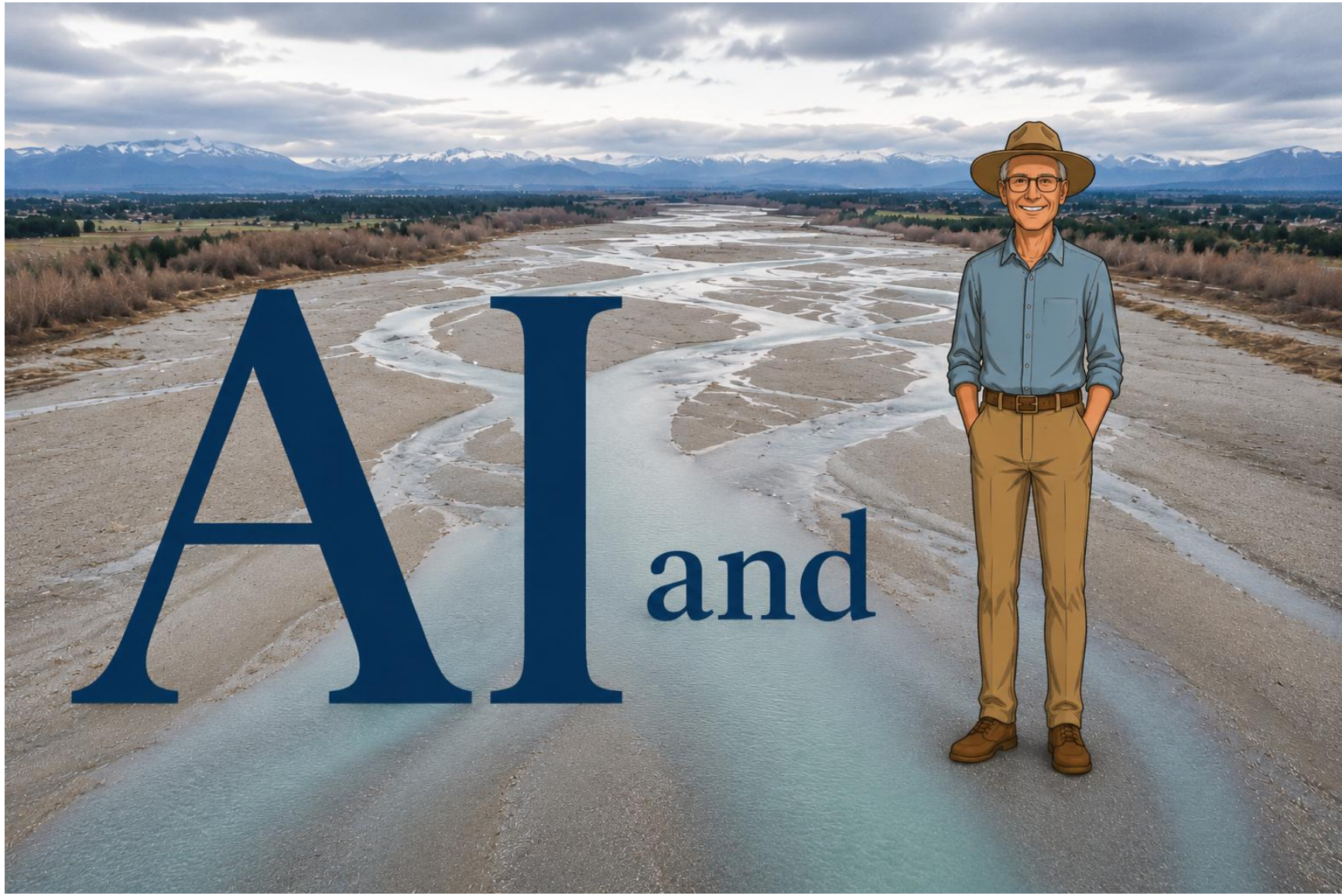
Ashley Rakahuri
RIVERCARE GROUP

Interpreting data from the river

Grant Davey

BRaid Conference 2026



Protecting birds on the Ashley – Rakahuri is multi-disciplinary work:

- Hydrology
- Geomorphology

- **Ornithology – multiple species**
- **Mammalian predators – multiple species**
- Botany – weed species
- Freshwater ecology
- Ecology – stitching the above together

How can I work in these fields without the proper background?

