

# Colony Size, Distribution, and Habitat Preferences of the Little Auk *Alle alle* on West Spitsbergen

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Little Auks are seabirds nesting in breeding colonies of different sizes – from less than a hundred to tens of thousands pairs. It is the most numerous seabird species in the northern hemisphere breeding in the high Arctic region.

The deposition of Little Auk's droppings in the vicinity of the colonies is of the biggest importance for the land ecosystem. The seabirds' droppings are the primary source of nutrients for the Arctic tundra letting it thrive in the poor conditions of the Arctic land ecosystem.

The aim of this study was to investigate the Little Auks' breeding colonies distribution along the west coast of Spitsbergen and to estimate the size of the breeding population.

The scientific effort was also focused on the environmental factors shaping the size of the colonies and the factors highly pronounced in the habitat preferences of the Little Auks. The factors taken into account were: elevation, slope, solar radiation, aspect, the distances from the foraging areas and a rock type. The estimated breeding population of the Little Auks was 590 000 pairs. It is the third largest breeding concentration of the Little Auks in the world. Three main regions hosting the majority of the breeders were distinguished: the north-west Spitsbergen, Bellsund (central Spitsbergen) and Hornsund (the south-west Spitsbergen). The vast majority of the Little Auks were breeding in Hornsund region (76% of the estimated population). Colonies in Hornsund were also the biggest in all studied regions with 6 603 pairs per colony on average. The differences between the regions in elevation, slope angle, solar radiation and the distance from the foraging areas were statistically significant. The distance from the colonies to the foraging grounds at sea was the smallest in Hornsund. The aspect of the slopes where colonies were found didn't differ between the regions – the Little Auks prefer slopes with western - southern aspects in all of the studied locations. The size of colonies was best explained by the aspect – the biggest colonies were placed on the southern slopes. The second most important factor was the distance from the foraging areas – the closer to the foraging grounds, the bigger was the colony. The comparison analyses of polygons with colonies and polygons without colonies showed that the colonies are not placed randomly, suggesting that the birds have certain preferences towards their breeding sites. The modeling showed that the probability of colony occurrence is the biggest in

the areas with the highest solar radiation values, on the western – southern slopes, with the moderate slope angle (the lowest probability in the flat and vertical areas). The modeling also showed that the probability of colonies occurrence is lower at higher altitudes.