**Factsheet**[1]

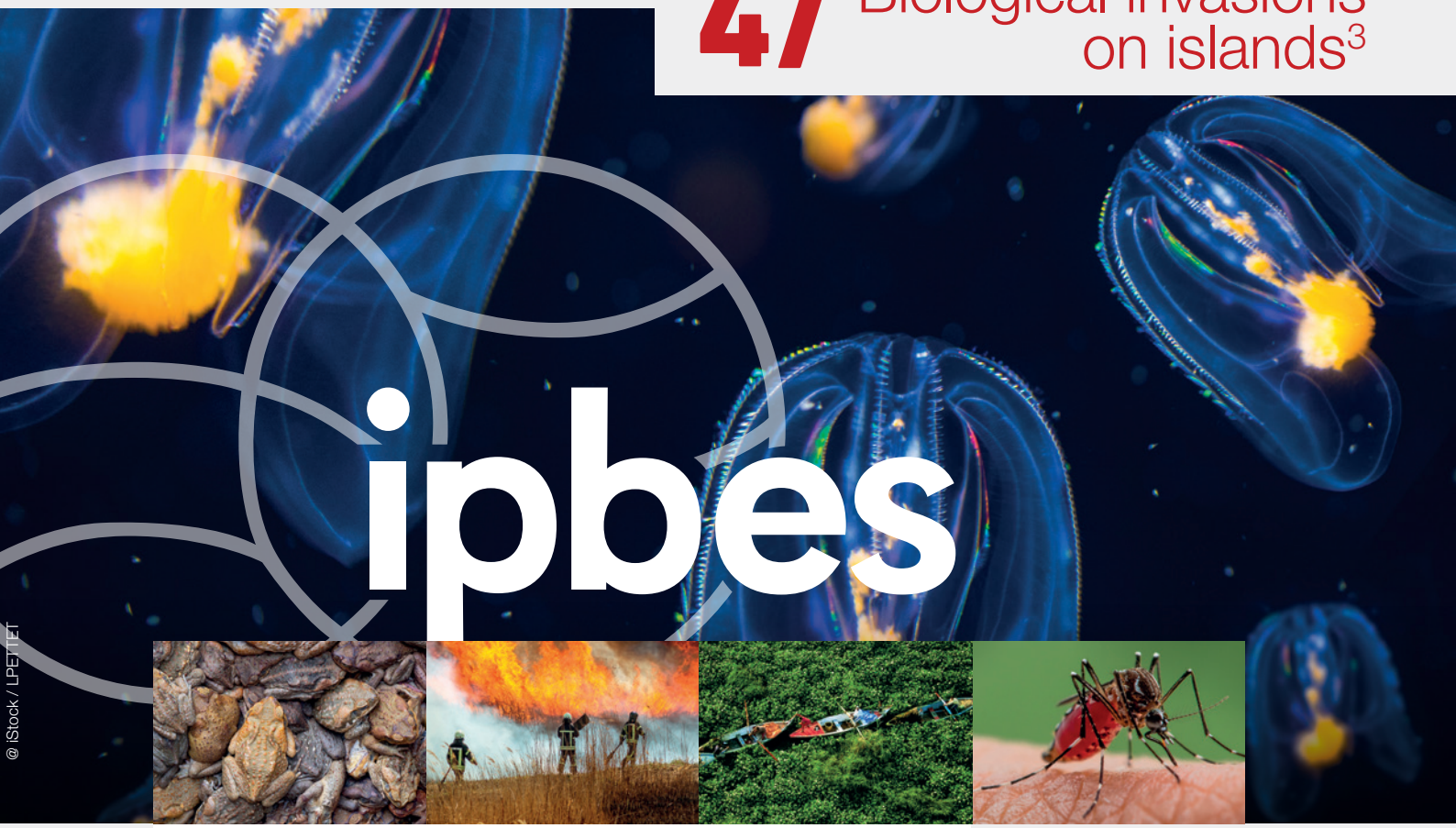
Messages from
the summary for policymakers

The thematic assessment report of

# INVASIVE ALIEN SPECIES AND THEIR CONTROL[2]

Prepared by the co-chairs and technical support unit of the assessment

## 4/ Biological invasions on islands[3]






## Overview

**People and nature are threatened by invasive alien species in all regions of Earth {KM-A1}[4]. On islands, invasive alien species are a major cause of biodiversity loss *(well established)* {A3}.** Some areas protected for nature conservation or remote areas are also vulnerable to the negative impacts of invasive alien species *(well established)* {A3}. For example, on more than a quarter of islands, the number of alien plants exceeds the total number of native plants *(well established)* {A3}. In addition, the majority of documented global extinctions attributed mainly to invasive alien species are reported from islands *(well established)* {A3}.

