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W KATOWICACH

Analysis of the invasiveness of alien species in Poland: the methodological approach used and the results obtained

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WEBINAR ON INVASIVE ALIEN SPECIES, REGULATION 1143/2014

EU4Green Recovery East

08-09.04.2026

Analysis of the invasiveness of alien species in Poland, including the identification of species that pose a significant threat to native flora and fauna

Barbara Tokarska-Guzik, University of Silesia in Katowice

Project Closing Conference
No. POIS.02.04.00-00-0100/16 pn.

Development of principles for the control and eradication of invasive alien species, together with the implementation of pilot activities and public education

31.05.2023

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Co-financed under project no. POIS.02.04.00-00-0100/16 entitled Development of principles for the control and eradication of invasive alien species, together with the implementation of pilot activities and public education, from European Union funds under the Infrastructure and Environment Programme 2014-2020.

Analysis of the invasiveness of alien species in Poland, including the identification of species that pose a significant threat to native flora and fauna

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with a proposal for strategic actions to combat IAS

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INSTYTUT OCHRONY PRZYRODY PAN

Implementation time:
November 2017 – November 2018

Development of principles for the control and eradication of invasive alien species, together with the implementation of pilot activities and public education

POIS.02.04.00-00-0100/16

Fundusze Europejskie Infrastruktura i Środowisko

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Unia Europejska Fundusz Spójności

Współfinansowano w ramach projektu nr POIS.02.04.00-00-0100/16 pn. *Opracowanie zasad kontroli i zwalczania inwazyjnych gatunków obcych wraz z przeprowadzeniem pilotażowych działań i edukacją społeczną* ze środków Unii Europejskiej w ramach Programu Infrastruktura i Środowisko 2014-2020

Scientific team:

- **109 experts** from **32** national research centers
- **30** foreign experts
- **Institutions**:
  - Regional Directorates for Environmental Protection
  - National Parks
  - Landscape Parks
  - State Forests
  - Botanical Gardens and Arboretum
  - Zoos
  - General Inspectorate for Environmental Protection
  - Scientific Organizations and Societies
- **Databases and results of scientific projects**

▲ Adopted assessment logo

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Objectives and scope of the study

1. Development of methods for assessing the invasiveness of alien species
2. List of priority invasive alien species,
   specifying their degree of invasiveness and the threats they pose to the national nature
3. Development of action plans for priority invasive alien species
4. Strategy for combating invasive alien species

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Analysis of the invasiveness of alien species in Poland, including the identification of species that pose a significant threat to native flora and fauna

Subject of the study

Legal basis	Number of species	Plants	Animals
Species listed in the Commission Implementing Regulations (EU) of 13 July 2016 and of 12 July 2017	49	23	26
Species listed in the regulation of the Minister of the Environment of 9 September 2011	33 (52)	10 (16)	23 (36)
Species indicated by the General Directorate for Environmental Protection, previously identified as invasive	36	27	9
Total	**118**	**60**	**58**

▲ Examples of previous studies

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Criteria for assessing species of alien origin

1. degree of invasiveness
2. degree of spread/occurrence
3. the method of dealing with the analysed species
4. species dynamics
5. the impact of the species on the natural environment
6. the impact of the species on the economy
7. the impact of the species on human health
8. the impact of species on ecosystem services
9. the impact of predicted climate change on the invasiveness of the species
10. selection of priority invasive species

Analysis of the invasiveness of alien species in Poland,
including the identification of species that pose a significant threat to native flora and fauna

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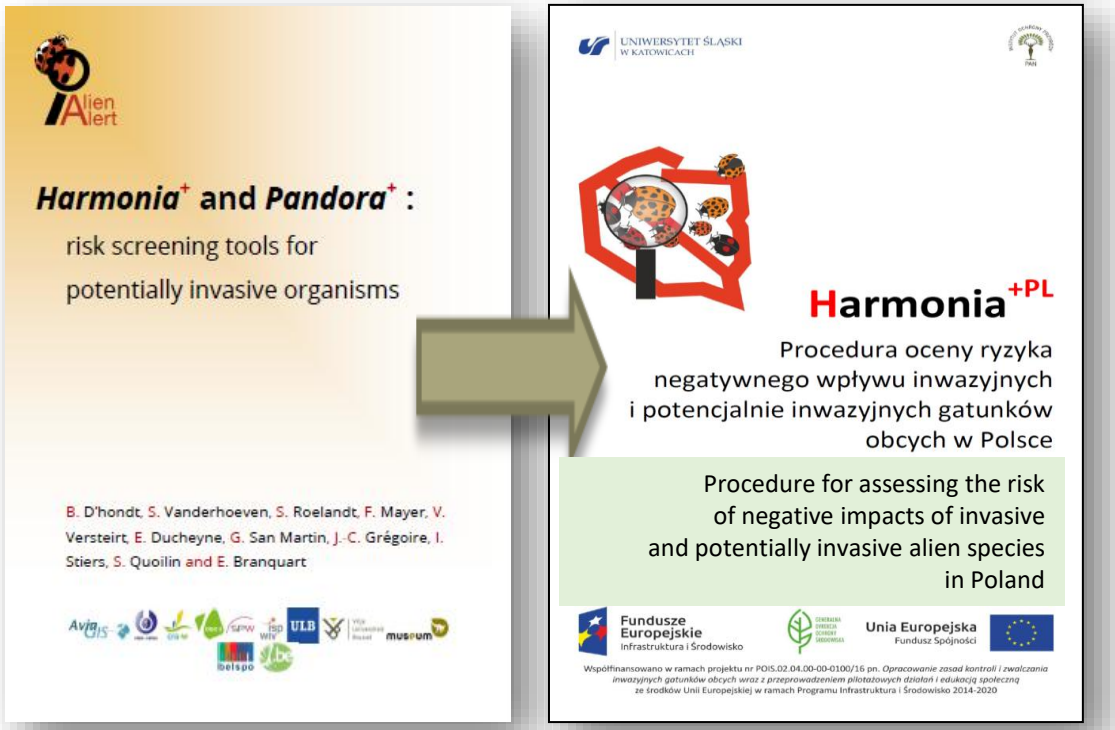
Criteria for assessing species of alien origin

