

The role of protected areas for butterflies and their habitats

Pledge networking event on Butterflies and European
Union Biodiversity Strategy 2030 targets
29th and 30th March 2022



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board member**

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National Coordinator Butterfly Monitoring Scheme

Inaugural Meeting on BCE - Laufen, 29-31 October 2007

Bavarian Academy for Nature Conservation and Landscape Management (ANL)



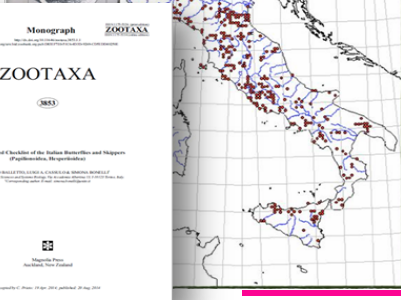
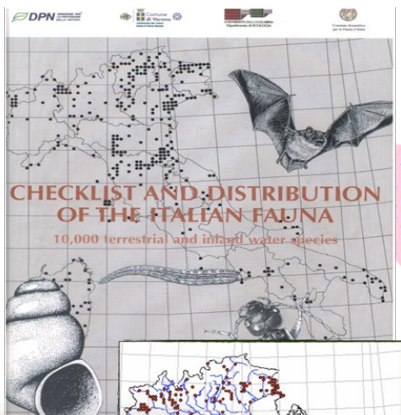
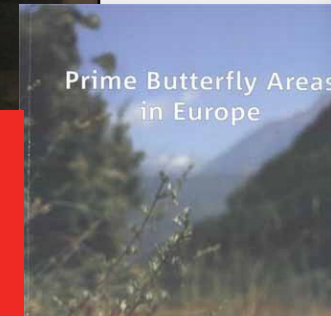
LISTA ROSSA DELLE FARFALLE ITALIANE

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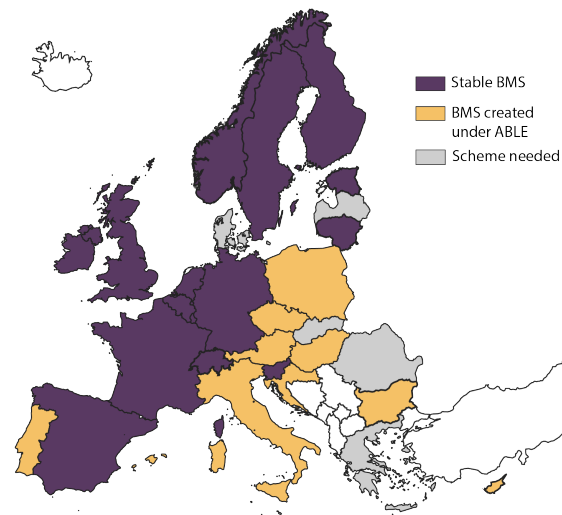
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Italia BMS



- ✓ ZOOLAB – University of Turin
(*Simona Bonelli*)
- ✓ ZENLAB- University of Florence
(*Leonardo Dapporto*)
- ✓ Research Centre for Forestry and Wood (CREA-FL)
(*Stefano Scalercio*)



European Butterfly Monitoring Scheme



in 2020 we established ALI Italian Lepidopterological Association

<https://www.lepidoptera.life/#>

Member States are invited to Pledge their contribution to ensuring Protected Areas across 30% of the EU area

How to select new PAs? Which criteria??

What can we learn from butterflies?

