

# COLLABORATIVE FRAMEWORKS IN LAND MANAGEMENT:



RURAL ECONOMY  
AND LAND USE

## A Case Study on Integrated Deer Management

Project Newsletter Number 6.

### Editorial

[www.macaulay.ac.uk/RELU](http://www.macaulay.ac.uk/RELU)

Welcome to the final newsletter from the RELU Deer Project. We are now at the stage of analysing, writing up and reporting on the work we carried out with you. Some of you may already have seen the poster displays earlier this year at the Scotland Game Fair or heard the presentation at the recent Mammal Society Symposium in London on human-wildlife conflict resolution. This newsletter highlights some of our key findings. A number of papers are in

preparation with those already published or accepted identified below. We could not have achieved so much without all your support and hope that you have found the project helpful even if only in a small way. We also aim to extend the application of participatory GIS as an approach to facilitate information exchange and collaboration in other areas in England and Scotland, through a RELU Knowledge Transfer proposal, which is being supported by the Forestry Commission. It is a testament to the value of this approach that the Deer Commission for Scotland, Scottish Natural Heritage and the Deer Initiative are keen to be involved in this extension. We would also like to thank all of you who completed the questionnaire about your involvement with this project. Your responses along with those from the research team will be used to improve how we set up and manage similar projects in the future.

### The project

The project has used the management of wild deer as a case study to investigate the role of collaborative land management in developing a sustainable rural economy, taking into account the interaction between social, economic and environmental factors. Interviews of stakeholders at National, Regional and local level enabled existing collaborations to be mapped and their goals, interrelationships, legitimacy and power to be explored using stakeholder analysis techniques. Reviews of UK legislation and venison processing in Scotland provided an insight into whether and how legislation influences management at the local level and whether the venison market is an import factor influencing deer manager's decisions. Management choices were further investigated using choice experiments. Field based workshops identified a broad consensus across wider stakeholder groups in terms of preferred landscapes, and at case study level locally specific information was used to improve models predicting deer use of the landscape and local population changes, highlighting the importance of good quality information.

As this Newsletter is larger than usual the index below will help you find information on the items you were directly involved with. We hope you enjoy reading about our findings.

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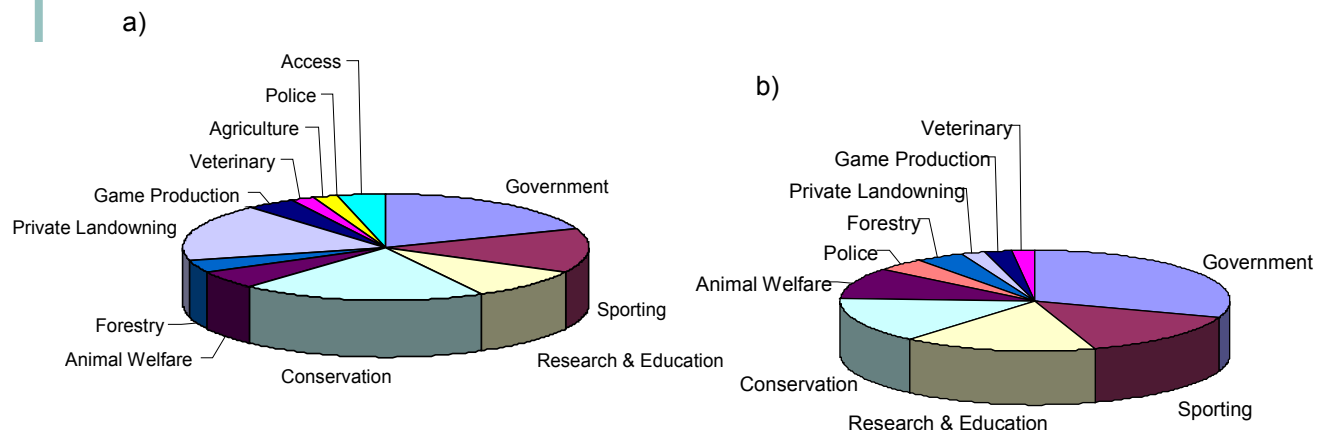
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**Brenda Mayle, Project Communications Officer** [brenda.mayle@forestry.gsi.gov.uk](mailto:brenda.mayle@forestry.gsi.gov.uk)

## Deer World: Who's involved in collaboration?

Interviews at the national level in each country identified stakeholders involved in deer management (Figures 1 & 2) and their motives for collaboration - which include addressing management problems, acting efficiently, setting standards, avoiding conflict, gaining influence and sharing responsibilities.



