36th Task Force Meeting of the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests)

Virtual Meeting, 11–12 June 2020

Minutes

Opening

1 The 36th Task Force Meeting of ICP Forests was hosted by the Swiss Federal Research Institute WSL and the Programme Co-ordinating Centre of ICP Forests (PCC). It was held as a virtual meeting with 76 participants representing 28 countries (see Annex I).

2 Mr Marco Ferretti, Chairman of ICP Forests, opened the meeting and welcomed all participants from the ICP Forests/WGE community and other external bodies. He expressed his gratitude to Mr Vít Šrámek (NFC Czechia) for organizing this year's Combined ICP Forests Expert Panel (EP) Meeting in Kutná Hora and to Mr Marcus Schaub (Chair of the Scientific Committee) for organizing the 9th Scientific Conference in Birmensdorf/Zurich. However, due to the COVID-19 pandemic the physical Combined EP Meeting had to be cancelled and was carried out instead as two-day extensive email discussions led by the EP Chairs. The 9th Scientific Conference was postponed to 7-9 June 2021.

3 Mr Ferretti also specifically thanked Mr Peter Waldner (NFC Switzerland) for his preparatory work in view of the foreseen in-person Task Force Meeting, and him and his colleagues from the WSL, the Swiss Federal Office for the Environment (FOEN), and the Programme Co-ordinating Centre of ICP Forests (PCC) for organizing the virtual 36th Task Force Meeting.

4 On behalf of the ICP Forests lead country Germany, Ms Juliane Beez and Ms Dorothea Steinhauser from the Federal Ministry of Food and Agriculture welcomed all meeting participants and thanked the WSL and PCC for the preparation of this meeting, including the technical support. After Ms Sigrid Strich's retirement this year, Ms Beez has taken on some of Ms Strich's responsibilities at the Ministry until a replacement is found.

Item 1 Adoption of the agenda

5 The Task Force adopted the agenda of this meeting.

Item 2 Adoption of the minutes of the last Task Force Meeting

6 The Task Force approved the minutes of the 35th Task Force Meeting in Ankara, Turkey.

Item 3 Report of the PCC

7 Mr Schwärzel welcomed all participants on behalf of the PCC and reported on **PCC activities** since the last Task Force Meeting. He showed the **new ICP Forests logo and corporate design** which

will also be used for the new website launched later in the year. He then thanked all organizers of ICP Forests meetings/events since the last Task Force Meeting, and specifically expressed his gratitude to Mr Šrámek for organizing the last Combined EP Meeting in March 2020.

8 Mr Schwärzel informed the Task Force that the paper version of the ICP Forests **2019 Technical Report** is currently in press and will be distributed soon. He then presented selected results from the draft of this year's **2020 Technical Report**. Of the 47 ongoing projects using ICP Forests data, 33 are led by external researchers and 13 started in 2019. In 2019, 62 peer-reviewed publications, including 4 book chapters, using ICP Forests data or the ICP Forests infrastructure were published. Chapter 7 on the online questionnaire on the future of Level II monitoring is still in preparation and will be distributed later. Comments and suggestions on the draft version of the TR can be sent to the PCC by 25 June 2020.

9 During the ensuing discussion concerning Chapter 6 on *Tree Crown Condition in 2019*, it was clarified that multiple damage symptoms for a single tree can be reported but causes of tree damage and mortality cannot always be identified with certainty. It was suggested that ICP Forests aims at contributing more substantially to global initiatives working on the assessment of tree mortality such as the International Tree Mortality Network[1]. It was also clarified that the different symbols in the maps of Chapter 5 on *Atmospheric deposition in European Forests in 2018* indicate potential quality issues and depend on whether or not the data had passed the required quality checks as was agreed at the Combined EP meeting in Brussels in 2019. Mr Ferretti reminded the Task Force to stay in contact with the PCC if further clarification is needed and kindly asked the NFCs to submit data early for the Technical Report to be drafted in time.

10 The **ICP Forests Brief** No. 4 titled *Increased evidence of nutrient imbalances in forest trees across Europe* is being layed out. Briefs in preparation are on (a) long-term defoliation trends, (b) ectomycorrhizae in forest ecosystems, and (c) soil water depletion under European forests in response to droughts and heat waves.

11 Mr Schwärzel listed the ICP Forests activities/objectives under the **new 2020-21 Workplan for the implementation of the Convention[2]**, including ongoing research on the concentration and effects of ozone, nitrogen and heavy metals in forest ecosystems. He also reported on the input that ICP Forests gave to the new long-term strategy of the Working Group on Effects (WGE) under the Air Convention.

12 Mr Schwärzel reported on the **PCC's expenses in 2019**. Of the USD 123,296.00 that the PCC had received in 2019, USD 98,660.41 went into staff and other personnel costs and USD 24,635.59 were general operating and direct costs.

Item 4 Report from the Working Group on Effects and other ICPs

13 Ms Isaura Rábago, Chair of the **Working Group on Effects[3]** under the Convention, provided an update on current WGE and Convention issues. She reported on the topics addressed during the last meetings under the Air Convention: (a) the review of the Gothenburg Protocol, (b) the update of the WGE/EMEP Scientific Strategy 2020-2030 and beyond, (c) decisions by the Convention's Executive Body on the Workplan 2020-2021, (d) the Mandates describing the achievements and functions of the respective Task Force, Programme Center and lead country, and (e) funding flows under the Convention over the years. In January 2020, the Joint Expert Group on Dynamic Modelling

[1] http://tree-mortality.net/
[2] https://www.unece.org/fileadmin/DAM/env/documents/2019/AIR/EB/ECE_EB.AIR_144_Add.2__Advance_version_.pdf
[3] http://www.unece-wge.org/

(JEG-DM) under the WGE was renamed as the international designated Center on Dynamic Modelling (CDM) and it has become part of the ICP Modelling & Mapping.

14 Ms Rábago highlighted the importance of the different ICPs under the Convention for the National Emission Ceilings Directive (NECD) with approx. 75% of the reported data coming from ICPs' monitoring sites and 75% of those coming from ICP Forests. The advantages of the LRTAP ecosystems monitoring network for the NECD is that it already is a consolidated and effects-based network offering harmonized methodologies and long-term data. Thorough data on biodiversity and methodologies for other ecosystem types, however, are still missing.

