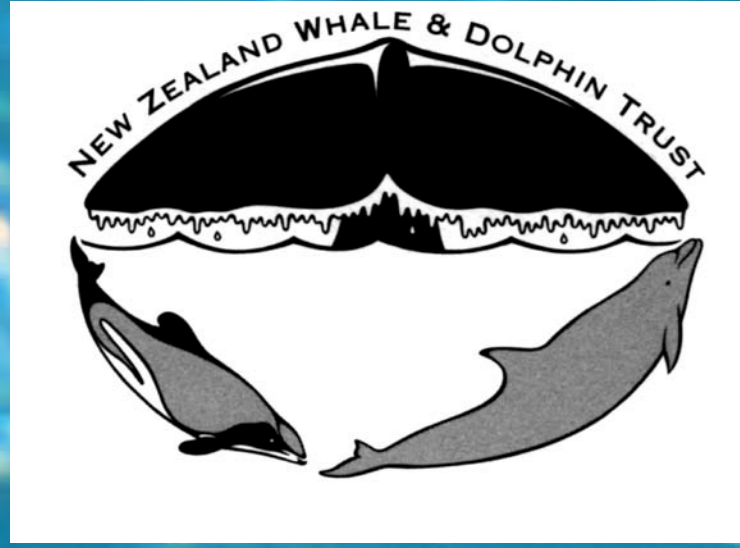


Listening for a needle in a haystack - Passive acoustic detection of dolphins at very low densities

Liz Slooten, Silvia Scali, Steve Dawson, Will Rayment – Otago University, Dunedin, New Zealand



Locations of PODs (Echolocation Detectors)

Why do this study?

- Maui's dolphin is the North Island subspecies of Hector's dolphin
 - Endemic to New Zealand
 - Critically endangered
 - Currently 7% of their original population size
- Acoustic surveys to assess overlap with gillnet fisheries inside harbours
 - Harbours not included in protected area for Maui's dolphin
 - Very high fishing effort in these harbours
 - By commercial and recreational fishers



Methods

- We used acoustic survey methods, given the very low dolphin densities
- PODs were deployed in four harbours on the west coast of the North Island
- A physically and acoustically challenging environment
 - High-current and noisy
- Conservative decision rules minimised potential for false positive detections
 - No detections on a lower frequency scan within 10 minutes of focal click train
 - No accompanying noise around focal click train
 - Smooth trend in pulse repetition frequencies
 - Mean click duration < 300 micro seconds
 - > 7 Clicks in the click train

Harbour:	Sampling days	"Cet All" detections	Maui's dolphin detections	non-Maui's cetacean detections
Kaipara	632	108	1	14
Kawhia	186	3	0	0
Manukau	1883	300	38	3
Raglan	510	100	0	0

Results

- Maui's dolphins use North Island harbours
- There were more detections in summer
- Consistent with South Island data on distribution and seasonal movements
- Differences between seasons and harbours were statistically significant
 - Based on analysing days with and without dolphin detections
 - Using binomial models, zero-inflated binomial models and negative binomial models

Conservation implications

- The protected area was extended slightly in response to the results of this study
 - See grey shading on the map
- Still considerable overlap between Maui's dolphins and fishing methods that cause dolphin mortality
 - Commercial and recreational gillnetting inside harbours
 - Gillnetting in southern part of Maui's dolphin range
 - Trawling on the open coast