Waiau/Toa Clarence River Phase 2 Monitoring

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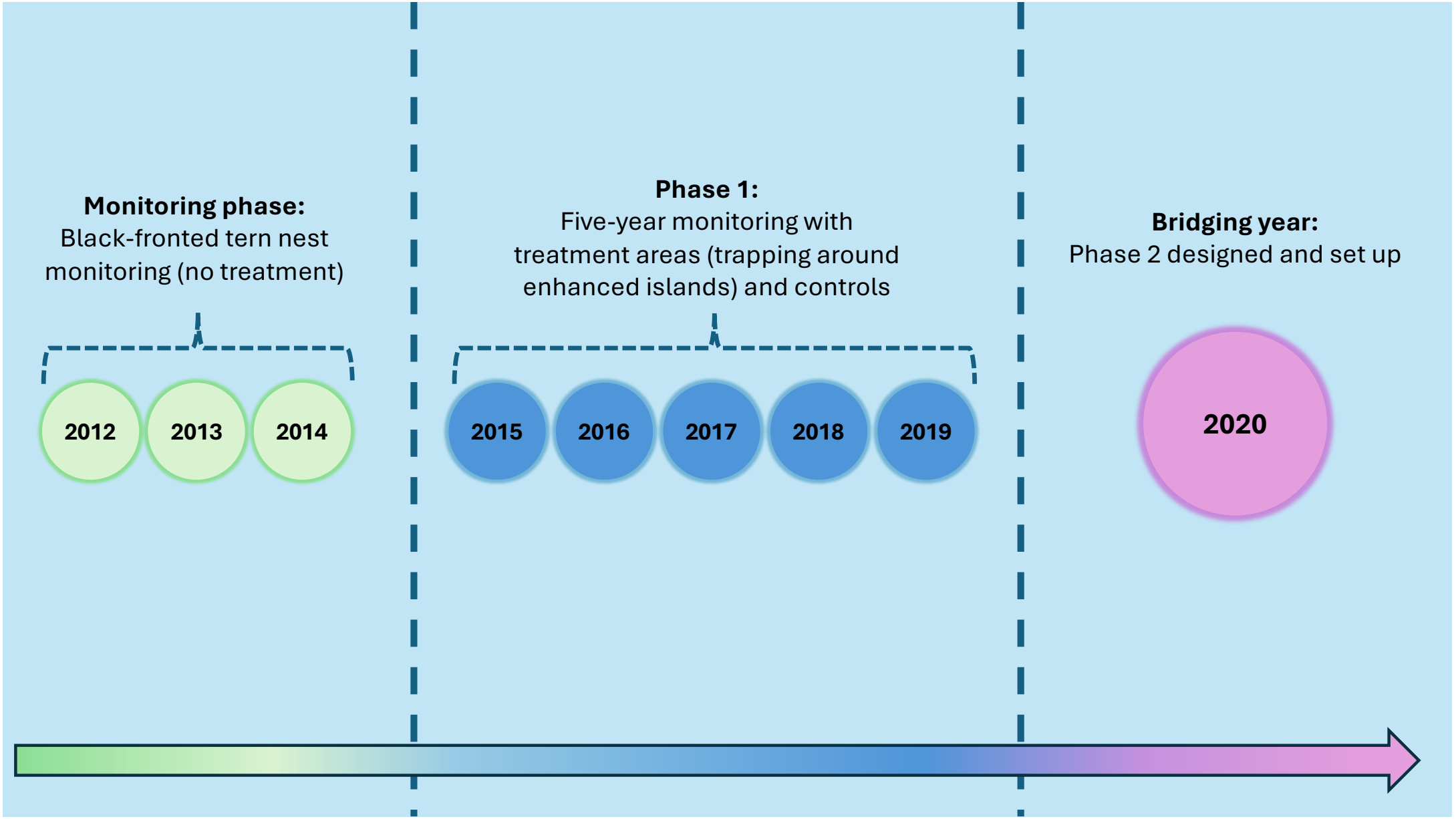
10th July 2025

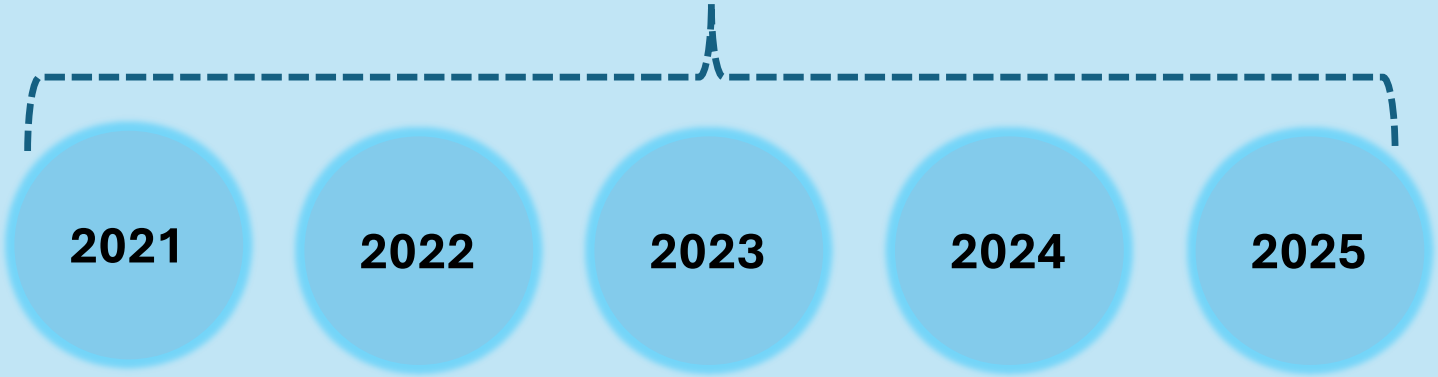
BRaid

WMIL Wildlife Management International

TOITŪ CARBON ZERO ISO 14064-1 ORGANISATION


Monitoring phase:
Black-fronted tern nest monitoring (no treatment)
2012
2013
2014
Phase 1:
Five-year monitoring with treatment areas (trapping around enhanced islands) and controls
2015
2016
2017
2018
2019
Bridging year:
Phase 2 designed and set up
2020

Phase 2:
Five-year monitoring with treatment areas (trapping around enhanced islands) and controls



Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

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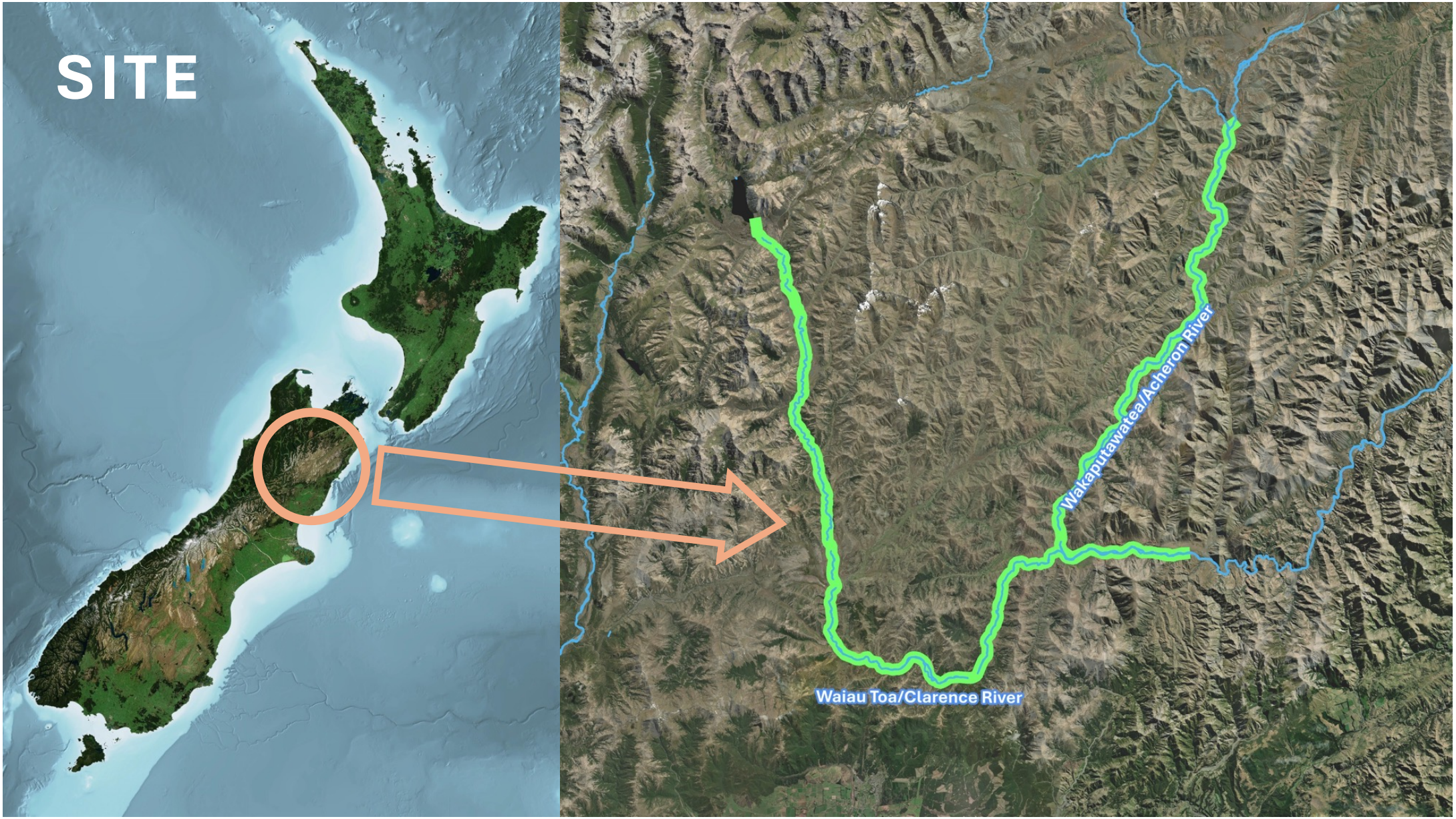
Department of Conservation
Te Papa Atawhai

1

Habitat/site management

Mapping, island enhancement, weed control, human disturbance, awareness / advocacy, offsite activity (overnight roost sites / movements, migration)


SITE
Waiau Toa/Clarence River
Wakaputawatea/Acheron River


Molesworth Recreation Reserve
© WMIL

Island enhancement

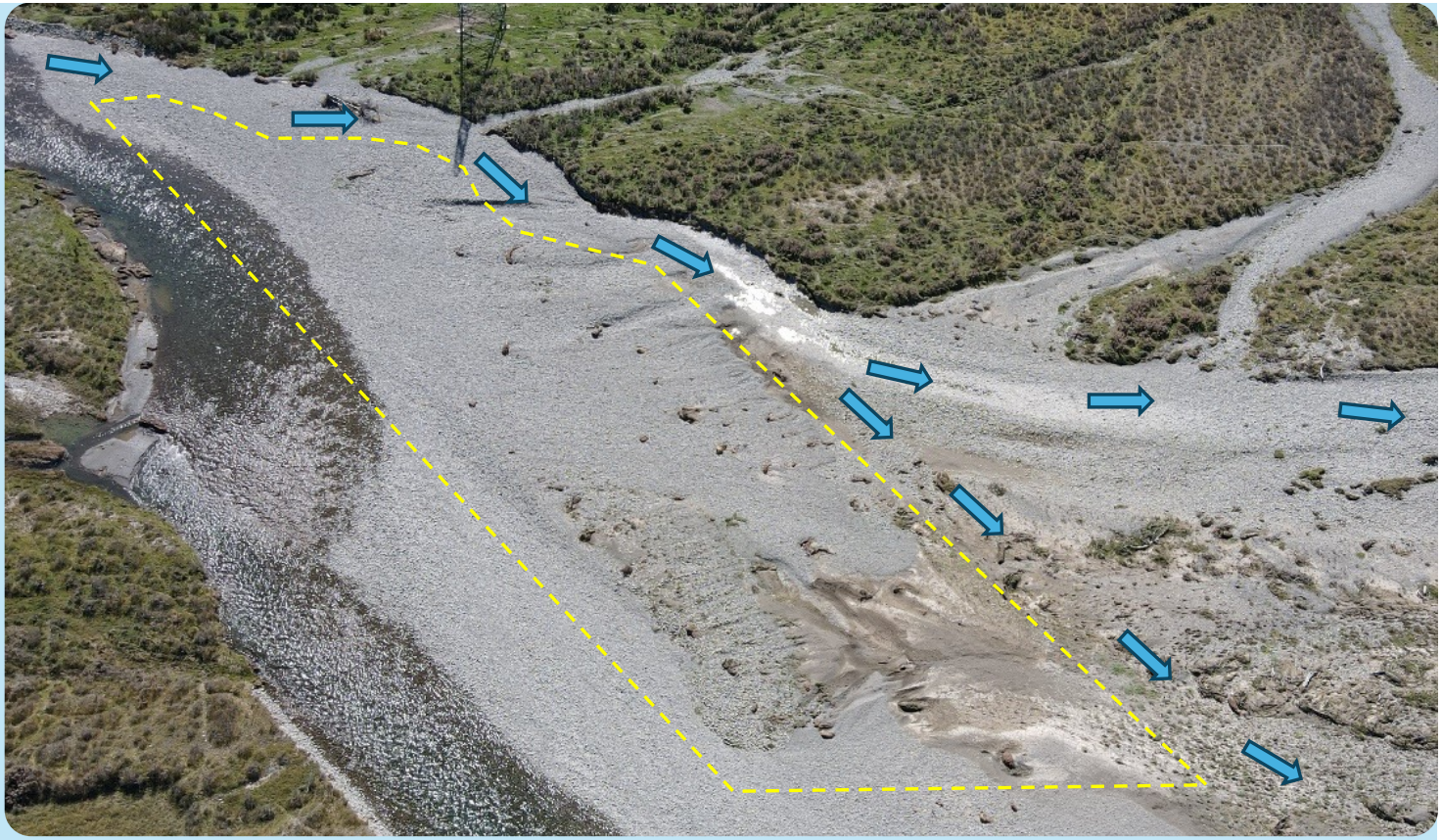
Aim to improve three known breeding islands by:

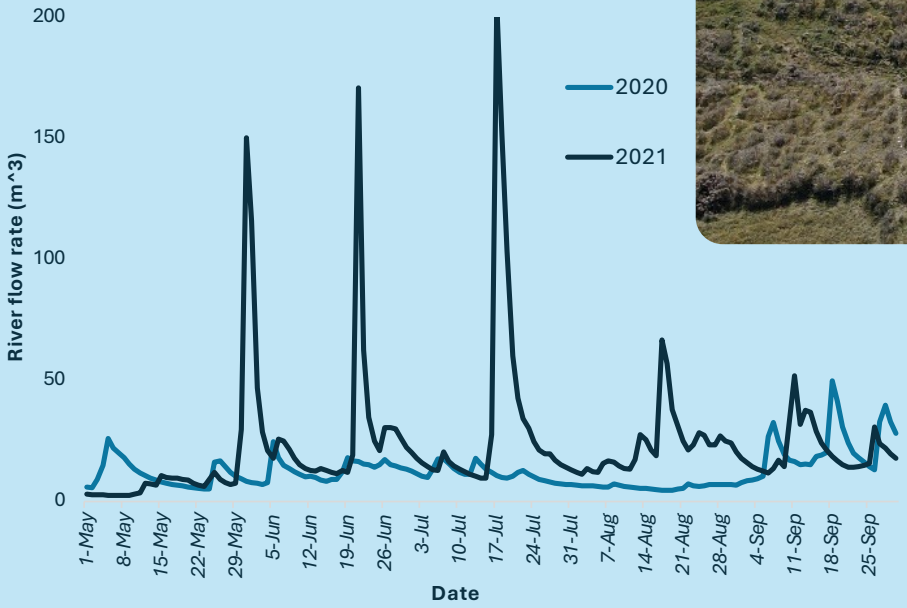
- Deepening and widening channels
- Removing woody vegetation
- Clearing gravel Islands with good channels on either side


BEFORE
© WMIL


AFTER
© WMIL

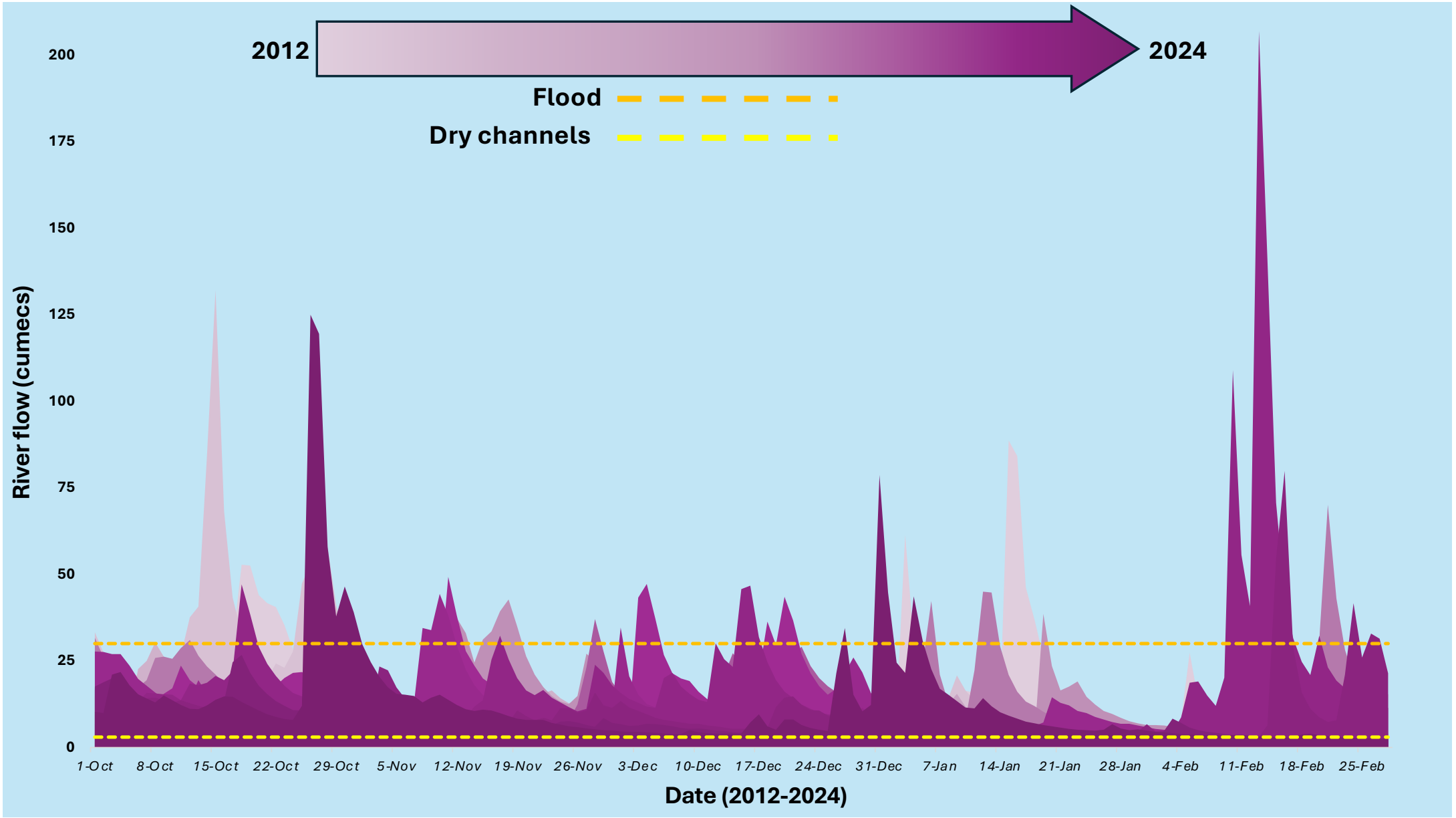
FLOODING




River flow rate (m^3)
200
150
100
50
0
2020
2021
1-May
8-May
15-May
22-May
29-May
5-Jun
12-Jun
19-Jun
26-Jun
3-Jul
10-Jul
17-Jul
24-Jul
31-Jul
7-Aug
14-Aug
21-Aug
28-Aug
4-Sep
11-Sep
18-Sep
25-Sep
Date

LOW FLOWS

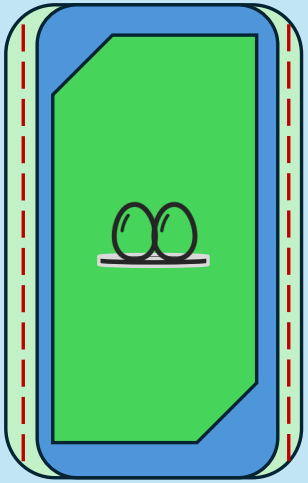
LOW FLOWS


2012
2024
Flood
Dry channels
River flow (cumecs)
200
175
150
125
100
75
50
25
0
1-Oct
8-Oct
15-Oct
22-Oct
29-Oct
5-Nov
12-Nov
19-Nov
26-Nov
3-Dec
10-Dec
17-Dec
24-Dec
31-Dec
7-Jan
14-Jan
21-Jan
28-Jan
4-Feb
11-Feb
18-Feb
25-Feb
Date (2012-2024)

These islands therefore need maintenance each year to fix channels, and to clear weeds

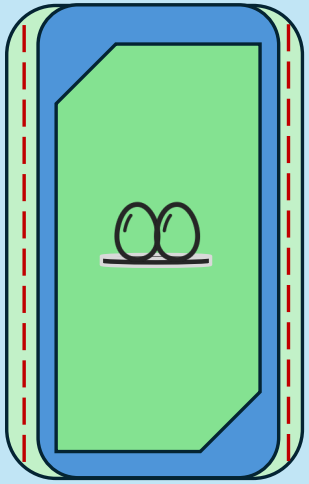
Possible nesting site scenarios

Treatment



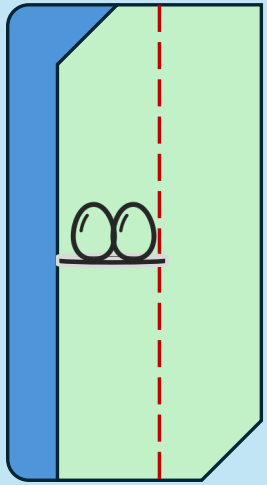
Enhanced Island

- Channels dug
- Weeds removed
- Raised
- Circled by trapping



Natural Island

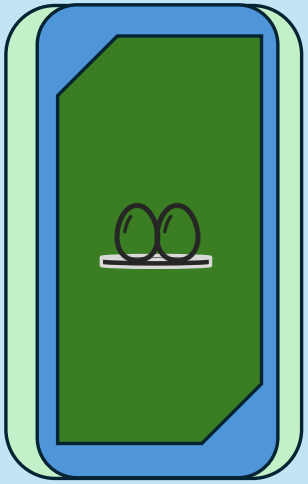
- No enhanced works
- Circled by trapping



Mainland

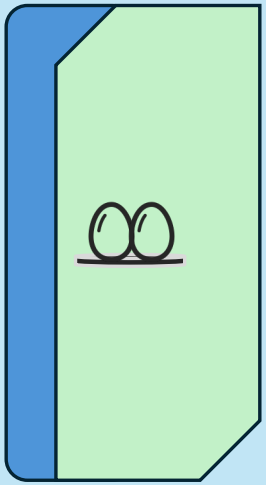
- Within trapping network

Non-treatment



Natural Island

- No enhanced works
- No trapping



Mainland

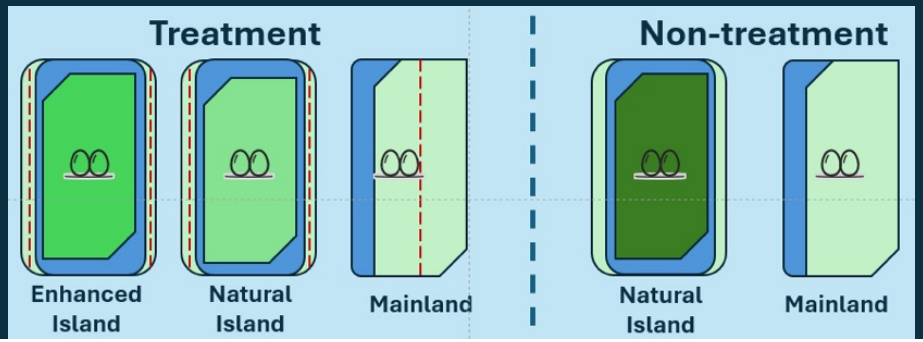
- No trapping

Key points

Habitat/site management

Island enhancement works, however requires constant maintenance due to dynamic braided river habitat (flooding and low flows)

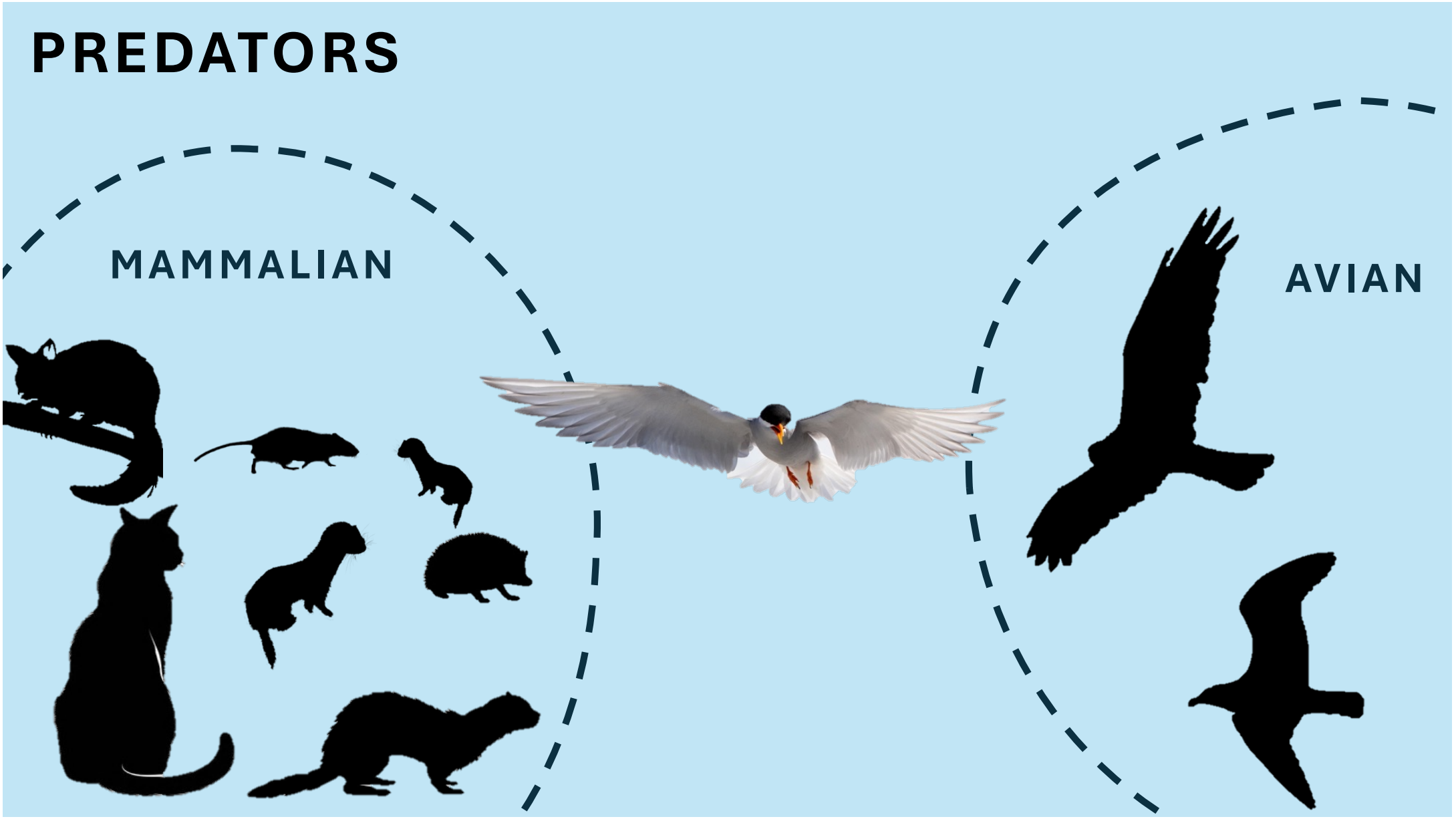
Different scenarios for BFT nesting location and treatment need to be incorporated into analyses accurately (treatment vs non-treatment, island vs mainland)



