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

5/ Invasive alien species management and governance[3]

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Overview

Invasive alien species cause dramatic and, in some cases, irreversible changes to biodiversity and ecosystems, resulting in adverse and complex outcomes across all regions of Earth, including local and global species extinctions {KM-A2}[4]. The economy, food security, water security and human health are profoundly and negatively affected by invasive alien species {KM-A3}.

Invasive alien species and their negative impacts can be prevented and mitigated through effective management {C}, which includes decision support tools; prevention (supported by regulation) and preparedness planning and actions; eradication, containment and control of invasive alien species; site- and ecosystem-based management; and ecosystem restoration {Introduction}.

The Kunming-Montreal Global Biodiversity Framework provides an opportunity for national governments to develop or update aspirational, ambitious and realistic approaches to prevent and control invasive alien species {KM-D3}. With sufficient resources, political will and long-term commitment, preventing and controlling invasive alien species are attainable goals that will yield significant long-term benefits for people and nature {KM-D7}.

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.10057035

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 the approaches, decision-framework and tools available to manage biological invasions?

There are three options for preventing or reducing the number and negative impact of invasive alien species {C15}:

- Pathway management, based on the analysis of pre-border, border, and post-border risks, can prevent the movement and spread of invasive alien species through surveillance and the implementation of biosecurity response measures *(well established)*.
- Species-based management at a local or landscape level, which includes surveillance, early detection and rapid response, eradication, containment and widespread control (including biological control) of invasive alien species. This approach can be applied throughout the biological invasion process *(well established)*.
- Site- or ecosystem-based management, which can both protect and restore native species and ecosystems *(well established)*.

There are effective **decision-making frameworks and tools** that can support management of biological invasions *(well established)* {C16}. Frameworks and tools have been developed based on evidence from practice, science and other knowledge systems, including those of Indigenous Peoples and local communities. These can underpin impact assessment, monitoring and prioritization of intentional and unintentional introduction pathways, species and sites for the successful management of biological invasions *(well established)* {C16}.

Preventing the introductions of invasive alien species is the most cost-effective management option *(well established)* {C17}.

Prevention measures through pathway management, including 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}.

When prevention fails or is not possible, **preparedness, early detection and rapid response** are effective at reducing rates of invasive alien species establishment in terrestrial and closed water systems, and critical for marine and connected water systems *(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 to support 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}.

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}.

Adaptive management, including ecosystem restoration, can improve the control of invasive alien species and support the recovery of nature's contributions to people in terrestrial and closed water systems *(well established)* {C21}. 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}. Adaptive co-management includes capacity-building; co-creation, co-design, co-development and co-implementation; social learning; and broad partnerships *(established but incomplete)* {C23}.

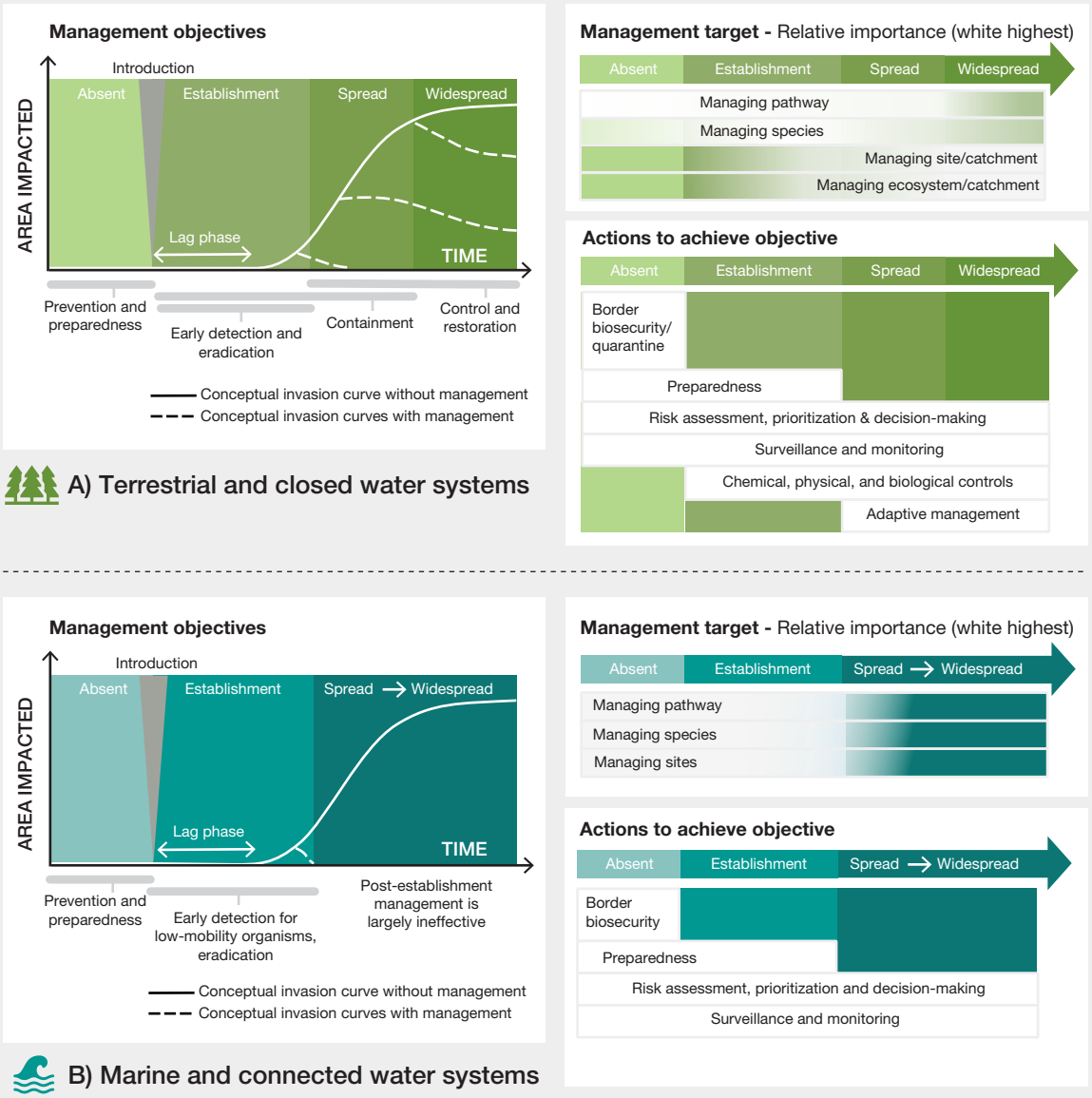
The objectives and some actions for managing biological invasions.

