



Interaction of Marine Mammals with tidal turbines

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Introduction

Currently in the early stages of background research, this project aims to simulate the movements of Harbour Porpoise in Ramsey sound. This simulation will be guided by available observational data and literature and will draw on statistical and computational techniques from a range of sources.

Boids

Bird-like, "bird-oid" objects[1]

One approach being examined is to create virtual porpoise pods, with the behaviour of each porpoise defined by a list of criteria. This approach was devised to create realistic looking animations of flocks of birds[1], but has since been used to research the movements of animals[2]. The term 'boids' has become the generic term for these virtual creatures, whether they represent birds, fish or other creatures.

The simulation could be used to map out a distribution for the animals under different conditions, which can be compared to observational data. It is important to note that while this approach models individuals, the results are based on the overall behaviours of the system being modelled.

Observational Data

Current work includes analysing Harbour Porpoise observations from Ramsey Sound alongside researchers from Pembroke College. This work has allowed a series of 'heatmaps' to be produced based on the number of sightings per hour of effort. This has been done for the whole dataset as well as for specific conditions (e.g. Time since high water)

Analysing this data required calculating the observation effort for each 100m x 100m cell of Ramsey Sound in order to normalise the sightings recorded. The field of view from each observation point was determined in consultation with the observers in order to make these calculations. This is shown in Figure 2.

