

Invasive Alien Predators

Policy, research and management in Europe



**Report from a conference in Luleå, Sweden
16–19 June 2013**



Project members



Miljøministeriet
Naturstyrelsen



Supporting organizations

The National Veterinary Institute (Sweden), the Swedish Institute for Communicable Disease Control, Directorate for Nature Management (Norway), the County Administrative Boards of Västerbotten, Norrbotten and Skåne (Sweden), Danish Hunters Association (Denmark) and Federation of Associations for Hunting and Conservation of the EU (FACE).

Content

Conference summary.....	5
<i>Conference statement.....</i>	<i>7</i>
Key note: Invasion biology – where did it come from, where is it going, and why is it so controversial?	8
Session 1: Research, management and international cooperation.....	9
<i>Toward a coordinated policy to prevent and manage biological invasions – an analysis of the global, European and national contexts.....</i>	<i>9</i>
<i>Managing IAS.....</i>	<i>9</i>
<i>Adaptive management and international cooperation in IAS management</i>	<i>10</i>
<i>Strategies to improve landscape scale management of mink populations in the west coast of Scotland: Lessons learned from the Uist mink eradication 2001–2006</i>	<i>11</i>
<i>Fighting invasive species – Habitat recovery in the Atlantic Islands</i>	<i>12</i>
<i>Control of the invasive alien species <i>Lampropeltis getula californiae</i> on the island of Gran Canaria – LIFE10NAT/ES/000565</i>	<i>13</i>
<i>Life+ Return of rural wetlands</i>	<i>14</i>
Session 2: Practical examples of managing IAS.....	15
<i>Management of the invasive raccoon dog (<i>Nyctereutes procyonoides</i>) in the north-European countries LIFE09/NAT/SE/344</i>	<i>15</i>
<i>“A needle in a haystack” – The challenges and lessons learnt in eradicating foxes in Tasmania</i>	<i>16</i>
<i>Mink control and eradication: Why nothing matters</i>	<i>17</i>
<i>Landscape scale grey squirrel control: Lessons from the UK</i>	<i>18</i>
Session 3: Speed presentations and poster session	19
<i>Investigations of infections in raccoon dogs (<i>Nyctereutes procyonoides</i>) from northern Sweden</i>	<i>19</i>
<i>Social dispersal of raccoon dog at the edge of their distribution range in northern Europe.....</i>	<i>19</i>
<i>Can social media mining support alien invasive species monitoring and management?</i>	<i>20</i>
<i>Mobilisation and coordination: The role for stakeholders in managing IAS</i>	<i>20</i>
<i>Temporal variation in movement patterns of invasive raccoon dog</i>	<i>20</i>
<i>Habitat use of raccoon dogs at their invasion front.....</i>	<i>21</i>
<i>The “Wildtierinformationssystem” and the increasing population of raccoon in Germany</i>	<i>21</i>
<i>DNA barcoding</i>	<i>22</i>
<i>Control of the invasive alien species Californian king snake in Gran Canarias</i>	<i>22</i>
<i>Genetic variation and differentiation among Nordic raccoon dogs.....</i>	<i>22</i>
<i>Automatic humane traps</i>	<i>22</i>
Session 4: From international policy to national management	23
<i>Aims and objectives of the EU legislation on IAS – the perspective from a Member State viewpoint</i>	<i>23</i>
Participant survey and pictures from the conference	24
List of participants	28
<i>Sponsors and exhibitors.....</i>	<i>29</i>
Program.....	30

Conference summary

This conference summary has been compiled by the project leaders of the organizing LIFE+ project “Management of the invasive Raccoon Dog (*Nyctereutes procyonoides*) in the north-European countries – MIRDINEC LIFE+/09/NAT/SE/344” and reflect their impressions of the conference.

The overall purpose of this conference was to demonstrate successful management of Invasive Alien Species (IAS), with a main focus on invasive predators, to relevant authorities and the public. This was done by presenting a number of IAS projects, performed both in Europe and in other parts of the world, as case studies.

More specifically the aims of the conference were;

- to raise awareness on the policy context (regional, national & international level) that frames the legal requirements for the management of IAS.
- to share knowledge and experience on the management of IAS (in particular mammalian predators), putting it into a larger perspective
- to present research that helps the management of IAS and to pinpoint knowledge gaps where more research is needed
- to disseminate knowledge and awareness of IAS to the public

The conference gathered approximately 100 participants, from 13 countries and three continents, all working with IAS in one way or another, or being a part of the local community that were invited for a free evening session.

Gathering scientists, policy makers, authorities and managers from the international and EU-level down to the regional level provided an opportunity to discuss and share what needs to be done, by whom, how it should be done, and how to pay the bill.

The pre-conference excursion day 1 was attended by 28 participants. During this day the arranging LIFE+ project “Management of the invasive Raccoon Dog (*Nyctereutes procyonoides*) in the north-European countries – MIRDINEC LIFE+/09/NAT/SE/344” demonstrated the practical work of the project, from the equipment to the use of Judas animals. One appreciated point was the release of a sterilised Judas animal. On the bus drive back to the hotel the project also succeeded in keeping a promise to the New Zealand delegate; to see a moose.

