

FORESTRY COMMISSION

Description of the Research Project or Services

1.	Research Purchasing Manager (C&FS)	Sallie Bailey
	Relevant PAG	Ecosystems and Biodiversity

2.	Name of FR Programme Manager (PgM) or Project Manager (PM) and staff	Brenda Mayle is PGM and PM for 'Impact of Alien Invasive Vertebrates Particularly Grey Squirrels to Forestry'. Helen Armstrong and Robin Gill are joint PM's for 'Impact of Large Herbivores on Woodlands' Mark Ferryman is the only support staff in the Programme. Staff from other programmes provide support to specific work areas (detailed below) where funding allows.
	Name of Institution/company	Forest Research
	Official address	Alice Holt Lodge, Wrecclesham Farnham Surrey, GU10 4LH
	Telephone No.	
	e-mail address	brenda.mayle@forestry.gsi.gov.uk
	Programme Life (years)	2 Years. This programme will receive £250K in 2011-12. In 2012-13 funding for Herbivore Impacts ceases with only £100k for Grey Squirrel management. CFS funds in this Programme cease in 2013-14 with Squirrel research being funded (£100k) in another Programme (Advice and scientific support for tree health.) – but for completeness and to understand continuity, the work programme is described here.
	Start Date	1st April 2011
	Completion Date	31st March 2014
	Revision Dates	31st March 2012/2013/2014

3. **Title of Research Project or Service**

Vertebrate Management

4. **Abstract of proposed research (Summary to be used on website/FRCC etc) (200 words)**

The Vertebrate Research Programme has sought to provide increased understanding, knowledge and tools to inform and support Vertebrate management to reduce their negative impacts and provide positive impacts, and to deliver increased benefits to society by informing sustainable woodland management practice. The programme contains two project areas: Alien and Invasive species (AIS) and Herbivore Impacts (HI),

both of which contain a number of specific work areas. For AIS these are; Alien species, Grey Squirrel and Feral Boar. For HI these are; HI general, Domestic Stock, Impacts, Population Dynamics, Advice and Knowledge Transfer, RELU Deer, Natural England SSSI contract.

Funding for this programme during 2011-12 is £115k for AIS including grey squirrels and £135 for HI. This supports 1.9 project officers, 0.5 specialist and other support staff including TSU, programming, GIS and statistics (0.6 PL and 0.5 specialist support officer under Grey squirrels; 1.2 PL plus support staff under the HI project, and 0.1 PL plus limited support under other AIS)

From April 2012 CFS funding for HI research stops with only £100k for grey squirrel research and limited AIS horizon scanning. The 67% reduction in funding to this research programme over the next 2 years will have a **significant impact** on research and outputs for policy makers and practitioners within the forest industry as well as other land management. It will also limit Forest Research's ability to maintain core skills with which to seek external funding.

During 2011-12 Herbivore Impacts work will focus on completion of key outputs and seeking external funding to retain a Herbivore Impacts research and knowledge transfer capability. Alien and Invasive Species research will focus on maintaining a horizon scanning ability and progressing investigations into prediction of damage risk and fertility control options for grey squirrels.

From April 2012 grey squirrel research will focus on improving understanding of damage risk prediction and novel approaches for control of grey squirrels and their impacts.

5. Aims and objectives (word limit 1500)

5.1 Aim of the research

Over the next few decades the presence of trees and woodlands in the landscape across GB will increase driven by policies to mitigate climate change impacts (Read report¹), to halt biodiversity loss and ecosystem degradation (Defra Natural Environment White Paper), and to enhance habitat diversity through integrated land use and by supporting underpinning ecological processes (Lawton review, UK Forestry Standard).

Changes in woodland management practices such as production of woodfuel (including the use of novel tree species) will also increase habitat availability to vertebrates. Climate change scenarios (Sparks & Gill, 2002) predict an increase in population densities and ranges for deer and squirrels driven by improved habitat quality and reduction in natural mortality. Vertebrates have potential to limit the success of novel approaches by impacting on trees and woodlands from establishment through to mature stages and by impacting on associated habitats and woodland biodiversity.

The aims of this research are to:

1. Provide an understanding of Vertebrate impacts (positive and negative) to trees, woodlands and forests in a changing environment.
2. Develop tools and publish information to support the management of Vertebrates within woodland and urban landscapes for multiple ecosystem benefits.
3. Provide advice and knowledge transfer to policy makers and practitioners delivering European, Country and Regional HAP's, BAP's and land management policy targets.

