



# Friends of Cooper Island

Monitoring a Changing Arctic since 1975

## Monitoring Climate Change with Arctic Seabirds

George Divoky's discovery of a Black Guillemot colony on a northern Alaskan barrier island in 1972 began an ongoing study of a **high arctic seabird** at one of the most remote locations in North America. The island, surrounded by **pack ice** and covered by snow for much of the year, is home to a unique colony of seabirds which nest in boxes and other manmade structures allowing detailed monitoring of each nest.



From 1975 through the mid-1980s George created nest sites. By 1989 the colony had increased to over 200 pairs and had become the largest Black Guillemot colony in Alaska. George has monitored the size, breeding timeline, and breeding success of the colony from 1975 to present, making it one of the longest

ongoing studies of a seabird in the world. While the initial motivation in maintaining the database was to examine the breeding of a relatively long lived bird, in the mid-1990s it became clear that there were long-term changes in breeding biology and population size that might be related to **environmental changes** occurring in the Western Arctic.

Guillemots, of which there are three species, belong to the seabird family known as **alcids**. The most abundant seabird family in the Northern Hemisphere,



the alcid family includes murre, puffins, auklets and murrelets. All members of the family dive to obtain prey below the sea surface typically in offshore waters some distance from land.



The study colony on Cooper Island, a low sand and gravel bar, is 25 miles east of Point Barrow, the furthest point north in Alaska. Snow and ice dominate the landscape of the northern Alaska coast for much of the year. Snow can fall on any day during the short arctic summer but air temperatures just above freezing from June to

August melt the winter snow and prevent any accumulation until September. During this snow-free period the island and adjacent coastal tundra are home to seabirds, shorebirds and waterfowl that raise their young utilizing the 24-hours of sunlight and large invertebrate and fish populations of the Arctic.

While Guillemots are in the region of Point Barrow in numbers as early as March, they return to Cooper Island only when the snow melts in early June and entrances to nest cavities become snow free.

While guillemots encounter snow at the start and end of their breeding period, sea ice is typically part of their marine existence for the entire year. Sea ice has a range of effects on the physical and biological structure of marine waters. The most important to seabirds is the barrier it creates between birds and potential prey in the water. Diving species like the Black Guillemot can exploit cracks



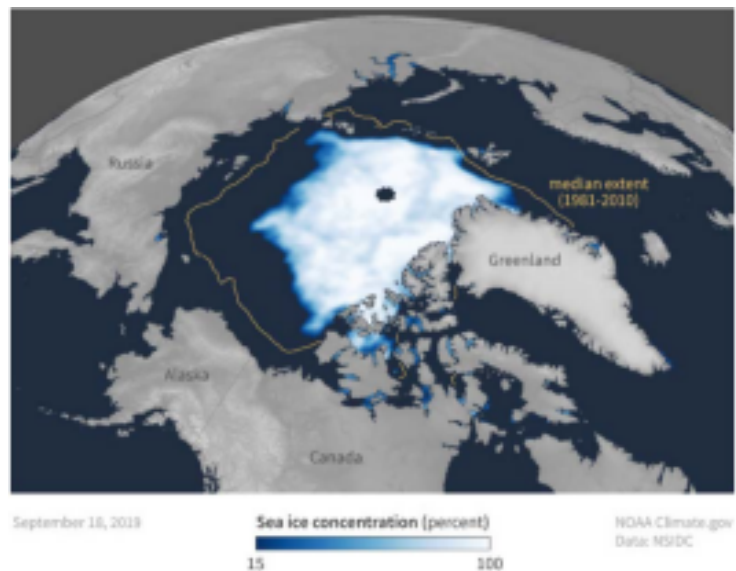
and other openings in the ice to access the waters beneath the ice. Most importantly, the underside of arctic sea ice supports a community of fish and zooplankton that live on phytoplankton and algae blooms within and on the undersurface of ice. This **under-ice fauna** provides a prey source (arctic cod) for Black Guillemots.

The guillemot's close association with snow and ice habitats makes it a sensitive **indicator to atmospheric warming**. Species that have a major part of their life benefiting from the presence of ice or snow should be among the first to show the effect of warming in the Arctic. Snow and ice habitats, especially those that are near freezing for part of the year, can respond immediately to even small changes in air temperature.

The field seasons over the last few years have seen an unprecedented retreat and melt of the Arctic sea ice. This past summer in 2019, the sea ice extent (coverage)

tied as the second lowest in recorded history. On Cooper Island, this meant an almost complete shift in prey for the guillemots, from the ice-loving arctic cod to more open open water fish that are less abundant and less desirable to the island's seabirds. Less abundant prey made it harder for many parent birds to find enough food for their chicks.

Though some birds are adapting to different fish for their chicks. The loss of sea ice also meant having polar bears as regular visitors throughout late July and August.





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## Check your comprehension!

### Paragraph 2:

1. How long has George been studying guillemots on Cooper Island?
2. What are two reasons to study guillemots on Cooper Island?
3. By 1989, the colony had increased to over \_\_\_ \_\_\_ \_\_\_ pairs.

### Paragraph 3:

1. What family of birds do guillemots belong to?
2. Where do these birds get their food?

### Paragraph 4:

1. Cooper Island is a low sand and \_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_.
2. \_\_\_ \_\_\_ \_\_\_ \_\_\_ can fall on any day of the year, even in the short summer.
3. In the summer there is \_\_\_ \_\_\_ hours of sunlight.



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## Check your comprehension!

### Paragraph 6:

1. Sea ice creates a \_\_\_\_\_ for birds and prey.
2. Guillemots feed on \_\_\_\_\_.

### Paragraphs 7 and 8:

1. Guillemots are a sensitive \_\_\_\_\_.
2. Describe the 2019 field season on Cooper Island. What happened?