EUROPEAN FOREST INSTITUTE
ATLANTIC EUROPEAN REGIONAL OFFICE – EFIATLANTIC

# Appendix 2: Report from Workshop on 'Policies for Forest Storm Damages Mitigation and Restoration'

## 'Policies for Forest Storm Damages Mitigation and Restoration'

## STORMS Workshop 1st July 2010, Scotland House, Brussels

## Workshop Report

**Chaired by: Yves Birot**

**Attended by:**

Roland Beck, European Commission, DG Agriculture and Rural Development
Yves Birot, EFIMED, France
Kristina Blennow, Swedish University of Agricultural Sciences, Sweden
Caroline Boström, CEPFEU
Jean-MichelCarnus, INRA, France
Daniel Fröhlich, Bayerische Landesanstalt für Wald und Forstwirtschaft, Germany
Barry Gardiner, Forest Research, Northern Research Station, UK
Jean-Luc Guitton, French ministry of Agriculture, Food and Fisheries, France
Bo Hultgren, Swedish Forest Agency, Sweden
Jean-Jacques Lafitte, CGAAER, France
Guy Landmann, GIP ECOFOR, France
Yves Lesgourgues, CRPF Aquitaine, France
Martin Lindell, EUSTAFOR, EU
Mariella Marzano, Forest Research, Northern Research Station, UK

Bruce Nicoll, Forest Research, Northern Research Station, UK
Christophe Orazio, EFIATLANTIC, France
Jean-Luc Peyron, GIP ECOFOR, France
Caroline Pradeau, USSE - Unión de Silvicultores del Sur de Europa, Belgium
Zoltán Rakonczay, European Commission, DG Environment
Marie-Pierre Reviron, EFIATLANTIC, France
Peter Ries, Landesbetrieb, Forst und Holz NRW Fachbereich IV, Hoheit, Germany
Mart-Jan Schelhaas, Alterra, The Netherlands
Olivier Schneider, Office Fédéral de l'Environnement, Divison Forêts (FOEN), Switzerland
Andreas Schuck, EFICENT, Germany
Ernst Schulte, European Commission, DG Environment
Christer Segerstéen, CEPFEU
Michaela Spielmann, EFICENT, Germany
Ana Suarez-Meyer, European Commission, DG Environment
Tamas Szedlak, European Commission, DG Agriculture and Rural Development
Tilo Usbeck, WSL, Switzerland
Gerry Wahlqvist, Länsförsäkringar, Sweden
Joost Van de Velde, European Commission, DG Environment
Peter Welten, Swiss Re, Switzerland
Vicky West, Forestry Commission, UK
Thomas Wohlgemuth, Swiss Federal Institute for Forest, Snow and Landscape Research, WSL, Switzerland
Bin You, FVA, Germany

## 1. Opening remarks: Yves Birot

Delegates were given a warm welcome to the workshop by the chairman, and the structure of the day was set out.

## 2. Introduction – Workshop and Project Background: Barry Gardiner

This workshop reports on a project reviewing the impacts of storms on European forest since 1950, sponsored by the EC Directorate General for Environment. Policy and forest management systems will be examined for their effectiveness in mitigating damage and in helping restoration after storms. During this workshop we hope that researchers, policy makers, decision makers and stakeholders will share knowledge on whether the current systems are adequate at both national and European level and identify where more effective systems are needed. This provides an opportunity to share best practice and experience between countries affected by forest storm damage. The outcome of this workshop will make an important and necessary contribution to the final report of the STORMS project and our recommendations to DG Environment.

# Presentations from the STORMS project and DG Environment

## 3. A review of storm damage to European forests over the last 60 years and an analysis of trends: Mart-Jan Schelhaas

**Sources of data**

- Annual overviews
- First estimates
- References
- Internet
- Consolidated reports
- Grey literature
- Compiled in the Database on Forest Disturbances in Europe (DFDE) held by EFI

**Possible reasons for increase in damage:**

- Fluctuations in storminess
- More intensive management
- Older and taller forests
- More (coniferous) forest
- Increased growing stock

Annual overviews of damage are available for some countries, but not all. Estimates of damage appear to be variable in quality. Referencing is often poor. Graph presented of overview of damage by all agents (Biotic and abiotic) since 1850. Examined factors that may influence damage, for example in Sweden there has been a downward trend in frequency of geostrophic wind speeds >25 $ms^{-1}$. Large increase in forest area in Denmark, largely conifers that are assumed to be more vulnerable. When graph of wind damage presented as % of growing stock there is no apparent increase or decrease in Europe since 1950. Therefore no discernable climate change effect on European wind damage so far.

## 4. Motivations for active risk management – examples of economic, environmental and social impacts of storm damage in European forests: Kristina Blennow

Direct effects of exposure to strong wind – **Damage to forests**, damage to constructions, flooding, etc.

Effects of wind damage to forests – Social, Economic and Environmental

In December 1999, 3 major storms in Europe: 3 December Anatol, 24-27 December Lothar, 25-28 December Martin. In total 200 million cubic meters of timber was damaged.

Social cost – many deaths (either direct in storm or indirect in clear-up operation).

**Salvage harvest casualties:**

| Year | Individuals | Cause |
|---|---|---|
| 1953 | > 2100 killed | By drowning |
| 1969 | 16 killed | Forest workers |
| 1990 | 258 killed | |
| 1999 | approx. 150 killed | Mainly forest workers |
| 2005 | 20 killed >1700 accidents | Mainly forest workers |

Many workers involved in clear-up came from other countries. Roads blocked by fallen trees, power disruption for 45 days in some places and rail travel disrupted for 12 days.

Economic cost – depressed timber prices.

Environmental cost - Reduced carbon sink, mobilization and leaching of methyl-mercury, leaching of nitrate, release of phosphate and organic material upon storage of timber in lakes, effect on biodiversity strongly dependant on clearing-up activity

Risk needs to be seen as both probability of occurrence and the value of products and services at risk.

Hollgren 1903 after a storm stated that "Any new knowledge about how to protect the forest from storm damage, the forest man has likely not been able to collect at this destruction, especially since it probably should be regarded as a nature phenomenon of such an abnormal kind that nothing for the future could be done.".

But now we have ways in which we may be able to modify risk: climate change mitigation, silviculture and species choice, planning and management in time and space, insurance compensation.

Policy responses. Any recommendation on forest management implies a certain amount of risk taking. But who is taking the risk? This is the key question.

Management. In Sweden in 1969, there was 43 million $m^3$ of damaged timber, followed by 3 million $m^3$ of damage by spruce bark beetles. This secondary damage is influenced by post-storm management.

