

Forest functions of small-scale protected areas on Training forest Enterprise Masaryk's forest Křtiny

Ecosystem approach to evaluation of forest functions according to Vyskot et al. Method

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Evaluation of Forest Functions According to Vyskot et al. - working steps

1. Six forest functions
2. Forest stand types - tree species composition
3. Functionally determinative criteria
4. **REAL POTENTIAL OF FOREST FUNCTIONS**
5. Functionally reduction criteria
6. **REAL EFFECT OF FOREST FUNCTIONS**
7. **FACTOR OF THE TOPICAL SOCIAL INTEREST**
8. FINANCIAL EXPRESSION OF FOREST FUNCTION VALUE
9. SAPFO



Forest Functions



BIOPRODUCTION



ECOLOGICAL-STABILIZATION



HYDRIC-WATER MANAGEMENT



EDAPHIC-SOIL CONSERVATION



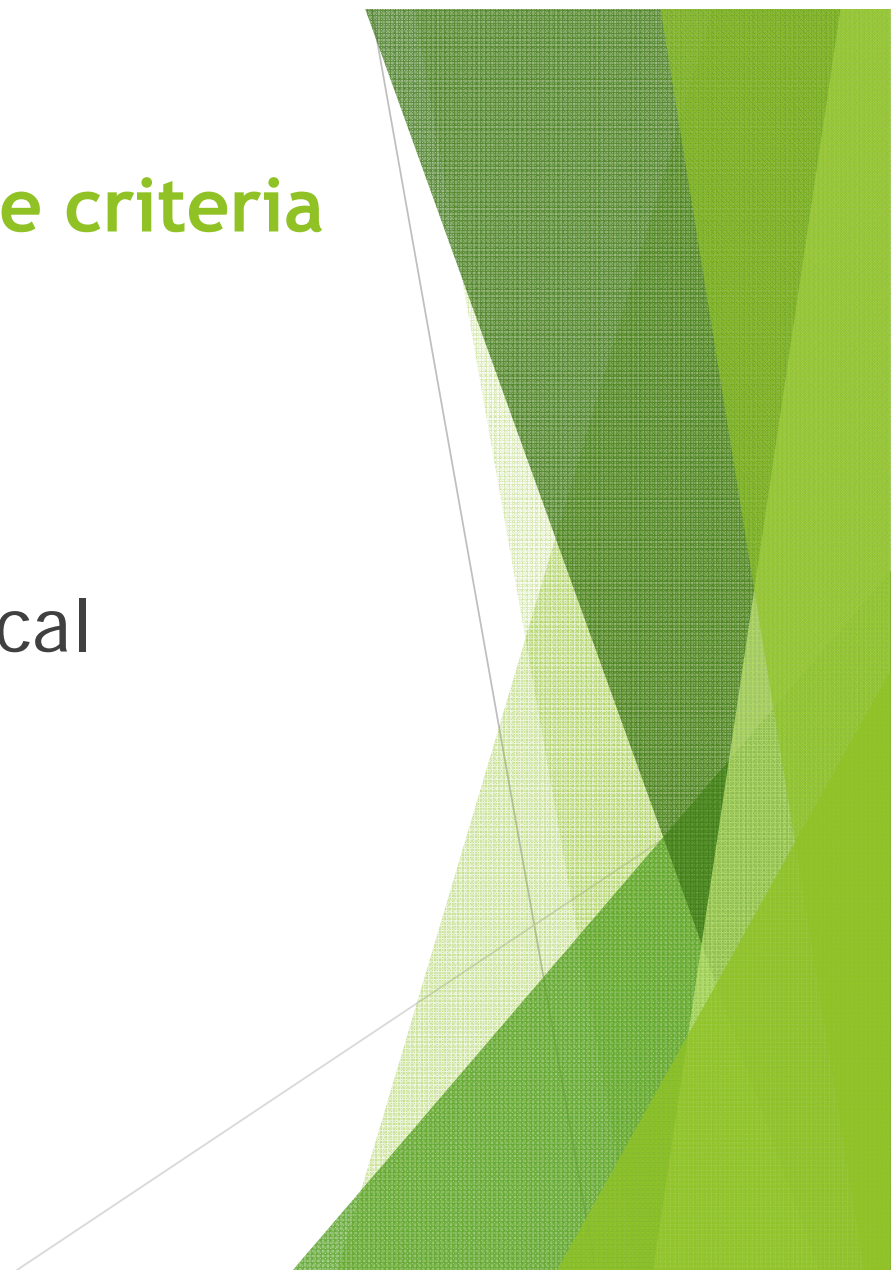
SOCIAL-RECREATION



SANITARY-HYGIENIC

Forest ecosystem parameters = functionally determinative criteria

- ▶ Climatic
- ▶ Hydrological
- ▶ Terrain
- ▶ Geopedological
- ▶ Biotic



Geopedological parameters - value classification

Degree	Interval %	Potential infiltration - annual amount W mm	Soil permeability K _p m/d	Soil depth z cm	Geopedo- logical coef. GP	Humus form Hf	Slope coef. S	Intensity of humification C/N
0	<11	<211	<0.7	<30	0-0.73	without soil humus	0-1.59	<17
1	11-30	211-575	0.7-1.8	30-67	0.74-1.19	mull	1.60-4.35	17-20
2	31-45	576-863	1.9-2.7	68-95	1.20-1.63	mull-moder	4.36-6.53	21-25
3	46-55	864-1055	2.8-3.3	96-114	1.64-1.95	moder	6.54-7.98	26-30
4	56-70	1056-1343	3.4-4.2	115-143	1.96-2.49	moder-moder	7.99-10.15	31-35
5	71-90	1344-1726	4.3-5.4	144-181	2.50-3.30	moder-moder	10.16- 13.05	36-40
6	>90	>1726	>5.4	>181	3.31-3.75	moder	13.06- 15.00	>40

Real potentials of forest functions of the functional MGS 45 according to particular function criteria (example)