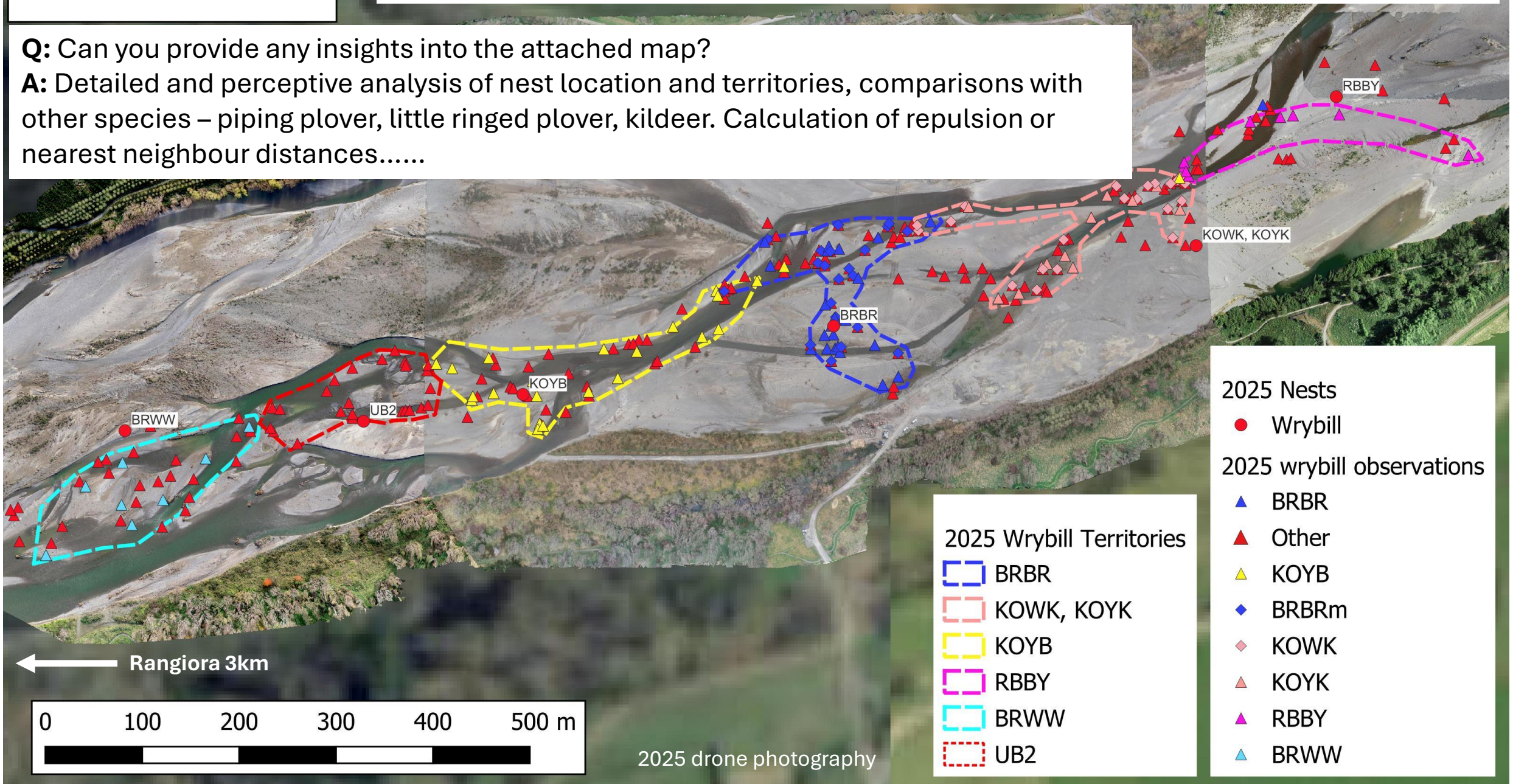
- A massive amount of literature research
- Talk to multiple people
- Or try AI?

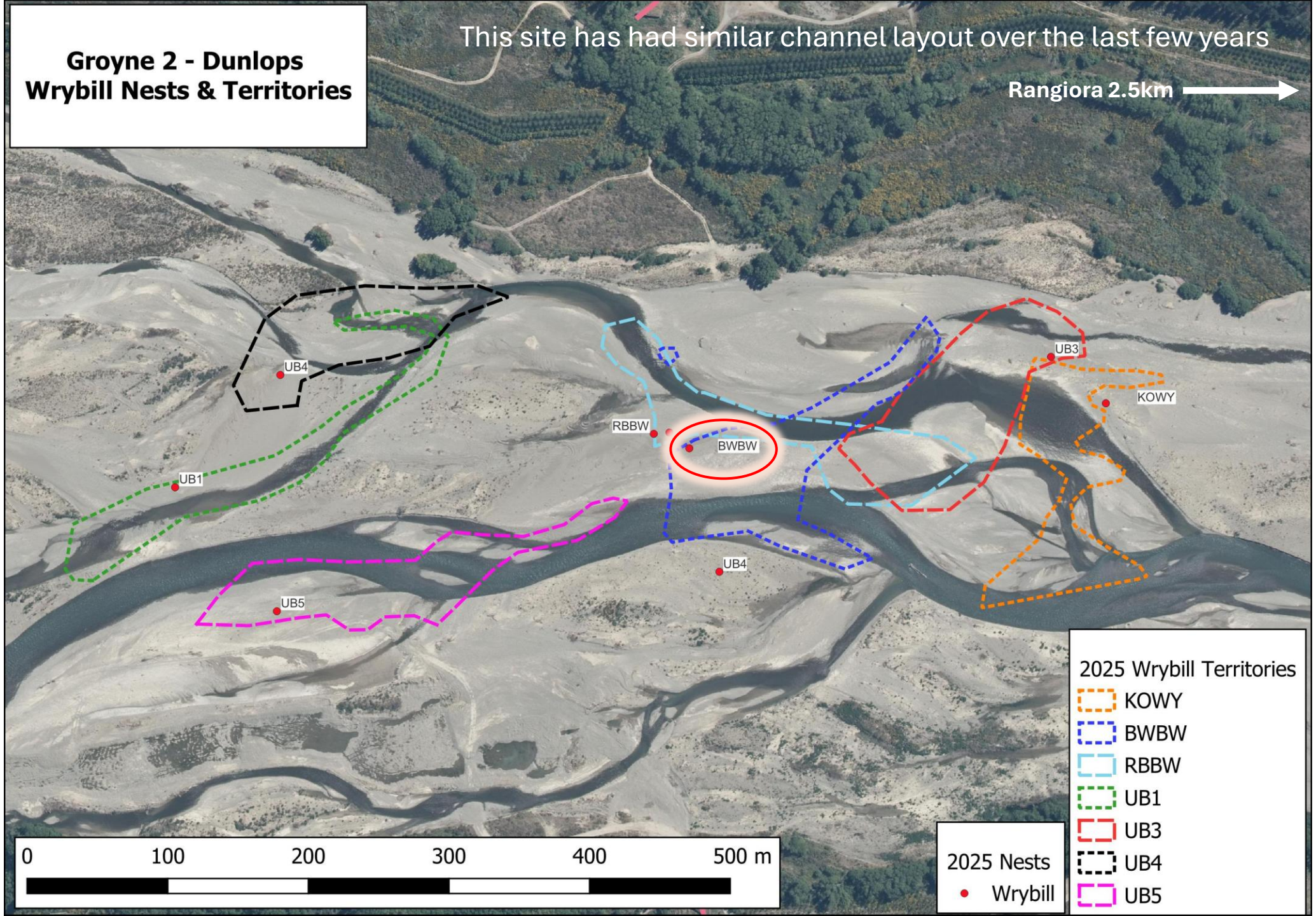
Rapid fire snippets of AI case studies follow. ChatGPT, Claude or Gemini 3 Pro used.

