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**EXECUTIVE BODY FOR THE CONVENTION ON
LONG-RANGE TRANSBOUNDARY AIR POLLUTION**

Working Group on Effects
(Twenty-third session, Geneva, 1-3 September 2004)
Items 4 and 5 of the provisional agenda

**2004 JOINT REPORT OF THE INTERNATIONAL COOPERATIVE PROGRAMMES
AND THE TASK FORCE ON THE HEALTH ASPECTS OF AIR POLLUTION**

Addendum

**REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS
OF THE EFFECT-ORIENTED ACTIVITIES**

Report compiled by the secretariat in collaboration with the Extended Bureau
of the Working Group on Effects

1. Pursuant to the decision taken by the Executive Body at its twenty-first session (ECE/EB.AIR/79/Add.2, item 3.1.1), the secretariat compiled the annual review of the activities and results of the International Cooperative Programmes (ICPs) and the Task Force on the Health Aspects of Air Pollution based on the information provided by the lead countries and the programme coordinating centres. Information on the achievements of ICPs and the Task Force since the twenty-second session of the Working Group on Effects, their plans for the coming year and the most important recent publications of their results are summarized in annexes I to VII below.
2. Based on the contributions provided by ICPs and the Task Force on Health, the Bureau with the assistance of a consultant finalized for submission to the Working Group the 2004 substantive report on the review and assessment of air pollution effects and their recorded trends (in English only). Its executive summary can be found in document EB.AIR/WG.1/2004/14.

Documents prepared under the auspices or at the request of the Executive Body for the Convention on Long-range Transboundary Air Pollution for GENERAL circulation should be considered provisional unless APPROVED by the Executive Body.

Annex I

REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON ASSESSMENT AND MONITORING OF AIR POLLUTION EFFECTS ON FORESTS (ICP FORESTS)

I. **ACTIVITIES SINCE THE TWENTY-SECOND SESSION OF THE WORKING GROUP ON EFFECTS**

1. The twentieth meeting of the Task Force of ICP Forests took place from 23 to 26 May 2004 in Växjö, Sweden, and was attended by 80 experts. The meeting addressed the following main topics:

- (a) Implementation and evaluation of the intensive monitoring (level II);
- (b) Evaluations of large-scale data (level I);
- (c) Upscaling of results from the ecosystem scale to the large scale;
- (d) Assessment of ozone concentrations in forests;
- (e) Assessment of forest biodiversity in relation to air pollution and other environmental stress factors;
- (f) Cooperation with other international organizations and processes, e.g. the European Union (EU) "Forest Focus" and the European Forest Institute (EFI).

2. Evaluations of level II data focused on deposition trends on ICP Forests level II plots in the years 1996 to 2001 and on forest growth. Evaluations of level I data focused on statistical models as well as on the spatial and temporal variation in defoliation mainly of Picea abies, Pinus sylvestris, Fagus sylvatica and Quercus robur/petraea. Special attention was paid to abiotic stress factors for forest trees and ecosystems, such as the extreme heatwaves and drought in 2003, the fire calamities in South-Western Europe and in-depth evaluations of the storm damage at the end of the 1990s.

3. Statistical models were developed to extrapolate statistical relationships identified at level II to the large scale by means of level I data. Key parameters measured at both levels are crucial for connecting the information from different scales.

4. The increasing forest growth that was reported from other case studies throughout Europe was substantiated by evaluations based on level II plots. The role of air pollutants in this respect needs further investigation. Both forest growth and defoliation proved to be good indicators for forest condition.

5. Within a project co-financed by the EU, passive sampling data from the intensive monitoring plots were used to evaluate the relationship between modelled AOT40 ozone values (accumulated exposure over the concentration threshold of 40 parts per billion) and measured concentration data from nearby active measurement stations. Results showed good relationships that support the suitability of the programme's passive samplers specifically in remote areas. The thresholds as defined in Kuopio (Finland) (1996) and Gothenburg (Sweden) (2002) were exceeded on many plots in the years 2000–2002. The monitoring test phase will be continued until 2005. All countries were encouraged to participate.
6. The Task Force took note of the progress made in a biodiversity monitoring test phase (ForestBIOTA) and asked its working group on biodiversity to report the first results back to it in 2005. Assessments of epiphytic lichens, stand structure, deadwood, forest stratification, and ground vegetation are planned to be carried out on a limited number of level II plots and will be evaluated in relation to existing data. All countries were encouraged to participate.
7. As part of the test phase for a new design of international cross-calibration courses for crown condition assessments, the results of last year's courses in Germany and Estonia were evaluated. For 2004, the implementation of a photo assessment project is planned to allow cross-calibration based on photos and without travelling.
8. Updates of the existing ICP Forests Manual's chapters on ozone sampling, deposition monitoring, meteorology, phenology and forest growth, as well as new subchapters on damage causes and litterfall, were adopted by the Task Force.
9. ICP Forests and the European Commission (EC) agreed to continue their fruitful cooperation up to 2006. Contracts for financial support from EC are being drawn up. ICP Forests and EFI identified a number of points of common interest and decided to intensify their cooperation.