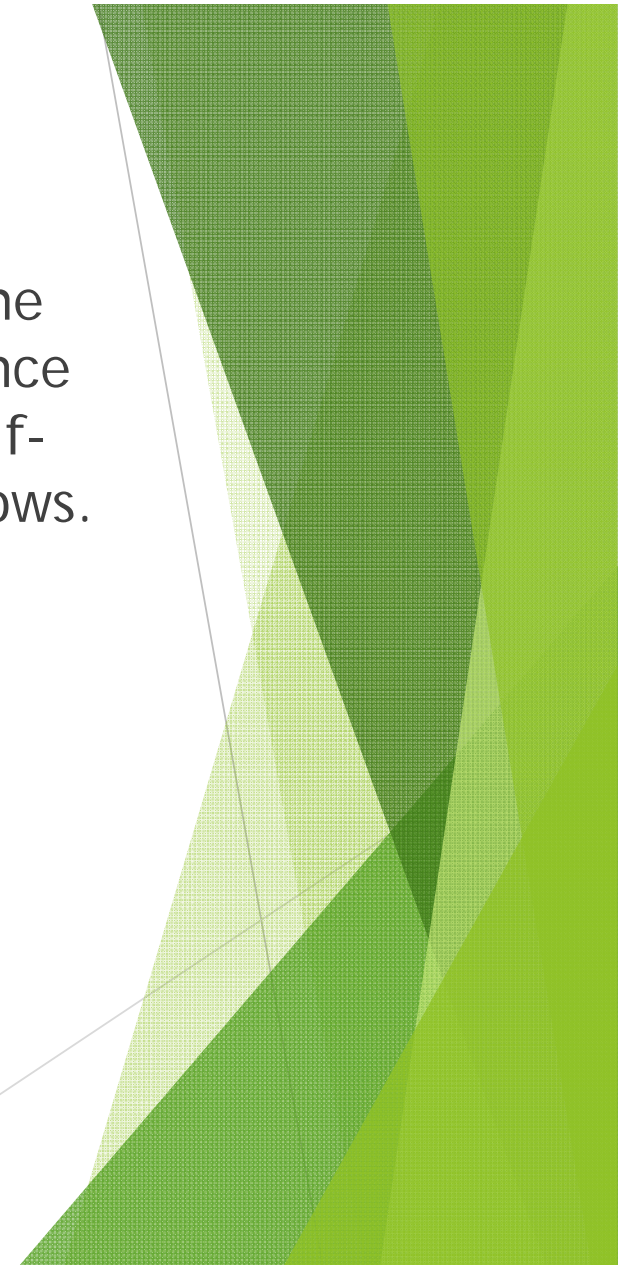
Target MGS	REAL POTENTIAL OF FOREST FUNCTIONS – RP_{FL}																																										
45	BP	ES			HV							EP							SR										ZH					ΣRP_{FL}									
Stand type	RP 0	Species diversity	Natural composition	RP 0	Horizontal precipitation	Potential infiltration	Potential runoff	Interception	Evapotranspiration	Soil permeability	RP 0	Rain factor	Characteristic soil	Slope inclination factor	G – P factor	Soil depth	Humification	Forest floor form	RP 0	T_{wz} – growing season	Physiological period	N – summer days	N – rain days	N – days with snow	Duration of sunshine	N_v – relief energy	Terrain accessibility	Soil depth	Site bearing capacity	Physiol. biodiversity	Herb diversity	Herb cover	RP 0	Max. T_v of air	N – icy days	N – tropical days	Duration of sunshine	Filtration effect	Air pollution load	Allergenic load (d,b)	RP 0	ΣRP_{FL}	RP_{FL} class
C1	5	0	1	1	0	0	0	2	1	4	2	4	3	1	1	3	3	5	3	4	4	4	4	2	4	2	4	2	6	2	3	4	3	2	4	2	4	6	5	6	5	19	III
D1	5	1	2	2	0	0	0	2	1	4	2	4	3	2	1	3	3	5	3	4	4	4	5	1	4	1	4	2	6	3	3	4	4	2	4	2	4	6	5	6	5	21	IV