15 Ms Felicity Hayes, Chair of the **ICP Vegetation**[4], reported on achievements of the ICP Vegetation in 2019 and their future work plan. Since April 2020, Ms Hayes and Ms Katrina Sharps are leading the ICP Vegetation as Programme Chair and Head of the Programme Centre, respectively. Ms Hayes provided an overview of the ICP's latest scientific findings such as the interactive impacts of O_3 and N in crops, semi-natural vegetation and Mediterranean vegetation and on global annual wheat production losses between 2010 and 2030 due to ozone which indicate large losses in Europe and parts of North America but even more severe impacts in India and China. They revised Chapter 3 of the Convention's *Manual for Modelling and Mapping Critical Loads & Levels*[5] and developed new chapters for the Scientific Background Document[6].

16 A report on their last moss survey 2015/16 showed a NW to SE gradient in heavy metals (HM) in Europe due to anthropogenic sources and high wind resuspension. The concentrations of many HM in mosses have declined significantly over the last 30 years which often correlates well with their emissions but the concentration of nitrogen has not. The next moss survey will be conducted in 2020-22. It will concentrate on heavy metals, nitrogen and POPs but will also include a pilot study on mosses as biomonitors of microplastics as indication of atmospheric deposition rates.

17 Their Work Plan 2020-21 focusses on ozone flux-based risk assessments and maps, flux-response models, interactive impacts of ozone and nitrogen or methane, respectively, and spatial patterns and temporal trends of HM in mosses, often in close co-operation with other bodies under the Convention.

18 During the discussion, it was clarified that since 1995 the concentration of mercury in mosses has not significantly declined and that the major driver for the reported harvest losses in India and China is indeed assumed to be ground-level ozone despite an additional climate effect.

19 Ms Heleen de Wit, Chair of **ICP Waters**[7], presented recent publications, results and plans for the future as discussed during the remote ICP Waters Task Force Meeting, 11-12 May 2020. The ICP Waters database contains long-term water chemical data from over 500 sites mostly in Europe but some located also in the USA and Canada. Their latest reports focus on trends and patterns in surface water chemistry between 1990 and 2016, intercomparisons in water chemistry, and biological intercalibrations.

20 A publication on the mercury concentration in fish in northern Europe shows a strong decline over the last 50 years but it is still above levels advised for human consumption. Between 1990 and 2016, surface waters have recovered strongly from acidic deposition in various European and North-American regions. Acidic episodes, which are more important for biota than average water chemistry, have also become less severe. Their next report looks at nitrate leaching, which is still very relevant for streams and lakes, as an indicator of nitrogen saturation. N deposition has significantly

[4] https://icpvegetation.ceh.ac.uk/
[5] https://www.umweltbundesamt.de/en/manual-for-modelling-mapping-critical-loads-levels?parent=68093
[6] https://icpvegetation.ceh.ac.uk/get-involved/manuals/mapping-manual
[7] http://www.icp-waters.no/

declined on nearly all of the 500 sites between 1990-2016, nitrate concentrations were also decreasing or not changing significantly at about ½ of the sites each. A report on trends in N and empirical loads for N will be published in 2021. The next Task Force Meeting will take place in Riga in 2021. Ms de Wit suggests N and mercury for a closer collaboration among ICPs in future.

21 Mr Ulf Grandin, Chair of the **ICP Integrated Monitoring**[8], gave on overview on recent activities of the ICP IM. The current ICP IM network includes 48 active catchment sites in 15 countries with a renewed interest from Canada. ICP IM currently aims at expanding their network to include different habitat sites and countries by enabling "IM light" sites with a lower demand of monitoring variables. Mr Grandin described the variables being measured at an ICP IM site and the programme's main objectives: to assess concentrations, pools, and fluxes of S and N and HM, bulk and throughfall deposition, runoff water chemistry, ecosystem responses using biological data, dynamic modelling, calculation of critical loads for S, N, HM and the link between their exceedances with empirical impact indicators. He listed recent publications, ongoing studies and plans on various topics related to the 2020-21 Workplan of the Convention. A publication on the effects of N enrichment on forest vegetation is prepared in cooperation with ICP Forests.

22 Ms Alice James Casas, Chair of the **ICP Modelling and Mapping**[9] **(ICP M&M)**, described the new organisation and recent activities of the ICP M&M. In January 2020, a new international designated centre was created: the Centre on Dynamic Modelling (CDM). It became the second centre under the umbrella of the ICP M&M in addition to the Coordination Centre for Effects (CCE). It will focus on the dynamic modelling of effects of air pollution, the further development and maintenance of the common WGE website, promotion of dynamic work within the Convention and with non-Convention research groups and organizations.

23 Achievements of the ICP M&M since mid-2019 include mainly the revision and update on the background database, and the launching of the review and revision of the empirical critical loads with a virtual kick-off meeting on 15-16 June 2020. Further potential collaboration with ICP Forests is much appreciated on the review and revision of the empirical critical loads to which some of the deposition experts of ICP Forests had already agreed to.

Item 5 Reports of the Expert Panels and Committees of ICP Forests

24 All publications and projects presented by the individual EPs are available from the ICP Forests website and will not be listed here again.

25 Mr Volkmar Timmermann, Co-Chair of the **EP Crown Condition and Damage Causes**, listed all publications and reports by EP members using ICP Forests crown data, and reported on EP activities since the last TFM. In 2019, 27 countries participated in the Level I crown condition survey with 5798 plots, 109 659 trees and over 140 tree species. Ireland resumed their Level I activities again after their abandonment in 2012. 19 countries with 153 teams participated in the international Photo ICC 2019. Although the number of participating countries with 19 countries had never been higher, the EP chairs still encourage more countries to join the Photo ICC at least with their national reference team. Mr Potočić, Chair of the EP, took part in the EANET/ICP Forests workshop in Niigata in November 2019 and gave a presentation on *Monitoring of tree condition as a part of UNECE ICP Forests: pressures, damage and trends*. A discussion group on the effects of the COVID-19 pandemic on crown condition assessments revealed that all the 17 responding countries wil conduct crown surveys on Level I and Level II plots will be conducted as planned but some delays in field work may be expected. Some national calibration courses, however, had to be cancelled or were postponed.

