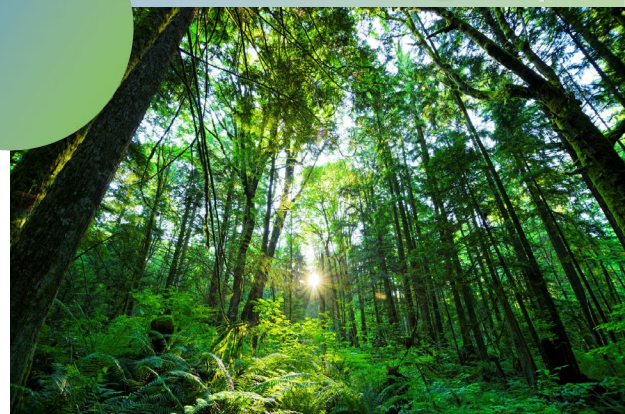
UNECE

Food and Agriculture Organization of the United Nations

# Reporting and assessment of forest damage and disturbance in the ECE region

Agenda Item 5. (a)



Joint Working Party on Forest Statistics, Economics and Management, 1-3 June 2022

# Conceptual foundations for forest disturbance and damage reporting in the UNECE region

- **Climate change increases the frequency and impact of damages and disturbances to forest ecosystems in the ECE region.**
- **Understanding the processes of forest disturbance at multiple scales is a prerequisite for successful management and policy responses.**
- **Monitoring, reporting and assessing forest damage and disturbance is essential to build knowledge and resilience.**
- **The research and assessment of forest damages and disturbance indicates an urgent need for improving monitoring and reporting.**

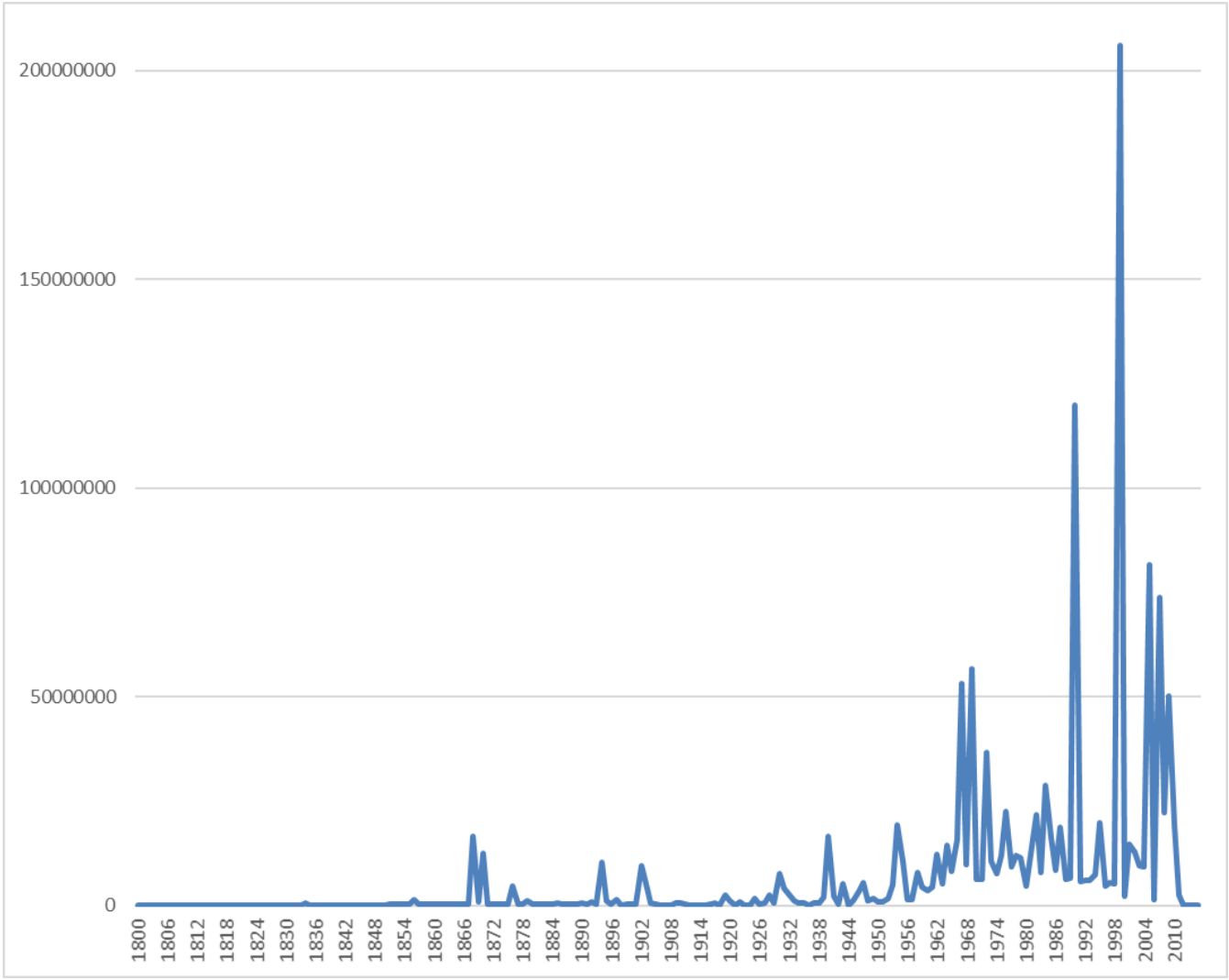
# The ongoing project on reporting and assessment of forest damage and disturbance in the ECE region