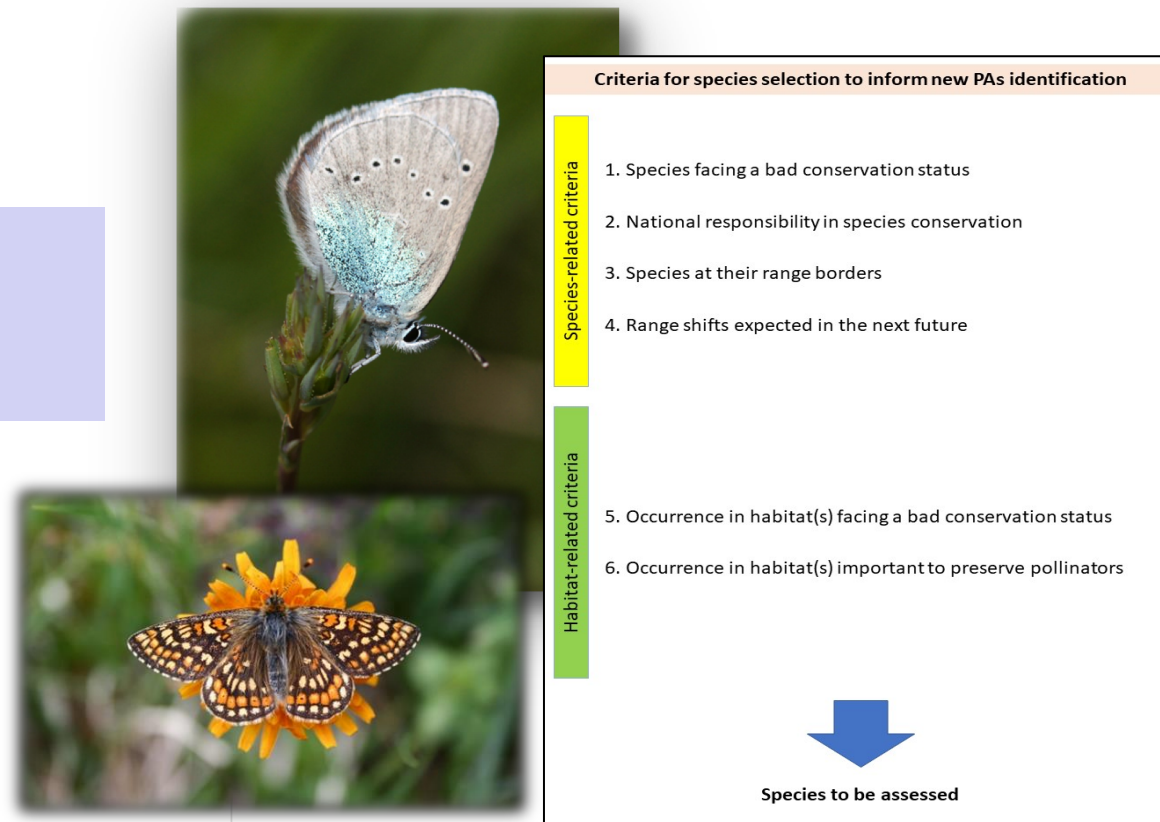


Figure 1. Proposed criteria for butterfly species selection to inform new PAs identification in the 2030 Biodiversity Strategy framework.

Only the 21.7% of the Italian terrestrial territory is currently designated as protected area (PA), considering both the Natura 2000 network and the national/regional/local protected areas.

Butterflies will benefit from PAs expansion

Butterflies are relatively well represented in PAs and Natura 2000 network

But PAs are:

- ✓ Fixed while butterflies distribution is changing as a consequence of changing scenario
- ✓ Often too small
- ✓ Often not properly managed

Thus the Agenda 2030 give butterflies an incredible opportunity

Since most of them, and in particular most of Habitats Directive species, are:

- ✓ Habitat specialist
- ✓ Food specialist
- ✓ Not very mobile

Different species different approaches

- ❖ Rare and localized species: protecting all the populations you can!
- ❖ Mobile and rare species: creating connections among existing protected areas to face climate change
- ❖ Well distributed species: protecting suitable amount of habitat to ensure the long term Favourable Conservation Status
- ❖ National or regional responsibility: protecting endemic species and most endangered species at UE level (U2 or IUCN threatened species)
- ❖ Butterflies are umbrella species: protect the hotspots of pollinator biodiversity
- ❖ Existing PAs, lack of management, strong anthropic impact
- ❖ Existing PAs, lack of management, reforestation

Rare and localized species: protecting all the populations!