**Islands are also disproportionately vulnerable to climate change, which can increase the rate of establishment and spread of many invasive alien species *(well established)* {A3}.**

**Management of invasive alien species has been successful in many contexts *(well established)* {C15}.** The use of individual species-based and site-based approaches for the management of multiple invasive alien species has been both successful and cost-effective on biogeographically isolated areas such as small islands *(well established)* {C15}.

1. This factsheet is part of a series of factsheets, which highlight a selection of key elements on specific themes from the Summary for Policymakers of the IPBES Assessment Report on Invasive Alien Species and their Control. For further information and context, please consult the Summary for Policymakers and Chapters of that Assessment Report.

2. IPBES (2023). Summary for Policymakers of the Thematic Assessment of Invasive Alien Species and their Control of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Roy, H.E., Pauchard, A., Stoett, P., Renard Truong, T., Bacher, S., Galil, B.S., Hulme, P.E., Ikeda, T., Kavileveettil, S., McGeoch, M.A., Meyerson, L.A., Nuñez, M.A., Ordonez, A., Rahlao, S.J., Schwindt, E., Seebens, H., Sheppard, A.W., Vandvik, V. (eds.). IPBES secretariat, Bonn, Germany. https://doi.org/10.5281/zenodo.7430692

3. https://zenodo.org/doi/10.5281/zenodo.10057031

4. The references enclosed in curly brackets (e.g., {KM-C1, B11}) are traceable accounts and refer to sections of the Summary for Policymakers of the IPBES Assessment of Invasive Alien Species and their Control. A traceable account is a guide to the section in the summary for policymakers and the chapters that contains the evidence supporting a given message and reflecting the evaluation of the type, amount, quality, and consistency of evidence and the degree of agreement for that statement or key finding.

## What are biological invasions and why are they important on islands?

- **Definition:** The term "biological invasion" is used to describe the process involving the intentional or unintentional transport or movement of a species outside its natural range by human activities and its introduction to new regions, where it may become established and spread {Introduction}. Invasive alien species represent a subset of alien species, known to have established and spread, with negative impacts on biodiversity, local ecosystems and species {Introduction}. Many invasive alien species also have impacts on people {Introduction}.

- **Impacts on nature: On islands, invasive alien species are a major cause of biodiversity loss *(well established)* {A3}.** Globally, invasive alien species harm native species most often by changing ecosystem properties (27 per cent) and through competition between species (24 per cent), predation (18 per cent) and herbivory (12 per cent) *(established but incomplete)* {A2}.
  - 90 per cent of documented global extinctions with invasive alien species as one of the major causes, are reported from islands {A2}.
  - Local extinctions account for 9 per cent of documented impacts of invasive alien species on islands, in contrast to 4 per cent on mainlands {A3}.

- **Impacts on people: Invasive alien species can threaten livelihoods, water and food security, economies and human health *(well established)* {A5}.** Reduction in food supply is by far the most frequently reported impact of invasive alien species on nature's contributions to people {A4}. Invasive alien species can also serve as vectors for infectious zoonotic diseases that can lead to epidemics *(well established)* {A5}. In 2019, global annual costs of biological invasions were estimated to exceed $423 billion, with variations across regions *(established but incomplete)* {A4}. This figure has increased fourfold every 10 years since 1970 and is anticipated to continue rising *(established but incomplete)* {B10}. Invasive alien species can also adversely affect the autonomy, rights and cultural identity of Indigenous Peoples and local communities *(established but incomplete)* through the loss of traditional livelihoods, knowledge and cultural practices *(well-established)* {A6}.

- **Trends and drivers:** The number of alien species is rising globally at unprecedented and increasing rates *(well established)* {B10}. The increase in the transport and introduction of invasive alien species worldwide is primarily influenced by economic drivers, especially the expansion of global trade and human travel *(well established)* {B11}. Projected growth in international trade and movement of people, including tourism, will lead to further pressure on border inspection regimes and could soon overwhelm the biosecurity capability of most countries *(well established)* {B11}. Accelerated establishment and spread of invasive alien species within countries are primarily driven by direct drivers, notably changes in land- and sea-use *(well established)* {B12}.

