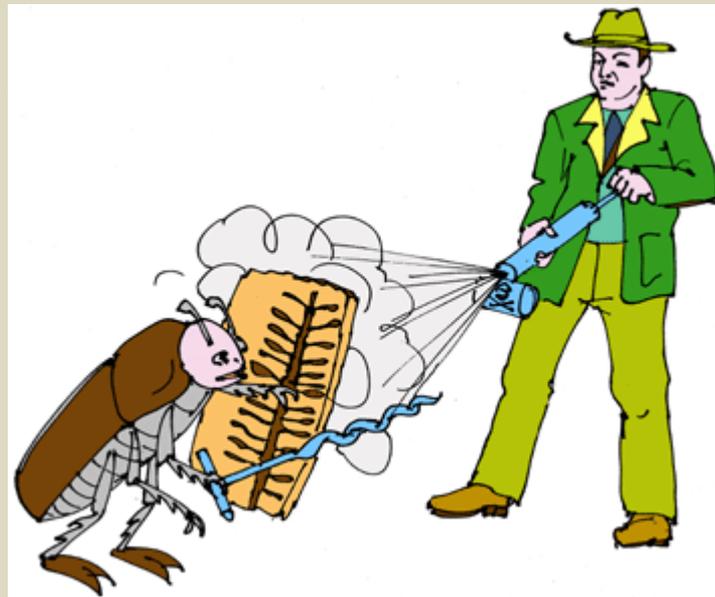


Public perceptions of natural disturbance in protected areas



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Introduction

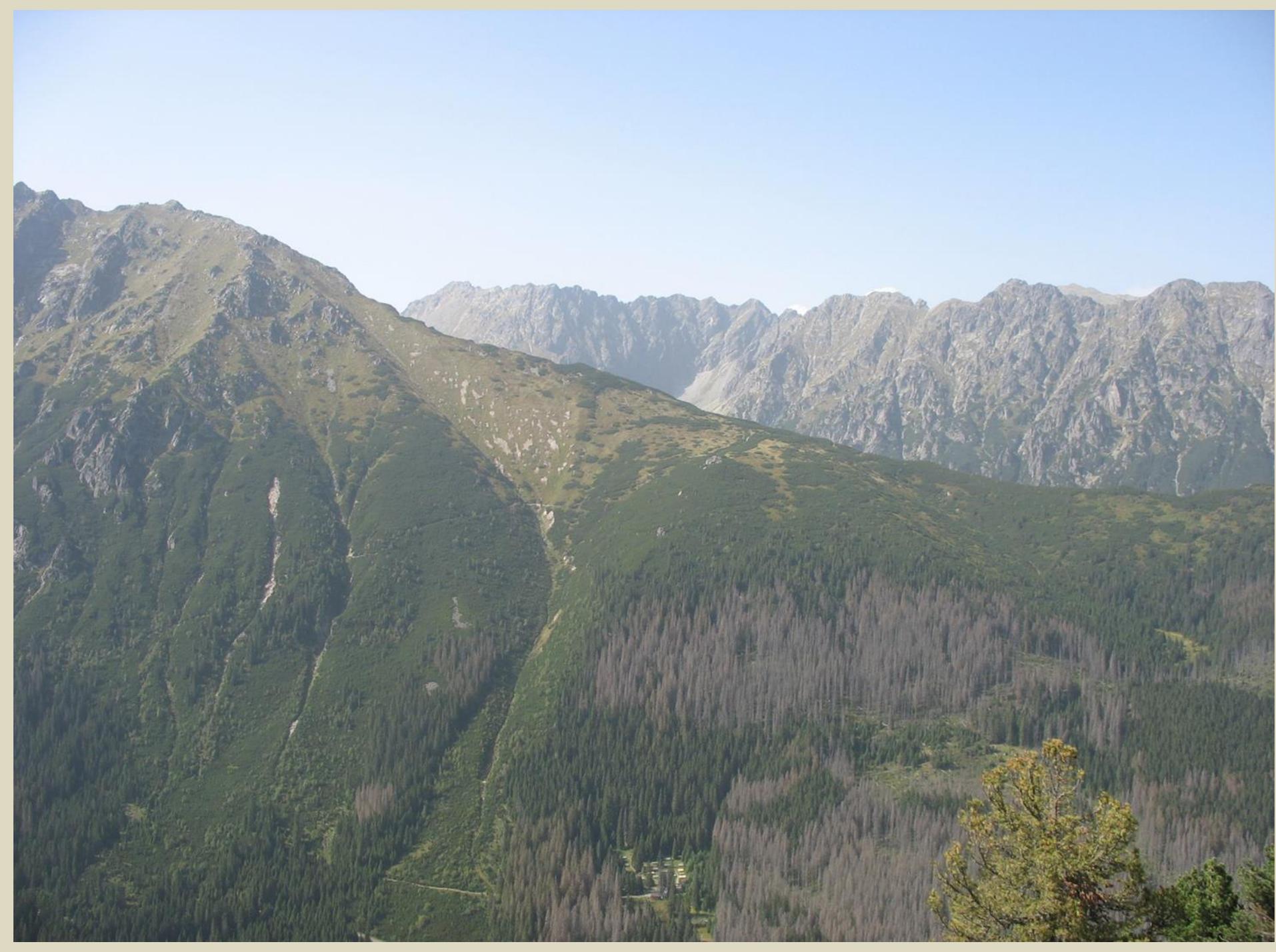
- Paradigm shift to an ES management framework (role of ecological disturbance in nature)
- Value-neutral events from an ecological point of view
- Conflicts on political and societal levels from HD standpoint
- Ecological and biophysical parameters of forest disturbances well studied (Flint et al. 2009)