Assessment of the degree of invasiveness



http://ias.biodiversity.be/

11 modules

- **invasion process:**

Introduction ► *Naturalisation* ► *Spread*

- **the impact of an alien species on:**

natural environment
plant cultivation
animal breeding
human and *other objects*

- 41 questions
- expert assessment
- valuation (point) risk assessment

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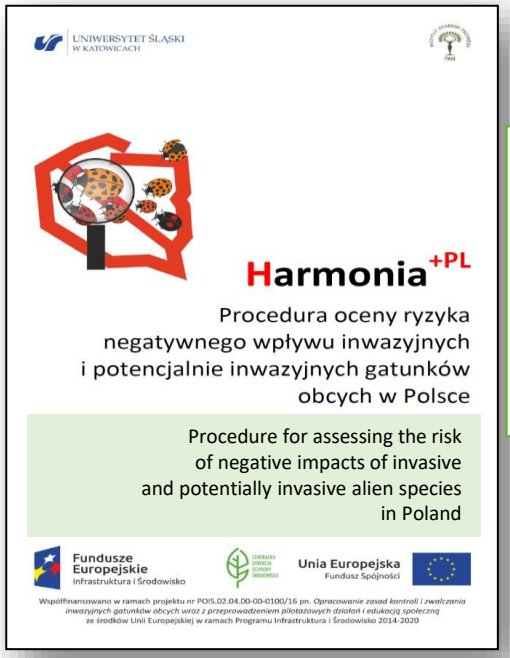
Criteria for assessing species of alien origin

Assessment of the degree of invasiveness



Expert rating

independent assessment conducted by two experts

Assessment agreement

by two experts

Verification

verification of the assessment by a third expert; agreement on the final assessment

Result:

Invasiveness level

description & point/valuation index

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Criteria for assessing species of alien origin

Module	Result	Degree of certainty
Introduction (questions: a06-a08)		
Naturalisation (questions: a09-a10)		
Spread (questions: a11-a12)		
The impact on natural environment (questions: a13-a18)		
The impact on plant cultivation (questions: a19-a23)		
The impact on animal breeding (questions: a24-a26)		
The impact on human (questions: a27-a29)		
The impact on other objects (question: a30)		
Invasion process (questions: a06-a12)		
Negative impact (questions: a13-a30)		
Overall rating		
Invasiveness category		

Assessment of the degree of invasiveness

IMPACT ON THE ENVIRONMENTAL DOMAIN

a13 – The impact of *the species* on native species through **predation, parasitism or herbivory** is: inapplicable I low I medium I high

a14 – The impact of *the species* on native species through **competition** is: low I medium I high

a15 – The impact of *the species* on native species through **interbreeding** is: none/very low I low I medium I high I very high

a16 – The impact of *the species* on native species by **hosting pathogens or parasites** that are harmful to them is: very low I low I medium I high I very high

a17 – The impact of *the species* on ecosystem integrity by **affecting its abiotic properties** is: low I medium I high

a18 – The impact of *the species* on ecosystem integrity by **affecting its biotic properties** is: low I medium I high

Categories of species impact on the environmental domain:	
Very low	0,00-0,20
Low	0,21-0,40
Medium	0,41-0,60
High	0,61-0,80
Very high	0,81-1,00

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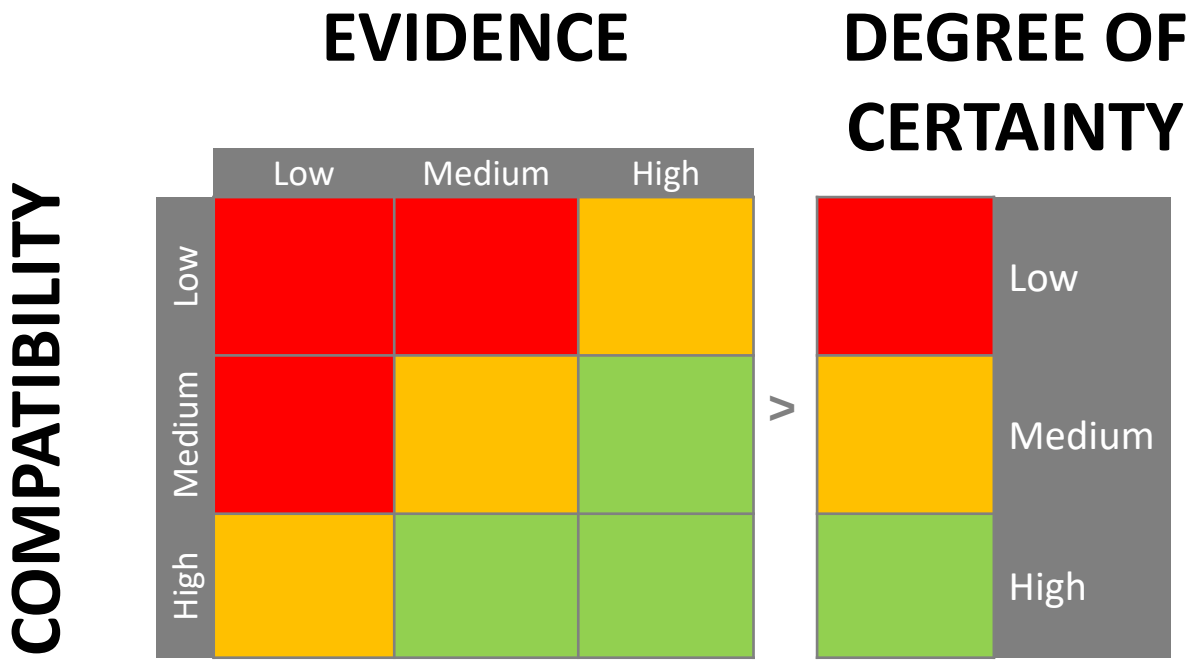
Criteria for assessing species of alien origin

Assessment of the degree of invasiveness



Assessment of the degree of certainty as a function of two parameters: the amount of evidence and the level of agreement between them (Mastrandrea et al. 2010)

Criteria for assessing species of alien origin

Assessment of the degree of invasiveness

Maximum value of the degree of invasiveness	Average value of the degree of certainty	Category/status
0,00-0,25	0,34-1,00	**non-invasive** alien species
0,26-0,50	0,34-1,00	**a minimally** invasive alien species
0,51-0,75	0,34-1,00	**moderately** invasive alien species
0,76-1,00	0,34-1,00	**a very** invasive alien species
0,00-1,00	0,00-0,33	a species of **uncertain** invasiveness

