

Science and Innovation Strategy for British Forestry

Annual Report 2011

Science and Innovation Strategy Annual Report 2011

INTRODUCTION

When we refreshed the Science and Innovation Strategy for British Forestry in 2010, we made a commitment to produce an annual report.

*"Implementation of this Strategy will demand continuous analysis and review. The results will be reported annually to the Research Strategy Management Board. **An annual report of outputs will be published on the internet as a supporting document to the Strategy.** This will contain the analysis of measures detailed [on the following page], and a comprehensive summary of research work undertaken and delivered during the year. This annual report, combined with the published Catalogue of research, and the published forward research programme for the coming year will support this process, and aid the transparency of our research procurement programme."*

This is the first annual report, providing outputs against most of the measures specified in the strategy. Several indicators and measures remain to be developed, and work is in progress on these, and one has been dropped due to changes in research commissioning practice as a result of streamlining our processes to deliver the spending review.

Forestry Commission
Silvan House
231 Corstorphine Road
Edinburgh
EH12 7AT

Science and Innovation Strategy Annual Report 2011

ANNUAL RESEARCH REPORT BY INDICATOR

Indicator	Measure
1. Expenditure on themes and programmes	Annual out-turn expenditure % by theme, split between expenditure with FR and external expenditure, to ensure that it follows the priorities identified in Section 2;
2. Leverage and gearing from partnership work, including in-kind contributions	Annual outturn for partnership work, by theme and programme, showing FC science budget spend and total value, to show total leverage. Partnership projects include FC-led projects with EU co-funding, Research Council funding, funding from other parts of FC, as well as funding from other organisations. It also includes all projects led by others for which the science budget contributes any funding, however minor.
3. Statistics on publications are the crucial measures of the scientific quality. We will record and publish these annually by research theme.	The number of scientific publications in peer-reviewed journals or delivered at conferences as a result of research sponsored by the Commission The number of other complete publications, and other published articles Annual total number of publications as a result of research sponsored by the Commission, by theme, split between publications in peer-reviewed journals, published papers delivered at conferences
4. Research liaison officers	Annual report by country on dissemination events supported covering statistics on 'dissemination events' – workshops, demonstrations, publications – to indicate that communication pathways remain open. We will develop an indicator of effectiveness for these communication posts
5. Programme advisory groups and their role in bringing countries into the process of commissioning research.	Due to restructuring of the research commissioning process to meet our spending review commitments, this indicator has been dropped.
6. Knowledge transfer	We will develop a measure to reflect the successful linkages between research and policy development
7. Outward looking focus	We will consider including more outward looking indicators e.g. innovation and presence in new area, and more outcome focussed indicators.

Science and Innovation Strategy Annual Report 2011

Indicator 1: Annual out-turn expenditure % by theme, split between expenditure with FR and external expenditure, to ensure that it follows the priorities identified in Section 2;

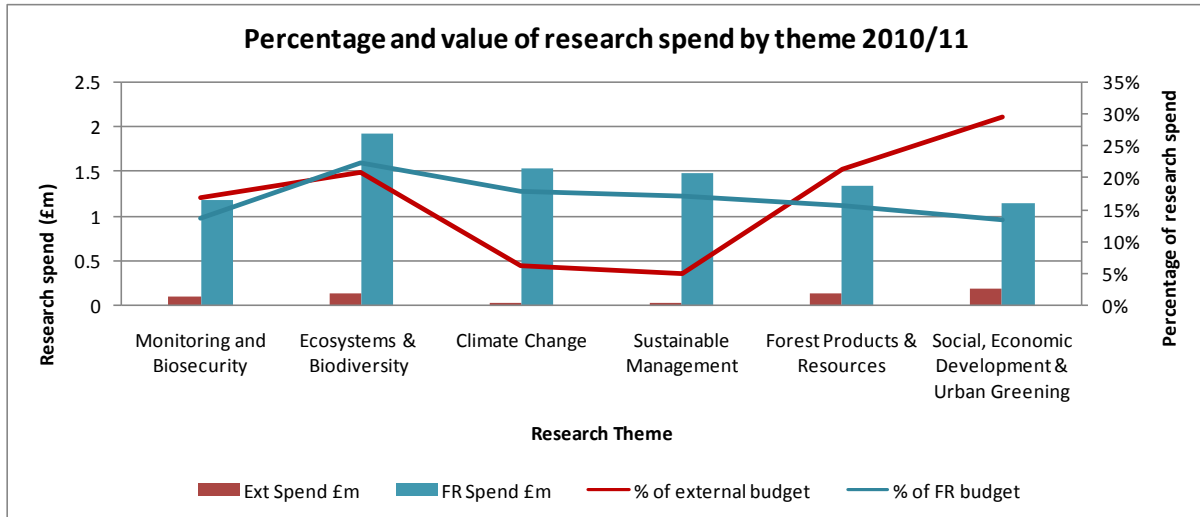


Fig1. Total expenditure (left axis) against each research theme as spent with Forest Research (blue bar) and with external providers (red bar), and these values expressed as a percentage of the total research spend (right axis) with FR (blue line) and external providers (red line).

Science and Innovation Strategy Annual Report 2011

Indicator 2: Annual outturn for partnership work, by theme and programme, showing FC science budget spend and total value, to show total leverage. Partnership projects include FC-led projects with EU co-funding, Research Council funding, funding from other parts of FC, as well as funding from other organisations. It also includes all projects led by others for which the science budget contributes any funding, however minor.

Theme	Programme	2010/11	CFS	Leverage	Leverage as % of total spend by programme
Ecosystems & Biodiversity	Hydrology	£337,000	£337,000	£100,000	30%
Ecosystems & Biodiversity	Genetic conservation	£240,000	£240,000	£128,800	54%
Ecosystems & Biodiversity	Ecological indicators	£91,000	£91,000	£40,250	44%
Ecosystems & Biodiversity	Priority habitats	£224,000	£224,000	£0	0%
Ecosystems & Biodiversity	Alien and invasive species	£166,000	£166,000	£70,000	42%
Ecosystems & Biodiversity	Soil Sustainability	£192,000	£192,000	£103,000	54%
Ecosystems & Biodiversity	Landscape ecology and spatial planning	£182,000	£182,000	£0	0%
Ecosystems & Biodiversity	Management and restoration of Priority Habitats	£116,000	£116,000	£0	0%
Ecosystems & Biodiversity	Priority species and their conservation	£176,000	£176,000	£0	0%
Ecosystems & Biodiversity	Impact of large herbivores on woodland	£135,000	£135,000	£0	0%
Ecosystems & Biodiversity	Decision support for forest ecology	£80,000	£80,000	£0	0%
Ecosystems & Biodiversity	Total for theme	£1,939,000	£1,939,000	£442,050	23%
Monitoring and Biosecurity	Integrated Forest monitoring (inc. Forest Health)	£237,000	£237,000	£100,000	42%
Monitoring and Biosecurity	Red Band Needle Blight	£274,000	£274,000	£0	0%
Monitoring and Biosecurity	Integrated Forest Management (Habitat)	£50,000	£50,000	£0	0%
Monitoring and Biosecurity	Advice and scientific support for tree health	£347,000	£347,000	£37,000	11%
Monitoring and Biosecurity	Risk assessment of invasive pathogens	£50,000	£50,000	£130,000	260%
Monitoring and Biosecurity	Remote sensing	£79,000	£79,000	£30,000	38%
Monitoring and Biosecurity	Characterisation of Bacterial Diseases	£80,000	£80,000	£0	0%
Monitoring and Biosecurity	Horse Chestnut Bacterial canker	£50,000	£50,000	£0	0%
Monitoring and Biosecurity	Pine Wood nematode	£25,000	£25,000	£0	0%
Monitoring and Biosecurity	Total for theme	£1,192,000	£1,192,000	£297,000	25%
Climate Change	ForeCast	£510,000	£510,000	£171,000	34%
Climate Change	Pests and pathogens in a changing climate (semi-natural woodland)	£180,000	£180,000	£0	0%
Climate Change	Managing Forest Carbon and GHG Balances	£757,000	£757,000	£0	0%
Climate Change	Climate Change and Trees in the Built Environment	£100,000	£100,000	£0	0%
Climate Change	Total for theme	£1,547,000	£1,547,000	£297,000	19%

