

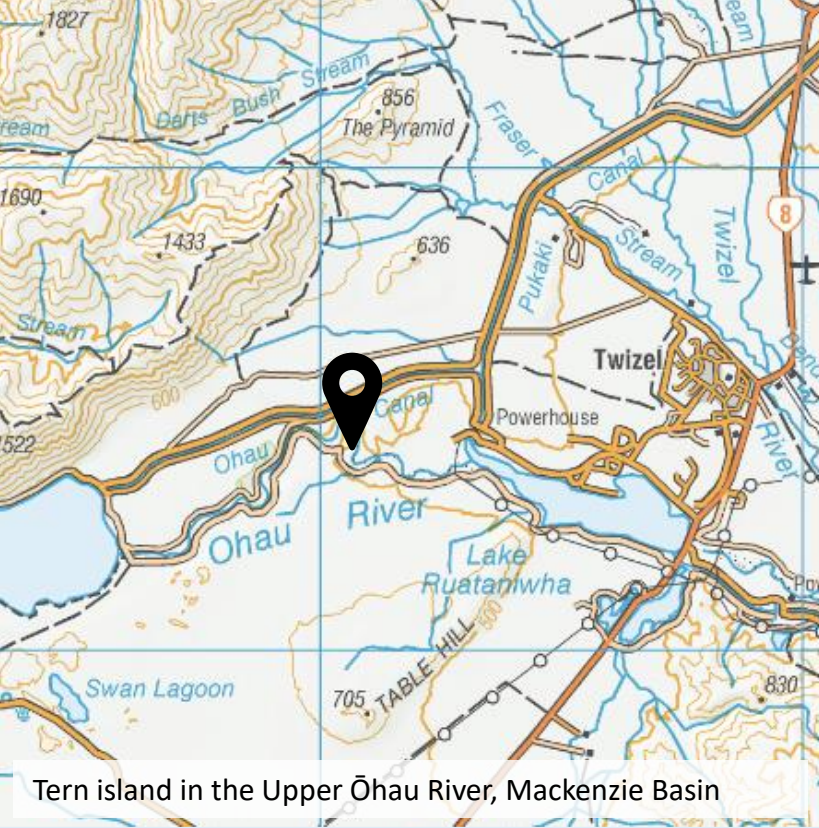
A photograph of a tern in flight over a rocky island. The tern has white wings, a black cap, and an orange beak. It is flying towards the left. The background shows a blue sky with light clouds and a rocky landscape with some green grass. The text is overlaid on the right side of the image.

# *A tern of events:*

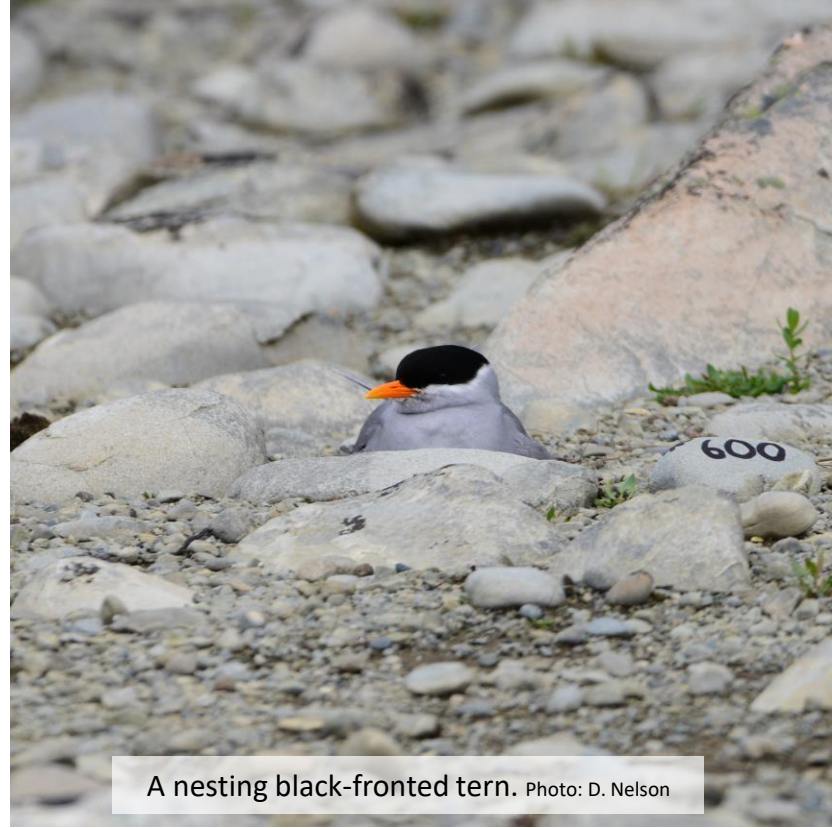
Outcomes from recent changes to management  
on Project River Recovery's *Tern Island*

Samantha Turner, Tom Goodman & Jennifer Schori

Department of Conservation, Twizel



Tern island in the Upper Ōhau River, Mackenzie Basin



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

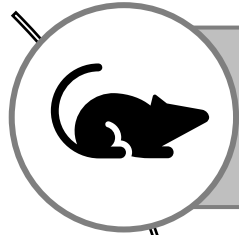


Weir upstream by Lake Ōhau

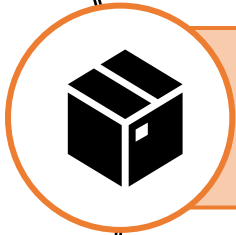
Tern Island: A gravel island surrounded by flowing water (8-12 cumecs)

What and where is *Tern Island*?

# Hatching a plan...

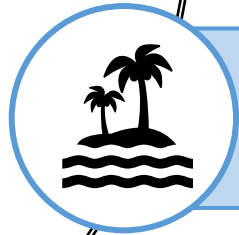


**Mammalian predators** key cause of BFT nesting failure in Mackenzie Basin (Keedwell 2002, 2005)



**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

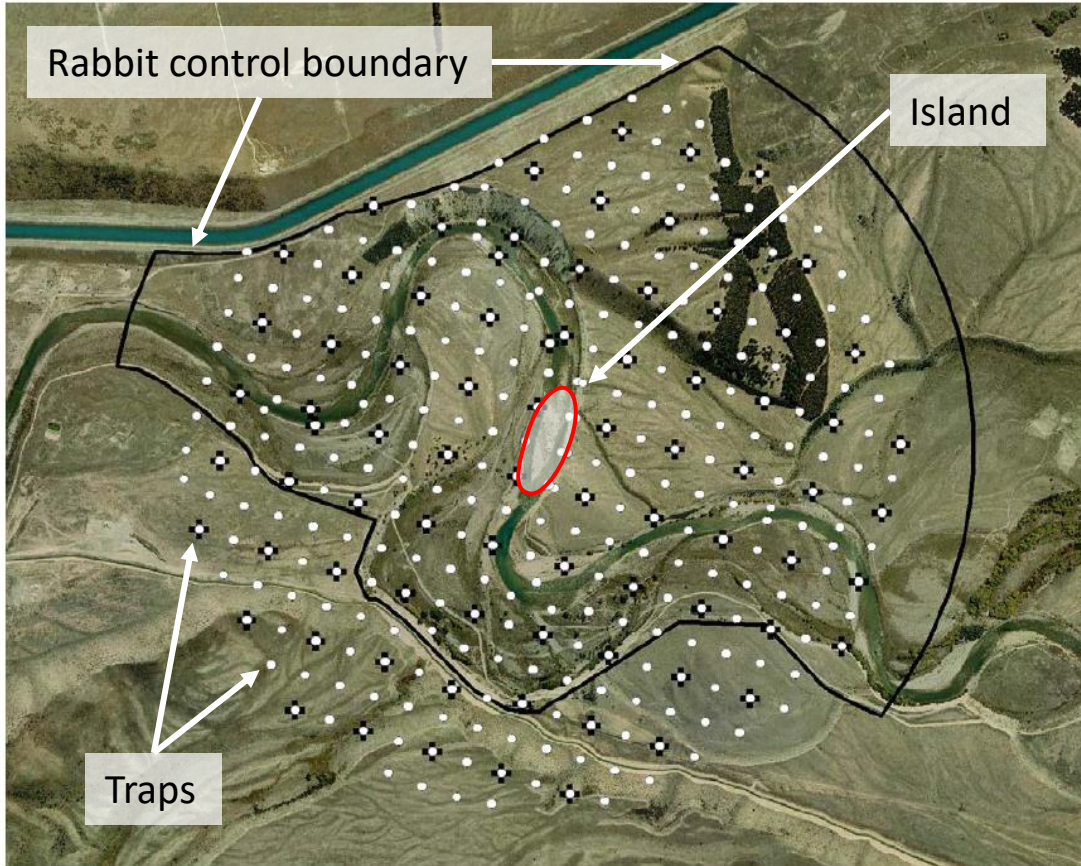
(Pierce 1987; Rebergen et al. 1998; McClellan 2008)

