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Items 4 of the provisional agenda

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

2002 joint report of the International Cooperative Programmes
and the Task Force on the Health Aspects of Air Pollution

Introduction

1. Pursuant to the decision taken by the Executive Body at its nineteenth session (ECE/EB.AIR/75, para. 89, and annex VI, section 3.1.1), the secretariat in collaboration with the Extended Bureau of the Working Group on Effects 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.
2. Information on the achievements of ICPs and the Task Force since the twentieth session of the Working Group on Effects, their plans for the coming year and the most important recent publication(s) of their results are summarized in annexes I to VII below.

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 THE ACTIVITIES AND ACCOMPLISHMENTS OF THE INTERNATIONAL
COOPERATIVE PROGRAMME ON ASSESSMENT AND MONITORING OF AIR
POLLUTION EFFECTS ON FORESTS (ICP FORESTS)

I. ACTIVITIES SINCE THE TWENTIETH SESSION OF THE WORKING GROUP ON
EFFECTS

1. The eighteenth meeting of the Task Force of ICP Forests took place from 25 to 29 May 2002 in Lisbon and was attended by 80 experts from Europe, North America, North Africa and East Asia. The Meeting addressed the following main topics:

- (a) The implementation and the evaluation of intensive monitoring (level II); (b) Integrative evaluations of large-scale data (level I);
- (c) Ground vegetation and forest biodiversity in relation to air pollution and other environmental stress factors;
- (d) Critical loads for nitrogen, acidity and heavy metals;
- (e) Cooperation with other ICPs in cause-effect research, data evaluation and presentation of results.

2. Evaluations of level II data focused on present deposition, critical loads and critical load excess for nitrogen, acidity and heavy metals, as well as on ground vegetation diversity and its relation to environmental stress factors. Evaluations of level I data focused on statistical models, as well as on the geostatistical interpolation of the spatial and temporal variation in defoliation of Pinus sylvestris and Fagus sylvatica. In addition, the influences of nitrogen and sulphur depositions and other factors on tree crown condition were evaluated.

3. 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 the Czech Republic, Finland and Portugal were evaluated. The concept was further developed in preparation of the forthcoming international cross-calibration courses in France, Norway and Spain. In data quality assurance, ring tests for foliage analyses, soil solution analyses and deposition measurements were launched. The plan for preparing the level I soil survey was agreed.

4. The Task Force at its eighteenth meeting decided to start a test phase of biodiversity assessments in forests. Several countries will undertake, on a voluntary basis, additional assessments on a limited number of level II plots to derive relationships between stand structure and floristic biodiversity, and their relationships to environmental stress factors.

5. A joint report on cause-effect relationships was prepared in cooperation with ICP Integrated Monitoring on the basis of the latest monitoring results from level II and integrated monitoring plots. A brochure on "Damage to Vegetation by Ozone Pollution" was published in

collaboration with ICP Vegetation. ICP Forests and the Acid Deposition Monitoring Network in East Asian (EANET) agreed to organize a joint workshop in Viet Nam in December 2002.

II. ACTIVITIES AND TASKS PLANNED FOR 2002/2003

A. Activities/tasks related to the programme's present objectives

- (a) International cross-calibration course on crown condition of Norway spruce (Norway);
- (b) International cross-calibration course on crown condition of Holm oak (Spain);
- (c) International cross-calibration course on crown condition of European/sessile oak (to be confirmed);
- (d) Meeting of the expert panel on deposition, back to back with a workshop (France);
- (e) Meeting of the expert panel on crown condition (Denmark);
- (f) Meeting of the expert panel on forest growth (Switzerland);
- (g) Meeting of the working group on ambient air quality (France);
- (h) Publication of the 2002 Executive Report;
- (i) Publication of the 2002 Technical Report, Level I;
- (j) Publication of the 2002 Technical Report, Level II;
- (k) Finalization of the level I databank under ORACLE;
- (l) Further development of the evaluation strategy for level II and level I by the programme coordinating centre (PCC), the Forest Intensive Monitoring Coordinating Institute (FIMCI) and the European Commission in collaboration with the Scientific Advisory Group (SAG) and National Focal Centres (NFCs);
- (m) Submission of data by NFCs to PCC and FIMCI;
- (n) Joint workshop of EANET and ICP Forests (Viet Nam);
- (o) Drafting of the 2003 Technical Report, Level I;
- (p) Drafting of the 2003 Technical Report, Level II;
- (q) Drafting of the 2003 Executive Report.

B. Activities/tasks aimed at further developing the programme

- (a) Up-scaling of results from level II to level I;
- (b) Participation in the Advisory Group of the Ministerial Conference on the Protection of Forests on the improvement of indicators for sustainable forest management;
- (c) Quality assurance of crown condition data by means of international cross-calibration courses and application of digital photography.

C. Activities/tasks to be carried out in close cooperation with other ICPs

- (a) Publication of the joint Cause-effect Report of ICP Integrated Monitoring and ICP Forests;
- (b) Dynamic modelling based on level II data in cooperation with ICP Modelling and Mapping;

- (c) Development of methods and intercalibration of assessments of ozone damage to trees with ICP Vegetation;
- (d) Drafting of contribution to the 2004 substantive report on the review and assessment of present air pollution effects and their recorded trends;
- (e) Intercalibration exercises.