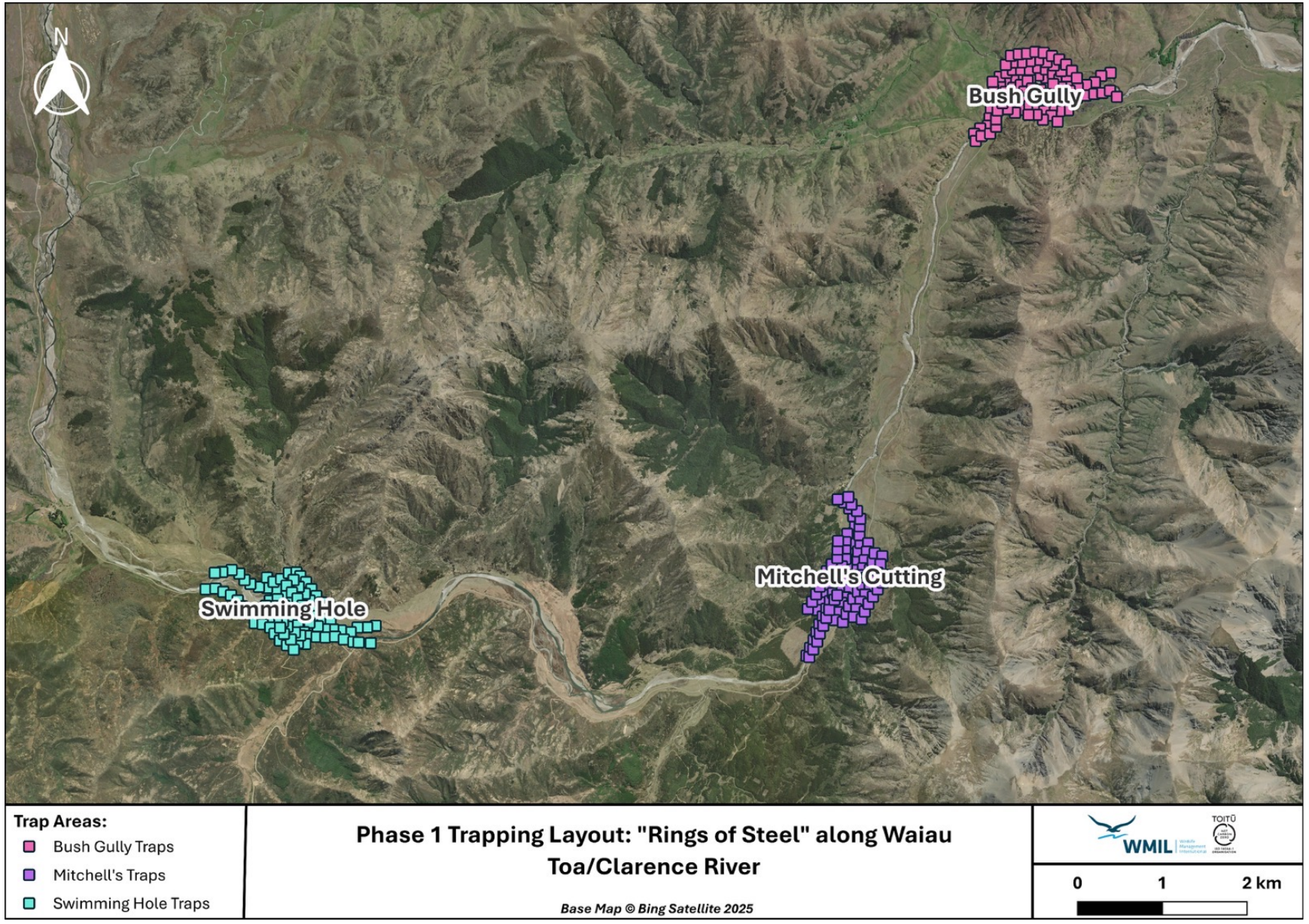
2

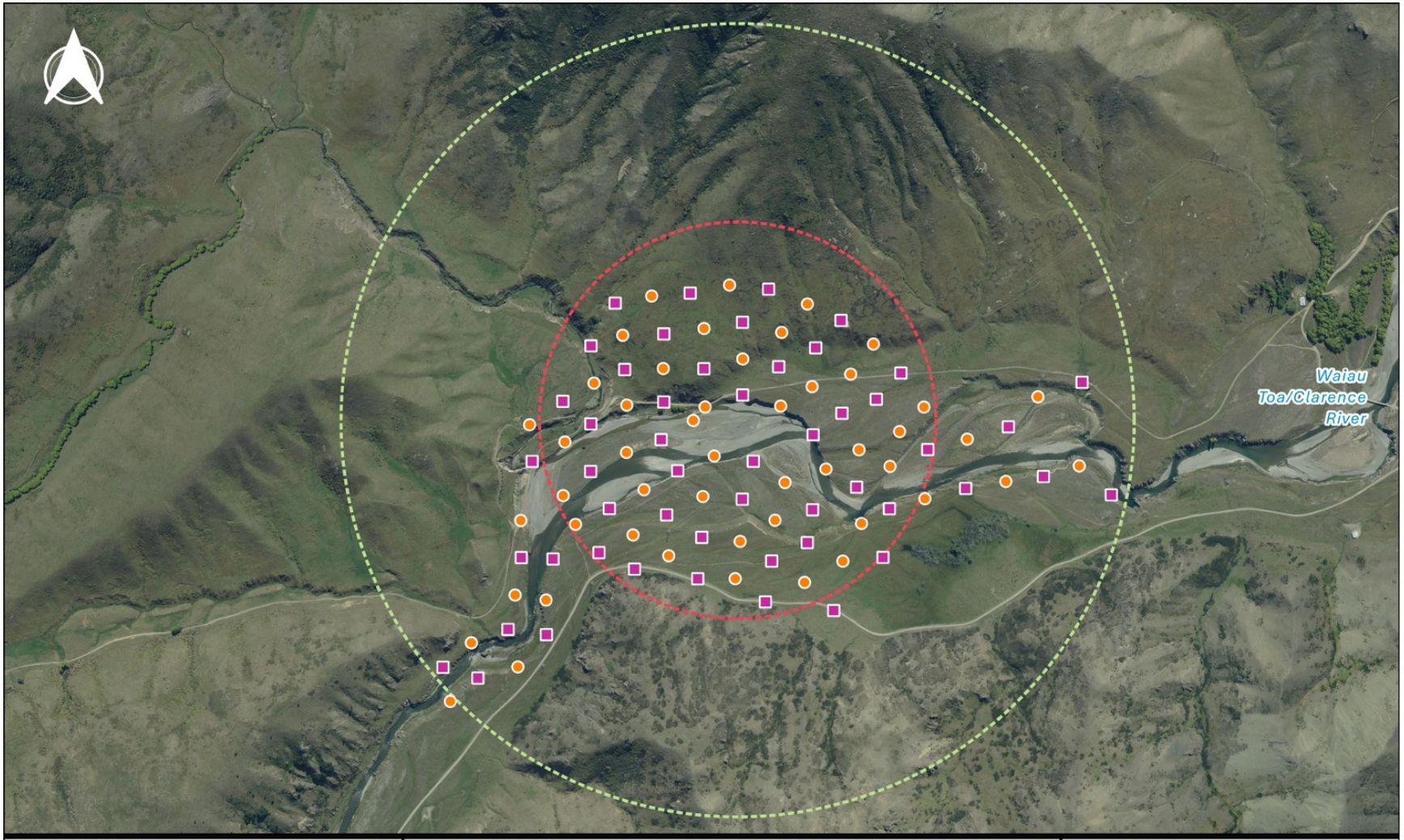
Predators

Which ones are the problems, most effective control techniques (trap types, layout, baits, and timing), use of toxins, dogs.


PREDATORS
MAMMALIAN
AVIAN

Trapping


N
Bush Gully
Mitchell's Cutting
Swimming Hole
Trap Areas:
Bush Gully Traps
Mitchell's Traps
Swimming Hole Traps
Phase 1 Trapping Layout: "Rings of Steel" along Waiau Toa/Clarence River
Base Map © Bing Satellite 2025
WMIL
TOITŪ
0
1
2 km



Traps

- DOC 150 + SA
- DOC 250

1km Buffer

500m Buffer

River

Base Map © LINZ Aerial Imagery

Predator trap layout at Bush Gully, Waiau Toa/Clarence River

0 250 500 m

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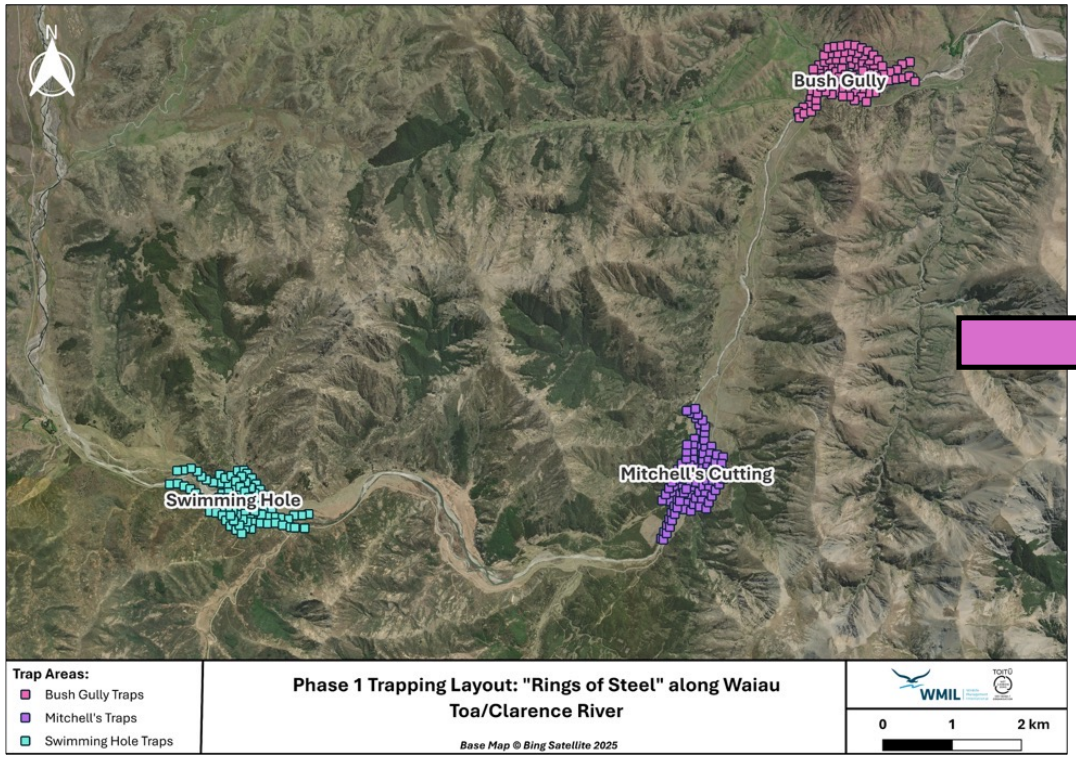
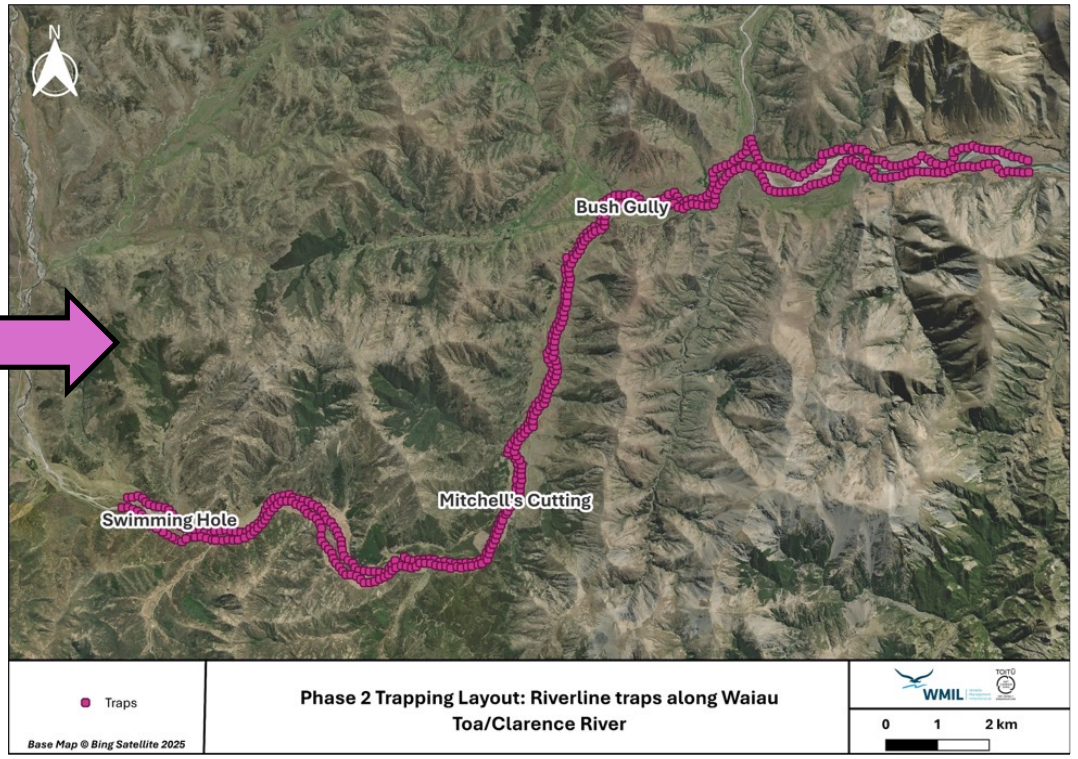
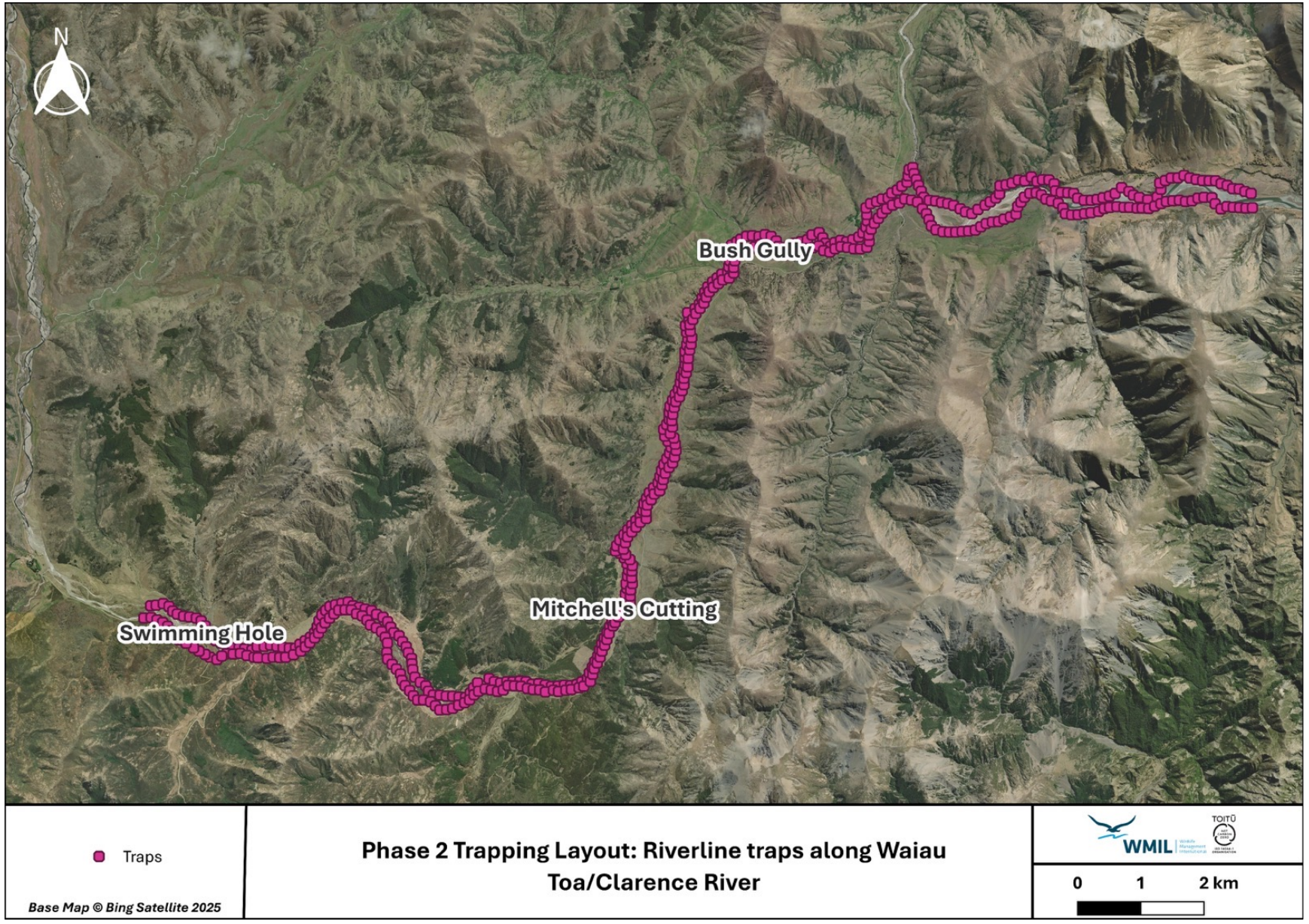
TOITŪ