# Hatching a plan...

## Goal:

**"...a black-fronted tern fledgling-success rate equal to or better than the best previously recorded for this colony and achieved consistently over three consecutive seasons."**

# *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

# Historic Fledgling success



Photo: S. Gale

-  estimated fledgling success
-  historic max rate

# 2010-2015: Fledgling success

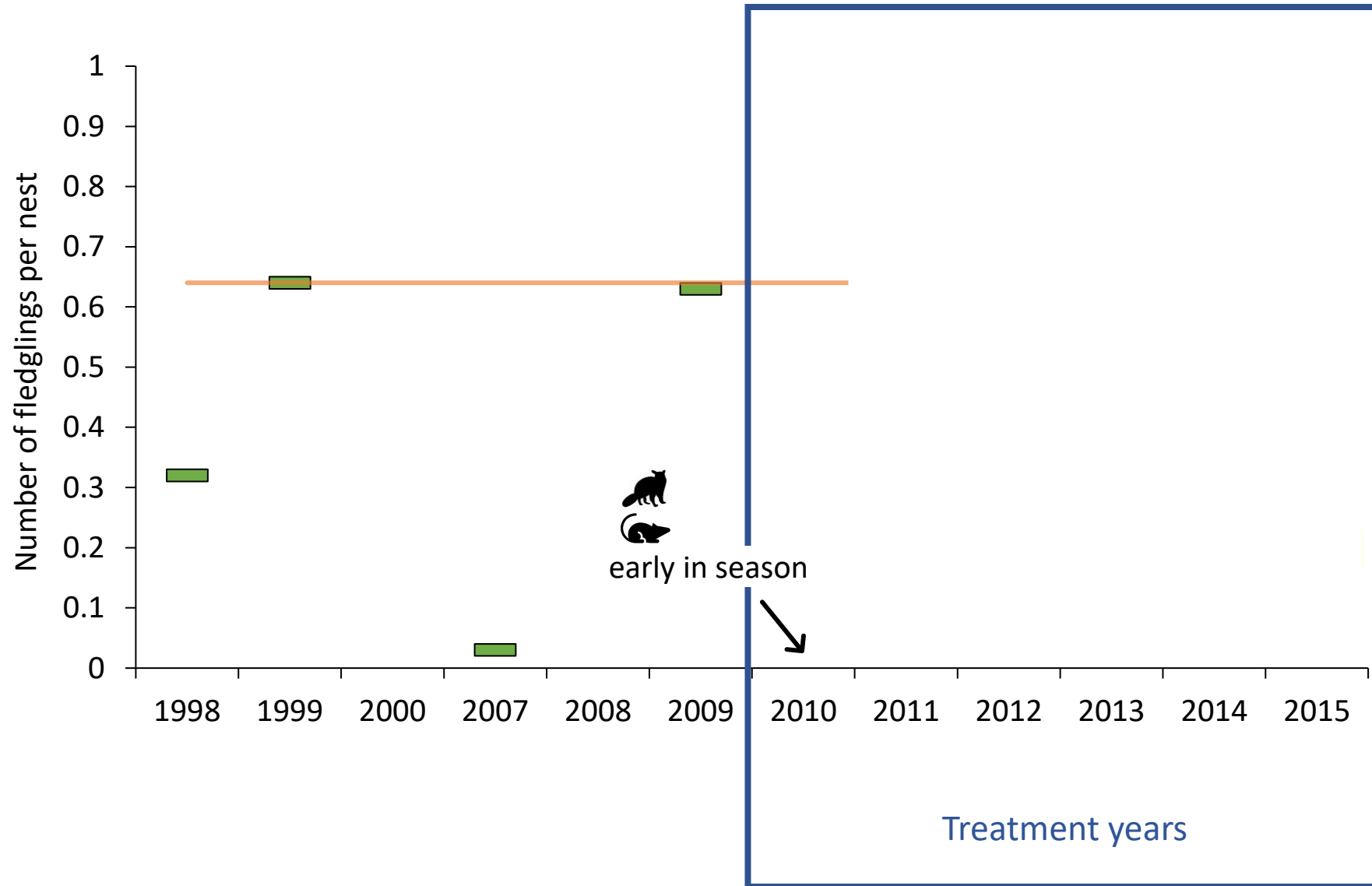


Photo: S. Gale

■ estimated fledgling success

— historic max rate

