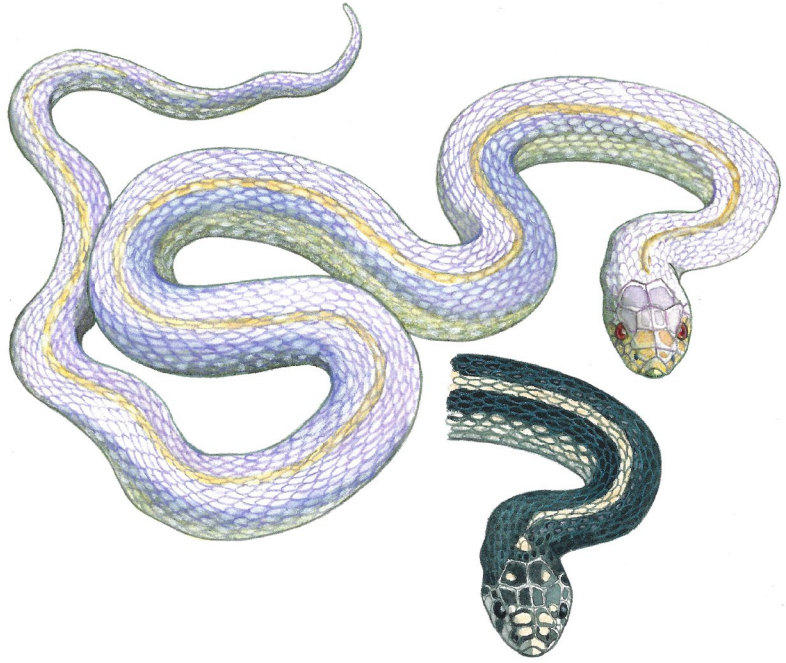
Tools and resources for managing invasive alien species of amphibians and reptiles in the EU



LIFE Platform Meeting: Amphibian and Reptile Conservation (ARC)

Challenges and Opportunities in Europe

Santander, Spain - 22-24 May 2024

Assessment Report on Invasive Alien Species and their Control

www.ipbes.net

The Intergovernmental Science-Policy Platform on Biodiversity & Ecosystem Services

#InvasiveAlienSpecies Assessment

UN environment programme

unesco

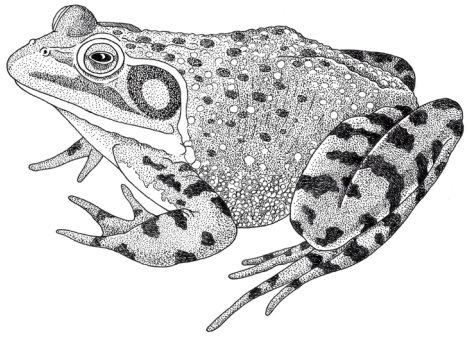
Food and Agriculture Organization of the United Nations

UNDP

Main take home messages from IPBES

- The IPBES report presented compelling evidence that people and ecosystems all over the world suffer adverse impacts from nonnative species.
- The thoroughly documented information in this report removes any uncertainty about the negative consequences of nonnative species.
- There is compelling evidence for immediate and sustained action.
- Current policies have been insufficient in managing biological invasions and preventing and controlling invasive alien species

Are IAS a real threat?



OXFORD

BioScience, 2024, **0**, 1–10
https://doi.org/10.1093/biosci/biad114
Advance access publication date: 0 2023
Overview Article

Systematic and persistent bias against introduced species

Patricio Javier Pereyra, Paula de la Barra, Lu
Emiliano Rodríguez, Ana Mazzolari, Mara Ana

OXFORD

BioScience, 2024, **0**, 1–3
https://doi.org/10.1093/biosci/biae029
Advance access publication date: 0 2024
Viewpoint

Systematic and persistent bias against invasion science: Framing conservation scientists

Daniel Simberloff, Alejandro Bortolus, James T. Carlton, Franck Courchamp, Ross N. Cuthbert, Philip E. Hulme, Julie L. Lockwood, Laura A. Meyerson, Martín A. Nuñez, Anthony Ricciardi, David M. Richardson and Evangelina Schwindt

Effectiveness of eradications

- Over 1000 eradications successfully completed
- Significant advances allow targeting much more challenging species and areas than in the past, and limiting undesired effects
- Eradication is not “the” solution, but it is a concrete and effective response to invasions
- One of the few examples of concrete action to combat biodiversity loss

Increasing impact of IAS

Diversity and Distributions, (Diversity Distrib.) (2010) **16**, 95–108

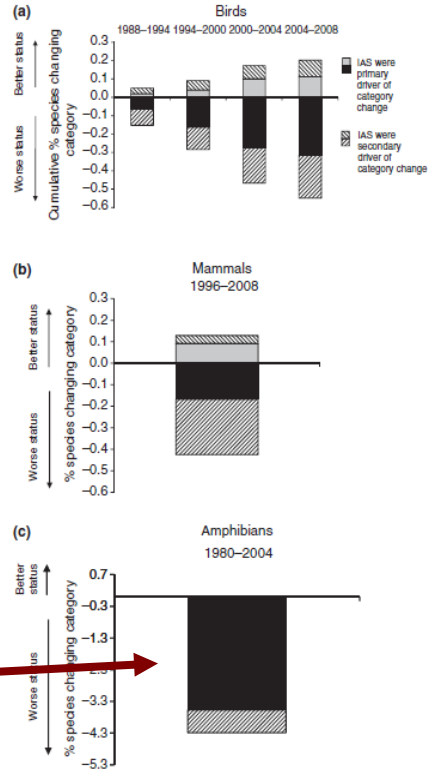
BIODIVERSITY RESEARCH

Global indicators of biological invasion: species numbers, biodiversity impact and policy responses

Melodie A. McGeoch[1]*, Stuart H. M. Butchart[2], Dian Spear[3], Elrike Marais[3], Elizabeth J. Kleynhans[3], Andy Symes[2], Janice Chanson[4] and Michael Hoffmann[5,6]

Genuine IUCN Red List category changes, driven by the impacts of IAS

Impacts leading to deterioration in status (31 birds, 9 mammals and 205 amphibians)