Science and Innovation Strategy Annual Report 2011

Theme	Programme	2010/11	CFS	Leverage	Leverage as % of total spend by programme
Sustainable Forest management	Continuous cover silviculture	£340,000	£340,000	£0	0%
Sustainable Forest management	Restoration and Management of U	£95,000	£95,000	£0	0%
Sustainable Forest management	Modelling for mixed age and mixe	£95,000	£95,000	£0	0%
Sustainable Forest management	Impact of Changing Management	£195,000	£195,000	£0	0%
Sustainable Forest management	Scientific support for FRM regulati	£74,000	£74,000	£0	0%
Sustainable Forest management	Management of long term experim	£40,000	£40,000	£0	0%
Sustainable Forest management	Operational efficiency in a sustain	£195,000	£195,000	£0	0%
Sustainable Forest management	Regeneration and sustainable silvi	£461,000	£461,000	£0	0%
Sustainable Forest management	Total for theme	£1,495,000	£1,495,000	£0	0%
Social, Economic Development & Urban Greening	Economic research for sustainable	£164,000	£164,000	£0	0%
Social, Economic Development & Urban Greening	Historic environment & cultural he	£96,000	£96,000	£0	0%
Social, Economic Development & Urban Greening	Wildfires in Wales: Social drivers a	£54,000	£54,000	£0	0%
Social, Economic Development & Urban Greening	Land Regen & Urban greenspace	£244,000	£244,000	£210,000	86%
Social, Economic Development & Urban Greening	Social	£602,000	£602,000	£85,000	14%
Social, Economic Development & Urban Greening	Total for theme	£1,160,000	£1,160,000	£295,000	25%
Forest Products & Resources	Wood and timber	£324,000	£324,000	£335,000	103%
Forest Products & Resources	Tree breeding	£697,000	£697,000	£345,000	49%
Forest Products & Resources	Woodfuel and biomass research	£325,000	£325,000	£198,000	61%
Forest Products & Resources	Total for theme	£1,346,000	£1,346,000	£878,000	65%
CFS funded research overall programme leverage		£8,679,000	£8,679,000	£2,209,050	25%

Science and Innovation Strategy Annual Report 2011

Indicator 3: The number of scientific publications in peer-reviewed journals or delivered at conferences as a result of research sponsored by the Commission. The number of other complete publications, and other published articles. Annual total number of publications as a result of research sponsored by the Commission, by theme, split between publications in peer-reviewed journals, published papers delivered at conferences

Summary	Number
Publications by theme	
Monitoring and biosecurity	30
Climate change	19
Ecosystems and biodiversity	38
Social and economic	36
Wood and Timber Properties	12
Sustainable Forest Management	22
National Forest Inventory	5
All Publications	162
Publications by Type	
Book	1
Books, proceedings and other technical publications 2010-11	40
Bulletin	1
General publications 2010-11	18
Papers Published in Peer Reviewed Journals 2010-11	77
Practice Notes (Free)	2
Research Notes (Free)	3
Research Paper/Report	1
Web Publication	19
All Publications	162

Science and Innovation Strategy Annual Report 2011

Theme	Author(s)	Title	Publisher
Climate change	Pizzirani, S., Gardiner, B. and Edwards, D. (2010)	Analysing forest sustainability under various climate change scenarios: a case study in northern Scotland.	Commonwealth Forestry Conference Secretariat, Edinburgh. 14pp; 23 slides.
Climate change	[Burgess, P.J.], Moffat, A.J. and [Matthews, R.B.] (2010)	Assessing climate change causes, risks and opportunities in forestry.	<i>Outlook on Agriculture</i> 39 (4) 263-268.
Climate change	[Tene, A., Tobin, B., Dyckmans, J.], Ray, D., [Black, K. and Nieuwenhuis, M.] (2011)	Assessment of tree response to drought: validation of a methodology to identify and test proxies for monitoring past environmental changes in trees.	<i>Tree Physiology</i> 31 (3) 309-322.
Climate change	Perks, M., Gardiner, B.A. and [Smith, J.] (2011)	Balancing turbine and woodland benefits. Mike Perks, Barry Gardiner and Jo Smith look at developing a carbon perspective.	<i>Forestry and Timber News</i> 43 , February 2011, 18-19.
Climate change	[Minunno, F., Xenakis, G.], Perks, M.P. and [Mencuccini, M.] (2010)	Calibration and validation of a simplified process-based model for the prediction of the carbon balance of Scottish Sitka spruce (<i>Picea sitchensis</i>) plantations.	<i>Canadian Journal of Forest Research</i> 40 (12) 2411-2426.
Climate change	Perks, M.P., [Nagy, L., Meir, P., Auld, M., Wood, M., Atkinson, N., Staples-Scott, L., Harvey, G., McGhee, W. and Tipper, R.] (2010)	Carbon sequestration benefits of new native woodland expansion in Scotland. In: <i>18th</i>	Conference Secretariat, Edinburgh. 12pp; 16 slides.
Climate change	[Sturrock, R.N., Frankel, S.J.], Brown, A.V., [Hennon, P.E., Kliejunas, J.T., Lewis, K.J., Worrall, J.J. and Woods, A.J.] (2011)	Climate change and forest diseases.	<i>Plant Pathology</i> 60 (1) 133-149.
Climate change	[Black, K.,] Xenakis, G. and Ray, D. (2010)	Climate change impacts and adaptive strategies.	<i>Irish Forestry</i> 67 (1-2) 66-85.
Climate change	Ray, D., Morison, J. and Broadmeadow, M. (2010)	<i>Climate change: impacts and adaptations in England's woodlands.</i>	Forestry Commission, Edinburgh. 16pp.
Climate change	Yi, C., 20 authors, Broadmeadow, M.S.J., 121 authors, Wilkinson, M., 7 authors (2010)	Climate control of terrestrial carbon exchange across biomes and continents.	<i>Environmental Research Letters</i> 5 Article 034007. 10pp.

Science and Innovation Strategy Annual Report 2011

Climate change	[Butler, A.J., Barbier, N., Èermák, J., Koller, J., Thornily, C.], McEvoy, C., Nicoll, B., Perks, M.P., Grace, J. and [Meir, P.] (2010)	Estimates and relationships between aboveground and belowground resource exchange surface areas in a Sitka spruce managed forest.	<i>Tree Physiology</i> 30 (6) 705-714.
Climate change	Yamulki, S. and Martin, S. (2010)	Forests and greenhouse gases: more than just CO ₂ .	<i>Forestry and Timber News</i> 38 , 21-22.
Climate change	[Ciccarese, L., Elsasser, P., Horattas, A., Pettenella, D.] and Valatin, G. (2011)	Innovative market opportunities related to carbon sequestration in European forests?	In: <i>Innovation in forestry: territorial and value chain relationships</i> , G Weiss, D Pettenella, P Ollonqvist and B Slee, eds. CABI Publishing, Wallingford, Oxon. 131-153.
Climate change	Morris, J. and Lawrence, A. (2010)	<i>Learning from monitoring and evaluation – a blueprint for an adaptive organisation.</i>	Forest Research, Farnham, Surrey. 22pp.
Climate change	Broadmeadow, S. and Nisbet, T.R. (2010)	<i>Opportunity mapping for woodland to reduce flooding in the Yorkshire and the Humber Region.</i>	Forest Research, Farnham, Surrey. 64pp. 24maps. Online publication only.
Climate change	Tubby, K.V. and Webber, J.F. (2010)	Pests and diseases threatening urban trees under a changing climate.	<i>Forestry</i> 83 (4) 451-459.
Climate change	Moffat, A.J. and Morison, J.I.L. (2010)	<i>UK 2012 Climate Change Risk Assessment. Forestry Sector: telephone interview records. (CEOSA 0901).</i>	Defra, London. 38pp.
Climate change	Morison, J.I.L., Vanguelova, E., Broadmeadow, S., Perks, M., Yamulki, S. and Randle, T.J. (2010)	<i>Understanding the GHG implications of forestry on peat soils in Scotland.</i>	Forest Research. Farnham, Surrey; Roslin, Midlothian. 55pp.
Climate change	Benham, S.E., [Broadmeadow, M.S.J., Schaub, M., Calatayud, V. and Bussotti, F.] (2010)	Using commercial tree nurseries to monitor visible ozone injury: an evaluation.	<i>Forest Ecology and Management</i> 260 (10) 1824-1831.

Science and Innovation Strategy Annual Report 2011

Ecosystems and biodiversity	[Thomas, C.D., Hill, J.K., J Anderson, B.J., Bailey, S., Beale, C.M., Bradbury, R.B., Bulman, C.R., Crick, H.Q.P., Eigenbrod, F., Griffiths, H.M., Kunin, W.E., Oliver, T.H., Walmsley, C.A.], Watts, K., [Worsfold, N.T. and Yardley, T.] (2011)	A framework for assessing threats and benefits to species responding to climate change.	<i>Methods in Ecology and Evolution</i> 2 (2) 125-142.
Ecosystems and biodiversity	[De Carvalho, D., Ingvarsson, P.K., Joseph, J., Suter, L., Sedivy, C., Macaya-Sanz, D.], Cottrell, J., [Heinze, B., Schanzer, I. and Lexer, C.] (2010)	Admixture facilitates adaptation from standing variation in the European aspen (<i>Populus tremula</i> L.), a widespread forest tree.	<i>Molecular Ecology</i> 19 (8) 1638-1650.
Ecosystems and biodiversity	Vanguelova, E. (2010)	BioSoil case study. Evaluation of the quality and changes in UK forest soils.	Publications Office of the European Union, Luxembourg. 13-14.
Ecosystems and biodiversity	[Irvine, J.] (Key contact) and Mayle, B. ed. (2010)	<i>Collaborative frameworks in land management: a case study on integrated deer management.</i>	University of Newcastle, School of Agriculture, Food and Rural Development, Centre for Rural Economy, Rural Economy and Land Use Programme (Relu), Newcastle Upon Tyne. 4pp.
Ecosystems and biodiversity	[Irvine, J.], Armstrong, H., [Macmillan, D.], Mayle, B., O'Brien, L., [van der Wal, R., White, P., White, R. and Yearley, S.] (2010)	<i>Collaborative frameworks in land management: a case study on integrated deer management.</i>	Research Report RES-224-25-0014. ESRC, Swindon. 39pp.
Ecosystems and biodiversity	Manning, A.D., Kesteven, J., Stein, J., Lunn, A., Xu, T.] and Rayner, W.F. (2010)	Could native Scots pines (<i>Pinus sylvestris</i>) still persist in northern England and southern Scotland?	<i>Plant Ecology & Diversity</i> 3 (2) 187-201.
Ecosystems and biodiversity	Watts, K. and Handley, P. (2010)	Developing a functional connectivity indicator to detect change in fragmented landscapes.	<i>Ecological Indicators</i> 10 (2) 552-557.
Ecosystems and biodiversity	[Holland, J.P., Pollock, M., Waterhouse, T., Morgan-Davies, C., Bibby, H., Stewart, S.] and Armstrong, H.M. (2010)	<i>Developing guidance for managing extensive upland grazing where habitats have differing requirements.</i>	Scottish Natural Heritage. Inverness. 116pp.

