



NÁTTÚRUSTOFA SUÐURLANDS

The Atlantic Puffin's Population Size of Vestmannaeyjar, Iceland



HÁSKÓLI ÍSLANDS

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Abstract

The total burrow number of Atlantic puffins (*Fratercula arctica*) in the Vestmannaeyjar archipelago is estimated to be **1.136.000** ± 253.000 (95% C.I.). The burrow occupancy ratio is variable but believed to be around 62% as in a “normal” year reflecting a breeding population of **704.000 pairs** ± 157.000, the world's largest Atlantic puffin colony complex.

Methods

The colonies (Fig. 2 and Table 1.) were **aerially photographed** in 1989 to 1993 from 1.220 m or 1.830 m over sea level (occasionally 610 m).

Puffin colonies are readily distinguished from colour photographs and their outlines digitized and their **surface area (A)** calculated using the program Microstation™.

Burrow density (D) was estimated in 9.175 m² within puffin colonies: 7.575 m² in 9 transects (n=367, 25 m² squares) and 1.600 m² in n=64 randomly located 25 m² squares (Hansen 1995).

Slope was measured in most squares and **surface area was corrected** due to slope using the 2D/3D ratio of surface areas (**C_A**, see Fig. 1).

Burrow population (and 95% confidence intervals) was calculated by bootstrapping the product: **A × C_A × D**; 10.000 times using Pop Tools v.3 (Hood 2008) within each colony.

Neither mean density nor the variance in randomly located 25 m² squares (n=12) v.s. transects (n=76) in Elliðaey differed significantly (**P**>0.05). *F*-test: **F**_{11, 75}=1.7982. *2 tailed t*-test: **t**₈₆=1.7172. The data was pooled accordingly.

