Forest ecosystem vulnerabilities to climate change in the Carpathians from the perspective of polish experts

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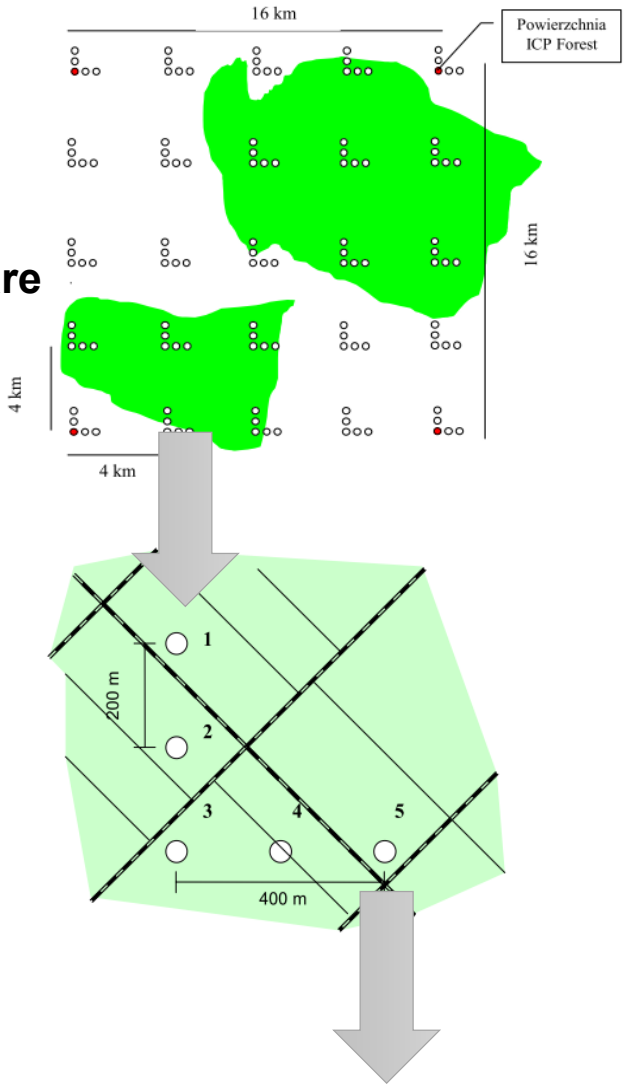
Information about Polish forests
National Forest Inventory

NFI in Poland 2005-2021

- Cycle length 5 years
- All forms of ownership
- Provides current data on the condition of forests.
- Monitors the direction of change that forests are undergoing over time.

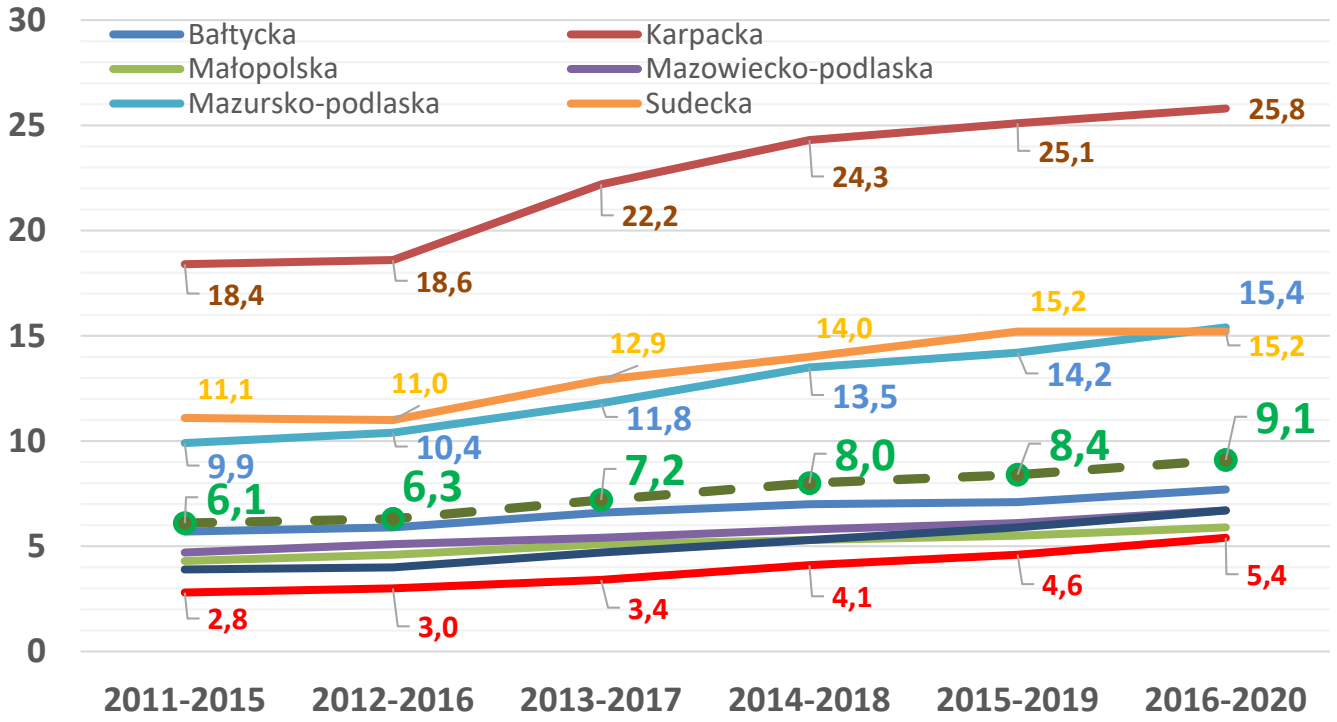
The whole country is covered by a network of sample plots (4 x 4 km), integrated into the pan-European forest monitoring network



