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CONFERENCE OF THE PARTIES TO THE
CONVENTION ON BIOLOGICAL DIVERSITY
Ninth meeting
Bonn, 12-16 May 2008
Item 3.3 of the provisional agenda*

IN-DEPTH REVIEW OF ONGOING WORK ON ALIEN SPECIES THAT THREATEN ECOSYSTEMS, HABITATS OR SPECIES

Addendum

Preliminary report of expert workshop on best practices for pre-import screening of live animals in international trade

(9-11 April 2008, South Bend, Indiana, USA)

Note by the Executive Secretary

I. INTRODUCTION

1. An expert workshop entitled "Preventing Biological Invasions: Best Practices in Pre-Import Risk Screening for Species of Live Animals in International Trade" was held at the University of Notre Dame in South Bend, Indiana, United States of America, from 9 to 11 April 2008. It was organized by the Global Invasive Species Programme (GISP), the Invasive Species Specialist Group of the Species Survival Commission of IUCN and the Secretariat of the Convention on Biological Diversity (SCBD), in collaboration with the University of Notre Dame and Defenders of Wildlife.

2. This document contains preliminary information on the workshop results, which are provided as assistance to COP9's consideration of the in-depth review of the implementation of CBD decisions related to invasive alien species, including a review of gaps and inconsistencies in the international legal framework identified by COP-8[1]. The Ad Hoc Technical Expert Group on gaps and inconsistencies in the international regulatory framework in relation to invasive alien species, which met in Auckland, New Zealand, 16-20 May 2005, *inter alia*, identified that "[a] significant general gap in the international regulatory framework relates to lack of international standards to address animals that are invasive alien species but are not pests of plants under the International Plant Protection Convention.".[2] The full report of this workshop will be provided later with more detailed information through the Clearing-house Mechanism.

* UNEP/CBD/COP/9/1.

1 Decision VIII/27 (UNEP/CBD/COP/8/31). See also footnote 6.

2 UNEP/CBD/SBSTTA/11/INF/4.

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3. This expert workshop specifically focused on good practices that can be applied to address the risks associated with imports of live animals (and their parasites and pathogens) in international trade; these are species imported primarily for the pet, aquarium/terrarium, aquaculture/mariculture, live bait, game farming, fur farming and live food industries. They include terrestrial and aquatic species, vertebrate as well as invertebrate. The workshop participants addressed the often complex intertwining of science, economics, culture, social norms, practical implementation, and international laws and institutions; they considered and discussed a range of tools, processes/procedures and regulations that have been developed and adopted by different countries, and discussed their applicability to pre-import risk screening for species of live animals in international trade. A number of conclusions and technical suggestions were reached, the key ones of which are summarized below. A full report, including all conclusions, suggestions, presentations and appendices will be published by the organizers at a later date.

4. It is important to keep in mind that alien animals and their parasites and pathogens are introduced into countries both unintentionally and intentionally; however, this workshop focused only on addressing the risks associated with intentional introductions of live animals.

Acknowledgement: This document was prepared by Maj De Poorter (IUCN) and David Lodge (University of Notre Dame), with major contributions from Junko Shimura (SCBD), Peter Jenkins (Defenders of Wildlife), Stas Burgiel (GISP), and Phyllis Windle,(Union of Concerned Scientists) and was provided for review by the participants of the workshop (participants list, see annex III).

Terminology used in this preliminary report

Screening: "A systematic examination or assessment, done especially to detect an unwanted substance or attribute."[3] Here it refers to *risk assessment* in the context of biological invasion risks.

Risk assessment is used extensively in the technical literature on invasive alien species and many other issues involving decisions about environmental pollutants. This includes the World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures (WTO SPS Agreement), in which "risk assessment" is defined, in pertinent part, as: "The evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing Member according to the sanitary or phytosanitary measures which might be applied, and of the associated potential biological and economic consequences."[4]

Introduction: the movement by human agency, indirect or direct, of an alien species outside of its natural range (past or present).[5]

Import: the bringing of a species into a country from another country (usually, in this context, as part of international trade). Note: "introduction" (see above) refers to the movement of a species across an ecological boundary but "import" refers to the movement across a jurisdictional boundary.

