A *tern* of events:

Outcomes from recent changes to management on Project River Recovery's *Tern Island*

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Tern island in the Upper Ōhau River, Mackenzie Basin

A nesting black-fronted tern. Photo: D. Nelson

What and where is *Tern Island*?

Tern Island: A gravel island surrounded by flowing water

2008: Hatching a plan…

Mammalian predators key cause of BFT nesting failure in Mackenzie Basin (Keedwell 2002, 2005)

Trapping: mixed results

(Sanders & Wells 1999; Sanders & Brown 2000, 2001; Keedwell & Sanders 2002; Leseberg et al. 2003; Anderson et al. 2006, 2007 & others)

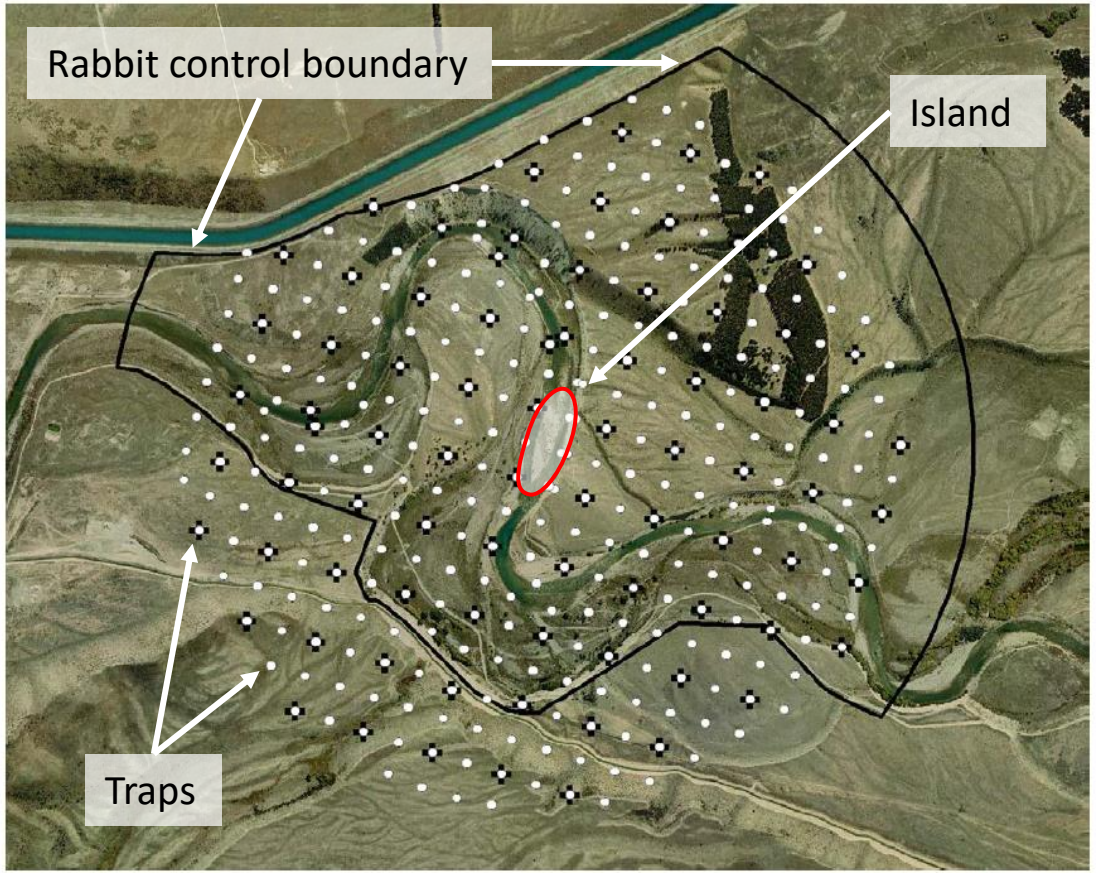
Islands: good results vs. “mainland”

(Pierce 1987; Rebergen et al. 1998; McClellan 2008)

Anderson 2008, DOCDM-1387737

Photo: A Rebergen

Setting up *Tern Island*'s "ring of steel"



Mustelids, hedgehogs, rats (*white dots, 100m spacing*)

- 334 x DOC150s and DOC250s

Cats (*black crosses, 200m spacing*)

- 84 x Belisle 220 Super X, modified Timms, Steve Allan double-spring conibear

Rabbits (*black line*)

- Monthly night shooting
- Pindone toxin operation

The target for success is a black-fronted tern fledging-success rate equal to or better than the best previously recorded for this colony, and achieved consistently over three consecutive seasons.

