LIFE13 BIO/IT/000204

Invasive Alien Species:
Impacts and Management Strategies at the International Level

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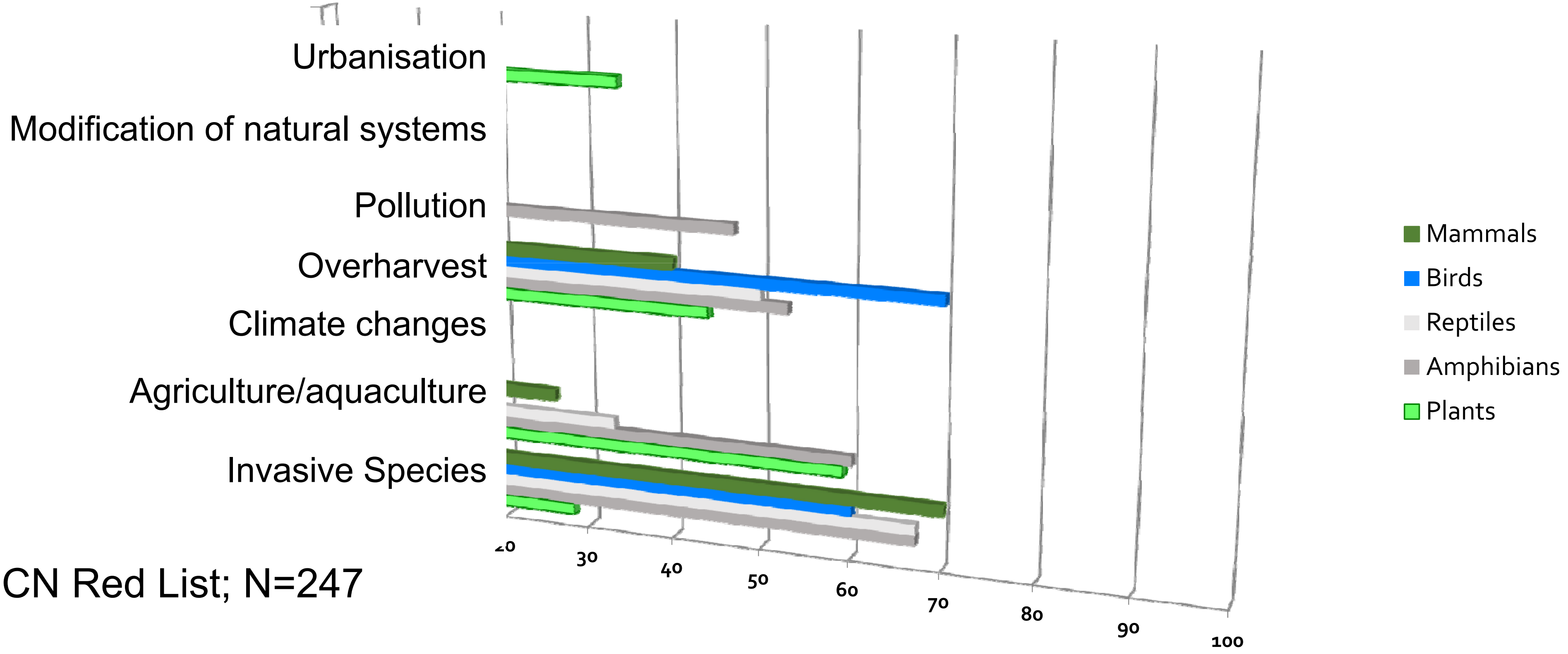
Istituto Superiore per la Protezione e la Ricerca Ambientale

Sistema Nazionale per la Protezione dell'Ambiente

MAJOR DRIVER OF BIODIVERSITY LOSS

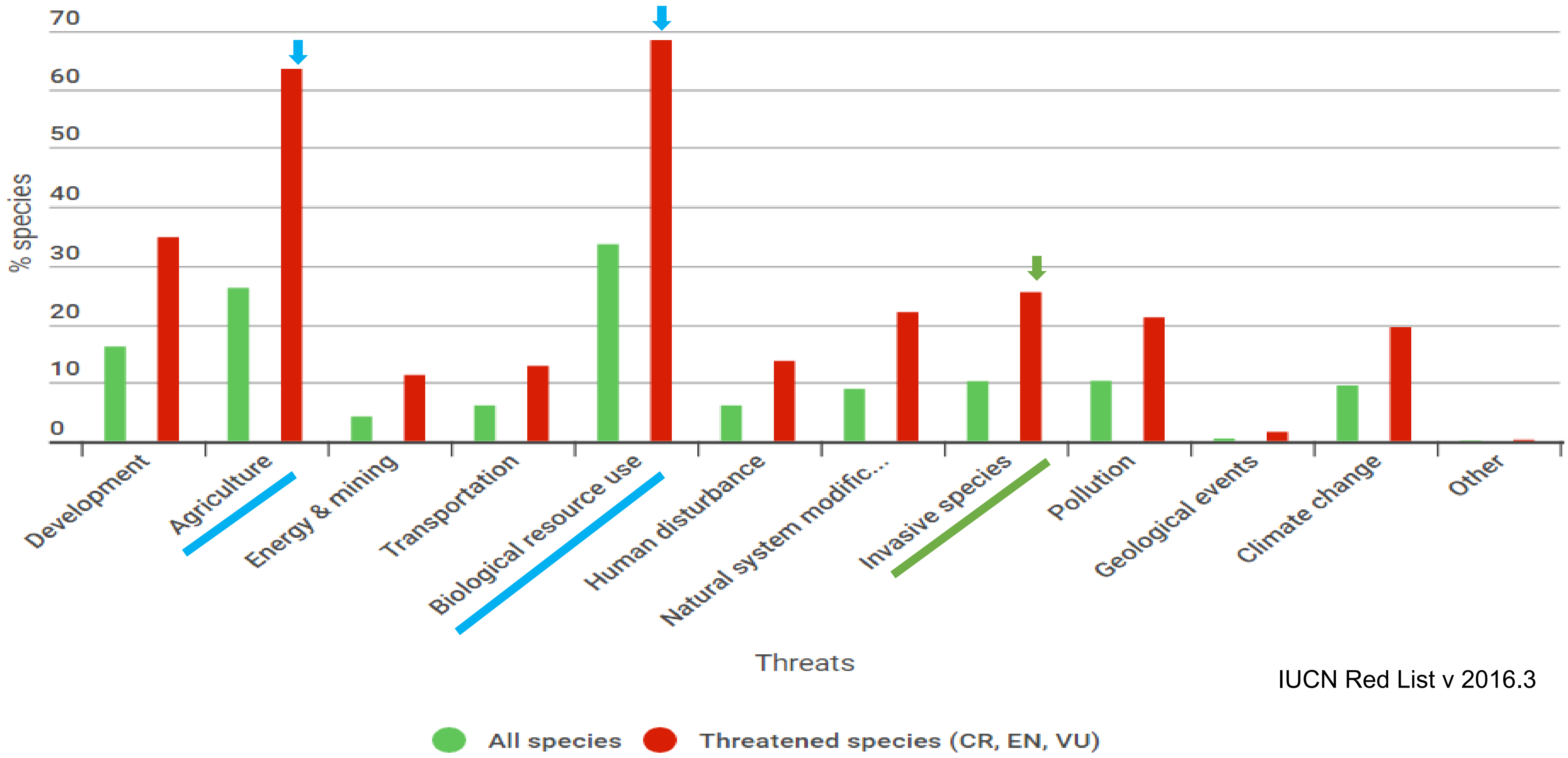
Causes of extinctions globally



Source: IUCN Red List; N=247

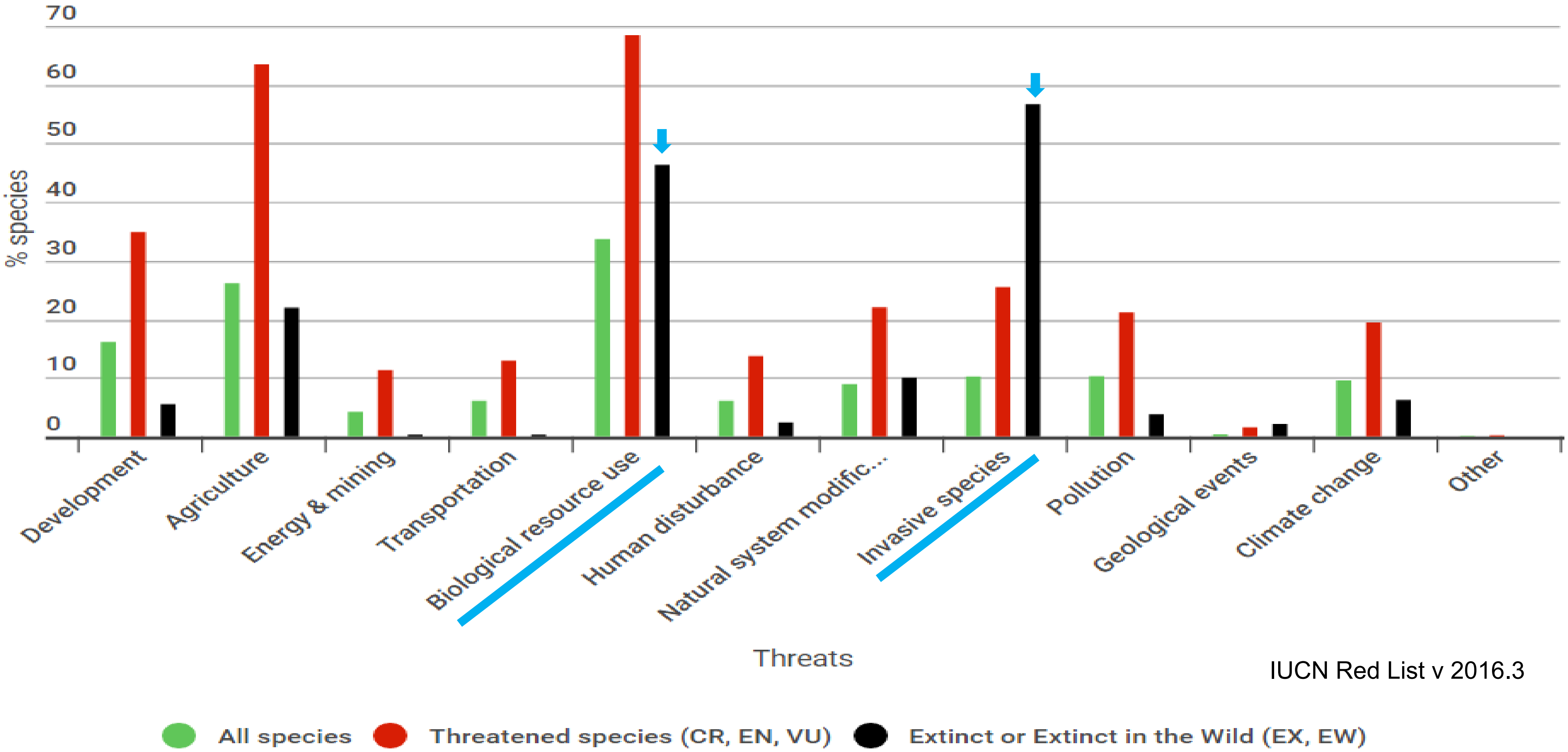
Bellard et al. 2016. Biol. Lett.

Comprehensively assessed groups
(>150 spp)



IUCN Red List v 2016.3

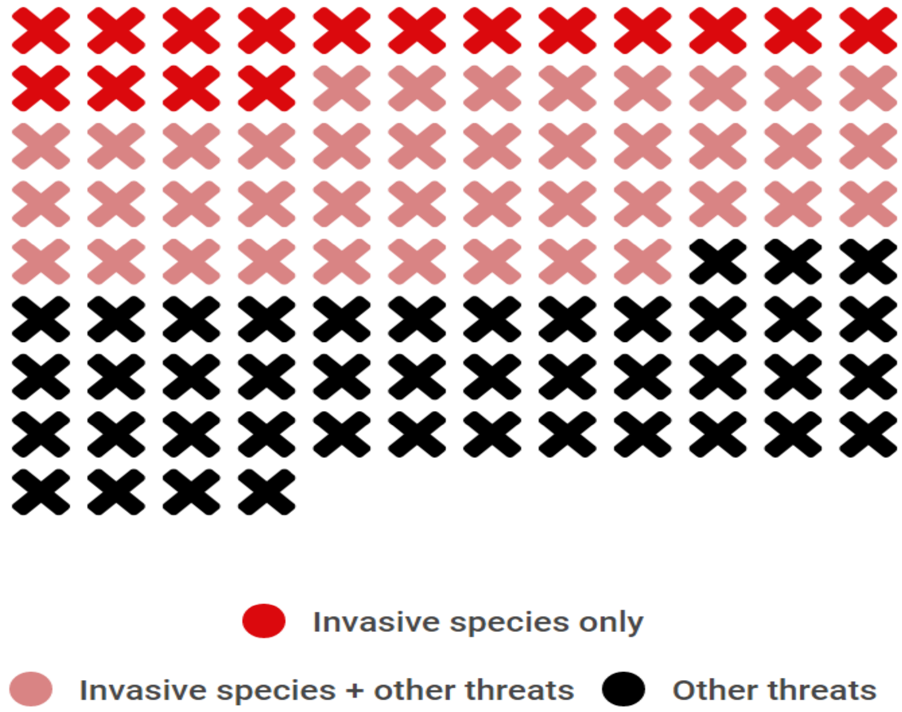
Comprehensively assessed groups (>150 spp)



IUCN Red List v 2016.3

Comprehensively assessed groups
(>150 spp)

16.2% of extinctions are driven by **invasive alien species** ONLY



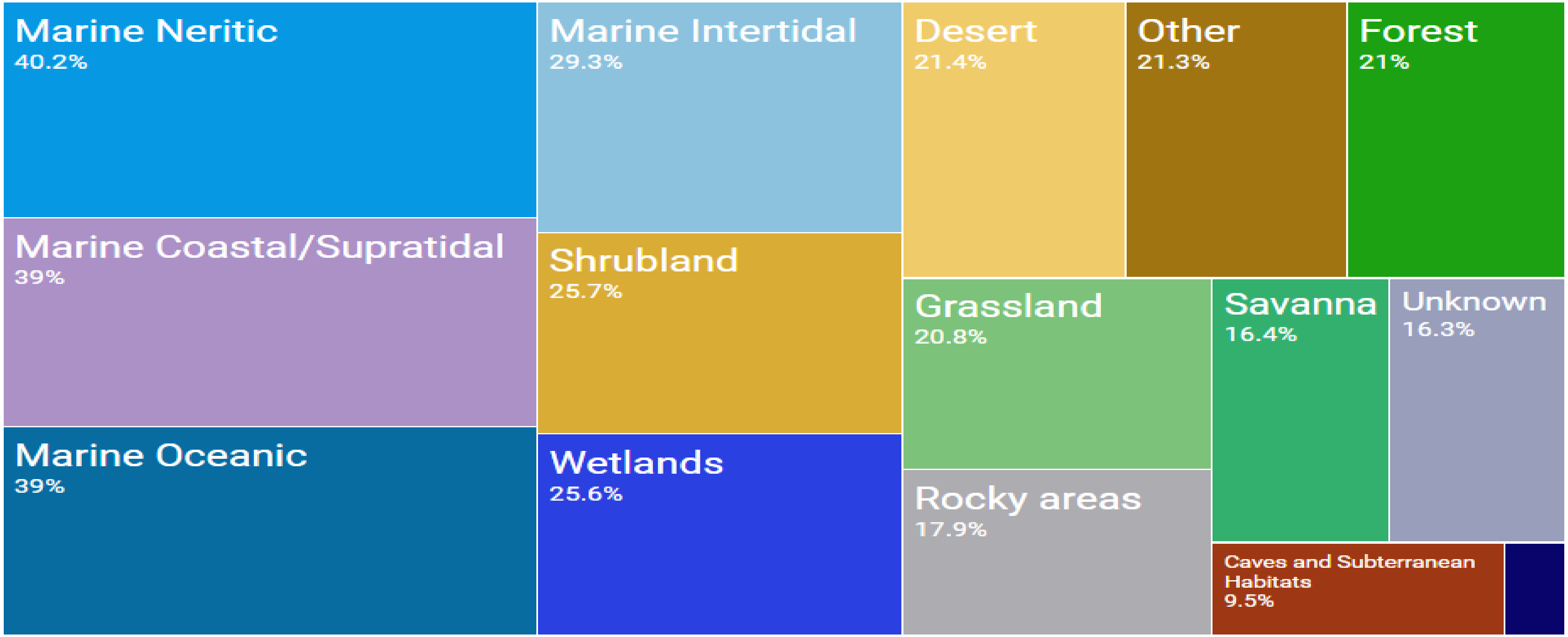
40.5% of extinctions are driven by **invasive alien species + other threats**

43% of extinctions are driven by **other threats**

IUCN Red List v 2016.3

HABITATS

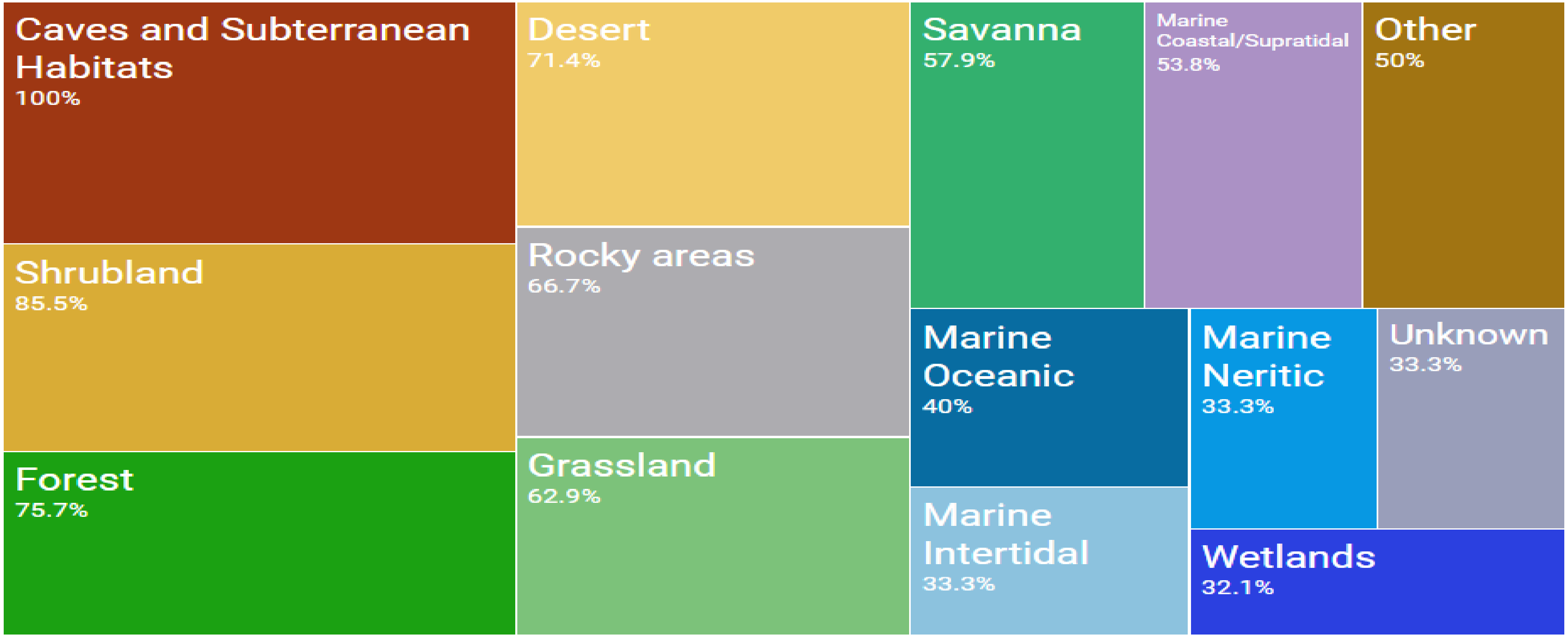
% of **threatened** species impacted by **invasive alien species** by habitat:



IUCN Red List v 2016.3

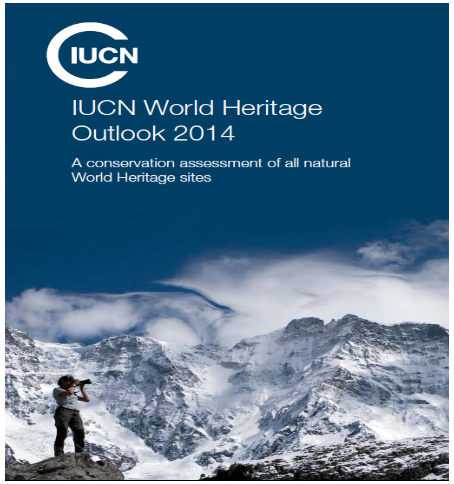
HABITATS

% of EX/EW species impacted by invasive alien species by habitat:



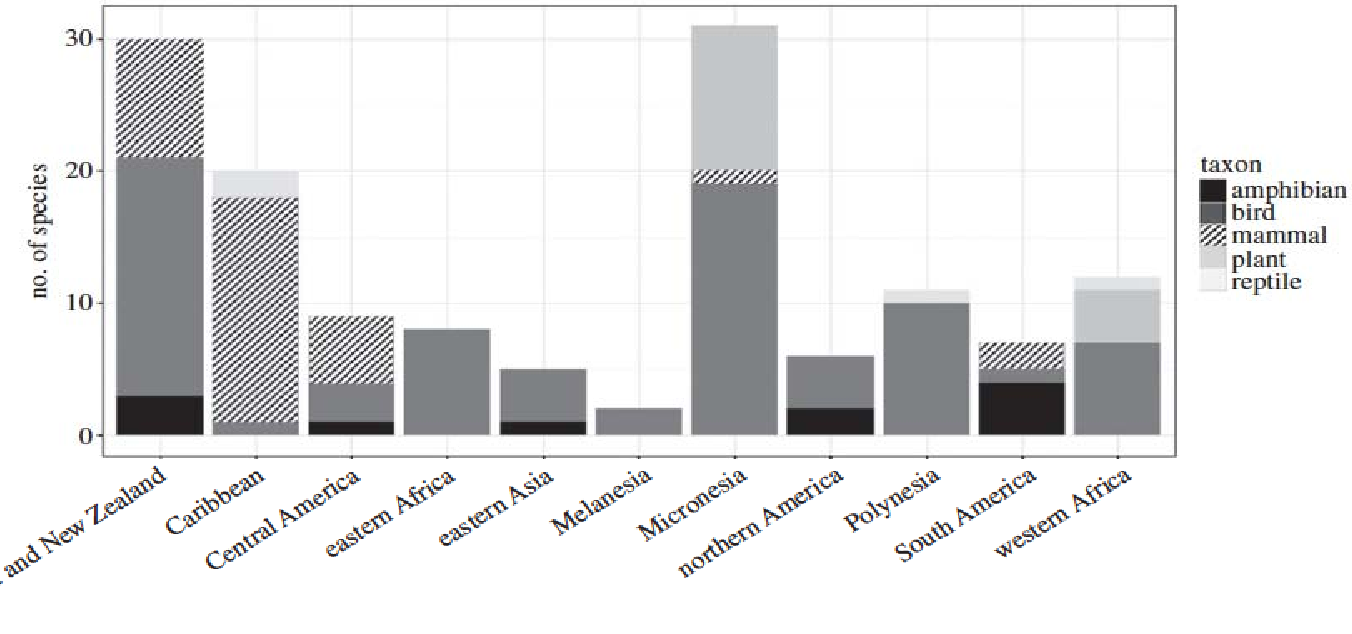
IUCN Red List v 2016.3

THREATENING GLOBAL PROTECTED AREAS



Current threats affecting WH sites (number of sites)

ISLANDS



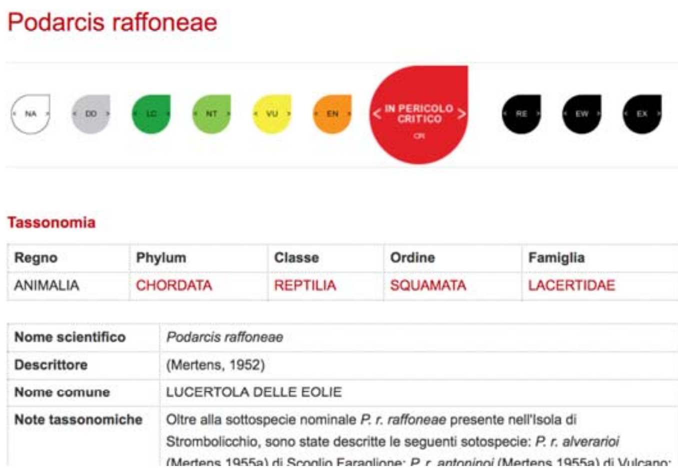
Source: IUCN Red List; N=134

Bellard et al. 2016. Biol. Lett.

- Islands occupy ~5.5% of the globe but contain >15% of terrestrial species, 61% of all recently extinct species, and 37% of all critically endangered species.

IMPACT ON SPECIES

- Aeolian wall lizard, *Podarcis raffonei*
- 5 small populations; latest data suggest that the largest population decreased by 80% in a few years, due to hybridisation with the Sicilian wall lizard,



Podarcis raffoneae

Tassonomia

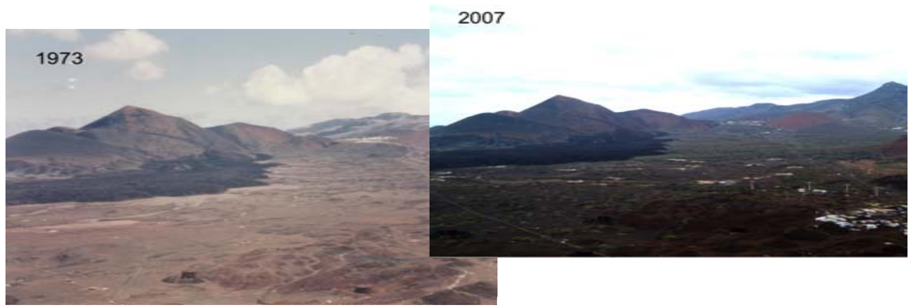
Regno	Phylum	Classe	Ordine	Famiglia
ANIMALIA	CHORDATA	REPTILIA	SQUAMATA	LACERTIDAE

Nome scientifico	*Podarcis raffoneae*
Descrittore	(Mertens, 1952)
Nome comune	LUCERTOLA DELLE EOLIE
Note tassonomiche	Oltre alla sottospecie nominale *P. r. raffoneae* presente nell'Isola di Strombolicchio, sono state descritte le seguenti sotospecie: *P. r. alverarioi* (Mertens 1955a) di Scoglio Faraglione; *P. r. antoninoi* (Mertens 1955a) di Vulcano;

IMPACT ON ECOSYSTEMS AND LIVELIHOOD

- Beaver introduced in Tierra del Fuego, established in over 7 Mln hectares

- *Prosopis* invading large areas of Africa, limiting access to land



- Water hyacinth impacting access to water and transport, and spreading malaria

AFFECT OUR HEALTH


Ethology Ecology & Evolution, 2013
http://dx.doi.org/10.1080/03949370.2013.863225

Biological invaders are threats to human health: an overview

G. Mazza [1,3], E. Tricarico [1], P. Genovesi [2] and F. Gherardi [1]

[1] Dipartimento di Biologia, Università degli Studi di Firenze, Via Romana 17, 50125 Firenze, Italy
[2] ISPRA – Istituto Superiore per la Protezione e la Ricerca Ambientale, and Chair IUCN SSC Invasive Species Specialist Group, Via Vitaliano Brancati 44, 00144 Roma, Italy

- More than 100 known cases of invasive species with effects on health
- Pathogens, parasites, vectors of pathogens, producing toxins, allergenic, direct attacks or bites, indirect effects on other invasive species with impact on health, etc.

AFFECT OUR HEALTH

Tiger mosquito

- transmits 20 pathogens, including Dengue, West Nile, Chikungunia

RISCHIO INFEZIONI

Anzio, registrati casi di Chikungunya: stop alle donazioni di sangue

È una malattia virale acuta, tropicale, trasmessa attraverso la puntura della zanzara tigre infetta. Si manifesta con sintomi simili a quelli dell'influenza. Il divieto vale per 28 giorni per chi è stato nel Comune del litorale romano

di Redazione Roma

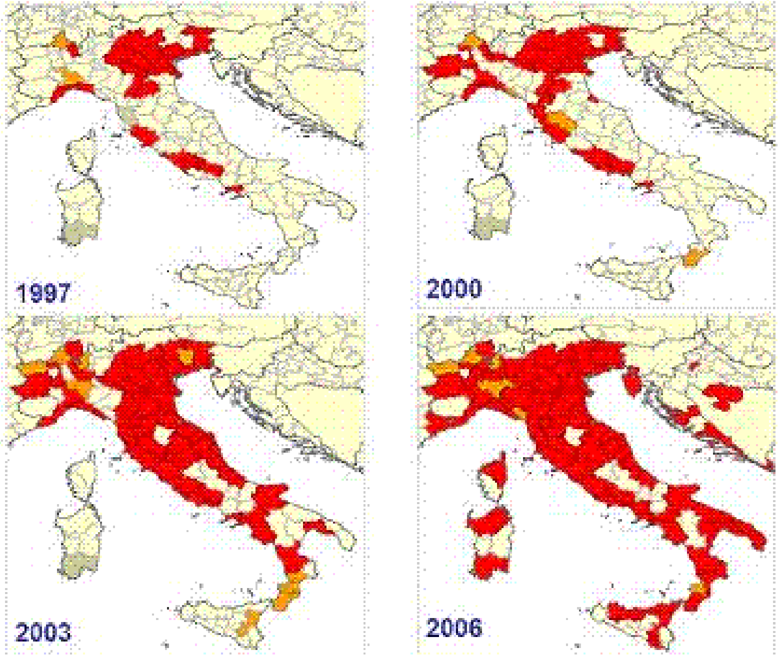


Fig. 1 - Diffusione della zanzara tigre in Italia

CAUSE HUGE ECONOMIC LOSSES

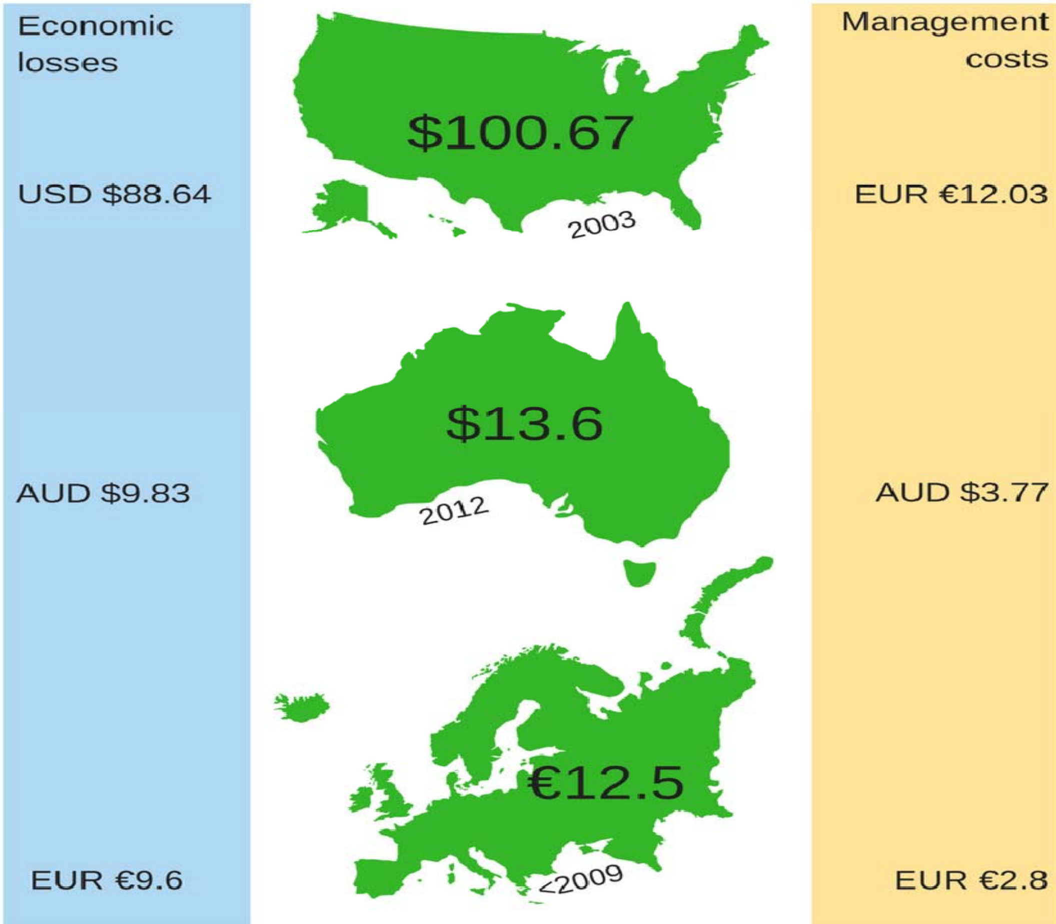
Europe

- € Eradication/control
- € Damage to infrastructure
- € Damage to agriculture and forestry
- € Fishing
- € Human health
- € Research, prevention, monitoring, etc

> € 12.5 billions/year; probably > 20b

Kettunen, Genovesi, et al. 2008. Report for European Commission. IEEP

Economic costs of IAS (billions)



Hoffmann & Broadhurst. 2016. Neobiota
Kettunen, Genovesi et al. 2008. IEEP

CAUSE HUGE ECONOMIC LOSSES

- analysis of almost 1,300 known invasive insect pests and pathogens; total potential cost of these species invading each of 124 countries of the world

PNAS

CrossMark

Global threat to agriculture from invasive species

Dean R. Paini[a,b,1], Andy W. Sheppard[a], David C. Cook[c,d], Paul J. De Barro[e], Susan P. Worner[f], and Matthew B. Thomas[g,h]

[a]Commonwealth Scientific and Industrial Research Organization, Canberra, ACT 2601, Australia; [b]Plant Biosecurity Cooperative Research Centre, Bruce, ACT 2617, Australia; [c]Department of Agriculture and Food, Western Australia, Bunbury, WA 6230, Australia; [d]School of Agricultural and Resource Economics, The University of Western Australia, Crawley, WA 6009, Australia; [e]Commonwealth Scientific and Industrial Research Organization, Brisbane, QLD 4001, Australia; [f]Bio-Protection Research Centre, Lincoln University, Lincoln 7647, New Zealand; [g]Department of Entomology, Penn State University, State College, PA 16802; and [h]Center for Infectious Disease Dynamics, Penn State University, State College, PA 16802

Edited by Harold A. Mooney, Stanford University, Stanford, CA, and approved April 28, 2016 (received for review February 13, 2016)

Invasive species present significant threats to global agriculture, although how the magnitude and distribution of the threats vary between countries and regions remains unclear. Here, we present an analysis of almost 1,300 known invasive insect pests and pathogens, calculating the total potential cost of these species invading each of 124 countries of the world, as well as determining which countries present the greatest threat to the rest of the world given their trading

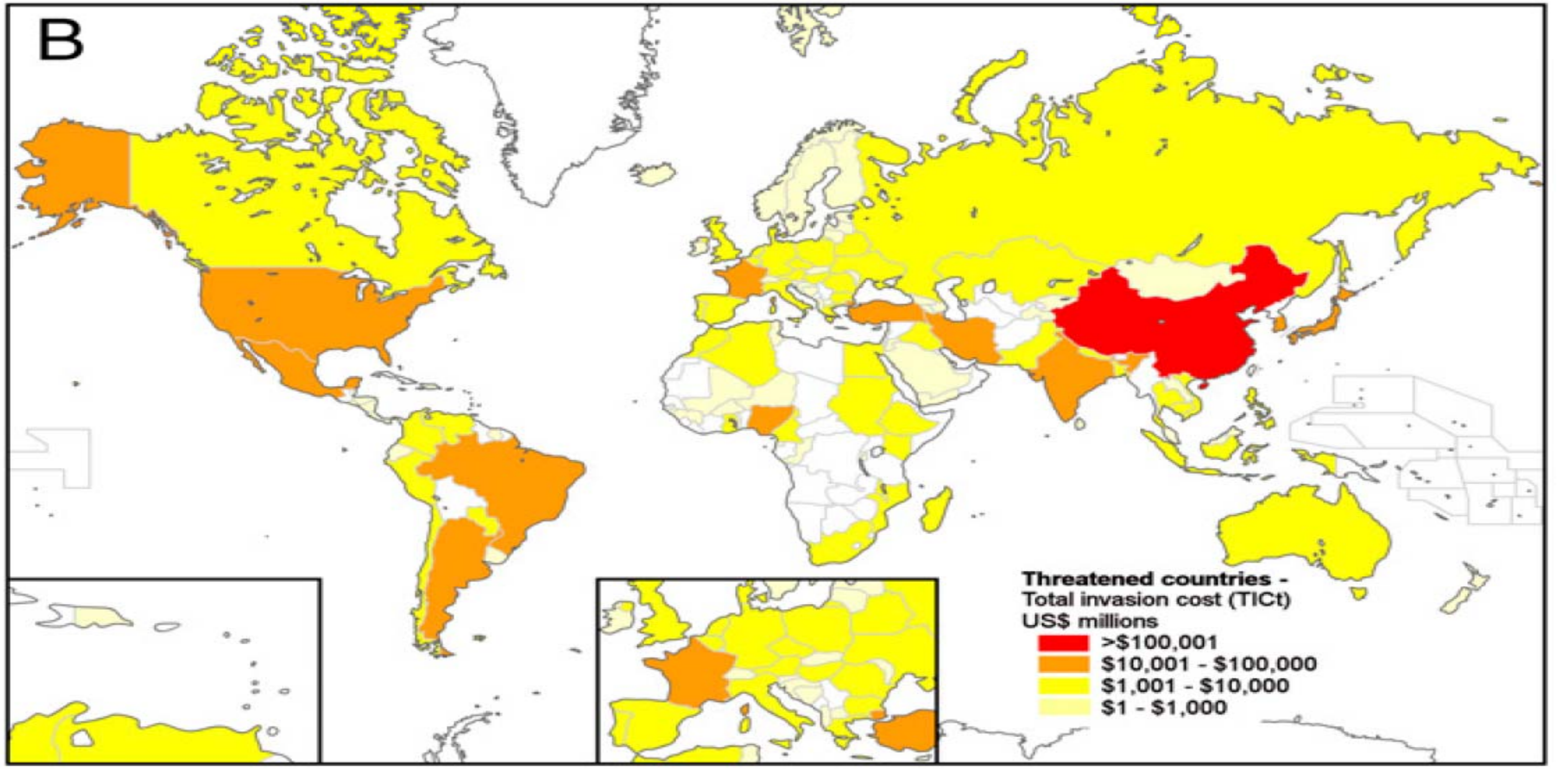
of each country's annual mean (2000–2009) importation (in millions of US dollars) from each trading partner as a proportion of total imports from all trading partners (17) as a proxy for species arrival likelihood. For establishment likelihood, we analyzed the worldwide distribution of the almost 1,300 insect pests and fungal pathogens (18) using a self-organizing map (SOM), which analyses pest assemblages and pest associations to generate establishment