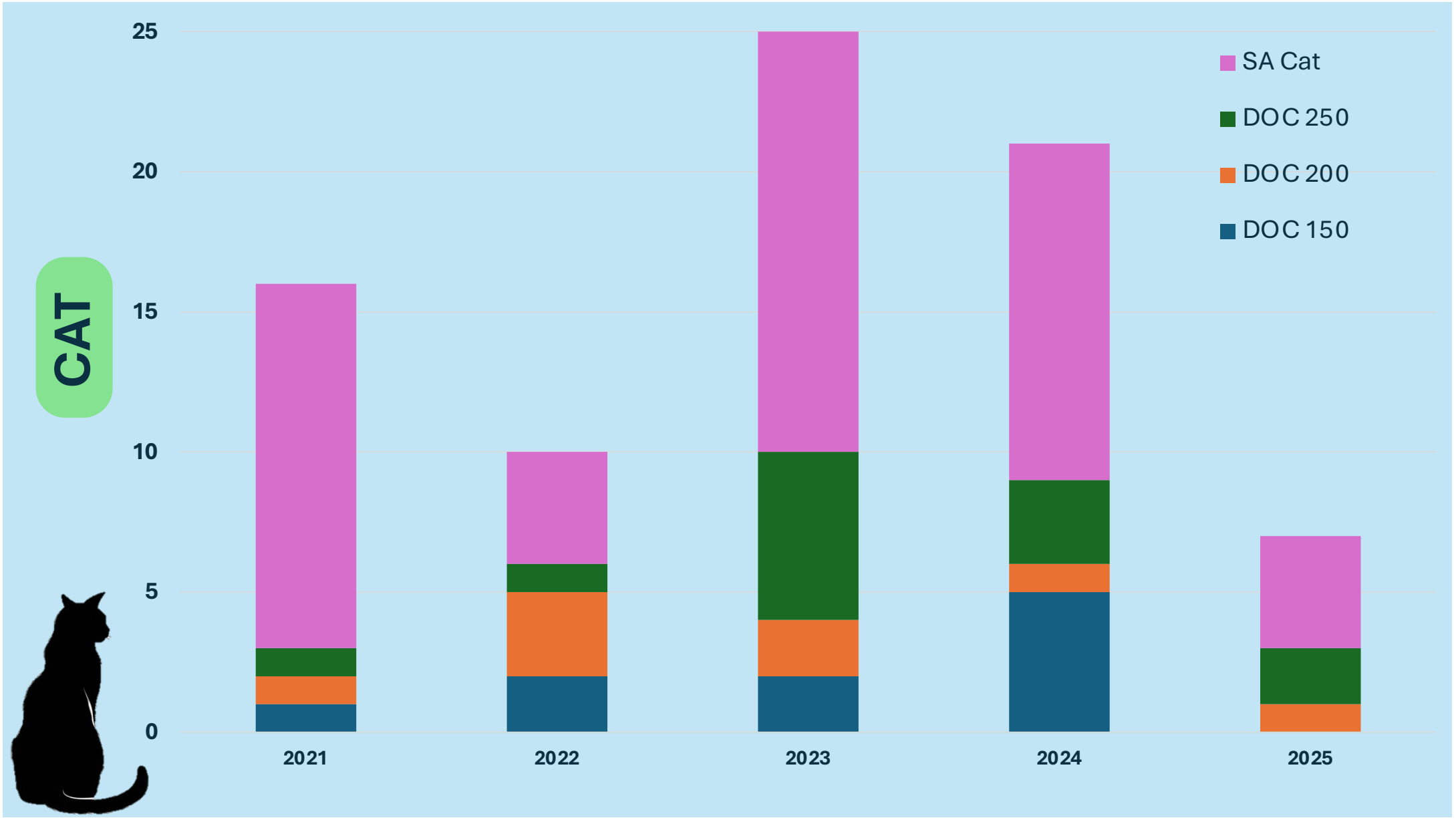
2020

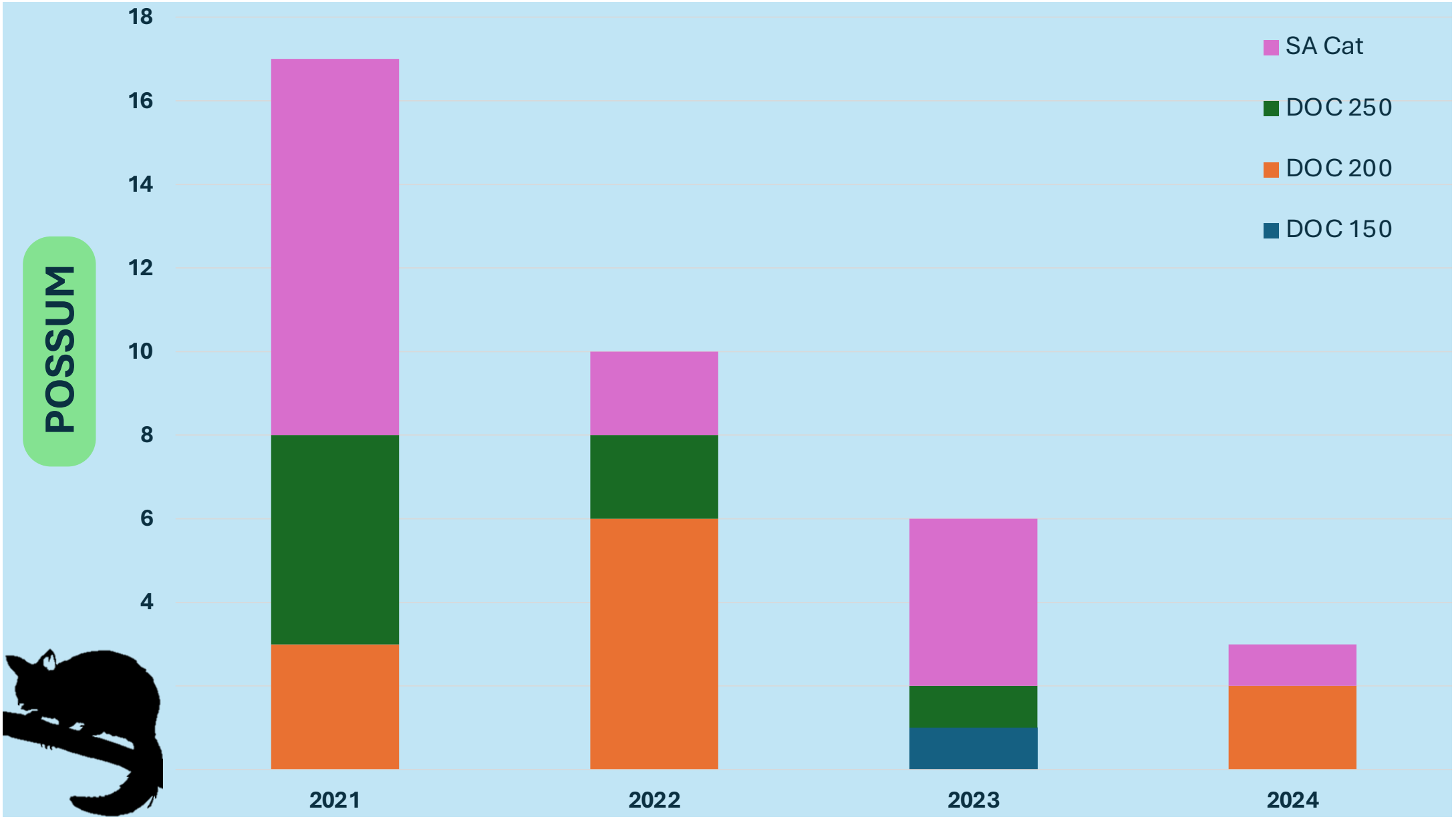
BRIDGING YEAR



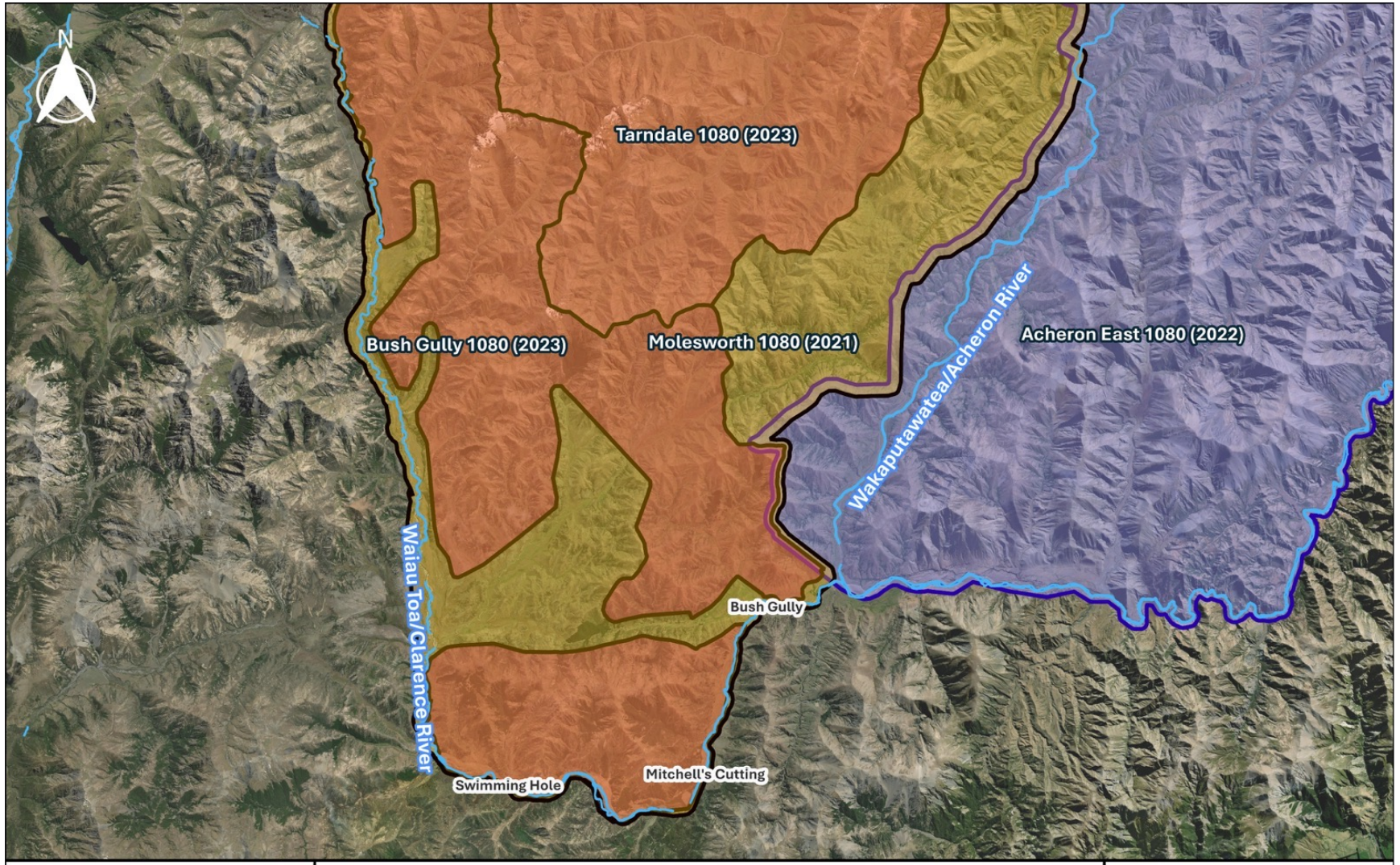



N
Bush Gully
Mitchell's Cutting
Swimming Hole
Traps
Base Map © Bing Satellite 2025
Phase 2 Trapping Layout: Riverline traps along Waiau Toa/Clarence River
WMIL
TOITŪ
0
1
2 km


