

# Bottlenose dolphin densities across the Moray Firth

Paul Thompson, 11<sup>th</sup> October 2011

Recent discussions on assessments of the impact of noise on marine mammals have highlighted how one can overlay information on predicted noise levels over available data on animal density.

Our technical report on pre-consent marine mammal data gathering (Thompson & Brookes 2011) used habitat association analyses to produce density maps for harbour porpoise (Fig 3.8) and harbour seal (Annex 1, Fig 13). However, there are several reasons why it is more difficult, and arguably less appropriate, to produce equivalent maps for bottlenose dolphins. First, the dolphin distribution is known to be much patchier, with high use areas on the coast, and survey techniques have differed in these high and low density areas. Second, these animals are highly mobile, so an average density based on studies over a large area (eg. SCANS II data) are of more limited use when considering their likely presence in relatively small areas of interest around a windfarm site.

In general, it will be more appropriate to use metrics which account for temporal patterns of occurrence when considering bottlenose dolphin use of these smaller areas. Work is underway through the DECC project to achieve this using a combination of PAM data and classification tree analysis.

In the meantime, however, there remains a demand for the best available data on bottlenose dolphin densities to incorporate into noise assessment for the BOWL and MORL EIAs.

One option is to use the Hammond et al's (In prep) SCANS II estimate for Area J (0.011 animals/km<sup>2</sup>) as an average for the whole region, but we know that this underestimates the use of the coastal areas known to be important to the East coast of Scotland Bottlenose Dolphin population.

As an alternative, I suggest that we use our estimate of (0.066 animals/km<sup>2</sup>) for the density of all dolphin species in the Moray Firth (Table 3.7), and use the classification tree analyses (Fig 3.16) to account for spatial variation in the density of bottlenose dolphins in different parts of the Moray Firth .

The resulting density map is provided below, and a data file with the estimated number of bottlenose dolphins in each 4x4km square across the Moray Firth is attached.

In using this density distribution, it must be recognised that this remains very conservative when focussing on impacts in offshore areas and along the northern coast of the Moray Firth SAC, as this approach tends to underestimate the number of animals occurring in the inner Moray Firth and along the southern Moray Firth coast. Ie. Whilst the total number of animals represented on this map (213) appear reasonable given current estimates of population size, these animals are predicted to be much more widely distributed outside their core areas than we'd expect given other data on the number of animals typically found in the

inner part of the Moray Firth SAC and along the Moray coast (Bailey & Thompson 2009; Thompson et al 2011).

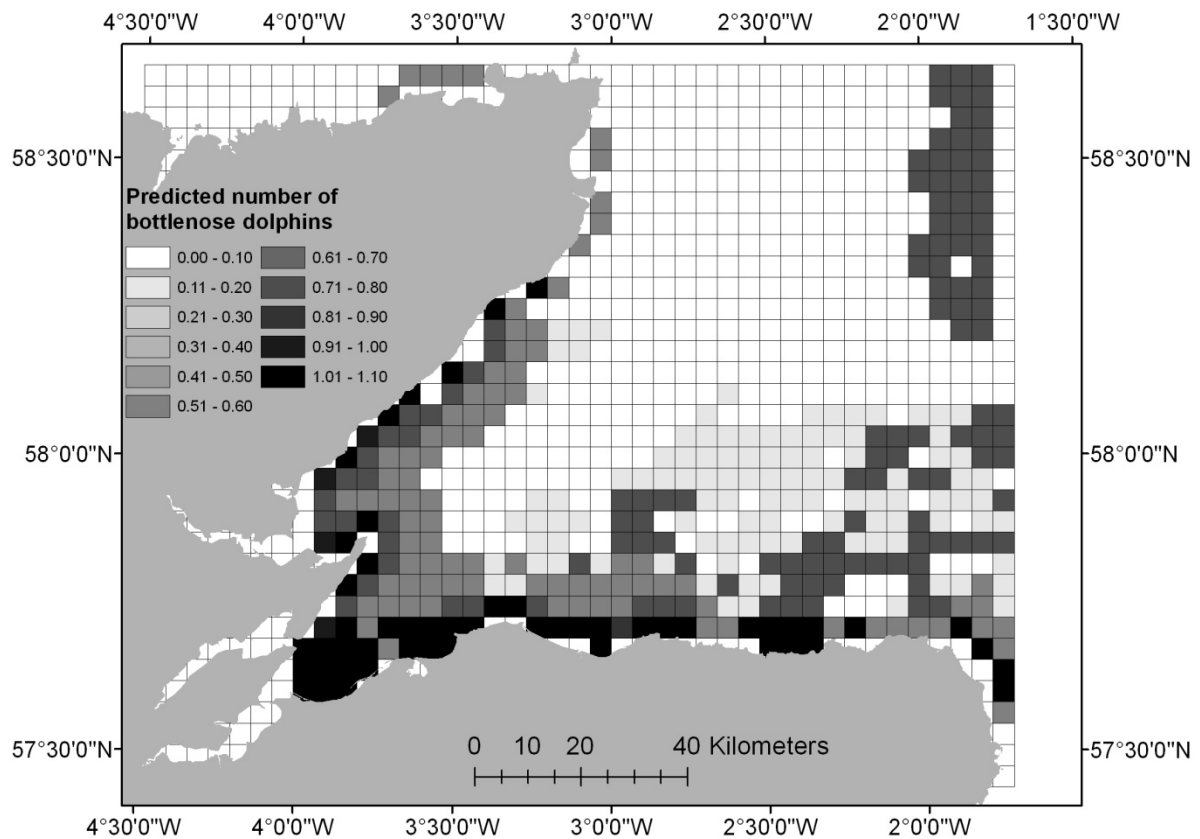


Figure 1. Predicted number of bottlenose dolphins in each 4x4 km cell. Baseline dolphin density across the whole area is taken to be 0.066 per km<sup>2</sup> (ie 1.056 per 4x4km cell). Data from the classification tree are then used to estimate the probability of dolphins in a particular cell being a bottlenose dolphin.

Data are provided in file: Predicted Bottlenose Dolphin density.xlsx

#### References:

Bailey, H. & Thompson, P.M. (2009) Using marine mammal habitat modelling to identify priority conservation zones within a marine protected area. *Marine Ecology Progress Series*, **378**, 279-287.

Hammond, P.S., Macleod, K., Berggren, P., Borchers, D.L., Burt, M.L., Cañadas, A., Desportes, G., Donovan, G.P., Gilles, A., Gillespie, D., Gordon, J., Hiby, L., Kuklik, I., Leaper, R., Lehnert, K., Leopold, M., Lovell, P., Øien, N., Paxton, C.G.M., Ridoux, V., Rogan, E., Samarra, F., Scheidat, M., Sequeira, M., Siebert, U., Skov, H., Swift, R., Tasker, M.L., Teilmann, J., Van Canneyt, O. & Vázquez, J.A. (In prep). Abundance of harbour porpoise and other cetaceans in European Atlantic shelf waters.

Thompson, P.M., Cheney, B., Ingram, S., Stevick, P., Wilson, B. & Hammond, P.S. (Eds) (2011b). *Distribution, abundance and population structure of bottlenose dolphins in Scottish waters*. Scottish Natural Heritage & Scottish Government Funded Report. SNH Commissioned Report No 354