

Analysis of braided river bird count data from the Waimakariri and Waiau Uwha Rivers

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**Environment
Canterbury**

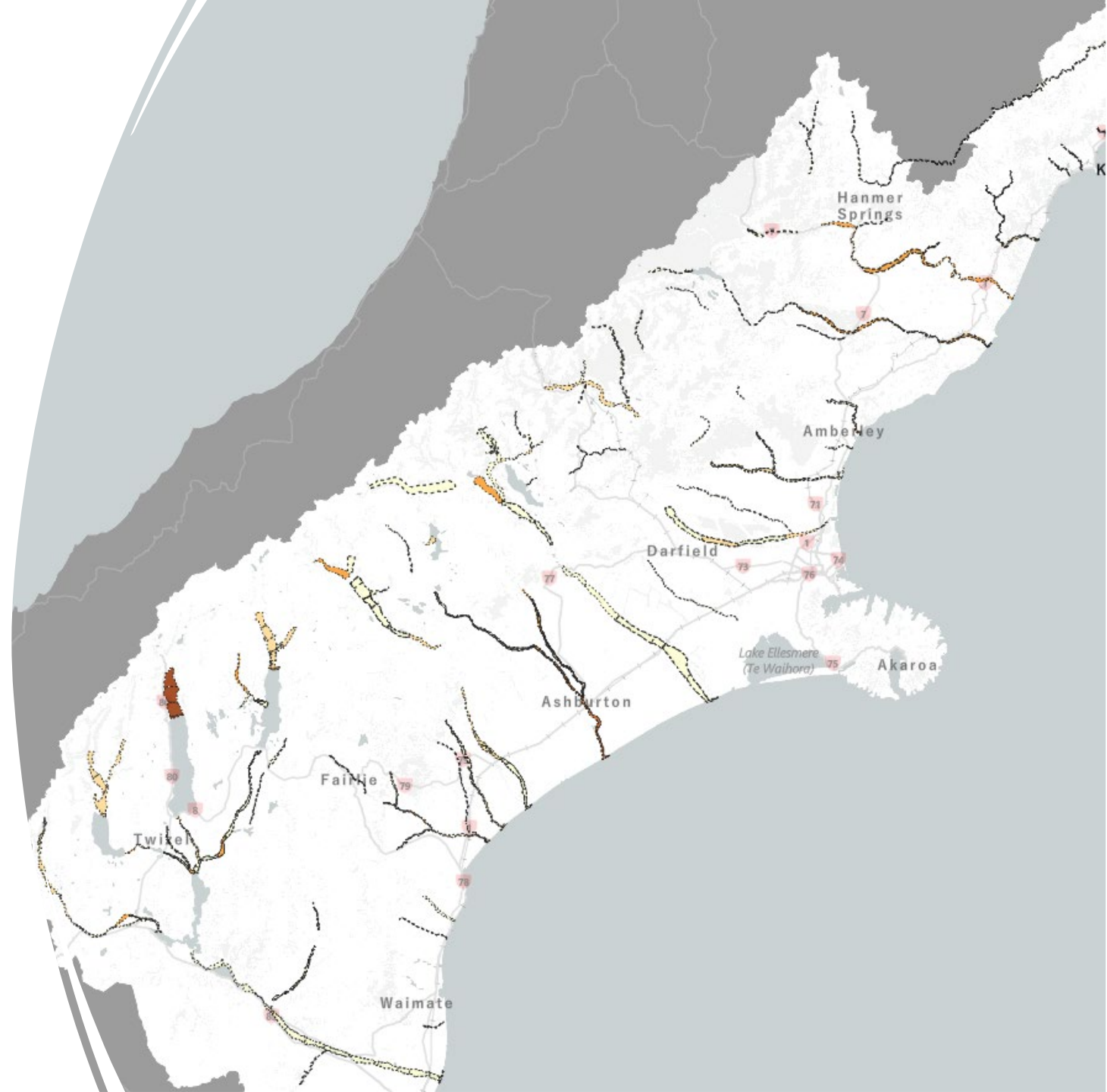
Regional Council

Kaunihera Taiao ki Waitaha



