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Table S1. Description of the protected areas (jointly called 'reserves') used for the study of land use/land cover (LULC) changes and associated changes in Lepidoptera diversity.

Name (coordinates)	Year established	Description of the reserve	Area (in ha)
Koda (49.9294925N, 14.1270511E)	1952	Canyons covered with oak-hornbeam forests and reamins of dry grasslands on hilltops, scree forests and floodplain forests in low elevations.	502
Karlštejn (49.9409281N, 14.1802661E)	1955	Geologically rich area with volcanic, schist, sandstone, loess, and limestone soils mostly covered with formerly coppiced oak-hornbeam forests with dominance of cow-wheat (<i>Melampyrum</i>) in understorey; a few rocky outcrops are present.	1559
Zbraslav (Šance) (49.9707478N, 14.4139617E)	1982	Volcanic rocky hills covered with oak forests admixed with birch, hornbeam, beech, pine, in lower elevations with black locust, maple, lime, rowan, or alder.	485
Podyjí (48.8429672N, 15.9099261E)	1978 (1991)	Area along a river canyon covered mostly with acidophilous and temperate type oakwoods (largely former coppices) with hornbeam, beech, and alder. Remains of open woodlands on hilltops. Arable land, grasslands, shrublands and heathlands in higher elevations and in the east. Numerous rocky areas present, reed-beds in lower alluvial parts. (the area was biologically mostly unexplored before the fall of Iron Curtain in 1989)	6 292
Mohelensko (49.1081475N, 16.1844128E)	1933 (core area), 1996-2015 the rest	Rocky canyons covered with scree forests (thermophilic oak woods) and dry grasslands on serpentinite and loess soils (complex of several small neighbouring reserves: NPR Mohelenská hadcová step, PR Dukovanský mlýn, PR Havran, PR Pod Havranem, PP Bílá skála u Jamolic, PR Mohelnička, PR Velká skála, PR Templštejn, PR Černice, PP Pustý mlýn)	339
Pouzdřany (48.9470497N, 16.6429203E)	1946	Hills with claystone, sandstone, and loess soils covered with steppic grasslands, xeric shrublands or thermophilic forests dominated by oak, hornbeam and maple.	263
Pálava (48.8285608N, 16.6808144E)	1946 (core area), 1976	Limestone hills with a significant proportion of steppe ecosystems including meadow steppes, forest steppes, and thermophilic oak forests; in addition meadow and wetland habitats with halophytic vegetation are present in lower parts. (a part called Milovický Forest was not mapped due to a lack of suitable historical layers)	666

Table S2. Classification of original 22 land use/land cover (LULC) categories into five simplified categories of natural habitats based on the level of canopy cover. The original LULC categories were created following Miklín & Smolková (2011).

Canopy cover category	Land use/land cover categories
(0) not a habitat	build-up area; residential and technical; infrastructure; arable land; vineyards; water area; water course
(1) 0–10 %	grassland; clear-cut; wetland; rock
(2) 11–33 %	grassland with solitary trees; clear-cut with retention trees
(3) 34–65 %	gardens and parks; orchards; agroforestry mosaic; open woodland
(4) 66–89 %	semi-open woodland; clear-cut afforested; bushes
(5) 90–100 %	closed forest; linear vegetation

Table S3. Description of life-history traits used for the recorded butterflies and macro-moths. Extracted from Bartonova et al. (2014), Sucháčková Bartoňová et al. (2024), and Potocký et al. (2018).

Group	Variable type	Trait (<i>code</i>)	Description
Butterflies	Eco-morphological	Average population density (<i>Density</i>)	density, the number of individuals which can occur per unit area of habitat (ranked 1–9 scale, sparse to dense).
		Feeding index (<i>Feeding</i>)	trophic range, expressed as an index that weights the number of consumed host plant families (F) and genera (G): $I = (G \times Fa)^{1/2}$, where $a = F/2G$.
		Fertility (<i>Fertility</i>)	number of eggs for a female at eclosion (ranked 1–9 scale, from few to many, Reinhardt et al. 2007). In species missing in Reinhardt et al. 2007, averages across all other species were used.
		Flight period length (<i>FlightPerLen</i>)	flight period length, number of months of summed adult flight, excluding months of hibernation (Benes et al. 2002)
		Wing length (<i>Winglength</i>)	Forewing length (min = 11.0, max = 37.5 [mm])
		Host plant form (<i>HostPlantForm</i>)	prevailing host plant apparency (used as categorical variable: 1 – ephemerals and small forbs, 2 – large forbs and grasses, 3 – bushes, creepers and small trees, 4 – large trees)
		Mobility (<i>Mobility</i>)	the propensity to disperse (ranked 1–9 scale, from extremely sedentary to extremely mobile)
		Overwintering stage (<i>Overwinter</i>)	a proxy for development speed (ranked 1–5 scale and used as categorical variable; 1 – egg, 2 – larva, 3 – pupa, 4 – hibernating adult, 5 – migrating adult)
		Voltinism (<i>Voltinism</i>)	the average number of generations per year in the Czech Republic (min = 1, max = 4)
	Habitat affinity	<i>Hubiquitous</i>	ubiquitous (generalist)
		<i>Hmesophilic1</i>	associated with grasslands
		<i>Hmesophilic2</i>	associated with shrublands
		<i>Hmesophilic3</i>	associated with woodlands
		<i>Hxerothermophilic1</i>	associated with xeric grasslands (steppe)
		<i>Hxerothermophilic2</i>	associated with dry shrublands
		<i>Hhydrophilic</i>	associated with wetlands
		<i>Htyrphophilic</i>	associated with bogs/peatlands
		<i>Halpine</i>	associated with alpine habitats
Moths	Eco-morphological	Wing span (<i>Wingspan</i>)	Forewing length [mm] (also a proxy for dispersal ability)
		Overwintering stage (<i>Overwinter</i>)	ordinal value from egg = 1, to adult = 4. Used as categorical.
		Voltinism (<i>Voltinism</i>)	the mean number of generations per year; related to development speed
		Migrating species (<i>Migrations</i>)	species known to migrate over long distances (0/1)

