



# Seals and marine renewables:

## Understanding how animals respond to new energy technologies

Katherine Whyte

kfw5@st-andrews.ac.uk

@katey\_whyte

### What are marine renewables?

These devices generate renewable energy from our oceans and offshore environment:



Offshore wind farms



Tidal energy devices



Wave energy devices

Scotland aims to meet 100% of its demand for electricity from renewable sources by 2020.

### Are marine renewables safe for seals?

The construction and operation of these devices can be noisy and might be dangerous for seals. Possible impacts include:



Injury or death from collisions



Temporary or permanent hearing damage



Animals change where they go (avoidance)



Animals change what they are doing (behaviour)

### How do seals respond to wind farm construction noise?

#### 1. We put GPS trackers on seals

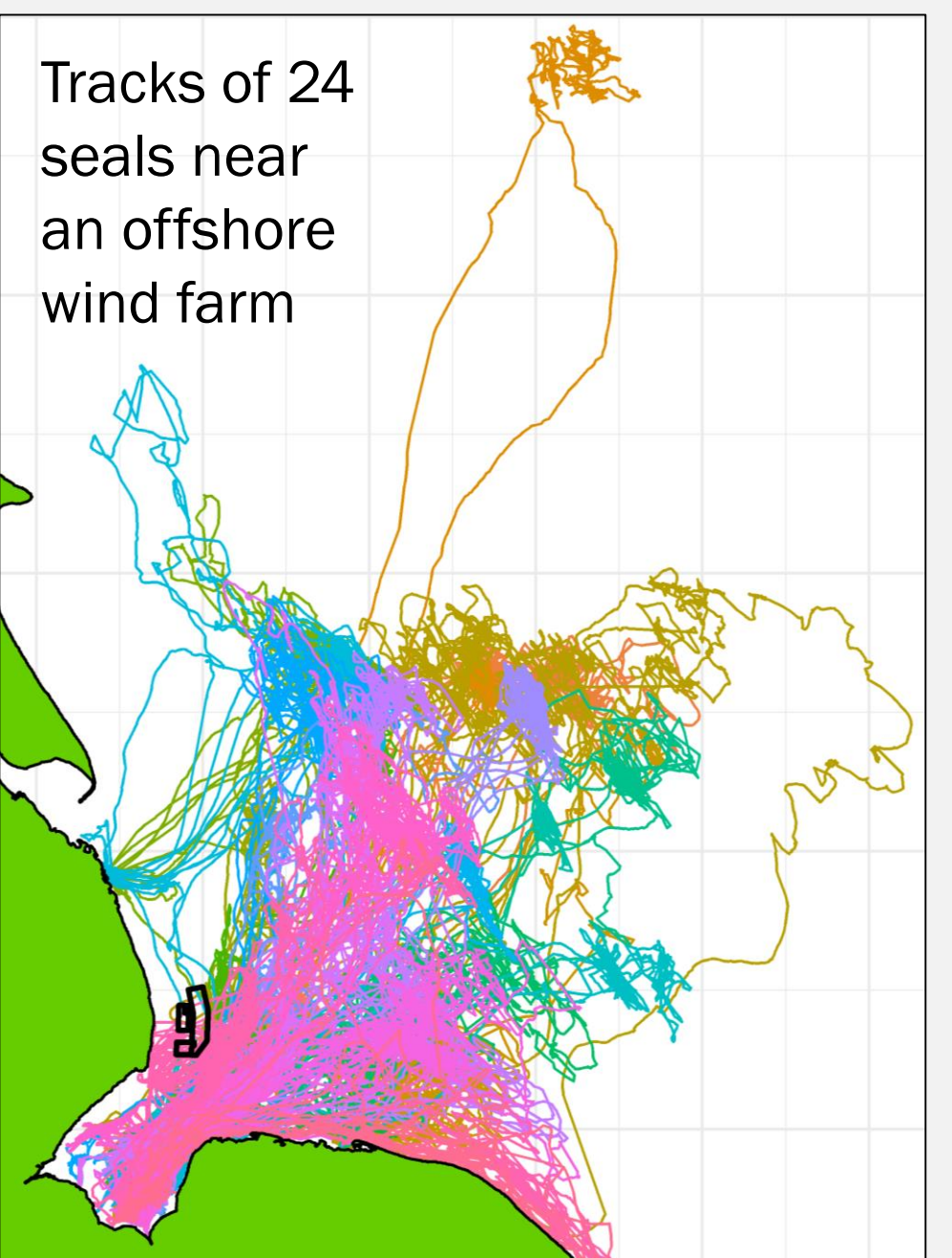


Harbour seal with a GPS tag

#### 2. Animal tracks are recorded

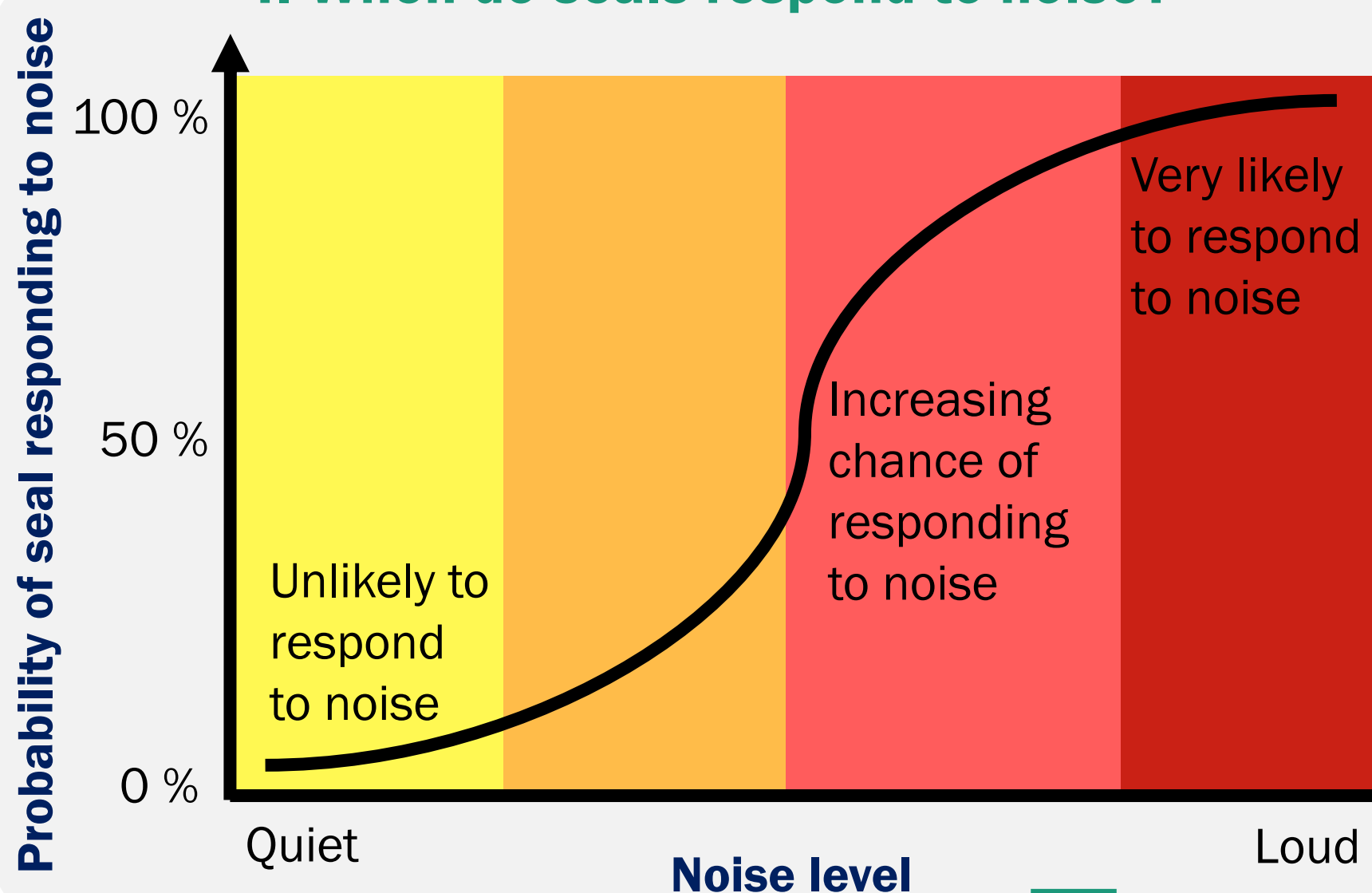
Seals travel near offshore wind farms during construction.

Their tracks are recorded and sent back to us via the mobile phone network.



Tracks of 24 seals near an offshore wind farm

#### 4. When do seals respond to noise?



The graph plots the 'Probability of seal responding to noise' (0% to 100%) against 'Noise level' (Quiet to Loud). The response is categorized into three zones: 'Unlikely to respond to noise' (yellow, low noise), 'Increasing chance of responding to noise' (orange/red, medium noise), and 'Very likely to respond to noise' (red, high noise).

#### 3. Do seals respond to noise?

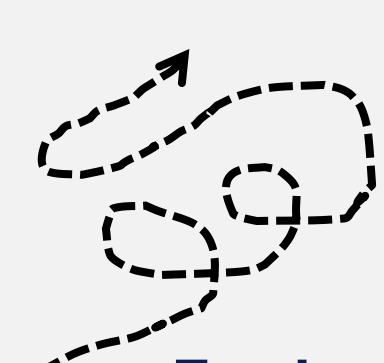
Do they move differently in response to wind farm construction noise? We look for changes in:



Speed



Heading



Track Wigglyness

#### 5. This information can be used to decide when and where new devices can be built safely



Pile driving for offshore wind farms may be heard by seals up to 70 km away.