During the following two days of presentations and discussions many aspects of IAS management were covered. The on-going effort to develop a European policy on IAS was a major point of discussion, which resulted in a 10 point list compiled by the conference delegates (not including national authorities/ministries). The list pinpoints ten of the most important issues that the conference delegates agreed need to be covered in the new legislative document to make it efficient. The list can be found below.

Another issue that was covered in the discussions was the commercial use of IAS, or more specifically the pros and cons about using a bounty system to manage mammalian IAS. This is at the moment a hot topic of discussion in the international scientific community of IAS. In this conference very few examples could be identified where bounties have helped, especially in the case of new establishments of IAS. On the contrary, in the final panel discussion where all remaining speakers participated, there was a consensus that such a system instead risk to promote conservation of the species including import or breeding of the IAS for private economic benefit. An example where a bounty system would most likely be inappropriate is the Nordic raccoon dog project. A bounty system in Sweden could easily be misused. Animals could for example easily either be imported from

In brief

When: Sunday 16/6 – Wednesday 19/6 2013

Where: Nordkalotten Hotell, Luleå, Sweden

Aim:

- to raise awareness on the policy context (regional, national & international level) that frames the legal requirements for the management of IAS.
- to share knowledge and experience on the management of IAS (in particular mammalian predators), and put it into a larger perspective
- to present research that helps the management of IAS and to pinpoint knowledge gaps where more research is needed
- to disseminate knowledge and awareness to the public

Participants: The conference gathered approximately 100 participants from 13 countries and three continents, and has seen the active participation of leading experts from all over the world.

Organizer: the LIFE+ project “Management of the invasive Raccoon Dog (*Nyctereutes procyonoides*) in the north-European countries – MIRDINEC LIFE+/09/NAT/SE/344”

Facilitator: Anders Esselin, Man & Nature

Finland, where approximately 180 000 animals are shot each year, or produced by breeding this high reproductive animal. Instead of reporting sightings of animals to the project, which have very efficient tools to find them, an incentive is created for some people to try to shoot or catch the animal by their own to earn money, when inevitably some animals would survive and disperse. A bounty system for raccoon dog in Sweden is more likely to help save the raccoon dog than to eradicate it or keep it at a low level. It should be noted, however, that this risk analysis of implementing a bounty system for the raccoon dog in Sweden does not reflect the local hunters’ will to help with the current management. On the contrary, the voluntary cooperation of the local hunters with the project has been a major part of its success in all project countries. The importance of this stakeholder involvement was also repeatedly shown in the project presentations.

The most crucial point brought up at the conference, in almost all presentations, was the short and long term funding of IAS projects. There is no doubt that the management of IAS is considered highly important for the biodiversity, the risk of transmission of diseases, and for the future economy of states as well as regions. It is indisputable that an early warning and fast response system in the long run will be much more cost efficient than to wait until the IAS is established before taking action. Yet, almost every project at the conference have had to chase funding to be able to continue the management, even after having demonstrated highly successful management in a first project. It should, in fact, be the other way around if the policy decisions were reflected in the actual funding possibilities. On the European level, LIFE+ funding has been a reliable source of funding for the initiation of many IAS projects. Thereafter, the member state countries are expected to continue the funding of the projects if found prioritised. Few, if any, politicians are however willing to take decisions of long term funding that will reach beyond their own election period. This is especially true if a country is not itself directly or acutely affected by the IAS. This is often the case since animals do not care about country borders and it is almost impossible for a single country to fight an IAS existing in neighboring countries without their help. Often it is also a purely economic question. Even though a

country would like to help (and fulfil their various ratified directives and conventions) they do not have the economic resources. Is it then only up to the member state, or does EU have a responsibility in such cases?

The current LIFE+ funding for the organizing LIFE+ raccoon dog project will end in August 2013. The future funding for the project was raised as a case study in the discussion. The four Nordic nature management authorities who were all represented at the conference were asked about their support for a continuation of the project and the funding situation in the foreseeable future.

The Swedish Environmental Protection Agency (SEPA) is a partner of the LIFE+ project and currently contributes with the major part of the co-funding for the whole LIFE+ project. SEPA were positive to the development and results of the project and have secured the Swedish funding to the end of 2013. Nothing has yet been decided concerning co-funding of the project from 2014. However the Swedish Government has decided on extra funding for work concerning Invasive Alien Species for the years 2013-2016.

The Norwegian Directorate for Nature Management (DNM) is a co-financier of the LIFE+ project and has supported the project and the funding of the project ever since the first national project started in Sweden in 2008. In fact, DNM initiated and hosted the first meeting between the Nordic countries. It should be noted that Norway have had only a few confirmed raccoon dogs in their country and that they are not allowed to participate as a partner in the LIFE+ project. They have nevertheless already from the start acknowledged the importance of cooperation between countries for an effective management, and the fact that an effective early warning and fast response system, and the relatively low cost of such a system early in the invasion, will actually reduce the cost for Norway in the longer run. DNM were positive to a continuation of the project and were also prepared to continue to fund parts of the project, especially in Sweden and Finland, as long as it helps Norway to keep the raccoon dog out of the country (within their budget frame for IAS).