Technical capacity: the competency of conducting risk assessment (see above) on alien species in accordance with the standards of existing international regulatory frameworks and other voluntary codes. This includes the availability and reliability of data to use for the risk assessment and legal competency to apply the result of risk assessment in management to address invasive alien species (including decision-making and management of risks).

II. SUMMARIZED CONCLUSIONS AND SUGGESTIONS FROM THE WORKSHOP

5. Workshop participants took part in their individual expert capacity. While the conclusions and suggestions reflect overall broad agreement, they are not meant to imply consensus by every

[3] Am. Heritage Dictionary of the English Language, 4th Edit. (2003).

[4] See Annex A, definition 4, online at: *www.wto.org/english/tratop_e/sps_e/spsagr_e.htm*

[5] Please note that this is how "introduction" is used in the context of the CBD discussions on invasive alien species. In the IPPC context, for instance, "introduction" is defined differently.

participant. Conclusions and suggestions do not necessarily represent the views of any individual participant nor of their employer (institution/agency), nor of sponsors or the host institution.

2.1 Risk assessment and decision-making

6. The workshop strongly suggested carrying out a science-based risk assessment, appropriate to the specific context, before a decision is made on whether or not to authorize the proposed import of live alien animal species into a country. The assessment should include biodiversity and environmental risks associated with the alien species as well as with their parasites and pathogens.

7. Extensive workshop discussions resulted in broad agreement on a suggested risk assessment approach (table 1) for the importation of live alien animal species (and their parasites or pathogens). This approach is not intended to be applied "off the shelf" as a risk assessment framework, but as generalised guidance. Workshop participants hope that this may assist countries or industries in developing or revising their own risk assessment procedures in the context of live alien animal imports. The set of questions in table 1 can be adapted and formalized so it is appropriate to country-specific legal authorities, industry-specific needs, data availability, technical capacities, and available resources. The approach as shown in table 1 is a "proof of concept" that can be developed further over time. It should be noted that risk assessment is an evolving methodology that is being improved and revised continuously.

8. The approach outlined in table 1 is based on the common set of risk assessment questions and approaches now successfully used by many countries; in addition, it is consistent with international risk assessment frameworks developed for other purposes such as the International Plant Protection Convention (IPPC), WTO SPS Agreement, World Organization for Animal Health (OIE), and the International Council for the Exploration of the Sea (ICES).

9. There was broad agreement that the best risk-assessment procedures are science-based, transparent, comparable and repeatable, based on reliable data and using the best information available, and which also explicitly consider uncertainties. In general, science-based quantitative tools are most effective, but qualitative tools can serve supplementary and/or complementary purposes and may be all that is available under certain circumstances. Due to lack of capacity, some participants are necessarily making decisions using risk assessments based on limited data and information. Participants thus recognized the need for capacity-building for risk assessment as a top priority (see 2.3).

10. The workshop noted that the actual decision on whether or not to allow a proposed import of an alien species (and under what conditions, if any) is not a part of the risk assessment, but is made by a relevant authority after the assessment has been conducted. In this context, assessment of the risks to biodiversity and the environment is an important input to decision-making. Decision-makers may have to consider additional matters such as national policy, food security, livelihoods and cost-benefit considerations.

2.2 Sub-national and regional risk assessments

11. In addition to being carried out at national level, risk assessments can be conducted with respect to smaller or larger geographic and/or jurisdictional scales. For example, a country might choose to assess risks for different ecosystem types or biogeographic regions within the country. Or risks might be assessed at a regional (multi-country) scale, either by a regional entity such as the Secretariat of the Pacific Community (SPC), by a regional industry body, or by neighbouring countries cooperating for example to manage a transboundary ecosystem such as a watershed. Such regional cooperation can effectively increase in-country capacity. An example is the regional approach to risk assessment for aquaculture in the Pacific Islands. Because environmental boundaries are more relevant to species than political boundaries, risk assessments at scales other than the national scale are often very appropriate.