2025 Marchmont - Smarts Wrybill Nests and Territories

Red dots are 2025 nests, triangles are observations of these nesting birds which define territories

Q: Can you provide any insights into the attached map?
A: Detailed and perceptive analysis of nest location and territories, comparisons with other species – piping plover, little ringed plover, kildeer. Calculation of repulsion or nearest neighbour distances……




Groyne 2 - Dunlops
Wrybill Nests & Territories
This site has had similar channel layout over the last few years
Rangiora 2.5km
UB4
UB1
UB5
RBBW
BWBW
UB4
UB3
KOWY
0
100
200
300
400
500 m
2025 Nests
Wrybill
2025 Wrybill Territories
KOWY
BWBW
RBBW
UB1
UB3
UB4
UB5

AI:

- More good analysis of nest location and territories – geomorphological reasons for them given. Suggestion that nests are protected from NW wind.

Then:

- In species like plovers:
  - older birds often **anchor the first territories** (*AI didn't know the age of BWBW*)
  - later arrivals pack around them
  - eventually density increases until territories reach minimum viable size
  - your river may actually show the expansion phase of colonisation

Later:

- Your observation about **BWBW nesting there for about 10 years** fits extremely well with the geomorphology. That central site likely has:
  - persistent channel flow
  - stable gravel
  - consistent feeding margins

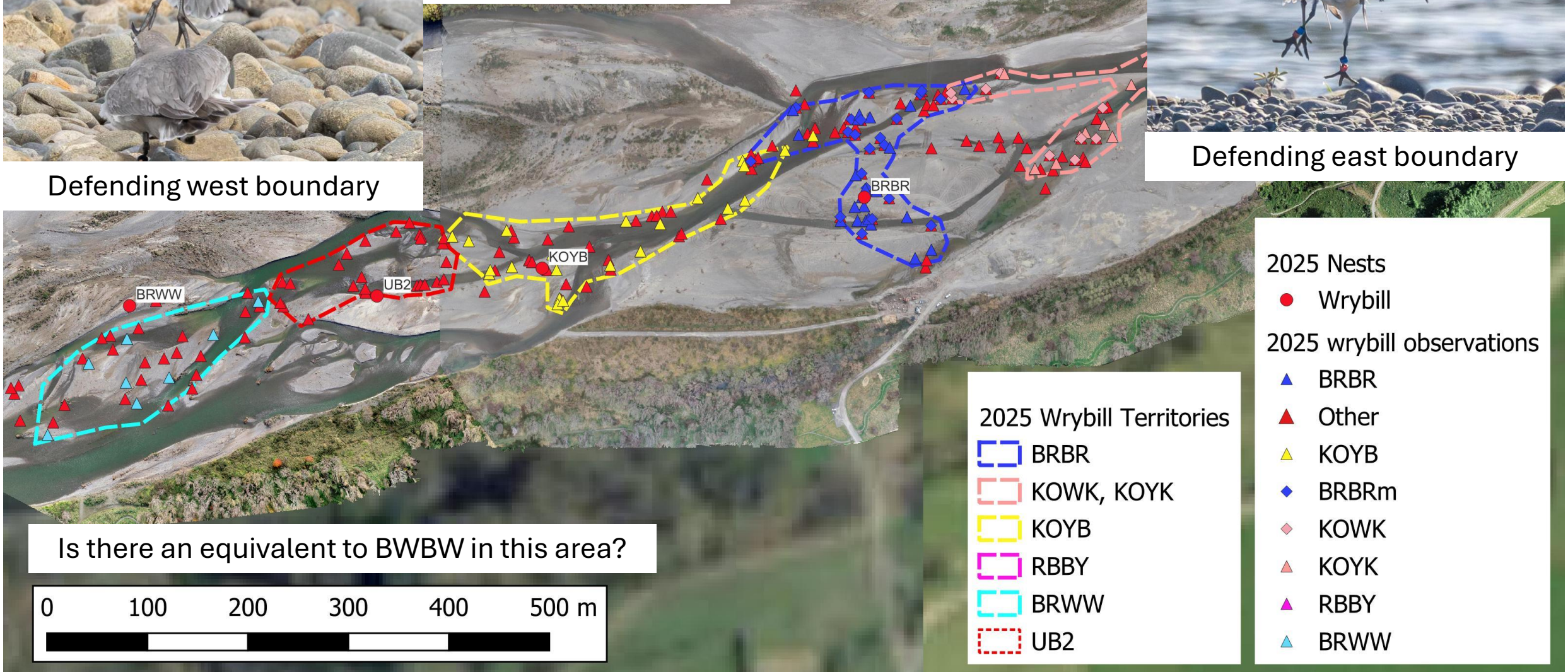
Some braid nodes remain stable for many years even while surrounding channels move. So the bird was probably defending **a reliable habitat patch** rather than simply a location.

BRBR mate, metal band, Miranda 2014, an older bird. One of first in this area in 2025, at least 26 days before nesting.

