

Identifying and assessing pathways of unintentional introduction and spread of invasive alien species – a case study for Poland

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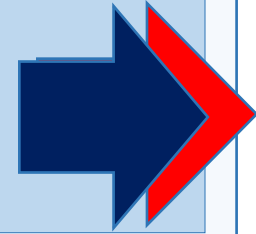
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1. RATIONALE: EU Regulation on Invasive Alien Species (IAS) requires Member States to carry out a comprehensive analysis of the pathways of unintentional introduction and spread of invasive alien species of Union concern and establish and implement action plans to address the identified priority pathways. In Poland the assessment was commissioned in 2017-2018 by the General Directorate for Environmental Protection (GDOŚ). A total of about 100 experts participated in accomplishing this task.

2. SPECIES POOL: Pathways of introduction and spread were analysed for **83** IAS, including species listed in the EU Regulation and/or in the national law, as well as several other IAS selected by GDOŚ.

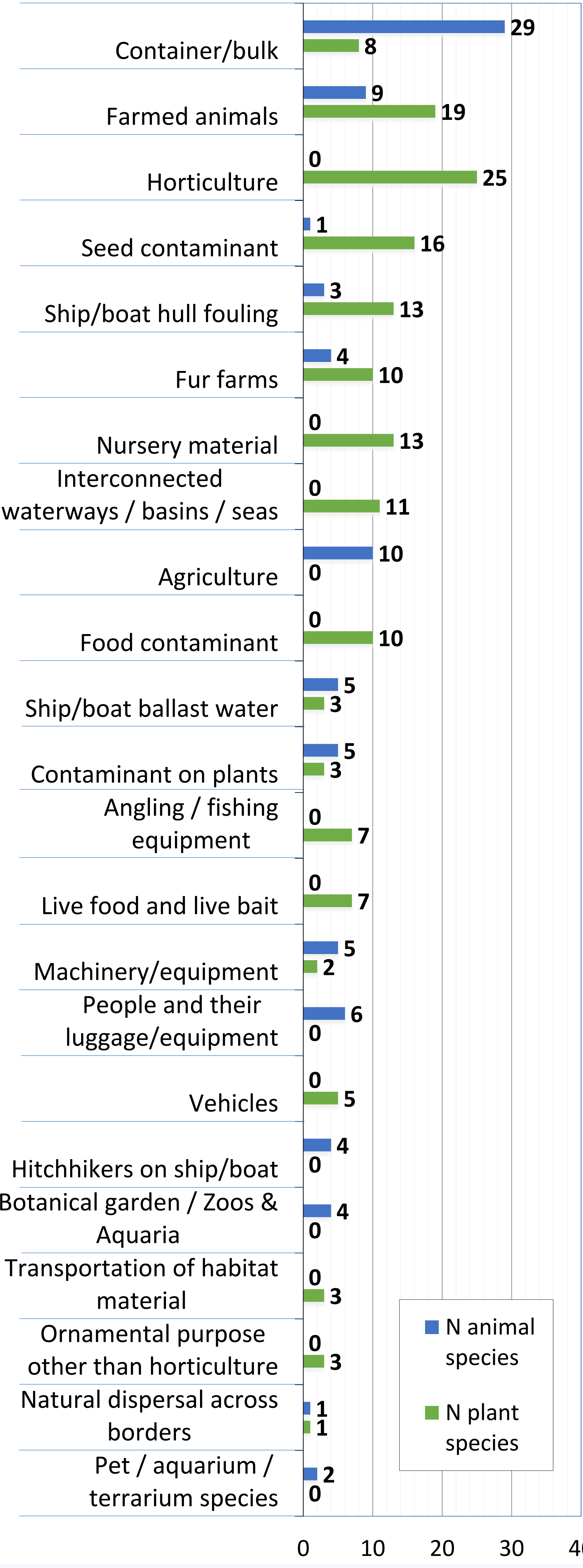
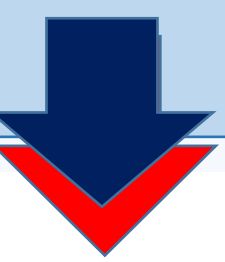
3. RISK ASSESSMENT OF IAS: The first step was risk assessment of IAS according to the Harmonia+PL protocol, adopted from the Belgian Harmonia+ and adjusted for the Polish circumstances. Maximum impact (current or potential) on environment, economy, human health and ecosystem services was assessed for each IAS. This parameter was then combined with the invasion stage of the species in Poland, producing 15 risk categories. **Impact:** L – low, M – medium, H – high; **Invasion stage:** 0 – absent, 01 – in cultivation/captivity, 2 – isolated population(s), 3 – restricted range, 4 – widespread.