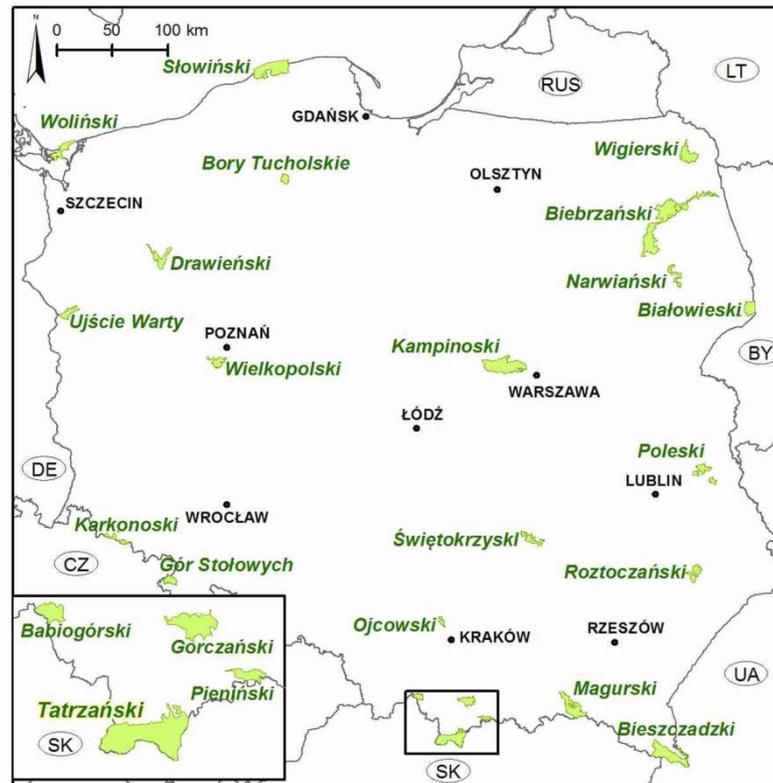
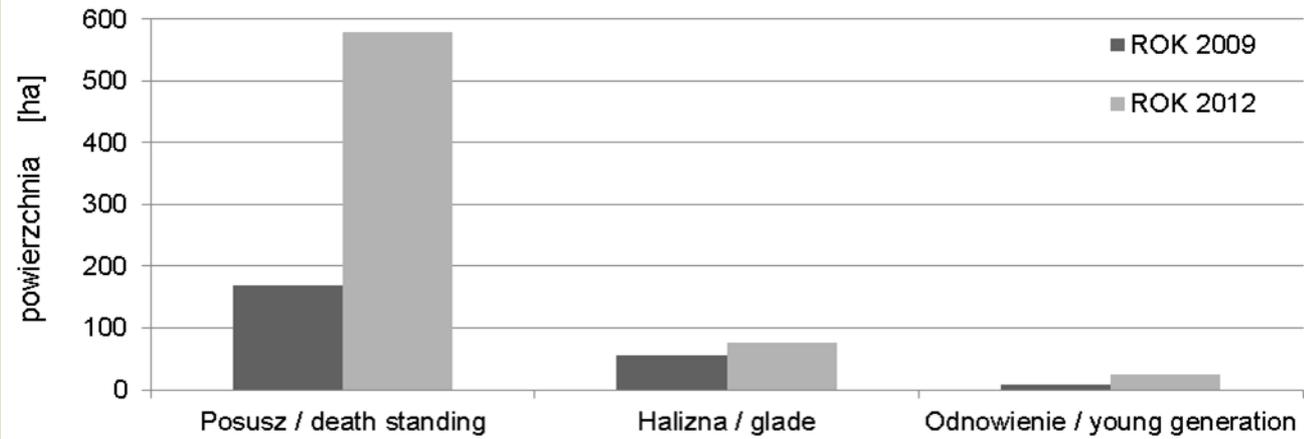
- Abiotic and biotic natural disturbances are fundamental to the development of structure and function of forest ecosystems (Attiwill 1994)
- They heavily affect forest functions and management (Seidl et al. 2008)
- Damage in EU forests seems to be increasing in the future – frequency and severity (Schelhaas et al. 2003)
- Windstorms followed by insect outbreaks will intensify as climate warms (Logan et al. 2003)