Anderson 2008, DOCDM-1387737

2010-2015: **Fledgling** success

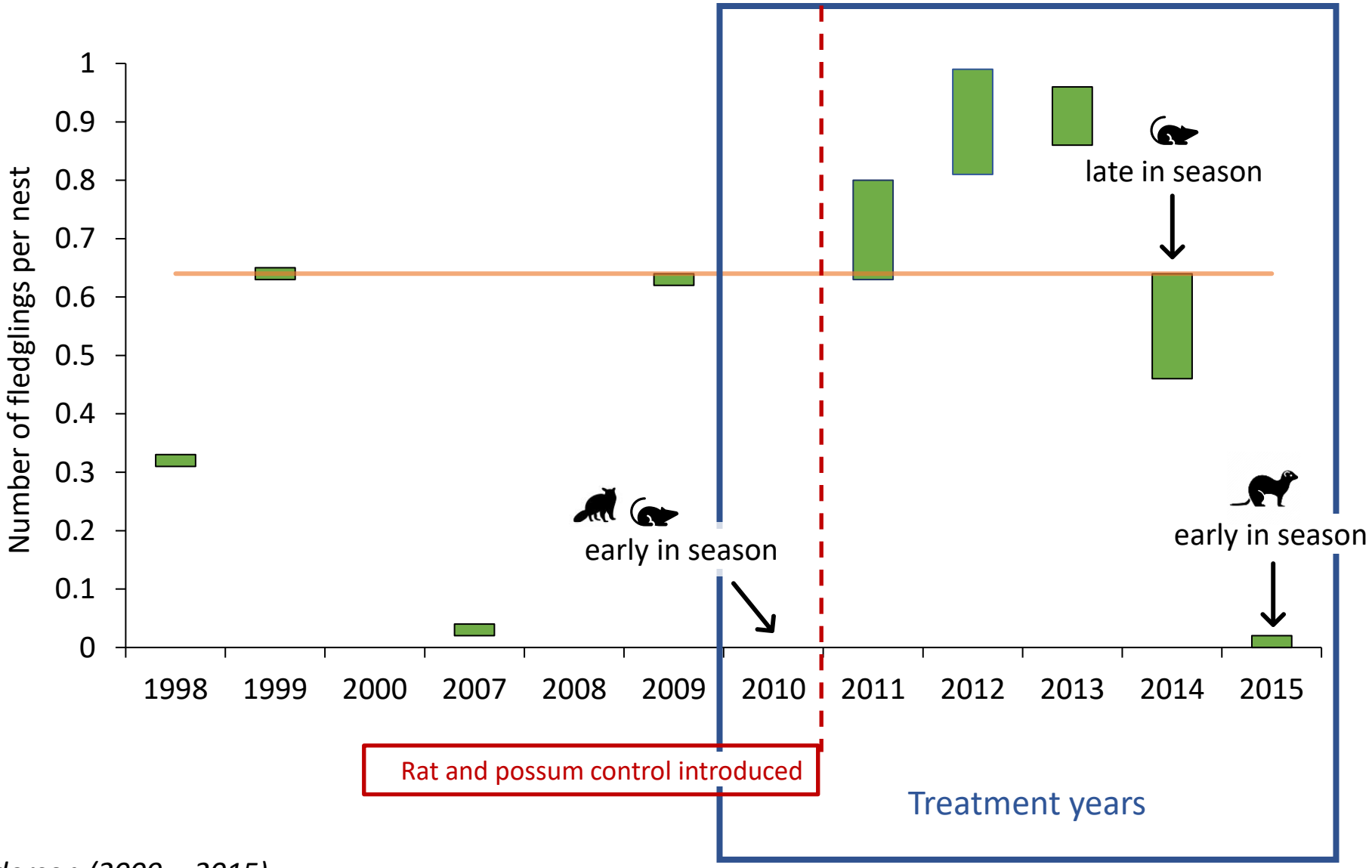


Photo: S. Gale

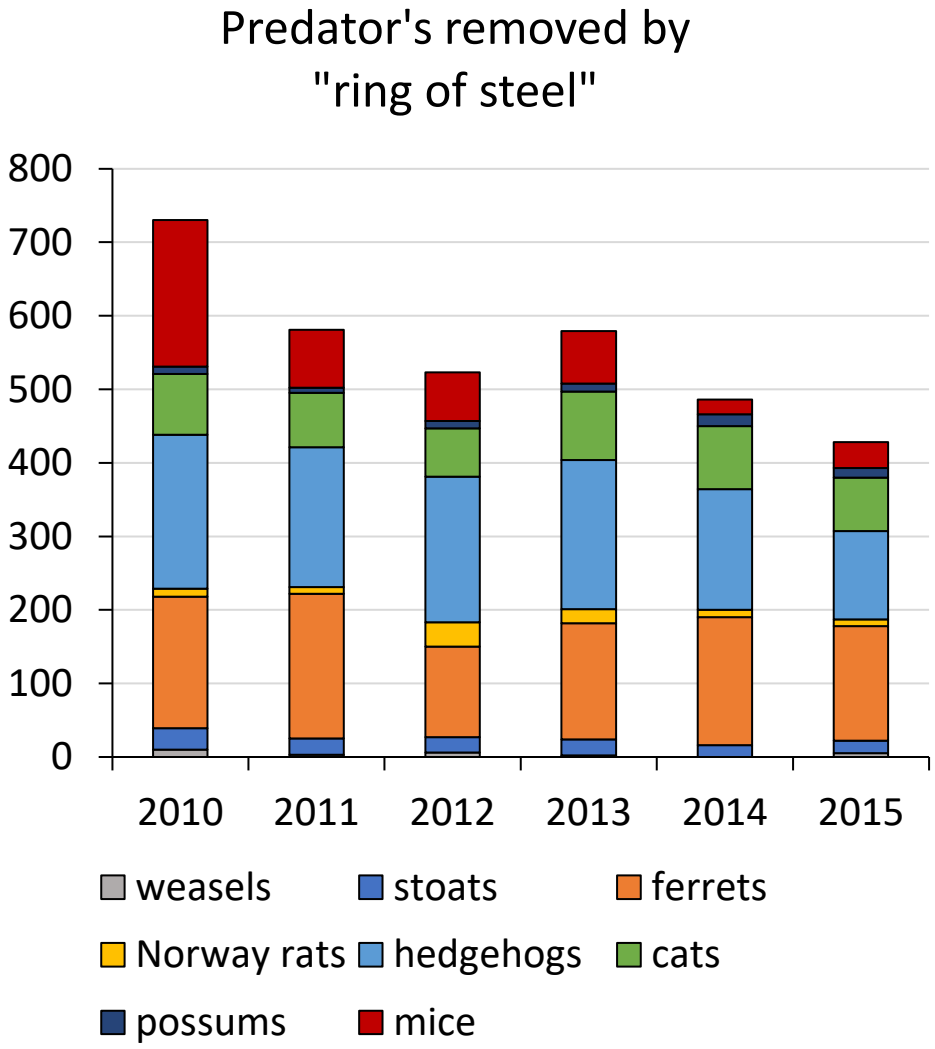
estimated fledgling success

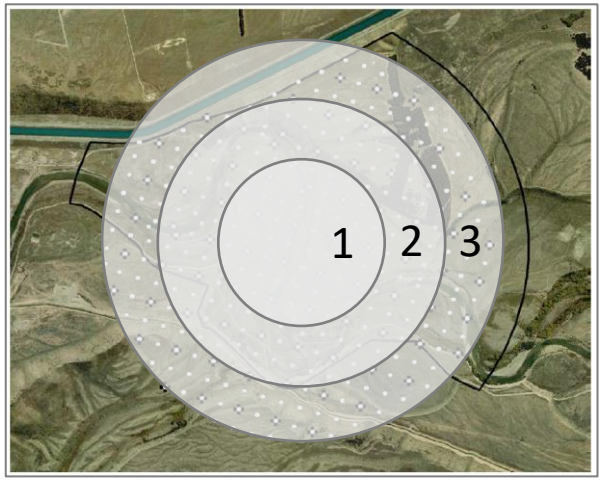
historic max rate

Fledgling success ≥ best historic rate for 3 consecutive years

Anderson (2009 – 2015)

Predators removed by the “ring of steel”





- **Hedgehogs**, **ferrets**, **cats**: 3 > 2 > 1
- **Rats**: 3 = 2 = 1

- **Stoats, rats**: closer to river
- **Ferrets, hedgehogs**: further from river