*Question from Jean-Michel Carnus. Is mercury leaching site specific? Answer – This may partly be a result of pollution, but mostly from mobilization of very small concentrations of mercury from disturbed forest soil.*

## 5. Factors influencing storm damage: Guy Landmann

Questions:

- Which factors influence damage?
- Is ranking of factors possible?
- Relative importance for a given event?
- On what factors can foresters act? (> policy options)

**Factors of vulnerability: classification**

- Tree species
- Stand characterization
    - Slow changes: tree height, stand structure & composition
    - Rapid changes: effects of thinnings
- Soil characteristics
    - Permanent conditions: physical limitation to root development
    - Short-term fluctuations: water saturated soils
- Landscape characteristics
    - Landscape and local scale

**Scientific approaches have changed over time**

- Earlier work: local field studies based on expert judgment
- "Phenomenological" studies: large samples and new statistical methods. But: factors are difficult to separate.
- Mechanistic approaches: description and modelling of the turbulent air flows together with the modelling of the mechanical behaviour of the tree when exposed to high wind pressure test the influence of interrelated factors

**Wind: the damage factor**

- Storms affecting large areas imply generally western winds, but other damaging wind directions occur during smaller (summer) events
- For a given storm, level of damage increases with wind speed (gust peak wind) (but local speed is not always known)
- low for gust peak wind speeds <100 km/h,
- much more evident >140 km/h
- Thresholds are not universal: trees commonly exposed to severe wind are less sensitive, other factors may modify the thresholds
- Some time series suggest strong correlation between wind speed & storm damage while others show quite different responses (this could be due to short term influences, e.g. frozen soils, etc)

**Tree species**

- Tree species are more or less vulnerable to wind (wood resistance, depth and quality of rooting system, etc.).
- Many classifications have been proposed, which show some differences. In a given region, a specific ranking is possible.
- Overall, conifers appear more sensitive then hardwoods, but unstable hardwoods are as sensitive as conifers, and some conifers, eg silver fir, are more resistant than some hardwoods
- Among the more resistant hardwoods: sessile and pedunculate oak, ash, hornbeam while cultivated poplars, locust and chestnut proved generally rather sensitive.
- Among 'sensitive' conifers: Norway spruce, maritime pine

**Stand characteristics**

A wealth of available information, some aspects are quite controversial:

**Tree height** has increased for many species in various parts of Europe, as a result of genetic improvement and lack of felling. It means higher pressure on the tree crown and a higher gravity centre. It is, at individual tree and stand level, correlated to damage, though results vary according to species.

**Stand structure** (irregular vs regular stands): mechanisms uncertain, no clear influence, contradictory results (future: mechanistic approaches should help).

**Stand composition**: potential mechanisms identified, but controversial results. Advantageous to mix a sensitive species with a more resistant one, but "synergistic" in resistance is unclear.

The role of stand structure & composition on the vulnerability of forest stands to storms is uncertain and probably not prominent (less important than many foresters believe), but mixed and structured stands are more resilient

**Short term fluctuations of stand characteristics : thinnings**

Shortly after a thinning stands prove sensitive: frequent and/or strong thinnings may have a marked impact. Depending on the thinning frequency, the proportion of stands in a labile state may vary substantially. A lack of thinning would lead to undesirable effects (including reduced stability to the wind): frequent/intensive thinning should be carried out early during the life span of stands. Similarly, any stand newly exposed to wind, when the neighboring stand(s) are cut, open stands, or in a phase of natural regeneration, are also sensitive.

**Soil characteristics**

- Permanent soil conditions (altered by silviculture practices)
- Physical (rather than chemical) limitations to root development seem to be most important
- Real soil depth and the real root development are difficult to measure. When studies include estimates, they confirm the influence of soil and root conditions. Specific examples: beech on superficial calcareous soils in Lorraine; rooting restrictions due to indurations or to ironpans.
- In naturally wet sites which are used for intensive plantations: importance of good drains.

**Soil characteristics -** Short term fluctuations

Temporary excessive soil humidity: Some evidence that water saturated soils as a result of very rainy periods make trees more sensitive to wind, because the physical structure of the soils is altered, making tree roots less efficient anchors. Example is the December 1999 storms.

Landscape characteristics - It is possible to predict where damage will be worst

Air flow is locally influenced by a series of topographical factors which are gradually becoming better understood

Complex effects in hilly or mountainous situations. Stands situated in sheltered situation (opposite to the origin of the wind) are somewhat protected. Flat/ plateau areas are more damaged than slopes.

Locally, forest edges and any significant unevenness in the forest canopy (open land/forest transitions, recent cuts, stands of different heights) strongly influence the spatial distribution of damage.

**Outlook:**

Vulnerability is a complex issue where knowledge is currently insufficient. It is a sensitive subject where views are often subjective. How do we reach a shared conclusion?

Ranking of factors is not easy. However, some factors are clearly identified as important and modifiable by managers. These include stand height, thinning regime, and spatio-temporal organization of harvesting.

But technical options must be weighted against economic, and environmental issues (C, biodiversity, etc.).

*Peter Welten asked for an explanation of the impact of soil conditions on storm resistance of trees.*

*Guy Landmann explained that there are 3 overall possibilities. First, free draining soils that provide normal resistance of trees to windthrow. Second, wet or waterlogged soils where vulnerability to windthrow is increased, third, frozen soils in which the roots are firmly anchored and windthrow is unlikely but instead windbreak will be the predominant form of damage.*

## 6. EC Green Paper on "On Forest Protection and Information in the EU": Ernst Schulte

Presentation of a historical overview of EU involvement in forest issues 1952 – 2010.

**EU Forest Action Plan**

Key action 6 : EU compliance with UNFCCC/Kyoto Protocol + adaptation to the effects of climate change
Key action 8 : Work towards a European Forest Monitoring System
Key action 9: Enhance the protection of EU forests

**Commission White Paper on adaptation to climate change – COM(2009)147**

Establishing an EU Framework for Action

Launching a debate on forest protection and information

Adapting the EU Forestry Strategy

EC Green paper on 'Forest Protection and Information in the European Union' covers: State of EU forests, forest functions, Impacts of Climate change, Tools available for forest protection, and Forest Information. Consultation continues until end of July 2010.

**What is at stake?**

- Trees and soil as sinks or sources of carbon
- Output of forest products that can act as sink during their useful life
- High expectations for bio-energy supply, especially with current bio-energy debate
- Ecological functions that are essential to the earth's life supporting systems (70% of species threatened by loss of their habitat)

Protecting forests = both mitigation of and adaptation to climate change

**Functions of EU forests**

Socio- Economic functions :

- Forest based industry = 10 % of EU manfacturing/2.5 million jobs
- Large downstream value chain
- Possible imbalance supply/demand > bio-energy 2020
- Local importance of non-wood forest products
- Important landscape element (tourism/property value)
- « Green infrastructure » protects settlements

**Environmental functions – ecosystem services:**

- Forests protect soil
- Forests protect water quality and regulate water quantity
- Forests are a major repository of terrestrial biodiversity
- Forests regulate climate and weather
- Forests act as carbon stocks

**Impacts of climate change on forests**

- Increase in water stress
- Increased risk of storm damage
- Increased fire risk in terms of frequency and scale
- Changes in nutrient balance in soils
- Northward/altitude migration of tree species as well as other organisms
- Increase in insect outbreaks , e.g. of bark beetles
- Increase of pests
- Forest dieback, including damage caused by game and invasive alien species

**Rapid changes may affect ecosystem stability and forest functions**

**Forest Protection challenges:**

- Forest fires , mainly in Southern Europe
- Storms and windthrow more frequent
- invasive alien species, including exotic trees, new pests
- Fragmentation of ecosystems and holdings
- Changes in water regime
- Excessive game density
- Decline of genetic resources
- Scarcity of undisturbed areas
- Impacts of forest management
- Forest « dieback » at regional level

➔ **loss of biodiversity and carbon**

➔ **forest functions at risk**

**Tools available now:**

EU policies:EU Forest Strategy, FAP, CAP (rural development), Natura Directives, Forest based industries, FP7, climate policy, energy, plant health, etc

National policies: National forest programmes, national forest inventories, management requirements, legal provisions, etc

Forest management: Afforestation, fire prevention, planning

**Current forest information sources** – not coherent

- European forest data centre / European Forest Information and Communication Platform.

