

An aerial photograph of Tiritiri Matangi Island, a green, forested island in the middle of a blue sea. The island has some rocky outcrops and a small lighthouse on the right side. The text is overlaid in white, bold font.

Lessons and results from ten years of bird monitoring on Tiritiri Matangi

SONZI Conference

August 2024

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Counting bush birds



Line transects vs 5-minute counts

Line transects

- Slow walk along fixed routes
- Covers large area
- Generates large sample size
- Record all birds detected within a fixed distance from the route
- Requires good judgement of fixed distance

5-minute counts

- Counts from fixed positions
- More practical for rugged terrain where line transects difficult
- Cover less area so fewer records
- May require distance judgement depending on method chosen

Index vs population estimate

- Both line transects and 5-minute spot counts are index methods
- Not all birds present are detected
- Can easily use line transects to make population estimates though these will be lower than the true population if unable to detect all the birds present

Assumptions for slow-walk transect surveys

- Transect routes are ‘randomised’ or ‘fairly distributed’
 - Important when bird distribution is patchy or clumped
- Chance of detecting birds is consistent over time and location
 - Enables comparisons between areas and time (e.g. years)
- Number of birds detected is consistently and linearly correlated with the true density
- Birds are equally detectable on each sampling occasion
- Birds are not double-counted
- Populations are ‘closed’ throughout the survey period

Advantages of line transect surveys

- Flexible, inexpensive, requiring little time or equipment
- Suited to sampling large, homogenous areas and for mobile, large or conspicuous species
- Good for low densities of birds
- Multiple species at same time
- Risk of double counting is low

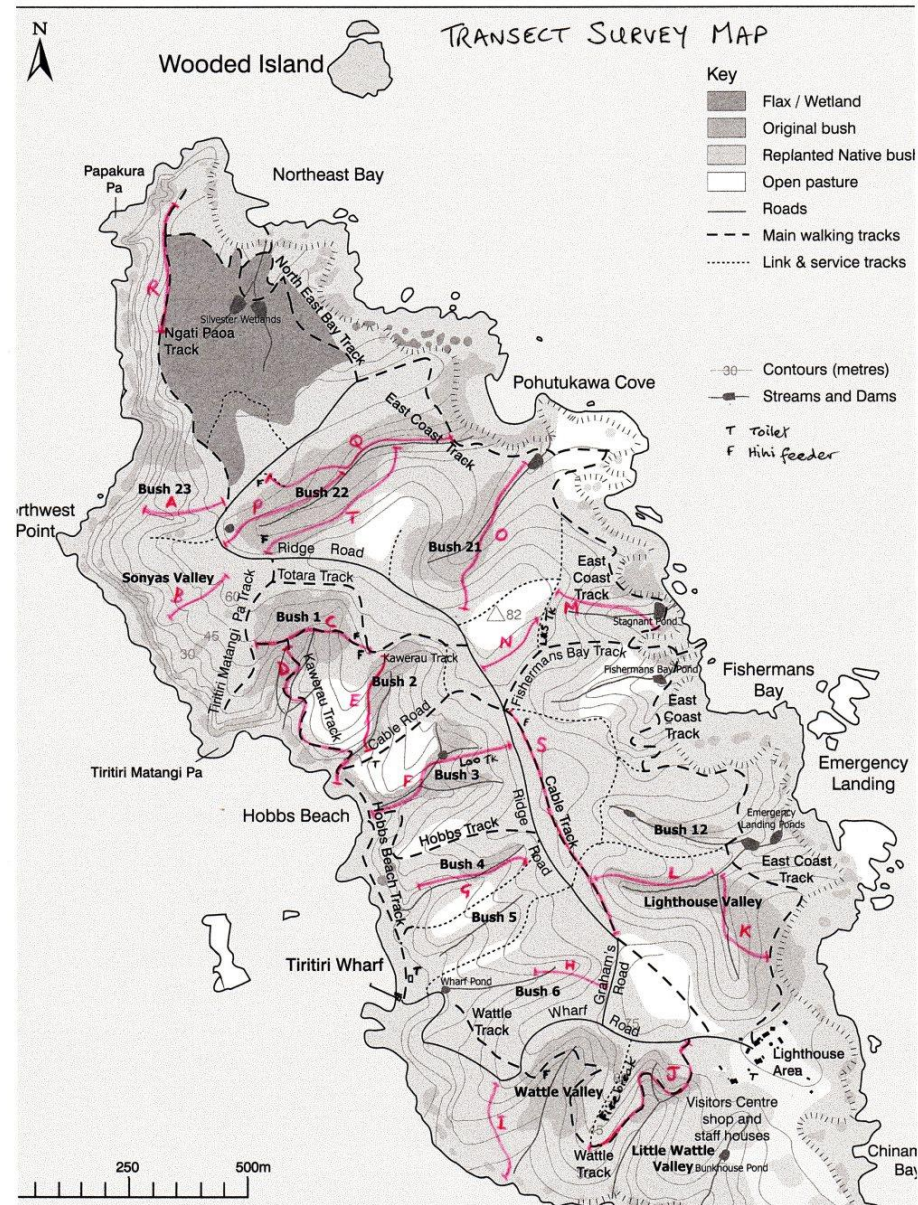
Disadvantages of line transect surveys

- Need highly skilled observers as most species detected by their calls
- Risk of changes in counts if observers change over the years
- Need to be undertaken at same time of year, similar times of day and similar weather as all these affect abundance and detection rates
- Only possible to estimate relative abundance as not all birds detected
- May not be suitable for highly mobile or hard to detect species
- Good for inventory (what species present)