II. ACTIVITIES AND TASKS PLANNED FOR 2004/2005

A. Activities and tasks to be carried out in close collaboration with other programmes

- (a) Cooperation in critical loads assessment in cooperation with ICP Modelling and Mapping and the United States Department of Agriculture's Forest Service;
- (b) Mapping of revised critical levels of ozone in cooperation with ICP Vegetation and ICP Modelling and Mapping;

(c) Report on nitrogen effects and nitrogen/carbon interactions in cooperation with ICP Integrated Monitoring and ICP Modelling and Mapping;

(d) Collation of materials for a possible review of the 1998 Protocol on Heavy Metals in cooperation with all ICPs;

(e) Intercalibration exercises.

B. Activities and tasks related to the programme's present objectives

(a) Meeting of the expert panel on foliage analysis;

(b) Meeting of the working group on soil solution;

(c) Meeting of the expert panel on forest growth;

(d) International intercalibration course for crown condition assessments based on decentralized photo assessments;

(e) ICP Forests biotic damage training course (Orleans, France);

(f) Workshop on quality assurance (QA) and quality control (QC) in forest soil assessment (Ghent, Belgium);

(g) Workshop on ground vegetation assessments (Norway);

(h) Programme coordinating group meeting (Hamburg, Germany);

(i) Publication of the 2004 executive report;

(j) Publication of the 2004 technical report on the Internet;

(k) Conclusion of the grant agreement with EC;

(l) Further development of the data management and evaluation strategy with EC;

(m) Submission of level I data by national focal centres (NFCs) to the programme's coordinating centre;

(n) Contribution to the development of a potential network of excellence with EFI;

(o) Drafting of the 2005 technical report;

(p) Drafting of the 2005 executive report.

C. Activities and tasks aimed at further developing the programme

(a) Coordination of the ForestBIOTA project;

(b) Further development of QA for crown condition data by means of international cross-calibration and digital photography;

(c) Development of Internet access to selected raw data and aggregated data for authorized users;

(d) Development of an extended public relations strategy.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

Fischer, R., Barbosa, P., Bastrup-Birk, A., Becher, G., Dobbertin, M., Ferretti, M., Goldammer, J.G., Haußmann, T., Lorenz, M., Mayer, P., Mues, V., Petriccione, B., Raspe, S., Roskams, P., Sase, H., Schall, P., Stofer, S., Wulff, S. (2004) Forest Condition in Europe. Executive Report 2004. UNECE, Geneva, 48 pp.

Lorenz, M., Becher, G., Mues, V., Fischer, R., Ulrich, E., Dobbertin, M., Stofer, S. (2004) Forest Condition in Europe. Technical Report 2004. UNECE, Geneva. 169 pp.

Note: The references have been reproduced as received by the secretariat.

Annex II

REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON ASSESSMENT AND MONITORING OF ACIDIFICATION OF RIVERS AND LAKES (ICP WATERS)

I. ACTIVITIES SINCE THE TWENTY-SECOND SESSION OF THE WORKING GROUP ON EFFECTS

1. The nineteenth meeting of the Task Force was held from 7 to 9 October 2003 in Lugano, Switzerland, and was attended by 38 experts from 16 Parties to the Convention. At present 20 countries actively participate in ICP Waters activities.
2. The Task Force considered the following reports: (i) the 15-year report; (ii) the draft report on biological recovery in ICP Waters sites; (iii) the report on the seventeenth chemical intercomparison; and (iv) the 2004 substantive report.
3. The 15-year report provided an overall synthesis and assessment of information on water chemistry and biology accumulated in ICP Waters within the past three years (1999-2001) including in-depth evaluation of recovery from acidification for water chemistry and biology, possibilities and limitations of dynamic modelling of surface waters and an assessment of heavy metals within the ICP Waters database.
4. The draft report on biological recovery gave an in-depth summary of all findings related to trends in aquatic biota (in particular invertebrates) in relation to trends (reduced acidification) in surface waters. The report used different empirical and statistical methods depending on the amount and quality of data. The report showed positive trends in biology in Scandinavia, the United Kingdom and Canada, while sites in Germany still had not reached a chemical water quality where biological recovery was expected to occur.
5. In the 2003 chemical intercomparison two sets of samples were used for the determination of major ions and heavy metals. Sixty-nine laboratories in 27 countries had participated in the intercomparison exercise.
6. Representatives of the ICP Waters Programme Centre actively participated at the meetings of the Task Forces on ICP Integrated Monitoring, ICP Mapping and Modelling and ICP Forests.