- Should monitoring be improved?

**Future forest information needs**

Possible forest reporting requirements after 2013 could target on:

- A harmonization of definitions and forest inventory systems which assures compatibility and comparability
- An agreement on a forest typology
- Assuring continuity of the forest condition monitoring, including information on climate (carbon contents of soils), biodiversity and biomass
- Assuring continuation of efficient forest fire monitoring and prevention

**Recent relevant council conclusions**

- International biodiversity beyond 2010; 22 December 2009
- Biodiversity post-2010; 15 March 2010
- Forest fire prevention within the European Union; 26 April 2010
- Preparing forests for climate change: Forest protection and information in the EU; 11 June 2010

**Where are we now?**

- International Forest Protection Conference, Valsain, Spain, April 2010
- Public consultation on the Green Paper - Web based, ends 31 July 2010. All interested parties are invited to contribute. This could lead to a white paper next year.
- http://ec.europa.eu/environment/forests/fprotection.htm
- Green Week and forest side session of 3 June 2010

**A POLICY PROCESS**

- Studies: storms, forest fires, forest protection, dieback, protective functions, biotic agents, …
- Valsain Declaration on forest protection of 6 April 2010
- Public consultation
- Council conclusions, Forest Strategy and Forest Action Plan
- Opinions/resolutions from the Parliament, European Economic and Social Committee (EESC) and the Committee of the Regions (CoR)
- Report on public consultation (2010)
- White paper on forest protection and information (2011)
- Legislative proposal (2012)
- update of the EU Forest Strategy on climate related aspects

## 7. Future damage scenarios in a changing climate and impacts on GHG exchange: Mart-Jan Schelhaas and Marcus Lindner

**Observed trends in storm activity in Europe**

Measured wind speed of gusts increased strongly in Switzerland since the beginnings of recordings in 1933 (Usbeck et al., Int. J. Climatology 2010).

Storm Gudrun max wind gusts near 35 m s-1, the highest ever recorded in southern Sweden (Alexandersson and Ivarsson, 2005).

**Future storm frequency and intensity**

General cyclone activity is forecast to decrease overall in the Northern hemisphere (Ulbrich et al., Theor. & Appl. Climatology 2009).

Storm tracks expected to move further north (Ulbrich et al. J.Climate 2008).

Frequency of high intensity storms (not total number) increases (Leckebusch et al. Met. Zeit. 2008).

Projections indicate: Increasing cyclonic activity over parts of Europe (e.g. UK), storm tracks moving north, decrease in return period of storm wind speeds. Storm tracks becoming wider and penetrating further east. Less prolonged winter frozen soil.

"Prototype storm Kyrill": higher wind speeds; larger areas affected (longer tracks; broadening along the path); Eastern Central Europe exposed more to intense storms by the end of the 21st century (Fink et al., Natural Hazards and Earth System Science 2009).

Increasing temperature extends the duration of unfrozen soil conditions leading to reduced tree anchorage in the soil (Valinger and Fridman, 1999)

Projections of extreme events suggest increased amounts of precipitation during cyclone activities (Bengtsson et al., 2009) leading to excessive soil wetness

Susceptibility of forest stands to storm damage increases

**Forest development 1950 – 2010**

Forests have grown older and taller, and the composition and characteristics of European forests have changed significantly since 1950. This has led to an increased amount of damaged timber (Schelhaas et al., Global Change Biology 2003).

Without drastic management changes, European forests will continue to accumulate growing stock, and on average will become older (Nabuurs et al., European J. Forest Research 2007)

**Management factors influencing forest sensitivity to damages**

- Management intensity is crucial
- Larger biomass demand for bioenergy could stimulate more intensive management
- Species changes? Less spruce could possibly reduce damage risk

With increasing growing stock , more intense storms, and reduced soil anchorage, forest damage projections indicate a large increase in forest damage, with a 'rough estimate' of up to 4 times the current damage levels by 2100, although this estimate must be treated with caution for various reasons. Factors not included that would reduce this estimate include reduced increase in growing stock due to increased forest damage, adaption to increased wind speeds increasing the anchorage of trees, and any changes to current forest management.

**Consequences of wind damage on GHG exchange**

- Reduction of C assimilation

- Increased heterotrophic respiration

Soil carbon content on storm damaged sites was found to be 27-38% lower than on undisturbed sites (Kramer et al. 2004: Ecology, 85, 2230-2244).

**Impacts of historical storms on the European carbon balance**

Lindroth et al. (2009) estimated that disturbance of European forest ecosystems by windthrow over the last 50 years has resulted in an average annual loss of 1.14 million tonnes C $year^{-1}$. An extremely damaging storm, Lothar in 1999, reduced the C sink in Europe by around 16 million tonnes C which is equivalent to over 30% of the European Net Biome Production in that year (Lindroth et al., Global Change Biology, 2009)

*Point raised by Christer Segersteen: The growing stock increase may be considerably less than projected as biomass will be needed for many products by 2050*

## 8. Possible policy options for the forest sector in order to reduce the impacts of storm damage: Christophe Orazio, Jean-Luc Peyron

**Potential measures**

- Pre-storm measures
- Common regulations
- Improve risk knowledge
- Stability improvement
- Crisis plan
- Insurance system
- Post-storm measures
- Short term effect : crisis management
- Long term effect : recovery
- What is relevant at the European level?