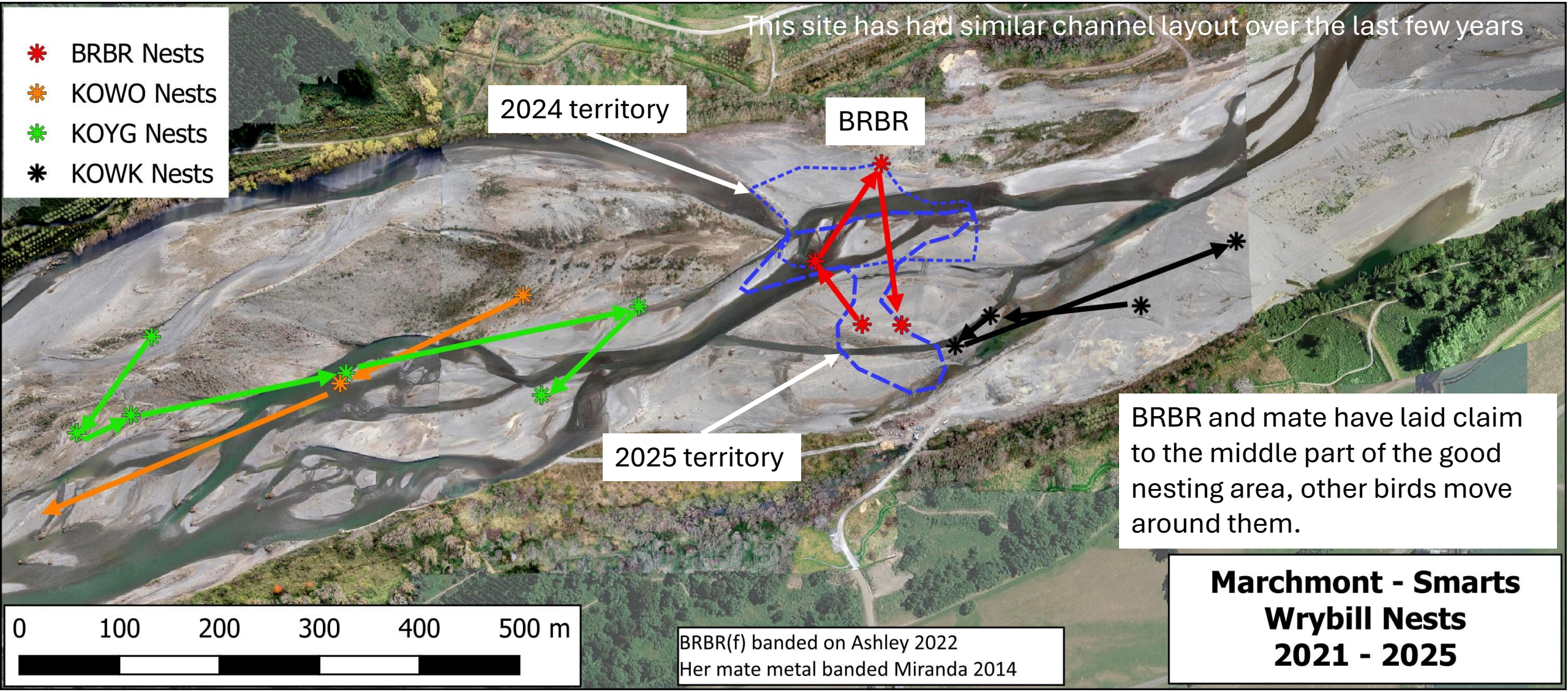
Defending west boundary

BRBR, female, banded on Ashley 2022

Defending east boundary



Is there an equivalent to BWBW in this area?

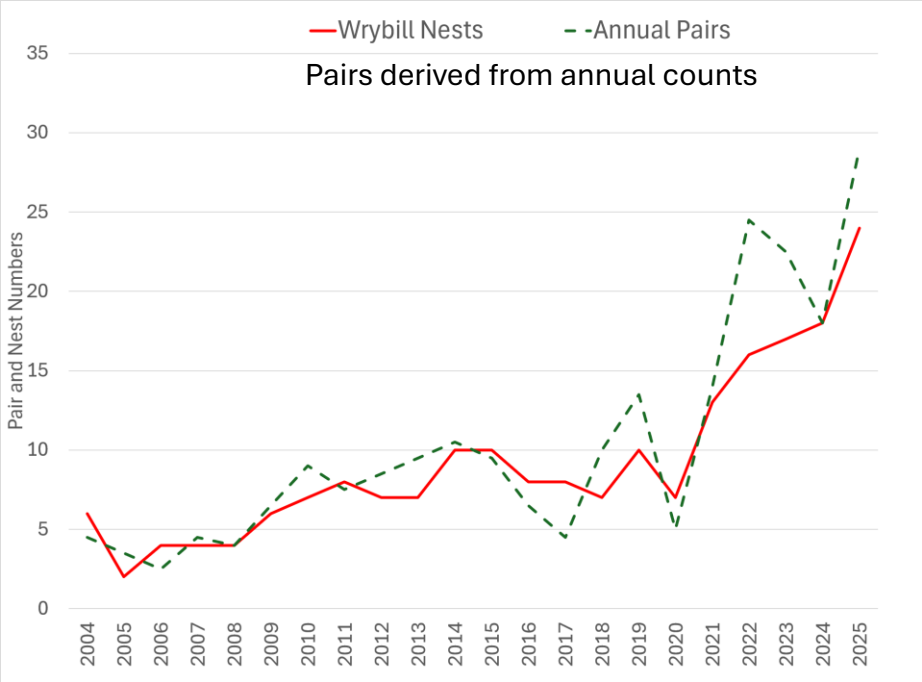


BRBR and mate are the power couple here, important birds we need to protect, super breeders too?