Science and Innovation Strategy Annual Report 2011

Ecosystems and biodiversity	Eycott, A.E., Watts, K., [Brandt, G., Buyung-Ali, L., Bowler, D., Stewart, G. and Pullin, A.] (2010)	<i>Do landscape matrix features affect species movement? Completed review.</i>	Collaboration for Environmental Evidence Systematic Review CEE 08-006 (ex SR 43) Centre for Evidence-Based Conservation, Bangor, Gwynedd. 119pp.
Ecosystems and biodiversity	[Silvertown, J., Tallwin, J., Stevens, C., Power, S.A., Morgan, V., Emmett, B., Hester, A., Grime, P.J., Morecroft, M., Buxton, R., Poulton, P.], Jinks, R.L. and [Bardgett, R.] (2010)	Environmental myopia: a diagnosis and a remedy.	<i>Trends in Ecology & Evolution</i> 25 (10) 556-561.
Ecosystems and biodiversity	[Dolman, P., Fuller, R.], Gill, R., [Hooton, D. and Tabor, R.] (2010)	Escalating ecological impacts of deer in lowland woodland.	<i>British Wildlife</i> 21 (4) 242-254.
Ecosystems and biodiversity	[Mortimer, S., Mauchline, A., Park, J., Finn, J.,] Edwards, D. and Morris, J. (2010)	Evaluation of agri-environment and forestry schemes with multiple objectives.	<i>Eurochoices</i> 9 (1) 48-54.
Ecosystems and biodiversity	[Brouwers, N.C., Newton, A.C.], Watts, K. and [Bailey, S.] (2010)	Evaluation of buffer-radius modelling approaches used in forest conservation and planning.	<i>Forestry</i> 83 (4) 409-421.
Ecosystems and biodiversity	[Helming, K., Diehl, K., Kuhlman, T., Jansson, T., Verburg, P.H., Bakker, M., Perez-Soba, M., Jones, L., Verkerk, P.J., Tabbush, P.], Morris, J.B., [Drillet, S., Farrington, J., LeMouël, P., Zagame, P., Stuczynski, T., Siebielec, G., Sieber, S., Wiggering, H.] (2011)	Ex ante impact assessment of policies affecting land use, Part B: Application of the analytical framework. Part of a Special Feature on Landscape scenarios and multifunctionality – making land use assessment operational.	<i>Ecology and Society</i> 16 (1) Article 29. 23pp.
Ecosystems and biodiversity	Eycott, A.E., [Scott, D. and Smithers, R.] eds. (2010)	<i>Future landscape ecology: proceedings of the seventeenth annual ialeUK conference, held at University of Brighton, 13-16 September (2010)</i>	ialeUK International Association for Landscape Ecology, UK Region.

Science and Innovation Strategy Annual Report 2011

Ecosystems and biodiversity	[Wachowiak, W., Salmela, M.J., Ennos, R.A., Iason, G.], Cottrell, J.E. and [Cavers, S.] (2010)	Genetic diversity at nuclear loci in Scots pine (<i>Pinus sylvestris</i> L.) in Scotland.	In: Network of Excellence EVOLTREE: Forest ecosystem genomics and adaptation, San Lorenzo de El Escorial (Madrid), Spain 9-11 June, 2010: Book of abstracts, compiled by B Vinceti. Biodiversity International, Rome. 151.
Ecosystems and biodiversity	Smith, M., [Cowie, N., Atkinson, S. and Harvey, G.] (2010)	Long term biodiversity planning and monitoring of new native woodlands. Long term impacts of whole tree harvesting on soil carbon and nutrient sustainability in the UK. [Paper presented at BIOGEOMON 2009, the 6th international symposium on ecosystem behavior, held in Helsinki, Finland 29 June - 3 July 2009].	Commonwealth Forestry Conference Secretariat, Edinburgh. 11pp.; 17 slides
Ecosystems and biodiversity	Vanguelova, E., Pitman, R., [Luiro J. and Helmisaari H-S.] (2010).		<i>Biogeochemistry</i> 101 (1-3) 43-59.
Ecosystems and biodiversity	Harmer, R., Kerr, G. and Thompson, R. (2010)	<i>Managing native broadleaved woodland.</i>	TSO, London. 508pp. (£30.00)
Ecosystems and biodiversity	[Clark, J.M., Billett, M.F., Coyle, M, Croft, S., Daniels, S., Evans, C.D., Evans, M., Freeman, C., Gallego-Sala, A.V., Heinemeyer, A., House, J.I., Monteith, D.T., Nayak, D., Orr, H.G., Prentice, I.C., Rose, R., Rowson, J., Smith, J.U., Smith, P., Tun, Y.M.], Vanguelova, E.I. , [Wetterhall, F. and Worrall, F.] (2010).	Model inter-comparison between statistical and dynamic model assessments of the long-term stability of GB blanket peat (1940-2099).	Climate Research, 45, 227-248.
Ecosystems and biodiversity	[Sutherland, B.G., Belaj, A., Nier, S.], Cottrell, J.E., [Vaughan, S.P.], Hubert, J. and [Russell, K.] (2010)	Molecular biodiversity and population structure in common ash (<i>Fraxinus excelsior</i> L.) in Britain: implications for conservation.	<i>Molecular Ecology</i> 19 (11) 2196-2211.
Ecosystems and biodiversity	[Cox, F.], Barsoum, N., [Lilleskov, E.A. and Bidartondo, M.I.] (2010)	Nitrogen availability is a primary determinant of conifer mycorrhizas across complex environmental gradients.	<i>Ecology Letters</i> 13 (9) 1103-1113.

Science and Innovation Strategy Annual Report 2011

Ecosystems and biodiversity	[Gerber, S., Chadoeuf, J., Fogelqvist, J., Lascoux, M., Bordács, S., Borovics, A.; Buiteveld, J.], Cottrell, J.E., [Cseke, K., Dounavi, A., Fineschi, S., Forrest, L., Goicoechea, P.G., Gugerli, F., Jensen, J.S., Salvini, D., Vendramin, G.G. and Kremer, A.] (2010)	Patterns of gene flow in white oak stands across Europe. Abstract only.	In: Network of Excellence EVOLTREE: Forest ecosystem genomics and adaptation, San Lorenzo de El Escorial (Madrid), Spain 9-11 June, 2010: Book of abstracts, compiled by B Vinceti. Biodiversity International, Rome. 122.
Ecosystems and biodiversity	Quine, C.P. (2011)	<i>Protecting countryside users against zoonotic diseases by influencing their behaviour.</i>	University of Newcastle, School of Agriculture, Food and Rural Development, Centre for Rural Economy, Rural Economy and Land Use Programme (Relu), Newcastle Upon Tyne 4pp.
Ecosystems and biodiversity	Vanguelova, E. and Nisbet, T.R. (2010)	Protection of forest soils and water in a changing climate - management and policy changes.	In: SAC/SEPA Proceedings 'Climate, water and soil science, policy and practice' held 31 March to 1 April 2010, Edinburgh. 146-153.
Ecosystems and biodiversity	[Selman, P.], Carter, C., Lawrence, A. and [Morgan, C] (2010)	Re-connecting with a recovering river through imaginative engagement.	<i>Ecology and Society</i> 15 (3) Article no. 18, 12pp.
Ecosystems and biodiversity	[Battarbee, R.W., Curtis, C.J., Helliwell, R.], Nisbet, T.R., [Rose, N., Evans, C., Monteith, D.T., Aherne, J. and MacDougall, G.] (2010)	Recovery: the future, confounding factors and threats. In: Recovery of lakes and streams in the UK from the effects of acid rain. UK Acid Waters Monitoring Network 20 year interpretative report.	M Kernan, R W Battarbee, C J Curtis, D T Monteith and E M Shilland, eds. 222-262.