CAT
25
20
15
10
5
0
2021
2022
2023
2024
2025
SA Cat
DOC 250
DOC 200
DOC 150


POSSUM
18
16
14
12
10
8
6
4
2021
2022
2023
2024
SA Cat
DOC 250
DOC 200
DOC 150

OSPRI


N
Tarndale 1080 (2023)
Bush Gully 1080 (2023)
Molesworth 1080 (2021)
Acheron East 1080 (2022)
Wakaputawatea/Acheron River
Waiau Toa/Clarence River
Bush Gully
Swimming Hole
Mitchell's Cutting
1080 Molesworth 2021
1080 Acheron East 2022
1080 Bush Gully Tarndale 2023
Base Map © Bing Satellite 2025
Phase 2 1080 Operations along Waiau Toa/Clarence River
2021-2023
WMIL
TOITŪ
0
2.5
5 km

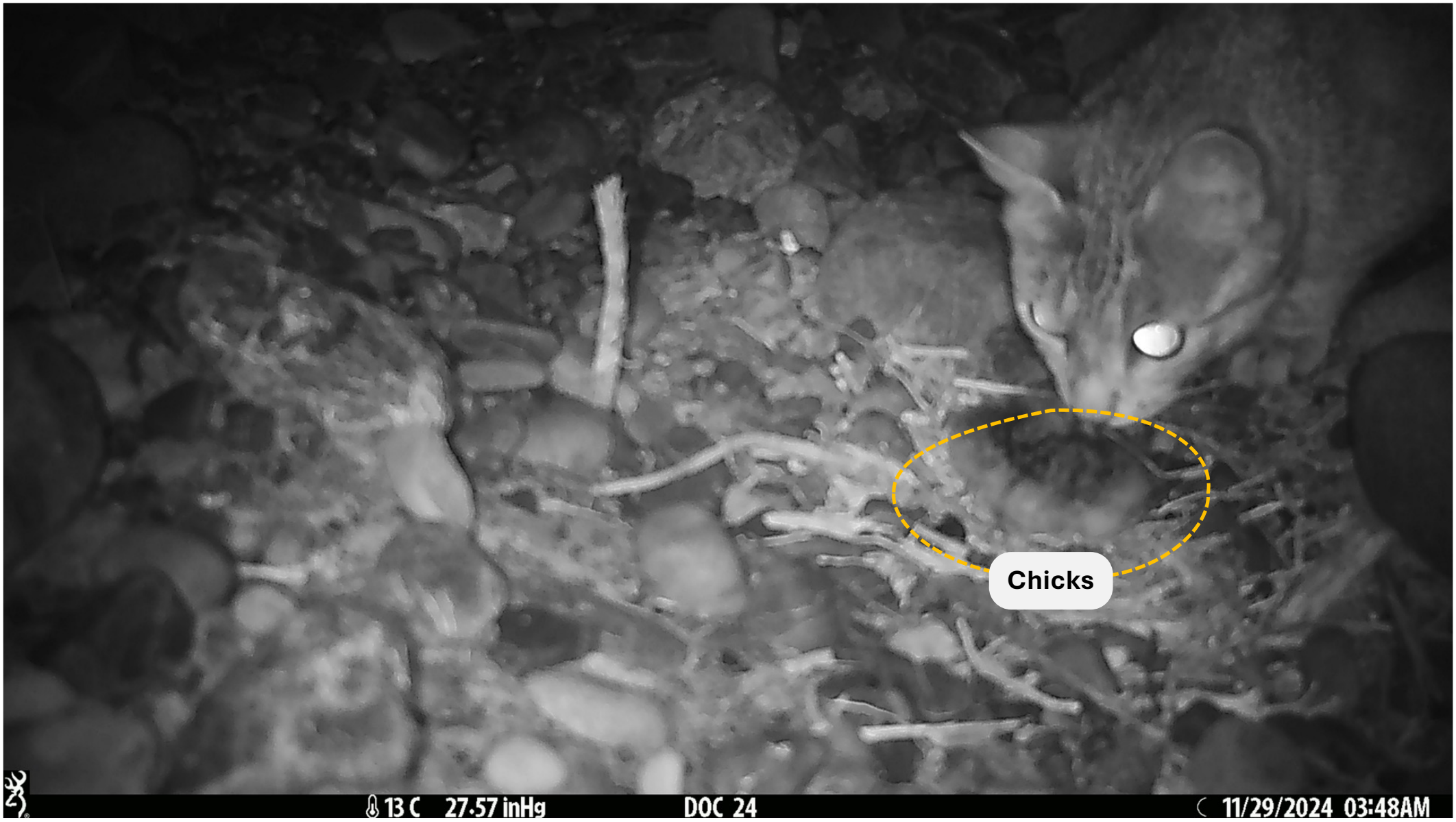
OSPRI

WORKING TOWARDS TB ERADICATION

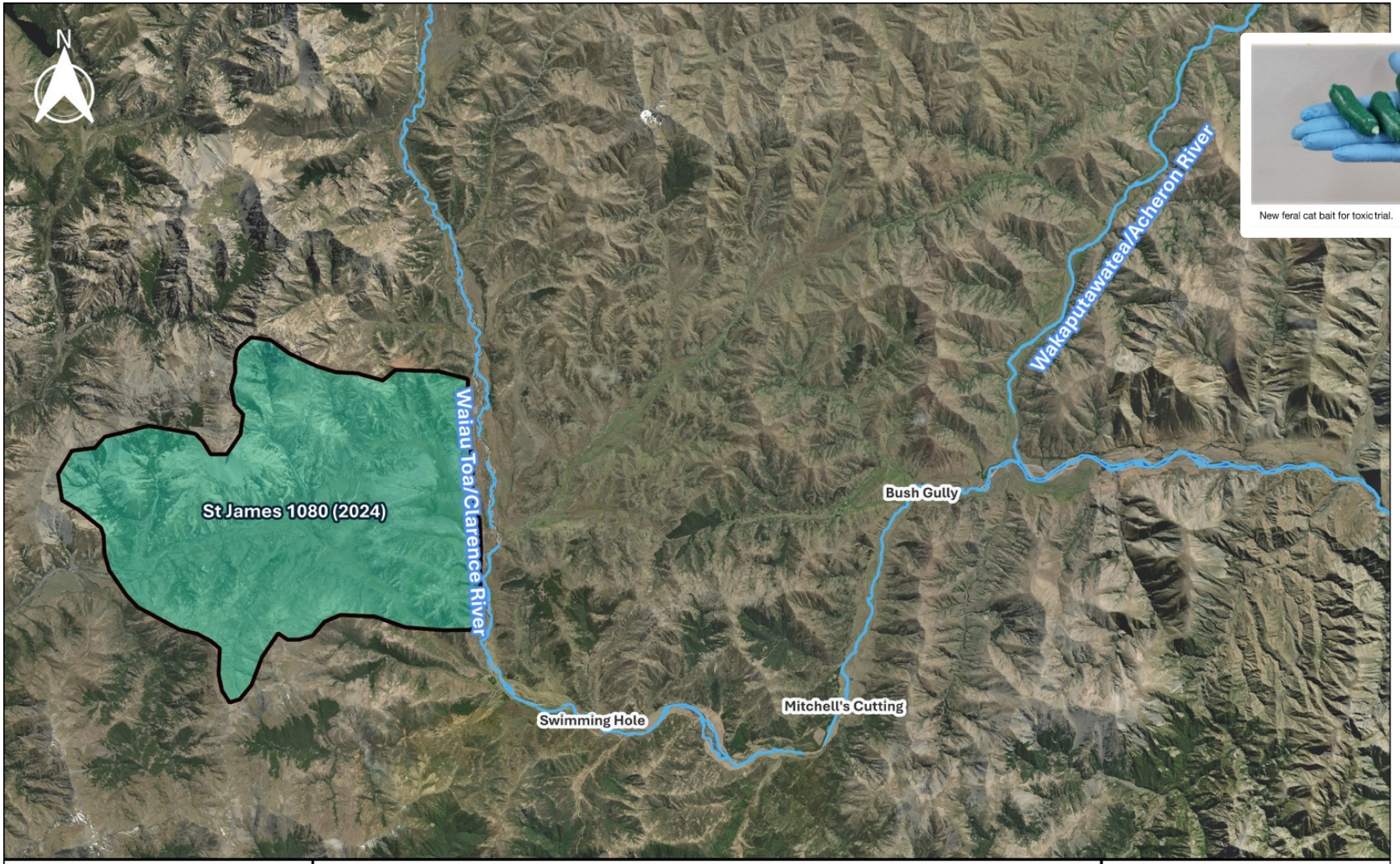
The TB National Pest Management Plan (NPMP), commonly known as the TB plan, aims to achieve TB eradication in New Zealand. The objectives of the TB plan are:

- TB freedom in livestock by 2026
- TB freedom in possums by 2040
- Biological eradication of TB in New Zealand by 2055.

This factsheet will demonstrate how OSPRI New Zealand Limited will measure the progression towards and ultimately the success of achieving these three milestones.


Chicks
13 C 27.57 inHg
DOC 24
11/29/2024 03:48AM


8 C 27.79 InHg
TRAILCAM31
12/01/2024 12:00:45AM



New feral cat bait for toxic trial. Source: DOC

KĀHU/HARRIER BANDING

132

Adults banded (2021-2024)

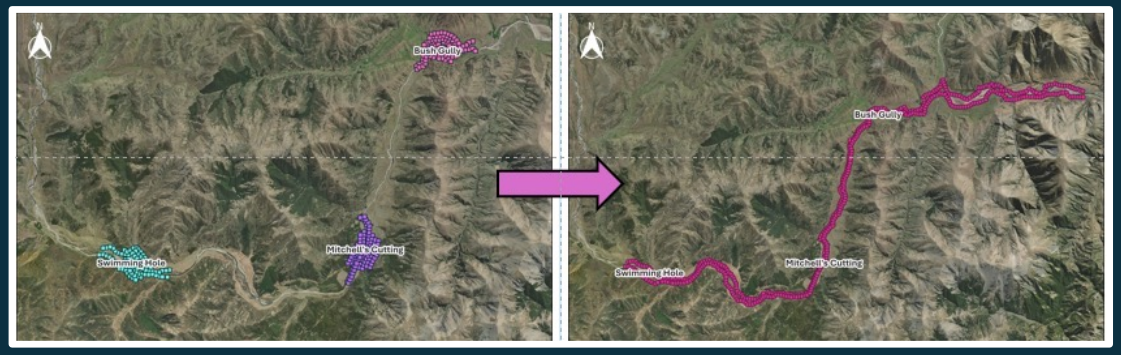
35

Recaptured

Key points

Predators

Trapping has shifted from ‘Rings of Steel’ to linear along the river. Analysis is still needed to see what is the most effective.



Analysis is complicated by 1080 drops for TB control in the area.

Key points

Predators

SA traps are most effective for cats.

Cats are the main predator, even with trapping, one cat can cause widespread colony failure. Targeted control (leg-holds/shooting) could better protect colonies.

Key points

Predators

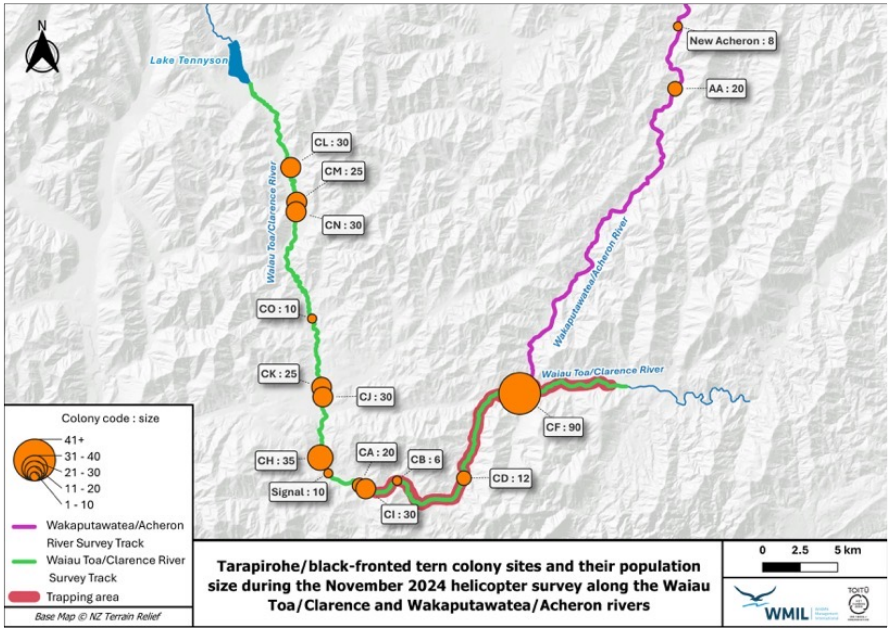
Kāhu predation is still being investigated through banding and resights. 1080 may have complicated this due to secondary poisoning.

