



# Value of Transboundary Nature Protected Areas Situated near the EU Outer Borders (Research Idea)

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Narodowe Centrum  
Badań i Rozwoju



# Motivation

**Transboundary Nature Protected Areas (TNPA)** – contiguous natural complexes, artificially divided with the state borders, protected on the every side of the border

- 188 TNPA in 112 countries  $S=3.2\text{mio km}^2$  ( $\cong$ India), 17% of total PAs' (Conservation International, 2005)
- Significant scientific and popular literature in natural disciplines
- Minimal literature in economics (Busch, 2007) including empirical studies
- Białowieża/Biełavieskaja Pušča



# Are TNPAs **international public goods?**

- Natural sciences: definitely
- Economics: far from trivial
  - Non-exclusion principle applies
  - Non-rivalry principle applies
  - Not being sold out or exchanged on regular markets  
=> no market prices for them exist

Many natural goods theoretically qualify for being the public goods...

...but empirical verification is needed if the theory is consistent with people's real preferences

# Methodology: Stated Preferences

- Simply asking the individual about her preferences;
- Accounts for the non-use values;

Two elicitation formats:

- contingent valuation (CVM);
- choice experiment (CE).

[Carson&Louviere, 2011]

# Empirical study: methodology

Two identical surveys of people's preferences in every of the two cases of transboundary nature protected areas (Białowieża/Biełavieskaja Pušča and Fulufjellet/Fulufjället) with the involvement of the representative samples of Belarusians, Norwegians, Poles, Swedes with wide possibilities for comparison of the results obtained.

*Payment vehicle* – obligatory tax payments, charged nationally and then transferred to bilateral target fund under the auspices of independent international organisation like IUCN or UNESCO.

First thought about voluntary contributions as payment vehicle

Scenario introduces transboundary nature protected area as a common good of the both nations involved.

The core of the programme proposed – enlargement of the existing strict conservation reserve, partly covering the sites under consideration, in order to provide restoration of semi-intact ecosystems in distant future.

# Expected results

- WTP calculated.
- Comparison between cases and between the national samples within each case conducted. Hypothesis: „the mean national WTPs do not differ from each other when adjusted by PPP and income factors” tested empirically.
- Impact of differences in socioeconomics assessed
- Hypothesis: „TNPAs are international public goods in accordance with people’s preferences” tested empirically.
- ‚International’ free-riding effect verified.

# Respondent's utility function draft specification

$$V = \beta_{SD} * S_D + \beta_{SF} * S_F + \beta_{cost} * Bid + \theta' * SEV,$$

where

$S_D$  – additional strict reserve area on domestic side, ha

$S_F$  – additional strict reserve area on foreign side, ha

$Bid$  – individual annual tax for the conservation programme, \$

$SEV$  – vector of socioeconomic variables and their interactions with programme alternatives and with each other



# Hypothesis', international public good' testing strategy

$$V = \beta_{SD} * S_D + \beta_{SF} * S_F + \beta_{cost} * Bid + \theta' * SEV$$

Comparison of  $\beta_{SD}$  against  $\beta_{SF}$  in the subsample of respondents assigning **non-use value only**. Three profiles of respondents according to their individual preferences are possible:

- “Patriot”:  $\beta_{SD} > \beta_{SF}$ , maximises  $S_D$  on average;
- “???” (various explanations)  $\beta_{SD} < \beta_{SF}$ , maximises  $S_F$ ;
- “Citizen of the Earth”  $\beta_{SD} = \beta_{SF}$ , maximises  $S_F + S_D$ .

If  $\beta_{SD} = \beta_{SF}$  in the subsample of those who assign **non-use value only** =>

$H_0$ : TNPA is the international public good in accordance with the preferences of the given population cannot be rejected

