



Agenda Item: CEP 10a  
Presented by: SCAR  
Original: English  
Submitted: 04/05/2015

## **Monitoring biological invasion across the broader Antarctic: a baseline and indicator framework**



# Monitoring biological invasion across the broader Antarctic: a baseline and indicator framework

*Information Paper submitted by SCAR*

## **Summary**

The introduction of non-native species is a key priority of the CEP. In consequence, some monitoring of the number and impacts of non-native species is undertaken in parts of Antarctica. At present, however, an appropriate system for tracking the number of non-native species, those which are invasive or likely to become so, their impacts, and regulatory or other responses to the problem is unavailable. Here we report on a recently developed framework (the *Antarctic Biological Invasion Indicator* (ABII), which applies global best practice to the problem. It not only provides a comprehensive baseline on the current status of biological invasions in Antarctica, but also provides a mechanism to facilitate information exchange across the broader Antarctic region. The paper recommends consideration by the CEP of the potential value of the ABII for helping to address one of its key priorities.

## **Background**

Non-native species have long been recognised as a key threatening process in the Antarctic region, with high potential for serious and negative impacts on indigenous biodiversity. Indeed, non-native species remain a key priority of the CEP.

Much information is now available on the likely risks posed to the Antarctic Environment by marine and terrestrial non-native species (e.g. Rogan-Finnemore 2008; ATCM XXXII SP11 *Topic Summary of CEP discussions on Non-native species (NNS) in Antarctica*). Recommendations for actions to mitigate the introduction and impacts of such species have also been made and are included in the CEP's Non-Native Species Manual (ATCM XXXIV Resolution 6 (2011) *Non-Native Species*) and in the COMNAP/SCAR Checklists for Supply Chain Managers (ATCM XXXIV WP012).

New information on non-native species continues to be considered by the CEP, including risks from various activities (ATCM XXXV WP005 *Outcomes of the International Polar Year Programme: Aliens in Antarctica*; ATCM XXXV WP006 *Reducing the risk of inadvertent non-native species introductions associated with fresh fruit and vegetable importation to Antarctica*; ATCM XXXVI WP019 *Report on the Research Project "The Impact of Human Activities on Soil Organisms of the Maritime Antarctic and the Introduction of Non-Native Species in Antarctica"*), and new species being documented (ATCM XXXVII IP023 *Colonisation status of known non-native species in the Antarctic terrestrial environment* (updated 2014)).

Although the focus on non-native species in the Antarctic has been significant, currently no system exists for systematically tracking trends in invasion, or tracking progress towards managing the problem, and no formal baseline of invasion across the region has yet been established. Similarly, no system is in place for systematically documenting impacts by invasive alien species, nor for tracking policy and/or management responses. Indeed, little systematic reporting is undertaken, and few mechanisms are available that promote information sharing on invasive alien species problems, management interventions, and policy developments across the region. Much concern exists about this situation (e.g. Hughes *et al.* 2015)

### ***The Antarctic Biological Invasion Indicator***

The recently developed *Antarctic Biological Invasion Indicator* (ABII) (McGeoch *et al.* 2015) provides a means to address these deficiencies in the evidence base for management of non-native species. It is based on the driver-pressure-state-response framework; a general framework advocated by the Organisation for Economic Cooperation and Development (OECD) and widely adopted for global monitoring of biodiversity outcomes (Butchart *et al.* 2010). The rationale underpinning this indicator framework is that tracking trends in the drivers of invasion (or introduction of non-native species), and in the numbers of non-native species and their impacts on the state of biodiversity, will inform effective policy and management responses. In turn these should result in a reduction in the pressure, and improvement in the status of biodiversity.

By utilizing this framework and documenting data on:

- 1) the type and extent of human activities (Driver),
- 2) the abundance and distribution of alien and invasive species (Pressure);
- 3) the trends in the conservation status of threatened species (State), and
- 4) policy adoption and activities relevant to invasion management (Response)

McGeoch *et al.* (2015) showed that:

- invasion drivers are significant and extensive across the region and are increasing,
- among the metazoans (microbiota were not considered) plants and insects make up the majority of invasive species, and that a significantly higher proportion of non-native species have impacts in the region than is generally the case elsewhere on the globe,
- the conservation status of threatened species impacted by invasive species is declining,
- trends in policy responses relevant to the prevention and control of invasive alien species have been strongly positive over the last three decades. However, information on national invasive species prevention and control legislation and plans specifically relevant to Antarctic activities was often lacking.

### ***Conclusions and recommendation***

The driver-pressure-state-response framework for monitoring and managing invasions in the Antarctic provides an immediate picture of status, and potentially of trends in both the threats posed by non-native species and responses to them.

The latter is dependent on further monitoring and surveillance in the region, and on a system for collating and sharing this information. By collecting data in a manner consistent with the ABII framework, and making this data available, national programs and others could contribute significantly to a broader understanding of invasive impacts in Antarctica, and the best way to manage and mitigate these impacts.

It is recommended that the Committee for Environmental Protection consider this new development, which has much potential to assist its work in addressing the key priority of non-native species.

**References**

Butchart, S.H., Walpole, M., Collen, B., Van Strien, A., Scharlemann, J.P.W., *et al.*, (2010) Global biodiversity: indicators of recent declines. *Science* **328**, 1164 – 1168

Hughes, K. A., Pertierra, L. R., Molina-Montenegro, M. A. & Convey, P (2015) Biological invasions in terrestrial Antarctica: what is the current status and can we respond? *Biodiversity and Conservation* DOI 10.1007/s10531-015-0896-6.

McGeoch, M.A., Shaw, J.D., Terauds, A., Lee J.E. & Chown, S.L. (2015) Monitoring biological invasion across the broader Antarctic: a baseline and indicator framework. *Global Environmental Change* **32**, 108-125.

Rogan-Finnemore, M. (Ed.). (2008) *Non-native Species in the Antarctic. Proceedings*. Gateway Antarctica Special Publication Series Number 0801, University of Canterbury, Christchurch.