The case: *Phengaris teleius*
Specialist butterfly Habitat 6410

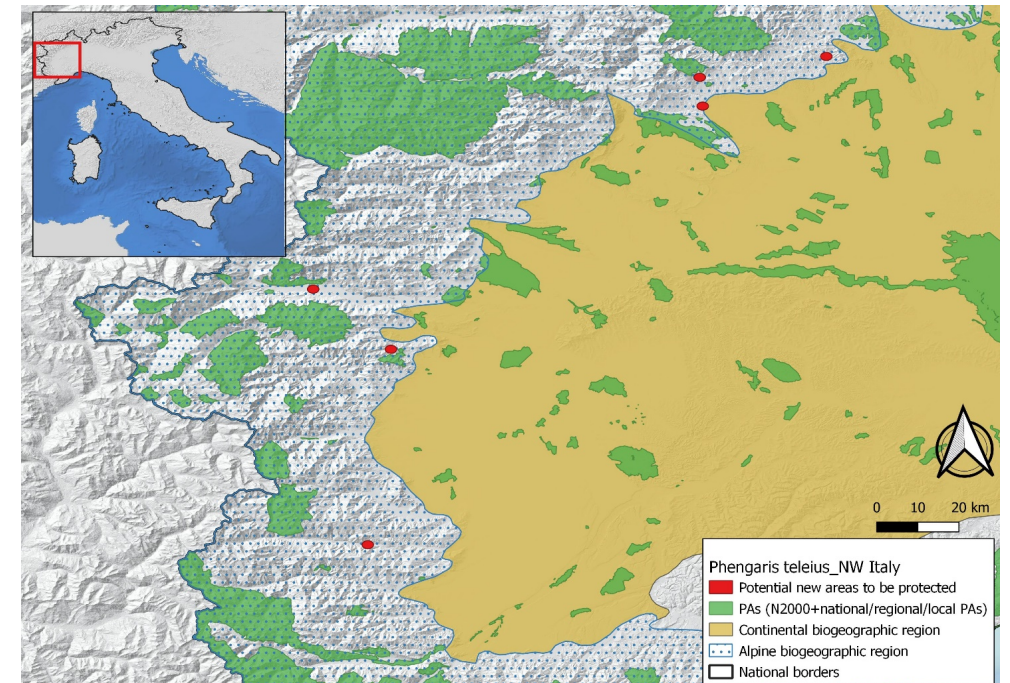
IUCN category			
European (2010): Vulnerable		Italy (2015): Vulnerable	
HD Annex II, IV		4 th DH Italian Report (2019)	
		Alps	Cont. Med.
		U2	U2 /

Approach: Establishing new protected areas and enlarge borders of the exiting ones. High resolution distribution data.



P. teleius show a very large proportion of occurrence points outside Pas. In this context, the new areas to be protected proposed in the maps are **little enlargements of existing PAs** and the designation of new PAs.

To identify we could considering **1 Km-buffer** as reference area allows for a precautionary approach around precise occurrence data.



Mobile and rare species: creating connections among existing protected areas to face climate change