Threat to agriculture – future invasion cost

<u>Total</u> potential cost to agriculture of IAS globally

Paini et al. 2016. PNAS
Kew. 2017. State of the Worlds Plants

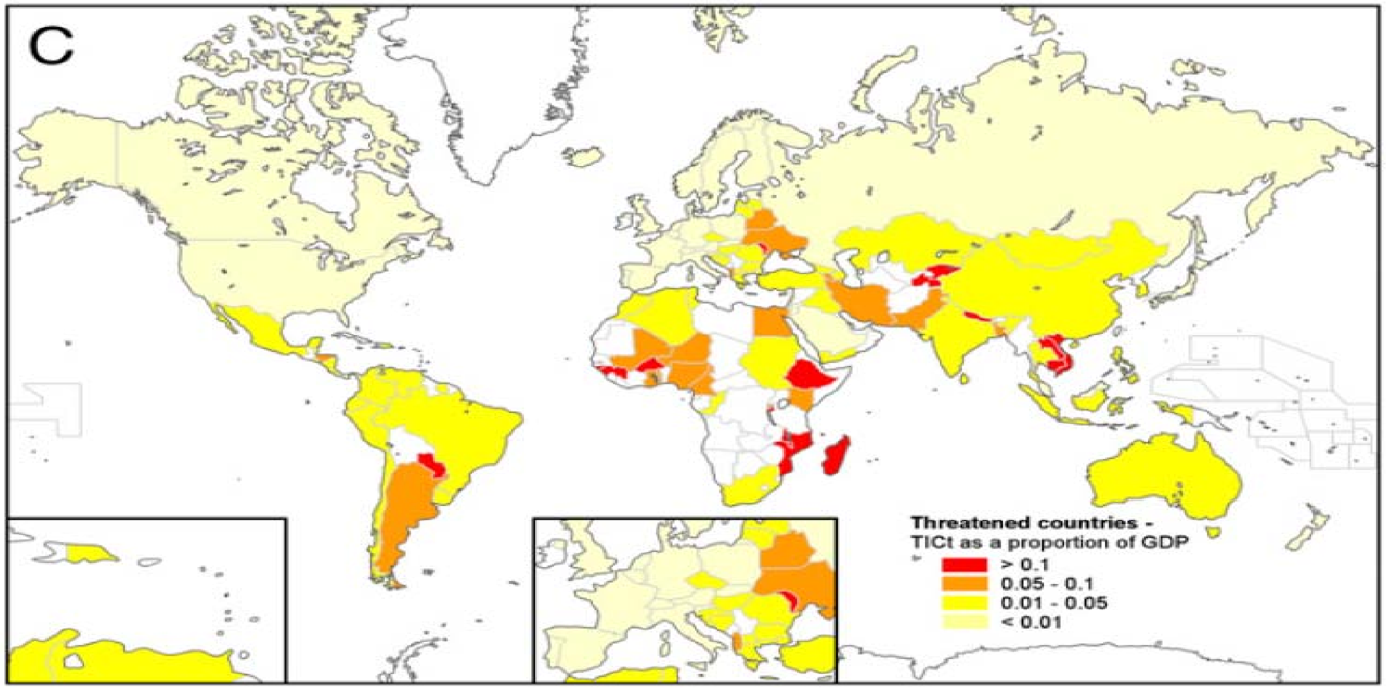
Threat to agriculture – future invasion cost



Total potential cost to agriculture of IAS by country

Paini et al. 2016. PNAS

Threat to agriculture – future invasion cost



Total potential cost of IAS to agriculture as % of GDP

Paini et al. 2016. PNAS

PROTECTING BIODIVERSITY SAFEGUARDS LIVELIHOOD

REVIEWS REVIEWS REVIEWS 135

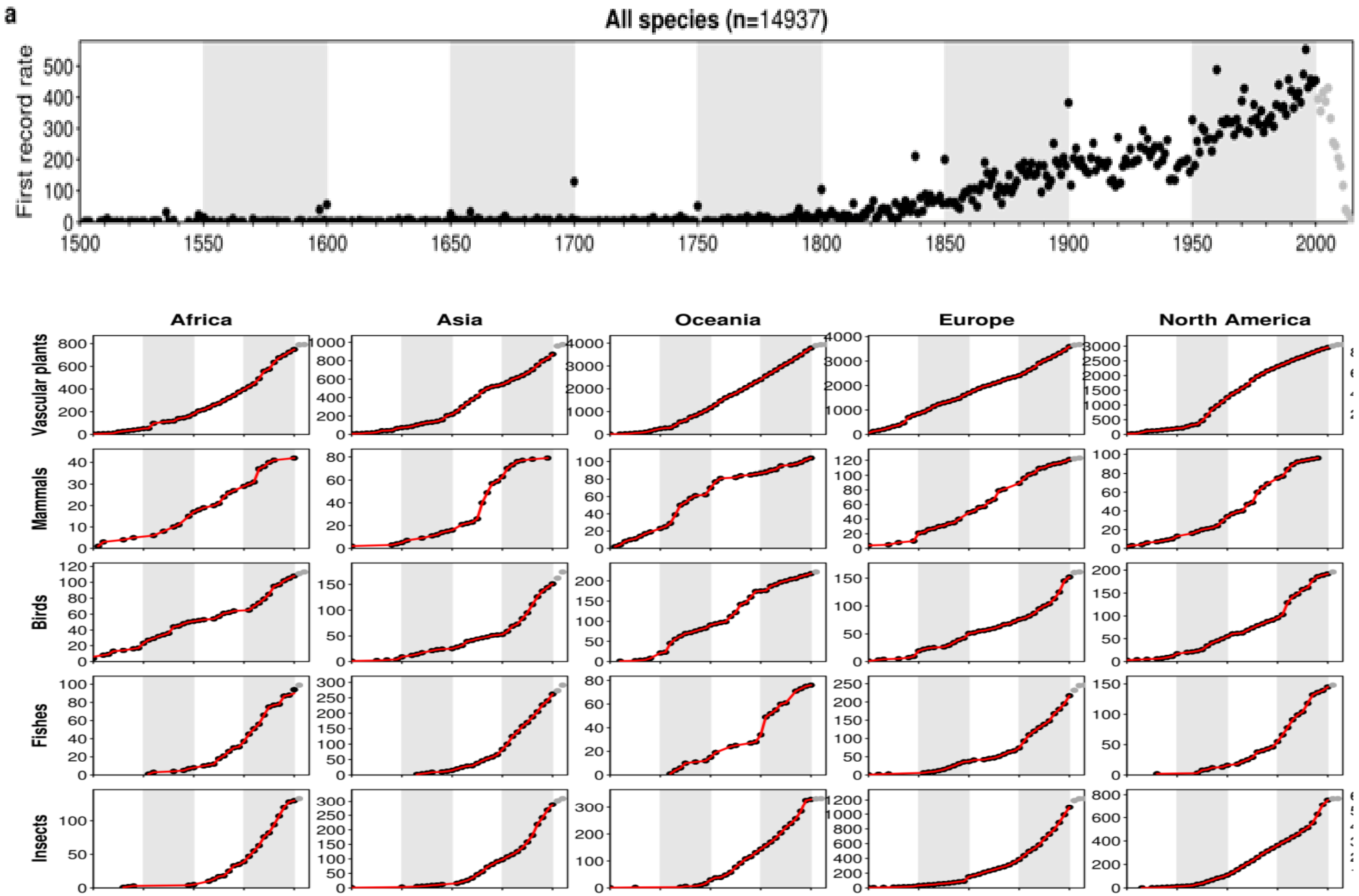
How well do we understand the impacts of alien species on ecosystem services? A pan-European, cross-taxa assessment

Montserrat Vilà[1*], Corina Basnou[2], Petr Pyšek[3], Melanie Josefsson[4], Piero Genovesi[5], Stephan Gollasch[6], Wolfgang Nentwig[7], Sergej Olenin[8], Alain Roques[9], David Roy[10], Philip E Hulme[11], and DAISIE partners[12]

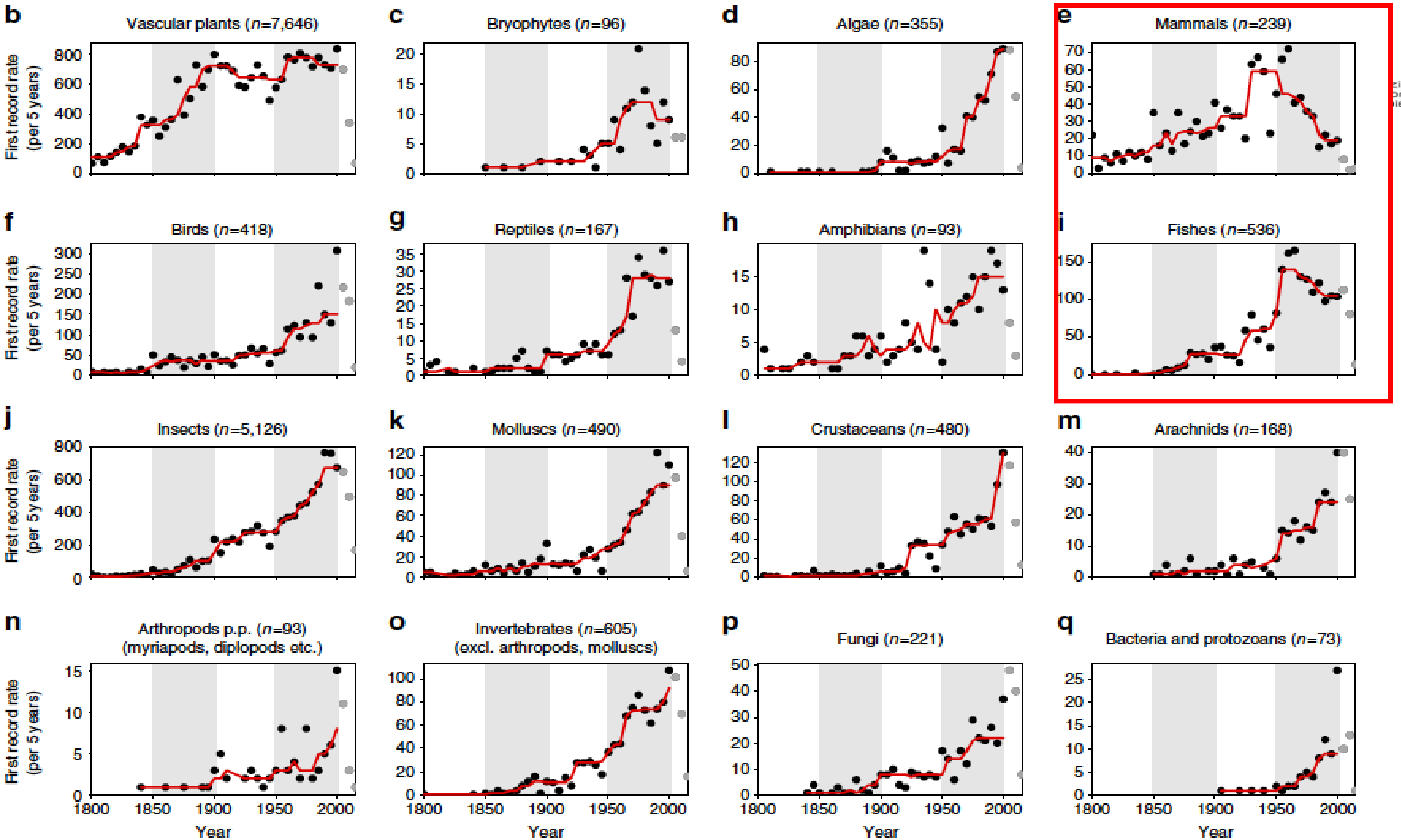
	Total	Ecological impacts		Economic impacts	
Aquatic marine	1076	134	12.45%	114	10.59%
Aquatic inland	486	139	28.60%	107	22.02%
Birds	172	46	26.74%	78	45.35%
Terrestrial invertebrates	584	126	21.58%	180	30.82%
Terrestrial mammals	112	55	49.11%	67	59.82%
Terrestrial plants	6135	841	13.71%	745	12.14%

No saturation

- Annual rate of first records worldwide
  is still increasing, both in mainland
  and on islands



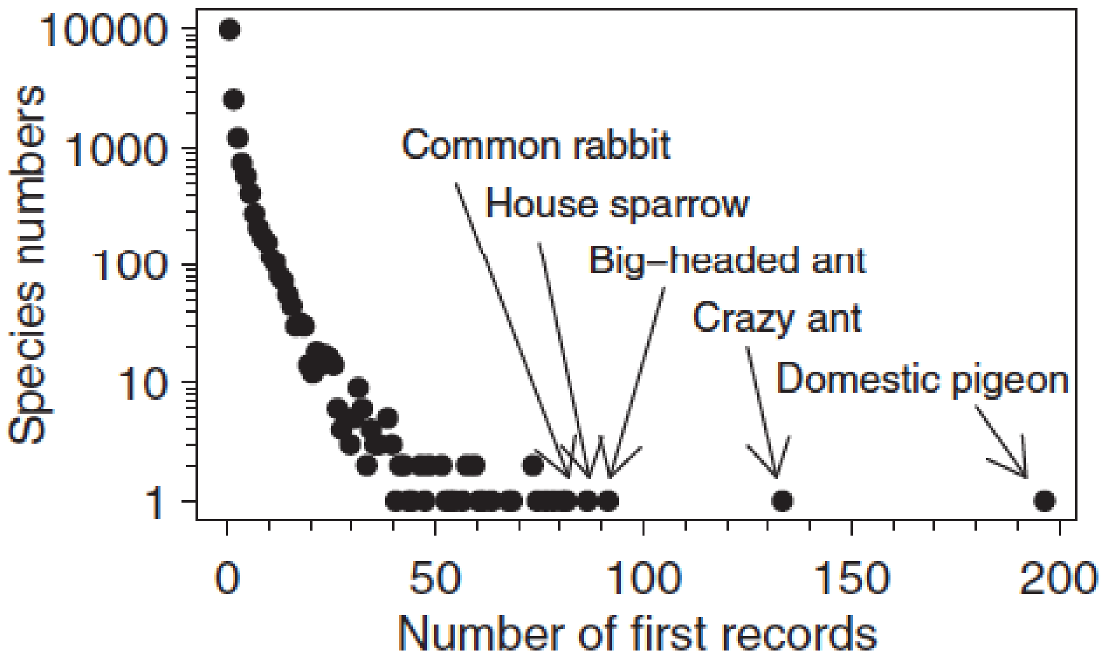
Seebens H, Blackburn TM, Dyer E, Genovesi P et al. (2017). Nature Comm. 1–9.



b
Vascular plants (n=7,646)
c
Bryophytes (n=96)
d
Algae (n=355)
e
Mammals (n=239)
f
Birds (n=418)
g
Reptiles (n=167)
h
Amphibians (n=93)
i
Fishes (n=536)
j
Insects (n=5,126)
k
Molluscs (n=490)
l
Crustaceans (n=480)
m
Arachnids (n=168)
n
Arthropods p.p. (n=93)
(myriapods, diplopods etc.)
o
Invertebrates (n=605)
(excl. arthropods, molluscs)
p
Fungi (n=221)
q
Bacteria and protozoans (n=73)
First record rate
(per 5 years)
1800
1850
1900
1950
2000
Year

How many potential invaders?

- First records in new areas



Seebens H, Blackburn TM, Dyer E, Genovesi P et al. (2018). PNAS. 115, 10

Metric	Birds	Crustaceans	Fishes	Insects	Mammals	Molluscs	Other invertebrates	Vascular plants
Estimated candidate species pool	625	1,565	1,354	20,611	499	1,289	3,268	26,048
No. of alien species in analysis	406	430	478	4,992	248	441	780	7,380
Percentage of established alien species, %	65	27	35	24	50	34	24	28
Reported total no. of alien species	971*	425[†]	944[‡]		445[§]	539[†,¶]		13,168[#]
Estimated true candidate species pool	1,494	1,574	2,697		890	1,585		47,029
Estimated total no. of native species on Earth[‖]	10,000	150,000	40,000		5,500	200,000		368,000
Percentage of potential alien species among all species worldwide, %	15	1	7		16	1		13

	15%	**1%**	**7%**		**16%**	**1%**		**13%**

Seebens H, Blackburn TM, Dyer E, Genovesi P et al. (2018). PNAS. 115, 10

SYNERGY WITH CLIMATE CHANGE

Increased impacts

- Europe, N America, Oceania
- Some taxonomic groups

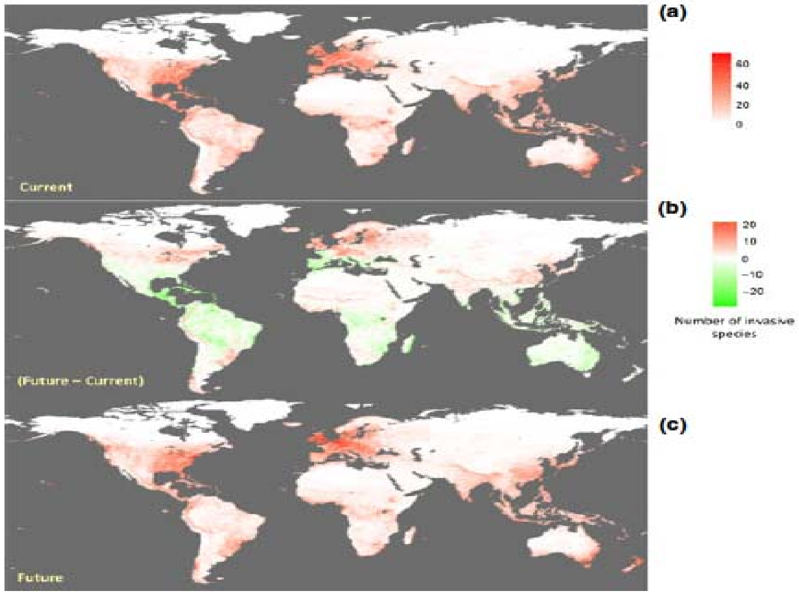
Global Change Biology

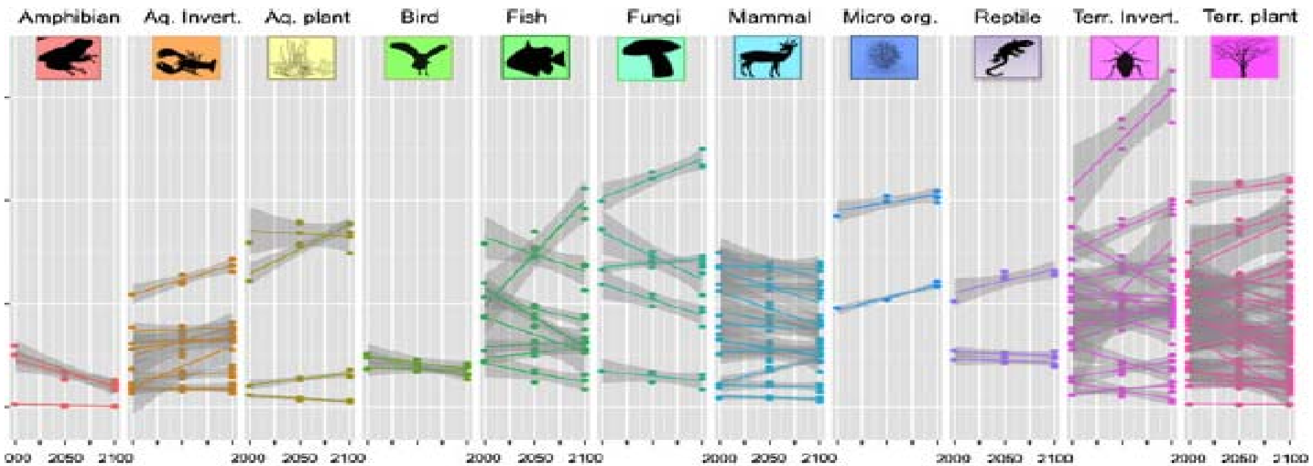
Global Change Biology (2013), doi: 10.1111/gcb.12344

Will climate change promote future invasions?

