Toward IUCN Guidelines to manage invasive alien species in Protected Areas

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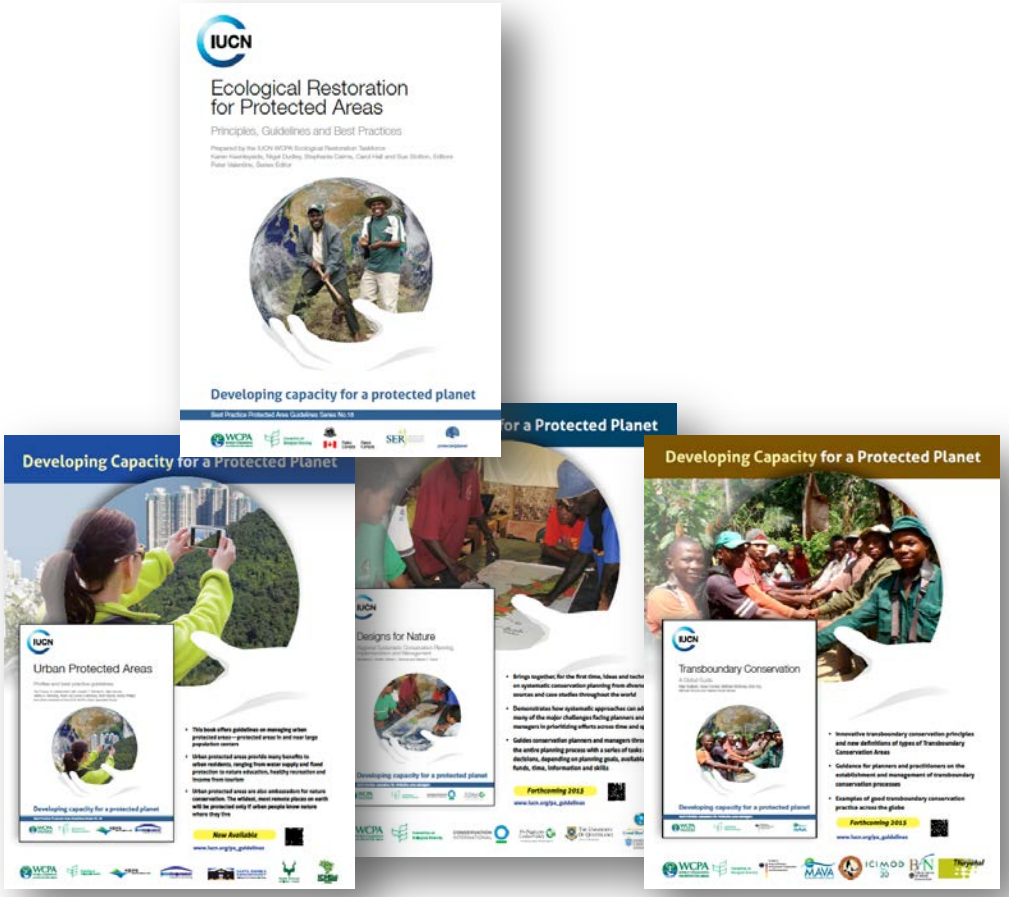
IUCN WORLD PARKS CONGRESS SYDNEY 2014

BEST PRACTICE

PAs can play a major role in managing key invaders, to protect global biodiversity

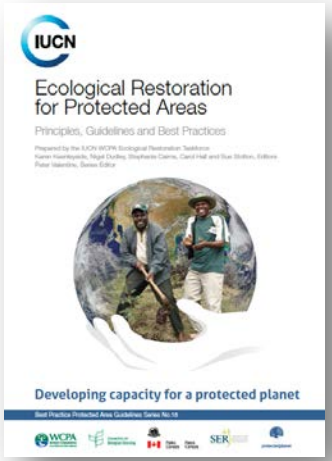
BEST PRACTICE

Best Practice Protected Area Guidelines Series



OUTLINE

1. How to use
2. IAS and PAs, key concepts
3. Principles and guidelines
4. Best practices
5. Defining a management plan on IAS
6. Case studies
7. References and useful resources



PRINCIPLE 1: Effective in re-establishing and maintaining protected area values

To be effective, ecological restoration for protected areas should:

Guideline 1.1: 'Do no harm' by first identifying when active restoration is the best option

Decisions about whether, when and how to restore need to be made with caution; ecological restoration projects have high failure rates and sometimes the best choice is not to intervene. Issues to consider include: (a) whether active restoration is needed (e.g., whether simply removing pressure would result in natural recovery; *see* Holl & Aide, 2011); (b) whether it is feasible, from a practical, cost and social perspective; and (c) if there are serious risks of harmful side effects, which implies the need for a careful impact analysis. Ill-conceived interventions can have unintended indirect or long-term consequences (Suding et al., 2004). For example, cane toads (*Bufo marinus*) were deliberately introduced to Australia in 1935 in a futile attempt to stop cane beetles from destroying sugar cane crops in North Queensland. Since then cane toads have spread rapidly, as they have no natural predator, and are thought to be responsible for the decline in quoll (a native carnivorous marsupial) and native frogs (CSIRO, 2003).