- Ecological disturbances of forests by insects have a complex array of associated HDs – visual-quality impacts at the landscape level (Sheppard&Picard 2006), fire hazard (Jenkins et al. 2008) or relationships between stakeholders and managers (Flint et al. 2009)
- Visitors represent important stakeholder (Müller & Job 2009)
- Extractive use is not consistent with objectives of category II (Dudley 2008)

Study area and methodology

- Tatra NP (Poland) founded in 1955
- 21.197 ha area, 82% is publicly owned
- Forest ecosystems cover 72% of the area
- Core zone of the park area about 60%
- Mostly spruce, silver fir and beech
- 3 million visitors yearly
- Bark beetle outbreaks 1993-98 and 2009-13
- Face to face on-site interviews (511 valid questionnaires)





Results

Demographics of respondents and characteristics of visit used in survey

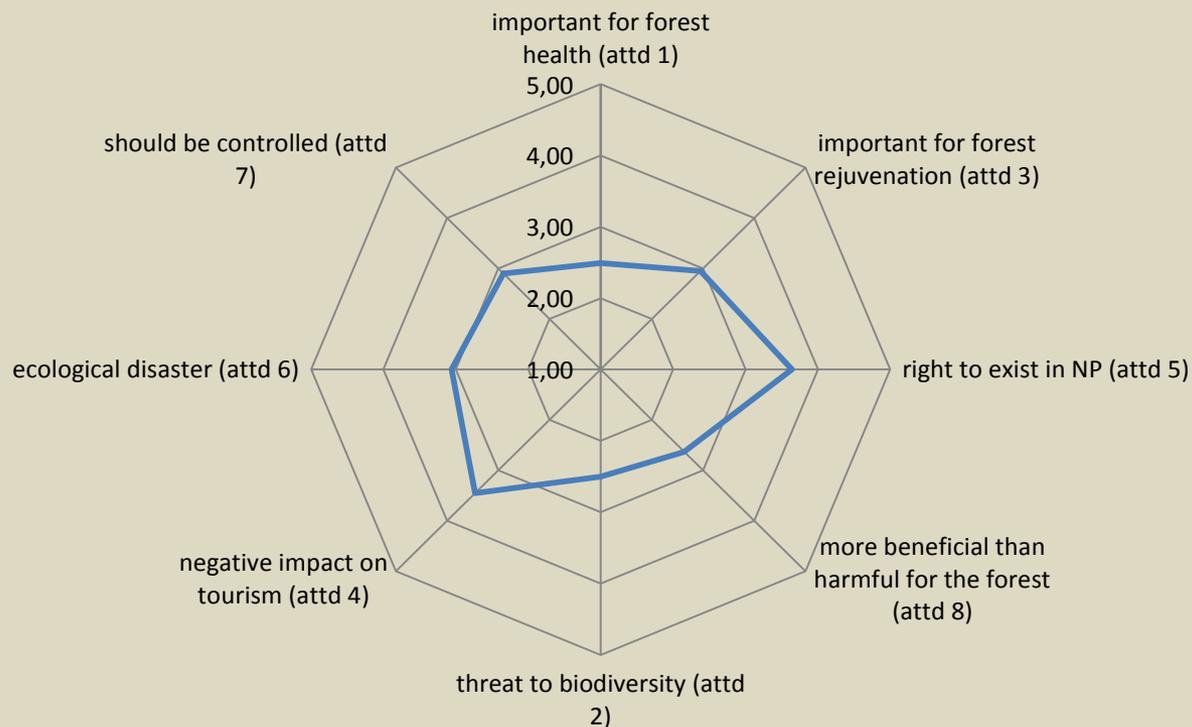
Gender	
Female	48.2 %
Male	51.8 %
Age (mean)	34.48 years
Highest level of education	
Primary / Elementary school	1.6 %
Secondary school	46.1 %
University degree	49.0 %
Other	3.3 %
Number of visits in TPN (mean)	5.67
Country of visitors	
Poland	98.8 %
Others (A, D, GB, SK)	1.2 %
Origin of visitors	
Major city	47.8 %
Provincial town	30.5 %
Countryside	21.7 %