- **Aim:**
  - Review of the international reporting system and to contribute to data harmonization in the ECE region
- **Objective:**
  - Improve knowledge, methodology and reporting capacity on forest damage in the UNECE region
- **Project timeline**
  - Duration: October 2020 – December 2022
  - Scientific-Technical Symposium in Vienna, September 2022
  - Finalization of the publication, December 2022
- **Carried out and supported by**
  - the UNECE/FAO Team of Specialists on Monitoring Sustainable Forest Management and
  - Austria, Canada, Finland, Germany, and the United States of America, with contributions from experts of countries of the UNECE region

# Forest damage and disturbance in the ECE region

**Volumes ($m^3$) of wood damaged by storms as reported in European countries for 1800–2011.**

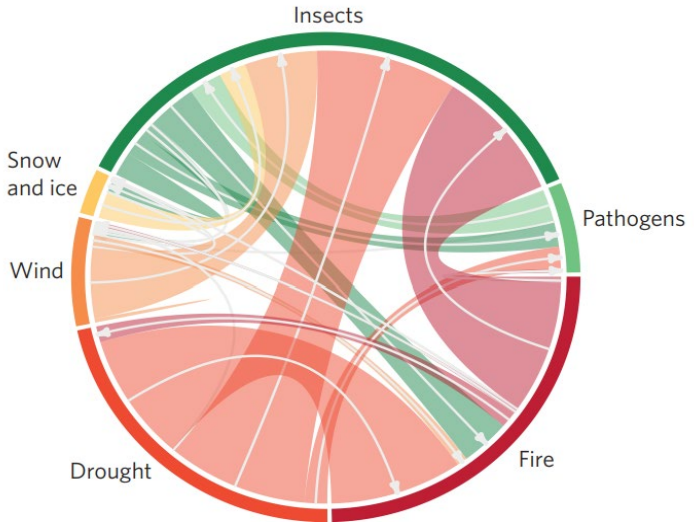
Source: DFDE database, Schelhaas pers. com., 2021



# Forest damage and disturbance in the ECE region

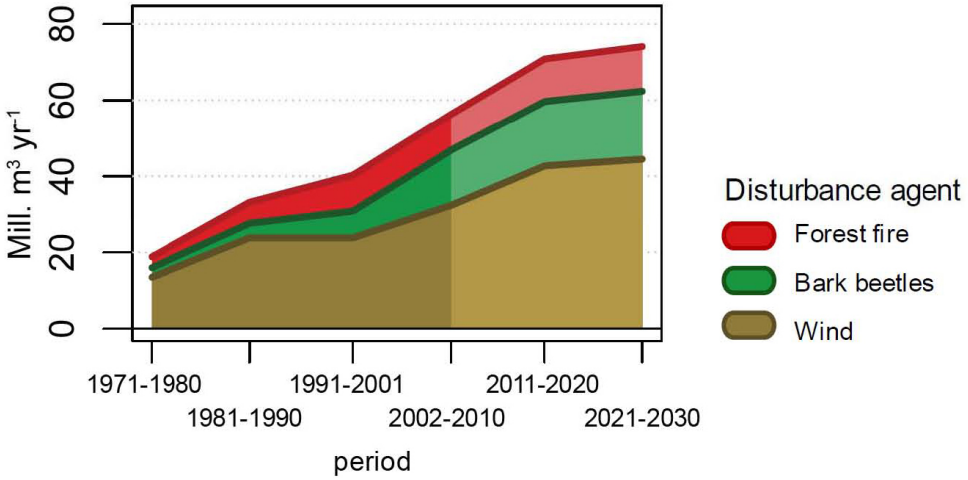
## Multi-factorial hazard events are becoming more likely