**Figure 1.** Interest groups involved in deer management in a) England and b) Scotland. There is a wider range of groups involved in Scotland with Agriculture, Police and Access included

Not only are there many stakeholders, but the Figures illustrate the range and breadth of 'stakes' –i.e. ways in which wild deer relate to people and organisations. There is also, of course, some variation across government bodies. This suggests that collaborative approaches are essential to effectively manage and integrate these varying perspectives.

Government bodies/Public Agencies, non-governmental organisations (NGOs) and private sector representatives collaborate to generate policies at national level, but collaboration between stakeholders over implementing these policies at the local level may be hampered by a lack of time, resources, communication, understanding or respect.

Collaboration takes many forms including discussion and planning meetings, consultation exercises, establishment of strategic partnerships, personal interaction between individuals, completion of bilateral research contracts, the development of Best Practice advice, and co-ordinated land management.

Effective collaboration requires the stakeholder to clearly understand their interest in the stake, and have the time and resources to be involved. All stakeholders need to be willing to share knowledge, to be tolerant, flexible and develop trust in the other parties. Networks of contacts are important, as is the presence of a convenor or leader to encourage and facilitate the collaboration. Where it occurred, effective collaboration resulted in a wider understanding of the issues, and each other's perspectives as well as identification of the critical influences to achieve the objectives and meet the needs of more stakeholders.

Some results from this part of the project have been published in a paper which draws upon research from across the RELU programme;

[Who's in and why? A typology of stakeholder analysis methods for natural resource management](#)  
*Journal of Environmental Management*, Volume 90, Issue 5, April 2009

## Rights, responsibilities and collaboration over deer management.

A review of legislation sought to relate deer management laws to the social, economic and environmental contexts in which they were established. This shows that for the majority of its history deer hunting has been an exclusive practice; under the control of landowners through a combination of tradition, culture, social networks, and economic wealth. Legislation has supplemented this exclusivity by limiting technology to kill deer, access to land (e.g. trespass), economic opportunities (e.g. licensed venison sales) and time (e.g. seasons and prohibition of night shooting). A number of rights have been created for those with the opportunity to kill deer, particularly the right to exclude others, but at the same time given them very few responsibilities to address the impacts created, at least in part, by management choices.

Collaborative management requires an approach that is inclusive of a range of stakeholders, and within which at least some responsibility for taking management action is required. This is clearly in tension with the British legislative framework and thus significant innovation is likely to be necessary if legislation is to encourage collaboration. However, collaborative approaches may allow non-legislative frameworks for sustainable deer management to develop that are based on consensus and agreed responsibilities.

The full review is published in;

Phillip, S., Dandy, N., Gill, R. and MacMillan, D.C. (2009). Is legislation a barrier to the sustainable management of game species? A case study of wild deer in Britain. *Journal of Environmental Planning and Management* Vol. 52, (8), 993–1012

## Knowledge and information: what gets used and where does it come from?

To explore how the objectives of an organisation for managing deer can influence how effectively they communicate with each other about deer management we interviewed representatives from 22 organisations in Scotland and deer managers in 2 case study sites. Four main objectives were shared to a lesser or greater extent by most organisations (Figure 2); Sustainable deer management, Deer related (welfare, population management, marauding deer), Social-cultural (tourism, sport, access to countryside, public safety, communication), and Environmental (designated site protection, grazing impact, natural heritage, woodland regeneration). Most organisations were concerned with environmental issues.