Group	Variable type	Trait (<i>code</i>)	Description
		Apterous females (<i>Apterous</i>)	species with reduced wings in adult females (0/1)
		Flight period - early spring (<i>FPearlyspring</i>)	species active in early spring (0/1)
		Flight period - spring (<i>FPspring</i>)	species active in spring (0/1)
		Flight period - summer (<i>FPsummer</i>)	species active in summer (0/1)
		Flight period - autumn (<i>FPautumn</i>)	species active in autumn (0/1)
		Flight period - winter (<i>FPearlyspring</i>)	species active in winter (0/1)
		Flight period length (<i>FlightPerLen</i>)	numeric as a sum of the above flight periods, i.e. length of the seasonal activity
		Trophic range (<i>TropRange</i>)	ordinal: 1 – monophages, feeding on <4 genera from a single family or on <3 genera from different families; 2 – oligophages; and 3 – polyphages, >3 plant families
		Host plant form (<i>HostPlantForm</i>)	defining the host plants' spatiotemporal availability (i.e. apparency) and linked to anti-herbivore defences; ordinal: 1 – forbs, 2 – grasses, 3 – shrubs, 4 – trees, 5 – non-vascular plants, e.g. lichens, fungi, etc. Used as categorical.
		Host plant part - leaves (<i>HPPleaves</i>)	larval preference for feeding on leaves (0/1)
		Host plant part - flowers and seeds (<i>HPPflowerseeds</i>)	larval preference for feeding on flowers or seeds (0/1)
		Host plant part - stem or roots (<i>HPPstemsroots</i>)	larval preference for feeding on stem or roots (0/1)
		Larval sociality (<i>LarvSocial</i>)	trait with assumed defensive function, ordinal: 1 – solitary, 2 – small groups in at least some instars, 3 – large aggregations in at least some instars
		Hairy larvae (<i>LarvHairy</i>)	larva with dense fur covering the entire body (0/1)
		Adult feeding (<i>AdultFeed</i>)	Adult feeding (0/1) increases longevity and egg production but complicates habitat quality demands
		Diurnal activity (<i>DiurnAct</i>)	diurnal activity of adults (0/1); fuzzy coded (0.5/0.5) if both diurnal and nocturnal activities exist
		Sexual dimorphism (<i>SexDimorph</i>)	Sexual dimorphism in adults (0/1)
	Habitat affinity	<i>Hmesophilous1</i>	associated with mesic grasslands
		<i>Hmesophilous2</i>	associated with mesic shrublands
		<i>Hmesophilous3</i>	associated with mesic woodlands
		<i>Hxerophilous1</i>	associated with barrens and xeric grasslands
		<i>Hxerophilous2</i>	associated with dry shrublands
		<i>Hxerophilous3</i>	associated with warm woodlands

Group	Variable type	Trait (<i>code</i>)	Description
		<i>Hhygrophilous1</i>	associated with open wetland
		<i>Hhygrophilous2</i>	associated with wooded wetlands
		<i>Hhygrothermophilous</i>	associated with warm wetlands and swamps
		<i>Htyrphophilous</i>	associated with bogs/peatlands
		<i>Halpine</i>	associated with alpine habitats
		<i>Hubiquitous</i>	ubiquitous (generalist)
		Habitat range (<i>HabRange</i>)	the number of exploitable habitat types listed above
		Habitat 3-D structure (<i>Hab3D</i>)	Preferred habitat structure (1 = grasslands; 2 = shrublands; 3 = woodlands)
		Habitat temperature (<i>HabTemp</i>)	3 for xerophilous and 1 for alpine and tyrphophilous species
		Habitat humidity (<i>HabHum</i>)	1 for xerophilous and 3 for hygrophilous, hygrothermophilous and tyrphophilous species
		Habitat acidity (<i>HabAcid</i>)	1 for hygrothermophilous and 3 for tyrphophilous species

Table S4. Changes in the area of natural habitats. Gains (positive, bold print) or losses (negative) of different canopy cover categories (in hectares) between past (1938, 1946, 1947) and present state (2014, 2019) for each studied reserve.

Canopy cover category	Koda	Karlštejn	Zbraslav	Podyjí	Mohelensko	Pouzdřany	Pálava
(1) 0–10 %	12	-2	4	-312	-29	-9	-5
(2) 11–33 %	-23	-52	-4	-196	-12	14	-55
(3) 34–65 %	-36	-39	-31	-1023	3	-132	-72
(4) 66–89 %	-76	-81	-55	-510	9	-2	-38
(5) 90–100 %	142	217	96	1812	55	50	199

Table S5. List of species and their occurrences in reserves. *Group* – butterfly (butterflies and burnet moths) for diurnal Lepidoptera or moths (macro-moths) for nocturnal Lepidoptera. The texts in the columns specifying reserves (*Koda* to *Pálava* column) indicate the status of the species in the particular reserve: *stable* = recorded in past as well as in present, *missing* = recorded in past but not recorded in present, *new* = not recorded in past but recorded in present, *never_rec.* = never recorded in the reserve. *Times missing* – number of studied protected areas (reserves) in which the species went missing. * = butterfly species marked as ‘ubiquists’ in the trait table.

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Carcharodus alceae	Hesperiidae	butterfly	stable	stable	stable	stable	missing	stable	stable	1
Carcharodus floccifera	Hesperiidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	missing	never_rec.	never_rec.	1
Carterocephalus palaemon	Hesperiidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Erynnis tages	Hesperiidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Hesperia comma	Hesperiidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Heteropterus morpheus	Hesperiidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Ochlodes sylvanus *	Hesperiidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Pyrgus armoricanus	Hesperiidae	butterfly	stable	stable	missing	new	never_rec.	never_rec.	stable	1
Pyrgus carthami	Hesperiidae	butterfly	stable	stable	missing	stable	stable	missing	stable	2
Pyrgus malvae	Hesperiidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Pyrgus serratulae	Hesperiidae	butterfly	missing	missing	missing	stable	stable	missing	stable	4
Spialia orbifer	Hesperiidae	butterfly	never_rec.	never_rec.	never_rec.	missing	never_rec.	never_rec.	never_rec.	1
Spialia sertorius	Hesperiidae	butterfly	stable	stable	missing	never_rec.	stable	stable	stable	1
Thymelicus acteon	Hesperiidae	butterfly	stable	stable	missing	stable	missing	missing	stable	3
Thymelicus lineola	Hesperiidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Thymelicus sylvestris	Hesperiidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Aricia agestis	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Aricia eumedon	Lycaenidae	butterfly	stable	stable	never_rec.	stable	missing	missing	missing	3
Callophrys rubi	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Celastrina argiolus	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Cupido alcetas	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	stable	0
Cupido argiades	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Cupido decoloratus	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Cupido minimus	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Cyaniris semiargus	Lycaenidae	butterfly	missing	missing	never_rec.	stable	missing	never_rec.	missing	4
Favonius quercus	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Glaucopsyche alexis	Lycaenidae	butterfly	missing	missing	missing	stable	stable	stable	stable	3
Lycaena alciphron	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	missing	missing	missing	3
Lycaena dispar	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Lycaena hippothoe	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	missing	stable	missing	2
Lycaena phlaeas *	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Lycaena thersamon	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	missing	never_rec.	missing	2
Lycaena tityrus	Lycaenidae	butterfly	stable	stable	missing	stable	stable	missing	stable	2
Lycaena virgaureae	Lycaenidae	butterfly	stable	stable	missing	stable	missing	missing	missing	4
Phengaris alcon	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	never_rec.	missing	1
Phengaris arion	Lycaenidae	butterfly	missing	missing	missing	missing	missing	never_rec.	missing	6
Phengaris nausithous	Lycaenidae	butterfly	never_rec.	missing	never_rec.	never_rec.	missing	never_rec.	missing	3
Phengaris teleius	Lycaenidae	butterfly	never_rec.	missing	never_rec.	never_rec.	missing	never_rec.	missing	3
Plebejus argus	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Plebejus argyrognomon	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Plebejus idas	Lycaenidae	butterfly	missing	missing	never_rec.	never_rec.	missing	never_rec.	missing	4
Polyommatus amandus	Lycaenidae	butterfly	stable	stable	never_rec.	stable	stable	stable	stable	0
Polyommatus bellargus	Lycaenidae	butterfly	missing	missing	missing	stable	stable	stable	stable	3
Polyommatus coridon	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Polyommatus damon	Lycaenidae	butterfly	never_rec.	never_rec.	missing	never_rec.	missing	missing	missing	4
Polyommatus daphnis	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Polyommatus dorylas	Lycaenidae	butterfly	missing	missing	never_rec.	missing	missing	missing	stable	5
Polyommatus eros	Lycaenidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	missing	1
Polyommatus icarus *	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Polyommatus thersites	Lycaenidae	butterfly	missing	missing	never_rec.	stable	missing	stable	stable	3
Pseudophilotes vicrama	Lycaenidae	butterfly	stable	stable	missing	missing	missing	missing	missing	5