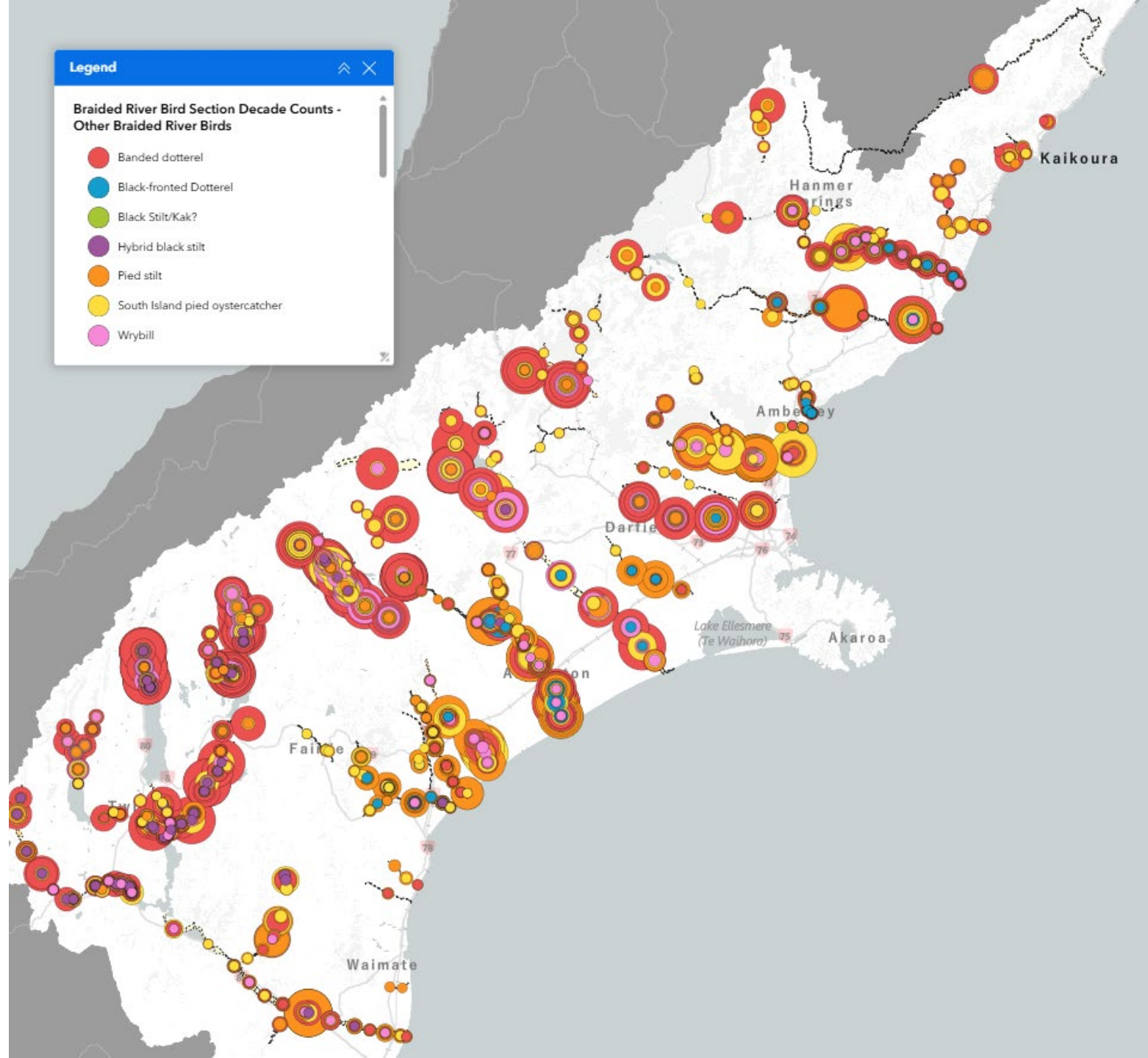
Background

- ~65% of braided rivers in New Zealand are in Canterbury
- Braided Rivers are Naturally Uncommon ecosystems with many Threatened and At-Risk species
- 804+ surveys
- 64 rivers