NFI Results 2016-2020

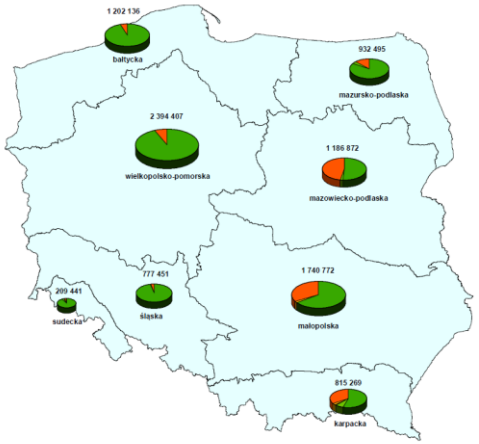
Indicators	Carpathian Region	Poland
Forest Area [ha]	815 269 (8,8 %)	9 258 843
Growing Stock [million m^3]	284,4 (10,8%)	2 657,0
Volume [m^3/ha]	351,2	287
Mean Age [years]	68	59
Dead wood [m^3/ha]	28,8	9,1
Current volume increment [m^3/ha/year]	11,46	9,29
Harvest	5,73	6,1
Species composition by dominant species [%]	Coniferous – 55,3 (Fir 29,7) Broadleaved – 44,7 (Beech – 27,5)	Coniferous – 68,2 (Pine 58,1) Broadleaved – 31,8 (Oak – 8,1)

Dead wood by natural forest divisions m³/ha

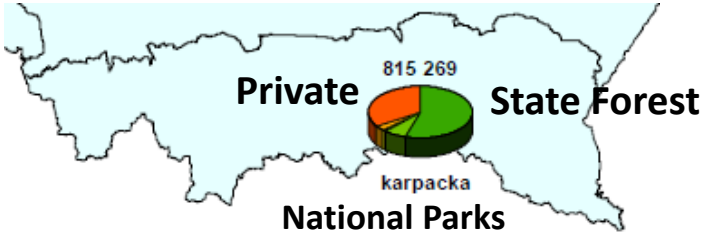


Carphatian region

Poland



Ownership forms of forest



BACCARA Publications

International project "Biodiversity And Climate Change, A Risk Analysis (BACCARA)", 7. Framerork Program, 2009-2012.

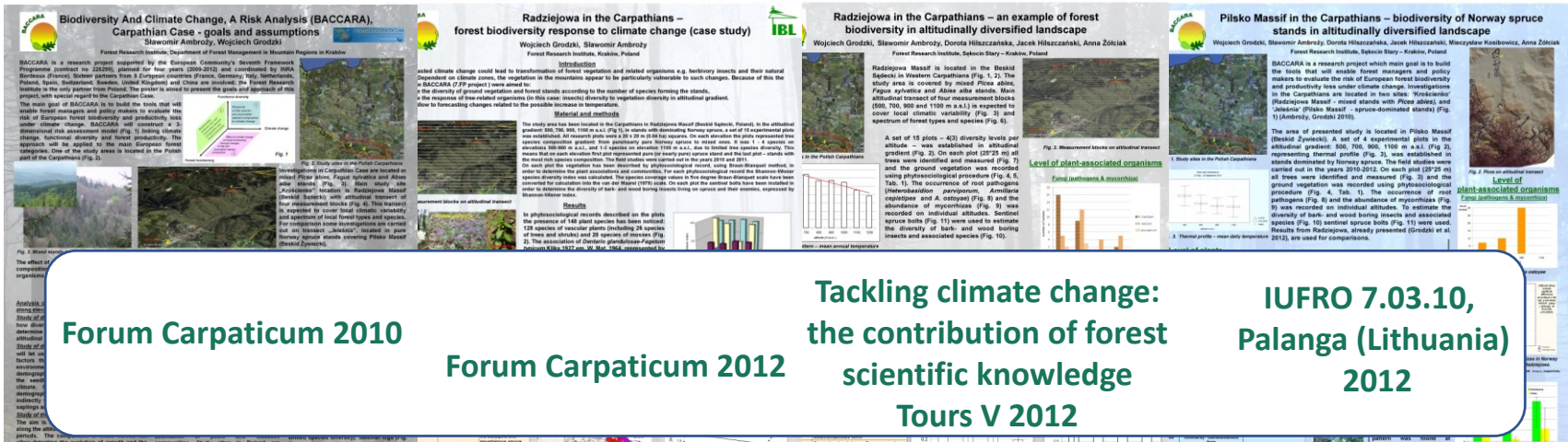
Poland: Radziejowa (Beskid Sądecki), Pilsko (Beskid Żywiecki)
Altitudinal transects – gradient to simulate climatic variability (change)