II. ACTIVITIES AND TASKS PLANNED FOR 2004/2005

A. Activities and tasks to be carried out in close collaboration with other programmes

- (a) Participation in developing guidelines for applying dynamic modelling in activities of ICPs;
- (b) Cooperation with other ICPs in carrying out chemical and biological inter-laboratory comparisons;
- (c) Evaluation of trends in sulphate and nitrogen in surface waters in cooperation with EMEP;
- (d) Calculating critical loads on a site-specific basis together with ICP Integrated Monitoring.

B. Activities and tasks related to the programme's present objectives

- (a) Collection and processing of 2003 data and continuing management of the ICP Waters database;
- (b) Chemical intercalibration, including heavy metals;
- (c) Biological intercalibration;
- (d) Maintaining the ICP Waters Internet home page;
- (e) Reports to be produced in 2004:
 - (i) Recovery from acidification of invertebrate fauna in ICP Waters sites in Europe and North America;
 - (ii) Draft report on the effects of POPs from long-range transboundary air pollution on aquatic organisms;
 - (iii) Proceedings from the national presentations at the eighteenth meeting of the Task Force in Lugano;
 - (iv) Note on alkalinity, analytical methods and interpretation of results;
- (f) Participation in the meetings of the Task Forces for ICP Integrated Monitoring and ICP Modelling and Mapping, and in relevant workshops and technical meetings.

C. Activities and tasks aimed at further developing the programme

- (a) Consider further problems related to the regional lake and river database including, for example, develop an international network to secure the necessary cover of important areas;
- (b) Assess possibilities for further development of monitoring of heavy metals in surface waters;

- (c) Follow up the recommendations from the workshop on biological assessment and monitoring, evaluation and models;
- (d) Follow up the recommendations from the workshop on critical loads of heavy metals (Pb, Cd and Hg) concerning surface waters, monitoring and biological impacts;
- (e) Assess possibilities for using dynamic modelling in the ICP Waters network;
- (f) Explore the possibilities for developing biological response models for use in assessing recovery from acidification;
- (g) Plan and prepare contributions in support of future review/revision of protocols.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

ICP Waters report 72/2003. Intercalibration 0307: Invertebrate fauna.

ICP Waters report 73/2003. The 15-year report: Assessment and monitoring of surface waters in Europe and North America; acidification and recovery, dynamic modelling and heavy metals.

ICP Waters report 74/2003. Intercomparison 0317. pH, K₂₅, HCO₃, NO₃ + NO₂, Cl, SO₄, Ca, Mg, Na, K, total aluminium, aluminium - reactive and nonlabile, TOC, COD-Mn. Fe, Mn, Cd, Pb, Cu, Ni and Zn.

ICP Waters report 75/2004. Recovery from acidification of invertebrate fauna in ICP Water sites in Europe and North America.

ICP Waters report 76/2004. Proceedings of the 19th meeting of the ICP Waters Programme Task Force in Lugano, Switzerland, 7-9 Feb 2002.

Skjelkvåle et al 2004. Regional scale evidence for improvements in surface water chemistry 1990-2001. Submitted to Environmental Pollution.

Note: The references have been reproduced as received by the secretariat.

Annex III

REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON EFFECTS OF AIR POLLUTION ON MATERIALS, INCLUDING HISTORIC AND CULTURAL MONUMENTS (ICP MATERIALS)

I. ACTIVITIES SINCE THE TWENTY-SECOND SESSION OF THE WORKING GROUP ON EFFECTS

1. The one-year extension of the multi-pollutant exposure programme including measurements of the additional parameters particulate matter and nitric acid was finished in November/December 2003.
2. The corrosion attack of materials exposed in the multi-pollutant exposure programme was evaluated and a database of environmental data, including particulate matter and HNO₃, was compiled.
3. A statistical evaluation of the results from the four years' exposure in the multi-pollutant programme took place.
4. The programme further developed activities towards using dose-response functions obtained for mapping areas with elevated risks for corrosion of materials.
5. Cultural heritage objects at risk were assessed at the new sub-centre for stock at risk and cultural heritage in Italy.
6. The Proceedings from the Convention workshop on release of heavy metals due to corrosion of materials were published.
7. The twentieth meeting of the Task Force was held on 9 June 2004 in London, in connection with the EU MULTI-ASSESS project workshop "Cultural heritage in the city of tomorrow; Developing policies to manage the continuing risks from air pollution."
8. The 2004 technical report of ICP Materials "Recent corrosion trends and measurements of particulates and HNO₃ for the multi-pollutant programme was prepared".
9. The contribution to the 2004 substantive report on the assessment of present air pollution effects and their recorded results was finalized.

II. ACTIVITIES AND TASKS PLANNED FOR 2004/2005

A. Activities and tasks to be carried out in close collaboration with other programmes

Workshop on cost caused by air pollution on materials including cultural heritage, in cooperation with the Centre for Integrated Assessment Modelling (CIAM).