III. RELEVANT DOCUMENTS AND REPORTS

- (a) Forest Condition in Europe (Executive Report);
- (b) Forest Condition in Europe (Technical Report, Level I);
- (c) Intensive Monitoring of Forest Ecosystems in Europe (Technical Report, Level II);
- (d) Joint Report on Cause-effect Relationships of ICP Forests and ICP Integrated Monitoring.

Annex IIREVIEW OF THE ACTIVITIES AND ACCOMPLISHMENTS OF THE INTERNATIONAL
COOPERATIVE PROGRAMME ON ASSESSMENT AND MONITORING OF
ACIDIFICATION OF RIVERS AND LAKES (ICP WATERS)I. ACTIVITIES SINCE THE TWENTIETH SESSION OF THE WORKING GROUP ON
EFFECTS

1. The seventeenth meeting of the Programme Task Force, held in Lillehammer (Norway) from 18 to 20 March 2002, was attended by 30 experts from 16 Parties to the Convention. At present 20 countries actively participate in ICP Waters.
2. The Task Force considered three reports; (i) the draft report on in-depth assessment of trends in biological recovery in surface waters by the use of multivariate statistics; (ii) the report on the sixth intercalibration of invertebrates 2001; and (iii) the report on the results of 2001 chemical intercomparison. The programme's ongoing activities, including the results of the preceding workshop on heavy metals (Pb, Cd and Hg) in surface waters, and its future work-plan were also discussed.
3. The draft report on in-depth assessment of trends in biological recovery in surface waters by the use of multivariate statistics assessed the correlation between various variables (pH, Ca, acid neutralizing capacity, total organic carbon and time) and biology (benthic invertebrates). It pointed out that there were some clear indications of chemical and biological recovery. The report suggested that while the method indicated signs of recovery of total benthic communities, as well as changes in acidity, it did not provide complete information on what was happening in the watersheds. It should therefore be seen as a useful complementary method to existing acidification indices for invertebrates.
4. In the 2001 chemical intercalibration (Intercomparison 0115) three sets of samples were used for the determination of: (i) major ions; (ii) organic matter and aluminium fractions; and (iii) heavy metals. Seventy-two laboratories in 26 countries had participated in the intercomparison exercise.
5. Six laboratories participated in the 2001 biological intercalibration. In all 13 countries have participated in these exercises over the past three years.
6. The workshop on heavy metals (Pb, Cd and Hg) in surface waters; monitoring and biological impacts, held on 19-20 March 2002, was attended by 54 experts from 18 countries.
7. Representatives of the ICP Waters Programme Centre actively participated at the meetings of the Task Forces on ICP Integrated Monitoring, ICP Mapping and Modelling, ICP Forests and the Expert Group on Dynamic Modelling (Ystad (Sweden), November 2001).

II. ACTIVITIES AND TASKS PLANNED FOR 2002/2003

A. Activities/task related to the programme's present objectives

- (a) Collection and processing of 2001 data, and continuing management of the ICP Waters database;
- (b) Preparing a workshop on biological response models (September 2002, Grimstad, Norway);
- (c) Preparation of the following reports/documents (in 2002):
 - (i) Proceedings of the heavy metals workshop;
 - (ii) Proceedings of the biological response model workshop;
 - (iii) The 15-year report (draft);
 - (iv) Tracing recovery in watersheds - a multivariate approach;
 - (v) Dynamic modelling of the impact of emission reductions on surface water chemistry – possibilities and limitations;
 - (vi) Results of biological intercalibration;
 - (vii) Results of chemical intercomparison;
- (d) Drafting brochure on nitrogen in surface waters;
- (e) Chemical intercalibration, including heavy metals;
- (f) Biological intercalibration;
- (g) Maintaining the ICP Waters Internet home page;
- (h) Participation in the forthcoming meetings of the Task Forces on ICP Integrated Monitoring and ICP Modelling and Mapping, and in other relevant workshops and technical meetings.

B. Activities/tasks aimed at further developing the programme

- (a) Further development of the regional lake and river database, including improving the geographical coverage of the international network;
- (b) Elaboration of monitoring of heavy metals in surface waters;
- (c) Elaboration and implementation of conclusions and recommendations of the workshops on biological assessment and monitoring, evaluation and models, and on heavy metals (Pb, Cd and Hg) in surface waters; monitoring and biological impacts;
- (d) Advancement in using dynamic modelling in the ICP Waters network;
- (e) Exploring possibilities for developing biological response models for use in assessing recovery from acidification.

C. Activities/tasks to be carried out in close cooperation with other ICPs

- (a) Participation in developing guidelines for applying dynamic modelling in activities of ICPs;
- (b) Cooperation with other ICPs in carrying out chemical and biological interlaboratory comparisons;
- (c) Evaluation of trends in surface waters' sulphate and nitrogen in cooperation with EMEP;

(d) Drafting of contribution to the 2004 substantive report on the review and assessment of present air pollution effects and their recorded trends.