IAS management is an effective tool

Diversity and Distributions, (Diversity Distrib.) (2010) **16**, 95–108

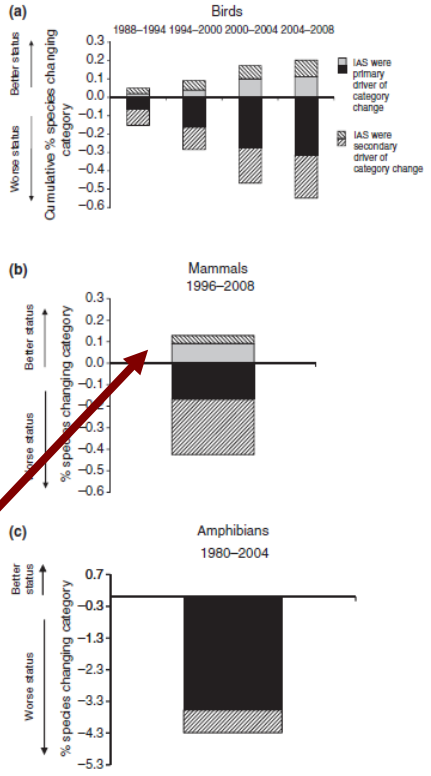
BIODIVERSITY RESEARCH

Global indicators of biological invasion: species numbers, biodiversity impact and policy responses

Melodie A. McGeoch[1]*, Stuart H. M. Butchart[2], Dian Spear[3], Elrike Marais[3], Elizabeth J. Kleynhans[3], Andy Symes[2], Janice Chanson[4] and Michael Hoffmann[5,6]

Eradication one of the very few examples of effective action to reduce biodiversity loss

Conservation status of 11 birds, 5 mammals and 1 amphibian improved because of eradication of IAS

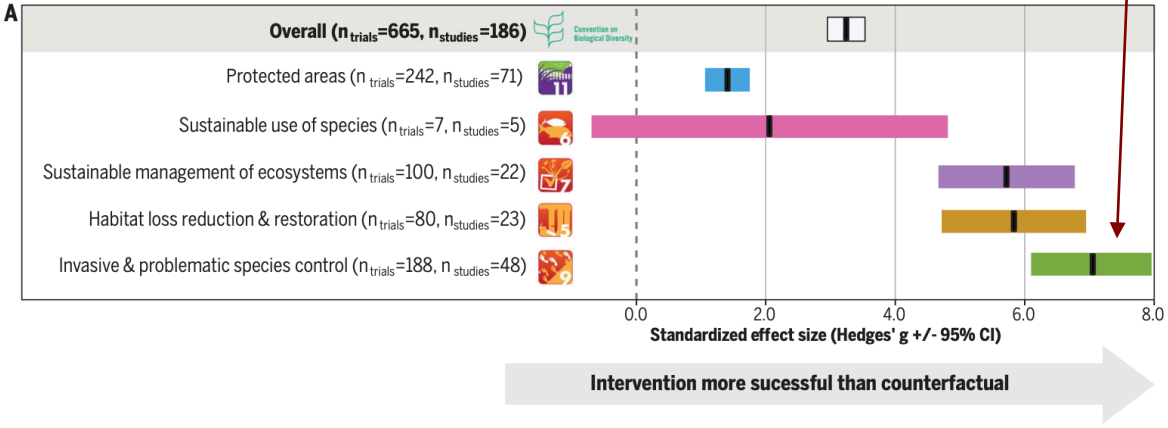


CONSERVATION

The positive impact of conservation action

Penny F. Langhammer[1,2]*, Joseph W. Bull[3,4,5], Jake E. Bicknell[4], Joseph L. Oakley[6], Mary H. Brown[1], Michael W. Bruford[7,8]†, Stuart H. M. Butchart[9,10], Jamie A. Carr[11,12,13], Don Church[1], Rosie Cooney[14,15]‡, Simone Cutajar[16], Wendy Foden[13,17,18,19], Matthew N. Foster[1], Claude Gascon[20], Jonas Geldmann[10,21], Piero Genovesi[22,23,24], Michael Hoffmann[25,26], Jo Howard-McCombe[27,28], Tiffany Lewis[29], Nicholas B. W. Macfarlane[30], Zoe E. Melvin[27,31], Rossana Stoltz Merizalde[32], Meredith G. Morehouse[33], Shyama Pagad[34], Beth Polidoro[25,35], Wes Sechrest[1], Gernot Segelbacher[8,36], Kevin G. Smith[37], Janna Steadman[4], Kyle Strongin[38], Jake Williams[39], Stephen Woodley[40], Thomas M. Brooks[41,42,43]

Interventions targeted at species and ecosystems, such as invasive species control, are highly effective and have large effect sizes.



Alien species in the EU

Over 14,000 alien species recorded in Europe

European Commission

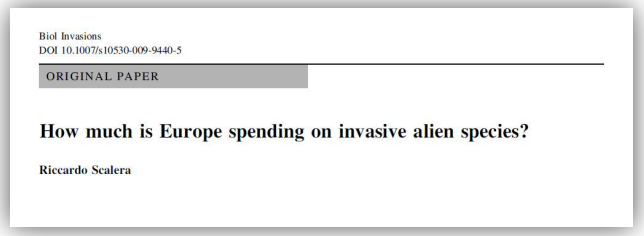
EASIN - European Alien Species Information Network

Total costs of IAS in Europe summed to 116.61 billion EUR between 1960 and 2020

The costs for management

- The costs related to IAS management increase significantly if the species is not eradicated immediately.
- Costs to quickly detect and eradicate a new invasion are much less expensive than trying to eradicate, or control, an established and widespread IAS population.

- Number of LIFE projects including measures dealing with IAS: 265
- Total budget spent: €70 million


Biol Invasions
DOI 10.1007/s10530-009-9440-5

ORIGINAL PAPER

How much is Europe spending on invasive alien species?

