Thermal Imagery

For 5 years we have been using a Pulsar Lexion XP38 Thermal imager on both braided rivers and beaches, for finding nesting birds, for counting roosting birds, for all aspects of understanding these systems and for predator control.

What is thermal imagery?

It is looking at a part of the electromagnetic spectrum that strongly correlates to the temperature of the body emitting the radiation. All matter above absolute zero glows in the electromagnetic spectrum, it is called black body radiation.

Warm blooded things tend to stand out strongly against a background of relatively cool things (though everything is hot compared to absolute zero, -273 C).

One huge advantage when studying nocturnal birds, is that you can see them, see what they are doing, without introducing anything into their environment other than your presence.

Same applies when studying predators, and their habits.

Focus

- Thermal sensors can be very sensitive to precise focus, so when you are looking for something, to maximize the probability of seeing what you are looking for you need to constantly be adjusting the focus rather than just leaving the focus fixed and assuming near enough is good enough.

  You will usually be interested in a relative small subset of the distance from 1 m away to the horizon, so the actual amount of movement of focus is usually quite small. When perfectly focused, this machine will detect a dotterel's eye at 80m, as a single bright pixel on the screen. If the bright spot comes and goes with tiny changes in focus, then you know it is real.

Timing – choosing cold times

- Use late at night or early morning most days, or anytime on heavily overcast days, to make maximum use of the technology.
- Images will be shown of various situations.
- Using this gear with nocturnal species allows observation of behaviours that cannot be captured by any other method, as it is totally passive – they have no idea you are there unless you move or make a sound.

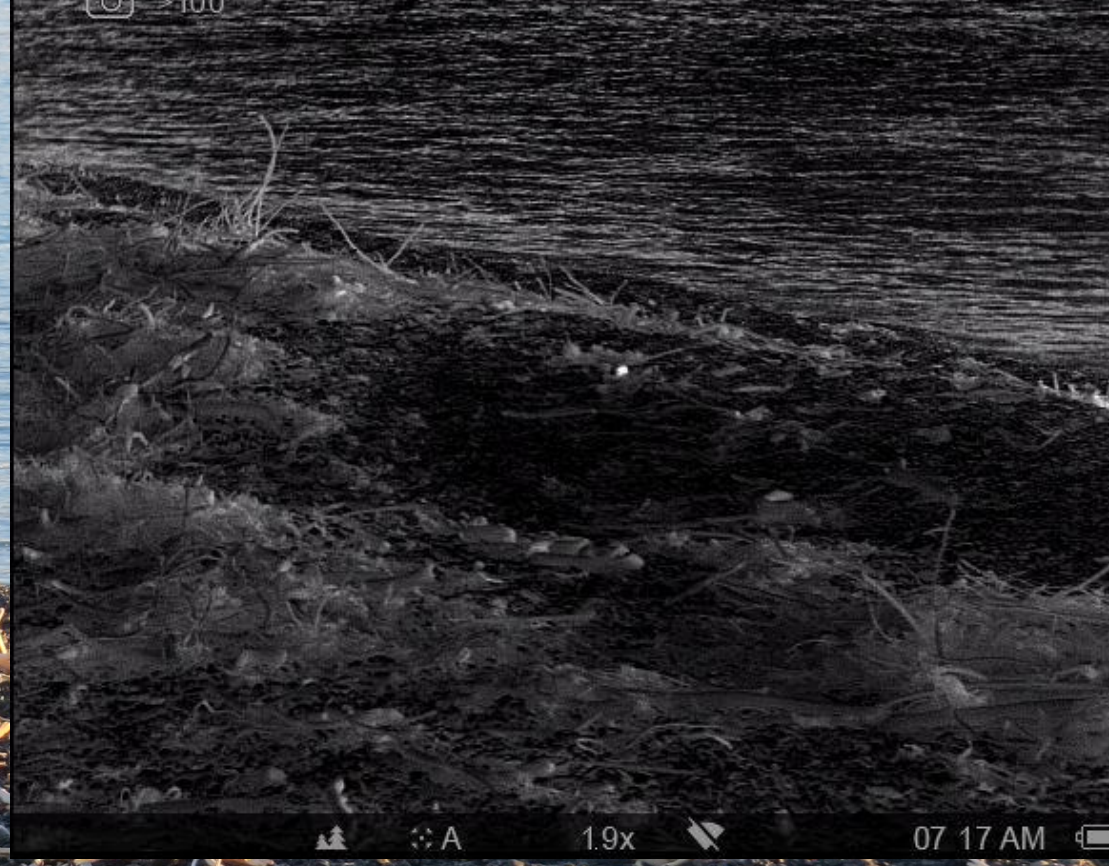
Risk of the cold

- Cold gives you the greatest contrast, and you do need to dress appropriately. I have been caught 3 times, underestimating just how much warmth my body would lose at the study site. Just 2 km of travel can mean 10C difference in temperature.
- Three times, while standing perfectly still to observe a subject of interest, I have been so focussed on the subject that I failed to notice I was going hypothermic, and when I went to walk on my legs refused to obey my commands. I now tend to overdress, rather than underdress. Relatively small changes in the environment (light drizzle, increased breeze, etc) can make a huge difference to the amount of heat your body loses.