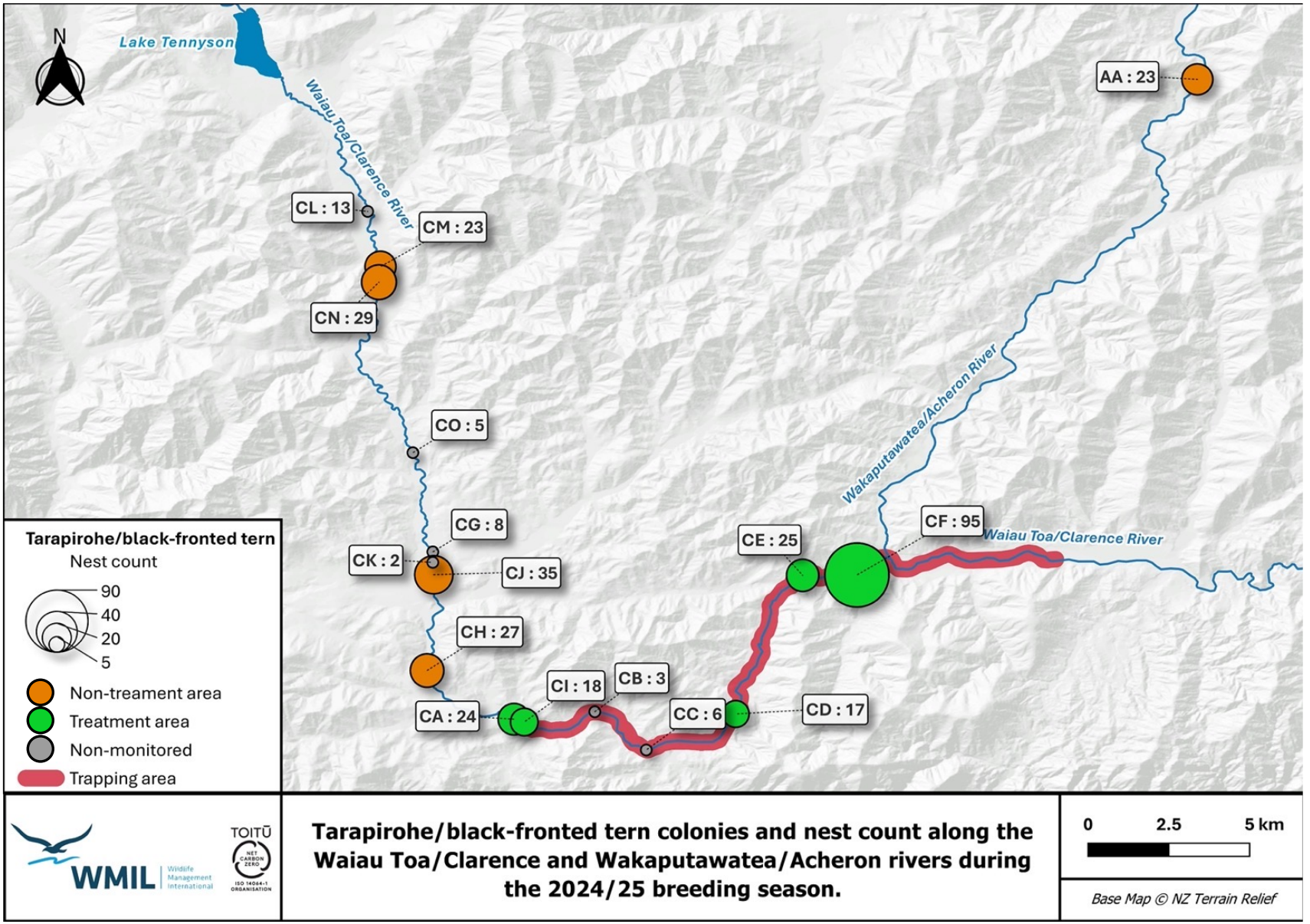
3

Monitoring

Existing monitoring protocol, how colonies and nests found/counted, what data recorded at nests, how recorded (paper, electronically), use of trail cameras, fledgling success per nest/pair (how counted and calculated)/ reporting metrics, banding / resighting (chicks / adults), level of monitoring/ cost-benefit (is it worth it?)

AERIAL SURVEYS




N
Lake Tennyson
Waiau Toa/Clarence River
Wakaputawatea/Acheron River
Waiau Toa/Clarence River
AA : 23
CL : 13
CM : 23
CN : 29
CO : 5
CG : 8
CK : 2
CJ : 35
CH : 27
CA : 24
CI : 18
CB : 3
CC : 6
CD : 17
CE : 25
CF : 95
Tarapirohe/black-fronted tern
Nest count
90
40
20
5
Non-treament area
Treatment area
Non-monitored
Trapping area
WMIL
Wildlife Management International
TOITŪ
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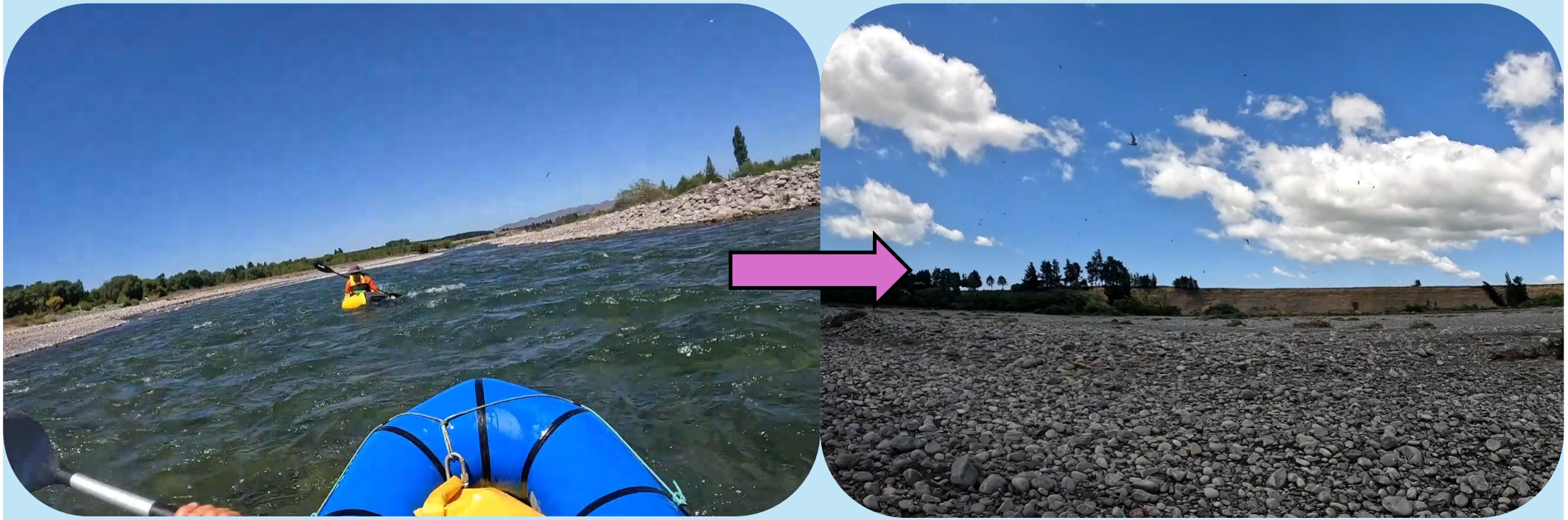
ISO 14064-1 ORGANISATION
Tarapirohe/black-fronted tern colonies and nest count along the Waiau Toa/Clarence and Wakaputawatea/Acheron rivers during the 2024/25 breeding season.
0
2.5
5 km
Base Map © NZ Terrain Relief