Riccardo Scalera

Economic costs for management and research on alien species in Europe -> € 130 mln for ca. 300 projects during 1992-2006

Alien herps impact on economy

www.nature.com/scientificreports

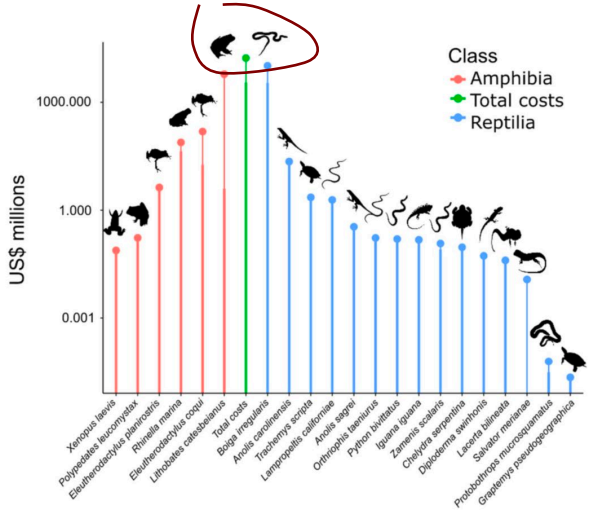
scientific reports

OPEN

Global economic costs of herpetofauna invasions

Ismael Soto[1], Ross N. Cuthbert[2], Antonín Kouba[1], César Capinha[3,4], Anna Turbelin[5], Emma J. Hudgins[6], Christophe Diagne[5], Franck Courchamp[5] & Phillip J. Haubrock[1,7]✉

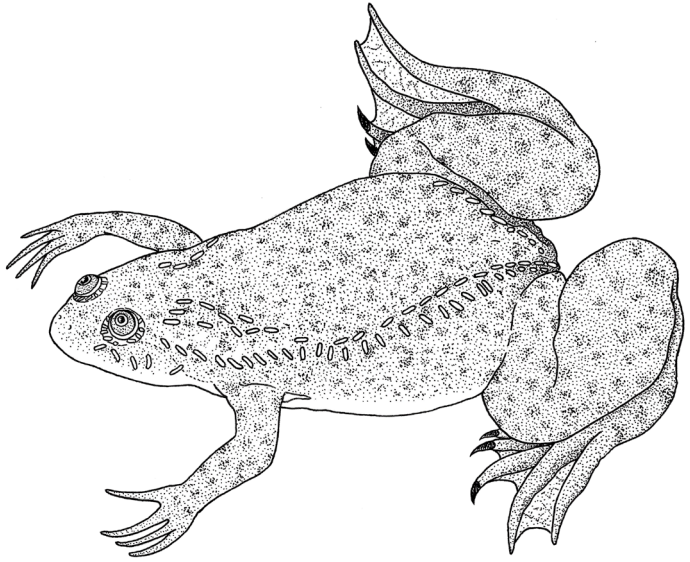
Biological invasions by amphibian and reptile species (i.e. herpetofauna) are numerous and widespread, having caused severe impacts on ecosystems, the economy and human health. However, there remains no synthesised assessment of the economic costs of these invasions. Therefore, using the most comprehensive database on the economic costs of invasive alien species worldwide (InvaCost), we analyse the costs caused by invasive alien herpetofauna according to taxonomic, geographic, sectoral and temporal dimensions, as well as the types of these costs. The cost of invasive herpetofauna totaled at 17.0 billion US$ between 1986 and 2020, divided split into 6.3 billion US$ for amphibians, 10.4 billion US$ for reptiles and 334 million US$ for mixed classes. However, these costs were associated predominantly with only two species (brown tree snake *Boiga irregularis* and American bullfrog *Lithobates catesbeianus*), with 10.3 and 6.0 billion US$ in costs, respectively. Costs for the remaining 19 reported species were relatively minor (< 0.6 billion US$), and they were entirely unavailable for over 94% of known invasive herpetofauna worldwide. Also, costs were positively correlated with research effort, suggesting research biases towards well-known taxa. So far, costs have been dominated by predictions and extrapolations (79%), and thus empirical observations for impact were relatively scarce. The activity sector most affected by amphibians was authorities-stakeholders through management (> 99%), while for reptiles, impacts were reported mostly through damages to mixed sectors (65%). Geographically, Oceania and Pacific Islands recorded 63% of total costs, followed by Europe (35%) and North America (2%). Cost reports have generally increased over time but peaked between 2011 and 2015 for amphibians and 2006 to 2010 for reptiles. A greater effort in studying the costs of invasive herpetofauna is necessary for a more complete understanding of invasion impacts of these species. We emphasise the need for greater control and prevention policies concerning the spread of current and future invasive herpetofauna.



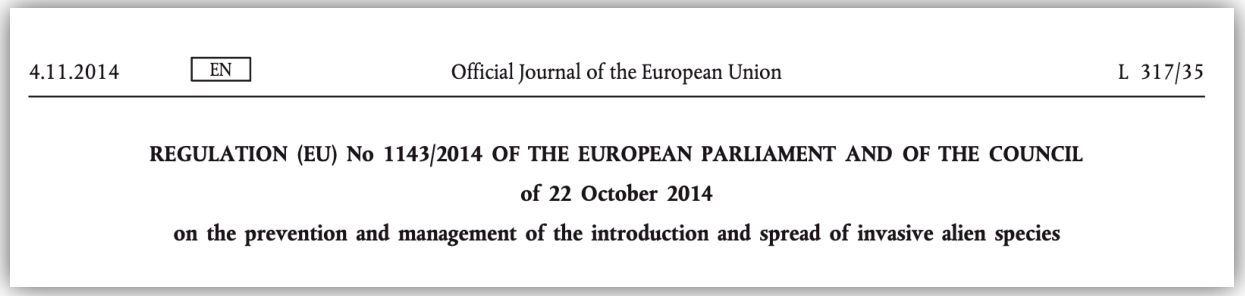
17 billion USD between 1986 and 2020

The EU (policy) framework related to the Regulation on invasive alien species

- EU Habitats and Birds Directives
- EU Wildlife Trade Regulation
- EU Aquaculture Regulation
- EU Water Framework Directive
- EU Animal health law
- EU Plant health law
- EU Regulation on IAS



The EU regulation on IAS



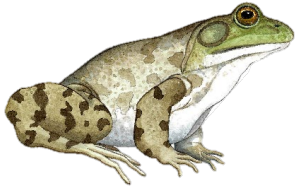
4.11.2014 EN Official Journal of the European Union L 317/35

REGULATION (EU) No 1143/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 22 October 2014
on the prevention and management of the introduction and spread of invasive alien species

Objective (Art 1):

