

## **The Global Invasive Species Database (GISD) and international information exchange: using global expertise to help in the fight against invasive alien species**

M De Poorter and M Browne

*IUCN-SSC Invasive Species Specialist Group<sup>1</sup>, University of Auckland, New Zealand*

*Emails: m.depoorter@auckland.ac.nz m.browne@auckland.ac.nz*

### **ABSTRACT**

Sharing information and expertise internationally on the ecology, impacts and practical management of invasive alien species (IAS) is a priority for successful management. In addition, knowledge of past invasiveness of IAS elsewhere is critical information for use in pest and weed risk assessments to prevent new invasions. International "vehicles" for such exchange of information and expertise are described, including; 1) The Global Invasive Species Database (GISD); 2) the planned development a global master list of invasive species; 3) Aliens-L and other listservers and; 4) the planned development of a Global Invasive Species Information Network. Discussion includes the role of a centralised database like the Global Invasive Species Database in the context of a distributed network and recent thinking on the "Conservation Commons".

### **INTRODUCTION**

Since 1999, the International Plant Protection Convention (IPPC) has been clarifying its role with regards to invasive alien species<sup>2</sup> (IAS) - sensu CBD- that are plant pests. This includes clarification on how environmental impacts are included under the term "economic harm" (ISPM 5)<sup>3</sup> and a revision of the standard for Pest Risk Analysis for Quarantine Pests (ISPM 11 Rev1)<sup>4</sup>. In order to adequately include environmental impacts into their mandate, Plant Protection Agencies will need to deal with a wide scope of impacts, and often with a high level of ecological complexity (De Poorter 2003, De Poorter & Clout 2005). Sharing information and expertise internationally on the ecology, impacts and management of such IAS is a priority. In addition, knowledge of past invasiveness elsewhere is particularly important in assessing potential risks from new introductions<sup>5</sup> given that "Only one factor has consistently high correlation with invasiveness: whether or not the species is invasive elsewhere" (Wittemberg and Cock 2001). The Invasive Species Specialist Group (ISSG) is

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<sup>1</sup> The Invasive Species Specialist Group (ISSG) is a network of expert volunteers, organised under the auspices of the Species Survival Commission of IUCN (The World Conservation Union). Its mission is: *to reduce threats to natural ecosystems and the native species they contain, by increasing awareness of alien invasions and of ways to prevent, control or eradicate them* (Website: [www.issg.org](http://www.issg.org)).

<sup>2</sup> "invasive alien species" means an alien species whose introduction and/or spread threaten biological diversity (CBD, 2002)

<sup>3</sup> <http://www.ippc.int/IPP/En/ispm.jsp>

<sup>4</sup> <http://www.ippc.int/IPP/En/Archive/IAS2003/IAS-WORKSHOP-Home.htm>

<sup>5</sup> "introduction" refers to the movement by human agency, indirect or direct, of an alien species outside of its natural range (past or present). This movement can be either within a country or between countries or areas beyond national jurisdiction; (CBD COP6, 2002) (Note that this definition is different from that of "introduction" under IPPC).

involved in several "vehicles" for such information exchange, including 1) The Global Invasive Species Database; 2) the planned development of a global master list of invasive species; 3) The listserver Aliens-L; and 4) the Global Invasive Species Information Network (GISIN). Some other examples of international IAS information exchange are also described.

## **THE GLOBAL INVASIVE SPECIES DATABASE (GISD)**

The Global Invasive Species Database is a free, online source of authoritative information about alien species that negatively impact biodiversity. It contains comprehensive profiles of all kinds of invasive species from plants, mammals, invertebrates, birds, reptiles, fish and amphibians, to macro-fungi and micro-organisms. GISD profiles cover the biology, ecology, native and alien range of invasive species and include references, contacts, links and images. Information in the GISD is either created or reviewed by acknowledged international invasive species experts and is being updated on an ongoing basis.

The GISD was developed as part of Phase I of the Global Invasive Species Programme (GISP). It is managed, maintained and under continuous development by ISSG with support from a number of partners.