CELINE BELLARD*, WILFRIED THUILLER†, BORIS LEROY‡§, PIERO GENOVESI¶, MICHEL BAKKENES|| and FRANCK COURCHAMP*

*Ecologie, Systématique & Evolution, UMR CNRS 8079, Univ. Paris-Sud, Orsay Cedex FR-91405, France, †Laboratoire d'Ecologie Alpine, UMR CNRS 5553 Université Joseph Fourier, Grenoble 1 BP 53, Grenoble Cedex 9 FR-38041, France, ‡URUEM 420 Biodiversité et Gestion des Territoires, Université de Rennes 1, Campus de Beaulieu, Rennes Cedex 35042, France, §Service du Patrimoine Naturel, MNHN, Paris, France, ¶Institute for Environmental Protection and Research, Rome, Italy, ||Netherlands Environmental Assessment Agency (PBL), PO Box 303, Bilthoven 3720, The Netherlands





EMERGING CHALLENGES

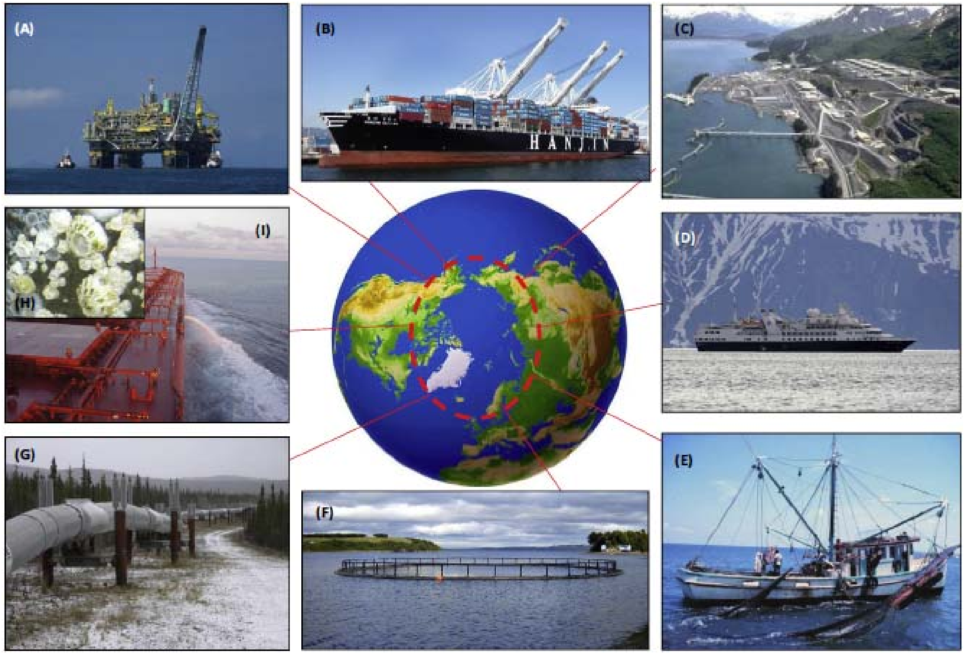
Trends in Ecology & Evolution

CellPress

Review

Invasion Science: A Horizon Scan of Emerging Challenges and Opportunities

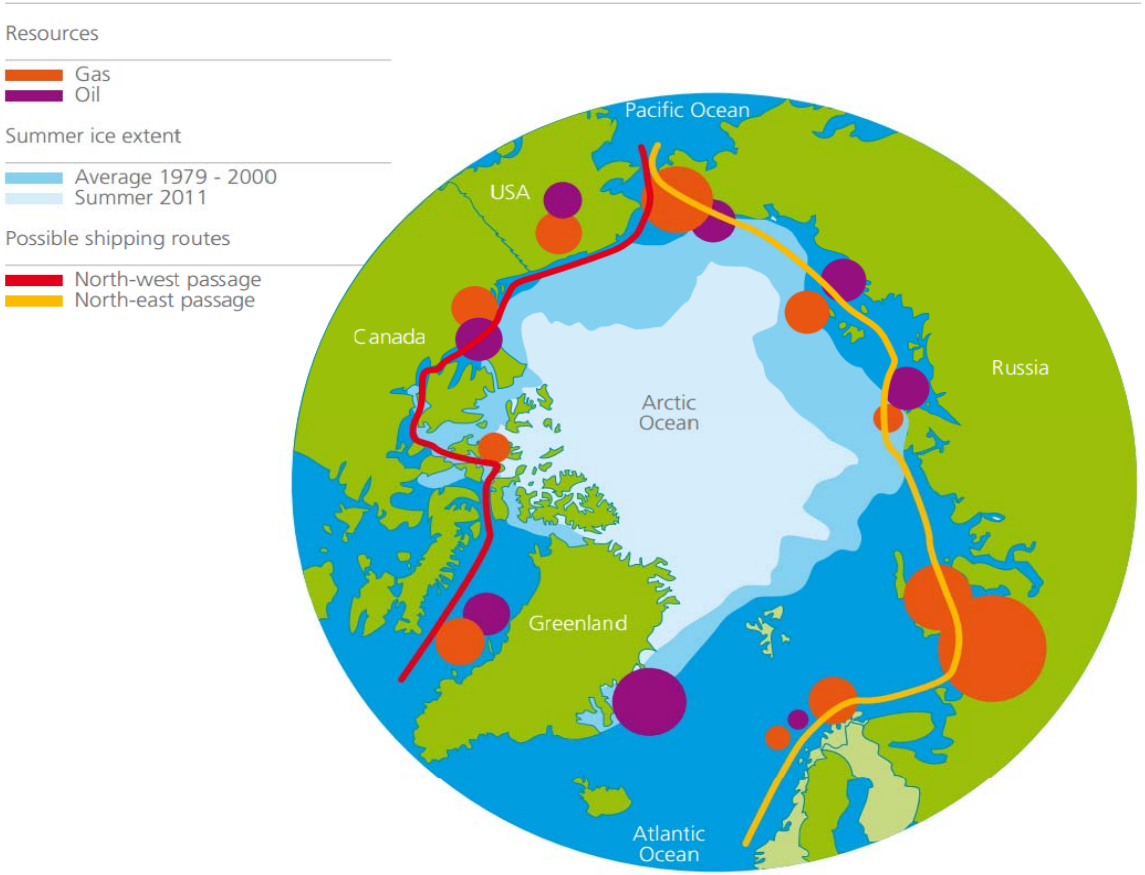
Anthony Ricciardi,[1,22,*] Tim M. Blackburn,[2,3] James T. Carlton,[4] Jaimie T.A. Dick,[5] Philip E. Hulme,[6] Josephine C. Iacarella,[7] Jonathan M. Jeschke,[8,9,10] Andrew M. Liebhold,[11] Julie L. Lockwood,[12] Hugh J. MacIsaac,[13] Petr Pyšek,[14,15] David M. Richardson,[16] Gregory M. Ruiz,[17] Daniel Simberloff,[18] William J. Sutherland,[19] David A. Wardle,[20,21] and David C. Aldridge[19,22]



Loss of Arctic sea ice, Movement of commodities, Port development, Tourism and cruise ships, Commercial fishing, Aquaculture, Construction of overland pipelines, Hull fouling …

Pathway trends – shipping arctic passages

- Opening of NW & NE passages
  - cutting distance from Europe to Asia by 1/3

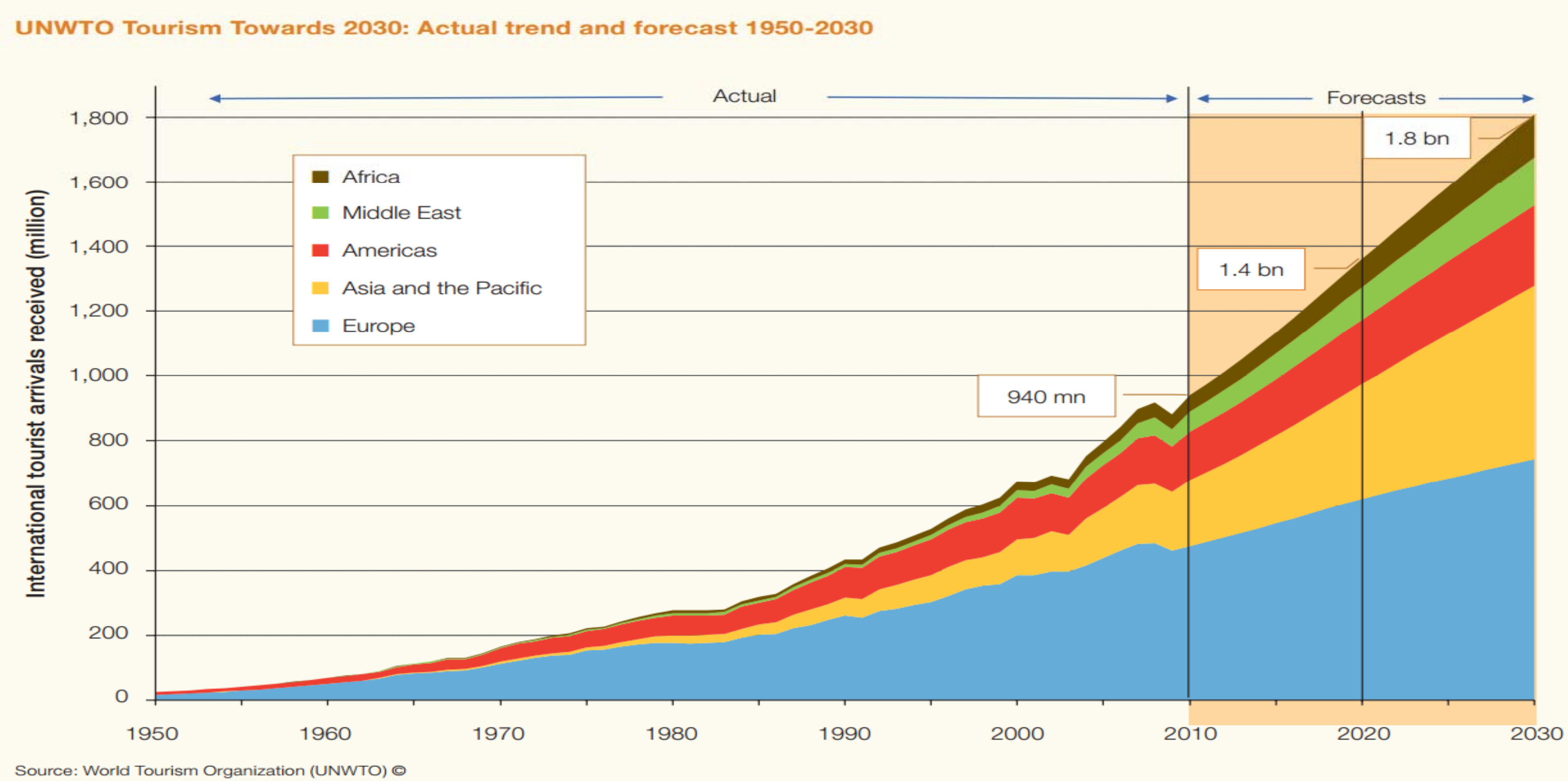


Lloyds et al. 2013. Global marine trends 2030

Pathway trends - tourism

double

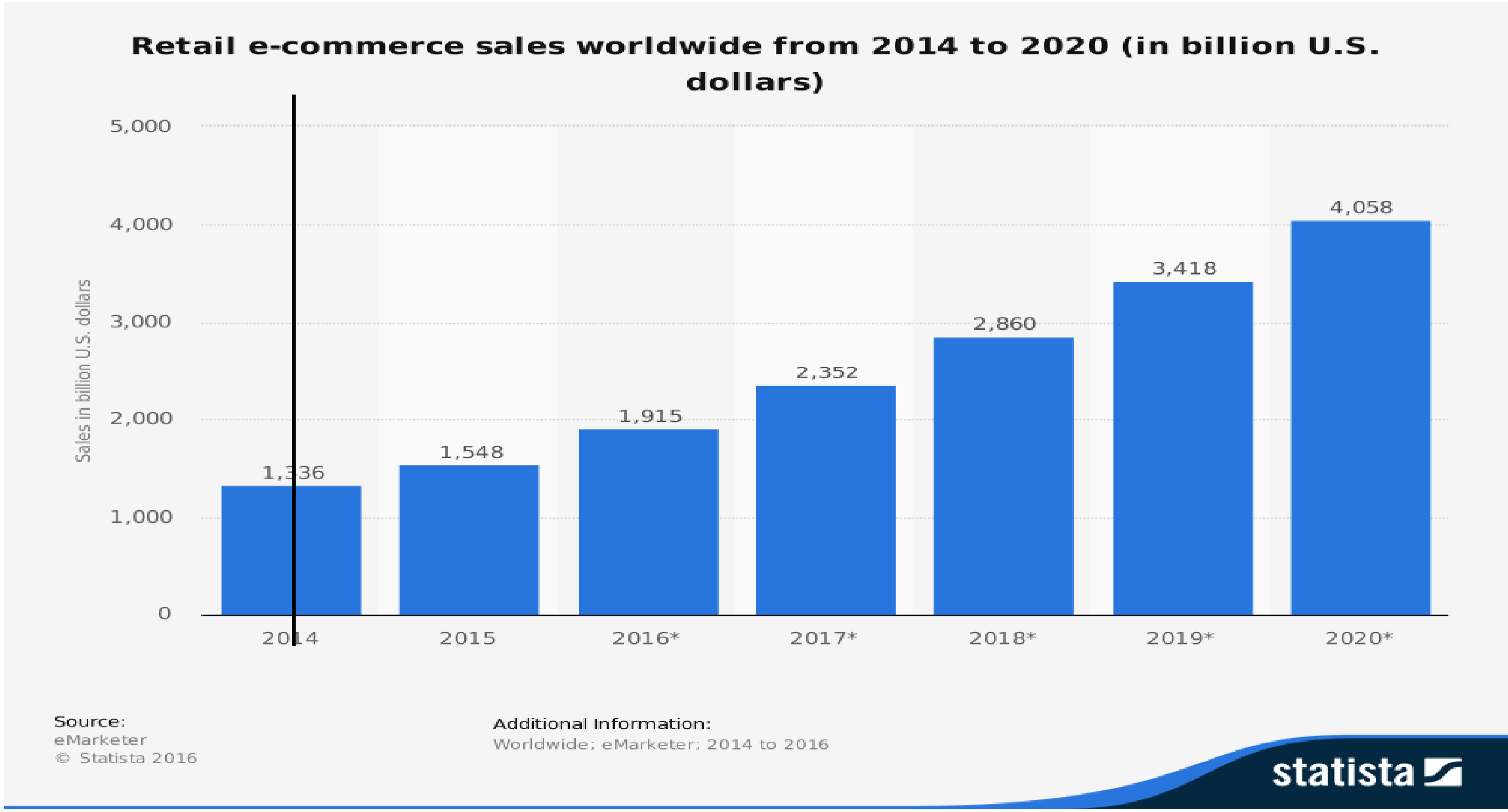
between 2010 to 2030



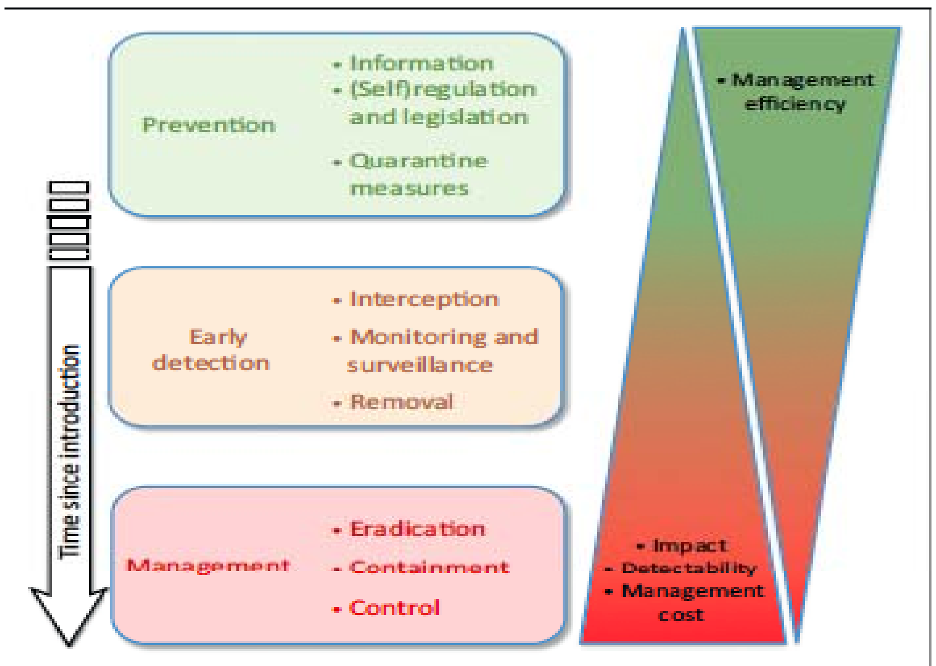
Pathway trends – e-commerce

>double

between 2015 to 2020



HOW TO RESPOND?