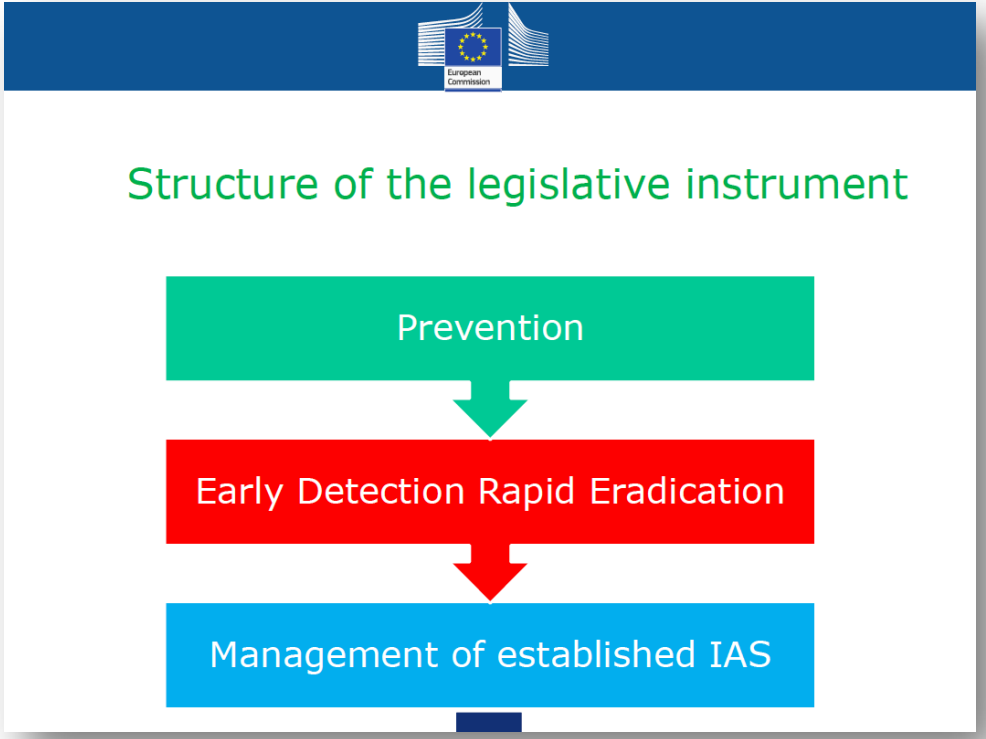
prevent, minimize and mitigate the adverse impact on biodiversity of the introduction and spread within the Union, both intentional and unintentional, of IAS.

IAS of Union concern or Union list



at the core of the Regulation

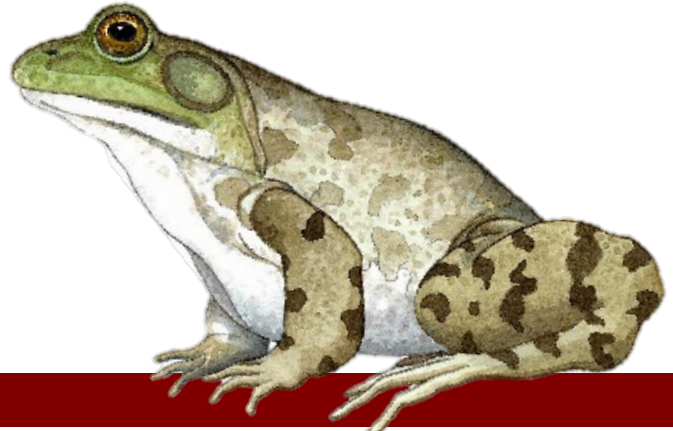
- Based on criteria and risk assessments
- No native species
- Dynamic list, developed and updated with the assistance of
  - Scientific Forum (advice on scientific questions)
  - Committee (agreement of Member States)
- First Union list: entry into force - August 2016
- Updated regularly (last update August 2022)
- 88 IAS of Union concern (41 plants, 47 animals)


European Commission
Structure of the legislative instrument
Prevention
Early Detection Rapid Eradication
Management of established IAS

Prevention

Action triggered by the Regulation on the species of Union concern:

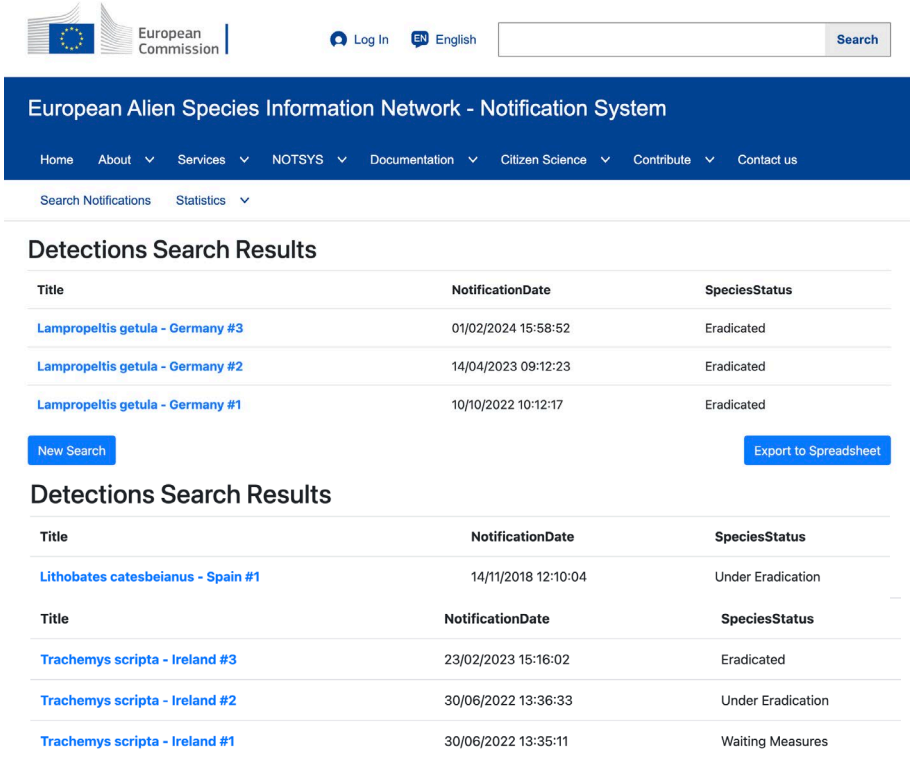
- Prevention of new introductions or further spread
- Restrictions on intentional activities (Art 7) such as imported into the Union kept, bred, grown, sold, transported or released into the environment
- Pathway management to tackle unintentional introductions (Art 13)