How it works

- Select and mark a representative range of transect routes
- Measure each route and calculate the area surveyed
- Recruit and train the survey team
- Plan the timing, direction and sequence of transect walks
- Prepare the paperwork for:
 - instructions and maps
 - data recording
 - health and safety
- Do the survey during the pre-determined date window
- Analyse the results and prepare reports

Slow walk line transect surveys on Tiritiri Matangi



Walk schedule for transect counts

Transect	Start from	Walk time	Clock time
			07:15
C	Kawerau Tk	25	07:40
move		2	07:42
D	Upper end	24	08:06
move		5	08:11
E	Cable Rd	25	08:36
move & break		15	08:51
B	Ridge Rd end	12	09:03
wait		5	09:08
B		12	09:20
move		10	09:30
A	<u>Ngati Paoa Tk</u>	10	09:40



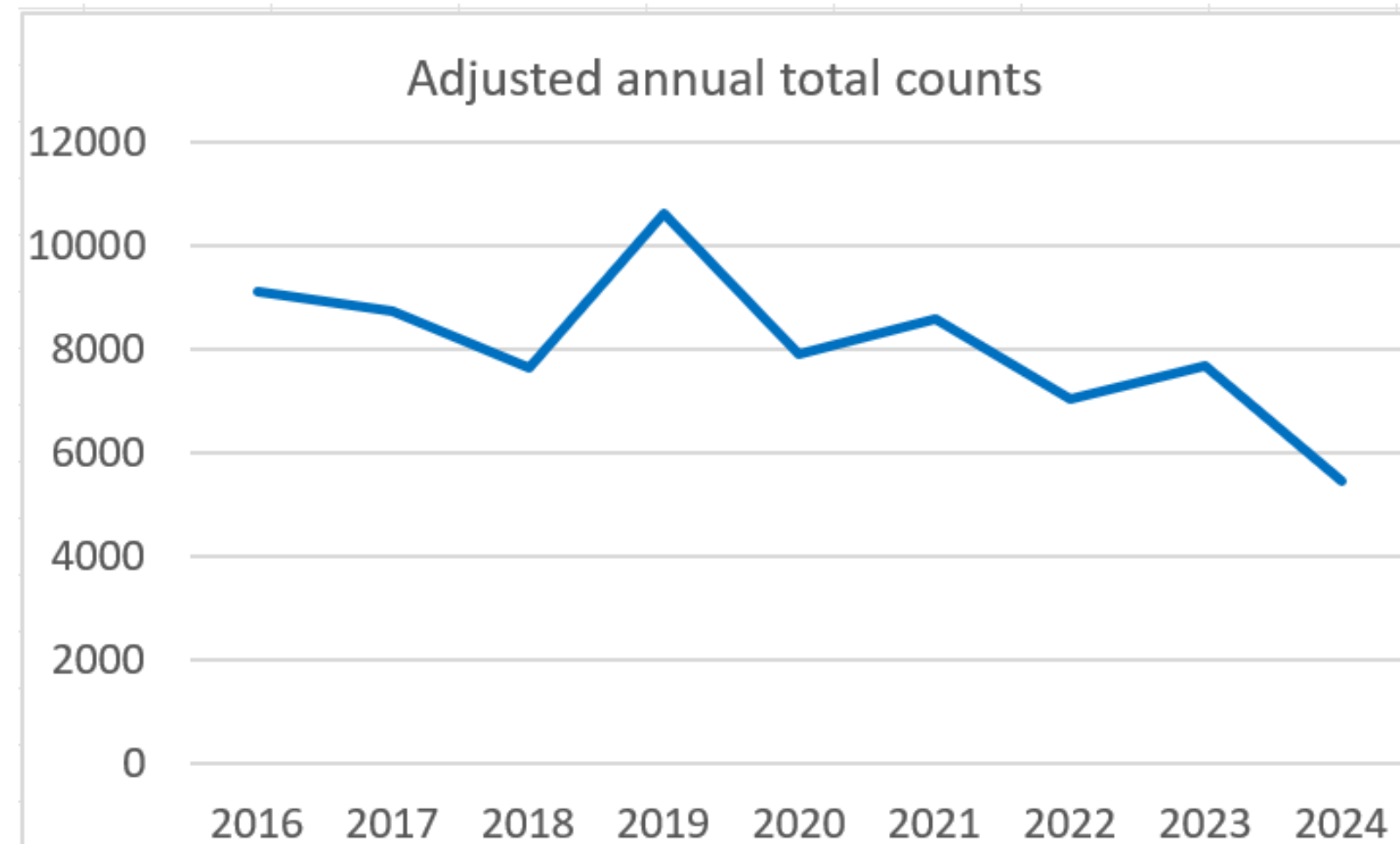
Data recording and analysis

	A	B	C	D	E	F	G	H	I	J	K
1	Initial	Date	Time 1	Time 2	Transect	Whitehead	Whitehead	Total recorded	Average per tx	Ha	Birds/ha