Monitoring Dataset Progress

- Adjusted methodology to increase spatial resolution of observations
- Cleaned and conversion of non-spatial data into a spatial dataset
- Public visibility and accessibility of the data



Objectives

- Bird Count data collected since the 1960's needed consideration into detecting trends in braided river birds
- Acknowledge caveats with data collection and improvements for future surveys
- Undertake statistical analyses to reveal current state and trends in an ecological meaningful way that can be applied to other braided river surveys



Waimakariri - Upper



Waimakariri - Mid



Waiau Uwha - Lower

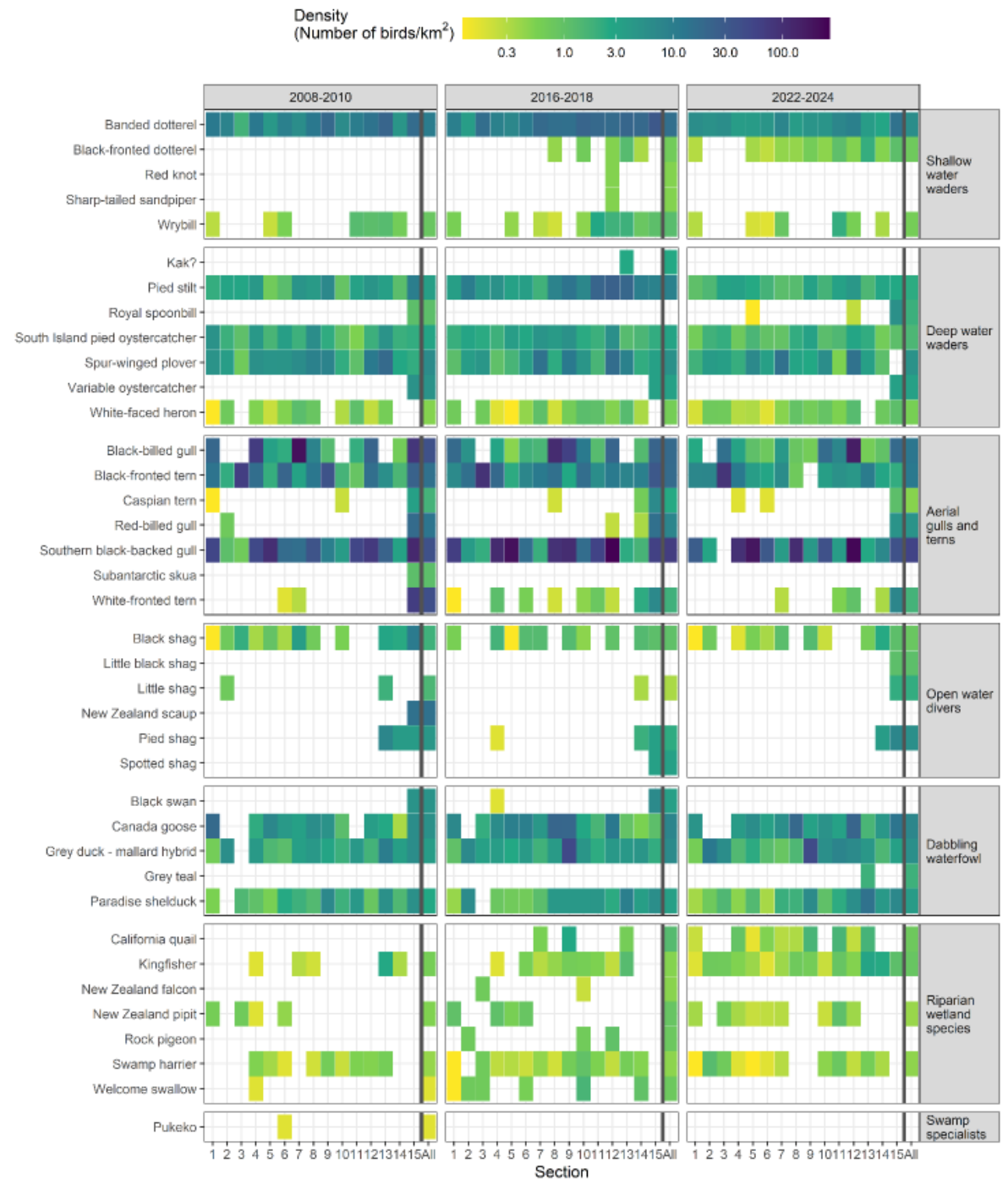
Methods

- Current state of braided river avifauna calculated as mean number of birds per km²
- Statistics in three grouping levels species, feeding guilds threat category
- Estimate percentage change in density with strength of evidence