B. Activities and tasks related to the programme's present objectives

- (a) Coordination of the programme including preparation for the twenty-first meeting of the Task Force in 2005;
- (b) Statistical evaluation of results from the multi-pollutant exposure programme;
- (c) Developing dose-response functions based on the results of the multi-pollutant and MULTI-ASSESS programmes;
- (d) Application of the programme results for mapping of areas with increased risk of corrosion.

C. Activities and tasks aimed at further developing the programme

- (a) Develop the activities of the programme sub-centre on cultural heritage and stock at risk;
- (b) Strategies and measures for sharing the chairmanship of ICP Materials between Sweden and Italy;
- (c) Develop a plan for network of sites and a programme for future trend exposures.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

Kucera, V: "Changing pollution situation and its effect on material corrosion". Proceedings of 5th EC Conference Cultural Heritage Research: a Pan-European Challenge. European Communities, 2003, s. 23-29.

Tidblad J. and Kucera V.: "Mapping areas in Nordic countries with elevated risk of atmospheric corrosion. Methodology development and mapping on a 20 km x 20 km grid for Sweden.", KI-Rapport 2003:4E, Swedish Corrosion Institute, Stockholm, 2003.

Tidblad J., Kucera V., Persson D. and Dolezel B.: "Decay of polyamide and polyethylene exposed in the UN/ECE ICP Materials programme", Proc. 1st European Weathering Symposium EWS, Gesellschaft für Umweltsimulation e.V., Pfinztal, Germany, 2003.

J. Tidblad, V. Kucera, J. Henriksen, T. Kaunisto: "Mapping and Trends of Acid Deposition Effects on Materials in Scandinavia", Proc. 13th Scandinavian Corrosion Congress, Icelandic Building Research Institute, Reykjavik, 2003.

Report No 41. Final Environmental data report for the multipollutant programme: November 1997 to October 2001.

Report No 42. Results from the multipollutant programme: Corrosion attack on carbon steel after 1, 2 and 4 years of exposure (1997-2001).

Report No 43. Results from the multipollutant programme: Corrosion attack on zinc after 1, 2 and 4 years of exposure (1997-2001).

Report No 44. Results from the multipollutant programme: Corrosion attack on copper and bronze after 1, 2 and 4 years of exposure (1997-2001).

Report No 45. Results from the multipollutant programme: Corrosion attack on limestone after 1, 2 and 4 years of exposure (1997-2001).

Report No 46. Results from the multipollutant programme: Corrosion attack on painted steel after 1, 2 and 4 years of exposure (1997-2001).

Report No 47. Trends of corrosivity based on corrosion rates and pollution data. Part 3.

Report No 48. Results from the multipollutant programme: Evaluation of the decay to glass samples after 3 and 4 years exposure (1997-2001).

Note: The references have been reproduced as received by the secretariat.

Annex IV

REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON EFFECTS OF AIR POLLUTION ON NATURAL VEGETATION AND CROPS (ICP VEGETATION)

I. **ACTIVITIES SINCE THE TWENTY-SECOND SESSION OF THE WORKING GROUP ON EFFECTS**

1. The seventeenth meeting of the Task Force of ICP Vegetation was held from 10 to 13 February 2003 in Kalamata, Greece. Fifty participants attended the meeting, representing 19 Parties to the Convention. In addition to plenary sessions, two parallel sessions were organized to present and discuss recent progress in the ozone and heavy metals sub-programmes. Small working groups discussed the development of possible new areas for ICP Vegetation and the short- and medium-term objectives of ICP Vegetation were revised. After ten years of chairing ICP Vegetation, Ms. G. Mills handed over the chair to her colleague Mr. H. Harmens.

2. The summer of 2003 was generally hot and dry and relatively high ozone levels were experienced across much of Europe, resulting in frequent occurrences of ozone injury on white clover at every biomonitoring site. A pilot study using Centaurea jacea (brown knapweed) as a new ozone biomonitoring system showed promising results; ozone injury was detected at 8 of the 12 participating sites. At five sites the interaction between ozone and nutrient nitrogen (N) was investigated, but no clear-cut effects of N on the impact of ozone on visible injury were observed.

3. A framework was established for building a canopy ozone flux-effect model for white clover using data collected in the ICP Vegetation biomonitoring programme.

4. The text of chapter 3 of the Mapping Manual was finalized and submitted to ICP Modelling and Mapping for final approval at the meeting of the Task Force in Laxenburg, Austria, on 27-28 May 2004. Concentration-based critical levels for agricultural crops, horticultural crops, (semi-) natural vegetation and forest trees were revised and flux-based critical levels of ozone for wheat, potato and provisionally for sensitive forest trees were introduced (see EB.AIR/WG.1/2004/8).