Otherwise two separate national public goods exist instead of the common one

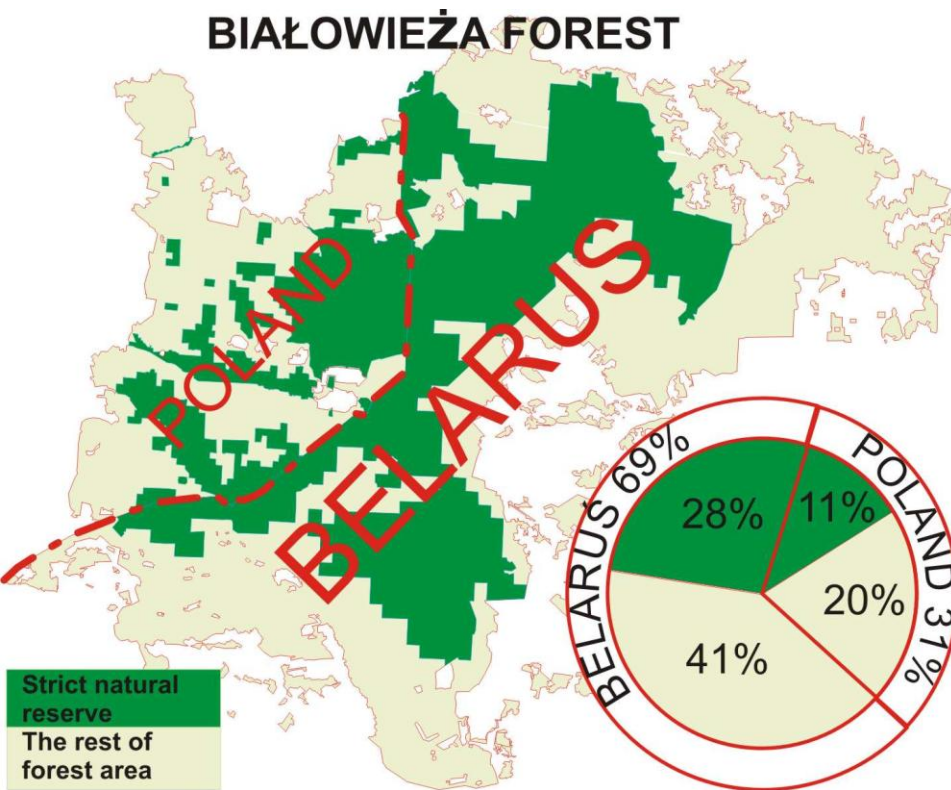


# Testing for the „International Free-riding Effect”

- Split samples by the rate of „co-financing” from the other side:  
  
„...in addition to every monetary unit, which you declare, you are willing to pay for the site’s conservation – another 1 (1,25; 1,5; 1,75; 2,0) monetary units will be granted by the tax-payers from the other side of the border....”
- Compare descriptive statistics of the WTP between the subsamples
- Estimate regression of individual WTPs on rates of co-financing actually observed by the respondent
- If the rate is negatively correlated with individual WTP, then ,international’ free-riding cannot be rejected

# Pilot study: Białowieża/Biełavieskaja Pušča case

- July-August 2012
- Aims: to check up questionnaire, to estimate 'priors'
- E-mail („friends of the friends”): 98(BY)+24(PL)
- Returned: N=32(BY)



# Basic Idea of the Scenario: Strict Reserve Regime Expansion => Forest Ecosystems' Restoration in a Long Run

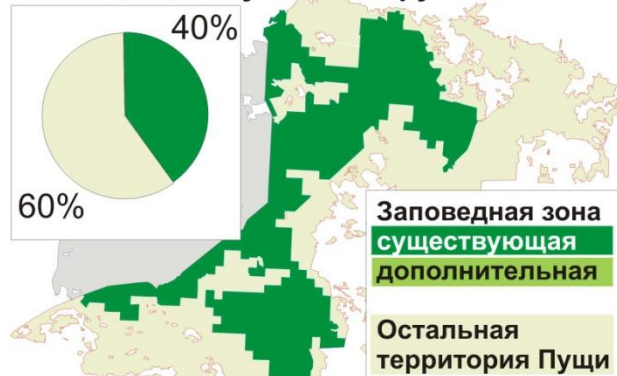


Наши дни

Через 250 лет

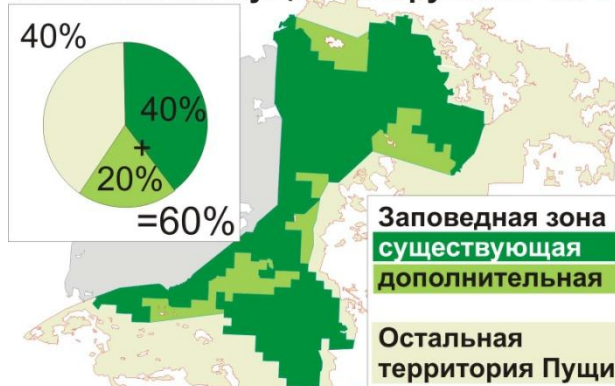
## Attributes and their Levels: Enlargement of Strict Reserve on BY side