Metric	Category	Definition	Displayed as
Trend		<i>Median percentage change over a 10-year period</i>	
	Rapid decline	-∞ to -50%	
	Moderate decline	-49% to -25%	
	Shallow decline	-24% to -10%	
	No or little change	-9% to +9%	
	Shallow increase	10% to 24%	
	Moderate increase	25% to 49%	
Evidence strength		<i>Percentage of bootstrap replicates within same category as median</i>	
	Very strong	> 90%	
	Strong	80% to 89%	
	Moderate	70% to 79%	
	Weak	60% to 69%	
	Very weak	50% to 59%	
	Insufficient	0% to 49%	

Results – Different Trajectories

Waiau Uwha Species Density



Waiau Uwha species trend and evidence strength

Species	Initial estimate (Number of birds/km ²)	Trend						Evidence strength	Change estimate
		Rapid decline	Moderate decline	Shallow decline	No or little change	Shallow increase	Moderate increase		
Banded dotterel / Tūturiwhatu	9.10 [8.88; 9.31]							●●●●●	-24% [-26; -21]
Wrybill / Ngutu parore	0.25 [0.21; 0.28]							○○○○○	-1% [-21; 14]
Pied stilt / Poaka	1.72 [1.60; 1.83]							●○○○○	-9% [-17; -1]
South Island pied oystercatcher / Tōrea	2.00 [1.89; 2.12]							●●●●●	-35% [-40; -30]
Spur-winged plover	2.53 [2.38; 2.69]							●●●○○	-6% [-13; 0]
White-faced heron / Matuku	0.18 [0.14; 0.22]							●●●●○	86% [38; 117]
Black-billed gull / Tarāpuka	0.0008 [0.0005; 0.0012]							●●○○○	-18% [-42; 4]
Black-fronted tern / Tarapirohe	6.52 [6.27; 6.76]							●●●●●	-29% [-33; -25]
Southern black- backed gull / Karoro	136.25 [131.78; 140.04]							●●●●●	-1% [-8; 6]
Black shag / Māpunga	0.13 [0.10; 0.18]							●●●●●	-49% [-62; -39]
Canada goose	5.03 [4.81; 5.25]							●●●●○	59% [46; 70]
Grey duck-mallard hybrid	1.77 [1.64; 1.88]							○○○○○	10% [-2; 16]
Paradise shelduck / Pūtakitaki	1.14 [1.06; 1.22]							●○○○○	8% [-2; 20]
New Zealand kingfisher / Kōtare*	0.05 [0.03; 0.07]							●●●●●	566% [242; 760]
Swamp harrier / Kāhu	0.12 [0.09; 0.15]							●●○○○	64% [14; 99]

Waiau Uwha feeding guild trend and evidence strength

Guild	Initial estimate (Number of birds/km ²)	Trend							Evidence strength	Change estimate
		Rapid decline	Moderate decline	Shallow decline	No or little change	Shallow increase	Moderate increase	Rapid increase		
Shallow water waders	9.44 [9.23; 9.64]								●●●●●	-19% [-22; -16]
Deep water waders	8.76 [8.53; 9.00]								●●●●○	-6% [-10; -2]
Aerial gulls and terns	66.05 [65.08; 67.02]								●●●●●	1% [-1; 4]
Open water divers	1.04 [0.94; 1.12]								●●●●●	-47% [-56; -38]
Dabbling waterfowl	8.01 [7.80; 8.22]								●●●●●	31% [25; 36]
Riparian wetland specialists	0.39 [0.34; 0.44]								●●●●●	204% [160; 242]

