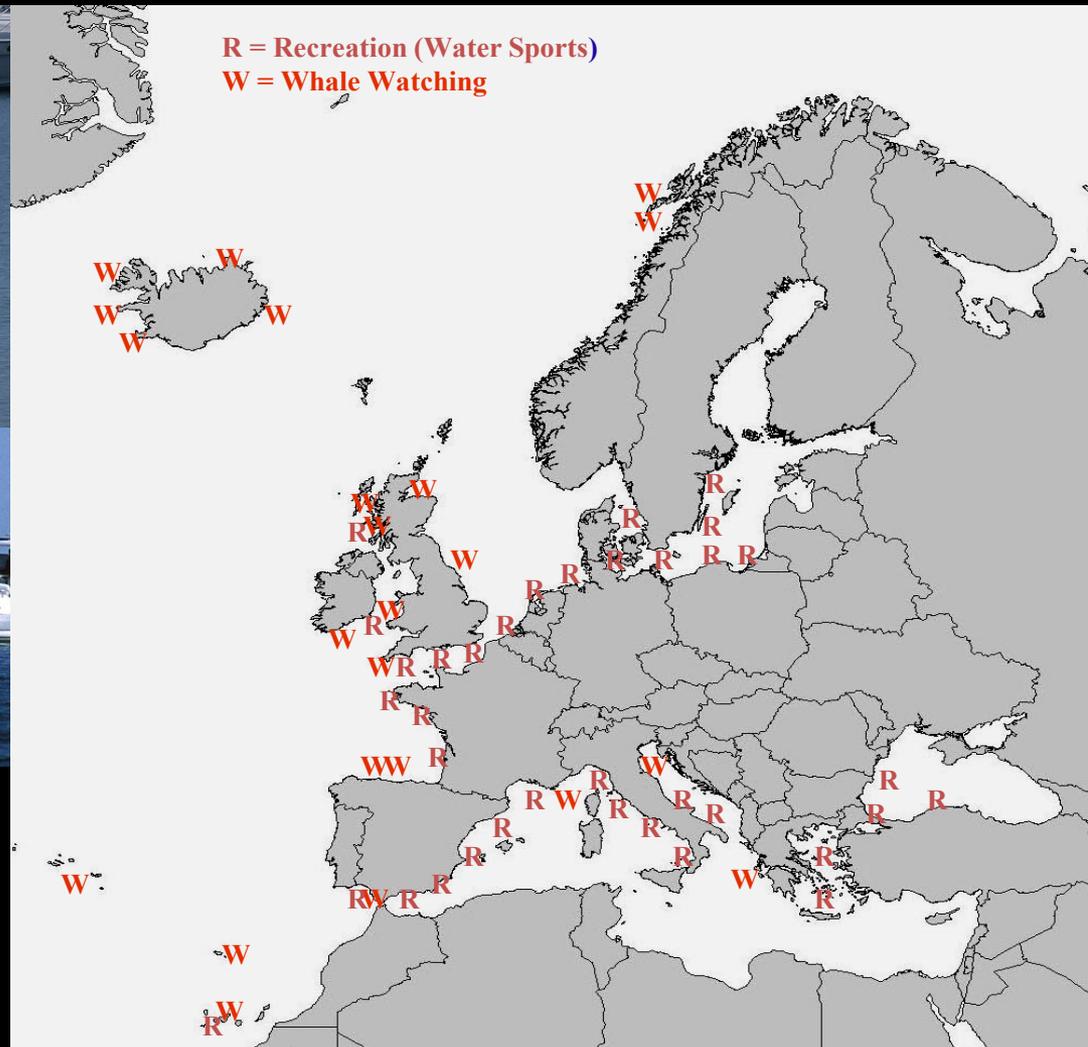


# Recreational Activities & Their Potential Impacts on Cetaceans

**Peter G.H. Evans**

*Sea Watch Foundation & Bangor University*

# DISTRIBUTION OF RECREATIONAL ACTIVITIES IN EUROPE



- Whale watching started in Europe in the mid-late 1980s
- Since then, the number of whale watchers has increased to >500,000/year in mainland Europe, and >1 million in the Atlantic Islands, particularly Canaries

## Cardigan Bay dolphins 'sent north' by water sports noise

By Gemma Ryall  
BBC News

© 17 June 2013 [Wales](#)

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# Is eco-tourism harming whales and dolphins? Animal spotting tours are 'stressing' marine mammals

- Boat trips have been found to stress minke whales and bottlenose dolphins
- Whales off the coast of Iceland have been observed upping their speed and breathing heavily when boats came near, signifying their distress
- Populations of bottlenose dolphins have plunged off the coast of New Zealand because they are being pushed out of feeding areas, experts claim
- Rules about how close boats should get to animals and knowledge of long-term population trends could help solve the problem



## Bottlenose dolphins 'disturbed' by boat noise

20 June 2013 Last updated at 06:49 BST

**Bottlenose dolphins in Wales are being disturbed by the noise caused by boats, say scientists.**

Cardigan Bay is home to Britain's largest bottlenose dolphin population in the summer - around 350.

Many tourists visit the area to try and spot them.

## Skippers warned not to approach dolphins

IT IS home to Europe's largest population of bottlenose dolphins and recognised as among the finest wildlife areas in Europe.