Science and Innovation Strategy Annual Report 2011

Ecosystems and biodiversity	Harmer, R., Morgan, G.W. and Beauchamp, K. (2011)	Restocking with broadleaved species during the conversion of <i>Tsuga heterophylla</i> plantations to native woodland using natural regeneration	<i>European Journal of Forest Research</i> 130 (2) 161-171.
Ecosystems and biodiversity	Anderson, A.R. (2010)	<i>Restoring afforested peat bogs: results of current research.</i>	Forestry Commission, Edinburgh. 8pp.
Ecosystems and biodiversity	Vanguelova, E. and Nisbet, T.R. (2010)	Save the soil. Forest Research scientists address the risks to soil and water from harvesting woody biomass.	<i>Chartered Forester</i> , Autumn 2010, 22-23.
Ecosystems and biodiversity	Watts, K., Eycott, A.E., Handley, P., Ray, D., Humphrey, J.W. and Quine, C.P. (2010)	Targeting and evaluating biodiversity conservation action within fragmented landscapes: an approach based on generic focal species and least-cost networks.	<i>Landscape Ecology</i> 25 (9) 1305-1318.
Ecosystems and biodiversity	Vanguelova, E.I., [Reynolds, B.], Nisbet, T. and [Godbold, D.] (2011).	The cycling of pollutants in non-urban forested environments. <i>directions</i> , D F Levia, D E Carlyle-Moses and T Tanaka, eds. Ecological Studies Series 216, Springer, Dordrecht, Netherlands. 679-710.	In: Forest hydrology and biogeochemistry: synthesis of past research and future
Ecosystems and biodiversity	Broome, A., [Clarke, S.], Peace, A.J. and [Parsons, M.] (2011)	The effect of coppice management on moth assemblages in an English woodland.	<i>Biodiversity and Conservation</i> 20 (4) 729-749.
Ecosystems and biodiversity	Broadmeadow, S.B., [Jones, J.G., Langford, T.E.L., Shaw, P.J.] and Nisbet, T.R. (2011)	The influence of riparian shade on lowland stream water temperatures in southern England and their viability for brown trout.	<i>River Research and Applications</i> 27 (2) 226-237.
Ecosystems and biodiversity	Moffat, A.J., Benham, S., Morison, J.I.L., Pitman, R., Vanguelova, E.I., Wilkinson, M. and Yamulki, S. (2010)	The value of forest monitoring in developing forest ecosystem science in Britain.	Finnish Forest Research Institute (METLA), Vantaa. Page 28.
Ecosystems and biodiversity	Armstrong, H., [Black, B.], Crow, P., [Holl, K., Mainprize, N., Pollock, M.], Smith, M., [Sumsion, L., Tanner, A., Taylor, P. and Thompson, R.] (2011)	<i>The woodland grazing toolbox.</i>	Forestry Commission Scotland, Edinburgh.

Science and Innovation Strategy Annual Report 2011

Ecosystems and biodiversity	[Salmela, M.J., Cavers, S., Wachowiak, W.], Cottrell, J.E., [Iason, G.R. and Ennos, R.A.] (2010)	Understanding the evolution of native pinewoods in Scotland will benefit their future management and conservation.	<i>Forestry</i> 83 (5) 535-545.
Ecosystems and biodiversity	[Sparks, T., Britt, C., Cherrill, A., Marrs, R., Mortimer, S., Pywell, R., Rotherham, I.], Stokes, V.J. and [Westbury, D.] eds. (2011)	<i>Vegetation management [held at] Sheffield Hallam University, Sheffield, 27-28 April 2011.</i>	Aspects of Applied Biology 108. Association of Applied Biologists, Wellesbourne, Warwick.272pp.
Monitoring and biosecurity	[North, P.R.J., Rosette, J.A.B.], Suárez, J.C. and [Los, S.O.] (2010)	A Monte Carlo radiative transfer model of satellite waveform LiDAR.	<i>International Journal of Remote Sensing</i> 31 (5) 1343-1358.
Monitoring and biosecurity	[Billiard, H.E.], Straw, N.A. and [Stewart, A.J.A.] (2010)	Adult fecundity, host plant preferences, field activity and parasitism in the leaf weevil <i>Phyllobius pyri</i> (L.) (Coleoptera: Curculionidae).	<i>Bulletin of Entomological Research</i> 100 (3) 303-314.
Monitoring and biosecurity	Suárez-Mínguez, J.C. (2010)	<i>An analysis of the consequences of stand variability in Sitka spruce plantations in Britain using a combination of airborne LiDAR analysis and models.</i>	University of Sheffield, Department of Applied Mathematics, Sheffield. 285pp.
Monitoring and biosecurity	Green, S. (2010)	An epidemic education.	<i>Chartered Forester</i> , Summer 2010, 18-19.
Monitoring and biosecurity	Steele, H., Laue, B.E., MacAskill, G.A., Hendry, S.J. and Green, S. (2010)	Analysis of the natural infection of European horse chestnut (<i>Aesculus hippocastanum</i>) by <i>Pseudomonas syringae</i> pv. <i>aesculi</i> .	<i>Plant Pathology</i> 59 (6) 1005-1013.
Monitoring and biosecurity	Green, S., [Studholme, D.J.], Laue, B.E., [Dorati, F., Lovell, H., Arnold, D.], Cottrell, J.E., [Bridgett, S., Blaxter, M., Huitema, E., Thwaites, R., Sharp, P.M., Jackson, R.W. and Kamoun, S.] (2010)	Comparative genome analysis provides insights into the evolution and adaptation of <i>Pseudomonas syringae</i> pv. <i>aesculi</i> on <i>Aesculus hippocastanum</i> .	<i>PLoS ONE</i> 5 (4) 1-14.
Monitoring and biosecurity	Beal, E., Webber, J.F. and [Eaton, R.A.] (2010)	Comparative susceptibility of pine, spruce and larch to sapstain.	<i>Forest Pathology</i> 40 (1) 116-128.
Monitoring and biosecurity	Brady, C., Denman, S., Kirk, S., Venter, S., Rodríguez-Palenzuela, P. and Coutinho, T. -2011	Description of <i>Gibbsiella quercinecans</i> gen. nov., sp. nov., associated with Acute Oak Decline.	<i>Systematic and Applied Microbiology</i> 33 (8) 444-450.

Science and Innovation Strategy Annual Report 2011

Monitoring and biosecurity	[Redfern, D.B., Pratt, J.E.], Hendry, S.J. and [Low, J.D.] (2010)	Development of a policy and strategy for controlling infection by <i>Heterobasidion annosum</i> in British forests: a review of supporting research.	<i>Forestry</i> 83 (2) 207-218.
Monitoring and biosecurity	Webber, J.F., Mullett, M. and Brasier, C.M. (2010)	Dieback and mortality of plantation Japanese larch (<i>Larix kaempferi</i>) associated with infection by <i>Phytophthora ramorum</i> .	<i>New Disease Reports</i> 22 , 19.
Monitoring and biosecurity	[Masuya, H.], Brasier, C.M., [Ichihara, Y., Kubono, T. and Kanzaki, N.] (2010)	First report of the Dutch elm disease pathogens <i>Ophiostoma ulmi</i> and <i>O. novo-ulmi</i> in Japan.	<i>Plant Pathology</i> 59 (4) 805.
Monitoring and biosecurity	Tan, J.Y., Wainhouse, D., [Day, K.R.] and Morgan, G.W. (2010)	Flight ability and reproductive development in newly-emerged pine weevil <i>Hylobius abietis</i> and the potential effects of climate change.	<i>Agricultural and Forest Entomology</i> 12 (4) 427-434.
Monitoring and biosecurity	[McInerney, D.O.], Suárez, J.C., [Valbuena, R. and Nieuwenhuis, M.] (2010)	Forest canopy height retrieval using LiDAR data, medium-resolution satellite imagery and kNN estimation in Aberfoyle, Scotland.	<i>Forestry</i> 83 (2) 195-206.
Monitoring and biosecurity	Bertin, S., Perks, M.P., Straw, N., [Bertin, J.-M. and Mencuccini, M.] (2010)	Green spruce aphid infestations cause larger growth reductions to Sitka spruce under shade.	<i>Tree Physiology</i> 30 (11) 1403-1414.
Monitoring and biosecurity	Denman, S., Kirk, S.A. and Webber, J.F. (2010)	<i>Managing acute oak decline.</i> Monitoring and evaluation practice for brownfield, regeneration to greenspace initiatives: a meta-evaluation of assessment and monitoring tools.	Forestry Commission, Edinburgh. 6pp.
Monitoring and biosecurity	[Pediaditi, K.], Doick, K.J. and Moffat, A.J. (2010)	National Forest Inventory update using the medium resolution optical satellite images from the ESA archive.	<i>Landscape and Urban Planning</i> 97 (1) 22-36.
Monitoring and biosecurity	Suárez, J.C., [Brown, C. and Bye, I.] (2010)	Operational tools in forestry using remote sensing techniques.	ForestSAT Organising Committee, Lugo. 185-189.
Monitoring and biosecurity	[Miranda, D.], Suárez, J. and [Crecente, R.] eds. (2010)		ForestSAT Organising Committee, Lugo, Spain.