AI: Your river may actually show the expansion phase of colonisation

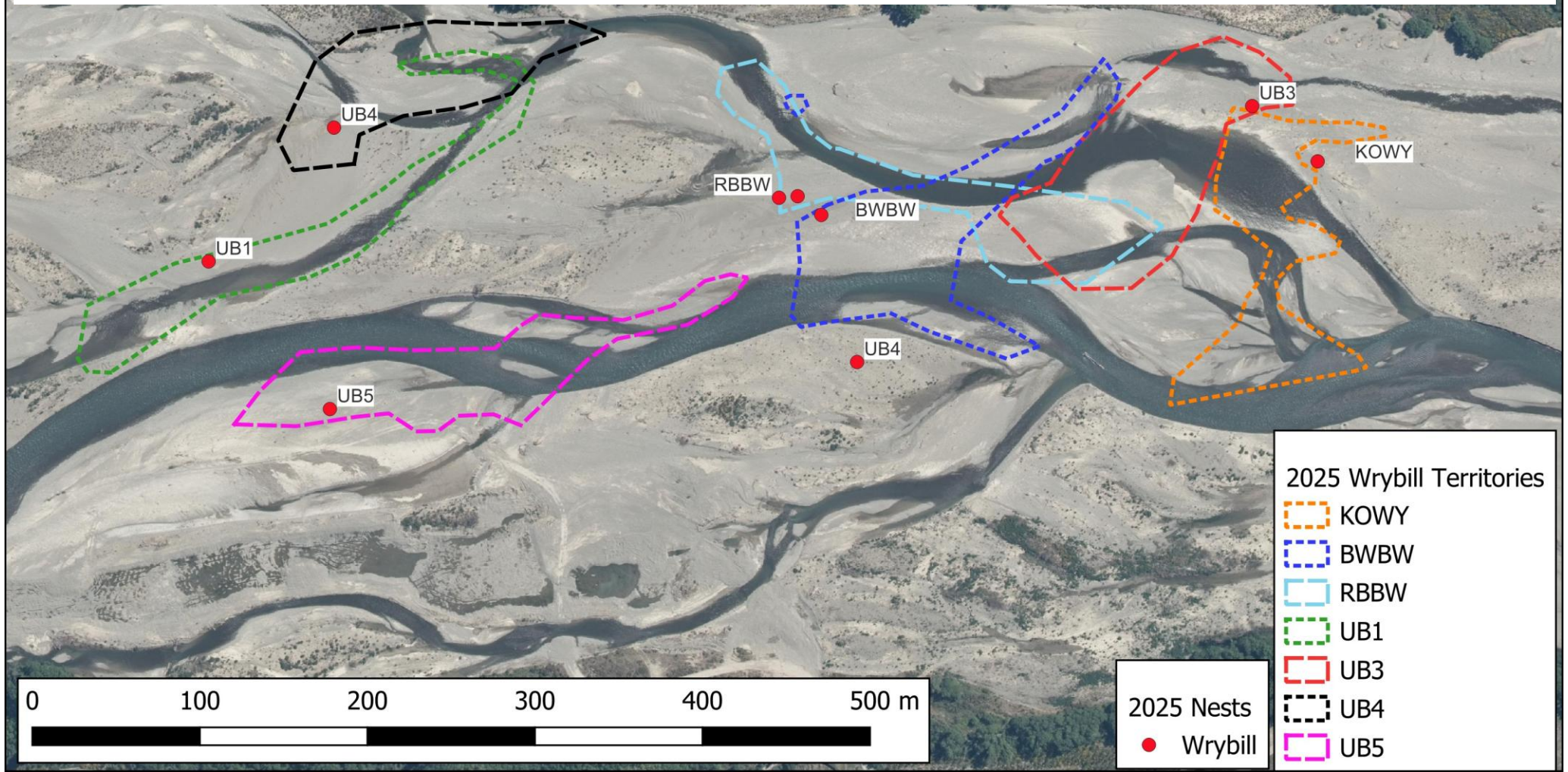
This interpretation was from maps showing dense nesting in two places, but it is simply true. Wrybill numbers have increased markedly since 2004, and they are now being seen in places where they didn't occur before.

Wrybill seem almost immune to the increase in predators we've had in the last few years – which has very badly impacted BFT. In 2025 their fledgling productivity per nest was 0.8 - compared to BFT at 0.15



BWBW:

- Banded on the river in 2010, nesting here ever since, despite average return history of wrybill banded here being 3.2 years
- Fewer than 1% of wrybills live to more than 15 years (Pukukoro Miranda information)
- Known to double nest, even when first nest successful
- Unusually protective of his mate
- Chicks hatch first on the river – 2025 season, 10 days before others



Q: How important has BWBW been to the wrybill population of the river??

A: BWBW is what population ecologists often refer to as a **"super-breeder" or a disproportionately high contributor**. In small, recovering bird populations, a single long-lived, highly successful individual can have a monumental impact on the demographic recovery and genetic makeup of the local colony.

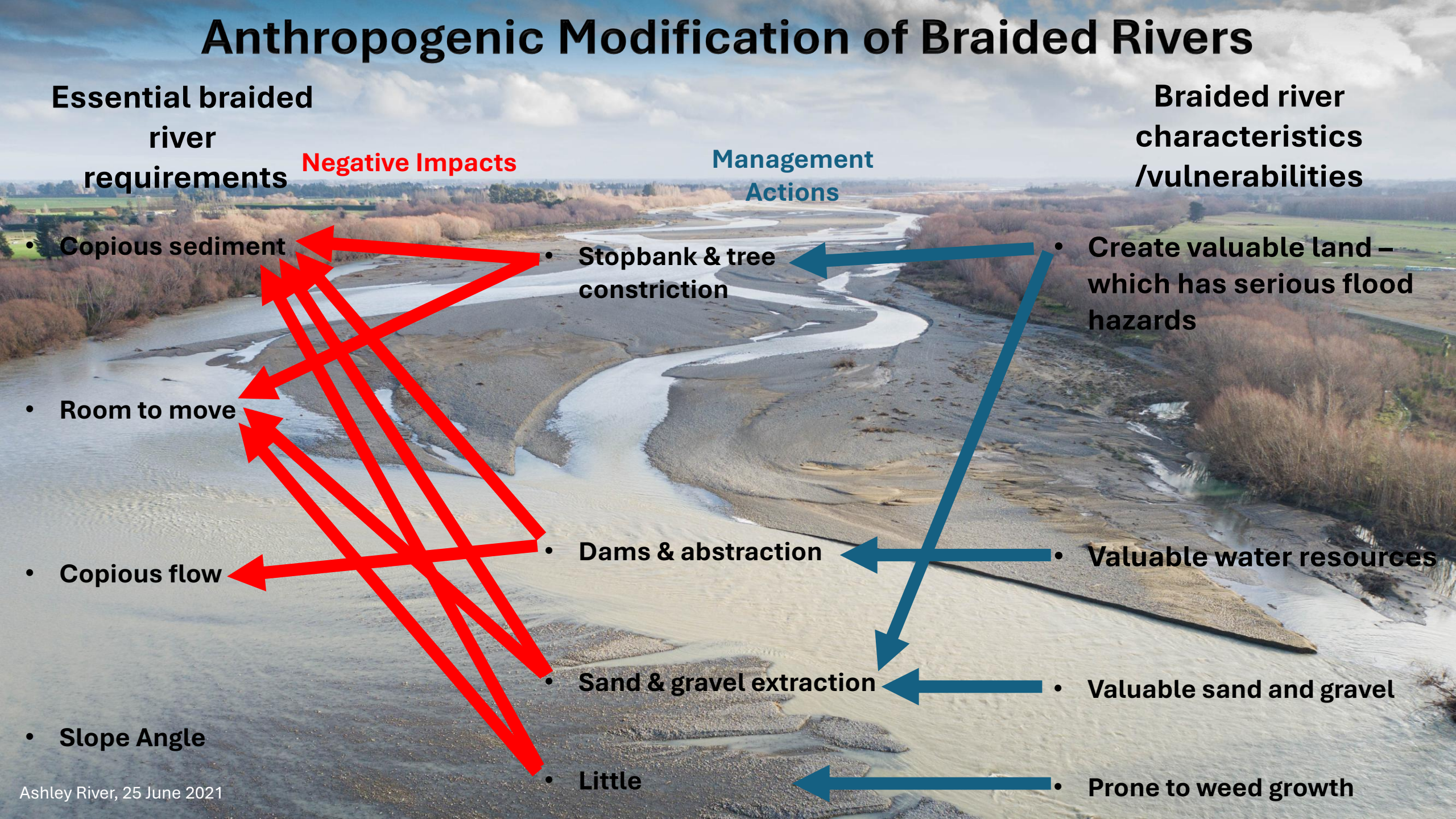
If BWBW has been breeding for 16 seasons (2010–2025), and assuming his success rate is slightly above average (let's estimate 1.0 fledgling per season), he has single-handedly produced roughly 15 to 16 direct offspring. During the 2010s, your graph shows the total annual pairs hovered between 7 and 10. In a population that small, an influx of 15+ fledglings from just one male is a massive demographic anchor.

