



Environment Center
Charles University
in Prague

Optimal pricing of recreation in the Czech protected areas



Charles University Environment Center

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Public Recreation and Landscape Protection Conference

Brno | May 1-3, 2017

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Economic concept of entrance fees

- **Entrance/recreation fees** --> monetary payments given in turn for admittance or use of a recreational area or service (Bates, 1999)
- One of many economic tools of **environmental regulation**
 - example of an indirect tool with *negative stimulation*
 - changing behavior by influencing market signals (*prices*)
 - more *cost-effective* than direct administrative regulation
 - *budget determination* --> revenues used for nature protection/maintenance of touristic infrastructure
 - *internalizing of externalities* stemming from environmental degradation (garbage, erosion) and crowding

Two dimension of recreation charges

1. Recreation charge as an **access fee**

- charging the place that tourists visit
- represents the price of using *public land*
- target: reducing the congestion in the area

2. Recreation charge as a fee for a **particular service**

- service is an equivalent for the fee
- providing mainly a *private goods*
- parking, guide service, boating on watercourses, access and maintenance of trail, lookout towers, maintaining cross-country ski trails, outdoor equipment, sales of postcards and souvenirs

Pricing strategies and objectives

- **Revenue generation** (*fiscal motivation*)
 - cost recovery --> cover tourism's operating cost, environ. damage
 - generation of „profit“: excess of revenue over cost -> finance conservation activities
- **Visitor management** tool (*internalization motivation*)
 - reducing congestion and environmental damage
 - visitor monitoring
- **Declaration of value and quality** (*token charges*)
 - indicating value of protected nature
 - imputing value to visitation
 - indication of quality of touristic sites and equipment -->
 - and thus stimulate local business opportunities

Recreation charges at the Czech specially protected areas (SPA)

1. Direct pricing (*fee for the entry*)

- not charged at present
- adjustment of fees in national parks in the Act no. 114/1992 Coll. on the Protection of Nature and the Landscape
- i. for the *entry of motor vehicles*, ii. for *driving a motor vehicle*, iii. for *entry into selected locations* outside the built-up areas of the municipality
- revenue of the management of national park

2. Indirect pricing (*fee for a service*)

- Fee collection based on a *private law relationship*
 - maintenance of trails, access to the site (nature reserves, municipalities and private owners)
 - paid registration (boating on the Vltava upper river, National Park)
 - guide activities (payment for a guide, National Park)
 - guide activities and maintenance trails and equipment (Cave administration of the CR)
 - construction and operation of a lookout tower (municipalities and associations)
- *Local fees* based on the Act No. 565/1990 Coll., on local fees
 - incomes to municipal budgets
 - local fee for a spa or leisure stay
 - for use of a public space (parking lots)