Беловежская Пуца: Белорусская часть



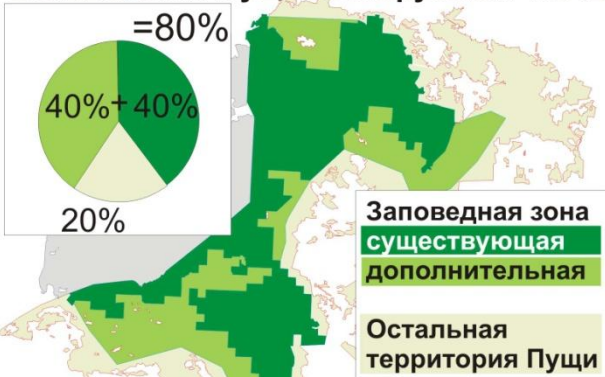
+ 0 га

Беловежская Пуца: Белорусская часть



+ 28 600 га

Беловежская Пуца: Белорусская часть



+ 57 200 га

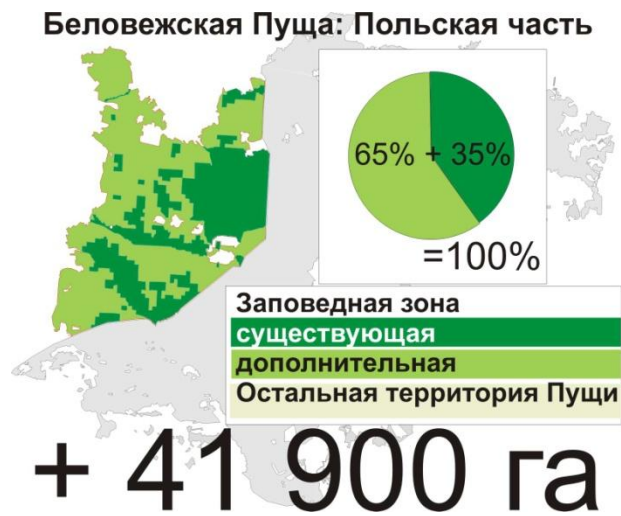
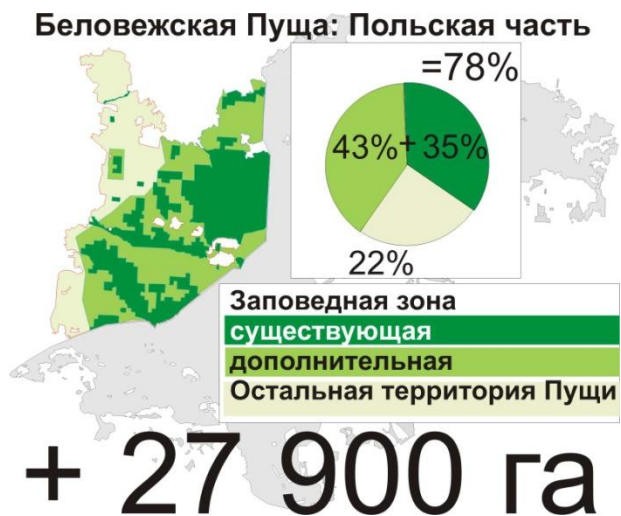
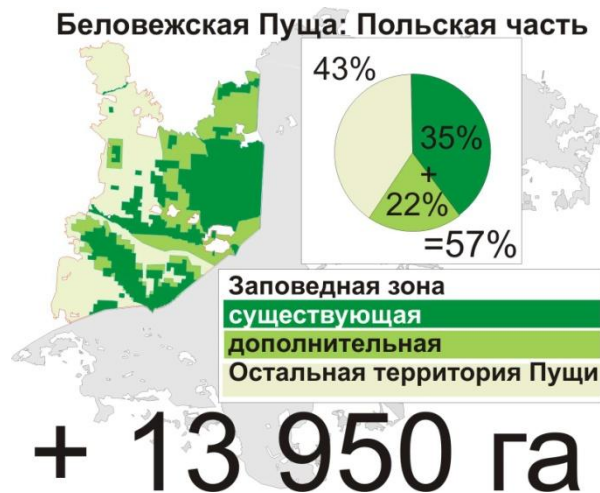
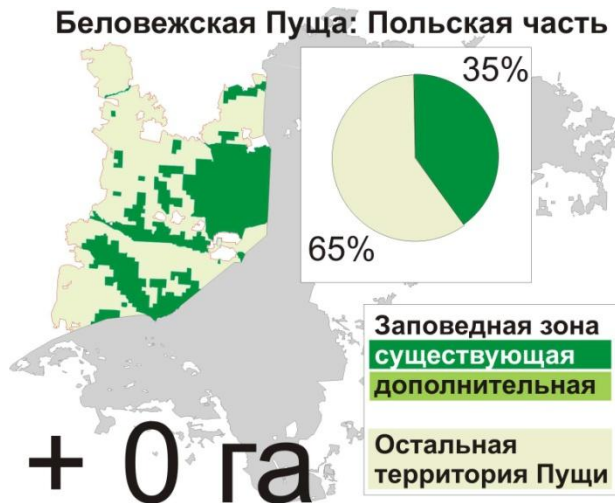
Беловежская Пуца: Белорусская часть