Criteria for assessing species of alien origin

Module	Result	Degree of certainty
Introduction (questions: a06-a08)	1,00	1,00
Naturalisation (questions: a09-a10)	1,00	1,00
Spread (questions: a11-a12)	1,00	1,00
The impact on natural environment (questions: a13-a18)	0,65	0,90
The impact on plant cultivation (questions: a19-a23)	0,15	0,70
The impact on animal breeding (questions: a24-a26)	0,25	1,00
The impact on human (questions: a27-a29)	0,00	1,00
The impact on other objects (question: a30)	1,00	1,00
Invasion process (questions: a06-a12)	1,00	1,00
Negative impact (questions: a13-a30)	1,00	0,92
Overall rating	1,00	
Invasiveness category	**a very invasive alien species**	

Assessment of the degree of invasiveness – example results

Photo: B. Tokarska-Guzik

Designated point ranges for a specific degree of invasiveness:

0,00-0,25 – non-invasive
0,26-0,50 – a minimally invasive
0,51-0,75 – moderately invasive
0,76-1,00 – a very invasive

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Criteria for assessing species of alien origin

Module	Result	Degree of certainty
Introduction (questions: a06-a08)	1,00	1,00
Naturalisation (questions: a09-a10)	1,00	1,00
Spread (questions: a11-a12)	1,00	1,00
The impact on natural environment (questions: a13-a18)	0,60	1,00
The impact on plant cultivation (questions: a19-a23)	0,15	1,00
The impact on animal breeding (questions: a24-a26)	0,50	0,50
The impact on human (questions: a27-a29)	0,00	1,00
The impact on other objects (question: a30)	0,25	1,00
Invasion process (questions: a06-a12)	1,00	1,00
Negative impact (questions: a13-a30)	0,60	0,90
Overall rating	0,60	
Invasiveness category	**moderately invasive alien species**	

Assessment of the degree of invasiveness – example results

Photo: B. Tokarska-Guzik

Designated point ranges for a specific degree of invasiveness:

0,00-0,25 – non-invasive
0,26-0,50 – a minimally invasive
0,51-0,75 – moderately invasive
0,76-1,00 – a very invasive

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Analysis of the invasiveness of alien species in Poland, including the identification of species that pose a significant threat to native flora and fauna

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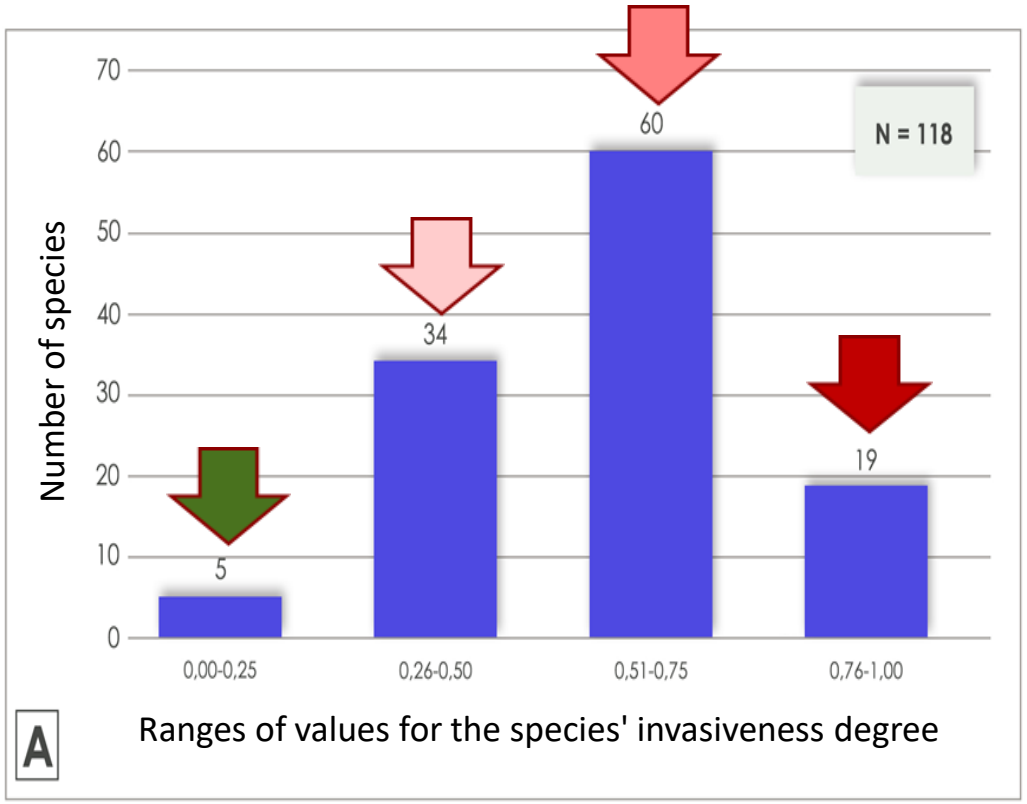
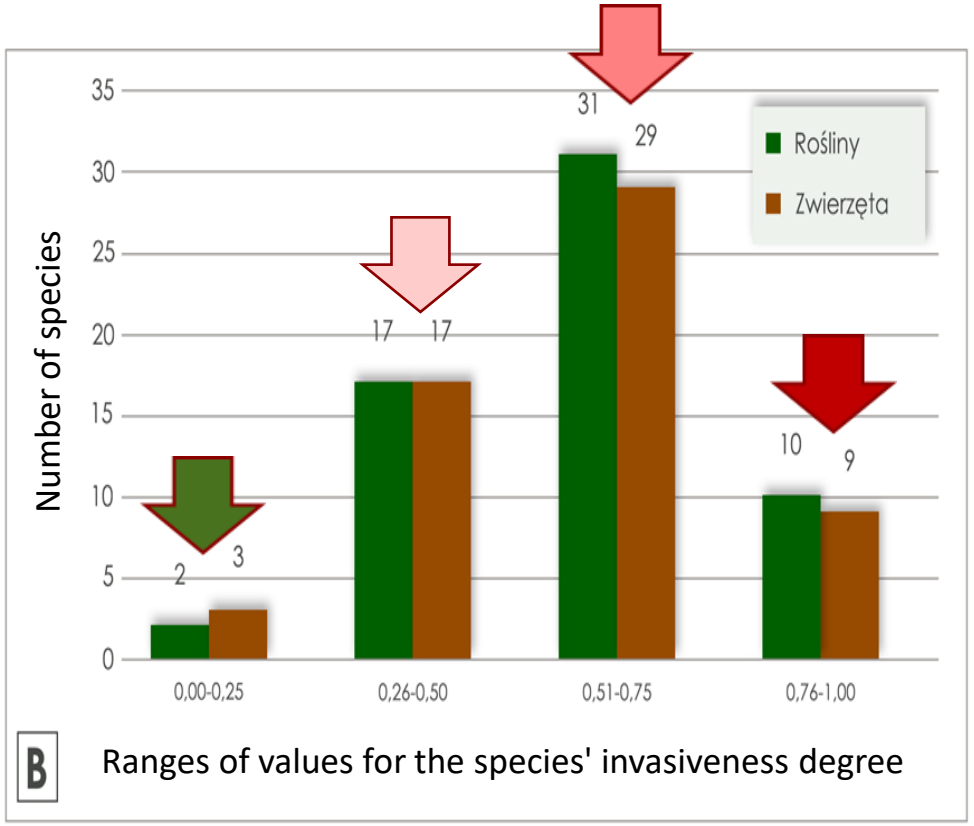
Assessment of the degree of invasiveness – example results