Counting birds – how many dotterels

- When cryptic birds are flocking, thermal makes all the difference to counting.

Finding a nesting bird



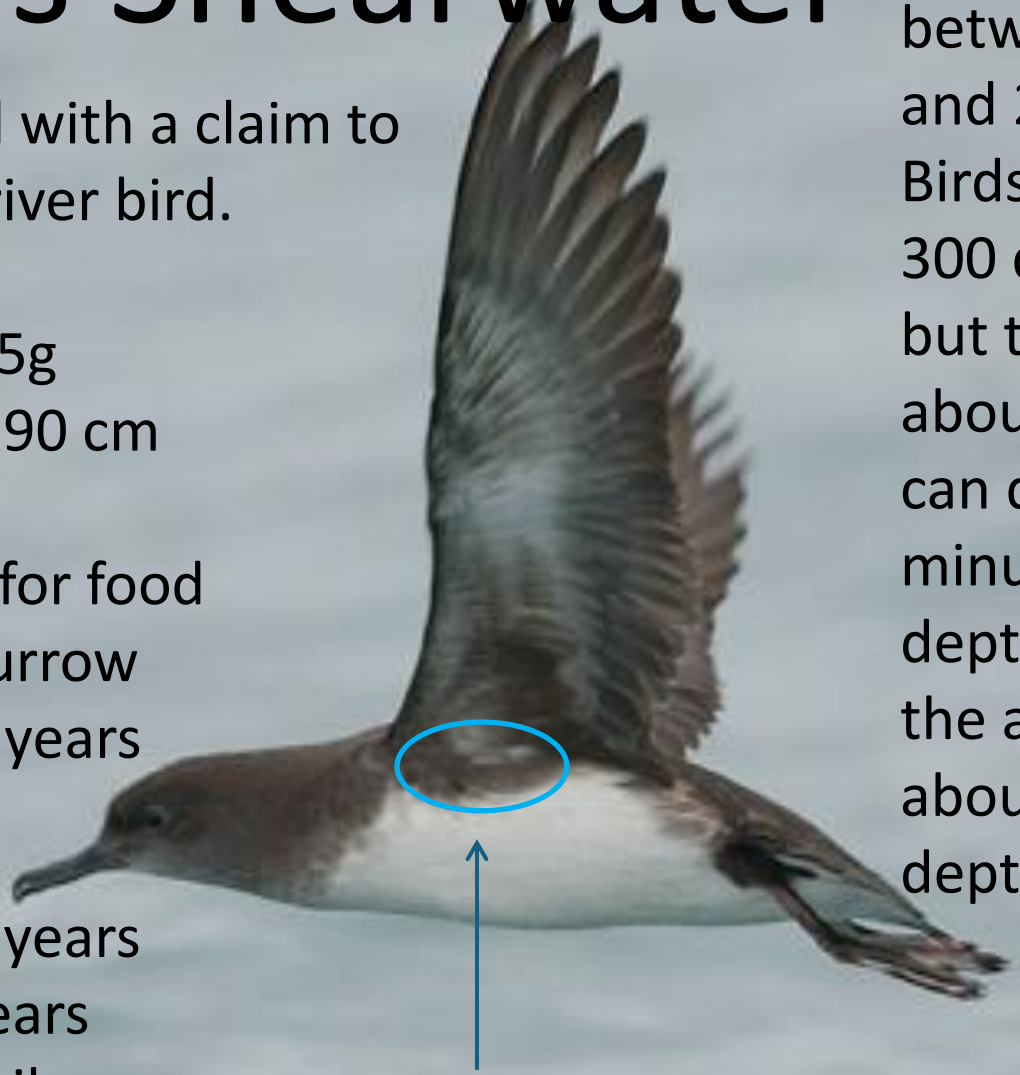
Bird? Where?

This cat had no idea I was there, as it searched for dotterels to eat.

Hutton's Shearwater

The only sea bird with a claim to being a braided river bird.
Length 36-38cm
Weight about 365g
Wingspan about 90 cm
Feeds at sea
Dives up to 30m for food
Lays 1 egg in a burrow
First returns at 3 years

Foraging trips between 250km and 2,100km. Birds can do over 300 dives per day, but the average is about 70. They can dive for up to a minute and to depths of 35m, but the average is for about 20s and to a depth of about 6m.



Distinguishing Feature

Most return at 5 years
Lives about 20 years
Breeds only at Kaikoura
Now only two natural and one artificial sites left.


Hutton's research Hut
Main colony
Hutton’s Shearwater
Mt Fyffe Hut
Mount Fyffe carpark
Kowhai River, braided lower reach
Te Rae o Atiu
Artificial colony
Hutton’s Shearwater
Kaikoura Peninsula

From 2024 the Kowhai research hut, looking up, in the heart of the mountain colony.

From2025 the Mt Fyffe ridge, near midnight, as birds make their way inland to feed their chicks.

From 2025, peak exodus from the Kowhai colony as adults head back out to sea just before dawn, looking up-ridge from the Mt Fyffe Hut.

Knowing thee things must be here, and actually seeing them, are two very different things.