Rachael Misstear

00:00, 10 AUG 2010 | UPDATED 04:00, 28 MAR 2013

NEWS



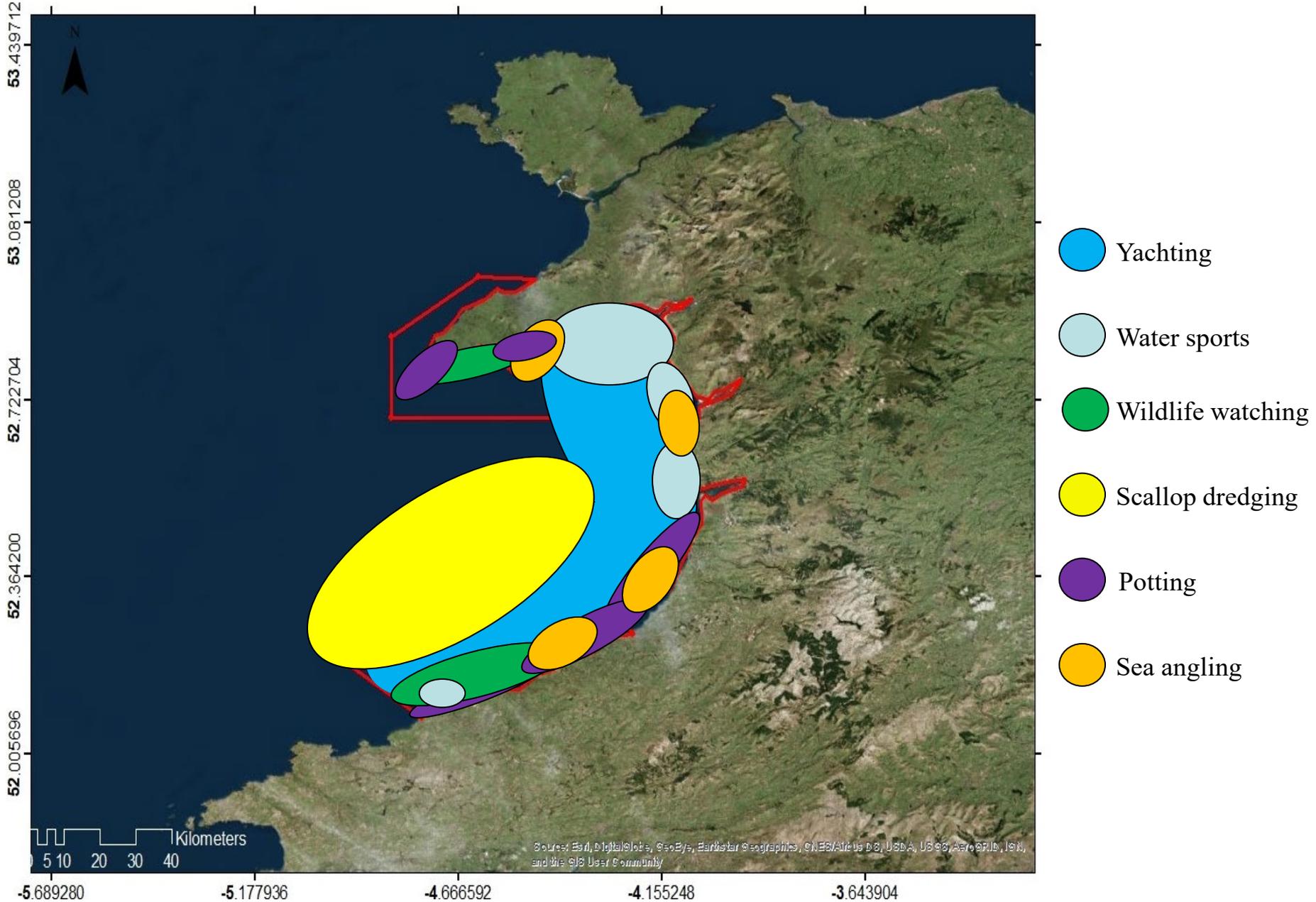


# Human Activities in Cardigan Bay

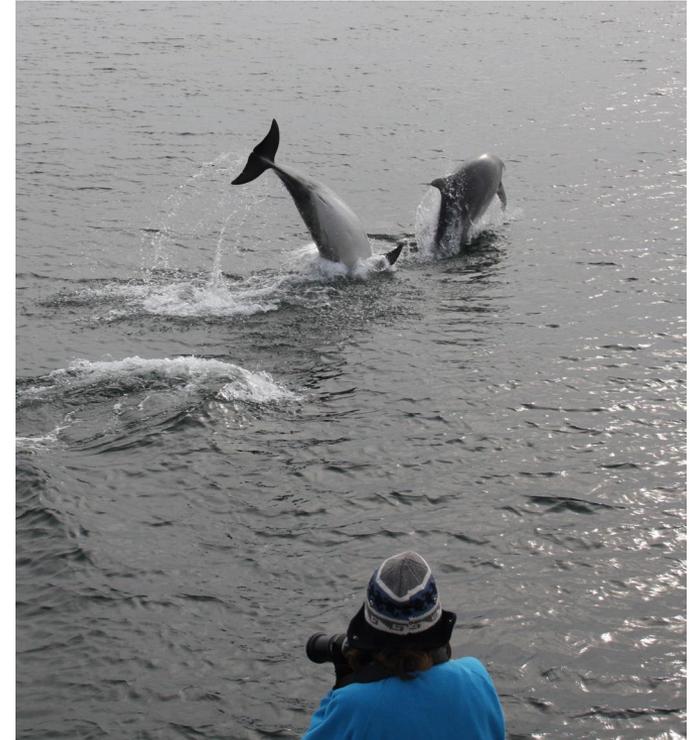


- Potting
- Scallop Dredging
- Sailing
- Water Sports
- Dolphin Watching

# DISTRIBUTION OF HUMAN ACTIVITIES IN CARDIGAN BAY

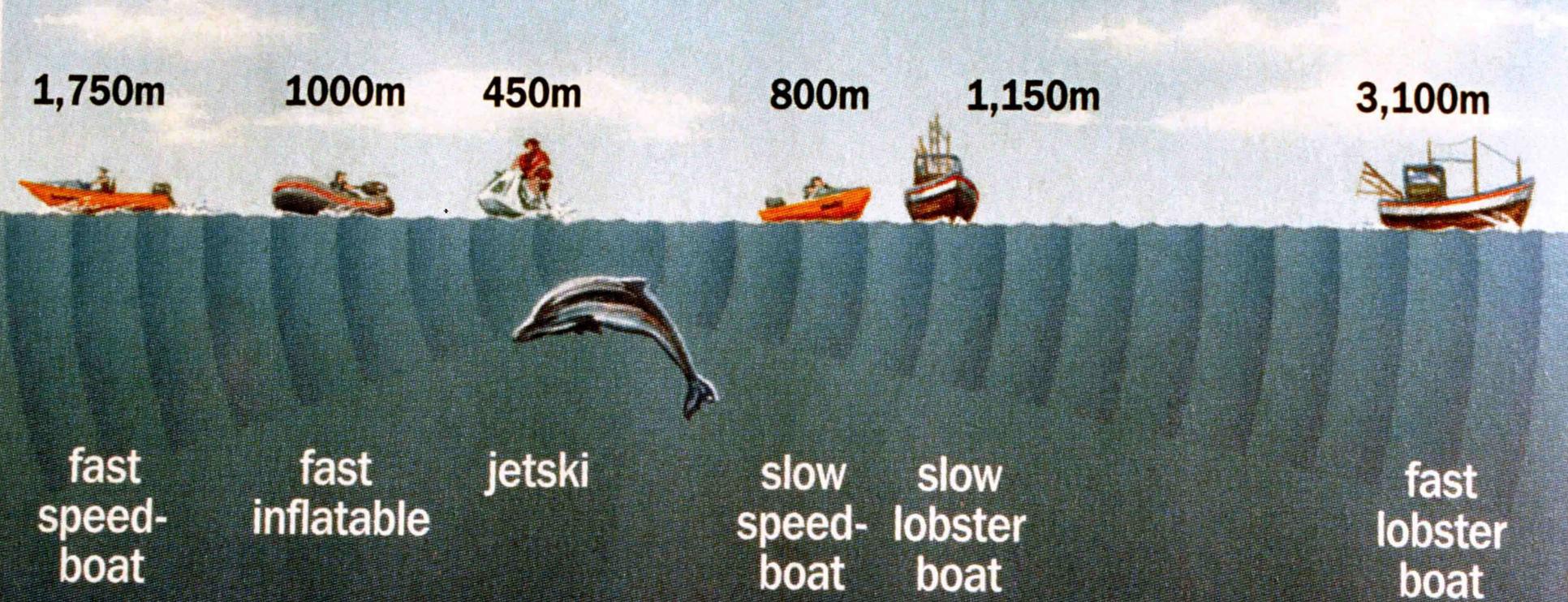


# The socio-economic value of dolphin watching in Wales



- No. of dolphin watchers in Wales rose from 17,000 (1998) to 33,350 (2008) and 45,150 (2011)
- No. of dolphin trip operators in Wales rose from 3 (1998) to 17 (2008) and 26 (2011)
- Direct income to trip operators rose from £147,000 (1998) to £659,000 (2008) and £1.09 million (2011) + indirect income from £1.33m (1998), to £1.70m (2008) and £2.82m (2011)

**Sources:** Hoyt (2001); O'Connor *et al.* (2009); Lambert & Evans (2012)

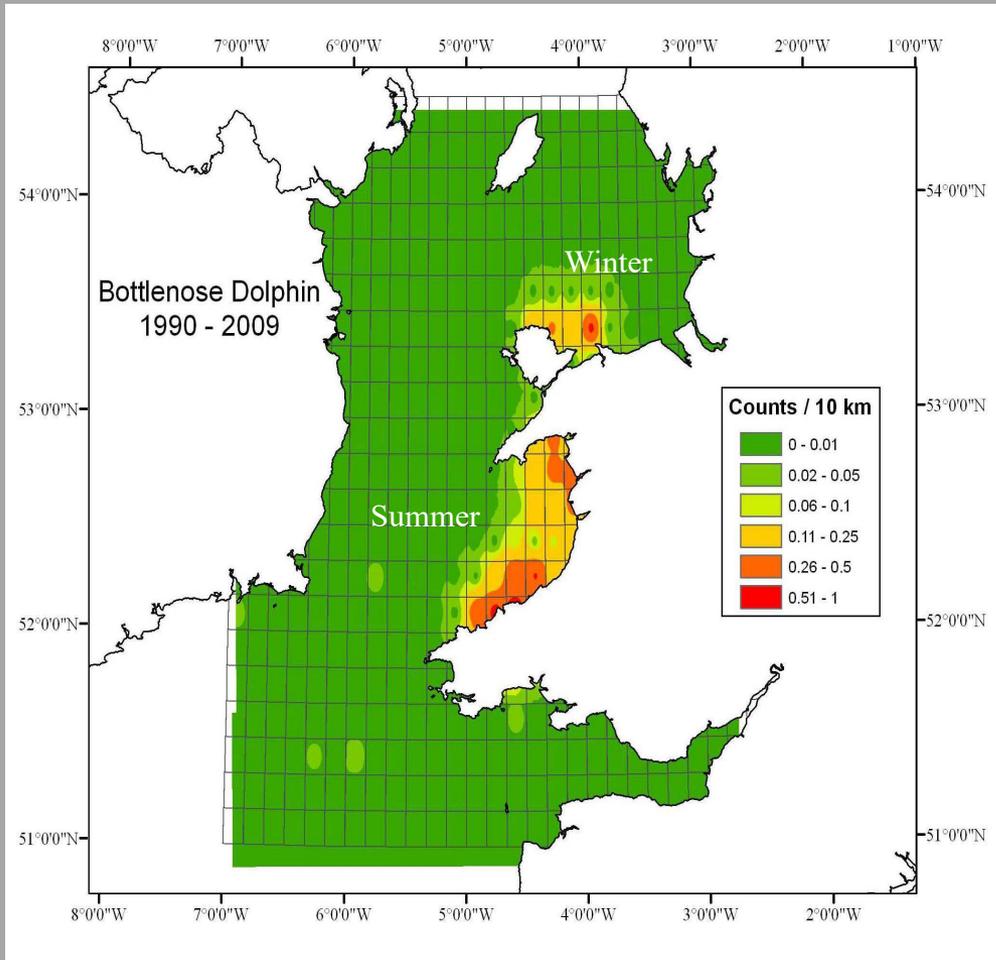


## Underwater engine noise

The diagram shows the ranges at which a bottlenose dolphin becomes aware of different types of vessel in the water

(Evans *et al.* 1992)

# Bottlenose Dolphin Distribution in the Irish Sea

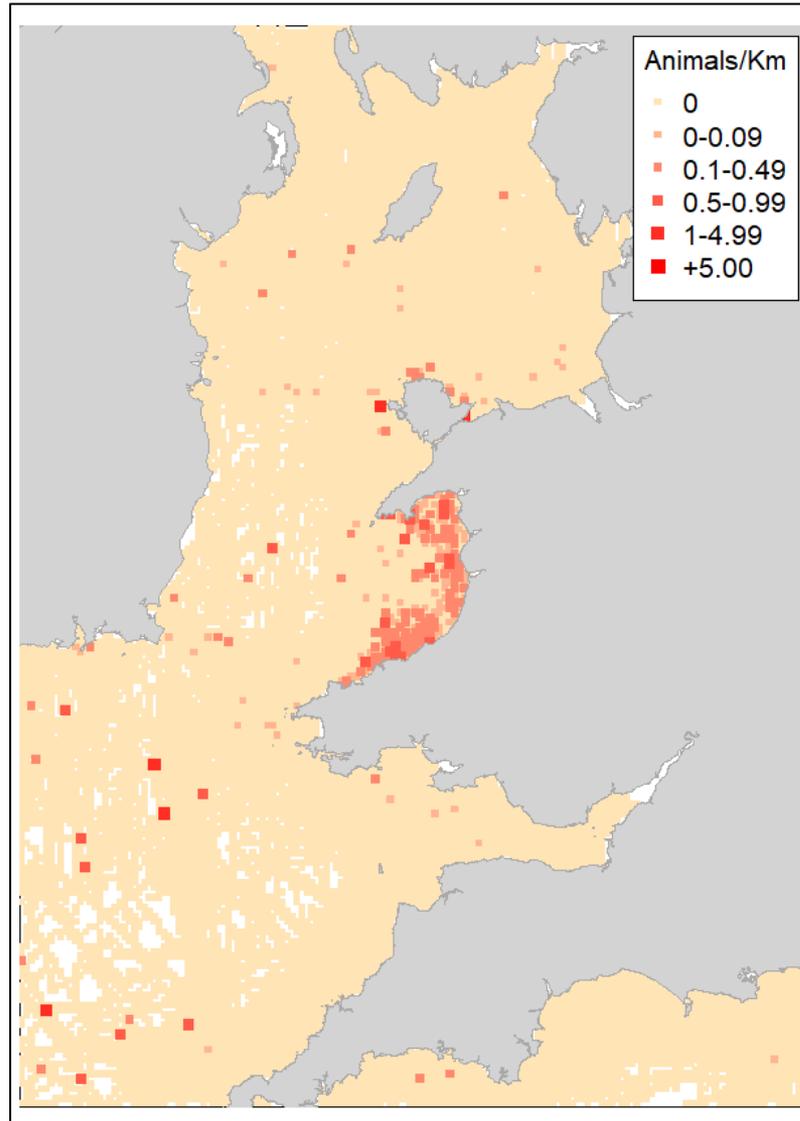


- locally distributed, mainly coastal, particularly in summer

- main summer concentrations are in Cardigan Bay & in winter, N Wales

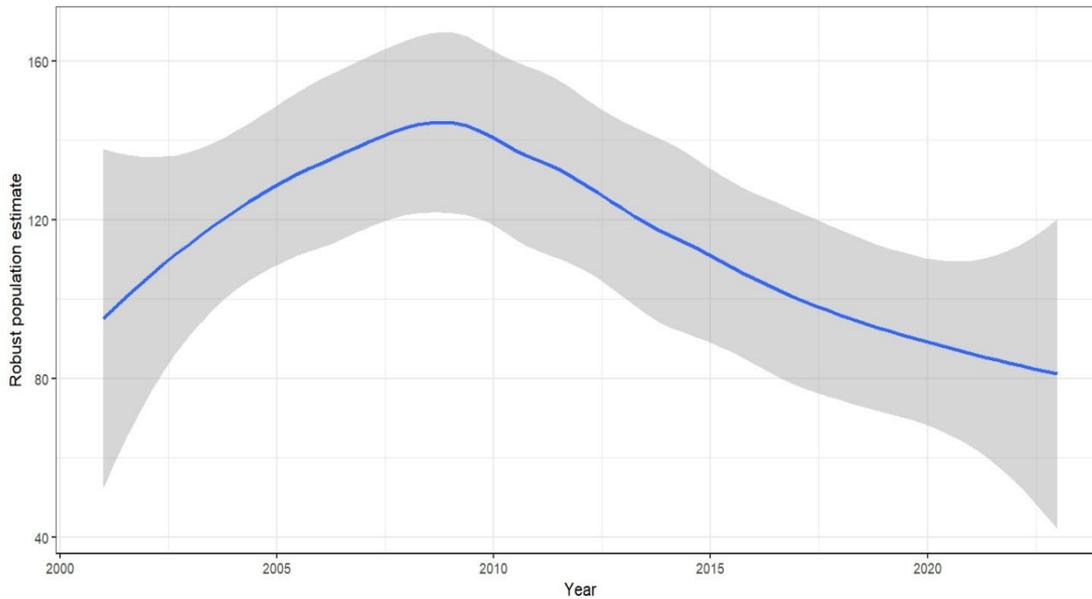
**Source:** Baines & Evans (2012) *Atlas of Marine Mammals of Wales*

# Bottlenose dolphin sighting rates: ten years on



**Source:** Evans & Waggitt (2023) *Atlas of Marine Mammals of Wales*

# 20-year trend in Bottlenose Dolphin Abundance in Cardigan Bay



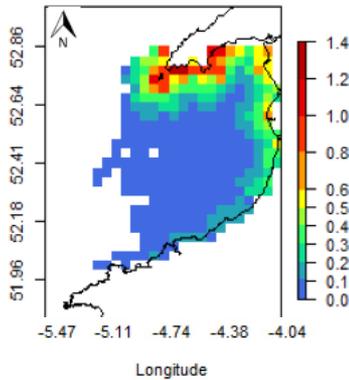
- Increase between 2001 and 2008
- Stable between 2008 and 2012
- Decline between 2012 and the present