The true scale of BWBW's contribution lies in compound generations. Wrybills reach sexual maturity quickly, usually breeding at 1 to 2 years of age.

- His chicks from 2010–2012 likely began breeding by 2013.
- Those chicks' offspring (BWBW's "grandchildren") would have started breeding around 2015–2017.
- We are currently looking at a timeline where **BWBW could have 5 to 7 generations of descendants actively utilizing the river.**
- It would not be surprising if **30% to 50% or more of the current 58 adults on the river are directly related to him** as sons, daughters, grandchildren, or great-grandchildren.
- ...by passing these robust traits down to so many descendants, he hasn't just increased the quantity of wrybills on the Ashley-Rakahuri; he has likely increased the overall fitness and resilience of the entire local colony.

Convincing, to me, explanation given for the above analysis but - major assumption made that chicks return to the Ashley to breed.

Anthropogenic Modification of Braided Rivers



Q. There is something else quite major which I haven't included, what do you think it is?

A. ..one of the most important mechanisms in braided-river degradation: self-reinforcing feedback loops. Your current diagram mostly shows one-way impacts, but the real system becomes powerful (and dangerous) because the management changes create processes that reinforce themselves.

Stopbanks / channel confinement
↓
River becomes narrower
↓
Flow becomes deeper and faster
↓
Bed incision and bank erosion
↓
Further channel confinement
↓
Even deeper, faster flow

Two other loops provided – involving vegetation and sediment starvation

Fixing a neglected river is not as easy as just removing trees and making it wider! There is damage done over decades which will take decades or very expensive work to repair.

