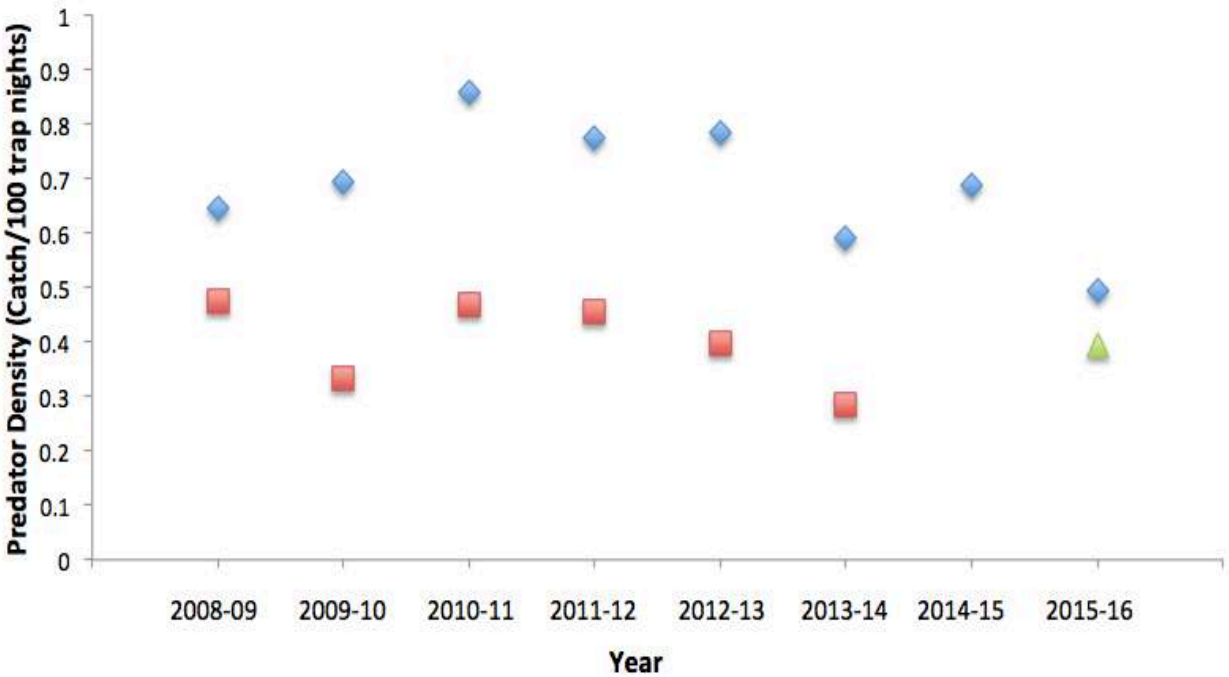


Figure 4: Predator density (catch/100 trap nights) for the Ashley-Rakahuri River (blue diamonds), Upper Rangitata River (green triangle) and Tasman River (red squares) between September to January.

- Total catch - Ashley: hedgehogs (234), cats (36), stoats (26) and weasels (10)
- Total catch - Tasman: hedgehogs (1739), stoats (448) and cats (162)

Predators: Ashley-Rakahuri River

Outcome monitoring

- Wrybill average productivity: 0.84 chicks/pair
- Black-fronted tern average productivity: 0.41 chicks/pair

Black-fronted tern numbers

- 1980-2008: no significant increase, but positive trend (O'Donnell & Hoare 2011; Monks et al. 2013)
- 2000-2015 – managed by the ARRG, significant increase (*P*=0.024; Monks et al. 2013; Spurr & Ledgard unpubl. report)

- Also significant increases in abundance of wrybill, pied stilt and banded dotterel (Spurr & Ledgard unpubl. report)

