



LIFE07 ENV/D/000218

**FURTHER DEVELOPMENT AND IMPLEMENTATION
OF AN
EU-LEVEL FOREST MONITORING SYSTEM**

**FUTMON PROJECT
2009 ANNUAL REPORT**

**Fiona Harrington
October 2009**



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ACRONYM and PROJECT TITLE

FutMon LIFE07 ENV/D/000218 – Further Development and Implementation of an EU-Level Forest Monitoring System

PROJECT TEAM

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OBJECTIVES

The following is a list of the project Actions which Ireland is participating in.

Action M7: Project management by Associated Beneficiaries

Action M8: National dissemination of Information (2009-2010)

Action L1: Creation of large scale representative monitoring grid (2009-2010)

Action IM1: Selection of core plots for intensive monitoring

Action D1: Tree vitality and adaptation

Action D2: Nutrient cycling and critical loads

Annex 1, lists all the tasks and deliverables planned under each action. The timeframe for completion of all actions is over the life of the project (2009-2010)

PROGRESS AGAINST OBJECTIVES AND DELIVERABLES

Details of the progress to date for all objectives and deliverables is provided in Annex 1. A summary of progress is provided below.

Action M7: Project management by Associated Beneficiaries

This action covers the management of the project at a national level. Areas include financial matters, personnel (office staff, laboratory staff and field staff), the monitoring network, laboratory analysis, the quality control and assurance programme, data handling and storage, dissemination of results and attendance at project meetings. All aspects of this action were managed according to project timeframes and no significant issues require highlighting.

Details of all meetings attended in 2009 are provided in Table 1. Summaries of meetings are provided in Annex 2. Highlights of the Heads of Laboratories meeting are detailed under Action IM1.

Table 1 - Details of meetings attended 2009

Date	Place	Meeting	Attended by (Capacity)
12-13 Oct 2009	Warsaw	Meeting of the Heads of Laboratories	Dr. P. O'Dea (Head of laboratories)
26/27 & 23-25 May 2009	St. Petersburg, Russia	1st FutMon Status Workshop 25th ICP Forests Task Force Meeting	F. Harrington (FutMon Manager & NFC) P. Neville (Chairman EP Biodiversity)
5-7 May 2009	Ilirska Bistrica, Slovenia	Combined Field Course on Phenology and LAI	F. Harrington (FutMon Manager & Phenology surveyor)
22 April 2009	Rome, Italy	Expert Panel Meeting Forest Biodiversity and Ground Vegetation	P. Neville (Chairman EP Biodiversity)
12-16 Jan 2009	Hamburg, Germany	Combined ICP Forests/FutMon Expert Meeting	F. Harrington (FutMon Manager & NFC) P. Neville (Chairman EP Biodiversity) Dr. P. O'Dea (Head of laboratories)

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The following meetings will be attended in the last quarter 2009

- A soil solution Expert Panel meeting in December 2009, which Dr. P. O’Dea will attend
- A Biosoil meeting is scheduled for November, the focus of which will be on results obtained. P. Neville will attend in his role of Co-chairman of Biodiversity and Ground Vegetation Expert Panel.
- Conference on Future Forest Monitoring in the European Union. Attended by F. Harrington and P. Neville. The agenda for the meeting maybe found in the following link: www-conference.slu.se/futforestmon

The next submission dates for FutMon data are as follows:

Large Scale Monitoring (Level I/L2a)

2009 Data Submission: 15/12/2009 - 15/03/2010

2009 Final data validation and reporting: 16/03/2010 – 30/06/2010

Intensive Monitoring (Level II/IM1/D1-D3 plots)

2007 Data submission: 15/12/2009 – 15/03/2010

2007 Final data validation and reporting: 16/03/2010 – 14/04/2010

It is planned that all relevant data from Ireland will be submitted by these deadlines.

Action M8: National dissemination of Information (2009-2010)

A forest monitoring workshop is currently being organised for end January 2010 by FutMon project personnel in conjunction with key stakeholders. F. Harrington, FutMon Project Manager and P. Neville, EU/ICP Forest Biodiversity Expert Panel Co-chair will be presenting on key aspects of FutMon and forest monitoring.