## Capacity-building and governance options relevant to islands

**Access to adequate and sustained financial and other resources, including international funding to support developing countries, underpins and improves the effectiveness of actions for long-term management of biological invasions**, including eradication, control and ongoing monitoring, by, for example, providing access to modern tools and enhancing capacity to deploy them *(well established)* {C23}.

**Public awareness, commitment and engagement, and capacity-building, are crucial for the prevention and control of invasive alien species {KM-D6}.** Communication strategies based on evidence can help to bring about community action on biological invasions by supporting the co-design of management actions, knowledge exchange and enhanced partnerships among stakeholders {KM-D6}. Engagement by all stakeholders, governments and the private sector helps to optimize management of biological invasions in terms of economic, environmental and social outcomes, particularly when resources are limited *(well established)* {C23}.

**Enhancing research capacity in some regions and collaboration between biological invasion experts and across knowledge systems could improve data and information availability** as well as understanding of the context-specific features of invasive alien species and their impacts *(established but incomplete)* {D32}.

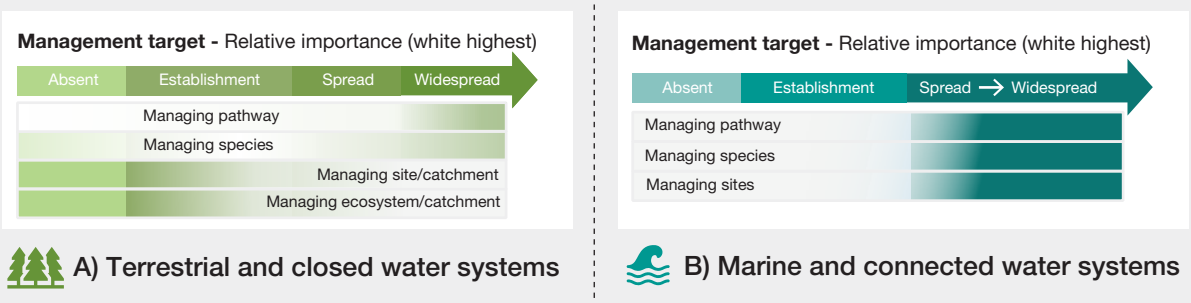
**Collaboration and networking among stakeholders and governments can ensure equitable knowledge access *(established but incomplete)* {D31}.** Open and interoperable information systems, supported by international cooperation, play a critical role in tackling biological invasions *(established but incomplete)* {D31}. Strengthening existing open information systems can facilitate the management of biological invasions, including prioritization of actions, early detection and rapid response, and can improve the effectiveness of regulations *(established but incomplete)* {D31}. The "rate of invasive alien species establishment" headline indicator adopted for monitoring progress towards Target 6 of the Kunming-Montreal Global Biodiversity Framework provides opportunities to build on existing indicators of biological invasions {D31}.

# Managing biological invasions on islands

**Management of invasive alien species has been successful in many contexts *(well established)* {C15}.** There are three options for preventing or reducing the number and negative impact of invasive alien species:

- Pathway management, based on the analysis of pre-border, border, and post-border risks *(well established)* {C15}.
- Species-based management at a local or landscape level, which includes surveillance, early detection and rapid response, eradication, containment and widespread control *(well established)* {C15}.
- Site- or ecosystem-based management, which can both protect and restore native species and ecosystems *(well established)* {C15}.

The use of individual species-based and site-based approaches for the management of multiple invasive alien species has been both successful and cost-effective for biogeographically isolated areas such as small islands *(well established)* {C15}.




**Conceptual diagram of management options across the biological invasion process.**

**Preventing the introductions of invasive alien species is the most cost-effective management option *(well established)* {C17}.** Strictly enforced pre-border quarantine, import controls and border biosecurity have increased interception rates and slowed the rate of invasive alien species arriving and establishing globally *(well established)* {C17}. Effective prevention measures depend on adequate and sustained funding, capacity-building, technical and scientific cooperation and transfer of technology, monitoring, relevant and appropriate biosecurity legislation and enforcement, which is supported by strong infrastructure, quarantine and inspection facilities, including diagnostic support services *(well established)* {C17}. Adoption of regulated species lists with explicit prohibition or permission of the import of specific alien species, underpinned by risk analysis, has been an effective prevention strategy *(well established)* {C17}.