- **Cats**: no difference in distance from river

Anderson (2009 – 2015), Haultain (2017) and Watts (unpublished data)

Photo: D. Nelson

What did we learn?

With a 1km predator control radius + rabbit control, we achieved:

- Good **hatching** success (>85%) on island in 4/6 years
- Good **fledgling** success (≥ best historic rate) for 3 consecutive years

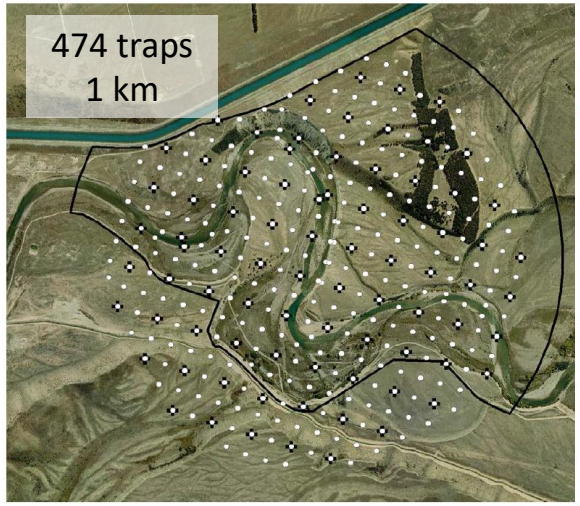
But,

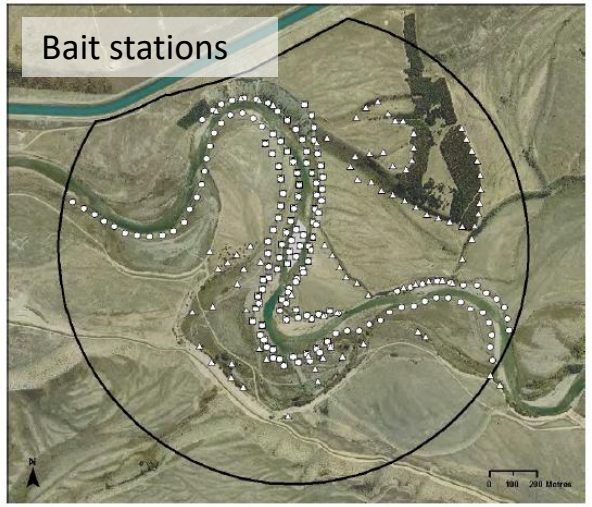
- Expensive
- High effort
- Difficult to transfer to other black-fronted tern colony sites

Can we get similar results for less cost/effort?