**Before storms**

Common regulations

- The European Civil Protection Mechanism can help any member country in case of major disaster.
- The European Union Solidarity Fund can support countries for emergency measures of not insurable damage, but does not cover private losses.
- European Agricultural Fund for Rural Development (EAFRD) to restore forestry potential in forest damaged by natural disasters
- Obligation of reforestation after clear-cut or disaster: specific regulation or Sustainable Forest Management
- Change of land use required specific procedure
- States are implementing EU Forest act, Natura2000, LIFE+, EAFRD. This funds can be used to :
    - Promote environmental afforestation
    - Enhance ecological value of forest
    - Support restoration of damaged forests
    - Review and update protection strategies and monitoring

**Policy options to Improve risk knowledge**

- Monitor and harmonize damage monitoring to compare the storm effect to other types of damage to define the share between hazards
- Map risk to define best land use option and management options according to risk level
- Regional foresight according to predicted changes in wind regimes
- Support fundamental and applied research on forest stability

**Policy options to Improve stand stability and resilience**

- Use national regulations, grants and certification schemes for forests to:
    - Modify thinning regimes and rotation ages
    - Optimize spatio-temporal cutting and species
    - Encourage appropriate site preparation
    - Minimize fragmentation
    - Use appropriate species and provenance according to site
    - Maintain drainage when needed for deep rooting

**Policy options to Improve stand stability and resilience**

- Reduction of low stability areas linked to environmental regulation :
    - Old stands, preservation of wetland areas, protection forests, etc.
    - High value stands
- Integrate storms in protection policy as an hazard for:
    - Habitats
    - Genetic resources
- Coordinate biomass policy taking into account that storm damaged trees can be used for biomass

**Policy options to anticipate storm damage by preparing plans**

- Alert threshold and procedure
- Options according to damages scenarios
- Participants and role
- Priorities
- Temporary funding of emergency measures
- Permanent funding of emergency services

**Policy options to anticipate storm damage with insurance**

- In some countries storms are considered as an insurable risk : True? Cost efficient? Equitable inside EU?
- In many countries only a few forest areas are covered by insurance
- Problem of ratio between exposure/hazard and insurance guarantee, social and economic context.

**Post-storm management:**

**Policy measures for alert management**

- When storm is announced, the following measures have to be undertaken :
    - Establishment of crisis cell
    - Security measures for rescue
    - Information and communication to public
- What is the appropriate level : local, national or European?

**Policy measures for emergency and rehabilitation**

- Normal reactions just after storm are :
    - Limitation of public access
    - Quick damages assessment
    - Psychological support
    - Training of team for clearing
    - Clearing and rehabilitation of infrastructures
    - Restore seedlings and young trees in regeneration areas
    - Support and secure seedlings production

**Policy measures for forest crisis management**

- Facilitation of wood harvesting
- Incentive to acquire forest machines
- Infrastructures creation (roads, harbour, railway, etc)
- Adaptation of transportation regulation
- Grants for long distance transportation
- Wood storage : funding facilities
- Priority to damaged wood harvesting in public forests
- Collective agreements on prices
- Financing roundwood removal and guarantees for buyers
- Promoting use of wood products
- Limiting imports and facilitating exports
- Limiting losses of forest owners
- Direct forest income support
    - damaged forests
    - unaffected forests
- Adaptation of taxes on
    - capital and wealth
    - Income and value added
- Organize collection of charity funds
- Management of post storm additional risks:
    - Protection against pest and diseases
    - Limiting exchanges of potential pathogens related to long distance transportations
    - Prevention against forest fires
    - Prevention against soil erosion
    - Restoring ecological balance between game and forests
    - Reinforcement of means
    - Staff
    - Budgets

**Policy measures for forest reconstitution**

- Support of forest reconstitution:
- Definition of a collective strategy (trans-boundary??)
- Grants for stand cleaning
- Grants for forest reconstitution
- Funds for scientific studies

**Policy measures for general post storm management**

- Governance
- Stakeholders
- Organization
- Communication
- Monitoring

**Research studies - What should Europe do?**

**Policy measures - key issues at European level**

- Harmonize monitoring system for forest damages (primary, secondary, other hazards, etc). Not only through individual projects but in a more consistent and long-term approach
- Organize trans-boundary alert system and crisis management
- Harmonize post storm management response affecting the market of surrounding countries
- Contribute to the cost of major event recovery as is done in agricultural systems in order to pool the necessary resources?
- Contribute in order to maintain value of market?
- Contribute to harmonized status for insurance to avoid disparities between European citizens owning forests? European reinsurance fund?
- Include storms as an integral part of EU Forest Strategy?

**Policy measures -Conclusions**

Policy measures are necessary due to the exceptional nature of destructive storms
Despite the experience gained in this field, they still need to be improved
Adaptations are necessary for each storm event
Europe has a role to play alongside Member States and their regions. Need to decide:

- Which of these measures are efficient?
- Which measures are controversial?
- Are any efficient measures missing from the list?
- What should be implemented at a European level to help deal with storm impacts on forestry?

## 9. Brainstorm session to identify management, policy and responses that are effective and those that are ineffective in relation to storm damage: facilitated by Mariella Marzano

The brainstorming session was used to initiate discussion prior to the last session of the day. Participants were informally divided into groups of four to discuss existing policy measures, instruments and tools that are relevant to storm damage. Participants were asked to identify these, decide whether they are effective or ineffective, and in both cases to state why. The responses were collated and categorized by Mariella Marzano, Bruce Nicoll and Barry Gardiner for use in the introduction to the final Breakout Session – see later.

# Short presentations on storm impacts from different stakeholder perspectives

## 10. Private Forest Sector viewpoint (CEPF): Christer Segerstéen

**European forestry**

- 16 million family forest owners
- Over 60 % of forests owned by families
- Small scale forest holdings
- average size 2-50 ha
- Sustainable forest management (SFM) is the goal
- 60 % of the annual increment in European forests is harvested

Most important for forest owners is how to prepare for the next storm. A storm is a catastrophe for forest owners; it is not only a loss of income but also creates strong feelings when foresters see the work of generations gone in an instant. Generally, a storm event receives a lot of attention from policy and media in the first week after the storm but after a time, forest owners are left alone. Thus it is very important to have contact and keep in dialogue with forest owners for a long-period (years) after the storm damage.

SFM is a keyword for CEPF; how to prepare for the next storm; cooperating with research and universities. Management practices have changed after Gudrun from 3 commercial thinnings to 2 commercial thinnings. Where more wood is taken out, the trees left can become stronger and more resistant.

Each country has a different way to cope with storm damage. Dialogue with politicians, forest industry, authorities and the forest owners is most important! Dialogue is also important if we are to learn from each other.

## 11. State Forest Sector viewpoint: Martin Lindell, Executive Director EUSTAFOR

About EUSTAFOR (www.eustafor.eu)

European State Forest Association (EUSTAFOR)

- Represents commercially orientated state forest , which have sustainable wood production as a major concern
- 28 members from 21 countries
- Total forest area ~ 46 Mha (27% of EU forest area)
- Protected forest area ~ 10 Mha
- Annual increment ~ 155 $Mm^3$
- Annual harvest ~ 115 $Mm^3$
- Number of employees ~ 110 000

**Two examples as background (Sweden and Czeck Republic):**

SVEASKOG, Sweden Gudrun 2005 and LESYCR, Janovice in Czeck republic 2008

**SVEASKOG, Sweden Gudrun 2005**
Windblow of Jan 8-9 2005
What happened in Sweden?
How did Sveaskog (state forest company) handle the situation and what consequences will it have in the future?