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Satyrrium acaciae	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Satyrrium ilicis	Lycaenidae	butterfly	missing	missing	missing	missing	stable	stable	stable	4
Satyrrium pruni	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Satyrrium spini	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Satyrrium w-album	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Scolitantides orion	Lycaenidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Thecla betulae	Lycaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Pyrgus alveus	Notodontidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	missing	never_rec.	missing	2
Aglais urticae *	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Apatura ilia	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Apatura iris	Nymphalidae	butterfly	stable	stable	stable	stable	stable	never_rec.	stable	0
Aphantopus hyperantus	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Araschnia levana	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Arethusana arethusa	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Argynnis adippe	Nymphalidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Argynnis aglaja	Nymphalidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Argynnis niobe	Nymphalidae	butterfly	missing	missing	missing	missing	missing	never_rec.	missing	6
Argynnis paphia	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Boloria dia	Nymphalidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Boloria euphrosyne	Nymphalidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Boloria selene	Nymphalidae	butterfly	stable	stable	missing	stable	stable	missing	stable	2
Brenthis daphne	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	new	0
Brenthis ino	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	stable	never_rec.	never_rec.	never_rec.	0
Brintesia circe	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Coenonympha arcania	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Coenonympha glycerion	Nymphalidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Coenonympha pamphilus *	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Erebia aethiops	Nymphalidae	butterfly	stable	missing	missing	missing	missing	never_rec.	missing	5

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Erebia ligea	Nymphalidae	butterfly	never_rec.	never_rec.	missing	missing	never_rec.	never_rec.	never_rec.	2
Erebia medusa	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Euphydryas aurinia	Nymphalidae	butterfly	never_rec.	missing	never_rec.	never_rec.	missing	never_rec.	never_rec.	2
Euphydryas maturna	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	missing	never_rec.	missing	2
Hipparchia fagi	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Hipparchia hermione	Nymphalidae	butterfly	missing	missing	missing	never_rec.	missing	never_rec.	never_rec.	4
Hipparchia semele	Nymphalidae	butterfly	stable	stable	missing	missing	missing	missing	missing	5
Hipparchia statilinus	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	missing	never_rec.	never_rec.	missing	2
Hyponephele lycaon	Nymphalidae	butterfly	missing	missing	missing	missing	missing	missing	missing	7
Chazara briseis	Nymphalidae	butterfly	missing	missing	missing	missing	missing	missing	missing	7
Inachis io *	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Issoria lathonia *	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Lasiommata maera	Nymphalidae	butterfly	stable	stable	never_rec.	stable	stable	stable	stable	0
Lasiommata megera *	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Libythea celtis	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	new	0
Limenitis camilla	Nymphalidae	butterfly	stable	stable	missing	stable	stable	never_rec.	missing	2
Limenitis populi	Nymphalidae	butterfly	stable	stable	missing	stable	stable	missing	stable	2
Limenitis reducta	Nymphalidae	butterfly	never_rec.	missing	never_rec.	never_rec.	missing	never_rec.	never_rec.	2
Lopinga achine	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	missing	missing	never_rec.	missing	3
Maniola jurtina *	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Melanargia galathea	Nymphalidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Melitaea athalia	Nymphalidae	butterfly	stable	stable	missing	stable	stable	stable	stable	1
Melitaea aurelia	Nymphalidae	butterfly	missing	missing	missing	stable	stable	never_rec.	stable	3
Melitaea britomartis	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	missing	stable	1
Melitaea cinxia	Nymphalidae	butterfly	missing	missing	missing	stable	stable	missing	stable	4
Melitaea diamina	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	missing	never_rec.	never_rec.	never_rec.	1
Melitaea didyma	Nymphalidae	butterfly	missing	stable	missing	stable	stable	missing	stable	3
Melitaea phoebe	Nymphalidae	butterfly	never_rec.	never_rec.	never_rec.	stable	missing	never_rec.	missing	2

[illegible]

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Pieris brassicae *	Pieridae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Pieris manni	Pieridae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	missing	1
Pieris napi *	Pieridae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Pieris rapae *	Pieridae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Pontia edusa *	Pieridae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Hamearis lucina	Riodinidae	butterfly	stable	stable	missing	stable	stable	missing	stable	2
Adscita geryon	Zygaenidae	butterfly	missing	stable	never_rec.	never_rec.	missing	never_rec.	missing	3
Adscita statices	Zygaenidae	butterfly	stable	stable	never_rec.	stable	stable	missing	stable	1
Jordanita globulariae	Zygaenidae	butterfly	missing	stable	never_rec.	stable	never_rec.	stable	stable	1
Jordanita chloros	Zygaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	never_rec.	stable	0
Jordanita notata	Zygaenidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	missing	1
Jordanita subsolana	Zygaenidae	butterfly	missing	missing	never_rec.	stable	missing	missing	stable	4
Rhagades pruni	Zygaenidae	butterfly	stable	stable	never_rec.	stable	stable	missing	stable	1
Zygaena angelicae	Zygaenidae	butterfly	stable	stable	never_rec.	stable	stable	stable	stable	0
Zygaena brizae	Zygaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	missing	never_rec.	stable	1
Zygaena carniolica	Zygaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Zygaena cynarae	Zygaenidae	butterfly	never_rec.	never_rec.	never_rec.	never_rec.	missing	never_rec.	never_rec.	1
Zygaena ephialtes	Zygaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Zygaena filipendulae	Zygaenidae	butterfly	stable	stable	stable	stable	stable	stable	stable	0
Zygaena laeta	Zygaenidae	butterfly	new	new	never_rec.	stable	stable	missing	stable	1
Zygaena lonicerae	Zygaenidae	butterfly	missing	missing	never_rec.	stable	stable	missing	stable	3
Zygaena loti	Zygaenidae	butterfly	stable	stable	never_rec.	stable	stable	stable	stable	0
Zygaena minos	Zygaenidae	butterfly	stable	stable	never_rec.	stable	stable	missing	missing	2
Zygaena osterodensis	Zygaenidae	butterfly	stable	stable	never_rec.	missing	missing	never_rec.	missing	3
Zygaena punctum	Zygaenidae	butterfly	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Zygaena purpuralis	Zygaenidae	butterfly	stable	stable	never_rec.	missing	missing	never_rec.	missing	3
Zygaena viciae	Zygaenidae	butterfly	stable	stable	never_rec.	stable	never_rec.	missing	stable	1
Lemonia dumi	Brahmaeidae	moth	stable	missing	never_rec.	stable	stable	never_rec.	never_rec.	1