All management approaches may have non-target impacts as indicated by the superscript a.

Objectives	Management actions
Prevention and preparedness	Horizon scanning
	Import controls and border biosecurity
	Pathway management
	Risk analysis
Early detection	Surveillance
	Diagnostics
Eradication	Physical eradication[a]
	Chemical eradication[a]
	Adaptive management
Containment and control	Physical control[a]
	Chemical control[a]
	Biological control[a]
	Adaptive management
Ecosystem restoration	Adaptive management
Public understanding	Public engagement

Management in marine areas

While some management approaches can be applied at multiple scales across terrestrial and closed water systems *(well established)*, pathway management (e.g., ballast water and biofouling) is by far the most effective option for managing biological invasions in marine and connected water systems *(well established)* {C15}.



Conceptual diagram of management-invasion continuum.

Management objectives panels A and B show the generalized invasion curve without management and the expected changes in the trajectory of the invasion curve with appropriate management actions in (A) terrestrial and closed water systems (including lakes and coastal systems such as salt marshes) and (B) marine and connected water systems (including rivers). Post-establishment management actions (such as containment and control) are not shown in panel B as they are generally not achievable in such systems. In a management context, the first detection (introduction point), lag phase and exponential spread phase are important points at which to implement an early detection and rapid response management plan. This figure is conceptual, and the curves do not represent actual population dynamics of invasive alien species.

Stakeholder engagement, capacity-building and sustained resourcing are critical to the success of adaptive management *(well established)* {C23}. The knowledge, practices, values and customary governance systems of Indigenous Peoples and local communities can improve management outcomes *(established but incomplete)* {C24}; many communities successfully manage biological invasions on their lands *(established but incomplete)* {C24}. Multi-stakeholder engagement, including risk communication, and context-specific application can improve public acceptability and adoption of new tools and technologies for managing biological invasions *(well established)* {C22}. Potential benefits and risks of novel technologies can be assessed using a risk assessment and risk management framework in line with a precautionary approach, as appropriate *(well established)* {C22}. Using this framework in consultation with regulators, stakeholders and Indigenous Peoples and local communities, can also limit the potential for unintended consequences *(well established)* {C22}. However, most countries do not have the regulatory frameworks and/or technical capabilities needed to guide development and implementation of new tools and technologies *(established but incomplete)* {C22}.

Tools and technologies increase efficacies when managing biological invasions and controlling invasive alien species, with many new options emerging *(established but incomplete)* {C22}. New approaches can be integrated with existing management actions to support site- and ecosystem-based management and restoration *(established but incomplete)* {C22}.

What are governance approaches to manage biological invasions?

Management of biological invasions and prevention and control of invasive alien species can be achieved through a context-specific integrated governance approach with a set of complementary strategic actions *(established but incomplete)* {D25}:

1. Enhance coordination and collaboration across international and regional mechanisms *(established but incomplete)*;
2. Develop and adopt effective and achievable national implementation strategies *(well established)*;
3. Share efforts and commitments and understanding of specific roles of all actors *(established but incomplete)*;
4. Improve policy coherence *(well established)*;
5. Engage broadly across governmental sectors, industry, the scientific community, Indigenous Peoples and local communities and the wider public *(established but incomplete)*;
6. Support, fund and mobilize resources for innovation, research and environmentally sound technology *(established but incomplete)*;
7. Support information systems, infrastructures and data sharing *(established but incomplete)*.

National-scale strategies and action plans are instrumental to successfully manage biological invasions as part of a context-specific integrated governance approach *(well established)* {D27}. The national strategies and action plans could be developed or updated to align with and implement the Kunming-Montreal Global Biodiversity Framework, in particular Target 6, as well as other relevant international guidelines for sustainable development through aspirational, ambitious and realistic approaches *(well established)* {D27}.

Integrated governance of biological invasions.

A context-specific integrated governance approach to biological invasions is enabled by a governance system with properties that support integration, and a set of strategic actions.

Successfully addressing biological invasions can also strengthen the effectiveness of policies designed to respond to other drivers *(established but incomplete)* {D33}. An integrated governance approach that acknowledges the interactions between invasive alien species and other drivers, including climate change, direct exploitation of natural resources, pollution and land- and sea-use, alongside human, animal and plant health, can identify where to best direct policy alignment and mutually supportive efforts *(established but incomplete)* {D33}. Evidence-based policy planning can reflect the interconnectedness of the drivers so that efforts to solve one problem do not exacerbate the magnitude of others and may even have multiple benefits *(established but incomplete)* {D33}.

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