Storm-felled timber in southern Sweden (million $m^3$sub)

| *Player* | *Volume* |
|---|---|
| Sveaskog | 3 |
| Södra Skogsägarna | 30 |
| Sydved | 12 |
| Skogssällskapet | 3 |
| **Total** | **48** |
| National Board of Forestry'sassessment | 63 |
| *Sweden's total felling* | *70* |

**Planning work**

- Overall volume determination – helicopter inventories of random stands
- Fast field start due to experience from storms in 1999 and 2001

**Action own machines**

- Reallocation of own resources
- Overtime for own operators who travelled from north Sweden
- Media advertising
- Machines came from Sweden, Germany, Finland, Estonia

- Active recruitment of felling machines, Sveaskog's staff, international contacts
- Local negotiations
  – agreement exemptions
- Safety training

**Impacts**

- Entire company affected
- Low field purchasing activity
- Assistance to industry colleagues
- Language problems
- High workload
- Work relocation for long period
- Accidents, deaths and personal tragedies

**Stand selection, priorities**

1. Seed trees and final felling -both pine and spruce stands
2. Heavy thinning spruce stands
3. Heavy thinning mixed forests
4. Light thinning
    - Spruce with root contact on wet land to be left until summer
    - Stands with scattered wind throws not given priority

**High risk for bark beetle attacks**

- Important to remove as much as possible before swarming
- Priorities set on what to remove

**Increased fire risk**

- Problems with accessibility
- Sveaskog - Fire & Rescue Services - minimise fire risk
- All planning staff and machine operators trained by Fire & Rescue Services
- Fire-fighting planes

**Conclusions**

Silviculture recommendations:

- Earlier harvests
- Fewer thinnings in old forests
- Spruce remains profitable

**LESYCR, Janovice in Czeck republic 2008**

**The Windblow in June 25 2008 -** What happened in Janovice, Czech republic?
How did LESYCR handle the situation and what consequences will it have in the future?

**Background and effects of the storm**

- Janovice Preserve is a state property of about 650 ha
- The property is managed for wood production and breeding of deer and mufflon for hunting
- The whole property was/is fenced
- It contained 100-150 deer and 200 mufflons
- Wind speeds of up to 55 m/s and tornados
- 230 ha were cleared, largest single area 132 ha

**Main tasks**

- Save the timber value
- Minimize risk of bark beetle attacks
- Start regeneration
- Ensure return of animals

**Focus on:**

- Quick estimate of damage
- Removal of timber to save value
- Minimise insect damage
- Decide on a new regeneration plan
- See possibilities within damaged forest
- Encourage animals back

**CONCLUSIONS IMPACT AND ACTION**

- Impact on all of the company
- Market prices down
- Increased costs for storm harvest
- Fast action needed to estimate damage
- Action plan and clear leadership
- Safety is key
- Quick removal of timber to save value
- Action to minimise insect damage
- Reforestation as soon as possible

**CONCLUSIONS FOR FUTURE MANAGMENT**

- Guidelines in handbooks or as conclusions
- When possible more broadleaves using natural regeneration together with conifers
- When suitable more broadleaves as main species
- In some cases earlier final harvest
- Fewer thinnings in old forests
- In central Europe use lower density when regenerating

## 12. Insurance company viewpoint: Peter Welten, Swiss Re

**Who is Swiss Re?**

Swiss Re is the second largest re-insurance company in the world. It specializes in insurance of insurance companies in case of catastrophes and has a dedicated Agriculture team. 16 specialists (location Zurich, Singapore, Mumbai, Sao Paolo).

**Forestry (Re)-insurance**

There is forestry insurance available for forest owners. Insurance cover is available for fire/lightning damage, windstorm, hail, frost, snow, ice, floods, earthquakes. Cover is not provided for forest pests and diseases (insects and fungi), largely because past management practice is believed to be critical.

Forest insurance available in the following European countries: Finland, Sweden, Norway, Denmark, Netherlands, UK, Germany, Austria, France, Spain, Portugal, Romania, Czech Republic, Slovak Republic

**Indemnification:**

1) for "new" established plantations (up to ~ 7 years): compensation in order to re-establish the plantation (insured value: ~ EUR 2 000 per ha)

2) for established plantations: Insurance pays a partial cost to the forest owner (~ EUR 20 per $m^3$). No fuel value coverage. No coverage for entrepreneurial risk (future timber values, timber prices)

**Challenges for the forestry storm insurance**

- Correct premium calculation (vulnerability: correlation between storm model and the effective loss)
- Awareness & willingness of forest owners to insure and pay the premium
- Low frequency, high severity (long period without losses)
- Geographical diversification (sizeable portfolio)
- Development of timber prices
- Loss assessment after catastrophic events
- Availability of governmental subsidies
- National catastrophic fund

**To increase insurance penetration:**

- Increase awareness of risk
- Provide clear and understandable insurance products based on the needs of the forest owner
- Affordable premium rate
- Clarify potential state involvement – does insurance cover affect payment from national disaster fund?
- Potential involvement of State (subsidies)
- Check situation with national catastrophic fund
- Voluntary vs. mandatory scheme
- Forest land consolidation (numerous small & private owners)

**Future development of storm events**

- Past events: 1990 Daria, Vivian/Wiebke; 1999 Anatol, Lothar/Martin; 2001 Pyry/Janika; 2005 Erwin/Gudrun; 2007 Kyrill, Per; 2008 Paula/Emma; 2009 Klaus
- Difficult as-if considerations from past event to future due to:
- Changed forest area (growth, age classes, species, silviculture measurements, standing timber volume,etc)
- Climate change
- Lack of reliable and representative loss data (FGU)

44% increase in damage is expected by end of century, with average annual loss increasing by 16-68% by 2082. The increase will vary from country to country.

**Summary of the findings**

- An increase in average annual loss of 16%–68% over the period 1975–2085, depending on the models used
- A disproportionate increase in losses for less frequent events (in high insurance and reinsurance layers).
- Country-to-country variance in the increase in expected losses
- Changes to both storm severity and frequency

For more information see SwissRe home page (www.swissre.com) – documents on climate change.

# Short presentations on national perspectives

## 13. France (Storm Klaus): Jean-Michel Carnus

Klaus was a 'centennial' storm, less than 10 years after another 'centennial' storm (Martin). Very high local impacts: standing volume in the area was reduced by 50 % in 2 storms (150 to 75 $Mm^3$). The response to Klaus was complicated by the global economic crisis in 2008-2009 (25 to 50% activity reduction for regional wood-based industry)

**Klaus – local impacts**

Volume of damage = 1.6 x Martin damage

- 37,1 M $m^3$ for maritime pine
- 31% of standing volume (source NFI 2009)
- 68 % of damaged trees were uprooted
- 200 000 ha of maritime pine > 40% damaged

**Klaus – post storm operations**

- damage assessment
- clearing and restoring road access
- exploitation of damaged wood
- setting up of storage platforms
- transportation and storage

- forest sites cleanup
- forest regeneration

Klaus - policy measures (similar to 2000 post storm measures)

| measures | State | Region |
|---|---|---|
| **emergency (road clearing, damage inventory, support of organisations, human resources...)** | **grants** | **grants** |
| **post storm forest operations (construction of storage infrastructures, wood extraction, transport and storage, support of forest enterprises..)** | **grants, loans** | **grants, training** |
| **forest protection and restoration (forest cleanup, restoration of infrastructures, pest control, forest regeneration, support of nurseries…)** | **grants, loans** | **grants** |
| **storm prevention (insurance system, emergency plan, expertise and foresight studies, research programmes…)** | **new law** | **carbon fund** |

**Effectiveness of measures**

1. delays in implementation & loss of timber value
2. collapse of timber prices
3. discouragement to forest owners
4. exploitation of 14 $Mm^3$ in 2009
5. large volumes exported from the Region (20 %)
6. storage of 4 $Mm^3$ in 2009
7. cleanup of 40000 ha by mid-2010

## 14. Germany (Storm Kyrill): Peter Ries

Lessons learned from Kyrill were applied to smaller storm Xynthia a few years later. Forest is 20% community owned, 46% private owned, 34% state owned. The storm killed 43 people in Europe, 11 of which were in Germany. According to insurance information 8 people were killed during salvage operations. Overall damage in Germany cost 4.7 billion Euros. 16 million $m^3$ timber was damaged in Germany (4x sustainable annual harvest).