<p>4. Engage with GB and Country policy development and vertebrate management officers to identify research & Knowledge Transfer priorities and funding options.</p> <p>Opportunities for linkages with other research programmes such as Ecosystem Resilience and Climate change, Climate Change Adaptation Strategies, Sustainable Forest Management and Society and Alternative Management Approaches will be lost unless core funding is available to retain the experience and skills of Herbivore Impact staff.</p> <p>Links between the Grey Squirrel work area and Advice and Scientific Support for Tree Health have already been identified. There is potential for links to Alternative Management Approaches, Wood and Timber Properties and Species and Gene conservation.</p>	
<p>5.2 Work Areas</p> <p>Please list your work Areas as shown in the table below and show how they further sub-divide. Work Areas should be individually costed and be time bound – see 13. below. Please state key desired outcomes from each work area. First two years should be detailed, the next two in outline. See also Note for this Section below.</p>	
<p>Work Area 94VM100 B Mayle (BM), M Ferryman (MF),</p> <p>Work package 94VM1001 BM</p> <p>Work package 94VM1002 BM</p> <p>Work package 941003 BM, MF, A Peace, TSU staff</p>	<p>Grey Squirrels. The objective of the work is to identify risk of negative impact on woodland habitats from grey squirrels, to improve methods for predicting impacts and to improve management options to reduce these impacts. Links to other research programmes and work areas will be identified, such as the <i>Phytophthora ramorum</i> surveys.</p> <p>'Programme development.' Manage programme and investigate options for generating external income and collaboration to progress research and enable development of tools to predict and manage grey squirrel impacts. New collaboration opportunities have been identified with the Royal Veterinary College. Example outputs are proposals for BBSRC & NERC Case studentships.</p> <p>Investigate methods to evaluate levels of grey squirrel impacts, economic and biodiversity significance. Aerial surveys for <i>P. ramorum</i> will be investigated as a source of information.</p> <p>Develop an understanding of factors influencing development of a practical reproductive inhibition system for grey squirrels and maintain facilities to enable reproductive inhibition studies. Seek collaborators and funding for a PhD investigating squirrel physiology, particularly digestive physiology, to inform formulation of oral delivery agents for population management and disease control. Improve oral bait delivery systems In collaboration with NWRC, USDA, Fera and others, test potential agents for fertility control in grey squirrels and publish results.</p>
<p>Work package 94VM1004 BM, MF, AP, TSU staff</p>	<p>Improve landscape scale risk assessment methods to more effectively target limited resources for control of grey squirrels. Prediction of damage risk will enable improved targeting of limited resources and grant aid to support grey squirrel control to benefit woodland management and provision of ecosystem benefits.</p>
<p>Work package 94VM1006</p>	<p>Provide Advice under Country SLA Agreements and to Policy makers, woodland and land managers, education, media and the public, via webpages Report on Advice provided under work package 94VM1203 (below)</p>
<p>Work package 94VM1007</p>	<p>Knowledge transfer to forest industry, policy and education establishments and media. Two presentations at the 8th European Pest Management Conference, Berlin, Sept 2011. Publish papers and articles as detailed in 14.</p>
<p>Work Area 94VM120</p> <p>Work package 94VM1201 BM, MF,</p>	<p>Alien Invasives. Manage programme closure. Investigate options for national and international collaboration to generate external income and maintain horizon scanning and research capability beyond April 2012.</p> <p>Identify potential issues for future alien invasive species impacts through engagement with INNS forum and annual report on Advice and Knowledge Transfer services.</p>