The Danish Nature Agency is a partner of the LIFE+ project and was positive to a national continuation of the raccoon dog project and to a continued coordination and cooperation between countries. They had already, within the budget frame of the agency, taken the decision to continue with the raccoon dog management until the end of

2015, whereafter the project will be evaluated and potential longer term funding can be decided on. In Denmark the management system has also proved to work well on the invasive alien raccoon (*Procyon lotor*), and several raccoons have already been culled within the system*. The raccoon is a common IAS in large parts of Germany.

** During the conference a raccoon was also being hunted by the project in Sweden (the first confirmed in about a decade). Shortly after the conference ended the raccoon was captured in a project trap and culled.*

The Finnish Wildlife Agency is a partner in the project and was positive to continuing with the actions, however, this decision has to be made by several ministries (Ministry of the environment and Ministry of Agriculture and Forestry) and no decisions on the future funding had yet been taken at the time of the conference. Finland is in a situation where it is probably too late to eradicate the raccoon dog from the country. In 2012 approximately 170 000 - 180 000 raccoon dogs were shot by hunters. Without Finland living up to their ratified conventions and directives relating to IAS (i.e. to stop the IAS from spreading to other countries) it would be difficult to stop the establishment in Sweden and Norway.

The only national ministry represented at the closing discussions was the Swedish Ministry of the Environment. They reported that they are well aware of the work and results of the LIFE+ raccoon dog project. They also reported that Sweden, Finland and Norway recently, in a meeting between the state secretaries, agreed on a continued cooperation to prevent the raccoon dog from spreading within and between the countries <http://www.regeringen.se/sb/d/17423/a/214905>. The form of the cooperation was not yet decided at the time of the conference.

At the end of the discussion the conference delegates (not including the raccoon dog project members or the national authorities/ministries) expressed their support for the continuation of the raccoon dog project.

Luleå 2013-07-13

Fredrik Dahl, P-A Åhlén, Marie Louise Simmelsgaard Platz, Mathias Lindström – Project leaders of the raccoon dog project

Conference statement

Conference statement of the “Invasive Alien Predators – policy, research and management” conference in Luleå, Sweden 16-18 June 2013.

The conference was organised by the LIFE+ project “Management of the invasive Raccoon Dog (*Nyctereutes procyonoides*) in the north-European countries – MIRDINEC LIFE+/09/NAT/SE/344”.

The conference gathered approximately 100 participants from 13 countries and three continents, and has seen the active participation of leading experts from all over the world.

The on-going effort to develop a European policy on IAS received particular attention during the conference, and a specific workshop discussed the key points that a European strategy should cover. In the closing discussion, moderated by Dr. Piero Genovesi, the participants (not including national authorities/ministries) to the meeting agreed on the following list of priority actions:

1. the need to adopt without any further delay a stringent EU policy on invasive species to meet the Target 5 of the EU biodiversity strategy as well as Aichi Target 9.
2. the need to secure a dedicated budget to the struggle against IAS, also developing mechanisms for contingency actions against new incursions (early warning rapid response);
3. that countries or regional authorities should designate competent authorities with a specific mandate on IAS;
4. the need to avoid or solve constraints of regulations developed for other sectors, to the management of IAS: for example there should be ways to grant the access to private land for managing key invasives, it should be possible to use all effective measures to control invasive species (e.g. trapping devices, toxic baits), and therefore regulations on the use of toxicants, or of trapping devices should have derogation mechanisms for projects dealing with IAS, for example when protecting endangered species on islands.
5. the need for a stringent regulation of trade (such as pet trade) is a crucial pillar of any coordinated policy on invasive species: the EU should develop a community approach to this issue, and at the same time it should encourage European countries to develop national regulations
6. that pets and domestic species are an important component of IAS and should be explicitly covered by an EU policy
7. that IAS has no borders, and it is therefore essential to encourage international cooperation and coordination; one pro-active example has during the conference been shown by the Nordic countries in the LIFE+ raccoon dog project
8. that Europe should support eradication and control projects, to prevent further damage by already established species, also encouraging research on and development of innovative control techniques.
9. that the involvement of stakeholders is crucial, and any EU policy should find ways – including financial mechanisms – to encourage bottom up approaches to IAS, as in the case of the raccoon dog project.
10. that societal support is essential, and Europe should invest in communication, awareness raising, networking, as well as in voluntary approaches to the issue, for example by supporting the development of codes of conduct

Luleå 2013-07-13

Fredrik Dahl, On behalf the “Invasive Alien Predators – policy, research and management” conference in Luleå, Sweden 16-18 June 2013.

Key note: Invasion biology – where did it come from, where is it going, and why is it so controversial?