2.3 Capacity and resourcing

12. Capacity-building to implement the risk-assessment approach for the importation of live alien animal species is required at regional and national levels. Additional needs identified by the workshop include the following:

* datasets on which risk assessments can be based, should be urgently developed;
* information-exchange mechanisms should be fostered and/or developed;
* risk-assessment templates and tools should be made more accessible and be widely distributed;
* completed risk assessments could be usefully shared;
* efforts to revise / improve risk-assessment tools could be coordinated; and
* funding is essential for further developing and testing of risk-assessment tools.

2.4 Strategic framework

There was broad agreement that addressing invasive alien species at the national level is most effective when operating within an overall strategic framework in which practical implementation, overall vision, and legal and institutional arrangements are mutually supportive. This is equally true for pre-import risk assessment of live alien species and may require increased communication and/or cooperation among different national agencies - such as those implementing risk assessment under the mandates from IPPC, OIE, CBD, IMO, ICES, and others as applicable.

2.5 Awareness and stakeholder involvement

13. It was noted that public awareness, education and stakeholder engagement will increase the effectiveness and efficiency of pre-import risk assessment of live animals. Participants highlighted that in some cases voluntary measures by the private sector to assess risks from their imports may precede formal regulations, particularly where capacity is lacking. Furthermore, risk assessment as part of self regulation often continues in situations where a regulatory framework exists.

14. The workshop strongly suggested that public awareness and stakeholder involvement be incorporated into management programmes addressing intentional introductions of live animals (and their parasites or pathogens) in international trade.

2.6 Gaps in the international regulatory framework

15. The workshop endorsed and reiterated the concern expressed elsewhere in CBD discussions and documents that there is a significant gap in the international regulatory frameworks, relating to the lack of international standards to addressing animals that are invasive alien species but are not pests of plants under the International Plant Protection Convention (IPPC).[6] In addition, the workshop expressed concern about alien species' pathogens and parasites that could pose risks to wildlife but that are not listed by the World Organization for Animal Health (OIE), and are therefore currently not adequately regulated.

16. The workshop suggested that these gaps be addressed as soon as possible.[7]

2.7 Tools for use in risk assessment

17. Traits predictive of establishment risk or invasiveness risk vary among taxa and this has ramifications for the development of risk-assessment tools. The workshop noted that various tools (qualitative as well as quantitative) for use in risk assessment have been developed and adapted, and that their successful application has been demonstrated in a range of countries (although not for all geographical areas nor all taxa). Some of these tools have already been made publicly available by those that developed them and a partial list will be provided in the workshop's full report.

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[6] UNEP/CBD/SBSTTA/11/INF/4 and decisions VIII/27 and VII/13 (UNEP/CBD/COP/8/31, and UNEP/CBD/COP/7/21/PART2).

[7] Possible ways to address gaps in the international regulatory framework have been identified, see, e.g. UNEP/CBD/SBSTTA/11/INF/4, UNEP/CBD/COP/8/31, UNEP/CBD/SBSTTA/13/6, UNEP/CBD/COP/9/32.

18. The workshop suggested that tools used as part of the risk-assessment process be clear, consistent, fit for the specific purpose, and effectively utilize available information. Ideally these tools draw on the best available information and are applied in a transparent and accountable manner. It was noted that in general, science-based quantitative tools will achieve this best, but that until such time as these can be applied effectively, non-quantitative tools can serve supplementary and/or complementary purposes and may be all that is available under certain circumstances.