- A Crisis committee was immediately established as a communication platform between the Ministry, the State Enterprise and different stakeholders
- Remote sensing was performed using infrared aerial photography. It is important to do this as soon as possible after a storm so as not to miss window of good weather.
- A call centre for affected owners was set up and was effective.
- The EU Stability fund was used, along with national funding.
- Timber storage: both wet storage and foil storage.
- Old rail and road networks were reactivated.

- Entered the national cooperation PUMA (Prevention and Management of Forest Disasters) as Knowledge managemet platform
- See handbook 'STORM'

## 15. Storms Vivian (1990) and Lothar (1999) in Switzerland: damage causes, policies and regeneration state: Thomas Wohlgemuth

Forest area in Switzerland has grown from small percentage cover 100 years ago.

There appears to have been low levels of damage from 1900-1950 ('disaster gap') which may have encouraged a lack of awareness of the rise of storm damage.

More stock = more damage

Forest functions:

- Protection (Stone fall, avalanches in mountains)
- Production (Construction and energy in lowlands and mountains)
- Nature conservation
- Recreation in lowlands and mountains

To clear or not to clear? - and to plant or not to plant? – Important questions.

Main problem: transient decrease of protective function => experiments with three treatments

plantation 10 years ahead
- differences levelled after 20 years
- protective function on uncleared forests for ca. 10 years

=> research has de-emotionalized the discussion on pros and cons => decision support system (BUWAL 2000)

Main problem: no experience with natural regeneration => experiments with two treatments (cleared - uncleared)

regeneration generally quicker at lower elevations than in mountains – problem vegetation: black berry, bracken

**Lessons from Vivian (1990) and Lothar (1999):**

(1) Governmental support Vivian: ca. 200 Mio CHF, Lothar: ca. 600 Mio CHF => support as the case arises
(2) Decision support systems: BUWAL (2000), BAFU (2008)
(3) Incentives for conservation areas: rarely used
(4) Climate change: implementation ongoing (programme "forest and climate change")

## 16. Sweden (Storm Gudrun): Bo Hultgren

- 10 killed in clearing up the storm damage

- 2400 accidents in clearing after the storm
- 450 000 without electricity
- 50000 without electricity for more than a week.
- 3 million $m^3$ killed by bark beetle (*Ips typographus*)

New means of transport used – e.g. rail plus ship, etc. Increased transport costs.

Swedish forest policy is based on 'sector responsibility'. New regulations in Forestry Act - took away restrictions for first year, then enforced them slightly harder in subsequent years.

Environmental problems:

- Salvage whatever the cost
- Sediment to streams and watercourses
- Mercury and N leaching
- Destruction of ancient monuments hidden in the woods – lack of information.
- Damaged natural values

Used information more than legislation to get action:

- Be careful!
- How bad is it?
- Where is it?
- When to do what?
- Regulations – what are you allowed to do?

This was then followed by another storm in 2007.

Reflections:

- Collective responsibility stronger than law enforcement
- Saved to some extent by good market conditions and by weather that was not good for bark beetles.
- Massive response from Swedish Forestry Community
- Better communication between authorities
- New and old knowledge (e.g. what to plant where) and better alarm system (weather forecasting and networks).
- Electricity company changed its name following the storm
- Insurance companies ask for storm planning
- Business as usual?
- Maybe even more spruce than before
- Forest owners have hope for the future!

# Brainstorming, Breakout Sessions and Discussion

## 17. Review of morning brainstorming session: Barry Gardiner

- Although participants were asked to write down existing policies most notes contained wishes
- There is no EU standard for storm management
- Little sharing of knowledge and practices in Europe even though we now know a lot
- Key wishes are
    - to have National/regional contingency plans
    - to have a better insurance system standard across Europe
    - Flexibility of forest regulations
    - Clear guidelines to help with forest management – don't force management inappropriately
    - to have standardized monitoring
    - to have quick access to funding, particularly for fast and appropriate situation analysis
    - to have EU standards/regulations for machinery and transport to allow response from many countries to storm damage

## 18. Breakout groups - discussion and agreement on recommendations, proposals and policy gaps. Moderators: Andreas Schuck/Jean-Michel Carnus

In particular to focus on: Current forest management, Current policy and policy changes, Pre-planning and immediate response to storms, and Long-term strategy for adaptive forest management.

Questions asked by the groups were:

1. What policies (guidance/measures/tools/instruments) currently exist in relation to storm prevention or minimizing damage and post-storm management?

2. How do these policies etc. inform (i) current forest management relating to wind risk, and (ii) pre-planning and immediate response to storms?

3. How effective are these policies in relation to Q2 above?

4. If they are effective, please describe how. If they are not effective what policy changes are needed?

## Group 1 – European Context

Participants:

Andreas Schuck (facilitator), Caroline Boström, Jean-Luc Peyron, Mart-Jan Schelhaas, Ernst Schulte, Christer Segerstéen, Peter Welten, Martin Lindell

Relevant European policies listed by the group at EU level were:

- European Solidarity Fund (ESF): Can be applied in case of an emergency
- European Agricultural Fund for Rural Development (EAFRD): funds are allocated beforehand, but may be re-allocated to mitigate storm damage impacts
- Cohesion funds: could be used to influence vulnerability/management of the forest more generally, i.e. before a storm.

The group noted that there is often a delay in the availability of financial support for storm stricken regions. Examples were: Authorization for re-allocation of EAFRD funds took in practice two months,

which is very long, as storm damaged timber needs be cleared in a rather short period. ESF funds were seen to be available much quicker.
The group felt that crisis management is not so well organized as compared to e.g. fire both at EU and national scale. Here the EU could play an important role.
It was noted by DG ENV (Ernst Schulte) that countries can ask for mutual assistance via the 'Monitoring and Information Centre' in case of emergencies. Since 2001, the EU has adopted the Community Mechanism for Civil Protection of which the Monitoring and Information Centre is the operational unit. It is part of Directorate-General for Humanitarian Aid & Civil Protection of the EC and accessible 24 hours a day. It gives countries access to a platform, to a one-stop-shop of civil protection means, and is available to all the participating states.
The group recommended adding storms expertise to the centre. Further, a reference on the availability and tasks of the Monitoring and Information Centre should be given within any national/regional crisis management plans, as it was not believed to be well known.