[8] https://www.syke.fi/nature/icpim
[9] https://www.umweltbundesamt.de/en/Coordination_Centre_for_Effects

26 Mr Tom Levanič, Chair of the **EP Forest Growth**, reported that the 2019/20 periodic growth survey was conducted in most countries already prior the SARS-CoV-2 outbreak. The surveys will be continued during the summer or fall 2020 if they had not been finished before which will lengthen the survey period from five to six years.

27 Mr Roberto Canullo, Chair of the **EP Biodiversity and Ground Vegetation**, reported on their review of plant functional traits on Level I and Level II datasets. The EP encourages the countries to submit all mandatory data since at least 2015 and will ask for more detailed information on the sampling design and methodology to study their effect, which was first attempted during FutMon in 2009. Mr Canullo listed approved and ongoing projects and publications using biodiversity datasets from Level I or Level II.

28 Ms Diana Pitar, Chair of the **EP Ambient Air Quality**, informed about the EP's contibutions to the 2020 SoEF Report and the 2019 ICP Forests Technical Report, ongoing projects and publications. Members of the EP gave presentations at the EANET/ICP Forests workshop in Niigata in November 2019, at the last Task Force on Hemispheric Transport of Air Pollutants Meeting in Edinburgh, and at the IUFRO World Congress in Curitiba in September 2019. An online photo exercise is planned for August and September this year and an intercalibration course in Cluj, Romania, on 1-4 September 2020. The EP encourages data corrections and resubmission to the ICP Forests database. Countries had not reported any specific problems with regard to the air quality monitoring and visible injury assessment in 2020 to the EP chairs due to the COVID-19 pandemic.

29 Mr Arne Verstraeten, Chair of the **EP Deposition**, presented the EP's contributions to the SoEF 2020 report and ICP Forests 2020 Technical Report. Deposition data since 1985 and in addition for more than 60 plots from the Swedish Throughfall Monitoring Network (SWETHRO) were integrated into the ICP Forests database and have become available after request. Further work is undertaken in co-operation with EMEP on the comparison between S and N deposition modelled by the EMEP MSC-W model with a higher spatial resolution and using ICP Forests data. Members of the EP gave presentations at the EANET/ICP Forests workshop in Niigata and at the XXV IUFRO World Congress in Curitiba.

30 The resubmission of the deposition data using the new data format is planned to be finalized by 15 February 2021 with the aim to complete the data. The EP chairs will prepare a list with various issues to be checked by the countries. Mr Verstraeten and Mr Aldo Marchetto will join the reestablished Quality Assurance Committee of ICP Forests. The CORONA pandemic has not affected the deposition sampling and analysis in most countries but in some sampling had not been possible temporarily and data gaps of around 1-2 months are expected.

31 Mr Bruno De Vos, Chair of the **EP Soil and Soil Solution**, informed the Task Force that no new solid soil data has been submitted since 2017; 21 countries submitted their 2018 soil solution data. A report and maps on the distribution of heavy metals in forest floors and topsoils across Europe using data from 5000 Level I plots will be available by the end of 2020 and a following comparison with spatial patterns of heavy metals in moss as studied by ICP Vegetation will be of high interest to the WGE. Many ICP Forests partners are active in a Horizon 2020 call on forest soils which had successfully passed stage 1 of the call. Furrther planned activities include the production of maps on the concentration levels of six metals in forest floors and topsoils across Europe and a publication on SOC stores and DOC fluxes in Finnisch Level II plots. The COVID-19 pandemic has not seriously affected the solid soil or soil solution surveys in most countries, except for Italy where the sample collection had stopped in April and data gaps and reporting delays are expected.

32 Mr Stefan Fleck, **Co-Chair of the EP Meteorology, Phenology, and LAI,** described the extensive email exchange within the EP during the review of the three respective Manual parts after the cancellation of the Combined EP Meeting in Kutná Hora, Czechia. The EP agreed that the phenology data model needs to be harmonized over time, former damage descriptions need to be

included in the forms again, and attributes for the dating of events were harmonized. A new ICP Forests Brief on soil water depletion under European forests in response to drought and heat waves as a case study requiring water budget models and including the study of plant indicators for droughts is in preparation. Except for delays and missing phenological spring phases in some, most countries reported no impact on the measurements and assessments due to the COVID-19 pandemic.

33 Ms Liisa Ukonmaanaho, Co-Chair of the **EP Foliage and Litterfall**, listed recent publications, ongoing projects and approved proposals concerning the EP. 14 countries have reported 2018 litterfall data and the evaluation and correction of the data in the ICP Forests database is continuing. The COVID-19 pandemic has not affected the field work but delays in pretreatment and sample analyses have been reported in some countries due to staff restrictions.

34 Mr Schaub, Chair of the **Scientific Committee**, informed about internal projects and collaborative Horizon 2020 studies, selected publications, and the new date of the 9th Scientific Conference and Summer School which were postponed to 7-9 June 2021 and 22-28 August 2021, respectively. The Scientific Committee had organized a session at the XXV IUFRO World Congress in Curitiba, Brazil in September 2019 and had recently prepared the ICP Forests contribution to the new EMEP/WGE strategy.

35 Mr Alfred Fürst, Chair of the **Working Group QA/QC in Laboratories**, listed the topics discussed at the 7th Meeting of the Heads of the Laboratories in Brașov, Romania, on 5-6 September 2019, including microwave extraction methods for soil; the inclusion of several new heavy metals in the deposition ringtest and the change to its yearly repetition; problems with the sampling and measurement of mercury in water samples; the link between monitoring data, LQA-files and ringtest results; and the review of LQA data. The minutes are available from the ICP Forests website[10].

