Forest dieback/damages in European State Forests and measures to combat it

Several EUSTAFOR members have recently experienced and reported on severe cases of forest dieback, caused by different biotic and abiotic agents. To get a better overview of these events and their consequences, with a view to a possible exchange of experiences among EUSTAFOR members as well as the development of proposals on how to communicate on these issues, the EUSTAFOR Office sent a short questionnaire to SFMOs in Europe.

What follows is a comprehensive summary of the key information we received from our members.

Results

Out of 19 responses, 17 experienced forest dieback/damage to their forests. Only Romania and Ireland reported no forest dieback. However, Coillte (Ireland) is experiencing the problem with certain species, so they answered accordingly. Due to EUSTAFOR's membership structure in some countries, we received input from more than one organization in that country. For example, in Germany, five different regional forest enterprises responded to the survey and, in Bulgaria, information came from two sources: the governing body - Executive Forest Agency (Ministry of Agriculture and Foods) and from one of the regional forestry enterprises. The reporting period relates to the most current available data. For the majority of the reports, this is 2018-2019. A few members, however, reported data that is a bit older.

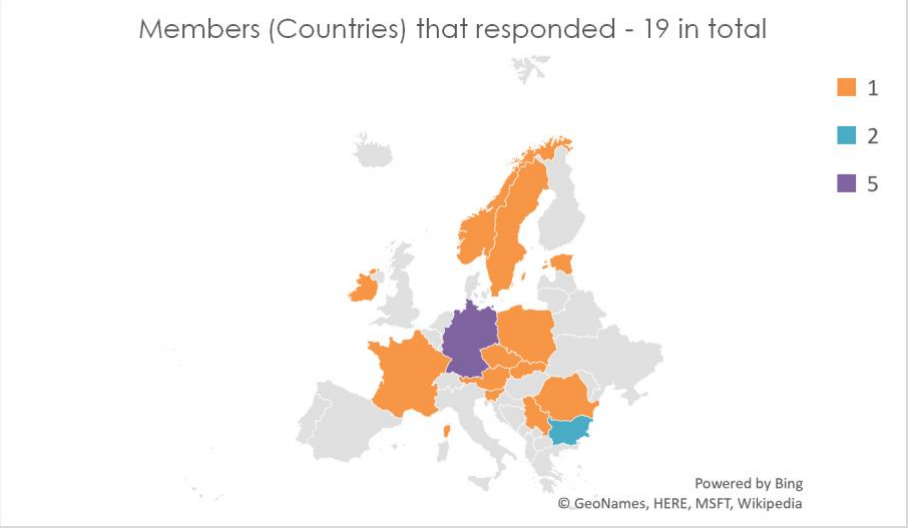

Figure 1: Map of members that answered the survey

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1. Causes

52% of damages were caused by **abiotic** agents and **48%** by **biotic** agents.

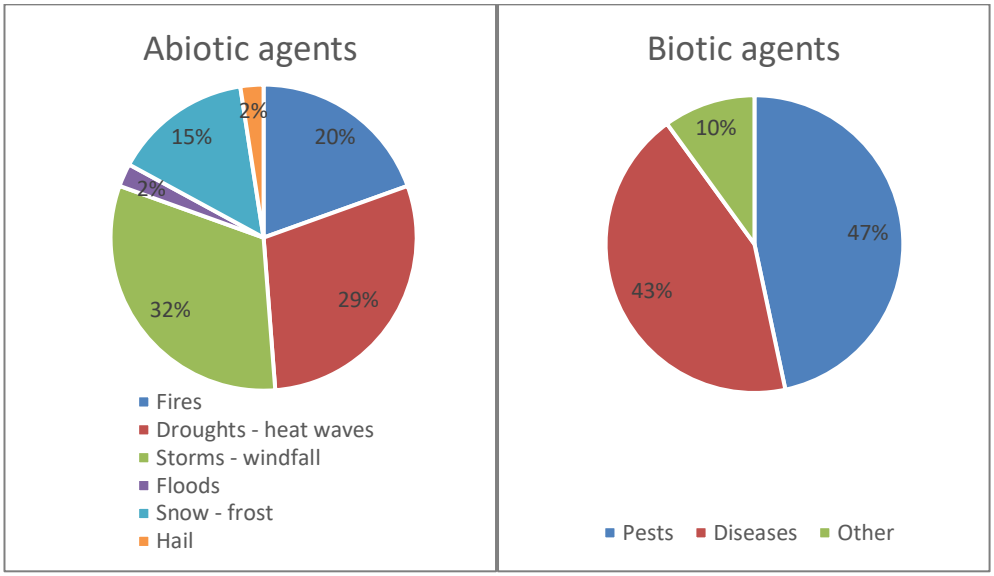

Figure 2: Abiotic and biotic agents that caused forest dieback/damages

Among pests and diseases, the following species were reported:

Pests	Diseases
Bark beetles (63%)	Tip blight (Diplodia pinea) (19%)
Pine processionary (Thaumetopoea pityocampa)	Root disease and butt rot of forest trees Heterobasidion spp (13%)
European pine sawfly (Neodiprion sertifer)	Ash dieback (Chalara fraxinea/ *Hymenoscyphus fraxineus*)(13%)
Large pine weevil (Hylobius abietis)	Red band needle blight (Dothistorma septosporum/ *Mycosphaerella pini*)
Beech splendour beetle (Agrilus viridis)	Aspen trunk rot (Phellinus tremulae)
Nun moth (Lymantria monacha)	Root rot (Phytophthora cinnamomic)
Geometer moths (Geometridae sp)	Sudden oak death (*Phytophthora ramorum*)
Leafroller moths (Tortricidae sp)	Dark honey fungus (Armillaria ostoyae)
Forest cockchafer (Melolontha hippocastani)	Scots pine blister rust (Cronartium flaccidum)
	Pine stem rust (Peridermium pini)

Table 1: Reported biotic agents

Additionally, three members also reported other damages caused by moose and deer browsing and mistletoe.

Among bark beetles, several species were reported as damaging agents, with the *Ips typographus* being the most significant (69%), followed by the growing importance of the *Ips acuminatus* (19%).

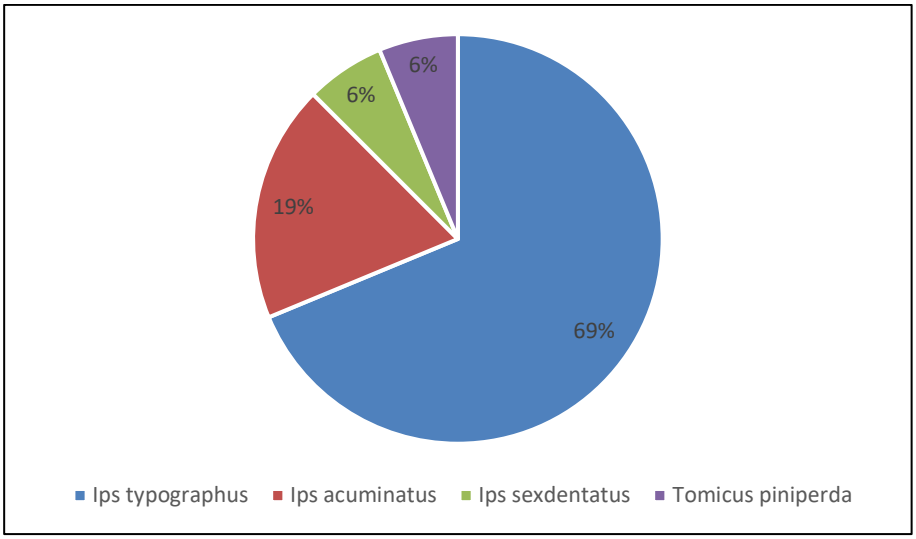

Figure 3: Reported bark beetle species

2. *Size of the damages*

According to the survey results, more than 1,2 million ha of forest have experienced damage, resulting in the loss of more than 36 million m3 of wood. The Czech Republic and Slovakia were the most affected, accounting for more than half of the total loss.