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Lemonia taraxaci	Brahmaeidae	moth	missing	missing	never_rec.	stable	missing	never_rec.	missing	4
Cossus cossus	Cossidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Dyspessa ulula	Cossidae	moth	missing	missing	never_rec.	missing	stable	never_rec.	stable	3
Parahypopta caestrum	Cossidae	moth	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	stable	stable	0
Phragmataecia castaneae	Cossidae	moth	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	stable	0
Zeuzera pyrina	Cossidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Achlya flavicornis	Drepanidae	moth	stable	stable	stable	stable	stable	never_rec.	missing	1
Cilix glaucata	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Cymatophorina diluta	Drepanidae	moth	never_rec.	never_rec.	never_rec.	new	never_rec.	never_rec.	stable	0
Drepana curvatula	Drepanidae	moth	never_rec.	never_rec.	never_rec.	new	never_rec.	never_rec.	never_rec.	0
Drepana falcatoria	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Falcaria lacertinaria	Drepanidae	moth	stable	stable	missing	stable	stable	missing	stable	2
Habrosyne pyritoides	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Ochropacha duplaris	Drepanidae	moth	stable	stable	missing	stable	stable	never_rec.	stable	1
Polyplocia ridens	Drepanidae	moth	stable	stable	stable	stable	stable	new	stable	0
Sabra harpagula	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Tethea ocularis	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Tethea or	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Tetheella fluctuosa	Drepanidae	moth	missing	stable	missing	stable	stable	never_rec.	never_rec.	2
Thyatira batis	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Watsonalla binaria	Drepanidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Watsonalla cultraria	Drepanidae	moth	stable	stable	stable	stable	stable	never_rec.	stable	0
Endromis versicolora	Endromidae	moth	stable	stable	stable	stable	missing	never_rec.	missing	2
Amata phegea	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Arctia caja	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Arctia festiva	Erebidae	moth	never_rec.	missing	missing	never_rec.	missing	never_rec.	missing	4
Arctia villica	Erebidae	moth	never_rec.	missing	never_rec.	stable	stable	missing	stable	2
Arctornis l-nigrum	Erebidae	moth	stable	stable	stable	stable	stable	missing	stable	1

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Atolmis rubicollis	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Callimorpha dominula	Erebidae	moth	stable	stable	stable	stable	stable	never_rec.	stable	0
Calliteara abietis	Erebidae	moth	never_rec.	never_rec.	never_rec.	missing	never_rec.	never_rec.	never_rec.	1
Calliteara pudibunda	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Coscinia cribraria	Erebidae	moth	missing	missing	missing	never_rec.	never_rec.	never_rec.	never_rec.	3
Coscinia striata	Erebidae	moth	stable	stable	missing	stable	missing	never_rec.	stable	2
Cybosia mesomella	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Diacrisia sannio	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Diaphora luctuosa	Erebidae	moth	never_rec.	never_rec.	never_rec.	stable	stable	never_rec.	stable	0
Diaphora mendica	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Dicallomera fascelina	Erebidae	moth	missing	missing	missing	stable	missing	missing	stable	5
Dysauxes ancilla	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Eilema caniola	Erebidae	moth	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	new	never_rec.	0
Eilema complana	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Eilema depressa	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Eilema griseola	Erebidae	moth	missing	missing	stable	never_rec.	never_rec.	never_rec.	stable	2
Eilema lurideola	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Eilema lutarella	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Eilema palliatella	Erebidae	moth	stable	stable	missing	stable	stable	missing	stable	2
Eilema pseudocomplana	Erebidae	moth	never_rec.	never_rec.	never_rec.	stable	stable	never_rec.	stable	0
Eilema pygmaeola	Erebidae	moth	stable	stable	missing	stable	stable	stable	stable	1
Eilema sororcula	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Euplagia quadripunctaria	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Euproctis chrysorrhoea	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Euproctis similis	Erebidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Hyphoraia aulica	Erebidae	moth	missing	missing	missing	stable	missing	stable	stable	4
Chelis maculosa	Erebidae	moth	missing	missing	missing	stable	stable	never_rec.	stable	3
Leucoma salicis	Erebidae	moth	stable	stable	missing	stable	stable	stable	stable	1