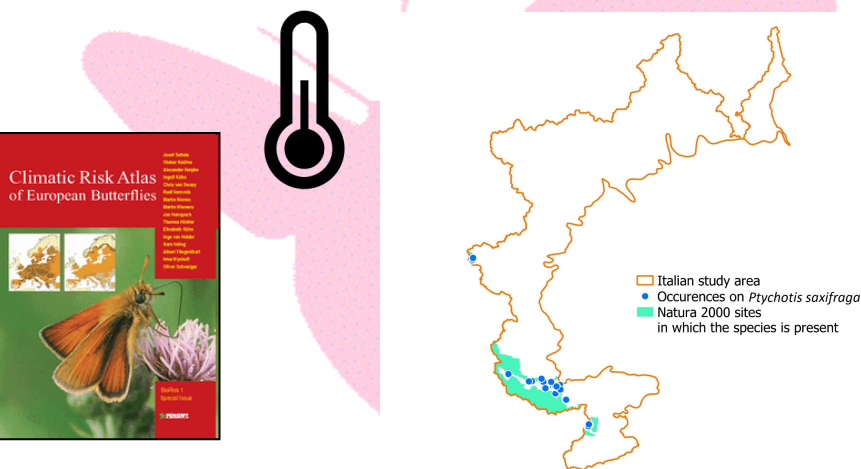
The case: *Papilio alexanor*



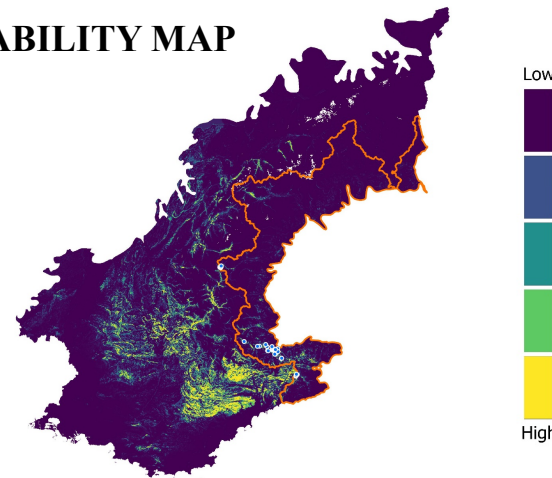
IUCN category			
European (2010): Least Concern		Italy (2015): Endangered	
HD Annex IV		4 th DH Italian Report (2019)	
	Alps	Cont.	Med.
	U1	/	/



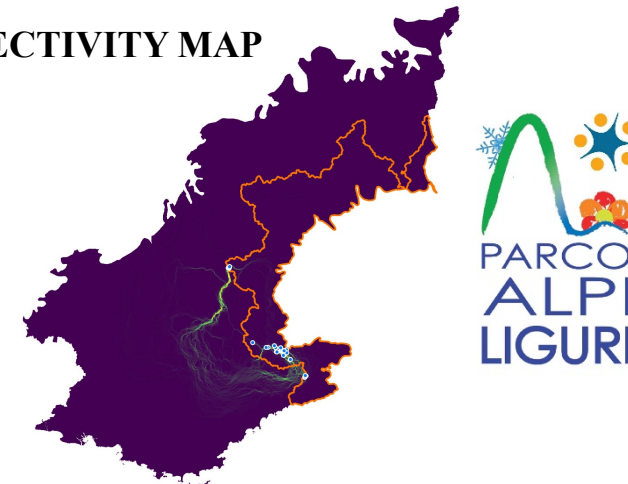
The approach: high resolution models of suitability and connections of present and future areas.
The models have been extended to the entire transboundary western Alps and to the French regions where the species is present



SUITABILITY MAP



CONNECTIVITY MAP



Bonelli et al., 2015. Habitat preferences of *Papilio alexanor* Esper, [1800]: Implications for habitat management in the Italian Maritime Alps. *Zoosystema*, 37(1):169-177.

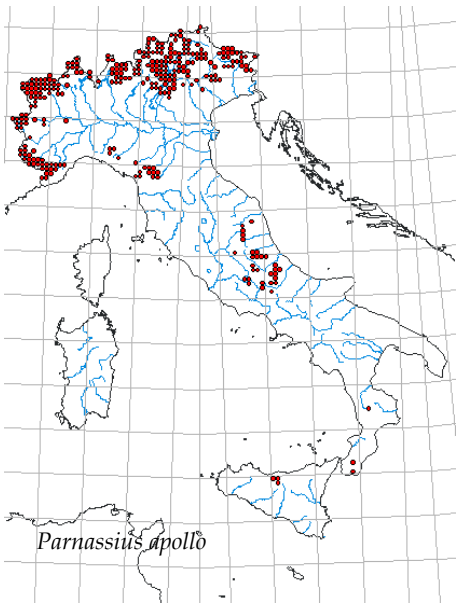
Settele J., Kudrna O., Harpke A., Kühn I., Van Swaay C., Verovnik R., Warren M., Wiemers M., Hanspach J., Hickler T., Kühn E., Van Halder I., Veling K., Vliegenthart A., Wynhoff I., Schweiger O., 2008. *Climatic risk atlas of European butterflies*. Pensoft, Sofia.

