



Course in Forest Conservation  
Bachelor Level  
2023-2024

**PhD. Dr. Zana Ahmed Lak. Forest Ecophysiology**

- ✓ Increasing focusing of the role of natural disturbance in shaping the forest composition and structure, through research in forests has caused a shift in ecology that has major effect for forest conservation and management .
- ✓ understanding of forest disturbance and its impacts on the population dynamics of trees have become widespread, and have generated a voluminous literature.
- ✓ **Forest dynamics can be studied in three main ways:**
  - by result dynamics from first assessments of stand structure
  - by monitoring forests over time, for example through repeated surveys of permanent sample plots (PSP)
  - through the use of models of forest dynamics

## Characterizing forest disturbance regimes

- ✓ Disturbances can be defined as relatively discrete events that disrupt ecosystem, community or population structure, and change the availability of resources or the physical environment.
- ✓ Analysis of the disturbance regime of a forest can be of great value for understanding patterns of structure and composition, as well as being important for defining appropriate management interventions.

**In order to characterize the disturbance regime of a particular forest, the following variables should therefore be measured:**

- extent and spatial pattern of the disturbed area
- intensity, or the strength of the disturbance (for example, fire temperature or wind speed)
- severity, or the amount of damage that occurred to the forest (for example, number of individual trees killed or stems damaged)
- timing, including the frequency (the number of disturbances per unit time), the turnover rate or rotation period (the mean time taken for the entire forest area to be disturbed) and the turnover time or return interval (the mean time between disturbances).
- interactions between different types of disturbance (for example, drought increases fire intensity).

## Wind

- ✓ The impacts of wind disturbance on a forest can be assessed through a field survey, involving measures of the structure and species composition of the area affected and the canopy gaps created .
- ✓ Windthrow also results in production of woody broken fall trees .
- ✓ Treefalls not only create gaps in the canopy but also cause disturbance to the soil and influence the micro-environmental of the forest with exposed root mats, bare mineral soil, and humus, as well as fallen logs.
- ✓ The amount of damage caused by wind is a function of wind speed, duration, and the direction from which the winds originate.

## Wind

- ✓ This form of natural disturbance results from the interaction between climate, topography, stand structure, soil characteristics and the growth and form characteristics of individual trees.
- ✓ Damage can be in the form of stem failure, root failure or uprooting.



Wind storms toppled thousands of trees on the Arapahoe National Forest in Colorado in 2012. The dead trees were rotted at the base, and the needles of the live trees were "catching the wind like sails." (*USDA Forest Service image*)



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