Users of the GISD can search for IAS information by scientific, common name or synonym, country or location, life form, habitat type or by any combination of these. A taxonomic search is also available. The information available in the GISD is presented in species profiles, which are constructed using core information elements, including -

- Taxonomy, scientific and common names, descriptions, images to help identify invasive species
- Distribution records
- Impacts (focus on biodiversity)
- Pathways, vectors
- Prevention and management information
- Contact details of specialists for advice

Each species profile contains links back to local, national and regional resources where more detailed and locally specific information can be found.

Following extensive consultation and user analysis, it was decided that the GISD should be primarily a management and awareness-raising/educational tool delivering summary information, rather than a source of primary data for researchers. Its focus is more on users "at the coal face" of IAS prevention and management, rather than those conducting more academic pursuits. In consideration of the fact that a large proportion of the potential audience of the GISD do not have English as a first language, may not have scientific training and perhaps have poor or limited access to the Internet, information is presented in plain English in a standard format as simply as possible.

With 270 profiles already completed and reviewed by experts, the GISD currently receives an average of more than 40,000 hits per day (~900 unique visitors/day). GISD search for invasive species on the Eurasian continent (Europe-Asia) currently produces the names and profiles of 70 introduced species, plus 70 more that are invasive elsewhere but native to Europe-Asia. From information we have gathered in the course of our work, we estimate that

most countries in Europe face threats from between 500 and 1000 IAS with known biodiversity impacts. There is a lot of work yet to be done. We would welcome assistance to further develop the 'European component' of the GISD.

## **A GLOBAL MASTER LIST OF INVASIVE SPECIES**

National and regional IPPC implementation agencies need to be able to access information on the biodiversity impacts of alien species anywhere in the world (see above). A global master list will be a crucial tool in risk assessment. ISSG is planning to develop such a master list if sufficient financial resources can be obtained. To develop a global master list we need to collect and standardise information about alien species that are considered to have biodiversity impacts. This information will come from national and regional collection and observation databanks, as well as from practitioners and will include information not formally published elsewhere. A large proportion of this information is not currently available on the Internet and initially many source lists will need to be digitised.

After digitisation, standardisation of lists is one of the major challenges. There is a great deal of variation in the definitions used in lists and in the criteria used to place organisms on those lists. Many lists are described as 'preliminary' reflecting the fact that often very little is known about the situation being assessed. The overall aim of the list is to provide an alert if an alien species has been considered to have biodiversity impacts anywhere in the world – so that users can follow up on those cases that are potentially most relevant to them.

## **ALIENS-L AND OTHER LISTSERVERS**

A helpful contribution to information exchange on biodiversity impacts of alien species can be achieved through the use of Listservers. For example, a message posted on the well-established Aliens-L listserv<sup>6</sup> along the lines of "there is some deliberation about plans to use alien species 'X' for purpose 'Y' in our country or region will usually "flush out" several responses if the species in question has been problematic elsewhere. Another listserv with Asian-Pacific regional range and more of an agricultural pest and weed emphasis is PestNet<sup>7</sup>. It offers a rapid species identification service using expert taxonomists to identify pest and weed species from users' images.

Listservers may lack some aspects of consistency, standardisation, and quality control compared to a global database or a distributed network, but they offer an important contribution to empowerment and horizontal information transfer (e.g. practitioners helping each other and others) because of their great flexibility and their ability to deal quickly with ad-hoc, time-critical issues.

## **THE GLOBAL INVASIVE SPECIES INFORMATION NETWORK (GISIN)**

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<sup>6</sup> For information on how to join, see [www.issg.org](http://www.issg.org)

<sup>7</sup> For PestNet, see <http://groups.yahoo.com/group/pestnet>

The development of a Global Invasive Species Information Network was proposed at the sixth meeting of the Conference of the Parties to the Convention on Biological Diversity held at The Hague in April, 2002.

The GISIN will provide a platform through which IAS information from hundreds of databases and web sites can be accessed<sup>8</sup>. The GISIN will use a web services architecture consisting of:

- IAS data standards
- Standardised data elements
- IAS terminology – thesauri – closed vocabularies for data elements
- Aggregation of data and information in standardised “Invasive Species Profiles”
- Service discovery mechanisms
- Search and presentation tools

It will enable the sharing of species profiles or fact sheets, expertise lists, observation and bibliographic information as well as information about research and management projects. The databases and web sites providing information could be local, national or regional in scope or they may have a thematic focus, such as aquatic IAS or rodent eradications, for example.