Source: Seidl, Rupert et al. “Forest disturbances under climate change." Nature climate change vol. 7 (2017): 395-402. doi:10.1038/nclimate3303




## Increasing forest disturbance in Europe

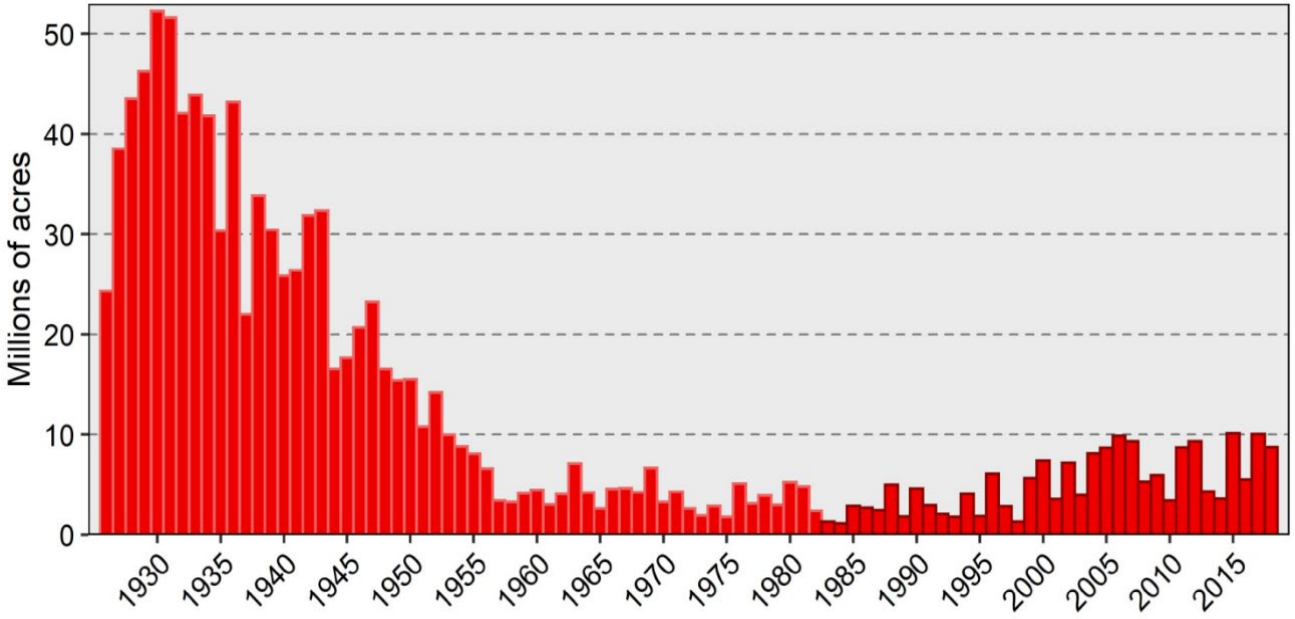
Source: "Increasing forest disturbances in Europe and their impact on carbon storage." Rupert Seidl, Mart-Jan Schelhaas, Werner Rammer & Pieter Johannes Verkerk. Nature Climate Change (2014) DOI: 10.1038/nclimate2318 .



# Forest damage and disturbance in the ECE region

**Wildland fire in the United States 1926 to 2018**

Source: U.S. National Interagency Fire Center (NIFC) , https://www.nifc.gov/index.html