III. LIST OF PUBLISHED DOCUMENTS AND REPORTS

Skjelkvåle, B.L., Olendrzynski, K., Stoddard, J., Traaen, T.S, Tarrason, L., Tørseth, K., Windjusveen, S. and Wright, R.F. 2001. Assessment of trends and leaching in Nitrogen at ICP Waters Sites (Europe And North America). NIVA-report SNO 4383-2001, ICP Waters report 54/2001. ISBN 82-577-4022-5.

Wright, R.F. 2001. Note on: Effect of year-to-year variations in climate on trends in acidification. NIVA-report SNO 4328-2001, ICP Waters report 57/2001. ISBN 82-577-3962-6.

Kvaeven, B. Ulstein, M.J., Skjelkvåle, B.L., Raddum, G.G. and Hovind. H. 2001. ICP Waters – An international programme for surface water monitoring. *Water Air Soil Poll.*130:775-780.

Skjelkvåle, B.L. Stoddard J.L. and Andersen, T. 2001. Trends in surface waters acidification in Europe and North America (1989-1998). *Water Air Soil Poll.*130:781-786.

Stoddard, J. Traaen, T and Skjelkvåle, B.L. 2001. Assessment of Nitrogen leaching at ICP-Waters sites (Europe and North America). *Water Air Soil Poll.* 130:825-830.

Raddum, G.G. and Skjekvåle B.L. 2000. Critical Load of Acidifying Compounds to Invertebrates In Different Ecoregions of Europe. *Water Air Soil Poll.* 130:825-830.

Raddum.G.G. Intercalibration 0005: Invertebrate fauna. NIVA-report SNO-4384-2001 ICP Waters report 62/2001. ISBN-82-577-4023-3.

Lyulko, I. Berg, P. and Skjelkvåle, B.L. (eds.) 2001. National presentations from the 16th meeting of the ICP Waters Programme task Force in Riga, Latvia, October 18-20, 2000. NIVA-report SNO 4411-2001. ICP Waters report 63/001. ISBN-82-577-4053-5.

Hovind, H. 2001. Intercomparison 0115 of the ICP on Assessment and Monitoring of Rivers and Lakes. ICP Waters report 64/2001. ISBN 82-577-4059-4.

Bull, K.R. Achermann, B., Bashkin, V., Chrast, R. Fenech, G., Forsius, M., Gregor H.-D., Guardans, R., Haussmann, T., Hayes, F., Hettelingh, J.-P., Johannessen, T., Kryzanowski, M., Kucera, V., Kvaeven, B., Lorenz, M., Lundin, L., Mills, G., Posh, M., Skjelkvåle, B.L. and Ulstein, M.J. 2001. Coordinated Effects Monitoring and Modelling for Developing and Supporting International Air Pollution Control Agreements. *Water Air Soil Poll.* 130:119-130.

Raddum, G.G. Intercalibration 0206: Invertebrate fauna. NIVA-report SNO-4494, ICP Waters report 66/2001. ISBN 82-577-4144-2.

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

Annex III

REVIEW OF THE ACTIVITIES AND ACCOMPLISHMENTS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON EFFECTS OF AIR POLLUTION ON MATERIALS, INCLUDING HISTORIC AND CULTURAL MONUMENTS (ICP MATERIALS)

I. ACTIVITIES SINCE THE TWENTIETH SESSION OF THE WORKING GROUP ON EFFECTS

1. Material specimens were withdrawn in autumn 2001 and corrosion and its trends assessed after four years of exposure in the multi-pollutant programme.
2. The programme further developed activities towards using dose-response functions derived from its results for:
 - (a) Mapping areas with a high risk of deterioration of materials; and
 - (b) Calculating the cost of corrosion damage.
3. Preparations were started for the creation of a new sub-centre in Italy for assessing stock at risk and dealing with the cultural heritage part of the programme.
4. New measurements of HNO₃ and particulates strengthened the exposure programme of a MULTI-ASSESS project for the European Union's fifth framework programme (Key Action: City of tomorrow and cultural heritage).
5. A proposal was prepared (MULTI-ASSESS-NAS) and favourably evaluated for incorporating the newly associated States Poland and Latvia into the ongoing project.
6. The eighteenth meeting of the Programme Task Force was held from 13 to 14 May 2002 in Kjeller, Norway. The Meeting considered, in particular, the following:
 - (a) The results from the multi-pollutant exposure programme and their assessment;
 - (b) A one-year extension of the multi-pollutant exposure programme to include new materials and environmental parameters based on a European Union's fifth framework programme research proposal;
 - (c) Use of the programme's results for mapping and the calculation of costs; and
 - (d) The programme's contribution to the 2004 substantive report on the assessment of present air pollution effects and their recorded trends.

II. ACTIVITIES AND TASKS PLANNED FOR 2002/2003

A. Activities/tasks related to the programme's present objectives

- (a) Coordination of the programme including preparations for the nineteenth meeting of the Programme Task Force in 2002;

(b) Development of a database of environmental data for the multi-pollutant exposure programme, including preparation of an environmental data report for the period November 2000 to October 2001;

(c) Statistical evaluation of results from the multi-pollutant programme after four years of exposure and analysis of trend results.

