Initial Expectations Modified with Comments

Parts of the file geese001 are re-evaluated taking into account comments and corrections. The changes are presented here.

Background

The breeding range of the Western European population of the species is not restricted to the Barents Sea coast. Additions to introduction regarding the species distribution are suggested from Madsen and Cracknell (1999)'s book, Goose Populations of the Western Palearctic.

Observations

1. Initially, family groups were suggested to be identified as those having a higher proportion of juveniles. This should be corrected to reflect that a family group is defined as a pair or single adult associated with first winter juveniles. The terminology suggested is to retain groups as interchangeable with flocks, but to use broods or families when referring to family groups.
2. Flocks consisting mostly of non-breeding birds arrive a few weeks earlier than flocks containing family groups. No changes suggested.
3. Some families stay together through winter and the following spring migration to the breeding grounds. Other families split with the juveniles leading the group and becoming independent. No changes suggested.
4. As a result of the splitting of some families during the winter, the size of families shows a decreasing trend. A related trend may be the

increase in the proportion of juveniles in flocks, since some flocks may be composed of mostly first-winter birds that have split from their families.
5. In addition, larger families are seen in the west.
6. The numbers of geese are lower in the west. This might lead to the aggregation of geese in order to gain benefits from collective anti-predator vigilance. It was initially expected that this might make it more difficult to distinguish large families alone, from small flocks of geese. It has been pointed out that this is not the case. It is suggested that successful families gather in smaller flocks, and that flocks are fewer and smaller in the west. This could result in families selecting western regions to winter in. This could be because they are selecting for a less competitive environment, which would be available in a region with fewer and smaller flocks. The underlying reasoning is that goose families are selecting flocks to join, rather than driving flock size dynamics.

Questions

1. Question 1 asked how family and flock sizes are different between the breeding and wintering grounds. From short observations at both sites, it appears that family sizes may be higher in the breeding grounds. The relationship between family and flock size is observed to be an inverse one, but it remains to be determined how the two affect each other.
2. Question 2 asked about the relationship between family size, flock size, and environmental predictors. This question is discussed in the general expectations. Briefly, environmental conditions at both the breeding and wintering grounds are conducive to supporting goose flocks, and it may be that no significant differences will be found.
3. Question 3 asked how large families were to be distinguished from small flocks of non-breeding adults. The issue is discussed above. Briefly, families are geese associated with juveniles. First winter juveniles have a different plumage from adults, and are distinguishable from them. This makes distinguishing families on their own, or families within a flock, possible.

General Expectations

1.

a. Families were expected to be higher in summer than in winter. This may be due to this period being before the migration, during which juvenile mortality might occur, and also because families may split in winter, lowering the mean family size.
b. Expectation 1.b. was that since flock size is a balance between anti-predator benefits and intra-flock resource competition, flocks would be larger in summer because spring growth would result in resource availability not being a limiting factor on size of a flock. It is suggested that this may apply to families as well. Observations from the summer and winter grounds contradict this expectation. Flocks do not regularly increase above 100 in the summer. Geese were seen to be organised into families, which may be found quite far from the next nearest geese, but were seen to loosely aggregate as a flock while feeding or moving towards a waterbody. In winter, flocks frequently reach sizes of over 2000.
c. Expectation 1.c. related the presence of predators with the benefits of group living. In the summer, predator abundance is probably higher than in the winter. It was expected that predator abundance would be reduced in the wintering grounds, reducing the predation pressure faced by goose families and making it less profitable to join a flock. This idea might not hold true, since geese on the wintering grounds show anti-predator vigilance behaviours. In this case, the benefits of flocking might also extend into the winter season. It was also expected that the wintering grounds would be a low resource area. It was corrected that the wintering grounds might actually be a relatively high resource area since the landuse type is highly productive agriculture.

2. Expectation 2 was a that flock and family size would both be well explained by a vegetation metric such as NDVI, or by snow cover. It was noted that geese select for high quality forage rather than biomass. NDVI is a biomass metric and might not be suitable here.

Madsen, Jesper, and Gill Cracknell. 1999. “Goose Populations of the Western

Palearctic." National Environmental Research Institute, Denmark; Wetlands International, Wageningen, The Netherlands.