2016 onwards: a change in the design

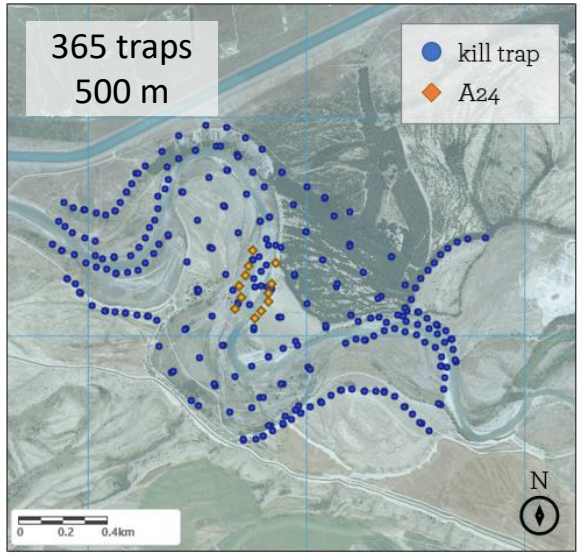
2009 - 2015

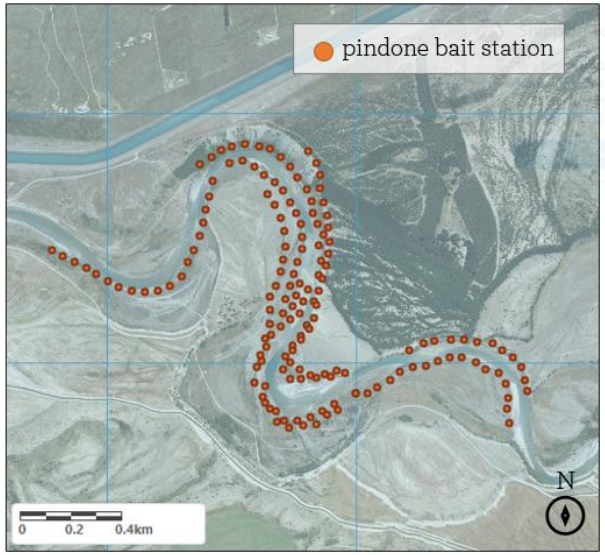




- Weekly/fortnightly checks
- Rabbit shooting & poison operation
- 158 x **rat** bait stations
- 183 x **possum** bait stations

2016 - present





- Weekly/monthly check
- 12 x A24 traps added
- **No rabbit control**
  - 2017 no shooting
  - No poison operation
- 158 x **rat** bait stations (*Pindone*)
- **No possum** bait stations

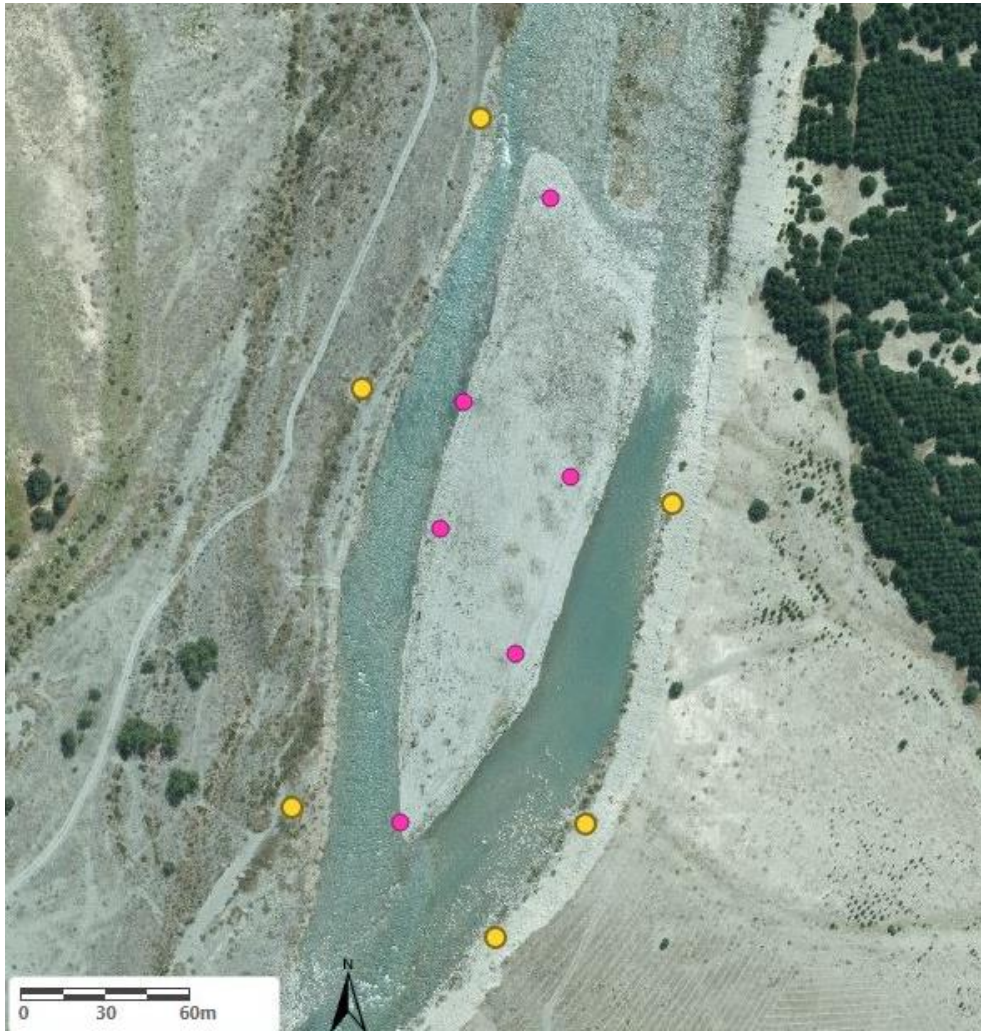
Reactionary stance: **detect** then respond