Waiau Uwha threat category trend and evidence strength

Threat classification	Initial estimate (Number of birds/km ²)	Trend						Evidence strength	Change estimate
		Rapid decline	Moderate decline	Shallow decline	No or little change	Shallow increase	Moderate increase		
Threatened	7.11 [6.89; 7.35]							●●●●○	-28% [-32; -24]
At Risk	18.44 [18.12; 18.74]							●●●●●	-29% [-32; -27]
Not Threatened	50.81 [50.17; 51.49]							●●●●●	29% [26; 32]
Introduced & Naturalised	4.48 [4.28; 4.68]							●●●●●	74% [60; 87]

Waimakariri – Mid Species Density



Waimakariri – Mid species trend and evidence strength

Species	Initial estimate (Number of birds/km ²)	Trend							Evidence strength	Change estimate
		Rapid decline	Moderate decline	Shallow decline	No or little change	Shallow increase	Moderate increase	Rapid increase		
Banded dotterel / Tūturiwhatu	5.69 [5.49; 5.89]								●●●●●	20% [14; 27]
Wrybill / Ngutu parore	1.21 [1.13; 1.31]								●●●●○	93% [115; 135]
Pied stilt / Poaka	0.52 [0.43; 0.61]								●●●●●	212% [151; 257]
South Island pied oystercatcher / Tōrea	0.93 [0.85; 1.00]								●●●○○	58% [39; 75]
Spur-winged plover	4.21 [3.88; 4.57]								●●○○○	107% [83; 128]
White-faced heron / Matuku	0.10 [0.07; 0.13]								●●○○○	72% [-18; 126]
Black-billed gull / Tarāpuka	0.93 [0.80; 1.07]								●●●●●	1589% [1212; 1875]
Black-fronted tern / Tarapirohe	5.88 [5.67; 6.09]								●●●●●	42% [34; 49]
Southern black- backed gull / Karoro	93.82 [87.14; 97.26]								●●●●●	12% [10; 13]
White-fronted tern / Tara	1.36 [0.84; 1.86]								●●●●○	60% [334; 442]
Black shag / Māpunga	0.08 [0.05; 0.10]								●○○○○	-52% [-85; -30]
Canada goose	3.33 [3.04; 3.62]								●●●○○	1% [-11; 9]
Grey duck-mallard hybrid	1.63 [1.49; 1.75]								●●●●●	-64% [-70; -58]
Paradise shelduck / Pūtakitaki	0.29 [0.24; 0.34]								●●●●●	49% [17; 74]