B. Activities/tasks aimed at further developing the programme

(a) Start in October/November 2002 of a broad-field exposure which will include measurements of HNO₃ and particulates in order to assess their effect on the multi-pollutant situation (EU MULTI-ASSESS project);

(b) Further application of the programme's results for mapping areas with increased risk of corrosion, as a basis for calculating the cost of damage;

(c) Initiation of a new programme sub-centre for cultural heritage and stock at risk in Italy;

(d) Preparations for a workshop on emissions of heavy metals due to corrosion, organized by Umweltbundesamt (UBA), in cooperation with the Programme Main Research Centre (May 2003 in Munich, Germany).

C. Activities/tasks to be carried out in close collaboration with other ICPs

(a) Drafting of contribution to the 2004 substantive report on the review and assessment of present air pollution effects and their recorded trends.

III. LIST OF DOCUMENTS AND REPORTS

J. Tidblad, V. Kucera, A. A. Mikhailov, J. Henriksen, K. Kreislova, T. Yates, B. Stöckle and M. Schreiner, "UN ECE ICP MATERIALS: Final Dose-response Functions on Dry and Wet Acid Deposition Effects", *Water air and Soil Pollution* 130: 1457-1462, 2001.

J. Tidblad, V. Kucera, A. A. Mikhailov, J. Henriksen, K. Kreislova, T. Yates and B. Singer, "Field Exposure Results on Trends in Atmospheric Corrosion and Pollution", in *Atmospheric Corrosion*, ASTM STP 1421, H. E. Townsend, Ed., American Society for Testing and Materials, Philadelphia (2002), accepted for publication.

Report No 35. Results from the multipollutant programme: Corrosion attack on carbon steel after 1 and 2 years of exposure (1997-1999).

Report No 36. Results from the multipollutant programme: Corrosion attack on zinc after 1 and 2 years of exposure (1997-1999).

Report No 37. Results from the multipollutant programme: Corrosion attack on copper and bronze after 1 and 2 years of exposure (1997-1999).

Report No 38. Results from the multipollutant programme: Corrosion attack on limestone after 1 and 2 years of exposure (1997-1999).

Report No 39. Results from the multipollutant programme: Corrosion attack on painted steel after 1 and 2 years of exposure (1997-1999).

V. Kucera, "Dose-response functions as a basis for assessment of acceptable levels", in 4th European Commission Conference, 22-24 November 2000.

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

Annex IV

REVIEW OF THE ACTIVITIES AND ACCOMPLISHMENTS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON EFFECTS OF AIR POLLUTION ON NATURAL VEGETATION AND CROPS (ICP VEGETATION)

I. ACTIVITIES SINCE THE TWENTIETH SESSION OF THE WORKING GROUP ON EFFECTS

1. The fifteenth Task Force Meeting of ICP Vegetation was held in Trier, Germany, from 11 to 14 January 2002. Sixty-three participants attended the meeting. They represented 16 Parties to the Convention, the Bureau of the Working Group on Effects, other ICPs, EMEP and the International Institute for Applied Systems Analysis (IIASA). Presentations, poster sessions and discussions in working groups addressed the following topics: ozone impacts on crops and natural vegetation, economic assessment of crop losses, and heavy metal deposition to vegetation. Also discussed were plans for the forthcoming workshops on mapping and modelling ozone deposition and establishing level II critical levels for ozone. The short- and medium-term objectives of ICP Vegetation were reviewed and revised.
2. The effects of ambient ozone were monitored across ICP Vegetation sites by recording incidences of ozone injury on white clover and selected species of semi-natural vegetation and by determining the impacts on biomass. As in previous years, these data showed that the ambient climate of Europe was sufficient to cause reductions in biomass at several sites. By regularly recording injury, it was possible to show how ozone episodes covered large areas of Europe at several times during the summer, and that the episodes were sufficient to cause the development of ozone injury.
3. Participants from nine sites across Europe, representing seven countries, measured the stomatal conductance of selected leaves on white clover in a wide range of climatic and pollution conditions. These data have been collated at the Coordination Centre and checked for quality. Three approaches are being used to model the data with the aim of developing a simplistic model of ozone flux for white clover. The data are being analysed by multivariate statistical methods at the ICP Vegetation Coordination Centre, by multiplicative flux modelling at the Stockholm Environment Institute at York (United Kingdom), and by using artificial neural networks at the University of Trier (Germany). Each of these methods is providing models with a reasonable to good fit to the data and the results will be assessed at the forthcoming workshops.
4. In June 2002, ICP Vegetation co-organized with EMEP an expert panel meeting on the methodology for modelling ozone flux and deposition (Harrogate, United Kingdom). This meeting brought together invited experts on stomatal conductance modelling together with representatives of ICP Vegetation, ICP Forests, ICP Modelling and Mapping, the Coordination Center for Effects and EMEP. Progress with modelling ozone flux and deposition to crops and semi-natural vegetation and forest trees was reviewed and suggestions were made for further research to be conducted prior to the workshop on establishing ozone critical levels II, to be held in November 2002 in Gothenburg, Sweden.

