Project River Recovery

‘Tern Island’ & Tasman River

Jennifer Schori
Senior Ranger (PRR)

Department of Conservation
Te Papa Atawhai

Te Kāwanatanga o Aotearoa
New Zealand Government

A black-fronted tern landing on Tern Island

Tasman River

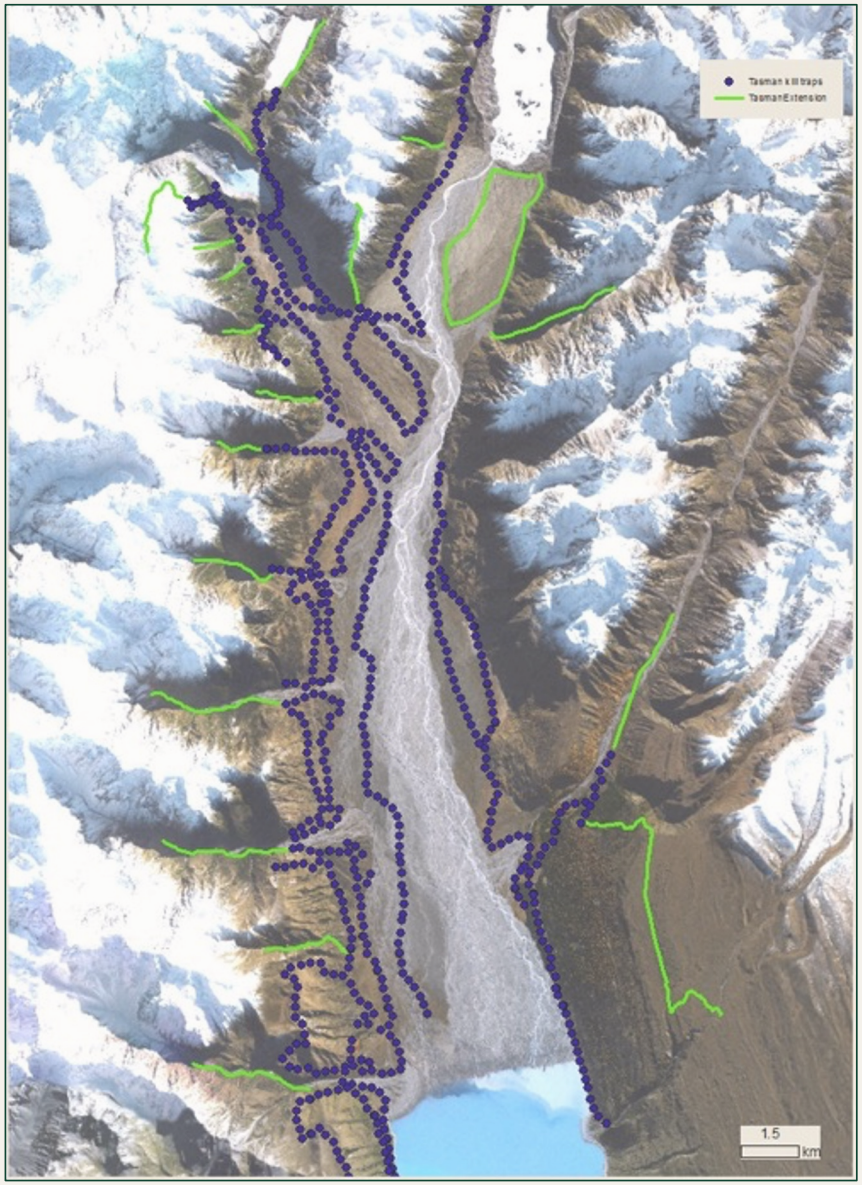
A black-fronted tern flies over the Tasman River.

Predators

No ‘key predator/s’ but nests are lost to mammals (cats, hedgehogs, etc.) and predatory birds (SBBG)

Control methods

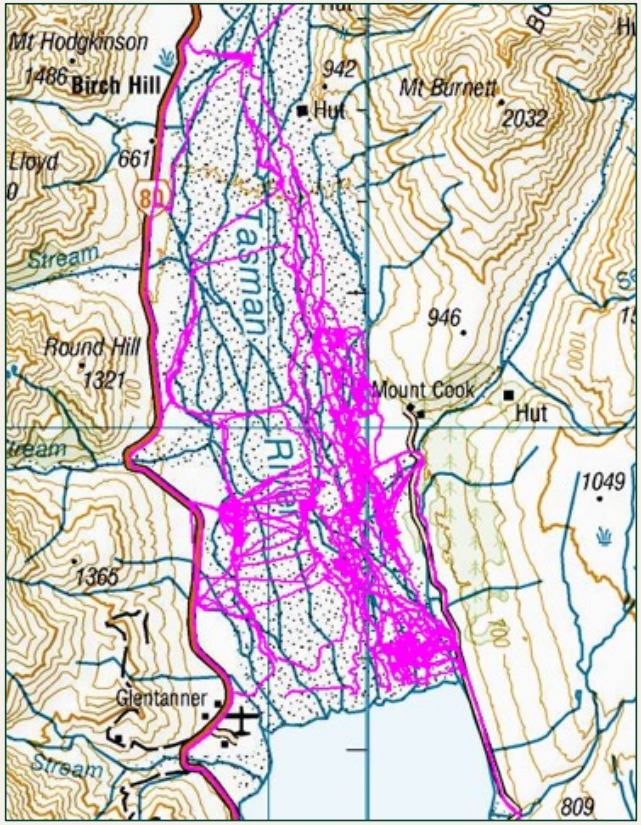
- 20-yrs of trapping at landscape scale
- DOC150s, DOC250s, Timms
- Autumn leg hold trapping for cats
- Southern black-backed gull control
- Rabbit control ops