5. The Coordination Centre of ICP Vegetation has continued to collate data from published and unpublished information on the responses of (semi-) natural vegetation to ozone. The data

were used in the revision of chapter 3 of the Mapping Manual to identify species and plant communities that might be at risk from ozone pollution.

6. The maps of the "Heavy metals in European mosses: 2000/2001 survey" in the EMEP 50 km x 50 km grid were updated with data received from Iceland and the analysis of factors influencing the heavy metal concentrations in mosses in Europe was initiated. Preparations were started for the next survey planned for 2005.

II. ACTIVITIES AND TASKS PLANNED FOR 2004/2005

A. Activities and tasks to be carried out in close collaboration with other programmes

(a) Continue to develop concentration- and flux-effect models for crops, (semi-) natural vegetation and trees, including consideration of methods for developing dose-response relationships from the ICP Forests database (with ICP Forests, ICP Modelling and Mapping and the EMEP Meteorological Synthesizing Centre – West (MSC-W));

(b) Develop ozone critical level exceedance maps based on the new critical levels for ozone (with MSC-W);

(c) Report on heavy metal deposition and the potential contamination of food crops (with Task Force on the Health Aspects of Air Pollution);

(d) Comparison between the concentrations of heavy metals in mosses in the 2000/2001 survey and EMEP heavy metal deposition data (with the EMEP Meteorological Synthesizing Centre – East (MSC-E)).

B. Activities and tasks related to the programme's present objectives

(a) Monitor the extent of ozone damage to vegetation by conducting standardized experiments with ozone-sensitive species of crops and (semi-) natural vegetation;

(b) Further develop ozone flux-effect models for white clover, including photosynthesis-based modelling methods;

(c) Provide advice to other groups within the Convention on the application of the revised critical levels for ozone, including exceedance mapping procedures;

(d) Identify of communities of (semi-) natural vegetation at risk from ozone;

(e) Compare of economic impacts of ozone on crops using concentration-based and flux-based approaches;

(f) Prepare for and conduct the "European heavy metals in mosses survey" in 2005;

(g) Monitor the deposition of heavy metals using (semi-) natural vegetation other than mosses.

C. Activities and tasks aimed at further developing the programme

- (a) Further develop a database on the sensitivity of (semi-) natural vegetation species to ozone, and procedures for mapping areas where sensitive communities are at risk from ozone-induced damage;
- (b) Study interactive impacts of ozone and nitrogen on crops and (semi-) natural vegetation;
- (c) Prepare for an analysis of trends in the European heavy metals in mosses data set;
- (d) Analyse temporal trends in the nitrogen concentration in European mosses;
- (e) Further develop links with pollution networks in Asia.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

Harmens, H., Buse, A., Büker, P., Norris, D., Mills, G., Williams, B., Reynolds, B., Ashenden, T.W., Rühling, Å., Steinnes, E. (2004). Heavy metal concentration in European mosses: 2000/2001 survey. *Journal of Atmospheric Chemistry*. In press.

Harmens, H., Mills, G., Hayes, F., Williams, P.D. 2004. Air Pollution and Vegetation: the ICP Vegetation Annual Report 2003/4. Prepared for the 23rd session on the Working Group on Effects, September 2004.

Mills, G., Harmens, H. 2004. The scientific basis of the new flux-based critical levels of ozone. Technical Report prepared for the 23rd session of the Working Group on Effects, September 2003. (EB.AIR/WG.1/2004/8).

Harmens, H., Hayes, F., Mills, G. 2004. ICP Vegetation Experimental Protocol for 2004. ICP Vegetation Coordination Centre, Centre for Ecology and Hydrology, Bangor, UK.

Contributions were also made to the Mapping Manual, the 2004 substantive report and the joint report of the ICPs (EB.AIR/WG.1/2004/3).

Note: The references have been reproduced as received by the secretariat.

Annex V

REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON INTEGRATED MONITORING OF AIR POLLUTION EFFECTS ON ECOSYSTEMS (ICP INTEGRATED MONITORING)