# 2010-2015: Fledgling success

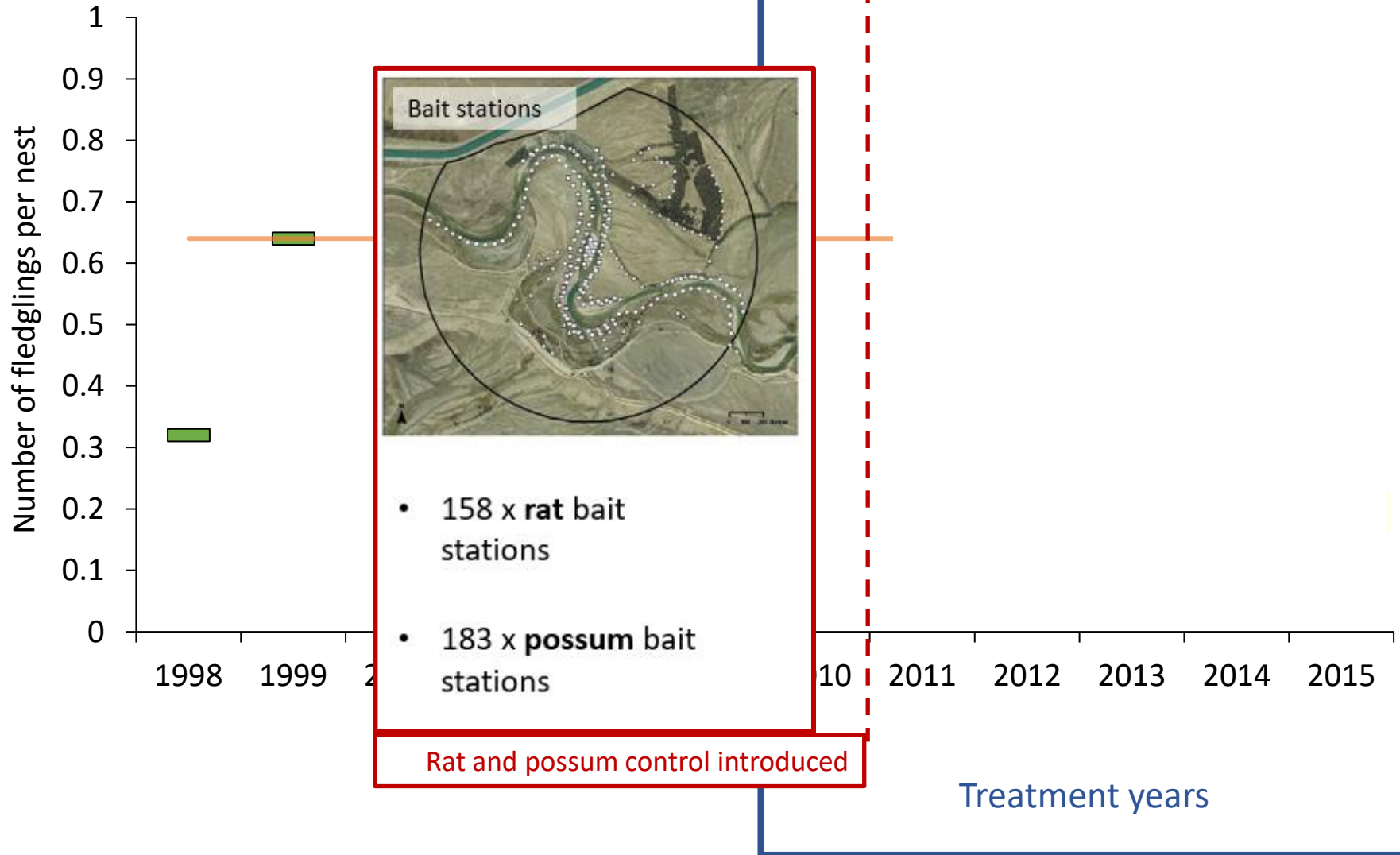


Photo: S. Gale



# 2010-2015: Fledgling success

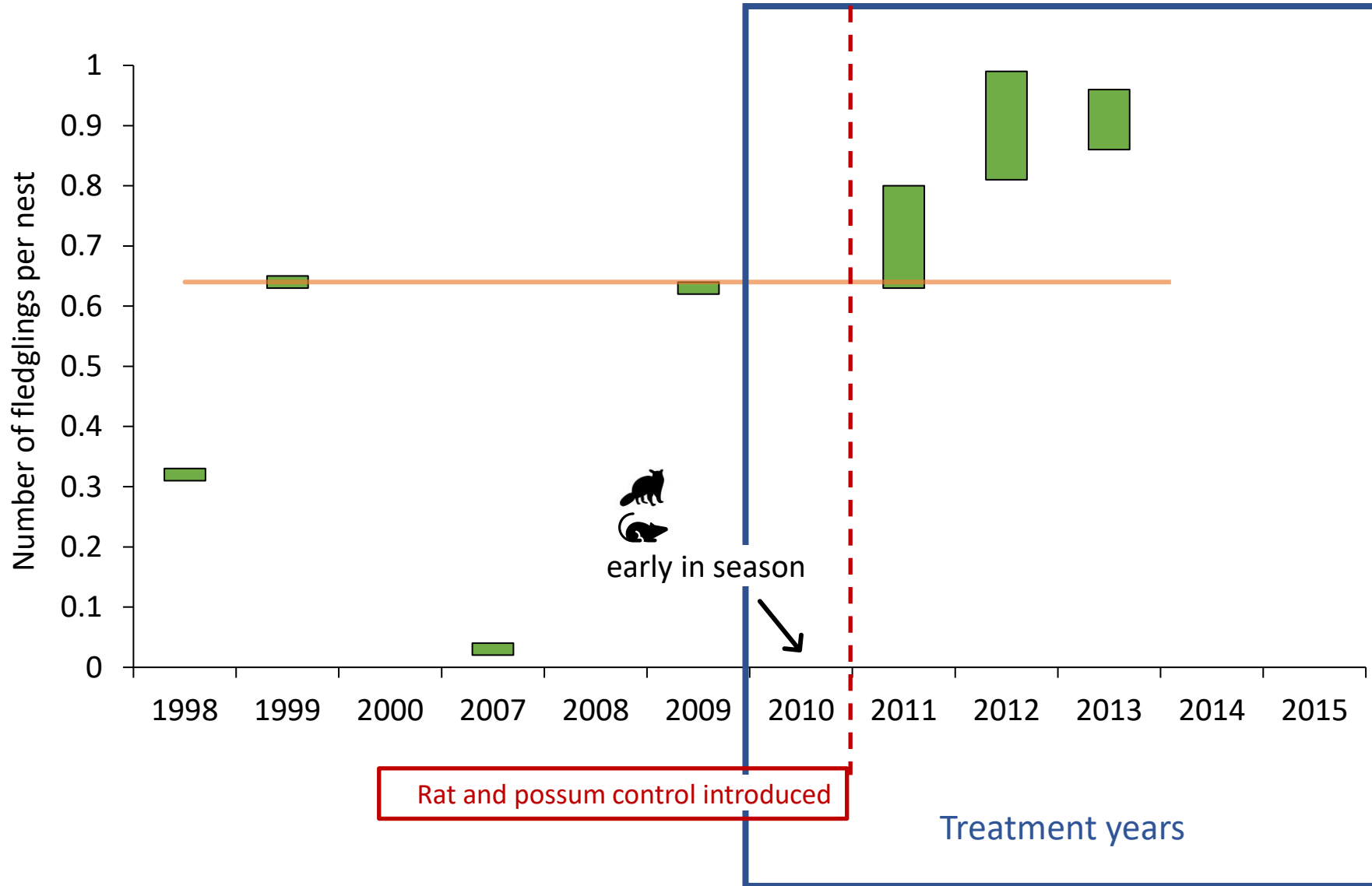


Photo: S. Gale

# 2010-2015: Fledgling success

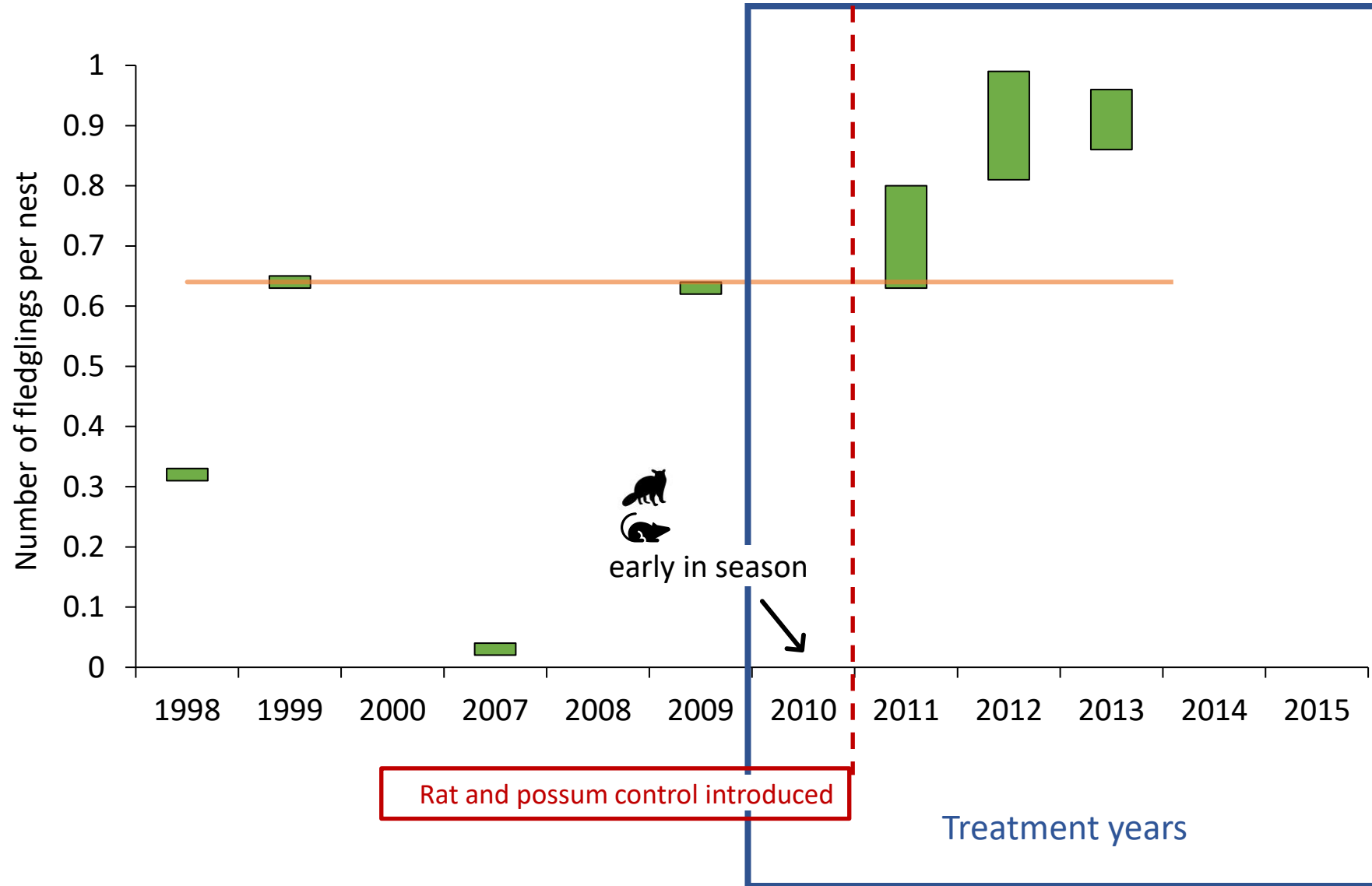


Photo: S. Gale

■ estimated fledgling success

— historic max rate

Fledgling success  $\geq$   
best historic rate for  
3 consecutive years

# 2010-2015: Fledgling success

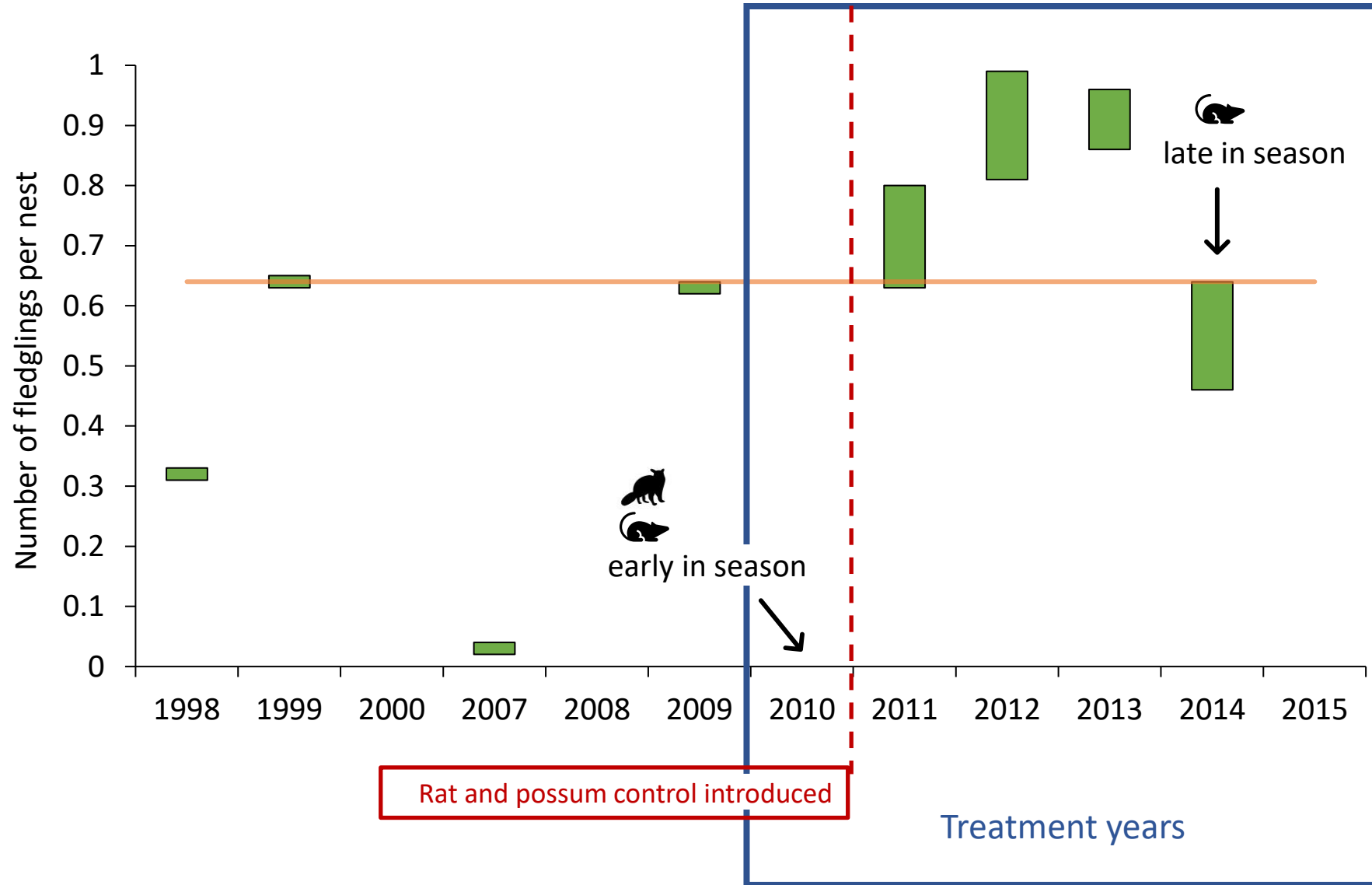




Photo: S. Gale

 estimated fledgling success