By Daniel Simberloff

Invasion biology is a young discipline, even though people recorded introduced species by the 18th century. Contrary to popular belief, the field did not begin with Elton's 1958 monograph, but rather with the SCOPE project of the 1980s. Because invasion biology is so young, the SCOPE questions are still relevant: (1) Why are some introduced species invasive while others are innocuous? (2) Why are some habitats readily invaded? (3) How can knowledge about (1) and (2) aid management of troublesome invaders? Of course the questions have evolved, and we now know that questions (1) and (2) are inextricably linked, but the sorts of detailed, case-specific research that has led to this realization remains important.

Evolutionary research was a very minor part of the SCOPE project, but it has increasingly become a prominent component of invasion biology, spurred by technological advances in molecular genetics. One major finding is the key role of hybridization in generating invasion impacts – including hybridization between introduced genotypes as well as between introduced and native species. Molecular genetic techniques are also used to trace origins and routes of invasions, while eDNA is increasingly employed to detect the presence of low densities of introduced species. Ecosystem impacts were just a minor component of modern invasion biology during the SCOPE project, but they have now become one of its leading edges, particularly as ecological research on aboveground-belowground interactions has proliferated. Stable isotope analysis, improved remote-sensing methods, and other new technologies have helped elucidate ecosystem impacts. Research on ecosystem impacts is part of an explosive growth of knowledge on impacts of invasions in general. This corpus of research has shown that impacts of introduced species are remarkably varied and may be subtle and delayed, but substantial impacts are more widespread than was formerly believed.

Amidst an explosion of research activity on invasions, critics have lambasted invasion biology and management on several grounds, most notably charging that the claimed harmful impacts are overblown, that invasions often increase biodiversity, that the attempt to control invasions is futile, and that the entire enterprise is tainted with xenophobia. These arguments are largely misguided. Efforts to manage invasions are far from futile; impediments are at least as likely to be socio-political as they are to be scientific and technological.

In fact, advances in both long-term maintenance management and eradication are striking, with incremental improvements in traditional techniques of mechanical/physical control, chemical control, and biological control. Occasionally totally new approaches are developed, including a plethora of projects on autocidal methods based on various types of genetic manipulation.

Invasive predators receive much attention because they are highly visible, often charismatic, and predation is easily understood by the public and frequently quite dramatic. Determining the population impact of an introduced predator requires more evidence than simply observing acts of predation, but many introduced predators have been demonstrated conclusively to have greatly affected populations of native species and various ecosystem properties. Maintenance management and eradication projects targeting invasive mammals and birds frequently confront objections from advocates of animal rights. These objections will not easily be countered, as there is as yet little agreement about which if any non-human entities are morally considerable, whether collective entities such as populations and species have rights, and, if they do have rights, what the relative weights are for individual rights and group rights. For some opponents of killing invasive predators, contraception would be an ideal long-term solution, but such contraceptives for field use are not yet widely developed. All parties to the animal rights debates agree that, if lethal means are used, they should be as humane as possible.

Daniel Simberloff is the Nancy Gore Hunger Professor of Environmental Studies at the University of Tennessee. His publications center on ecology, biogeography, evolution, and conservation biology; many focus on biological invasions. His research projects are on insects, plants, fungi, birds, and mammals. He is editor-in-chief of *Biological Invasions* and senior editor of the *Encyclopedia of Biological Invasions*. He served on the United States National Science Board 2000-2006. In 2006 he was named Eminent Ecologist by the Ecological Society of America, and in 2012 he was elected to the U.S. National Academy of Sciences.

Session 1: Research, management and international cooperation

Toward a coordinated policy to prevent and manage biological invasions – an analysis of the global, European and national contexts

By *Piero Genovesi*

In the last decades many countries of the world have adopted policies on invasive alien species, ranging from mild recommendations to stringent legal tools, but despite these efforts, the rate of invasions has not decreased globally. However, there are indeed examples of policies that have managed to effectively reduce the number of introductions of unwanted species, as well as to more efficiently address the problems caused by invasions. It is therefore important to analyse the different approaches followed in different context, in order to guide decision making.

Also in regard to the commitment of the European Union to develop a community policy on invasive species, including a dedicated legal tool, the present review analyses examples from several countries in all regions of the world, and discusses cost effectiveness of different policy approaches. The review not only assesses the legal component of policies on invasive species, but also discusses the pos-

sible role of voluntary models, including codes of conduct and more in general of approaches developed in cooperation with the relevant stakeholders and interest groups.

Piero Genovesi has worked since 1996 with the INFS (Italian Wildlife Institute – the Italian government research institute for conservation), focusing on carnivore conservation and alien species. Today he is a senior conservation officer with the ISPRA (Institute for Environmental Research and Protection, created by the Italian Government after the suppression of INFS), where he coordinates the activities on alien species management. He has coordinated several research projects and worked closely with the Italian Ministry of Environment and with several international institutions to develop guidelines and policies on the management of alien species. In 2000 he was nominated Chair of the European section of IUCN SSC ISSG, and in 2005 appointed Deputy Chair of ISSG.

Managing IAS

By *Sugoto Roy*

Best practice in the management of invasive species suggests following a hierarchical precautionary approach where species are primarily prevented from entering a defined area, and then contained and removed rapidly should they arrive. Early management is the most preferred choice as it is both the most cost effective and biologically effective of all options.