INVASION STAGE	IMPACT		
	L0	M0	H0
	L01	M01	H01
	L2	M2	H2
	L3	M3	H3
	L4	M4	H4

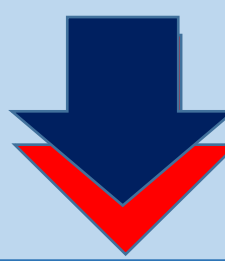
4. ASSIGNING IAS TO PATHWAYS

On the basis of extensive literature search and expert knowledge, each IAS was assigned to pathways of introduction and spread. Pathway classification by Harrower et al. 2018 was used. Only pathways of unintentional introduction were assessed, including pathways operating in the past and still active, as well as pathways that may potentially operate in future.



5. RISK ASSESSMENT OF INTRODUCTION CONSEQUENCES

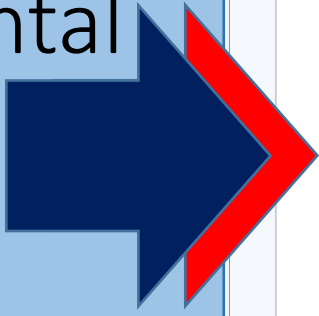
For IAS currently absent from Poland, change in the risk category was assessed in case they were introduced for the first time. For IAS already present in Poland, change in the risk category was assessed if they continued to be introduced. One of 4 values (27, 9, 3 or 1) was attributed to each risk change scenario. The highest values (27 and 9) were assigned for introductions of IAS whose impact is high but that are currently absent from Poland, present only in captivity or cultivation, or have a very restricted distribution. The values decreased with decreasing impact and for widespread species. For each IAS, 4 values were assigned, corresponding to its impact on environment, economy, human health and ecosystem services. The sum of those 4 values was calculated for each IAS.



		RISK CATEGORY IF (STILL) INTRODUCED											
CURRENT RISK CATEGORY		H01	H2	H3	H4	M01	M2	M3	M4	L01	L2	L3	L4
	H0	9	27										
	H01		27										
	H2		27	27									
	H3			9	9								
	H4				3								
	M0					3	9						
	M01						9						
	M2						9	9					
	M3							3	3				
	M4								1				
	L0									1	3		
	L01										3		
	L2										3	3	
	L3											1	1
	L4												1