M1P3	4	2	3	3	0	0	0	2	1	4	2	5	3	1	1	3	3	5	3	4	4	4	5	1	4	1	4	2	6	3	3	4	4	2	4	2	4	6	5	5	5	21	IV
D1P3	4	1	2	2	0	0	0	2	1	4	2	5	3	1	1	3	3	5	3	4	4	4	5	1	4	1	5	2	6	3	3	4	4	2	4	2	4	6	5	6	5	20	III
D1P4	5	1	1	1	0	0	0	2	1	4	2	4	3	1	1	3	3	5	3	4	4	4	4	2	4	2	4	2	6	3	3	4	4	2	4	2	4	6	5	6	5	20	III
M1P4	5	2	2	2	0	0	0	2	1	4	2	4	3	1	1	3	3	5	3	4	4	4	4	2	4	2	4	2	6	3	3	4	4	2	4	2	4	6	5	5	5	21	IV
C6	5	0	5	3	0	2	0	4	0	4	2	4	3	2	1	3	4	3	3	4	4	4	2	4	2	4	2	6	0	4	4	3	2	4	2	4	4	5	6	5	21	IV	
M1P6	5	2	2	2	0	0	0	2	1	4	2	4	3	2	1	3	3	5	3	4	4	4	4	2	4	2	4	2	6	5	4	4	5	2	4	2	4	6	5	6	5	22	IV
D6	5	1	6	4	0	1	0	4	0	4	2	4	3	2	1	3	4	3	3	4	4	4	5	1	4	1	4	2	6	1	4	4	3	2	4	2	4	4	5	6	5	22	IV
M1P5	5	2	3	3	0	0	0	2	1	4	2	5	2	1	3	0	3	5	3	4	4	4	5	1	4	1	5	2	6	5	3	4	5	2	4	2	4	6	5	5	5	23	IV

Ecological-stabilisation forest function

- ▶ **Ecological-stabilization function (ecostabilization)** – is the potential of a forest ecosystem to maintain dynamic balance and to resist to effects of stress factors on the basis of self-regulation mechanisms and balance of energo-material flows.