Undertaking wide scale eradication comes later once earlier options are no-longer viable because populations have already become established. At this stage eradication of the species is the preferred action because it is finite, and once a species has been removed completely, focus can shift to other conservation goals such as restoration of impacted species and habitats of conservation concern. However, for eradications to be successful, certain strict criteria need to be fulfilled. If they are not, then carrying out an expensive and fully fledged eradication is unlikely to work.

In these circumstances, long-term management is sometimes the only option, and is not always considered as a viable choice. This presentation looks at situations where eradication is not feasible but

long-term management needs to be carried out nevertheless. It also explores different strategies that can be used to increase the effectiveness of long-term management such as exclusion methods and socio-economic approaches. Examples are drawn from long-term mongoose and feral cat management programmes in Japan and the Caribbean respectively.

Sugoto Roy is an ecologist focusing on the ecology and management of non-native vertebrates, especially predators, at the Animal Health and Veterinary Laboratories, England. He completed his Ph. D. at Bristol University, where he researched the management of the introduced small Indian mongoose in the Republic of Mauritius. Since that time he has continued to work on the management of non-native species, in particular carnivores, such as the American mink, small Indian mongoose, and feral cat introduced to island ecosystems.



Adaptive management and international cooperation in IAS management

By Fredrik Dahl

To be efficient in management it is important to have the best possible knowledge at hand. The more we know, the better the management. In the raccoon dog LIFE+ project (LIFE09 NAT/SE/ 000344) and its predecessor projects we have been using an adaptive management approach from the start. Apart from the management project, there have always been associated research projects running simultaneous to constantly improve the management. After each project the outcome has been evaluated by the steering group and new decisions has been taken; if and in that case what other knowledge is important to have to further improve the management. With this adaptive management approach we have learnt a lot and been able to improve our management considerably. In this presentation we will describe the way we work and give examples of management improvements due to the applied research connected to the management. However, no matter how efficient we can get in Sweden, it would likely be in

vain without the international cooperation demonstrated in our LIFE project which will also be discussed.

Fredrik Dahl is employed at the Swedish Association for Hunting and Wildlife Management and at the Swedish University of Agricultural Sciences (SLU). He has a PhD in Wildlife Ecology from SLU, specializing on population dynamics of medium sized mammals (2005). He made a post-doc at the International Institute for Applied Systems Analysis (IIASA), Austria, 2006–2007. He was the coordinator of SLU's Environmental Monitoring and Assessment – Wildlife Program 2006–2010. In 2008 Fredrik was one of the initiators of the Swedish Raccoon Dog project and have since then been the scientific leader of the project (first the national project(s) and since 2010 for the ongoing international LIFE+ project).

Population model

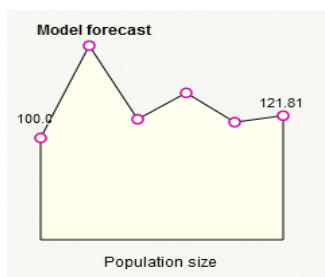


Figure 1a. Population development during five years including our efforts in culling and sterilisation.

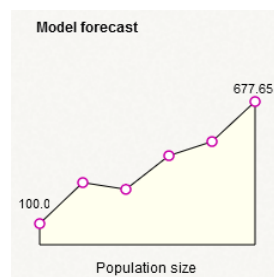


Figure 1b. Population development during five years without our efforts in culling and sterilisation.

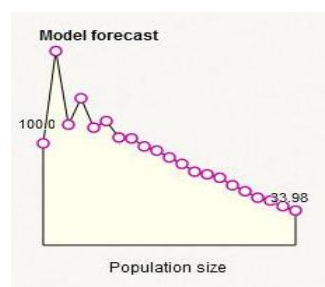


Figure 2a. Population development during 20 years including our efforts in culling and sterilisation.

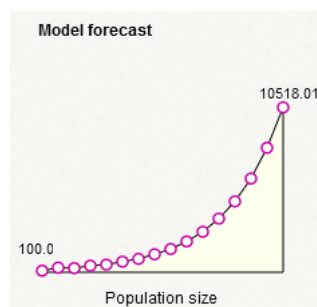


Figure 2b. Population development during 15 years without our efforts in culling and sterilisation.

The predicted exponential population development without management efforts shown in fig. 2b. can be difficult to imagine. A real example of a similar development can however be found in Finland, where the hunting bag increased from 800 raccoon dogs in 1970 to 85 000 in year 2000 and further to approximately 180 000 shot individuals in 2012.