Since the majority of countries lack resources and capacity in information management with regard to biological invasions issues, the GISIN will disseminate tools and experience to other countries. The tools being developed by GISIN include a ‘capacity building’ database that will be offered at no cost to users. Its use will promote the adoption of a common system for collecting, storing and sharing information on invasive species.

ISSG contributions to development of the GISIN include sharing the GISD’s core elements, which will be reviewed and used as a model for a species profile schema for sharing IAS information. We have also shared our extensive experience in locating and evaluating IAS information from many diverse sources for use by a broad international audience.

## **DISCUSSION**

### **1) Role of ISSG and the Global Invasive Species Database within a distributed network**

IAS information is typically widely dispersed and difficult to access. Much of it has not been digitised (especially information about IAS in the developing world) and it would not be available on the Internet if it were not for the activities of the GISD and other initiatives that have maintained a focus on creating relevant content. Examples include:

- Structuring information from *Invasive species in the Pacific: A technical review and draft regional strategy*, SPREP 2000 in order to produce IAS lists and distribution records for the region.

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<sup>8</sup> see <http://invasivespecies.nbio.gov/as/gisin.htm> for more information

- Digitising information from important hard-copy publications, such as Gherardi F. & Holdich D. M. (Eds), 1999. *Crayfish in Europe as alien species. How to make the best of a bad situation?* A. A. Balkema, Rotterdam, pp XI +299.
- Collecting experts' knowledge in their heads, in notes or otherwise unpublished.
- Collecting management expertise that is either not published or only available in internal technical reports.
- Adding up-to-date content from IAS listservers and other networks

Different user groups have different IAS information requirements. Quarantine officers, land managers, environmental and biodiversity specialists, extension agents and other individuals and organisations concerned with the environment need quick access to a user-friendly source of relevant, summarised information. Rather than simply providing access to IAS information and leaving the user to manage issues of variation, complexity and potential gaps in that information, staff at the GISD locate, summarise and check relevant material for accuracy in order to meet the information needs of a broad range of users in the most user-friendly manner possible.

In the longer term, our experience and networks will make the ISSG a strong candidate to play a role in the global coordinating centre and clearing house of GISIN. The purpose of such a centre would be to filter, summarise and package information in a local context for the needs of those regions that do not have the capability to do it themselves. In turn, the GISD will use GISIN as a major source of information for our profiles, alongside our ongoing digitising and data discover activities.

## 2) Free access to information for biodiversity conservation purposes.

“Information is power” – is just as true in conservation as elsewhere. Social equity requires that communities are empowered to solve their problems, including those created by IAS issues. IUCN strongly believes that information related to biodiversity conservation must be easily and freely available. Recently, several organisations have started to develop this concept further:

The Conservation Commons<sup>9</sup> at its simplest encourages organisations and individuals alike to place documents, data and other information resources related to conservation in the public domain. The Conservation Commons is characterised by an underlying set of principles:

- **Principle 1. Open Access** The Conservation Commons promotes free and open access to data, information and knowledge for conservation purposes.
- **Principle 2. Mutual Benefit** The Conservation Commons welcomes and encourages participants to both use resources and to contribute data, information and knowledge.
- **Principle 3. Rights and Responsibilities** Contributors to the Conservation Commons have full right to attribution for any uses of their data, information or knowledge and the right to ensure that the original integrity of their contribution to the Commons is preserved. Users of the Conservation Commons are expected to comply, in good faith, with terms of uses specified by contributors and in accordance with these Principles.

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<sup>9</sup> <http://conservationcommons.org>

### **3) Providing Internet access is not enough**

Potential users of the GISD were interviewed about their information requirements and access to the Internet. Since many of those interviewed have very slow, unreliable, or no access to the Internet (e.g. South Pacific and parts of Africa), alternative methods of disseminating IAS information must be provided. ISSG is hopeful of making IAS information available across the “digital divide”, through hardcopy and CD-ROM, but financial resources for this are currently lacking.

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