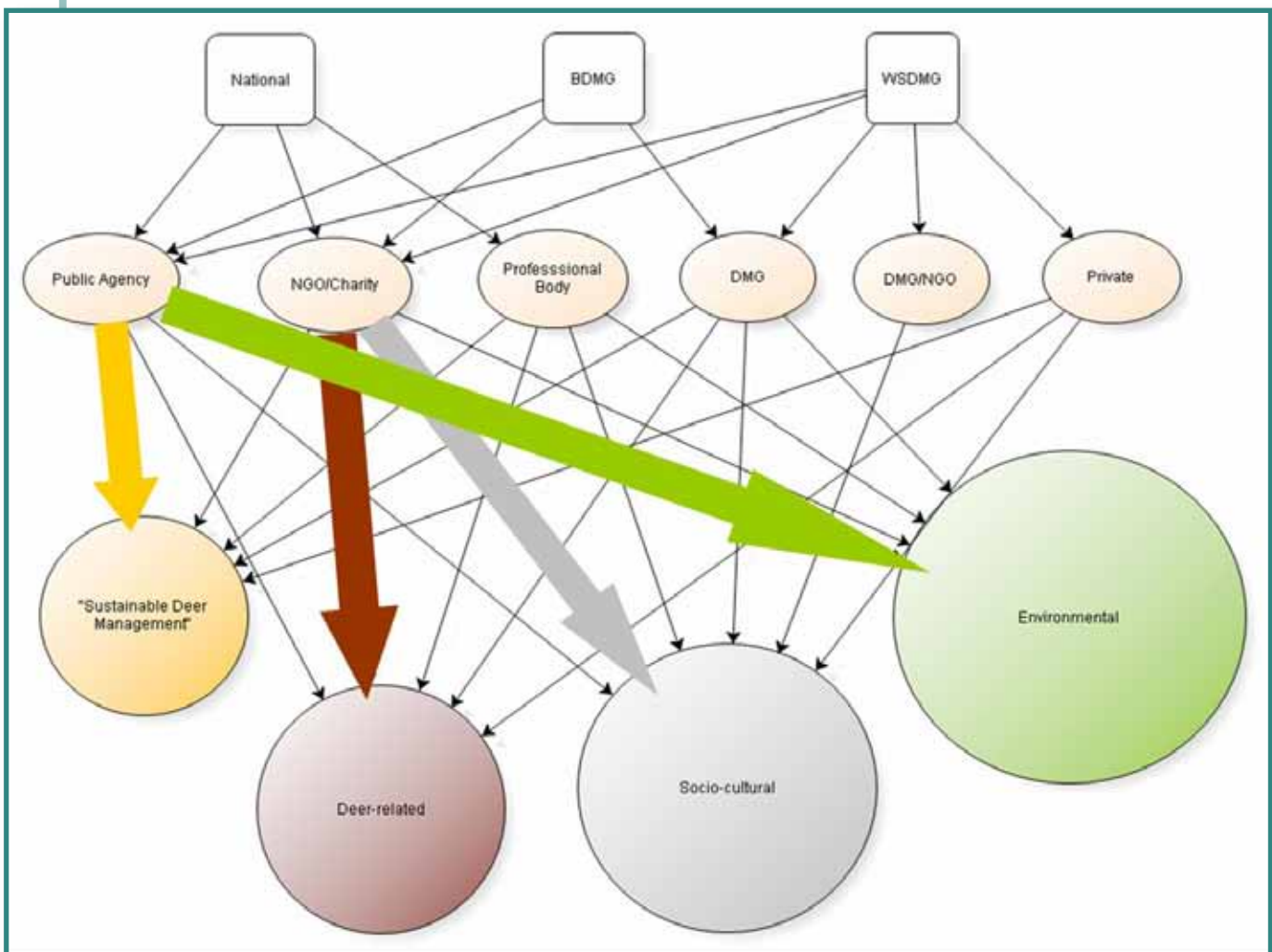


Figure 2 Diagram showing priorities of organizations in deer management by theme. Size of bubble denotes relative importance of theme to respondents and size of arrow denotes agency most likely to cite theme as a priority.

**Table 1** Information Exchange between Organisations

Showing the number of times an individual mentioned information sharing with other organization types in deer world. "Other\*" denotes unspecified mention of an organization, for example: "I speak to other organizations working in deer management".










Stakeholders		Organisations Cited as Sources of Information					
Organisation	Individuals (n)	Public Agency	NGO/Charity	DMG	Professional Body	Scientific/Research	"Other"*
National							
Public Agency	4	7	1	3	3	3	4
NGO/Charity	6	12	4	1	3	3	2
Professional Body	4	2	0	1	2	5	5
S/Total	14	21	5	5	8	11	11
Balquhider							
Public Agency	4	9	0	2	1	1	1
NGO/Charity	3	5	2	2	2	1	2
DMG	2	3	1	1	1	0	0
S/Total	9	17	3	5	4	2	3
West Sutherland							
Public Agency	3	7	1	4	0	0	1
NGO/Charity	3	2	0	1	1	0	1
DMG	1	0	0	0	1	0	0
DMG/NGO	1	1	0	0	3	0	0
Private	1	1	1	1	0	0	0
S/Total	9	11	2	6	5	0	2
<b>Total</b>	<b>32</b>	<b>49</b>	<b>10</b>	<b>16</b>	<b>17</b>	<b>13</b>	<b>16</b>

Organisations that shared objectives communicated with each other more than with those with divergent objectives (Table 1 and Figure 2). Talking to people and attending meetings were the most popular methods to gain knowledge at local deer management (case-study) level, whilst scientific research was important at a national level. Internet and email were more important for information transfer for stakeholders in the more remote case study site. Public Agencies played a key role in the provision and exchange of information. These results are particularly helpful to inform researchers and policy makers about how best to communicate research results to inform Best Practice.