EU has also influences in other ways (e.g. indirectly). For example: In Sweden, direct wood transport between certain locations was not allowed due to some specific EU regulations, which hindered efficient logistics in wood removals. State aid subsidies (such as for transport) have to be approved by the EU.

A clear wish was identified for an exchange of information that could be facilitated by the EU. Different countries have coped with crisis management after storms and could gain from the experiences of others. This could be shared through an information portal in different languages. The group noted that UNECE has collected some material on their website. Possible options are:

- One way to keep information available is to publish regularly a state-of-the-art report in this field, as is done e.g. in the US or by the EEA (published in different languages).
- Enhance dialogue across borders: Role of the EU in the wake of storm events that affect more than one country
- Crews from other countries are not familiar with national legislation and guidelines. Europe could help in offering translations (beforehand?)
- Offering training sessions for field crews and offer exchanges for gaining knowledge from other countries (this is done to some degree in the fire field)
- EU already offers remote sensing products, which could be helpful in damage estimates or identifying storm prone areas; see also Space Programme projects which deal with such topics
- Support towards flexibility of measures
- Investigate the role of insurance systems vs. state aid (agriculture is better organized in this respect when it comes to tapping into subsidies and having insurance)

**Discussion questions during 'Feedback session':**

Need for exchange of knowledge – especially in planning for and dealing with storm damage. Is it possible for EU to facilitate information exchange, for example translation of material?

Remote sensing: It should be possible to have daily maps of European forests.

Is it possible for centralized repository for 'state-of-the-art' reports such as, for example, European Environment Agency?

It would help if up-to-date world wide timber prices could be made available rapidly and online.

## Group 2 – Storms Martin and Klaus

Participants:

Christophe Orazio (facilitator), Yves Birot, Jean-Michel Carnus, Guy Landman, Yves Lesgourgues, Marie pierre reviron, Ana Suarez-Meyer, Joos Van de Velde, Jean-Jacques Lafitte, Jean-Luc Guitton, Caroline Pradeau

As most of the participants were involved in the Klaus and Lothar-Martin post storm management, to identify gaps and improvement required, the group decided to follow the various steps of the crisis management. Following this process the participants could make comments on the difference between the two storms, the improvement required and the gaps in political process.

This quite systematic procedure permitted an exhaustive listing of the problems faced during the post storm management, but no time was left to discuss on potential measures to improve stability.

The following measures where listed and discussed :

- Committees for crisis management
- Damages assessment (rapid and detailed)
- Emergency measures
  - for public
  - for forest
- Negotiation of the governmental plan
- Political announcement of the plan
- Negotiation with Brussels for plan acceptance
- Demand of Solidarity funds
- Regional and departmental support
- Grants for transportation
- Grants for mobilization
- Grants for storage
- Derogations for truck loads and work forces
- Postponing of thinning
- Grants for stands cleaning
- Grants for stands regeneration
- Monitoring of measures (stocks, fluxes, areas, ..)

In the discussion, participants expressed the need for the following elements :

- Contingency plan for storms with list of measures, involved bodies and amount of money available under a simplified procedure for emergency measures. (The outline for such a plan was drafted during the KLAUS '*expertise*' http://landes.gip-ecofor.org.)
- Pre-defined temporary derogation for itinerary, truck loads, workforces.
- Pre-established emergency plan with Brussels : to save a couple of month, European legislation should allow automatically governments to contribute to emergency measures such as roads opening, initial inventory of damage and wood storage. A post event evaluation process could validate the appropriateness of the procedure used.
- Renegotiation procedure after plan adoption : when a plan is adopted and validated by Europe, it appears very difficult to renegotiate anything. The adaptation processes should be included in the regulation.
- As storms generate huge amounts of wood available on local/national/European market in a short period a good understanding of European market and price trends is required to take appropriate measures after a storm. An European inventory of prices would be very useful.

- When minimum prices between stakeholders are not defined market disruption is huge, and affect the whole sector. Prices should be controlled in some manner. Grants for transport should be available under certain conditions. Market evolution should be taken into account in the supporting procedures, priorities on products types (according to the final use and the species); Market alone should not decide the prices.
- Maintenance of storage platforms. As it requires a lot of technical and financial efforts to create such platforms, some of them should remain active on long term to be active immediately after the event, and save time. The appropriate location and size should be defined in an agreed way.
- A European crisis secretariat for forest crisis management (fire, storm, diseases) to inform and exchange information on the prevention and the consequences of an event would be helpful. Another option is a bilateral procedure between countries. At the moment, exchange tools with neighbouring countries for crisis management only concern civil protection. A new or an existing body could take care of this.

**General comments extracted form the comparison between 1999 and 2009 storm management :**

- In both case, crises committees worked well. It was better in 1999, because the inter-professional groups collapsed in 2009 after Klaus( growers and producers did not agree plan and prices)
- Emergency measures have been more efficient in 2009 thanks to 1999 experience.
- Negotiation for the action plan was difficult, and resulted in frustration for forest owners in 2009. In 1999, no negotiation process was initiated.
- National plan announcement by the government was very clear n 1999 and more confused in 2009.
- Communication with Brussels for the plan validation required 3 months n 2009 and 6 months in 1999.
- Support from regional bodies was more important in 1999.
- Grant for transportation in 2009 were distributed after the action; It resulted in a level of expense higher than planned. In 2009, the demand had to be done before the expense, improving the control by donors.
- Some misunderstandings occurred with the government in 2009 about grants for mobilization.
- Some partners noticed that it was not relevant to give subsidies for storage of wood. More money was given for storage than the value of the wood itself!
- The monitoring of measures applied in 2009 was missing in 1999

## Group 3 – Storms Lothar and Kyrill

**Participants:**

Barry Gardiner (facilitator), Tilo Usbeck, Thomas Wohlgemuth, Olivier Schneider, Daniel Fröhlich, Bin You, Peter Ries, Michaela Spielmann

**Existing policies:**

Switzerland:

- Post-storm measures are almost all incorporated in the Forest Act of Switzerland. It contains basic regulations, decision support systems, basis for funding, and state aid for management. [An

Ecological Standard will be published this year at a Federal level with reference to the Forest Act, containing guidelines for regeneration and species choice.]
Following a severe storm state aid is initiated but the amount and rules for obtaining subsidies are individually developed for each storm.

- Swiss Meteorological Service (MeteoSwiss) informs Cantons about impending storm damage.
- Crisis coordination between federal level and Cantons has been in existence for the last 2 years
- Silvicultural guidelines (only recommendations) exist at the Canton level. Natural regeneration and the use of broadleaves where appropriate is generally recommended.
- There is conflict between professionals and processors about reestablishment following storms. The training for forestry professionals stresses the use of broadleaf while the wood processing industry is still asking primarily for spruce.