+ 85 900 га



## Attributes and their Levels: Enlargement of Strict Reserve on PL side

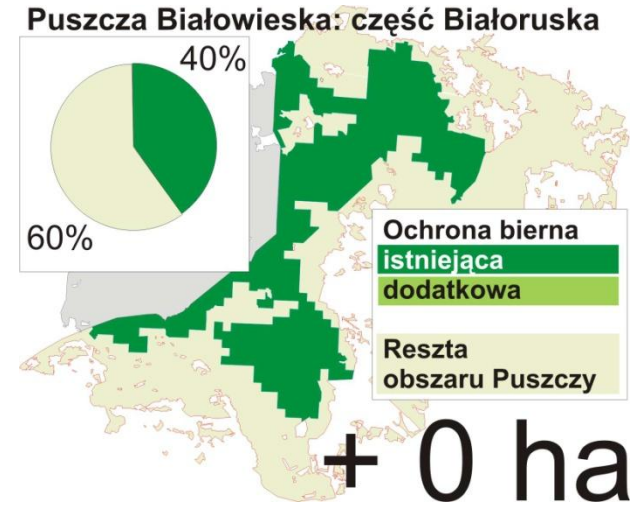
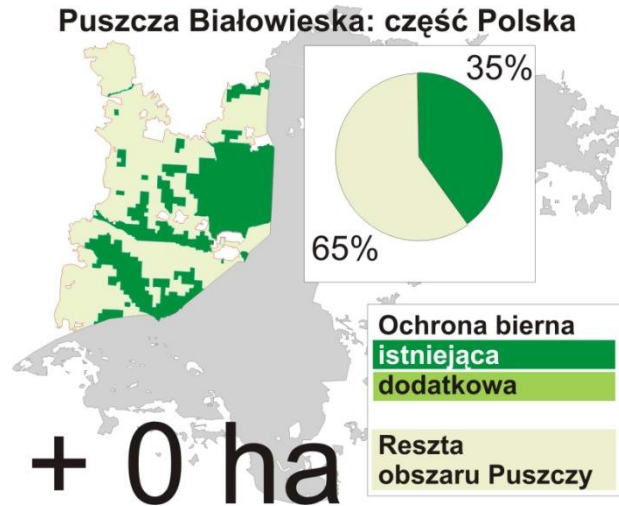


## Attributes and their Levels: Monetary Bid

For Poles, PLN/year		For Belarusians, USD/year	
35	70	6	12
105	140	18	24

Corresponding bid levels for Belarusians and Poles are equal with respect to exchange rate and PPP factor

# Status Quo Option





## Pilot survey: summary of attributes and their levels

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Expansion of the strict reserve protection regime on Belarusian part of the Białowieża forest	Additionally enlarging protection level of the reserve in the Belarusian part of Białowieża forest from the current area.	1) +0 ha 2) +28 600 ha 3) +57 200 ha 4) +85 900 ha
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BAU\* = +0 ha