TREE-1578; No. of Pages 9 ARTICLE IN PRESS

Review

Cell PRESS

Impacts of biological invasions: what's what and the way forward

Daniel Simberloff[1], Jean-Louis Martin[2], Piero Genovesi[3], Virginie Maris[2], David A. Wardle[4], James Aronson[2,5], Franck Courchamp[6], Bella Galil[7], Emili García-Berthou[8], Michel Pascal[9], Petr Pyšek[10,11], Ronaldo Sousa[12,13], Eric Tabacchi[14] and Montserrat Vilà[15*]

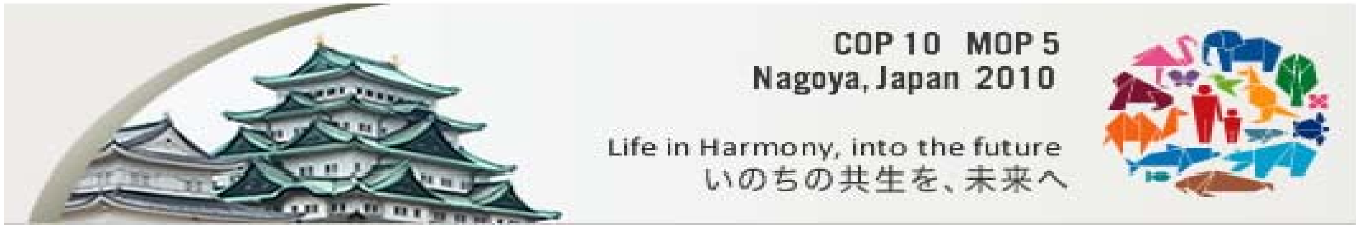
CBD guiding principles

- Prevention as the first line of defence
- Early detection rapid response
- Eradication when feasible
- Permanent management when appropriate

Decision VI/23 on Alien Species that threaten ecosystems, habitats and species; COPVI, The Hague, April 2002

CBD STRATEGIC PLAN 2011-2020

CBD strategic goal	CBD 2020 target Summarised from Report of the Ad Hoc Open-Ended Working Group on Review of Implementation of the Convention on the Work of its Third Meeting, document UNEP/CBD/COP/10/4, June 2010
A. Address underlying causes	1. Everyone is aware of the value of biodiversity and the steps they can take to conserve and use it sustainably
	2. Biodiversity is integrated into national and local development and planning processes
	3. Harmful incentives are eliminated or reformed and positive incentives are developed and applied
	4. Governments and businesses have achieved or implemented plans for sustainable production and consumption
B. Reduce pressures and promote sustainable use	5. Loss, degradation and fragmentation of forest and other habitats is at least halved
	6. Overfishing and destructive fishing practices are eliminated
	7. Agriculture, aquaculture and forestry are managed sustainably
	8. Pollution is reduced to levels that are not detrimental to ecosystem function and biodiversity
	9. Invasive alien species are identified, prioritised and controlled or eradicated, and measures are in place to control pathways of introduction
	10. Pressures on corals and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised
C. Safeguard ecosystems, species and genes	11. Terrestrial, inland-water, coastal and marine areas, especially those of particular importance for biodiversity, are conserved through comprehensive, representative and well-connected systems of effectively managed protected areas
	12. Extinction and decline of threatened species is prevented and their status improved
	13. Loss of genetic diversity in crop, livestock and wild relatives is halted
D. Enhance benefits from biodiversity and ecosystems	14. Ecosystems that provide essential services and livelihoods are safeguarded and/or restored, with equitable access
	15. Ecosystem resilience and the contribution of biodiversity to carbon stocks is enhanced, through conservation and restoration, including 15% of degraded ecosystems
	16. Access to genetic resources is enhanced and benefits shared
E. Enhance implementation through planning, knowledge management and capacity building	17. All parties have implemented effective national biodiversity strategies and action plans
	18. Traditional knowledge and practices are protected and their contribution to biodiversity conservation is enhanced
	19. Knowledge and technologies relating to status, trends and value of biodiversity are improved and shared
	20. Human resources and financing for implementing CBD has increased.

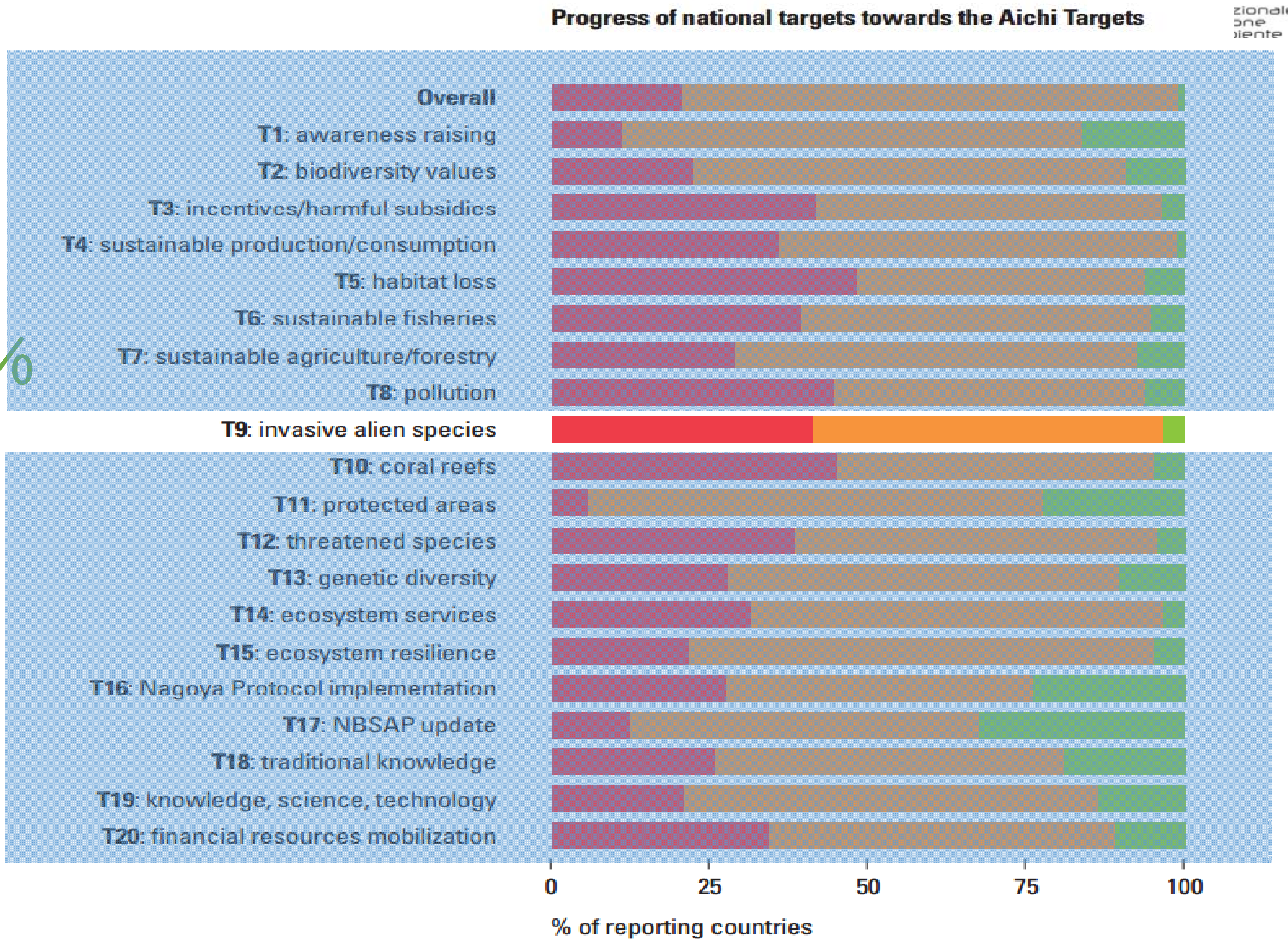


Target 9: By 2020, **invasive alien species** and **pathways** are identified and **prioritized**, **priority species are controlled or eradicated**, and measures are in place to manage pathways to **prevent** their introduction and establishment

T9 Progress

On track – 3%

Insufficient – 48%



RSPB et al. 2016

Correspondence

Zika virus: designate standardized names

A rapid response by the public-health and research communities to infectious viral diseases depends on the reproducible tracking and analysis of pathogen isolates. A standard strain-naming convention for Zika virus sequences is therefore urgently needed. This will ensure that the exchange and interpretation of data is unambiguous in efforts to contain the current outbreak in the tropical Western Hemisphere.

Zika virus strain names for isolates associated with the outbreak are arbitrarily designated as BeH818995, ZikaSPH2015 and BR/949/15, for example. Such names are largely opaque and inconsistent when it comes to context, although some may include useful metadata about isolates. It is impractical to include all relevant metadata in the isolate name, but some consistent information is useful for identifying specific isolates.

Building on conventions in other viral fields, we urge the Zika community to adopt a standard nomenclature for isolate names, specifying the virus type (ZIKV), host species abbreviation, geographical location of isolation, unique identification string and year of isolation. The preferred isolate name for BeH818995, for example, would then be ZIKV/*H. sapiens*/Brazil/BeH818995/2015.

Richard H. Scheuermann* *J. Craig Venter Institute, La Jolla, California, USA.*
rscheuermann@jcvi.org
**On behalf of the Viral Genome Annotation Standards Working Group (see go.nature.com/i5dewk for full list).*

Zika virus: accurate terminology matters

You describe microcephaly as a "serious congenital malformation", which risks confusing the public and causing needless distress to the families of children with small heads, irrespective of whether these are linked to Zika virus infection (see *Nature* 530, 5; 2016). In fact, 'microcephaly' simply means a small head and is not necessarily associated with intellectual disability, as is often assumed.

Microcephaly is a feature of hundreds of different conditions, but can also be seen in otherwise normal individuals (P. Merlob *et al. J. Med. Genet.* 25, 750–753; 1988; S. Ashwal *et al. Neurology* 73, 887–897; 2009).

This is not mere semantics. Investigations into the proposed link between Zika virus and birth defects (for which there seems to be little evidence at present) will need to include systematic assessment of all the possible causes of microcephaly in children thought to have been affected by the virus (C. G. Victora *et al. Lancet* 387, 621–624; 2016).

Edwin P. Kirk *Sydney Children's Hospital; University of New South Wales; and SEALS Laboratories, Randwick, Australia.*
edwin.kirk@health.nsw.gov.au

How to engage social scientists in IPBES

We contend that the disciplinary imbalance within the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) could best be remedied by improving the organization's communication with researchers from the social sciences and humanities (see A. B. M. Vadrot *et al. Nature* 530, 160; 2016).

Our analysis of the groups that were nominated and selected after the second IPBES call for experts for deliverables 2(b) and 3(b)(i) — namely the regional/subregional assessments of biodiversity and ecosystem services, and of land degradation and restoration — indicated that most people who applied for the assessments had a background in natural sciences (see go.nature.com/pexril). This suggests that IPBES communications about the details and implications of the IPBES process itself might not be effectively engaging the social-science and humanities communities.

We suggest that IPBES calls need to be circulated more widely and avoid language and expressions that are tailored specifically for natural scientists. The calls should recognize differences in the social-science and humanities communities and target these more specifically.

Katrin Reuter, Malte Timpte *Museum für Naturkunde, Leibniz Institute for Evolution and Biodiversity Science, Berlin, Germany.*
Carsten Nesshöver *Helmholtz Centre for Environmental Research — UfZ, Leipzig, Germany.*
malte.timpte@mfn-berlin.de

Better management of alien species

In our view, the European Union's recent legislation on invasive alien species will be an effective conservation tool only if the inclusion of new species is supported by the majority of EU states. We call for Europe to put the protection of its biodiversity before the short-term economic interests of member states.

Europe is one of the world's most biologically invaded regions (M. van Kleunen *et al. Nature* 525, 100–103; 2015). But the list of invasive alien species targeted for action under the January 2015 EU legislation includes just 37 entries (see go.nature.com/gigftz) — even though Europe hosts more than 1,000 such species, most of which meet the criteria for listing (M. Vilà *et al. Front. Ecol. Envir.* 8, 135–144; 2010). For example, knotweed (*Fallopia* sp.) and American mink (*Neovison vison*) are well-characterized species that are responsible for extensive biodiversity losses across the continent.

We are concerned that the restricted new listing cannot hope to address the scale of biological invasions in Europe. Management must be coordinated at the EU level if both protective and preventative regulation are to be widely applicable, comprehensive and effective.

Jan Pergl *Institute of Botany, The Czech Academy of Sciences, Pruhonice, Czech Republic.*
Piero Genovesi *Institute for Environmental Protection and Research, Rome, Italy.*
Petr Pyšek *Institute of Botany, The Czech Academy of Sciences, Pruhonice; and Charles University in Prague, Czech Republic.*
jan.pergl@ibot.cas.cz

Class uncorrected errors as misconduct

Post-publication peer review is becoming increasingly popular, but authors need more incentive to self-correct and amend the scientific record (see D. B. Allison *et al. Nature* 530, 27–29; 2016). We propose that failure by authors to correct their mistakes should be classified as scientific misconduct. This policy has already been implemented by our institute, and we encourage research institutions and funding bodies to follow suit (see go.nature.com/dgifft).

The responsibility to correct errors lies mainly with the criticized authors. Snubbing criticism by not addressing it promptly runs counter to our fundamental ethos as scientists, and threatens to erode society's trust in the scientific community.

Sophien Kamoun, Cyril Zipfel *The Sainsbury Laboratory, Norwich, UK.*
sophien.kamoun@tsl.ac.uk

CONTRIBUTIONS
Correspondence may be sent to **correspondence@nature.com** after consulting the guidelines at **http://go.nature.com/cmchno**.

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Better management of alien species

Sistema Nazionale per la Protezione dell'Ambiente

In our view, the European Union's recent legislation on invasive alien species will be an effective conservation tool only if the inclusion of new species is supported by the majority of EU states. We call for Europe to put the protection of its biodiversity before the short-term economic interests of member states.

8, 135–144; 2010). For example, knotweed (*Fallopia* sp.) and American mink (*Neovison vison*) are well-characterized species that are responsible for extensive biodiversity losses across the continent.

Pergl J, Genovesi P, Pysek P (2016) Europe: Better management of alien species. Nature, 531, 173.

BIOSECURITY POLICIES

New Zealand, the “champion”

- Very stringent biosecurity
- Reduced rate of invasions
- Effective early warning rapid response
- Advanced management for several key IAS
- Worldwide champions in eradication science

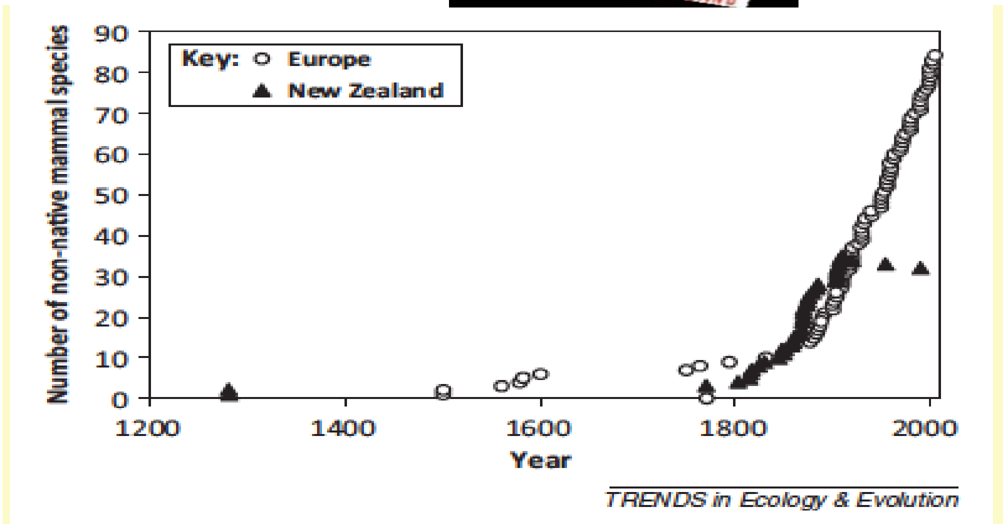
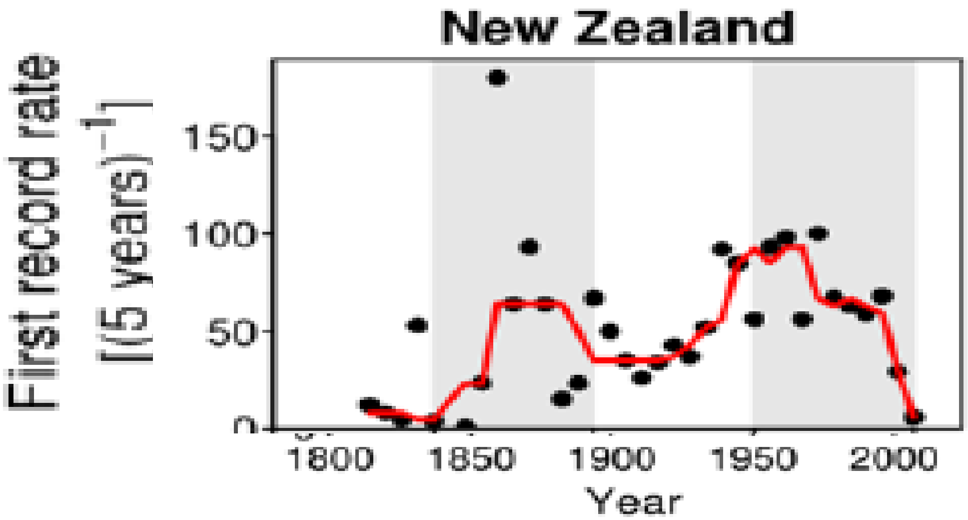


Figure I. Numbers of non-native mammal species established in Europe and New Zealand over eight centuries (compiled by P. Genovesi and M. Clout).

Simberloff et al. 2013. TREE

BIOSECURITY CAN REDUCE INVASION RATES

Edney-Browne et al. 2018. Biol. Inv.
Establishment patterns of non-native insects in
New Zealand



Seebens et al. 2018. Nature Communications

INCREASING N OF BIOSECURITY POLICIES

Norway (outside EU)

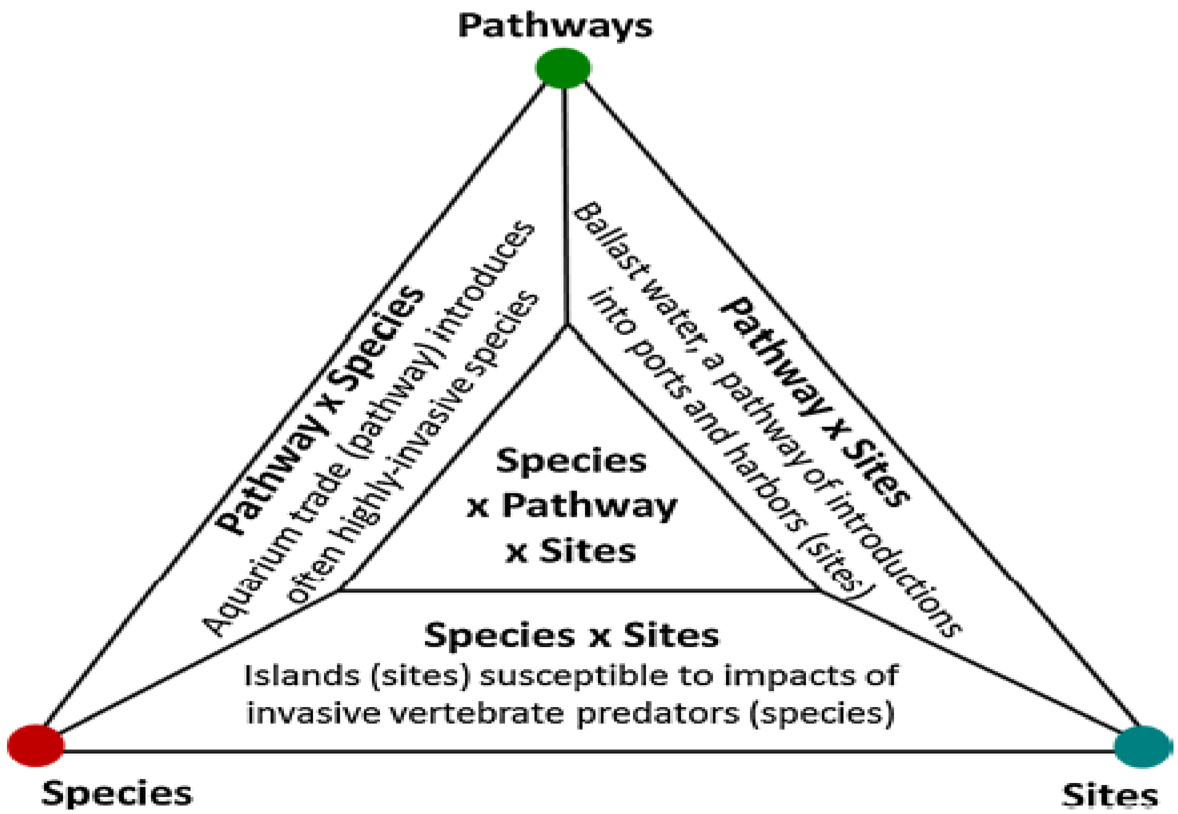
- Royal Decree 19 June 2015, entered into force 1 January 2016; regulating import of all species. Ban on import, trade and release/planting of several alien species.
- All imports of live species and release/planting need a permit issued by the environment authorities, unless they are listed on the exemption list.
- Permits only issued after a screening and risk assessment

INCREASING N OF BIOSECURITY POLICIES

Iceland

- new Nature Conservation Act recently entered into force. Importation permit required for any living organism. Based on a risk assessment.
- General ban of all actions that can cause the spread of non-native organisms within the country.
- The Environment Agency of Iceland has the power to control and/or eradicate IAS.
- List of species that can not be imported to Iceland (or spread within Iceland). The minister can also publish a list of species that can be imported without permission (white list).