36 The results of the 22nd Needle/Leaf Interlaboratory Comparison Test 2019/20 have been published[11] and the registration deadline for the new 23rd Needle/Leaf Interlaboratory Comparison Test 2020/21 is 1 July 2020 with an extension possible as needed. The deadline for participation in the 10th Atmospheric Deposition and Soil Solution Working Ringtest 2020[12] has been extended to 26 June 2020. Preparations for the 11th Atmospheric Deposition and Soil Solution Working Ringtest 2021 and the 10th Soil Interlaboratory Test 2021[13] are underway.

37 Mr Manuel Nicolas (NFC France, Level II) presented his suggestions for a re-establishment of the **Quality Assurance Committee (QAC)** of ICP Forests which had been inactive since 2017. He proposed to chair the QAC for one year and presented a new mandate which includes the revision of Manual Part III on *Quality assurance* and of common QA/QC reporting rules together with the EPs, the consolidation of the aims and organization of the group and the preparation of a new mandate for its future activities.

38 Ideas for possible improvements include to systematically evaluate and report on the quality in field assessments, to include and evaluate data completeness as part of quality indicators, to give the possibility to NFCs to flag their data (as uncertain, or confirmed by a control assessment, or corrected), and to discuss actions and responsibilities if DQOs are not met.

39 The Task Force approved the new mandate of the QAC and agreed to give the QAC chairmanship to Mr Nicolas. Mr Nicolas invited the Task Force to send him suggestions for updating Manual Part III.

[10] http://icp-forests.net/group/qualityinlaboratories/page/document-archive
[11] http://icp-forests.net/group/qualityinlaboratories/page/foliage-and-litterfall-ringtest-and-qa-qc-information
[12] http://icp-forests.net/group/qualityinlaboratories/page/deposition-and-soil-solution-ringtest-and-qa-qc-information
[13] http://icp-forests.net/group/qualityinlaboratories/page/soil-ringtest-and-qa-qc-information

Item 6 The ICP Forests database: Status and future work

40 Mr Till Kirchner, **Data Manager at the PCC**, presented new data management functions and the status of the revision of the structure of the ICP Forests database. As a result of differing formats of data forms during upload and download, data downloaded from the ICP Forests database cannot be used for resubmissions without further data transformations. To simplify data corrections and resubmissions, he developed the new "Checkout Module"[14] that allows existing data to be got ready for resubmissions more easily, to download data from the past submission in "fixed format" in the new "CSV" structure, and that ensures that data changes done manually by the PCC are included in the resubmission.

41 Because overviews on data submissions had only been available on a highly aggregated level, Mr Kirchner introduced the new menu "Data Reports" to evaluate data completeness and availability. Three different data reports have been made available:

- the "Missing Submissions" reports provide a general overview on forms which might be missing completely for a specific survey-year in the database,
- the "Missing Plot-Years" reports give an overview on plot-years which might be missing for a specific survey, and
- the "Data Availability" reports describe what data is currently available in the database and whether a Data Accompanying Report (DARQ) has been submitted. They can be downloaded for each survey separately.

Mr Kirchner encouraged the Task Force to have a look at the current data reports and send him some feedback.

42 Because of several changes to the data structure over time potentially difficult to understand, Mr Kirchner had begun to revise the database three years ago and to harmonize the data structure survey by survey so that a unique data structure is defined and the upload and download harmonized for each survey. Harmonized data structures have recently been established for the surveys "Ground Vegetation", "Phenology", and "Ozone Injuries" and structural problems in the survey "Forest Growth" identified.

43 Major remaining issues of the ICP Forests database include problems associated with different tree numbers across surveys for the same trees and the submission of several differing coordinates for the same plots. Mr Kirchner will prepare additional "Data Reports" with a transparent overview on coordinates as submitted to the database and asked for support from all NFCs to help him address these issues.

44 Mr Kirchner kindly reminded the Task Force that the deadline for the submission of data to be used in the annual ICP Forests Technical Report is 15 February. A timely submission is absolutely vital for the PCC and the chapter authors to prepare a draft of the report in time for discussion at the Task Force Meeting.

45 Mr Schwärzel then continued the presentation on the status and future developments of the data infrastructure by listing the challenges related to the data in the ICP Forests database, e.g. potential incompleteness, quality issues, or abandoned plots. He would like to restart activities already begun in 2016 to publish a book in the Ecological Studies series by Springer on *Long-term monitoring of forest ecosystems: status, changes, and trends*. This could mean a great opportunity to complete the ICP Forests database, to improve the quality of the data, to increase the visibility of the Programme, and to improve the perception of ICP Forests as significant player in the policy arena.

[14] https://www.icp-forests.org/pdf/checkout_module.pdf

46 Mr Schwärzel listed the responsibilities of the editors, the PCC and the EP Chairs as discussed at the last PCG meeting. Two positions for three years will be installed at the Thünen Institute to help the EPs with data corrections in preparation of the analyses needed for the book. He kindly asked the NFCs to support this initiative by resubmitting their data if needed. An updated schedule will be discussed at the next meeting of the Programme Co-ordinating Group this fall.

Item 7 Manual revision

47 Ms Anne-Katrin Prescher (PCC) presented the process of the **ICP Forests Manual[15] Revision 2020**, which had already started at the Combined EP Meeting in Zvolen in October 2018. She described all major changes in each of the Manual parts separately except for Manual Part I on the *Objectives, strategy and implementation of ICP Forests* and Part III on *Quality assurance within the ICP Forests monitoring programme* which will be revised in 2021. For Part XI on *Soil solution collection and analysis* no revision was considered necessary. All major changes and respective explanations have been compiled in a table format and will be added to the Annex of each Manual Part.

48 Manual Part IV – Visual Assessment of Crown Condition and Damaging Agents

- Only small changes in language/wording and in the reporting/codes had been made. A major revision is foreseen during the next Manual revision in 2025.

The Task Force approved the revision of Manual Part IV.

49 Manual Part V – Tree Growth Level II

- It was clarified that this Manual Part only applies to Level II plots. For Level I, reference is made to the BioSoil Manual.
- The assessment interval was specified. A full inventory is to be conducted every ten years on each Level II plot, every five years a representative subplot shall be assessed.
- At future plot installations, individual tree coordinates need to be submitted.
- A specification of methods concerns the periodic measurements of dbh, continuous circumference measurements, tree ring analysis, and bark thickness measurements.

