

Gothenburg Protocol revision

Gap closure on both health and biodiversity

On European scale, an approach for biodiversity protection aligned with nature policies

Ex post analysis on optimised scenarios for both biodiversity (including species), health materials, vegetation..

EECA staged / phased implementation



Working Group on Effects

Tenth joint session

Geneva, 9–13 September 2024

Item 2 of the provisional agenda

Matters arising from recent meetings of the Executive Body and its subsidiary bodies and activities of the Bureaux of the Steering Body and the Working Group on Effects

Scenarios for the upcoming Gothenburg protocol revision

Air pollution effects on materials and cultural heritage

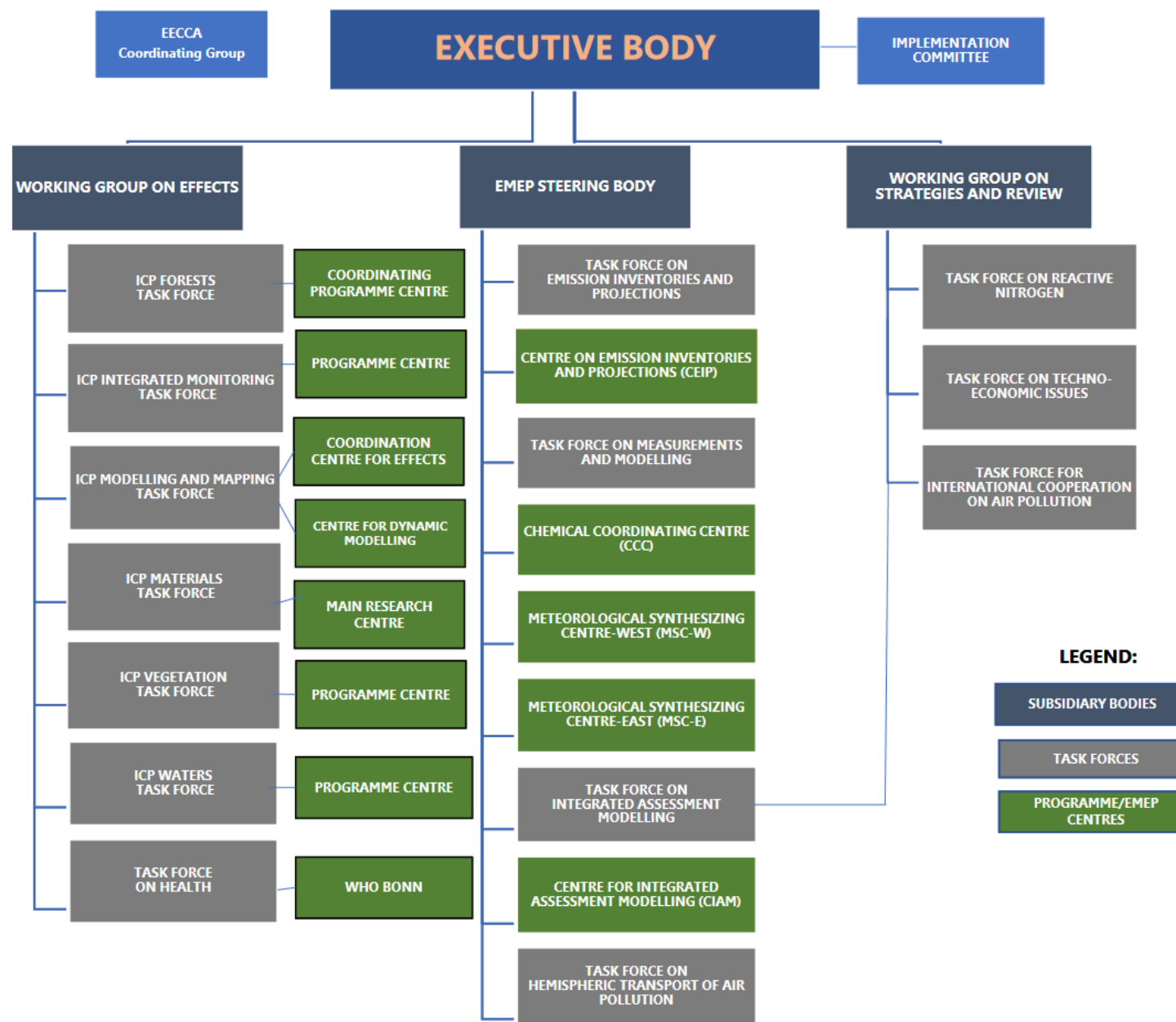
Air pollution effects on health

Air pollution effects on ecosystems and biodiversity

Forests, Catchment areas and light open nature, surface waters, biodiversity

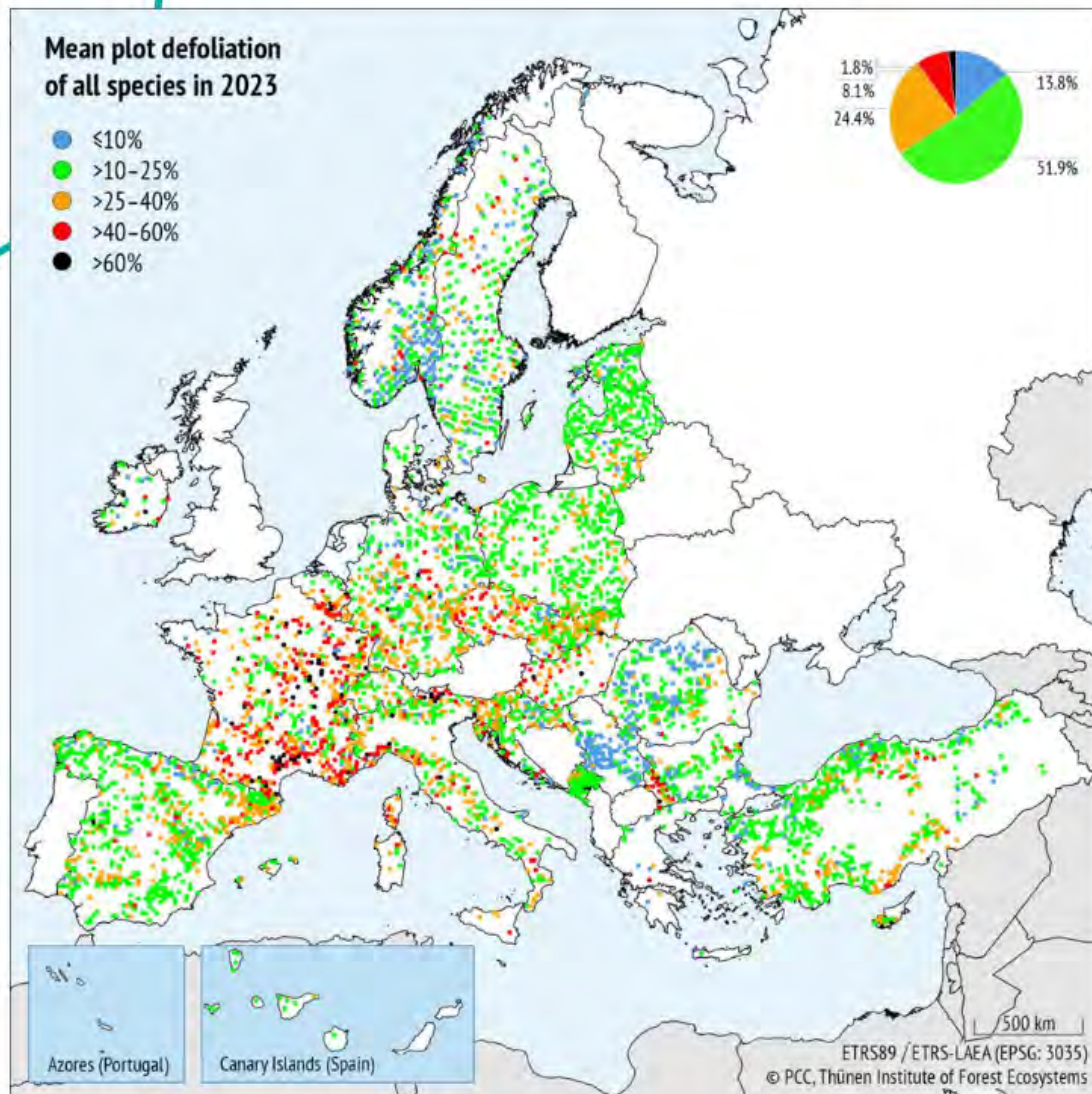
Critical loads and levels

Critical loads, Critical levels (vegetation and crops), temporal development



TR 2024 – Tree crown condition in 2023

by Volkmar Timmermann, Nenad Potočić, Katrin Haggemüller, Till Kirchner, Alexa Michel



Mean plot defoliation in 2023

- one third of the plots have more than 25% defoliation
- 10 % of the plots have more than 40% defoliation
- deciduous temperate oaks and evergreen oaks displayed the highest mean defoliation (29.3% and 27.8%, respectively).