5. An assessment of the economic impacts of ozone on crop yields in Europe was completed. Ozone-response functions were derived for 23 agricultural and horticultural crops, and new land-use maps were developed for Europe. These data, together with information on pollution control scenarios and crop values, were used to assess the impact of the Gothenburg Protocol on economic losses predicted to result from ozone pollution. The results indicated that the 1990 scenario found losses worth €6.8 billion (US\$ 6.3 billion) were likely to be reduced to €4.8 billion (US\$ 4.5 billion) with the implementation of the Gothenburg Protocol. Of these losses, 32% were attributed to wheat, 21% to potato and 9% to sugar beet. Further information can be found in EB.AIR/WG.1/2002/10.

6. 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 will be used in the forthcoming ozone critical levels workshop to identify species and plant communities that might be at risk from ozone pollution.

7. Data from the Heavy Metals in Mosses Programme have continued to be collated at the Coordination Centre. Older data from previous surveys have been organized in a standard format at the Coordination Centre in readiness for trends analysis in the future.

II. ACTIVITIES AND TASKS PLANNED FOR 2002/2003

A. Continuation of present (already planned) activities

(a) Monitoring of the responses of white clover and selected natural vegetation species to atmospheric pollution will continue at sites across Europe and North America. These data will be used: (i) to validate the expected new level II critical levels for ozone; and (ii) to identify areas where exceedance of the critical levels corresponds with effects on biomass;

(b) Flux-effect and modified accumulated exposure index AOT30/40-effect modelling will be conducted for clover, wheat and potato. Wherever possible, level I and/or level II functions or models will be developed for other crops and for species of semi-natural vegetation and will be considered at the forthcoming workshop in Gothenburg in November 2002;

(c) A new monitoring programme will be conducted in 2003 to assess the impacts of ozone on *Centaurea jacea*. The database on semi-natural vegetation responses to ozone will be used to identify ozone-sensitive species, and the plant communities which they represent. Information on the factors which influence the distribution of these species will be used by the mapping community to attempt to map the location of species of semi-natural vegetation that are sensitive to ozone;

(d) The data from the 2000/2001 survey for the heavy metal content of mosses in Europe will be analysed at the ICP Vegetation Coordination Centre and reviewed in a report to be published in April 2003. Data from previous surveys will continue to be analysed.

B. Activities/tasks aimed at further developing the programme

(a) Nationally funded ozone exposure experiments will be conducted at selected sites to provide further information for validating the level II critical levels for ozone;

(b) The possibility of further developing the pilot study on the impacts of nitrogen deposition on the responses of semi-natural vegetation species to ozone will be studied further using ozone exposure facilities available at some of the ICP Vegetation sites;

(c) Representatives of ICP Vegetation will participate at the workshop on empirical critical loads for nitrogen deposition on (semi-) natural ecosystems (Bern, November 2002). Future contributions of ICP Vegetation to the work on nitrogen deposition will be considered at the next Task Force meeting;

(d) Methods for analysing the spatial and temporal trends in the heavy metal content of mosses will be considered for use in the future.

C. Activities carried out in cooperation with other programmes/bodies inside as well as outside the Convention

(a) Ozone flux-effect relationships will be developed for tree species in collaboration with ICP Forests. Methods for mapping the exceedance of the level II critical levels for ozone will be developed in collaboration with CCE and ICP Modelling and Mapping;

(b) Data on the concentrations of ozone across Europe, ozone injury assessment methods and ozone-sensitive species will be shared with ICP Forests and EMEP;

(c) ICP Vegetation will work with ICP Modelling and Mapping and ICP Forests on methods for mapping the deposition of heavy metals to vegetation;

(d) The advice of the Convention on Biological Diversity's secretariat will be sought on improving methods for mapping (semi-) natural vegetation types across Europe;

(e) There will be a further exchange of information on nitrogen impacts on natural ecosystems with ICP Integrated Monitoring, and on heavy metal deposition to, and accumulation by, crops with the Task Force on the Health Aspects of Air Pollution;

(f) A contribution to the 2004 substantive report on the review and assessment of present air pollution effects and their recorded trends will be drafted in consultation with other ICPs.

III. PUBLISHED DOCUMENTS AND REPORTS

Reports

Buse, A., Hayes, F., Mills, G. 2002. Air Pollution and Vegetation: the UNECE ICP Vegetation Annual Report 2001/2. Prepared for the 21st Session on the Working Group on Effects, August, 2002.

Mills, G., Holland, M., Hayes, F., Buse, A., Ashenden, T., Emberson, L., Cambridge, H., Cinderby, S., Terry, A., Ashmore, M. An Evaluation of the Economic Impact of Ozone Pollution on Agricultural Crop Production in Europe. Technical Report prepared for the 21st Session of the Working Group on Effects, August 2002. (EB.AIR/WG.1/2002/10).

Mills, G. and Hayes, F.H. 2002. ICP Vegetation Experimental Protocol for 2002. ICP Vegetation Coordination Centre, Centre for Ecology and Hydrology, Bangor, United Kingdom.

Mills, G., Hayes, F., Buse, A., Ashenden, T., Emberson, L., Cambridge, H., Cinderby, S., Terry, A., Ashmore, M. & Holland, M. 2002. The UNECE International Cooperative Programme on Vegetation. Progress Report to DEFRA (April 2001-March 2002).