Results

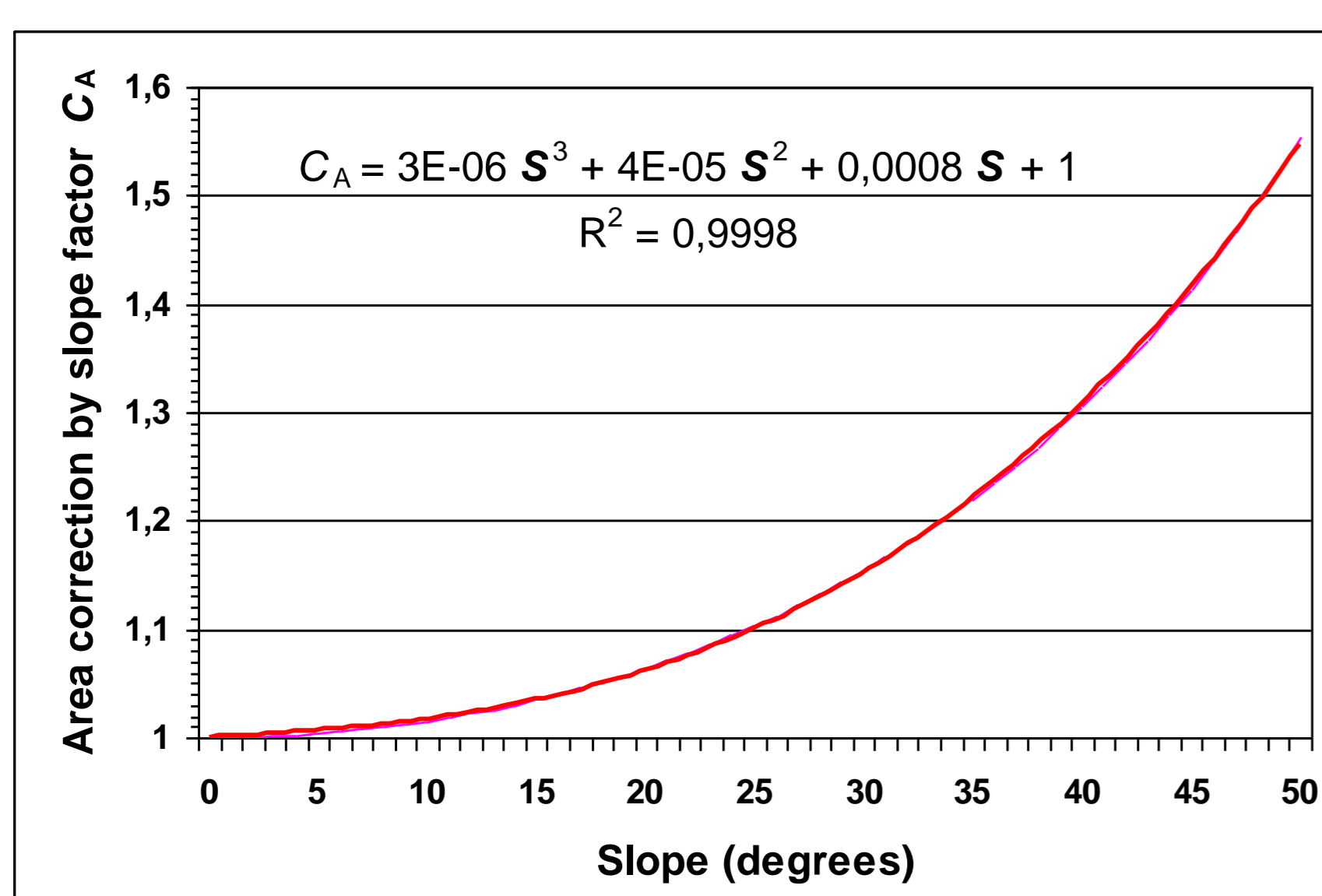


Figure 1. Colony surface area correction factor **C_A** as a function of slope (°).