 historic max rate

Fledgling success  $\geq$   
best historic rate for  
3 consecutive years

# 2010-2015: Fledgling success

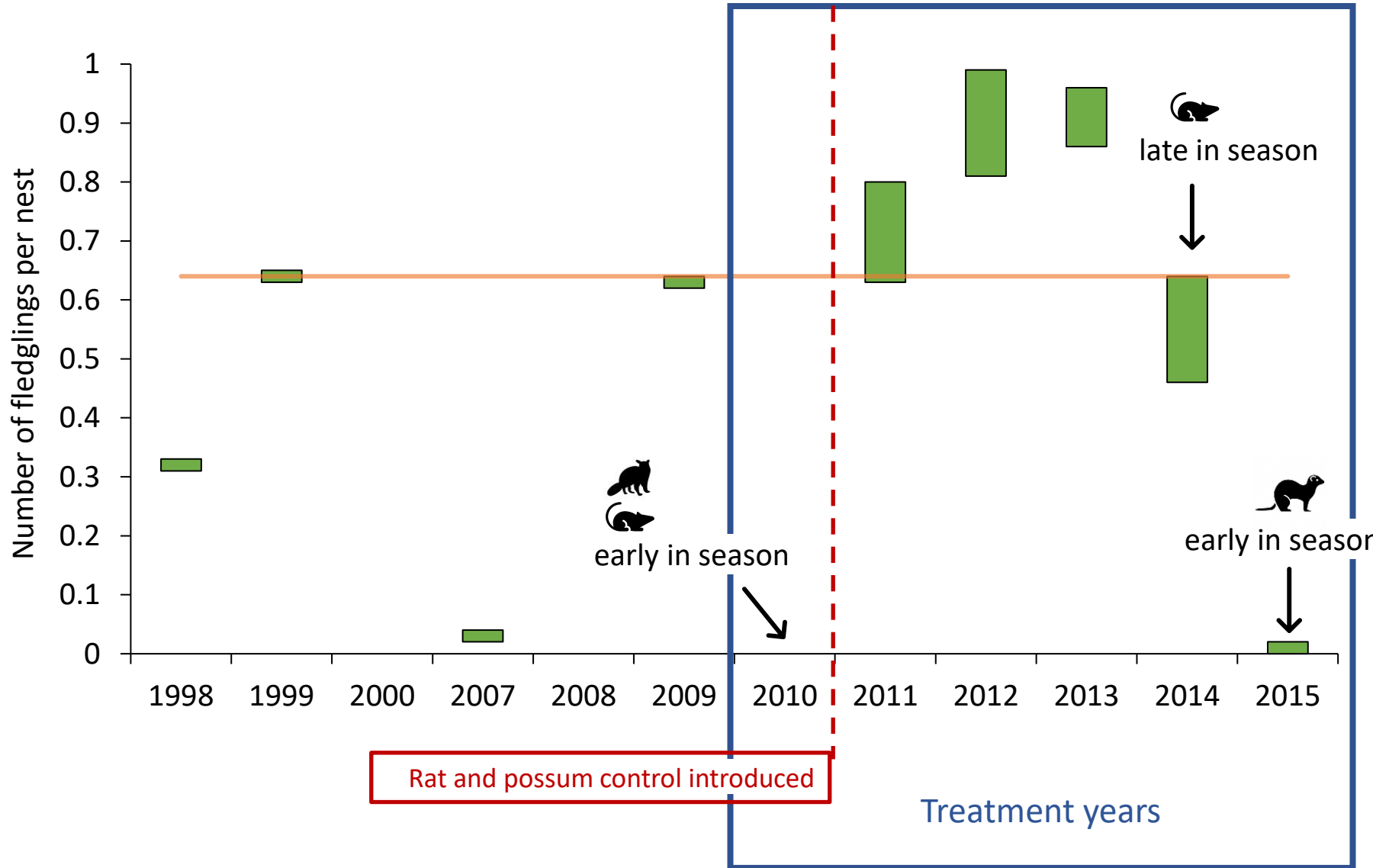


Photo: S. Gale

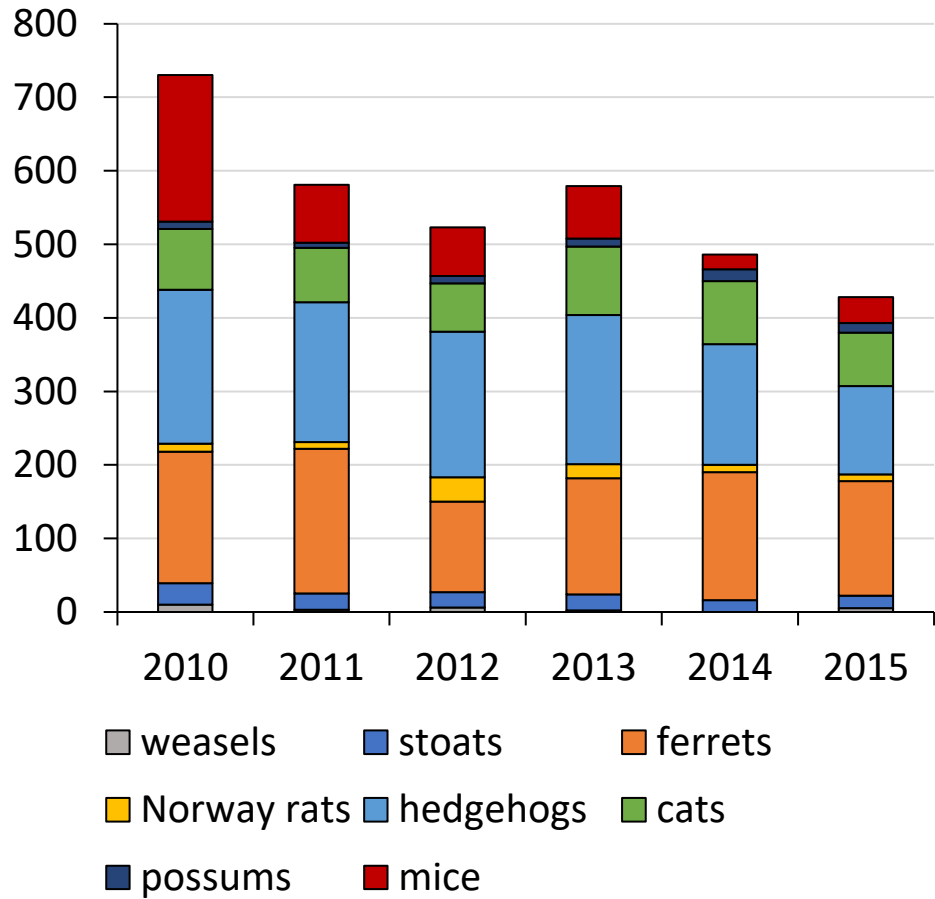
■ estimated fledgling success

— historic max rate

Fledgling success  $\geq$  best historic rate for 3 consecutive years

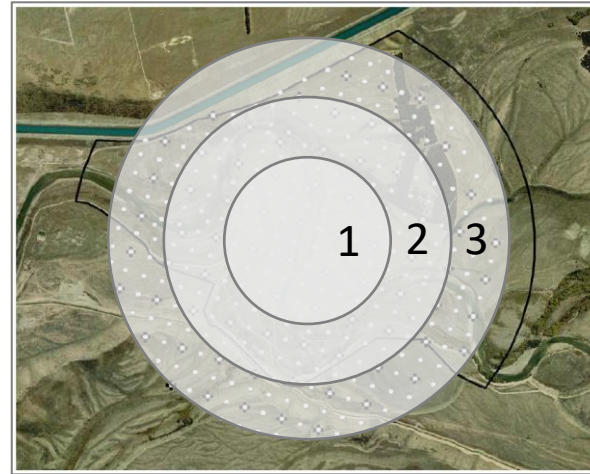
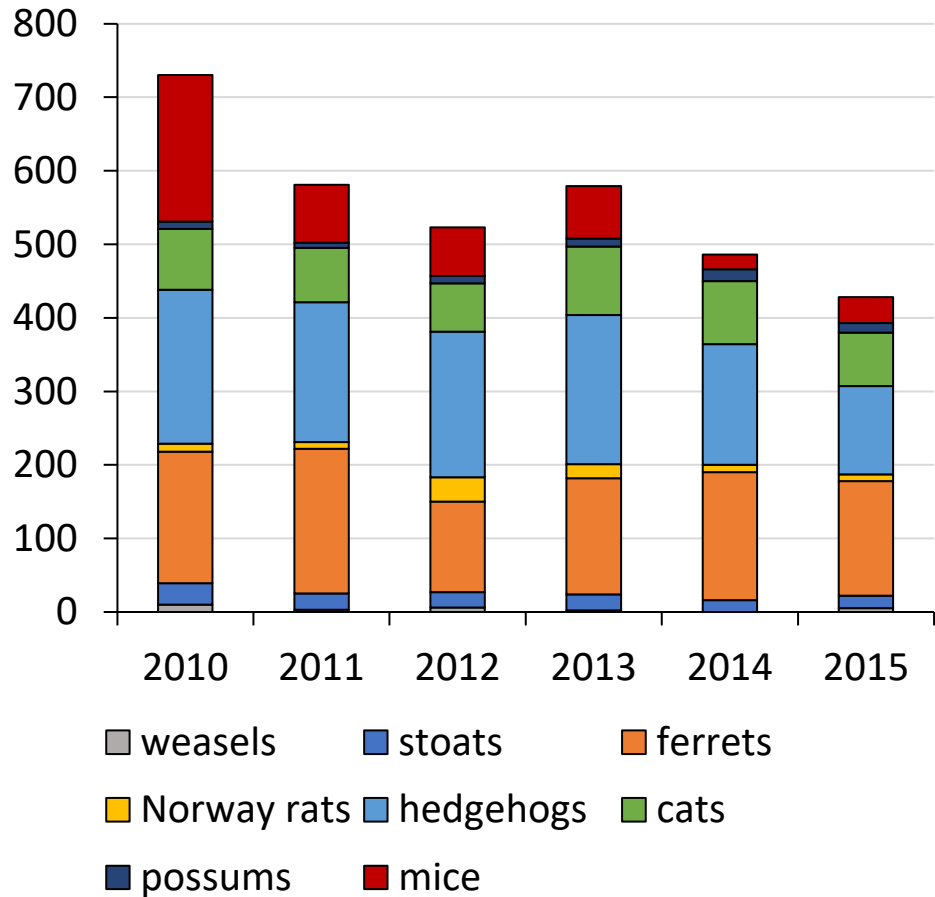
# Predators removed by the “ring of steel”

Predator's removed by  
"ring of steel"