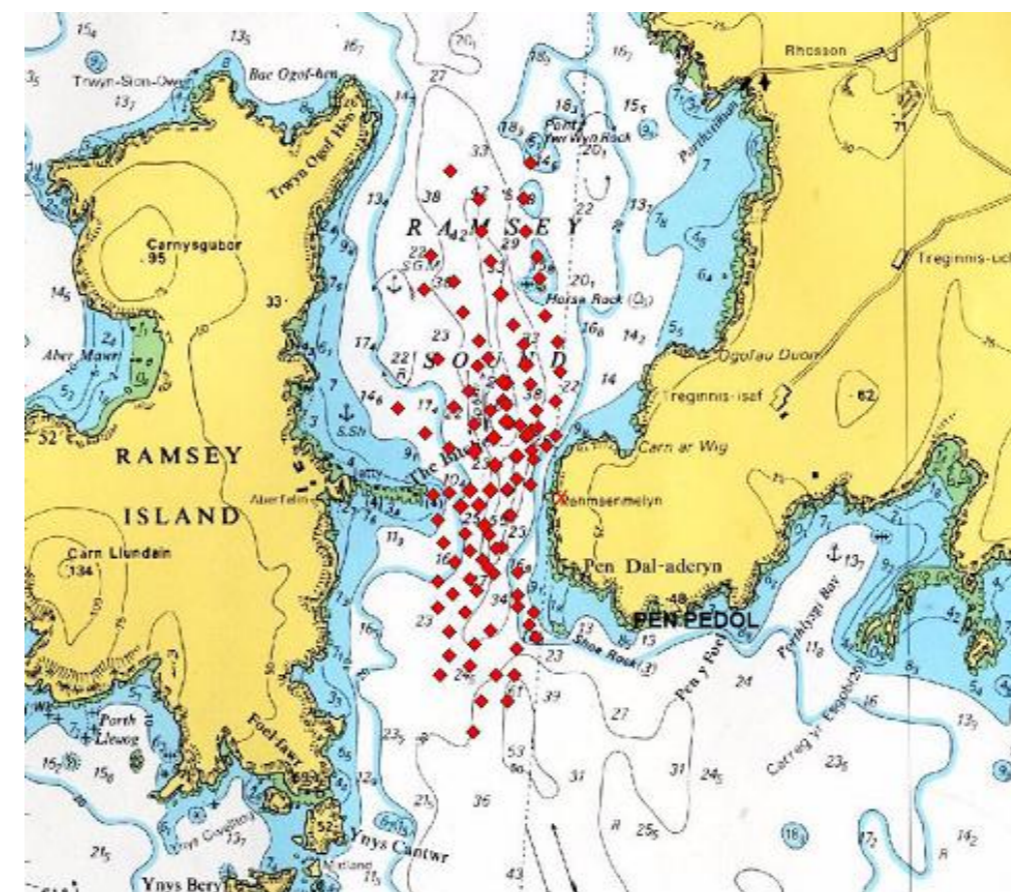


Figure 1: Porpoise sightings in Ramsey Sound



Figure 2: Ramsey Sound, overlooking the Bitches

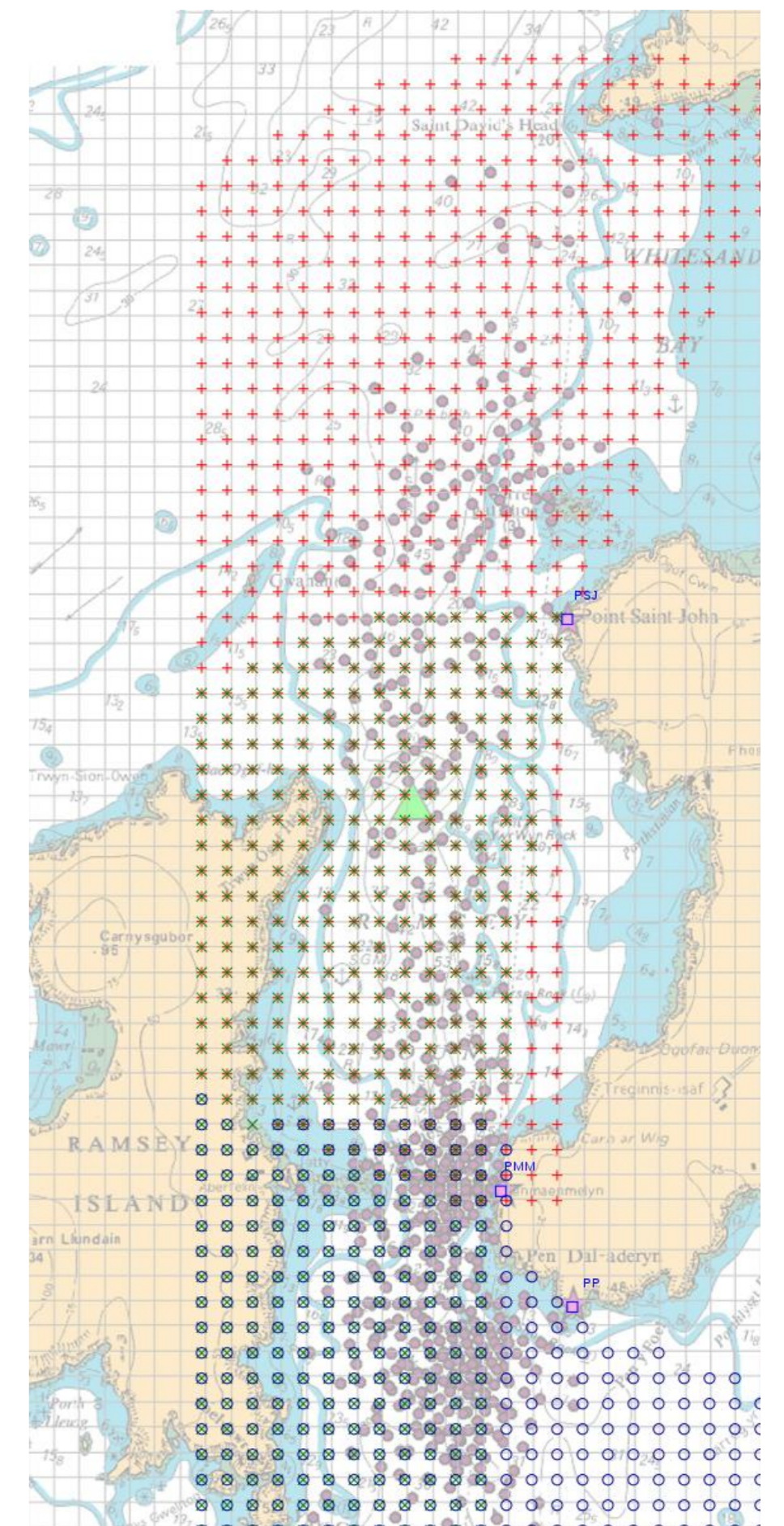


Figure 3: Field of View from each observation point, showing overlaps

Future Work

Current plans for this project include further analysis of the available observational data and review of available literature in order to determine a suitable set of conditions for the behavioural model.

A proof of concept model with a much simpler set of behaviours will be developed in order to test methods of visualising the results of the simulation and to gauge the computational requirements involved. It will also be necessary to investigate how to incorporate other data available for the area, including bathymetry and underwater noise data

References

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