Total number of plant and animal species in the distinguished categories



The number of plant and animal species in each range of invasiveness degree values

non-invasive alien species

minimally invasive alien species

moderately invasive alien species

very invasive alien species

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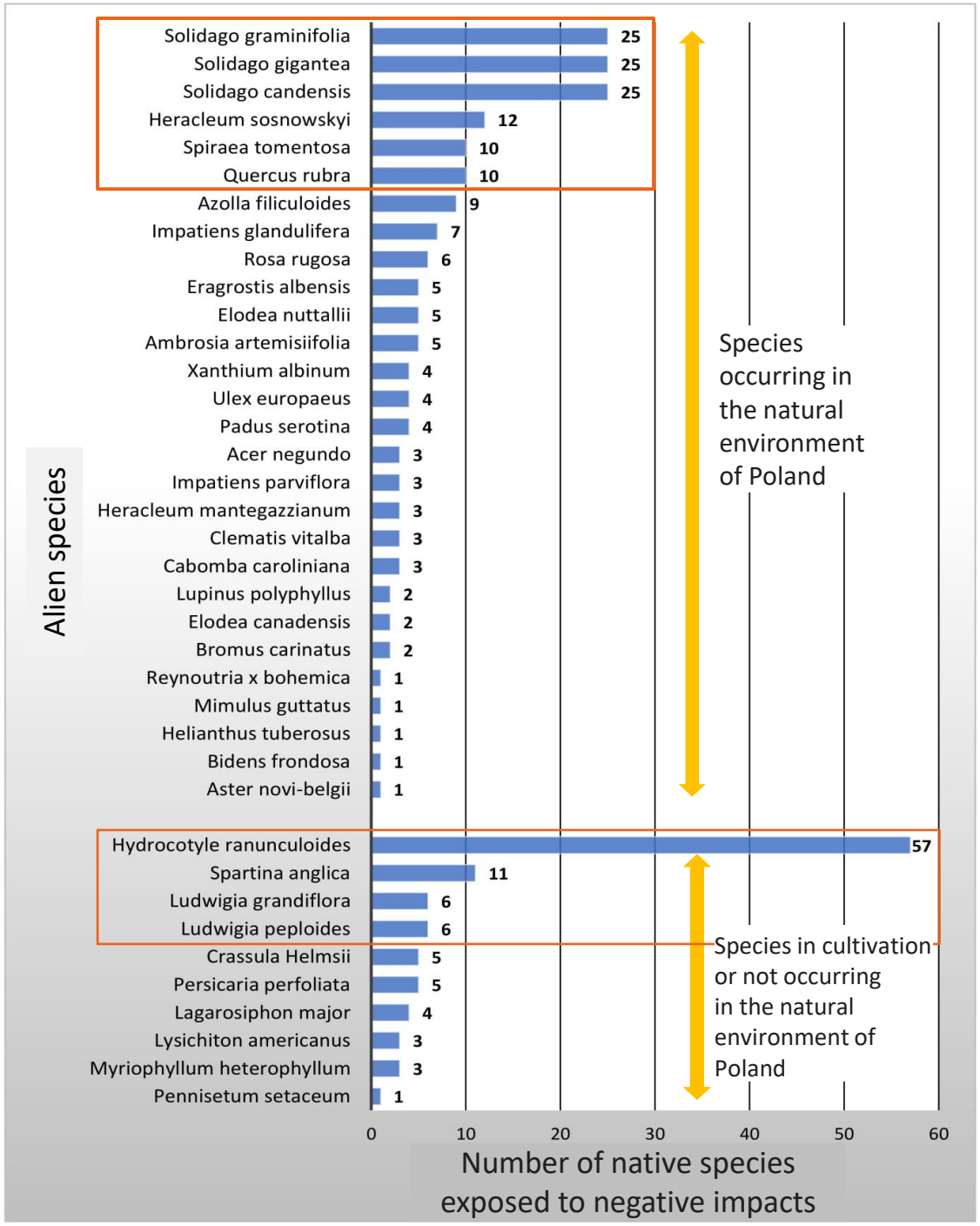

A list of invasive plants ranked by the number of protected and/or endangered native species they may negatively impact

Criteria for assessing species of alien origin

Assessment of the degree of spread/occurrence

Category	Symbol
• the species does not occur in Poland	0
• the species occurs in crops and breeding	01
• isolated population(s)	2
• limited range of occurrence	3
• a widespread species	4

Number of localities / Population size	1-10	11-100	more than 100
no data or number of individuals 1-10	isolated	isolated	limited occurrence
11-100	isolated	limited occurrence	widespread
more than 100 individuals	limited occurrence	widespread	widespread

Analysis of the invasiveness of alien species in Poland,
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Criteria for assessing species of alien origin

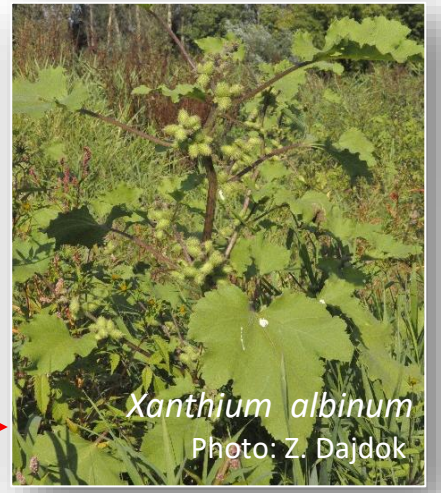
Assessment of the degree of spread – examples

Category	Number of species
● the species does not occur in Poland	7
● the species occurs in crops	12
● isolated population(s)	0
● limited range of occurrence	9
● a widespread species	32