2	KM	9/02/2024	9:12	9:24	A	2		2			
3	KM	9/02/2024	9:29	9:40	A	1	5	6			
4	LK	11/02/2024	7:10	7:18	A		5	5			
5	LK	11/02/2024	7:23	7:32	A	1		1			
6	GB	15/02/2024	9:10	9:20	A			0			
7	GB	15/02/2024	9:25	9:34	A			0			
8	KG	16/02/2024	7:30	7:40	A	3	2	5			
9	KG	16/02/2024	7:15	7:25	A	1		1			
10	MF	22/02/2024	9:18	9:24	A	8		8			
11	MF	22/02/2024	9:32	9:42	A			0			
12	JS	23/02/2024	8:56	9:03	A	2		2			
13	JS	23/02/2024	9:08	9:16	A			0			
14	KM	23/02/2024	7:15	7:25	A	5		5			
15	KM	23/02/2024	7:30	7:38	A			0			
16	KJ	24/02/2024	7:20	7:28	A	1	6	7			
17	KJ	24/02/2024	7:34	7:43	A	1	2	3	2.8125	0.306	9.191176471
18	KM	9/02/2024	8:29	8:49	B			0			

Population estimates

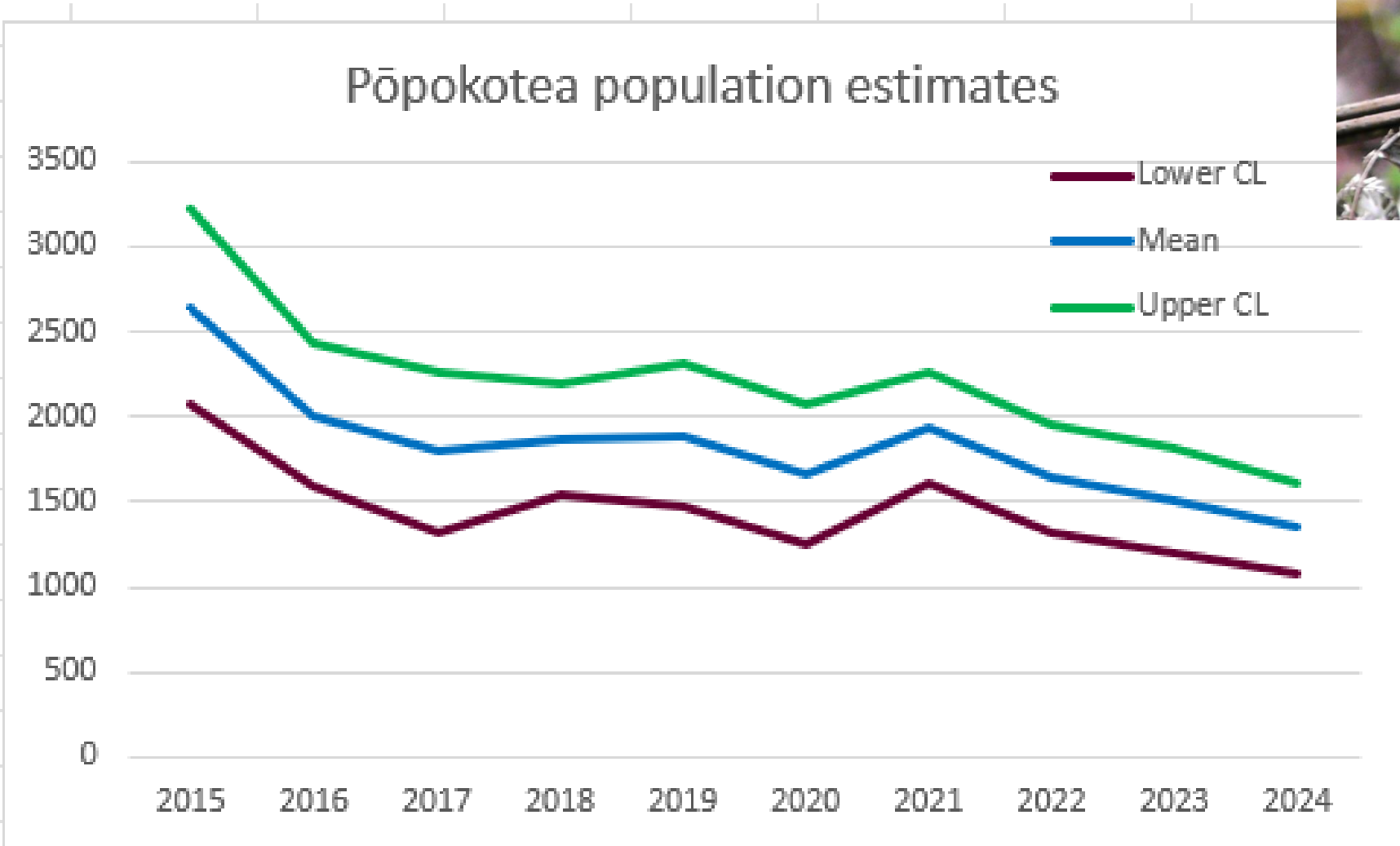
Average		7.381930042						
Std deviation		3.309561378						
Std Error		0.740040422						
95% conf limit		1.450479226						
				Area		Population estimate		
Birds per hectare	Lower	5.931450815		182.6		1083		
	Mean	7.381930042		182.6		1348		
	Upper	8.832409268		182.6		1613		