Official notice and agenda will be communicated to all relevant stakeholders by end October 2009. The workshop will be advertised nationally by COFORD, the National Council for Forestry Research and Development. Details once finalised will be also made available on their web-site at:

<http://www.coford.ie/iopen24/>

It is planned that the workshop proceedings will be published in the “Irish Forestry Journal”.

Notice boards, providing details of FutMon objectives and funding agencies are currently being designed. These notice boards will be erected at forest entrances where each of the three intensive plots are located.

Publication detailing “20 years of Forest Monitoring in Ireland” is currently, being prepared by Dr. T. Cummins *et al* UCD Soils.

Action L1: Creation of large scale representative monitoring grid (2009-2010)

This action requires all partners to revise their current national monitoring systems, aiming at maximising synergies between Level I and existing National Forestry Inventories (NFI's). In Ireland's case 27 new plots "FutMon large-scale plots" need to be created, which are a sub set of the NFI. To date 14 new plots have been established. Work is ongoing with Mr. John Redmond of the Forest Service in selecting the remaining plots. These will be established over the spring/summer period of 2010.

Action IM1: Selection of core plots for intensive monitoring

This action is concerned with intensive monitoring. Ireland has three plots located in Ballinastoe (Co. Wicklow), Cloosh (Co. Galway) and Brackloon (Co. Mayo) which are intensively monitored. Surveys performed on a regular basis are; deposition, litterfall, soil solution and ambient air quality (NH₃, NO₂, SO₂ and O₃). All are being conducted according to the project guidelines. Ambient air quality is a new mandatory survey under FutMon. Ireland is using Gradko samplers. Figure 1 shows their installation at Ballinastoe intensive plot. Ammonia, NO₂ and SO₂ sampling is conducted on a monthly basis all year round. Ozone is sampled fortnightly between May and Oct.



Figure 1

Ambient air quality sampling at Ballinastoe intensive plot:

NO₂/SO₂ (green tubes)

NH₃ (yellow tubes)

O₃ (black tubes)

Mandatory quality control and assurance measures in the form of ring tests were fully participated in. These tests rate and compare all analytical laboratories involved in the project throughout the EU. Dr. Philip O'Dea attended the Heads of the Laboratories meeting in Warsaw in October 2009 where results from current ring tests were discussed. Highlights from this meeting are provided below:

- Two presentations were made to the Heads of the Laboratories meeting by Dr. O'Dea detailing the analytical problems encountered and solutions found in adapting EU harmonised analytical procedures to Irish conditions.
- Under FutMon, the laboratory has participated in the mandatory 3 inter-laboratory ring tests to date and obtained the following results:

- (1) **6th FSCC Soil Ring Test** - the laboratory was amongst the **top 3 labs out of a total of 50 labs** that participated in this ring test. The remaining laboratories will be obliged to undergo a re-qualification procedure to ensure that their analytical quality meets mandatory guidelines and thus ensure inclusion in the FutMon database and subsequent evaluations
 - (2) **3rd WRT of deposition and soil solution** - the laboratory was amongst **18** out of **45 labs** that meet the strict QA/QC qualification criteria stipulated by the Working Group QA/QC in Laboratories.
 - (3) **11th needle and leaf interlaboratory comparison test** - the laboratory was amongst **19 out of 56** laboratories that meet the strict analytical criteria required.
- The laboratory is due to complete two more ring tests (Foliar and Deposition and Soil Solution) before the end of FutMon in December 2010.
 - The laboratory has agreed to provide technical assistance on request to a FutMon laboratory that encountered serious difficulties in meeting the mandatory QA/QC in the Soil, Foliage and Water ring tests.
 - Arising from Dr. O’Dea’s work on the ICP Sub-Manual Quality Assurance and Control in Laboratories, he has been invited to become a member of the Working Group QA/QC in Laboratories. This Group directs and manages the WA/QC procedures that labs must adhere too as part of the Forest Monitoring Programme conducted under ICP/EU Life FutMon. In addition, Dr. O’Dea has been requested, in collaboration with colleagues in Belgium, Italy, and Austria, to complete the content and editorial changes required to the aforementioned manual by March 2010.