III. SUGGESTED RISK-ASSESSMENT APPROACH FOR IMPORTATION OF LIVE ALIEN ANIMAL SPECIES

19. Workshop presentations illustrated that substantial recent progress has occurred on the development of concepts and technical tools for risk assessment of live animal species proposed for importation. Presenters demonstrated that it is now often possible to distinguish, with acceptable levels of accuracy, between alien species that will probably be harmful to the importing country and alien species that will probably be benign. These concepts and tools were built by combining recent progress in the discipline of invasion biology with standard practices in the more established discipline of risk assessment. Recent developments in assessing the risks posed by potential import species enable more accurate and cost-effective management of those risks. For example, for species assessed as "likely to be benign," importation could be allowed with few, if any, conditions. Species assessed as "likely to pose a high risk of harm" could be prohibited or, if import is allowed, be subjected to stringent conditions (such as sterilization) to manage identified risks. Such decisions based on risk-assessment procedures could be part of a country's regulatory framework or part of a self regulating process - for example an industry code of conduct (note that for simplicity, below, we refer mostly to "countries"). By applying risk assessment and decision-making in this way, the net economic value of international trade in live animals can likely be increased.

20. The suggested approach (see table 1),[8] is organized around a list of questions that reflect the key components of a risk assessment. Also indicated are the kinds of data sources and tools needed to answer the questions, along with the capacity required to gather, develop, and apply the relevant data and tools (see section 2.1 for a discussion of how this approach may be used in practice).

21. The order of questions in table 1 is logical in two respects: first, it reflects the progression of a biological invasion from importation to release (or escape) into the environment, to establishment, to spread, and to impact. Second, the order progresses from questions that require fewer data and less technical capacity to answer to questions that require more data and/or greater technical capacity. However, countries should not be daunted by the questions for which statistical or other models are desired, because the technical capacity that is required to develop models is a one-time investment; the level of expertise required to apply those models afterwards is much lower. If either data or capacity are limiting, then a country may reasonably choose to complete a risk assessment based on the answers to only one or a few questions. For example, in many cases, an assessment that progresses only through question 3 of table 1 may provide an assessment result which a decision-maker can use with other relevant information to make a reasonable decision about whether to allow importation. If at a later stage, additional data or capacities are available, then there is the option of carrying out a more complete assessment, the results of which can be used to review and amend the initial decision as appropriate. A country could therefore initiate reliable risk-assessment based decisions about importation while continuing to build additional risk-assessment capacities and strategic frameworks referred to in 2.4.

[8] Any country that formalizes these suggestions into a specific risk-assessment tool will need to take into account risk-assessment provisions of the following agreements, if the country is a party to them: the IPPC to the extent the species involved is a plant pest as defined thereunder; the OIE to the extent that the species or the pathogens or parasites involved are addressed by the OIE; and the World Trade Organization SPS Agreement, with particular attention to its provisions on risk assessment including, but not limited to, Article 5 provisions 5.1, 5.2, 5.3, and 5.7.

3.1 Relation between the suggested risk-assessment approach and decision-making

22. Table 1 outlines an approach only to the risk-assessment stage; this stage ends with the provision of its results to the appropriate decision-maker(s).

23. In the decision-making phase, a relevant authority will decide whether or not to authorize the proposed alien species' import, the conditions of its import (if applicable), and any ongoing management required to reduce risks. Decision-makers, in addition to considering the results of the risk assessment, often may consider other factors such as: a pre-determined appropriate level of protection (or acceptable level of risk); costs and benefits associated with importing the species, food security and/or livelihoods; national policies; cost and effectiveness of various management options for reducing risk; and appropriate accountability to other countries. Such considerations form part of the decision-making process but should be independent of the assessment process itself.