Spartina anglica
Photo: Ian C. Trueman


Lysichiton americanus
Photo: Z. Dajdok


Spiraea tomentosa
Photo: Z. Dajdok


Xanthium albinum
Photo: Z. Dajdok

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Criteria for assessing species of alien origin

Assessment of the degree of spread – examples

Category	Number of species
● the species does not occur in Poland	8
● the species occurs in crops and breeding	10
● isolated population(s)	17
● limited range of occurrence	3
● a widespread species	20


Castor canadensis
Photo: Sari Holopainen


Aix galericulata
Photo: J. Kaliszewski


Bison bison
Photo: M. Hędrzak


Corbicula fluminalis
Photo: A.M. Łabęcka


Harmonia axyridis
Photo: K. Ox

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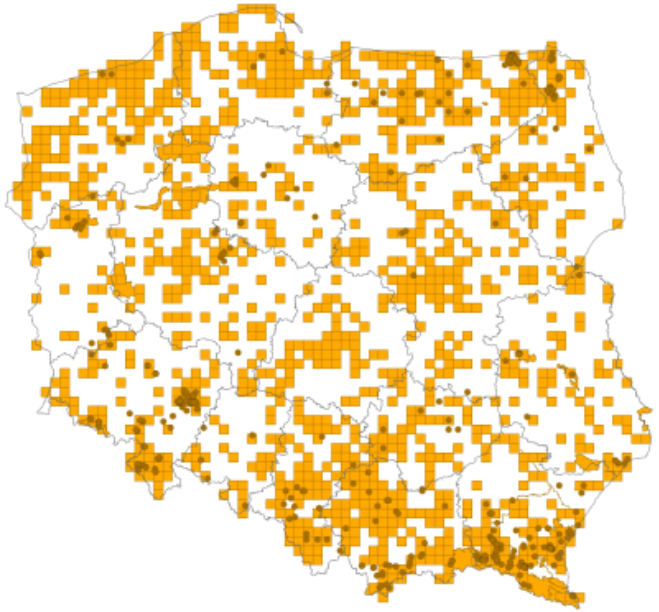
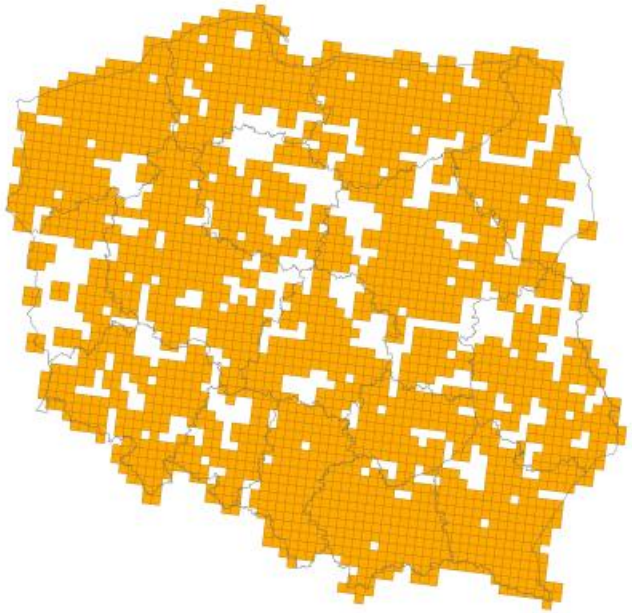
Criteria for assessing species of alien origin

Assessment of the degree of spread – examples



point/dot map



cartogramme map

range map

Photo: B. Tokarska-Guzik

Sosnowsky's Hogweed (*Heracleum sosnowskyi*) Distribution Maps

Category 4 – a widely distributed species

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Criteria for assessing species of alien origin

Method for selecting priority invasive alien species

Schematic diagram of the stages of selecting priority invasive alien species

Poziom procedury	Kryterium oceny gatunku	ODPOWIEDŹ: TAK			ODPOWIEDŹ: NIE			
		Kategoria gatunków w odniesieniu do **metody oceny sposobu postępowania z gatunkiem**	Dalsza procedura	PRIORYTET	Kategoria gatunków w odniesieniu do **metody oceny sposobu postępowania z gatunkiem**	Dalsza procedura	PRIORYTET	Wytyczne do przeprowadzenia oceny
0	Czy oddziaływanie gatunku jest wystarczająco rozpoznane?	gatunki o stopniu ryzyka dostatecznie rozpoznanym	przejść do poziomu **1**		gatunki niepewngo ryzyka: **rn0, rn01, rn2, rn3, rn4**	koniec procesu priorytetyzacji		
1	Czy gatunek jest inwazyjny?	gatunki średniego ryzyka: **S0, S01, S2, S3, S4**; gatunki wysokiego ryzyka: **W0, W01, W2, W3, W4**	przejść do poziomu **2**		gatunki niskiego ryzyka: **N0, N01, N2, N3, N4** w razie zmiany ryzyka na wysokie	koniec procesu priorytetyzacji	**PRIORYTET NISKI**	HarmoniaPL+
2	Czy gatunek występuje w Polsce?	gatunki występujące w Polsce: S01, S2, S3, S4, W01, W2, W3, W4	przejść do poziomu **3**		gatunki niewystępujące w Polsce: **S0, W0** w razie stwierdzenia gatunku w Polsce	koniec procesu priorytetyzacji	**PRIORYTET NISKI**	HarmoniaPL+
3	Czy gatunek występuje w środowisku przyrodniczym?	gatunki występujące w środowisku przyrodniczym: **S2, S3, S4, W2, W3, W4**	przejść do poziomu **4**		gatunki występujace wyłącznie w uprawach i hodowlach: **S01, W01** w razie stwierdzenia gatunku poza uprawą / hodowlą	koniec procesu priorytetyzacji	**PRIORYTET NISKI**	HarmoniaPL+
4	Czy znane są skuteczne sposoby zwalczania gatunku	gatunki, których kontrola jest możliwa: **S2, S3, S4, W2, W3, W4**	przejść do poziomu **5**		gatunki, których kontrola **nie** jest możliwa: **S2, S3, S4, W2, W3, W4** w razie znalezienia skutecznych metod zwalczania gatunku	koniec procesu priorytetyzacji	**PRIORYTET NISKI**	
5	Czy jest to gatunek wysokiego ryzyka?	gatunki wysokiego ryzyka: **W2, W3, W4**	przejść do poziomu **6**		gatunki średniego ryzyka: **S2, S3, S4** w razie zmiany ryzykana wysokie	koniec procesu priorytetyzacji	**PRIORYTET NISKI**	metody postępowania z gatunkiem
6	Czy gatunek stwarza zagrożenie tylko dla środowiska przyrodniczego?	gatunki stwarzające zagrożenie dla środowiska przyrodniczego: **W2, W3, W4**	przejść do poziomu **8**		gatunki stwarzające zagrożenie dla środowiska przyrodniczego, zdrowia człowieka lub gospodarki: **W2, W3, W4**	przejść do poziomu **7**		HarmoniaPL+
7	Czy gatunek ma ograniczony zasięg występowania lub jest szeroko rozpowszechniony?	gatunki stwarzające zagrożenie dla środowiska przyrodniczego, usług ekosystemowych, zdrowia człowieka lub gospodarki, o ograniczonym występowaniu i szeroko rozprzestrzenione: **W3, W4**	przeprowadzic bilans kosztów i korzyści (Etap II)	**PRIORYTET WYSOKI**	gatunki stwarzające zagrożenie dla środowiska przyrodniczego, usług ekosystemowych, zdrowia człowieka lub gospodarki, których populacje są izolowane: **W2**	przeprowadzic bilans kosztów i korzyści (Etap II)	**PRIORYTET NAJWYŻSZY**	metoda oceny stopnia rozprzestrzenienia
8	Czy gatunek ma ograniczony zasięg występowania lub jest szeroko rozpowszechniony?	gatunki stwarzające zagrożenie dla środowiska przyrodniczgo, o ograniczonym występowaniu i szeroko rozprzestrzenione: **W3, W4**	przeprowadzic bilans kosztów i korzyści (Etap II)	**PRIORYTET ŚREDNI**	gatunki stwarzające zagrożenie dla środowiska przyrodniczego, których populacje są izolowane: **W2**	przeprowadzic bilans kosztów i korzyści (Etap II)	**PRIORYTET WYSOKI**	metoda oceny stopnia rozprzestrzenienia