Examples of the indirect private pricing at the SPA

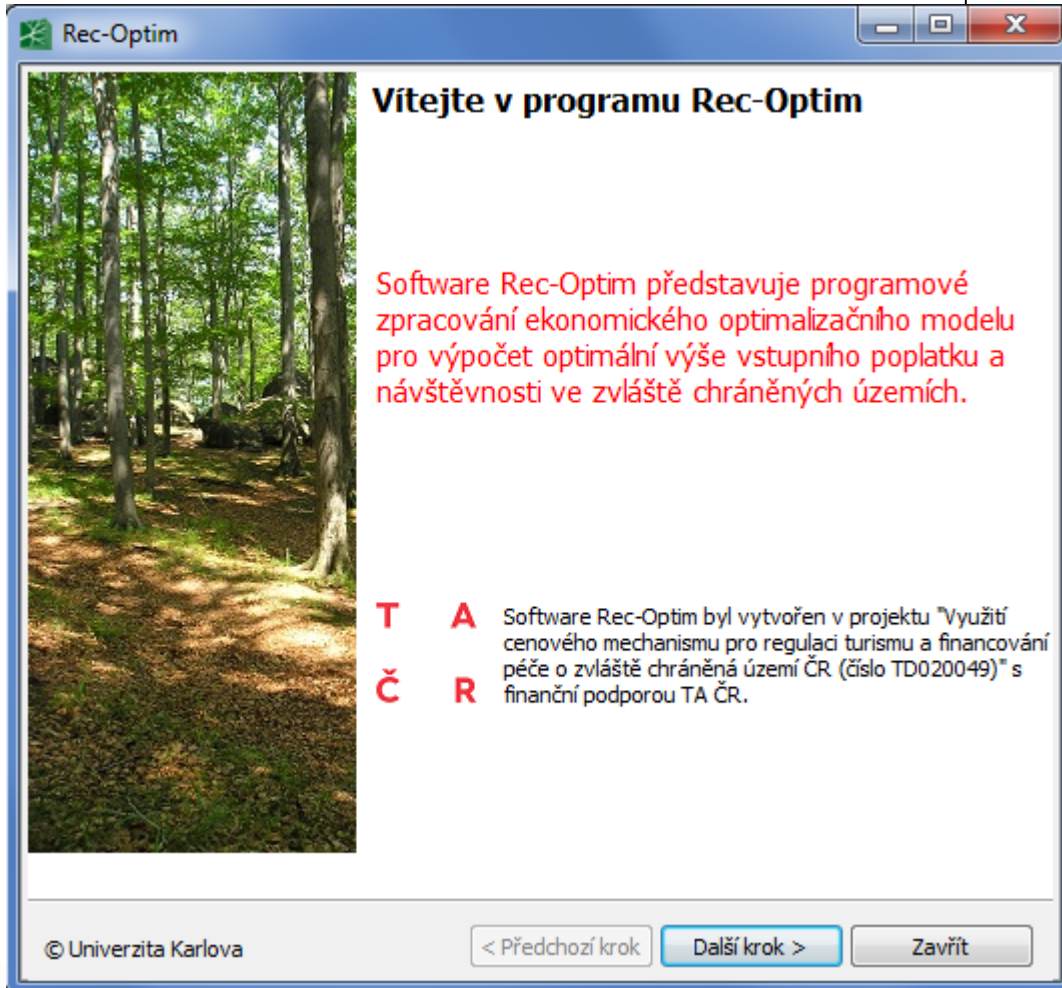
Location	Beneficiary of entrance fee	PLA / NP	Entrance fee (CZK)
Soos	museum	near Slavkovský les	90
Pravčická brána	private	České Švýcarsko	75
Edmundova soutěžka	municipality	České Švýcarsko	80
Prachovské skály	private	Český ráj	70
Adršpašskoteplické skály	municipality	Broumovsko	70
Rejvíz	municipality	Jeseníky	30
Tiské stěny	municipality	Labské pískovce	30
Votrubcův lom	private	near Český ráj	60
Vltava upper river	national park	Šumava	500

Software Rec-Optim

- A **software tool** for an economic optimization of entrance fee in the SPA, based on:
 - visitor monitoring data and parameters of recreation demand → data available for 27 natural areas in CR, including NP and PLA
 - supply side data about maintenance and investment costs
- **Categories of sites** involved:
 - large-size specially protected areas (PLA and NP)
 - small-size specially protected
 - parking lots and other types of entrance points into the SPA
- **Purpose** of the optimization:
 - change in visitation if entrance fee is introduced
 - optimal entrance fee in order to:
 - regulate visitation
 - achieve a particular payback period of investment
 - generate a certain level of revenues
 - payback period at a given level of entrance fee

Rec-Optim project websites, <https://www.czp.cuni.cz/rec-optim>

Uživatelský manuál Software Rec-Optim



UNIVERZITA KARLOVA –
CENTRUM PRO OTÁZKY ŽIVOTNÍHO PROSTŘEDÍ

Praha, prosinec 2015

Economic optimization model

objective function for maximization of social welfare:

$$\max f(p)$$

$$f(p) = \int_p^{\infty} x(v)dv + px(p) - C(x) - I - g(x) + T(x)$$

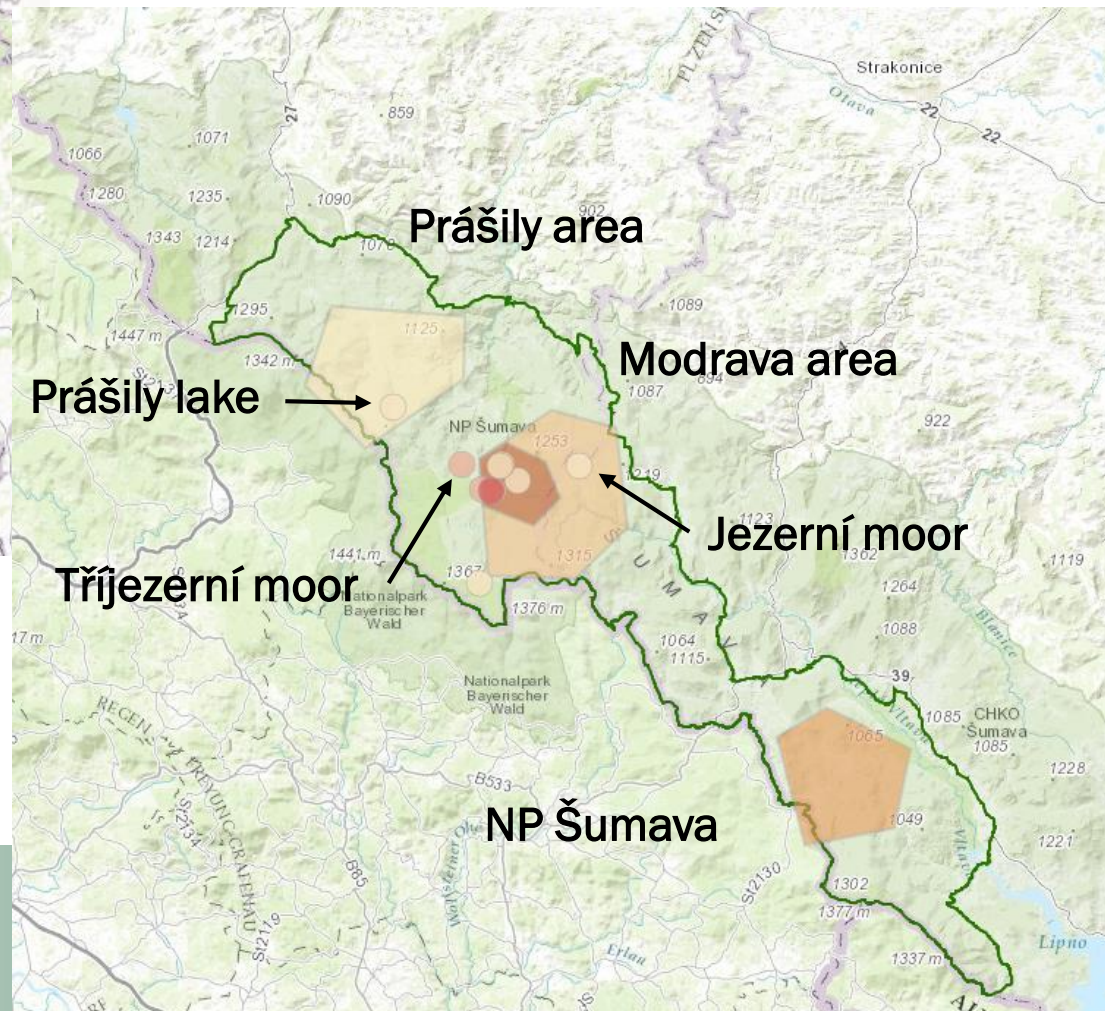
constraints:

$$px(p) - C(x) - I - R \geq 0$$

$$x > 0$$

Source: Alpízar (2006)