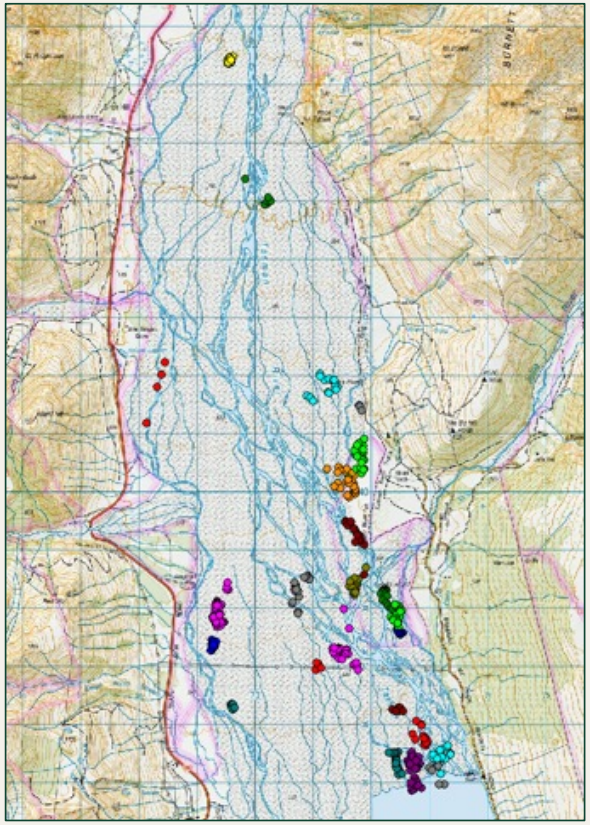


Site management

- Extensive weed control throughout entire riverbed
- Riverbed is PCL - access gates locked during nesting season (Sep-Feb)
- Signage to inform visitors of values

Monitoring at the Tasman River





- Riverbed surveyed on foot for colonies
- Select 30-50 nests across the riverbed
- Nests are checked weekly
- Cameras on a subset of nests to record cause of nesting failures (e.g., predation), 1-2 cameras per colony