Early detection and rapid eradication

Action triggered by the Regulation on the species of Union concern:

- Early detection and rapid eradication of new populations
- Surveillance & official controls (Art 14 & 15)
- Early detection and notification (Art 16)
- Rapid eradication (Art 17)



https://easin.jrc.ec.europa.eu/notsys

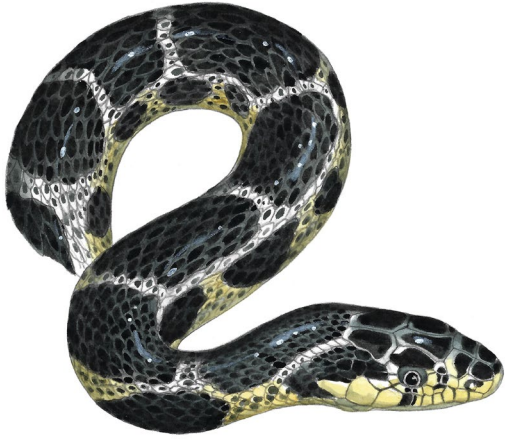
Management

Action triggered by the Regulation on the species of Union concern:

- Management measures for widely spread species (Art 19)

Importance of welfare considerations to be always taken into account in any management operation: managers should always strive to apply a measure with the lowest welfare impacts, without compromising the effectiveness of the management objective

…Much more than invasive alien species of Union concern



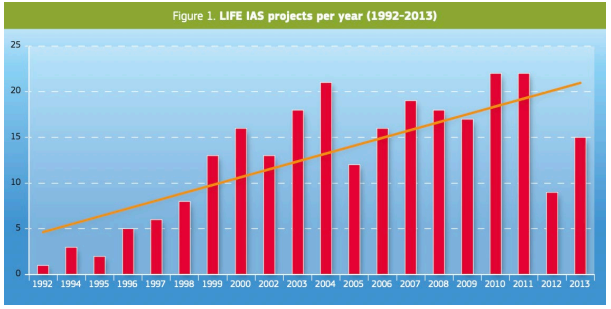
- Invasive alien species of regional concern and species native to the Union (Article 11)
- Invasive alien species of Member State concern (Article 12)
- Invasive alien species not on the EU Union list

Implementing the Regulation - Financial tools

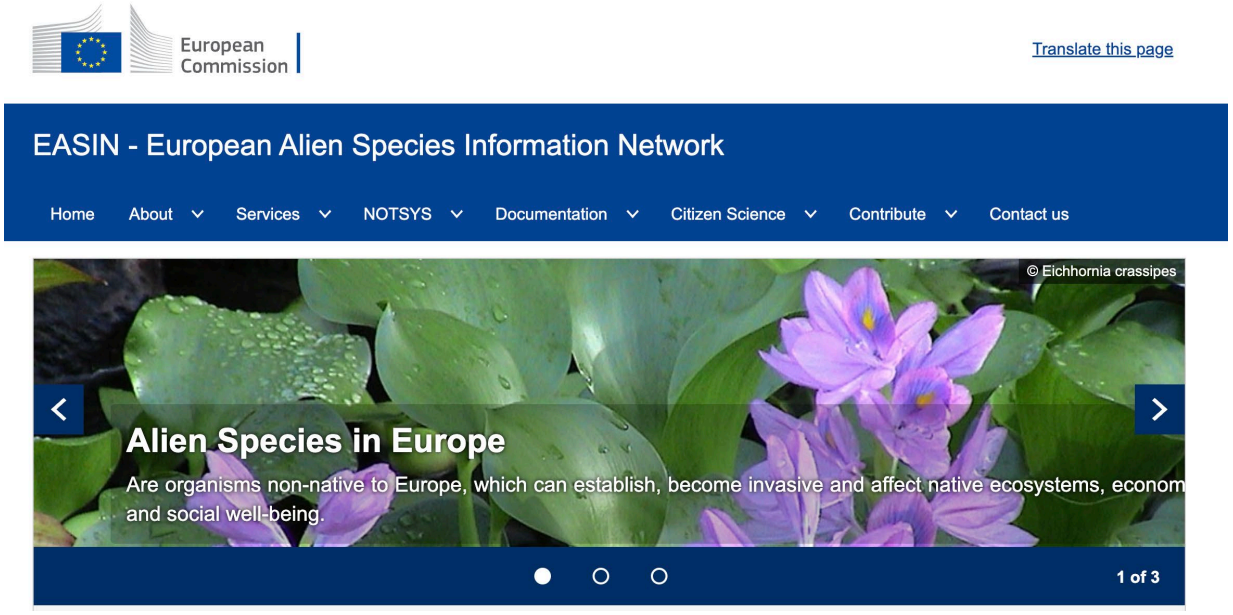
Key funding programmes:

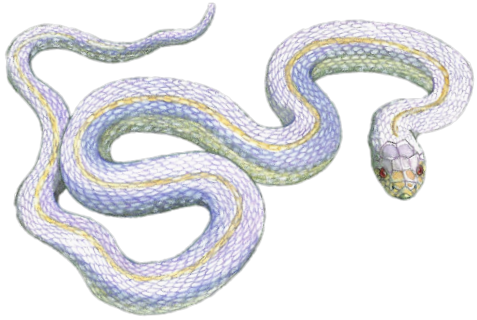
- LIFE programme
- Horizon Europe
- Rural Development programme and Cohesion funds
- INTERREG funding