Strategies to improve landscape scale management of mink populations in the west coast of Scotland: Lessons learned from the Uist mink eradication 2001–2006

By Sugoto Roy

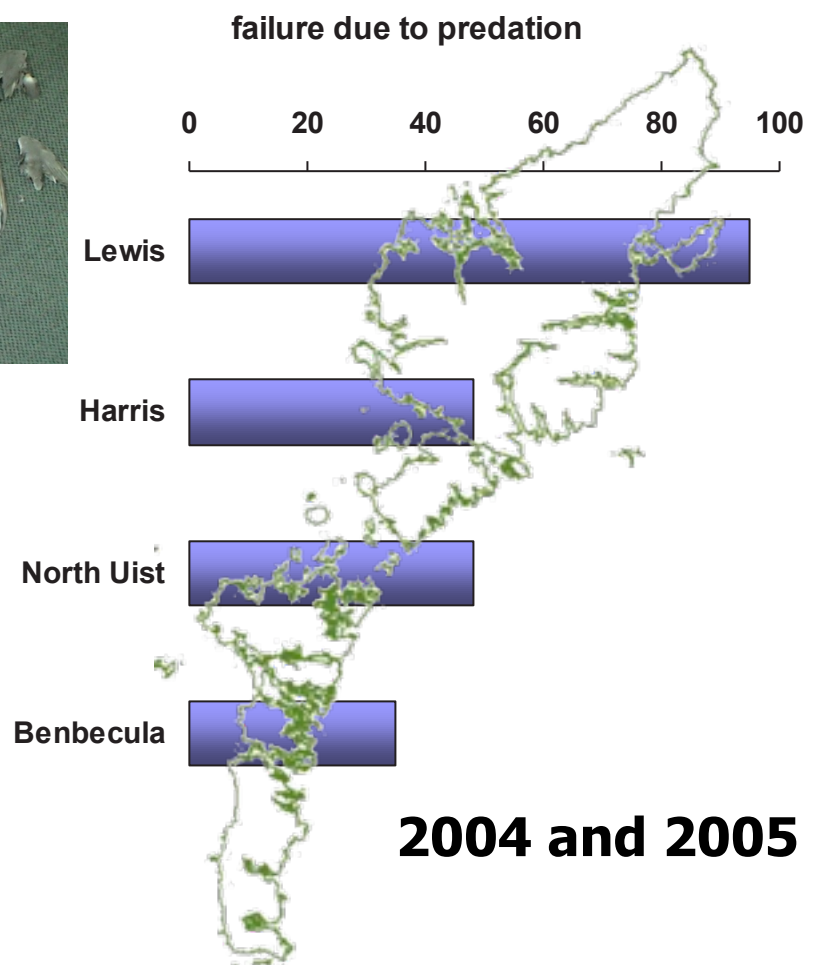
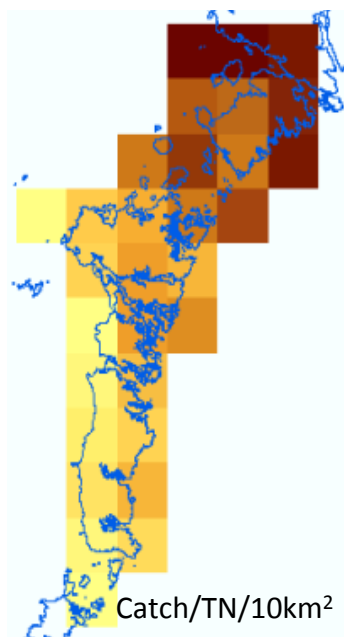
Phase One of the Hebridean Mink Project (HMP) ran from 2001–2006 at a cost of £1.6 million and successfully eradicated invasive mink *Neovision vison* from 1 100 km² of the southern islands of the Hebridean Archipelago, North Uist, Benbecula and South Uist (The Uists).

Mink were also heavily controlled in South Harris to the North of the Uists to prevent reinvasion. A total of 532 mink were removed, and no further animals were caught or recorded in the eradication area in the last 6 months of the project. The project is now in its second phase and is continuing to remove mink from the remainder of the Outer Hebrides using lessons learned from the original eradication.

This paper outlines the strategies developed in the first phase of the HMP. The strategies outlined can be divided into logistical strategies,

such as trap design and staff training, and ecological strategies, such as using information on the behaviour of the population in space and time to effectively allocate resources.

Sugoto Roy is an ecologist focusing on the ecology and management of non-native vertebrates, especially predators, at the Animal Health and Veterinary Laboratories, England. He completed his Ph. D. at Bristol University, where he researched the management of the introduced small Indian mongoose in the Republic of Mauritius. Since that time he has continued to work on the management of non-native species, in particular carnivores, such as the American mink, small Indian mongoose, and feral cat introduced to island ecosystems.



Fighting invasive species – Habitat recovery in the Atlantic Islands

By Pedro Geraldes

LIFE Project Safe island for Seabirds

The Azores islands used to be the home of millions of breeding seabirds. Nowadays these colonies decreased drastically as a result of introduced predators (rats, cats and mice) and invasive exotic plant species. With the exception of the Cory's shearwater, seabird populations are confined to small islets and steep inaccessible cliffs.

The island of Corvo, with an area of 17.1 km², is the smallest, westernmost and less populated of the nine islands of the Azorean Archipelago. The island is surrounded by deep cliffs ranging from the sea level to 700 meters height, and there is only one village in the island, with 437 inhabitants. 41% of the island is classified as a Special Area for Conservation (SAC) and Special Protection Area (SPA) thus included in the Natura 2000 Network and classified as UNESCO's Biosphere Reserve. Azorean settlers, as with all other island colonisations, brought a number of associated threats to the local fauna and flora, such as the introduction of invasive mammals (rats, mice, cats, goats and sheep), which jeopardize the breeding populations of seabirds.