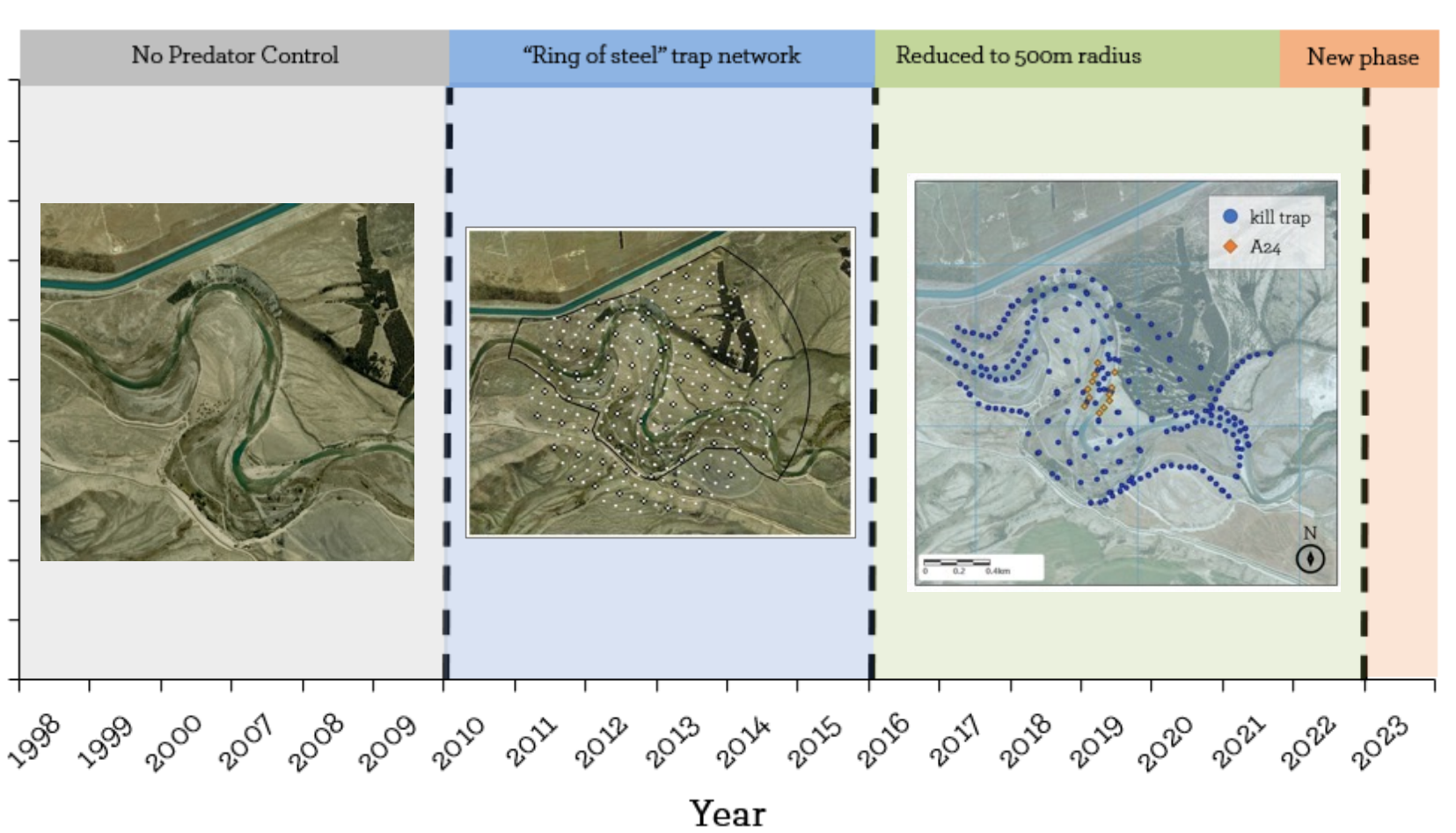
Challenges of this site

- Defining what a colony is – some are very widespread
- Continuous access to colonies through the season as the river changes – missed checks during high flows can obscure the outcome of the nest
- Getting an accurate count of the fledglings at each colony
- Still left with many ‘unknown’ outcomes

Tern Island, Upper Ōhau River

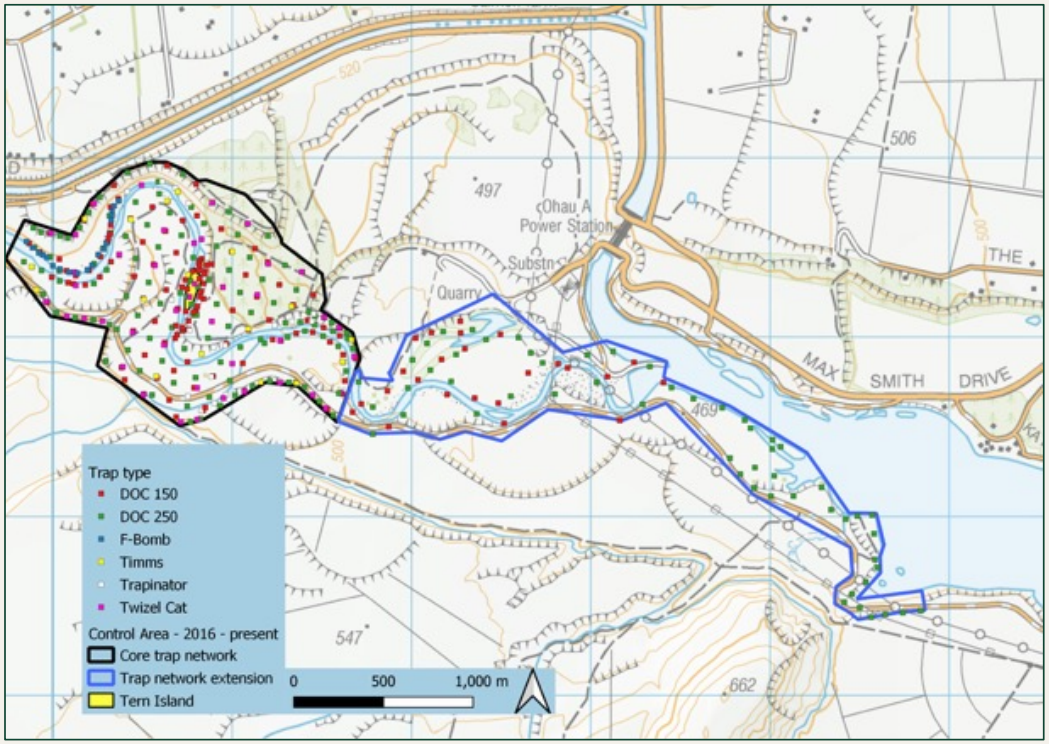
Tern Island as viewed from upstream on the true left of the Ōhau River.

