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POLICY DEPARTMENT A
ECONOMIC AND SCIENTIFIC POLICY

Economic and Monetary Affairs

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Invasive Alien Species

WORKSHOP

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Invasive Alien Species

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POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

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Invasive Alien Species

Brussels, 17 December 2013

PROCEEDINGS

Abstract

This report summarises the presentations and discussions during the Workshop on Invasive Alien Species, held on 17 December 2013. The aim of the workshop was to allow an exchange of views on the new proposal for a regulation on the prevention and management of the introduction and spread of invasive alien species between MEPs, the European Commission, stakeholders, NGOs, public administration and academia.

There is general agreement that the new proposal is timely and a major step forward in dealing with the negative consequences invasive alien species have for the environment, ecosystem services, public health and the economy in Europe. Different views exist on how to best achieve the aims of the proposed regulation.

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LIST OF ABBREVIATIONS

CABI	Commonwealth Agricultural Bureaux International
CBD	Convention on Biological Diversity
DAISIE	Delivering Alien Invasive Species Inventories for Europe
DG ENV	Directorate-General for the Environment of the European Commission
EASIN	European Alien Species Information Network
EEA	European Environment Agency
ELCA	European Landscape Contractors Association
EPO	European Pet Organisation
EPPO	European and Mediterranean Plant Protection Organisation
FACE	Federation of Associations for Hunting & Conservation of the EU
GBIF	Global Biodiversity Information Facility
GEIB	Spanish Expert Group for Biological Invasions
IAS	Invasive Alien Species
ISPRA	Institute for Environmental Protection and Research
ISSG	Invasive Species Specialist Group
IUCN	International Union for Conservation of Nature
JRC	Joint Research Center
NOBANIS	European Network on Invasive Alien Species
OECD	Organisation for Economic Cooperation and Development
SEBI	Streamlining European Biodiversity Indicators
SSC	Species Survival Commission
WTO	World Trade Organisation

EXECUTIVE SUMMARY

The workshop was held on 17 December 2013 at the European Parliament in Brussels to discuss the new proposal for a Regulation of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species (COM(2013) 620 final of 9.9.2013). The workshop was organised to support the discussions between Parliament (Rapporteur MEP Pavel Poc), the Commission (DG ENV) and the relevant stakeholders. Comments on the proposal are currently presented by Member State delegations at the Council Meetings, with the most recent compromise text submitted by the incoming Greek Presidency on 20 December 2013.

The workshop started with a general overview of the impact of biological invasions, as well as presentations regarding the current status of the proposal for a regulation as provided by DG ENV, the current presidency and the European Parliament. This was followed by presentations of current experiences and best practice examples in selected Member States and a stakeholder roundtable discussion on the priorities and challenges for different interest groups, where several experts outlined their position on the proposed Regulation.

There was general agreement that the new proposal is timely and a major step forward in dealing with the negative consequences that invasive alien species may have for the environment, for ecosystem services, public health and the economy in Europe. Different views were expressed and it was discussed how to best achieve the aims of the regulation. One of the suggestions made was a better incorporation of scientific expertise into the decision-making process, particularly regarding the drawing up of a list of invasive species of Union concern. Any cap of this list ("50+" species) was not supported, whereas the need for the establishment and further development of a dedicated information support mechanism was recognised. It was also agreed that the cooperation and coordination between Member States and all stakeholder groups relevant to invasive alien species in the business and private sectors needed to be strengthened. Voluntary actions, e.g. code of conducts, were seen as important additional elements to the regulation. Derogations need to be carefully formulated so as to not hinder research while making sure that they are duly motivated (as they allow for exemptions which may act against the aims of the regulation). Management actions have to consider animal welfare and avoid negative non-target effects. Social and economic aspects need to be clearly defined in the legislative text and should be included in the regulation. The question of how to finance the implementation of the regulation remained unanswered. The polluter pays principle was seen as an important element, but difficult to put into practice. Raising public awareness was seen as a crucial element of any successful management strategy for invasive alien species.

WORKSHOP PROCEEDINGS

Opening Remarks

Mr Pavel Poc, MEP, ENVI Rapporteur

Mr Poc welcomes all participants and announces slight changes to the programme, due to the delayed start of the workshop.

PART 1 - INVASIVE ALIEN SPECIES – WHAT IS AT STAKE?

Invasive alien species: how do they arrive, and what are their impacts

Mr Piero Genovesi, ISPRA and Chair IUCN SSC Invasive Species Specialist Group, gives a brief overview of the global problem of IAS. Especially in Europe, the impact on biodiversity is often the main focus of discussions about IAS. Indeed, IAS are the primary cause of extinctions worldwide. As clearly shown by the example of extinct endemic Hawaiian bird species which were substituted by IAS, extinctions related to IAS are a significant loss of global biodiversity even if local species richness remain almost constant. With respect to impacts on ecosystems, which should not be underestimated, the Canadian Beaver, introduced in Tierra del Fuego, has meanwhile become established in an area of over 7 million hectares and causes dramatic changes in the environment and enormous economic damage. The same is true for *Proposis* (mainly in Africa) and the Water Hyacinth (also in Southern Europe), limiting access to land and water, respectively. Additionally, IAS can have a negative impact on human health. The Tiger Mosquito has caused virus outbreaks which have led to a large number of casualties. Ragweed is an example where it has been shown that coordinated action at supranational level is important and can have wide benefits not only for the protection of health and biodiversity, but also for reducing the overall economic impact. The conservative estimate of the costs of IAS for Europe is well above 12 billion € per year. This is an important message which needs to be communicated because the development of a new policy is also costly. Taking action on species that have impact on the economy and ecosystem services normally brings synergies with conservation measures as the same species often impact biodiversity. However, the economic aspect should not be forgotten.

Europe and other regions of the world will be more affected by IAS in the future as a result of climate change. Recent research provides many new insights into the process of invasion, which is important as guidance for more effective measures in the future. Both target 9 of the CBD Strategic Plan and the EU Biodiversity Strategy stress the importance to work on prevention through pathway management and by prioritising species. Trends in the relevance of pathways have been studied and it is now known how their relative importance is changing across time. Intentional introductions are still an important factor for IAS, but IAS also arrive unintentionally such as the Yellow-legged Hornet in France, which is easy to detect because of the huge nests which this particular species builds. It has recently reached Italy, as predicted by models, but Italy was not prepared for this invasion. Trade is a key factor, for instance for the Water Hyacinth, causing enormous costs in Europe and at the same time it can still be bought in shops in several European countries for as little as 1 €. About 80% of the IAS in Europe have arrived by trade, and this is why an EU regulation with a focus on possibilities for regulating trade is of crucial importance for the future.

Prevention and management of the introduction and spread of invasive alien species – the Commission proposal for a regulation

Mr François Wakenhut, Head of Unit Nature and Biodiversity, DG ENV, points out that IAS are the second most important threat for biodiversity globally and the reason for enormous economic costs. Action at the EU level has to be effective, including action related to trade issues. The three guiding principles of the Commission proposal are (i) prioritisation, (ii) focus on prevention as this is the most effective method in ecological and economic terms and (iii) that existing instruments should be used and coordination increased where it already exists. The cost estimate of 12 billion € per year is a conservative estimate, but it gives clearly the signal that action is required. The magnitude of the benefits derived from IAS management increases over time as increasing numbers of invasions are avoided, implying a solid economic case for action at prevention level.

The list of species of European concern is aimed to be a dynamic list. The proposal to list the top 50 species was not well received by the Council and the EP. It is essential that it is evidence based, and therefore selection criteria have been identified that will guide the risk assessment work that underpins the proposal of the EC. The Member States will be fully involved in the listing process. As regards management measures, a hierarchy will be followed, starting with prevention, followed by early detection, and then management for established IAS when there is no other choice. Beyond the species of European concern, an action plan for pathway management has to be developed which considers the dynamic nature of pathway importance. Emergency measures will allow Member States to take action if there is evidence which requires them to do so, which must then be made known to the other Member States and can lead to the inclusion of the species on the list. Not least due to the subsidiarity principle, IAS of Member States concern are an important issue, and some Member States already have a well-developed and comprehensive legislative framework that should be maintained and strengthened by the EU regulation. Member States should have the option to go beyond and encourage further regional collaboration on species with regional impacts. The main issues of the discussion include the 50 species cap, the selection criteria for priority species, the questions of regionalisation and the question of Member States' margins and room for manoeuvre.

State of play of discussions in Council

Ms Inga Semeškaitė, Permanent Representation of Lithuania to the EU, expresses her thanks to the Commission for the legislative proposal on IAS. The Lithuanian presidency organised five working parties meetings and an orientation debate in the Council on the draft proposal within the last 3 months. Ministers were invited to answer two questions, (i) on the scope of the regulation and particularly on the establishment of the list of priority species, and (ii) on actions on possible regional cooperation. All delegations supported the need for a legislative act on IAS. A further outcome of the discussion is that the majority of the delegations of the Member States have stressed that the EU needs an efficient system for combating IAS, and thus a revision of some features of the proposal is needed, for instance with regard to the capping of the species list. The majority of the Member States also pointed out that the fact that some species were native to some parts of the EU and invasive in other parts needed to be sufficiently recognised. The Member States also stressed that actions against IAS should be prioritised and based on specific impact assessments. The majority of the Member States recognised the importance of regional collaboration to maximise the effectiveness of measures, to avoid duplication, reduce administrative burdens and facilitate the sharing of experiences.

The incoming Greek presidency (first half of 2014) will make further progress on developing the regulation. The Lithuanian presidency believes that the debate and the Council documents should prove to be very useful to the Greek presidency so that an agreement can be achieved with the Parliament still during this parliamentary term. No one doubts that the role of scientists and stakeholders is important in this context, and thus the workshop will provide a significant contribution to the work. Finally, the importance of an EU-wide approach for managing IAS must be stressed. The Council welcomes the proposal of the Commission and the authorities at European, national, regional, and local level will have to share their responsibilities and make a joint effort to achieve these goals.

State of play in European Parliament

Mr Pavel Poc, MEP, ENVI Rapporteur, welcomes the work and the discussions with the Council under the Lithuanian presidency and hopes that the incoming Greek presidency will take up the topic. Mr Poc then describes the state of play in the European Parliament and states that the ENVI committee welcomes the proposal and agrees on the principles and the good framework it provides. However, there are some suggestions for amendments which need to be further discussed. These amendments are mainly needed for strengthening the Commission proposal and to strengthen compliance and public engagement in the Member States in the future. Without their support nothing can be achieved. One of the crucial issues is to develop criteria and a method for preparing the list of species of EU concern. Mr Poc is convinced that there is no practical or scientific reason for a “50 cap”, which should be removed. Capped lists tend to fill up fast, and a cap is not a solution for avoiding future expenditure. It is proposed that the list of IAS of EU concern should be established by implementing acts. Instead, an empty annex should be provided and filled by using delegated acts, which will be needed because some species will be banned and the lives of Europeans, as well as businesses, will be affected. For these reasons the list should be based on democratic decision-making, which should also bring about broad public compliance and increase legal clarity. The list, then, should be part of the regulation.

Native invaders, i.e. species which are native to one part of Europe but invasive in another, such as the Zebra Mussel, Spanish Slug and the *Rhododendron ponticum*, are outside the scope of the proposal, although they ought to be included, as action is required. They are very important and can be used as a good tool to strengthen collaboration. In order to respond to the concerns of the Member States, stricter measures and legislation in particular Member States should be maintained, where they are already in place.

To control risks and costs, the financing issue must be discussed, ideally by the Council because the Member States will take the biggest share of the costs. Public and scientific participation has been somewhat omitted in the proposal, although it should be stressed and encouraged at Member State level as this is the level where people can become involved. A dedicated scientific forum is required as the issue at hand is a complex issue and a proper form must be found. An information support mechanism is crucial for real progress. It must be in place in time before the very start of the process and include expertise from the EEA or JRC.

The timetable is tight, but hopefully the regulation is still a “mission possible”, not least because of the great work already done by the Commission and the shadow rapporteurs in the ENVI committee and the support coming from other committees. The deadline for amending the dossier in the ENVI committee is 8 January 2014; voting in the ENVI committee will take place at the end of January/beginning of February, the first reading in the European Parliament Plenary session is planned for March/April 2014.

Questions & Answers, open discussion – Part 1

Ms Simona Bacchereti, from the European Association for Information on Local Development wonders about the scientific forum. The setting up of such a forum might cost precious time, and it might be better to immediately start working with already existing scientific knowledge.

Mr Poc replies that the Commission proposes the setting up of a committee for decision-making. He proposes the setting up of a supporting scientific forum as he thinks that it is very important, mainly because the topic of IAS is a very complex one.

PART 2 - CURRENT EXPERIENCE AND BEST PRACTICES

Introduction by the moderator

Mr Chris Davies, MEP, Draftsperson for the Committee on Fisheries

Mr Davies introduces the first speakers.

Gaining momentum: Status quo and trends of invasive alien species in Europe

Mr Franz Essl, Environment Agency Austria, emphasises in his presentation the temporal dimensions of biological invasions. Recent research has shown that most species have arrived and become established recently and that the trend does not show any indication of saturation. The same is true for impacts on ecosystem services caused by IAS. These patterns are valid across many investigated taxa. When discussing the crucial role of pathways, it must be considered that their relative importance changes over time and differs between different groups of organisms. It must also be considered that the global trade network is getting more diversified and denser, as the velocity and the volume and range of trade are increasing very fast. For instance, trade between Europe and China has strongly increased, which is particularly important as China has a climate which is quite similar to the European climate. Also, marine trade and pathways are strongly increasing and the Ballast Water Convention for instance is of crucial importance in this context. Invasions have a long legacy and for most taxa it is true that the actual invasion rates in European countries are more strongly correlated with the socio-economic parameters from 1900 than with those from 2000. This long legacy of invasions implies that inaction now will have consequences in future decades. For all these reasons, the main conclusion is to “act now before it is too late”.

Fighting IAS: better late than never, but never late is better

Mr Bernardo Zilleti, from the Spanish expert group for biological invasions (GEIB), explains that prevention is the best strategy, but eradication and control might be needed, if prevention fails. Eradication is feasible when the number of individuals and the invaded area is small, otherwise control is more feasible, which is more expensive in the long-term. In Spain, the management of IAS is mainly linked to strategies for the conservation of native species, and a particular management plan exists only for Zebra Mussels. At regional level and in the LIFE framework, specific IAS actions are carried out. The following examples provide insights into eradication and control measures for already established species.

1) The Hudson Pear is an invasive cactus, established on the Spanish east coast. It is a priority species because 32% of the Valencia region is potentially suitable, and fast colonisation can occur originating from few individuals. The species is transforming habitats and causing injuries to humans and animals. The management plan for fast eradication includes legal measures (e.g. trade prohibition) and an alert network. 38 occurrences of the species have been detected, and control measures started in 2009. 185 tonnes have been removed up to now, at a cost of 950,000 €. Targeted monitoring is required as plants younger than 2 years old are too small to be efficiently detected while it is very costly to remove stands older than 4 years.

2) The Common Carp was illegally introduced in 1985 to a lake in the Zoñar Natural Reserve, which hosts a large number of water birds of conservation concern. Due to the successful eradication of the carps in 2006, oxygen levels and the transparency of the water as well as the number of genera of aquatic insects increased after only one year to before-introduction levels, and the threatened bird species (including the White-Headed Duck *Oxyura leucocephala*) returned.

3) The American Mink was introduced to Spain during the 1950s for fur farming. Meanwhile there are six populations, partly overlapping with the endangered European mink, upon which the American Mink has negative impact. Management started in 2002, with a promising beginning with a large number of captures, but then problems occurred such as illegal releases by animal rights activists, further escapes from fur farms, legal inconsistencies, a lack of long-term planning and coordination, financial cuts and a lack of social support.

As a general conclusion it can be said that although it is certainly impossible to eradicate all IAS there exist many successful programmes which are hardly known, because conservation managers do not often publish their IAS management projects.

Managing Invasive Alien Species in the United Kingdom

Mr Niall Moore, Non-native Species Secretariat UK, gives examples of IAS control and management in Great Britain, which hosts 2000 established IAS, with 10 new species becoming established per year, 48% of them arriving from the rest of Europe. The economic impact of IAS in the UK is 2.1 billion € per year, and still only the management of 25 species is supported by the UK government. Efficient management must be fast and coordinated. The best example to support this claim is the Ruddy Duck in the UK, which is very problematic for the globally threatened White-Headed Duck in Spain with which it is hybridising. 30 years after the problem arose, the UK is now spending 5 million € on its eradication. At the same time, 1.7 million € are spent on LIFE projects. However, in 8 Member States there is inadequate monitoring and in 10 Member States (including the UK) keeping the duck is still legal. Another example is the water primrose, whose eradication would cost 200,000 € now, while a delayed eradication would cost 250 million €. After eradication trails in the UK, the estimate for an “early response” eradication of the Monk Parakeet would only amount to 150,000 €. This parakeet costs the USA several million $ as it makes huge nests on electricity pylons causing power cuts. Surprisingly, despite their cost efficiency, rapid response programmes are rarely implemented in the EU. Contingency planning (i.e. setting measures to be prepared for the arrival of new IAS) is also strongly required. For instance, the UK has implemented a staff training programme to handle Asian Hornets and their huge nests for only 5000 €. But despite its cost efficiency, there is no other example of a contingency response in the entire EU. In summary, the most important thing is to strongly increase collaboration among EU countries, to implement EU-wide action for priority species, to focus on new arrivals, to anticipate future problems, to create an alert system for each Member State which is linked with other systems across the EU, and to develop, retain and share expertise.

Eradication of alien plants: a matter of prompt reaction and resources invested

Mr Jan Pergl, Institute of Botany and Academy of Sciences of the Czech Republic, presents recent research on the eradication of alien plants and explains that their eradication is mainly a matter of prompt reaction, because the success rates are only satisfying for small populations. An evidence-based rule of thumb, relying on 53 studies of 18 alien plant species, says that plants occupying less than 1 hectare can be successfully eradicated, while an eradication of populations occupying 1 to 100 hectares is only successful in every third case, and where 100 to 1000 hectares are occupied it will be successful only in every fourth case. Recent research has confirmed that for several groups of organisms the size of the population is the main factor affecting eradication success, and that a secondary but strongly related factor is the time between the recognition of the problem and the initiation of the campaign. The costs and resources needed for eradiation are often unavailable and an information system is strongly needed. Costs for eradication measures on islands ranged (according to a recent assessment of 26 programmes) from 200 € to 2.25 million €. Other relevant strategies recently produced by invasion biologists include a uniform framework for biological invasions (consisting of the steps transport, introduction, establishment and spread) and a pathway classification with linked regulation measures. In conclusion, it can be said that (i) prevention is the cheapest strategy (also valid for biofuel plants and GMOs, due to partly similar traits to IAS), (ii) success of eradication is dependent on early detection, (iii) if there is a need to prioritise, the nascent foci rather than the old populations should be eradicated, (iv) after eradication, monitoring is crucial.

Question & Answers, open discussion – Part 2

Current information systems

Mr Davies initiates the discussion with a question about the state of the art of information systems on IAS in the EU.

Mr Pergl answers that some databases such as EASIN (developed by JRC) or GBIF are only database aggregators, while “better information” (the real data) is available in original databases such as DAISIE and NOBANIS.

Mr Moore mentions that information systems do exist, but that information is not easily available and that in practice it is often the best way to search for information in Wikipedia.

Mr Wagenhut mentions in this context that EASIN is being developed fast and that new features still need to be integrated. Building upon existing (supra-)national and regional databases is a practice that will be continued in the future as these databases are precious sources at EU level.

Mr Pergl states that the original databases such as DAISIE and NOBANIS are not at all (or not sufficiently) supported, although they should be.

Mr Poc adds that JRC-developed systems are sometimes not useful in practice. A multi-layer information system is required to cover mapping, as well as a large amount of further information to support administrative tasks. The Commission should help in this context so that the wheel is not reinvented too often.

Public awareness

Mr Keith Davenport, from the Ornamental Aquatic Trade Association mentions that in the case of IAS, it is very important to raise public awareness as this would be a very efficient mitigation and management measure, especially with a view to trade playing a major role.

Mr Moore confirms that trade is a very important aspect and that public awareness should be raised.

Mr Davies asks for best practice examples from the Member States on the issues of trade and raising public awareness.

Mr Ploeg mentions that in the Netherlands, a system exists for stopping imports of a number of plant species on a voluntary basis.

Polluter pays principle

Mr Davies asks whether the polluter pays principle should be applied in the context of IAS.

Mr Pergl is not aware of any application of the polluter pays principle but thinks that companies introducing IAS for economic reasons should also pay for costs of invasions and that the regulation should be developed into this direction.

Mr Essl explains that the polluter pays principle would only be operational if it can be proved that polluters have not fulfilled the legal requirements for IAS mitigation. It might be challenging to obtain legally valid proof, but apart from this problem, the polluter pays principle could be an important element in the implementation of the new EU legislation.

Mr Poc mentions that the term “polluters” should be substituted by “criminals” in this case and that effective legislation must provide for the punishment of “criminals”.

Mr Andrew Kelly from Humane Society International explains that animal welfare organisations would condemn illegal releases of American Mink. Indiscriminate management methods are an important animal welfare issue, as is the fact that non-target species might suffer from eradication or control measures. Mr Kelly mentions the example of muskrat control in the Netherlands where, in 2012, 115,000 muskrats were trapped together with more than 11,500 other species, including protected species. For this reason non-lethal measures and measures avoiding non-target species would be preferred and this should be clearly specified in control measures.

Mr Zilleti fully agrees that eradication methods should be selective and only applied to target species.

PART 3 - PRIORITIES AND CHALLENGES - STAKEHOLDER ROUNDTABLE

Introduction by the moderator

Ms Renate Sommer, MEP, Shadow Rapporteur of the EPP group, welcomes the participants and the panellists. She mentions that it will be very interesting to hear the stakeholders expressing their views on this topic and that it seems to be clear that widespread species are not easily eradicated and that raising public awareness might be an important solution. Ms Sommer says that it is necessary to find out which practical approaches are feasible to fight IAS if the costs and benefits are taken into account as well as the animal welfare perspective.

Mr Wolfgang Rabitsch, Environment Agency Austria, Round table Moderator welcomes all participants and the panellists, whom he introduces to the audience while also inviting them to provide their key messages.

Mr Alex Ploeg, European Pet Organisation, EPO, explains that EPO is the umbrella organisation of the national pet trade associations in Europe. Mr Ploeg supports the new legislation. He sees a need for communicating more clearly the actual risks that have to be managed, as well as for defining specific key words such as “environment” more clearly in legislation (he mentions for example that it is unclear if the term “environment” includes a private garden pond), and he insists that the proposed list of species should be compiled rigorously and transparently. It should place equal value on practical and theoretical issues; however, the arbitrary number of 50 species is probably not the best option. The aims should be achieved, but as regards trade, with as few regulations as possible. Regional differences are another important issue. For instance, species causing problems in the south should not automatically be restricted in the north. The regulation should permit the control of species that are native to some Member States and invasive in others. The impact of buying decisions is quicker than the impact of legislation, and companies should be treated as equally important partners. Business will be subject to control under legislation relating to plant and animal health, and now to the new piece of legislation on IAS. All these regulations should be part of a common framework of control so as to permit coherence.

Mr Cy Griffin, Federation of Associations for Hunting & Conservation of the EU, FACE, states that FACE was involved in the making of the legislation, which he welcomes very much. The list of species will be crucial for many stakeholders and Mr Griffin asks how it will be handled that some species might have a huge local impact in one or a few Member States, but a comparatively low impact at EU level. An important challenge for FACE is the motivation of its members, the hunters, to implement the regulation. FACE has collaborated with the Council of Europe, as the strategy for IAS contains an action point of adopting a code of conduct with FACE, which was done recently with very little floor discussion. Mr Griffin concludes from this experience that it is important that everybody is in agreement before a regulation is adopted. Mr Griffin mentions that the importance of hunting as a pathway of IAS introduction has been decreasing since the 1980s and that this positive development is the reason why hunting is no longer considered as a priority pathway in the new legislation.

Mr Richard Shaw, CAB International, explains that CABI is a non-profit organisation which is owned by its 48 member countries and states CABI's mission to improve people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. CABI welcomes the regulation and has enjoyed the expert consultations. IAS are a cross-border, cross-taxa and cross-research discipline that requires collaboration. Mr Shaw mentions that CABI's history in IAS management goes back 100 years. Mr Shaw explains that "doing nothing" is a high risk option and that even already established species can be controlled. There are many examples of successful bio-control actions, for instance from Australia and New Zealand, which might be useful and could be implemented successfully in Europe, e.g. to control ragweed (Ambrosia artemisiifolia). Mr Shaw mentions that more bio-control opportunities exist than are currently implemented in Europe. He would like to see more of the proposals for the application of bio-control management in the regulation and emphasises that it is important that bio-control is at least not hindered by the regulation. As regards IAS, collaboration with other countries is particularly important and the regulation is an important step (and a significant change) in this direction. Mr Shaw states that CABI wants to help other countries with the knowledge it can provide on IAS bio-control.