Aim: to sustain a *stable or increasing* adult population of black-fronted terns

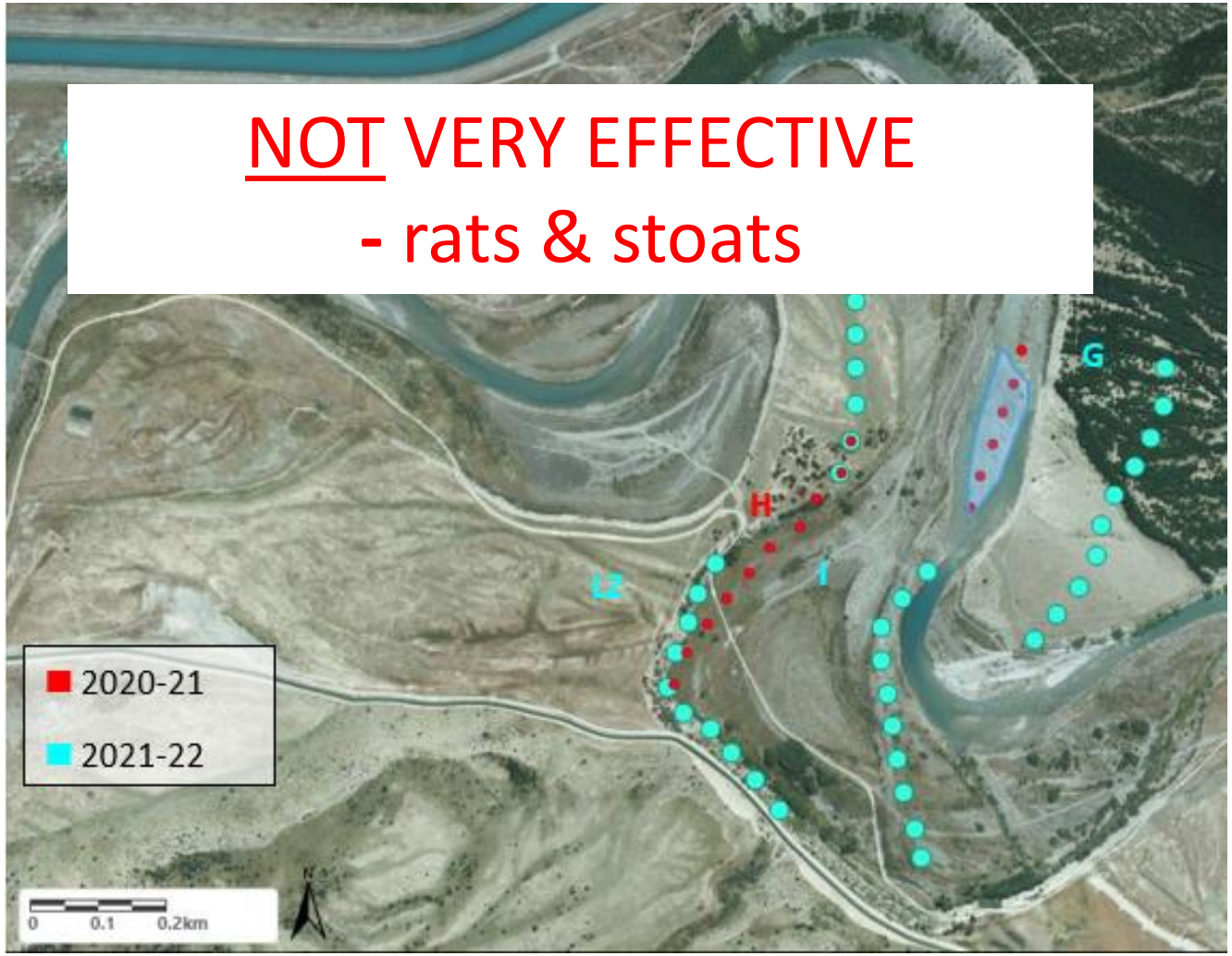
- Stoats & cats - main predators of **adult BFT**
- Other pest incursion = case by case

Reactionary stance: detect - **methods**

- Trail Cameras - each year



- Tracking Tunnels: 2 designs



Reactionary stance: detect then **respond**

ACTIONS:

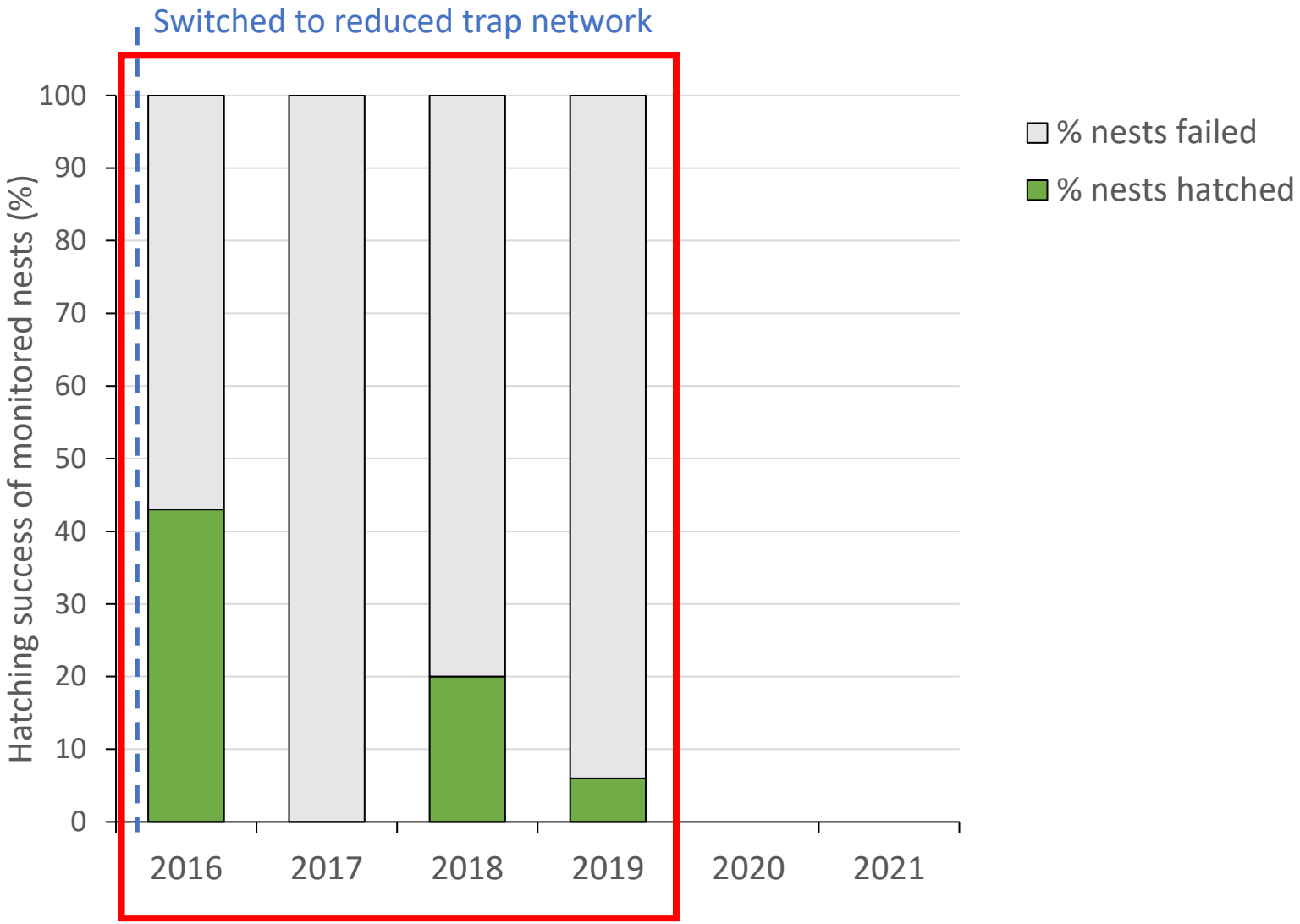
1. Direct observation → call hunter

2. Indirect detection → increased detection device/ methods & trap checks

2016-2019: **Hatching** success

Initial results

- Hatching success - low
- Fledging success - **zero**
- Colony - mass abandonment



Preventative stance: **prevent** predator incursion

Reduced trap network
+
Reactionary stance

➔

Response: **not quick enough** to make a difference

Target species - can access island

- Stoats
- Rats - 21 % nest failure in 2014
- Cats
- Avian predators
  - Black backed gulls (Schlesselmann et al., 2018)
  - Swamp harrier <5%

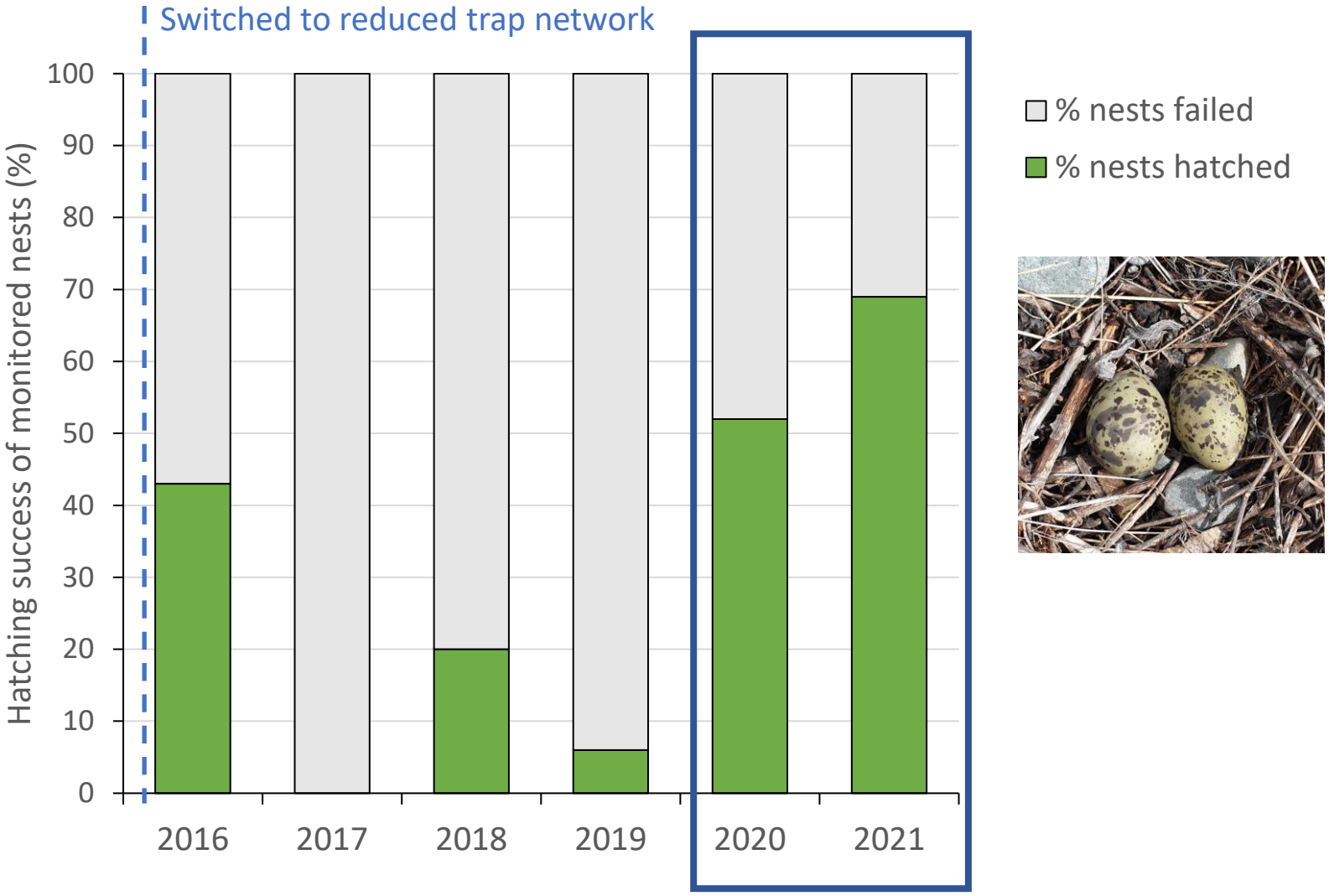
Preventative stance:
Methods

- Dog (rodent & mustelid)
  - detection & destruction
- Cat control – spotlighting
- Avian predator - shooting
- Additional traps