The main objective of this project was the elaboration of a viability study and correspondent operational plan for the eradication/control of alien mammals on the Island of Corvo for the conservation of seabird colonies in the Azores, including habitat restoration measures. This includes establishing the first predator-free and invasive plant-free optimal seabird breeding habitat enclave in Corvo, prepare full-scale participatory and multidisciplinary operational plans for the eradication of invasive mammals in the island, and test, fine-tune, demonstrate and improve alien mammal and exotic plant eradication techniques thorough carrying out the complete restoration of one large islet off São Miguel island (Vila Franca do Campo), with similar problems with those from Corvo

Several invasive species were targeted and the main results achieved were:

Cats

- Responsible for 84% of the predation events of Cory's Shearwater chicks
- The density of cats was estimated using automatic cameras placed around the island.
- 51% of the domestic cats and 40% of the feral cats were neutered.
- This was the first step for a future situation in which all the cats should be identified with a microchip and be neutered to avoid the increase of the population of feral animals.

Rats

- There are no records of the presence of brown rat in Corvo Island.
- Seabirds are 10,6% of the diet of black rat
- The abundance of rodents was estimated throughout the year and the highest peak in abundance of both species occurred in November.
- House mice were eradicated from the Corvo Biological Reserve
- House mice were least abundant in April and black rats during April and the winter months.

Invasive Plants

- More than 23,000 native plants (fire tree, Azorean heather, fescue, Picconia azorica, Azorean cedar, Viburnum treleasei, Myosotis maritima e Azorina vidalii, Azorean blueberry, Frangula azorica) were planted in Corvo and on Vila Franca do Campo Islet.
- Control of invasive alien plants (tamarisk, the giant reed and the big leaf hydrangea) in the Corvo Biological Reserve, the Altitude Biological Reserve and in Vila Franca do Campo Islet.
- Nine main alien species were identified
- After the project interventions, the area occupied by the invasive alien plants was reduced to 5%

In terms of direct actions with the target seabird species the project managed to:

- Achieve the first Cory's shearwater chick translocation
- A 100% pest-proof fence was built on Corvo
- 400 artificial nests for seabirds were built on Corvo and Vila Franca do Campo Islet.
- More than 800 Cory's shearwater juveniles were saved and released during the SOS Cory's shearwater campaigns.

The involvement of the local population is critical and so, we also developed a very successful environmental Education Program for the local students. Efforts dedicated to education and awareness of the next generations may guarantee the seabirds' protection and conservation in the future.

It is increasingly important to demonstrate the value of this projects, not only in terms of conservation and biodiversity, but also in direct economic impacts. The Safe Islands project created 4.5 direct annual jobs and 1.5–2.5 indirect ones in the region and made possible that more than half a million Euros of European funds were applied in the region. This meant that the project contributed with 0.81% of the island Gross Domestic Product.

Unfortunately we found that a full eradication of invasive alien predators in Corvo is actually socially and economically impossible. Measures to control and manage these species should be implemented instead as well as measures to control the entrance of other alien species.

With the proper monitoring and management, the Corvo Island and Vila Franca do Campo islet can recover their status and a sanctuary for seabirds in the future.

Other SPEA projects

- The LIFE Priolo project – “Recovery of Priolo's habitat”, and the Sustainable Laurel Forest Project
- SPEA's long-term conservation project has already recovered more than 250 hectares of natural forest with 150,000 native saplings re-planted. As a result, the population of Azores Bullfinch has been stabilised, and its threat level has been down-listed from Critically Endangered to Endangered Elaboration and publication of the Management Plan of the ZPE Pico da Vara / Ribeira do Guilherme, allowed the continuity of the main management and monitoring of the habitat of the Priolo and reinforced the components of the Legislation of Protection of the Habitat of the Priolo. Several actions of Education and of Environmental Sensibilization of the populations were implemented and made compatible the economical
- Porto Santo LIFE project
- Spea was a partner in the Porto Santo LIFE project that was coordinated by the Madeira Natural Park. These islets harbour a high number of endemic species, and the project aimed to create the conditions for the recovery of the habitats and species present, specially through the eradication of the rabbit populations, the control of the mice population and the reduction of the invasive plants populations.

Pedro Geraldes holds a degree in Applied Biology on Animal Resources. Worked as a technician and consultant throughout his career for both the private and public sectors as well as several environmental NGOs. In the past few years specialized in seabirds, mostly on habitat recovery and control or eradication of invasive species. Working with SPEA since its inception, was involved in several LIFE projects targeting marine protected areas and habitats. Currently is working in the Cape Verde Islands to recover the threatened local seabird populations and recover their natural habitats.