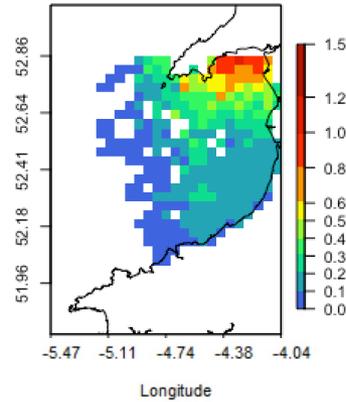
# Recreational Sea Use



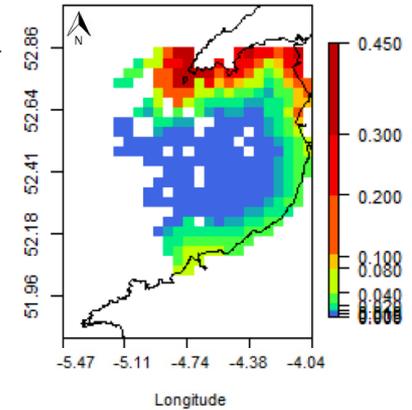
Kayaking



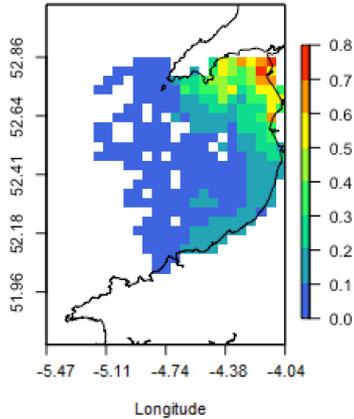
Sail boat



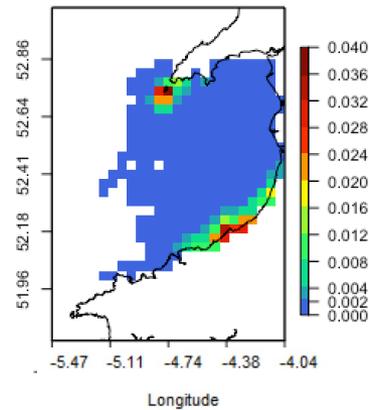
Speed craft



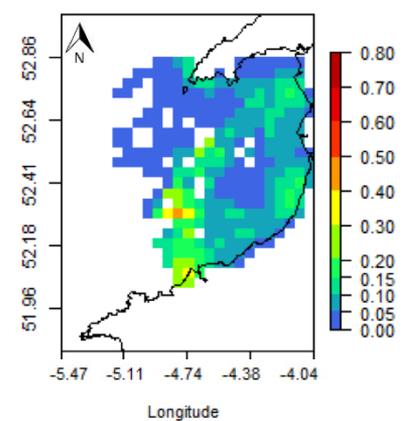
Motorised craft



Wildlife watching



Sea angling



Source: Vergara-Peña (2019)

# Effects of Recreational Activities on Bottlenose Dolphins

## *Short-term*

- swim away
- make longer dives
- swim faster
- whistle at different frequencies
- cluster together
- social group break-up can occur

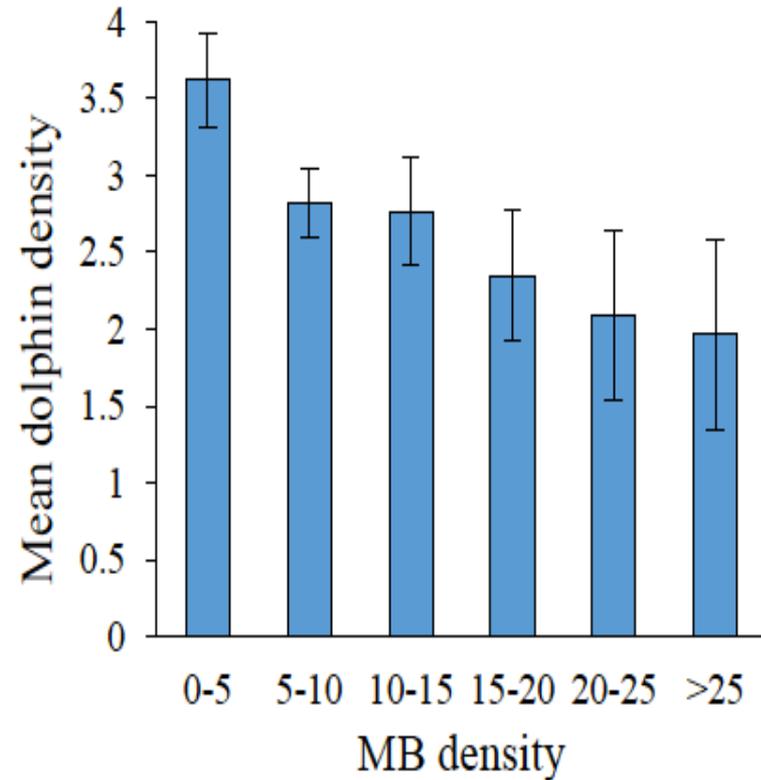
## *Long-term*

- move completely out of the area
- show overall population declines
- association patterns become disrupted



**Sources:** Bejder and Samuels (2003), Hastie *et al.* (2003), Mattson *et al.* (2005), Bejder *et al.* (2006a, b), Lusseau (2006), Lusseau *et al.* (2006, 2009), New *et al.* (2013), Hudson (2014), Pirota *et al.* (2014, 2015), Vergara-Peña (2019), Koroza & Evans (2022)

# Bottlenose Dolphin Encounter Rates in Relation to Recreational Activity in Cardigan Bay, Wales



- Bottlenose dolphin densities are lower when motor boat densities increase. in contrast to yachts or non-powered vessels



Sea Watch Foundation

# Dolphin

*D*olphins and porpoises share these waters with you, please show understanding when in their vicinity



## Code of conduct



Speedboats and jet skis can disturb their daily activities, scaring them away and even causing injury. Please observe the code of conduct opposite ►

The bottle-nosed dolphin and harbour porpoise are protected by law under the Wildlife and Countryside act (1981). If you see anyone deliberately harassing them, please report it to the police.

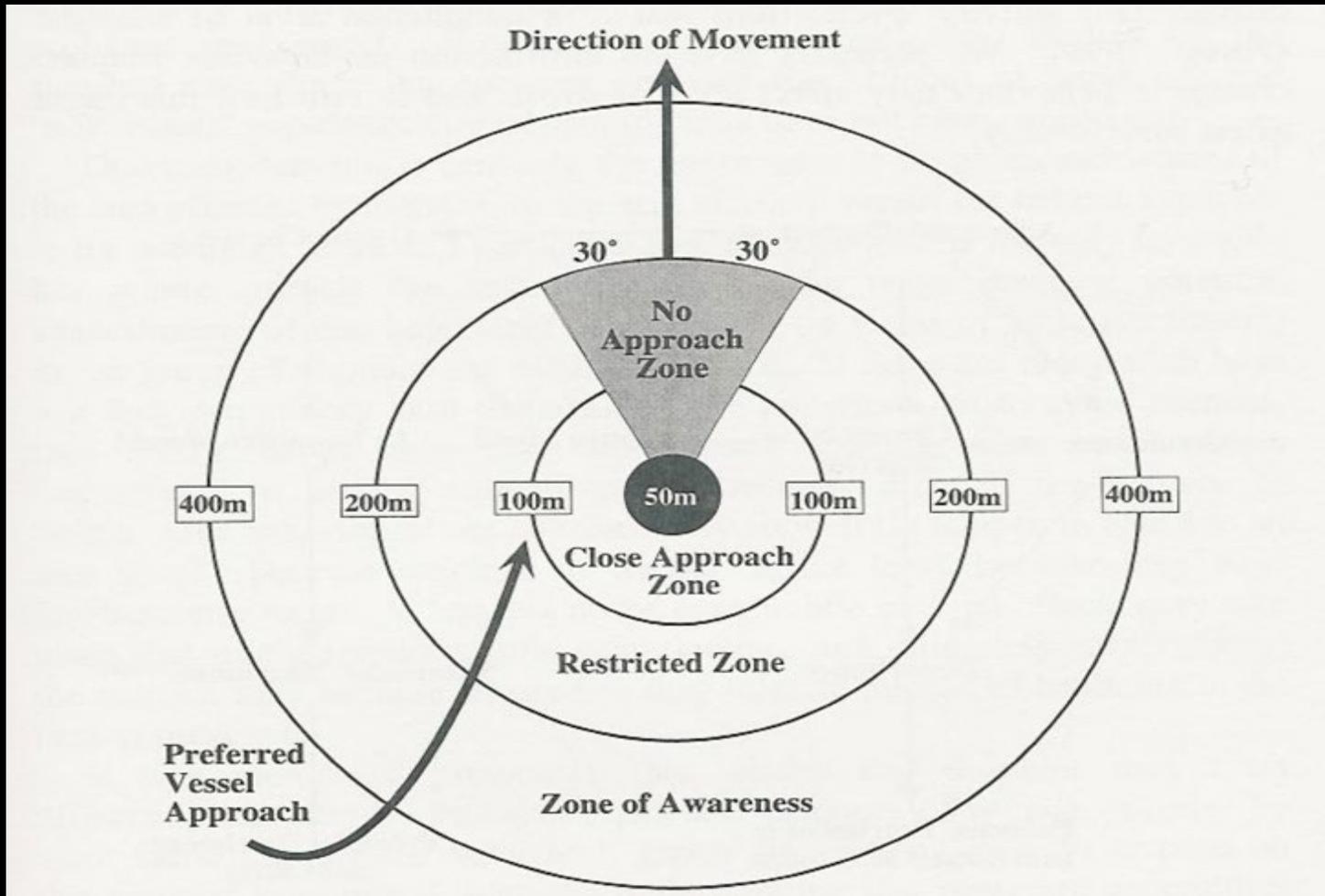
Produced by Sea Watch Foundation in conjunction with the UK Marine Society and with financial support from World Wide Fund for Nature and National Westminster Bank

NatWest

# Whale-watching Guidelines

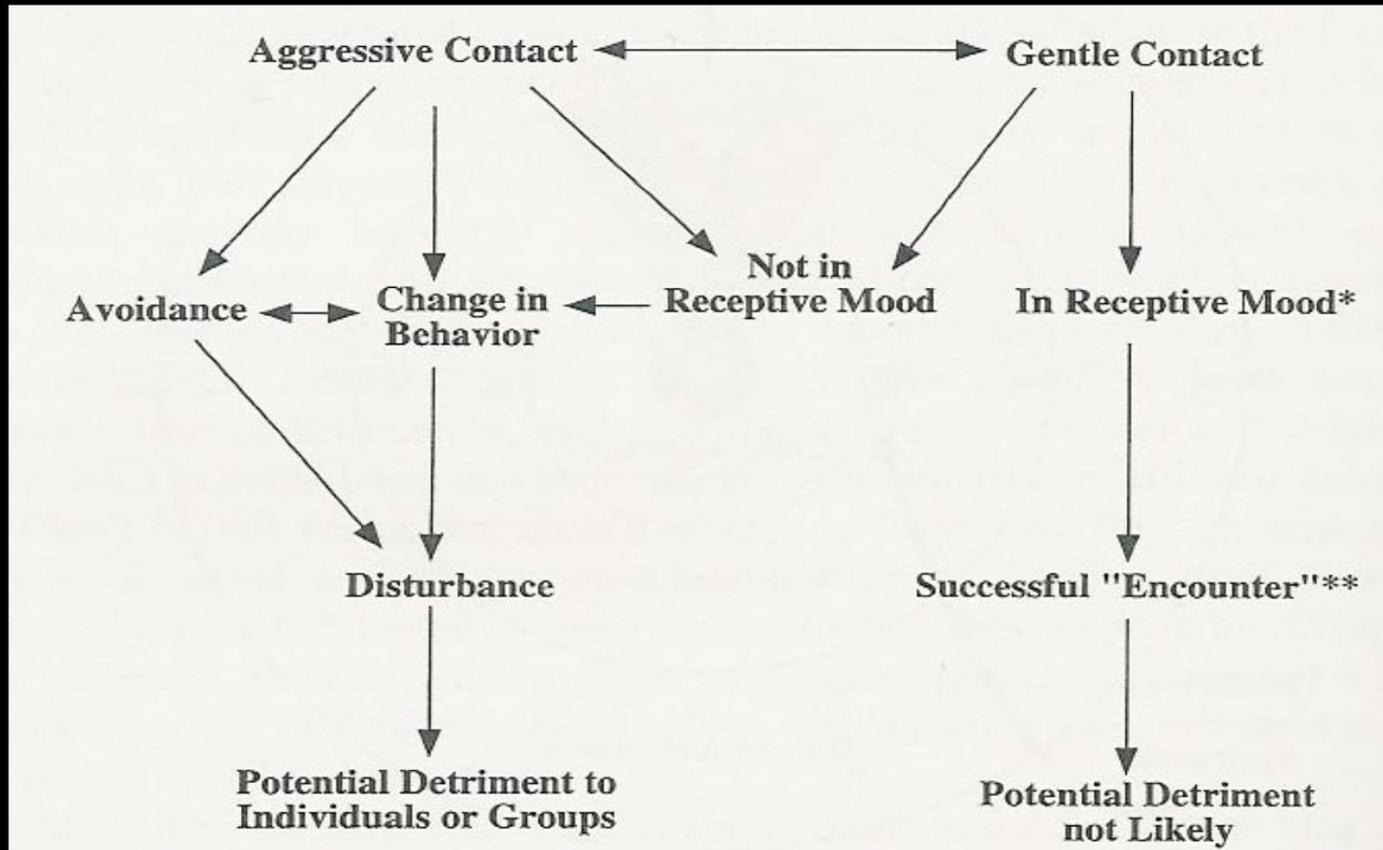
- Do not change course or speed in a sudden or erratic manner
- If possible, let cetaceans approach you. Do not steer directly at them. Otherwise approach cautiously from behind and to one side
- Avoid cetaceans with young
- Ensure cetaceans have an escape route
- Limit the number of vessels within close proximity of cetaceans