2016-2021: **Hatching** success

Last 2 seasons

- Hatching success: 50-70%
- Fledging success: chicks fledged
- Colony: 330 – 520 adults



2021-2022

- 423 nests monitored – 70% known outcomes
- Hatching success: 69%
- Chicks fledged!!!
- 522 = Largest colony since 2016

  + 50 first years seen

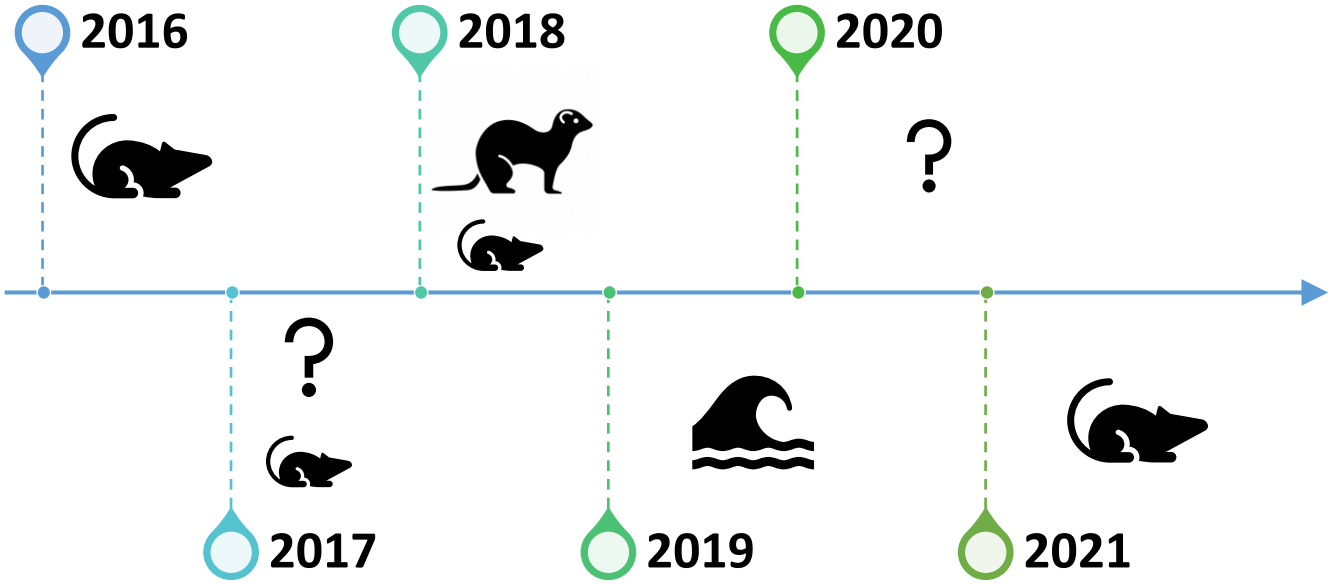
Note – higher monitoring effort this year