Descriptive statistics of statements describing relationship between man and nature based on New Ecological Paradigm statements (for comparison see Müller & Job 2009)

Evaluative items	Min.	Max.	Mean	Std. Deviation
earth has enough natural resources, use them wisely	1	5	4.20	0.880
environment for satisfying demands of mankind	1	5	3.02	1.063
ecological balance is delicate and can be disrupted	1	5	4.40	0.741
human talent will make earth to be inhabitable	1	5	3.41	1.056
mankind overuses currently natural resources	1	5	4.09	0.960

Descriptive statistics of statements describing positive (attd 1, 3, 5, 8) and negative (attd 2, 4, 6, 7) roles of bark beetle for forest along a 5-point scale (1="strongly disagree" to 5="strongly agree" resp. inverted for negative roles) (for comparison see Müller & Job 2009)

The bark beetle...	Min.	Max.	Mean	SD
...helps ensure that forests are healthy (attd 1)	1	5	2.49	1.045
...is important in rejuvenating the forest (attd 3)	1	5	2.95	1.082
...should have a right to exist in the park (attd 5)	1	5	3.64	1.004
...is more beneficial than harmful for the forest in the park (attd 8)	1	5	2.63	0.958
...is a threat to biodiversity in the park (attd 2)	1	5	2.50	0.997
...has a negative impact on tourism (attd 4)	1	5	3.45	1.177
...is an ecological disaster for the park (attd 6)	1	5	3.06	1.054
...should be controlled in the park (attd 7)	1	5	2.90	1.069



The arithmetic mean of 4 positive and 4 negative attitudinal statements describing visitor attitudes towards the bark beetle in Tatra National Park on 5-point Likert scale (higher number means better attitude)

Multivariate linear regression model of mean bark beetle statements as a function of significant predictors (Adjusted R square = 0.189, n = 322)

Mean of bark beetle statements	Unstandardized Coefficients		Standardized Coefficients	t	P
	B	Std. Error	Beta		
(Constant)	3.631	0.363		10.002	0.000
Age (years)	-0.014	0.003	-0.249	-4.835	0.000
Importance of bark beetle issue	-0.192	0.042	-0.238	-4.577	0.000
Major city	0.190	0.072	0.135	2.651	0.008
Statements describing man and nature (earth and natural resources)	0.093	0.040	0.116	2.302	0.022
Activity...quietude, relaxation, winding down, spending time with family	-0.193	0.082	-0.120	-2.345	0.020
Filling of expectations	0.099	0.046	0.110	2.162	0.031
Statements describing man and nature (overuses of natural resources)	-0.077	0.037	-0.105	-2.064	0.040

- Younger respondents, as well as people appreciating the role of bark beetle in the renewal are less likely to recognize that the species should be combated
- National park potentially influences visitors' attitudes towards bark beetle
- Younger and better educated respondents had a better attitude towards the bark beetle
- Factors influencing visitors' attitudes could be influenced directly by the park management by way of public relations and environmental education

Discussion

- Economic impacts connected with commercial forestry
- In regions oriented on tourism and recreation effects on visitation (aesthetic and safety issues)
- Management responses – vary from salvage logging, preventive treatments, no intervention
- Reaction of different stakeholders (private landowners, local residents, tourists, communities)
- Local settings and conditions (historical, political and regional context)

- Bavarian Forest NP (Müller et al. 2008) – affinity of visitors towards NP as significant predictor, „dead“ could increase attractiveness of park (possibility to observe wilderness cycle in European conditions)
- Canada (Chang et al. 2009) – ecologically sensitive areas and wildlife habitat should be protected
- Colorado (Flint et al. 2012) – higher risk perceptions among lower amenity communities with more emphasis on resource extraction
- Social science research for support the formulation of natural resource management decisions (Czaja & Cottrell 2014)

Conclusion



- Economic and non-economic implications, strategies, responses and capacities
- Managers and decision-makers (role of disturbances in ES, how well they are accepted by visitors, what is the role of PA, how to manage natural disturbances)
- Test more predictors (e.g. income), different models, different stakeholder groups







POZORI! BEZPÉČENIA ZÓNA
NEBEZPEČENSTVO PÁDU STROMOV
VSTUP NA VLASTNÉ RIZIKO

UWAGA! STROPA
NIEBEZPECZENSTWO PRZEWRACANIA SIĘ DRZEW
WEJŚCIE NA WŁASNE RYZYKIO

CAUTION! ZONE OF NATURE PROTECTION
WITHOUT INTERVENTION
DANGER OF FALLING TREES
ENTER AT YOUR OWN RISK



The bark beetle infestation is throughout western forests from Canada to Mexico, and has occurred several times previously in the past 500 years.



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