# VESSEL APPROACH DIAGRAM



Source: Würsig and Evans (2001)

# SCHEMATIC OF HOW TO APPROACH CETACEANS FOR “BEST WHALE-WATCHING RESULTS”



(Source: Würsig and Evans, 2001)

# Ceredigion Marine Code

In general keep a good look out and keep your distance. Do not approach marine mammals, let them come to you. Headlands and reefs such as Mwnt, Aberporth, Ynys Lochtyn, New Quay and Sarn Cynfelyn are very important feeding areas for dolphins and porpoises; take extra care to travel slowly and not to disturb animals in these areas. Please operate all boats with care and attention for the safety of occupants and respect for all other sea users. Do not discard litter or fishing tackle at sea.

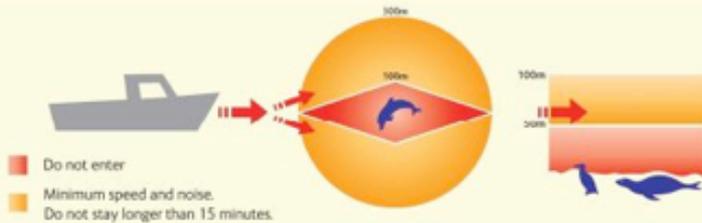
## Dolphins, Porpoises & Seals

If these creatures are encountered at sea please:

- Slow down gradually to minimum speed. Do not make sudden changes in speed or course.
- Do not steer directly towards them or approach within 100m.
- Do not attempt to touch, feed or swim with them.
- Take extra care to avoid disturbing animals with young.
- Do not approach seals resting on the shore, and do not enter sea caves during the pupping season (1<sup>st</sup> August to 31<sup>st</sup> October).
- Avoid any unnecessary noise near the animals.

## Birds

- Keep out from cliffs in the breeding season, 1<sup>st</sup> March – 31<sup>st</sup> July.
- Avoid any unnecessary noise close to cliffs.
- Keep clear of groups of birds resting or feeding on the sea.



*This code applies to all recreational vessels including motor boats, yachts, dinghies, personal watercraft, kayaks and canoes. Always comply with requests from the local patrol boats and be aware of speed restrictions around bathing beaches and wildlife sites.*

Note that Ceredigion Harbourmasters and Launch Control Officers are authorised to withdraw launching and/or mooring permits from vessels and individuals not observing local regulations, byelaws or the Ceredigion Marine Code. Deliberate or reckless disturbance of any protected species (such as dolphins) is a criminal offence.



Ceredigion County Council Department of Environmental Services and Housing



# Gwynedd Marine Code

In general keep a good look out and keep your distance. Do not approach marine mammals, let them come to you. Please operate all boats with care and attention for the safety of occupants and respect for all other sea users.

## Dolphins, Porpoises & Seals

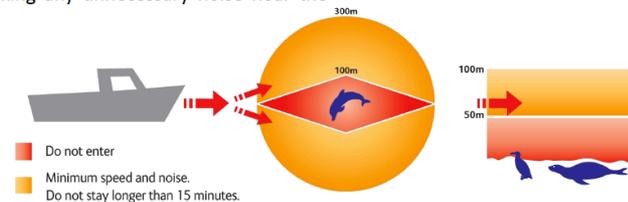
If these creatures are encountered at sea please:

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[www.penllynarsarnau.co.uk](http://www.penllynarsarnau.co.uk)



@ACA\_PLAS\_SAC



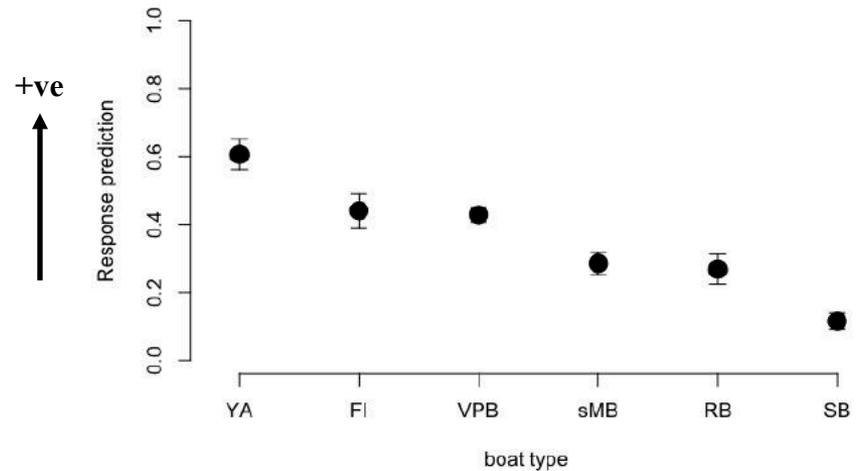
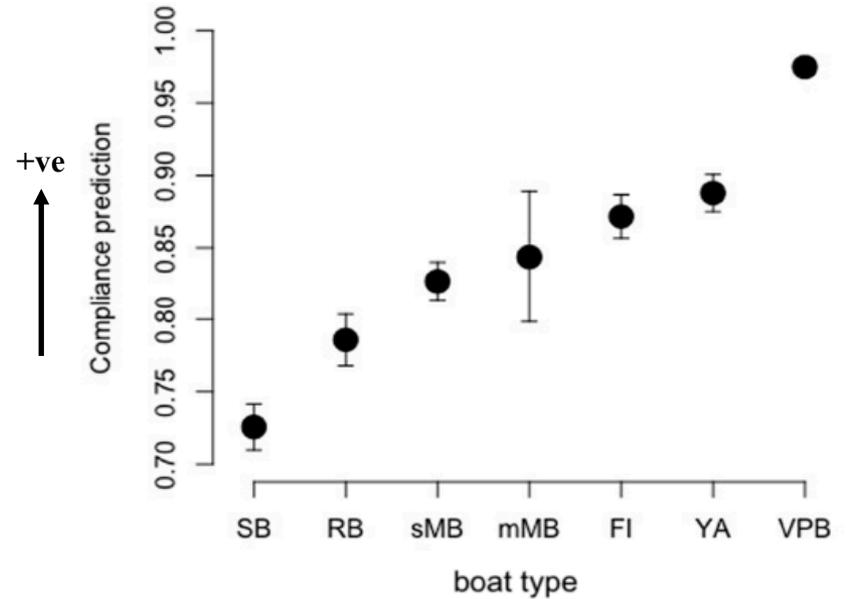
Pen Llyn a'r Sarnau

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Marine Ecosystems Project



# Compliance to the local Code of Conduct & Bottlenose Dolphin Reactions to Boats

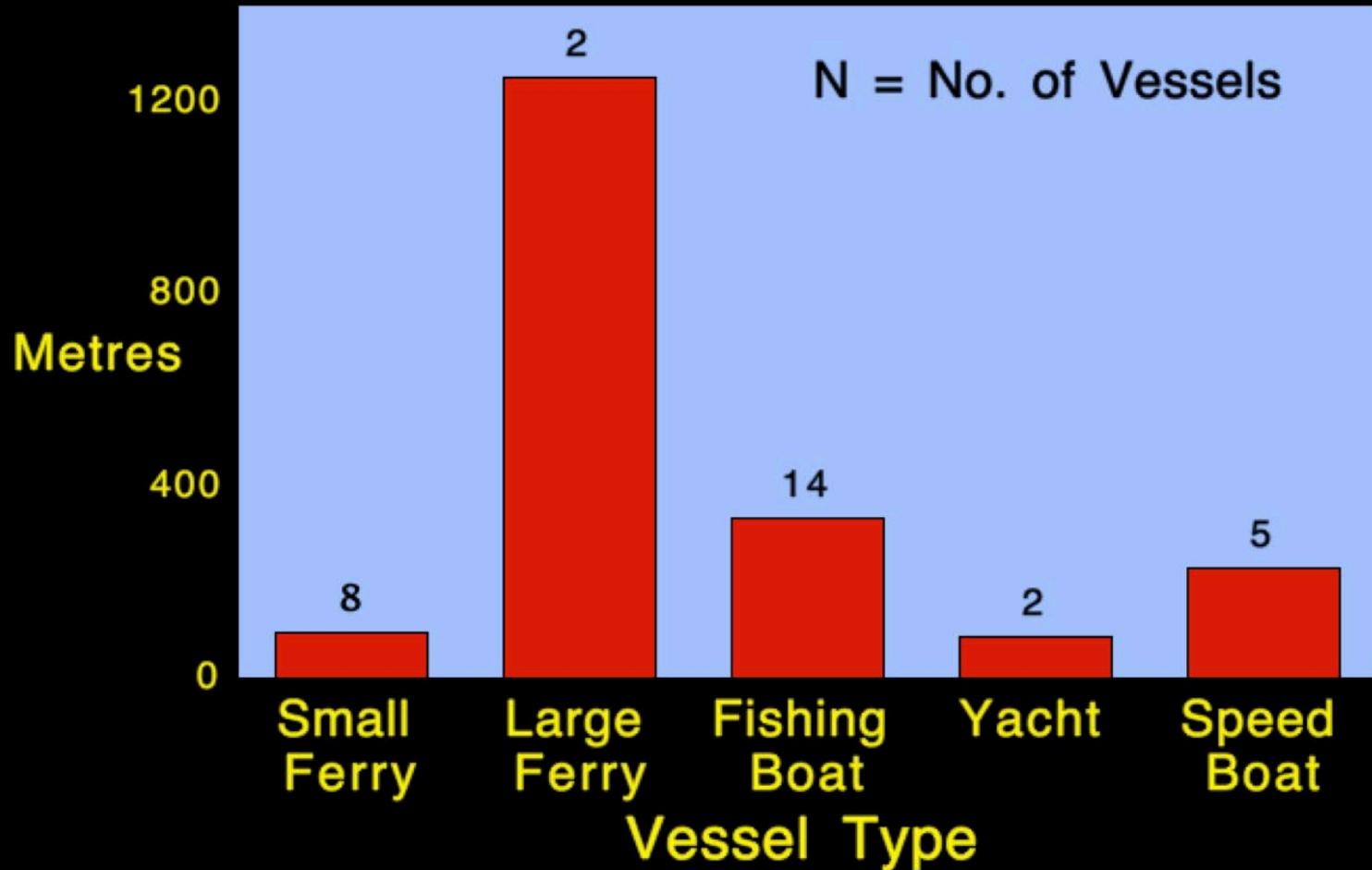


Source: Koroza & Evans (2022)