Example of an optimal pricing for recreation sites in NP Šumava



Data: Recreation demand and current visitation

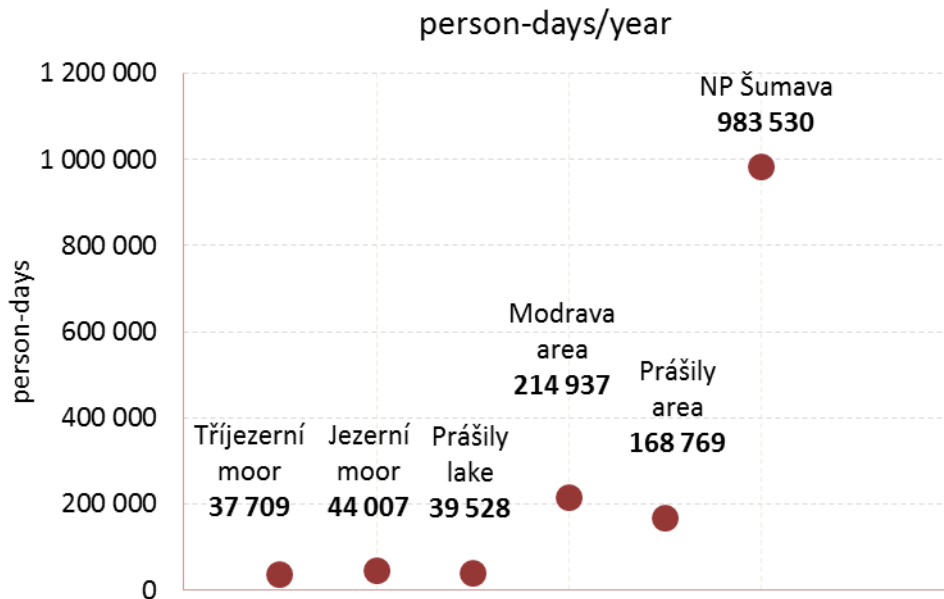
1. Recreation demand estimates

Variable	Coefficient	Mean
Travel costs	-0.001	651.2
Constant	0.450	-
Visits	-	1.9
CS per trip and person	-	998.8
CS per day and person	-	184.3

Notes:

CS - consumer surplus

Source: Kaprová (2015)



2. Current visitation

Tabulka 1: Obje

Provádí:

Zadavatel (CHKO, NP, kraj, atd.)

Dodavatel

Zadavatel

Výzkumná pracovník

Zdroj: autoři

Metodika monitoringu návštěvnosti v přírodních oblastech

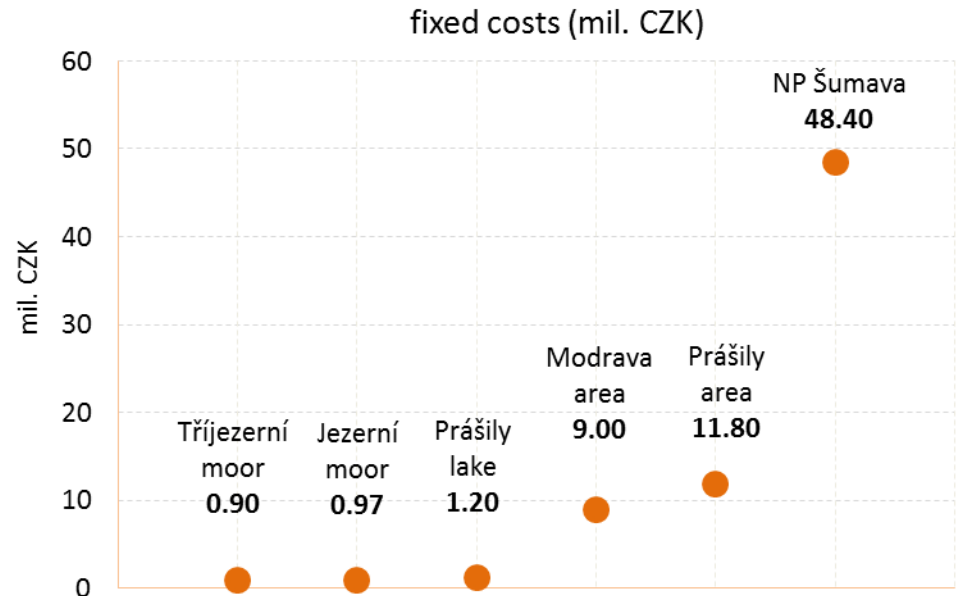
Centrum pro otázky životního prostředí
Univerzita Karlova v Praze

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Source: Braun Kohlová et al. (2016)