Holland, M., Mills, G., Hayes, F., Buse, A., Emberson, L., Cambridge, H., Cinderby, S., Terry, A. and Ashmore, M. 2002. Economic Assessment of Crop Yield Losses from Ozone Exposure. Part of the Progress Report to DEFRA, April 2002.

Mills, G., Sanz, M.J., and Fischer, R. 2002. Damage to Vegetation by Ozone Pollution. A colour brochure prepared jointly by ICP Vegetation and ICP Forests.

Papers

Bull, K.R., Achermann, B., Bashkin, V., Chrast, R., Fenech, G., Forsius, M., Gregor, H-D., Guardans, R., Hausmann, T., Hayes, F., Hettelingh, J-P., Johannessen, T., Krzyzanowski, M., Kucera, V., Kvaeven, B., Lorenz, M. 2001. Coordinating effects monitoring and modelling for developing and supporting international air pollution control agreements. *Water, Air and Soil Pollution*, 130: 119-13.

Fumagalli, I., Gimeno, B.S., Velissariou, D., De Temmerman, L. and Mills, G. 2001. Evidence of ozone-induced adverse effects on crops in the Mediterranean region. *Atmospheric Environment*, 35: 2583-2587.

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

Annex V

REVIEW OF THE ACTIVITIES AND ACCOMPLISHMENTS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON INTEGRATED MONITORING OF AIR POLLUTION EFFECTS ON ECOSYSTEMS (ICP INTEGRATED MONITORING)

I. ACTIVITIES SINCE THE TWENTIETH SESSION OF THE WORKING GROUP ON EFFECTS

1. The tenth meeting of the Programme Task Force on ICP Integrated Monitoring was held in Prague on 26 April 2002. A one-day dynamic modelling seminar was held on 24 April, and a one-day workshop on data assessment and evaluation was held on 25 April 2002.
2. A representative of ICP Integrated Monitoring actively participated in the seventeenth meetings of the Task Force on ICP Forests (May 2001, Ennis, Ireland) and the Task Force on ICP Waters (March 2002, Lillehammer). The Programme Centre also participated in the second meeting of the Joint Expert Group on Dynamic Modelling (November 2001, Ystad).
3. ICP Integrated Monitoring was also represented at:
 - (a) The special meeting of the Biosphere Reserve Integrated Monitoring (BRIM) (4-6 September 2001, Rome);
 - (b) The annual meeting of EU/ ICP Forests intensive monitoring programme (19-21 September 2001, Heerenveen, Netherlands);
 - (c) The first annual meeting of the Scandinavian/North European Network of Terrestrial Field Bases (SCANNET) (14-18 November 2001, Torshavn, Faroe Islands).
4. The Programme Centre and the Chairman of the Task Force on ICP Integrated Monitoring participated in finalizing the joint ICP Forests and ICP Integrated Monitoring report on cause-effect relationships of forested ecosystems. The report will be published in 2002.
5. The Programme Centres of both ICP Integrated Monitoring and EU/ICP Forests intensive monitoring are represented in the European Union project on carbon and nitrogen interactions in forest ecosystems (CNTER). Data from both programmes are used in the evaluations. The work started in May 2001. The project is of strategic importance because it allows the use of ICP Integrated Monitoring data in relation to global change. Assessment work is in progress, and the first results will be presented at the Task Force meeting in 2003.
6. A project on Climate-induced variation of dissolved organic carbon in Nordic surface waters (NMDTOC) (financed by the Nordic Council of Ministers) started in 2001. Data from ICP Integrated Monitoring sites are used to evaluate processes affecting the leaching of carbon.
7. Data from Swedish, Norwegian and Finnish ICP Integrated Monitoring sites have been used to assess the recovery from acidification in the EU-project RECOVER: 2010. A scientific publication has been prepared (Moldan et al. 2001).

8. In December 2001 and early in 2002 the National Focal Points (NFPs) reported their 2000 results to the Programme Centre. The Programme Centre carried out standard checks of the results and incorporated them into the new integrated monitoring database.

9. Laboratories participating in ICP Integrated Monitoring took part in the intercomparison tests 2001 organized by ICP Waters and EMEP.

10. Scientific work regarding four priority topics has continued:

(a) Calculation of pools and fluxes of heavy metals and their relation to critical limits and risk assessment (led by Sweden). The Programme Centre has assisted in compiling additional heavy metal data provided for this work by NFPs. A technical report, finalized in 2002, will be followed by a scientific paper;

(b) Assessment of cause-effects relationships for biological data, particularly vegetation (led by the Netherlands). A progress report on the ongoing joint assessment of EU/ICP Forests intensive monitoring programme and ICP Integrated Monitoring ground vegetation data is included in the ICP Integrated Monitoring Annual Report 2002;

(c) Dynamic modelling (led by the Center for Ecology and Hydrology, United Kingdom, in cooperation with the Programme Centre of ICP Waters and the Norwegian Institute for Water Research (NIVA), Norway). This work has strong links to projects financed by the Nordic Council of Ministers and the European Union. The priority of ICP Integrated Monitoring, which together with other ICPs participates in activities of the Joint Expert Group on Dynamic Modelling, is site-specific modelling. A technical report on the first results will be available in autumn 2002 and will be presented at the Task Force meeting in 2003;

(d) Calculation of fluxes and trends of S and N compounds, base cations (led by the Programme Centre). Priority in 2002-2003 is given to the calculation of proton budgets, N leaching and C/N interactions. This work has strong links to the CNTER project. A scientific paper is being prepared.