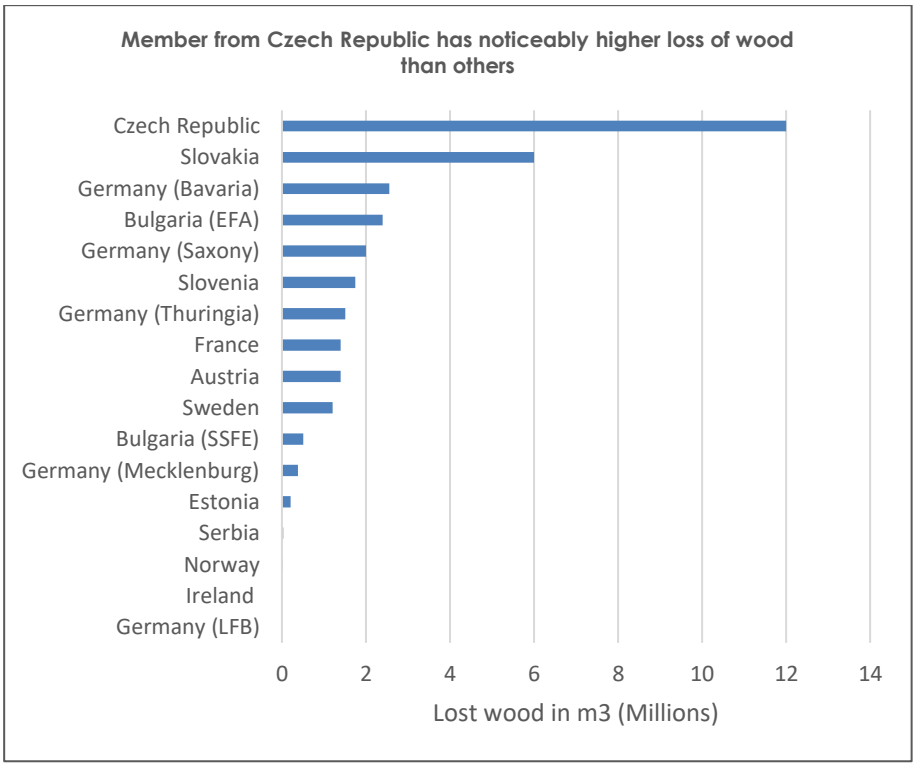

Figure 4: Amount of lost wood for each member[1]

3. Affected forest species

When it comes to forest species that suffered the most from the reported damaging agents, **62%** are **coniferous** and **38%** are **broadleaves**.

[1] EFA – Executive Forest Agency
SSFE - Southwestern State Forest Enterprise
LFB - Landesbetrieb Forst Brandenburg

Among conifers, **Norway spruce** is dominating **(52%)**, followed by different species of **pines (32%)**. The rest of the share is equally distributed between pine plantations, larch, Japanese larch and fir. **Beech (32%), oaks (25%)** and **birch (13%)** are the most affected amongst broadleaves, while ash, poplars, aspen and other broadleaves represent a smaller part.

4. Which ecosystem services were affected?

Most of the members reported that the latest damages affected mostly regulating and provisioning services, but also almost 20% reported that cultural ecosystem services suffered as well.

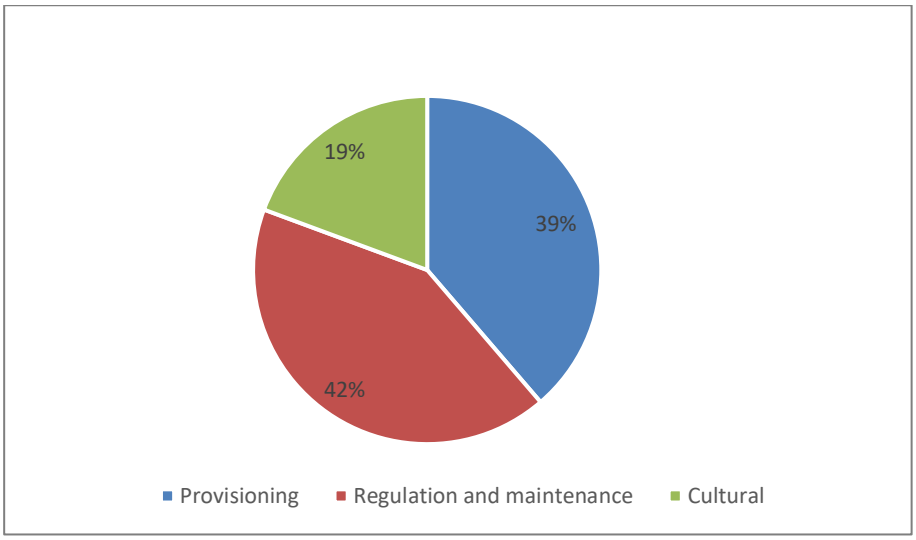

Figure 5: Effect of the damages on different ecosystem services

5. Measures taken – combating and preventive

In order to fight against the damaging agents, different measures were applied. Some of them are part of regular **forest management** and its adaptation, such as thinning, cleaning the sites, sanitary felling, reforestation of the affected areas, adapting the forest species mixture, ungulates management, and different monitoring and observation activities.

Other measures were more specific and used **chemicals, fungicides, and insecticides** such as pheromone traps, commercial products (Rotstop, Trico, browsing repellents). Besides these, when it comes to fighting **forest fires**, helicopters, engaging the ground crew and fire extinguishers were used.

Prevention measures also included raising the awareness of political decision-makers, society and the media through communications about the impact of climate change and amending forest legislation.

Since these events had a direct impact on the **market** situation, in the Czech Republic, the introduction of a dynamic purchasing system for public procurement was made. France searched for new outlets for industrial wood and wood for energy.

As storage played a significant role, resources were invested in **preparing new and upgrading old storage locations**, both wet and dry. Bavaria obtained its own Trailer-Logistic-System to cope with the situation.