- National funding schemes
- GEF



EASIN



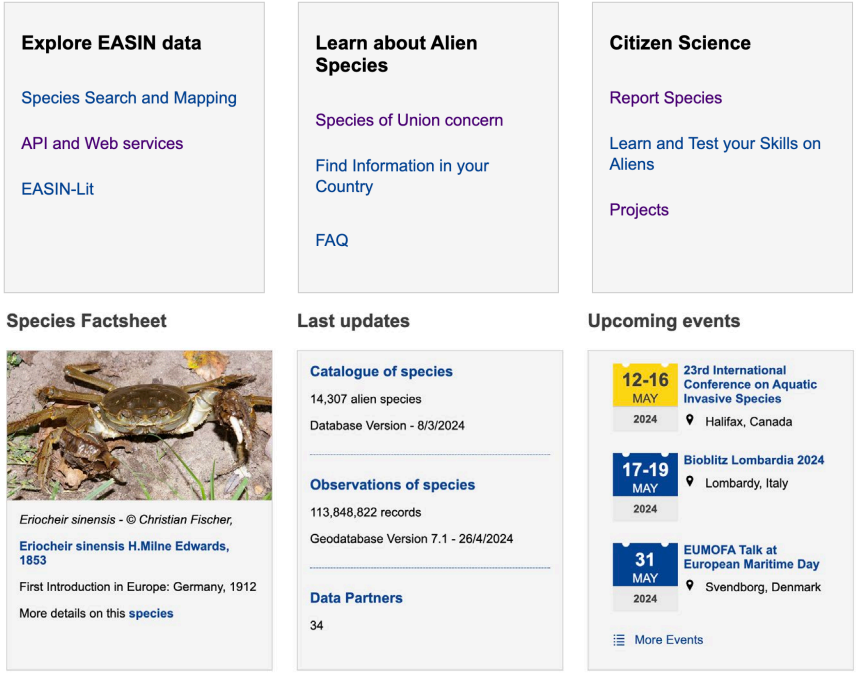


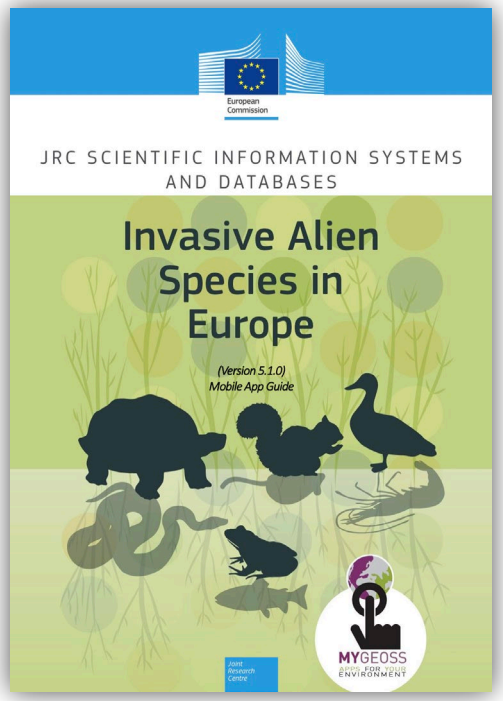
Amphibians and reptiles:

168 taxa

EASIN

Smartphone applications

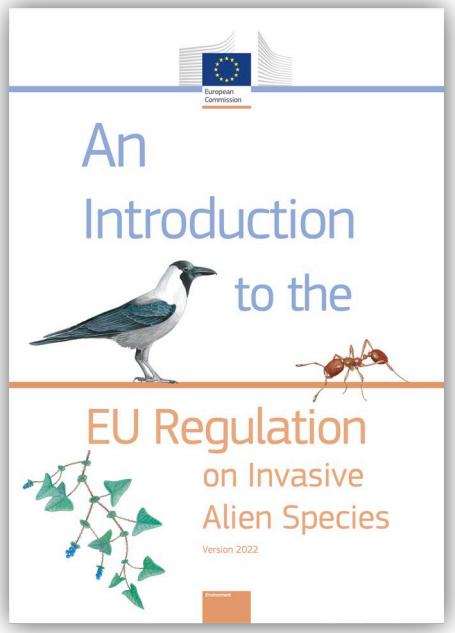




Other knowledge and information tools

Brochure

EU IAS Regulation



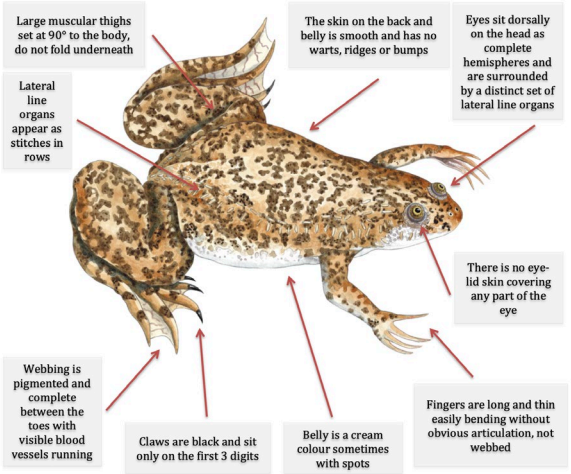
Other knowledge and information tools

Brochure

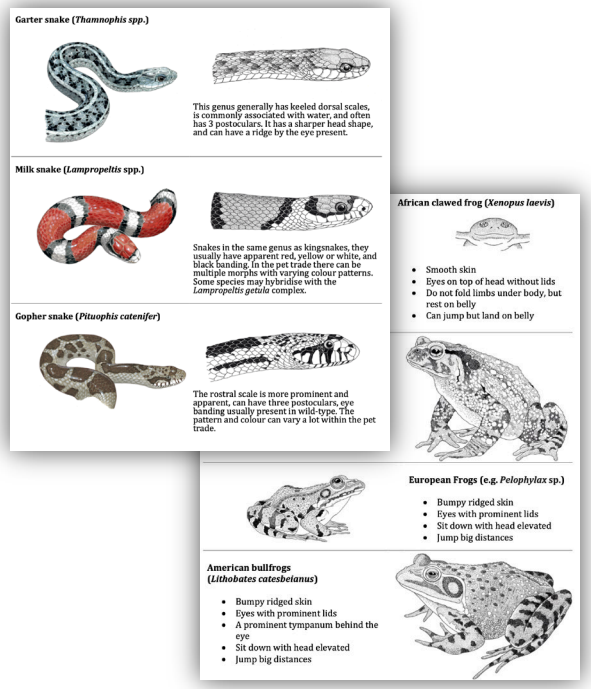
Invasive Alien Species of Union concern

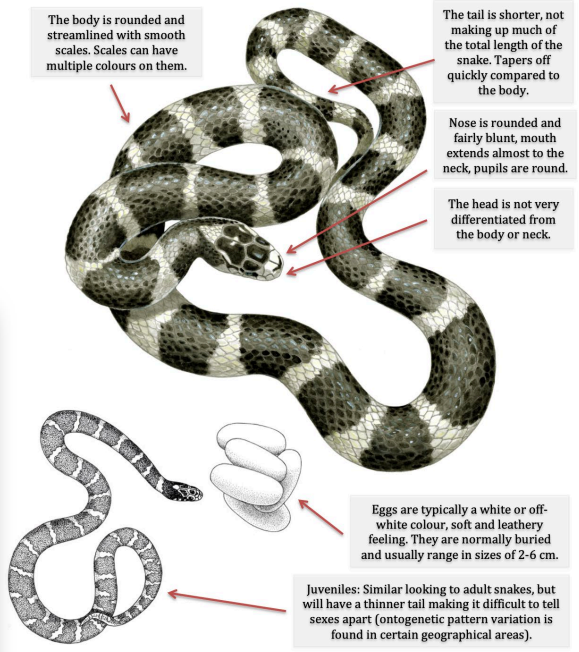
- 41 plants
- 47 animals

Learning tools: ID guides



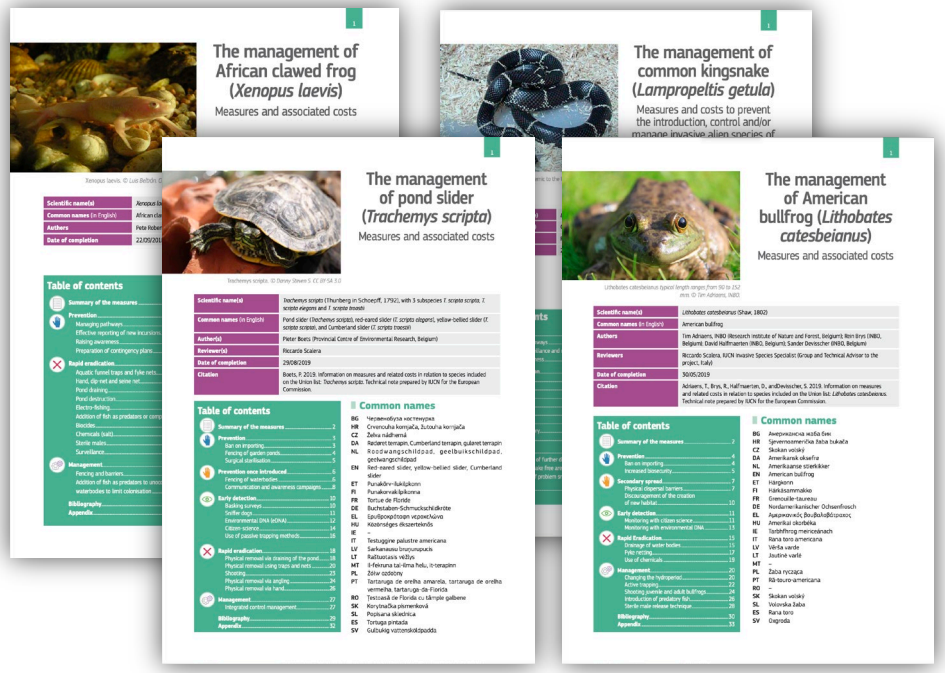
Xenopus laevis





Lampropeltis getula

Management notes



Management notes

INVASIVE ALIEN SNAKES 1

Invasive alien snakes

Information on measures and related costs in relation to species considered for inclusion on the Union list

California kingsnake. © Julien C. Piquet.

Scientific name(s)	*N.a.*
Common names (in English)	Invasive alien snakes
Author(s)	Riccardo Scalera and Tim Adriaens
Reviewer(s)	Chloi Adampoulou, Miguel A. Carretero, Víctor Colomar, Josh Fisher, Robert Fisher, Ramón Gallo-Barneto, Patricia Hernández, Mary Jo Mazurek, Hubert Laufer, Sigrid Lenz, Marta L. Darias, Sofía L. Plaza, Alicia M. Alonso, John Measey, Gianpaolo Montinaro, Julien C. Piquet, Shane R. Siers, McKayla Spencer, Richard Struijk, Rémon ter Harmsel, Sylvain Ursenbacher, Loïc van Doorn, Joseph Wasilewski, Katie E. Costello, Ana Nunes, Jose L. Postigo
Illustrations	Massimiliano Lipperi, Studio Wildart (*Reproduction is authorized provided the source is acknowledged*)
Date of completion	02/10/2023

Table of contents

This note aims at introducing the reader to the main methods, strategies and tools for alien snake management developed worldwide, yet it is not intended to be an exhaustive survey of all the literature on the topic. It builds on a previous note on the management of Lampropeltis getula (Robertson et al., 2017a).

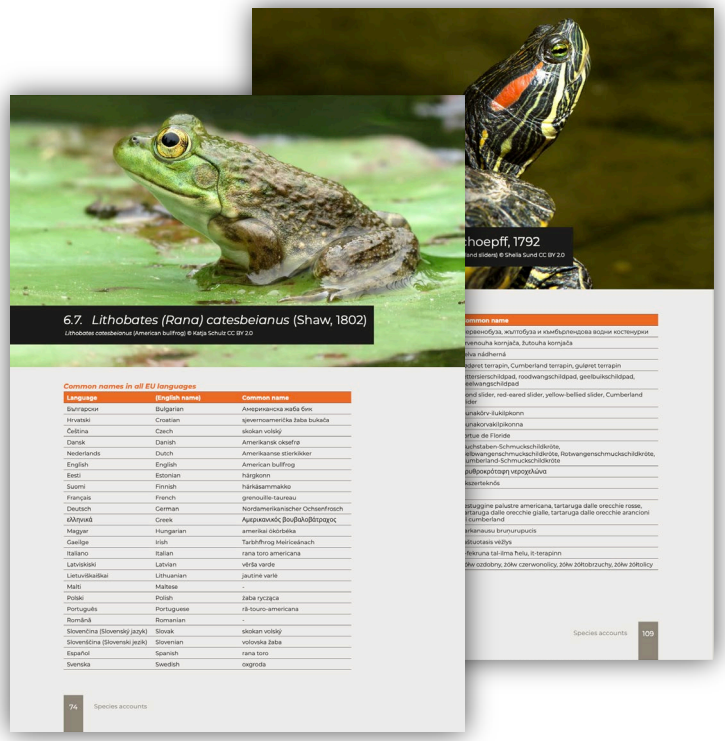
Organisation of dedicated workshops

Session 1: Welcome, introductions and EU Invasive Alien Species Regulations

Session 2: Presentations on management of invasive alien snakes

Session 3: Round table on the management note on invasive alien snakes

EC humane management of IAS



Consortium lead:

Consortium partners:

Service contract for the European Commission

Duration: 3 years
Start date: 07/10/2019
End date: 06/10/2022
Budget: 500,000 EUR

EC humane management of IAS

32 measures, 8 categories

Biological control

Habitat manipulation

Hand removal

Poisoning or toxicants

Shooting

Trapping

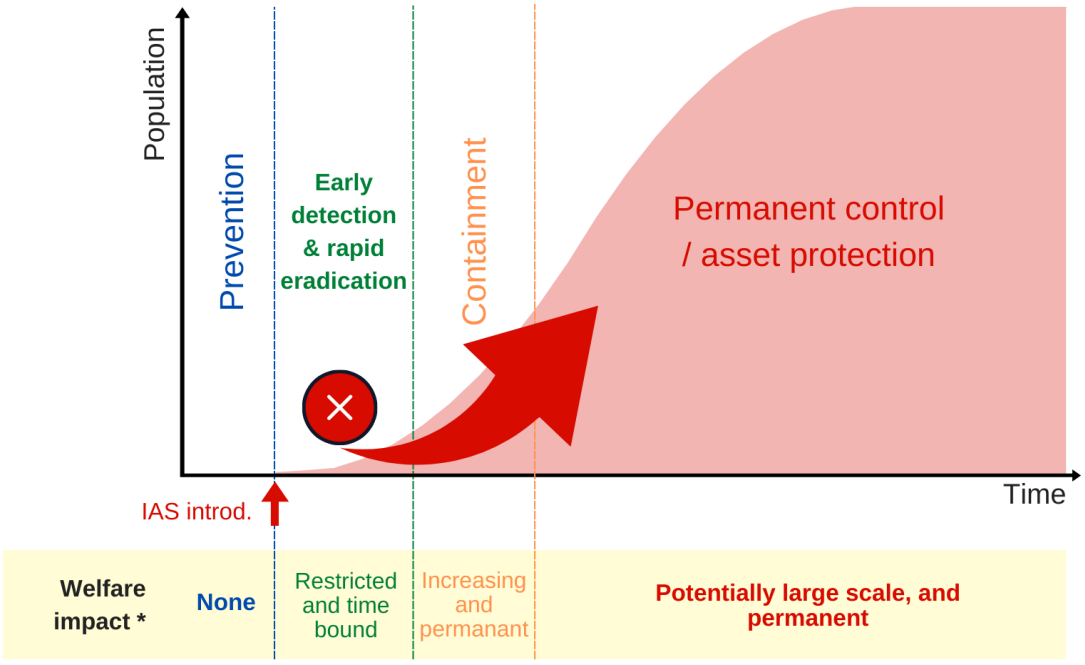
Other

Restrain, capture and/or remove (incl. kill/sterilise) in the field

Remove once captured

Remove (incl. dispatch/ sterilise/ captivity) an individual once captured

EC humane management of IAS



* Number of individuals affected, dependant upon measure used

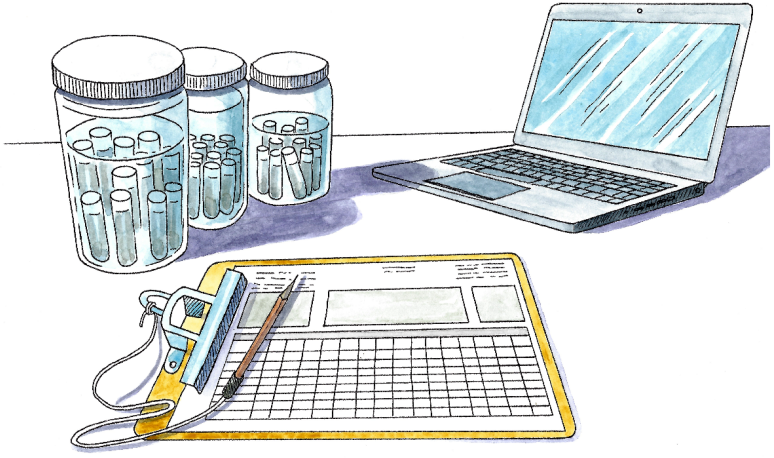
Article 19. Management *"When applying management measures …Member States shall… ensure that when animals targeted, they are spared any avoidable pain, distress or suffering without compromising the effectiveness of the management measures.*

Key tools and resources

- European Commission, DG Environment, Invasive alien species
  https://environment.ec.europa.eu/topics/nature-and-biodiversity/invasive-alien-species_en

- EASIN - European Alien Species Information Network
  https://easin.jrc.ec.europa.eu/easin/

- IUCN, Invasive Alien Species
  https://www.iucn.org/our-work/topic/invasive-alien-species



Specific points for discussion

- Availability of effective management measures and of documented evidence on effectiveness
- Availability and accessibility of data on management actions in general
- Innovative techniques
- Side effects of management measures (environmental, social and economic)
- Obstacles, including conflicting legislation (e.g. regarding the use of chemicals, and euthanasia), access to private lands, species protection.
- Acceptability of management measures by stakeholders, particularly in relation to animal welfare considerations (but also in relation to denialism towards the problem of IAS in general)
- Scale of application, efforts required, resources required (including cost information)

General points for discussion

- What action is needed the most to improve effectiveness of management measures for invasive alien species of amphibians and reptiles?
- What are the biggest obstacles to implementing effective management measures for invasive alien species of amphibians and reptiles in your country?
- Which initiatives would you like to see on European level?
- What tools would be mostly needed (e.g. toolkits, workshops, training, webinars, platforms for networking…)