# **Studies of Harbour Porpoise Interactions with Vessels**

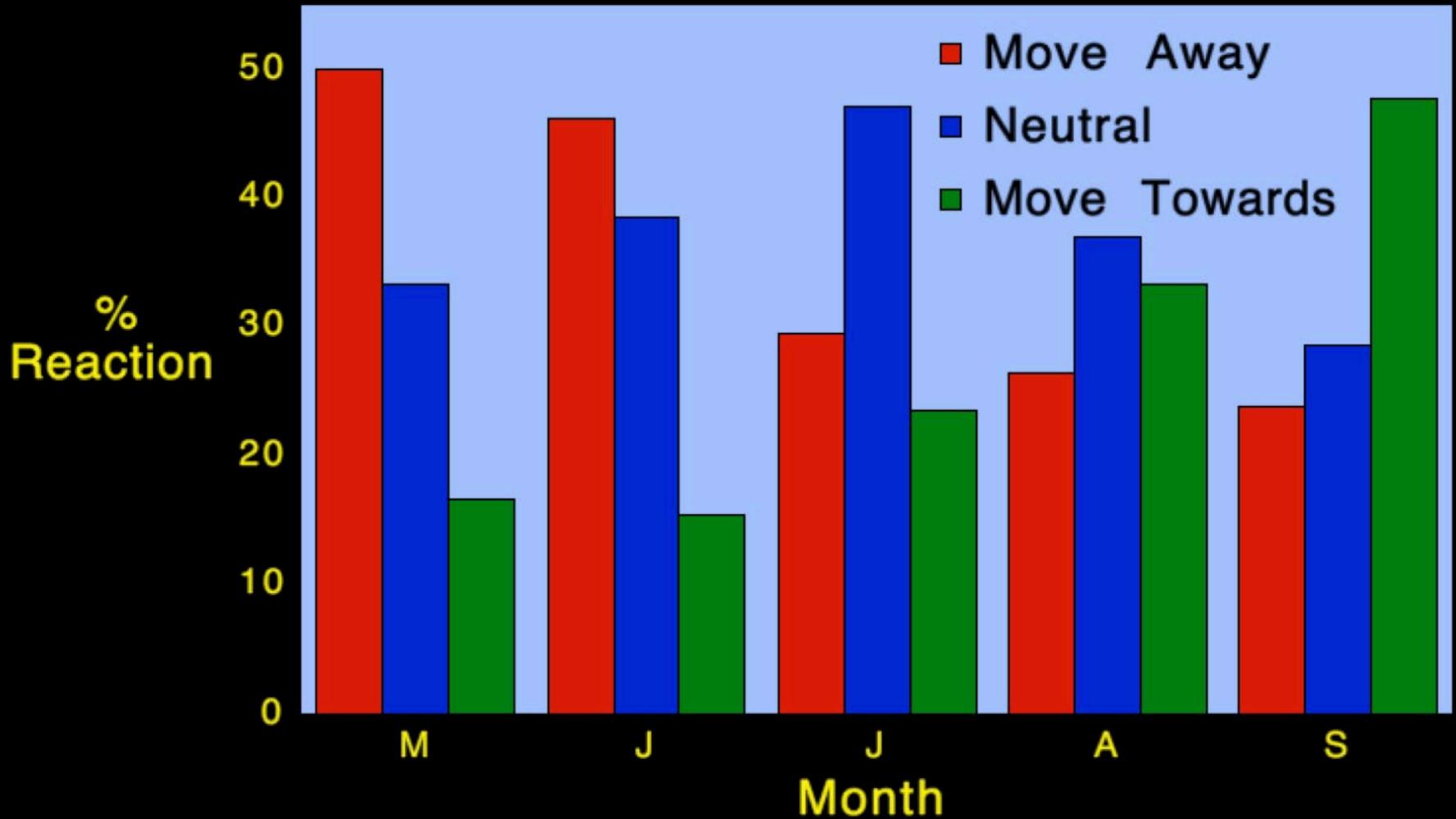


# Average Distance That Different Vessels Invoke a Negative Reaction from Porpoises



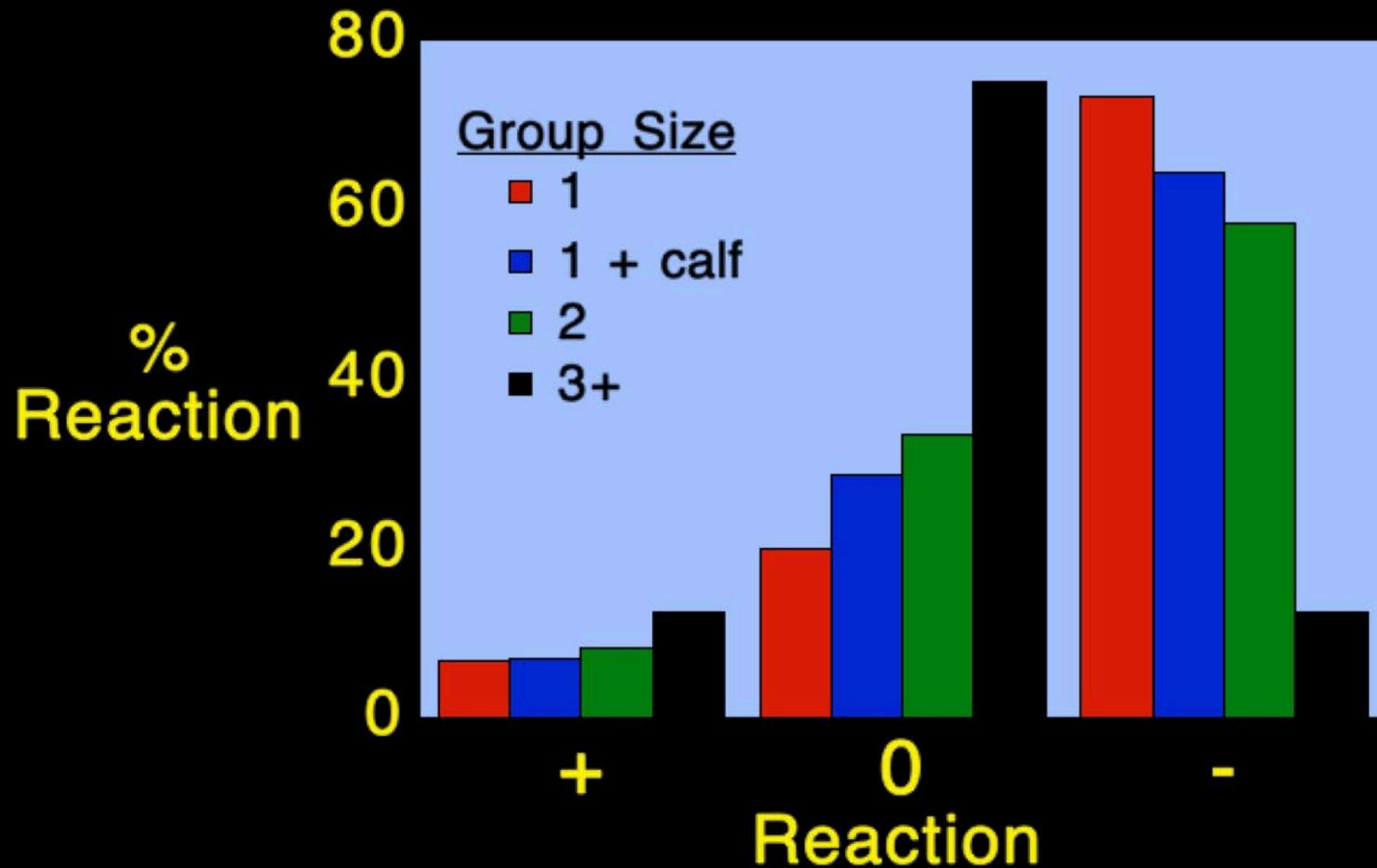
(Evans et al., 1994; Evans, 1996)

# Seasonal Changes in Porpoise Reactions to Vessels



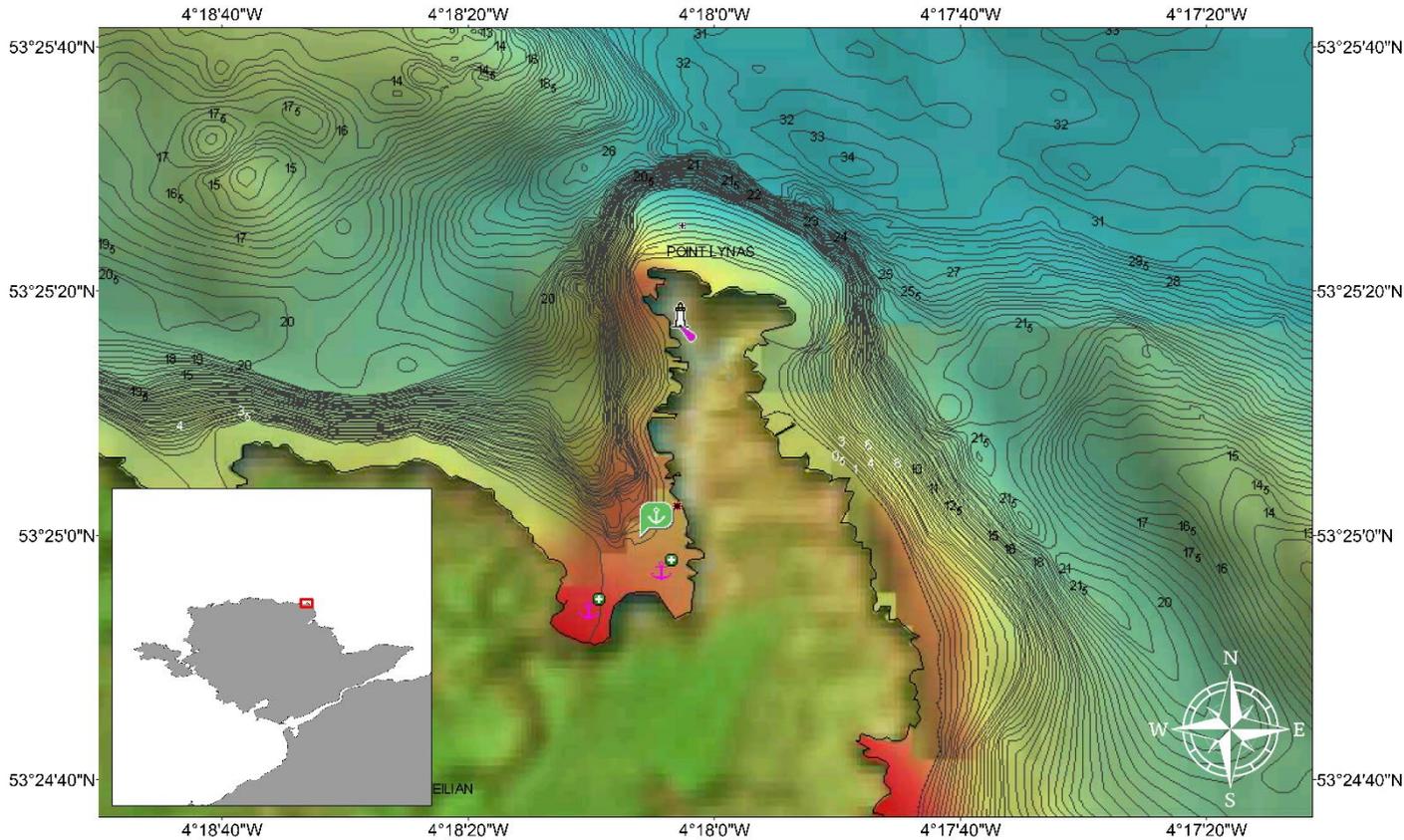
(Evans et al., 1994; Evans, 1996)