Mr Luc Bas, IUCN Office Brussels, mentions that IUCN is an intergovernmental non-profit organisation which is composed of 100 member states plus user groups and NGOs. His statement is a follow-up to the presentation of Mr Genovesi, the Chair of the IUCN SSC Invasive Species Specialist Group (see part I). IUCN is best known for its knowledge and its science based approach. A call for a science-based approach was launched to move the regulation in a better direction, e.g. the 50 cap was a problem, as well as freezing the list for a certain period of time after its adoption. The call was initiated with the Invasive Species Specialist group and signed by 250 scientists. IUCN wants to see a clear role for a scientific advisory board embedded in the regulation, to properly inform decision-making without too much of an administrative burden.

Ms Sarah Brunel, European and Mediterranean Plant Protection Organisation, EPPO, explains that EPPO is an intergovernmental organisation founded in 1951, which meanwhile represents 28 European and 22 Mediterranean and Russian-speaking countries. It has a unique role in providing technical tools and knowledge support for plant protection measures in the member countries. The main activities are the development of plant health early warning systems, risk assessment and rapid intervention tools, which are all freely available on the EPPO website. A monthly journal also helps to share information. EPPO compiles lists of priority species by using transparent methods of prioritisation and risk analysis, which then serve as a basis to recommend regulations for some species. Technical justifications are provided to the countries and are available online, which is consistent with the WTO requirements and the plant protection convention guidelines. In such processes both the environmental and the agricultural impacts are carefully considered, while offering an opportunity for dialogue and exchange between the two sectors. Building networks of experts is another important activity of EPPO. Ms Brunel states that EPPO is looking forward to sharing its experience on expertise sharing. Synergies should be developed given the limited resources available, especially for risk assessment, early warning systems and surveillance. EPPO has a strong experience in IAS management and wishes to continue building bridges between different sectors.

Mr Matthew Jebb, The European Botanical Gardens Consortium, represents 900 botanical gardens in Europe which cover one quarter of the global flora. He states that many species kept in botanic gardens are highly invasive, but meanwhile the code of conduct for botanical gardens (produced by Vernon Heywood) ensures that botanical gardens are no longer a source of further invasions. Botanical gardens have a considerable expertise, not only in identifying IAS, but also in avoiding their escape. Mr Jebb reminds the audience that we should focus on the purpose of the regulation, which is mainly to hinder and prevent newly emerging threats of invasions and to control established ones. In this context, we should not end up with the lowest common denominators, but focus on the new arrivals, which amount to over 60 new species in Europe per year. Mr Jebb underlines how important the speed of action is, as an early response is by far the most cost-effective option. He states that he is anxious that, due to the very general formulations it contains, the regulation might have a severe impact on collections such as herbaria (and their maintenance). Botanical gardens are of crucial importance for public awareness, but for instance, Articles 7 and 8 are problematic and Art. 8.3a stipulates that if IAS are kept for research, it must be guaranteed that they cannot escape, although it is impossible to give a 100% guarantee for this. Living examples of IAS are important for research and provide unique opportunities for public awareness. The risks and the benefits must be carefully examined in order to allow derogations for botanical gardens.

Mr Neil Huck, European Landscape Contractors Association, ELCA, states that ELCA represents companies which are based in 21 European countries in Europe. ELCA provides them with IAS standards and training certificates. Their business includes the provision of advice on IAS to client companies. The main activities are staff training programmes and the teaching of control measures. With respect to the regulation, Mr Huck criticises that training aids and public awareness are barely considered. For instance, water companies in the UK have severe problems with sewage treatment because New Zealand pigmyweed (*Crassula helmsii*) is invading the filter beds. 10 different control methods were tested; most efficient were hot foam and hot water, while the use of chemicals is impossible because of their effects on microorganisms. Education and raising client awareness is an important task. ELCA welcomes the regulation, and members of ELCA have come forward with the message that there is a need for a regionalisation of the list.

Question & Answers, open discussion – Part 3

Mr Genovesi underlines the crucial role of the different sectors of society which need to be involved in the IAS challenge. The IUCN has been working (and still is) on codes of conduct with hunting associations and botanical gardens, and also with zoological gardens. Botanical and zoological gardens have a crucial role in informing European citizens. Mr Genovesi also states that protected areas are important sentinels (together with botanical gardens and zoos) for detecting IAS, because early warning is a complicated task. People in the field, such as hunters and protected area managers, but also people working in botanical and zoological gardens have a wide range of expertise, including taxonomic expertise which is needed to correctly identify new alien species. Besides the new legislative tool, other instruments, such as a voluntary code of conduct, are crucial elements that are needed as well.

Ms Delphine Dupeux, representing the European Landowners Organisations, explains that also landowners and land managers can play the role of sentinels. They can prevent IAS, and take care of early warning and the management of IAS. Often they are already engaged in the implementation of field actions. The landowners welcome the regulation. They would also welcome flexibility in terms of derogations, when it comes to the decision

which IAS can be considered as priority species. The scientific approach is key, but a much broader approach which involves all stakeholders would be preferred. Another problem is that social and economic aspects are not considered enough, particularly as there is a lack of budget in most Member States and the regulation might impose further burdens on land managers. It is thus important to consider the economic damage to plant health and agriculture.

Ms Sommer states that in this context the term “social aspects” has to be defined more clearly, because otherwise it potentially implies everything.

Ms Dupeux gives examples of social activities (e.g. farming, heritage, cultural issues of land management, tradition), but does not define “social aspects”.

Ms Brunel mentions that in the plant health regulation “social impact” is considered in a broad sense which is not well defined, whereas for instance “impact on human activities” is referred to in contexts such as the blocking of sewage pipes, fishing or recreational areas.

Mr Mark Gareth Owen from the European Anglers Alliance explains the economic importance of angling in Europe and mentions that IAS impact badly on angling activities, which is an example of a social aspect that must be brought in. He welcomes the regulation and Mr Poc’s amendments. Derogations can be misused and should therefore not be granted too often.

Ms Tanja Runge from COPA COCEGA, the European farmers and European agri-cooperatives, continues the discussion on socio-economic aspects. She argues that the wording is somewhat unclear, since for instance “overall damage” sums up biodiversity and economy as if they can be treated in the same way, an incongruity which must be resolved. Social aspects include health issues as well as the considerable costs incurred by those who are the first ones to act. It is necessary to keep low both the burden and the costs incurred by those who are first to act (e.g. the farmers who have to destroy their yield).

Mr Bas mentions that local governments and cities have a very important role and refers to a report on a recent workshop about urban aspects of IAS organised by the IUCN in Gland.

Ms Sommer thanks the participants for the interesting discussion and invites Mr Poc to make the concluding remarks.

CONCLUDING REMARKS

The rapporteur, Mr Poc, summarises the workshop by stating that it is not too late to tackle the problem of IAS because, as the presentations of the experts show, we are still able to do something. The problem of IAS has clearly been recognised by the Member States, by the Commission and by the Parliament and the Council. Mr Poc mentions that strong scientific support is available (which needs to be strengthened further) and that the evidence is still increasing, e.g. of the eradication of the giant hogweed based on research in the Czech Republic, and that communication and collaboration need to be enhanced. So-called “door-knockers” are an important issue that needs to be considered, along with the issue of secondary spread that needs to be improved in the regulation. Botanical gardens can be an important source for invasions, although this issue will be studied carefully and the regulation adapted accordingly to allow for a fair consideration of botanical gardens.

Mr Poc finalises his statement by mentioning that any measures to increase public awareness should be taken at Member State level since it is at this level that they will reach people. It must be decided whether we want to do something about invasive species now. The involvement of local governments is already foreseen by the EC, as it has stated that public awareness must be considered by Member States. Mr Poc closes the workshop by acknowledging the large audience attending the workshop (approx. 100 persons) and the work of the shadow rapporteurs.

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Organised by the Policy Department A-Economy & Science for the Committee on the Environment, Public Health and Food Safety (ENVI)

Workshop on Invasive Alien Species

Tuesday, 17 December 2013 from 12.30 to 15.30
European Parliament, Room A1G-2, Brussels

AGENDA

Part 1

Invasive alien species – What is at stake?

12.30 **Welcome and introduction by the Chair, Pavel Poc, MEP, ENVI Rapporteur**

12.40 **Invasive alien species: how do they arrive, and what are their impacts**
Piero Genovesi, ISPRA and Chair IUCN SSC Invasive Species Specialist Group

12.50 **Prevention and management of the introduction and spread of invasive alien species - The Commission proposal for a regulation**
François Wakenhut, Head of Unit Nature and Biodiversity, DG ENV

13.00 **State of play of discussions in Council**
Inga Semeškaitė, Permanent representation of Lithuania to the EU

13.10 **Q&A, open discussion**

Part 2

Current experience and best practices

13.25 **Introduction by Chris Davies, MEP, Draftsperson for the PECH committee**

13.30 **Gaining momentum: Status quo and trends of invasive alien species in Europe**
Franz Essl, Environment Agency Austria

13.40 **Fighting IAS: better late than never but never late is better**
Bernardo Zilleti, GEIB (Grupo Especialista en Invasiones Biológicas, Spanish expert group for biological invasions)

13.50 **Managing Invasive Alien Species in the United Kingdom**
Niall Moore, Non-native Species Secretariat UK

14.00 **Eradication of alien plants: a matter of prompt reaction and resources invested**
Jan Pergl, Institute of Botany and Academy of Sciences of the Czech Republic

14.10 **Q&A, open discussion**

Part 3

Priorities and challenges – Stakeholder Roundtable

14.25 **Introduction by Renate Sommer, MEP, ENVI Shadow Rapporteur**

14.30 **Roundtable moderator: Wolfgang Rabitsch, Environment Agency Austria**

EPO, European Pet Organization – Alex Ploeg

FACE, Federation of Associations for Hunting & Conservation of the EU – Cy Griffin

CAB International – Richard Shaw

IUCN Office Brussels – Luc Bas

EPPO, European and Mediterranean Plant Protection Organization – Sarah Brunel

The European Botanical Gardens Consortium – Matthew Jebb

ELCA, European Landscape Contractors Association – Neil Huck

15.15 **Q&A, open discussion**

15.25 **Conclusions by the Chair**

SHORT BIOGRAPHIES OF EXPERTS

Piero Genovesi

Senior Scientist with ISPRA (Institute for Environmental Protection and Research, Italy), Chair of the IUCN (International Union for Conservation of Nature) SSC Invasive Species Specialist Group, and member of the Steering Committee of the IUCN Species Survival Commission. Author of the European Strategy on Invasive Alien Species, adopted by the Council of Europe in 2003, and of many studies, reports and assessments on invasive species. Collaborates with many European and global institutions, including the European Environmental Agency, the Convention on Biological Diversity, the WTO.

François Wakenhut

François Wakenhut is Head of Unit for Biodiversity (since 2009) in the Directorate-General for the Environment of the European Commission. He was previously Head of the Global governance, development and international relations Unit in the Environment Directorate-General.

Inga Semeškaitė

Environment attaché at the Permanent Representation of Lithuania to the European Union Inga has graduated from the Mykolas Romeris University in Lithuania with a Master degree in Commercial Law. Since 2005 she has been working in the Legal division of the Lithuanian Geological Survey under the Ministry of Environment (from 2008 – Head of the Legal division). From May, 2012 Inga has been acting as an Environment Attaché in the Permanent Representation of Lithuania to the EU. She is currently chairing the Council Working Party on Environment where the Regulation on the Invasive Alien Species proposed by the European Commission is being discussed.

Franz Essl

Franz Essl is an ecologist at the Austrian Environment Agency and the University of Vienna. He is interested in causes and patterns of biological invasions, reducing the impacts of invasive alien species, in the processes governing diversity patterns of species and habitats, and in the impact of climate change on the distribution of biota and the resulting consequences for nature conservation.

Bernardo Zilletti

Bernardo Zilletti is a biologist working within the GEIB Grupo Especialista en Invasiones Biológicas, a Spanish NGO focused on biological invasions. With 15 years background in IAS, he contributed towards promoting knowledge-building and awareness of the problem in Spain and collaborated in the design of management strategies for national and regional authorities. He also worked as consultant of the Council of Europe and the European Environment Agency. Bernardo is member of the ISSG/IUCN.

Niall Moore

Niall Moore is head of the Non-native Species Secretariat for Great Britain. The Secretariat was established in 2006 to co-ordinate action on alien species across government and its agencies. The Secretariat established and now runs the risk analysis mechanism for invasive species in Britain as well as a website and is intimately involved in research, rapid responses, the alert system and public awareness raising. Niall has been involved with the EU IAS Strategy since 2008 and was a member of the Commission's prevention working group representing the UK. He was lead author on the report from this group to the Commission on IAS risk assessment. He was seconded to DG Environment as a national expert for four months in 2012-13 to assist with aspects of the IAS Legislative Instrument (mainly looking at species for potential listing). Prior to 2006 Niall lead a team at a UK Government Agency including those attempting to eradicate ruddy duck and Mink.

Jan Pergl

My research focuses on the population biology of invasive plants and analysis of large datasets. Currently I am a project coordinator of the research project "Naturalization of garden plants as a result of interplay of species traits, propagule pressure and residence time". In the past I worked as a post-doc at University of Bern, Switzerland. Currently I am employed at the Department of Invasion Ecology at the Institute of Botany. I participated in several EU projects (ALARM, PRATIQUE, DAISIE and GIANT ALIEN), where I was involved mainly in data management and handling the Czech plant database. I closely cooperate with the Ministry of the Environment of the Czech Republic in the field of biological invasions.

Wolfgang Rabitsch

Wolfgang Rabitsch is senior expert on species conservation, nonindigenous species and the impact of climate change on biodiversity at the Department of Biodiversity & Nature Conservation at the Environment Agency Austria in Vienna. He is lecturer at the University of Vienna, Institute of Zoology. He has worked out an inventory of the endemic animal and plant species of Austria. He has contributed to the Alien Invasive Species Inventory for Europe (DAISIE), to the NOBANIS (European Network on Invasive Alien Species) database, to the development of a risk assessment and early warning tool for invasive alien species in Germany and Austria, and to the development of indicators for invasive species within the SEBI initiative of the EEA. He regularly contributes to the European Topic Centre on Biodiversity and has contributed to the Austrian Report within Article 17 Habitat Directive. Currently he co-leads the development of the new edition of the Austrian Biodiversity Strategy 2020.

Alex Ploeg

Alex Ploeg studied biology at the University of Utrecht and received his Phd in systematic zoology at the University of Amsterdam (1983), with ichthyology as specialization (1991). He worked as curator of a public aquarium on Aruba, Netherlands Antilles (1989-1990), fish breeder on Bonaire, Netherlands Antilles (1991-1992), Commercial manager of two importers of ornamental aquatic fish, Netherlands (1993-2000), sales manager for a publisher of book on ornamental fish (2000-2004), secretary general of Ornamental Fish International (2004-today), secretary general of European Pet Organization (2006-today) and adjunct secretary of Dibevo (2009-today).

Cy Griffin

Wildlife Policy Manager at FACE, Federation of Associations for Hunting and Conservation of the EU, since 2005. FACE technical expert on biology of game species with their related legislation. He also deals with the implementation of the EU Birds and Habitats Directives, and international agreements. Previously involved in field research on various mammal species including population dynamics of Red deer and invasion of American mink in Scotland.

Richard Shaw

Dick is the Invasives Regional Coordinator for CABI covering Europe and the Americas as well as being the Deputy Director at CABI's E-UK Centre. CABI works globally on IAS issues and has experience in most of not all of the stages in the intervention chain from Policy to control and boasts almost 40 invasive species specialists in Europe alone. Dick has worked on invasive species for CABI for almost 20 years starting as a research assistant and now running programmes including one researching biocontrol solutions for invasive weeds threatening Water Framework Directive goals in the UK. Dick lead the pioneering Japanese knotweed biocontrol project which recently culminated in the first ever official release of a biocontrol agent for a weed in the EU and hopes this tool will be used more widely in future for sustainable management of "out-of-control" invaders.

Luc Bas

Luc Bas is the Director of IUCN (International Union for Conservation of Nature) European Union Representative Office. In his current capacity, Luc represents the IUCN Secretariat and provides leadership and guidance for all activities undertaken within the European Union context in Brussels. Prior to IUCN, Luc has worked as adviser on international sustainable development policies for both the Belgian Federal and Flemish Governments. He was a representative for the Government at the UN Commission on Sustainable Development, the OECD national Sustainable Development expert panel and the Belgium Federal Council, and at various interregional networks on Sustainable Development. More recently, Luc represented The Climate Group in Brussels as its European Director, working with business and government to reach more ambitious EU climate policy and prepare for a true energy transition. As International Director of The Climate Group's States and Regions Alliance he established one of the most significant networks of sub-national governments leading on climate change. Through Luc's leadership the Alliance has now a functioning governance structure, involves leaders of governments from all over the world and uses its technical working groups to feed into the decision making at all levels. Luc is a sought-after speaker and moderator at high-level events on Sustainability and has worked closely with Ministers and business leaders. He holds a Master's degree in industrial engineering and postgraduate degrees in both environmental science and international politics, and he is fluent in English, Dutch, German and French.

Sarah Brunel

After a degree in agronomy, Ms Sarah Brunel developed the program on invasive alien plants for the south of France from 2001 to 2005. This program involved setting lists of invasive alien plants, developing management measures with land managers and voluntary initiatives with the nursery industry. Communication actions toward the general public were also undertaken, yielding more than 100 press articles, as well as TV and radio transmissions. For the last 8 years, Ms Sarah Brunel has worked for the European and Mediterranean Plant Protection Organization, which provides recommendations on Plant Health to its 50 member countries. Within EPPO, Ms Sarah Brunel is specifically in charge of invasive alien plants, pest risk analysis, environmental issues and modelling. She is also an expert for the IUCN Species Survival Commission, the European and Food Safety Authority, the European Environment Agency and the Bern Convention. She has taken further qualifications in international affairs and in environment anthropology to broaden her understanding of environmental matters.

Matthew Jebb

Director, National Botanic Gardens of Ireland since 2010. Formerly horticultural taxonomist and keeper of the National Herbarium since 1996. Chairman of PlantNetwork: The Plant Collections Network of Britain and Ireland since 2004. Member of the European Consortium of Botanic Gardens. Member of the Invasive Species Ireland steering group since 2006. Expertise: Plant Taxonomy, Herbaria and Museum curation, management of projects involving the control and eradication of invasive plant species in Ireland, including Gunnera tinctoria, Lagarosiphon major and Carpobrotus edulis.

Neil Huck

I have been on UK advisory stake holder group for invasive species for 3 years, to DEFRA. I have been surveying and managing control programs for 15 years for invasive species. I have been training people on the recognition and control methods for many invasive species. I am the vice President of the European Landscape Contractors Association representing 22 EU countries. I am technical director of the British Association of Landscape Industries in the UK. My education included 3 years at the Royal Botanic Gardens Kew. I am currently developing a training and certification program for the identification, and management of invasive species in the UK.

PRESENTATIONS

Presentation by Piero Genovesi

IUCN SSC Species Survival Commission ISSG Invasive Species Specialist Group

Invasive Alien Species:
how do they arrive, and what are their impacts

Piero Genovesi
ISPRA and Chair IUCN Invasive Species Specialist Group

EUROPEAN BUREAU FOR CONSERVATION & DEVELOPMENT

Workshop Invasive Alien Species
European Parliament, 17 December 2013

IUCN SSC ISSG

MAJOR DRIVER OF BIODIVERSITY LOSS

- Second driver of biodiversity loss after habitat loss and fragmentation
- Invasives impact 33% of threatened amphibians, 25% of birds, 24% of mammals, 22% of reptiles, 20% of fish
- Key factor in 54% of known animals extinctions. Only factor of 20% of extinctions

LOCAL PERCEPTION MAY BE MISLEADING

Hawaii hosted over 114 endemic species of birds.
At least 56 now globally extinct. 53 introduced species, almost all globally common and widespread

↓

Local number of species not changed, global biodiversity significantly reduced.

IMPACT ON ECOSYSTEMS

- Beaver introduced in Tierra del Fuego, established in over 7 Mln hectares
- *Prosopis* invading large areas of Africa, limiting access to land
- Water hyacinth impacting access to water and transport, and spreading malaria

AFFECT OUR HEALTH

- More than 100 known cases of invasive species with effects on health
- Pathogens, parasites, vectors of pathogens, producing toxins, allergenic, direct attacks or bites, indirect effects on other invasive species with impact on health, etc.

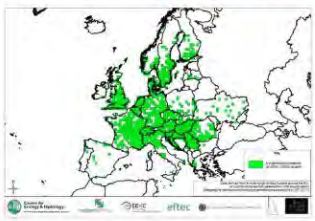
Tiger mosquito

- transmits 20 pathogens, including Dengue, West Nile, Chikungunia

CAUSE HUGE ECONOMIC LOSSES

Ragweed

- Impacts up to 50% of patients with pollen allergy (1/4 of all Europeans)
- Allergy reactions at > 200 km from sites where the plant occurs
- Total costs (agricultural, work productivity and human health) estimated as being €4.5bn per year
- Well planned control costing under €400m/yr could reduce impacts by €1,500m/yr in 2032



CAUSE HUGE ECONOMIC LOSSES

Europe

€ Eradication/control

€ Damage to infrastructure

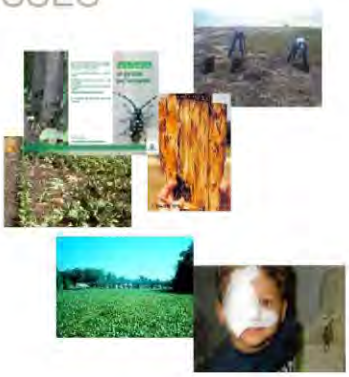
€ Damage to agriculture and forestry

€ Fishing

€ Human health

€ Research, prevention, monitoring, etc

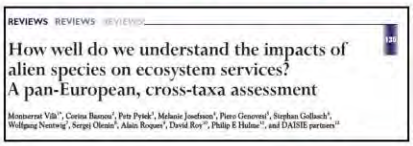
> € 12.5 billions/year



Source: Kettunen, Genovesi, Gollasch, Pagad, Starfinger, ten Brink & Shine. 2008. Assessment of the impacts of IAS in Europe and the EU (Final module report for the European Commission). IEEP

PROTECTING BIODIVERSITY SAFEGUARDS LIVELIHOOD

Invasive species impact on both ecosystems and livelihood



REVIEWS REVIEWS REVIEWS

How well do we understand the impacts of alien species on ecosystem services? A pan-European, cross-taxa assessment

	Total	Ecological impacts		Economic impacts	
Aquatic marine	1076	134	12.45%	114	10.59%
Aquatic inland	486	139	28.60%	107	22.02%
Birds	172	46	26.74%	78	45.35%
Terrestrial invertebrates	584	126	21.58%	180	30.82%
Terrestrial mammals	112	55	49.11%	67	59.82%
Terrestrial plants	6135	841	13.71%	745	12.14%

SYNERGY WITH CLIMATE CHANGE

Expected increase of impacts

- Europe particularly at risk of synergic effects of invasions and climate change

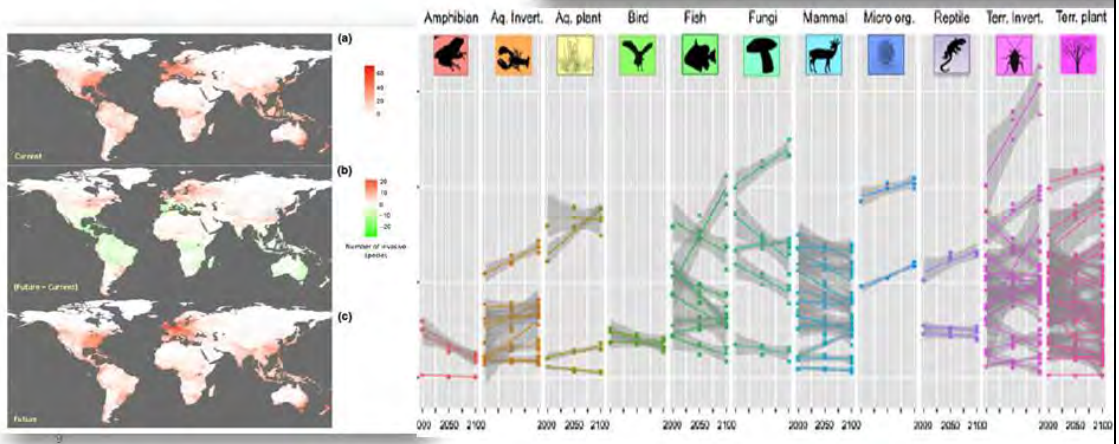
Global Change Biology

Global Change Biology (2013), doi: 10.1111/gcb.12344

Will climate change promote future invasions?