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Work package 94VM1202 BM, MF, Chris Quine (CQ)	Advice to FC under Country SLA Agreements, and to forest industry, woodland and land managers, education, media and the public via web pages. Provide annual report to CFS on Advice and Knowledge Transfer provided under Vertebrates and Priority Species Research Programmes
Work package 94VM1203 BM, MF, AP, (CQ)	Knowledge Transfer to forest industry, policy, and education establishments and media includes a presentation on Feral boar Biodiversity impacts at the 8 th European Pest Management Conference in Berlin, Sept 2011. Publish papers in peer reviewed journals and as popular articles as detailed in 14 .
Work Area 94VM130	Feral Boar. Evaluate methods to monitor feral boar population presence and their impacts on woodland biodiversity. This is a collaborative study with Fera, funded by Defra (Fera staff) and Forestry Commission (FR staff).
Work Package 94VM1302	Finalise reporting of investigations to Defra and FC and publish (web pages, articles).
Work Area 94VM140 Helen Armstrong (HA)Robin Gill (RG)	Impact of Large Herbivores on Woodlands The objective of the work is to provide increased understanding, knowledge and tools to support large herbivore management to reduce their negative impacts and provide positive impacts. Much of the effort will focus on 'Knowledge Transfer' in 2011-12.
Work package 94VM1401 HA, RG, BM	Manage the programme and investigate funding opportunities to enable herbivore impact research capability to be maintained within Forest Research beyond April 2012.
Work Area 94VM 150	Domestic Stock. Informing land managers' decisions on the use of domestic stock to achieve biodiversity objectives
Work package 94VM 1501 HA, T Connolly	Cattle impacts Publish evidence of use of cattle to manipulate habitats to improve biodiversity.
Work package 94VM 1502 HA	Grazing toolbox , Complete revisions and publicise availability. (Funded by SNH and FCS)
Work Area 94VM160	Evaluating the impact of large herbivores on woodlands.
Work package 94VM1601 RG, AP	Deer impacts. Publish information on landscape level influences of deer and their impacts to provide evidence on which to base forecasts of landscape level deer distribution and impact changes, as influenced by habitat changes driven by increased afforestation (for Climate Change mitigation).
Work package 94VM1602 HA, Paul Taylor	Impact assessment methods. Develop and amend impact assessment methods based on feedback from users, and publish details of the methods.
Work Area 94VM 170	Provide Knowledge transfer and Advice to forest industry, policy and education establishments. Provide evidence of Herbivore impacts (positive and negative) and best practice management to policy makers, the forest Industry, and land managers
Work package 94VM1701 HA, RG, BM	Provide Advice to policy makers and forest industry through SLA agreements Provide timely and appropriate response to requests for Advice.
Work package 94VM1702 HA, RG	Knowledge transfer to forest industry, policy and education establishments. Details of papers provided in work packages. Presentation at Animals, Man & Treescapes Conference, Sheffield (BES supported) Lead author for paper (co-authors; Nick Mainprize, FCS, Bob Black, woodland consultant, Kate Holl, SNH, Richard Thompson, FCS, and Lucy Sumsion, NFUS). Update herbivore Impacts web pages as appropriate.
Work Area 94VM180	Informing deer managers' decisions about appropriate culling rates for deer populations.
Work package 94VM1801 HA	Herbivore modelling Publish information on recruitment rates in red deer based on data from the FC deer cull database.

Work package 94VM1804 RG, AP, Phil Handley,		Assessing deer population size Publish information on deer use of field boundaries in relation to woodland boundaries to improve methods of assessing deer densities using thermal imaging.
Work Area 94VM190	HA	RELU deer project on collaborative deer management
Work package 94VM1901	HA	Complete analysis and publication of data from project 'Collaborative frameworks in land management: a case-study of wild deer in Britain'. See http://www.esrc.ac.uk/my-esrc/grants/RES-227-25-0014/read
Work Area 94VM1X3		Finalise report on SSSI Deer impacts survey for Natural England.
Work package 94VM1X31	RG	Results may provide additional information for inclusion in proposed publication on deer impact assessment methods (Work package 94VM1601)

* Add new work areas and packages as required

6. Please indicate which of the FC's 6 Climate change priority actions this work fits into

Protect what we already have	<input checked="" type="checkbox"/>	Reduce deforestation	<input checked="" type="checkbox"/>
Restore the world's forest cover	<input type="checkbox"/>	Use wood for energy	<input checked="" type="checkbox"/>
Replace other materials with wood	<input type="checkbox"/>	Plan to adapt to our changing climate	<input checked="" type="checkbox"/>

7. Comment on how this research will address Country Strategy needs/targets (175 words)

All Country Strategies propose an increase in woodland cover for climate change mitigation and to provide multiple ecosystem benefits. This will increase landscape level provision of habitat for Vertebrates with likely consequential increases in their populations, ranges and their impacts unless adequate management actions are taken. This Research Programme provides evidence on which to base decisions about policy and best practice management to mitigate negative impacts and encourage beneficial impacts to support provision of ecosystem services. Through the Advice and Knowledge Transfer service this programme provides a foresighting and horizon scanning service within which potential problem species/ groups can be identified to enable provision for evidence to be sought on which to base decisions about future management needs.