Ten years of surveys



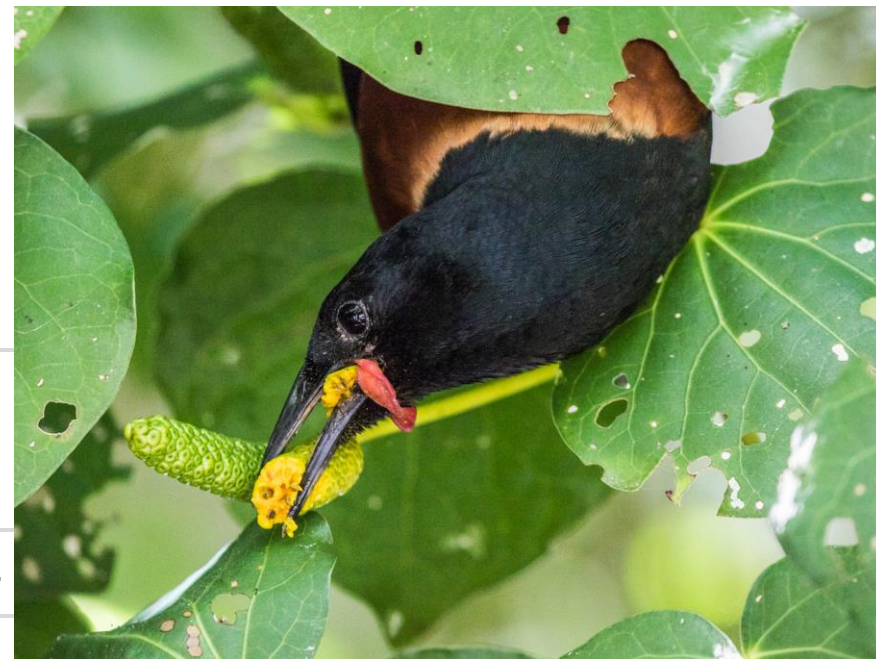
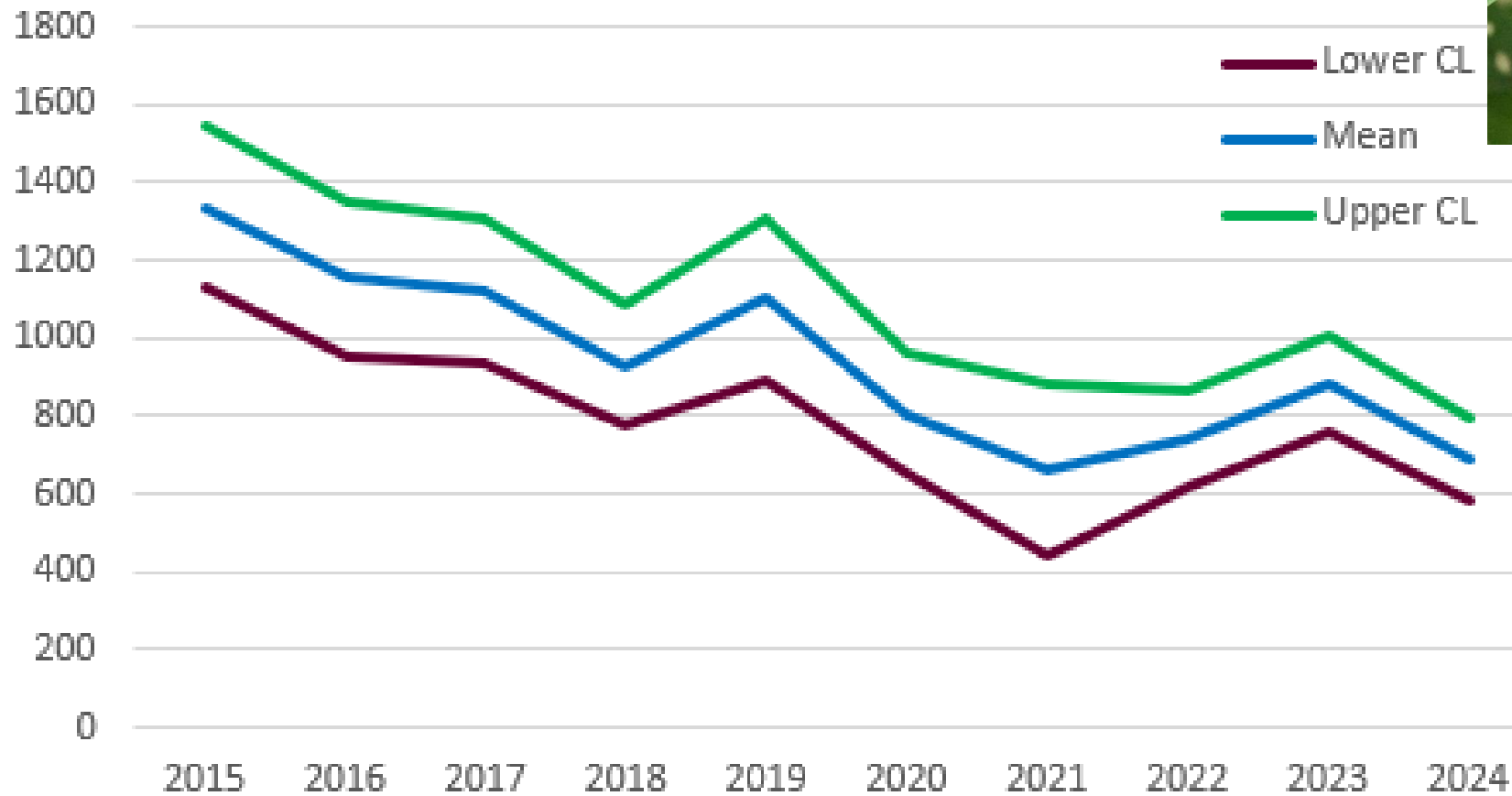
Ten years of surveys