The Task Force approved the revision of Manual Part V.

50 Manual Part VI – Phenological Observations

- Fruiting was introduced as a new optional parameter in the phenological assessments.

The Task Force approved the revision of Manual Part VI.

51 Manual Part VII – Assessment of Ground Vegetation

- Two new sublayers for vegetation cover estimation in the shrub layer were added.

The Task Force approved the revision of Manual Part VII.

52 Manual Part VIII – Assessment of Ozone Injury

- The assessment intervals were aligned to the chemical foliar analysis.
- A link to a new tool for identification of visible ozone injuries (OSVALD) was added.

The Task Force approved the revision of Manual Part VIII.

[15] http://icp-forests.net/page/icp-forests-manual

53 Manual Part IX – Meteorological Measurements

- The instructions for measurements inside the forest stand had been improved.
- It was clarified that the submission is mandatory for daily data, but optional for hourly data.

The Task Force approved the revision of Manual Part IX.

54 Manual Part X – Sampling and Analysis of Soil

- Oxalate extractable P was added as optional parameter.
- Further grinding is allowed according to ISO 11464 during pre-treatment of soil samples.
- Reference method EN 15936 was added to determine the total inorganic carbon content using a Total Carbon Analyzer.
- Microwave digestion according to ISO 12914 was added as an additional reference method.

The Task Force approved the revision of Manual Part X provided that the given references will be corrected. The PCC will take care of the required changes.

55 Manual Part XII – Sampling and Analysis of Needles and Leaves

- As, Co, Cr, Hg, Ni were added as optional parameters.
- A paragraph on how to sample foliage in a regenerated stand was added.
- Dry mass of 100 leaves or 1000 needles must be given by reference to 105 °C-dried material.
- Methods for all parameters were updated to be state-of-the-art.

The Task Force approved the revision of Manual Part XII.

56 Manual Part XIII – Sampling and Analysis of Litterfall

- As, Co, Cr, Hg, Ni were added as optional parameters.
- A paragraph on how to sample litterfall in a regenerated stand was added.
- Litterfall dry mass must be given by reference to 105 °C-dried material.
- New tables were added with plausibility ranges of element concentrations in the foliar, flower, seeds, and twigs-litter of different species.

The Task Force approved the revision of Manual Part XIII.

57 Manual Part XIV – Sampling and Analysis of Deposition

- Cr and NO2-N were added as optional parameters.
- A paragraph on how to assess deposition in a regenerated stand was added.
- Plausibility ranges were updated.
- A new paragraph was added describing the procedure for the use of deposition data in reports.

The Task Force approved the revision of Manual Part XIV.

58 Manuel Part XV – Monitoring of Air Quality

- O3 concentrations have to be reported at standard temperature and pressure.
- Plausibility limits and data quality limits for passive monitoring of air quality were updated.
- The proposal to make passive air sampling mandatory at all Level II plots was denied by many countries due to its financial cost.

The Task Force approved the revision of Manual Part XV.

59 Manuel Part XVI - Quality Assurance and Control in Laboratories

- ISO standards and references, plausibility ranges, and tolerable limits for ringtests were updated.
- The text on ringtests was shortened and links to the respective ICP Forests webpages were added.
- Regarding the inter-laboratory comparison tests (ring tests), the NFC will be informed about bad ring test results by the PCC. The documents needed for requalification were updated.

The Task Force approved the revision of Manual Part XVI.

60 Manual Part XVII - Canopy Leaf Area

- On severely disturbed and inhomogenous plots, a spatially distributed measurement of canopy closure and/or LAI has been made mandatory to characterize the heterogeneity of the overstory.
- The variable “Canopy Closure” and the related indirect optical methods were added.
- In hemispherical photography, the measurement grid gets a geographically fixed definition.
- Measured leaf angle distributions including additional species were updated.

The Task Force approved the revision of Manual Part XVII.

61 Manual Part II - Basic Design Principles for the ICP Forests Monitoring Networks

- Parameter definitions and general wording were extensively revised.
- A new framework was developed to report about management operations and natural disturbances with only a few mandatory but many optional parameters for detailed information in a structured way.
- Canopy closure was better defined in relation with new methods proposed in Part XVII on Canopy Leaf Area. It has been made mandatory for Level II plots experiencing inhomogenous canopy closure after e.g. severe damage caused by wind or biotic agents. On all other plots its assessment is optional.
- New mandatory parameters to answer the information needs of the community were added for all plots (relocated plot), and more specifically for Level II plots (management intensity and non-timber utilization distinguished between plot and buffer zone, estimated year of final cutting, canopy gaps, and stand rotation number).
- A new Annex IV was added. Ms Prescher presented a new title which had not been included in the distributed draft version: “Overview of advantages and disadvantages of maintaining or relocating Level II monitoring plots entering stand regeneration”. The new title of Annex IV was approved by the Task Force and the PCC will change Part II accordingly.

The Task Force approved the revision of Manual Part II provided that a footnote in Table 4 is added with a clarification that the sampling frequency given in this table may differ from the frequencies announced in the respective Manual Parts. In Part II the frequencies given are recommendations only. For specific sampling frequencies, readers will be advised to refer to the respective chapter of the ICP Forests Manual.

62 Ms Prescher thanked all Expert Panels and in particular the EP Chairs and Co-chairs for their preparation of the Manual drafts. She also thanked the NFCs for their valuable comments and

thorough discussions. The publication of the Manual will be announced as soon as the PCC has implemented all changes. The next major revision is foreseen for 2025.

63 During the discussion, the need for a clarification in Manual Part II was expressed on how to define Level II plots if the required surveys are not conducted according to the definitions of a standard or core plot.

64 Mr Ferretti expressed his gratitude to the EPs and WGs, NFCs, Mr Nicolas and the PCC for their extensive work leading to the revision of the ICP Forests Manual 2020.

Item 7 Recent and future initiatives and cooperation with other Air Convention and international organisations

65 Mr Hiroyuki Sase, Network Center for the Acid Deposition Monitoring Network in East Asia (**EANET**)[16], informed about the progress of EANET and its co-operation with ICP Forests. EANET is a regional co-operation of 13 countries in NE and SE Asia with 62 sites for wet/dry deposition and 31 sites with forest plots assessing ecosystem responses. This year they celebrate their 20th Anniversary.