Data: Supply side data on variable and fixed costs

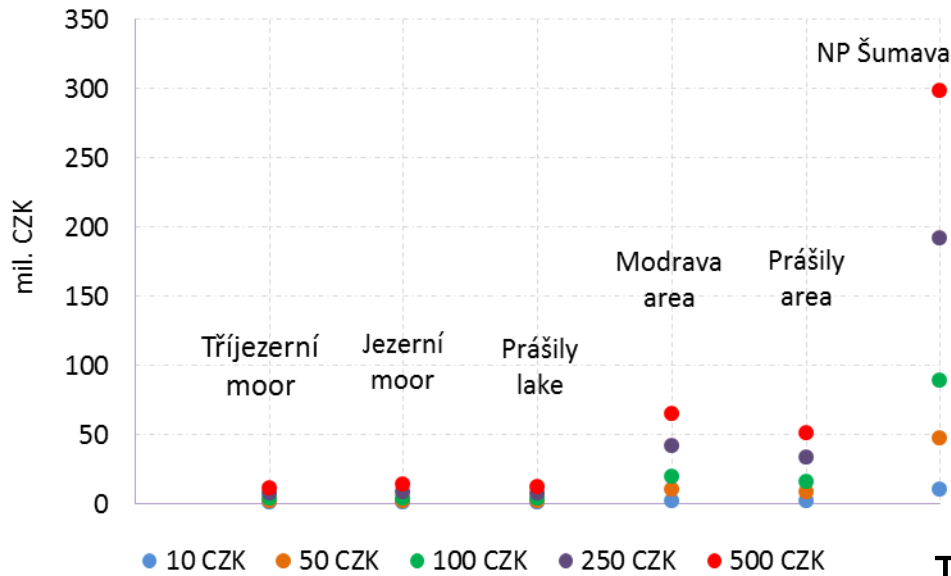
- **Fixed costs** (provision of the park's public services)
 - information centers
 - information and ranger service
 - touristic infrastructure
 - tourist marking
 - road maintenance and repair
 - operation of car parking lots
- **Variable costs** (marginal cost of recreation)
 - no clear evidence
 - range from 0-10 CZK per person and visit



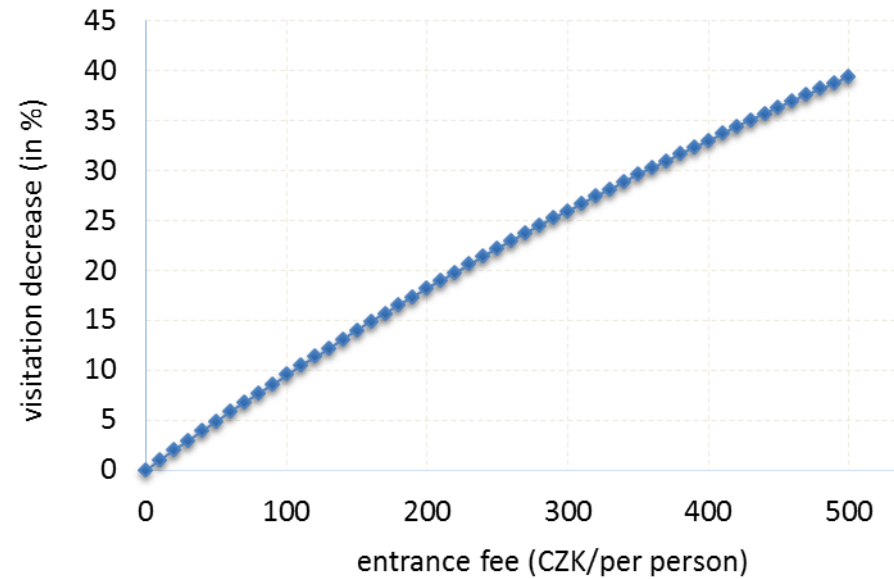
Source: Management of NP Šumava

Results: change in visitation

total revenues from charging entry (mil. CZK)



change in the yearly visitation (in %)