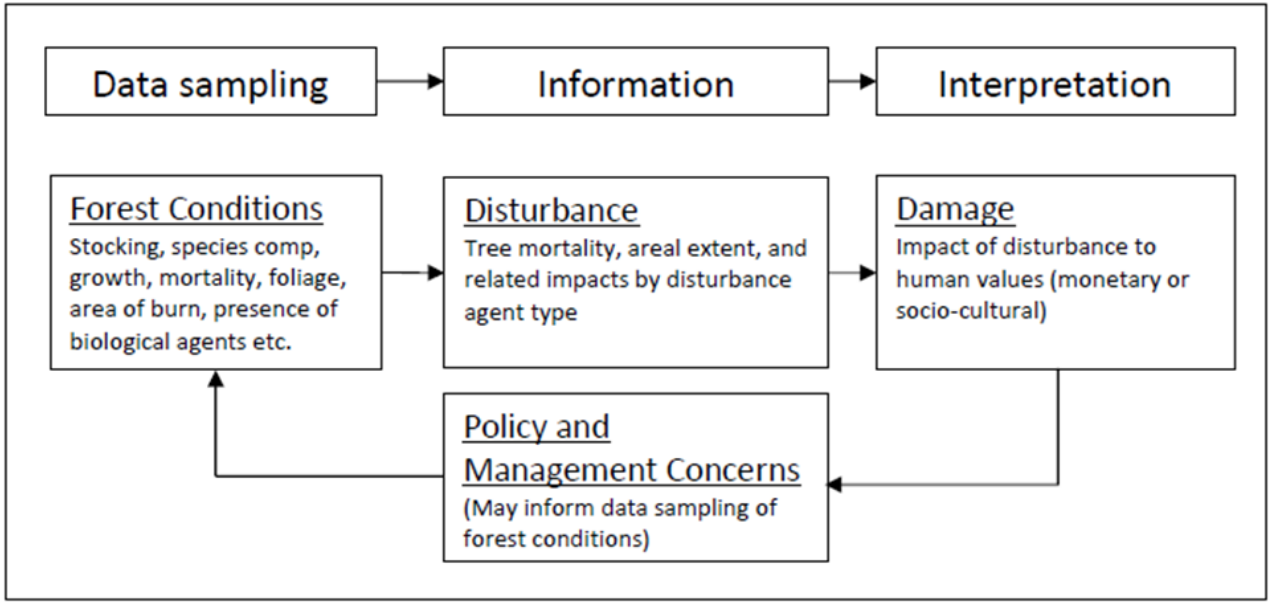

**Note:** provenance and sampling protocol for data prior to 1983 is unknown, and these data are not directly comparable to post-1983 data. Pre-1983 data is supplied here for approximate comparison on an order of magnitude basis

# The concept of forest damage and disturbance

- **Disturbances are an integral part of forest ecosystem dynamics with both "positive" and "negative" results.**
  - **Biotic** (e.g., insects, diseases, and animal damage) **and abiotic** (e.g., fire, drought, and storms)
- **Forest damage is defined as negative impacts to human values as an interpretation of disturbances.**
  - Damage is assessed based on specific values in combination with outputs and thresholds associated with these values.
- **Forest disturbance is valued neutral since it is linked to an objective set of information as results of forest monitoring.**
  - Therefore, tree mortality would be considered as disturbance, and loss of merchantable wood volume would be considered as damage.

# Reporting and assessing forest damage and disturbance

- **Forest disturbance is measured**
  - to inform actions,
  - to protect and enhance valued forest outputs or characteristics,
  - to limit the losses associated with disturbance events.




**Simple schema relating forest conditions, disturbance and damage** (Source: Guy Robertson)

# Reporting and assessing forest damage and disturbance

## Four specific objectives for undertaking forest disturbance monitoring efforts are:

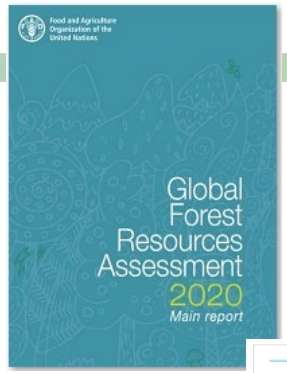
- **1. Targeted management response**
  - identify sources and extent of specific disturbance impacts to direct policy and management response
- **2. Scientific knowledge**
  - increase understanding of forest ecosystems to guide policy and management action
- **3. Broadscale change detection**
  - identify major departures in disturbance regimes to support future planning and enhance understanding of broadscale ecological and geo-processes (notably in response to climate change)
- **4. Environmental accounting**
  - support reporting to goals stipulated in international processes or to more localized environmental accounting efforts, notably those associated with carbon accounting.