Science and Innovation Strategy Annual Report 2011

Monitoring and biosecurity	[Vettraino, A.M.], Brasier, C.M., Brown, A.V. and [Vinnini, A.] (2011)	<i>Phytophthora himalsilva</i> sp. nov. an unusually phenotypically variable species from a remote forest in Nepal.	<i>Fungal Biology</i> 115 (3) 275-287.
Monitoring and biosecurity	Brasier, C.M., [Vettraino, A.M., Chang, T.T. and Vannini, A.] (2010)	<i>Phytophthora lateralis</i> discovered in an old growth <i>Chamaecyparis</i> forest in Taiwan.	<i>Plant Pathology</i> 59 (4) 595-603.
Monitoring and biosecurity	[Bezuidenhout, C.M.]; Denman, S.; Kirk, S.A.; [Botha, W.J.; Mostert, L.; McLeod, A.] - 2010	<i>Phytophthora</i> taxa associated with cultivated <i>Agathosma</i> , with emphasis on the <i>P. citricola</i> complex and <i>P. capensis</i> sp. nov.	<i>Persoonia – Molecular Phylogeny and Evolution of Fungi</i> , 25 , 32-49.
Monitoring and biosecurity	Wainhouse, D., [Reay, S. and Kay, M.] (2010)	Predicting the vulnerability of New Zealand radiata pine plantations to the European pine weevil.	<i>Forestry</i> 83 (3) 277-283.
Monitoring and biosecurity	[Fichtner, E.J., Rizzo, D.M.], Kirk, S.A. and Webber, J.F. (2011)	Root infections may challenge management of invasive <i>Phytophthora</i> spp. in UK woodlands.	<i>Plant Disease</i> 95 (1) 13-18.
Monitoring and biosecurity	[Rosette, J.A.B., North, P.R.J.], Suárez, J.C., [Rubio, J., Ranson, K.J. and Blair, B.] (2010)	Sensor and target effects on LiDAR simulation of forest structure.	ForestSAT Organising Committee, Lugo. 106-110.
Monitoring and biosecurity	[Hill, R.] and Suárez, J.C. eds. (2010)	SilviLaser 2008. Papers based on presentations made at the 8th international conference on LiDAR applications in forest assessment and inventory, held in Edinburgh, Scotland, UK, 17 to 19 September 2008.	<i>International Journal of Remote Sensing</i> 31 (5) 1129-1372.
Monitoring and biosecurity	Brasier, C.M. and Webber, J.F. (2010)	Sudden larch death. An aggressive and unpredictable fungal pathogen is devastating larch plantations in Britain. Its remarkably broad host range, and the possibility of further geographical spread, give heightened cause of concern.	<i>Nature</i> 466 (7308), 12 August 2010, 824-825.
Monitoring and biosecurity	Pitman, R., Vanguelova, E.I. and Benham, S. (2010).	The effects of phytophagous insects on water and soil nutrient concentrations and fluxes through forest stands of the Level II monitoring network in the UK.	<i>Science of the Total Environment</i> 409 (1) 169-181.

Science and Innovation Strategy Annual Report 2011

Monitoring and biosecurity	[Crutchley, S.] and Crow, P. (2010)	<i>The light fantastic: using airborne lidar in archaeological survey.</i>	English Heritage, Swindon, Wilts. 43pp.
Monitoring and biosecurity	Tilbury, C.A., Williams, D.T.; Jukes, M.R.; Straw, N.A. (2010)	The re-establishment of the gypsy moth <i>Lymantria dispar</i> in the UK.	<i>Atropos</i> 40 36-42.
Monitoring and biosecurity	[Rosette, J.A.B., North, P.R.J.], Suárez, J.C. and [Los, S.O.] (2010)	Uncertainty within satellite LiDAR estimations of vegetation and topography.	<i>International Journal of Remote Sensing</i> 31 (5) 1325-1342.
National Forest Inventory	Lawence, M., [McRoberts, R.E., Tomppo, E., Gschwantner, T. and Gabler, K.] (2010)	Comparisons of National Forest Inventories.	T Gschwantner, M Lawrence and R E McRoberts, eds. Springer, Dordrecht, The Netherlands. 19-32.
National Forest Inventory	[Tomppo, E., Gschwantner, T.], Lawrence, M. and [McRoberts, R.E.] (2010)	<i>National Forest Inventories: pathways for common reporting.</i>	European Science Foundation. Springer, Dordrecht, The Netherlands. 612pp.
National Forest Inventory	[McRoberts, R.E., Ståhl, G., Vidal, C.], Lawrence, M., [Tomppo, E., Schadauer, K., Chirici, G. and Bastrup-Birk, A.] (2010)	National Forest Inventories: prospects for harmonised international reporting.	T Gschwantner, M Lawrence and R E McRoberts, eds. Springer, Dordrecht, The Netherlands. 33-43.
National Forest Inventory	Lawrence, M. and Bull, G. (2010)	National Forest Inventory reports 14: Great Britain.	T Gschwantner, M Lawrence and R E McRoberts, eds. Springer, Dordrecht, The Netherlands. 245-258.
National Forest Inventory	Smith, S.M., Gilbert, J.R., Bull, G., [Gillam, S.] and Whitton, E.	<i>National inventory of woodland and trees (1995-99): methodology.</i>	Forestry Commission, Edinburgh. Online publication only.

Science and Innovation Strategy Annual Report 2011

Social and economic	Morris, J.B., [Tassone, V., de Groot, R., Camilleri, M. and Moncada, S.] (2011)	A Framework for Participatory Impact Assessment: involving stakeholders in European policy making, a case study of land use change in Malta. Part of a Special Feature on Landscape scenarios and multifunctionality – making land use assessment operational.	<i>Ecology and Society</i> 16 (1) Article 12.
Social and economic	[Petrokofsky, G., Brown, N.D., Hemery, G.E., Woodward, S., Wilson, E., Weatherall, A.], Stokes, V., [Smithers, R.J., Sangster, M., Russell, K., Pullin, A.S., Price, C., Morecroft, M., Malins, M.], Lawrence, A., [Kirby, K.J., Godbold, D., Charman, E., Boshier, D., Bosbeer, S. and Arnold, J.E.M.] (2010)	A participatory process for identifying and prioritizing policy-relevant research questions in natural resource management: a case study from the UK forestry sector. 11pp. ill. refs.	<i>Forestry</i> 83 (4) 357-367.
Social and economic	O'Brien, L. and Lovell, R. (2011)	<i>A review of the Forest Education Initiative in Britain.</i>	Forest Research, Farnham, Surrey. 99pp.
Social and economic	Forest Research, Centre for Forestry and Climate Change, Land Regeneration and Urban Greenspace, (2010)	<i>Benefits of green infrastructure. Main report to Defra and CLG.</i>	Forest Research, Farnham, Surrey. 196pp.
Social and economic	Forest Research, Centre for Forestry and Climate Change, Land Regeneration and Urban Greenspace (2010)	<i>Benefits of green infrastructure. Summary report. Defra Research Contract Number WC0807</i>	Forest Research, Farnham, Surrey 39pp.
Social and economic	Atkinson, G. and Doick, K.J. (2010)	Brownfield land regeneration to greenspace: improving the sustainability credentials of regeneration projects through process modelling.	Whittles Publishing, Dunbeath, Caithness. 34-46.
Social and economic	Lawrence, A. (2011)	Community connection. Dr Anna Lawrence from Forest Research looks at how community forestry is flourishing around the world and the lessons for the UK.	<i>Chartered Forester</i> , Spring 2011, 24-27.
Social and economic	Dandy, N. (2010)	Deer on the doorstep. A study by Forest Research on wild deer in the peri-urban environment shows how communities on the edge of our towns and cities value their interaction with deer.	<i>Deer</i> 15 (6) 12-14.

Science and Innovation Strategy Annual Report 2011

Social and economic	O'Brien, L., [Townsend, M. and Ebdon, M.] (2010)	Doing something positive: volunteers' experiences of the well-being benefits derived	<i>Voluntas: International Journal of Voluntary and Nonprofit Organizations</i> 21 (4) 525-545
Social and economic	[Young, J.C.] and Marzano, M. (2010)	Embodied interdisciplinarity: what is the role of polymaths in environmental research?	<i>Environmental Conservation</i> 37 (4) 373-375.
Social and economic	[Tallis, M.], Freer-Smith, P.H.; Sinnett, D.; [Aylott, M.; Taylor, G.] (2010)	Estimating the influence of different urban canopy cover types on atmospheric particulate matter (PM10) pollution abatement in London, UK. (Abstract)	<i>Geophysical Research Abstracts</i> 12, EGU2010-11815
Social and economic	O'Brien, L. and Morris, J. (2010)	<i>Estimating visitor and visit numbers to woodlands.</i>	Forest Research, Social and Economic Research Group. Farnham. 42pp.
Social and economic	Ambrose-Oji, B., Wallace, J., Lawrence, A. and Stewart, A. (2010)	<i>Forestry Commission working with civil society.</i>	Forest Research, Farnham, Surrey. 77pp.
Social and economic	Carter, C. and [Pycroft, A.] (2010)	Getting out: offenders in forestry and conservation work settings.	In: <i>What else works? Creative work with offenders</i> eds J Brayford, F Cowe and J Deering. Willan Publishing, Cullompton, Devon. 211-235.
Social and economic	Sarajevs, V. (2011)	<i>Health benefits of street trees.</i>	Forest Research, Social and Economic Research Group, Roslin, Midlothian. 15pp.
Social and economic	Stewart, A.E. and O'Brien, L. (2010)	<i>Inventory of social evidence and practical programmes relating to trees, woods and forests and urban/peri-urban regeneration, place-making and place-shaping.</i>	Forest Research. Farnham, Surrey; Roslin, Midlothian. 123pp.
Social and economic	Lawrence, A., Dandy, N. and [Urquhart, J.] (2010)	<i>Landowners' attitudes to woodland creation and management in the UK: a review of current evidence.</i>	Forest Research, Farnham, Surrey. 66pp.