PACKRAFT SURVEYS



GROUND SURVEYS

1. Survey colony
2. Locate nests
3. GPS and record nest contents
4. Set up nest cameras
5. Weekly nest checks

GROUND SURVEYS

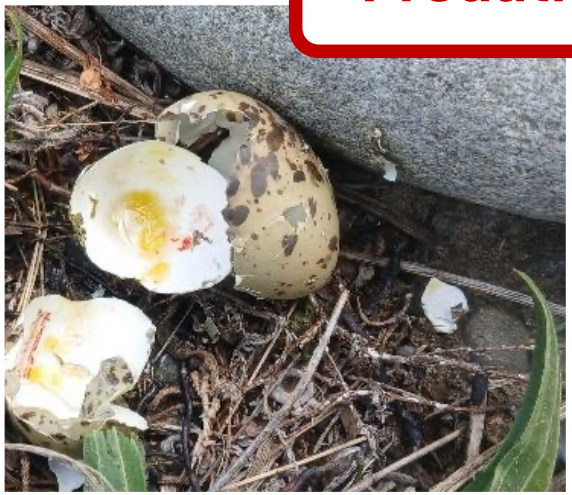
NEST MONITORING

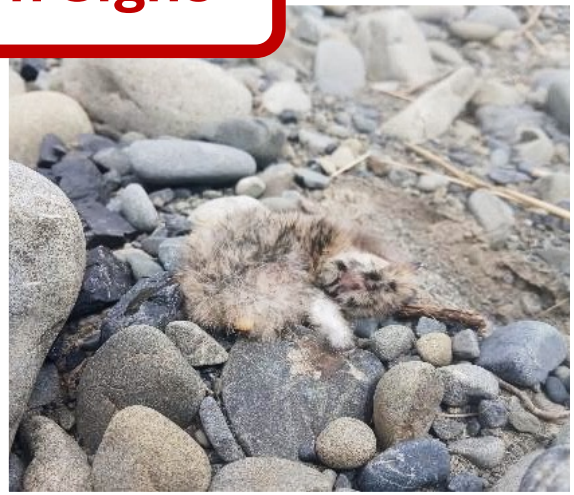
EGG STAGE

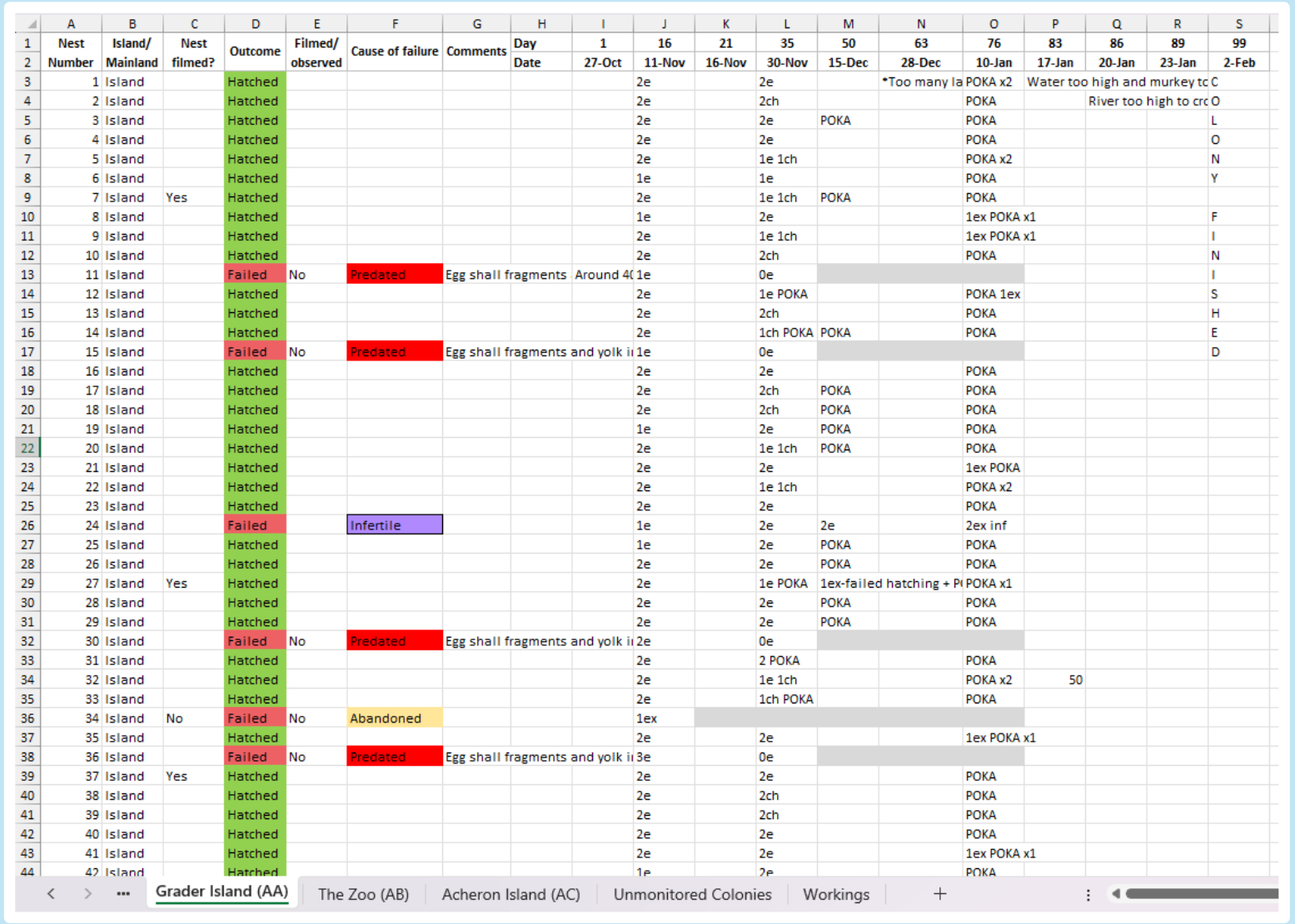
CHICK STAGE

NEST MONITORING

Predation Signs





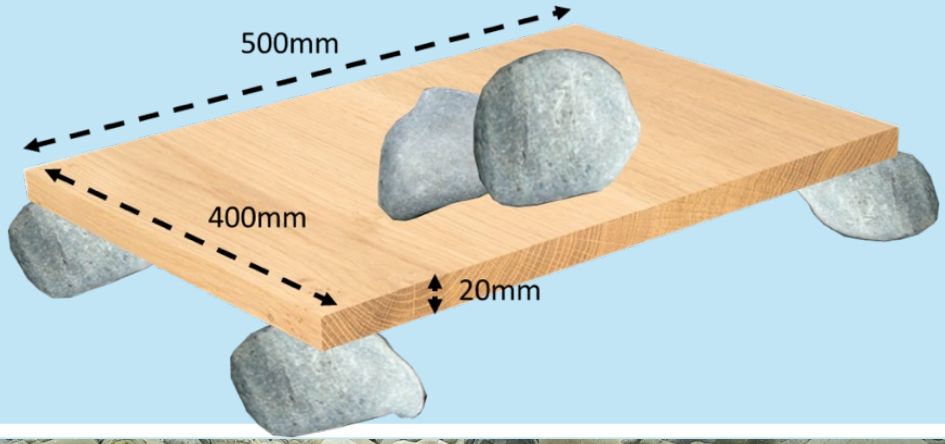


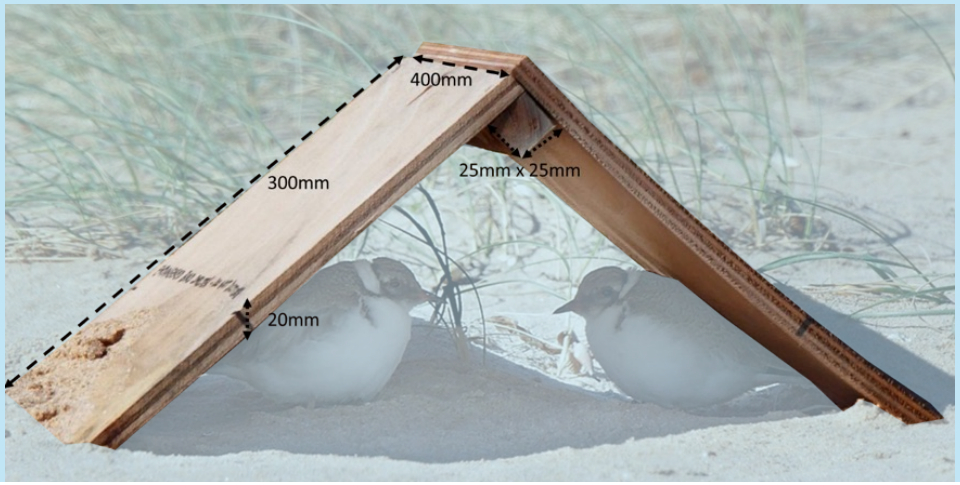
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Nest	Island/	Nest	Outcome	Filmed/	Cause of failure	Comments	Day	1	16	21	35	50	63	76	83	86	89	99
2	Number	Mainland	filmed?		observed			Date	27-Oct	11-Nov	16-Nov	30-Nov	15-Dec	28-Dec	10-Jan	17-Jan	20-Jan	23-Jan	2-Feb
3	1	Island		Hatched						2e		2e		*Too many la	POKA x2	Water too high and murkey to			C
4	2	Island		Hatched						2e		2ch			POKA		River too high to cro		O
5	3	Island		Hatched						2e		2e	POKA		POKA				L
6	4	Island		Hatched						2e		2e			POKA				O
7	5	Island		Hatched						2e		1e 1ch			POKA x2				N
8	6	Island		Hatched						1e		1e			POKA				Y
9	7	Island	Yes	Hatched						2e		1e 1ch	POKA		POKA				
10	8	Island		Hatched						1e		2e			1ex POKA x1				F
11	9	Island		Hatched						2e		1e 1ch			1ex POKA x1				I
12	10	Island		Hatched						2e		2ch			POKA				N
13	11	Island		Failed	No	Predated	Egg shall fragments		Around 4(	1e		0e							I
14	12	Island		Hatched						2e		1e POKA			POKA 1ex				S
15	13	Island		Hatched						2e		2ch			POKA				H
16	14	Island		Hatched						2e		1ch POKA	POKA		POKA				E
17	15	Island		Failed	No	Predated	Egg shall fragments and yolk i			1e		0e							D
18	16	Island		Hatched						2e		2e			POKA				
19	17	Island		Hatched						2e		2ch	POKA		POKA				
20	18	Island		Hatched						2e		2ch	POKA		POKA				
21	19	Island		Hatched						1e		2e	POKA		POKA				
22	20	Island		Hatched						2e		1e 1ch	POKA		POKA				
23	21	Island		Hatched						2e		2e			1ex POKA				
24	22	Island		Hatched						2e		1e 1ch			POKA x2				
25	23	Island		Hatched						2e		2e			POKA				
26	24	Island		Failed		Infertile				1e		2e	2e		2ex inf				
27	25	Island		Hatched						1e		2e	POKA		POKA				
28	26	Island		Hatched						2e		2e	POKA		POKA				
29	27	Island	Yes	Hatched						2e		1e POKA	1ex-failed hatching + P		POKA x1				
30	28	Island		Hatched						2e		2e	POKA		POKA				
31	29	Island		Hatched						2e		2e	POKA		POKA				
32	30	Island		Failed	No	Predated	Egg shall fragments and yolk i			2e		0e							
33	31	Island		Hatched						2e		2 POKA			POKA				
34	32	Island		Hatched						2e		1e 1ch			POKA x2	50			
35	33	Island		Hatched						2e		1ch POKA			POKA				
36	34	Island	No	Failed	No	Abandoned				1ex									
37	35	Island		Hatched						2e		2e			1ex POKA x1				
38	36	Island		Failed	No	Predated	Egg shall fragments and yolk i			3e		0e							
39	37	Island	Yes	Hatched						2e		2e			POKA				
40	38	Island		Hatched						2e		2ch			POKA				
41	39	Island		Hatched						2e		2ch			POKA				
42	40	Island		Hatched						2e		2e			POKA				
43	41	Island		Hatched						2e		2e			1ex POKA x1				
44	42	Island		Hatched						1e		2e			POKA				

Grader Island (AA) | The Zoo (AB) | Acheron Island (AC) | Unmonitored Colonies | Workings

Tarapirhoe breeding outcomes 2023/24	Overall	Treatment			Non-treatment	
		Natural Island	Enhanced Island	Mainland	Natural Island	Mainland
Total no. of nests (A)	325	47	40	17	188	33
No. nests with known outcome (B)	322	47	40	16	186	33
No. nests in B that hatched ≥ 1 egg (C)	151	13	19	4	111	4
No. nests that failed	174	34	21	13	77	29
Total no. of eggs	583	57	126	36	311	53
Of the nests in (B):						
No. eggs laid where fate known (D)	579	56	126	36	311	50
No. eggs where fate unknown	4	1	0	0	0	3
Of the eggs in (D):						
Total number of eggs that hatched	260	45	33	17	72	93
Total number of eggs that died in incubation	17	9	0	0	8	0
Number of eggs that failed from other causes	299	28	70	27	125	49
Hatching success (per nest) (E) = C/B	0.47	0.28	0.48	0.25	0.60	0.12
Nest Failure						
Total number of nests that failed	174	34	21	13	77	29
Nest failure because of:						
Predation	108	24	19	4	36	25
Failed unknown/likely predation	0	0	0	0	0	0
Desertion (fertile eggs)	56	7	2	8	35	4
Abandoned and scavenged	0	0	0	0	0	0
Flooding	0	0	0	0	0	0
Died during incubation/ infertile	7	3	0	0	4	0
Damaged in nest	0	0	0	0	0	0
Heat stress	1	0	0	0	1	0
Failed, cause unknown	3	0	0	1	2	0
Fledging Success						
Total no. females that attempted to breed	325	47	40	17	188	33
No. nests that hatched ≥ 1 egg	151	24	19	6	100	2
No. nests that fledged ≥1 chick (when/where possible)	61	17	4	2	36	2
No. nests that lost all chicks	50	1	14	4	0	31
No. nests with unknown fledgling outcome	40	-	-	-	-	-
No. chicks fledged as min/max (F)	100/175	14/23	19/24	3/6	62/120	2/2
Fledging success (per nest, as min/max) (G) = F/A	**0.31/0.54**	**0.30/0.49**	**0.48/0.60**	**0.18/0.35**	**0.33/0.64**	**0.06/0.06**

CHICK SHELTERS





BANDING

2021-2025

64

Adults

232

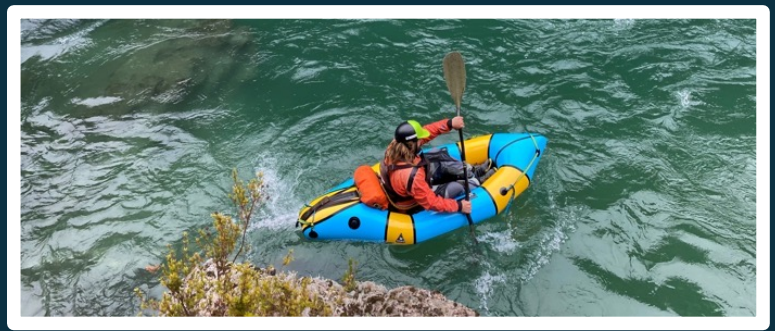
Chicks

Key points

Monitoring

Helicopter surveys have proven invaluable for locating colonies at the beginning of the season

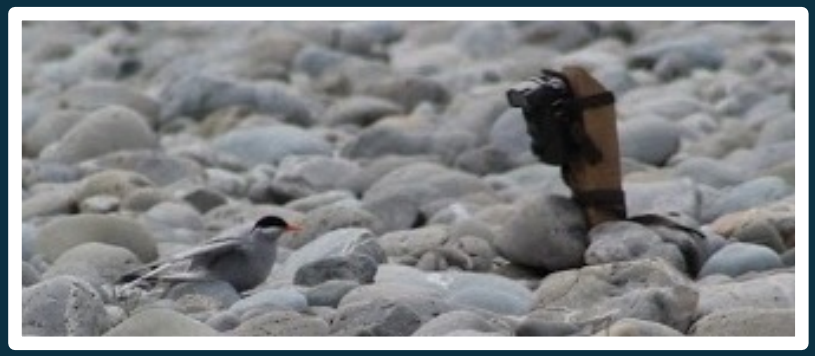
Packrafting has proven invaluable for accessing colonies and undertaking monitoring



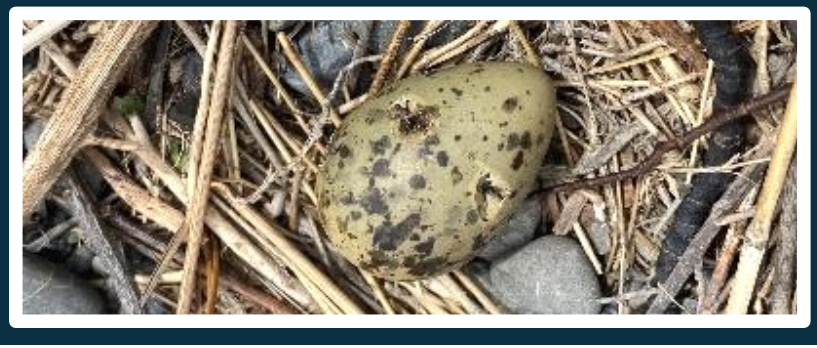
Key points

Monitoring

Trail cameras on nests help increase accuracy of monitoring, but have limitations



Assessing outcome of a nest, particularly predation, can be hard, introducing assumptions/unknowns into data



Key points

Monitoring

Chick shelters are proving effective for protecting chicks from predation and heat risk through climate change

Banding has helped understand some of this species biology, but more needed as well as tracking to better understand biology

ACKNOWLEDGEMENTS

- ECan, DOC, LINZ for providing funding for one or more of these projects
- Kaikoura Water Zone Committee and Waiau-Uwha Hurunui Water Zone Committee for providing support and recommendations
- Patrick Crowe, Ellery Mayence, Kerry Weston (DOC), Frances Schmechel (ECan) and Sian Reynolds (Boffa Miskell) for effectively managing these projects
- WMIL field staff and volunteers for their help over the seasons
- J&S Mears Contracting for undertaking trapping.
- Lott Contractors for island enhancement works

WMIL Wildlife Management International

TOITŪ NET CARBON ZERO ISO 14064-1 ORGANISATION

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Department of Conservation
Te Papa Atawhai

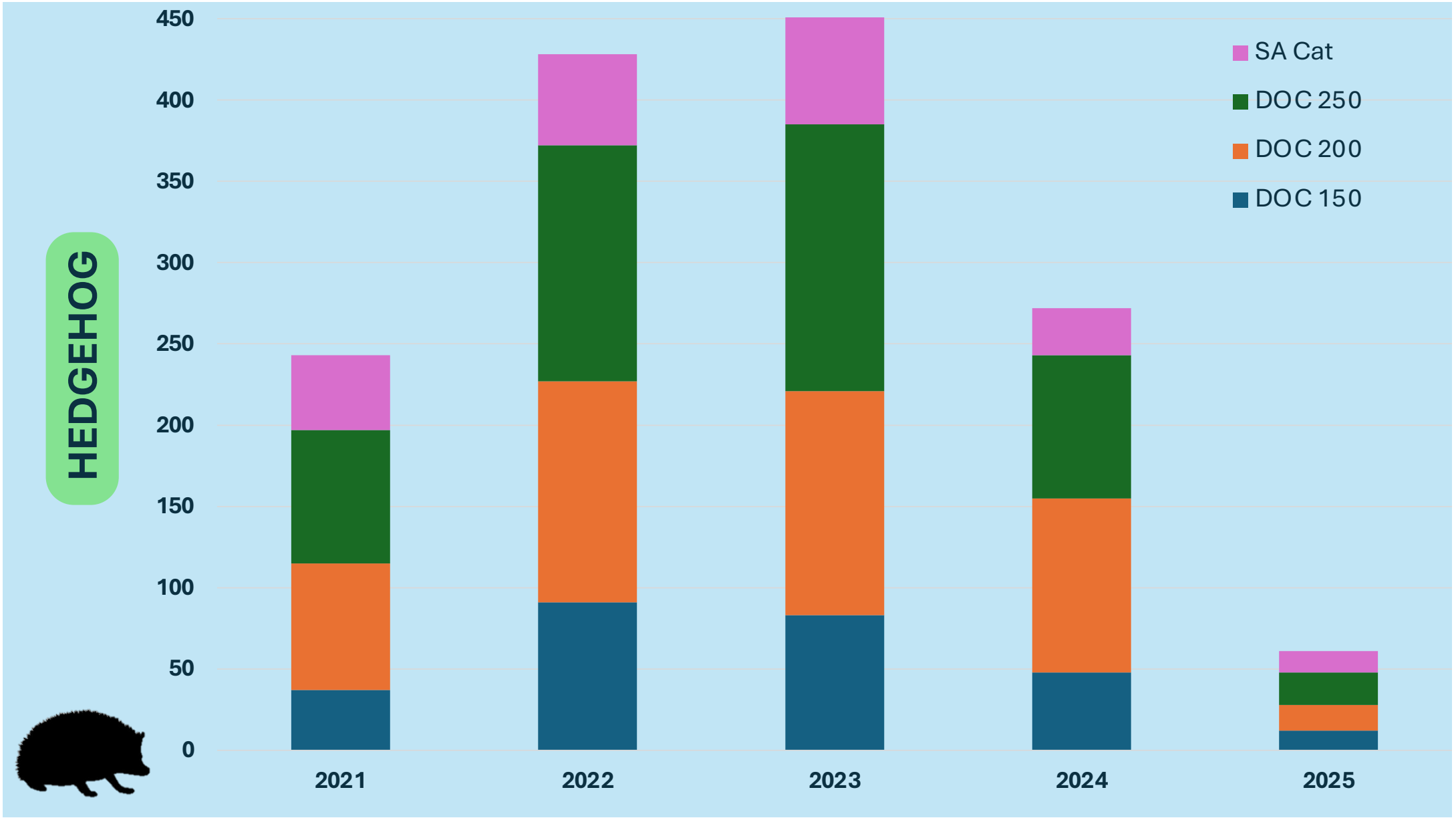
Toitū Te Whenua Land Information New Zealand