8. Identify and comment on any associated business risk of undertaking/not undertaking the research and how that will be managed

The proposed reduction in funding will prevent the completion of some and refining of other current methods and the development of new management tools for herbivore management. It will severely limit horizon scanning abilities re future Vertebrate management issues and will limit Forest Research's ability to provide support to Policy Makers and Practitioners in terms of likely impacts of Vertebrates on management practices to mitigate climate change.

9. Research impact (economic, social, or biodiversity)

Who will benefit from this research? Policy makers, Woodland and other land managers, other research projects, the public.
How will they benefit from this research? They will have increased access to information and tools to allow them to make informed decisions relating to vertebrate management.
What will be done to ensure that they have the opportunity to benefit from this research? Information will be published in scientific papers and as more 'accessible' popular articles in trade and professional organisation magazines and presented in talks to managers, professional bodies and university/ college groups.
Potential for innovation and new markets? The 'bud cap' idea to develop protectors for leading shoots of young conifers is in the process of being tested and developed. This idea came from the Vertebrate Management group. Further development and testing will be undertaken in 2011/12.

10. Communication Strategy

Publications:	HI -1 Research Note,
Reports:	HI -1 report to NE. AIS -1 report to Defra, 1 report to CFS
Seminars/conferences:	Presentations at key National and International conferences and seminars; 3 Presentations at 8 th European Vertebrate Pest Management Conference, Berlin. Paper at Animals, Man and Treescapes conference. Sheffield
Decision support systems:	
Website:	Maintain and update the Woodland Grazing Toolbox including '10m method' (with FCS and SNH funding). Revise FR AIS and HI web pages as appropriate
Peer review papers:	As listed in 14. HI - 6 papers GS - 2 papers

11. Under government survey control procedures, Ministerial approval must be sought before statistical surveys of businesses or local authorities can proceed. Please indicate any intention to carry out a survey.

<p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> • If yes please give brief details

12. Details of support agreed or to be sought from funding bodies for project
(including in-kind support)

13. Resources (times and fees) requested from the Forestry Commission



14. Deliverables and associated costs to Forestry Commission

Table to be revised so that work areas same as in section 5 and tie in with Finance codes and budget

Work Area number	Output	Year 1				Year 2				Year 3				Year 4				Output Unique Identifier	Total Cost
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Work Area 94VM100 94VM1001 BM	Grey squirrel project management including seeking funding opportunities to maintain expertise and capabilities.	x																	
94VM1002 BM MF AP	Investigate use of aerial surveys for P ramorum to quantify squirrel impact to Larch.		x				x												
	Analyse results from surveys of thinned v unthinned beech			x	x					x									
94VM1003 BM, MF	Maintain facilities and skills base for Home Office licensed work for grey squirrels	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	X		
	Analyse and publish results of 2006-10 studies in peer reviewed paper.	x	x	x	x		x												
BM AP MF MF BM	Investigate bait enhancement options.			x	x	x													
MF BM	Improve selective access hoppers to minimise bait spillage				x	x													
BM	Draft proposal for PhD on squirrel physiology, seek collaborators and funding	x	x	x	x														
94VM1004 BM MF AP, TSU staff	Complete 2011 damage surveys to support model development to predict damage risk.				x	x				x									
94VM1006 BM MF	Knowledge Transfer and advice specific to grey squirrels, including webpage updates Including under country SLA's	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
BM AB BM et al	Presentations at European Vertebrate Pest Management Conference in Berlin Grey squirrel impacts and control ' Fertility Control in grey squirrels'			x															



Forestry Commission Proposal for funding Agreement Number CFS 14-2011-15

Signed.....Research Provider/HOD
Date.....

Signed.....C&FS Advisor
Date.....

Proposal Approved

CFS

Date 31st August 2011



15. Agreed Changes

Description of change:		
<p>Signed.....Research Provider Date.....</p> <p>Signed.....C&FS Date.....</p>		
<p>Signed.....Research Provider Date.....</p> <p>Signed.....C&FS Date.....</p>		
<p>Signed.....Research Provider Date.....</p> <p>Signed.....C&FS Date.....</p>		

16. Detailed communications plan:
Year 1
Year 2
Year 3
Year 4