Predator control through time

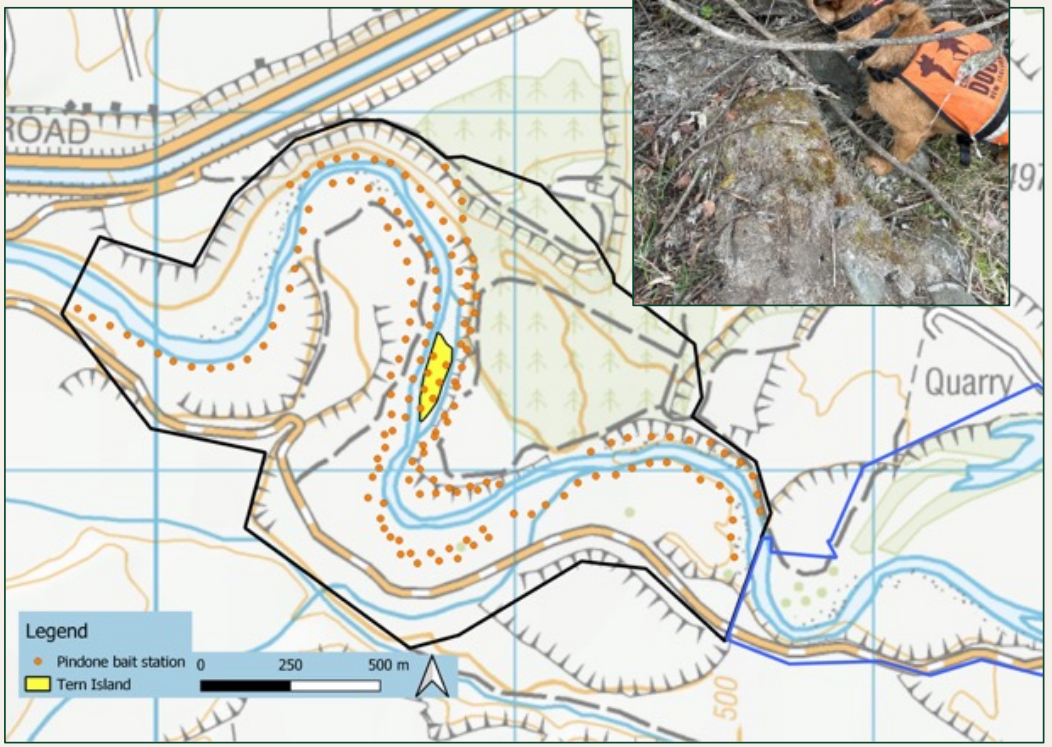


Current management of predators

Rodent and mustelid detection dogs: October and November



Upper Ōhau trap network (*n*=475)



Upper Ōhau pindone bait station network (*n*=158)