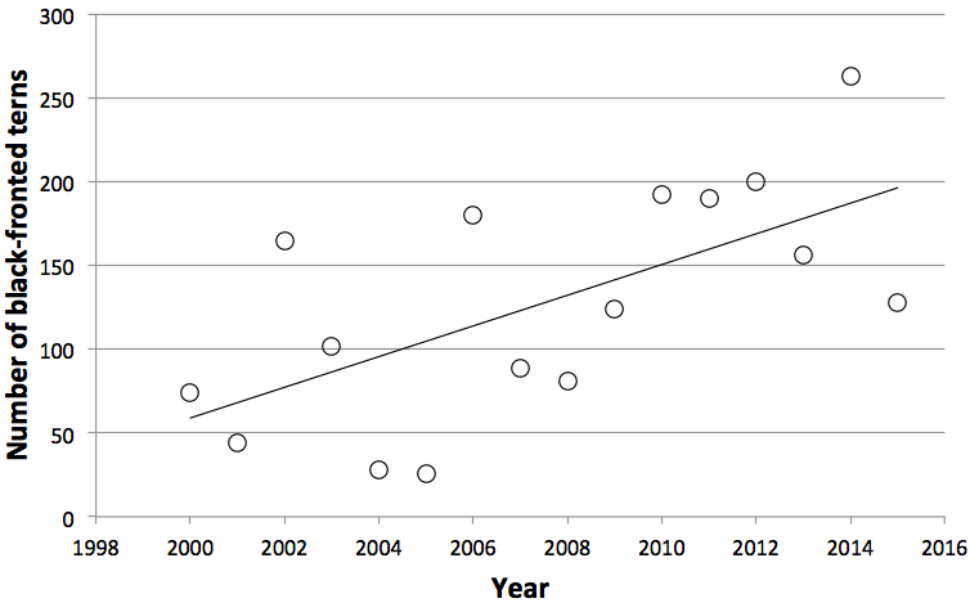


Figure 5: Black fronted tern numbers on the Ashley-Rakahuri River from 2000-2015.

Predators: Ashley-Rakahuri River

Criteria Ranking (1=not suitable, 5=suitable)

- Predators – 3
  - Traps placed in proximity to where nests are, but not distributed along entire length of the river
  - Catch rates are higher than the Tasman River
  - Outcome monitoring parameters not comparable to the Tasman River
  - Predator control contributing to increasing river bird numbers

Predators: Upper Rangitata River

Map source: MapToaster

Figure 4: Locations of traps on the Upper Rangitata River. Trap types: light blue triangles – Timms (n = 139), pink circles – DOC150's (n = 558), dark blue circles – DOC250's (n = 244), yellow circles – Conibear (n = 114).

Predators: Upper Rangitata River

- 2015/16 catch rate – 0.47 predators/100 trap nights
- September-January - 0.39 predators/100 trap nights
- Main predators caught: hedgehogs (667), rats (92), cats (70), stoats (63) and ferrets (56)
- Average number of Southern black-backed gulls – 401

Outcome Monitoring

- Pre-trapping breeding success
  - Wrybill: 2011/12 – 0.26 (Sullivan 2011; Langlands & Long unpubl. report)
  - Black fronted tern: 2014/15 – 0 (no chicks fledged)
- Tasman River breeding success
  - Wrybill: 2014/15 – 0.28
  - Black-fronted tern: 2014/15 – 0.35

Predators: Upper Rangitata River

Criteria Ranking (1=not suitable, 5=suitable)

- Predators – 3
  - Large trapping effort
  - Not complete on true left side
  - Only active for 1 year, no analysis into trapping effectiveness

DOC150 trap

Photo: Julia Nicholls

Conclusions & Recommendations

Photo: Julia Nicholls

Ashley-Rakahuri River

- Overall, moderately suitable as a reintroduction site for kakī

Recommendations

- Implement annual weed control, targeting specific areas
- Increase trapping intensity & distribution
- Outcome monitoring needs to incorporate egg success, hatching success, fledging success and breeding success.

Conclusions & Recommendations

Upper Rangitata River

- Overall, moderately suitable as a reintroduction site for kakī

Recommendations

- Assess options for future habitat creation as additional foraging areas
- Continue weed control under current regime
- Need at least 3 years of post-trapping monitoring data to assess effectiveness of predator control


Photo: Julia Nicholls

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