II. ACTIVITIES AND TASKS PLANNED FOR 2002/2003

A. Activities/tasks related to the programme's present objectives

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

(b) Participation in interlaboratory comparisons organized by other ICPs;

(c) Inclusion of quality-controlled national data for 2001 in the programme's database;

(d) Processing of additional information (e.g. background information, site descriptions) for detailed assessments (e.g. dynamic modelling);

(e) Continuation of scientific work in the following four areas according to agreed scientific strategies:

(i) Calculation of concentrations, pools and fluxes of heavy metals at selected sites;

(ii) Assessment of cause-effect relationships for biological data (particularly vegetation);

- (iii) Assessment of pools, fluxes and trends of S and N compounds, base cations and H⁺;
- (iv) Site-specific dynamic modelling and impact scenario assessment.

B. Activities/tasks aimed at further developing the programme

- (a) Participation in the activities of external organizations, particularly the Global Terrestrial Observing System (GTOS) and the International Long-Term Ecological Research Network (ILTER);
- (b) Participation in projects with a global perspective, i.e. Carbon and nitrogen interactions in forest ecosystems (CENTER) and Climate-induced variation of dissolved organic carbon in Nordic surface waters (NMDTOC);
- (c) Continuing contacts with the Biosphere Reserve Integrated Monitoring (BRIM) and Scandinavian/North European Network of Terrestrial Field bases (SCANNET).

C. Activities/tasks to be carried out in close collaboration with other ICPs

- (a) Joint assessment of ICP Forests/EU Intensive Monitoring and ICP Integrated Monitoring data on ground vegetation;
- (b) Dynamic modelling work coordinated by the Joint Expert Group on Dynamic Modelling (ICP Forests and ICP Waters);
- (c) Participation in the CENTER project (together with ICP Forests/EU Intensive Monitoring);
- (d) Drafting of contribution to the 2004 substantive report on the review and assessment of present air pollution effects and their recorded trends.

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

Annex VI

REVIEW OF THE ACTIVITIES AND ACCOMPLISHMENTS OF THE INTERNATIONAL COOPERATIVE PROGRAMME ON MODELLING AND MAPPING CRITICAL LEVELS AND LOADS AND AIR POLLUTION EFFECTS, RISKS AND TRENDS (ICP MODELLING AND MAPPING)

I. ACTIVITIES SINCE THE TWENTIETH SESSION OF THE WORKING GROUP ON EFFECTS

1. The eighteenth meeting of the Task Force was held from 18 to 19 April 2002 in Sorrento, Italy, back to back with the twelfth CCE workshop (15 to 17 April 2002). The meeting, attended by 53 experts from 21 countries, focused on dynamic modelling and critical loads for heavy metals while considering also the further development of empirical critical loads of nutrient nitrogen and of critical levels for ozone.

2. The second meeting of the Joint Expert Group on Dynamic Modelling was held in November 2001 in Ystad. Several countries have already started to apply different models, e.g. MAGIC, SAFE and SMART. It was suggested to use the new Very Simple Dynamic (VSD) model for terrestrial ecosystems at sites where critical loads were estimated for covering the European scale. Other models can be used for aquatic ecosystems. Different examples of output formats for integrated assessment models were shown.

3. The Task Force and the National Focal Centres (NFCs) stressed the importance of developing effect-oriented methods for heavy metals. Eleven countries submitted critical loads for cadmium and lead to CCE in order to test modelling and mapping methods for critical loads and stand-still loads. Several NFCs stressed the preliminary status of present draft maps and did not wish these data or maps to be used for any policy purpose at this point. Differences in basic data and results of the individual NFCs should be further investigated. A technical report describing the results will be produced by CCE in 2002.

4. The Task Force welcomed the activities of the ad hoc expert groups on effects-based critical limits and on transfer functions for heavy metals, agreed with their work-plans, and decided to extend their mandate into 2003. Stand-still approaches require more attention. There is a need to deal with critical limits/loads for mercury in the near future. Inputs other than atmospheric deposition (when dealing with critical loads of agricultural soils) as well as natural pollution have to be assessed. Considering the amount of work still to be done before final critical load maps can be produced, the Task Force recommended to the Working Group on Effects to revise the medium-term work-plan with respect to the heavy metal work. It was recommended to delay the envisaged production of draft and final critical loads maps by one year.

5. A thorough revision of the Mapping Manual of the Programme was initiated. It will be carried out mostly during the second half of 2002 and will be finalized in 2003.

6. The preparedness of NFCs to engage in dynamic modelling is supported by the development of a dynamic modelling manual and the VSD model by CCE. A final draft of the manual on dynamic modelling, as presented and discussed during the CCE Workshop and the Task Force meeting, will be finalized following the third meeting of the Joint Expert Group.