Ecological-stabilization effects:

- ▶ function of self-regulation processes and feedbacks
- ▶ balance of energo-material flows
- ▶ resistance to stress factors



Criteria of ecological-stabilisation forest function

- Diversity of tree species composition
- Naturalness of tree species composition

Function degree	Function interval %	Function criterion	Interaction criterion dB Stand type at the level of part of a stand (storey)
		Species diversity D_d %	
0	<11	C	Data of species composition and absolute height class (AVB) of stands of dB of forests of the CR for the actual differentiation of management groups of stands (MGS)
1	11-30	DP	
2	31-45	MZ	
3	46-55	MZP	
4	56-70	MPP	
5	71-90	ZZZ	
6	>90	PPPP	

Criteria of ecological-stabilisation forest function

- Diversity of tree species composition
- Naturalness of tree species composition

Degree name	Code	Degree of naturalness
unsuitable	0	paraclimax - ecotope change (e.g. locust forests), tree species representation of natural composition < 10%
very low	1	exotic species, tree species representation of natural composition 11 - 30%
low	2	monocultures endangered by air pollution and damaged by game, allochthonous tree species, substitute stands of destruction air pollution stages of A and B zones, genetically unsuitable stands, species representation of natural composition 11 - 30%
average	3	monocultures, cultivated coenoses, unsuitable species composition, species representation of natural composition < 50%
high	4	semi-cultivated forest, simple composition, species representation of natural composition 51 - 70%
very high	5	close-to-nature forest differentiated from species and spatial aspects, species representation of natural composition 71 - 90%
exceptional	6	natural species composition corresponding to natural conditions, > 90%

Criteria of the ecological-stabilisation function - - significance weights

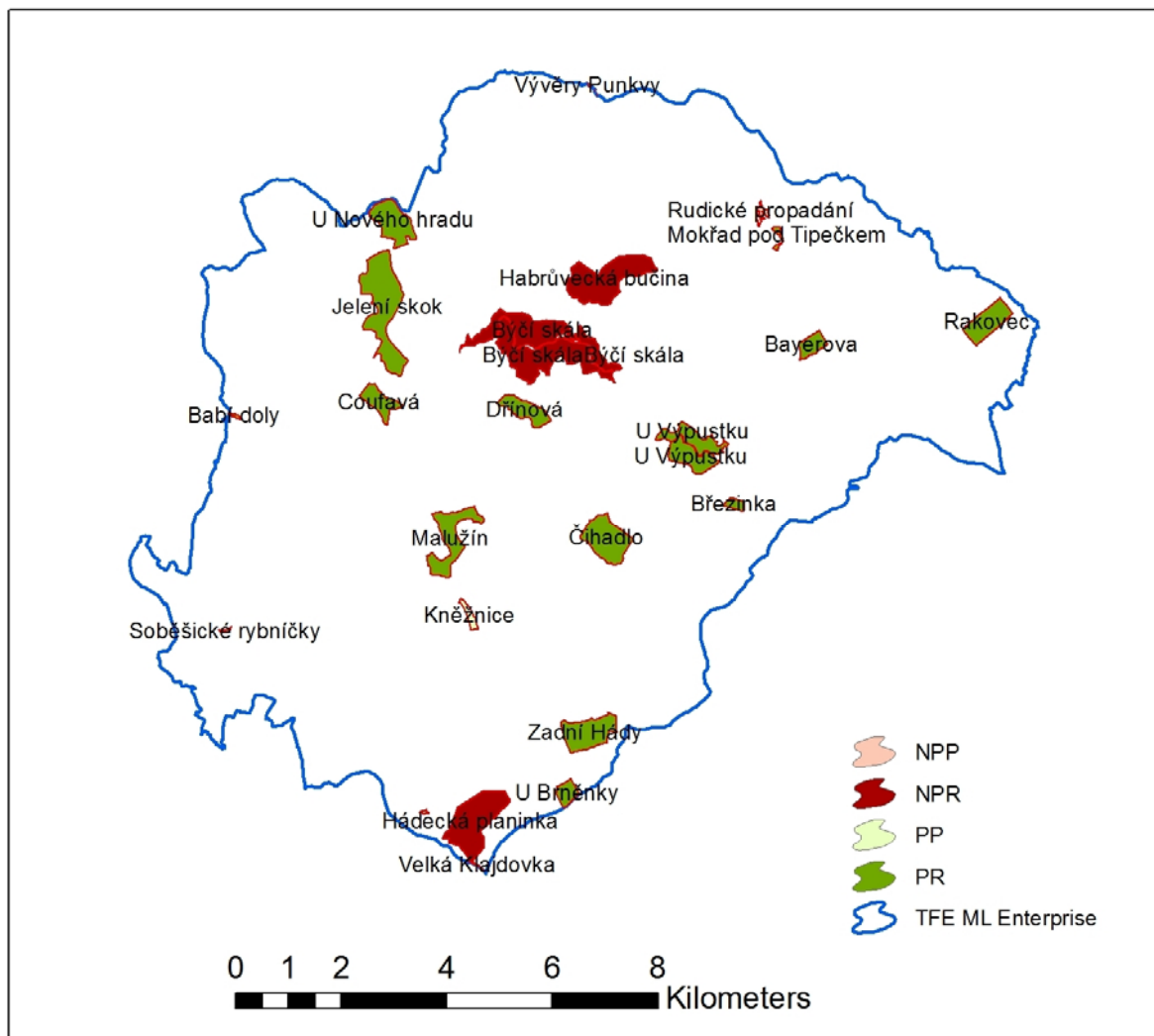
	1	2
$K_{(1-2)}$	Species diversity	Natural composition
sign.	D_d	P_s
$a_{(1-2)}^v$ %	40	60