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Criteria for assessing species of alien origin

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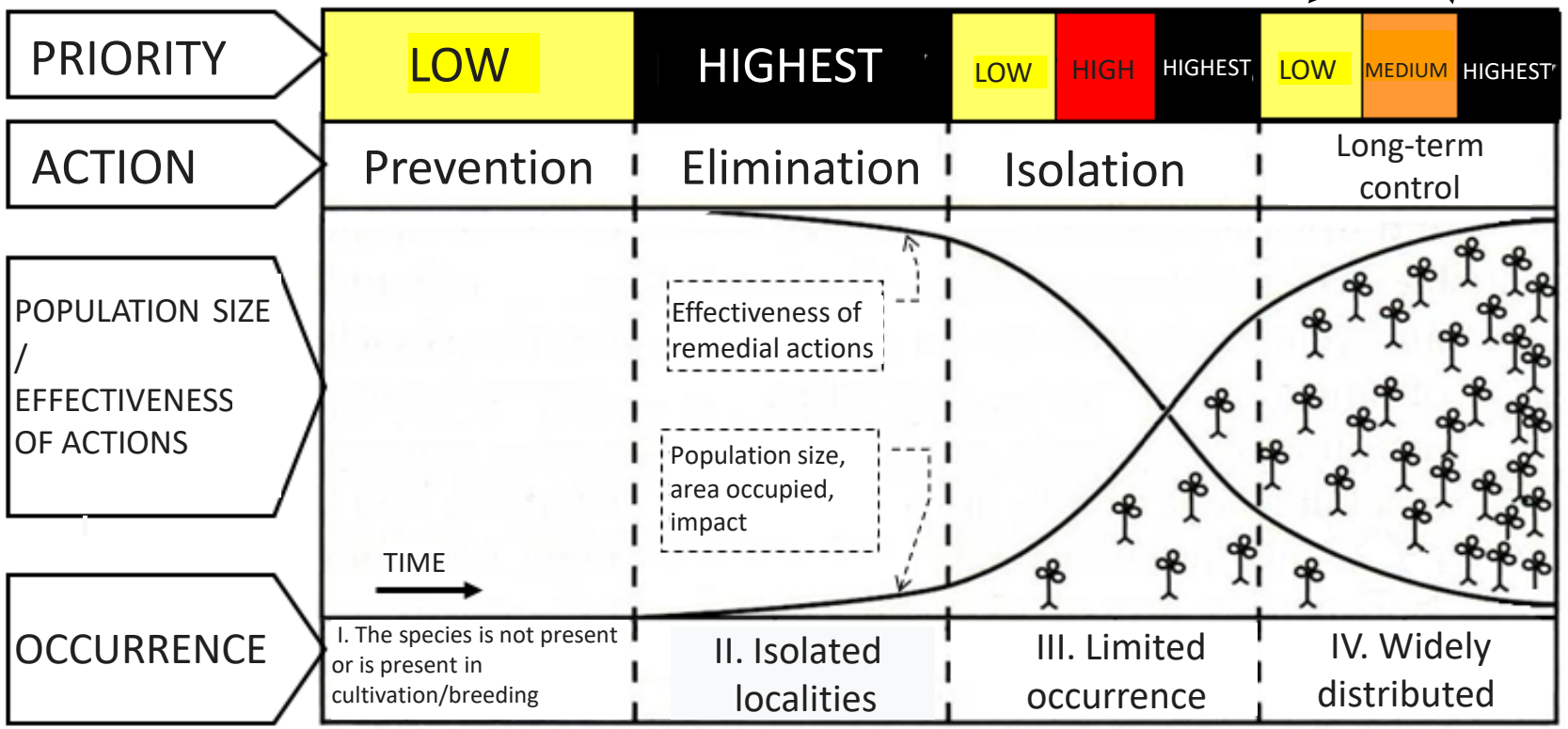
Method for selecting priority invasive alien species

Species targeted first – the highest chance of completely eliminating the species population, at relatively low costs

Eliminating small sites, limiting the spread to new areas, and controlling large populations

Limiting local populations, in exceptional cases, acting despite high costs



◄ Possible types of actions taken depending on the presence or development phase of the alien species population

after Wilson et al. (2017) changed

Wilson J. R., Panetta F.D., Lindgren C. 2017. *Detecting and Responding to Alien Plant Incursions*. Ecology, Biodiversity and Conservation., Cambridge Univ. Press