I. ACTIVITIES SINCE THE TWENTY-SECOND SESSION OF THE WORKING GROUP ON EFFECTS

1. The programme was represented at the meetings of the Task Forces of ICP Modelling and Mapping and ICP Forests and at the meeting of the Joint Expert Group on Dynamic Modelling.
2. The programme was represented at the workshops on heavy metals held from 17 to 18 November 2003 in Langen, Germany, and on critical loads of heavy metals held from 4 to 5 March 2004 in Potsdam, Germany.
3. The twelfth meeting of the Task Force on ICP Integrated Monitoring was organized from 6 to 8 May 2004 in Molln, Austria.
4. Data from both ICP Integrated Monitoring and the ICP Forests level II (intensive monitoring) are used in the EU project CNTER (Carbon and nitrogen interactions in forest ecosystems). The work started in 2001 and the final reporting is due in 2004.
5. Data from ICP Integrated Monitoring network are also used in the EU projects "Integrated project to evaluate impacts of global change on European freshwater ecosystems (EURO-LIMPACS)" and "A long-term biodiversity, ecosystem and awareness research network (ALTER-Net)".
6. The project "Climate induced variation of dissolved organic carbon in Nordic surface waters (NMDTOC)", financed by the Nordic Council of Ministers, ended in 2003. Data from Nordic ICP Integrated Monitoring sites were used to evaluate processes affecting the leaching of carbon.
7. Laboratories participating in the ICP Integrated Monitoring took part in intercomparison test 0317 organized by ICP Waters and an intercalibration organized by EMEP.
8. Scientific work on priority topics has continued:
 - (a) Calculation of pools and fluxes of heavy metals and relations to critical limits and risk assessment (led by the national focal point (NFP) of Sweden);

(b) Dynamic modelling (led by the NFP of United Kingdom in cooperation with the Programme Centre and the NFP of Norway). This work has strong links to projects financed by the Nordic Council of Ministers and the EU. Priority in the ICP Integrated Monitoring work is given to site-specific modelling activities;

(c) Calculation of fluxes and trends of sulphur (S) and N compounds, base cations and acidity (led by the Programme Centre). Priority is given to the calculation of proton budgets, N leaching and interactions with carbon-nitrogen ratio (C/N). This work has strong links to the CENTER project. A scientific paper on proton budgets has been submitted for publication.

II. ACTIVITIES AND TASKS PLANNED FOR 2004/2005

A. Activities and tasks to be carried out in close collaboration with other programmes

(a) Estimation of cumulative N deposition and its effects (cooperation with the Coordination Center for Effects (CCE); 2004);

(b) Participation in dynamic modelling work coordinated by the Joint Expert Group on Dynamic Modelling, progress report (2004-2005);

(c) Participation in meetings of the Working Group on Effects, other ICPs, and the Joint Expert Group on Dynamic Modelling (2004-2005);

(d) Acidification and eutrophication effects on vegetation (with ICP Forests; 2005);

(e) Preparation of a report to the Working Group on Effects on N effects and C/N interaction in forested ecosystems (with ICP Forests and ICP Modelling and Mapping, based on CENTER project results; 2005).

B. Activities and tasks related to the programme's present objectives

(a) Maintenance and development of central database at the Programme Centre;

(b) Arrangement of ICP Integrated Monitoring workshop and thirteenth meeting of the Task Force (2005);

(c) Preparation of the fourteenth ICP Integrated Monitoring annual report (2005);

(d) Finalization of scientific paper on heavy metals (2005);

(e) Participation in the preparation of scientific papers on N effects and C/N interactions in forested ecosystems (CENTER project; 2004);

(f) Preparation of report/paper on observed trends in S and N fluxes on ICP Integrated Monitoring sites (2005).

C. Activities and tasks aimed at further developing the programme

- (a) Participation in the activities of external organizations, particularly Global Terrestrial Observing System (GTOS) and the International Long Term Ecological Research Network (ILTER);
- (b) Participation in the EU projects CINTER, EURO-LIMPACS and ALTER-net;
- (c) Development of new assessment activities regarding the air pollution and climate change relations to carbon, nitrogen and C/N ratios in ecosystems.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

Jenkins, A., Larssen, T., Moldan, F., Hruška, J., Krám, P., Kleemola, S. 2003. Dynamic modelling at Integrated Monitoring sites - Model testing against observations and uncertainty. The Finnish Environment 636. Finnish Environment Institute, Helsinki. ISBN 952-11-1440-1. 37 pp.

Kleemola, S. and Forsius, M. (eds). 12th Annual Report 2003. UNECE ICP Integrated Monitoring. The Finnish Environment 637. Finnish Environment Institute, Helsinki, Finland. ISBN 952-11-1442-8. 78 pp.

Jenkins, A., Camarero, L., Cosby, B.J., Ferrier, R., Forsius, M., Helliwell, R., Kopacek, J., Majer, V., Moldan, F., Posch, M., Rogara, M., Schöpp, W. and Wright, R.F. 2003. A modelling assessment of acidification and recovery of European surface waters. Hydrology and Earth System Sciences 7: 447-455.

Note: The references have been reproduced as received by the secretariat.