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Questions	Information and data needs	Capacity needs
1. What is the taxon, identified to the most detailed level possible?	Standardized Global Species Checklist or globally unique identifier	Taxonomic expertise; library resources or access to web-based taxonomic keys; identification tools
2. What are the circumstances of the proposed importation?	Importer declaration of intent and any proposed or potential mitigation of invasiveness risk	See Question 7
3. What is the history of invasiveness of this taxon anywhere? **3a**. . . . of its pathogens or parasites? (Note: pathogens and parasites should be considered in subsequent questions but for purposes of brevity/simplicity this is not mentioned further in the table)	Information and data on invasiveness of taxon in other areas; occurrence of pathogens and parasites, and their invasiveness in other areas; data on whether the species has ever been imported anywhere before.	Experience interpreting scientific information on invasiveness; expertise in pathogens and parasites regarding possible shifts in hosts and vectors; data quality control; clear definition of invasiveness,
4. To what extent are the environmental conditions for persistence of this taxon present anywhere in the area of concern?	Maps of the occurrence of the taxon (or point data); at a minimum, maps of climatic match or other environmental attributes; ideally computerized data layers of climate and taxon occurrence	At a minimum, the ability to compare maps of climatic or other environmental information across areas; ideally the ability to apply computer-based models of climate or other environmental matching
5. What is the probability of establishment and spread of this taxon anywhere in the area of concern?	Biological information and data related to establishment and spread; ideally information on the traits used in available statistical models or models to be developed	Statistical models (and the ability to apply them, as above) built on history of establishment and/or spread of similar taxa in similar ecosystems; expert judgment
6. What is the potential impact of this taxon anywhere in the area of concern?	Biological information and data related to impact; ideally input data on the traits of the taxon for available statistical models or models to be developed; additional assessment data may include asset/land use maps and/or data within the potential range	Statistical models built on history of impact of similar taxa in similar ecosystems; expert judgment
7. What mitigation options are available and appropriate? Iterate throughout the risk assessment process considering how mitigation could change the answers to Questions 1-6.	Information on mitigation options and their feasibility and likely effectiveness based on past practices and the capacity within the country to apply them.	Experience with mitigation; infrastructure to assure feasibility and long-term maintenance of mitigation implementation; inspection, compliance and enforcement infrastructure (whether within a regulated or self-regulated framework), containment technology; surveillance and contingency planning
8. Provide results of the risk assessment to decision-makers.	Context of the proposed import together with answers to questions above and a concluding assessment of risk	Expertise in risk communication

Table 1. Risk-assessment questions for imports of live alien animals, data needs, and capacity needs for the approaches listed. Annotations on these questions, information and data needs, and capacity needs are provided below, listed by question number.

3.2 Annotations to Table 1

Question 1. Identification of the taxon should be to the lowest level feasible, including population and genetic structure where relevant. Identification of its potential pathogens/parasites may also be relevant.

Question 2. By which pathways and vectors will the taxon be introduced? What is the intended use of the taxon, and what unintended uses might develop? The answers to these questions may help set priorities for risk assessment among taxa proposed for importation, particularly where resources are limited. For example, knowledge of intended use could help prioritize work across multiple risk assessments by separating those uses that might obviously be riskier (e.g., where direct release into the environment is intended, or where the likelihood of escape or release from confinement and/or propagule pressure could be high) than others (e.g., where a small number of animals is intended to be kept in strict confinement) These aspects would be more fully documented and explored under Question 7.

A risk assessment may be carried out with the aim to provide a basis for a decision on whether or not an alien species should be listed as an "invasive alien species," "unwanted organism" or other specific determination for national regulatory purposes, without there being a proposal or application for import of the alien species. In such cases, question 2 may be of little relevance to the risk assessment.

Question 3. Each country conducting a risk assessment needs to determine what it means by "invasive". Existing databases on species invasiveness may be a valuable resource for answering this question, but definitions of "invasive" used by databases may not always be consistent with those of the country conducting the risk assessment. Available databases should therefore be interpreted carefully, with appropriate attention to data reliability and relevance.

The most relevant data on invasiveness will be for other areas that are ecologically similar to the potential area of introduction. The lack of history of invasiveness does not imply that risk is low unless it is known that the taxon was introduced in large numbers and/or established and nevertheless failed to become invasive. That is, one possible explanation for lack of information on invasiveness is that the taxon has not previously been introduced in sufficient numbers or under conditions suitable for escape, establishment, and spread. It is also possible that relevant information has not been made public yet or that relevant databases have not been updated due to limited resources.