Science and Innovation Strategy Annual Report 2011

Social and economic	Doick, K.J. (2010)	Learning lessons in monitoring brownfield land regeneration to greenspace through logic modelling.	Whittles Publishing, Dunbeath, Caithness. 16-26.
Social and economic	O'Brien, L., [Burls, A., Bentsen, P., Hilmo, I., Holter, K., Haberling, D., Pirnat, J., Sarv, M., Vilbaste, K. and McLoughlin, J.] (2011)	Outdoor education, life long learning and skills development in woodlands and green spaces: the potential links to health and well-being.	K Nilsson, M Sangster, C Gallis, T Hartig, S de Vries, K Seeland and J Schipperijn, eds. Springer, New York. 343-374.
Social and economic	Sinnett, D.E., Lawrence, V.K.; Hutchings, T.R.; [Hodson, M.E.] (2011)	Plants growing on contaminated and brownfield sites appropriate for use in Organisation for Economic Co-operation and Development terrestrial plant growth test.	<i>Environmental Toxicology and Chemistry</i> 30 (1) 124-131.
Social and economic	Lovell, R., O'Brien, L. and Owen, R. (2010)	<i>Review of the research evidence in relation to the role of trees and woods in formal education and learning.</i>	Forest Research, Farnham, Surrey. 60pp.
Social and economic	Ambrose-Oji, B. (2010)	<i>Social diversity in the forestry profession.</i>	Forest Research, Llanrwst, Conwy. 67pp.
Social and economic	[Drillet, Z., Kenderessy, P.], Morris, J., [Izakovicová, Z. and Farrington, J.] (2010)	Stakeholder-based sustainability impact assessment of EU bioenergy policy in the High Tatras, Slovakia.	<i>The Problems of Landscape Ecology</i> , 28 217-228. <i>Problemy Ekologii Krajobrazu</i> , special issue: Implementation of landscape ecological knowledge in practice.
Social and economic	Castán Broto, V., [Burningham, K.,] Carter, C. and [Elghali, L.] (2010)	Stigma and attachment: performance of identity in an environmentally degraded place.	Society and Natural Resources 23 (10) 952-968.
Social and economic	Sarajevs, V. (2011)	<i>Street tree valuation systems.</i>	Forestry Commission, Edinburgh. 6pp. Online publication only.

Science and Innovation Strategy Annual Report 2011

Social and economic	Lawrence, A., [Johnston, M., Konijnendijk, C.C. and De Vreese, R.] (2011)	The governance of (peri-)urban forestry in Europe. Briefing Paper 3:	Workshop on sharing experiences on urban and peri-urban forestry, Brussels, 28/01/2011
Social and economic	[Park, J.J.], O'Brien, L., [Roe, J., Ward Thompson, C. and Mitchell, R.] (2011)	The natural outdoors and health: assessing the value and potential contribution of secondary public data sets in the UK to current and future knowledge.	<i>Health & Place</i> 17 (1) 269-279.
Social and economic	[Sangster, M., Nielsen, A.B.] and Stewart, A. (2011)	The physical (peri-)urban forestry resource in Europe. 7pp	Workshop on sharing experiences on urban and peri-urban forestry, Brussels, 28/01/2011
Social and economic	Jenkins, T.A.R. (2010)	The route to recognition. Ahead of the final stage for this year's Professional Membership Entry applicants, ICF's Examinations Moderator Tom Jenkins outlines the route to becoming chartered.	<i>Chartered Forester</i> , Autumn 2010, 28-29.
Social and economic	Stewart, A., Bell, S., Sanesi, G., De Vreese, R. and Arnberger, A. (2011)	The societal benefits of (peri-)urban forestry in Europe.	Workshop on sharing experiences on urban and peri-urban forestry, Brussels, 28/01/2011
Social and economic	Lawrence, A. and Ambrose-Oji, B.A. (2010)	Understanding the effects of community woodlands and forests in Great Britain.	Commonwealth Forestry Conference Secretariat, Edinburgh. 13pp.
Social and economic	Stewart, A., Lawrence, A.; Edwards, D. (2010)	<i>Uptake of Decision Support Systems in the forestry sector in Great Britain: scoping report.</i>	Forest Research, Roslin, Midlothian. 38pp.
Social and economic	O'Brien, L., [Burls, A., Townsend, M. and Ebdon, M.] (2011)	Volunteering in nature as a way of enabling people to reintegrate into society.	<i>Perspectives in Public Health</i> 131 (2) 71-81.

Science and Innovation Strategy Annual Report 2011

Social and economic	Ambrose-Oji, B. and Fancett, K. eds. (2011)	<i>Woods and forests in British society: progress in research and practice.</i> Papers presented at the 'Trees and forests in British society' conference held at Heriot-Watt University, Edinburgh, 13-15 April 2010	Forest Research, Farnham, Surrey. 97pp. Online publication only.
Sustainable Forest Management	Stokes, V.J. and Willoughby, I. (2011)	A comparison of cover crops, direct seeding and herbicides in the establishment of ash trees (<i>Fraxinus excelsior</i> (L.)) in lowland Britain.	<i>Quarterly Journal of Forestry</i> 105 (1) 19-28.
Sustainable Forest Management	Hubert, J., [Worrell, R.; McG Wilson, S.; Clark, J.; Russell, K.; Taylor, H.; Malcolm, D.C.] (2010)	Broadleaved tree breeding in Scotland; recent progress and future priorities.	<i>Scottish Forestry</i> 64 (3) 6-11.
Sustainable Forest Management	Gardiner, B.A., [Blennow, K., Carnus, J.-M., Fleischer, P., Ingemarson, F., Landmann, G., Lindner, M.], Marzano, M., Nicoll, B.C., [Orazio, C., Peyron, J.-L., Reviron, M.-P., Schelhaas, M.-J., Schuck, A., Spielmann, M. and Usbeck, T.] (2010)	<i>Destructive storms in European forests: past and forthcoming impacts. Final report to</i>	Final report to European Commission - DG Environment. European Forest Institute, Atlantic European Regional Office, Cestas, France. 138pp.
Sustainable Forest Management	Ray, D., Xenakis, G., [Tene, A. and Black, K.] (2010)	Developing a site classification system to assess the impact of climate change on species selection in Ireland.	<i>Irish Forestry</i> 66 (1-2) 101-122.
Sustainable Forest Management	Harrison, A. (2010)	Eucalypts - proceed with caution?	<i>Forestry and Timber News</i> 41 October 2010, 15-16.
Sustainable Forest Management	[Leslie, A., Mencuccini, M.] and Perks, M. (2011)	Eucalyptus in the British Isles.	<i>Quarterly Journal of Forestry</i> 105 (1) 43-53.
Sustainable Forest Management	Moffat, A.J., Murgatroyd, I., Hutchings, T.R. and Kennedy, F.M. (2010)	Hardwood timber extraction over sensitive soils – a terramechanical study in southern England.	<i>Quarterly Journal of Forestry</i> 104 (3) 181-189.

Science and Innovation Strategy Annual Report 2011

Sustainable Forest Management	[Cavers, S., Wachowiak, W., Salmela, M.J., Ennos, R.A., Iasos, G.] and Cottrell, J.E. (2010)	History and evolution in the Scottish Scots pine (<i>Pinus sylvestris</i> L.) population. Abstract only.	In: Network of Excellence EVOLTREE: Forest ecosystem genomics and adaptation, San Lorenzo de El Escorial (Madrid), Spain 9-11 June, 2010: Book of abstracts, compiled by B Vinceti. Biodiversity International, Rome. 77.
Sustainable Forest Management	Mason, W.L. and [Glenny, I.J.] (2009)	Implementing continuous cover forestry in a mixed broadleaved woodland in north Nottinghamshire: results after twenty years.	<i>Quarterly Journal of Forestry</i> 103 (3) 185-193.
Sustainable Forest Management	[Hemery, G.] and Morison, J.I.L. (2010)	Oak tells a story.	<i>Chartered Forester</i> , Winter 2010, 12-14
Sustainable Forest Management	Quine, C.P. and Humphrey, J.W. (2010)	Plantations of exotic tree species in Britain: irrelevant for biodiversity or novel habitat for native species?	<i>Biodiversity and Conservation</i> 19 (5) 1503-1512.
Sustainable Forest Management	Mason, W.L. (2010)	<i>Respacing naturally regenerating Sitka spruce and other conifers.</i>	Forestry Commission, Edinburgh. Online publication only.
Sustainable Forest Management	Fletcher, A.M. and Samuel, C.J.A. (2010)	<i>Selecting Douglas fir seed sources for use in Britain.</i>	Forestry Commission, Edinburgh. 68pp. (£17.00)
Sustainable Forest Management	McKay, H.M. ed. (2011)	<i>Short rotation forestry: review of growth and environmental impacts.</i>	Forest Research, Farnham, Surrey. 212pp. Online publication only.
Sustainable Forest Management	Mason, W.L. and Meredieu, C. (2011)	Silvicultural strategies, sustainability, and adaptation to climate change in forests of the Atlantic region of Europe.	<i>Journal of Forest Planning</i> 16 1-11.