PRIORITIZATION TO ENHANCE BIOSECURITY



McGeoch, M.A., Genovesi P. et al., 2015. Biological Invasions.

PATHWAYS OF ARRIVAL

Standard categorization of pathways

- Developed by IUCN SSC ISSG within the GIASIP, in collaboration with CEH and CABI, inputs from CBD Secretariat
- Tested with major global databases, mapped toward CBD decisions
- CBD COP decision includes invitation to ISSG to "*..continue and complete the work on pathway*"

UNEP

CBD

Convention on Biological Diversity

Distr.
GENERAL

UNEP/CBD/SBSTTA/18/9/Add.1
1 May 2014

ORIGINAL: ENGLISH

SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE
Eighteenth meeting
Montreal, 23-28 June 2014
Item 5.2 of the provisional agenda*

PATHWAYS OF INTRODUCTION OF INVASIVE SPECIES, THEIR PRIORITIZATION AND MANAGEMENT

Note by the Executive Secretary

I. INTRODUCTION

1. The Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species that threaten Ecosystems, Habitats and Species (the Guiding Principles) annexed to decision VI/23** provide all Governments and organizations with guidance for developing effective strategies to minimize the spread and impact of invasive alien species. In particular, the Guiding

Table 1: Categoriz

	Category	Subcategory	COP decision
Movement of COMMODITY	**RELEASE** IN NATURE (1)	Biological control	VIII/27
		Erosion control/ dune stabilization (windbreaks, hedges, ...)	
		Fishery in the wild (including game fishing)	VIII/27; X/38
		Hunting in the wild	X/38
		Landscape/flora/fauna "improvement" in the wild	
		Introduction for conservation purposes	
		Release in nature for use (other than above, e.g., fur, transport, medical use)	
		Other intentional release	
	ESCAPE FROM CONFINEMENT (2)	Agriculture (including Biofuel feedstocks)	X/38
		Aquaculture / mariculture	VIII/27; IX/4
		Botanical garden/zoo/aquaria (excluding domestic aquaria)	XI/28
		Pet/aquarium/terrarium species (including live food for such species)	VIII/27, X/38, XI/28
		Farmed animals (including animals left under limited control)	VIII/27
		Forestry (including reforestation)	
		Fur farms	
		Horticulture	
		Ornamental purpose other than horticulture	
		Research and *ex-situ* breeding (in facilities)	VIII/27
		Live food and live bait	
		Other escape from confinement	
	TRANSPORT – **CONTAMINANT** (3)	Contaminant nursery material	
		Contaminated bait	
		Food contaminant (including of live food)	VIII/27; XI/28
		Contaminant on animals (except parasites, species transported by host/vector)	XI/28
		Parasites on animals (including species transported by host and vector)	XI/28
		Contaminant on plants (except parasites, species transported by host/vector)	XI/28
		Parasites on plants (including species transported by host and vector)	XI/28
		Seed contaminant	VIII/27
		Timber trade	
		Transportation of habitat material (soil, vegetation,...)	
VECTOR	TRANSPORT - **STOWAWAY** (4)	Angling/fishing equipment	VIII/27
		Container/bulk	VIII/27
		Hitchhikers in or on airplane	VIII/27, IX/4
		Hitchhikers on ship/boat (excluding ballast water and hull fouling)	
		Machinery/equipment	VIII/27
		People and their luggage/equipment (in particular tourism)	VIII/27
		Organic packing material, in particular wood packaging	
		Ship/boat ballast water	VIII/27
		Ship/boat hull fouling	VIII/27; IX/4
		Vehicles (car, train, ...)	
		Other means of transport	
SPREAD	**CORRIDOR** (5)	Interconnected waterways/basins/seas	VIII/27
		Tunnels and land bridges	
	UNAIDED (6)	Natural dispersal across borders of invasive alien species that have been introduced through pathways 1 to 5	

ISSG Invasive Species Specialist Group

GLOBAL INVASIVE SPECIES DATABASE

HOME ABOUT THE GISD HOW TO USE CONTACTS

100 OF THE WORST

Search

SEARCH

Results of your query will be returned by **species**

ADVANCED SEARCH OPTIONS

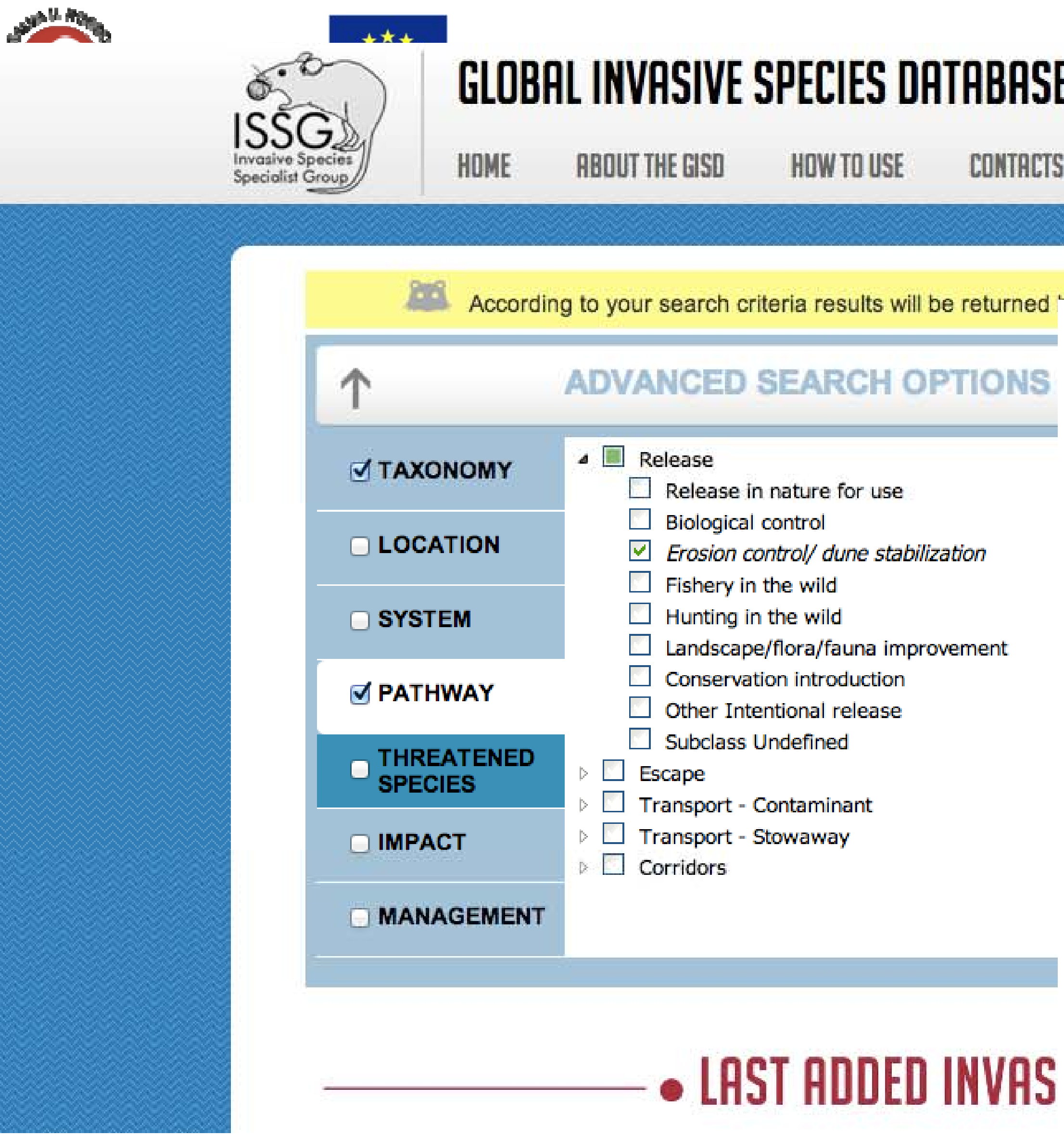
Leucaena leucocephala

Schinus terebinthifolius

Rattus rattus

IUCN SSC Species Survival Commission ISSG Invasive Species Specialist Group ISPRA Institute for Environmental Protection and Research

The Global Invasive Species Database is managed by the Invasive Species Specialist Group (ISSG) of the IUCN Species Survival Commission. It was developed as part of the global initiative on invasive species led by the Global Invasive Species Programme (GISP), and has been redesigned in 2013 with support from the Abu Dhabi Environment Agency, the Italian Ministry of Environment and ISPRA - the Institute for Environmental



CBD

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Table 1: Categorization of pathways for the introduction of

	Category	Subcategory	
Movement of COMMODITY	**RELEASE** IN NATURE (1)	Biological control	
		Erosion control/ dune stabilization (windbreaks	
		Fishery in the wild (including game fishing)	
		Hunting in the wild	
		Landscape/flora/fauna "improvement" in the w	
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		Release in nature for use (other than above, e.g	
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	ESCAPE FROM CONFINEMENT (2)	Agriculture (including Biofuel feedstocks)	
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		Ornamental purpose other than horticulture	
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		Timber trade	
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VECTOR	TRANSPORT - **STOWAWAY** (4)	Angling/fishing equipment	VIII/27
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		Machinery/equipment	VIII/27
		People and their luggage/equipment (in particular tourism)	VIII/27
		Organic packing material, in particular wood packaging	
		Ship/boat ballast water	VIII/27
		Ship/boat hull fouling	VIII/27; IX/4
		Vehicles (car, train, …)	
		Other means of transport	
SPREAD	**CORRIDOR** (5)	Interconnected waterways/basins/seas	VIII/27
		Tunnels and land bridges	
	UNAIDED (6)	Natural dispersal across borders of invasive alien species that have been introduced through pathways 1 to 5	

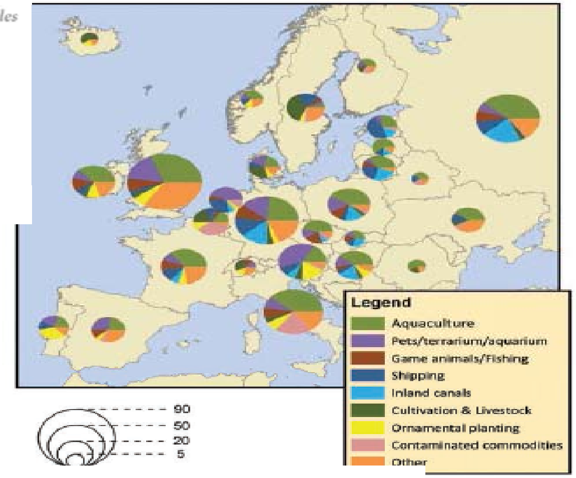
ANALYSIS OF PATHWAYS

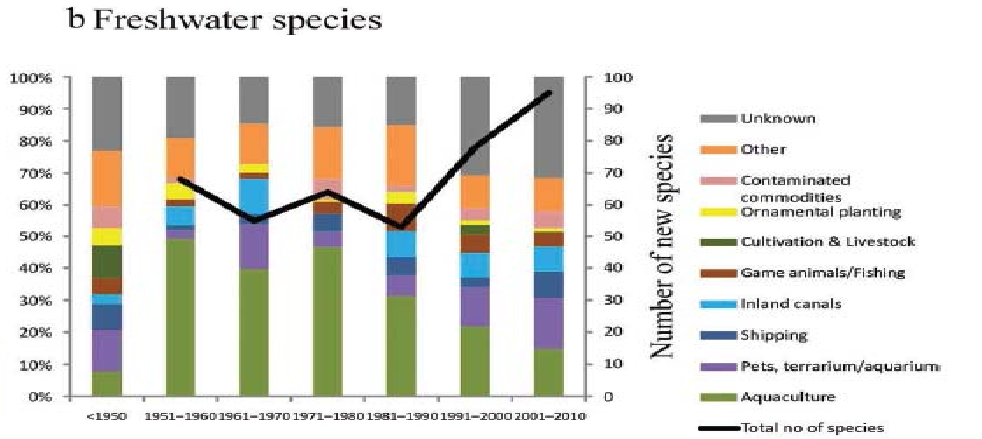
BioScience Advance Access published July 15, 2015

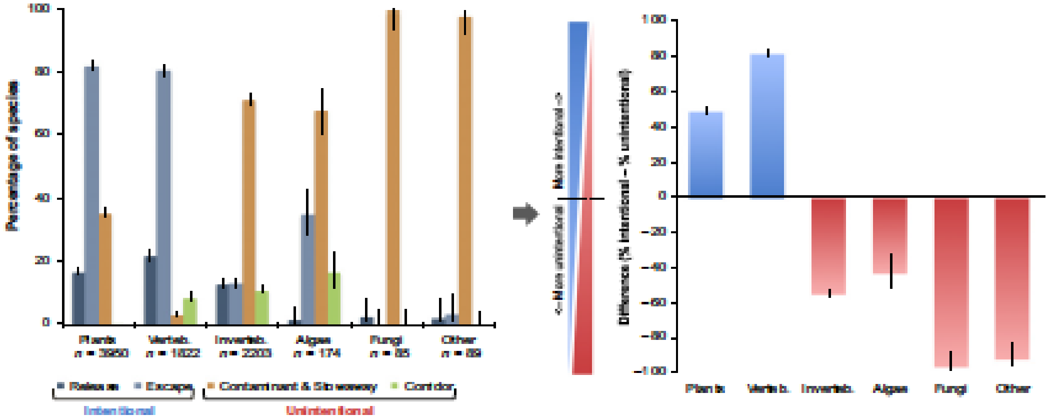
Overview Articles

Crossing Frontiers in Tackling Pathways of Biological Invasions

FRANZ ESSL, SVEN BACHER, TIM M. BLACKBURN, OLAF BOOY, GIUSEPPE BRUNDU, SARAH BRUNEL, ANA-CRISTINA CARDOSO, RENÉ ESCHEN, BELINDA GALLARDO, BELLA GALIL, EMILI GARCÍA-BERTHOU, PIERO GENOVESI, QUENTIN GROOM, COLIN HARROWER, PHILIP E. HULME, STELIOS KATSANEVAKIS, MARC KENIS, INGOLF KÜHN, SABRINA KUMSCHICK, ANGELIKI F. MARTINOU, WOLFGANG NENTWIG,







Journal of Applied Ecology
BRITISH ECOLOGICAL SOCIETY
Journal of Applied Ecology 2017, **54**, 657–669 doi: 10.1111/1365-2664.12819

Assessing patterns in introduction pathways of alien species by linking major invasion data bases

Wolf-Christian Saul[1,2,3,4]*, Helen E. Roy[5], Olaf Booy[6], Lucilla Carnevali[7], Hsuan-Ju Chen[8], Piero Genovesi[9,10], Colin A. Harrower[5], Philip E. Hulme[11], Shyama Pagad[12,13], Jan Pergl[14] and Jonathan M. Jeschke[1,2,3,4]

GLOBAL INVASIVE SPECIES DATABASE

ISSG Invasive Species Specialist Group

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100 OF THE WORST

Acridotheres tristis 简体中文 正體中文

System : Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Aves	Passeriformes	Sturnidae

FULL ACCOUNT (PDF)

GENERAL | DISTRIBUTION | IMPACT | MANAGEMENT | BIBLIOGRAPHY

COMMON NAME

house myna (English), common myna (English), Calcutta myna (English), mynah (English), Hirtenmaina (German), Germa Indischer mynah (English), manu rataro (English, Cook Islands), manu kavamani (English, Cook Islands), manu teve (Engli Cook Islands), piru (English, Cook Islands), manu kaomani (English, Cook Islands), manu (English, Cook Islands), talking r (English), Martin triste (French), Indian mynah (English), Indian myna (English)

SYNONYM

Acridotheres tristas , (Linnaeus, 1766)

SIMILAR SPECIES

Manorina melanocephala, Manorina flavigula

SUMMARY

The common myna (Acridotheres tristis), also called the Indian myna, is a highly commensal Passerine \nthat lives in close association with humans. It competes with small mammals and bird for nesting hollows and on some islands, such as Haw and Fiji, it preys on other birds' eggs and chicks. It presents a threat to indigenous biota, particularly parrots and other birdl in Australia and elsewhere.

Acridotheres tristis 简体中文 正體中文

System : Terrestrial

Kingdom	Phylum	Class	Order
Family	Animalia	Chordata	Aves
	Passeriformes	Sturnidae	

FULL ACCOUNT (PDF)

GENERAL | DISTRIBUTION | IMPACT | MANAGEMENT | BIBLIOGRAPHY

IMPACT INFORMATION

Flocks of the common myna are known to damage fruit crops, including grapes, apricots, apples, pears, strawberries, figs and gooseberries. (Heather and Robertson 1997).
\r\nMynas are communal and commensal, they are highly vocal throughout the year, making them a public nuisance. Their droppings are a nuisance (Yap et al. 20002, in Lim Sodhi Brook and Soh 2003) and public health concern. Mynas form combined populations of up to 160 000 (Lim Sodhi Brook and Soh 2003) and roost in numbers as great as 5000 (Markula Hannan-Jones & Csurhes 2009). They are a residential nuisance as they build nests in spouting and drainpipes (Stoner 1923). Mynas fearlessly steal food off plates which may be a hygiene or general nuisance for restaurants and other shops and scavenge food from people's houses and gardens.
Common mynas pose a human health risk as they carry bird mites such as *Ornithonyssus bursa* and *Dermanyssus gallinae* that may infect humans. They can also cause dermatitis, asthma, severe irritation and rashes. Their droppings can spread Psittacosis, Ornithosis, Salmonellosis and arboviruses (Pers. comm. Bill Handke). They may also carry owl flies, biting lice, *Oxyspirrura* thread worm and round worm (Stoner 1923).
Mynas are known to carry avian malaria (Massam 2001).
The common myna has been implicated in the demise of the lowland populations of the 'Vulnerable (VU)' Rarotonga starling (*Aplonis cinerascens*) (BirdLife International 2008b). Mynas are nest site competitors and can displace active breeding pairs of the Endangered (EN) Mauritius parakeet (*Psittacula eques*). In French Polynesia they are reported to predate on the Critically Endangered (CR) (*Todiramphus godeffroyi*).
Please follow this link for more examples of the impacts of common mynas on threatened species.