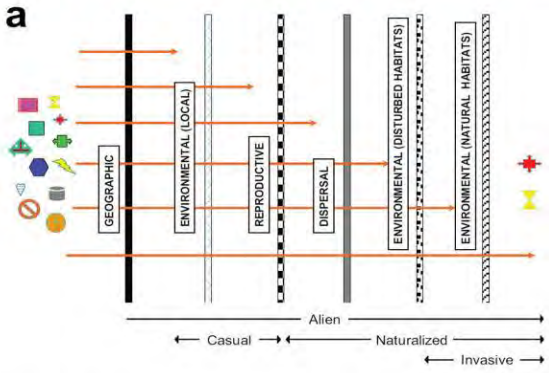
CELINE BELLARD*, WILFRIED THUILLER†, BORIS LEROY‡§, PIERO GENOVESI¶, MICHEL BAKKENES‖ and FRANCK COURCHAMP*

*Ecologie, Systématique & Evolution, UMR CNRS 8079, Univ. Paris-Sud, Orsay Cedex FR-91405, France, †Laboratoire d'Ecologie Alpine, UMR CNRS 5553 Université Joseph Fourier, Grenoble 1 BP 53, Grenoble Cedex 9 FR-38041, France, ‡URUEM 420 Biodiversité et Gestion des Territoires, Université de Rennes 1, Campus de Beaulieu, Rennes Cedex 35042, France, §Service du Patrimoine Naturel, MNHN, Paris, France, ¶Institute for Environmental Protection and Research, Rome, Italy, ‖Netherlands Environmental Assessment Agency (PBL), PO Box 303, Bilthoven 3720, The Netherlands



PATTERNS OF INVASIONS

Understanding how invasive species arrive, establish, spread and harm crucial to improve responses



Richardson et al. 2000. Diversity & Distribution, 6:93-107.

IUCN SSC ISSG

PATHWAYS OF ARRIVAL

***Target 9*: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and** measures are in place to **manage pathways to prevent** their introduction and establishment

- Define lists of species and pathways
- Identify priority pathways for focusing prevention
- Identify priority species for response

IUCN SSC ISSG

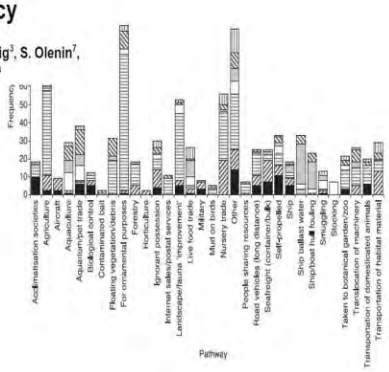
PATHWAYS OF ARRIVAL

Understanding how invasive species arrive may enhance prevention

Journal of Applied Ecology 2008, **45**, 403–414 doi: 10.1111/j.1365-2664.2007.01442.x

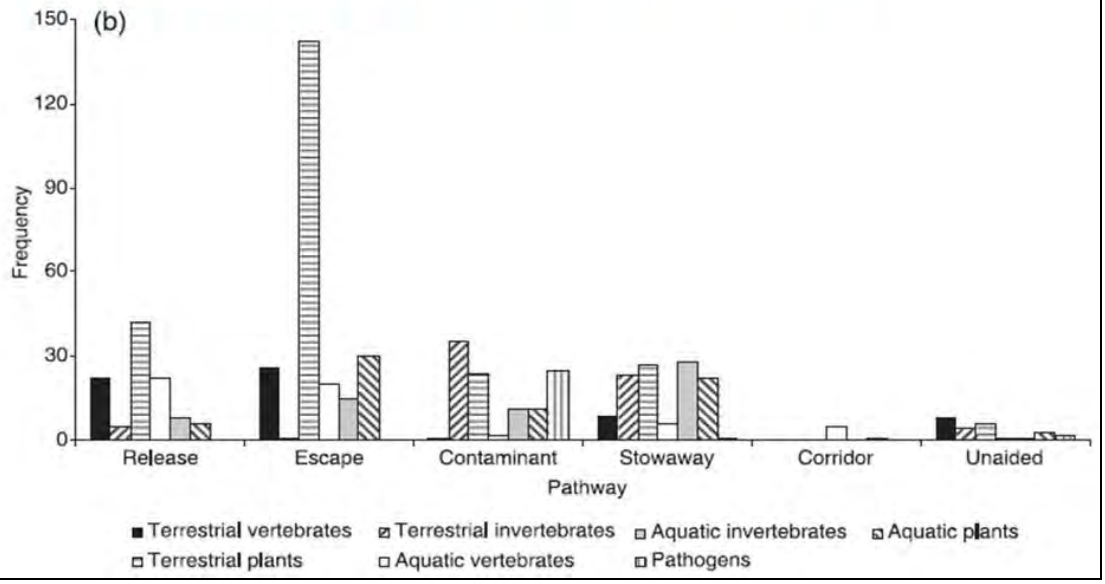
Grasping at the routes of biological invasions: a framework for integrating pathways into policy

P. E. Hulme[1,2*], S. Bacher[3], M. Kenis[4], S. Klotz[5], I. Kühn[5], D. Minchin[6], W. Nentwig[3], S. Olenin[7], V. Panov[8], J. Pergl[9], P. Pyšek[9,10], A. Roques[11], D. Sol[12], W. Solarz[13] and M. Vilà[14]



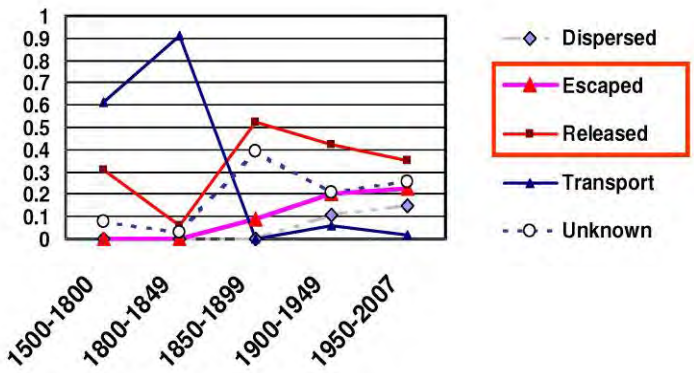
PATHWAYS OF ARRIVAL

Understanding how invasive species arrive may enhance prevention



PATHWAYS OF ARRIVAL

Pathways of arrival change over time



PATHWAYS OF ARRIVAL

Intentional import/introduction a major challenge for some taxonomic groups

15

MOST INVERTEBRATES ARRIVE UNINTENTIONALLY

Yellow-legged hornet *Vespa velutina nigrithorax*

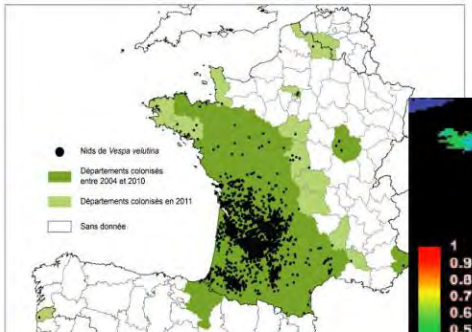
- Arrived in France 2005, rapidly detected. 89% of diet bees, wasps and other pollinators

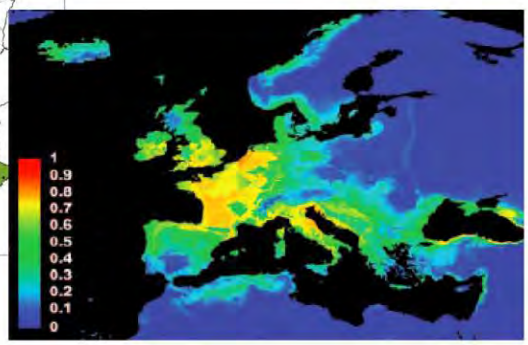
16

MOST INVERTEBRATES ARRIVE UNINTENTIONALLY

Yellow-legged hornet *Vespa velutina nigrithorax*

- Ongoing expansion in Spain and Portugal. Recently recorded in Italy



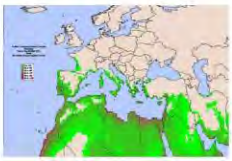


17

ROLE OF TRADE

Water hyacinth

- causes losses for over € 4 Mln/yr. Climate change could facilitate invasion of large areas of southern Europe



Sold at Lidl..

18

ROLE OF TRADE

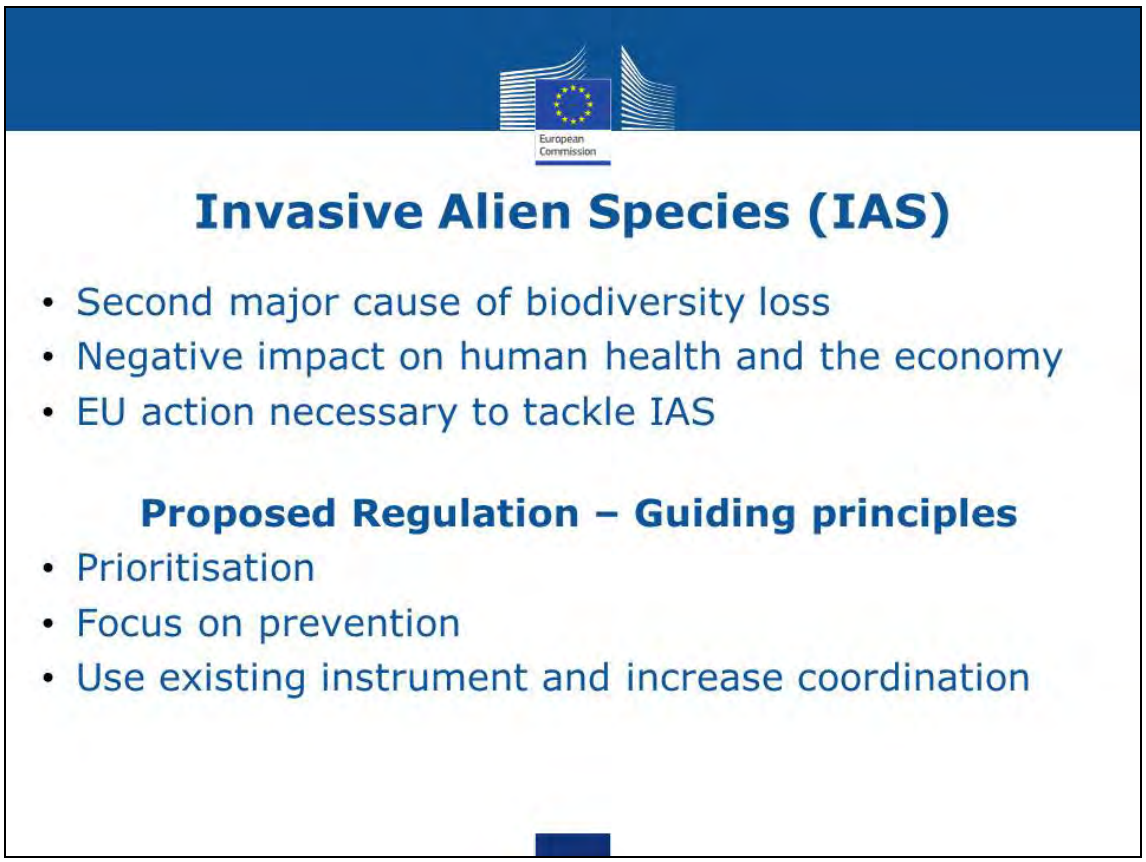
- Analysis of 380 invasive species (Genovesi & Scalera 2007)
- 82.1% introduced through trade (either direcly or indirectly)
- 20.2% intentionally introduced, most often to be released into the wild
  - Some of the most impacting invasions in Europe could have been prevented with a stricter trade regulation!
  - … and even more with stricter regulation of containment facilities

Thank you!

Piero Genovesi
ISPRA and Chair IUCN Invasive Species Specialist Group

Workshop Invasive Alien Species
European Parliament, 17 December 2013

Presentation by François Wakenhut




European Commission
Cost implications
• > 12,000 alien species in Europe - 10-15% of which invasive
• Increasing numbers of IAS, increasing costs
• Business as usual:
• Total cost of €12 bio/year expected to increase
• Current cost of action of € 1,4 bio/yr expected to increase
• Proposed measures:
• Initial additional investment in cost of action of € 26-40 mio/yr
• Then decrease of cost of action below € 1,4 bio/yr
• Total cost would remain under control
• Magnitude of benefits to increase over time as increasing numbers of invasions are avoided


European Commission
List of IAS of Union concern
• Focus on common priorities:
• Efficient resource use
• Effectiveness of uniform action at EU level
• Dynamic list (but max 50 IAS in initial phase)
• Science-based approach:
• Selection criteria and full risk assessment:
• Alien to EU territory
• Ability to establish and spread
• Causing such damage so as to deserve EU action
• Full involvement of Member States in listing

Measures on IAS of Union concern

- Prevention:
  - Species bans (derogations for research and ex-situ conservation)
  - Border controls
- Early detection and rapid eradication
  - Surveillance
  - Rapid eradication for newly establishing species (derogations possible)
- Management of established IAS
  - Flexibility - choice between eradication, containment and control

Action beyond the EU listed species:

- Pathway management
- Emergency measures
- IAS of MS concern

Issues for discussion

Listing:

- 50 species cap
- selection criteria – relatively open
- species native in some part of the EU but invasive somewhere else in the EU

Regionalisation:

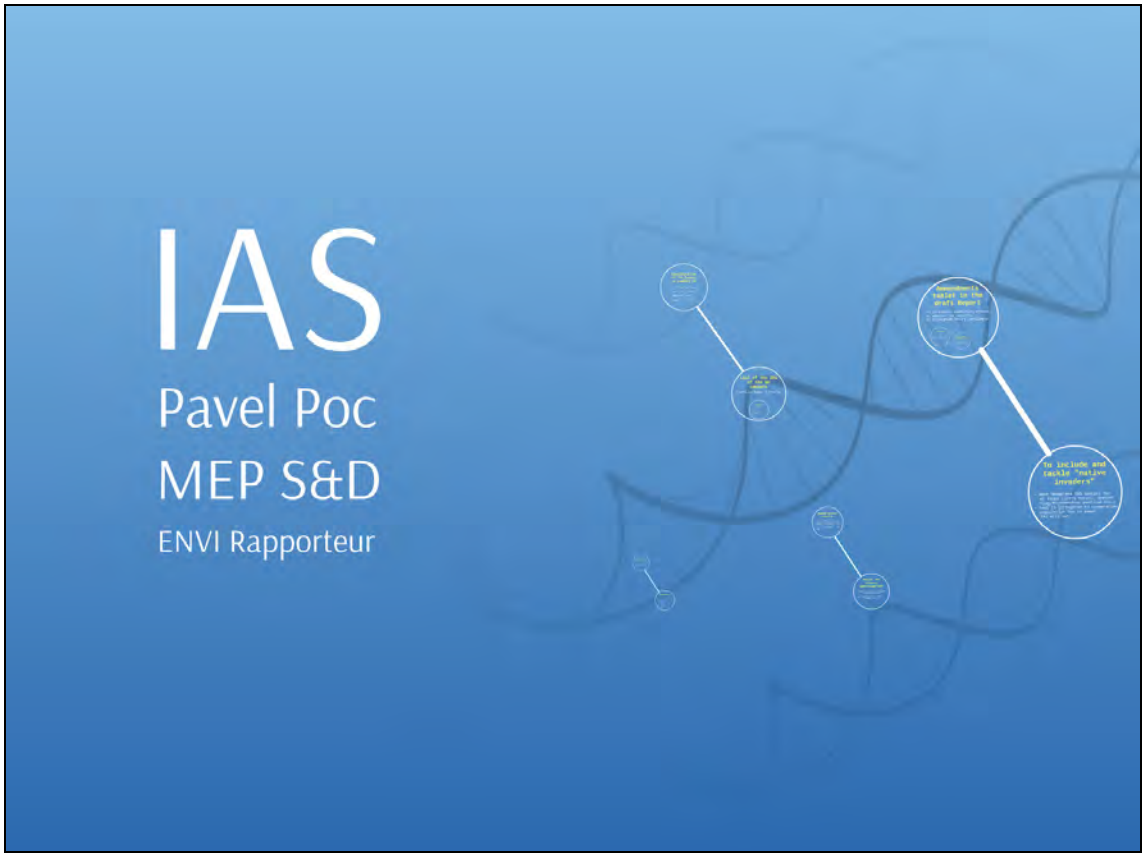
- Bulk of the obligations linked to EU list - to be applied at EU level
- Action possible at national or regional level, but not mandatory

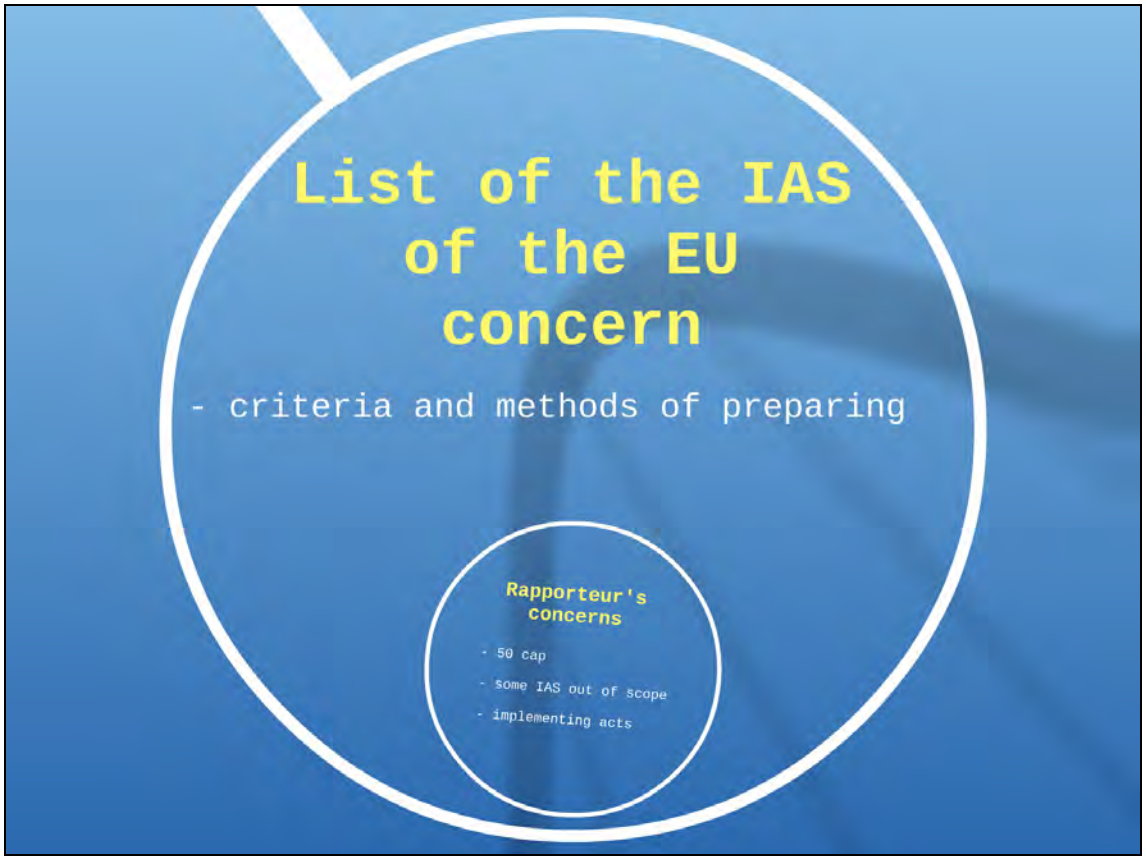
Margin of manoeuvre for MS:

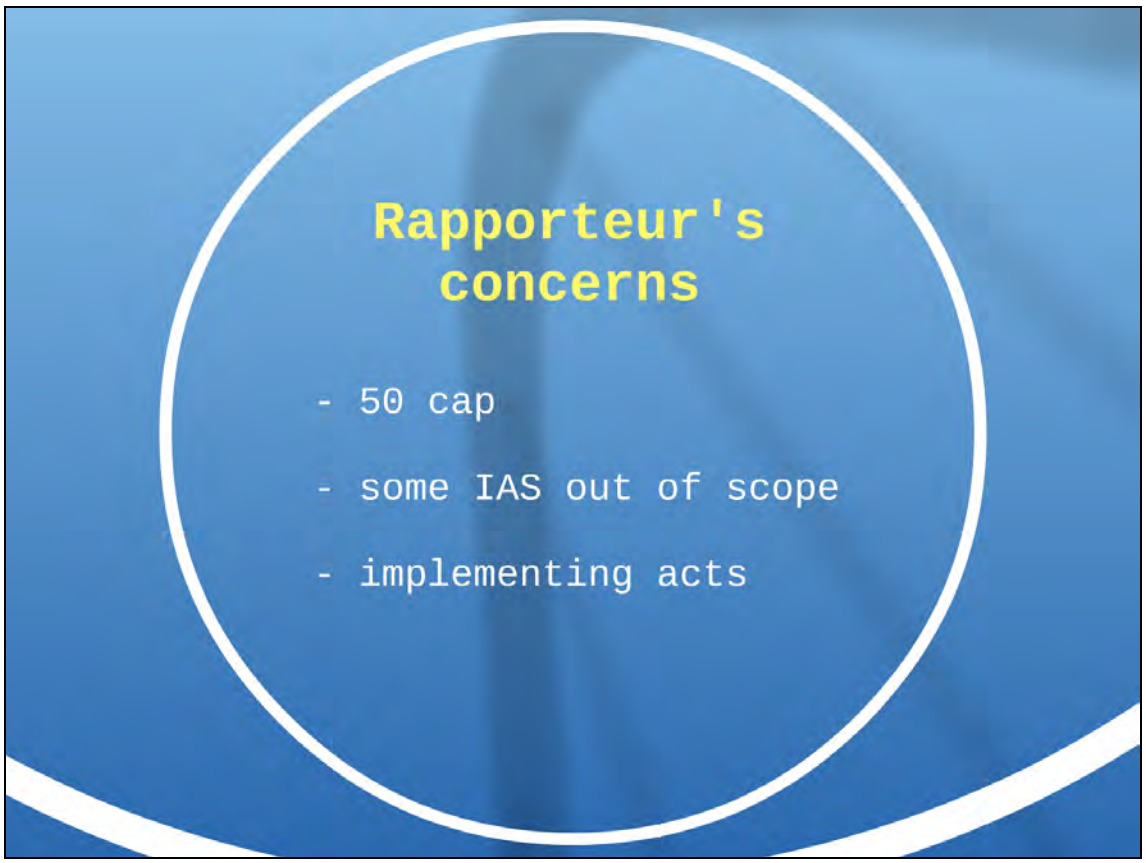
- Emergency measures and interplay with national measures


European Commission
Thank you for your attention!
For further information:
francois.wakenhut@ec.europa.eu
http://ec.europa.eu/environment/nature/invasiveali
en/index_en.htm