# Predators removed by the “ring of steel”

Predator's removed by "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

# What did we learn?

With a 1km trapping radius and rabbit control:

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

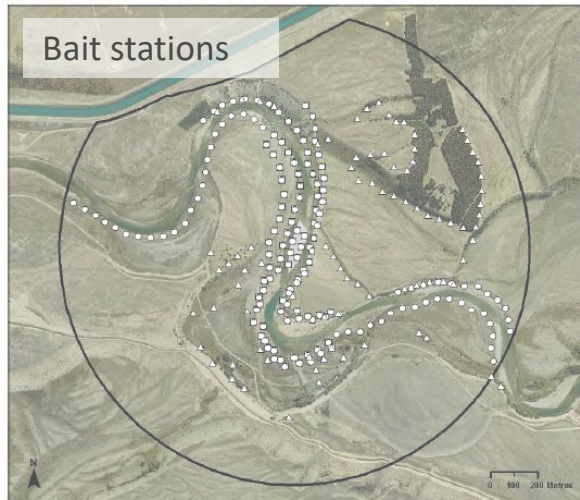
**BUT...**

- Expensive & high effort
- Difficult to transfer to other BFT colony sites

**Can we get similar results for  
less cost/effort?**

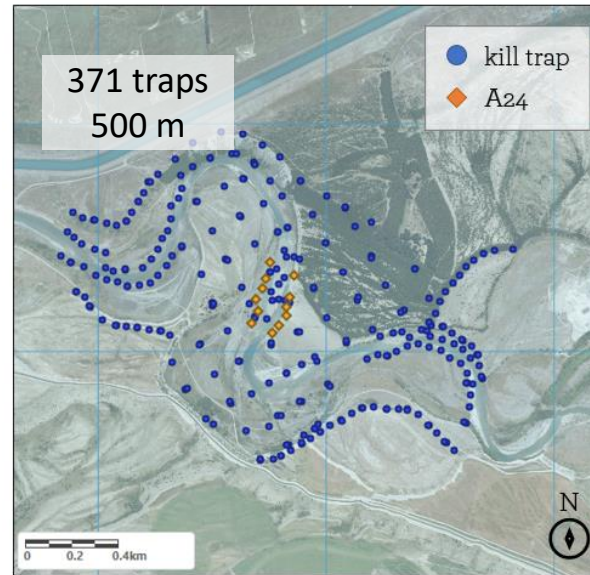
# 2016 onwards: reduced trapping network