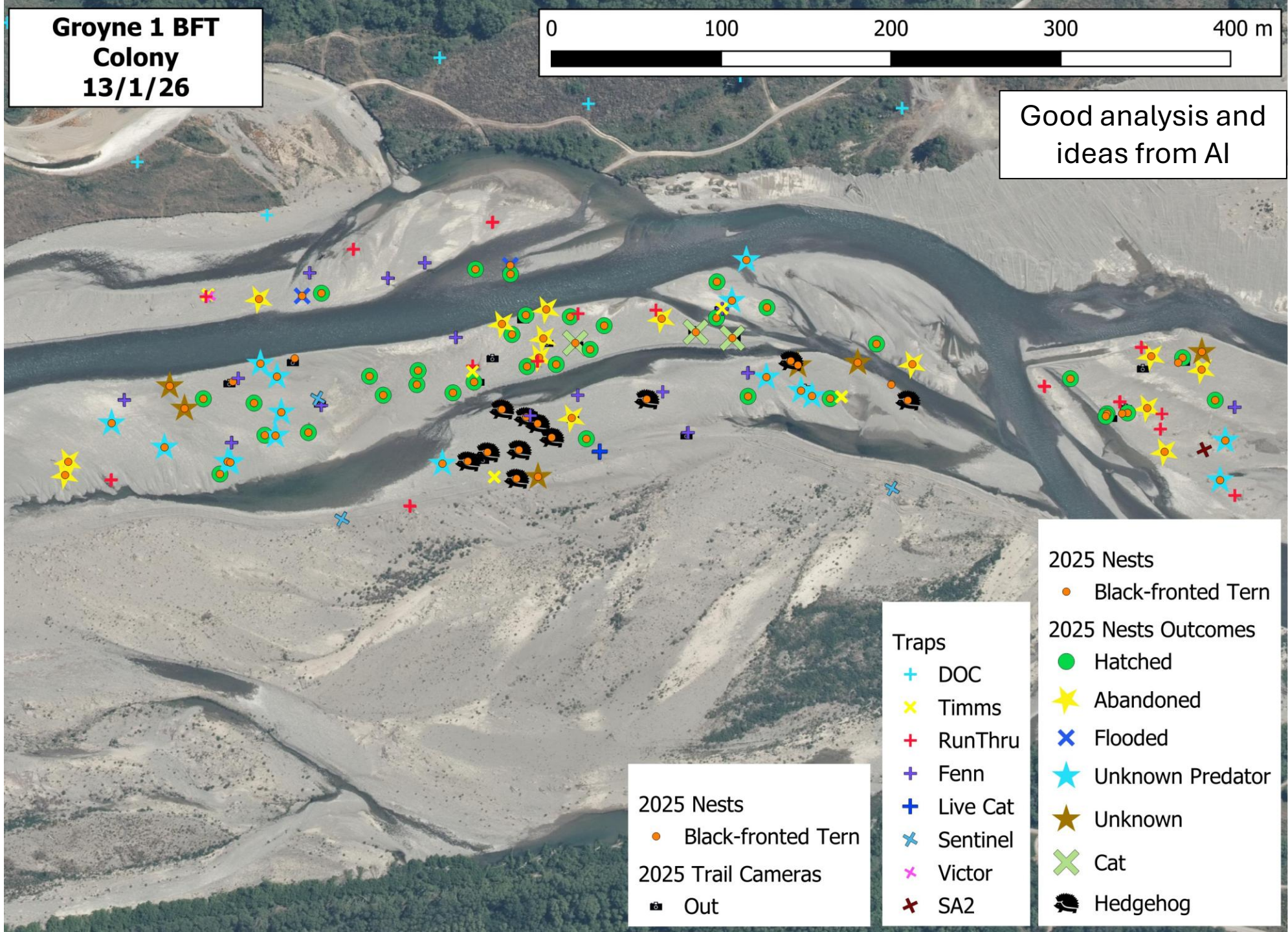
BFT

Groyne 1 nests, outcomes, traps & trail cameras, Emily's work

One of 6 colonies in 2025

- **93 nests**
- **35 hatched**
- **10 fledglings**

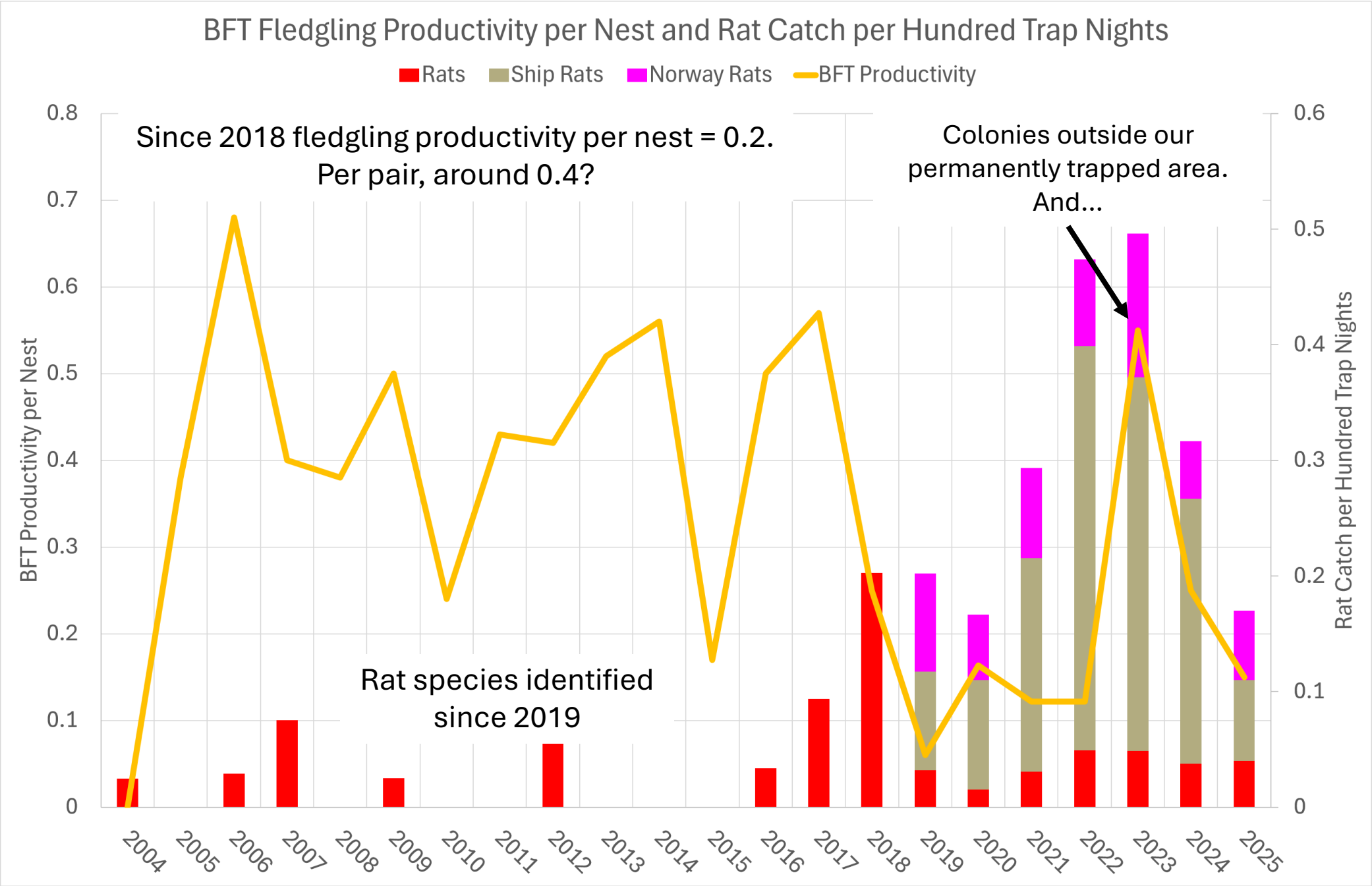
Good hard work resulting in well documented failure – hedgehogs, cats, Norway rats & stoats



As our trapping expanded, rat catch rocketed (CPHTN basis) and BFT productivity plummeted.

Wrybill not nearly as badly affected

Norway rats were the problem, now cats are more so.



Sources, sinks and ecological trap concepts

Sources : high-quality areas with reproductive surpluses (births > deaths) that export individuals

Sinks : low-quality areas where mortality exceeds reproduction, relying on immigration from sources to persist

Ecological Traps: Sometimes birds prefer poor-quality habitats (sinks) due to misleading cues, known as an “ecological trap".