Well distributed species: protecting suitable amount of habitat to ensure the Favourable Conservation Status

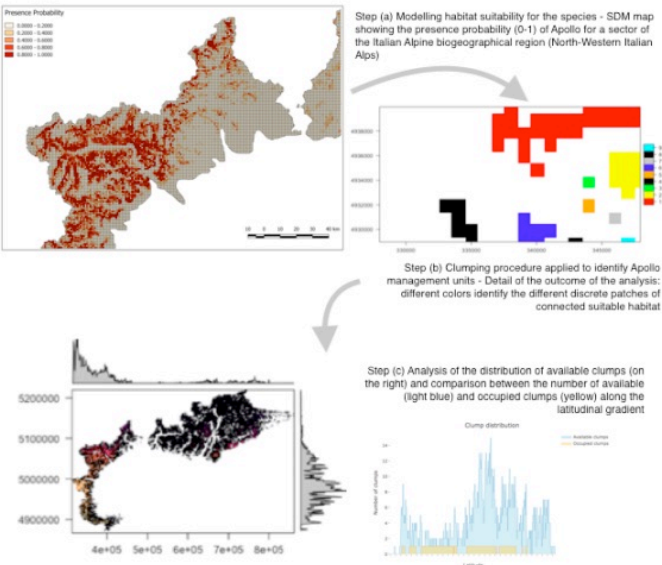
The case: *Parnassius apollo*

IUCN category			
European (2010): Near Threatned	Italy (2015): Least Concern		
HD Annex IV	4 th DH Italian Report (2019)		
	Alps	Cont.	Med.
	FV	U1	U 1

Small knowledge about population dynamics
Altitudinal wide range



The approach: modelling the Favourable Population Values



Bonelli, S., Cerrato, C., Barbero, F., Boiani, M. V., Buffa, G., Casacci, L. P., ... & Balletto, E. (2021). Changes in Alpine Butterfly Communities during the Last 40 Years. *Insects*, 13(1), 43.

Bonelli, S., Barbero, F., Zampollo, A., Cerrato, C., Genovesi, P., & La Morgia, V. (2021). Scaling-up targets for a threatened butterfly: A method to define Favourable Reference Values. *Ecological Indicators*, 133, 108356.

Menchetti, M., Talavera, G., Cini, A., Salvati, V., Dincă, V., Platania, L., ... & Dapporto, L. (2021). Two ways to be endemic. Alps and Apennines are different functional refugia during climatic cycles. *Molecular Ecology*, 30(5), 1297-1310.

National or regional responsibility: protecting endemic species and most endangered species at UE level (U2 or IUCN threatened species)

The case: *Polyommatus gennargenti*; *Polyommatus humedase*; *Erebia christi*; *Euphydryas maturna*, *Zerynthia cassandra*

Family	Scientific Name	Red List Category
Lycaenidae	<i>Lycaena helle</i>	RE
Nymphalidae	<i>Euphydryas maturna</i>	CR
Papilionidae	<i>Papilio alexanor</i>	EN
Lycaenidae	<i>Polyommatus exuberans</i>	EN
	<i>Polyommatus gennargenti</i>	EN
	<i>Polyommatus humedase</i>	EN
Nymphalidae	<i>Araschnia levana</i>	EN
	<i>Melitaea britomartis</i>	EN
	<i>Hipparchia sbordonii</i>	EN
	<i>Erebia christi</i>	EN
Lycaenidae	<i>Callophrys avis</i>	VU
	<i>Zizeeria karsandra</i>	VU
	<i>Maculinea alcon</i>	VU
	<i>Maculinea teleius</i>	VU
	<i>Plebejus trappi</i>	VU
	<i>Polyommatus galloi</i>	VU
Nymphalidae	<i>Melitaea aetherie</i>	VU
	<i>Erebia flavofasciata</i>	VU
	<i>Euphydryas aurinia</i>	VU
Pieridae	<i>Anthocharis euphenoides</i>	NT
	<i>Euchloe tagis (bellezina)</i>	NT
Lycaenidae	<i>Iolana iolas</i>	NT
	<i>Polyommatus dolus</i>	NT
	<i>Polyommatus ripartii</i>	NT
	<i>Satyrus pruni</i>	NT
Nymphalidae	<i>Argynnis elisa</i>	NT
	<i>Boloria graeca</i>	NT
	<i>Erebia calcaria</i>	NT
	<i>Erebia nivalis</i>	NT
	<i>Erebia ottomana</i>	NT
	<i>Hipparchia fidia</i>	NT
	<i>Lasiommata achine</i>	NT
	<i>Satyrus actaea</i>	NT
Hesperiidae	<i>Carcharodus baeticus</i>	NT
	<i>Spialia therapne</i>	NT

The approach: writing specific Action Plans!
Improve monitoring of population size and dynamics and collect high resolution distribution data. Manage PAs properly. Avoid planting trees



Butterflies are umbrella species: protect the hotspots of pollinator biodiversity



Several habitats listed in Annex 1 of the Habitats Directive are really important for butterflies. (i.e. these include dry calcareous grasslands, upland and lowland hay meadows, wet meadows, deciduous woodlands with open areas, heaths and scrubs and mosaics of green spaces in urban and peri urban areas.