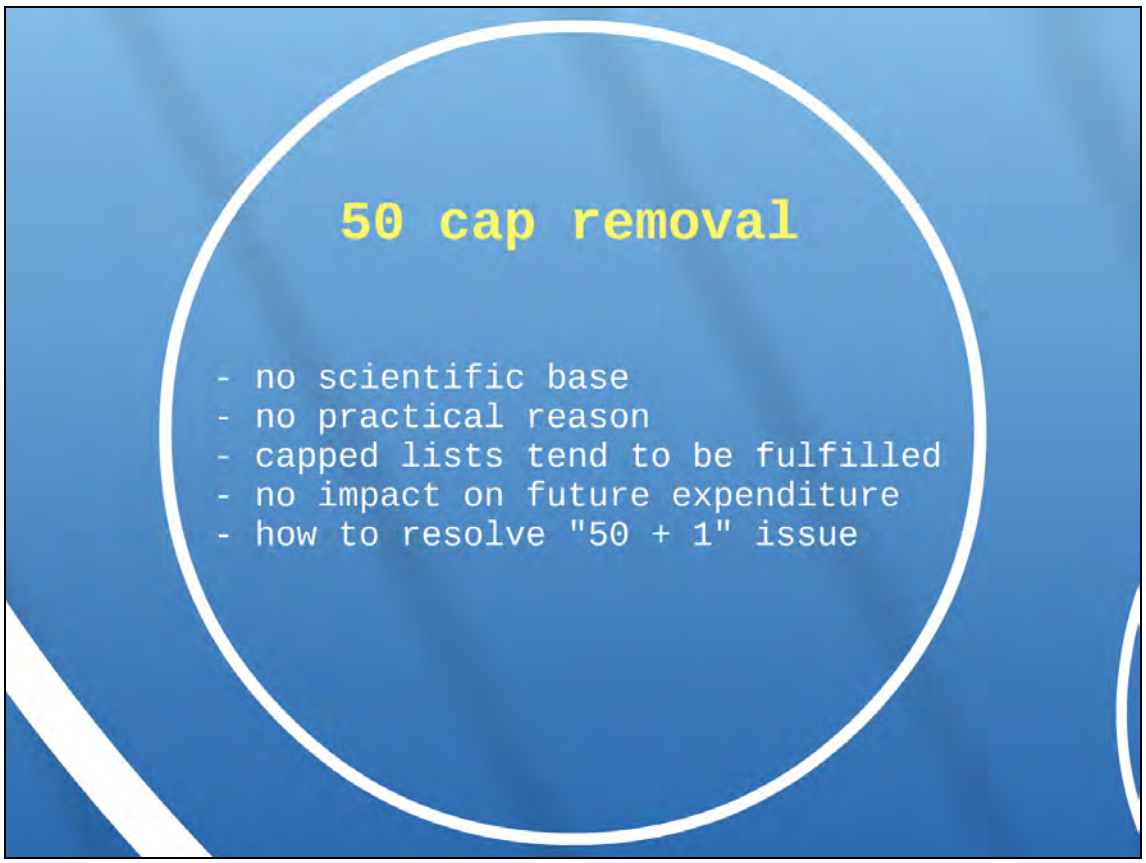
Presentation by Pavel Poc



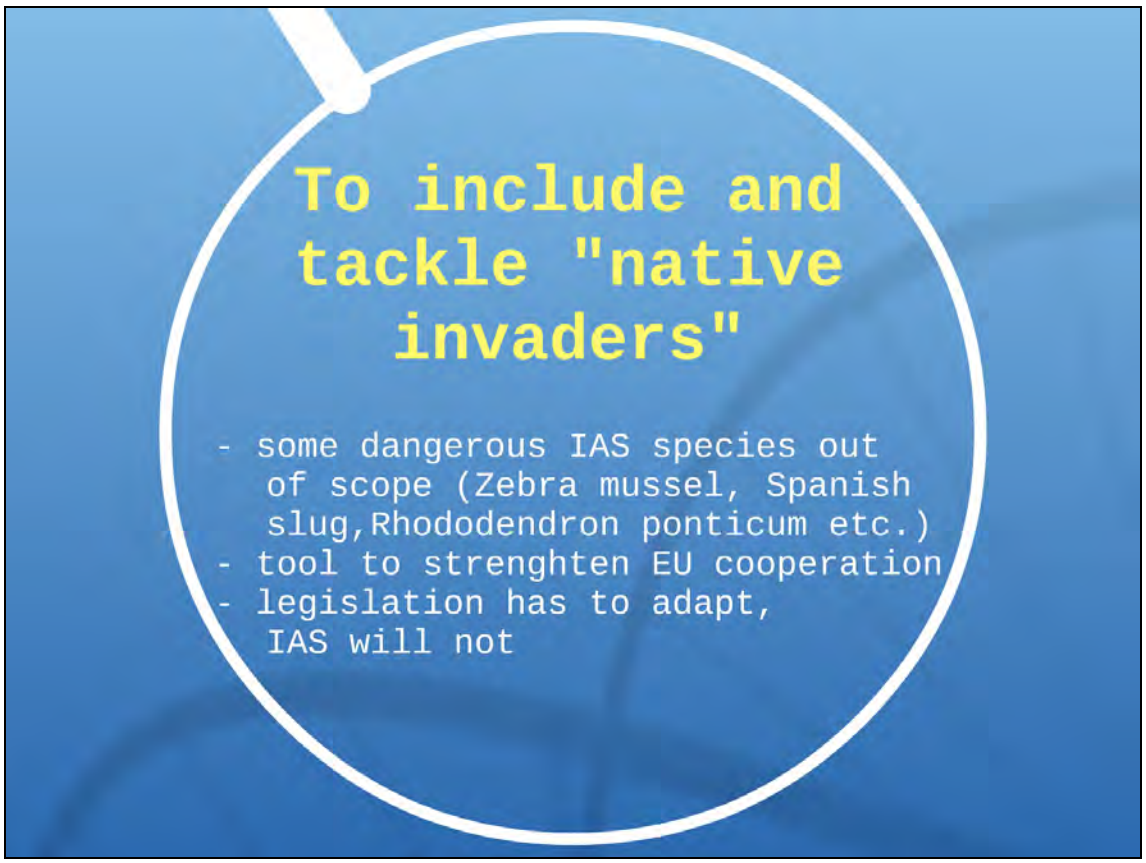

List of the IAS of the EU concern
- criteria and methods of preparing
Rapporteur's concerns
- 50 cap
- some IAS out of scope
- implementing acts


Rapporteur's concerns
- 50 cap
- some IAS out of scope
- implementing acts


Ammendments tablet in the draft Report
- to strenghten Commission proposal
- to address the concerns
- to strenghten future compliance
50 cap removal
Establishing of the EU concern list by delegated acts

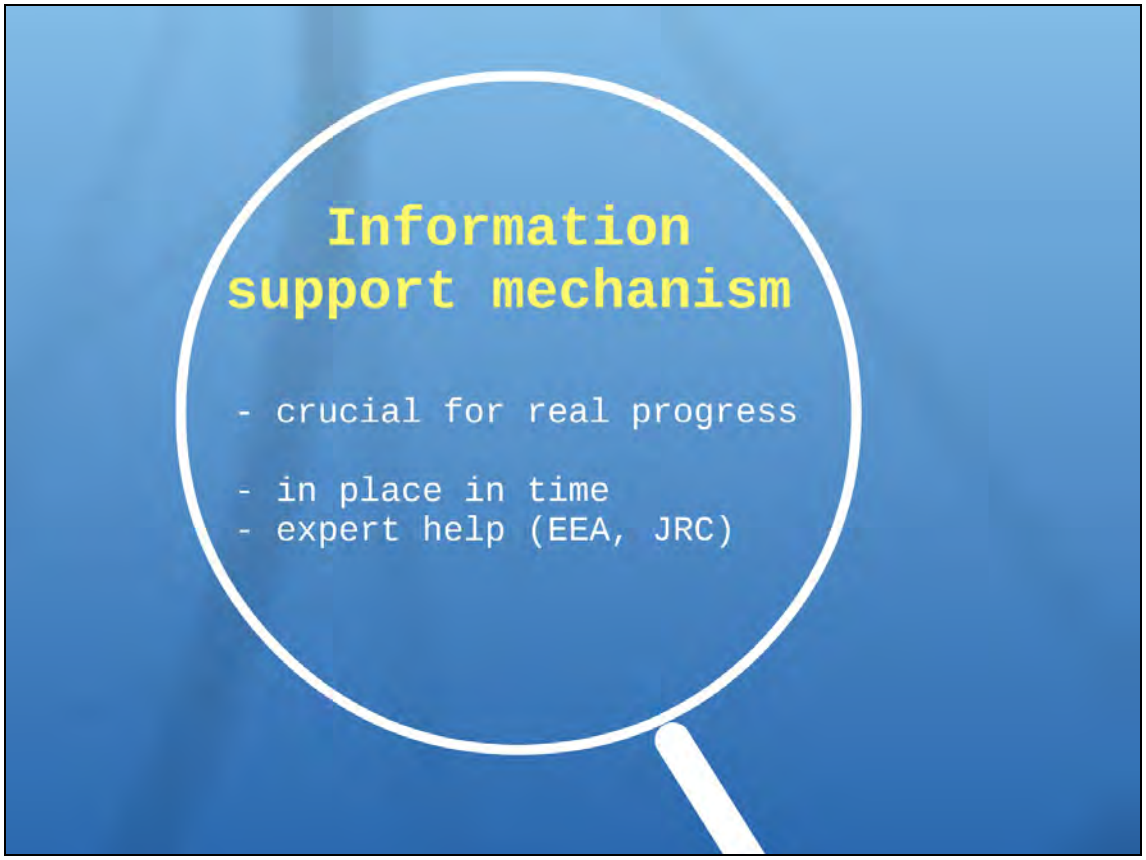

50 cap removal
- no scientific base
- no practical reason
- capped lists tend to be fulfilled
- no impact on future expenditure
- how to resolve "50 + 1" issue

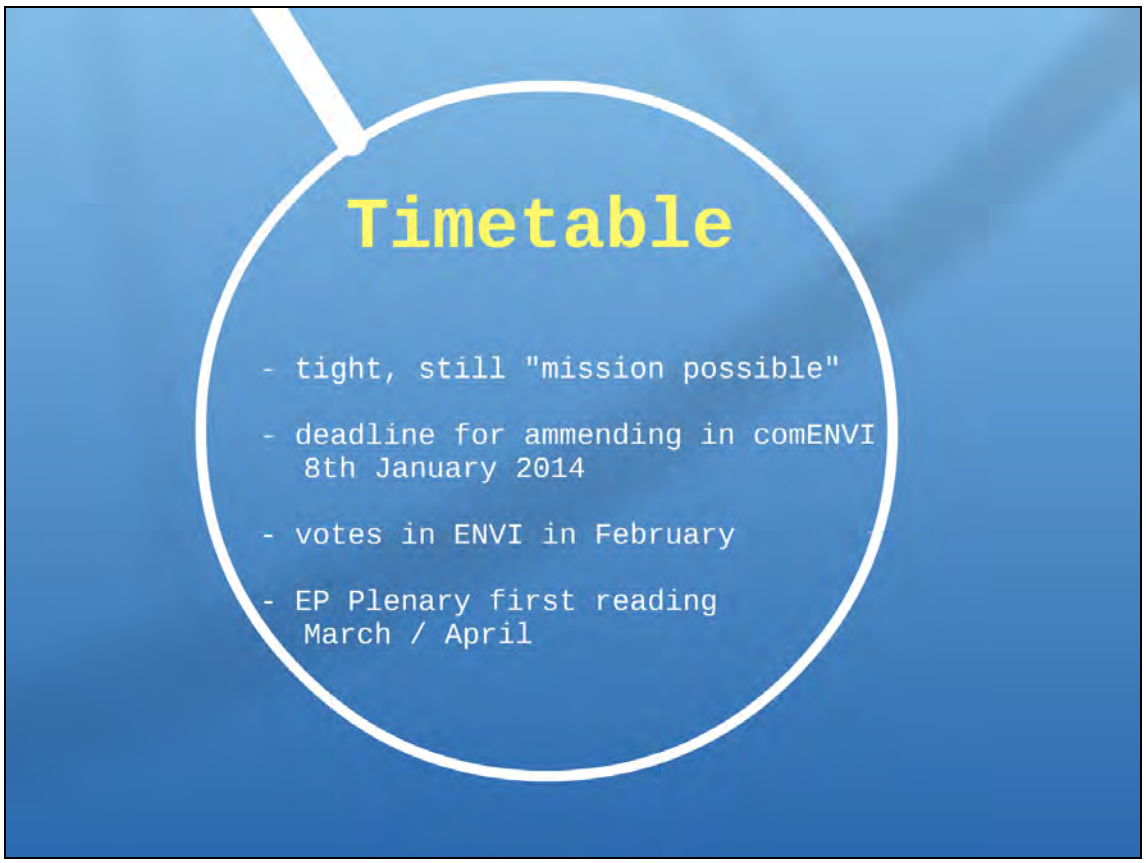

Establishing of the EU concern list by delegated acts
- political importance
- democratic decision making
- broad public compliance
- more legal clarity if annexed

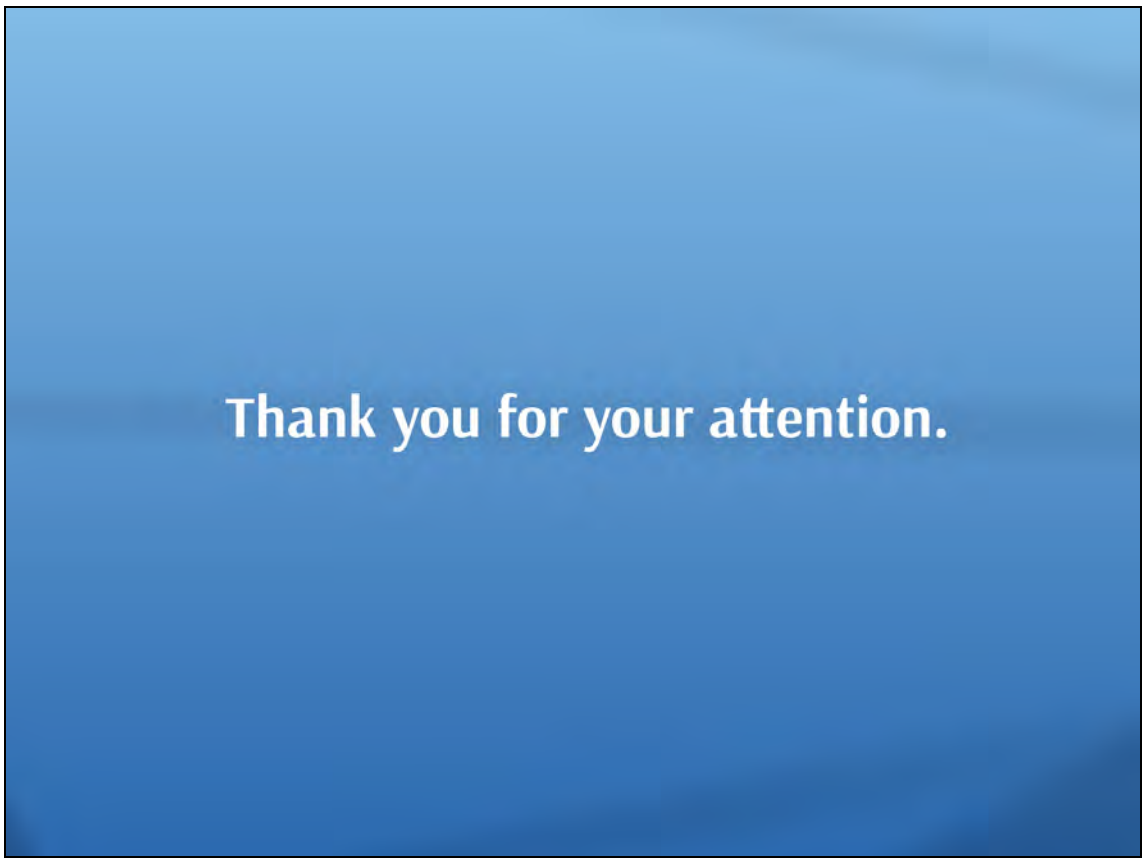

To include and tackle "native invaders"
- some dangerous IAS species out of scope (Zebra mussel, Spanish slug,Rhododendron ponticum etc.)
- tool to strenghten EU cooperation
- legislation has to adapt, IAS will not


Member States concerns
- maintain stricter messures
- control over risks and costs
- involvement of measures, tools and procedures already in place
- financing NOT AMMENDED in this stage

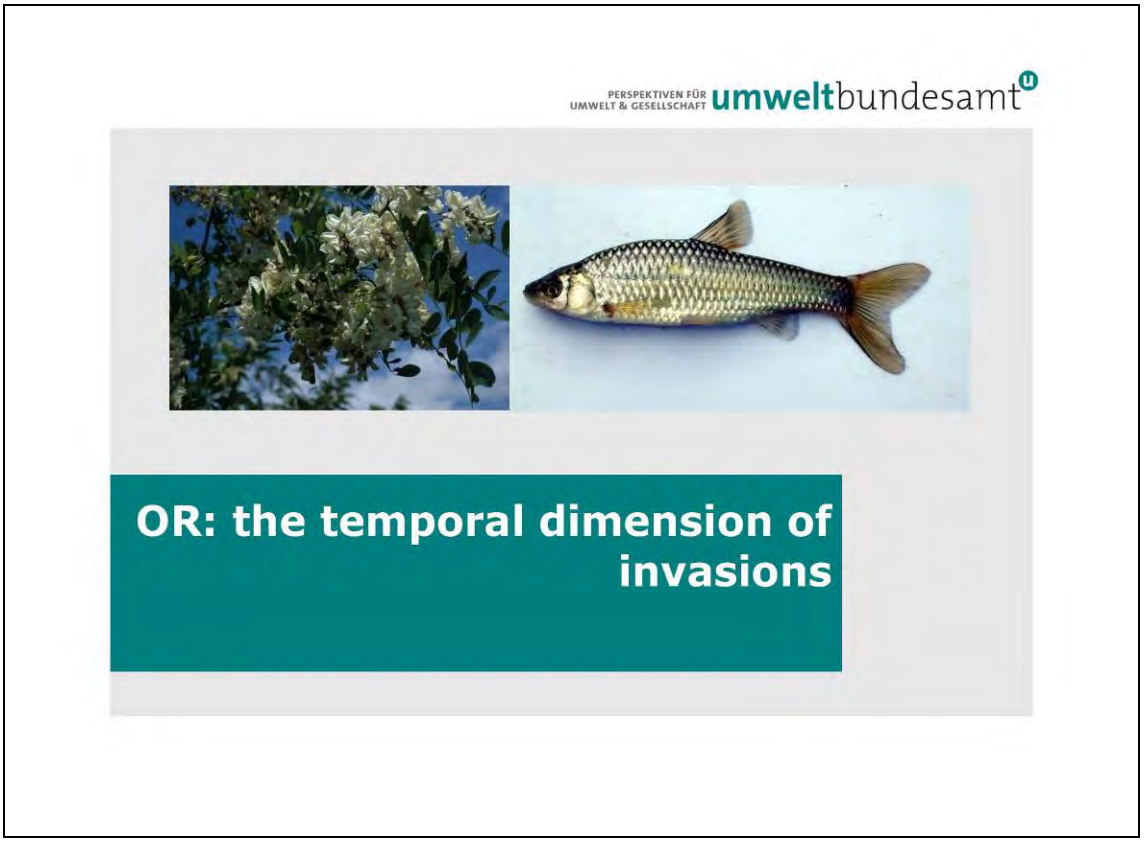

Public and science participation
- fostering public participation
?On EU or MS level?
- dedicated scientific forum
?Proper form?


Information
support mechanism
- crucial for real progress
- in place in time
- expert help (EEA, JRC)


Timetable
- tight, still "mission possible"
- deadline for ammending in comENVI
8th January 2014
- votes in ENVI in February
- EP Plenary first reading
March / April

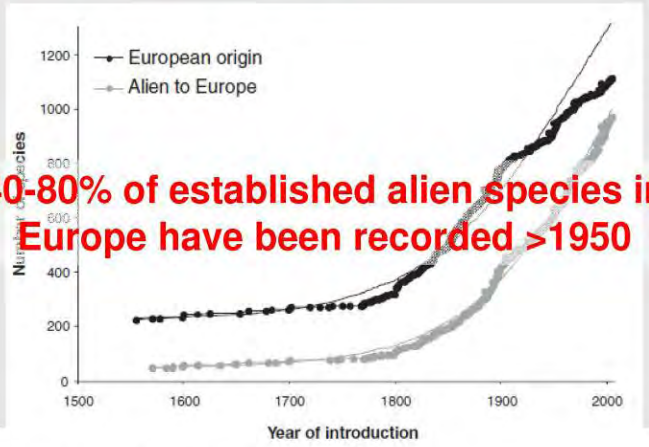

Thank you for your attention.

Presentation by Franz Essl



PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

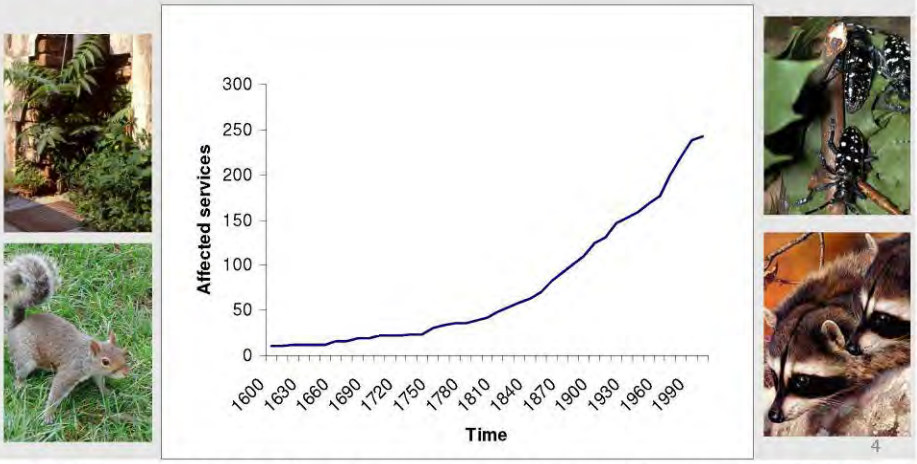
Rates of alien species introductions are rapidly increasing



Lambdon et al. 2008, Preslia 80, 101-149

PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

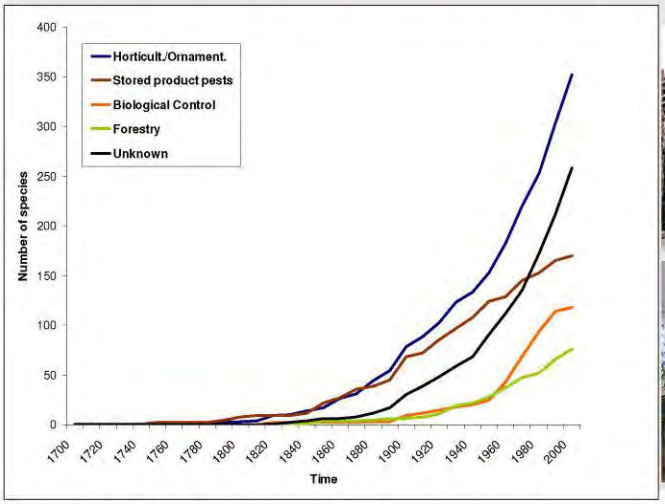
And so are IAS impacts: ecosystem services



Rabitsch et al. 2012, "*Affected ecosystem services over time for a) the DAISIE list of the '100 of the worst' IAS*"

PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

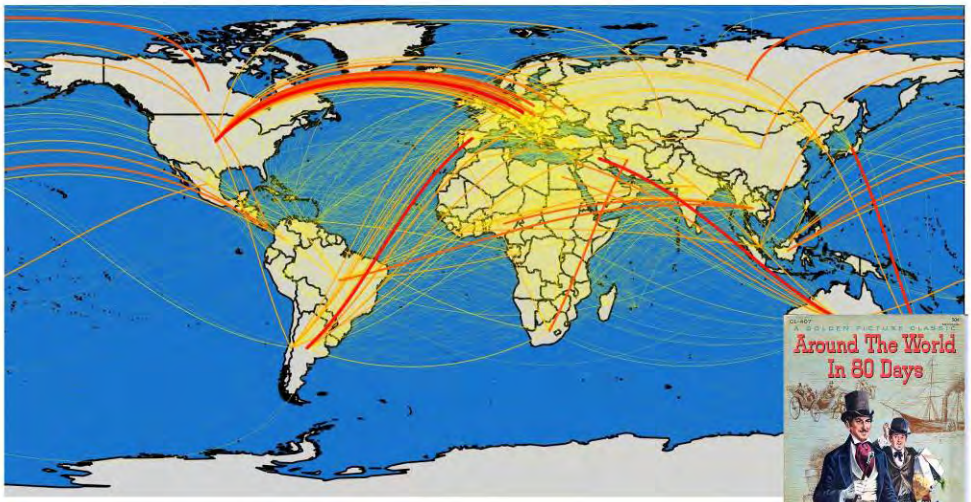
The changing role of major pathways



Rabitsch et al. 2012, "*Temporal trends of alien terrestrial arthropod species (n=974) in Europe for different pathways of introduction*"

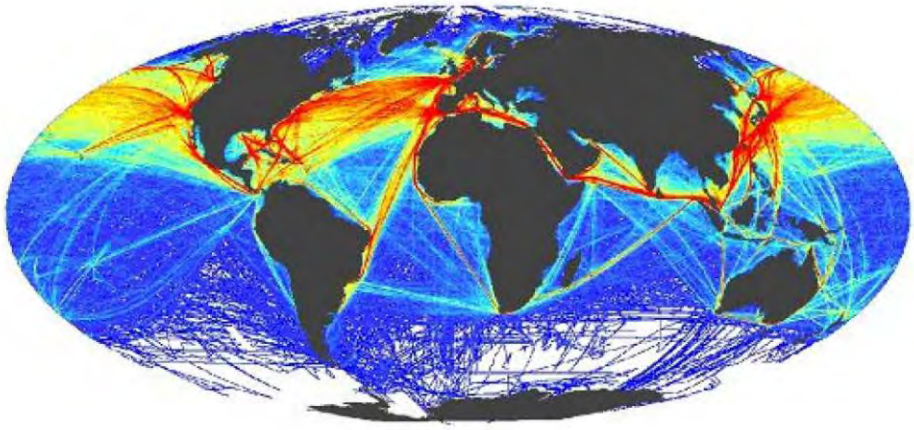
PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

The world seen as a network: trade



Seebens et al. in prep.

PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt



www.seaweb.org/otherfiles/GlobalShippingImpactsHalpernetal

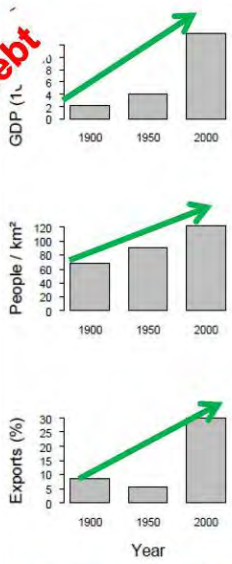
PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

To make things worse: long-term historical legacies in invasions

	1900	2000
PCA 1	0.19 ± 0.02***	0.15 ± 0.02***
PCA 2	0.14 ± 0.03***	0.10 ± 0.04**
PCA 3	−0.06 ± 0.05	−0.24 ± 0.07***
R^2_{MF}	0.36	0.28
AIC	367	408
Akaike weight	>99	<0.01

Essl et al. 2011, PNAS 3-207

Evidence of substantial invasion debt



PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

Act now, not (too) late!

- New IAS introductions are gaining momentum
- Strong signal of socio-economic legacies on invasions
- The consequences of the current high levels of socio-economic activity on the extent of biological invasions will not be realized until several decades into the future

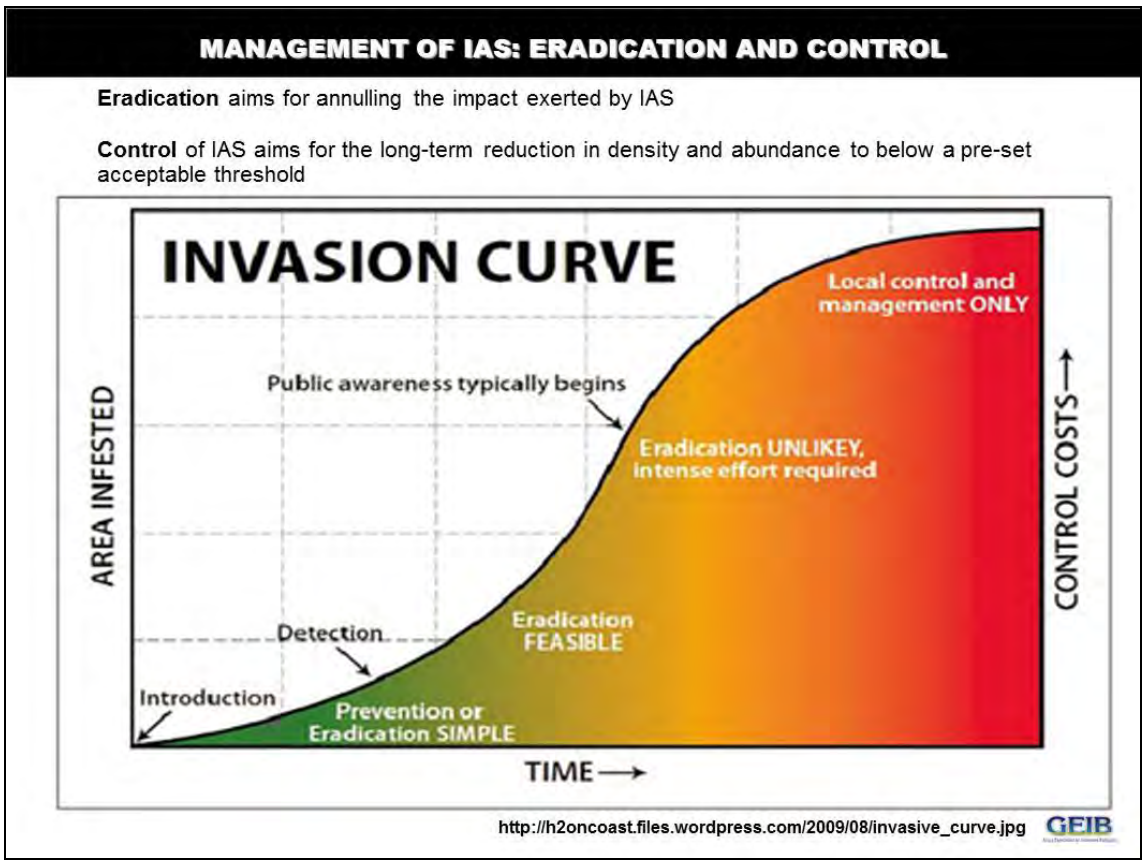
→ the seeds of future invasions have already been sown

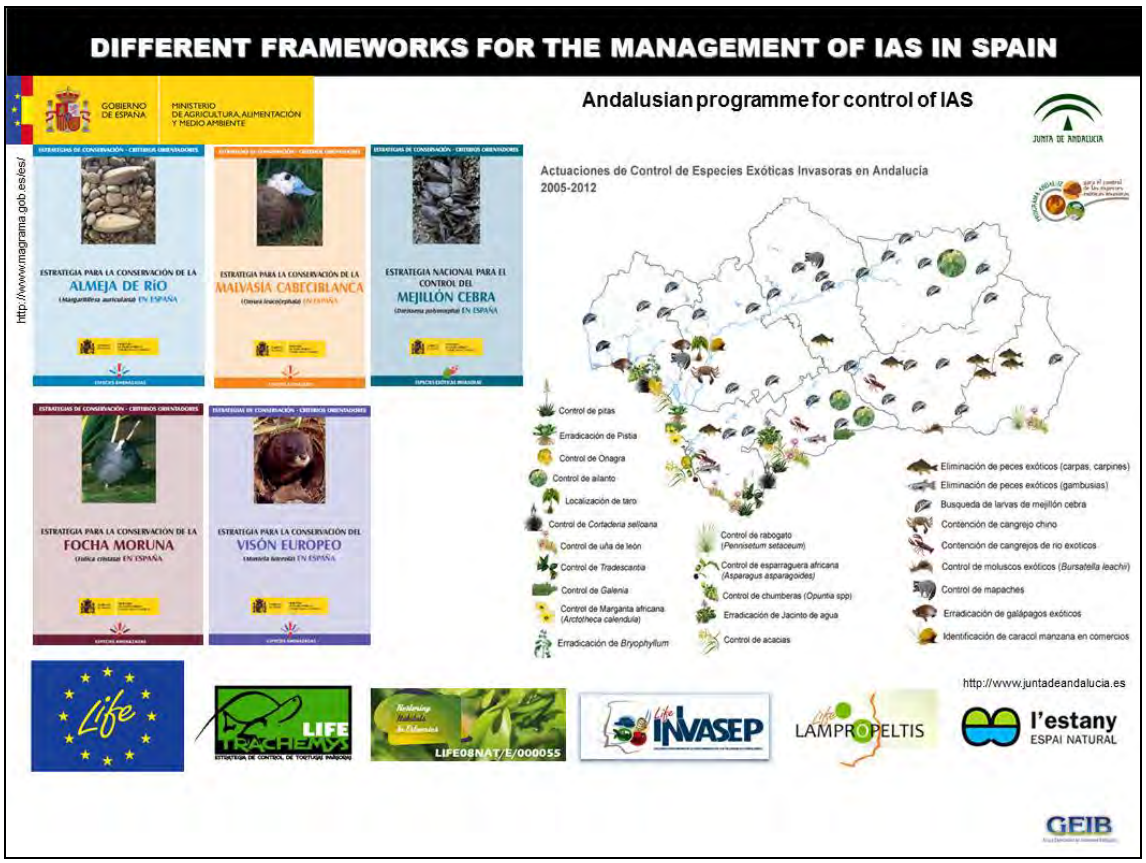
PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT umweltbundesamt

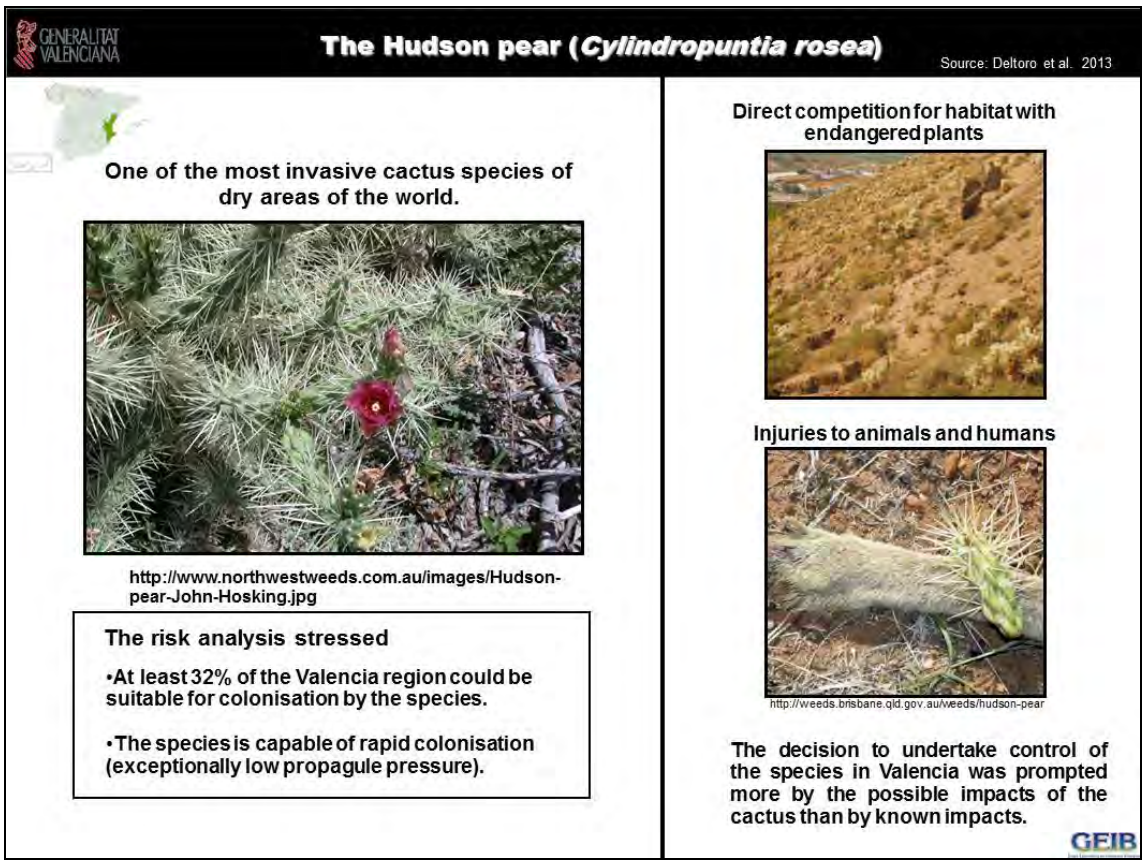
THIS IS THE END

Franz Essl
(T) +43-1-31304-3323
(E) franz.essl@umweltbundesamt.at

Presentation by Bernardo Zilleti




DIFFERENT FRAMEWORKS FOR THE MANAGEMENT OF IAS IN SPAIN
GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE
http://www.magrama.gob.es/es/
ESTRATEGIA PARA LA CONSERVACIÓN DE LA ALMEJA DE RÍO
ESTRATEGIA PARA LA CONSERVACIÓN DE LA MALVASÍA CABECIBLANCA
ESTRATEGIA NACIONAL PARA EL CONTROL DEL MEJILLÓN CEBRA
ESTRATEGIA PARA LA CONSERVACIÓN DE LA FOCHA MORUNA
ESTRATEGIA PARA LA CONSERVACIÓN DEL VISÓN EUROPEO
Andalusian programme for control of IAS
JUNTA DE ANDALUCIA
Actuaciones de Control de Especies Exóticas Invasoras en Andalucía 2005-2012
Control de pitas
Erradicación de Pistia
Control de Onagra
Control de ailanto
Localización de taro
Control de Cortaderia selloana
Control de uña de león
Control de Tradescantia
Control de Galenia
Control de Marganta africana (Arctotheca calendula)
Erradicación de Bryophyllum
Control de rabogato (Pennisetum setaceum)
Control de esparraguera africana (Asparagus asparagoides)
Control de chumberas (Opuntia spp)
Erradicación de Jacinto de agua
Control de acacias
Eliminación de peces exóticos (carpas, carpines)
Eliminación de peces exóticos (gambusias)
Busqueda de larvas de mejillón cebra
Contención de cangrejo chino
Contención de cangrejos de rio exoticos
Control de moluscos exóticos (Bursatella leachii)
Control de mapaches
Erradicación de galápagos exóticos
Identificación de caracol manzana en comercios
http://www.juntadeandalucia.es
Life
LIFE TRACHEMYS
LIFE08NAT/E/000055
Life INVASEP
Life LAMPROPELTIS
l'estany ESPAI NATURAL
GEIB


GENERALITAT VALENCIANA
The Hudson pear (Cylindropuntia rosea)
Source: Deltoro et al. 2013
One of the most invasive cactus species of dry areas of the world.
http://www.northwestweeds.com.au/images/Hudson-pear-John-Hosking.jpg
The risk analysis stressed
•At least 32% of the Valencia region could be suitable for colonisation by the species.
•The species is capable of rapid colonisation (exceptionally low propagule pressure).
Direct competition for habitat with endangered plants
Injuries to animals and humans
http://weeds.brisbane.qld.gov.au/weeds/hudson-pear
The decision to undertake control of the species in Valencia was prompted more by the possible impacts of the cactus than by known impacts.
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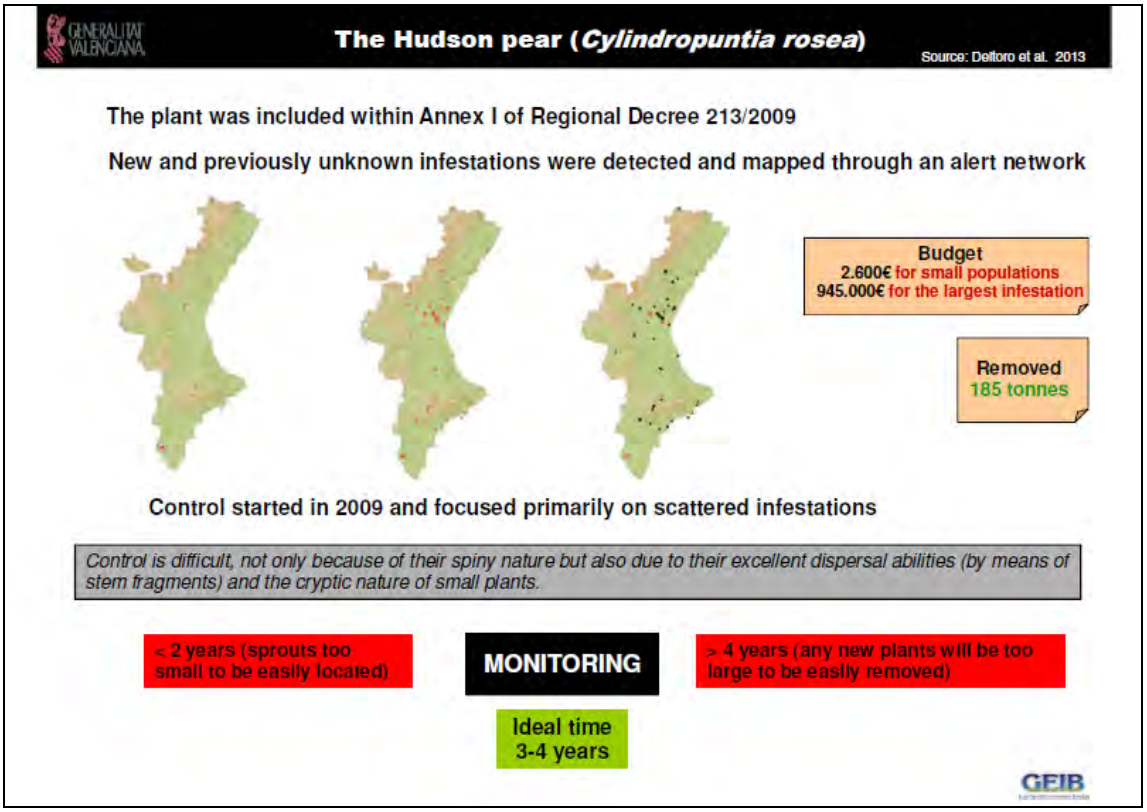
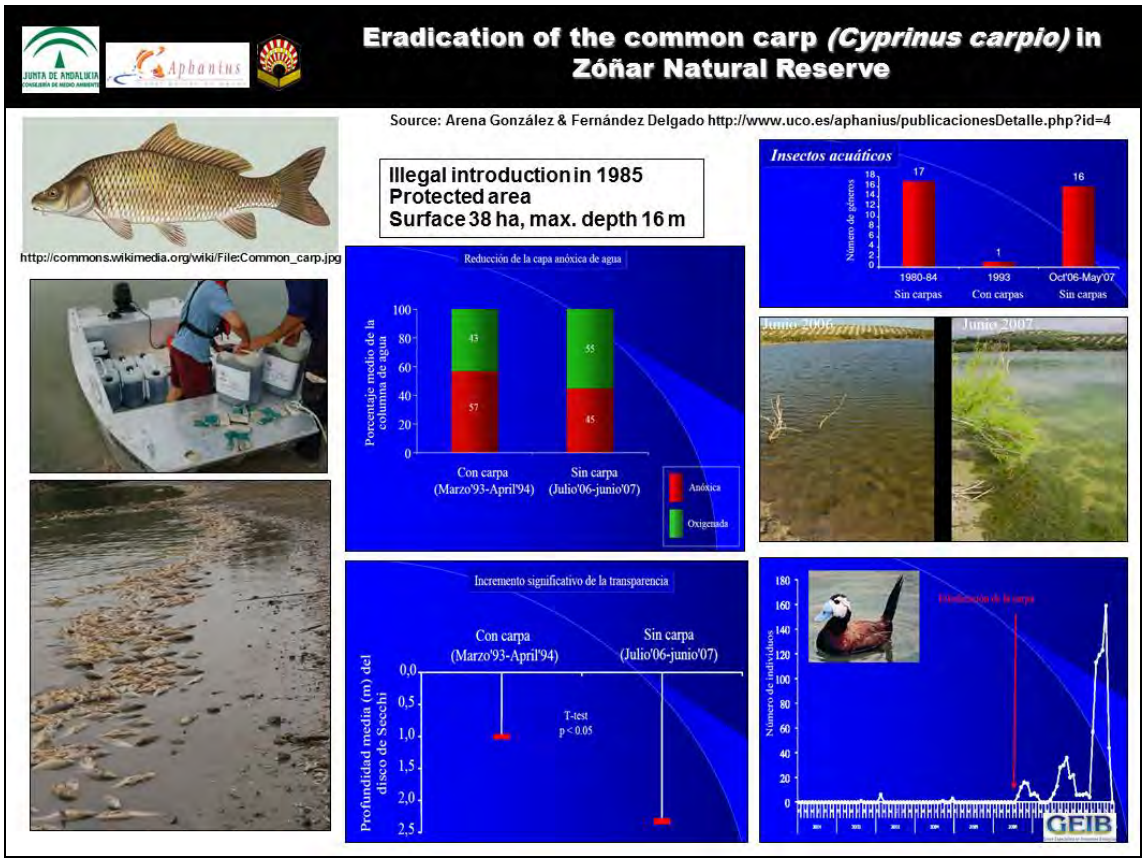
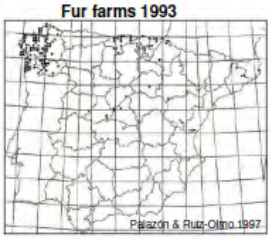

The Hudson pear (Cylindropuntia rosea)
Source: Delforo et al. 2013
The plant was included within Annex I of Regional Decree 213/2009
New and previously unknown infestations were detected and mapped through an alert network
Budget
2.600€ for small populations
945.000€ for the largest infestation
Removed
185 tonnes
Control started in 2009 and focused primarily on scattered infestations
Control is difficult, not only because of their spiny nature but also due to their excellent dispersal abilities (by means of stem fragments) and the cryptic nature of small plants.
< 2 years (sprouts too small to be easily located)
MONITORING
> 4 years (any new plants will be too large to be easily removed)
Ideal time
3-4 years
GEIB


Eradication of the common carp (Cyprinus carpio) in Zóñar Natural Reserve
Source: Arena González & Fernández Delgado http://www.uco.es/aphanius/publicacionesDetalle.php?id=4
http://commons.wikimedia.org/wiki/File:Common_carp.jpg
Illegal introduction in 1985
Protected area
Surface 38 ha, max. depth 16 m
Insectos acuáticos
Número de géneros
17
1
16
1980-84
1993
Oct'06-May'07
Sin carpas
Con carpas
Sin carpas
Reducción de la capa anóxica de agua
Porcentaje medio de la columna de agua
43
57
55
45
Con carpa (Marzo'93-April'94)
Sin carpa (Julio'06-junio'07)
Anóxica
Oxigenada
Junio 2006
Junio 2007
Incremento significativo de la transparencia
Profundidad media (m) del disco de Secchi
Con carpa (Marzo'93-April'94)
Sin carpa (Julio'06-junio'07)
T-test
p < 0.05
Número de individuos
GEIB

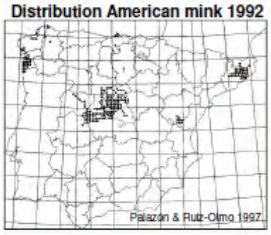
Control and eradication plan for the American mink (*Neovison vison*) in Spain

Source: Palazón et al. 2012

Fur farms 1993



Distribution American mink 1992



Distribution American mink 2007

http://commons.wikimedia.org/wiki/File:European_Mink.jpg

Impacts
- Competition
- Depredation
- Diseases transmission
- Economic costs

The plan started in 2002

Aims
- Eradication inside the distribution area of the European mink.
- Control in the rest of the country

GEIB

Control and eradication plan for the American mink (*Neovison vison*) in Spain

Source: Palazón et al. 2012

American minks captured in Spain

1999-2012	Alava (+La Rioja)	Northern Basque Country (Biscay, Guipuzcoa)	Central Spain (Burgos, Palencia, Soria, La Rioja)	Aragon	Catalonia	Total
Total	270	170	2097	458	1053	4048

Costs: 170-205 € per mink captured and sacrificed

Promising *but*...

GEIB

Control and eradication plan for the American mink (*Neovison vison*) in Spain

Illegal releases

La Voz de Galicia.es

PORTADA | GALICIA | DEPORTES | SOCIEDAD | DINERO | ESPAÑA | MUNDO | OPINIÓN | PARTICIPA | BLOGS | OCIO Y CULTURA

A Coruña | A Mariña | Arousa | Barbanza | Carballo | Deza | Ferrol | Lemos | Lugo | Ourense | Pontevedra | Santiago

ABEGONDO

Sueltan al menos 15.000 visones en tres granjas de Abegondo

Muchos de los animales han muerto atropellados por los coches al estar una de las explotaciones cerca de la carretera.

Redacción Digital | A CORUÑA | 19/10/2009 | Actualizada a las 17:57 h

EN LUBIA | Explotación

Capturan 600 visones del millar que se escapó de una granja de Soria

Los agentes de la Junta luchan por capturar uno de los visones fugados. | Valentín Guisande

http://www.elmundo.es

Escapes

Legal inconsistency

Real Decreto 630/2013, de 2 de agosto, por el que se regula el Catálogo español de especies exóticas invasoras.

BOE

BOLETÍN OFICIAL DEL ESTADO

Núm. 185 | Sábado 3 de agosto de 2013 | Sec. I. Pág. 56778

incluidas en el catálogo, cuando estén debidamente justificados y con medidas precautorias suficientes, previo análisis de riesgos favorable. En ningún caso se autorizarán nuevas explotaciones de cría de visón americano («Neovison vison»), o ampliación de las ya existentes, en las provincias del área de distribución del visón europeo («Mustela lutreola»), que figuren en el Inventario Español del Patrimonio Natural y la Biodiversidad.

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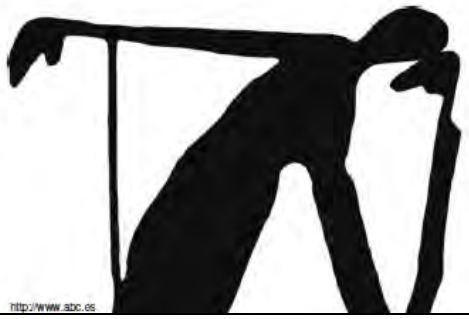
WHAT FAILS

- Reactive response but lack of long term planning
- Lack of coordination and fragmentation of competences
- Late interventions
- Legal constraints and inconsistency
- Financial cuts
- Lack of social support



http://www.abc.es

GEIB

ERADICATION AND CONTROL OF IAS: IS THERE ROOM FOR OPTIMISM?