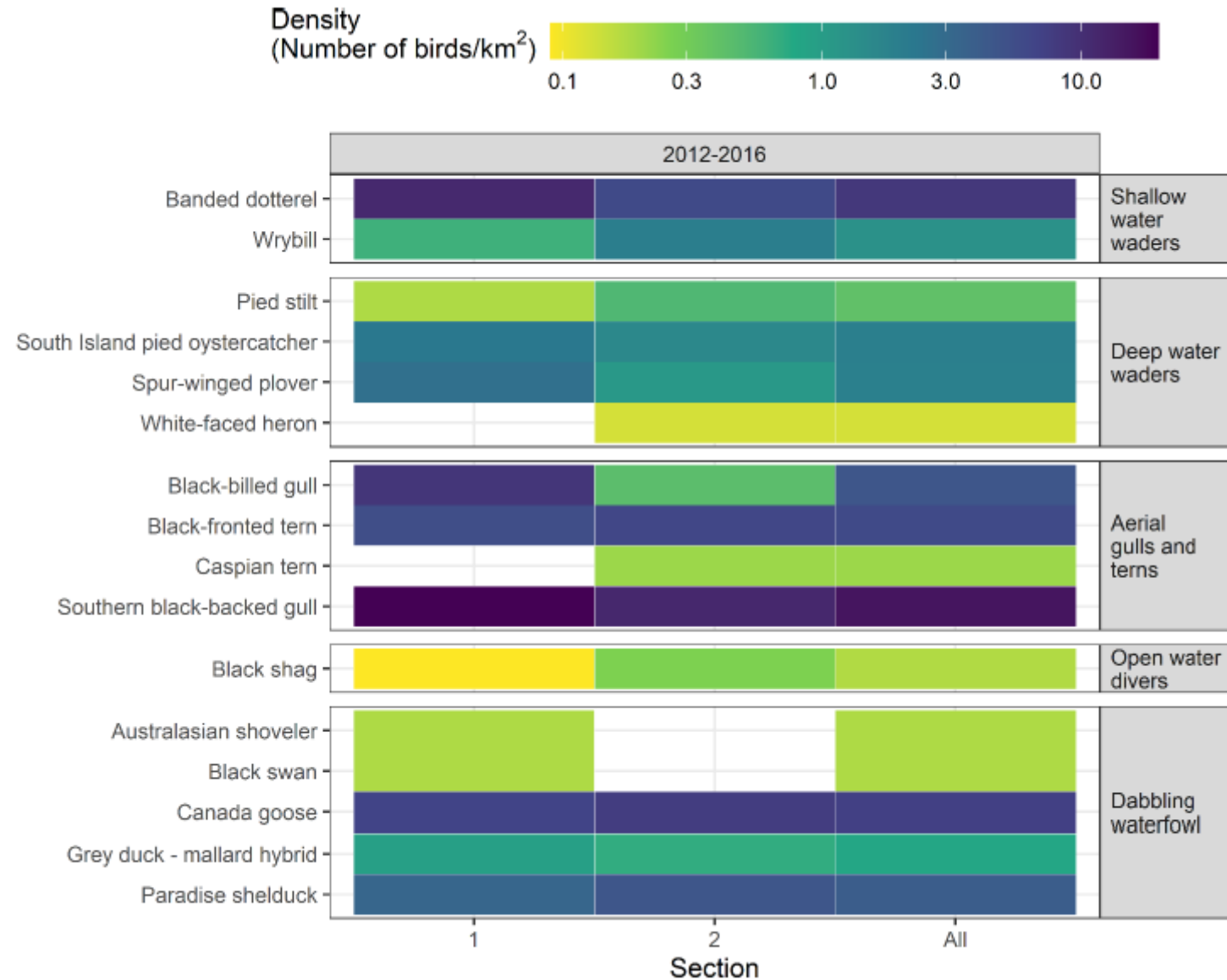
Waimakariri – Mid feeding guild trend and evidence strength

Guild	Initial estimate (Number of birds/km ²)	Trend							Evidence strength	Change estimate
		Rapid decline	Moderate decline	Shallow decline	No or little change	Shallow increase	Moderate increase	Rapid increase		
Shallow water waders	7.23 [7.00; 7.46]								●●●●●	39% [32; 44]
Deep water waders	6.68 [6.36; 6.95]								●●●●●	91% [80; 101]
Aerial gulls and terns	119.65 [118.76; 120.56]								●●●●●	59% [57; 61]
Open water divers	0.38 [0.31; 0.44]								●●●●●	-61% [-73; -50]
Dabbling waterfowl	7.06 [6.85; 7.29]								●●●●●	-32% [-35; -28]
Riparian wetland species	0.11 [<0.18; 0.15]								●●●○○	84% [-3; 152]

Waimakariri – Mid threat category trend and evidence strength

Threat classification	Initial estimate (Number of birds/km ²)	Trend						Evidence strength	Change estimate
		Rapid decline	Moderate decline	Shallow decline	No or little change	Shallow increase	Moderate increase		
Threatened	7.45 [7.22; 7.69]							●●●●●	48% [42; 54]
At Risk	10.66 [10.38; 10.94]							●●●●●	173% [164; 181]
Not Threatened	117.89 [116.96; 118.75]							●●●●●	23% [21; 24]
Introduced & Naturalised	3.81 [3.58; 4.03]							●●●●●	1% [-6; 8]

Waimakariri – Upper Species Density



Conclusions

- Easy to understand information on the state and starting to understand trends of braided river birds
- Strong evidence for differing trajectories for the Waiau Uwha and Waimakariri Rivers
- Applications can enable reporting at regional and reach levels
- Methodological refinements will provide more fine-scaled overview of distribution of braided river bird species

Questions