# Reactions to Vessels (all types combined) of Different Porpoise Group Sizes

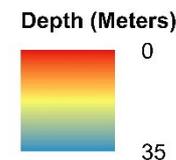


(Evans et al., 1994; Evans, 1996)

# Theodolite Studies of Harbour Porpoise Reactions to Recreational Craft



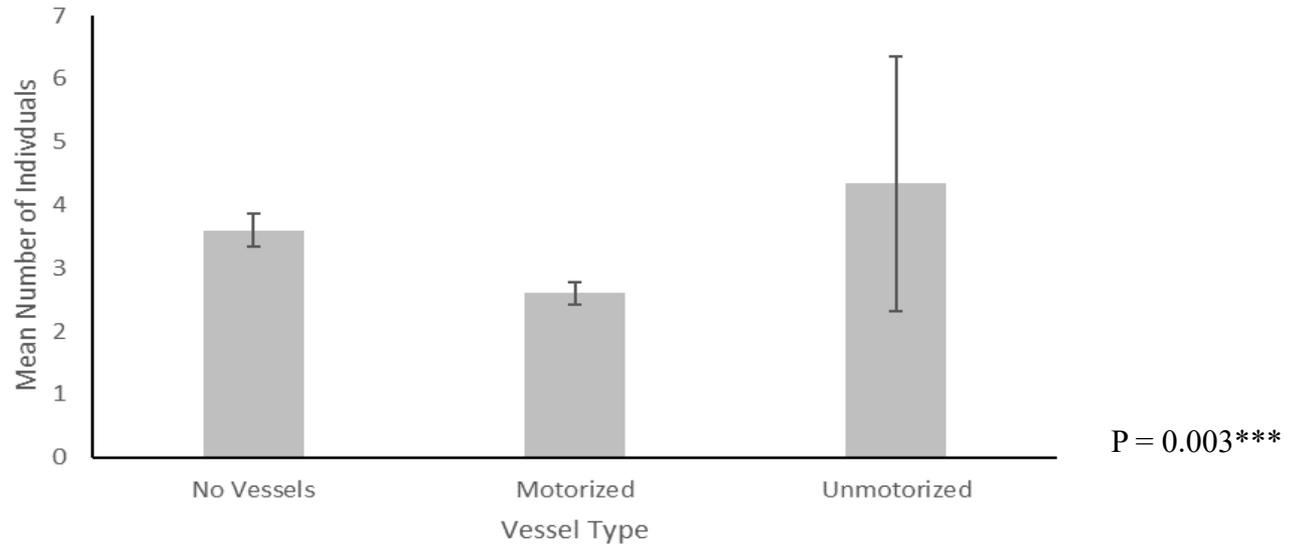
Study Area: Point Lynas, North Anglesey



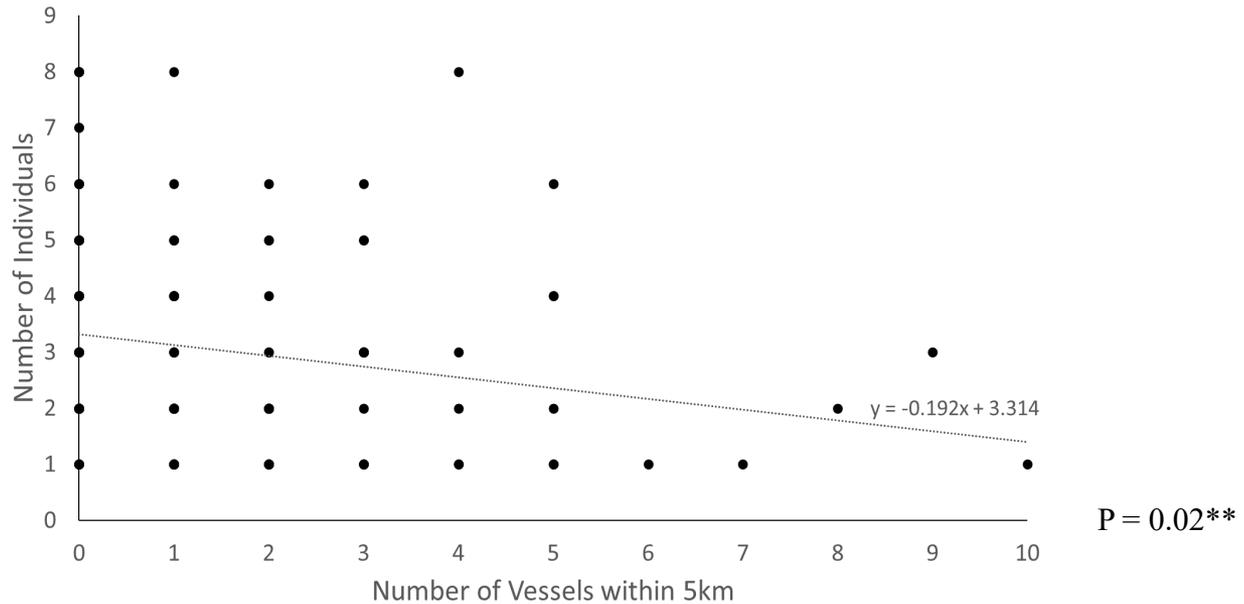
Vessel Type	Vessel Example
Small Fishing Boat	
Large Fishing Vessel	
Research Vessel	
Speed Boat	
Jet Ski	
Kayak	
Sailing Boat	

Source: Grundy (2021)

a) Mean porpoise numbers when motorised, non-motorised, or no vessels were present

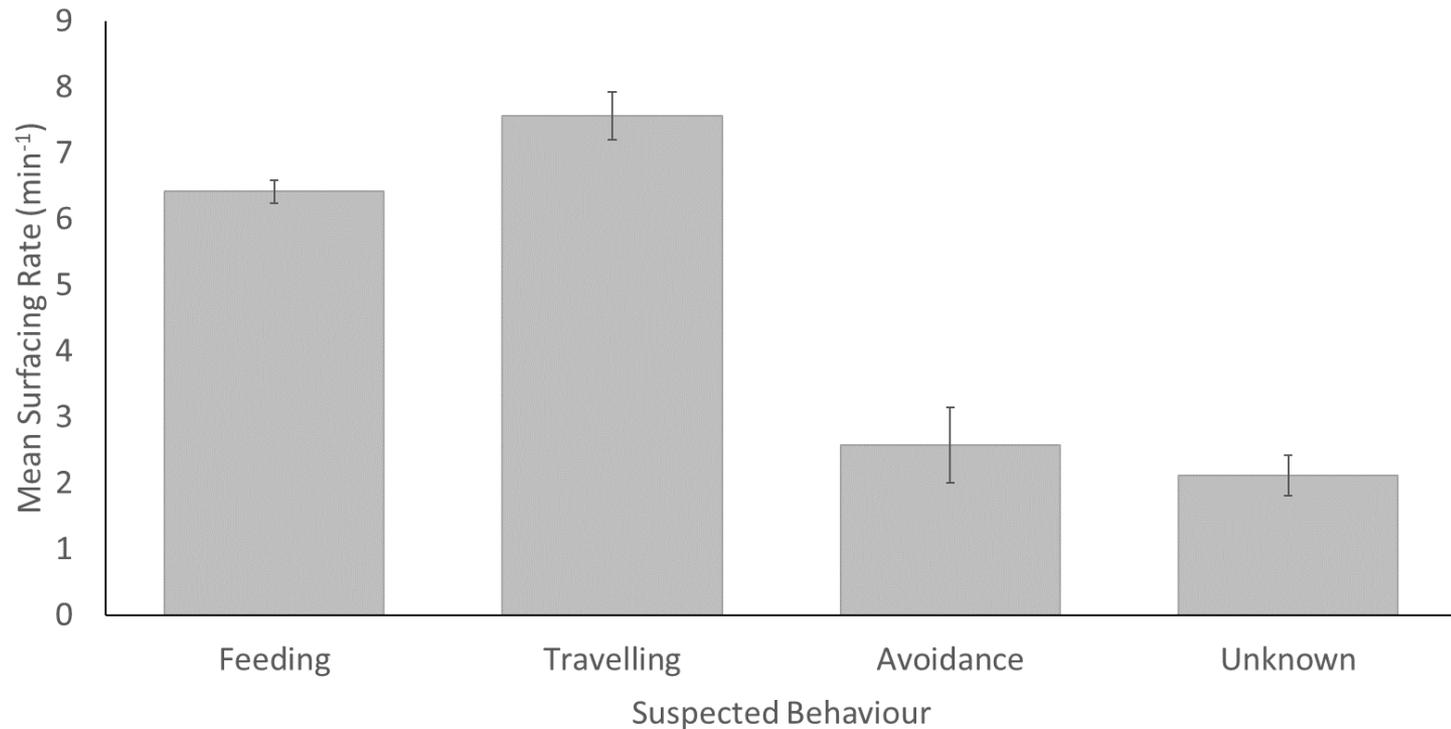


b) Porpoise numbers decline when vessel densities increase



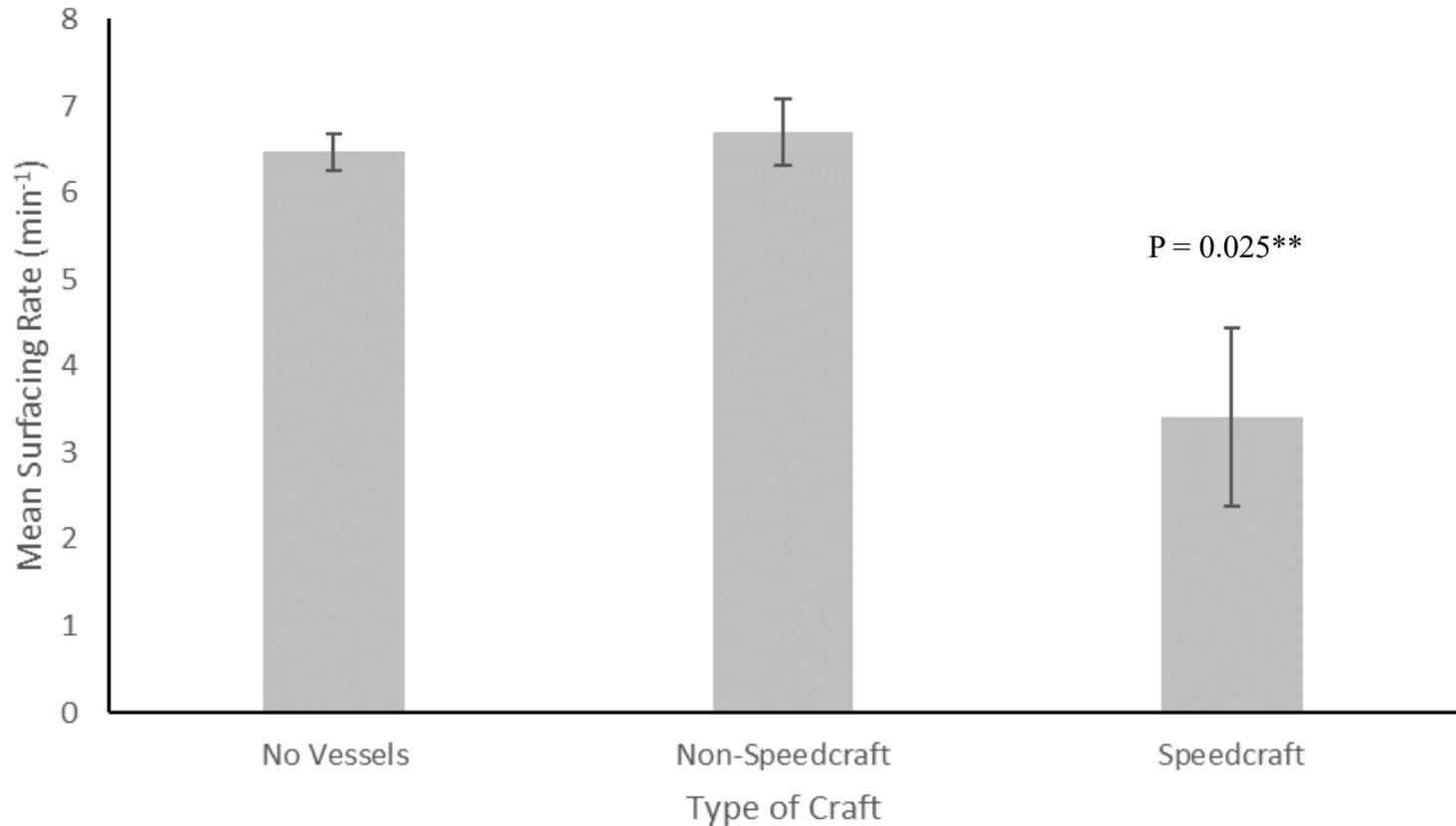
Source:  
Grundy (2021)