Pōpokotea population estimates



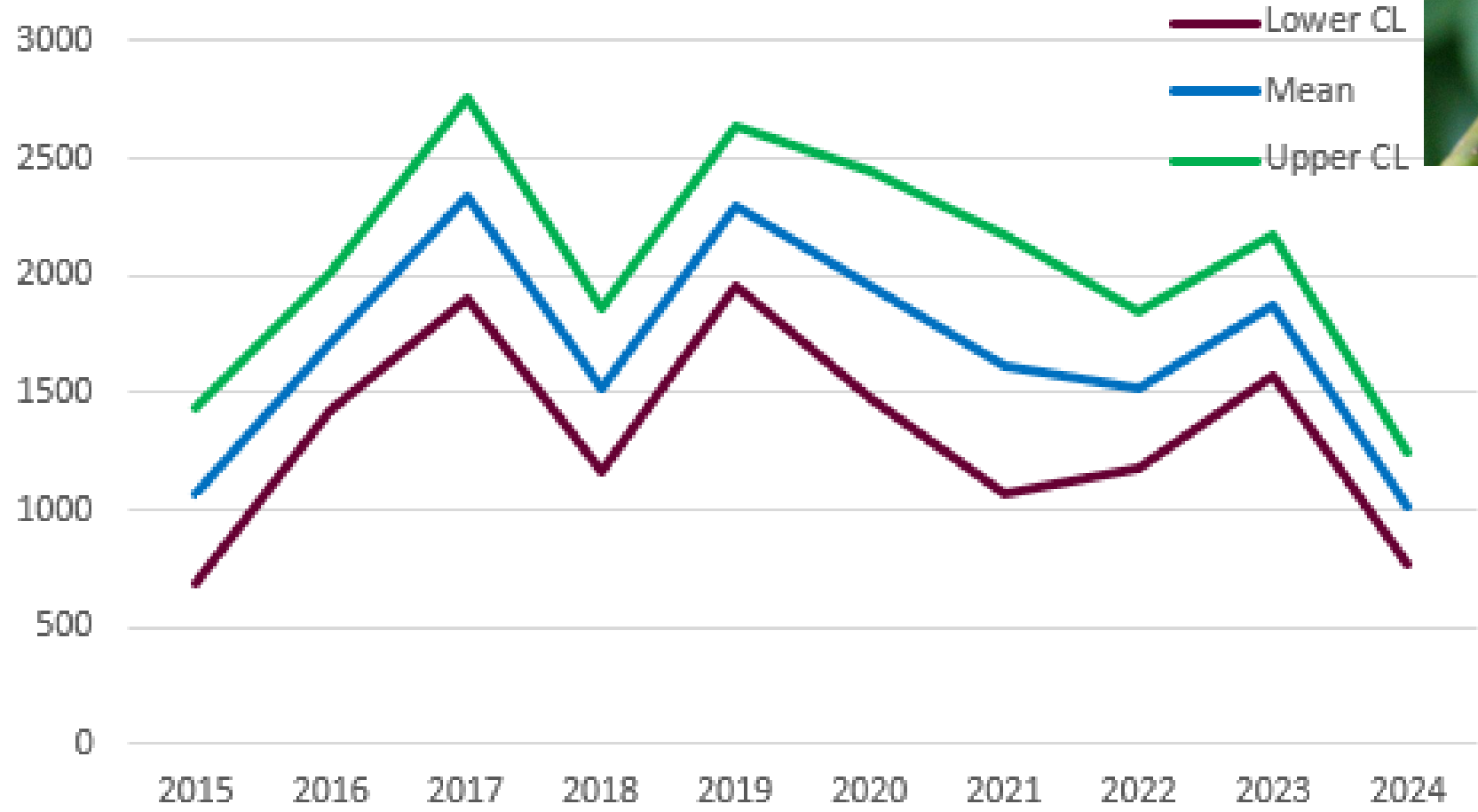
Ten years of surveys

Tieke population estimates



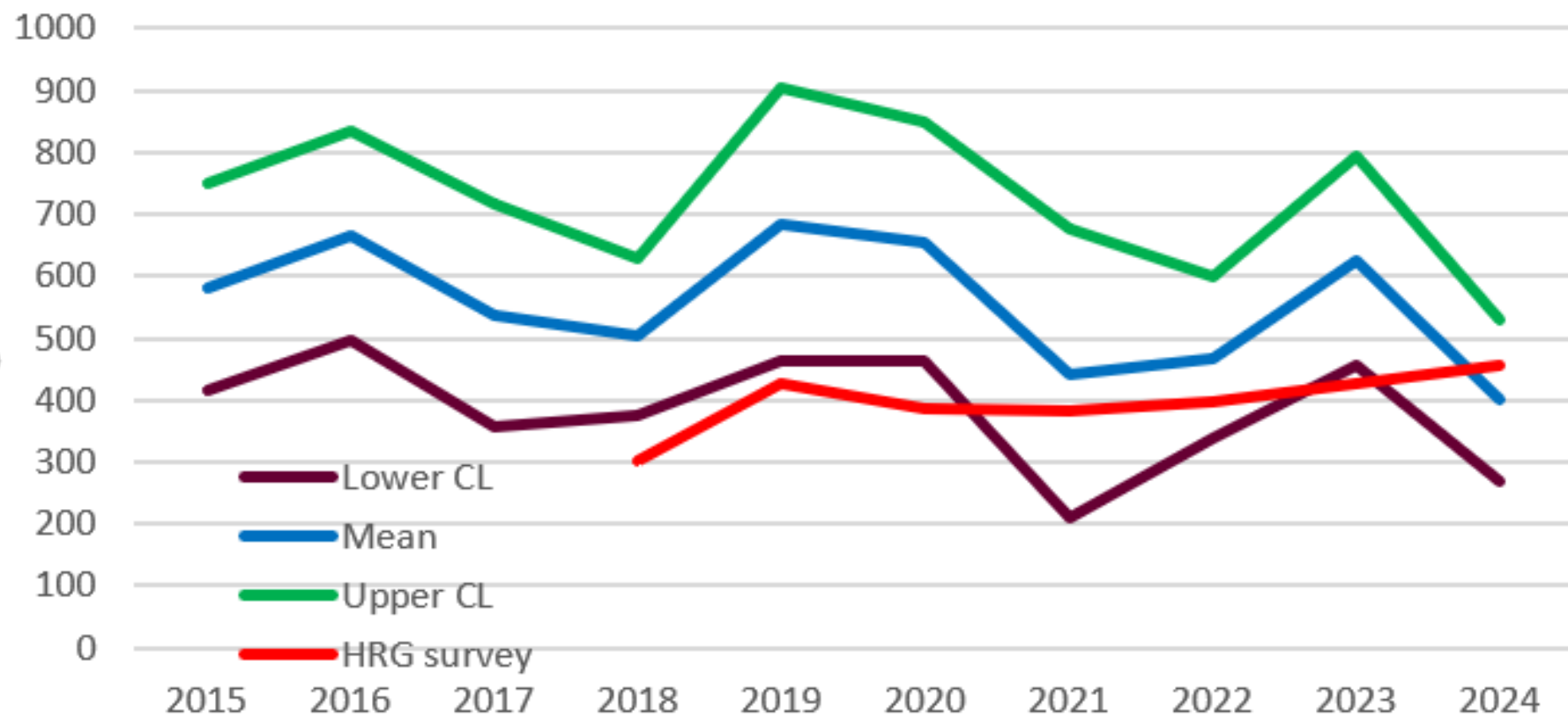