The case: Annex I, Habitat 6210
Up to 60 butterfly species in the same grassland
Lack of traditional management, abandonment and reforestation

Approach: work on typical species as umbrella



Casacci, L. P., Cerrato, C., Barbero, F., Bosso, L., Ghidotti, S., Paveto, M., Pesce, M., Plazio, E., Panizza, G., Balletto, E., Viterbi, R. & Bonelli, S. (2015). Dispersal and connectivity effects at different altitudes in the *Euphydryas aurinia* complex. *Journal of Insect Conservation*, 19(2), 265-277.

Ghidotti, S., Cerrato, C., Casacci, L. P., Barbero, F., Paveto, M., Pesce, M., Plazio, E., Rocchia, E., Panizza, G., Balletto, E., Viterbi, R., Bani, L., & Bonelli, S. (2018). Scale-dependent resource use in the *Euphydryas aurinia* complex. *Journal of Insect Conservation*, 22(3-4), 593-605.

Existing PAs, lack of management, strong anthropic impact

The species: *Lycaena dispar*
From wetland species to rice
field flag species

IUCN category			
European (2010): Least Concern		Italy (2015): Least Concern	
HD Annex II, IV		4 th DH Italian Report (2019)	
		Alps	Cont. Med.
		U1	U1 U1



Agricultural intensification
leads to uniform, almost
sterile grasslands for
biodiversity.

National Action Plan for the sustainable use of
pesticides (PAN), Directive 2009/128/EC

Agriculture is the main threat reported for the
animal species linked to grasslands (IUCN)

Existing PAs lack of management, reforestation

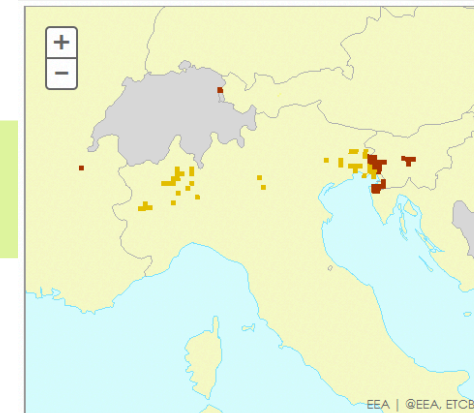
The case: *Coenonympha oedippus*

Food plant *Molinia*, linked to Annex I habitat 4030

IUCN category			
European (2010): Endangered		Italy (2015): Least Concern	
HD Annex II, IV		4 th DH Italian Report (2019)	
		Alps	Cont. Med.
		/	U1 /



Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices)



The approach: restoring deteriorated habitat and species reintroduction

J Insect Conserv
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ORIGINAL PAPER

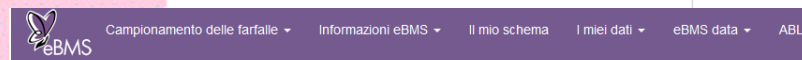
Winter-green host-plants, litter quantity and vegetation structure are key determinants of habitat quality for *Coenonympha oedippus* in Europe

Tatjana Čelik · Markus Bräu · Simona Bonelli ·
Cristiana Cerrato · Branko Vreš · Emilio Balletto ·
Christian Stettmer · Matthias Dolek

Management and monitoring, as well as protection from damaging activities are key to butterfly recovery.

Monitoring results of the new PAs is feasible and often simple and cheap

The approach: Integrating Butterfly Monitoring Scheme and specific Guide Lines for Monitoring Habitats Directive species. Working together with citizens and experts



Italia BMS

Butterfly
Monitoring
Scheme Italia



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Thank you for your attention!



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