Factor of the topical social interest (FAZ)

- is a factor (indicator) which does not determine the ecosystem but exclusively the **social value of forest functions**

Ecological-stabilization function group - FAZ	
Forests of national parks (1st zone)	3.0
Forests of national nature reserves	3.0
Forests of nature reserves	2.6
Forests of national parks (2nd zone)	2.6
Forests of protected landscape areas (1st zone)	2.3
Forests of supra-regional territorial systems of ecological stability	1.9
Forests of regional territorial systems of ecological stability	1.9
Forests of local territorial systems of ecological stability	1.6
Forests of protected landscape areas (2nd zone)	1.3
Forests of nature parks	1.3
Multifunctional forests with the standard level of ecological stability	1.0
Forests with the decreased function of ecological stability	0.6
Forests destroyed from the ecological-stabilization viewpoint	0.3

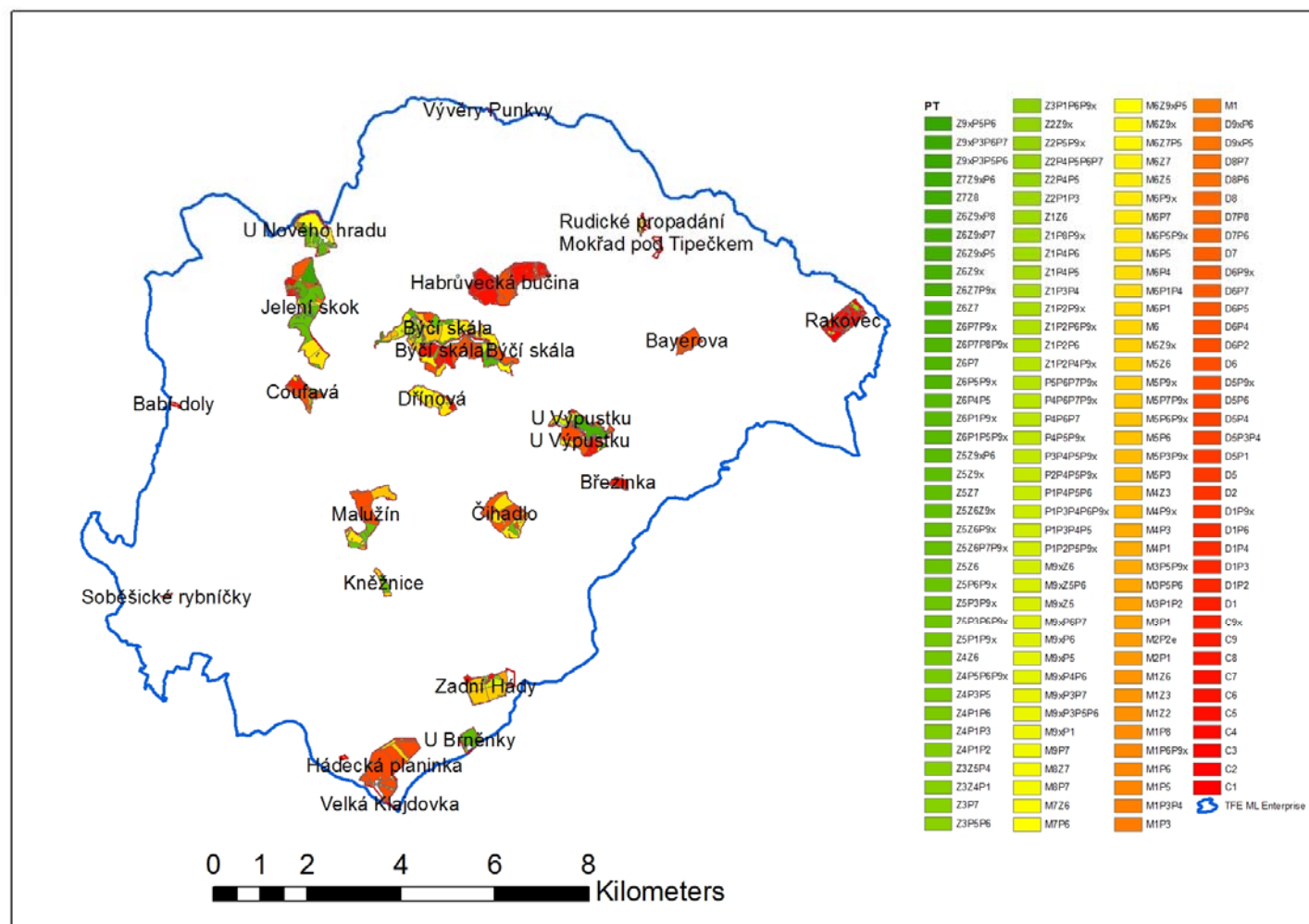
Small-scale protected areas on TFE ML Křtiny