6. Costs, source of financing and market outcomes

The cost of recovery[2] varied very much between different countries. In France, the estimated cost will be **300 million EUR** just for the reconstitution of damaged stands in public ownership (700 million EUR for all forests). Thuringia, Sweden and the Czech Republic had similar costs, **between 100 and 130 million EUR**. **In total, close to 800 million EUR** were/will be spent to recover from forest damages.

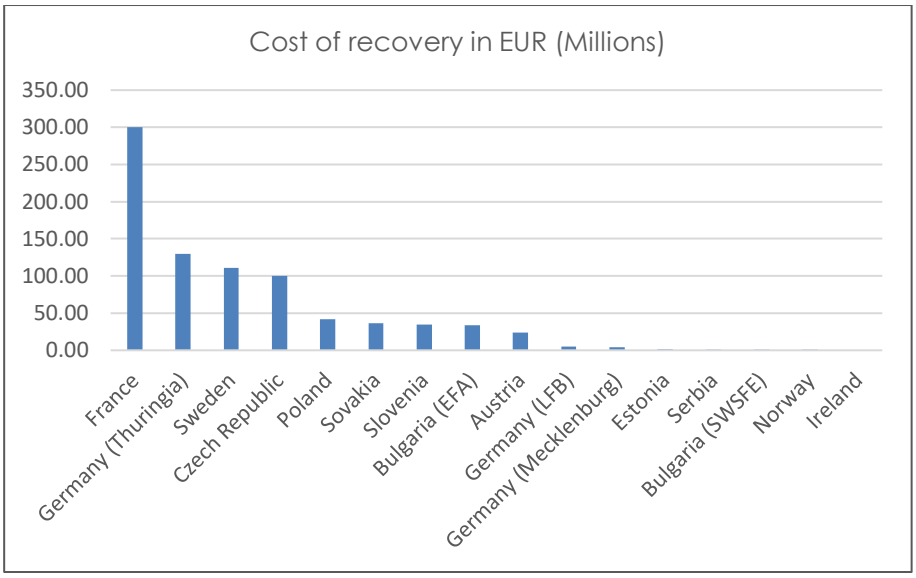

Figure 6: Cost of recovery for each member in Mil EUR

Most of the enterprises financed these costs with their **own resources**. Only 11% received external financial aid for more than 1% of their total costs.
Financial aid that was received, mostly for regeneration, was sourced either from the Member State/Province/ Federal/Communal budget or from an EU funding scheme (CAP or Structural funds).

Besides direct costs related to recovery, there were **indirect costs and market-related negative effects**. Additional financial burdens came from the increase in

the number of contractors that needed to be engaged. Additionally, **59%** of the organizations reported an **income decrease** (ranging from 10 – 90%).

In order to tackle the damages, approximately **84%** of the enterprises had to engage **additional workforce** in the form of contractors and other forestry organizations/enterprises.

[2] Reflects estimations or real expenditures of different activities that were or need to be applied

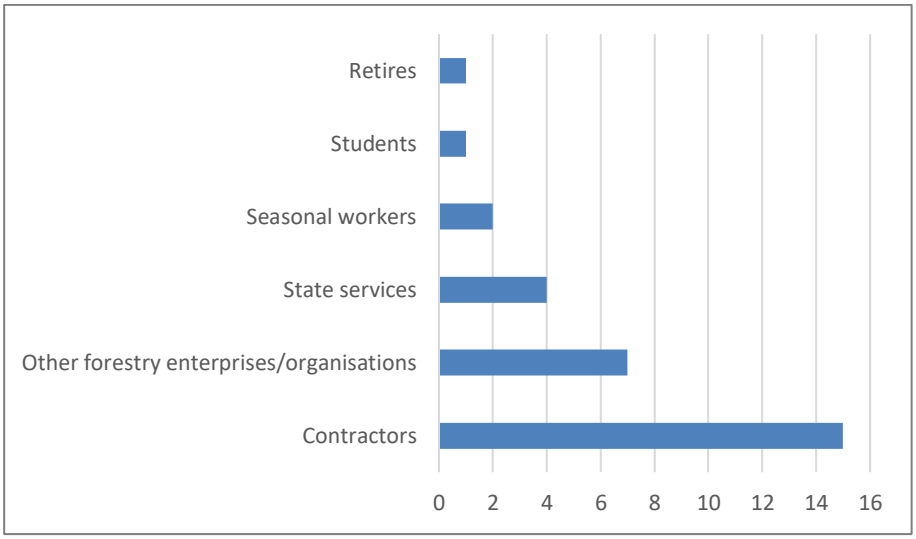

Figure 8: Additional work force engaged

The volume of unsold wood ranged from **20 000 m3** (Sweden) to **500 000 m3** (Czech Republic). In **65%** of reported cases, the higher wood volumes due to sanitary cuts resulted in a certain **quantity of unsold wood** that was mostly left in forests as natural waste or put in storage for sale at a later date.