7. Subregional training workshops on dynamic modelling took place from 1 to 4 October 2001 in Zagreb (Croatia), Bled (Slovenia) and Karzag (Hungary). The rapporteurs to the Task Force concluded that the training workshops had been successful and similar workshops should be held in the future.

8. A trilateral meeting of Polish, Czech and German NFCs took place in Neuschönau, Germany, from 29 to 31 October 2001. The aim of the meeting was to compare and harmonize the results of critical loads and their exceedances.

9. Bilateral cooperation focusing on dynamic modelling took place between CCE and the Polish and the Swiss NFCs.

II. ACTIVITIES AND TASKS PLANNED FOR 2002/2003

A. Activities related to the programme's present objectives

(a) Maintenance and updating of the database of critical loads for sulphur and nitrogen and of data derived from them;

(b) Further development, harmonization and application of methods and procedures (including dynamic modelling) to assess recovery and risk of future damage; support of the Joint Expert Group, including active participation at its third meeting (Sitges, Spain, 6-8 November 2002) and finalization of the dynamic modelling manual;

(c) Further development of methods for the derivation and mapping of empirical critical loads, in particular for nitrogen; organization of a workshop on this topic (Bern, 11-13 November 2002);

(d) Further development of effect-based critical limits and transfer functions as well as critical loads and stand-still loads for heavy metals; organization of an ad hoc expert meeting (tentatively in Berlin in December 2002);

(e) Encouragement and support to subregional workshops to increase participation of countries in mapping activities and to share technical experience;

(f) The CCE preparation of a call to NFCs for critical load and related dynamic modelling data by the end of 2002.

B. Activities/tasks aimed at further developing the programme

(a) Further development of the programme's activities aiming at, but not limited to (i) improving and harmonizing calculation methods and databases; (ii) identifying trends in air pollution and its effects; (iii) contributing substantially to the regional and subregional assessment of environmental damage and recovery; (iv) further developing methods to link dynamic modelling to integrated assessment modelling; and (v) investigating uncertainties;

(b) Further development of the effect-based approach, including elaboration of risk assessment methodologies;

(c) Maintenance of the programme's coherence considering varying national priorities of different work-plan elements due to national budget restrictions and varying participation of NFCs.

C. Activities/tasks to be carried out in close cooperation or jointly with other programmes

(a) Collaboration with EMEP and other international and national bodies/organizations in harmonizing as far as possible land-cover data/maps;

(b) Intensified cooperation between ICPs in the development and application of dynamic modelling, including participation in the third meeting of the Joint Expert Group;

(c) Evaluation of critical loads (exceedances) and dynamic modelling results at forest sites (in collaboration with ICP Forests and ICP Integrated Monitoring);

(d) The use of EMEP historic deposition fields of sulphur and nitrogen species and of basic cations in dynamic models;

(e) Support of the further development of critical levels or the development of critical fluxes of ozone; active participation at the workshop on level II critical levels for ozone (Gothenburg, 19-22 November 2002) (in cooperation with ICP Vegetation);

(f) Drafting of contribution to the 2004 substantive report on the review and assessment of present air pollution effects and their recorded trends.

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

Annex VII

REVIEW OF THE ACTIVITIES AND ACCOMPLISHMENTS OF THE TASK FORCE ON THE HEALTH ASPECTS OF AIR POLLUTION

I. ACTIVITIES SINCE THE TWENTIETH SESSION OF THE WORKING GROUP ON EFFECTS

1. The fourth meeting of the Task Force was held from 3 to 4 December 2001 in Bonn, Germany. The Task Force reviewed the first drafts of background papers on the health risks of persistent organic pollutants from long-range transboundary air pollution, prepared by experts invited by the World Health Organization's European Centre for Environment and Health (WHO/ECEH), Bonn Office. Following the recommendations of the meeting, the group of designated experts prepared the second draft report on the health risks of persistent organic pollutants.
2. The fifth meeting of the Task Force held from 13 to 14 May 2002 in Bonn, Germany, reviewed the second draft of the report prepared by the group on designated experts, as well as the comments received from external reviewers. The full report will be finalized for publication by August 2002. The Task Force also prepared the Executive Summary of the report on the "Health risks of heavy metals from long-range transboundary air pollution" and approved it for submission to the Working Group on Effects at its twenty-first session.
3. The final editing of the technical report on the "health risks of heavy metals from long-range transboundary air pollution" is under way and the report will be prepared for publication later in 2002.

II. ACTIVITIES AND TASKS PLANNED FOR 2002/2003

A. Activities/tasks related to the Task Force's present objectives

- (a) Preliminary assessment of the health risks of ozone, in particular as related to the long-range transport of air pollution;
- (b) Updating review of the health risks of particulate matter with emphasis on the contribution from the long-range transport of air pollution.

B. Activities/tasks aimed at further developing the Task Force's work

- (a) Continuing assistance in developing appropriate criteria for particulate matter for use in integrated assessment modelling.

C. Activities/tasks to be carried out in close cooperation or jointly with other programmes

- (a) Drafting of contribution to the 2004 substantive report on the review and assessment of present air pollution effects and their recorded trends.