Annex VI

REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON MODELLING AND MAPPING OF CRITICAL LEVELS AND LOADS AND AIR POLLUTION EFFECTS, RISKS AND TRENDS (ICP MODELLING AND MAPPING)

I. ACTIVITIES SINCE THE TWENTY-SECOND SESSION OF THE WORKING GROUP ON EFFECTS

1. The Coordination Center for Effects (CCE) organized a training session (Prague, 13-15 October 2003) to familiarize NFCs further with the use of dynamic models.
2. CCE issued a call for data on critical loads and dynamic modelling parameters (including target loads) on 18 November 2003, setting the deadline for 31 March 2004, after consultation with the Joint Expert Group on Dynamic Modelling at their fourth meeting in Sitges, Spain.
3. The twentieth meeting of the Task Force was held from 27 to 28 May 2004 in Laxenburg, Austria, hosted by the International Institute for Applied Systems Analysis (IIASA), back to back with the fourteenth workshop of CCE and a training session on critical loads of heavy metals (24-26 May). The meeting of the Task Force was attended by experts from 22 countries.
4. The Task Force evaluated and adopted the results of the CCE call for data. Sixteen countries delivered revised critical loads data and 11 provided additional dynamic modelling parameters, including target load functions (see EB.AIR/WG.1/2004/10). Some countries indicated that a revision was needed; an additional four NFCs announced that they were planning to provide target load functions in 2004/2005. The Task Force decided to have another call for data on critical and target loads in 2004/2005, to ensure the availability of data on critical loads and of dynamic modelling parameters to support the expected review of the 1999 Gothenburg Protocol.
5. The conclusions and recommendations of the fourth meeting of the Joint Expert Group on Dynamic Modelling (EB.AIR/WG.1/2004/13) were noted by the Task Force. In particular, the Task Force supported its conclusion that models of nitrogen dynamics in ecosystems needed further development. It also recommended further development of models linking effects of air pollutants (especially reactive nitrogen) with biodiversity and climate change.

6. An expert workshop on the emissions, transport, deposition and effects of base cations in relation to acidification took place from 26 to 28 November 2003 in Gothenburg, Sweden (EB.AIR/WG.1/2004/15). European base cation deposition maps will be produced by EMEP in cooperation with ICP Forests and ICP Modelling and Mapping in December 2004.
7. The Task Force appreciated the progress of the expert panel on critical loads of heavy metals of ICP Modelling and Mapping. Revised critical load methods and other results of a workshop (from 4 to 5 March 2004 in Potsdam; EB.AIR/WG.1/2004/10/Add.1) were adopted by the Task Force and used to finalize the respective chapter of the Mapping Manual.
8. The medium-term work-plan foresees advanced maps of steady-state critical loads for lead, cadmium and mercury by spring 2005, to be based on a call for such data to NFCs in autumn 2004. The Working Group on Effects is requested to note the unprecedented strain on NFCs and CCE caused by two simultaneous calls for data (see para. 4).
9. The Task Force agreed its work-plan for the expert panel for the next year, in particular for ensuring the availability of information relevant for a call for data to NFCs before September 2004, and for assessing results in 2005.
10. The Task Force thanked CCE for organizing the ad hoc meeting on the harmonization of European land-cover information that was held in Laxenburg on 10 March 2004. The Task Force endorsed the recommendations on merging land-cover information from the databases of the Stockholm Environment Institute (SEI) and CORINE, and concerning the planned follow-up activities (EB.AIR/WG.1/2004/10/Add.1). CCE, SEI and EMEP were invited to continue the collaboration.
11. The revision of the Mapping Manual was finalized, except for some changes mandated by the Task Force to editorial groups.
12. The Task Force reiterated its view that critical loads should not be used in a monetizing cost-benefit analysis framework. It did support the use of critical loads data in multi-criteria analysis.

II. ACTIVITIES AND TASKS PLANNED FOR 2004/2005

A. Activities and tasks to be carried out in close collaboration with other programmes

- (a) Harmonization of base cation deposition and land-cover maps, development of historic depositions of sulphur, nitrogen and base cations (with EMEP and other organizations);
- (b) Development of critical loads of heavy metals, dynamic modelling (acidification and eutrophication) and critical levels and fluxes of ozone (with all ICPs);
- (c) Using the results of ICP Modelling and Mapping in integrated assessment modelling (with the Task Force on Integrated Assessment Modelling and the Centre for Integrated Assessment Modelling).

B. Activities and tasks related to the programme's present objectives

- (a) Updating and evaluation of critical loads (acidification and eutrophication) and target load functions (acidification);
- (b) Updating and evaluation of critical loads of lead, cadmium, and mercury;
- (c) Further development, harmonization and dissemination of methods to NFCs to assess trends in air pollution and its effects.

C. Activities and tasks aimed at further developing the programme

- (a) Further development of the activities aiming at, but not limited to, critical limits, nitrogen modelling, assessment of linkages of air pollution effects to biodiversity and climate change;
- (b) Further development of risk assessment methodologies and robustness assessment;
- (c) Maintenance of the Programme's coherence considering varying national priorities among different work-plan elements due to national budget restrictions and varying participation of NFCs.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

De Vries W, Posch M (2003) Critical levels and critical loads as a tool for air quality management. In: CN Hewitt, AV Jackson (eds) Handbook of Atmospheric Science – Principles and Applications. Blackwell Science, Oxford, United Kingdom, pp. 562-602.