Red List assessed species 40: CR = 5; EN = 7; VU = 9; NT = 3; LC = 16;

Acrocephalus caffer **EN**	*Acrocephalus kerearako* **NT**	*Acrocephalus mendanae* **LC**
Acrocephalus rimatarae **VU**	*Aplonis cinerascens* **VU**	*Cacatua roseicapilla* **LC**
Charadrius sanctaehelenae **CR**	*Collocalia leucophaea* **VU**	*Copsychus saularis* **LC**
Copsychus sechellarum **EN**	*Coracina typica* **VU**	*Cyanoramphus novaezelandiae* **VU**
Dacelo novaeguineae **LC**	*Dendrocopos syriacus* **LC**	*Gerygone igata* **LC**
Hemiphaga novaeseelandiae **NT**	*Humblotia flavirostris* **EN**	*Hypsipetes olivaceus* **VU**
Jynx ruficollis **LC**	*Otus capnodes* **CR**	*Otus insularis* **EN**
Otus pauliani **CR**	*Passer melanurus* **LC**	*Petaurus breviceps* **LC**
Philesturnus carunculatus **NT**	*Ploceus velatus* **LC**	*Polytelis swainsonii* **VU**
Pomarea mendozae **EN**	*Pomarea nigra* **CR**	*Prosthemadera novaeseelandiae* **LC**
Psittacula eques **EN**	*Ptilinopus rarotongensis* **VU**	*Puffinus pacificus* **LC**
Rhipidura fuliginosa **LC**	*Stigmatopelia senegalensis* **LC**	*Todiramphus godeffroyi* **CR**
	Todiramphus sanctus **LC**	*Trachyphonus vaillantii* **LC**
Zosterops modestus **EN**		

View less species

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Home » Zosterops modestus (Seychelles Grey White-eye, Seychelles White-eye)

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Zosterops modestus

http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22714018A94397536.en

Scope: Global
Language: English
Download assessment

NOT EVALUATED (NE) | DATA DEFICIENT (DD) | LEAST CONCERN (LC) | NEAR THREATENED (NT) | VULNERABLE (VU) | ENDANGERED (EN) | CRITICALLY ENDANGERED (CR) | EXTINCT IN THE WILD (EW) | EXTINCT (EX)

Summary | Classification Schemes | Images & External Links | Bibliography | Full Account

TAKE ACTION NOW

Taxonomy
Assessment Information
Geographic Range
Population
Habitat and Ecology
Threats
Conservation Actions

Translate page into:
Seleziona lingua

Taxonomy [top]

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Aves	Passeriformes	Zosteropidae

Scientific Name:	*Zosterops modestus*
Species Authority:	Newton, 1867
Common Name(s):	English – Seychelles White-eye, Seychelles Grey White-eye French – Oiseau-lunettes des Seychelles
Taxonomic Source(s):	del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A., Fishpool, L.D.C., Boesman, P. and Kirwan, G.M. 2016. *HBW and BirdLife International Illustrated Checklist of the Birds of the World. Volume 2: Passerines.* Lynx Edicions and BirdLife International, Barcelona, Spain and Cambridge, UK.
Identification information:	10 cm. Small, dull olive-grey, warbler-like bird. Dark olive-grey upperparts with paler underparts and narrow, white eye-ring. Flank feathers sometimes fluffed open to impart pale grey flank-flash. Tiny, sharp bill. **Voice** Short, trilling nasal contact call and loud song.

Assessment Information [top]

Red List Category & Criteria:	Vulnerable D1+2 ver 3.1
Year Published:	2016
Date Assessed:	2016-10-01

TAKE ACTION NOW

Nazionale
tezione
Ambiente

11. Climate change & severe weather -> 11.4. Storms & flooding
♦ ***timing:***Future ♦ ***scope:***Majority (50-90%) ♦ ***severity:***Unknown ⇒ ***Impact score:***Unknown
→ **Stresses**

- 1. Ecosystem stresses -> 1.2. Ecosystem degradation
- 2. Species Stresses -> 2.1. Species mortality

2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.4. Scale Unknown/Unrecorded
♦ ***timing:***Past, Likely to Return ♦ ***scope:***Minority (<50%) ♦ ***severity:***No decline ⇒ ***Impact score:***Past Impact
→ **Stresses**

- 1. Ecosystem stresses -> 1.1. Ecosystem conversion
- 1. Ecosystem stresses -> 1.2. Ecosystem degradation

5. Biological resource use -> 5.3. Logging & wood harvesting -> 5.3.3. Unintentional effects: (subsistence/small scale) [harvest]
♦ ***timing:***Past, Likely to Return ♦ ***scope:***Minority (<50%) ♦ ***severity:***No decline ⇒ ***Impact score:***Past Impact
→ **Stresses**

- 1. Ecosystem stresses -> 1.1. Ecosystem conversion
- 1. Ecosystem stresses -> 1.2. Ecosystem degradation

7. Natural system modifications -> 7.1. Fire & fire suppression -> 7.1.3. Trend Unknown/Unrecorded
♦ ***timing:***Future ♦ ***scope:***Majority (50-90%) ♦ ***severity:***No decline ⇒ ***Impact score:***Low Impact: 3
→ **Stresses**

- 1. Ecosystem stresses -> 1.2. Ecosystem degradation

8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.1. Unspecified species
♦ ***timing:***Ongoing ♦ ***scope:***Majority (50-90%) ♦ ***severity:***Unknown ⇒ ***Impact score:***Unknown
→ **Stresses**

- 1. Ecosystem stresses -> 1.2. Ecosystem degradation
- 2. Species Stresses -> 2.1. Species mortality

8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species [*Foudia madagascariensis*]
♦ ***timing:***Ongoing ♦ ***scope:***Majority (50-90%) ♦ ***severity:***No decline ⇒ ***Impact score:***Low Impact: 5
→ **Stresses**

- 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.2. Competition

8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species [*Acridotheres tristis*]
♦ ***timing:***Ongoing ♦ ***scope:***Majority (50-90%) ♦ ***severity:***No decline ⇒ ***Impact score:***Low Impact: 5
→ **Stresses**

- 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success

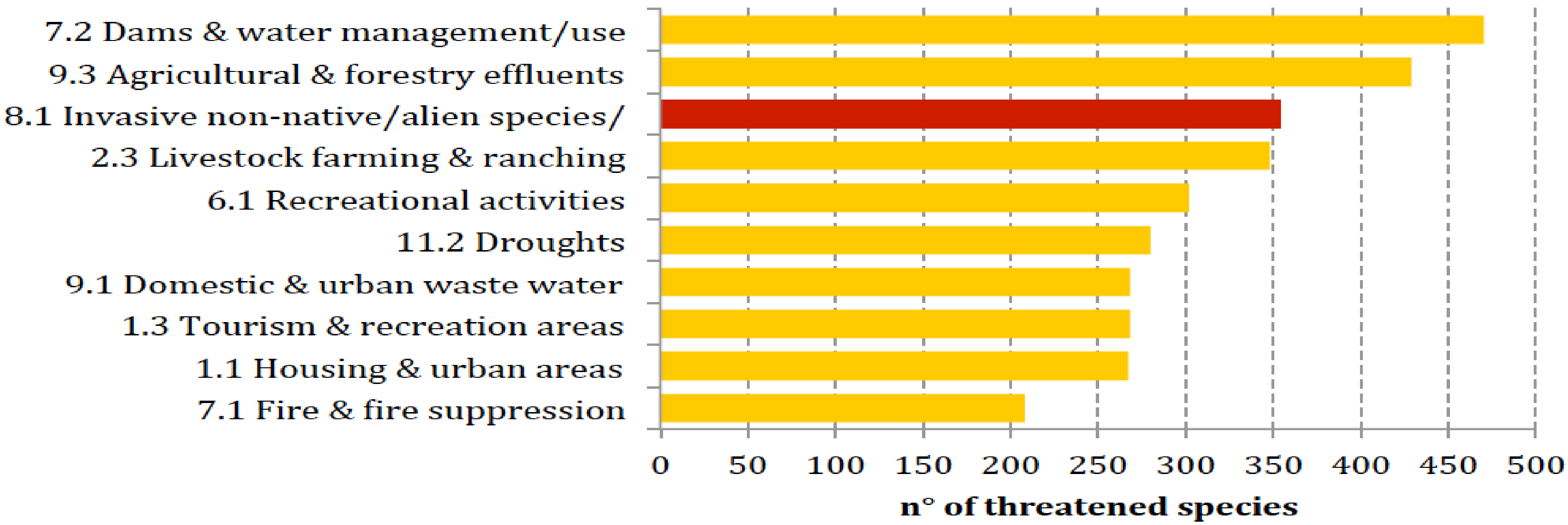
8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species [*Rattus rattus*]
♦ ***timing:***Ongoing ♦ ***scope:***Majority (50-90%) ♦ ***severity:***No decline ⇒ ***Impact score:***Low Impact: 5
→ **Stresses**

- 2. Species Stresses -> 2.3. Indirect species effects -> 2.3.7. Reduced reproductive success

8. Invasive and other problematic species, genes & diseases -> 8.1. Invasive non-native/alien species/diseases -> 8.1.2. Named species [*Rattus norvegicus*]

ASSESSING THE IMPACT OF IAS

- IAS 3rd most severe impact on threatened species in Europe
- 1 out of 5 threatened species in Europe directly affected by IAS

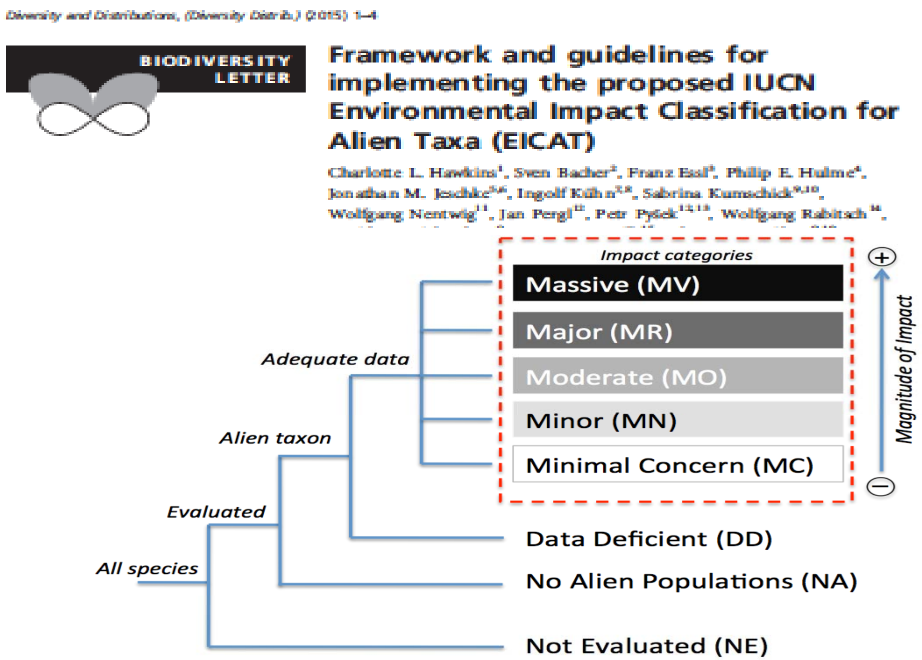


Genovesi et al. 2015. Mid-term review EU Biodiversity Strategy

RANKING INVASIVE SPECIES BY THEIR IMPACT

Toward a standard method

- Presented in a paper by Blackburn et al. PLOS 2014
- Detailed guide to application in Hawkins et al 2015 Div & Distr.



- COP XII Decision 17: *Invites IUCN ISSG to* ***complete the work pathways****, and to continue to develop a* ***system for classifying IAS based on the nature and magnitude of their impacts***

U-SAVEREDS

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ISSG Invasive Species Specialist Group

GLOBAL INVASIVE SPECIES DATABASE

HOME ABOUT THE GISD HOW TO USE CONTACTS

MA / MR / MO / MI / ML / DD / NA / NE / CG

100 OF THE WORST

Rattus rattus 简体中文 正體中文

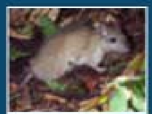
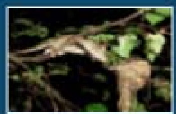
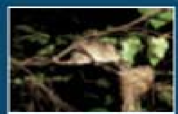
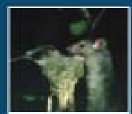
System : Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Rodentia	Muridae

FULL ACCOUNT (PDF)

MA MR MO MI Minimal ML DD NA NE CG

GENERAL DISTRIBUTION IMPACT MANAGEMENT BIBLIOGRAPHY CONTACT

COMMON NAME Hausratte (German), European house rat (English), bush rat (English), blue rat (English), ship rat (English), roof rat (English), black rat (English)

SYNONYM
Mus rattus , Linnaeus, 1758
Mus alexandrinus , Geoffroy, 1803
Musculus frugivorus , Rafinesque, 1814
Mus novaezelandiae , Buller, 1870

SIMILAR SPECIES *Rattus norvegicus*

SUMMARY *A native of the Indian sub-continent, the ship rat (Rattus rattus) has now spread throughout the world. It is widespread in forest*

COP Decision XIII/13; 17… Also requests the Executive Secretary… (a) To compile information on the potential **consequences of invasive alien species on social, economic and cultural values**..;

TABLE 1 Constituents of human well-being and examples of their subcategories (after MEA, 2005). The overarching premise for all constituents is the freedom of choice and action, i.e. the opportunity to be able to achieve what a person values doing and being

Constituents of human well-being	Examples
Safety	Personal safety
	Secure resource access
	Security from disasters
Material and immaterial assets	Adequate livelihoods
	Sufficient nutritious food
	Shelter
	Access to goods
Health	Strength
	Feeling well
	Access to clean air and water
Social, spiritual and cultural relations	Social, spiritual and cultural practice
	Mutual respect
	Friendship

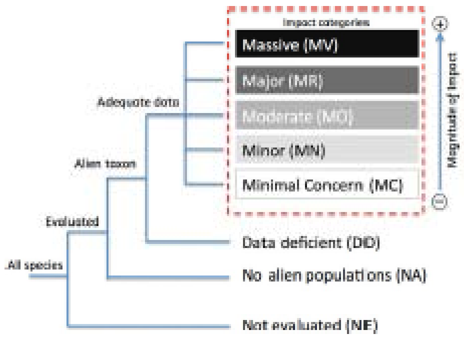


FIGURE 2 Socio-Economic Impact Classification of Alien Taxa (SEICAT) (after Blackburn et al., 2014; Hawkins et al., 2015). Detailed descriptions of the classes are given in Table 2

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Methods in Ecology and Evolution

RESEARCH ARTICLE

Socio-economic impact classification of alien taxa (SEICAT)

Sven Bacher[1,2] | Tim M. Blackburn[3,4,5] | Franz Essl[6] | Piero Genovesi[7] | Jaakko Heikkilä[8] | Jonathan M. Jeschke[9,10,11] | Glyn Jones[12] | Reuben Keller[13] | Marc Kenis[14] | Christoph Kueffer[2,15] | Angeliki F. Martinou[16] | Wolfgang Nentwig[17] | Jan Pergl[18] | Petr Pyšek[18,19] | Wolfgang Rabitsch[20] | David M. Richardson[2] | Helen E. Roy[21] | Wolf-Christian Saul[9,10,11] | Riccardo Scalera[22] | Montserrat Vilà[23] |

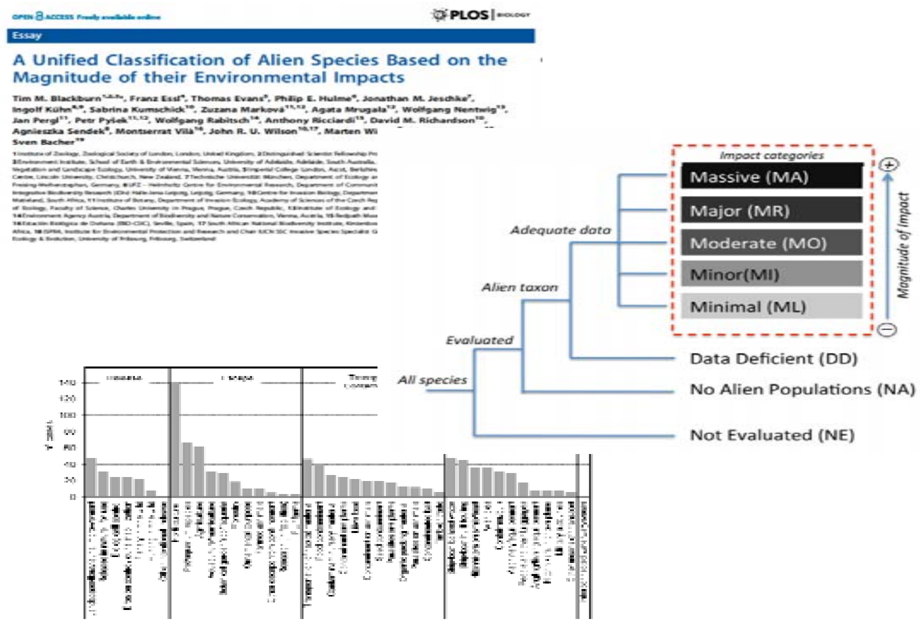
TABLE 2 Description of Socio-Economic Impact Classification of Alien Taxa (SEICAT) according to observed changes in peoples' activities

Impact classification	Description
Minimal concern (MC)	No deleterious impacts reported despite availability of relevant studies with regard to its impact on human well-being. Taxa that have been evaluated under the SEICAT process but for which impacts have not been assessed in any study should not be classified in this category, but rather should be classified as data deficient
Minor (MN)	Negative effect on peoples' well-being, such that the alien taxon makes it difficult for people to participate in their normal activities. Individual people in an activity suffer in at least one constituent of well-being (i.e. security; material and non-material assets; health; social, spiritual and cultural relations). Reductions of well-being can be detected through e.g. income loss, health problems, higher effort or expenses to participate in activities, increased difficulty in accessing goods, disruption of social activities, induction of fear, but no change in activity size is reported, i.e. the number of people participating in that activity remains the same
Moderate (MO)	Negative effects on well-being leading to changes in activity size, fewer people participating in an activity, but the activity is still carried out. Reductions in activity size can be due to various reasons, e.g. moving the activity to regions without the alien taxon or to other parts of the area less invaded by the alien taxon; partial abandonment of an activity without replacement by other activities; or switch to other activities while staying in the same area invaded by the alien taxon. Also, spatial displacement, abandonment or switch of activities does not increase human well-being compared to levels before the alien taxon invaded the region (no increase in opportunities due to the alien taxon)
Major (MR)	Local disappearance of an activity from all or part of the area invaded by the alien taxon. Collapse of the specific social activity, switch to other activities, or abandonment of activity without replacement, or emigration from region. Change is likely to be reversible within a decade after removal or control of the alien taxon. "Local disappearance" does not necessarily imply the disappearance of activities from the entire region assessed, but refers to the typical spatial scale over which social communities in the region are characterised (e.g. a human settlement)
Massive (MV)	Local disappearance of an activity from all or part of the area invaded by the alien taxon. Change is likely to be permanent and irreversible for at least a decade after removal of the alien taxon, due to fundamental structural changes of socio-economic community or environmental conditions ("regime shift")
Data deficient (DD)	There is no information to classify the taxon with respect to its impact, or insufficient time has elapsed since introduction for impacts to have become apparent

