

Disentangling foraging from occurrence in a passive acoustic monitoring time-series improves knowledge of drivers of foraging activity in harbor porpoise (*Phocoena phocoena*)

Nicole R E Todd ^{1,2}, Mark Jessopp ^{1,2}, Emer Rogan ², Ailbhe S Kavanagh ³

¹ MaREI Centre, Environmental Research Institute, University College Cork, ² School of Biological, Earth & Environmental Sciences, University College Cork, ³ Marine Institute, Oranmore, Co. Galway, Ireland

Context

Harbor porpoise are protected as an **Annex II species** under the EU habitats directive.

Understanding their distribution and habitat usage is important for management and effective conservation.

Methods

1. Passive acoustic data collected from **CPODs** in Broadhaven Bay NW Ireland
2. Foraging events were identified based on inter-click interval (time between successive clicks), and **proportion of time spend foraging** calculated.
3. **GEE-GAMs** were used to model spatiotemporal distribution of foraging with associated environmental variables



Fig. 1: Location of study site

Objective

- Investigate the **spatial and temporal** patterns of harbor porpoise foraging activity
- Foraging activity was investigated at **multiple temporal scales** (daily, monthly) to give a more holistic insight into porpoise habitat use

Results and discussion

- **One third** of porpoise detections classified as feeding events
 - Important area for foraging
- Similar variables retained in daily and monthly models highlighting their importance at both **broad and fine** temporal scales
- Foraging activity correlated with **temperature, absence of construction activity**
- Preference for **nocturnal** foraging was shown



Fig. 2: Explanatory variables in fitted GEE-GAMS

- Foraging activity varied seasonally with **peak foraging events detected in autumn (40% of clicks)**
 - Suggesting seasonal changes in prey availability or energetic requirements
- **Interannual variability** in foraging behaviour operating on a **2-4-year cycle**
 - Reflecting **contrasting patterns to biannual occurrence** patterns from the region
- Increase in porpoise foraging events with **co-occurrent dolphin detections**,
 - Despite previous reports of decreased porpoise occurrence with dolphin presence

Conclusions

9-years of robust acoustical data shows **interannual, seasonal and diel variation**

Drivers of occurrence and foraging in harbor porpoise are **not necessarily colinear**

Contrasting social and community dynamics in association with nearby dolphin species

Methods adaptable to various species to identify foraging areas and **improve conservation**