## What drives the decisions of deer managers?

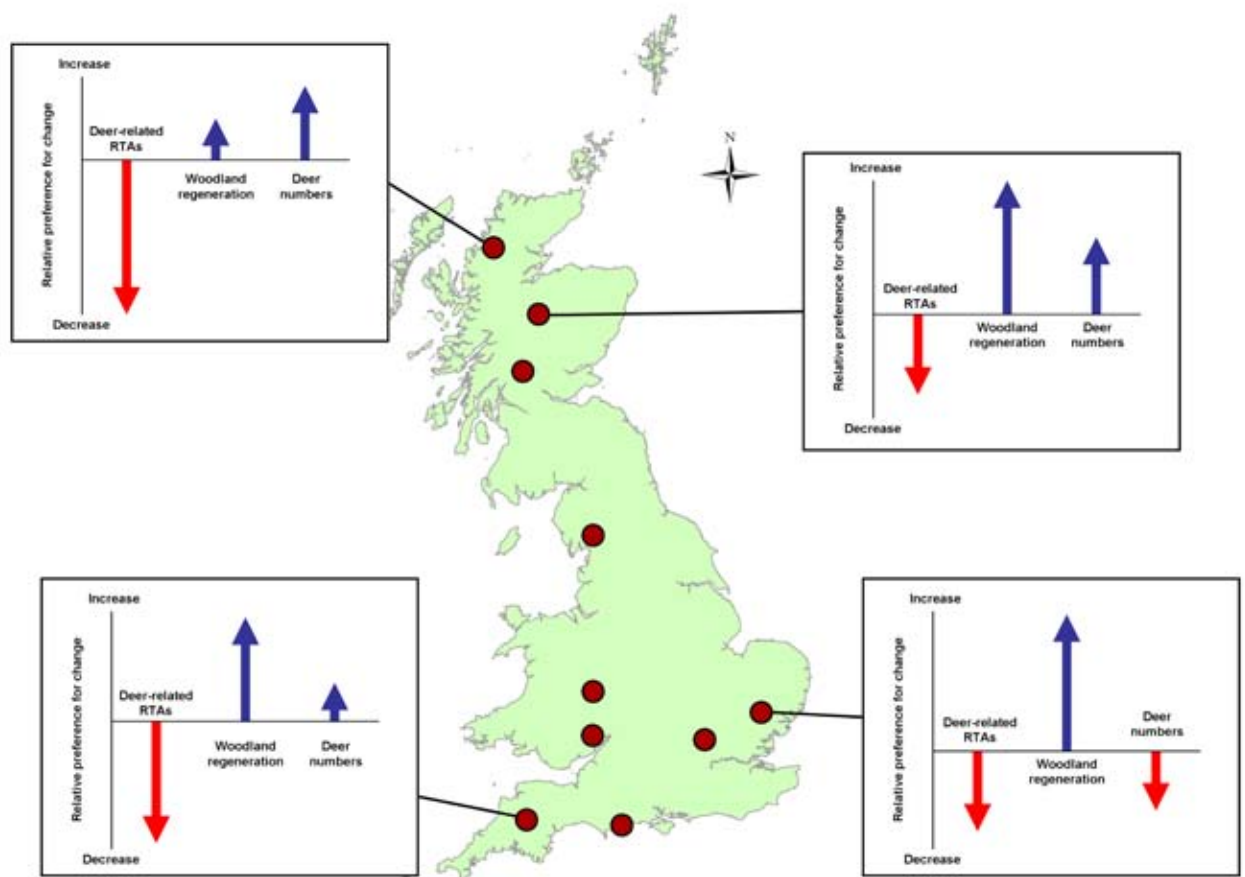
How managers make decisions and what influences these decisions is important if new public objectives are to be considered by managers. Choice experiments were conducted in 10 locations across the UK.

Participants were asked to choose between various representations of deer populations and their impacts on road traffic accidents and conservation interests using choice cards (Figure 3). The factors affecting their choices and their reactions to the situations shown on the cards were then discussed in a group setting. This discussion was also used to examine attitudes towards collaborative management.

	RTAs	Woodland regeneration	Deer population	Tick preferred
Option A				<input type="checkbox"/>
Option B				<input type="checkbox"/>
Status quo				<input type="checkbox"/>

**Figure 3.** Example of choice experiment card used to record management preferences

**Figure 4.** Location of study sites and preferences determined from choice experiments. Arrows graphs show relative preference for changes in the different factors for four of the study areas.



Nationally, participants had a strong aversion to increases in deer-related RTAs, a strong preference for increasing woodland regeneration and a relatively weaker but still significant preference for increasing deer numbers (Figure 4). There were regional exceptions including an aversion to increasing deer numbers in Suffolk and a larger preference for increases in deer compared with increases in woodland regeneration in parts of Scotland. The group discussions highlighted a number of additional factors affecting deer and their impacts. Common to most areas was a preference for a reduction in deer-related RTAs via mechanisms such as reducing traffic speeds rather than reducing deer numbers.