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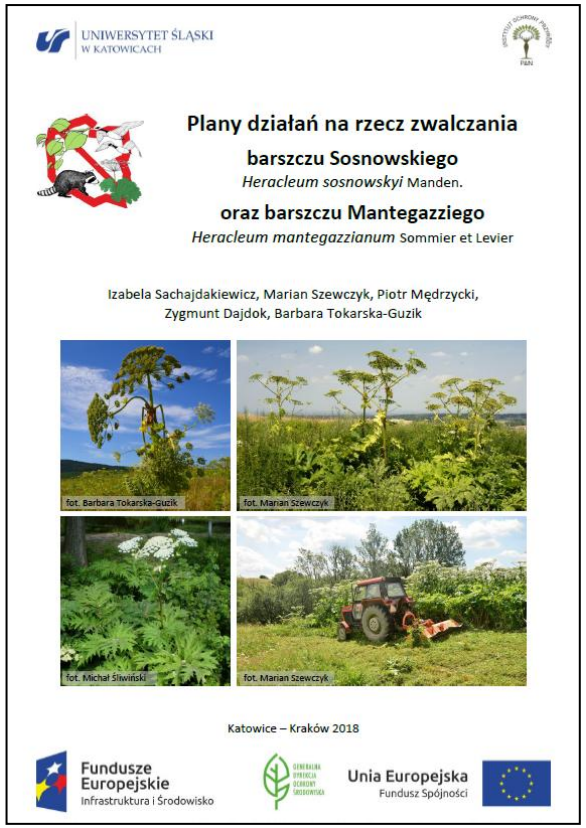
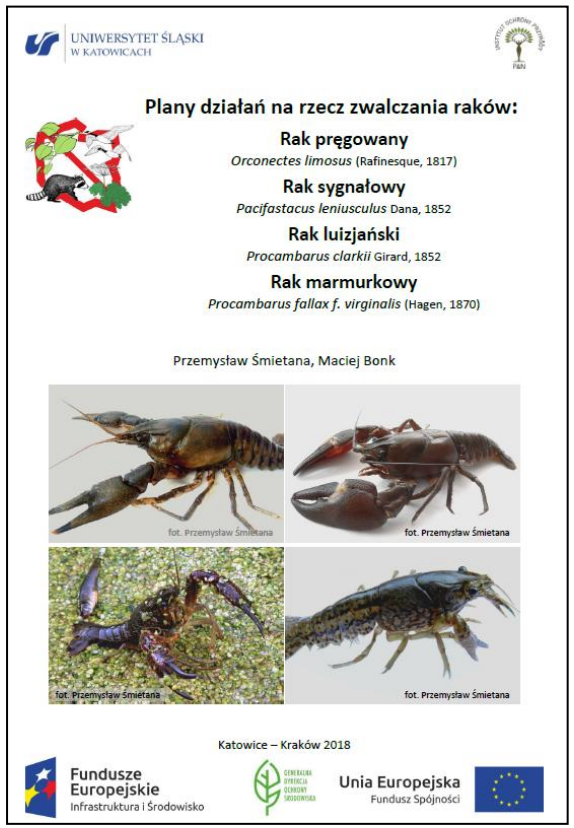
Criteria for assessing species of alien origin

Plants	Animals
Azolla filiculoides	*Neovison vison*
Cabomba caroliniana	*Ondatra zibethicus*
Echinocystis lobata	*Orconectes limosus, Pacifastacus leniusculus, Procambarus clarkii, Procambarus fallax f. virginalis*
Elodea nuttallii	
Heracleum sosnowskyi & H. mantegazzianum	
Impatiens glandulifera & I. capensis	*Procyon lotor*

Action Plans (for the period 2019–2030) developed for priority species





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Criteria for assessing species of alien origin

Action plan for the control of American mink

The plan's structure follows the model used in the "European Strategy for Dealing with Invasive Alien Species" (Genovesi and Shine 2003).
It identifies eight action areas that are key elements of a comprehensive system for reducing the negative impact of alien species:

1. Raising awareness of the threats posed by invasive alien species and ways to mitigate them
2. Gathering and exchanging information on invasive alien species
3. Streamlining legislation and clear division of competences between state structures and organizations responsible for solving problems related to invasive alien species
4. Development of international cooperation
5. Preventing new introductions
6. Early detection of new alien species and rapid decision-making regarding further procedures
7. Mitigating the negative effects of biological invasions: elimination, isolation, long-term control
8. Reconstruction of populations of native species and ecosystems

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Criteria for assessing species of alien origin

Water Fern
Azolla filiculoides

Carolina fanwort
Cabomba caroliniana

Wild cucumber
Echinocystis lobata

Nuttall's waterweed
Elodea nuttallii

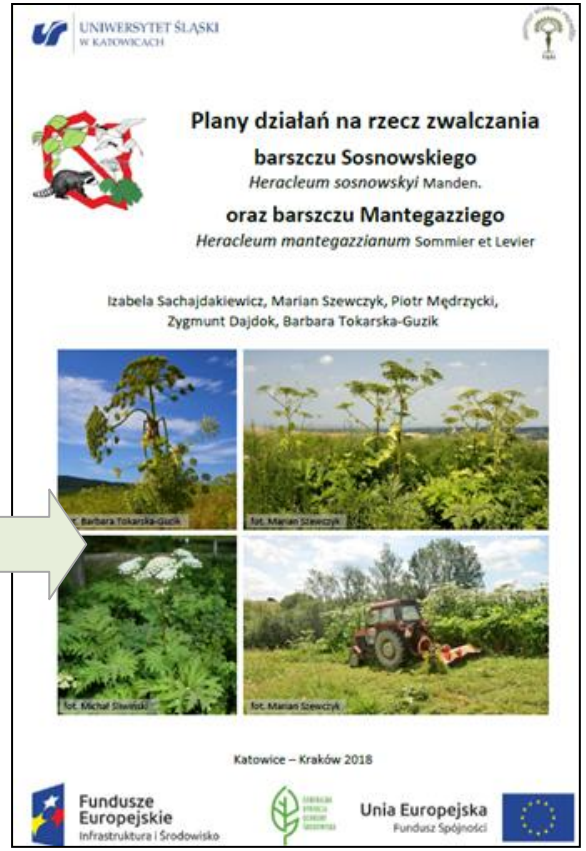
Sosnowsky's hogweed & Giant hogweed
Heracleum sosnowskyi & H. mantegazzianum

Himalayan balsam & Orange balsam
Impatiens glandulifera & I. capensis

The assessment of the degree of invasiveness enabled the selection of priority species from among 60 analysed plant species

complete elimination of the species from the territory of the country

elimination from selected areas,
e.g. national parks, nature reserves, etc.