Ireland participated in the passive sampler laboratory inter-comparison exercise providing NO₂/SO₂ and NH₃ samplers for testing. Results are pending.

Mandatory assessment of crown condition was performed in summer 2009. Data will be submitted in December followed by a written report.

The remaining required surveys within this action, forest growth, foliar chemistry, and ground vegetation have been planned for 2010.

Three meteorology stations will be established in 2010 at each of the intensive plots.

Action IM1 requires for the installation of EU standardized throughfall collectors on one intensive plot to be run in parallel with the national collectors for a period of 12 months. These collectors were established in Ballinastoe in August. Samples will be collected from these on a weekly basis until August 2010. Figures 2 and 3 show their installation at both the plot and the open control site.



Figure 2
National throughfall collector (left) and EU standardized throughfall collector (right) at Ballinastoe intensive plot.

Action D1: Tree vitality and adaptation

Action D1 is a demonstration action within FutMon. The objective is to develop new integrated key indicators for tree vitality and sound scientific tools for operational monitoring of tree vitality under field conditions.

Action D1 specifically focuses on the following surveys; crown assessment, continuous stem circumference measurements, litterfall and phenology. Crown condition and phenology were conducted on the three intensive plots in 2009. These will be repeated in 2010. Continuous stem circumference bands will be installed on all plots during the winter of 2009/2010. Litterfall is collected on a monthly basis and the 2009 samples will be analysed in last quarter of 2009.



Figure 3
EU standardized throughfall collector at the control site at Ballinastoe. Collector consists of a 5L bottle with funnel attached and supporting field structure.

New surveys to be implemented under this action are; cameras for phenological recordings (planned for 2010) and leaf area index measurements. Ireland participated in one phenological and leaf area index training course. Leaf area index was measured on all intensive plots during the summer of 2009 using hemispherical photography.

Action D2: Nutrient cycling and critical loads

Action D2 a demonstration action under FutMon aims at refining and developing monitoring methods in the field of nutrient cycling and critical loads. Two significant surveys; Intensive Foliar survey and a Ground Vegetation Survey will be completed in 2010.

ACTIVITIES PLANNED FOR THE FORTHCOMING REPORTING PERIOD

Action M7: Project management by Associated Beneficiaries

- Continued management of the FutMon project on behalf of the coordinating beneficiary

Action M8: National dissemination of Information (2009-2010)

- Erection of notice boards at the three FutMon intensive core plots providing information about the project objectives and funding agencies
- Successful organisation of Forest Monitoring workshop and publication of proceedings
- Publication of “20 years of Forest Monitoring in Ireland”.

Action L1: Creation of large scale representative monitoring grid (2009-2010)

- Establishment of 13 new FutMon Level 1 plots on as a subset of the NFI.
- Submission of new plot coordinates to ICP Forests

Action IM1: Selection of core plots for intensive monitoring

- Completion of large-scale assessment of plots, e.g. crown condition survey
- Participation at an International Calibration Course Forest Condition
- Participation in Forest damage Course

Action D1: Tree vitality and adaptation

- Planned surveys; forest growth, crown condition, litterfall, phenology, LAI
- Data submission

Action D2: Nutrient cycling and critical loads

- Planned surveys; intensive litterfall survey, soil solution, intensive foliar, ground vegetation
- Data submission

OUTPUTS

- Submission of Irelands 2007 and 2008 Level II data to ICP Forests.
- Submission of Irelands 2009 and 2010 Level I data to ICP Forests.
- 2008 and 2009 reports on Irish Forest Condition.

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- Final FutMon Project Report.
- Publications of proceedings from Irish Forest Monitoring Workshop.
- Publication entitled “20 years of Forest Monitoring in Ireland”.
- Establishment of a new Level 1 network which successfully integrates with the NFI.

