CAN DEER MANAGERS AND RESEARCHERS WORK TOGETHER TO FOSTER COLLABORATIVE DEER MANAGEMENT?

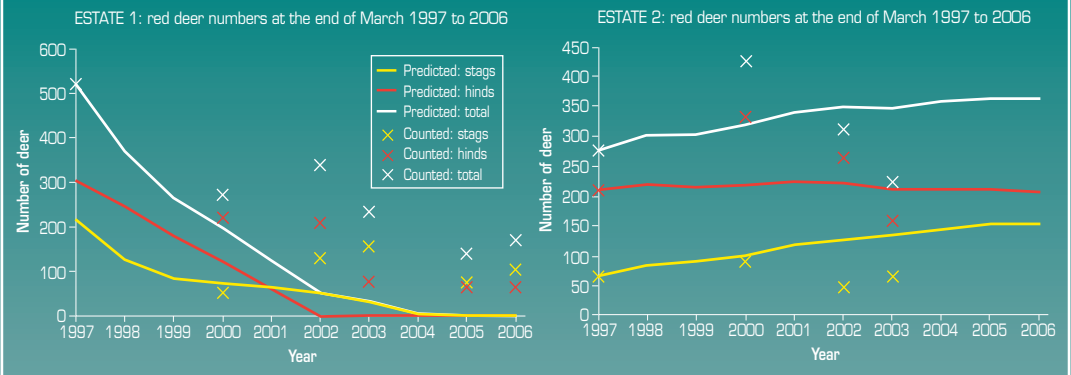
THE ISSUE:

- Deer range freely across landscapes made up of multiple owners and diverse management objectives and have a range of economic, social and environmental costs and benefits.
- Sustainable management requires that neighbours collaborate over the deer that use their land.
- In some cases deer are thought to move into areas where heavy culling has reduced density ('vacuum effect') leading to conflict between neighbouring land units with different objectives.

WHAT WE DID:

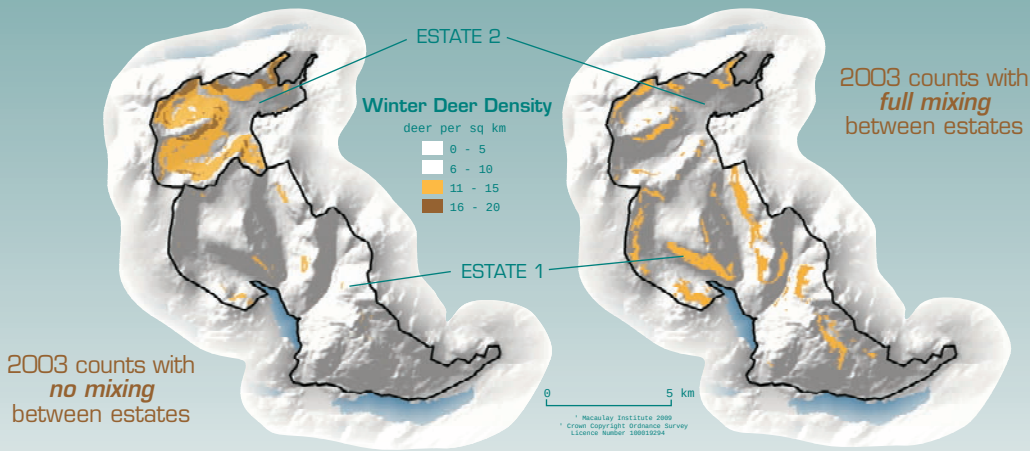
- Using cull and count data collected by deer managers, we ran the GIS model, together with a population dynamics model, to predict the effects of heavy culls on deer numbers (Box 1). We compared the results with counted deer numbers to see if heavy culls had resulted in large movements of deer.
- Using both scientific information and the local knowledge of deer managers from two Deer Management Groups we developed a GIS-based model that predicts how red deer distribute themselves across a landscape (Box 2).

BOX 1: LEARNING FROM POPULATION MODELLING



Is there deer movement between neighbouring estates with different culling levels? Using the real cull and count data to predict deer numbers (solid lines) indicates that at the present high culling intensity there should be no deer left (Estate 1). However, actual deer counts (crosses) indicate substantial numbers of deer. On the neighbouring Estate 2 with a lower cull, the opposite is true with predicted numbers increasing yet the real counts indicate a decline. So, although Estate 1 has more stags than predicted, there is limited evidence that they have come from Estate 2.

BOX 2: DeerMAP – PREDICTING DEER DISTRIBUTION



Do deer have a preference for habitats on one estate compared to the other? If culling is heavier on the preferred areas, this may lead to net movement into these areas. Predicting deer distribution across estates separately or as if the two estate were one unit gives different results indicating that there may be more preferred habitats on Estate 1 - leading to lower predicted densities on Estate 2.

WHAT WE FOUND:

- Managers' knowledge greatly improved our 'scientific' model of deer range use.
- Cull and count information, collected by deer managers, can show if there there has been large-scale movement of deer between adjacent land units which could affect hunting opportunities (Box 1).
- There was some evidence of deer moving from areas of high to areas of low density however (Box 2), culls did not appear to be affected.
- Calf production per hind appeared to increase as deer density declines so that sustainable stag culls may even increase when hind deer density is reduced (Box 3).
- Participatory GIS and population modelling (of the cull and count data collected by deer managers) creates a shared knowledge base to provide insights on management conflicts and foster collaboration between deer managers with differing objectives.

BOX 3: SUSTAINABLE CULLS AT DIFFERENT DEER DENSITIES

Modelling deer populations indicates that the sustainable stag cull for a reduced population may be as high, or even higher, than in the original population. For example, the table shows the maximum sustainable cull of stags, hinds and calves for a population reduced from 400 to 250 (90 stags, 110 hinds and 40 calves). The sustainable cull at two recruitment rates is compared (0.56 - pre reduction level and 0.8 - post reduction level) with the current cull.

	Recruitment rate (by hinds 3+ years old)		Cull prior to population decline
	0.56	0.80	
Stags	15	25	20
Hinds	14	25	32
Calves	5	8	12

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