PRIORITISING ACTION

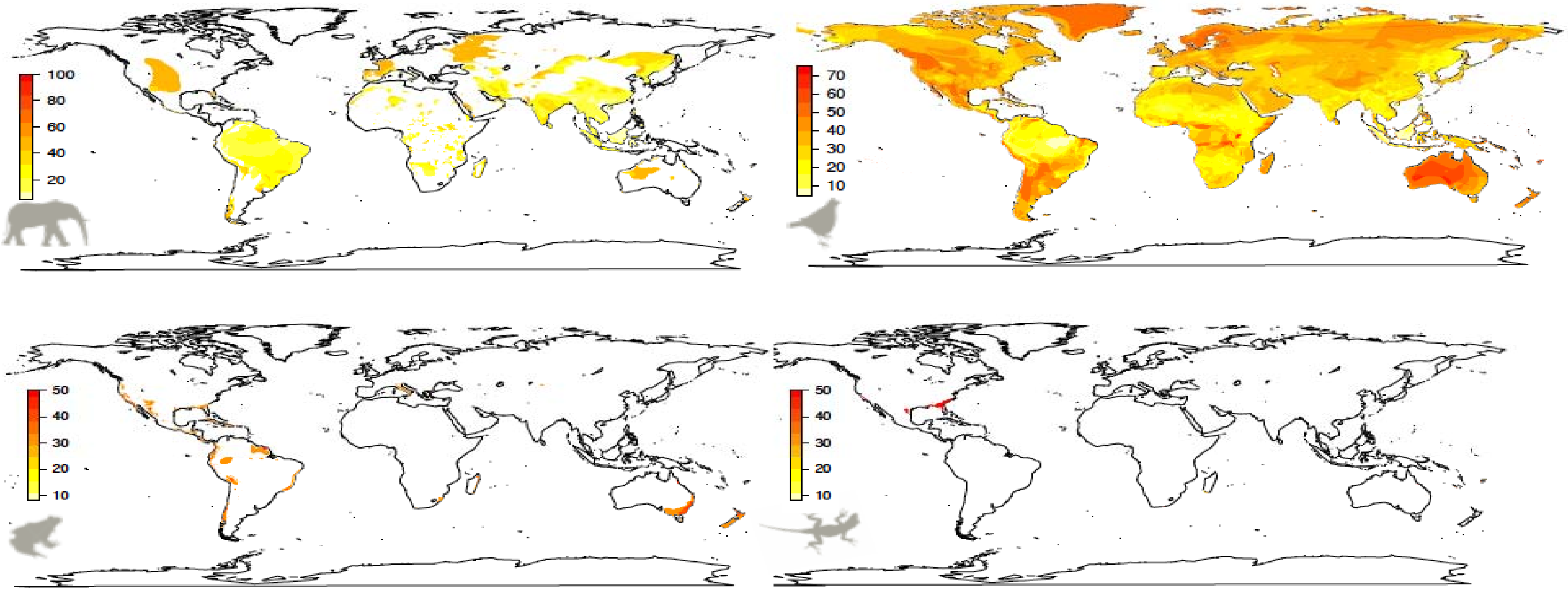
Combining data on the most relevant pathways and on the most harmful IAS can enhance prioritization of action

- Aggregating **pathways** and **invasive specie ranks** can enhance prioritization of prevention and management actions



ASSESSING PRIORITY REGIONS

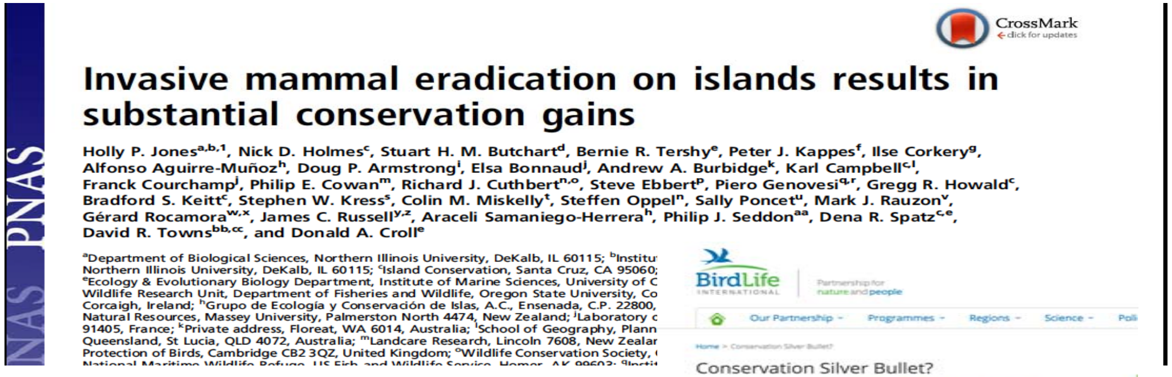
IAS and Red List data to define the most vulnerable regions

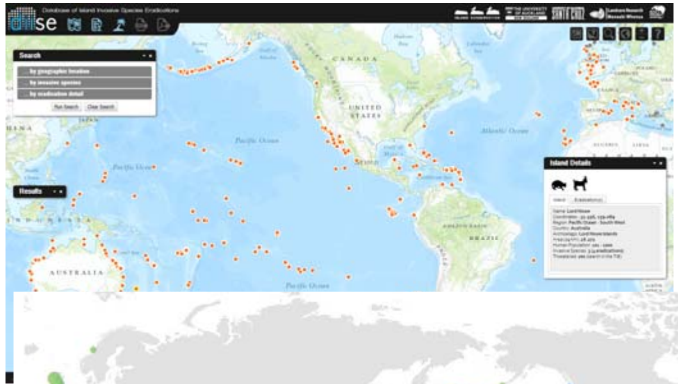


Spatial distribution of the proportion of IAS-threatened species among other threats.

Bellard, Genovesi, Jeschke 2016. Proc Royal Soc Lon B

ERADICATION:
AN EXTREMELY SUCCESSFUL CONSERVATION TOOL





- 825 populations of 329 species on 284 islands documented or predicted to benefit

GLOBAL ERADICATIONS FOR SANITARY PURPOSES

- Two major diseases (smallpox, rinderpest virus) eradicated
- Eradication of two other diseases (polio and dracunculiasis) close to completion

IUCN World Conservation Congress Hawai'i 2016

During the **2016 IUCN World Conservation Congress** in Honolulu, **call for greater action** on invasive alien species in order to **protect biodiversity and human wellbeing**.

"For this aim to be achieved we need to multiply efforts"

Braulio Dias (Exec Sec. CBD) & Piero Genovesi (IUCN ISSG chair) launching the Honolulu Challenge

L-R: Steve Cranwell - Birdlife International, Karen Poiani - Island Conservation, Andy Sheppard - CSIRO (Australia), Piero Genovesi - IUCN ISSG, Key Booth - Dept. Conservation New Zealand & Federico A. Méndez Sánchez - GECI Mexico

Commitments toward the Honolulu Challenge..

Department
for Environment
Food & Rural Affairs

The UK Government commits to ***spending £2.75 million on assisting its Overseas Territories*** *to develop comprehensive* ***biosecurity*** *for invasive non-native species as well as making a substantial contribution to the* ***eradication*** *of mice from Gough Island to save the critically endangered Tristan albatross and Gough bunting as well as other threatened species.*

THE PREDATOR FREE VISION

Officially endorsed by NZ Government in 2016

- All possums, rats and mustelids to be eradicated from New Zealand by 2050
- The estimated cost is c.$3 billion, including Government and private funding
- Predator Free 2050 Ltd has been established to contribute to funding, support and planning



PREDATOR FREE 2050

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ORIGINAL PRESS RELEASE 25 JULY, 2016: New Zealand to be Predator Free by 2050

"Prime Minister John Key has today announced the Government has adopted the goal of New Zealand becoming Predator Free by 2050."

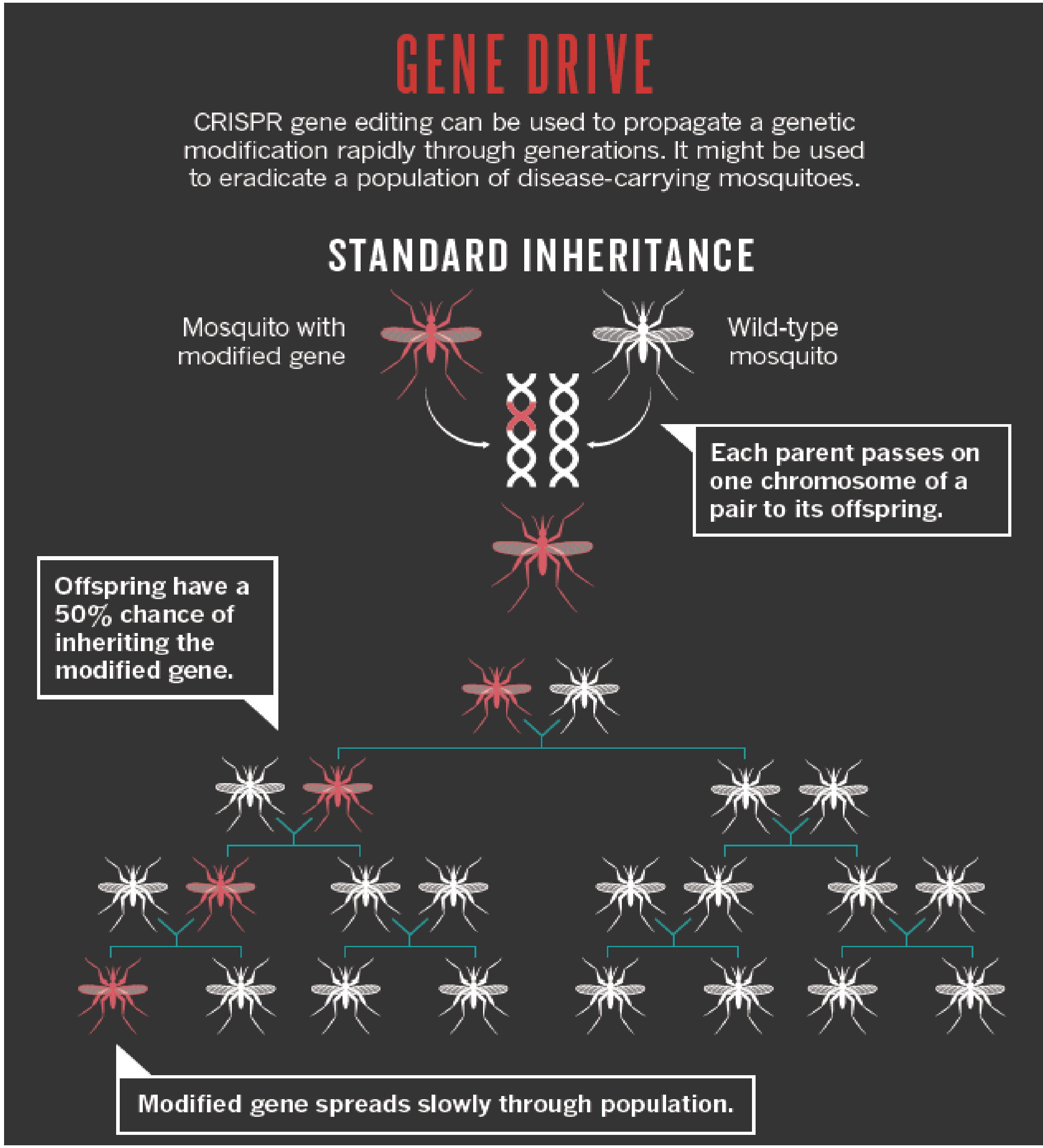
Four interim 2025 goals:

1. Suppress predators on a further 1 million hectares
2. Eradicate predators from at least 20,000 hectares without the use of fences
3. Eradicate predators from island nature reserves
4. Achieve a breakthrough science solution capable of eradicating at least one small mammal predator.

GENE DRIVE

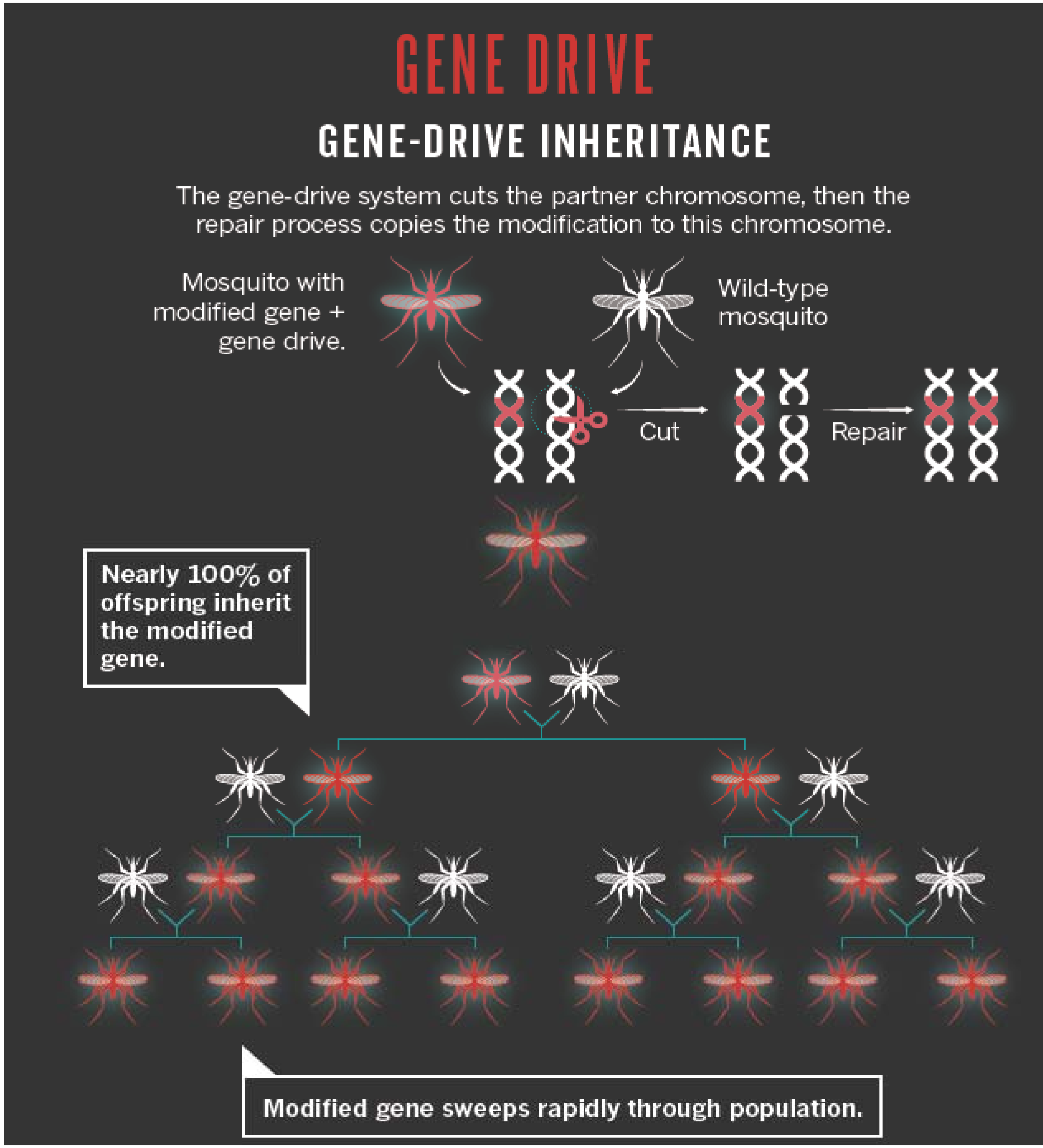
Gene-editing tools, based on technologies (e.g.: CRISTPR-Cas9) that are relatively cheap and easy to use

Publications: Scopus; Patents: The Lens



GENE DRIVE

Gene-editing tools, based on technologies (e.g.: CRISTPR-Cas9) that are relatively cheap and easy to use



Publications: Scopus; Patents: The Lens

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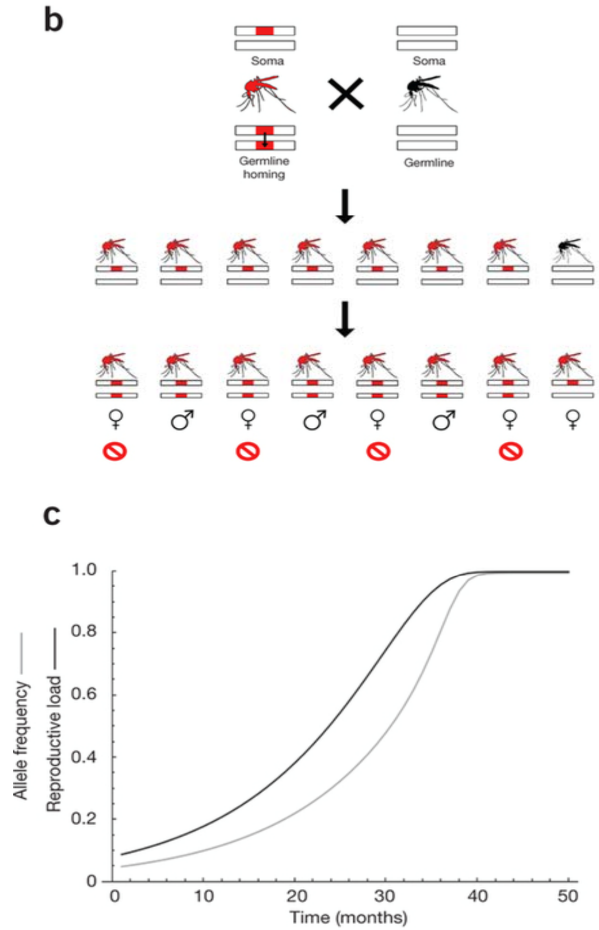
GENE DRIVE

Can CRISPR-Cas9 gene drives curb malaria?

Luke Alphey

Gene drives in mosquitoes to reduce the spread of malaria move closer, though technical and regulatory



Potential applications of gene drive:

Combating diseases such as malaria, dengue and the Zika virus, which account for more than 17% of all infectious diseases, and cause more than 1 million deaths annually. Malaria alone is estimated to cost African countries USD $12 billion/yr.

Hammond et al. 2016. Nature Biotechnology, 34:78-83.

GENE DRIVE

Control of invasive alien species for conservation purposes being investigated: invasive mosquitoes in Hawaii, European carp in Australia, removing the toxicity of Cane toads in Australia…

Based on current progress, products ready for field testing may be 5 years out.

Time to consider the important questions of regulation, risk assessment, ethics, and engagement, and to prepare for assessing an actual application.

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Thank you!