Porpoise mean surfacing rates were significantly lower when animals showed avoidance behaviour vs travelling or feeding



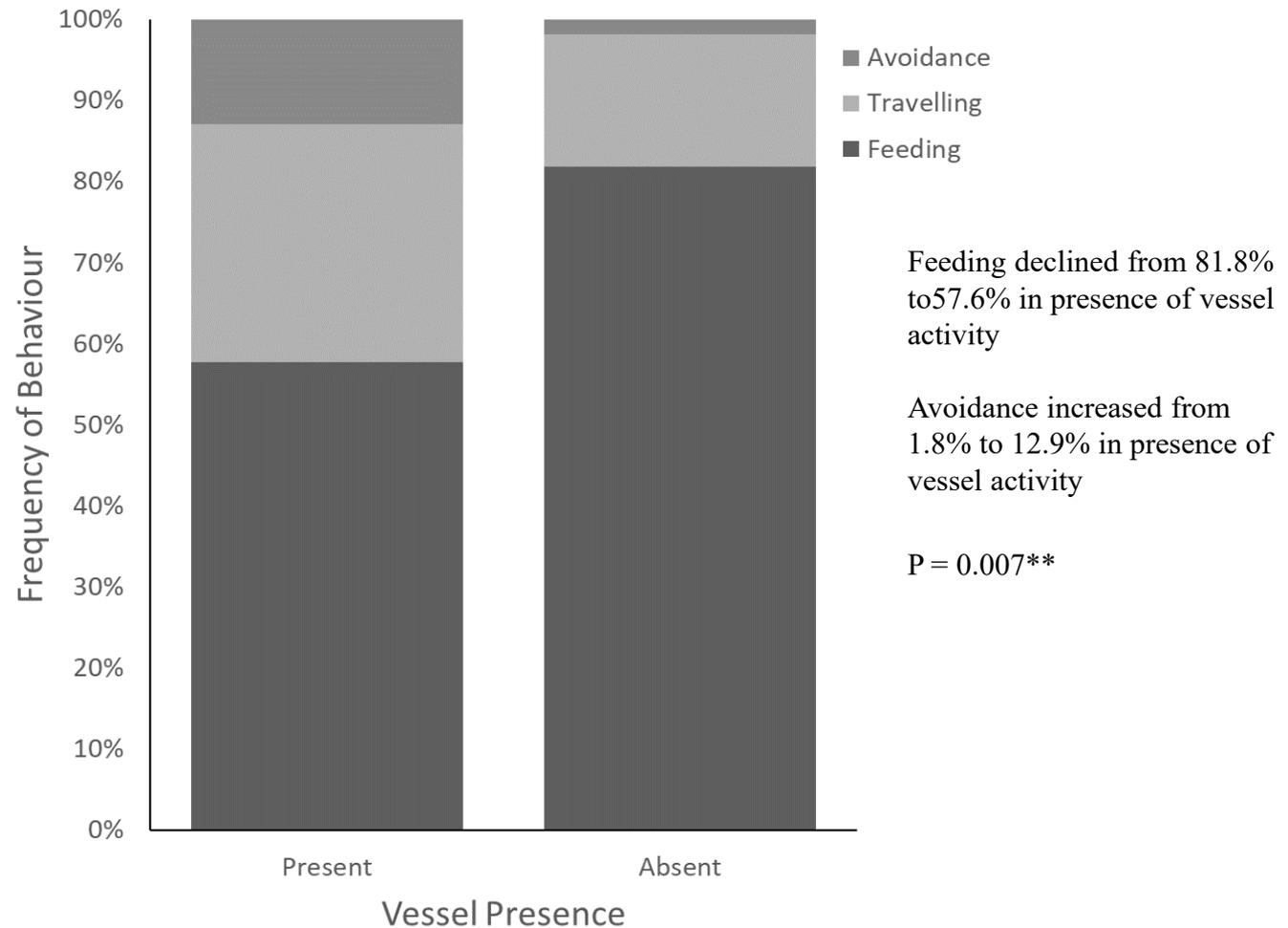
**Source:** Grundy (2021)

Porpoise mean surfacing rates were significantly lower when speed craft were present compared with non-speed craft or no vessels at all



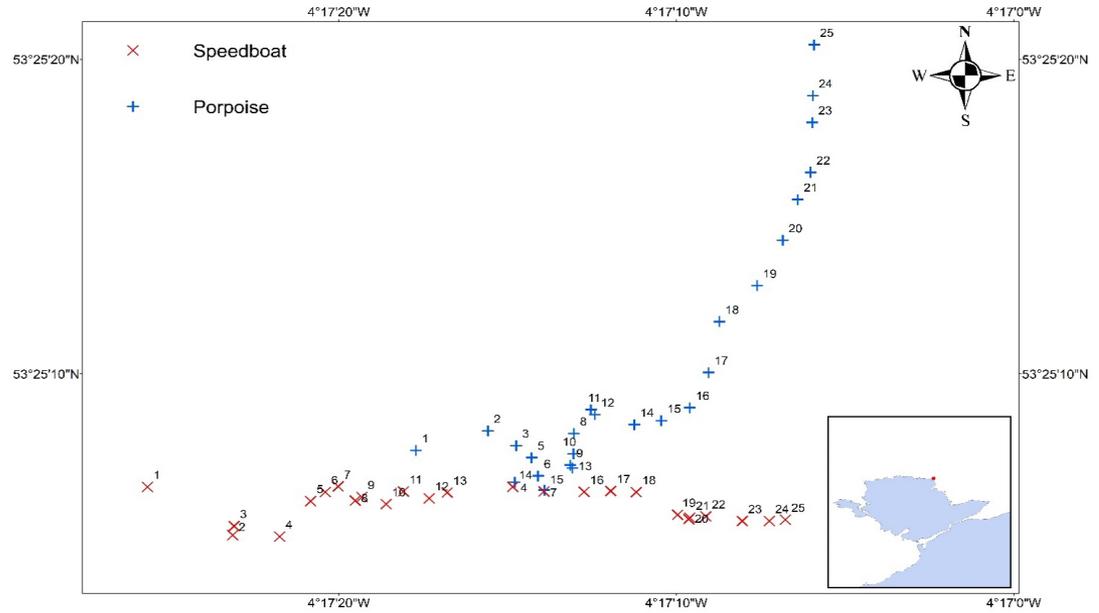
**Source:** Grundy (2021)