Predators

On island: Stoats and rats

Off island: Cats and hedgehogs

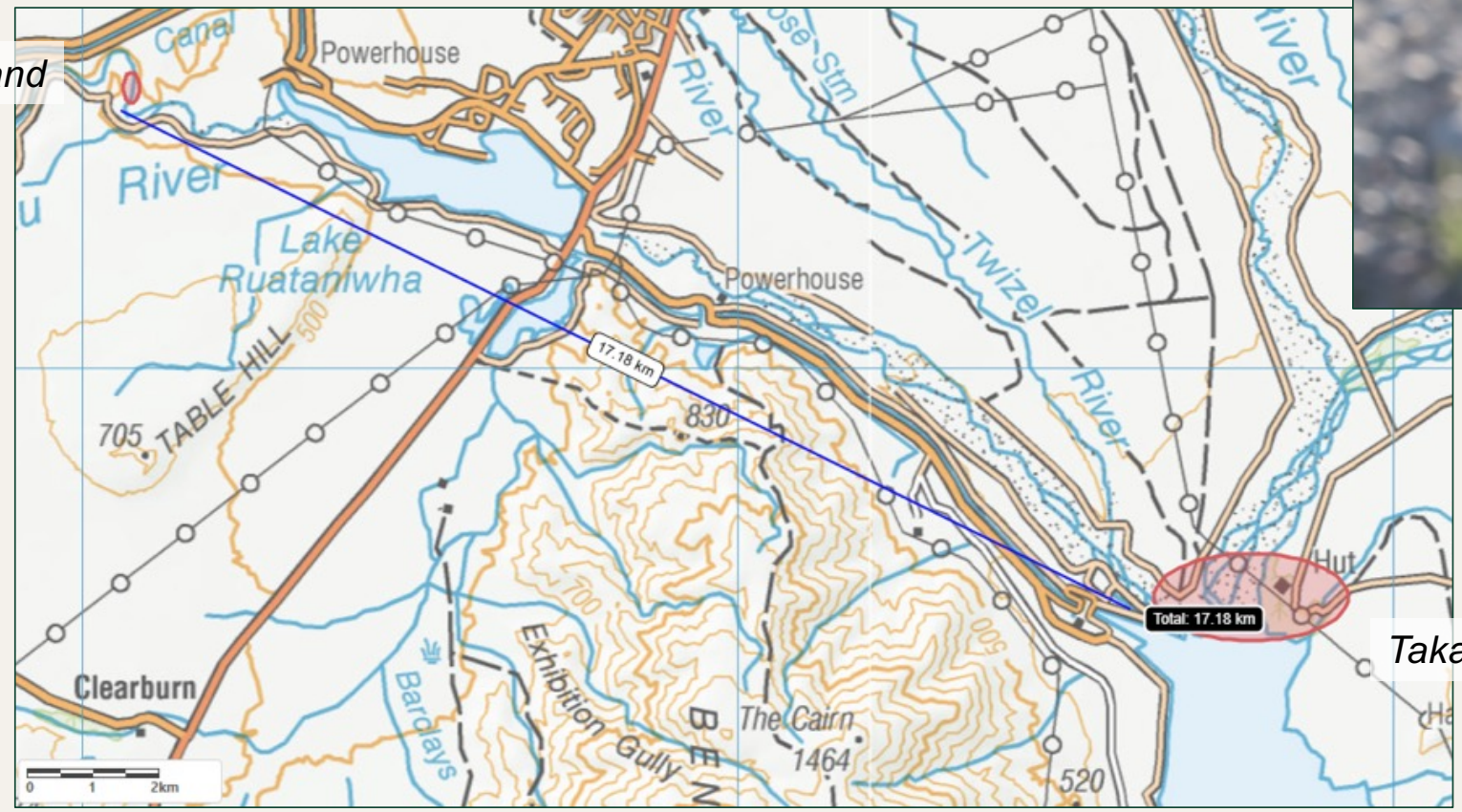
Management at Tern Island

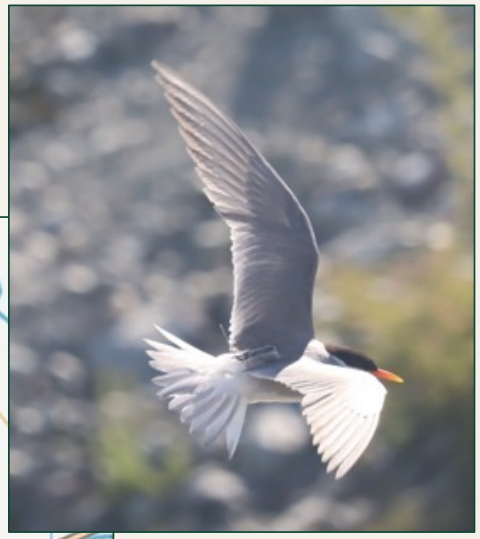
Track closure and signage to reduce disturbance and inform users

Tracks of drone during the annual weed spray of island

Roosting sites

Tern Island





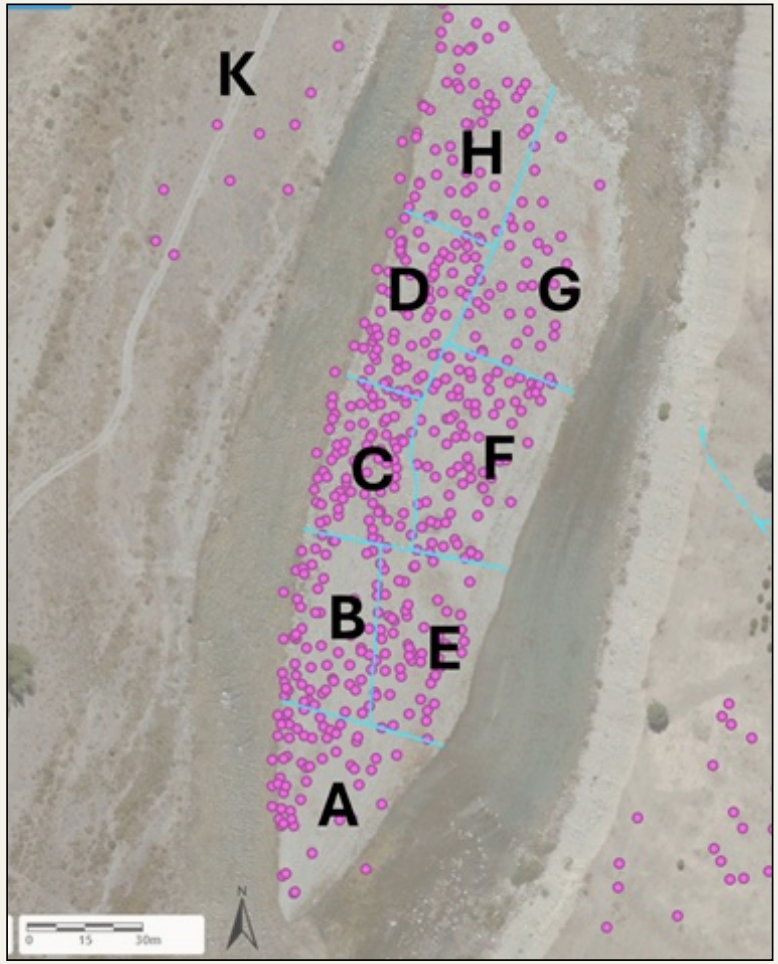
Black-fronted tern with transmitter at Tern Island

Takapō River delta

Flag banding

Understand natal site fidelity for colonies in the Mackenzie Basin (Ōhau, Cass and Takapō Rivers)

Monitoring at Tern Island



- Island divided into 8 sections to guide searches
- Visual search on foot covering entire island with 2 x observers
- Each nest checked 1 x per week
- Very dense nests, birds behave differently those in other colonies
- Approx 1 x camera on nest in each section (total = 8) to detect predator incursions