ICP Forests Manual

The ICP Forests monitoring Manual documents the harmonized methods for sampling and analysis as adopted by the participating countries of ICP Forests.

The latest revision of the ICP Forests Manual has been carried out in spring 2020. The updated parts of the Manual have then been adopted by the Programme Task Force on 12 June 2020.

For older Manual versions please refer to the bottom of the page or by contacting pcc-icpforests@thuenen.de.

Database Reports

The Database reports provide a quick overview of relevant database changes:

- [Database Report 2023](#)
- [Database Report 2022](#)
- [Database Report 2021](#) (period 2019–2021, of which most come from the last manual revision)

Manual versions (2020-2022)

-  [Part I Objectives, strategy and implementation of ICP Forests](#)
-  [Part II Basic design principles for the ICP Forests monitoring networks](#)
-  [Part III Quality assurance within the ICP Forests monitoring programme](#)
-  [Part IV Visual assessment of crown condition and damaging agents](#)
-  [Part V Tree growth Level II](#)
-  [Part VI Phenological observations](#)
-  [Part VII.1 Biological diversity - Assessment of ground vegetation](#)
-  [Part VII.2 Biological diversity - Assessment of epiphytic lichen diversity](#) *(no update with regards to content, version of 2016)*
-  [Part VIII Assessment of ozone injury](#)
-  [Part IX Meteorological measurements](#)
-  [Part X Sampling and analysis of soil](#),  [Annex](#)
-  [Part XI Soil solution collection and analysis](#) *(no update with regards to content, version of 2016)*
-  [Part XII Sampling and analysis of needles and leaves](#)
-  [Part XIII Sampling and analysis of litterfall](#)
-  [Part XIV Sampling and analysis of deposition](#)
-  [Part XV Monitoring of air quality](#)
-  [Part XVI Quality assurance and control in laboratories](#)
-  [Part XVII Leaf area measurements](#)



Activities by ICPF to raise awareness and to develop the programme EU Forests – New EU Framework for Forest Monitoring and Strategic Plans

A Proposal for a Regulation on a forest monitoring framework for resilient European forests was released by the Commission in November 2023.

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CORRESPONDENCE | 27 February 2024

Europe needs a joined-up approach for monitoring and protecting its forests

By [Marco Ferretti](#)

Page 12



ELSEVIER

Forest Ecology and Management

Volume 561, 1 June 2024, 121875



Perspectives: Resilient forests need joint forces for better inventorying and monitoring

[Marco Ferretti](#)^a , [Arthur Gessler](#)^{a, b}, [Nathalie Cools](#)^c, [Stefan Fleck](#)^d, [Rossella Guerrieri](#)^e, [Tamara Jakovljević](#)^f, [Manuel Nicolas](#)^g, [Tiina M. Nieminen](#)^h, [Diana Pitar](#)ⁱ, [Nenad Potočić](#)^f, [Stephan Raspe](#)^j, [Marcus Schaub](#)^a, [Kai Schwärzel](#)^k, [Volkmar Timmermann](#)^l, [Monika Vejpustková](#)^m, [Lars Vesterdal](#)ⁿ, [Petteri Vanninen](#)^o, [Peter Waldner](#)^o, [Lothar Zimmermann](#)^j, [Tanja GM Sanders](#)^k



Modelling plant biodiversity at Swedish sites

- Dynamic geochemical soil model (VSD+) coupled to a statistical plant response model (PROPS) to investigate recovery patterns in plant diversity after acidification.
- Modelled/observed “probability of occurrence”

Report available [at IM site](#)