Collaboration in deer management was favoured in most areas BUT mandatory collaboration schemes were largely thought to be impractical or unwanted. A voluntary scheme tailored to specific areas was the preferred option. A range of possible incentives for collaboration was discussed, and financial incentives were acceptable in some areas. Addressing venison prices and marketing was one of the suggested alternative mechanisms for encouraging more effective deer management. However results from the study of venison markets suggest this may not be successful.

## Can improved venison markets influence culling regimes?

This study focused initially on wild red deer in Scotland, through interviews with stalkers on 12 estates within the case study areas and 7 venison processors. Results show that revenue from stalking is more important than venison price for estates. Stalkers suggested an expansion of commercial stalking of hinds as one way to increase culls but herd management to maximise the numbers of stags to be shot on sporting estates is an important factor because each sporting stag can add up to £22,000 to the capital value of the land.



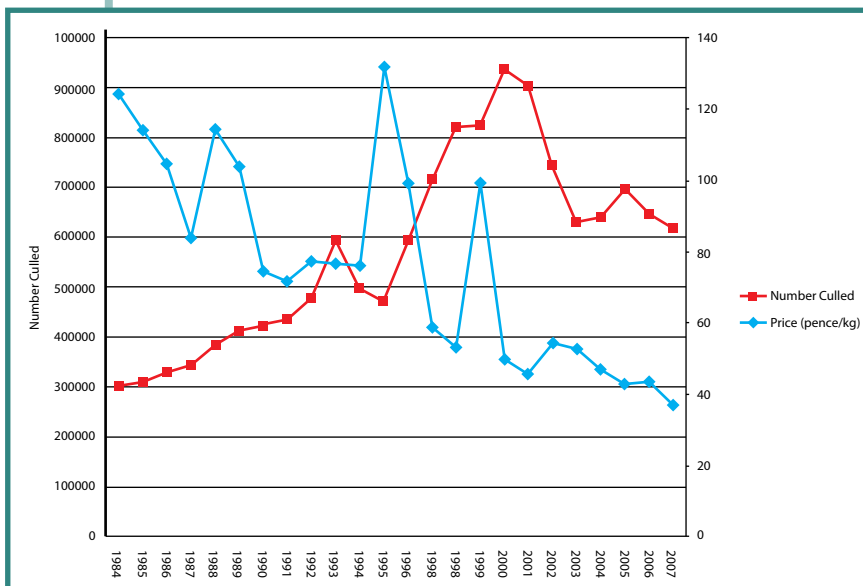
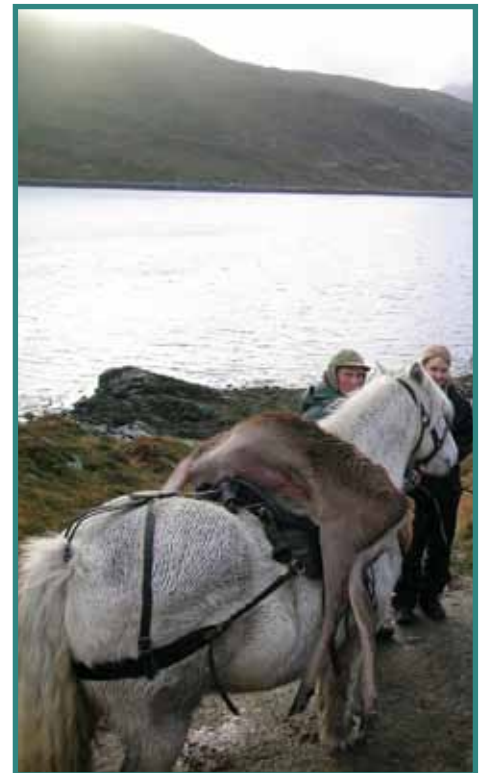


Figure 5 Venison price changes and total cull levels in Scotland between 1984 and 2007

Results indicate that improving financial returns to deer management through the promotion of the venison market is not a realistic solution for sporting estates in Scotland as venison production is less important than managing deer for sporting objectives. Incentives to produce more venison therefore compete with the cultural and economic aspects associated with sport hunting and are unlikely to be as effective as those used in agricultural contexts where farmers have been 'conditioned' to subsidies and are experiencing reduced incomes.

Douglas C MacMillan and Sharon Phillip. 2009. The role of economic incentives in resolving conservation conflicts: the case of wild deer management and habitat conservation. Environmental Conservation (in press).