Expansion of the strict reserve protection regime on Polish part of the Białowieża forest	Additionally enlarging protection level of the reserve in the Polish part of Białowieża forest from the current area.	1) +0 ha 2) +13 950 ha 3) +27 900 ha 4) +41 900 ha
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BAU\* = +0 ha

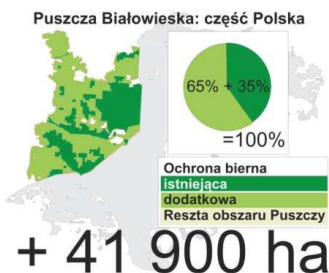
Cost (annually paid tax)	Annual cost per person (2012 prices)	Belarusians	Poles
	BAU = 0	1) 6 USD 2) 12 USD 3) 18 USD 4) 24 USD	1) 35 PLN 2) 70 PLN 3) 105 PLN 4) 140 PLN

# Pilot survey: choice-set example

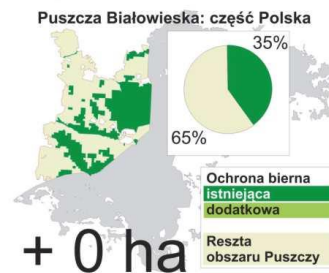
## Sytuacja 1

Powierzchnia poszerzenia strefy ochrony biernej Puszczy Białowieskiej po stronie Polskiej, hektarów

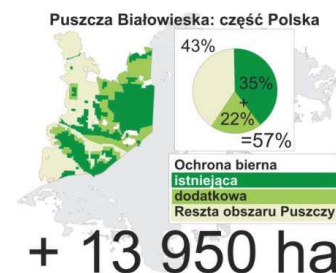
### Opcja 1



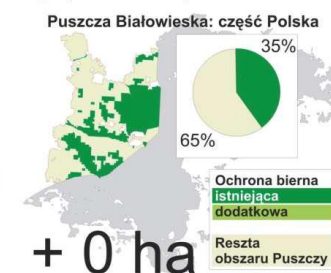
### Opcja 2



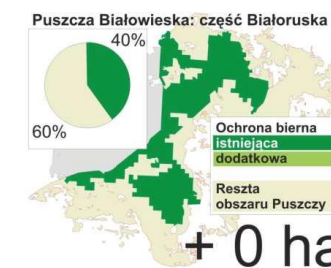
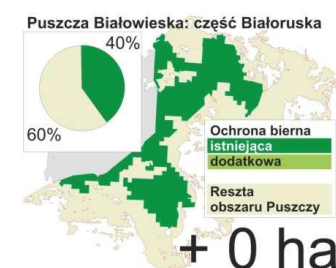
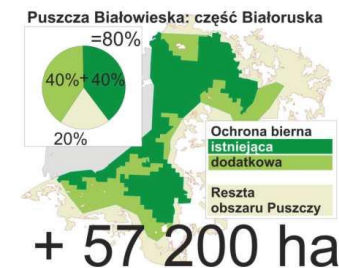
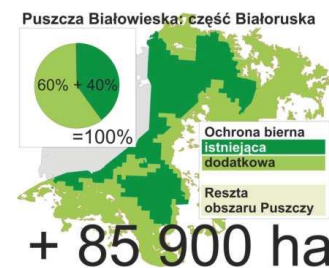
### Opcja 3



### Opcja status-quo



Powierzchnia poszerzenia strefy ochrony biernej Puszczy Białowieskiej po stronie Białoruskiej, hektarów



Roczna stawka podatku, złotych na rok

140

70

105

0

Proszę wystawić  
oceny tutaj →

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# Pilot survey: results (best choice)

Variables	Coeff.	t-rat.
SQ**	-1.407	-6.994
S_BY**	0.127D-04	6.024
S_PL*	0.945D-05	2.410
Bid**	-0.091	-9.405

Statistically significant at \* 0,05 \*\*0,01

# Pilot survey: WTP, USD/ha

	mean	t-rat.
WTP (S_BY)**	0.00013878	6.654
WTP (S_PL)**	0.00010344	2.620

WTP = 16.25 USD per person annually

Thank you for your attention!