EANET currently discusses a scope expansion from "acid deposition" to "air pollution" for their next Medium Term Plan for the EANET (2021-2025). The Fourth Periodic Report on the State of Acid Deposition is being prepared. The co-operation between EANET and ICP Forests had started in 1998 and it was renewed in 2018 leading to a joint "Workshop on regional impact assessment of atmospheric deposition and air pollution on forest ecosystems" on 21-22 November 2019 in Niigata, Japan. The Acid Rain 2020 conference was postponed to possibly March 2022.

66 Mr Tim Butler, Task Force on Hemispheric Transport of Air Pollution (**TF HTAP**)[17], gave an overview of TF HTAP which has operated under the EMEP Steering Body of the Air Convention since 2004, fostering international scientific co-operation to improve the understanding of intercontinental transport of air pollution across the Northern Hemisphere. The Task Force coordinates the run of around 15 global models of atmospheric chemistry classifiying the world in various source and receptor regions. One of their main conclusions so far is that methane is not only a major greenhouse gas but it also contributes significantly to background concentrations of ground-level ozone year-round. Thus, methane emission reductions are likely more effective than NO_X at decreasing ground-level ozone concentrations. To answer the question of how methane contributes to ozone deposition to forests, Mr Butler suggests a closer co-operation with ICP Forests.

67 During the discussion, Mr Butler admitted that they are not yet able to study the effect of exceptionally dry and hot years on ozone concentration patterns as their used models are not sufficiently detailed enough to simulate fundamental plant processes. In general, the models may underestimate the effect of high ozone episodes in those years when leaf stomata are closed or if trees are without leaves.

68 Mr Martin Schneekloth, C3 Clean Air Unit – DG Environment, European Commission[18], provided an overview of the latest and upcoming activities under the framework of the **NEC Directive (NECD)**[19] relevant for forest monitoring. Article 9.1 of the NECD states that EU Member States (MS) shall ensure the monitoring of negative impacts of air pollution based on a network of monitoring sites representative of their freshwater, natural and semi-natural habitats and forest ecosystems types. Sites and data have to be reported every four years starting in 2018/19. A first report on the

[16] https://www.eanet.asia/
[17] http://www.unece.org/env/lrtap/taskforce/tfhtap/welcome.html
[18] https://ec.europa.eu/environment/air/index_en.htm
[19] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.344.01.0001.01.ENG&toc=OJ:L:2016:344:TOC

reporting of the sites was published by the Wageningen University in 2019 and a report on data submission will be finalized this summer.

69 At the meeting of the NEC Ecosystem Monitoring Sub-group of the Ambient Air Quality Expert Group on 4 June 2020, preliminary conclusions from the 2019 data and recommendations for improving the monitoring were discussed. The network of sites and data are not yet fully representative and specifically data from the most sensitive ecosystems are missing.

70 The Commission is considering to launch a capacity building contract with approx. 10 MS which is to run until early 2022. The aim is to improve data quality and reporting documents before the next reporting cycle. The NEC implementation report on the progress made in the implemention of the Directive is planned for June 2020. The publication of the 2nd Clean Air Outlook is planned for late 2020. Mr Schneekloth thanked the WGE and its ICPs for their data and protocols which are important inputs to the ecosystem monitoring of the NEC Directive.

71 Ms Annemarie Bastrup-Birk from the European Environment Agency (EEA)[20] described the **European Environment Information and Observation Network (EIONET)**[21] and National Reference Center on Forests (NRC Forests)[22] before presenting several options for a closer collaboration between EEA and ICP Forests. EIONET is a partnership network of the EEA and 38 member and co-operating countries and their National Focal Points (NFPs). A network of 24 National Reference Centres (NRCs) brings together experts from hundreds of public authorities and research institutions from across Europe involved in various fields of environmental information with the aim to support EEA. The NRC Forests will support the building up of a knowledge base related to forests and environment across Europe. In addition, seven European Topic Centres (ETCs) deal with a specific environmental topic and are contracted by the EEA to perform specific tasks of its work programme. Reportnet tools ensure key data flows between EEA and the co-operating countries with the aim to simplify various reporting obligations in the framework of European legislation, regional and international conventions in future. The Forest Information System For Europe (FISE) webportal[23] was launched in February 2020 as a unique entry point for a knowledge-base on forest ecosystems in Europe.

72 Ms Bastrup-Birk proposed ideas proposed for closer co-operation between EEA and ICP Forests including the exchange, provision and dissemination in the field of forests and environment, joint projects, support to EEA reporting, and the development of in-situ datasets to train and validate remote sensing data.

73 Mr Rastislav Raši from the FOREST EUROPE – Liaison Unit Bratislava gave an introduction to **FOREST EUROPE**[24] which is the brand name of the Ministerial Conference on the Protection of Forests in Europe. It is a high-level political process for dialogue and co-operation on forest policies in Europe initiated in 1990 and develops common strategies for its 47 signatories (46 European countries and the EU) on how to protect and sustainably manage their forests. Next year, Germany will take over the chairmanship from Slovakia.

74 Mr Raši showed the updated pan-European criteria and indicators for sustainable forest management that are reported on in the five-yearly State of Europe's Forests (SoEF) reports. The publication of the SoEF 2020 report is planned for October 2020. Mr Raši thanked the PCC, authors, and NFCs for collecting data and providing input to the chapters in the SoEF 2020 report on

[20] https://www.eea.europa.eu/
[21] https://www.eionet.europa.eu/
[22] https://www.eionet.europa.eu/countries/national-reference-centres/nrc-on-forest
[23] https://forest.eea.europa.eu/
[24] https://foresteurope.org/

indicators *2.1 Deposition and concentration of air pollutants* and *2.3 Defoliation,* and specifically Mr Ferretti for acting as Lead Author for the chapter on *Criterion 2 Forest health and vitality*.