Pathogens and parasites should be considered. In many cases the risk assessment for associated pathogens and parasites will depend not only on the alien animal species being considered, but on precisely where it would be coming from -- as this would change the mix of pathogens and parasites that would need to be considered. How this would be addressed in practice may depend on data availability, technical capacities, or other variables.

If compelling evidence exists that the risk of invasiveness of the taxon is high, then question 3a may become moot. In that case a jurisdiction with limited capacity might choose to make a decision to restrict or prohibit import based on the answer to Question 3, without considering parasites and pathogens.

Question 4. Where possible, biotic interactions, as well as maps of climate and other physical and chemical conditions (e.g., water quality for aquatic taxa), would be considered. Ideally, such information would exist in data layers in a computerized Geographic Information System (GIS).

Parasites and pathogens should be considered, as explained under the annotation for Question 3.

Question 5. Depending on the taxonomic group, traits included in a statistical model to predict establishment might include fecundity and other life-history characteristics, body size, behavior and diet. An increasing number of statistical models to predict establishment and/or spread are available in some parts of the world for fishes, mollusks, reptiles and amphibians, birds and other taxa. See annotation for Question 2: intended and unintended uses may affect the probability of spread by anticipated and unanticipated transportation modes. If modeling potential spread is relevant to a risk assessment, an increasing array of diffusion and network modeling approaches are available. However, such models of spread require substantial technical capacity, data on the dispersal capacity of the taxon, and data on the

movements of transportation modes (airline traffic, land-based transportation, and boat and ship traffic patterns) on which the taxon might "hitchhike".

Parasites and pathogens should be considered, as explained under the annotation for Question 3.

Question 6. Each country conducting risk assessments needs to determine what it means by "impact," which might include positive or negative consequences that are biological (including biodiversity, ecosystem and wildlife health) or economic (including human health, agriculture or livelihoods). An increasing number of statistical models to predict impact are available for some parts of the world, e.g., for fishes, mollusks, birds and other taxa.

Parasites and pathogens should be considered, as explained under the annotation for Question 3.

Question 7. Depending on the country's policy, risk assessment might first be conducted without considering any mitigation ("unrestricted risk"), with mitigation being a relevant factor considered in making a final decision on importation. Or, risk assessment may include consideration of how risk would be changed by implementation of mitigation options and alternative management practices. Results would be provided under step/question 8 to the relevant authority to make a decision about whether and under which management conditions importation would be allowed.

Management practices that might be considered as part of the assessment will depend on the taxon, capacity regarding resources and infrastructure, policy frameworks, and inspection and enforcement capacities (whether voluntary or regulatory). Such management practices might include permitting systems that can restrict use and/or mandate additional management steps; containment methods; surveillance and contingency plans; limitation of the number of individuals imported (controlling propagule pressure); importation of only one sex in sexually reproductive taxa; sterility of organisms or other genetic modification to reduce survival in nature; regulatory, educational programs for consumers; and sanitary practices to reduce infestation by pathogens/parasites.

Parasites and pathogens should be considered in their own right for mitigation as explained under the annotation for Question 3.

Question 8. The results of the assessment should acknowledge uncertainty (and quantify it or categorize it where possible). The risk-assessment process ends when the assessment results are provided to the relevant decision-making authority that is empowered to make a decision whether or not importation is allowed – and, if so, appropriate restrictions or conditions (see section 3.1 above).

Annex I

ACRONYMS USED

GISP = Global Invasive Species Programme
IUCN = International Union for Conservation of Nature
SCBD = Secretariat of the Convention on Biological Diversity
COP = Conference of the Parties
CBD = Convention on Biological Diversity
IPPC = International Plant Protection Convention
WTO = World Trade Organization
SPS = Sanitary and Phytosanitary Measures Agreement (of the WTO)
OIE = World Organization for Animal Health
ICES = International Council for the Exploration of the Sea
SPC = Secretariat of the Pacific Community
IMO = International Maritime Organization
UNEP = United Nations Environment Programme
SBSTTA = Subsidiary Body on Scientific, Technical and Technological Advice
GIS = Geographic Information System