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Pharmacis lupulina	Hepialidae	moth	stable	stable	missing	missing	never_rec.	never_rec.	never_rec.	2
Phymatopus hecta	Hepialidae	moth	stable	stable	missing	stable	stable	never_rec.	missing	2
Triodia sylvina	Hepialidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Cosmotriche lobulina	Lasiocampidae	moth	missing	missing	missing	missing	missing	never_rec.	never_rec.	5
Dendrolimus pini	Lasiocampidae	moth	stable	stable	stable	stable	stable	never_rec.	stable	0
Eriogaster catax	Lasiocampidae	moth	never_rec.	never_rec.	missing	stable	missing	missing	stable	3
Eriogaster lanestris	Lasiocampidae	moth	stable	stable	missing	stable	stable	never_rec.	never_rec.	1
Eriogaster rimicola	Lasiocampidae	moth	never_rec.	never_rec.	missing	never_rec.	missing	never_rec.	missing	3
Euthrix potatoria	Lasiocampidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Gastropacha populifolia	Lasiocampidae	moth	never_rec.	never_rec.	missing	never_rec.	never_rec.	missing	missing	3
Gastropacha quercifolia	Lasiocampidae	moth	stable	stable	missing	stable	missing	stable	stable	2
Lasiocampa quercus	Lasiocampidae	moth	missing	missing	missing	stable	missing	never_rec.	missing	5
Lasiocampa trifolii	Lasiocampidae	moth	stable	stable	missing	stable	stable	missing	stable	2
Macrothylacia rubi	Lasiocampidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Malacosoma castrense	Lasiocampidae	moth	missing	missing	missing	never_rec.	missing	missing	missing	6
Malacosoma neustria	Lasiocampidae	moth	stable	stable	missing	stable	stable	stable	stable	1
Odonestis pruni	Lasiocampidae	moth	stable	stable	missing	stable	stable	stable	stable	1
Phyllodesma ilicifolia	Lasiocampidae	moth	missing	missing	never_rec.	never_rec.	never_rec.	never_rec.	missing	3
Phyllodesma tremulifolia	Lasiocampidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Poecilocampa populi	Lasiocampidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Trichiura crataegi	Lasiocampidae	moth	stable	stable	missing	stable	stable	missing	stable	2
Apoda limacodes	Limacodidae	moth	stable	stable	stable	stable	stable	stable	stable	0
Heterogenea asella	Limacodidae	moth	stable	stable	never_rec.	stable	never_rec.	never_rec.	missing	1
Cerura erminea	Notodontidae	moth	stable	stable	never_rec.	stable	stable	never_rec.	stable	0
Cerura vinula	Notodontidae	moth	stable	stable	missing	stable	missing	never_rec.	missing	3
Clostera anachoreta	Notodontidae	moth	missing	missing	missing	stable	stable	never_rec.	stable	3
Clostera anastomosis	Notodontidae	moth	missing	missing	never_rec.	stable	stable	stable	stable	2
Clostera curtula	Notodontidae	moth	stable	stable	missing	stable	missing	stable	stable	2

[illegible]

SPECIES	FAMILY	GROUP	KODA	KARLŠTEJN	ZBRASLAV	PODYJÍ	MOHELENSKO	POUZDŘANY	PÁLAVA	Times missing
Thaumetopoea processionea	Notodontidae	moth	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Aglia tau	Saturniidae	moth	stable	stable	stable	stable	stable	never_rec.	missing	1
Saturnia pavonia/pavoniella	Saturniidae	moth	stable	stable	missing	stable	missing	stable	stable	2
Saturnia pyri	Saturniidae	moth	never_rec.	never_rec.	never_rec.	stable	stable	stable	stable	0
Saturnia spini	Saturniidae	moth	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	never_rec.	missing	1
Deilephila elpenor	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Deilephila porcellus	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Hemaris fuciformis	Sphingidae	moth	stable	stable	never_rec.	never_rec.	stable	never_rec.	stable	0
Hemaris tityus	Sphingidae	moth	stable	stable	never_rec.	missing	missing	never_rec.	missing	3
Hyles euphorbiae	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Hyles gallii	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Laothoe populi	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Macroglossum stellatarum	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Marumba quercus	Sphingidae	moth	never_rec.	never_rec.	never_rec.	missing	missing	missing	stable	3
Mimas tiliae	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Proserpinus proserpina	Sphingidae	moth	stable	stable	never_rec.	stable	never_rec.	stable	stable	0
Smerinthus ocellatus	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Sphinx ligustri	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0
Sphinx pinastri	Sphingidae	moth	stable	stable	never_rec.	stable	stable	stable	stable	0

Table S6. Mean values and standard deviation (in parentheses) for the categorical trait *Host plant form* used in the generalised linear models with binomial distribution. *Host plant form* was significant in the analysed data for butterflies in Zbraslav and for moths in Pálava. The table shows the mean probabilities that species with particular level of the variable would disappear from the community.

Butterflies in Zbraslav				
bushes	ephemerals and small forbs	large forbs and grasses	trees	
0.50 (0.52)	0.61 (0.49)	0.38 (0.5)	0.14 (0.38)	
Moths in Pálava				
forbs	grasses	non-vascular plants	shrubs	trees
0.21 (0.41)	0 (0)	0.10 (0.31)	0.31 (0.47)	0.09 (0.29)

Table S7. Shared loss of butterfly and moth species for each pair of reserves. The numbers in the pairwise matrix show numbers of species (and percentage, in parentheses) that have gone missing in both reserves for each potential pair of reserves. The numbers in the ‘Missing’ column give the number of missing species in the particular reserve given next to it in the ‘Reserve’ column. The percentage was calculated as the proportion of the species going missing in both reserves out of all missing species, i.e. including species going missing in at least one of the two reserves (values over 30% are marked in bold).

A. BUTTERFLIES							
Missing	Reserve						
22	Koda						
24	Karlštejn	19 (70%)					
47	Zbraslav	13 (23%)	13 (22%)				
22	Podyjí	7 (19%)	8 (21%)	10 (17%)			
43	Mohelensko	12 (23%)	16 (31%)	12 (15%)	16 (33%)		
31	Pouzdrány	9 (20%)	8 (17%)	17 (15%)	8 (18%)	15 (25%)	
38	Pálava	8 (15%)	10 (19%)	10 (13%)	15 (33%)	30 (59%)	12 (21%)
		Koda	Karlštejn	Zbraslav	Podyjí	Mohelensko	Pouzdrány
B. MOTHS							
Missing	Reserve						
23	Koda						
27	Karlštejn	22 (79%)					
45	Zbraslav	16 (31%)	18 (33%)				
10	Podyjí	4 (14%)	4 (12%)	3 (6%)			
27	Mohelensko	9 (22%)	11 (26%)	17 (31%)	6 (19%)		
16	Pouzdrány	2 (5%)	4 (10%)	11 (22%)	2 (8%)	5 (13%)	
23	Pálava	7 (18%)	8 (19%)	11 (19%)	4 (14%)	13 (35%)	3 (8%)
		Koda	Karlštejn	Zbraslav	Podyjí	Mohelensko	Pouzdrány

Figure S1. Visual representation of habitat change patterns and their description. The patterns are related to the changes in class (habitat) metrics, specifically to the combination of increase/decrease in mean patch size and increase/decrease in patch density.