Germany:

- Tax exemption for damaged timber exist at a federal level (Forest Damage Compensation Act)
- Alert system (1-5 grades) in cooperation with the German Meteorological Service was developed after Kyrill for North-Rhine Westphalia (NRW).
- Alert system is more efficient and faster than the previous system in which plans evolved in the aftermath of a storm. This is because there is less debate and no permission from authorities required to initiate action.
- Early warning (2-3 days), pre warning (1-2 days), formal warning (some hours). The formal warning is actually too late because by that stage it is no longer possible to take action of any value.
- NRW is densely populated and media pressure is high. The involvement of the media is important and it is used to inform people.
- NRW developed a storm handbook which sets up formal procedures for the reaction to storms. This replaces existing provisions and is shorter and easier to understand.
- A number of German Länder, including NRW, Baden-Wuerttemberg, Bavaria, Rhineland Palatinate, and Lower Saxony, have provenance/species recommendations developed for dealing with climate change which are a binding requirement to get state aid for reforestation.
- Silvicultural practices for spruce (early and regular thinning) are practiced by forest professionals but not normally implemented by forest owners who are not in some sort of owner's organization. It is important to try to get forest owners organized in forest federations and to get them manage and thin their forests in order to produce more wind resistant forests.
- NRW established after the Kyrill storm subsidies for planting Douglas fir and other conifers, with exemption of spruce, if planted in mixture with an appropriate amount of broad leaved tree species
- More has been achieved through encouragement than through legislation
- A change in forest management is not very visible. Spruce is still the preferred species as it provides good economic return. The wood industry also wants spruce, and construction relies on spruce. Therefore, the pressure continues to plant spruce despite concerns that it is less wind resistant than other species.
- Following the recent global financial crisis and for a number of other reasons many small rural railway stations have been closed and small unprofitable train lines abandoned. This could present difficulties in the transport of wood from remote areas following further large scale wind damage.
- Infrastructure is important and should be considered particularly in land use planning on state and regional levels involving different agencies and stakeholders.
- There could be future problems with timber storage and environmental legislation. This is because permission to construct timber storage areas might not be given in the future due to concerns about the impact of chemical leaching on water quality.

**Presentation of Group 3: Lothar and Kyrill:**

1. Emergency plans exist in Switzerland and North Rhine-Westphalia to prepare for storm damage and to deal with the effect of storms. However, these do not exist in other Länder in Germany and the group had no information on what the situation was in Austria, Czech Republic or Slovenia.
2. Tools are available for dealing with impact of storm in some places. For example Decision Support Systems are utilized in Switzerland after storm damage to inform people on eligibility for state funding for forest restoration. The financial response depends on the level of damage.
3. There can be problems with quick access to funds for necessary actions (e.g. reconnaissance with aircraft). It is difficult to know in advance of a storm how quickly access to funds is required to deal with specific issues. Therefore, it would be of enormous benefit to have immediate access to emergency funds of some set amount that are triggered by certain thresholds being passed (e.g. wind speeds above a certain level, damage being greater than a percentage of growing stock, etc.)
4. Recommendations and guidelines about forest management, provenance and species choice, and use of natural regeneration already exist across the region. However, these are not fully effective because of lack of awareness from certain forest owners, continuing demand of processing sector and markets for particular forest products, and a lack of professional forestry knowledge in certain sectors of the industry.
5. There continues to be tension between foresters and wood processors. Spruce is still "king" at present, and it is difficult for foresters to change species and management to create what are believed to be more stable forests when the consequences of such a change would be a severe financial penalty.

## Group 4 – Storms Gudrun and Per

**Participants:**

Kristina Blennow (facilitator), Bo Hultgren, Bruce Nicoll, Vicky West, Gerry Wahlqvist.

**Post-storm**

In the UK as well as in Sweden information meetings were organized for forest owners. In Sweden the meetings were organized jointly by the Swedish Forest Agency, Insurance companies, and the South Swedish forest owner association. A large number of meetings were held starting about 2 weeks after the wind damage event. Gerry thinks the meetings started a bit too early since by the time action was to be taken the information had been forgotten. Bo, on the other hand, said that the meetings were needed. People needed to talk and to meet in a warm place (homes were often cold due to power failure). The main pieces of information were to stay calm to inform on safety issues in clearing the damaged wood.

Swedish Storm plan was mid-90s, and a bit out of date. So was the video on safe working in the forest.

**Could do better:** Up-to-date plans and information packages. Call centre needed. Important for people to talk.

The Gudrun event occurred about 2 weeks after a major tsunami catastrophe in Asia when a great many Swedish tourists lost their lives. The Swedish government was strongly criticized on how they handled the tsunami situation so when the Gudrun wind damage event took place, the government was on its toes and acted very quickly.

Salvage harvesting went much quicker than planned and had to slow down because of bottle-necks such as getting permission for using lorries and equipment from Eastern Europe. Also issues with different safety cultures between foreign forest workers and Swedish safety culture.

**Could do better:** Common regulations in EU for heavy transportation.

According to Swedish regulations a maximum of 5 $m^3$/ha of timber may be stored in the forest during summer. During the first year after the storm this regulation was relaxed but when reinstalled during the second year after the storm damage the limit was set to 3 $m^3$/ha and starts 1 month earlier than before.

Estimation of volume damaged took place in different ways:

- Initial guesses
- Ocular inspection from aircraft
- Helicopter inventory

Mismatch between methods in some areas.

At the moment the Swedish Forest Agency is developing routines for damage inventory.

**Could do better:** Common and efficient system of inventory.

**Pre-storm**

In Sweden recommendations for management have not really changed after the events. Earlier today C Segerstéen stated that 2 commercial thinning rather than 3 commercial thinning are now being practiced in adaptation to the risk of wind damage. It was questioned whether this change in practice is widespread. Kristina has heard that now the recommendations are actively implemented but the recommendations are about the same as before.

In GB wind damage risk is included in relevant operational guidance to be used in relevant areas of the country.

Sweden has some guidance on the internet. Models such as ForestGALES or Winda might be used if the potential user can see what is in it for the user. If the “storm issue” was included in FSC certification then they would be more likely to do something different.

The models might be used to make forestry plans if the user could get reduced insurance premium for doing so.

**Could do better:**

- Providing wind damage risk maps rather than models because they are easier to put into a plan.
- Climate change adaptation could/should be introduced in plans for regeneration.

## 19. Open discussion

Is it possible to combine public and insurance funds for storm disaster management? Response was that it is conceivable if there was a standard EU approach, maybe with a levy on the industry.

Contingency plans are good if there is a storm soon after plans completed, but they need to be regularly updated if they are to avoid losing effectiveness over time. Within 10 years they can become lost or useless. There could be a role for the EU to hold and maintain this information – Possible use of the European disaster management system?

In North-Rhine Westphalia instruments of Quality Management (training, exercises, audits) are utilised to maintain and improve storm adopted processes.

## 20. Wrap-up: Barry Gardiner

Damage by wind to European forests is clearly increasing, and will continue to increase, largely but not only because of the increase in growing stock. It is possible to control the risk and there is a huge amount of knowledge and experience of managing forests for wind and responding to wind damage in Europe. However the relevant information is scattered and not universally available. There is a clear role for the EU in helping to manage the impact of storms, partly in providing assistance and information, but also in coordinating efforts, such as mapping and remote sensing. The workshop has provided valuable information that will guide the development of the 'STORMS' report that will go to DG Environment later this month.

A huge 'thank you' to all participants for engaging so enthusiastically in this workshop.