Ten years of surveys

Korimako population estimates



Ten years of surveys

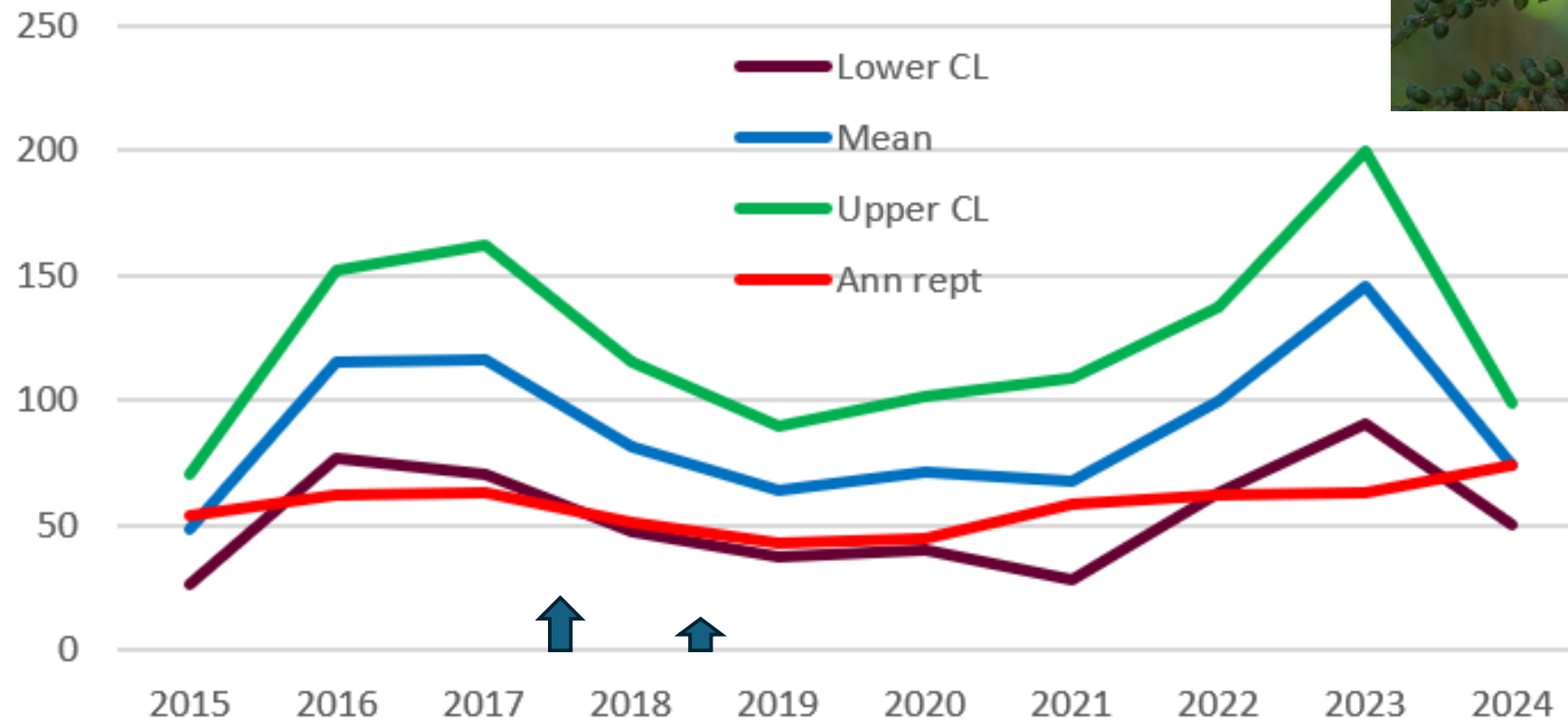
Hihi population estimates