**When prevention fails or is not possible, preparedness, early detection and rapid response are effective at reducing rates of invasive alien species establishment *(well established)* {C18}.** Horizon scanning and risk analysis are examples of the many decision-support tools used to identify and prioritize emerging invasive alien species. General surveillance strategies (e.g., through citizen science, sentinel sites and remote sensing) for detecting new invasive alien species can also underpin effective preparedness *(well established)* {C18}.

**Eradication has been successful and cost-effective for some invasive alien species, especially when their populations are small and slow-spreading in isolated ecosystems such as islands *(established but incomplete)* {C19}.** Over the last 100 years, there have been 1,550 documented examples of eradication on 998 islands, with success cited in 88 per cent of cases *(well established)* {C19}. One of the many examples is French Polynesia, where *Rattus rattus* (black rat), *Felis catus* (cat), *Oryctolagus cuniculus* (rabbits) and *Capra hircus* (goats) have been successfully eradicated *(well established)* {C19}. The success of eradication programmes depends on the support and engagement of relevant stakeholders and Indigenous Peoples and local communities *(well established)* {C19}.

**When eradication is not possible for different reasons, invasive alien species can be contained and controlled, particularly in terrestrial and closed water systems *(well established)* {C20}.** Containment of invasive alien species can be achieved with physical, chemical and biological control actions or in combination *(well established)* {C20}.

**The integration of site- and/or ecosystem-based management, including ecosystem restoration, can improve management outcomes**, enhancing ecosystem function and resilience to environmental change, including future invasive alien species, especially under climate and land-use change *(well established)* {C21}. The success of any applied adaptive site- or ecosystem-based management approach, including ecosystem restoration, depends on long-term monitoring to assess management efficacy, using ecological and social indicators *(established but incomplete)* {C21}.

| GAP | IMPLEMENTATION CHALLENGE | | POTENTIAL GAIN | |
|---|---|---|---|---|
| | Estimated research cost | Estimated scientific challenge | For taking management action | For better understanding biological invasions |
| Incomplete or lack of inventories of invasive alien species in marine, tropical and Arctic ecosystems {2.5.2.1, 2.5.2.4, 2.5.2.5, 2.5.4} | | | | |
| Poor understanding of drivers of change that facilitate biological invasions in aquatic and marine systems {3.6.1} | | | | |
| Lack of data on successful restoration attempts in terrestrial and marine systems {5.5.6, 5.6.2.1} | | | | |
| Lack of integration of impact data and knowledge sources across languages {4.7.2} | | | | |
| Incomplete data to prioritize biological invasion management under climate, sea- and land-use change {5.6.1.3} | | | | |
| Lack of inventories at fine scales and for specific taxon and biome contexts to support decision-makers in determining when to implement species-led or site-based management (or both) {5.6.2.1, 5.7} | | | | |
| Lack of control options for marine invasive alien species and invasive microbial fungal pathogens of plants and animals {5.6.1.1} | | | | |
| Lack of methods of managing pathways for invasive alien species arriving as contaminating invasive alien species, or through shipping containers, e commerce (legal/illegal), biofouling or ports {Table 5.11, 5.6.2.4} | | | | |
| Design principles for an integrated governance system to manage biological invasions {6.7.2.3, 6.7.3} | | | | |
| Lack of mechanisms that allow effective collaboration among different aspects of the socioecological systems {Figure 6.7, 6.7} | | | | |
| Lack of information on invasive alien species status and trends on land and water managed by Indigenous Peoples and local communities {Box 2.6} | | | | |
| Lack of information on Indigenous and local knowledge, values and culture regarding the drivers and impact of invasive alien species on land and water managed by Indigenous Peoples and local communities {1.6.7.1, Box 3.12} | | | | |
| Lack of understanding of and mechanisms for sharing knowledge on invasive alien species and their drivers, impact, management and governance among Indigenous Peoples and local communities and researchers and other outsiders {6.6.1.5} | | | | |
| Lack of consideration of the knowledge and perceptions of Indigenous Peoples and local communities in scenarios and models {1.6.7.3, 4.7.1, 6.6.1.6} | | | | |

VERY LOW LOW INTERMEDIATE HIGH VERY HIGH

## Knowledge and data gaps relevant to islands

Synthesis of the most important knowledge and data gaps identified and collated through the assessment.

UN environment programme unesco Food and Agriculture Organization of the United Nations UNDP ipbes