2009 - 2015

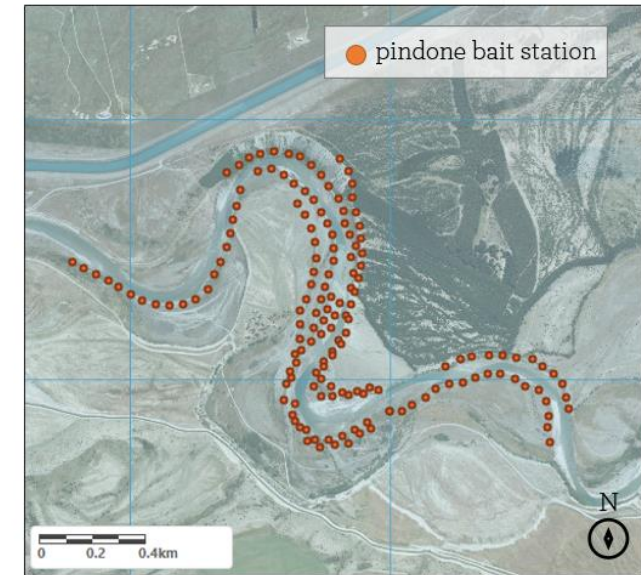


- Weekly/fortnightly checks
- Rabbit shooting & poison operation
- 158 x **rat** bait stations
- 183 x **possum** bait stations

2016 - present



- Weekly/monthly check
- **No rabbit control**
  - Discontinued in 2017
  - No shooting or poison operation



- 158 x **rat** bait stations (*Pindone*)
- **No possum** bait stations



# 2016: Reactionary stance

---

**Aim:** to sustain a *stable or increasing* adult BFT population

---

## ***Contingency Plan:***

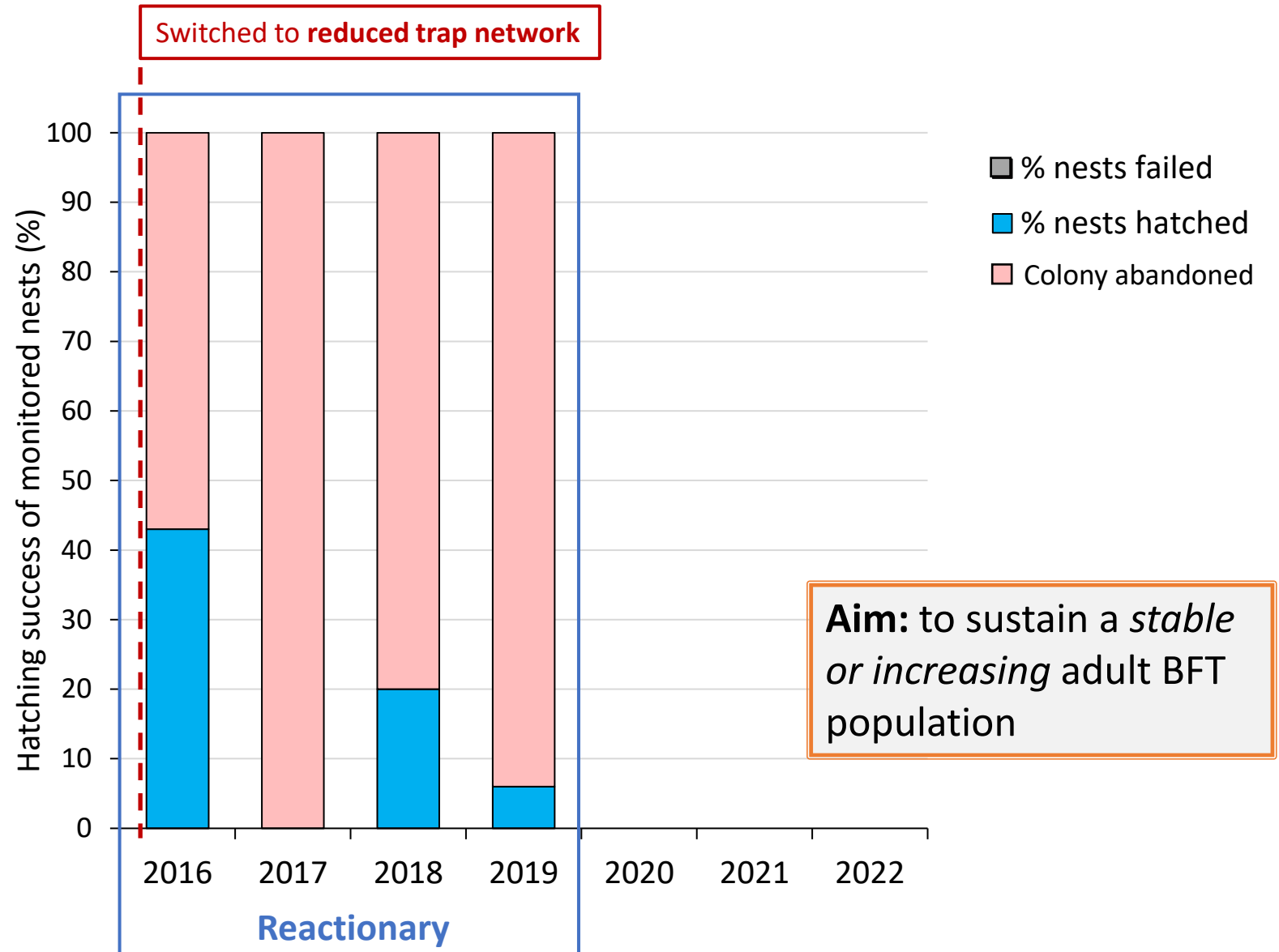
- a) Detect predators
- b) Respond – hunter/increase trap checks



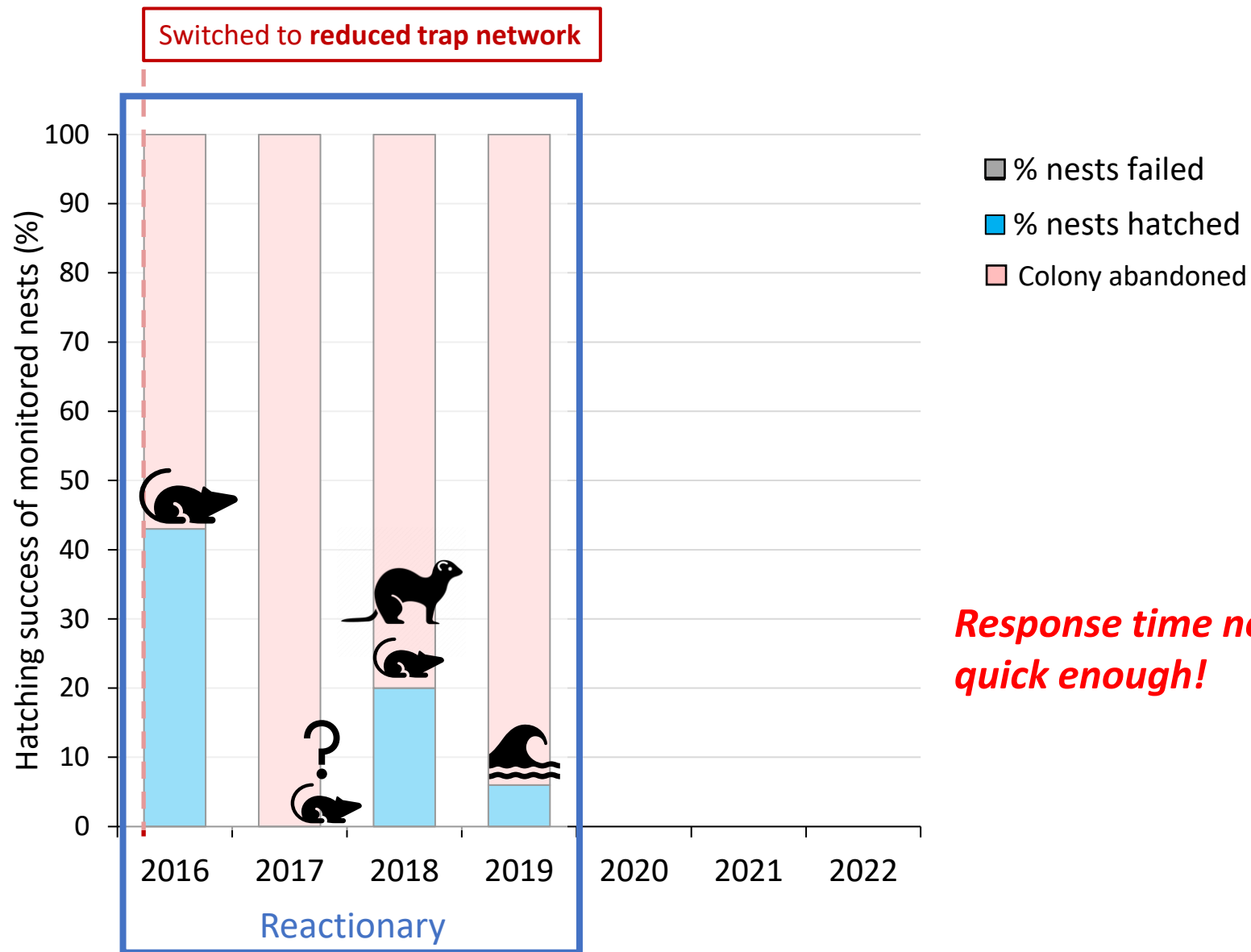
# 2016-2019: Hatching Success

Reduced network + reactionary stance:

- **Mass Abandonment** - 4 years
- Fledging success - **zero**



# 2016-2019: Causes of nest failure



# 2019-2022: Preventative stance

## ***Preseason: detections & control***

- Rodent & mustelid dogs
- Cat – spotlighting

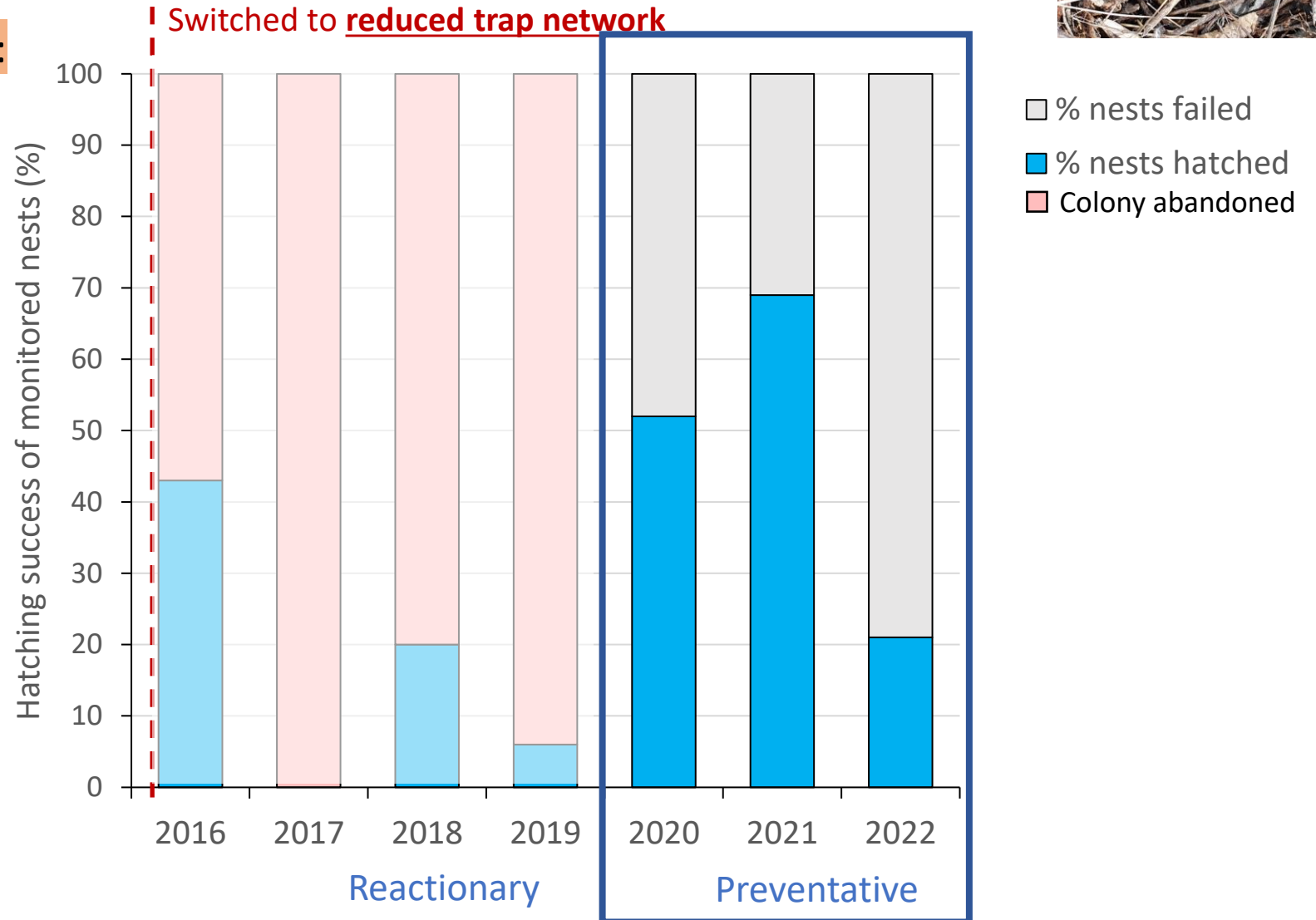
*Earlier action → prevent predator incursions on Tern island.*



# 2016-2022: Hatching success

## Reduced network + Preventative stance:

- Colony stuck around
- Fledging success
- Improved hatching success



# 2021-2022

*Most successful season since 2016*

- 400+ nests
- Colony ~ 520



Terns moved to upper terrace *after predator incursion*

Note – higher monitoring effort this year + earlier dog visits

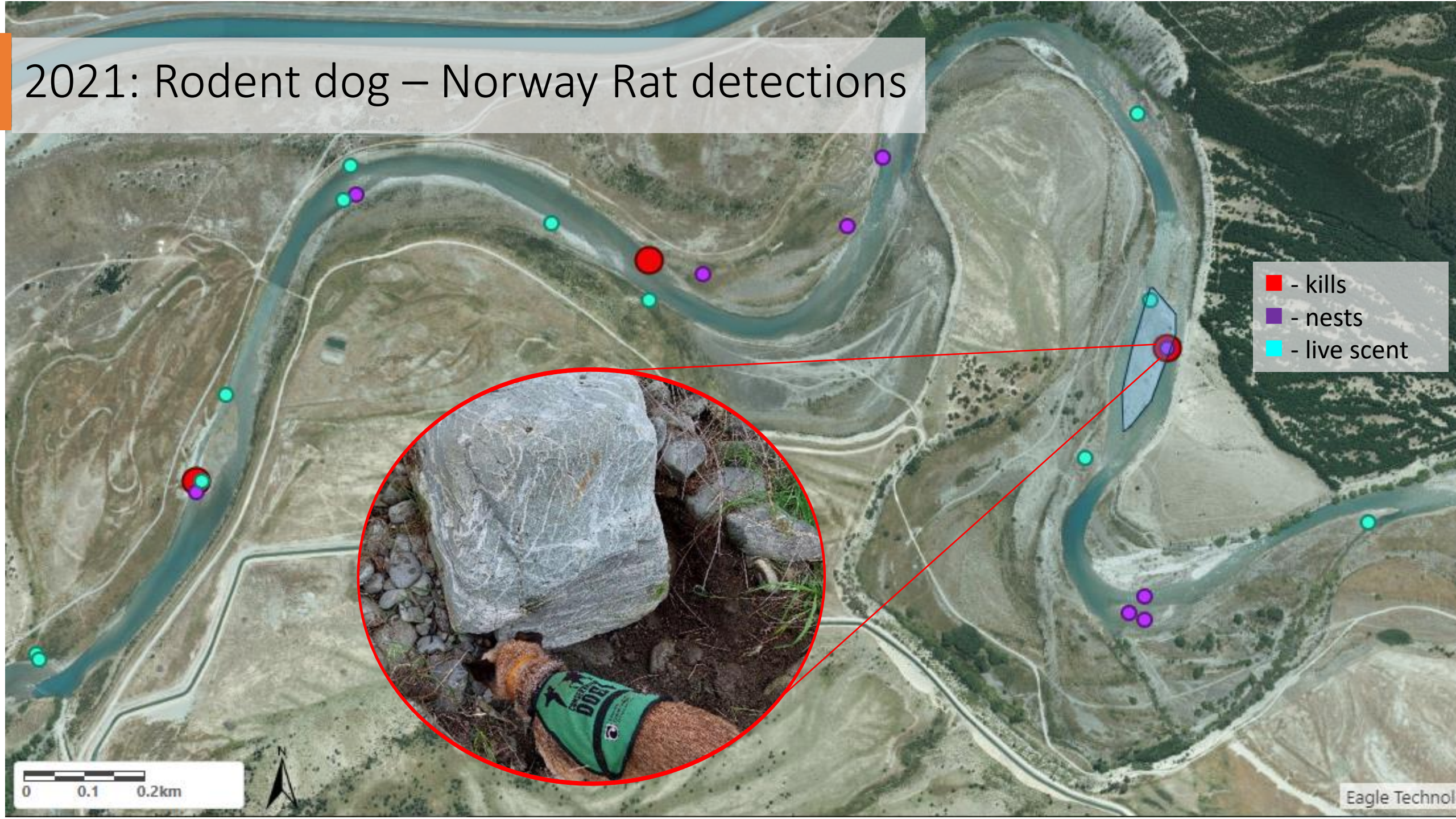
2021-2022: Despite success...