2016-2021: Causes of Nest Failure

Predator incursions, mostly rats & stoats

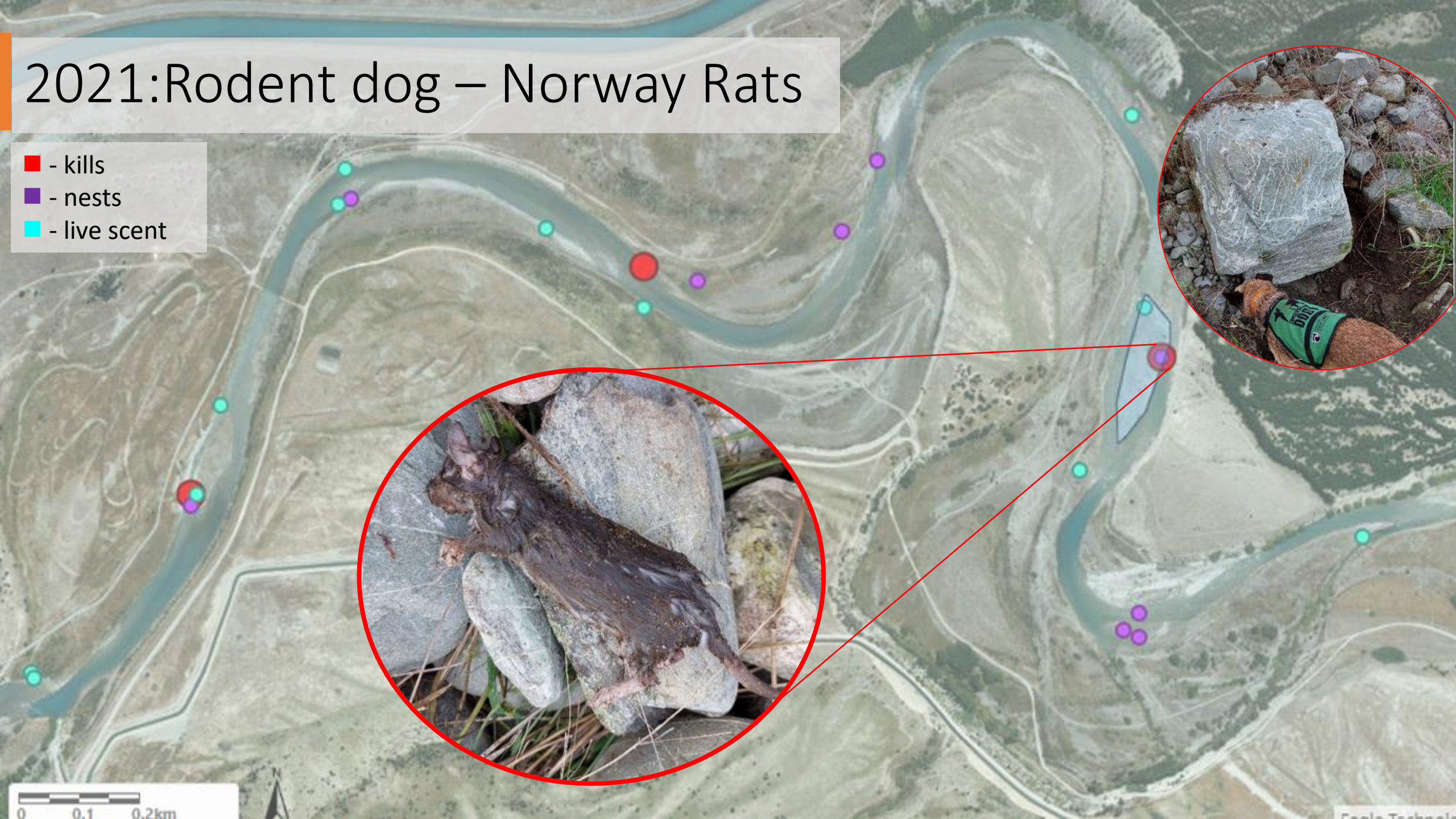
Flooding

? Abandoned

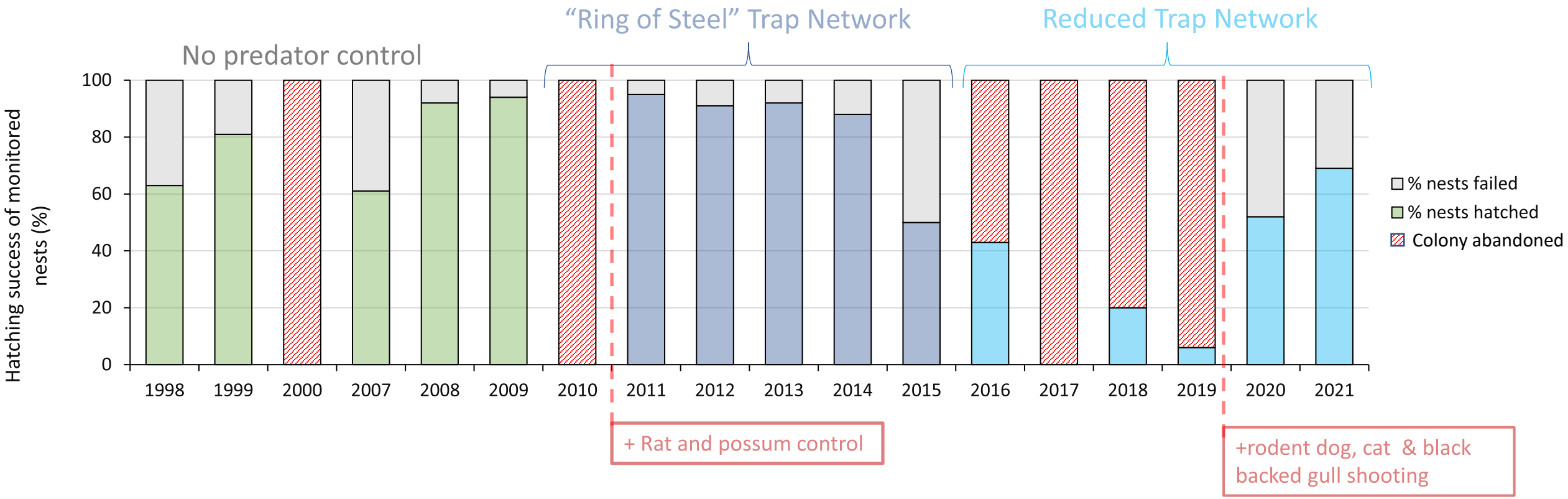


2021:Rodent dog – Norway Rats

- kills
- nests
- live scent



How does recent hatching success compare to before?



			Reactionary	Preventative:
Chicks fledged (yrs):	2 out of 6	4 out of 6	0 out of 4	2 out of 2
Colony Size:	130	700	XXX	520

Does a reduced trap network work?

Trapping + reactionary stance → chicks fledged: 0 / 4 years

- Trap network + bait stations + island = still not enough

Trapping + **preventative** stance → chicks fledged: **2 / 2** years

BUT… rats still accessed the island - late season

Tern Island Challenges:

Complex situation - hard to prevent incursion

- 1 x Predator ➔ potential colony failure
- Incursion timing & abandonment – early vs late
- Mesopredator release
- No rabbit control – taking space in traps, food for stoats

Future direction

- New technology/tools
  - Prevent incursion
    - new trap types, lures, dogs
  - Reduce response time
    - cellular cameras
- Other Toxins
  - Pindone – change?
  - E.g., Papp (stoats)

GPS study - implications

- Where do they go?
- Threats in these areas?
- Food sources – travel effort
- If Tern Island fails
  - do they nest somewhere else?

Thank you for listening!

Thank you to all the rangers, advisors, scientists and contractors, past and present, who have contributed to *Tern Island* and made this presentation possible.