Project Action M7 – Project Management at a National Level on Behalf of the Associated Beneficiary

Task	Expected deliverables	Progress
Financial management of FutMon project	Maintenance of all invoices, accounts and timesheets in respect of personnel working on the project and any other agreed costs	Three interim financial claims with supporting invoice and timesheet documentation submitted to FS during reporting period.
	Preparation of Irelands claim in respect of the EU draw down funding under the project	Awaiting request from Co-ordinating Beneficiary for the submission of Irelands claim
	Preparation of an annual financial claim to Forest Service for all project work undertaken at national level	Annual financial claim due to be submitted to FS mid-Nov
Quality management of FutMon project	Coordination and implementation of quality assurance and control (QA/QC) procedures developed under Action Group C1 which have relevance to National project Actions M7, M8, L1, L2, IM1, D1 & D2	Participated in all quality assurance procedures (FutMon ring tests) occurring during the reporting period. All were successfully passed, indicating the high quality of analytical analysis and reporting expertise within the project.
Management of field based project actions relevant to Ireland	Successful completion of all field assessments/laboratory work relevant to Actions L1, L2, IM1, D1 & D2:	Successful completion of all required field based project actions for the period Jan to Sept. Individual details provided below for individual Project Actions.
	L1 - Creation of a large-scale representative monitoring grid	
	L2 - Large-scale monitoring grid	
	IM1 - Selection of core plots for intensive monitoring	
	D1 - Tree vitality and adaptation	
D2 - Nutrient cycling and critical loads		
Management of FutMon data	Successful collection, validation, submission, and storage of all data in accordance with the ICP Forests manuals and Futmon project proposal	Ongoing and on track.
Dissemination of National results at International level	Submission of Irelands contribution to the activity Reports which are compiled by the Coordinating Beneficiary	Ongoing.
Project meetings	Participation in the Combined Expert Meetings, Status Workshops, Intercalibration Courses, heads of laboratories meetings, and Task Force Meetings	Participation at all relevant meetings. 2 FutMon meetings, 1 Task Force meeting, 1 Phenology inter comparison/LAI training course, 1 Heads of Laboratories meeting, 1 FutMon 2011-2013 development meeting
FutMon Proposal 2011-2013	Preparation of FutMon Proposal 2011-2013 on behalf of the Associated Beneficiary (Forest Service)	N/A. Decision by FS not to perform the role of Ireland's Associated Beneficiary in FutMon 2011-2013 (Project entitled as ForEU)

Project Action M8 – National Dissemination of information

Task	Expected deliverables	Progress
National dissemination of information by Ireland	National dissemination of information by Ireland over the Futmon project through national reports, press releases, scientific publications, websites and notice boards.	Notice boards (replacing existing signage) are currently being designed. A workshop on Forest Monitoring is being organised for Jan 2010 by key FutMon personnel.
	One COFORD Connect Publication during 2009-2010 period. Annual summary report of monitoring activities.	Planned for end of 2010

Project Action L1 - Creation of large-scale representative monitoring grid

Task	Expected deliverables	Progress
Revision of current national monitoring systems aiming at maximising synergies between Level I and NFI's	Successful integration of the monitoring network with the NFI's resulting in the creation of new "FutMon large-sale plots" as required under project Actions L1, L2, and IM1.	To date 14 of the 27 "large-scale plots have been established". The remaining plots will be selected with the help of key NFI staff during beginning of 2010 for establishment summer 2010.
	Submission of new "FutMon large-scale plot" coordinates to the Coordinating Beneficiary.	Coordinates of 14 "large-scale plots" have been submitted to Coordinating Beneficiary
	Participation in Expert Panel meeting for the development of trans-national guidelines.	N/A. Meeting took place at start of project during a period when Ireland was not a FutMon participant .t