The increasing rate of introductions and consequent chance of invasions.

The high number of IAS already established.

Failures examples of eradication and control are better known than successful examples.

They are everywhere (misconception)

Efficient management is possible

Learning from failures

Setting clear priorities

Selecting winnable battles

GEIB

Thanks for your attention!

GEIB

E-mail geib.org@gmail.com

Presentation by Niall Moore

Managing Invasive Alien Species in the UK

Niall Moore

GB Non-native Species Secretariat

defra

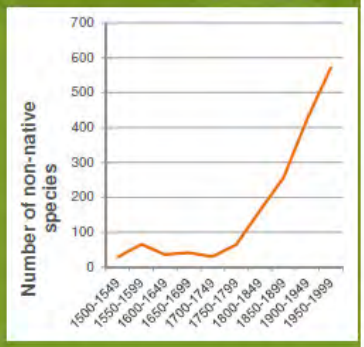
The Scottish Government

Llywodraeth Cymru
Welsh Government

AHVLA
Animal Health and Veterinary Laboratories Agency

Number of IAS

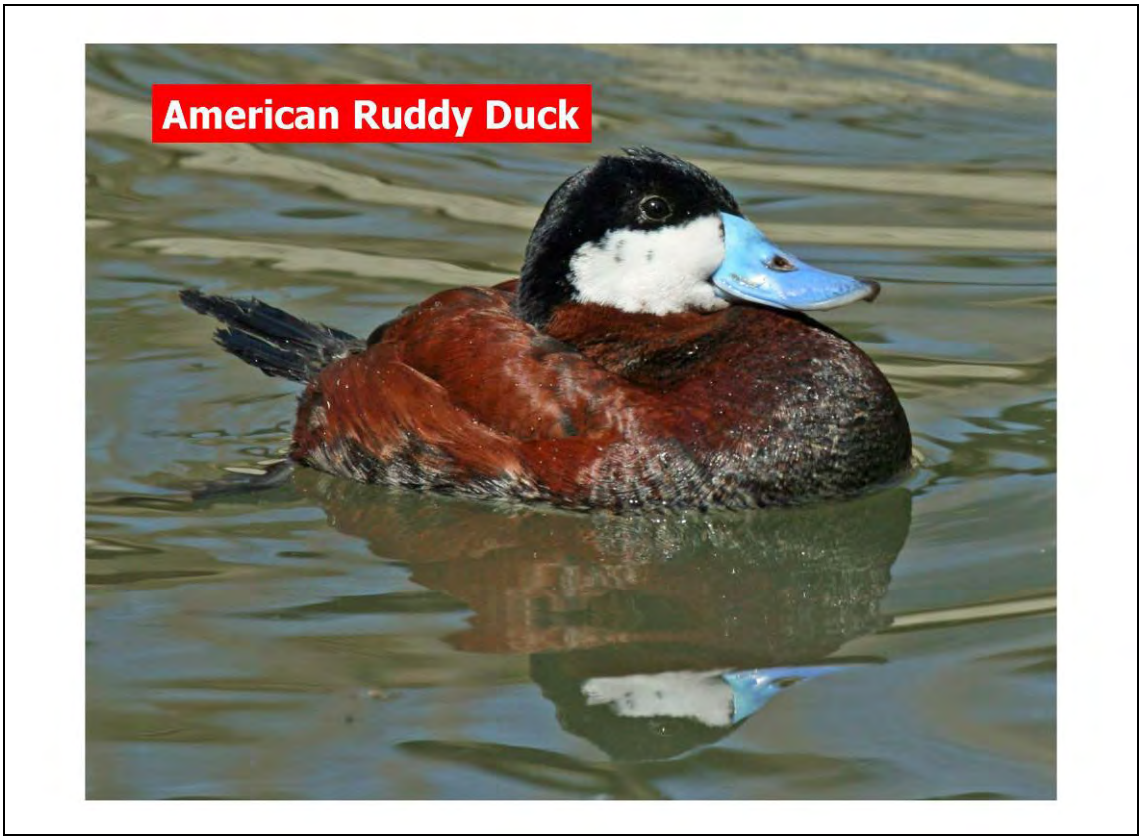
- **GB**
- 2,000 species established
  - 10 new species establish PA
  - 48% from Europe

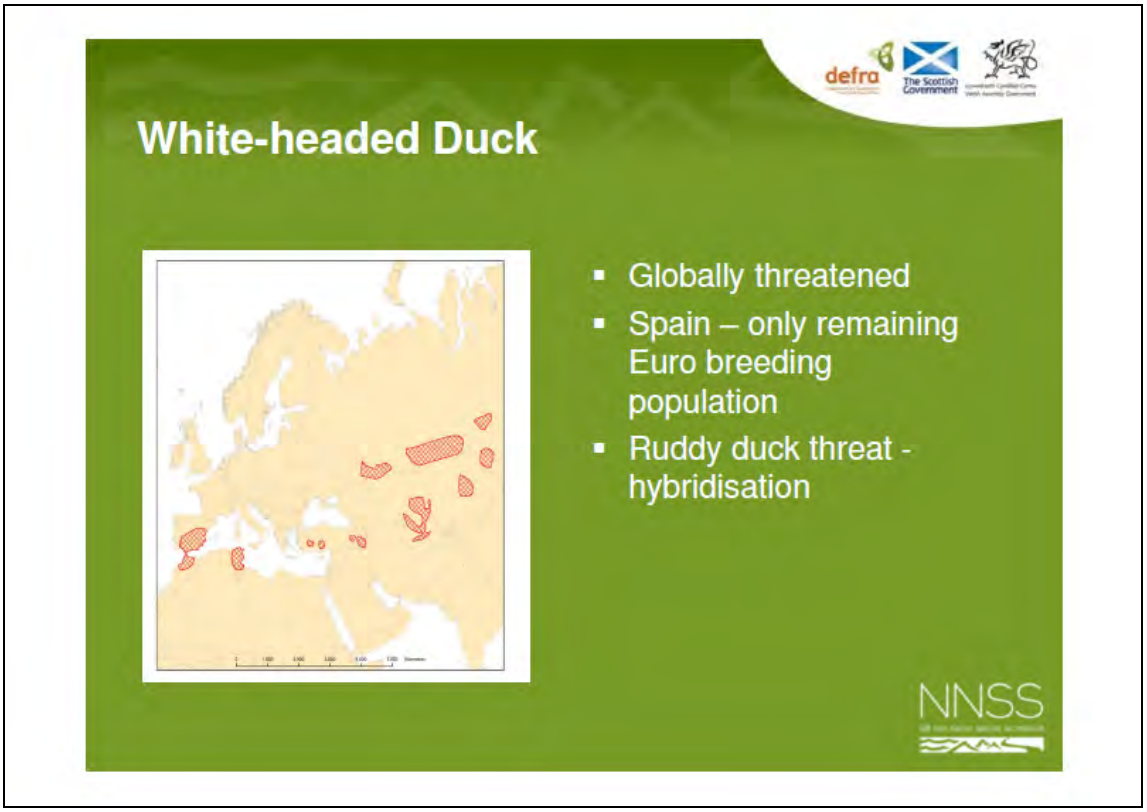


- **Europe**
- 12,000 species
  - 60 new species arrive PA
  - 30% from Europe

NNSS

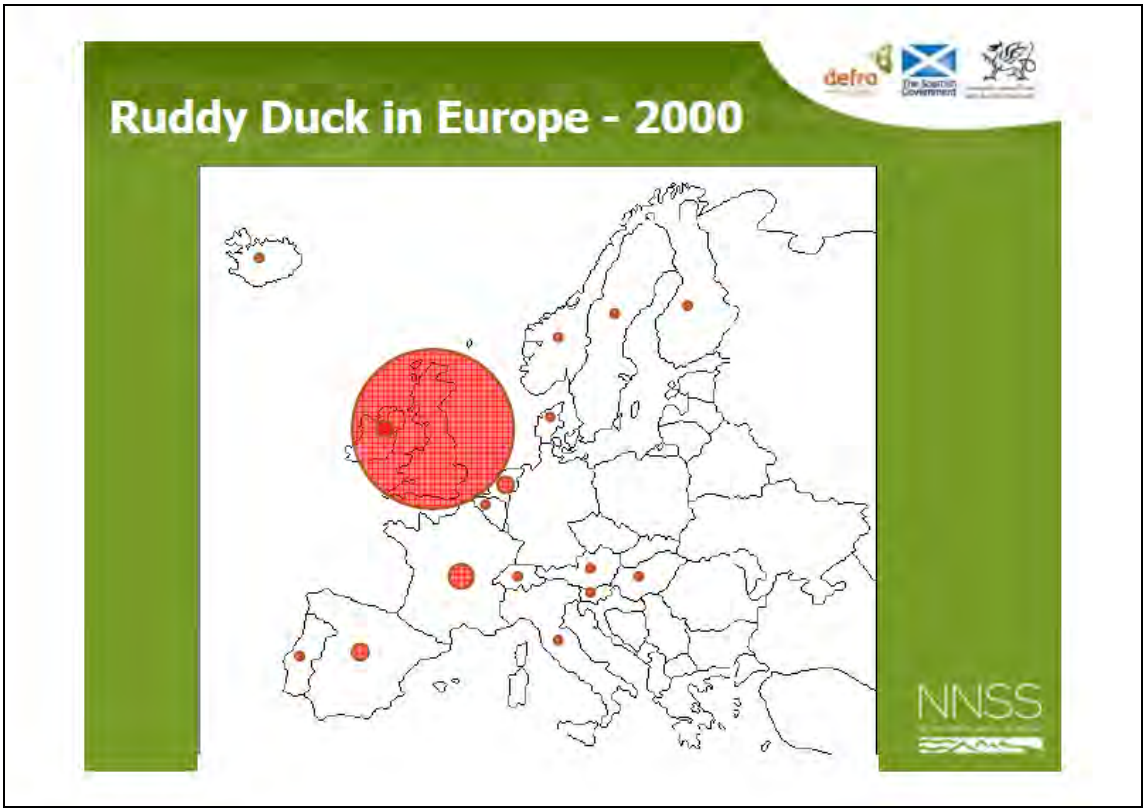

defra
The Scottish Government
Economic impact in UK
€2.1 Billion per year
(damage and control)
UK Government supports management of
about 25 species
NNSS

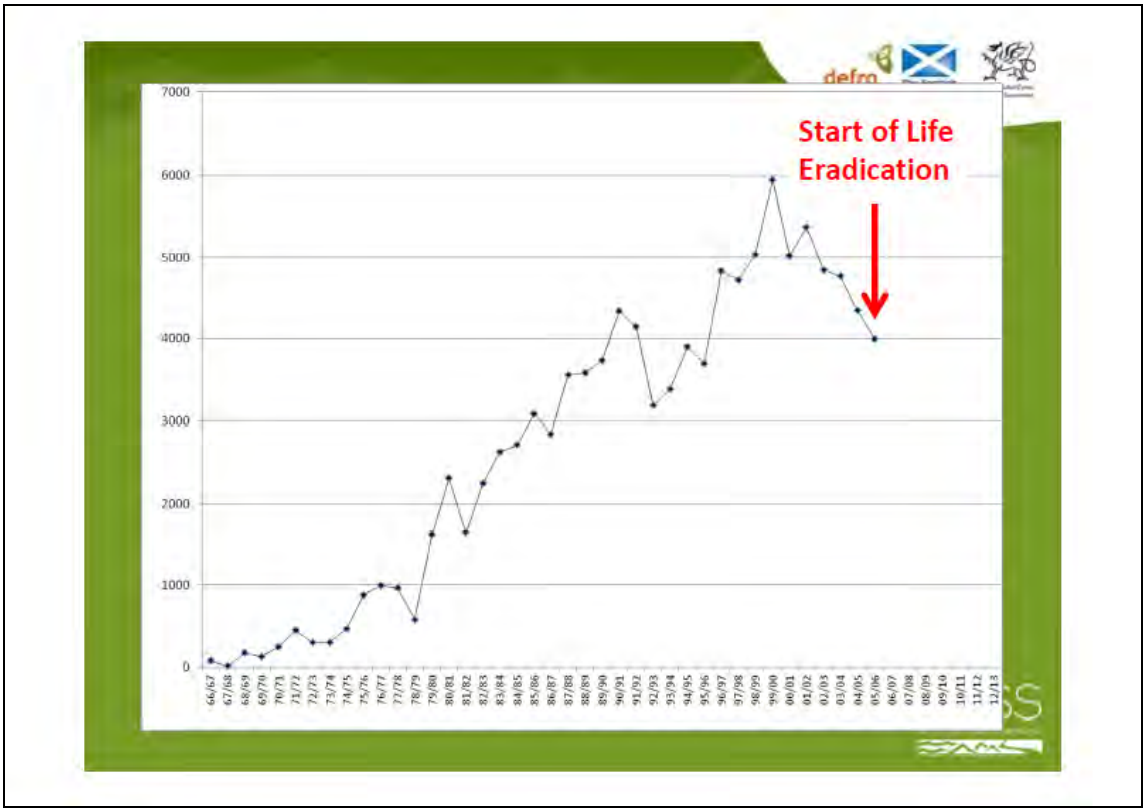

American Ruddy Duck

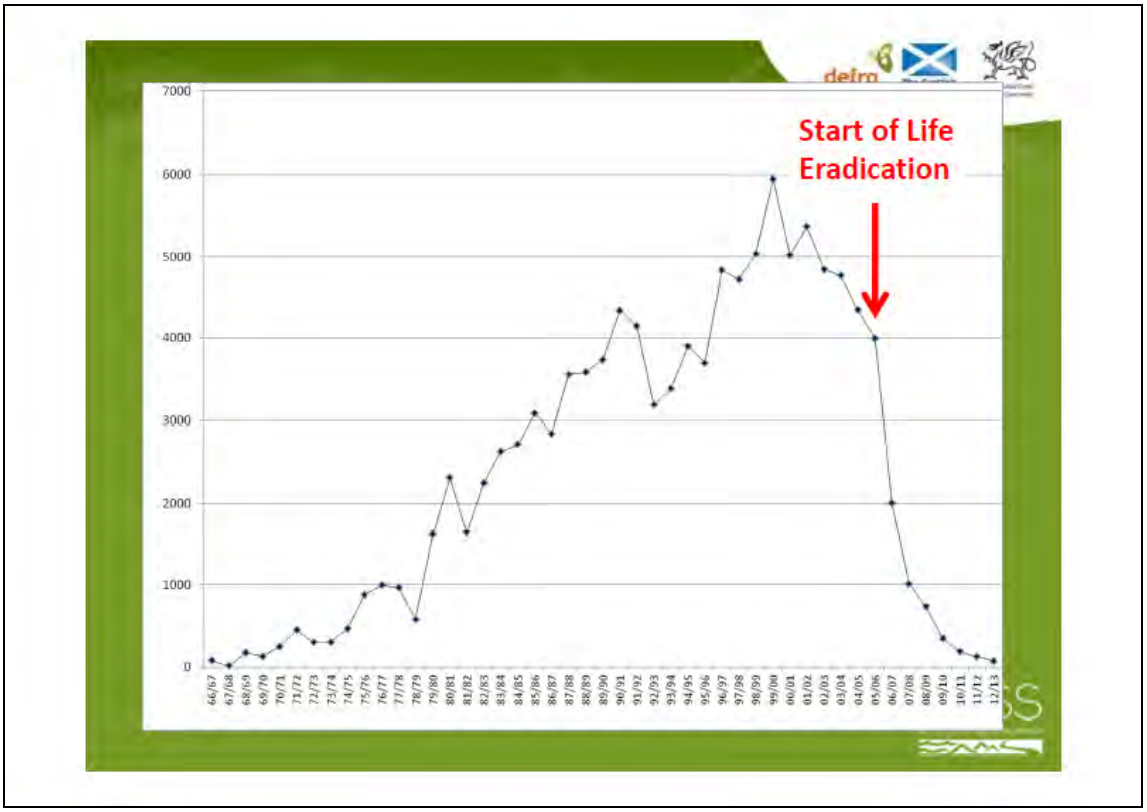

White-headed Duck
Globally threatened
Spain – only remaining Euro breeding population
Ruddy duck threat - hybridisation
NNSS

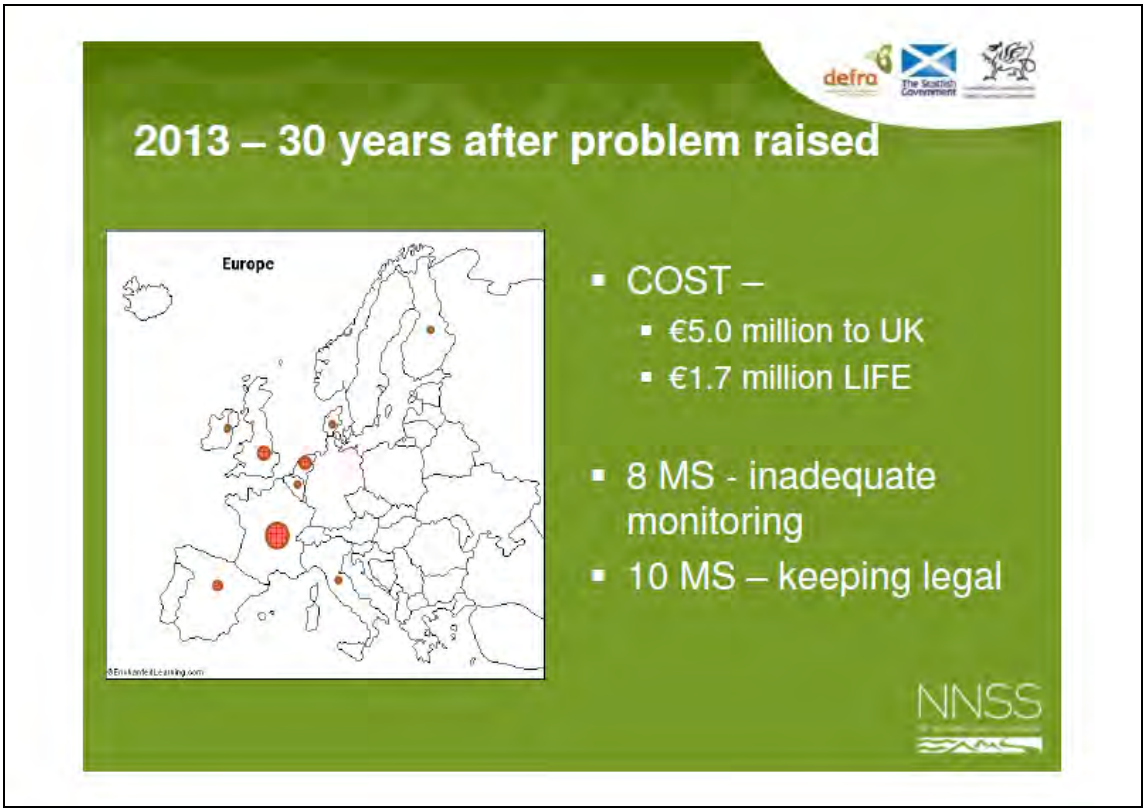

First record
Spain
7000
6000
5000
4000
3000
2000
1000
0

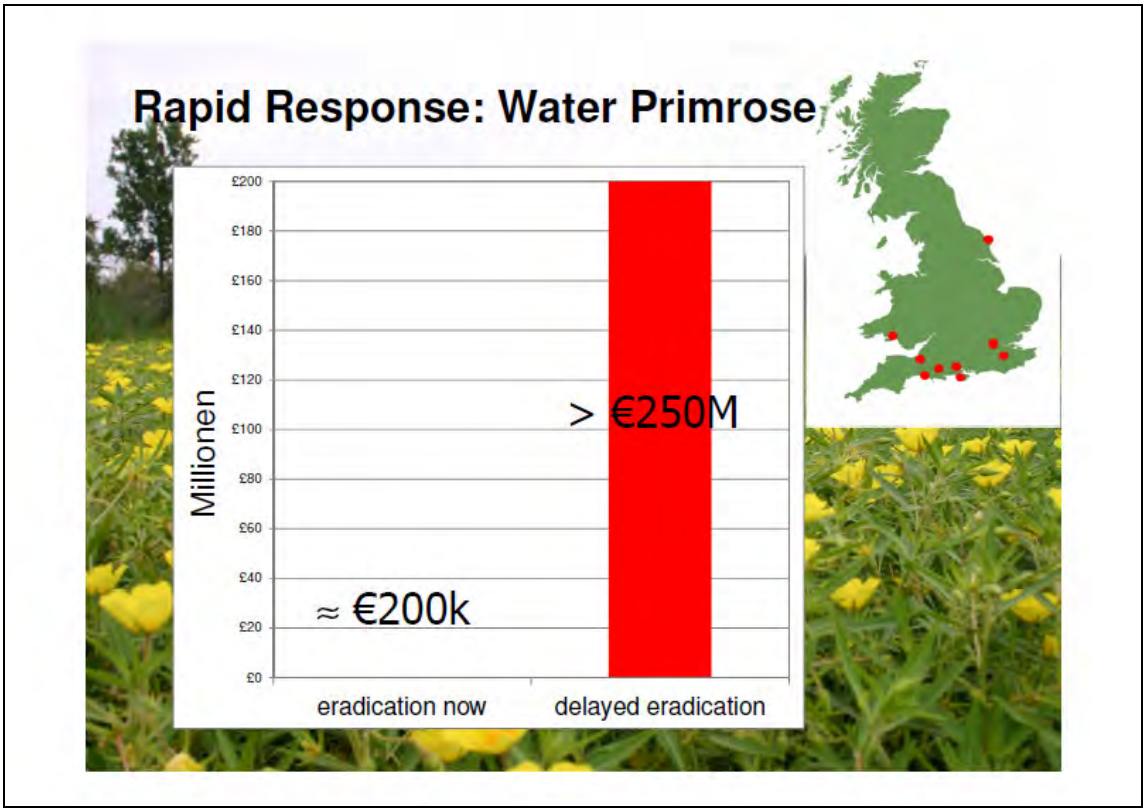

UK Control trials
7000
6000
5000
4000
3000
2000
1000
0


Ruddy Duck in Europe - 2000
NNSS


Start of Life
Eradication
7000
6000
5000
4000
3000
2000
1000
0

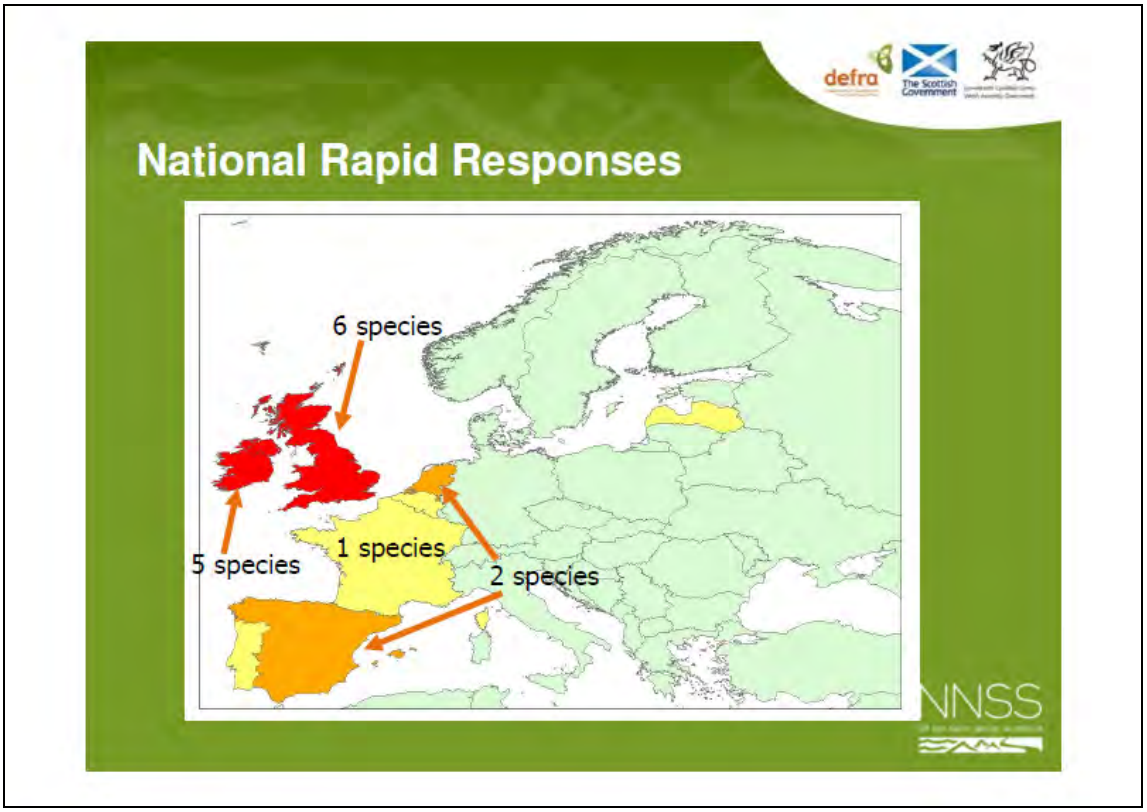

Start of Life
Eradication
7000
6000
5000
4000
3000
2000
1000
0


2013 – 30 years after problem raised
Europe
COST –
€5.0 million to UK
€1.7 million LIFE
8 MS - inadequate monitoring
10 MS – keeping legal
NNSS


