

A comparative analysis of mother-calf bottlenose dolphin home-ranges in Welsh Waters



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Introduction

Home-range is an important ecological feature of an animal population, and is a leading consideration when implementing conservation and management efforts. Cardigan Bay is an important calving ground utilised by the semi-resident bottlenose dolphin population and it has been established that the population ranges beyond the limits of the two assigned Special Areas of Conservation (SAC's). However, there is no current protection designated outside of these SAC's. This is a first attempt to investigate the female-calf home-range extents using Minimum Convex Polygon (MCP) and Kernel estimators.

Methods

Data were collected between 2007 and 2012 during standardised line transect and *ad-libitum* vessel-based surveys in three core areas; Cardigan Bay SAC, Pen Llŷn SAC, and Anglesey. Calf sighting rates were compared, and Photo ID data from 20 known females with at least ten re-sightings and at least five sightings with calves, were used for analysis. Home-ranges were calculated using the MCP (Figures 1-2) and the kernel utilisation distribution (UD) estimators (Figures 3-6), both methods subtracting any land masses. Overall range areas (95% UD) were calculated along with core areas at two different levels (50% UD and 25% UD).

Results

No significant differences were observed in number of calf sightings, corrected for effort, between the three areas (Cardigan Bay SAC, Pen Llŷn SAC and Anglesey) suggesting that several locations within Welsh waters may serve as calving grounds.

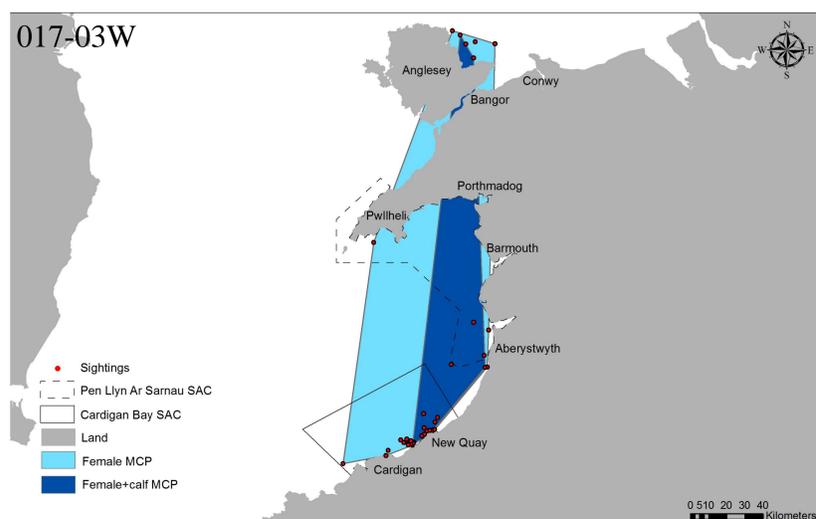


Fig 1. MCP home-range of female 017-03W with & without calf

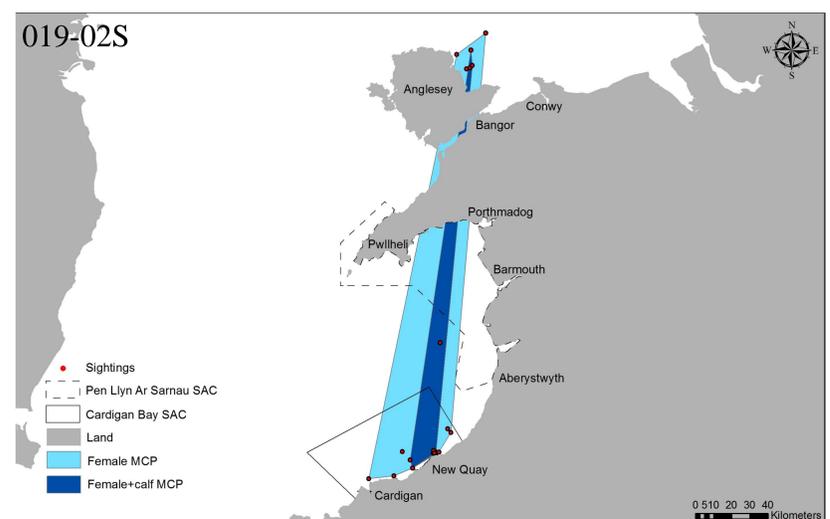


Fig 2. MCP home-range of female 019-02S with & without calf

MCP (Figures 1-2) and Kernel (Figures 3-6) home-range calculations revealed that female home-range sizes (with or without a calf) were significantly larger than those calculated for females accompanied by a calf (Wilcoxon test, $P < 0.05$). No differences in home-range sizes were seen at both levels of core areas (50% and 25%).