# Types of forest disturbance measurement activities

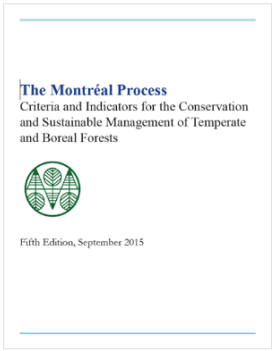
- **Plot-based, random sample inventory systems**
  - NFIs conducted in many European and North American countries
- **Remote sensing using satellite imagery**
  - World Resources institute (WRI) forest cover analysis
  - Landscape Change Monitoring System (LCMS)
- **Targeted one-time survey**
  - Rapid damage assessments with the EU EUFODOS project in various European countries.
  - After storm damage forest assessment by French IFN (Inventaire forestier National)
- **Targeted repeated survey using aircraft**
  - USA IDS (Insect and Disease Survey)
- **Other**
  - ICP Forests (depositions, defoliation/crown assessment)
  - Other monitoring and sampling efforts, usually at sub-national to local scale

# Reporting of forest damage and disturbance in international processes

- **Global Forest Resource Assessment (FRA), FAO**




- **Montreal Process C&I framework for sustainable forest management**




- **State of Europe's Forests (SoEF), Forest Europe**

# Challenges in forest damage and disturbance monitoring and reporting

- **Complexity**
  - Number of disturbance processes, the variety of life cycles, interactions, and effects across different spatial and temporal scales
  - Aggregating impacts across different categories and multi-hazard events
- **Causal Attribution**
  - Interacting multiple biotic and abiotic agents
  - Distinction between proximate and ultimate causes
- **Establishing Reference Values**
  - High dynamism and variation across space and time of disturbing processes
- **Aggregation and Consistent Measurement Protocols**
  - Different types of sampling/measurement activity
  - Different prioritizations of types/units of forest damage

# Monitoring and reporting harmonization in the ECE region

- **Forest damage/disturbance is inconsistently reported by member States across the ECE region, making further data comparison difficult.**

- **Comparable reporting on forest damage is challenged by**
  - different data collection systems,
  - data availability, timeliness,
  - evaluation and interpretation.

- **Adequate and comparable data on disturbance processes will support**
  - scientific communication and understanding,
  - the development and dissemination of effective policies
  - management responses at national to local scales

# Key points for guidance and discussion to the ongoing project by the Joint Working Party

- **A) Distinguishing between forest damage and disturbance**
- **B) Preferred thresholds for forest damage/disturbance**
- **C) Types of forest damage/disturbance to be prioritized**
- **D) Expected frequency of reporting**

# A) Distinguishing between forest damage and disturbance

- **The distinction is important since**
  - human values are divers and are likely to change and develop over time.
  - values might be interpreted differently in regards of various types of forest ecosystems and forest use.
- **Specific disturbance processes may be beneficial in certain settings**
- **A lack of distinction hampers clarity of reporting.**
- **Users should be aware of this distinction and take it into consideration when analyzing data.**

# B) Preferred thresholds for forest damage/disturbance

- **Thresholds,**
  - detect the presence and severeness of disturbing events at different observation units.
  - enable immediate decision-making and action in the case of disturbing events.
  - improve consistency of reporting, to develop and to adapt indicators and monitoring schemes for future needs.

- **No requirements for thresholds of forest damage/disturbance are applied in international reporting** (except in the Montreal Process, which mentions comparison to reference values but does not formally stipulate these values or derivations)**.**
- **Member States apply their own approaches which affects comparability of reported data.**

# C) Types of forest damage/disturbance to be prioritized

- **Forest damage reporting includes damages/disturbances by**
  - insects and diseases,
  - wildlife and grazing,
  - forest operations,
  - abiotic agents (storm, wind, snow etc.), fires (of which human induced),
  - and other human-caused disturbances

- **Prioritizing certain types of forest damage/disturbance to obtain a clearer picture of threats and impacts to forest ecosystems.**

# D) Expected frequency of reporting

- **The Global Forest Resources Assessment (FRA) and the Joint FAO/UNECE/Forest Europe Forest Data Collection, collect damage/disturbance related data in five years cycles.**

- **FRA requires annual data whereas the pan-European process considers longer periodical data of about five years.**

- **The frequency of reporting is an important factor of comprehensive understanding of forest damage for decision-making of sfm in the ECE region.**

# THANK YOU

Guy Robertson

US Forest Service R&D (Retired-Volunteer)
June 1, 2022
Geneva and Virtual

Thanks to Bastian Stahl and Roman Michalak for preparing this presentation.

Joint Working Party on Forest Statistics, Economics and Management, 1-3 June 2022