Publications:

Rabasa S. G., Granda E., Benavides R. Kunstler G., Espelta J.M., Ogaya R., Peñuelas J., Scherer-Lorenzen M., Gil W., Grodzki W., Ambrozy S., Bergh J., Hódar J.A., Zamora R., Valladares F. 2013. Disparity in elevational shifts of European trees in response to recent climate warming. Global Change Biology 19: 2490–2499. DOI: 10.1111/gcb.12220

Ambroży S., Grodzki W. 2013. Biodiversity And Climate Change, A Risk Analysis (BACCARA). Carpathian Case – goals and assumptions. J. Kozak et al. (eds.), The Carpathians: Integrating Nature and Society Towards Sustainability, Environmental Science and Engineering, Springer-Verlag Berlin Heidelberg: 425-428. DOI: 10.1007/978-3-642-12725-0_29

Grodzki W., Ambroży S., Gil W. 2013. The growth and biodiversity of spruce stands in variable climate conditions (Radziejowa Case Study). Folia Forestalia Polonica, Series A – Forestry, 55(3): 146-156. DOI: 10.2478/ffp-2013-00016.



TATRA NP Publications

Tatra National Park

Detection and definition of the altitudinal distribution of 2 bark beetle species not recorded earlier in the Tatra Mts. Altitudinal transects 1000-1400 m a.s.l.

Grodzki W. 2020. On the vertical distribution of *Ips duplicatus*, *I. cembrae* and some bark- and longhorn beetles (Col.: Curculionidae, Scolytinae; Col.: Cerambycidae) in the Tatra National Park in Poland. Folia Forestalia Polonica Series A – Forestry, Vol. 62 (2): 68–77. DOI: 10.2478/ffp-2020-0008

The upward spreading of the studied insects as a possible effect of climate change and the resulting environmental conditions favourable for those organisms.

Example of forest management under disaster pressure

Programme for the Beskydy Mountains (2003) - support for spruce forest disaster management in the Beskydy Mountains and their reconstruction (State Forests and Forestry Faculty in Cracow)

CLIMO
CLimate-Smart Forestry in MOuntain Regions

COST Action CA15226 CLIMO, Oct 2016 – Oct 2020, brings together international scientists, experts and young scholars to develop Climate-Smart Forestry (CSF) concept for European mountain regions. The Management Committee comprises of representatives from 28 COST Member Countries, as well as Observers from 5 Near Neighbour Countries (NNC) and 5 International Partner Countries (IPC).

1. Definition of Climate-Smart Forestry and identification of "smartness" criteria for the European mountain forests
2. Creation of an European Smart Forest Network (ESFONET)
3. Analysis of the requirements for the development of a cybernetic web of experimental structures
4. Development of innovative schemes of payment for environmental services (PES)
5. Dissemination of research results to the general public and to stakeholders

CLIMO
CLimate-Smart Forestry in MOuntain Regions

BOOK (Springer)
Expected in 2021

https://www.youtube.com/watch?v=qouZ-AUavlQ

Summary

the most pressing vulnerabilities of forests and their ecosystem services to climate change

- A new situation for which owners and managers are not fully prepared (pests, droughts, floods, changing expectations of forests). Monitoring and trends observed arer important

scientific studies

- From Baccara project to Climo COST Action

Which responses to identified climate impacts and risks are already being implemented?

- Programme for the Beskydy Mountains

What are the main challenges, but also opportunities, when dealing with current and future climate variability in forest ecosystems?

- Permanent forest monitoring need, exchange of knowledge science - practice, education of forest managers. Involving local communities in discussions