Guideline 1.2: Re-establish ecosystem structure, function and composition

The need to restore will often be identified because a measure of ecosystem structure or function falls below a pre-determined threshold (see Chapter 5). Ecological restoration will generally aim to re-establish an ecosystem capable, as far as possible, of continuing to function, with species diversity and interactions typical of its geographic, geological and climatic situation. The restored ecosystem may reflect historical conditions or may be a culturally-defined mosaic or a novel ecosystem evolving due to climate change. The degree of intervention, timescale and approach will depend on how far degradation has advanced (see Chapter 2). Changes in management, such as the frequency of removal of invasive species, may be all that is required to meet restoration objectives. Other cases require dedicated projects, such as habitat recreation or species re-introduction. Where degradation is advanced, abiotic properties (e.g., soil quality) may need to be restored before biological components can be manipulated. The extent to which restoration seeks to return to an historical ecosystem or reflects current and predicted changes must be decided on a case by case basis (see Chapter 5).

1.2.1.3 Control of invasive alien species (IAS)

a. **Aim first to prevent the introduction of IAS by: (i) using outreach to influence visitor behaviour to avoid spread of IAS; (ii) minimizing disturbances that can help IAS spread; (iii) avoiding introduction and spread of IAS during restoration; (iv) implementing strategies to ensure that increasing connectivity within and between protected areas does not create pathways for IAS.**
The 'Weedbusters Campaign' in Palau has run annual 'Invasive Weed Cleanup' days to control and inform about invasive alien species such as mile-a-minute weed (*Mikania micrantha*) and a booklet describing 11 species targeted for management was produced (Shine et al., 2002). The spread of the alien black locust (*Robinia pseudoacacia*) outside urban areas in South Korea is closely linked to human disturbance patterns (Lee et al., 1994) although in undisturbed conditions it will be shaded out and replaced by native species (Aronson et al., 1993).

b. **Recognize that large-scale global changes are resulting in the spread of IAS into protected areas and that while this may be a focus of restoration, not all alien species can be either prevented or eradicated.**
In New Zealand, invasion by introduced mammals like possum, stoats and rats is so pervasive that eradication is impossible even in national parks; instead rangers and volunteers use trapping to establish safe areas within parks, where threatened endemic ground-nesting birds can raise young (Parkes & Murphy, 2003).

c. **Focus efforts on managing harmful alien species (e.g., those competing with ecologically important native species or altering ecological processes).**
There are over 100 alien plant species in Snowdonia National Park, Wales, but control focuses on the highly invasive *Rhododendron ponticum* and Japanese knotweed (*Fallopia japonica*). For most island states and particularly in Australia a key consideration is the critical role of IAS in suppressing ecological structures and functions. It has been found that fencing to exclude predatory species may be an essential part of ecological restoration. For example in the Peron Peninsula in Shark Bay World Heritage area in Western Australia, a fence was constructed across the base of the peninsula to exclude feral species responsible for extinctions. Project Eden, as the work is called, is a work in progress[7].

d. **Prioritize management of IAS by: (i) wherever possible eradicating new IAS; (ii) eradicating or controlling existing IAS; (iii) ignoring alien species that do not significantly affect protected area values; (iv) recognizing potential *negative* effects of removing alien species.**
Mosquito ditching on Little Pine Island, Charlotte Harbor Preserve State Park, Florida, USA, destroyed freshwater, brackish and saltwater habitats consisting of exotic plants displacing native vegetation. Infestations of the following exotic tree species were removed from over 800 ha: melaleuca (*M. quinquenervia*), Australian pine (*Casuarina equisetifolia*) and Brazilian pepper (*Schinus terebinthifolius*). Filling canals restored freshwater systems and tidal flows. Dormant native seeds have sprouted to produce well-balanced ecosystems replete with wildlife[8] (Erwin, undated).

e. **Consider using restoration of non-invasive native species (e.g., those with similar seral and life history characteristics to compete with aliens) as a means of replacing or controlling IAS.**
The Mauritian Wildlife Foundation has worked in the island of Rodrigues to restore 13 ha of native forest in Grande Montagne reserve and 8 ha in Anse Quitor reserve, now the largest contiguous native forests on the island, to help block the spread of invasive plant species (Payendee, 2003).

f. **If control is needed, where possible use methods that replicate natural processes, e.g., managing total grazing pressure, shading out invasive species, or protecting natural predators by considering multi species interactions.**
In southern Brazil, invasive *Brachiaria* grass species from Africa were controlled by shading through the appropriate choice and planting of native species with rapid growth and dense crown (Ferretti & de Britez, 2006).