Jenkins A, Camarero L, Cosby BJ, Ferrier RC, Forsius M, Helliwell RC, Kopacek J, Majer V, Moldan F, Posch M, Rogora M, Schöpp W, Wright RF (2003) A modelling assessment of acidification and recovery of European surface waters. *Hydrology and Earth System Sciences* 7(4): 447-455.

Jenkins A, Cosby BJ, Ferrier RC, Larssen T, Posch M (2003) Assessing emission reduction targets with dynamic models: deriving target load functions for use in integrated assessment. *Hydrology and Earth System Sciences* 7(4): 609-617.

Posch M, Hettelingh J-P, Slootweg J, Downing RJ (eds) (2003) Modelling and mapping of critical thresholds in Europe. Status Report 2003, Coordination Center for Effects, RIVM Report 259101013, Bilthoven, Netherlands, iv+132 pp. (www.rivm.nl/cce)

Posch M, Forsius M, Johansson M, Vuorenmaa J, Kämäri J (2003) Modelling the recovery of acid-sensitive Finnish headwater lakes under present emission reduction agreements. *Hydrology and Earth System Sciences* 7(4): 484-493.

Schöpp W, Posch M, Mylona S, Johansson M (2003) Long-term development of acid deposition (1880-2030) in sensitive freshwater regions in Europe. *Hydrology and Earth System Sciences* 7(4): 436-446.

Note: The references were reproduced as received by the secretariat.

Annex VII

REVIEW OF RECENT RESULTS AND SHORT-TERM GOALS OF THE TASK FORCE ON THE HEALTH ASPECTS OF AIR POLLUTION

I. ACTIVITIES SINCE THE TWENTY-SECOND SESSION OF THE WORKING GROUP ON EFFECTS

1. The seventh meeting of the Task Force on the Health Aspects of Air Pollution was held from 6 to 7 May 2004 in Bonn, Germany (EB.AIR/WG.1/2004/11). It focused on the modelling and assessment of the health impacts of particulate matter and ozone. Considering the recent findings of the World Health Organizations (WHO) project "Systematic review of health aspects of air pollution in Europe" as well as the recent progress made by EMEP in modelling ambient concentrations of ozone and particulate matter (PM), the Task Force on Health recommended the approach for estimating the health impact of ozone and PM from long-range transboundary air pollution.

2. The project "Systematic review of health aspects of air pollution in Europe" implemented by the WHO/ECEH Bonn Office to support the Clean Air for Europe (CAFE) programme of the EC produced answers to follow-up questions, which WHO had received from the CAFE secretariat. The meta-analysis of studies on the short-term effects of PM and ozone was also published. A review of evidence on the effects of air pollution on children's health will be completed later in 2004. These results will provide a solid basis for the comprehensive reports on the health effects of exposure to PM and ozone from long-range transboundary air pollution. They will summarize the most important results from the ongoing hazard and exposure assessment, as well as estimates of impact due to the pollution and its predicted changes. The reports will be completed in 2004-2005.

3. The Centre for Work on the Health Effects of Air Pollution contributed relevant parts of the 2004 substantive report.

4. Collaboration with other programmes was mainly related to the further development of the modelling of PM and ozone, to better assess the health effects of pollution. Furthermore, the Task Force on Health discussed the collaboration with the Expert Group on POPs related to the expected support of the Task Force on Health to the assessment of new pollutants considered for addition to the Protocol on POPs.

II. ACTIVITIES AND TASKS PLANNED FOR 2004/2005

A. Activities and tasks to be carried out in close collaboration with other programmes

(a) Assess the impacts on health of PM and ozone based on exposure estimates produced by the RAINS (regional air pollution information and simulation) model; preparation of assessment reports;

(b) Assess the health hazards of (new) POPs considered by the Working Group on Strategies and Review.

B. Activities and tasks related to the programme's present objectives

Apply the results from the hazard assessment of PM and ozone to the health impact assessment of these pollutants; preparation of comprehensive summary reports.

C. Activities and tasks aimed at further developing the programme

(a) Develop a methodology to include morbidity estimates in the quantification of health impacts of PM and ozone;

(b) Review new scientific findings to better assess the health risks of heavy metals from long-range transboundary air pollution.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

WHO Working Group (2004) Health aspects of air pollution – answers to follow-up questions from CAFE. World Health Organization, Regional Office for Europe, Copenhagen (71 p.) E82790 (<http://www.euro.who.int/document/e82790.pdf>)

Anderson HR, Atkinson RW et al. (2004). Meta-analysis of time-series studies and panel studies of particulate matter (PM) and ozone (O₃). World Health Organization, Regional Office for Europe, Copenhagen (73 p.) E82792 (<http://www.euro.who.int/document/e82792.pdf>)

Note: The references have been reproduced as received by the secretariat.