Annex II

WORKSHOP AGENDA

Preventing biological invasions: best practices in pre-import risk screening for species of live animals in international trade

WEDNESDAY 9 APRIL

9:00 ***Welcome, introductions, and opening statements***

- Dr. Robert J. Bernhard, Vice-President for Research, University of Notre Dame
- Dr. David Lodge and Joanna McNulty, announcements of local logistics

SESSION 1: ***Overview talks to introduce the context and goals of workshop***

Moderator – Stas Burgiel (TNC & GISP)

9:30 *Best available technology in science and economics in pre-import animal risk analysis*: Dr. David Lodge (University of Notre Dame, USA)

10:00 *Overview of International Law on Pre-import Risk Screening of Live Animal Imports in International Trade*: Peter Jenkins (Defenders of Wildlife, USA)

10:45 *Pre-import animal screening of intentional animal introduction: what outcomes do we aim for and how do we obtain them*: Dr. Maj de Poorter, (IUCN ISSG, New Zealand)

11:15 Plenary discussion

11:45 *Description of meeting goals and how to reach them*

Junko Shimura (Secretariat CBD) & Dr. Maj de Poorter (IUCN ISSG) - Rapporteur, assisted by Phyllis Windle (Union of Concerned Scientists) – assistant rapporteur

SESSION 2: ***Science and Economics of Pre-Import Screening for Animal Species***

Moderator – Dr. David Lodge (University of Notre Dame, USA)

1:30 *Identifying suitable habitat, uncertainties, and pre-import decisions*: Dr. Simon Barry (CSIRO- Mathematical and Information Sciences, Australia)

1:55 *Forecasting spread and impact to inform pre-import decisions*: Dr. Jon Bossenbroek (University of Toledo, USA)

2:20 *Risk identification protocols for pre- and post-import screening of aquatic organisms (with emphasis on freshwater fishes):* Dr. Gordon Copp (Center for Environment, Fisheries and Aquaculture Science -CEFAS, UK)

3:15 *Alien reptiles and amphibians: early progress toward predicting risk:* Dr. Fred Kraus (Bishop Museum, Hawaii, USA)

3:40 *Incorporating risk of pathogens, parasites, and zoonotic disease in pre-import decisions:*Dr. Peter Daszak (Center for Conservation Medicine, USA)

4:05 *Results of a plant screening test with implications for animal screening approaches:* Dr. Doria Gordon (The Nature Conservancy and the University of Florida, USA)

4:30 Plenary discussion and break

5:00 Reception; poster session; demonstrations.

THURSDAY 10 APRIL

SESSION 2 (*continued*)

8:30 *Cost-benefit analysis of pre-import risk screening:* Dr. Reuben Keller (University of Notre Dame, USA)

8:55 *Socio-economic considerations for pre-import screening of live animals:* Dr. Jamie K. Reaser (Pet Industry Joint Advisory Council-PIJAC)

9:20 Plenary discussion

SESSION 3: ***The International Legal and Institutional Context for Pre-Import Screening of Animal Species in International Trade***

Co-moderators – Dr. Stas Burgiel (GISP) and Junko Shimura (CBD Secretariat)

9:45 *The Convention on Biological Diversity and invasive alien species, from Rio to Bonn:* Junko Shimura (CBD Secretariat)

10:10 *Precautionary regulation of live animal imports -- a perspective on national capabilities in developing countries*: Tomme Young (Consultant)

11:05 *Role of IPPC in pre-import animal screening:* Lesley Cree (Canadian Food Inspection Agency – on behalf of IPPC)

11:30 Plenary discussion and further comments on international organizations not represented at the workshop (e.g., OIE, EU, CITES, WorldFish, etc.)