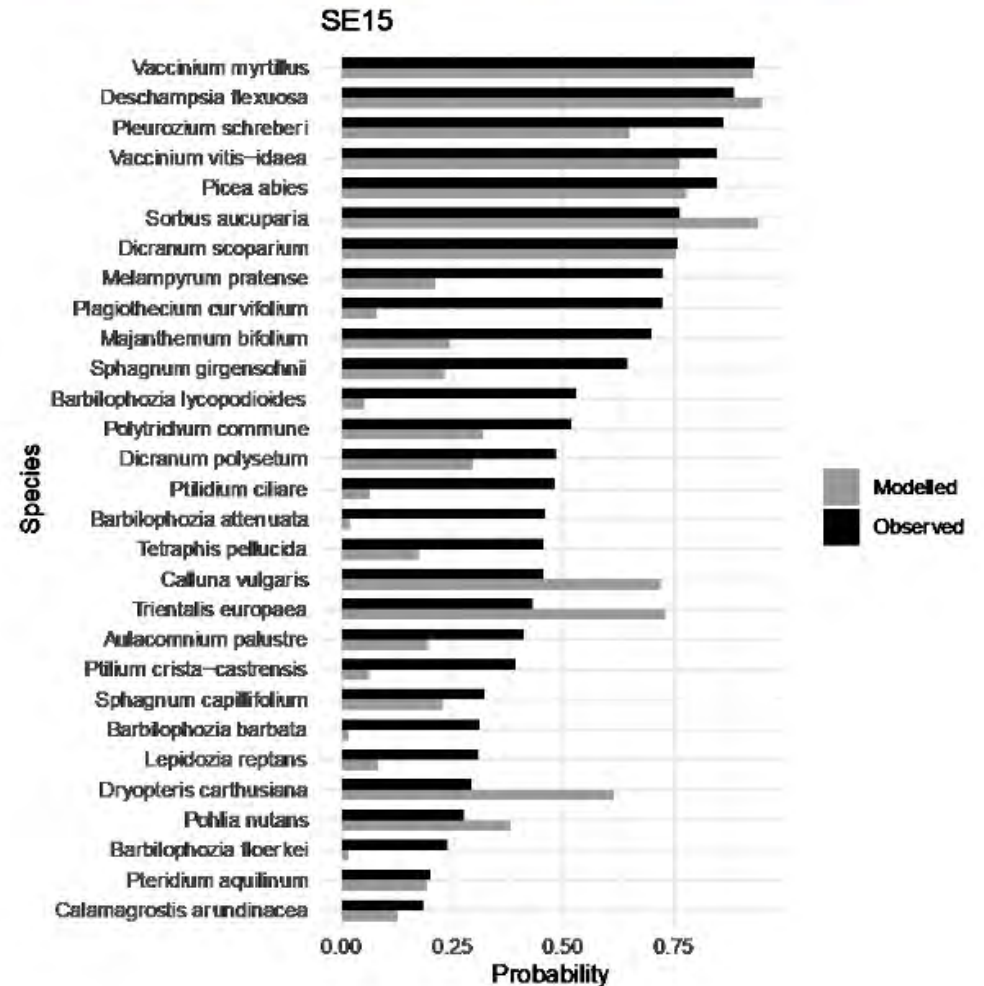


Table below presents summary of the inputs planned by ICPs/TFs/centres.

| | Date | Responsible | Deliverable | Workplan item/comment |
|---|-------------------|---------------------------|---|---|
| 1 | Already available | ICP Vegetation | Ozone impacts on crop production and deciduous forest biomass increment for 2015, 2030 and 2050, using the CLE, MFR and LOW scenarios | Presented (in brief) in Annex II of the Gothenburg Protocol Review report |
| 2 | Already available | ICP Integrated Monitoring | Report on dynamic modelling at the Swedish IM sites with a focus on modelling vegetation | 1.1.1.26 relevant for ex-post analyses/dynamic modelling work |
| 3 | Already available | ICP Waters | Impacts of reduced air pollution on surface water chemistry for 1990-2020 across Europe and North America (published report) | Can be included in GP review report. |
| 4 | Already available | ICP Waters | Impacts of reduced air pollution on biological recovery / species richness in lakes and rivers in Europa (published report). | Can be included in GP review report. |
| 5 | Mid-April 2024 | TFIAM | Scenarios | |
| 6 | | ICP Integrated Monitoring | Data from the IM sites | Relevant for dynamic modelling and potentially co-operation with CDM |