## Integrating knowledge to improve understanding: using GIS to make science useful to managers.

We collected stakeholder information about deer habitat and range use, population counts and cull data from 2 case study areas in Scotland using map-based interviews. The data was used in DeerMAP, a spatial model of deer at the landscape scale, to predict seasonal habitat use by deer and the potential influence of culling. The interviews and map helped to identify potential management conflicts between neighbours, such as a possible vacuum effect due to culling. The initial model output was then discussed with stakeholders and the model revised based upon additional stakeholder information (Figure 6 a & b).

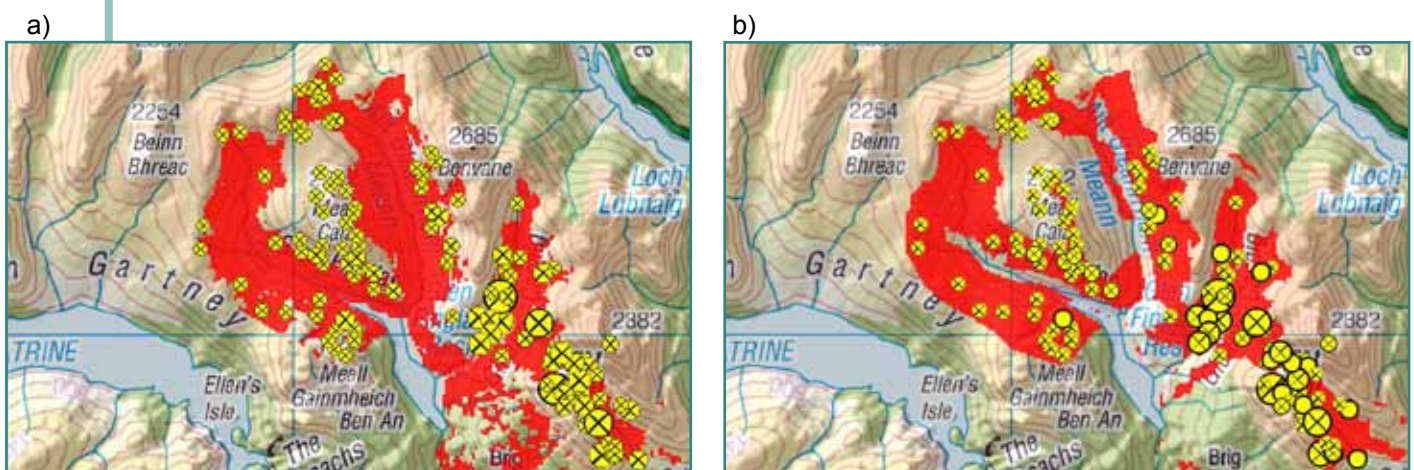
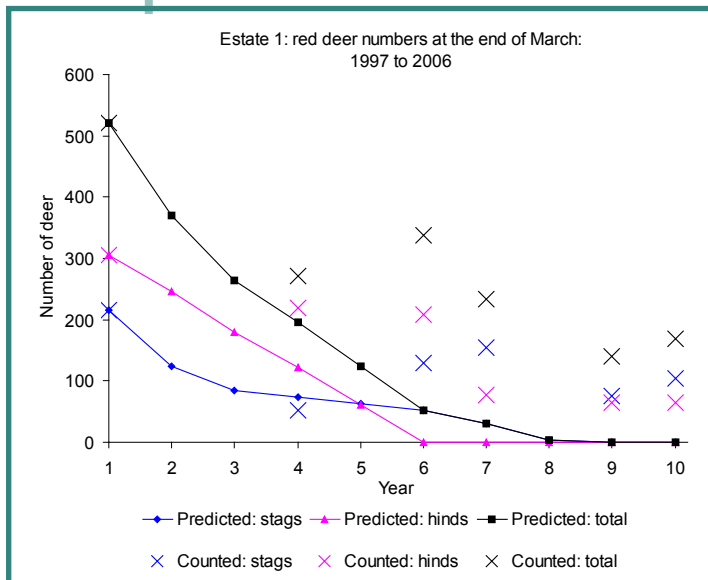