Rapid Response: Water Primrose
£200
£180
£160
£140
£120
£100
£80
£60
£40
£20
£0
Millionen
> €250M
≈ €200k
eradication now
delayed eradication


Monk Parakeet
UK Population = 100 birds
Cost = €150,000


Specialist skills needed


National Rapid Responses
6 species
5 species
1 species
2 species
NNSS

Contingency Planning

Copyright Jean Haxaire

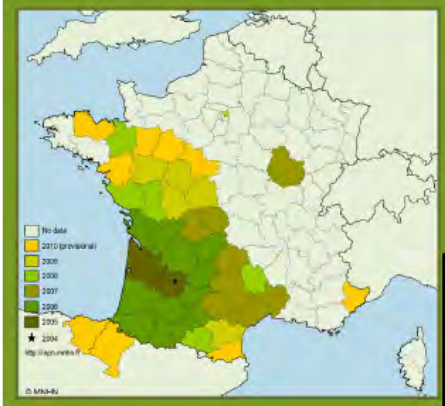
Asian hornet

Vespa velutina

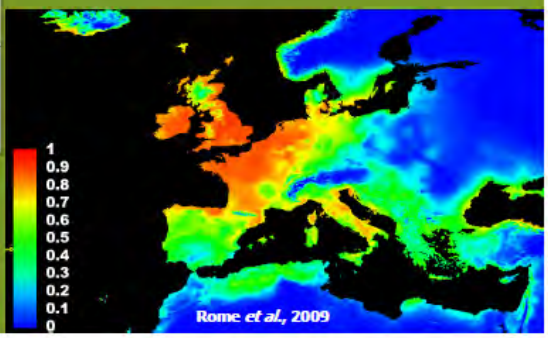
Small hornet (2.5 – 3.0 cm)

NNSS

Spread in Europe

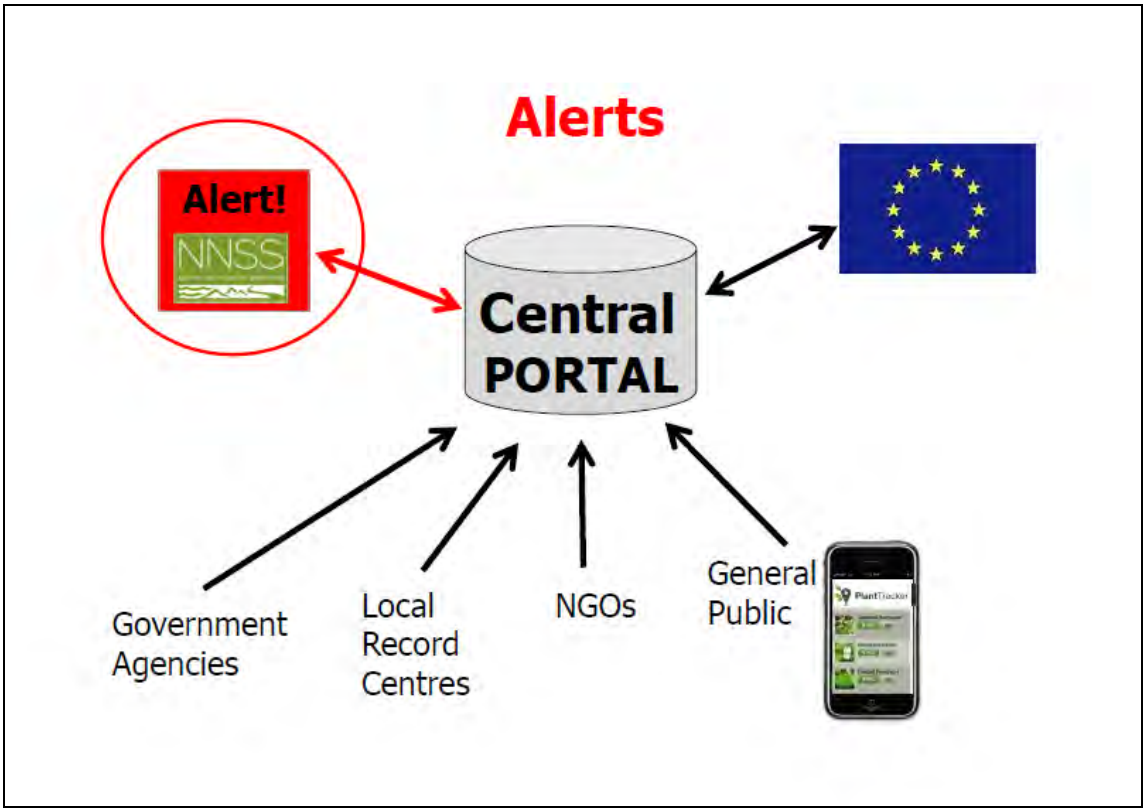


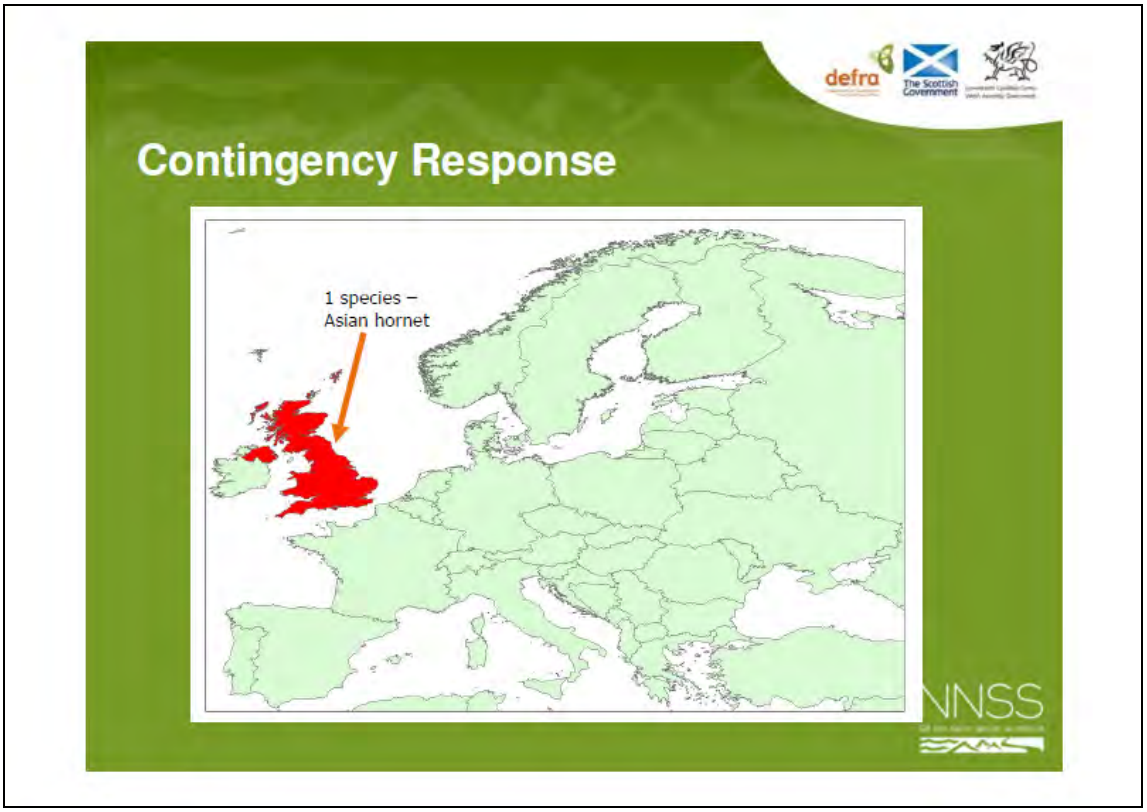
- **Introduced to France - 2004**
- **Spread of ~100km/year**
- **Spain, Portugal, Italy, Belgium**




defra
The Scottish Government
Contingency plan
Killgerm
Cost = €5,000
NNSS


defra
The Scottish Government
NNSS
Have you seen this insect?
ASIAN HORNET
Alert!
Asian Hornet
Species Description
Key ID Features
alert_nonnative@ceh.co
NNSS


Alerts
Alert!
NNSS
Central
PORTAL
Government
Agencies
Local
Record
Centres
NGOs
General
Public

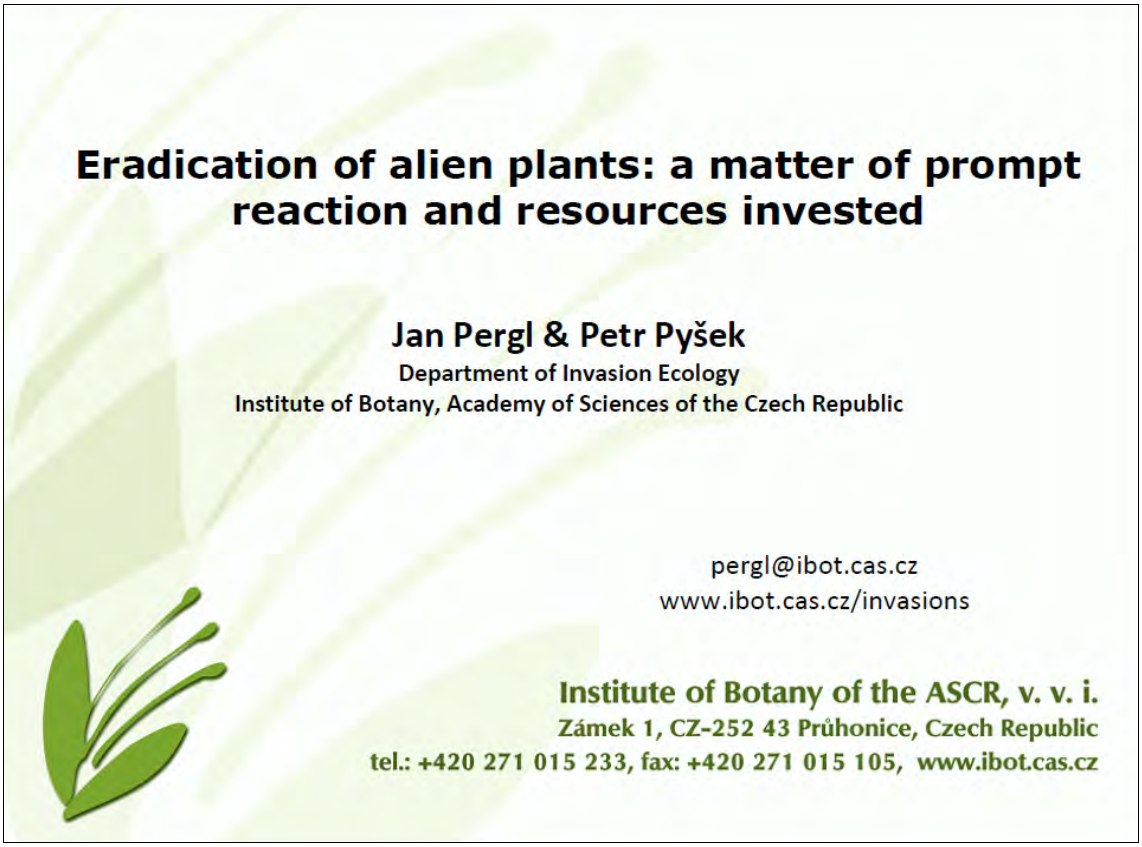

Contingency Response
1 species –
Asian hornet
NNSS

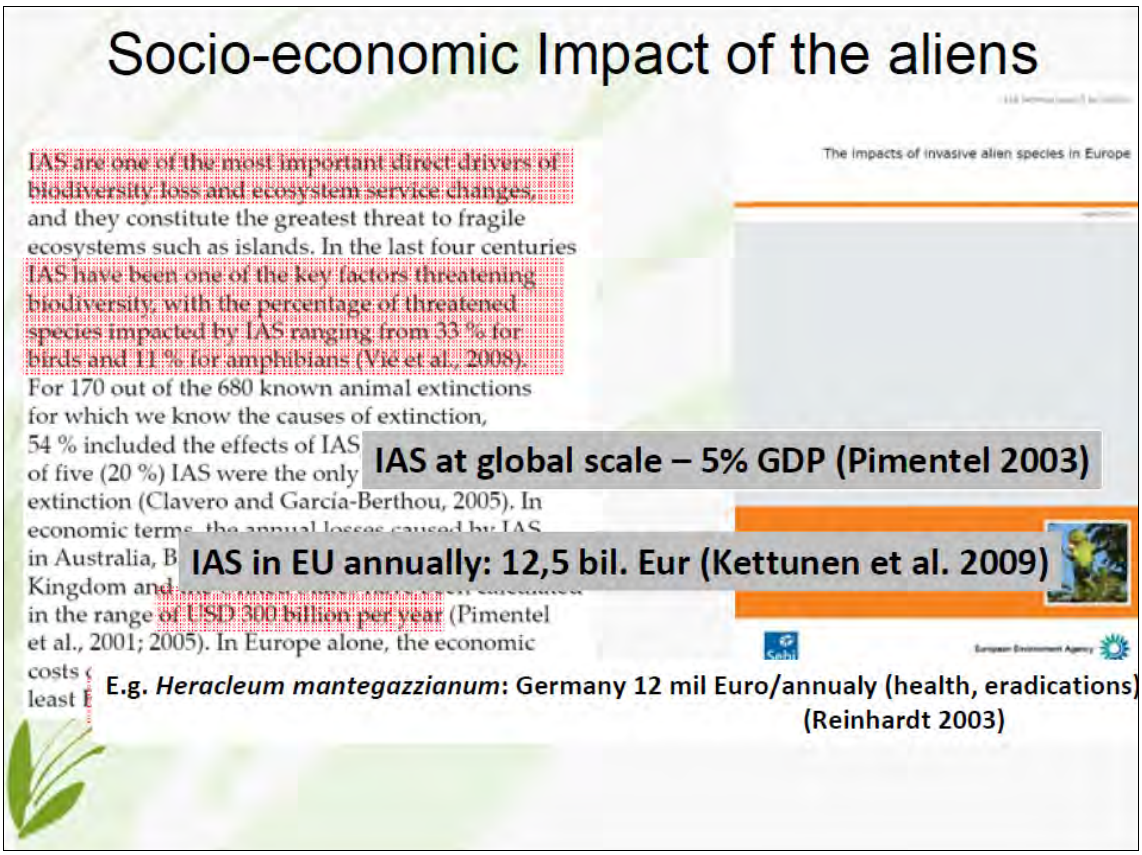
Summary

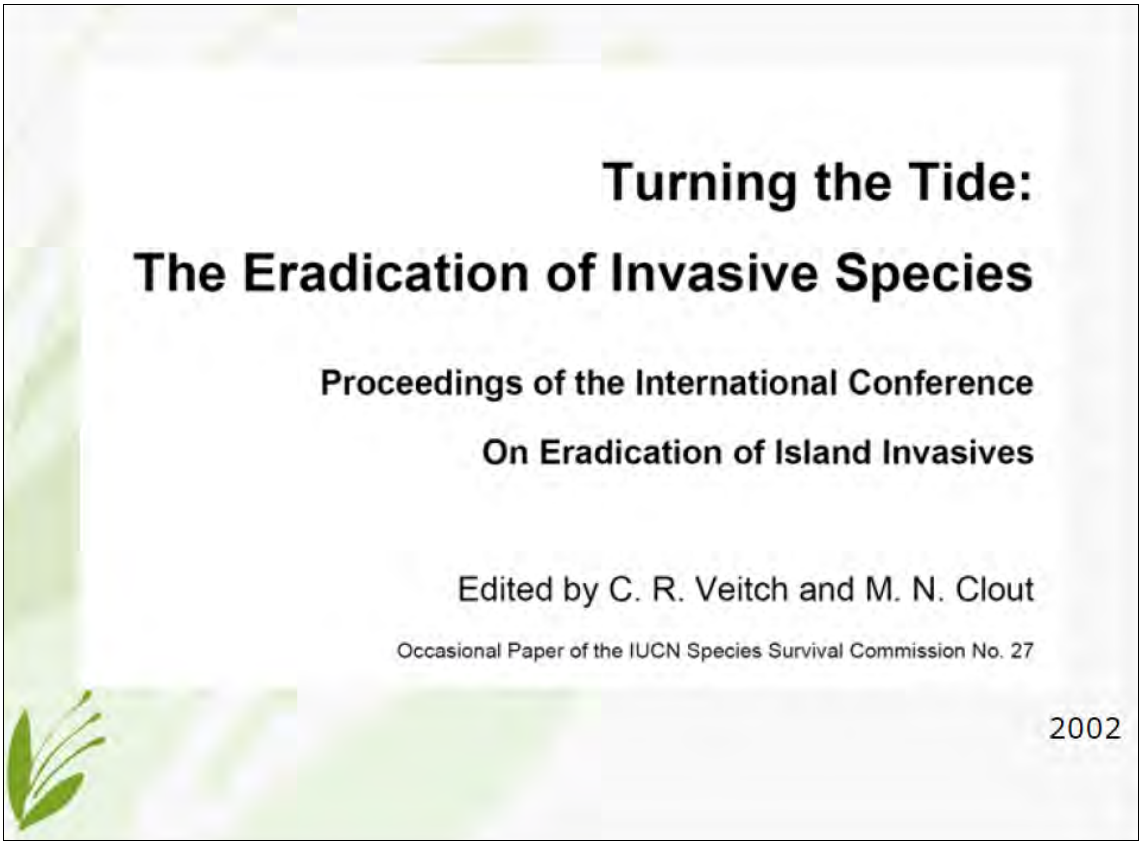
- We need EU wide action
- Focus on new arrivals
- Anticipate future problems
- Need alert system
  - Each MS
  - Linked across EU
- Need to develop, retain and share expertise

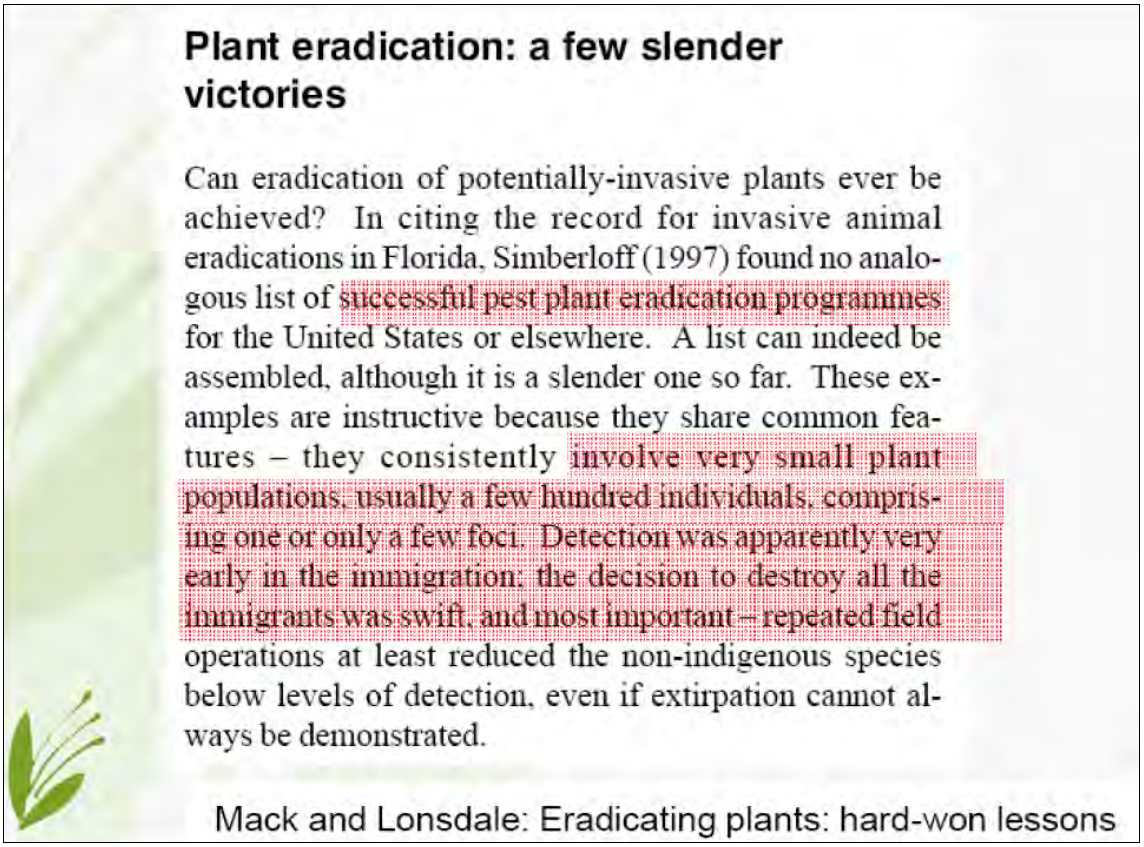
NNSS

Presentation by Jan Pergl






Turning the Tide:
The Eradication of Invasive Species
Proceedings of the International Conference
On Eradication of Island Invasives
Edited by C. R. Veitch and M. N. Clout
Occasional Paper of the IUCN Species Survival Commission No. 27
2002


Plant eradication: a few slender victories
Can eradication of potentially-invasive plants ever be achieved? In citing the record for invasive animal eradications in Florida, Simberloff (1997) found no analogous list of successful pest plant eradication programmes for the United States or elsewhere. A list can indeed be assembled, although it is a slender one so far. These examples are instructive because they share common features – they consistently involve very small plant populations, usually a few hundred individuals, comprising one or only a few foci. Detection was apparently very early in the immigration; the decision to destroy all the immigrants was swift, and most important – repeated field operations at least reduced the non-indigenous species below levels of detection, even if extirpation cannot always be demonstrated.
Mack and Lonsdale: Eradicating plants: hard-won lessons

When is eradication of exotic pest plants a realistic goal?

M. Rejmánek[1] and M. J. Pitcairn[2]

Data set on eradication attempts by the California Department of Food and Agriculture on 18 species and 53 separate infestations targeted for eradication in the period 1972-2000

Results:

- eradication of exotic weed infestations smaller than one hectare is usually possible. In addition,
- about 1/3 of infestations between 1 ha and 100 ha and 1/4 of infestations between 101 and 1000 ha have been eradicated.

BUT costs of eradication projects increase dramatically with extent!!!

- it is very unlikely that infestations larger than 1000 ha can be eradicated with realistic amount of resources

When is eradication of exotic pest plants a realistic goal?

M. Rejmánek[1] and M. J. Pitcairn[2]

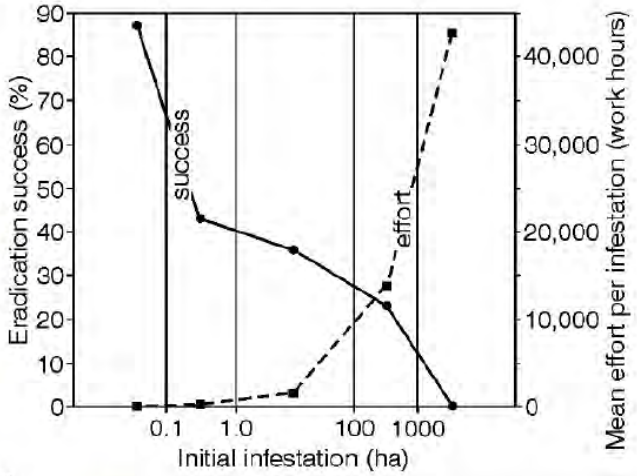


Fig. 1 The dependence of the eradication success (%) and the mean eradication effort per infestation (work hours) on the initial size of infestations. Based on the data for eradication projects of 18 noxious weed species and 53 independent infestations in California (see Table 1).

Biol Invasions (2012) 14:1365–1378
DOI 10.1007/s10530-011-0160-2

ORIGINAL PAPER

When are eradication campaigns successful? A test of common assumptions

Therese Pluess · Ray Cannon · Vojtěch Jarošik · Jan Pergl · Petr Pyšek · Sven Bacher

Global dataset on 136 eradication campaigns against 75 species (invasive alien invertebrates, plants and plant pathogens), (mainland, islands)...

Focus on (1) the reaction time between the arrival/detection of the organism and the start of the eradication campaign; (2) the spatial extent of the infestation; (3) the level of biological knowledge of the organism; and (4) insularity.