| | | | | |
|----|--------------------------------|---------------------------|--|---|
| 38 | 2025 | ICP Integrated Monitoring | Update in long-term changes in atmospheric deposition and runoff water chemistry of sulfate, inorganic N and acidity | 1.1.1.30 |
| 39 | 2025 | ICP Waters | Update of water chemistry in 2030, 2050 for key European ICP Waters sites calculated using the SSWC model (depending on availability, EMEP scenarios); needs some processing | Builds on earlier assessment for GP review (already available for GP review report). |
| 40 | 2025 | ICP Waters | Dose-response relationships between water chemistry and biology | 1.1.1.12. Potentially providing insights in lag times between chemical recovery and expected biological recovery |
| 41 | WGSR 25 | ICP Modelling & Mapping | Policy relevant dataset based on Empirical Critical Loads for Nitrogen (nitrogen related effects of eutrophication, acidification and for biodiversity); including EECCA region | 1.1.1.22 and 1.1.1.23 |
| 42 | WGSR 25 | ICP Modelling & Mapping | Dataset of Critical Levels of NH3 to assess NH3 related effects for vegetation | 1.1.1.24: Policy relevance not discussed yet, could be used in IAM, not discussed with ICP M&M, TFIAM, WGE/EMEP yet |
| 43 | September 2025 | ICP Modelling & Mapping | Policy relevant dataset on SMB Critical Loads for Eutrophication and Acidification including updated NFC data and background database results for EECCA region | 1.1.1.21 together with 1.1.1.25 |
| 44 | September 2025 | TFHTAP | Interim analysis of global modeling scenarios and model intercomparison to be presented at the joint meeting of the EMEP SB and WGE | 1.1.4.2 |
| 45 | September 2025 | ICP Forests | Update of long-term changes in atmospheric deposition and air pollution | Scientific paper/contribution to a report |
| 46 | WGSR, EB, 2025 | TFIAM | Updated version of the policy brief | 2.1.12 |
| 47 | 2025 | TFMM | Contribution of VOCs on high O3 pollution episodes using observations from intensive measurement period (summer 2022) and regular time series from EMEP network. Including model intercomparison exercise for intensive measurement week | 1.1.1.1 EMEP reports (MSC-W) Peer-reviewed publication describing campaign and key results Summary of model intercomparison exercise |
| 48 | 2025 | TFMM | Consolidate representation of intermediate and semi-volatile condensable emissions in models and validation against existing observations of PM composition | 1.1.1.4 Contribution to EMEP report (ad-hoc group?) |
| 49 | 2025 | TFMM | Summary report on BaP-related health effects | |
| 50 | December 2025/ January 2026 | ICP Forests | Long-term trend of forest health, growth and biodiversity in relation to atmospheric deposition, air pollution and climate. | Scientific paper/contribution to a report |




The Working Group on Effects under the UNECE Air Convention

WGE studies air pollution effects in the pan-European area and in North America based on international cooperation on research, monitoring, modelling and mapping.

Air pollution effects on nature, materials, and human health

The Working Group on Effects provides information on the degree and geographic extent of the impacts of major air pollutants, such as sulphur and nitrogen oxides, ozone, volatile organic compounds, persistent organic pollutants, heavy metals, particulate matter, including black carbon, and ammonia on human health and the environment. The Working Group on Effects provides information on policy-relevant user-friendly indicators to evaluate air pollution effects on the environment and health.

Strategy

The [Strategy for scientific bodies under the Convention on Long-range Transboundary Air Pollution](#)  was adopted by the Executive Body in 2022 ([Decision 2022/3](#) ) to better serve the work under the Convention.

In order to complete their mission, the science bodies of the Convention seek to develop, maintain and implement methods and tools that support the achievement of goals in the following areas:

- (a) Science: to establish sound scientific evidence and provide guidance to underpin, develop and evaluate environmental policies;
- (b) Partnership: to foster international partnerships to find solutions to environmental problems;
- (c) Openness: to encourage the open use of intellectual resources and products;
- (d) Sharing: to share information and expertise with research programmes, expert institutions, national and international organizations and environmental agreements;
- (e) Integration: to integrate information on emissions, environmental quality, effects and abatement options, and to provide the basis for solutions;
- (f) Leadership: to support the Convention in providing leadership in environmental policymaking at the national, pan-European and global levels.

Strategic discussion

- *Scale*. A reason for the success of the convention has been the focus on the regional scale where it has been beneficial for the parties to cooperate to reach goals that could not be reached on a per country basis and to have optimized solutions based on cost optimization, the polluter pay principle and equal benefits. In the later year, more focus has been given to coupling to local- and global scale. This do make a lot of sense, but how far should we go in this direction? and can we from the effect group maintain sufficient focus on supporting the policy development in the convention.
- *Optimized solutions*. The basis for the last GP revision was a flat rate reduction and a focus on health. Can and shall we try to get (back to) a situation where also effects on nature, environment, materials, vegetation are included in IAM and to some degree in optimized scenarios.
- *Biodiversity* – has been asked for in the policy process, and it is positive that we are getting in a position to address this, also as support to IAM. It is, however, important to look at what can be delivered now, and what should be the future strategy.
- *Climate change and mitigation* and the influence and interaction with AP effects and policies will be increasingly important
- *Nature restoration*. The condition of many ecosystems are so degraded, and still have deposition levels meaning that recovery cannot be expected in a foreseeable future. Focus in nature polities are therefore shifting from nature protection to nature restauration. We have to start thinking about how this can be reflected in effect assessment and AP policies. I have flagged this up at the EB meeting.