Monitoring at Tern Island

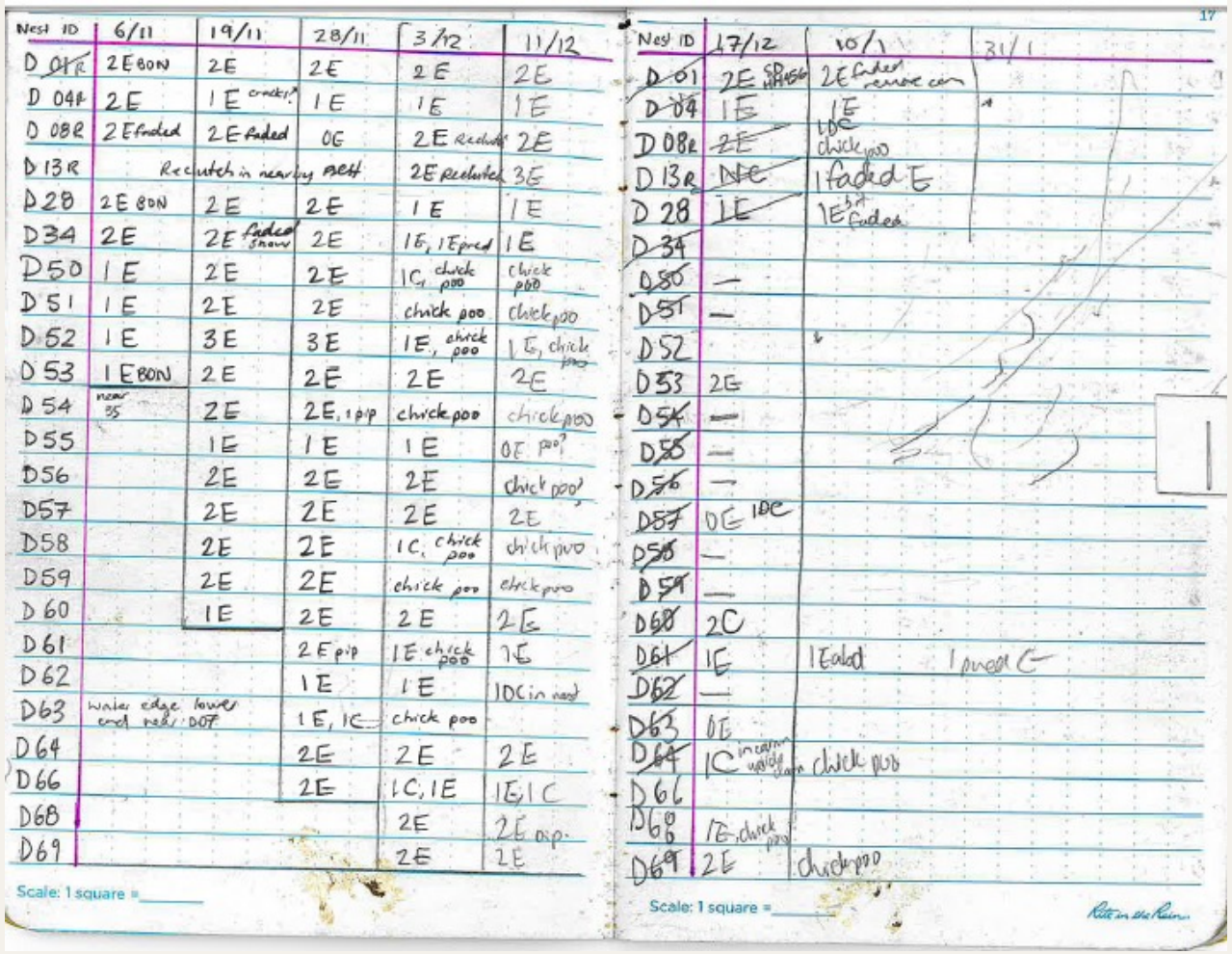
Challenges of monitoring at Tern Island

- If no eggs in nest – difficult to determine if chicks hatched because many chicks in close proximity to nest, and cannot look for parent behaviour because too many parents
- Tracking fate of chicks after hatching - the chicks form crèches and can't match them to a nest, and difficult to count chicks on the island because lost of hiding places
- Getting an accurate count (/estimate) of fledglings
- Managing disturbance to the birds/time spent on the island – close nest densities means many nests are disturbed by observer presence
    - Considering changing approach to sub-sampling to manage this
    - Investigating the value of using a drone to monitor this island