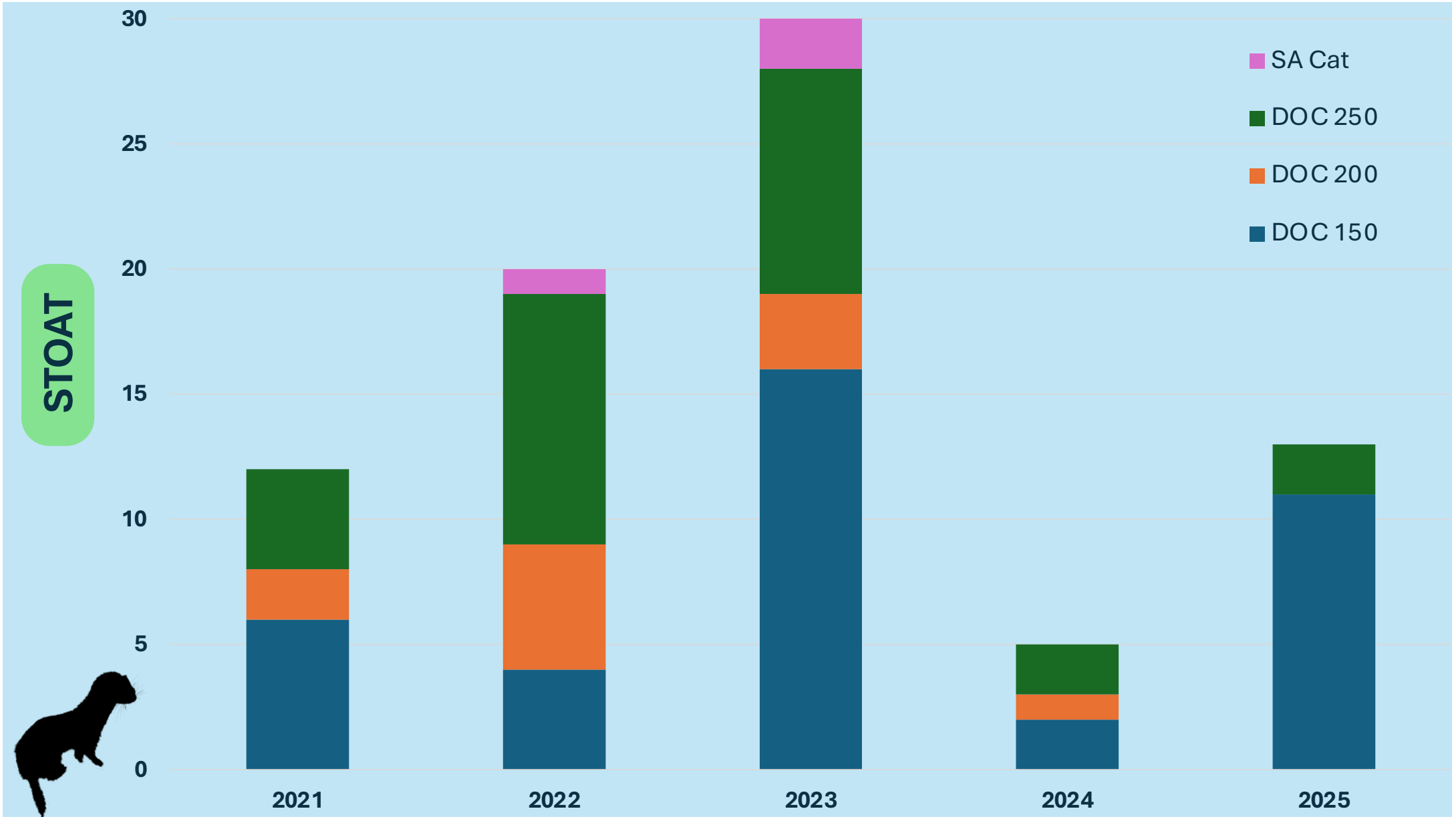
Questions

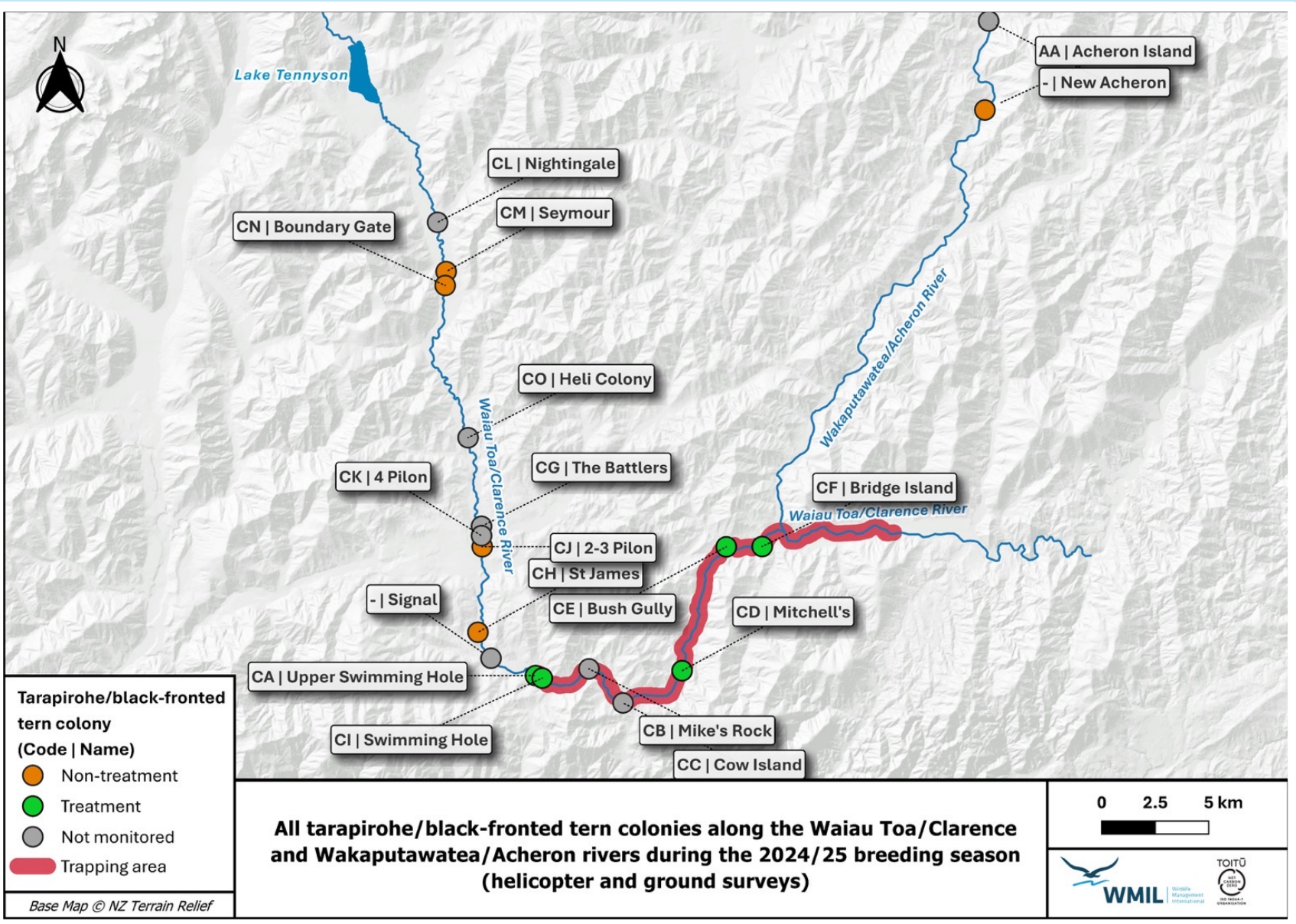
Further Info Slides

**These are here if discussions go further,
and if further questions are asked**


FERRET
14
12
10
8
6
4
2
SA Cat
DOC 250
DOC 200
DOC 150
2021
2022
2023
2024


HEDGEHOG
450
400
350
300
250
200
150
100
50
0
2021
2022
2023
2024
2025
SA Cat
DOC 250
DOC 200
DOC 150


STOAT
30
25
20
15
10
5
0
2021
2022
2023
2024
2025
SA Cat
DOC 250
DOC 200
DOC 150

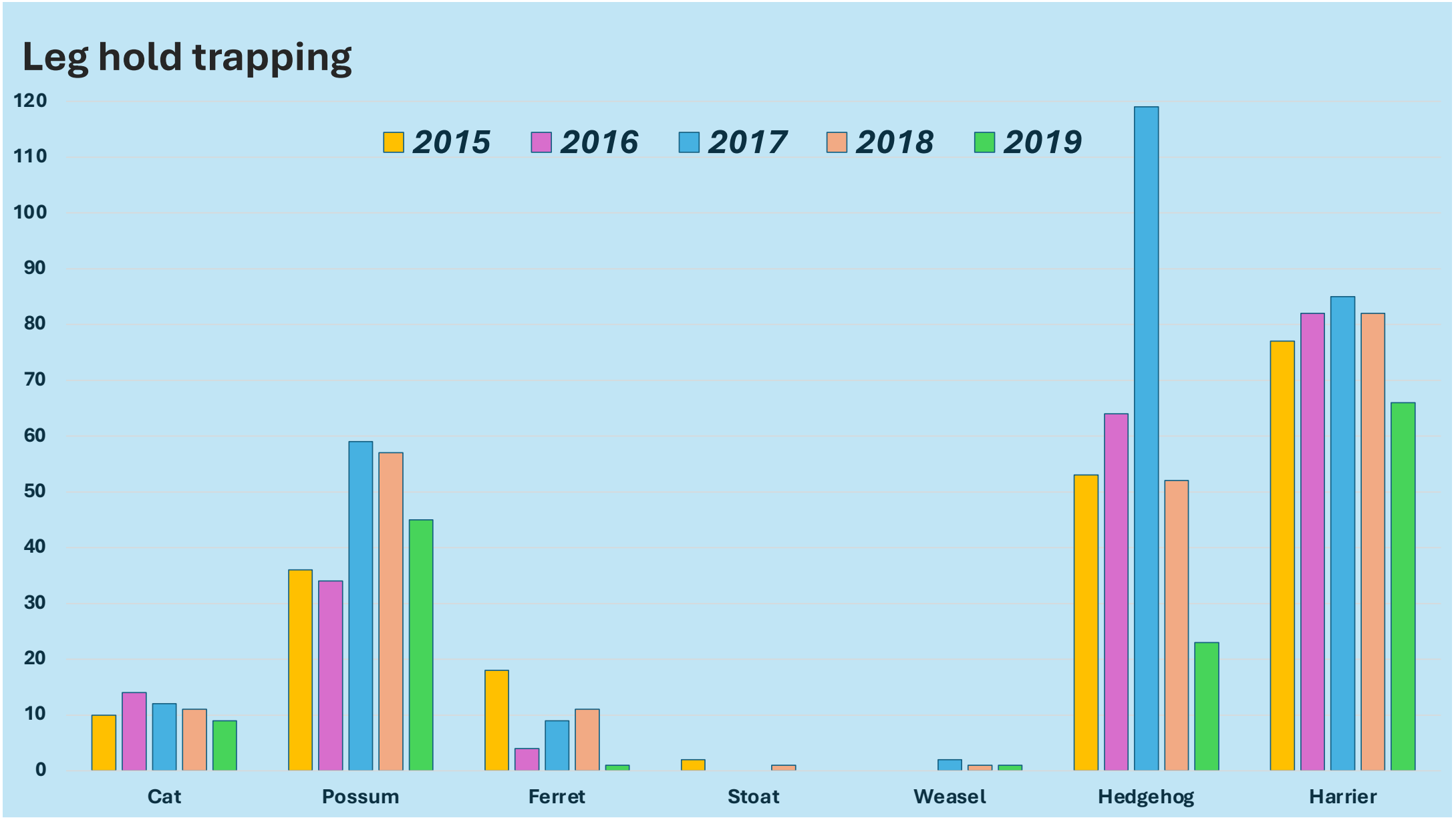

N
Lake Tennyson
AA | Acheron Island
- | New Acheron
CL | Nightingale
CM | Seymour
CN | Boundary Gate
Wakaputawatea/Acheron River
CO | Heli Colony
Waiau Toa/Clarence River
CK | 4 Pilon
CG | The Battlers
CF | Bridge Island
Waiau Toa/Clarence River
CJ | 2-3 Pilon
CH | St James
- | Signal
CE | Bush Gully
CD | Mitchell's
CA | Upper Swimming Hole
CI | Swimming Hole
CB | Mike's Rock
CC | Cow Island
Tarapirohe/black-fronted tern colony (Code | Name)
Non-treatment
Treatment
Not monitored
Trapping area
Base Map © NZ Terrain Relief
All tarapirohe/black-fronted tern colonies along the Waiau Toa/Clarence and Wakaputawatea/Acheron rivers during the 2024/25 breeding season (helicopter and ground surveys)
0 2.5 5 km
WMIL
TOITŪ

Leg hold trapping

Two 10-day leg-hold trapping sessions each season from 2015-2019 seasons in Phase 1

90-100 No. 1.5 soft-catch Oneida Victor™ leg-hold traps were deployed in the vicinity of the three treatment tern colonies

Recommended for Phase 3


Leg hold trapping
2015
2016
2017
2018
2019
120
110
100
90
80
70
60
50
40
30
20
10
0
Cat
Possum
Ferret
Stoat
Weasel
Hedgehog
Harrier