Norway Rat attack on adult tern

- Dec 2021



# 2021: Rodent dog – Norway Rat detections





# 2022 – October

- Late start (Oct) to control operation (vs Aug)
- Rat depredation  $\approx$  first eggs laid
- Lost most nests (177 + 39 re-clutches)



Tern Island nest locations – October



## Dog detection:

### *Early October*

- Rat nest - upper island
- Multiple egg caches (30+ eggs)



---

### *Late October*

- Rats nest on island (inaccessible)
- Eggs eaten
- At least 3 rats seen (thermal)

2022 – November

*Hand laid pindone on the island*



Tern Island nest locations – November

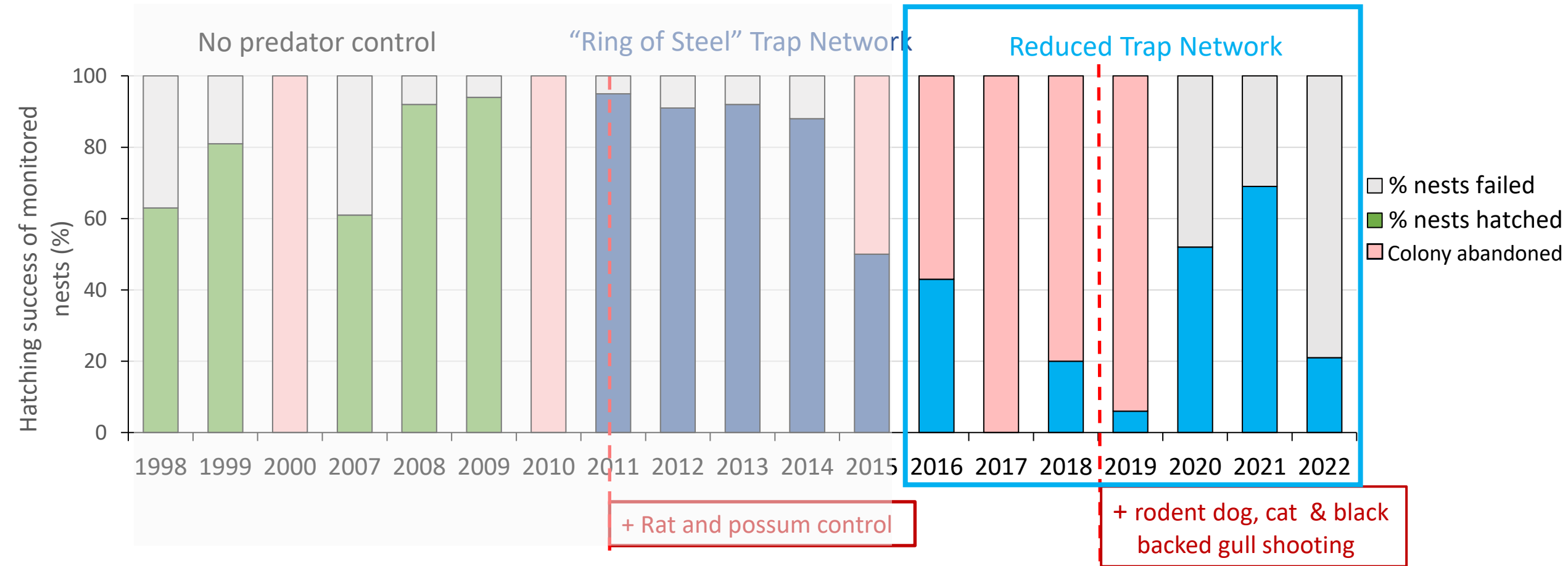
2022 – December - Jan



- Hedgehogs – off island nests
- 60 nests on island
- **Egg loss – 75% (370 eggs)**
  - *Predation & abandonment*



# How does recent hatching success compare to before?



# Does a reduced trap network *work*?

	No Predator control	'Ring of Steel'	<b>Reduced Network + Reactionary</b>	<b>Reduced Network Preventative</b>
<b>Chicks fledged (yrs):</b>	<i>2 of 6</i>	<i>4 of 6</i>	<i>0 of 4</i>	<i>3 * of 3</i>
<b>Colony Size (max):</b>	360	700-1000	400	520

# Tern Island Challenges

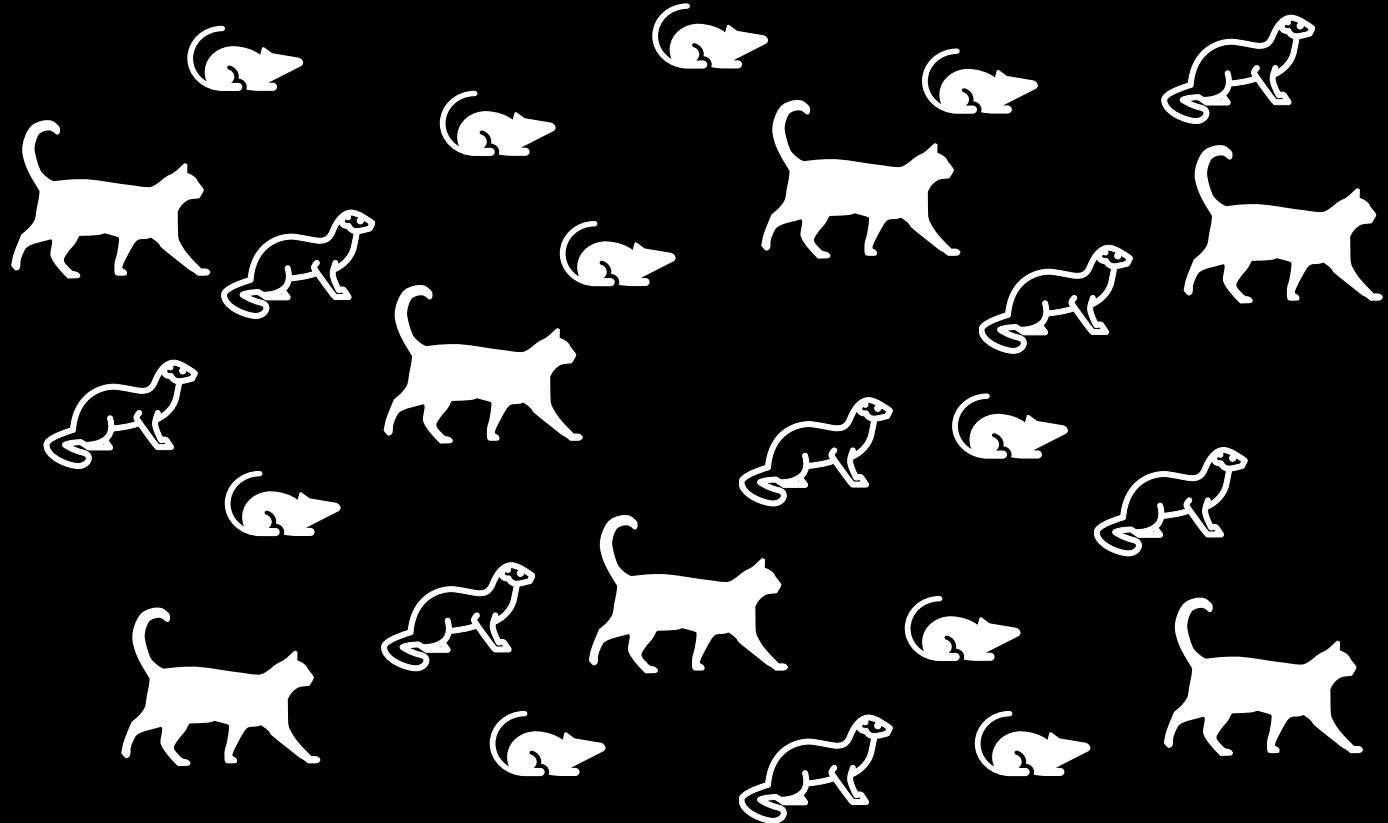
A "noisy site"





# Tern Island Challenges

It's always raining outside







## Future direction

### **Management phase**

- Improve & expand camera detection network (including Cellular)
- Refine timing of pindone ops
- Pre-scented traps and hand-lay response tools



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



Thank you for listening!