Ten years of surveys



Kōkako population estimates



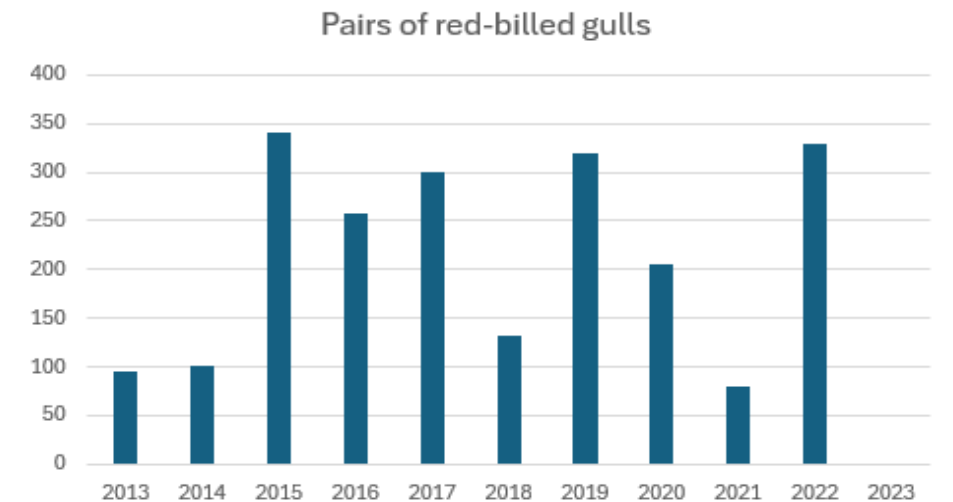
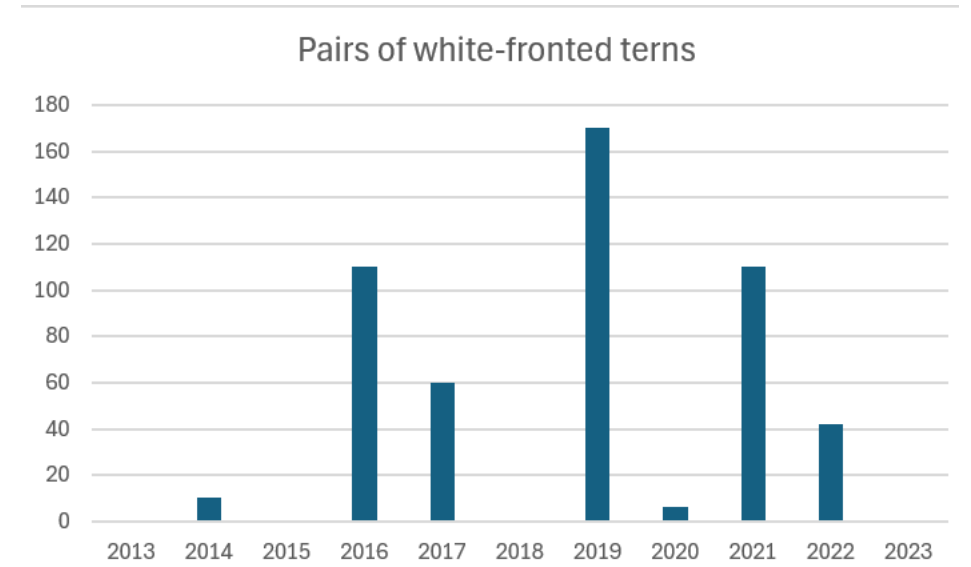
Reporting on long-term trends