SESSION 4: ***Current National Practices and Available Tools for Pre-import Screening of Animal Species in International Trade***

Moderators –Michael Browne (IUCN ISSG)

1:30 *Pre import screening of live animals for import into Australia:* Nick Gascoigne (Exotic Species Regulation Section, Wildlife Branch, Department of the Environment, Water, Heritage and the Arts, Australia)

1:55 a) *CITES and Invasive Species*; b) *Israel's new regulatory approach to risk screening for live animal imports*

Simon Nemtzov (Israel Nature and Parks Authority, Israel

2:20 *Regional Approach to and risk assessment for aquaculture species – South Pacific*

Ben Ponia, (Secretariat of the Pacific Community - SPC /Secrétariat général de la Communauté du Pacifique – CPS, New Caledonia)

2:45 *Addressing intentional animal imports in the development of the Mauritius Invasive Alien Species Action Plan:* John R Mauremootoo (Consultant)

3:10 Plenary Discussion

4:05 *Japanese IAS law and its practical implementation for addressing intentional animal imports:* Tomoo Mizutani (Dept of IAS control and eradication, Nature Conservation Bureau, Ministry of the Environment, Japan)

4:30 *The role of international information exchange tools in pre-import screening and invasion risk analysis:* Michael Browne (Manager Global Invasive Species Database, ISSG, New Zealand)

4:55 *Networking information on IAS in South America: first steps toward standardized risk analysis tools:*Sergio Zalba (Gekko-Grupo de Estudios en Conservacion y Manejo, Depto. de Biologia, Bioquimica y Farmacia, Argentina)

5:20 Plenary discussion

5:45 Instructions for break-out sessions and goals for tomorrow

Dr. Maj de Poorter (IUCN ISSG), Rapporteur, assisted by Dr. Phyllis Windle (Union of Concerned Scientists)

FRIDAY 11 APRIL

8.30: Plenary

8.45: Breakout groups (BOG)- discussion &commenting on conclusions, recommendations.

BOG1: chaired by Nick Gascoigne (Department of the Environment, Water, Heritage and the Arts, Australia), Reported by Michael Browne (ISSG, New Zealand)

BOG 2: chaired by Doria Gordon (The Nature Conservancy and the University of Florida, USA), Reported by Lori Williams (National Invasive Species Council, Department of the Interior)

BOG3: chaired by David Lodge (University of Notre Dame), Reported by Simon Barry (CSIRO-Mathematical and Information Sciences, Australia)

10.15: Reporting back to plenary from Breakout groups and plenary discussion

11.45: Closing remarks: Dr. David Lodge (University of Notre Dame)

12:00 End of workshop

Annex III

LIST OF PARTICIPANTS

Name	Organization	Country
Barry, Simon	Landscape Monitoring and Modeling, Commonwealth Scientific and Industrial Research Organisation, Mathematical and Information Sciences	Australia
Bossenbroek, Jon	Department of Environmental Sciences, University of Toledo	USA
Browne, Michael	International Union for Conservation of Nature, Invasive Species Specialist Group	New Zealand
Burgiel, Stas	The Nature Conservancy & Global Invasive Species Programme	USA
Copp, Gordon	Salmon and Freshwater Fisheries Team, Center for Environment, Fisheries and Aquaculture Science	UK
Cree, Lesley	Plant Health Division, Canadian Food Inspection Agency – for the International Plant Protection Convention	Canada
Cudmore, Becky	Fisheries and Oceans Canada, Centre of Expertise for Aquatic Risk Assessment	Canada
Daszak, Peter	Consortium for Conservation Medicine, & Member of the Executive of the Scientific Committee, DIVERSITAS	USA
De Poorter, Maj	International Union for Conservation of Nature, Invasive Species Specialist Group & Centre for Biodiversity and Biosecurity, University of Auckland	New Zealand
Gascoigne, Nick	Exotic Species Regulation Section, Wildlife Branch, Department of Environment, Water, Heritage and the Arts	Australia
Gordon, Doria	The Nature Conservancy	USA
Hoff, Mike	U.S. Fish and Wildlife Service	USA
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Annex IV

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University of Notre Dame

Additional Contributors:

U.S. Geological Survey, Invasive Species Program

U.S. National Biological Information Infrastructure
