

Ecosystem Services in North Rhine-Westphalia under Climate Change

Motivation:

Provision of multisectoral and regionally comparable analysis of climate change impacts for the German state of North Rhine-Westphalia (NRW) with a special focus on ecosystem services.

Example 1: Regional Analysis of Potential Windthrow Impact on Forests

Around 26% of the state is covered by forests, most of it underlies forestal use. A large amount was damaged in the storm event „Kyrill“ in 2007.

Aim: Assess windthrow impact by estimating and combining sensitivity and exposure of forest areas.

Exposure was represented by the spatial distribution of change in storm days (climate model CCLM, scenario A1B).

Multidimensional factors (concerning species composition, soil characteristic, topography) of sensitivity were identified based on their distribution in areas strongly affected by the storm event “Kyrill” and mean characteristics of all forest areas.

Further steps: Apply method to other regions, multiple storm events and multiple climate projections.

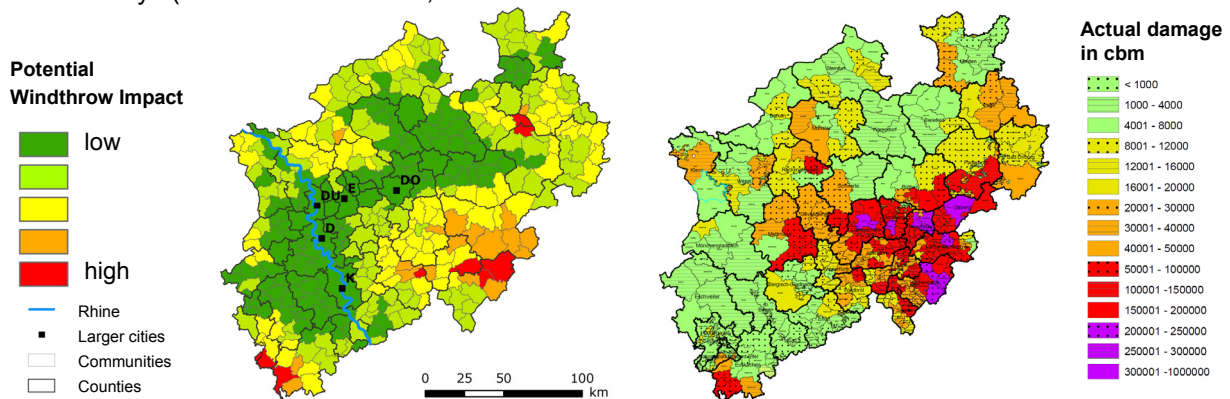


Fig. 1: Windthrow Index for communities in NRW and observed damage of storm event „Kyrill“.

Example 2: Future of Snow Availability for Winter Sports - Snow from December to March?

The low mountain range Sauerland is considered to be the leading winter sports area north of the Alps.

The operation relies on ~200 snow machines covering more than 53 ha.

Aim: Estimate days with skiing potential based on natural snow conditions and physical conditions for artificial snow production using regional climate models (see fig. 2).

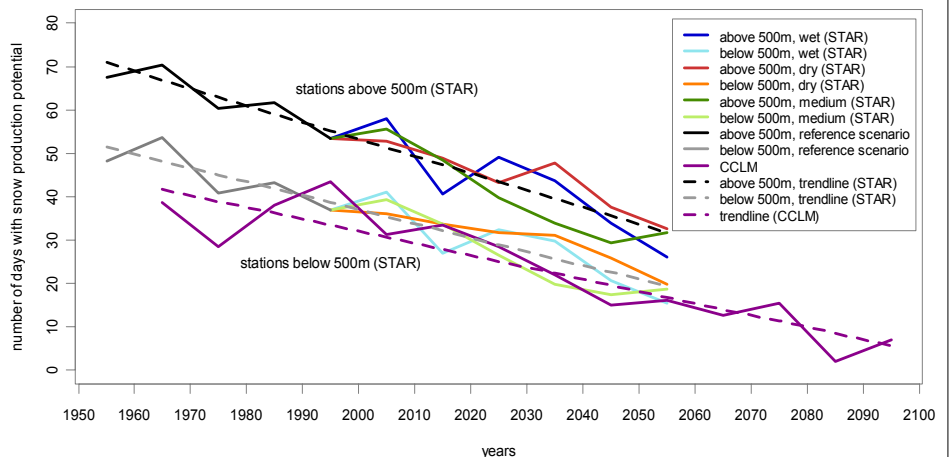


Fig. 2: Development of the max. annual number of days with a possibility to produce snow (with a wet-bulb temperature $<-4^{\circ}\text{C}$, based on min. temperature)

Further steps: Apply regional climate models CCLM (integrated snow model) and STAR (with added snow model) to analyze development of ski tourism season and estimate water/ energy consumption of snow machines.

Ongoing Research :

Integrated indicator-based assessment of vulnerability of European regions towards climate change with a more detailed multisectoral focus North Rhine-Westphalia. Carried out within the project: „ESPON Climate“ (Climate Change and Territorial Effects on Regions and Local Economies).

The preceding project was financed by the Ministry of the Environment and Conservation, Agriculture and Consumer Protection of NRW.