	2024 Estimate	Average of previous 9 years	Difference from 9- year average
Pōpokatea	1348	1884	-28%
Tīeke	687	972	-29%
Toutouwai	371	358	4%
Korimako	1010	1766	-43%
Kōkako	74	90	-18%
Tūi	111	758	-85%
Kākāriki	266	437	-39%
Hihi	400	574	-30%
Kererū	49	146	-67%
Manu pango/blackbird	155	154	1%
Pīwakawaka	254	255	0%

Monitoring other species groups – surface-nesting seabirds



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Nest-box schemes

- We use nest-boxes to monitor the annual breeding success of

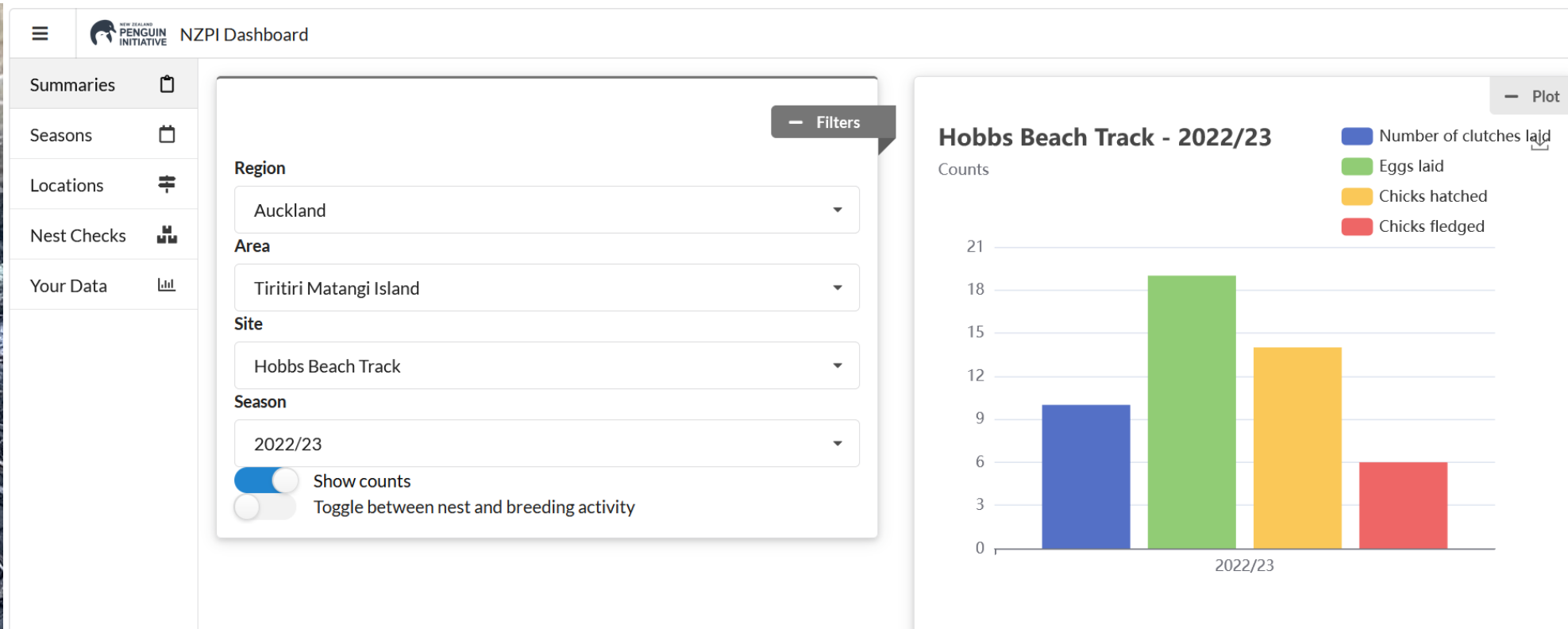
- Tīeke
- Kākāriki
- Kororā
- Hihi



Season	No. of boxes	No. used	% Used	No. failed at egg stage	% failed at egg stage	No. failed at chick stage	No. successful
2016-17	162	21	13.0	12	54.5	3	7
2017-18	162	25	15.4	13	50	4	9
2018-19	162	25	15.4	10	37	1	16
2019-20	162	20	12.3	11	55	2	7
2020-21	159	21	13.2	11	47.8	2	10
2021-22	152	20	13.2	9	45	1	10
2022-23	151	22	14.6	11	45.5	0	12
2023-24	154	21	13.6	8	38	0	13

Table 1 - Tīeke nest-box records

Kororā data uploaded to NZPI dashboard



Other species monitoring

- Ruru
 - Find and follow progress in natural nests (mostly on the ground)
 - Determine annual breeding success
- Common diving petrel and grey-faced petrel
 - Determine occupancy of burrows found in randomly selected tetrads
 - Problems with determining areal extent of colonies, inaccessible areas (cliffs) and isolated, non-colonial burrows



Photo credits

- Hihi: Martin Sanders
- Ruru: Alison Hunt
- Kororā banding: Jonathan Mower
- Counting: Karin Gouldstone
- Kōkako: Geoff Beals
- Whitehead: Heidrun Schinke
- Kororā: John Sibley
- Tīeke chicks: Morag Fordham
- Bellbird: Shaun Halyon
- Tīeke: Martin Sanders
- Bush image: Tan Teng Onn
- Telescope survey: Kay Milton
- East coast stacks: Geoff Beals
- Other images: John Stewart

That's it!

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