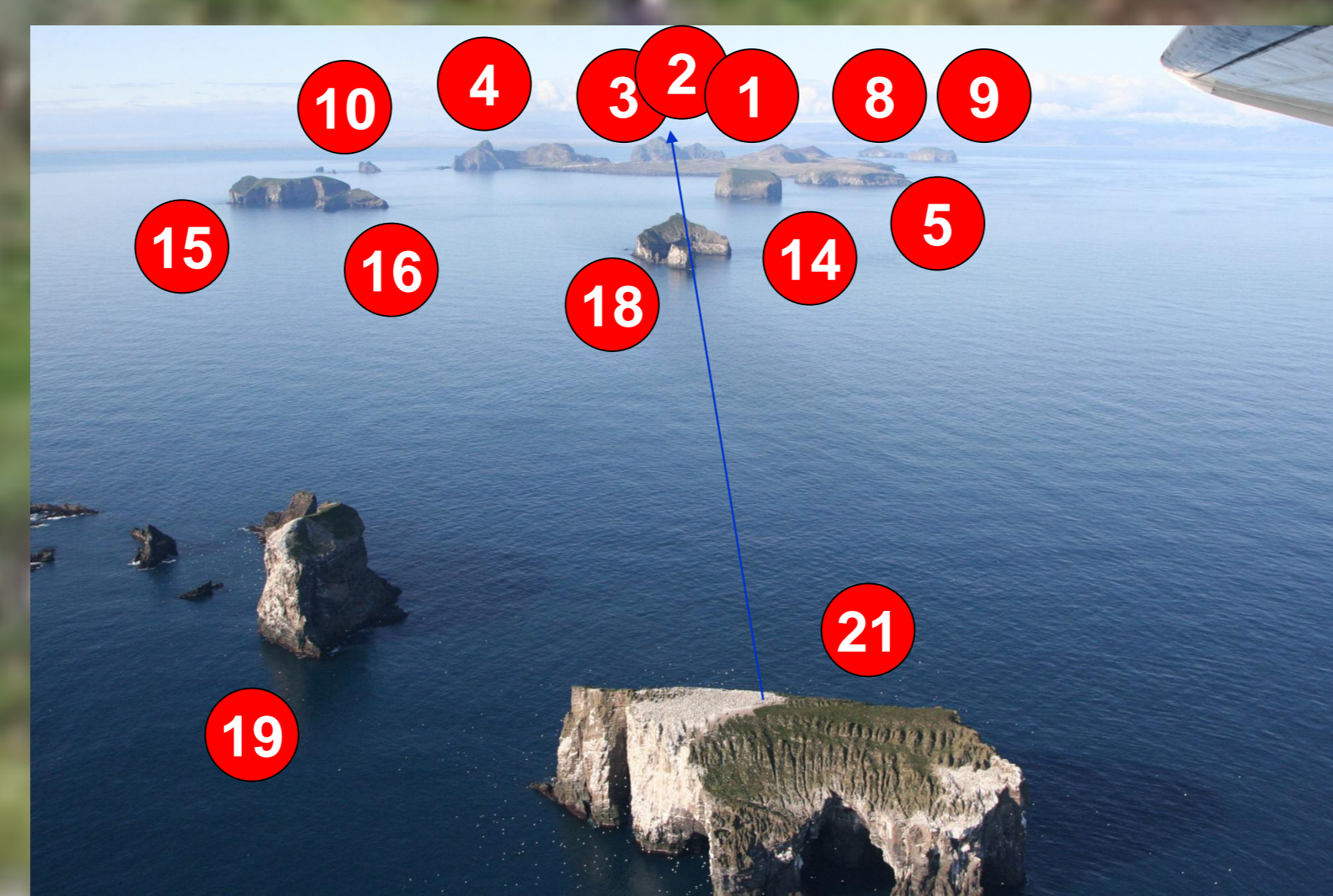


Figure 2. Atlantic puffin colonies distribution in Vestmannaeyjar. Encircled numbers refer to specific colony information in **Table 1.**

Table 1. Colony Registry

#	Location	Corrected area (m ²)	N	95% C.I.
1	Ystiklettur	178.266	82.024	10.770
2	Miðklettur	32.195	24.630	2.218
3	Heimaklettur	96.106	71.901	9.031
4	Dalfjall-Há	94.494	100.842	18.898
5	Stórhöfði	34.064	28.908	6.065
6	Litlihöfði	35.362	27.052	2.437
7	Kervíkurfjall- Stakkabót	79.836	67.531	21.023
8	Elliðaey	164.470	124.910	82.235
9	Bjarnarey	167.413	128.071	11.538
10	Hæna	8.224	6.292	567
11	Hani	11.137	8.520	768
12	Hrauney	5.992	4.584	413
13	Grasleysa	726	556	50
14	Suðurey	75.954	125.400	22.212
15	Álsey	175.651	210.159	40.601
16	Brandur	34.322	47.692	17.161
17	Máfadrangur	1.882	1.440	130
18	Hellisey	20.021	45.652	4.271
19	Litli Geldungur	1.581	1.210	109
20	Stóri Geldungur	1.411	7.839	706
21	Súlnasker	23.871	20.473	1.844
22	Geirfuglasker	645	553	50

Total: 1.136.236 253.121

Conclusion

Density in 1991 and 2008 did not differ significantly (**P**>0.05) by the comparison of the same ten 25 m² squares in Elliðaey Hábarð transect were compared with a *2 tailed paired t-test*: (**t**₉=-0.3531). We believe that burrow number has not changed greatly in the last decades.

Acknowledgements

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Reference

Hansen, E.S. (1995). *Habitat selection of the Atlantic puffin Fratercula arctica: in the perspective of a functional constraint by aerodynamical "take-off" capacity and the geometrical aspects of burrowing.* Honors thesis, Univ. of Iceland, Dept. of Biology.

Hood, G.M. (2008). Pop Tools version 3.0.3. Available on the internet: <http://www.cse.csiro.au/poptools/>