# The frequency of three main harbour porpoise behavioural states in the presence or absence of marine craft

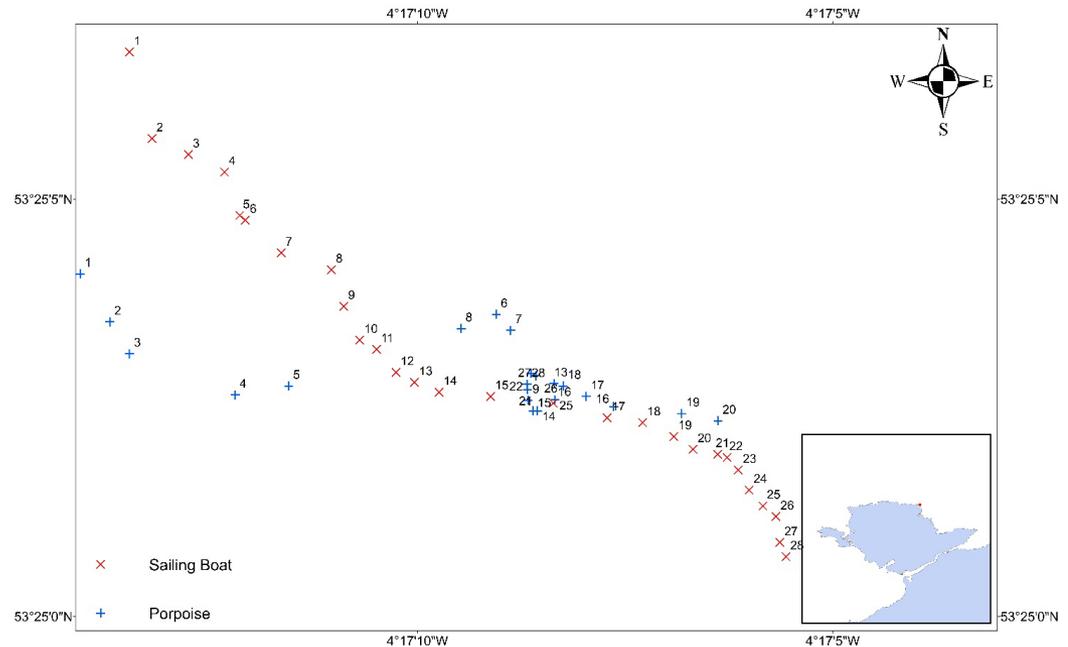


**Source:** Grundy (2021)

# Theodolite track of harbour porpoise in the presence of a speedboat

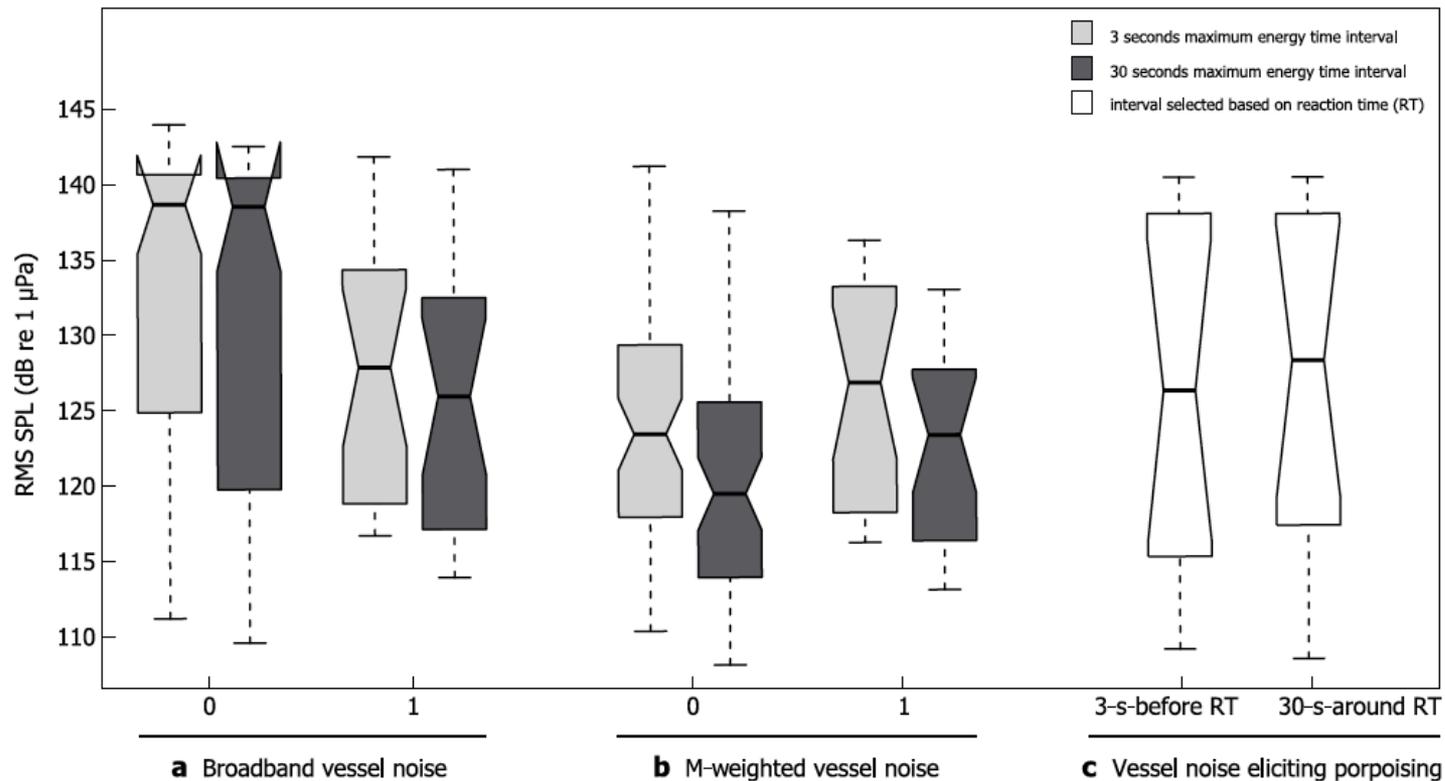


# Theodolite track of harbour porpoise in the presence of a sailboat



**Source:** Grundy (2021)

# Harbour Porpoise Reactions to High Frequency Vessel Noise



**Figure 1.** The distribution of rms sound pressure level calculated over different time intervals. (a) 3 seconds and 30 seconds of broadband vessel noise with maximum energy, (b) 3 seconds and 30 seconds of M-weighted vessel noise with maximum energy, (c) 3 seconds before and 30 seconds around reaction time (RT) - only for vessel noise eliciting porpoising behaviour. The thick line inside the box shows the median; the lower and upper edges of the box indicate the 1st and 3rd quartile, respectively; whiskers bound the minimum and maximum of the distributions. 0 - no reaction, 1 - reaction (porpoising) was observed. rms = root-mean-square.

# Harbour Porpoise Reactions to High Frequency Vessel Noise

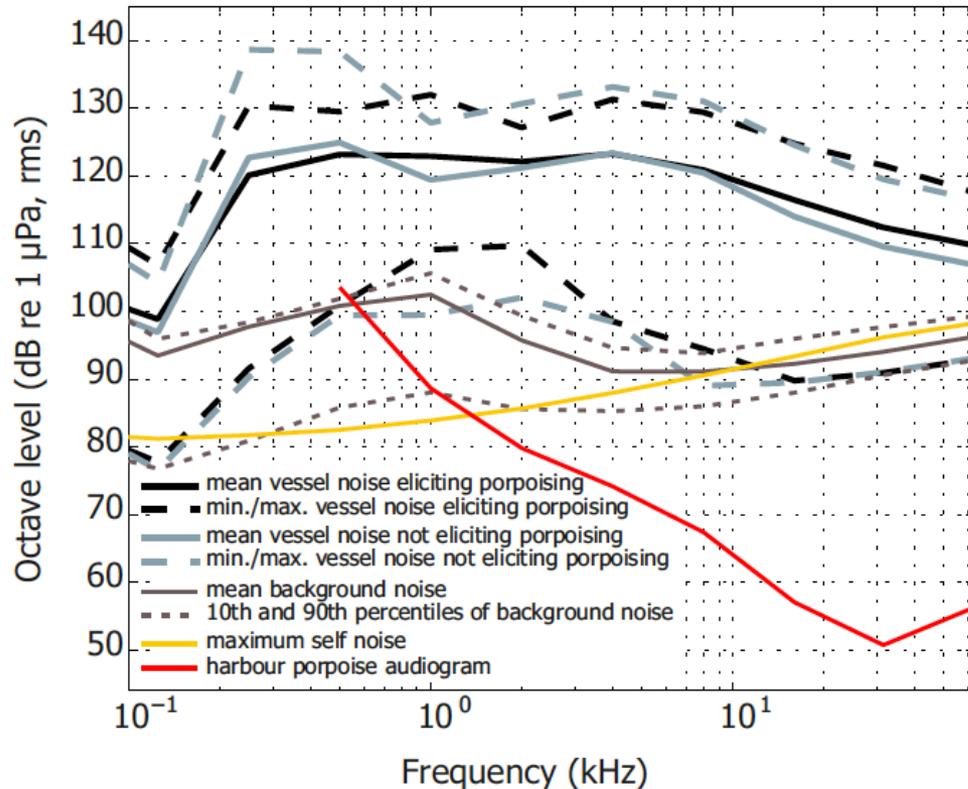
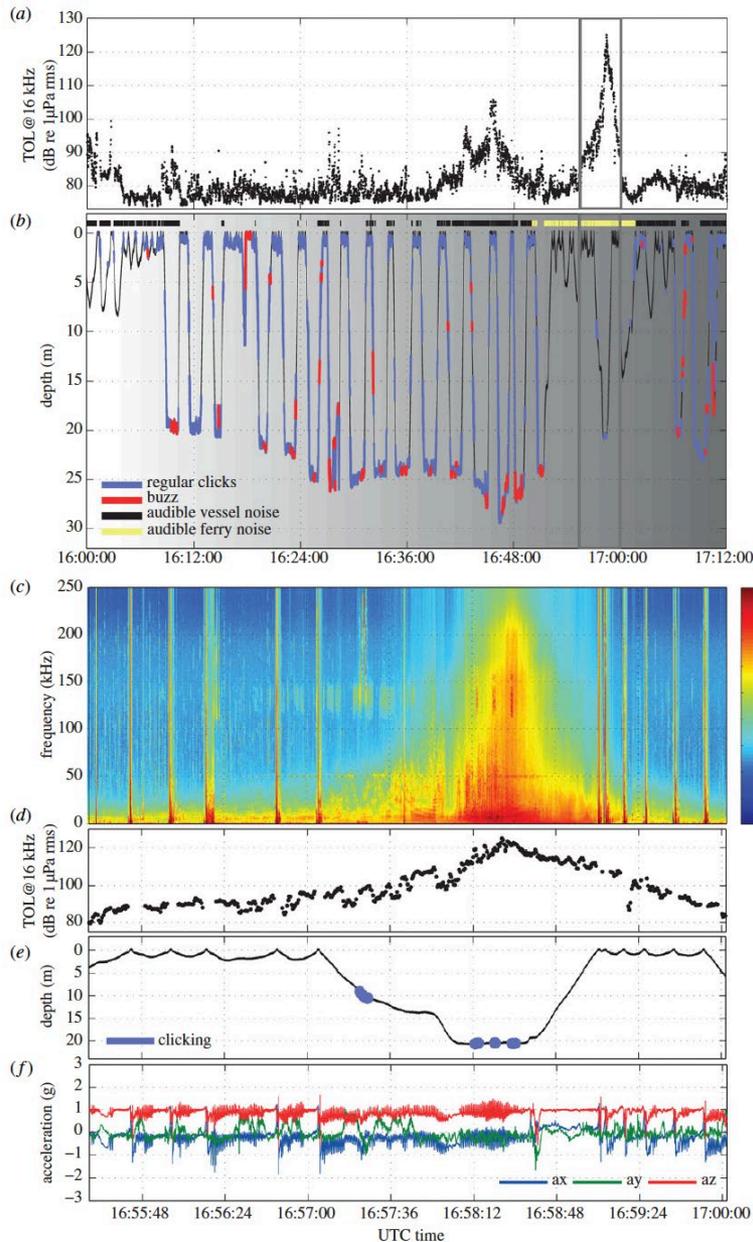


Figure 2. Mean, minimum and maximum of vessel noise (30 seconds with maximum energy) shown in octave bands superimposed on a harbour porpoise audiogram [red line; (adapted from 31)]. Noise evoking porpoising behaviour is indicated in black. Mean octave levels (solid) and 10<sup>th</sup> and 90<sup>th</sup> percentiles (dotted) of background noise are shown as grey lines. The maximum self-noise of the recording system is indicated by the yellow solid line.

# Diving and foraging behaviour of a porpoise around the time of passage of a presumed fast ferry



(a) 16 kHz Third Octave Band Noise Levels, TOLs (0.5 s trimmed mean averages over 1 ms measurements).

(b) Dive profile with the time during which the porpoise produced regular and buzz clicks marked in blue and red, respectively. The thick black lines above the profile show the times with audible vessel noise in the recordings. The yellow overlay marks the period when the ferry noise was clearly audible above other vessel noise. Shading marks twilight & night-time.

(c) Spectrogram composed of power spectral densities in 1 Hz bands. The broadband vertical bands indicate noise when the porpoise surfaces.

(d) Detail of Third Octave Band Noise Levels (TOLs)

(e) dive profile during the close-up interval.

(f) Acceleration. The oscillations in the x- and z-axes indicate propulsive motions.

# Working with the Police to improve public awareness of the dangers to marine wildlife from vessels



## How to approach marine wildlife safely: all vessels



Boat operators for dolphin/whale watching



### 1. Speed

.....→ 100 meters  
max 6 knots



Gradually reduce speed and approach from side. Do not cut off engine to allow mammals to find you. Keep a minimum distance of 100 meters, and allow them to approach you.

### 2. Behaviour

sudden changes in speed



alarm calls



stampedes

mother shields calf



No more than 2 boats within 100 meters. If animals exhibit tail/head slaps, sudden diving or increased speed and movement away from boat, do not chase them. Be aware of above signs of disturbance.

### 3. Moulting



bird moulting season  
Aug - Dec



max 6 knots

### 4. If you see marine wildlife disturbance, CALL 101

Note boat ID, date/time, species & behaviour



Follow the law. Keep your permit. Protect marine wildlife.

Diverse seabird breeding colonies are found around cliffs. During the moulting season, they are increasingly vulnerable due to inability to fly. Seals also moult between Nov - April. Keep speed low.

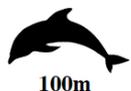
## How to make the most of your time with marine wildlife

# Know how to act

If you spot birds or marine mammals whilst out on the water, be sure to...



Reduce your speed slowly when you spot an animal. Stay at a speed **less than 6 knots**, but do not kill the engine.



100m

Remain at a distance of **at least 100 metres** away from the animals.



Do not crowd the animals. Make sure there are **no more than 2 boats** around the animal at any one time.



Do not stay with the animals for more than **15 minutes**.

Approach animals **from the side**. Do not chase them or approach from behind.



## Know the animals

The following behaviours may be a sign that you are disturbing wildlife. If animals display these signals, give them more space.

### Birds:

- Fly, walk or run away from you
- Flap their wings while standing or sitting
- Attack to defend their territory
- Call out in alarm



### Seals:

- Wake up to look directly at you
- Move suddenly from their resting position
- Stampede or suddenly dive into the water
- Dive or swim away from you



### Whales, dolphins and porpoises:

- Slap the water with their flipper or tail
- Dive, move away or come to the surface less
- Group together or make unpredictable movements



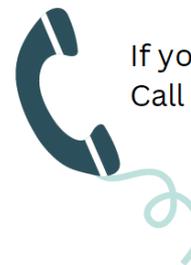
## Know the law



Did you know it is against the law to...

- Intentionally kill, injure or take any wild animal
- Intentionally or recklessly disturb any wild animal
- Sell, be in possession of, or transport for selling animals
- Take, damage or destroy the nest or eggs of a wild bird

Note that Anglesey Council Maritime Officers are authorised to **withdraw launching and/or mooring permits** from vessels and individuals not observing local regulations.



If you spot wildlife disturbance. Call 074865421986

### Breeding, wintering and moulting seasons

Give animals extra space during breeding seasons. Disturbance could prevent breeding or leave young vulnerable to disturbance, predators and starvation.

#### Breeding seasons:

- **June to January** for seals
- **February to September** for birds
- **Summer months** for dolphins, whales and porpoises

#### Wintering season

for birds is **between September and March**. This is a time when they need to conserve energy. Repeated disturbance could cause them not to survive the winter.

#### Moulting season:

- **Birds** moult in **late summer/ early autumn**. During this time they may not be able to fly.
- **Seals** moult **between November and April, and in August**. At this time they need to conserve energy to grow a new coat.