75 Mr Michael Mirtl from the Environment Agency Austria (EAA) informed about the **Integrated European Research Structure (eLTER)** under the European Long-Term Ecosystem Research Network (LTER-Europe) and collaborations with ICP Forests. The elements of the European LTER process include LTER-Europe which is a network of formal national networks, the eLTER H2020 project which helped advance the development of an integrated European Long-Term Ecosystem, critical zone and socio-ecological systems Research Infrastructure (eLTER RI), and the eLTER ESFRI Process for establishing eLTER RI as a research infrastructure under the European Strategy Forum on Research Infrastructures (ESFRI)[25]. The most recent projects are the HORIZON 2020 funded eLTER PPP for co-ordinating the specification and decision making processes towards the eLTER RI implementation, and eLTER PLUS for networking, co-ordinating joint research activities, and implementing transnational, remote and virtual access.

76 eLTER RI has achieved wide European coverage as well as political, financial and scientific support while it looks at interactions between socio-ecological systems at different scales and provides basic site infrastructure, data nodes and user access to data and sites. Since 2018, they use different site categories acccording to the intensity of instrumentalization at a site.

77 The aim of eLTER RI is to investigate the societal and economic impact as a collaborative process before feeding the data into European environmental policies like the Strategy on Adaptation to Climate Change, the Biodiversity Strategy, Habitats Directive, Water Framework Directive, Soils Thematic Strategy, and NEC Directive. eLTER proactively seeks to join forces with other research infrastructures and networks such as DISSCo, LifeWatch, EUDAT, AnaEE, EMBRC AQUACOSM, DANUBIUS, ICOS, and CLRTAP UNECE-WGE.

78 A Memorandum of Co-operation (MoC) and/or other forms of collaboration with the WGE are being considered and will be further discussed. As an example, key areas of co-operation would include the site infrastructure, standard observations, IT services and data integration, and scientific supoort for policy makers.

Item 8 Other business

79 On behalf of the Federal Office for the Environment (FOEN) and the Swiss Federal Research Institute WSL, Ms Sabine Augustin, Mr Waldner, and Mr Schaub invited the Task Force to the 9th Scientific Conference and 37th Task Force Meeting in Switzerland, 7-11 June 2021.

80 Mr Waldner proposed to allow virtual participations at future Task Force Meetings. This will be further discussed among the meeting organizers and future hosts.

81 Mr Ferretti thanked the international organizations, the NFCs, the EPs, the PCC, the WSL staff and specifically their IT department and Mr Waldner for the professional organization of the 36th Task Force Meeting. He then declared the meeting closed.

[25] https://www.esfri.eu/esfri-roadmap

ANNEX I – List of Participants

No	Name	First name	Organisation	Country
1	Apuhtin	Vladislav	Estonian Environment Agency	Estonia
2	Augustin	Sabine	Federal Office for the Environment (FOEN)	Switzerland
3	Badea	Ovidiu	INCDS Marin Dracea	Romania
4	Bastrup-Birk	Annemarie	European Environment Agency	Denmark
5	Beez	Juliane	Federal Ministry of Food and Agriculture Germany	Germany
6	Benham	Sue	Forest Research	United Kingdom
7	Bertini	Giada	Research Centre for Forestry and Wood (CRA-SEL)	Italy
8	Bleeker	Albert	National Institute for Public Health and Environment (RIVM)	Netherlands
9	Buksha	Ihor	Ukrainian Research Institute of Forestry and Agroforestry Melioration (URIFFM)	Ukraine
10	Butler	Tim	IASS Potsdam	Germany
11	Canullo	Roberto	University of Camerino	Italy
12	Cools	Nathalie	Research Institute for Nature and Forest (INBO)	Belgium
13	Cummins	Thomas	University College Dublin (UCD)	Ireland
14	De Marco	Alessandra	ENEA	Italy
15	De Vos	Bruno	Research Institute for Nature and Forest (INBO)	Belgium
16	De Wit	Heleen	Norwegian Institute for Water Research	Norway
17	Đorđević	Ilija	Institute of Forestry, Belgrade	Serbia
18	Ferretti	Marco	WSL Swiss Federal Research Institute	Switzerland
19	Fleck	Stefan	Nordwestdeutsche Forstliche Versuchsanstalt (NW-FVA)	Germany
20	Fürst	Alfred	Austrian Federal Research Centre for Forests	Austria
21	Glazko	Zbignev	Ministry of Environment	Lithuania
22	González	Ana	Ministry for Ecological Transition and Demographic Challenge	Spain
23	Gottardini	Elena	Research and Innovation Centre	Italy
24	Grandin	Ulf	Swedish University of Agricultural Sciences	Sweden
25	Hansen	Karin	Swedish Environmental Protection Agency	Sweden
26	Hayes	Felicity	ICP Vegetation (UKCEH)	United Kingdom
27	Heffernan	Luke	Forest Service	Ireland
28	Hunziker	Stefan	WSL Swiss Federal Research Institute	Switzerland
29	Ingerslev	Morten	IGN University of Copenhagen	Denmark
30	James Casas	Alice	INERIS	France
31	Kankaraš	Ranko	Ministry of Agriculture and Rural Development	Montenegro
32	Kirchner	Till	Thünen Institute of Forest Ecosystems	Germany
33	Kowalska	Anna	Forest Research Institute	Poland
34	Kulbokas	Gintaras	Lithuanian State Forest Service	Lithuania
35	Leca	Stefan	INCDS Marin Dracea	Romania
36	Lech	Paweł	Forest Research Institute	Poland
37	Levanic	Tom	Slovenian Forestry Institute	Slovenia
38	Loran	Christin	Umweltbundesamt (Deutschland)	Germany
39	Merilä	Päivi	Natural Resources Institute Finland (LUKE)	Finland
40	Michel	Alexa	Thünen Institute of Forest Ecosystems	Germany
41	Michopoulos	Panagiotis	Institute of Mediterranean Forest Ecosystems	Greece
42	Mirtl	Michael	Environment Agency Austria (EAA)	Austria
43	Nicolas	Manuel	Office national des forêts (ONF)	France
44	Nieminen	Tiina M.	Natural Resources Institute Finland (LUKE)	Finland
45	Olejnik	Marcin	Ministry of Environment	Poland
46	Papitto	Giancarlo	Carabinieri Corps - Office for Studies and Projects	Italy
47	Pavlenda	Pavel	National Forest Centre	Slovakia
48	Pilop	Katja	Thünen Institute of Forest Ecosystems	Germany
49	Pitar	Diana	INCDS Marin Dracea	Romania
50	Poljanšek	Simon	Ministry of Agriculture, Forestry and Food	Slovenia
51	Popa	Ionel	INCDS Marin Dracea	Romania
52	Popova	Genoveva	Executive Environment Agency	Bulgaria
53	Prescher	Anne-Katrin	Thünen Institute of Forest Ecosystems	Germany
54	Rábago	Isaura	CIEMAT	Spain
55	Raši	Rastislav	FOREST EUROPE Liaison Unit Bratislava	Slovakia
56	Rautio	Pasi	Natural Resources Institute Finland (LUKE)	Finland
57	Sanders	Tanja	Thünen Institute of Forest Ecosystems	Germany
58	Sase	Hiroyuki	Asia Center for Air Pollution Research (ACAP)	Japan