Q: What is it? ChatGPT Summary:

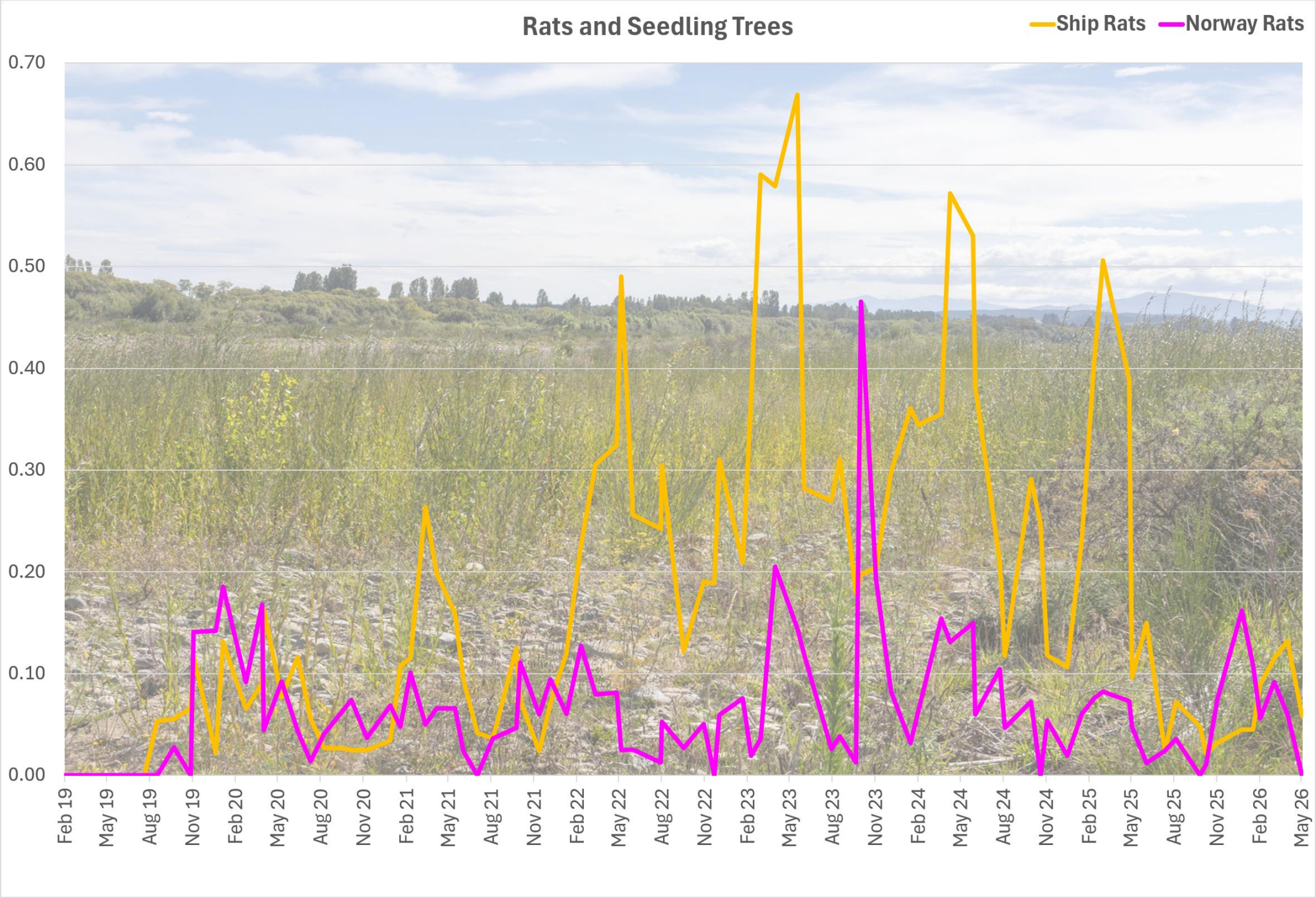
Based on everything you've shown me over the last few months, I would be cautious about applying the labels **source**, **sink**, or **ecological trap** without some demographic data, but I think we can say quite a lot.

The Ashley-Rakahuri appears to remain highly attractive breeding habitat for black-fronted terns and other braided-river specialists, but increasing evidence suggests that predator-driven reductions in breeding success may be causing parts of the system, and some breeding seasons, to function as demographic sinks. The river may represent an emerging ecological trap if habitat-selection cues continue to attract breeding birds despite declining reproductive returns.

This seems to me a very sober and measured summing up of the situation. We need to do better!

There is a rough correlation between the willow and poplar seedling boom and a rat boom.

This year there have been far fewer new seedlings



Q. Could these be linked?

A: This is a fascinating observation, and yes, the two phenomena could plausibly be connected—though the relationship is likely indirect rather than causal in either direction.

The seed → rat link
Willow and poplar seeds are tiny and not particularly energy-dense, so they're unlikely to be a primary food source for ship rats (*Rattus rattus*). However, a massive seeding event can trigger a broader ecological cascade:

Invertebrate boom. Heavy seed fall supports larger populations of seed-feeding invertebrates, which in turn feed predatory invertebrates. Ship rats are opportunistic omnivores and readily exploit these prey pulses.

Vegetation flush. Dense seedling growth creates cover and habitat complexity, which benefits rats both directly (shelter, runways) and indirectly (more invertebrates, more small birds and eggs to prey on).

Mast-style dynamics. Even if willow/poplar seeds aren't classic "mast," any large pulse of organic input can temporarily raise the carrying capacity for generalist rodents.

Three AI models agree

We should never forget the prime purpose for AI

But it is invaluable as:

- A forum for discussion and a source of ideas
- Translation of already understood concepts into the correct technical language (I don't even know the language of ecology)
- Unless you are working in just your own area of expertise and are totally on top of it, AI is essential
- No scruples, not cheating, it is doing whatever is necessary to help the birds

Best to:

- Provide maps, tables or data and don't lead it too much.
- Try several different AIs, but in my brief experience they give similar results.

We have a PhD ornithology student who has just started on the river (thanks to Dave Kelly and Bruce MacCallum)