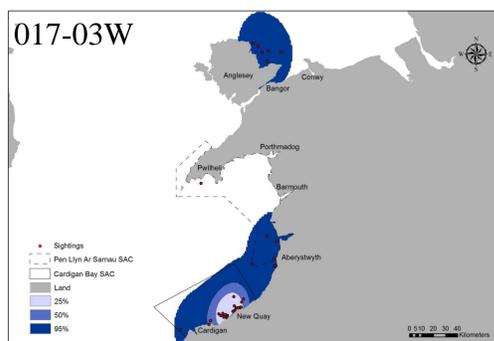


Fig 3. Kernel home-range of 017-03W

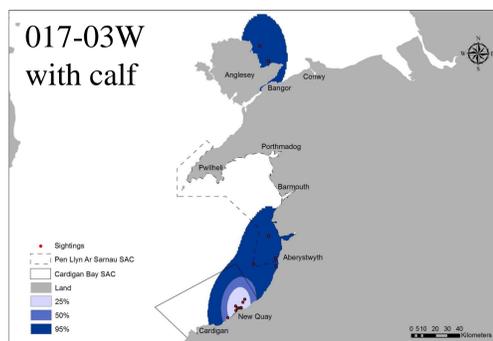


Fig 4. Kernel home-range of 017-03W with calf

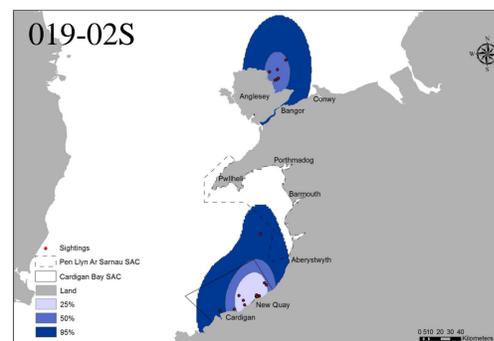


Fig 5. Kernel home-range of 019-02S

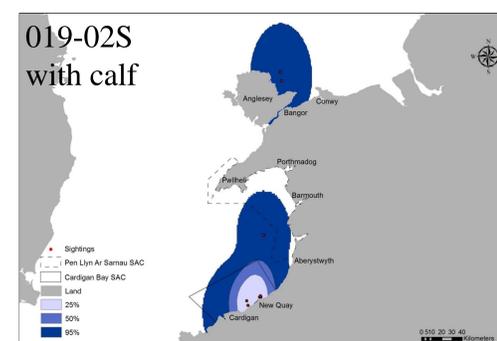


Fig 6. Kernel home-range of 019-02S with calf

Conclusions

Cardigan Bay SAC's do not encompass the full geographical range of mothers and calves in Welsh waters. Our analyses include at least one more significant area, around the Isle of Anglesey, North Wales. MCP's and UD analyses show significantly smaller home ranges for females accompanied by a calf but no differences in core home-range location or size suggesting that females may have extended home ranges when they are without a calf. Some core home range areas used by females and their calves, mainly around the Isle of Anglesey, have little or no protective status. Calving grounds are vitally important for cetaceans and should play an important role in conservation management plans.

References

- Flores, P.A.C. and Bazzalo, M. (2004) Home Ranges and Movement Patterns of the Marine Tucuxi dolphin, *Sotalia Fluvatilis*, in Baía Norte, Southern Brazil. Latin American Journal of Aquatic Mammals 3(1): 37-52.
Ingram, S.N. and Rogan, E. (2002) Identifying critical areas and habitat preferences of bottlenose dolphins *Tursiops truncatus*. Marine Ecology Progress Series Vol. 244: 247-255.

Acknowledgments

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