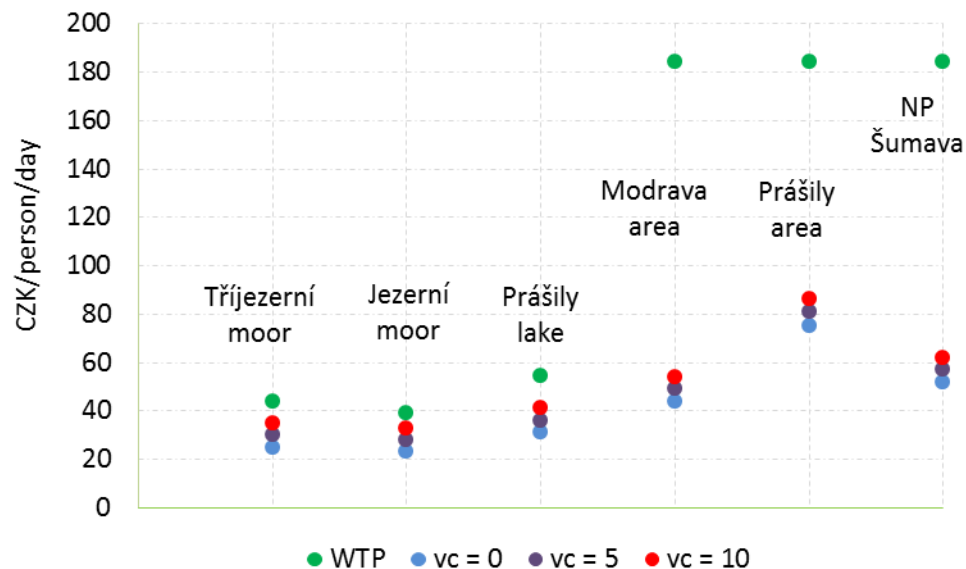


Total revenues from charging entry (mil. CZK/year)

Entrance fee	Change in the yearly visitation (in %)	Tříjezerní moor	Jezerní moor	Prášíly lake	Modrava area	Prášíly area	NP Šumava central part
10 CZK	1.0	0.4	0.4	0.4	2.1	1.7	9.7
50 CZK	4.9	1.8	2.1	1.9	10.2	8.0	46.8
100 CZK	9.5	3.4	4.0	3.6	19.4	15.3	89.0
250 CZK	22.1	7.3	8.6	7.7	41.8	32.8	191.4
500 CZK	39.4	11.4	13.3	12.0	65.1	51.2	298.1

Results: optimal entrance fees

optimal entrance fee and willingness-to-pay (CZK)



Variable	Unit	Tříjezerní moor	Jezerní moor	Prášíly lake	Modrava area	Prášíly area	NP Šumava central part
$vc = 0$	CZK/person/day						
entrance fee	CZK/person/day	25	23	31	44	75	52
visitation decrease	%	2.4	2.2	3.0	4.3	7.2	5.1
revenues	mil. CZK	0.9	1.0	1.2	9.0	11.8	48.4
$vc = 5$	CZK/person/day						
entrance fee	CZK/person/day	30	28	36	49	81	57
visitation decrease	%	2.9	2.7	3.5	4.8	7.7	5.6
revenues	mil. CZK	1.1	1.2	1.4	10.0	12.5	58.0
$vc = 10$	CZK/person/day						
entrance fee	CZK/person/day	35	33	41	54	86	62
visitation decrease	%	3.4	3.2	4.0	5.3	8.2	6.1
revenues	mil. CZK	1.3	1.4	1.6	11.0	13.3	57.7

Discussion and conclusions

- Visitor management
 - *inelastic* demand for recreation --> regulation of visitation via an entrance fee is difficult to implement
 - *sensitivity* of recreation demand depends on the type of recreation activity and service
- Revenue generation
 - visitors' willingness-to-pay is evident both from research studies and from the current pricing practice (local and entrance fees, guided activities)
 - potential revenues for investments and maintenance of touristic infrastructure and also for nature protection (in the order of mil. CZK per year) is possible to achieve by the publicly acceptable and usual level of entrance fee
- Insufficiency of data
 - there is no clear differentiation in fixed and variable costs
 - budget items on fixed costs associated with tourism need to be clarify
 - variable costs, which are related to an additional visitor, need to be quantify
 - further research and cooperation with NP management is needed

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T A The work on the study and contribution was supported by the research project
*The use of pricing mechanism for tourism directing and financing the
management of specially protected areas in the Czech Republic* (no.
TD020049) and *Novel policies in post-mining landscape planning:
socioeconomic assessment of alternative land rehabilitation options* (no.
Č R TD03000249) financed by the Czech Technological Agency.