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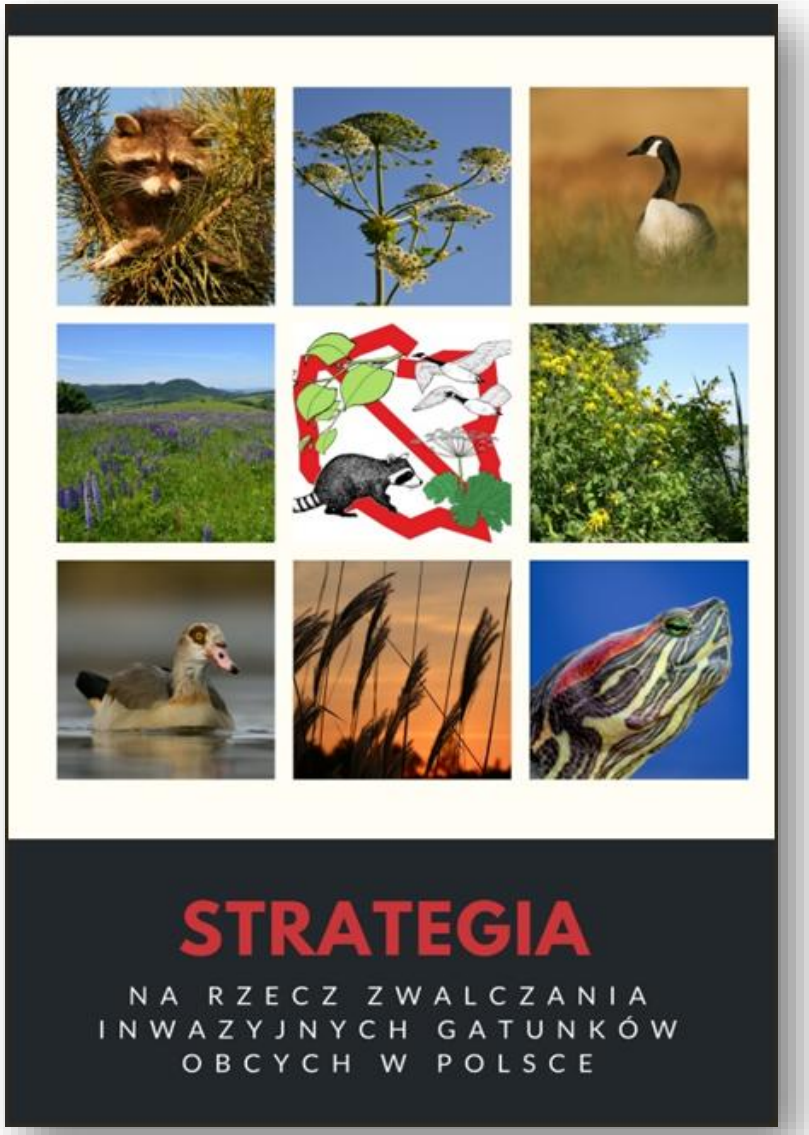
Assumptions

- Defining a long-term strategy to solve the problem of invasive alien species in Poland by 2030
- Defining strategic goals and main assumptions and directions of actions aimed at limiting the damage caused by invasive alien species in Poland
- Defining ways of dealing with invasive alien species in Poland

Strategy for combating invasive alien species in Poland

Recommendations

- Creation or amendment of normative acts, primarily taking into account the need for proper implementation of Regulation (EU) No 1143/2014 of the European Parliament and of the Council
- List of well-functioning and effective activities that should be continued (“strengths”)
- List of activities that require improvement in performance or increased effectiveness (“weaknesses”)
- Recommendations resulting from the analysis of the most important experiences in Poland to date regarding the use of methods for combating invasive alien species
- Proposal for a management system for biological invasions in Poland, with reference to the Action Plan for Combating Invasive Species in Poland until 2030



Analysis of the invasiveness of alien species in Poland,
including the identification of species that pose a significant threat to native flora and fauna

www.gov.pl/gdos

Dissemination of study results

GDOŚ Website

http://projekty.gdos.gov.pl/igo-o-projekcie
https://www.gov.pl/web/gdos/inwazyjne-gatunki-obce3

- ✓ Lists of invasive alien species
- ✓ Surveys/Questionnaires assessing the degree of invasiveness
- ✓ Alien species information cards
- ✓ Occurrence in Poland

http://GEOSERWIS.GDOS.GOV.PL

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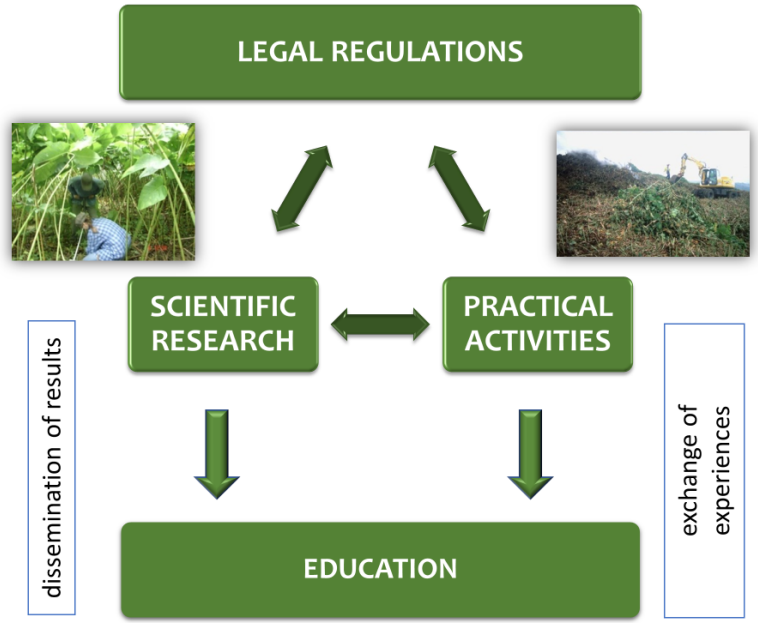
Recommendations for the future

- Increasing the level of knowledge necessary to carry out effective actions to limit the negative effects of invasions
- Creation of the IAS monitoring system
- Closer cooperation and communication between interest groups
- Integrating emerging technologies with IAS management in practice
- Filling and clarifying identified knowledge gaps (e.g. pathogen transmission)
- Verification of the assessment of the degree of invasiveness of alien species and carrying out an assessment for new alien species
- Further research to assess the impact of dominant species (including expansive native species)



Analysis of the invasiveness of alien species in Poland: the methodological approach used and the results obtained

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