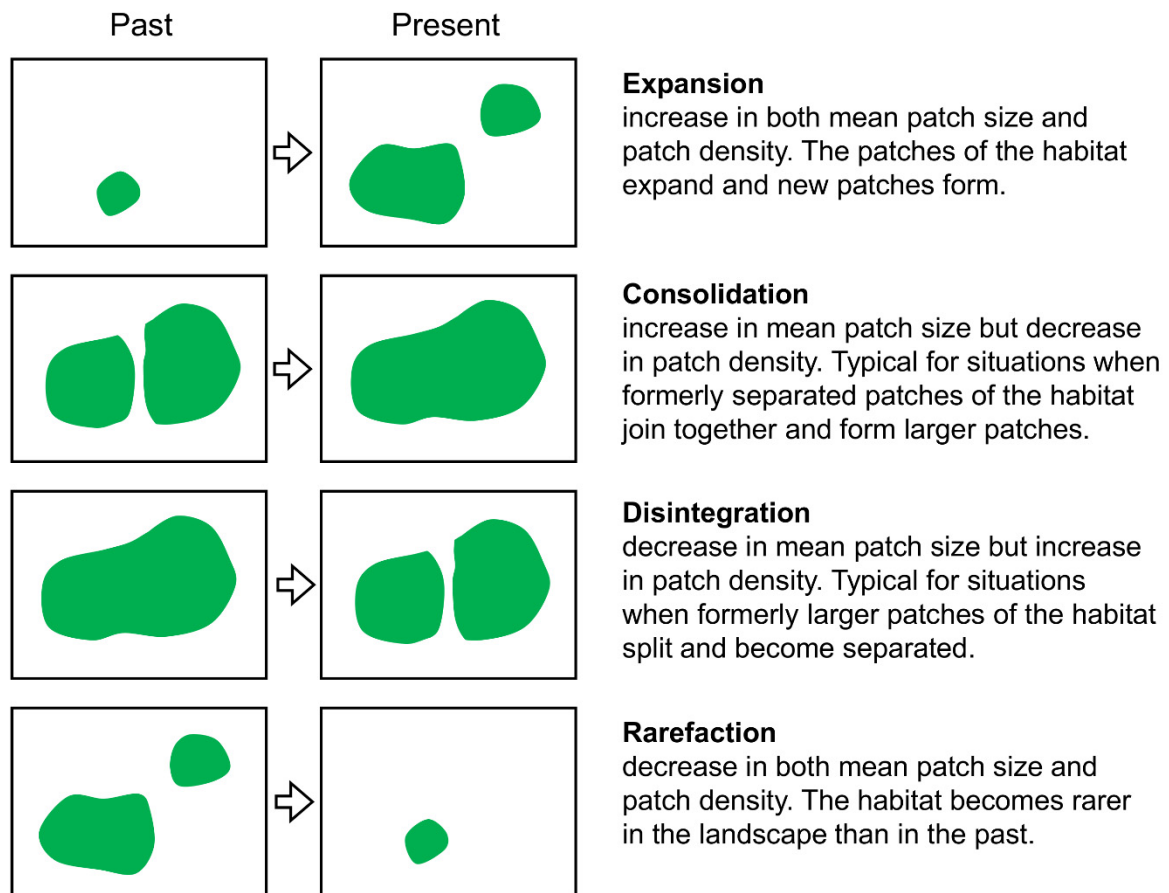


Figure S2. Maps of reserves with canopy cover categories in past and in present. For the reserves with incompact shapes – Podyjí, Mohelensko, and Pálava – only parts of their whole area are visualised here.

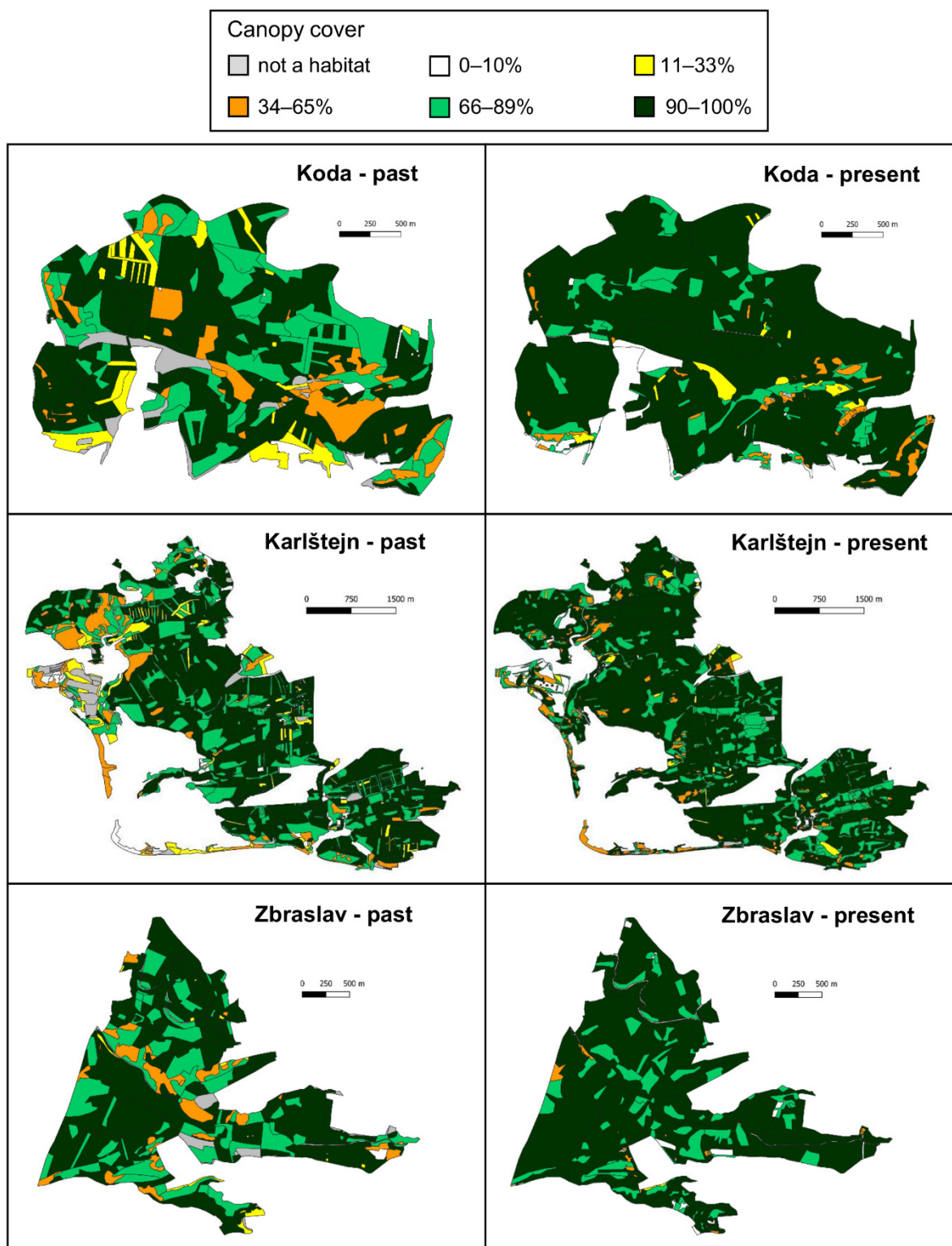


Figure S2. (continued)

