

Coastal Squeeze? Seabird nesting success and loafing behaviour in response to cliff-top- and water-based visitors at St Abb's Head, Berwickshire

Diele, K.^{1,2}, White, P.²

¹ St Abbs Marine Station, UK

² Edinburgh Napier University, UK

¹ School of Applied Science, Edinburgh Napier University – k.diele@napier.ac.uk

² St Abbs Marine Station

Area being submitted to: General Science Session

Preferred presentation medium: Oral

Are you a student? No

Populations of nesting seabirds have been declining for many species, for several reasons. There is concern that tourists may impose additional stress to frequently visited seabird colonies, affecting their behaviour, and possibly also nesting success. St Abb's Head at the Scottish Borders coast has one of the largest onshore breeding seabird colonies in the UK, and was designated an SPA in 1997 (extended in 2009 to include a 1km zone offshore). The site is visited by > 20,000 clifftop visitors during the breeding season. Likewise, the coves underneath the cliffs are popular boating destinations and frequently visited. To investigate whether the seabirds are suffering from "coastal squeeze" at St Abb's Head, which would call for mitigation through visitor management, a longer-term study was started in 2015, in collaboration with the National Trust for Scotland. The success of Kittiwake (*Rissa tridactyla*) nests is assessed annually at 9 plots with differing degree of human encroachment (~25 nests monitored per plot), and in 2017 the number of loafing guillemots (*Uria aalge*) in response to visual as well as auditory "disturbance" (i.e. boat noise) was recorded. Kittiwake nest success probability at both the egg stage and the chick stage was unrelated to any measured index of cliff-top visitor activity in all three study years (2015-2017, 2018 data analysis in progress). In contrast, in 2016 a significant negative relationship existed between nest success at the egg stage and "boat minutes". Boat presence in the coves significantly reduced the number of loafing guillemots, and distinct, presumably energetically very costly escape responses were observed.

In conclusion, the so far available data evidence no major negative effect of clifftop visitors on Kittiwake nesting success, suggesting that the current respective site management (no restriction of visitor numbers,

times or distances to the birds) is justifiable, which will be welcomed by the NTS and the visitors. We will continue monitoring cliff-top visitor effects in forthcoming years, since other (possibly increasing) environmental stressors may influence (and change) the bird's vulnerability towards this stressor. The results regarding the effects of boating presence /activities on Kittiwake nesting success are partly contradictory, and also more nuanced, clearly requiring more studies. The preliminary finding that boating affected Guillemot loafing behaviour and triggered significant escape responses (investigated in 2016) suggests that these birds may benefit from improved site management within the SPA. We will now study the birds' response patterns, boat presence/activity and severity of effects in more detail and also aim to disentangle visual from auditory effects.

Acknowledgements

We thank Liza Cole, the Senior Ranger of St Abb's Head National Nature Reserve at the National Trust for Scotland (NTS) for fruitful knowledge exchange, and generous practical support. Many thanks to Edinburgh Napier students Jill Crozier, Murray Fyfe, Jenna Lane, Alex Willey, Alex Clough and Annalise Bokenkamp who conducted their MSc theses within this multi-annual project; to Anne Sainpol and Valentin Pratesi from Université de Lyon for the development of scripts for the analysis of sound recordings and to Adam Houghton from the St Abbs Marine Station for practical support. The project received funding from Edinburgh Napier University, the AEB Trust (through NTS) and through two small grants of MASTS, the Marine Alliance from Science and Technology for Scotland.