No	Name	First name	Organisation	Country
59	Schaub	Marcus	WSL Swiss Federal Research Institute	Switzerland
60	Schneekloth	Martin	European Commission	Belgium
61	Schüler	Silvio	Austrian Federal Research Centre for Forests	Austria
62	Schwärzel	Kai	Thünen Institute of Forest Ecosystems	Germany
63	Sharps	Katrina	UK Centre for Ecology and Hydrology	United Kingdom
64	Sicard	Pierre	ARGANS	France
65	Skudnik	Mitja	Slovenian Forestry Institute (SFI)	Slovenia
66	Šrámek	Vít	Forestry and Game Management Research Institute	Czech Republic
67	Steinhauser	Dorothea	Ministry of Food and Agriculture	Germany
68	Timmermann	Volkmar	Norwegian Institute of Bioeconomy Research	Norway
69	Ukonmaanaho	Liisa	Natural Resources Institute Finland (LUKE)	Finland
70	Verstraeten	Arne	Research Institute for Nature and Forest (INBO)	Belgium
71	Vesterdal	Lars	University of Copenhagen	Denmark
72	Waldner	Peter	WSL Swiss Federal Research Institute	Switzerland
73	Wulff	Sören	Swedish University of Agricultural Sciences	Sweden
74	Žlindra	Daniel	Slovenian Forestry Institute	Slovenia
75	Zolles	Anita	Austrian Federal Research Centre for Forests	Austria
76	Zvirbulis	Uldis	Latvian State Forest Research Institute "Silava"	Latvia

ANNEX II – Agenda of the 36th Task Force Meeting of ICP Forests – Virtual Meeting

PCC of ICP Forests at the Thünen Institute of Forest Ecosystems, Eberswalde, Germany
Swiss Federal Research Institute WSL, Birmensdorf, Switzerland

Thursday, 11 June 2020

09:00 – 09:05 **Opening by the Chairman of the ICP Forests** (Marco Ferretti)

09:05 – 09:10 **Welcome address from the German Federal Ministry of Food and Agriculture, representing the lead country of ICP Forests** (Juliane Beez)

09:10 – 09:15 **Item 1: Adoption of the 36th TFM agenda**

09:15 – 09:20 **Item 2: Adoption of the 35th TFM minutes**

09:20 – 09:40 **Item 3: Report of the PCC** (Kai Schwärzel, Alexa Michel)

- Activities and progress since the 35th TFM
- Technical Report 2020
- ICP Forests Briefs
- Realisation of the WGE workplan 2020-2021, Contribution to the new strategy of the WGE
- Financial statement

09:40 – 10:30 **Item 4: Report from Working Group on Effects and sisters ICPs (10' presentations)**

- WGE (Isaura Rábago)
- ICP Vegetation (Felicity Hayes)
- ICP Waters (Heleen de Wit)
- ICP Integrated Monitoring (Ulf Grandin)
- ICP Modelling & Mapping (Alice James)

10:30 – 10:45 **Tea / Coffee break**

10:45 – 11:45 **Item 5: Reports of the Expert Panels and Committees of ICP Forests (5' presentations)**

- EP Crown Condition and Damage Causes (Nenad Potočić, Volkmar Timmermann)
- EP Forest Growth (Tom Levanič, Tanja Sanders)
- EP Biodiversity and Ground Vegetation (Roberto Canullo, Jean-Luc Dupouey)
- EP Ambient Air Quality (Diana Pitar, Elena Gottardini)
- EP Deposition (Arne Verstraeten, Daniel Žlindra, Peter Waldner)
- EP Soil and soil solution (Bruno de Vos, Nathalie Cools, Tiina Nieminen)
- EP Foliage and Litterfall (Pasi Rautio, Liisa Ukonmaanaho)
- EP Meteo, Phenology and LAI (Stephan Raspe, Stefan Fleck)
- Scientific Committee (Marcus Schaub, Lars Vesterdal)
- Working Group on QA in Labs (Alfred Fürst, Anna Kowalska)
- QA Committee (Marco Ferretti, Manuel Nicolas)

11:45 – 12:15 **Item 6:** **The ICP Forests data base: Status and future work** (Till Kirchner, Kai Schwärzel)

12: 15 – 12:30 **End of Day One**

Friday, 12 June 2020

09:00 – 10:30 **Item 7:** **Manual revision** (Anne-Katrin Prescher, Till Kirchner)

10:30 – 10:45 **Tea / Coffee break**

10:45 – 12:15 **Item 8:** **Recent and future initiatives and co-operation with other Air Convention bodies and international organisations**
(8' min presentations; 2' questions)

- EANET (Hiroyuki Sase)
- TF HTAP (Tim Butler)
- NEC Directive (Martin Schneekloth)
- EIONET NRC Forests (Annemarie Bastrup-Birk)
- Forest Europe (Rastislav Raši)
- LTER (Michael Mirtl)

12:15 – 12:25 **Item 9:** **Other business**

12:25 – 12:30 **Closing of the 36th Task Force Meeting**