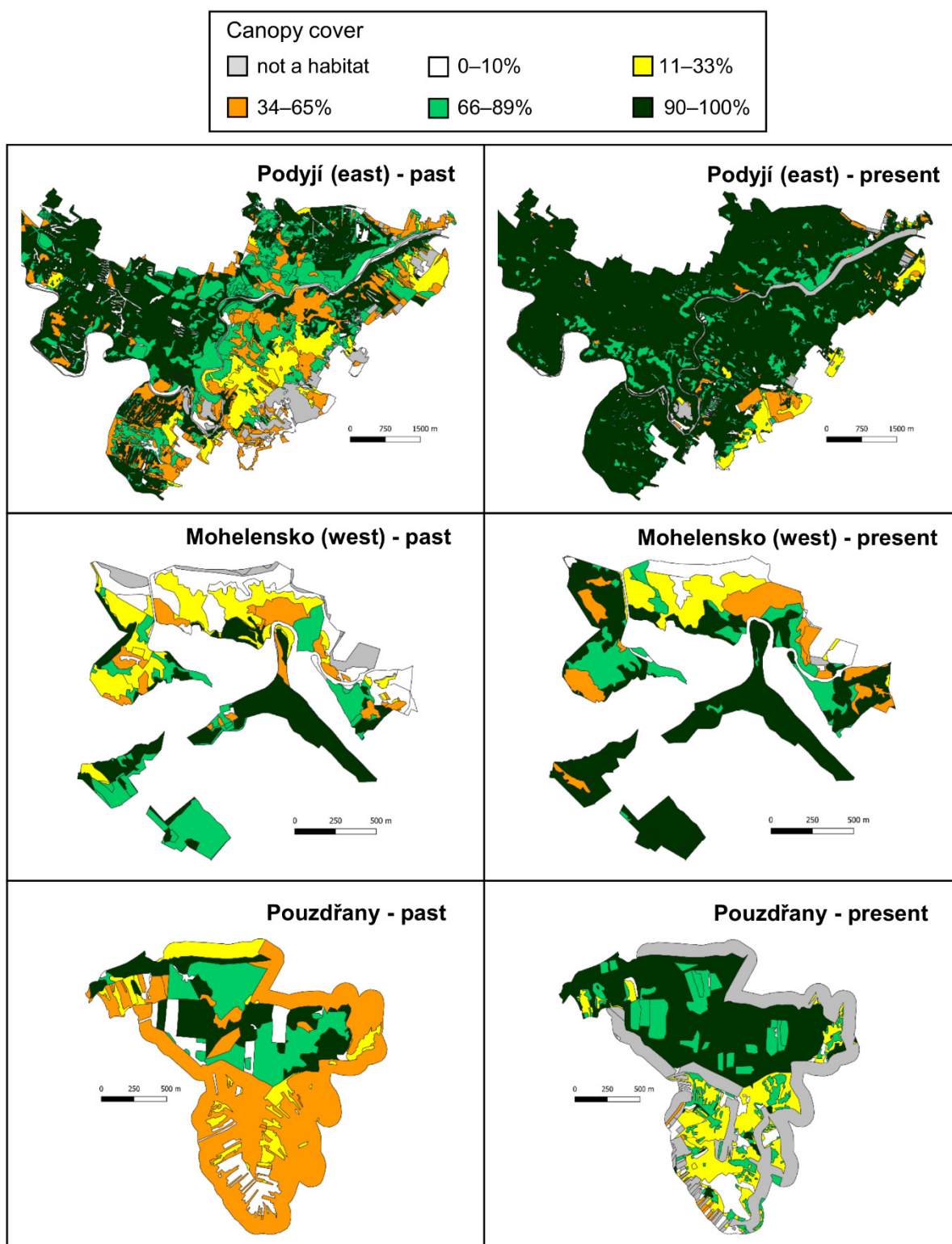


Figure S2. (continued)

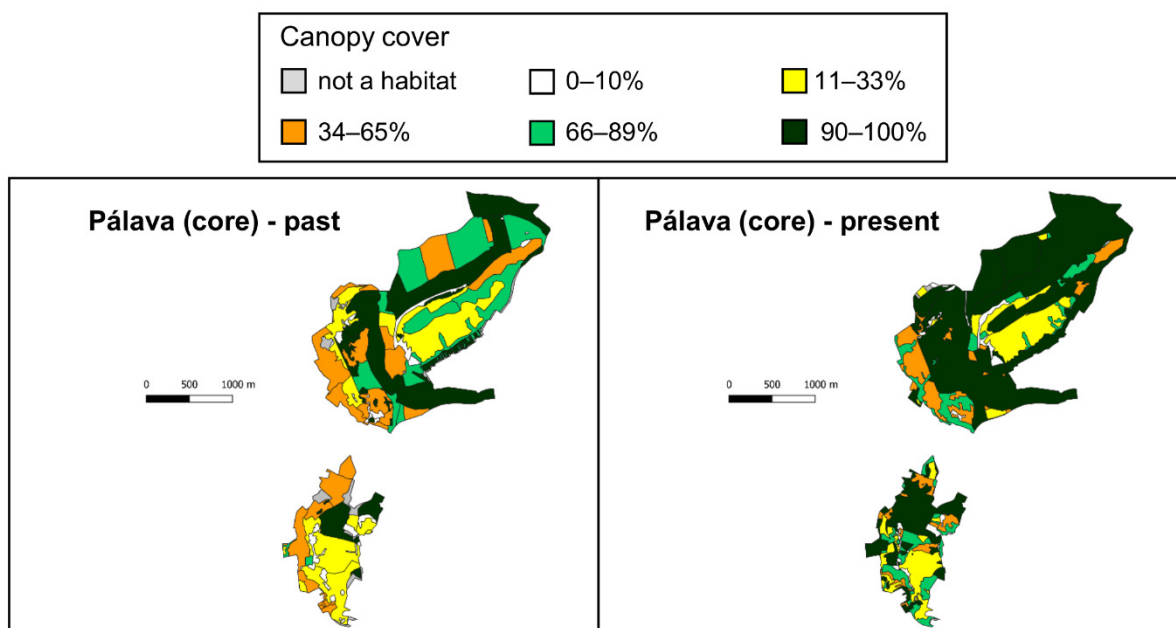
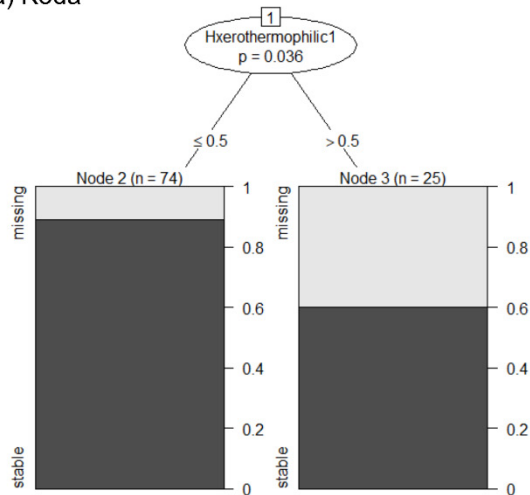


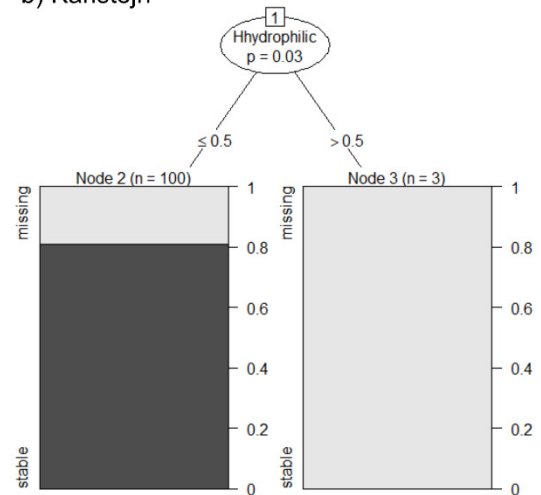
Figure S3. Recursive partitioning (conditional inference trees) showing significant life-history traits (variables) which have the best power to split local communities of butterflies and moths (next page) into the groups of *missing* and *stable* species.