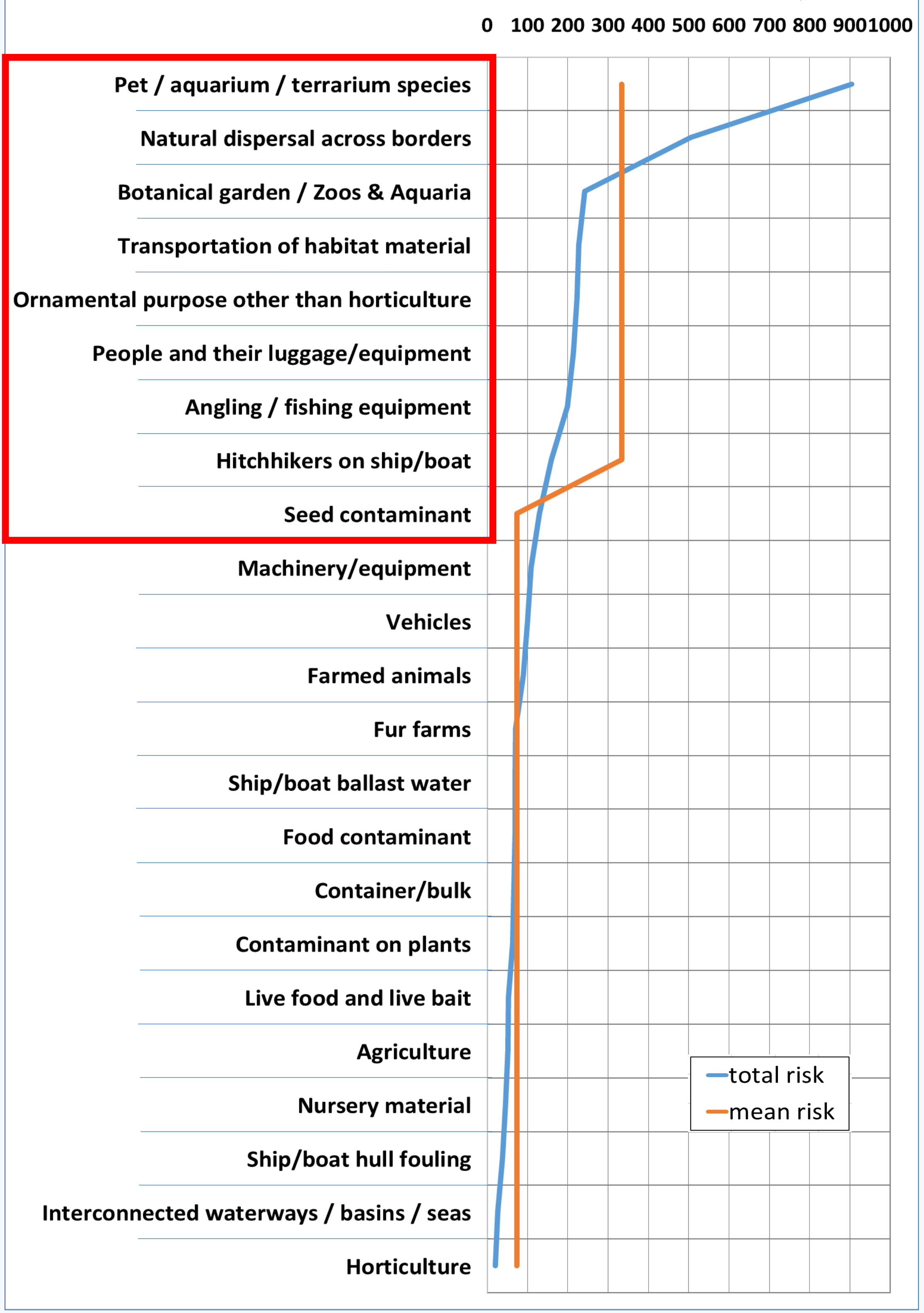
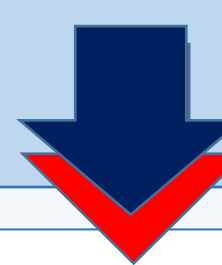
7. SELECTION OF PATHWAYS FOR ESTABLISHMENT AND IMPLEMENTATION OF ACTION PLANS:

Benefits and costs of management and its feasibility was assessed for all priority pathways; two pathways were selected for establishment and implementation of action plans. The plans were developed in 2018. These pathways: account for introduction and spread of 67.4% of all analysed IAS and 73.8% of those classified as high-risk; they account for 1/3 of the total risk calculated for all analysed pathways and can be effectively managed, with limited negative environmental or socioeconomic consequences. Some elements of their management have already been implemented.



6. PRIORITIZATION OF PATHWAYS

Total risk of each pathway was calculated by adding values assigned to all species that utilise it. Priority pathways were selected using Regime shift method (Rodionov 2004). This method defines which value in the data string divides it into significantly different subsets. There were 9 pathways selected as priority pathways of unintentional introduction and spread of IAS in Poland.



BIBLIOGRAPHY

- Harrower C. A., Scalera R., Pagad S., Schonrogge K. & Roy H. E. 2018. Guidance for interpretation of CBD categories on introduction pathways.
- Rodionov S. N. 2004. A sequential algorithm for testing climate regime shifts. Geophysical Research Letters, 31(9).



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