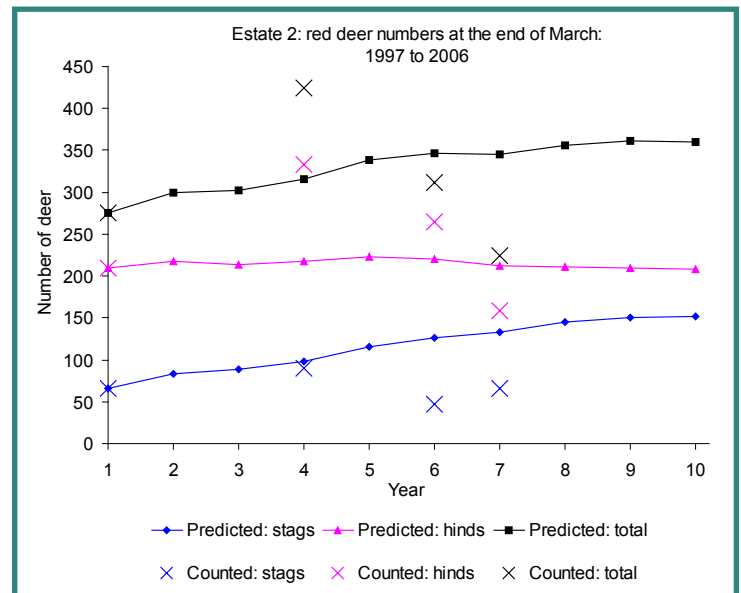
Figure 6. Maps of Estate GF: (a) shows the location of deer count data for stags in winter superimposed on the original GIS predictions of deer suitability. Shaded areas are those predicted to have the highest suitability. (b) as for (a) but using the modified GIS predictions from the model, adjusted for additional information provided through interviews with local stalkers.

Comparison of the deer distribution predictions and population modelling outputs with actual cull and count data (Figure 7) indicated there was little evidence for the vacuum effect expected from heavy culls in one area within the chosen sites. There was some evidence of deer moving from higher to lower density areas. Calf production per hind appeared to increase as deer density declined, so that sustainable stag culls may increase when hind density is reduced.

Figure 7. Model predictions for neighbouring estates with different culling levels.



a) Actual cull and count data (solid lines) shows that at current culling intensity no deer should be left. Actual deer counts (crosses) show high numbers of deer.



b) Predictions for Estate 2 show increasing numbers but real counts show a decline. The evidence does not support suggestions that stags on Estate 1 come from Estate 2.

The work demonstrates the importance of bringing together ecological and expert knowledge to provide insights on management conflicts and foster collaboration between managers with different objectives to address key issues of deer management. The importance of the quality of local knowledge and local cull and count data, particularly for population modelling were also demonstrated. Moreover, discussions based on evidence and practical issues help overcome conflicts that are grounded on perceptions and personal feelings, facilitating collaboration and the identification of solutions to the problem. Some of the results from this are already published in;

[Can managers inform models? Integrating local knowledge into models of red deer habitat use.](#) Journal of Applied Ecology, Volume 46 Issue 2, 344 - 352 March 2009

## Perceptions of and preferences for woodland landscapes impacted by deer

Field based workshops around the Herefordshire village of Fownhope were used to investigate the variation between perceptions of the values associated with woodland landscapes impacted on by deer across distinct societal groups, and the robustness of these preferences in response to ecological and deer management information.

Three woodlands with varying understorey density (Figure 8) were visited by 29 participants who were asked to take digital photos illustrating their likes and dislikes. These photographs then formed the basis for discussions during which the values of woodland landscapes were discussed and overall preferences were assessed. Information relating woodland understorey to plant and bird diversity, herbivore impact and deer management was then provided and any reassessment of preference by participants investigated.

1. Please indicate how you prefer to see the understorey of woodland, on a scale for 1 (very sparse) to 7 (very dense)?  
Please tick only one box.


☐

1

**Very Sparse**

☐

2

☐

3

☐

4

**Intermediate**

☐

5

☐

6

☐

7

**Very Dense**

There was substantial similarity in perceptions of and preferences for woodland landscapes across societal groups. 'Professionals' and 'the public' both valued;

- perceived 'naturalness' and 'wildness'
- notions of decay and regeneration, and associated 'cycles' of life
- the woodland's history and age
- physical aesthetic character
- its variety and diversity

There were, however, significant differences between 'professionals' and 'the public', in attributing values associated with access and the woodland as a physical resource. There was also change between values associated with the various woodland sites, and thus it is clear that deer browsing can change the values associated with woodlands, but in both positive and negative ways.

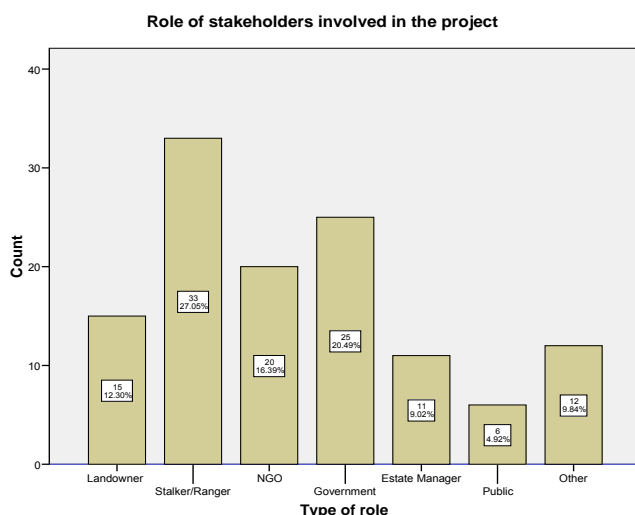
There was some variation between groups in terms of language used, with 'professionals' using terms such as 'timber' and frequently using species' common names. Although some of the public was particularly interested in access, openness of understorey and paths, overall dense to intermediate understorey was preferred. Individual preferences were very robust in the light of the new information provided by researchers, with very little change in overall preferences. There was widespread consensus that landscapes should have a patchwork of varied woodlands.