BUTTERFLIES

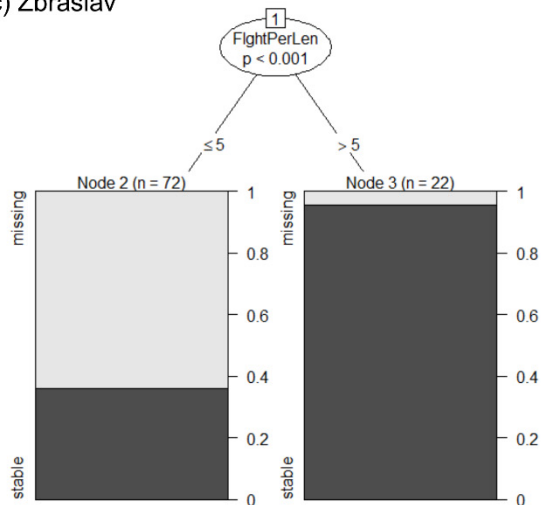
a) Koda



b) Karlštejn



c) Zbraslav



d) Mohelensko

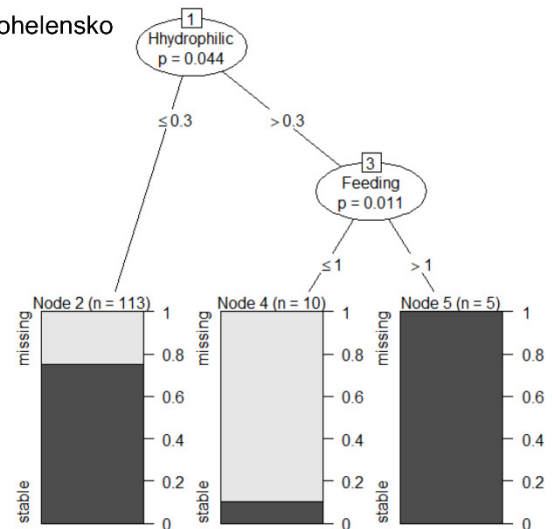
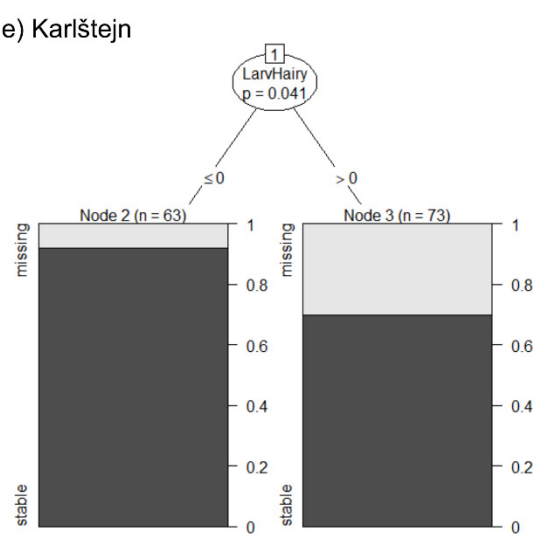


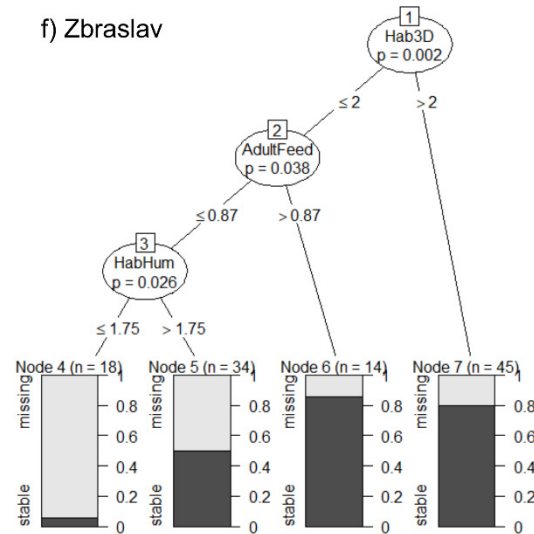
Figure S2. (continued)

MOTHS

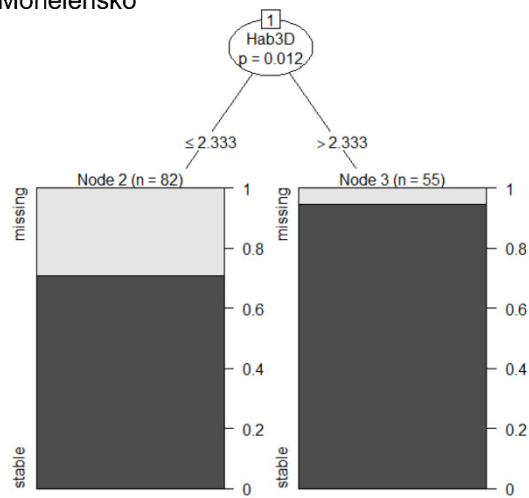
e) Karlštejn



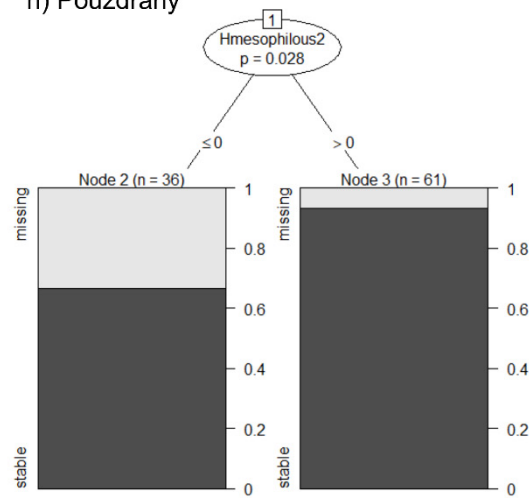
f) Zbraslav



g) Mohelensko



h) Pouzdřany



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