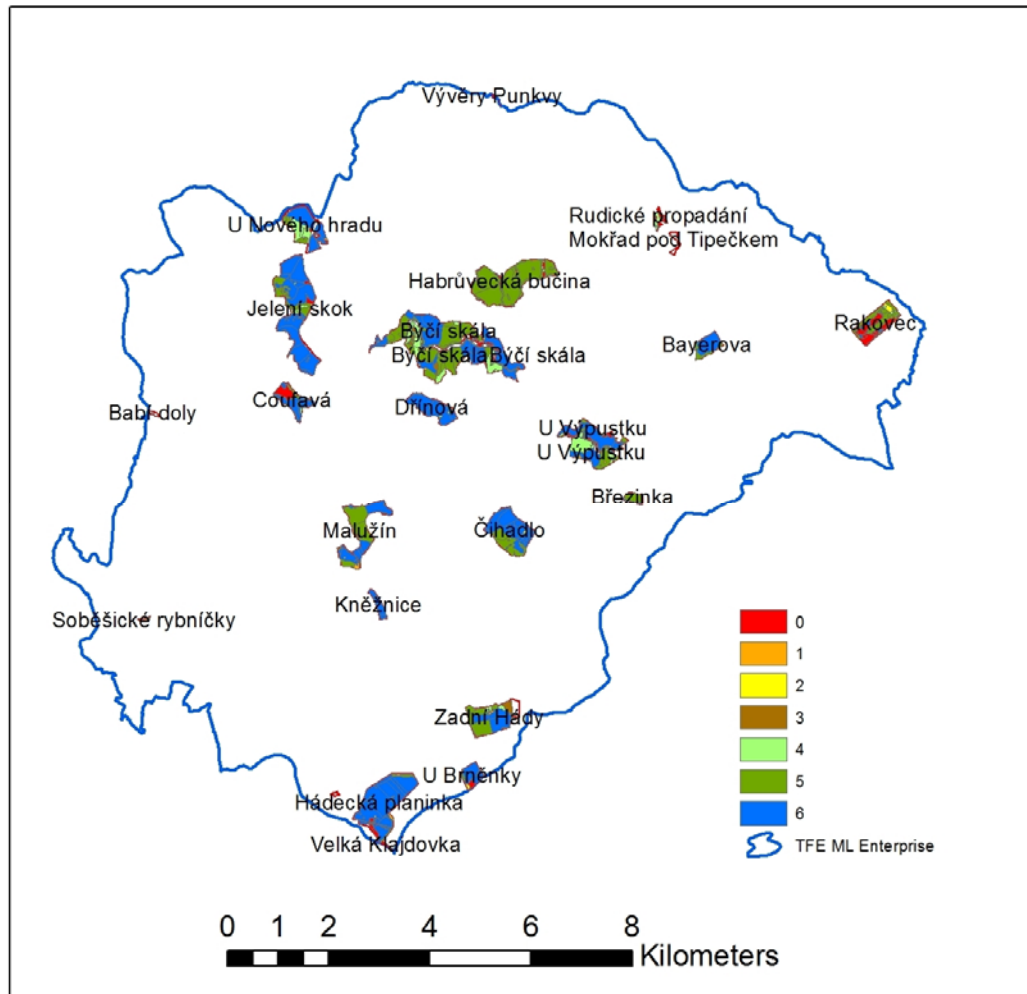




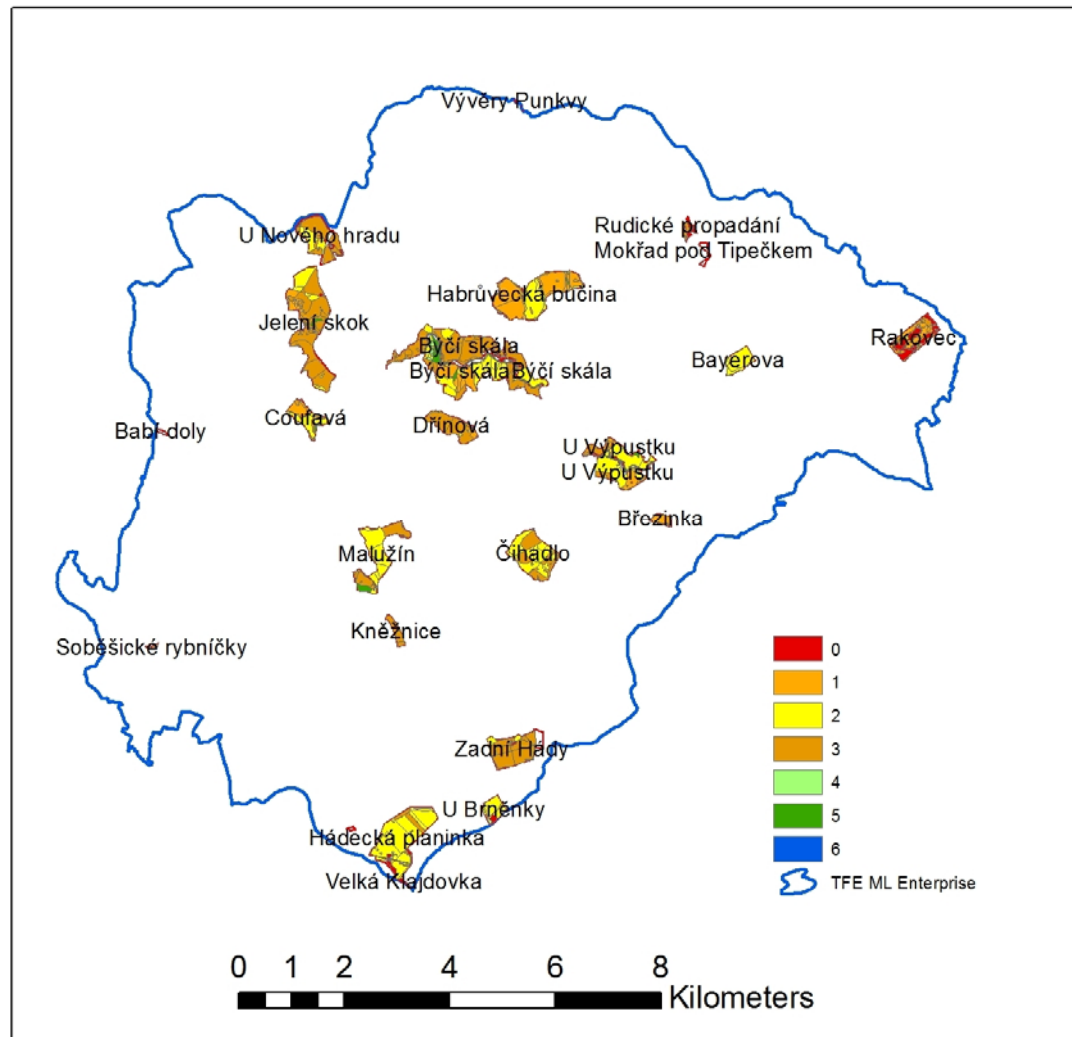
Tree species composition - stand types



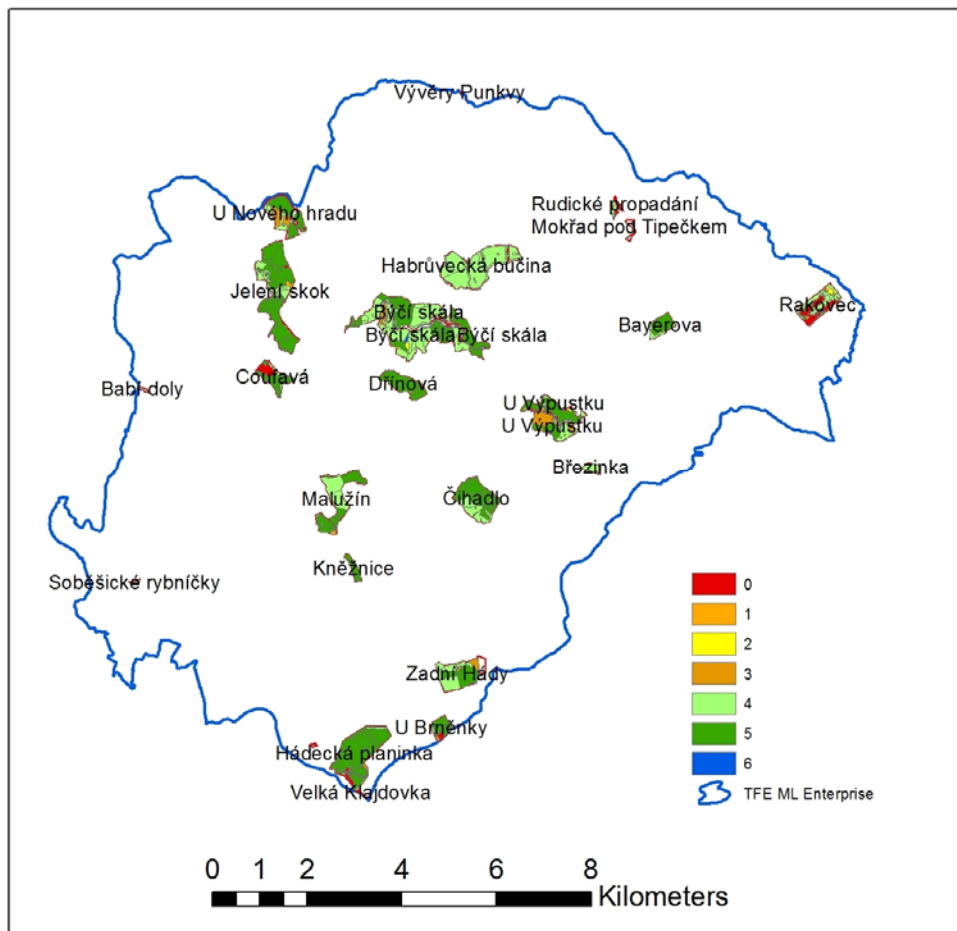
Naturalness of tree species composition



Tree species composition diversity



Real potential of ecological-stabilisation forest function



Practical utilisation of Method within management of protected areas

- ▶ Description of recent state
- ▶ Multifunctional management with accent of nature conservation
- ▶ Monitoring of management measures effectiveness



THANK YOU FOR YOUR ATTENTION