## Involving managers and policy makers in research projects

This project has used a novel technique of 'participatory interdisciplinary research', involving researchers, practitioners and policymakers in research development, implementation and dissemination. By involving managers and policymakers at all levels through site visits, interviews, choice experiments, mapping of deer density and movement we gathered their expertise and knowledge to improve tools aimed at improving practical deer management. As a part of the project we have asked researchers and stakeholders how well this has worked.

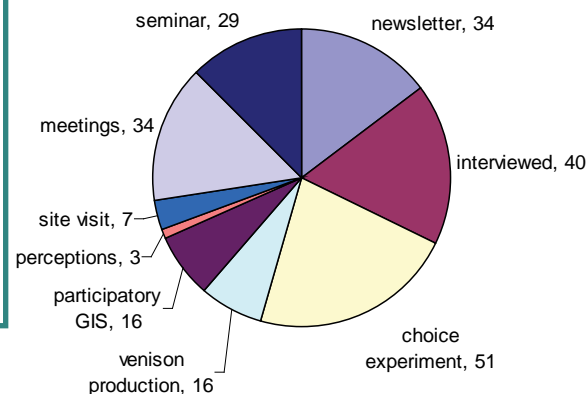
Researchers recognised the need to allow time to meet with a broad range of stakeholders and the difficulties of integrating different forms of stakeholder knowledge. They became increasingly aware of the importance of different types of knowledge in addressing rural resource management questions.





**Figure 9a** The different roles of stakeholders (122 replied) involved in the project

#### Types of project activities stakeholders engaged in



**Figure 9b.** Percentage of stakeholders engaged in the research activities. Stakeholders could be involved in a number of different activities.

Stakeholder involvement in the project varied depending upon their regional location and job description. Choice experiments and interviews were a key means of stakeholder involvement (Figure 9 a & b). Stakeholders identified the impacts of getting involved as:

- collaboration – a realisation of its importance and understanding
- understanding others and sharing information – hearing other viewpoints, gaining a wider perspective of deer management, the opportunity to share information and discuss issues.
- learning and changing behaviour – increasing their knowledge of the latest research.

The project prompted people to think about issues such as cull numbers, road traffic accidents, and the potential range of stakeholders with an interest in deer. Some of this increase in knowledge also led to stakeholders changing their behaviour. Others stated it was too early to identify the impact of the project, they were not involved enough for it to have an impact on them or they felt the research was not relevant to their particular needs. Benefits from involvement in the project were identified as; improved social networking, social and technical learning and academic achievements.

For the researchers the main challenge was the time and cost of involving stakeholders, building relationships within the constraints of the research project, the need to address stakeholder feedback requests and meet diverse expectations.

## Overall messages for collaborative management.

- **Time** - a key resource for engaging with stakeholders, developing trust and understanding of others perspectives.
- **Leadership** - there needs to be someone to lead the process who is sufficiently motivated to overcome the challenges of collaboration.
- **Public Agencies** - play a key role in disseminating research results to practitioners
- **Face to face meetings** - are important for information transfer. New methods to achieve this should be investigated - eg video conference meetings.
- **Knowledge** – Developing flexible adaptive platforms to integrate locally specific knowledge with ecological understanding across the landscape over which deer roam can inform conflicts over deer management and is the basis for more sustainable management planning.
- **Financial incentives** - are unlikely to encourage collaboration unless locally specific

## Very many thanks to all our research partners, funders and participants

Contact details for the Project team can be found at the individual university and institute websites or [www.macaulay.ac.uk/RELU](http://www.macaulay.ac.uk/RELU)

Macaulay Institute: Justin Irvine, Stefano Fiorini	Forest Research: Brenda Mayle, Liz O'Brien, Robin Gill, Norman Dandy, Helen Armstrong
University of York: Piran White, Zoe Austin, Jim Smart	DICE University of Kent: Douglas MacMillan
University of St Andrews: Rehema White	University of Edinburgh: Steve Yearley
University of Aberdeen: René van der Wal, Amy Turner	

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