

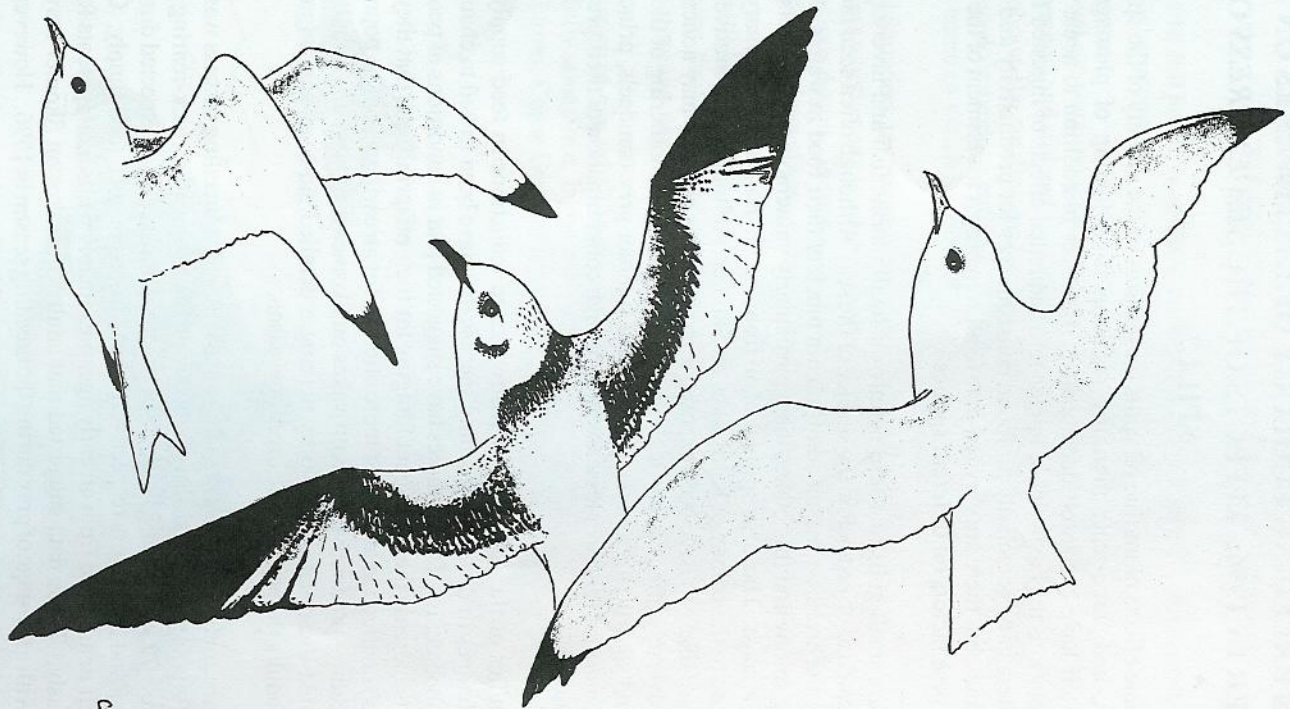
THE BREEDING ECOLOGY OF KITTIWAKES ON SKOMER IN 1996: EFFECTS OF THE SEA EMPRESS OIL SPILL?

The immediate effects of marine oil spills on seabirds in the vicinity of the spill are well known, and large-scale mortality resulting from fouling of plumage and ingestion of oil have been well documented. However in addition to acute lethal effects, populations may experience longer-term sublethal effects of ingested hydrocarbons. These have potentially profound consequences for productivity and population dynamics, but there are very few data to allow a proper assessment of the likely impacts of these factors on different species.

Kittiwakes are small gulls that feed mainly on small marine fish and invertebrates, which they catch at or just below the surface of the sea. Although often seen far from land, during the breeding season adults obtain much of their food in waters close to the breeding colony and this makes them particularly vulnerable to the effects of oil spills near the coast. The large spillage of oil from the *Sea Empress* in February 1996 occurred close to the colony of Kittiwakes on Skomer. Although comparatively few Kittiwakes are likely to have been exposed directly to this oil, they may nonetheless have been adversely affected, particularly through potential smothering of the overwintering and spawning grounds of their main summer prey (sandeels, principally *Ammodytes marinus*) and to a lesser extent through contamination of their prey with hydrocarbons.

Previous studies of the responses of Kittiwakes to reductions in food supply have described changes in diets and breeding success that have been linked to changes in the marine food chain. These studies have suggested that in conditions of poor food supply adults increase the time spent foraging for their offspring, and that they leave their chick(s) unattended at the nest more often and at an earlier age. The population size and breeding productivity of Kittiwakes on Skomer is monitored annually, and we augmented these data in 1996 by making a detailed study of nest attendance patterns of adults throughout the breeding season.

A preliminary analysis of these data indicates that whilst breeding success was close to normal, foraging trips made by adults during incubation and chick-rearing lasted approximately 22 hours and 7 hours respectively, compared with expected durations of 6 - 9 hours and 2 - 3 hours respectively in conditions of good food supply. Chicks were also left unattended from an early age, presumably whilst both parents foraged simultaneously. These data suggested that adult Kittiwakes on Skomer may have been faced with a shortage of prey during the breeding season in 1996. However there is no firm evidence to indicate that this was caused by the oil from the *Sea Empress*. Moreover Kittiwakes as far away as N.E. England showed similar changes in nest



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attendance patterns in 1996, suggesting that the events on Skomer may have been part of a more widespread phenomenon, possibly related to the cold and unproductive spring in that year.

There are important lessons to be learnt from this, including the value of long-term data sets in assessing the impact of unexpected catastrophic events and the importance of comparing sites inside and outside of the area potentially affected by such an event. The fact that Kittiwakes on Skomer were apparently able to increase their trip durations and incubation shift lengths in 1996 whilst maintaining near-normal breeding success suggests that they normally have some leeway in their activity patterns, that acts as a buffer against adverse environmental conditions. However chicks were left unguarded from an early age in 1996 even though average trip durations were only a third as long post-hatching as during incubation, and this suggests an additional constraint upon nest attendance during chick-rearing. This may have been the result of poor adult body condition or of a need to maintain a high rate of food delivery to the nest. Further work in 1997 will examine the nest attendance patterns and body condition of adults in more detail.

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Kittiwakes on Skomer in 1953

Photograph Eric Hosking