Science and Innovation Strategy Annual Report 2011

Sustainable Forest Management	Davies, O. and Kerr, G. (2011)	<i>The costs and revenues of transformation to continuous cover forestry.</i>	Forest Research, Roslin, Midlothian and Farnham, Surrey. 63pp.
Sustainable Forest Management	Stokes, V.J. and Kerr, G. (2010)	The evidence supporting the use of CCF in adapting forests to the risks of climate change.	<i>Forestry and Timber News</i> 42 , December 2010, 14,17.
Sustainable Forest Management	Stokes, V.J. and Willoughby, I. (2011)	The impact of bracken control on establishment of Corsican pine (<i>Pinus nigra</i> subsp. <i>laricio</i> (Maire)) and pine weevil (<i>Hylobius abietis</i> (L.)) damage.	Aspects of Applied Biology 108. Association of Applied Biologists, Wellesbourne, Warwick. 217-224.
Sustainable Forest Management	[McCarthy, N., Bentsen, N.S.], Willoughby, I. and [Balandier, P.] (2011)	The state of forest vegetation management in Europe in the 21st century.	<i>European Journal of Forest Research</i> 130 (1) 7-16.
Sustainable Forest Management	Kerr, G., Morgan, G., [Blyth, J.] and Stokes, V.J. (2010)	Transformation from even-aged plantations to an irregular forest: the world's longest running trial area at Glentress, Scotland.	<i>Forestry</i> 83 (3) 329-344.
Sustainable Forest Management	[Adams, T., Ackland, G., Marion, G.] and Edwards, C. (2011)	Understanding plantation transformation using a size-structured spatial population model.	<i>Forest Ecology and Management</i> 261 (3) 799-809.
Sustainable Forest Management	Hale, S.E., Gardiner, B.A.; Wellpott, A.; Nicoll, B.C.; Achim, A. (2010)	Wind loading of trees: influence of tree size and competition.	<i>European Journal of Forest Research</i> , special issue ' Wind effects on trees'
Sustainable Forest Management	Harmer, R. (2010)	Wither clonal oaks?	<i>Quarterly Journal of Forestry</i> 104 (3) 204-208.

Science and Innovation Strategy Annual Report 2011

Wood and Timber Properties	Macdonald, E., Connolly, T. and Gardiner, B. (2010)	A survey of Scots pine timber quality in the Northern Periphery Programme area of Scotland.	In: Wood structure and properties '10. Proceedings of the 6th IUFRO symposium 'Wood structure and properties '10' held in Podbanské, High Tatras, Slovakia, 6-9 September 2010, Jozef Kúdela and Rastislav Lagaňa eds. Arbora Publishers, Zvolen, Slovakia. 13-20.
Wood and Timber Properties Wood and Timber Properties	Macdonald, E., Connolly, T. and Gardiner, B. (2010)	A survey of Scots pine timber quality in the Northern Periphery Programme area of Scotland.	Proceedings of the 6th IUFRO symposium 'Wood structure and properties '10' held in Podbanské, High Tatras, Slovakia, 6-9 September 2010, J Kúdela and R Lagana, eds. Arbora Publishers, Zvolen, Slovakia. 13-20.
	[Korpunen, H.], Mochan, S. and [Uusitalo, J.] (2010)	An activity-based costing method for sawmilling.	<i>Forest Products Journal</i> 60 (5) 420-431.
Wood and Timber Properties Wood and Timber Properties	Macdonald, E., [Moore, J.], Connolly, T. and Gardiner, B.A. (2010)	Assessing timber quality of Scots pine (<i>Pinus sylvestris</i> L.).	Paper No 14 in: The Future of quality control for wood and wood products, Edinburgh, 4-7 May 2010, the final conference of COST Action E53. 11pp.
	Macdonald, E., [Davies, B. and Gjerdrum, P.] (2010)	Developing the Scots pine resource: study tour to Norway.	<i>Scottish Forestry</i> 64 (2) 16-25.
Wood and Timber Properties	[Aylott, M.J.], Casella, E., [Farrall, K. and Taylor, G.] (2010)	Estimating the supply of biomass from short-rotation coppice in England, given social, economic and environmental constraints to land availability.	<i>Biofuels</i> 1 (5) 719-727.

Science and Innovation Strategy Annual Report 2011

Wood and Timber Properties	Lee, S.J. and Connolly, T. (2010)	Finalizing the selection of parents for the Sitka spruce (<i>Picea sitchensis</i> (Bong.) Carr) breeding population in Britain using mixed model analysis.	<i>Forestry</i> 83 (4) 423-431.
Wood and Timber Properties	Fenning, T.M. (2010)	From the lab to the land. The prospects of propagating Sitka spruce by tissue cultures.	<i>Chartered Forester</i> , Winter 2010, 22-23.
Wood and Timber Properties	[Comeau, P.G.], White, M., Kerr, G. and Hale, S.E. (2010)	Maximum density–size relationships for Sitka spruce and coastal Douglas-fir in Britain and Canada.	<i>Forestry</i> 83 (5) 461-468.
Wood and Timber Properties	[Bauen, A.W., Dunnett, A.J., Richter, G.M., Dailey, A.G., Aylott, M.J.], Casella, E. and [Taylor, G.] (2010)	Modelling supply and demand of bioenergy from short rotation coppice and Miscanthus in the UK.	<i>Bioresource Technology</i> 101 (21) 8132-8143.
Wood and Timber Properties	Gardiner, B.A., Leban, J.-M., Auty, D. and Simpson, H.	Models for predicting wood density of British-grown Sitka spruce.	<i>Forestry</i> 84 (2) 119-132.
Wood and Timber Properties	Fonweban, J., Gardiner, B.A., Macdonald, E. and Auty, D. (2011)	Taper functions for Scots pine (<i>Pinus sylvestris</i> L.) and Sitka spruce (<i>Picea sitchensis</i> (Bong.) Carr.) in Northern Britain.	<i>Forestry</i> 84 (2) 49-60.

Science and Innovation Strategy Annual Report 2011

Indicator 4: Annual report by country on dissemination events supported covering statistics on 'dissemination events' – workshops, demonstrations, publications – to indicate that communication pathways remain open. We will develop an indicator of effectiveness for these communication posts.

Event	Date	RLO involvement	Other key partners (aside from event organisers)	No. attending	Comments
					3442 attendees at all events.
England					
RFS tree diseases conference	April 2010	Provided exhibition materials and manned information stand		250	
ICF conference, Newcastle	April 2010	Attended and manned information stand		400	
Trees and Woodlands in British Society conference	April 2010	Organised information materials to be available		150	
Bedales School, Hampshire - science careers afternoon	May 2010	Developed exhibit and attended with Anna Brown			
Forest Health Day – Grizedale, Cumbria	June 2010	Organised, attended, chaired and made introductory presentation	FC England (FCE)	Around 50	Attendees came from FC, private sector, local authority and voluntary sector. Event objectives, facilities, presentations, field visit and material generally rated 'above average' to 'excellent'. <ul style="list-style-type: none"> • 'Extremely knowledgeable presenters with excellent communication skills – presentations were interesting and

Science and Innovation Strategy Annual Report 2011

					<p>informative.'</p> <ul style="list-style-type: none"> • Very well organised event – good comfortable venue, good balance of presentations – not rushed and with time for questions. Good buffet and nice balance to the day with afternoon site visit'. • 'First hand information from the people researching these problems.' • 'More plant disease specimens and health issue identification would be helpful in future training'.
Forest Health Day - Wyre Forest, West Midlands.	June 2010	Organised, attended, chaired and made introductory presentation	FCE	Around 50	<p>Attendees came from FC, private sector, local authority and voluntary sector.</p> <p>Event objectives, facilities, presentations, field visit and material generally rated 'above average' to 'excellent'.</p> <ul style="list-style-type: none"> • 'Well organised, good venue, excellent presentations and supporting literature'. • 'Possibly more audience interaction at the beginning [would have been useful to] get us talking about our reasons for coming etc.'
RFS Southern Division Summer event at Alice Holt.	June 2010	Organised, chaired and made presentation		Around 30	
Hampshire Wood Fair	July 2010	Provided information materials for display at FCE stand	FCE		
Festival of the Tree, Westonbirt	August 2010	Organised, helped develop information materials and attended with Matt Parrott and Shelagh McCartan	FCE	Around 300 visited the FR display.	<p>Attended by general public</p> <ul style="list-style-type: none"> • 'Informative, tactile, variety of different displays, all ages – friendly, fun, engaging, well done!' • An excellent display absorbing the interest of children of all ages, and also very educational.' • 'Very entertaining, very informative, kids loved it. All seven