Monitoring: Nest marking

- Waypoint
- Labelled with an unique ID
- Marked with a small cairn

Recording data in the field

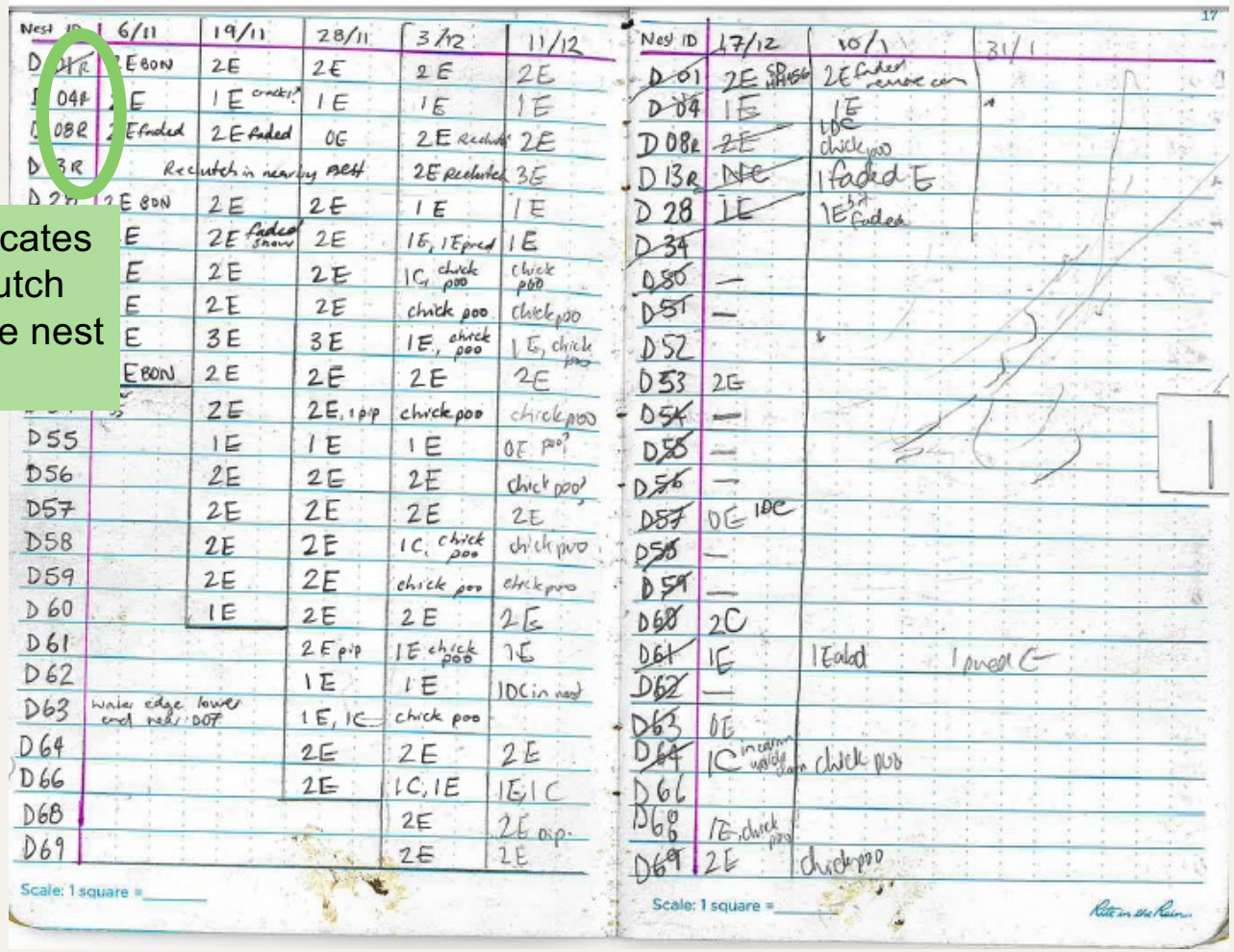


Pros/Cons

- Can ID nest very quickly on the ground
- Can see the notebook in the sun (no glare!)
- Quick to check nest status in previous visit
- Quick to check that all nests have been visited in current check
- Need a GPS/phone to help find nest
- Have to ‘digitise’ the data (time-consuming)

Recording data in the field

‘R’ indicates a re-clutch in same nest bowl



Pros/Cons

- No screen glare
- Quick to check nest status in previous visit
- Quick to check that all nests have been visited in current check
- Need a GPS/phone to help locate nest
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Data entry

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	Site Metadata				Bird Species Nesting Information					Sort Data				Nest Success/ Mortality									Camera
2	Site	Season	NZTM_E	NZTM_N	NestID	ColonyID	Species	Observer	DateFound	DateChecked	DateLast PossHatch	Weekly Check#	NestingInformationNotes	NestMxStatus	NestStatus_Current	Egg #	Chick #	TotalNoFailedEggs/Chicks	ChickFledgeNo.	Mortality Cause	Mortality Stage	NestStatusNotes	Camera
310	Ōhau River (Tern I	2024-25	1360746	5094234	B-19	B	BFT	Sam T.	16/10/24	7/10/2024	13/11/2024	1	Active		Egg(s)	1							
506	Ōhau River (Tern I	2024-25	1360745	5094243	C-01	C	BFT	Sam T.	11/12/24	7/10/2024	8/01/2025	1	Active		Egg(s)	2							Yes - Installed
507	Ōhau River (Tern I	2024-25	1360744	5094243	C-02	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
508	Ōhau River (Tern I	2024-25	1360743	5094248	C-03	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
509	Ōhau River (Tern I	2024-25	1360742	5094251	C-04	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
510	Ōhau River (Tern I	2024-25	1360743	5094254	C-05	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	1							
511	Ōhau River (Tern I	2024-25	1360749	5094251	C-06	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
512	Ōhau River (Tern I	2024-25	1360752	5094251	C-07	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	1							
513	Ōhau River (Tern I	2024-25	1360759	5094238	C-08	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
514	Ōhau River (Tern I	2024-25	1360758	5094235	C-09	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	1							
515	Ōhau River (Tern I	2024-25	1360756	5094235	C-10	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
516	Ōhau River (Tern I	2024-25	1360758	5094239	C-11	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
517	Ōhau River (Tern I	2024-25	1360758	5094241	C-12	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
518	Ōhau River (Tern I	2024-25	1360760	5094246	C-13	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							
519	Ōhau River (Tern I	2024-25	1360764	5094262	C-14	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	1							
520	Ōhau River (Tern I	2024-25	1360766	5094264	C-15	C	BFT	Sam T.	7/10/24	7/10/2024	4/11/2024	1	Active		Egg(s)	2							