Project Action L2 - Large-scale representative monitoring

Task	Expected deliverables	Progress
Field assessments on FutMon large-scale plots aiming at the continuation of existing time series for forest condition	Annual large-scale assessment of plots including all the mandatory parameters as detailed in EU/ICP Forests Manual. Completion of NFI field studies.	Successfully completed
	Attendance at Expert Panel meetings on Harmonisation of NFI's.	N/A
	Participation at an International Calibration Course Forest Condition.	Planned 2010
	Participation in one Forest Damage Course.	Planned 2010
	Participation in one Photo Intercalibration Exercise for forest condition.	Participated May 2009
	Submission of data to the Coordinating Beneficiary on behalf of the Associated Beneficiary (Forest Service)	

Action IM1 - Selection of core plots for intensive monitoring

Task	Expected deliverables	Progress
IM1 plot surveys	Annual assessment of crown condition as per EU/ICP Forest Manual Chapter 2, including removals and mortality.	Completed June-Sept 2009
	Completion of one forest growth assessment as per EU/ICP Forest Manual, Chapter 5.	Planned 2010
	Completion of one foliar chemistry assessment as per EU/ICP Forest Manual, Chapter 4.	Planned 2010
	Completion of one ground vegetation survey as per EU/ICP Forest Manual, Chapter 8.	Planned 2010
	Continued deposition monitoring and analysis as per EU/ICP Forest Manual, Chapter 6.	Ongoing
	Ambient air quality survey as per EU/ICP Forest Manual, Chapter 10A.	Ongoing
	Meteorology daily assessment.	Planned 2010
Quality control and assurance measures	Participation in annual foliar, soils, soil solution, deposition laboratory ring tests.	Completed and passed 2009
	Participation in meetings of the Heads of Laboratories	Participated Oct 2009 Warsaw
	Completed study comparing national throughfall samplers and standardised samplers.	Established. Ongoing study until August 2010
	Completed ground vegetation questionnaire in regard to national methods.	Planned 2010
	Independent Inter-comparison Exercises and Ground Vegetation Control surveys.	Planned 2010
	Participation in Inter-comparison Exercises (ground vegetation, passive sampler, visible ozone injury).	Participated in passive sampler Inter-comparison exercise for NO ₂ , SO ₂ and Ammonia
Data Submission and interpretation	Submission of general basic and plot data as well as intensive data to Coordinating Beneficiary on behalf of the Associated Beneficiary (Forest Service).	Dec 2009 onwards.

Action D1 - Tree Vitality and adaptation

Task	Expected deliverables	Progress
Field assessments/surveys on IM1 plots	Annual assessment of Crown Condition as per EU/ICP Forest Manual Chapter 2, including removals and mortality.	2009 Assessment completed
	Forest Growth survey as per EU/ICP Forests Manual, Chapter 5.	Planned 2010
	Litterfall survey as per EU/ICP Forests Manual, Chapter 11	Ongoing
	Phenology survey as per EU/ICP Forests Manual, Chapter 9	2009 Assessment completed
Demonstration/new surveys on IM1 plots	Installation of Webcams/digital cameras for phenological recordings as per methods described by C1-Phen-10(FI) action.	Planned 2010
	Leaf area index measurements as per methods described by C1-tree-30(NWD) action.	2009 measurement completed
Quality control and assurance measures	Participation in one Phenological Inter-comparison Exercise	Participated May 2009
	Participation in new phenological method training course.	Participated May 2009
IM1 plot survey data submission	Submission of monitoring data to Coordinating Beneficiary on behalf of the Associated Beneficiary (Forest Service)	Dec 2009 onwards

Action D2 - Nutrient cycling and critical loads

Task	Expected deliverables	Progress
Surveys on IM1 plots	Litterfall survey as per EU/ICP Forests Manual, Chapter 11 (mass and element concentrations).	Ongoing
	Soil solution (chemical composition) as per EU/ICP Forests Manual Chapter 3.	Ongoing
Demonstration/new surveys on IM1 plots	More intensive foliar survey as per methods described under C1-Fol-10(FI) action.	Planned 2010
	Nutrient budget of ground vegetation as per methods described under C1-Fol1-10(FI).	Planned 2010
IM1 plot survey data submission	Submission of monitoring data to Coordinating Beneficiary on behalf of the Associated Beneficiary (Forest Service)	Dec 2009 onwards

Annex 2

FutMon Phenology/Leaf Area Index Workshop May 5th-7th Ipicja, Slovenia

Under FutMon, demonstration Actions have been included which allow for the implementation of new surveys and development of harmonised methods.