g. **More active controls can be mechanical (physically removing the invasive species), chemical or biological. If chemical or biological controls are considered to be essential, ensure best practices for human health and to avoid environmental side effects on non-target species.**

IAS and PAS. Key concepts:

- IAS affect biodiversity, the maintenance of ecosystem services that are crucial also to human livelihood.
- These impacts are expected to grow in the future, as invasions increasingly interlink with other factors of change such as climate change, habitat loss and human pressure
- A number of treaties, policies, legal instruments and position statements deal with the threats of invasive species to protected areas and the need for management of this threat in protected areas to preserve biodiversity (e.g. CBD COP 10th in Nagoya (2010) Decision X/31, IUCN World Park Congress in Durban (2003)).

IAS and PAS. Key concepts:

- Urgent to improve the management of IAS in PAs
- "*Letting nature take its course*" is not a strategy that can be used for IAS
- Protected areas can and should play a major role in the struggle against IAS, not only by improving the efficacy of management within their territories, but also:
  - monitoring the patterns of invasions
  - raising awareness at all levels
  - improving the capacity of practitioners to deal with invaders
  - implementing site-based prevention efforts
  - enforcing early detection and rapid response frameworks
  - catalyzing action also beyond the protected area boundaries

IAS and PAS. Key concepts:

- PAs provide a valuable source of information on the effects of IAS as well as the dynamics of invasions
- PAS also have greater applied knowledge through research, monitoring and management. Great potential for using protected areas as a model for a better understanding of impacts, restoration, monitoring and human dimensions of biological invasions in natural systems

IAS and PAS. Key concepts:

- **PAs cannot stop invasions**, but can indeed be important in preventing and mitigating the global effects of this threat by being reservoirs of the heritage of native species and ecosystems
- They can also be used as **sentinels** of incursions to speed up response at all levels, and **champions** for increasing information and awareness within the different sectors of the society, as well as **catalysts** for action at all scales.

PRINCIPLES

1. *Barriers and sentinels against invasive species*
2. *Catalysts of action at all levels*
3. *Laboratories for developing solutions*
4. *Champions for increasing information and awareness within the different sectors of society*

Guidelines

1: *Barriers and sentinels against invasive species*

- Guideline 1.1: Enforce surveillance and monitoring, compile data, network to ensure information exchange
- Guideline 1.2: Integrate IAS in the broader Protected Area planning, set priorities of intervention
- Guideline 1.3: Implement site-based prevention actions
- Guideline 1.4: Develop and enforce appropriate and effective plans for managing priority IAS
- Guideline 1.5: Detect rapidly new incursions, and set up prompt response frameworks

2: *Catalysts of action at all levels*

- Guideline 2.1: Engage with the local communities to improve collaboration on prevention and management
- Guideline 2.2: Manage IAS beyond the PA boundaries
- Guideline 2.3: Lobby with institutions and decision-makers to promote the adoption of stringent policies

3: *Laboratories for developing solutions*

- Guideline 3.1: Act as a science-hub
- Guideline 3.2: Develop science-based management solutions

4: *Champions for increasing information and awareness*

- Guideline 4.1: Mainstream rigorous and targeted information
- Guideline 4.2: Improve staff capacities and awareness on all aspects of IAS management
- Guideline 4.3: Raise awareness on IAS at all levels

Other contents

- Multi-steps decision-making process for defining a management plan of IAS for PAs
- Set of detailed case studies (for ex: Management of IAS in the Kruger National Park)
- Examples, from boxes to brief texts

Possible additions

- Glossary of key terms
- More detailed technical guidance and manuals, including web resources, a reference list, including suggested further readings

PROGRAM OF WORK

1. *Lessons learned at WPC*
2. *Inputs from discussion during this session*
3. *Inputs on outline*
4. *Compilation of Best practices (30-50) and Examples*
5. *Selection of Case studies (15-20)*

1: *Barriers and sentinels against invasive species*

1.1: Surveillance and monitoring, information exchange
1.2: Integrate IAS in the broader PA planning, priority setting
1.3: Implement site-based prevention actions
1.4: Enforce effective plans for managing priority IAS
1.5: Detect rapidly new incursions, set up prompt response

2: *Catalysts of action at all levels*

2.1: Engage with the local communities, prevention and management
2.2: Manage IAS beyond the PA boundaries
2.3: Lobby to promote the adoption of stringent policies

3: *Laboratories for developing solutions*

3.1: Act as a science-hub
3.2: Develop science-based management solutions

4: *Champions for increasing information and awareness*

4.1: Mainstream rigorous and targeted information
4.2: Improve staff capacities and awareness on all aspects ref IAS
4.3: Raise awareness on IAS at all levels