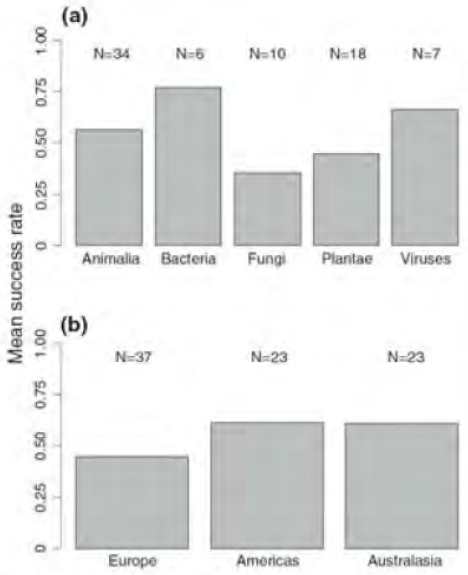


Fig. 2 Mean success rate of eradication campaigns against invasive alien invertebrates, plants and plant pathogens, across **a** five taxonomic Kingdoms and **b** three biogeographic regions.

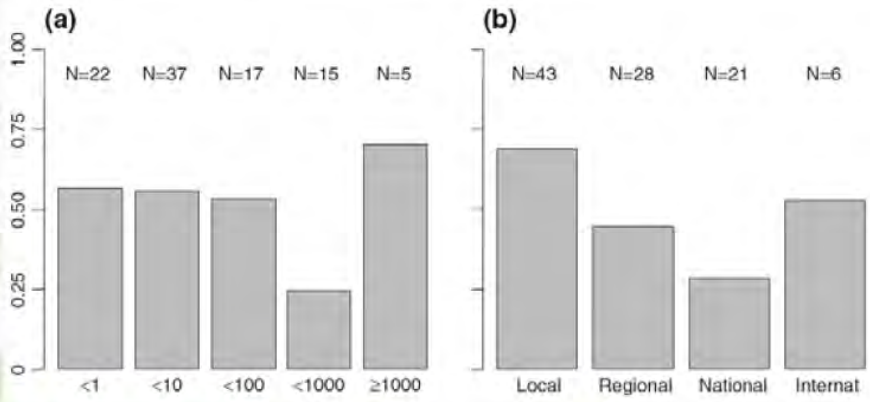


Fig. 3 Mean success rates of eradication campaigns against invasive alien invertebrates, plants and plant pathogens, depending on **a** reaction time in months, **b** the infestation size

Of the studied factors, only the spatial extent of the infestation was significantly related to the eradication outcome.

Local campaigns were more successful than regional or national campaigns. Reaction time, the level of knowledge and insularity were all unrelated to eradication success.

OPEN ACCESS Freely available online PLOS ONE

Which Factors Affect the Success or Failure of Eradication Campaigns against Alien Species?

Therese Pluess[1], Vojtěch Jarošík[2,3], Petr Pyšek[2,3], Ray Cannon[4], Jan Pergl[2]*, Annemarie Breukers[5], Sven Bacher[1]

Extending the previous study, we found additionally that it is crucial for success:

(i) initiate the campaign before the extent of infestation reaches a critical threshold (start with eradication within four years of the problem being first noticed), (ii) pay special attention to plant species introduced as ornamentals, and (iii) apply sanitary measures if possible

If the action is taken within four years since the start of the invasion or its detection, eradication is likely; later, chances rapidly decrease. However, the effect of such a rapid response is no longer obvious when targeting invasions progressing for longer than 50 years.

Invasive alien species on European islands: eradications and priorities for future work

P. Genovesi[1] and L. Carnevali[2]

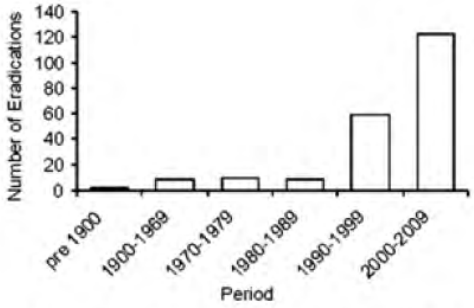


Fig. 1 Frequency of successful eradications; since 1970 reported per decade.

Study of eradications at islands:
Out of 224 eradication campaigns it was possible to gather information on costs only for 26 eradications (13%).

The costs ranged from €200 (ruddy ducks, *Oxyura jamaicensis*) in the Balearic Archipelago (Spain) to €2,247,951 (American mink, *Neovison vison*) in the islands of Lewis and Harris in the Outer Hebrides (UK).

Costs can vary even if the same species is targeted, e.g. the cost of rodent eradication programmes ranges from €321 to €400,000!!!

IUCN

Island Invasives:
Eradication and Management

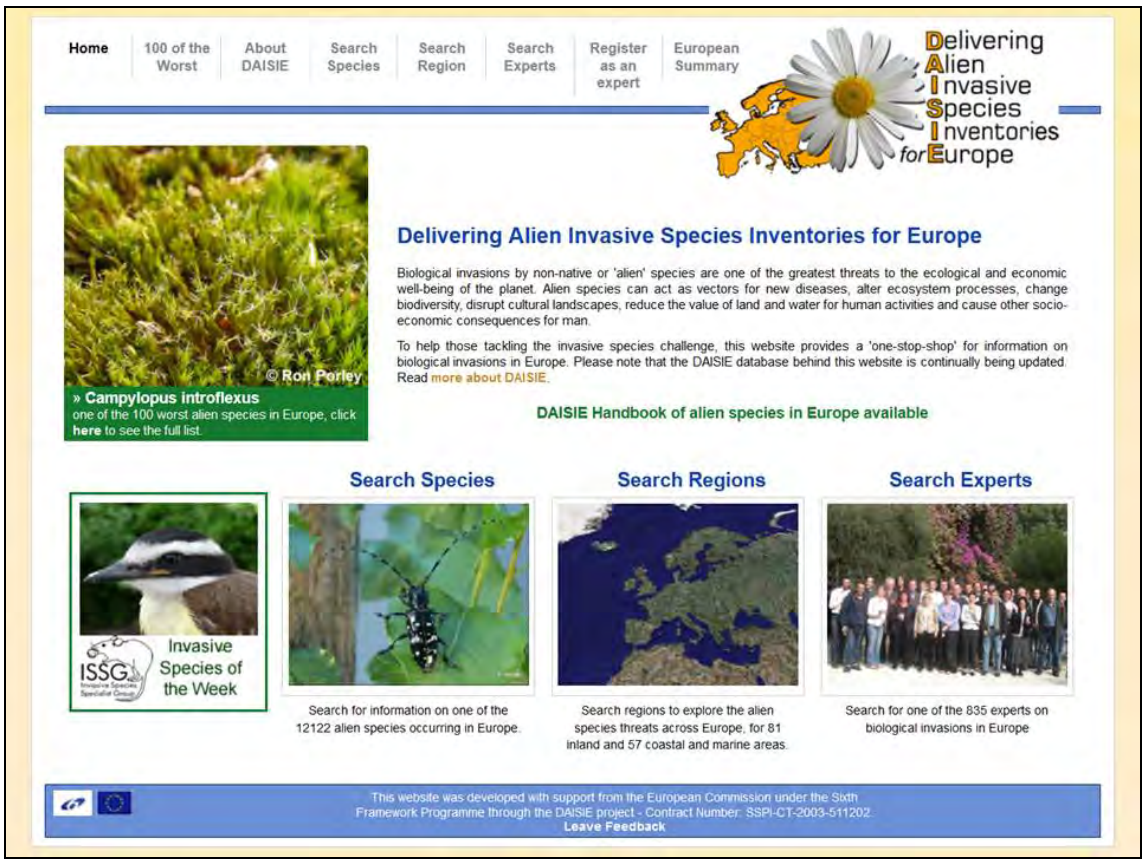
Proceedings of the
International Conference on Island Invasives

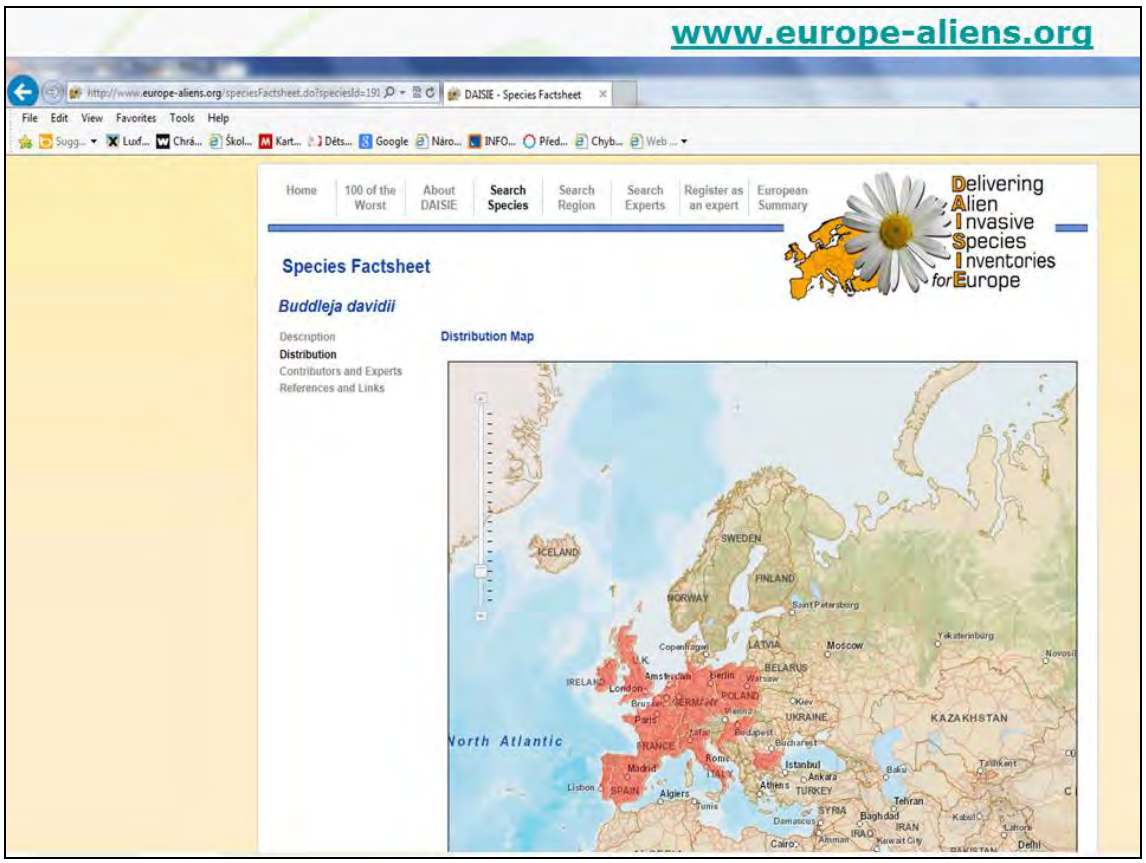
Edited by C. R. Veitch, M. N. Clout, and D. R. Towns

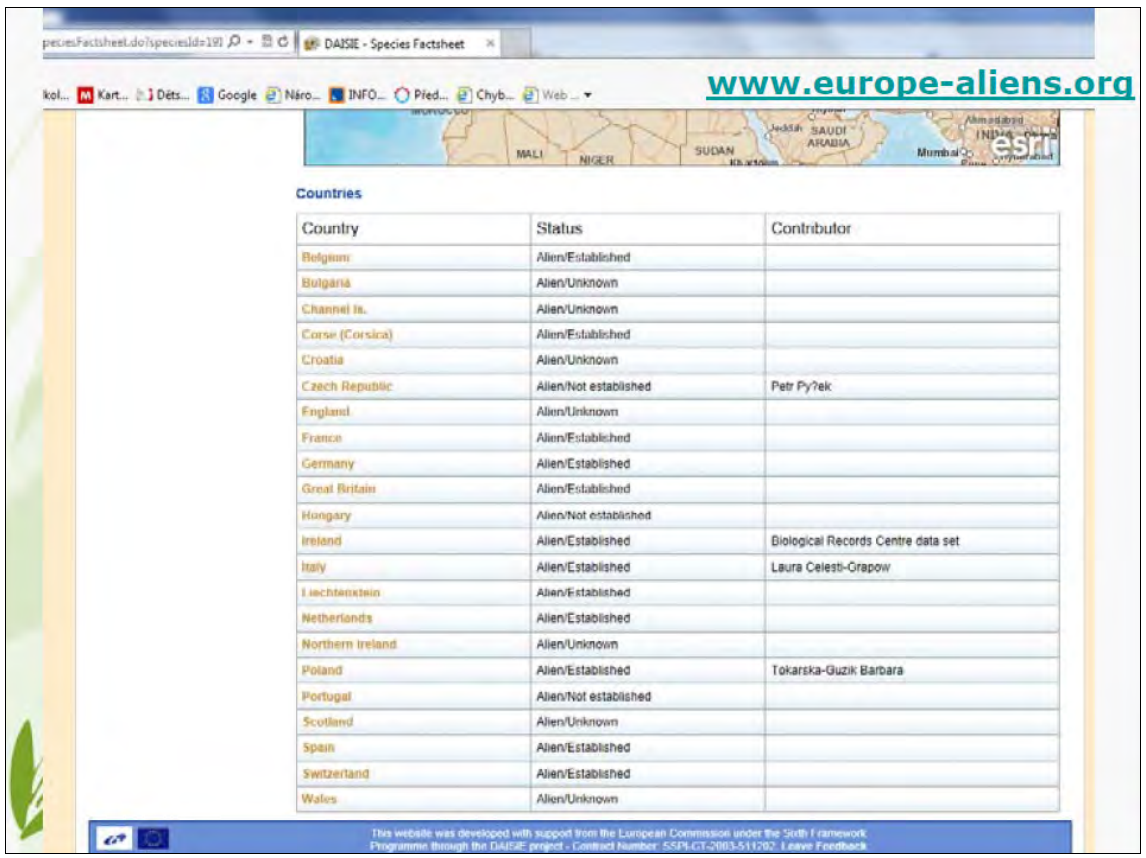
Information on past and running eradication/management actions becomes more accessible.

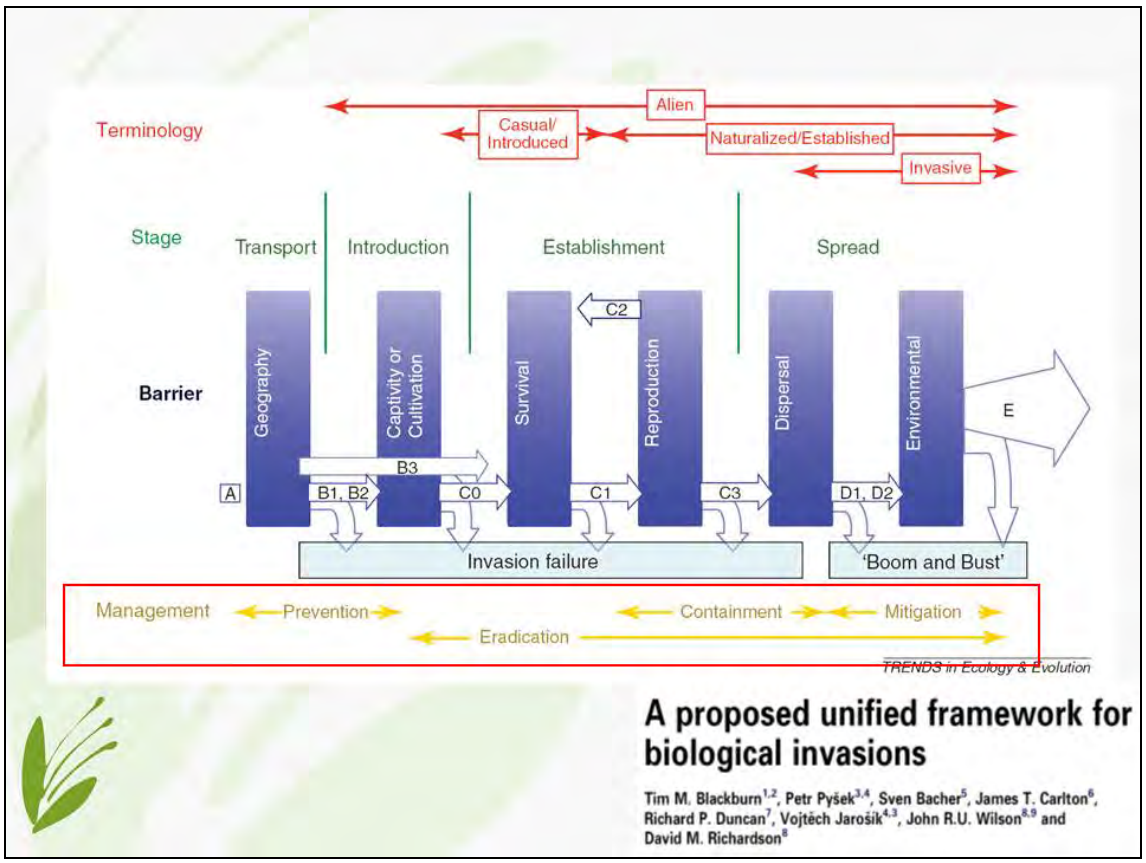
Nevertheless, there is a lack of precise data (financial resources, human power, follow-up monitoring of the sites)!

Information system for eradication campaigns???




www.europe-aliens.org
DAISIE - Species Factsheet
Home
100 of the Worst
About DAISIE
Search Species
Search Region
Search Experts
Register as an expert
European Summary
Delivering Alien Invasive Species Inventories for Europe
Species Factsheet
Buddleja davidii
Description
Distribution
Contributors and Experts
References and Links
Distribution Map
North Atlantic


DAISIE - Species Factsheet
www.europe-aliens.org
Countries
Country | Status | Contributor
Belgium | Alien/Established |
Bulgaria | Alien/Unknown |
Channel Is. | Alien/Unknown |
Corse (Corsica) | Alien/Established |
Croatia | Alien/Unknown |
Czech Republic | Alien/Not established | Petr Py?ek
England | Alien/Unknown |
France | Alien/Established |
Germany | Alien/Established |
Great Britain | Alien/Established |
Hungary | Alien/Not established |
Ireland | Alien/Established | Biological Records Centre data set
Italy | Alien/Established | Laura Celesti-Grapow
Liechtenstein | Alien/Established |
Netherlands | Alien/Established |
Northern Ireland | Alien/Unknown |
Poland | Alien/Established | Tokarska-Guzik Barbara
Portugal | Alien/Not established |
Scotland | Alien/Unknown |
Spain | Alien/Established |
Switzerland | Alien/Established |
Wales | Alien/Unknown
This website was developed with support from the European Commission under the Sixth Framework Programme through the DAISIE project - Contract Number: SSPI-CT-2003-511202. Leave Feedback



A proposed unified framework for biological invasions

Tim M. Blackburn[1,2], Petr Pyšek[3,4], Sven Bacher[5], James T. Carlton[6], Richard P. Duncan[7], Vojtěch Jarošík[4,3], John R.U. Wilson[8,9] and David M. Richardson[8]

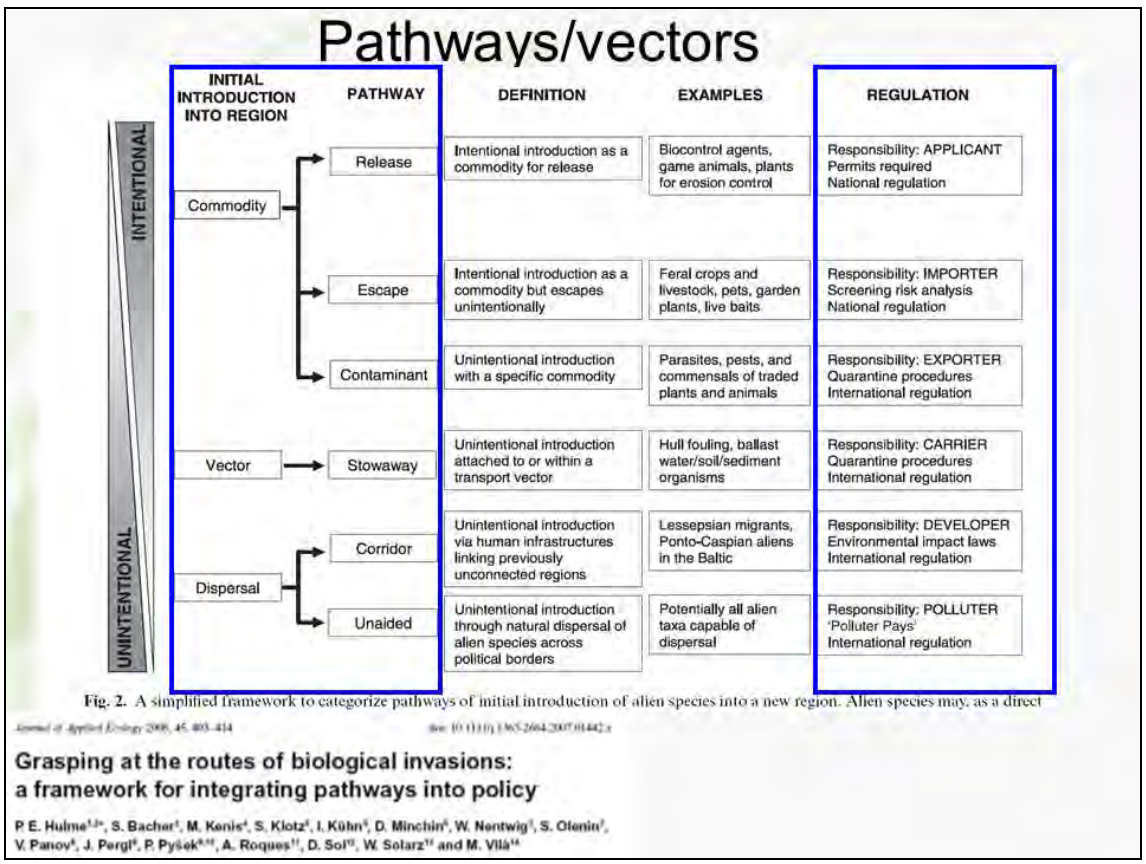


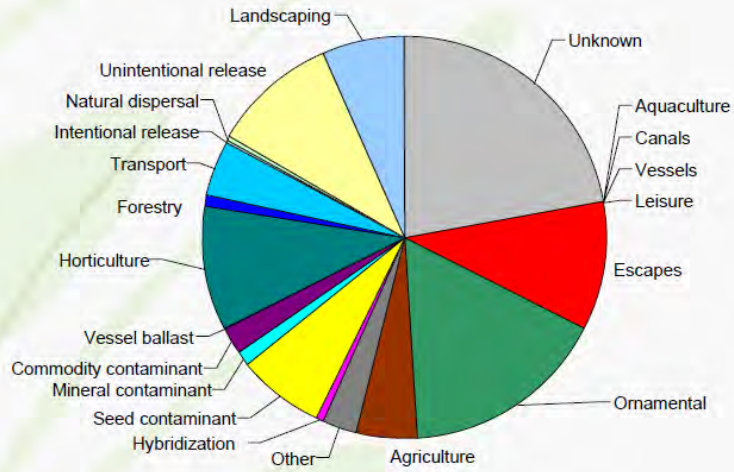
Fig. 2. A simplified framework to categorize pathways of initial introduction of alien species into a new region. Alien species may, as a direct

Journal of Applied Ecology 2008, 45, 403–414 doi: 10.1111/j.1365-2664.2007.01442.x

Grasping at the routes of biological invasions: a framework for integrating pathways into policy

P E. Hulme[1,2*], S. Bacher[3], M. Kenis[4], S. Klotz[5], I. Kühn[5], D. Minchin[6], W. Nentwig[3], S. Olenin[7], V. Panov[8], J. Pergl[9], P. Pyšek[9,10], A. Roques[11], D. Sol[12], W. Solarz[13] and M. Vilà[14]

Introductory pathways of plants to Europe



DAISIE 2013

Summary / take home messages

Prevention is the cheapest strategy (risk of biofuel plants, GMO...)

Success of eradication is dependent on early detection in a new region

If needed to prioritize, than nascent foci rather the oldest/more concentrated populations should be destroyed

After the eradication, a continual follow-up surveying is crucial (eradication usually destructs individuals above a level of detection but not e.g. seeds in seedbank,...)

If the goal of eradication i
better to create *„safe zon*

> Because the prediction of a species' invasive ability is problematic, it is better to err on the side of eradicating a non-indigenous species that later proves to be innocuous, than to withhold eradication until the species' fate is clear (Lonsdale & Smith 2000). Delay greatly reduces the prospects for eradication.

NOTES

EUROPEAN PARLIAMENT

CATALOGUE QA-02-14-005-EN-C

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A
ECONOMIC AND SCIENTIFIC POLICY

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- Environment, Public Health and Food Safety
- Industry, Research and Energy
- Internal Market and Consumer Protection

Documents

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doi: 10.2861/48840

Invasive Alien Species