Phenological and Leaf Area Index measurements (LAI) are two of the new surveys being introduced in Ireland. The recent meeting in Slovenia allowed for the distribution and discussion of newly developed field protocols, training in new methods, and completion of various inter comparison exercises as part of quality control and assurance measures.

As part of the FutMon agreement Ireland had signed up to attending this workshop.

May 5th

The first session took place indoors. New field protocols were introduced and discussed. Presentations were given by various experts in the different methods.

May 6th

The second session took place outdoors. A phenology training exercise was provided in black pine and beech, and an inter comparison exercise between all the delegates was performed. Two different types of webcams were demonstrated in the field.

Various different LAI methods/equipment were demonstrated in the field and the various advantages/disadvantages of each were highlighted:

- LAI 2000
- Winscanner
- Hemispherical photography
- Tracker

May 7th

Half day indoor session which looked at the results of the phenology exercises and the LAI measurements taken in the field the previous day were compared.

ICP Forest 25th Task Force Meeting/FutMon Life+ Workshop

St. Petersburg, Russia, 23rd - 25th May 2009

ICP Forest Task Force Meeting

Over a period of 20 years ICP Forests has been managing a programme which has developed into one of the world's largest biomonitoring networks. Results obtained through the network provide information on forest health, air pollution, climate change and biodiversity. The programme is steered by its Task Force under the leadership of Germany. In all, 41 countries and the European Commission are represented. Every year the PCC (Programme co-ordinating Committee) of ICP Forests organises a meeting of all participating countries represented in large by individual NFC's (National Focal Centres) and Expert Panel Chairs.

The 25th Task Force Meeting was held in St. Petersburg, Russia. The meeting consisted of an outdoor field excursion on the 24th, followed by an indoor session on the 25th.

The field excursion consisted of a visit to an EU/ICP Forest Level II site situated on the Finnish/Russian border. Presentations were made by members of the Russian Forest Protection Institute. Main forest disturbance factors in Russia are clear cutting, forest fires, extreme weather conditions, air pollution (Cu and Ni smelters causing SO₂ and heavy metal deposition), and insect pests.

The indoor session focused on presentations and discussions on the following items:

- Results and reports of ICP Forests in 2009
- Obligations towards Working Group on Effects of Convention on Long-range Transboundary Air Pollution (WGE of CLRTAP)
- Cooperation with the LIFE+ FutMon project
- Cooperation with international organisations
- Organisational issues

FutMon Life+ Status Workshop

St. Petersburg, Russia, 26th - 27th May 2009

FutMon Workshop

A FutMon workshop meeting was held after the ICP Forest Task Force Meeting on the 25th and 26th may. Presentations were made by Expert Panel individuals who have overall responsibility for the six FutMon project Actions. Presentation covered the following topics:

- Requirements under each Action: mandatory vs optional surveys
- Drafting/adoption/implementation of FutMon field protocols
- Data submission dates
- Database requirements
- Data quality checks – inter comparison exercises
- Proposal for FutMon II – content and submission dates

With regard to individual FutMon Actions, Ireland was listed as having fulfilled their requirements. In particular, Ireland (Coillte Laboratories) was listed as having successfully passed all water and foliage ring tests (quality control check tests). This establishes Coillte Laboratories in the top range of analytical laboratories in Europe.

Combined ICP Forests/FutMon Expert Meeting

Hamburg, Germany 12-16 January 2009

The Combined Meeting aimed to assemble experts active under ICP Forests/FutMon in order to facilitate continued harmonized forest monitoring in Europe. It was specifically targeted at method development for different intensive forest monitoring surveys.

Minutes from the parallel sessions may be accessed through the following link:

<http://www.icp-forests.org/CombMeet/index.htm>