Single-line data to produce the final stats

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
	Metadata													Egg				
	Season	River	Site	Species	Colony	Nest #	Reclutch?	NZTM East	NZTM North	Date found	Minimum Hatch date	Last Possible Hatch date (LPHD)	Unique Nest ID#	Total # eggs laid	*Egg 1 Fate*	*Egg 2 Fate*	*Egg 3 Fate*	Total # eggs failed
1	2024-25	Upper Ōhau River	Mainland - true left	Black-fronted tern	J	24	N	1360903	5094053	13/11	04/12	11/12	TIN24-J24	2	Hatched	Hatched		

	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
	Chick							Nest					
	Chick	*Chick 1 Fate*	*Chick 2 Fate*	Total # DC seen	Stage of Death	Total # possibly fledged	Total # assumed fledged	Camera	Known outcom	Failed (Y/N)	Nest failure Cause	Specific cause	Comments
1	2	Fledged (assumed)	Unknown			2	1	Y	Y	N			Chicks seen on camera footage til 12/12.
2				543									

Table 1. Summary of nest, hatching and egg success rates for black-fronted terns on Tern Island in the Upper Ōhau River.

Black-fronted tern	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
Total no. of nests monitored	25	2	57	104	176	423	321	365	717
Total no. of eggs laid	37	3-5	104	186	318	772	502	693	1340
No. of nests with **known outcome** (A)	23	2	55	66	141	295	304	220	629
No. of nests that hatched ≥ 1 egg (B)	10	0	11	4	74	203	64	164	248
No. of nests that failed	13	2	44	62	21	92	240	55	444
Of the nests in (A):									
No. of eggs laid where **fate known** (C)	36	3	99	102	154	550	469	426	1057
No. of eggs laid where fate unknown	1	1-2	3-5	63	164	222	33	267	132
Of the eggs in (C):									
No. of eggs - infertile or died during incubation (D)	1	0	2	0	1	13	0	5	22
No. of eggs failed - other causes	20	3	81	94	34		361	87	711
Total no. of chicks hatched (E)	15	0	16	8	119	212	105	155	324
***Hatching success* (F) = (B/A)**	0.43	0.00	0.20	0.06	0.52	0.69	0.21	0.75	0.39
***Egg success (G)* = (C-D)/C**	0.97	1.00	0.98	1.00	0.99	0.98	1.00	0.99	0.98

Table 20. Number of chicks fledged and fledging and breeding success rates of black-fronted terns in the Tasman River in 2019 – 2020.

Black-fronted tern	Mean 2004-2015 (Range)	2015-16	2016-17	2017-18	2018-19	2019-20
Total no. of ♀'s that attempted to breed[1] (O)	58 (23-201)	65	77	160	247	157
No. of nests - hatched ≥ 1 egg	22 (1-40)	56	70	141	105	43
No. of nests - fledged ≥ 1 chick (P)	3 (0-12)	-	-	83	22	0-42
No. of nests - lost all chicks	11 (0-23)	-	1	4	1	1
No. of nests - unknown fledging outcome	1 (0-4)	-	-	54	82	42?
No. of chicks fledged (Q) [2]	15 (4-32)	30-66	40-107	88-203	22-135	0-73
Fledging success (R) =Q/E	0.32 (0.20-0.56)	0.29 - 0.65	0.35-0.93	0.40-0.91	0.15-0.94	0-0.97
Breeding success (F x G x R)	0.20 (0.04-0.44)	0.23 - 0.53	0.31-0.82	0.32-0.73	0.06-0.40	0-0.26
Hatching success per female (E/O)	0.84 (0.09-1.54)	1.57	1.49	1.39	0.58	0.48
Fledging success per female (Q/O)	0.33 (0.06-0.86)	0.46 - 1.02	0.52-1.39	0.55-1.27	0.09-0.55	0-0.465

[1] Assuming that each nest of known outcome had a different unbanded female

[2] Minimum is confirmed number of fledglings, maximum is a realistic estimate

Table 19. (a) Causes of nest failure and (b) causes of egg loss in black-fronted terns in the Tasman River in 2019 – 2020.

(a) Black-fronted tern	Mean 2004-2015 (Range)	2015-16	2016-17	2017-18	2018-19	2019-20
Total no. of nests that failed	36 (8-165)	9	7	19	142	116
Nest failure due to:						
Predation	24 (0-124)	0	0	0	47	34
Predation then desertion	0 (0-2)	0	1	3	0	1
Desertion	3 (0-8)	6	5	9	5	6
Flooding	6 (0-31)	3	0	2	87	75
Died during incubation/infertile	1 (0-4)	0	1	3	1	0
Failed, cause unknown	3 (0-15)	0	0	1	1	0
Damaged in nest	0 (0-0)	0	0	1	1	0
(b) Black-fronted tern	**Mean 2004-2015 (Range)**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
Total no. of eggs that failed	72 (17-323)	26	24	64	265	190
Egg failure due to:						
Predation	46 (0-236)	0	2	3	80	48
Desertion	7 (0-21)	12	15	15	8	8
Flooding	11 (0-58)	6	0	5	162	131
Died during incubation/infertile	1 (0-5)	7	4	27	6	0
Died hatching	1 (0-4)	1	0	6	3	0
Damaged in nest	0 (0-1)	0	1	4	5	0