Science and Innovation Strategy Annual Report 2011

					children aged 5-11 engrossed. Lovely activities.'
'Flexible forestry' – 2 climate change seminars High Wield and South Downs	September 2010	Helped to design and organise and collated information materials			
APF 2010	September 2010	Attended to man FR exhibit	FCE		
Japanese scientists and policy makers visit to AH	September 2010	Organised and made presentation			
ICF National Study Tour, South Downs.	October 2010	Assisted in getting Joan Webber and Ralph Harmer to present to the group			
ICF Midlands meeting on ecosystem services	October 2010	Arranged for Gregory Valatin to speak at this event			
ICF SE, AGM at AH	November 2010	Organised 3 FR speakers to discuss urban green space and tree pests and diseases.			
London RAC	November	Organised 7 FR	FCE	Around 30	Including representatives from FCE, Royal Parks, Timber Trades

Science and Innovation Strategy Annual Report 2011

meeting, AH	2010	presenters on green networks and urban greenspace, and Andy Moffat as Chair.			Federation, City of London, Greater London Authority, Trees for Cities, and Natural England.
Imperial College, London visit AH	December 2010	Organised and presented to the group		35 MSc students	
EFIP/FR seminar on climate change and the timber trade	February 2011	Co-organised and attended		Around 15	<p>Attended by representatives from the timber industry, local authorities, and public sector organisations.</p> <ul style="list-style-type: none"> • 'A wide range of knowledgeable speakers, thought provoking' • 'Good speakers with a thorough knowledge of the subject' • 'A greater focus on practical issues and adaptation potential at the small scale would have been good'.
Wales					
Species diversity seminar	April 2010	Organised jointly with FCW and made presentation and led field visit	FC Wales (FCW)	12	Part of a series of events for forest districts to inform about future species choice in a changing climate
Species diversity seminar	April 2010	Organised jointly with FCW and made presentation and led field visit	FCW	10	Part of a series of events for forest districts to inform about future species choice in a changing climate
Species diversity seminar	April 2010	Organised jointly with FCW and made presentation and led field visit	FCW	14	Part of a series of events for forest districts to inform about future species choice in a changing climate
PAWS seminar	April 2010	Organised speakers and field visit	FCW	10	
Small holders show	May 2010	Organised and manned display stand	FCW	?	A general show disseminating information

Science and Innovation Strategy Annual Report 2011

"Read" report climate change event	May 2010	Organised and manned display stand	FCW, CONFOR	About 80	A number of FR speakers
Royal Forestry Society of Belgium	June 2010	Organised a number of field visits and talks and led several site visits	RFS	About 35	A 5 day visit to Wales to look at woodland management
Species Seminar S Wales	June 2010	Organised jointly and led field trips	CONFOR, Wales Forest Business Partnership WFBP	About 40	Increasing species diversity mainly private sector but also some FCW staff
Species Seminar N Wales	June 2010	Organised jointly and led field trips	CONFOR WFBP	About 45	Increasing species diversity mainly private sector but also some FCW staff
Woodland strategy advisory panel WSAP field visit	June 2010	Organised and led part of the field visit	FCW	20	Field visit discussing alternative management methods
Phytophthora Ramorum PR awareness seminar	June 2010	Organised and made presentations	UPM-Tilhill BSW Ltd	15	Mainly Tilhill and BSW staff but some haulage contractors as well
P R awareness and Biosecurity seminar S Wales	July 2010	Organised and made presentation	Food and Environment Research Agency (FERA) FCW	30	Mainly FCW staff
PR awareness and	July 2010	Organised and made	FERA	25	Mainly FCW staff

Science and Innovation Strategy Annual Report 2011

biosecurity seminar N Wales		presentation	FCW		
Royal Welsh Show	July 2010	Organised and manned display stand	FCW	?	A general show disseminating information
PR Biosecurity Seminar	Sept 2010	Organised Jointly and made presentation	FCW	30	An event specifically for contractors working in S Wales
APF	Sept 2010	Organised jointly and manned display stand	FCE	?	FR launched publications and presented at seminars as well as disseminating over 2000 information notes. A lot of direct engagement especially in relation to pests and diseases
Forest Health day N Wales	Oct 2010	Organised jointly and led field trips	FCW	45	Both FCW and Private (these days are organised every 2 years in Wales)
Forest Health day S Wales	Oct 2010	Organised jointly and led field trips	FCW	40	Both FCW and Private(these days are organised every 2 years in Wales)
ICF Wales Conference	Nov 2010	Provided display and gave presentation	Institute of Chartered Foresters	55	Research update presentation
Scotland					
Aviemore Autumn Update Seminar	11/11/10	Organised and made presentation		28 (18 organisations)	<ul style="list-style-type: none"> • Liked the broad range of current relevant topics • Extremely well presented and organised • Excellent presentations • Good subject areas covered • A useful networking opportunity • Please keep running these • Detail and content was first class
NRS Spring Update Seminar	17/3/11	Organised and made presentation		25 (21 organisations)	<ul style="list-style-type: none"> • Valued the cross-disciplinary interests • Good networking opportunity • Very topical • Very clear presentations

Science and Innovation Strategy Annual Report 2011

					<ul style="list-style-type: none"> • Good opportunity to meet with forestry professionals • Very relevant, informative and well presented • Lots of ideas to take back to base! • Well organised
Royal Botanic Garden Edinburgh Public engagement event	15-16/1/11	Organised partnerships and the event	Royal Botanic Garden Edinburgh, The Sylva Foundation, Edinburgh University Science Communicators, International Year of Forests	396	<ul style="list-style-type: none"> • Lots of things for young children – they loved making bugs 4/5 • Really impressive communication of science. Very enthusiastic, pleasant staff 5/5 • Very dedicated staff and most willing to explain 4/5 • Fabulous children’s craft activities, approachable volunteers, very interesting 5/5 • Excellent discussion and explanation on dendrology 4.5/5 • Thank you so much for your wonderfully efficient, professional and enthusiastic support for the OneOak project at our joint exhibition this weekend at RGBE. It was a genuine pleasure and privilege to work with you and your FR colleagues. The feedback we have received seems to have been very good. I certainly feel it was a very worthwhile exercise that perhaps we can repeat together in some form in the future.
Royal Botanic Garden Edinburgh Public engagement event	12-13/2/11	Organised partnerships and the event	Royal Botanic Garden Edinburgh, FC Scotland, Tweed Valley Osprey Volunteer, International Year of Forests	486	<ul style="list-style-type: none"> • The opportunity for the children to use the powerful microscopes was excellent. The owl table was very informative and the staff were lovely. 4/5 • Good mix of children’s and adult activities. 5/5 • Awesome! 5/5 • Tons of info. Squirrel pencil holder great too! 5/5 • Loved the engaging activities for all ages. 4/5 • Well set out, informative displays, very helpful staff. 5/5 • Great interaction for my children 3yrs, 4yrs and 5yrs. 5/5 • What a fantastic idea to get the kids interested – lots of fun! • It was excellent. • Excellent exhibition. Very helpful volunteers. Well done!

Science and Innovation Strategy Annual Report 2011

Royal Botanic Garden Edinburgh Public engagement event	14-15/4/11	Organised partnerships and the event	Royal Botanic Garden Edinburgh, FCScotland, Civil engineering Central Services, Edinburgh Napier University (Centre for Timber Engineering), International Year of Forests, International Year of Chemistry	1257	<ul style="list-style-type: none"> • Your team have created a model for science engagement which is exemplary. It is very satisfying to see not just the numbers you mention but the dwell time and level of engagement. I think the mix of 'crowd pulling' activities and real science works very well • This is the best science for children • I'm very happy cos I learned a lot about weevils • Very interesting and great for kids • This is great, kids had a ball, really interactive • Very instructive and impressive • I think this day out was fabulous • Very interesting for kids and adults, thanks • We loved all the activities ... making paper and squirrels
Forest Health Days (Scotland) 3 events	Dunoon, Kiltarlity Cardrona	Organised, attended, chaired and made introductory presentation	FC (GB), FC (Scotland), FE (Scotland), Benmore Botanic Garden	115 (43 organisations)	<ul style="list-style-type: none"> • Good quality, up-to-date information • Clear presentations • Great opportunity to speak to the experts face-to-face • Good variety/range of issues covered • Particularly benefited from session on monitoring and recording • I now see that I need to revitalise tree health recording when I get back • Good to have a brief overview from national perspective • Well organised and very informative • Particularly enjoyed getting out in forest and seeing the issues • Excellent transfer of information

Science and Innovation Strategy Annual Report 2011

Science and Innovation Strategy Annual Report 2011

Indicator 5: Programme Advisory Groups. Dropped.

Indicator 6: Knowledge transfer. We will develop a measure to reflect the successful linkages between research and policy development.

Work on this is underway and will be informed by an evaluation of research impact to be undertaken shortly.

Indicator 7: Outward looking focus. We will consider including more outward looking indicators e.g. innovation and presence in new area, and more outcome focussed indicators.

This indicator will be developed as part of the forthcoming full review of the Science and Innovation strategy to take place in 2012.

Science and Innovation Strategy Annual Report 2011

If you need this publication in an alternative format, for example in large print or in another language, please contact the Diversity Team at the address below.

Forestry Commission
Silvan House
231 Corstorphine Road
EDINBURGH
EH12 7AT
Tel: 0131-314-6575
E-mail: diversity@forestry.gsi.gov.uk