Control of the invasive alien species *Lampropeltis getula californiae* on the island of Gran Canaria – LIFE10NAT/ES/000565

By Ramón Gallo Barneto

The Californian Kingsnake (*Lampropeltis californiae*; Pyron and Burbrink 2009) was first detected in 1998 in el Barranco Real de Telde (Solana) in the east of Gran Canaria (Pether and Matthew, 2007). Between 2005 and 2007, 20 specimens were collected from the northern part of the island (Cabrera-Perez 2009). In 2006 the species was common in Barranco de Telde (Mateo et al., 2011) and in the spring and summer of 2007 there were hundreds of observations in La Solana, confirming the species naturalization.

The project LAMPROPELTIS LIFE +, LIFE10 NAT/ES/565, funded by the European Union, started in September 2011. The four years long project will aim to achieve the following: Enable the development of new techniques to capture snakes, increase the biological knowledge of the snake in Gran Canaria, their interaction with environmental variables and estimate the population status. The fight against the invasion is conducted by activating the early warning system, application of genetic techniques for analysis based on the use of molecular markers as a tool to establish the effective population size and genetic variability. Expected results from the LIFE + LAMPROPELTIS, is containment involving the core population and the reduction by 50% of the secondary core.

The captures have largely occurred between April and June although this varies from year to year and tends to tail off during the hotter and less humid summer months. The highest capture rates are linked to the mating season, and the male group of the species constitutes the highest proportion of captures during this period. However, during the subsequent pregnancy period, captures of females supersede male captures. The percentage of juvenile individuals captured throughout the first months of activity is low, building up after the hatching period where a progressive recession of size of the captured snakes is detectable. These data coincide with the parameter values of the species in its natural habitat.

Biometric data show that all individuals correspond to the California kingsnake phenotype (Pyron and Burbrink 2009). This snake shows four different colored patterns: normal linear, ordinary ringed, ringed albino, albino linear. Both populations show significant differences in the color pattern. In Telde-Valsequillo the proportion of albino snakes is 67%, while in Gáldar most snakes are linear normal (78%) and the number of albinos is about 4%. This suggests that the population in Gáldar comes from a new introduction (Mateo et al 2011). A genetic study conducted for this project confirms this fact, although it poses a possible common origin of some of the individuals in both populations.

The diet in Gran Canaria is formed by 74% of reptiles, 24% of

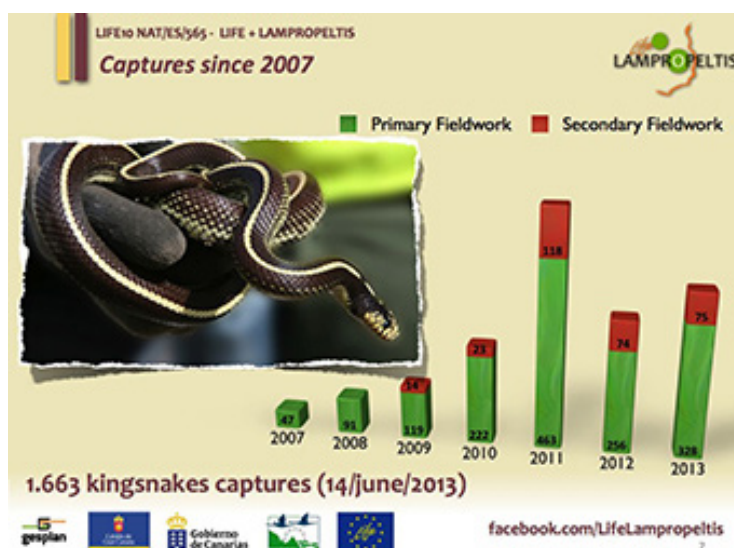
small mammals and 2% of small birds. In the case of reptiles, the Gran Canaria Giant Lizard (*Gallotia stehlini*), endemic and exclusive to Gran Canaria, and considered the largest living reptile in Europe, appeared in 48% of the cases studied, the Gran Canaria Skink (*Chalcides sexlineatus*) in 22% and the Gran Canaria Gecko (*Tarentola boettgeri*) in 3%. There are interesting differences between the two populations, small mammals made up 48% of the diet in Gáldar, compared to 14% in the Valsequillo Telde. This fact may explain some ethnological differences found between the two populations.

The overall sex ratio is 51.1% females and 48.9% males, but the percentage of females in Gáldar is higher than males (54% female, 46% male). The percentage of females with eggs is very high; of 220 females studied, 102 contained eggs, with 13.2 eggs on average. The work of the project team, along with the invaluable cooperation of citizens through the Early Warning System, has enabled us to capture 703 individuals from the start of the LIFE + LAMPROPELTIS in September 2011, of which 371 have been due to cooperation of citizens, 291 by direct capture by stalking and 40 by using different types of traps. Since 2013 we are using dogs to locate snakes and three Harris hawks (*Parabuteo unicinctus*), delivered the first direct capture of a snake last May. All above data shows the outstanding adaptation of the snake to the habitats of Gran Canaria, making this species a serious environmental threat, especially for endemic reptile populations.

References

- Pether J and Mateo JA (2007) La culebra real (*Lampropeltis getulus*) en Gran Canaria, otro caso preocupante de reptil introducido en el Archipiélago Canario. Boletín de la Asociación Herpetológica Española, 18: 20-23.
- Pyron RA and Burbrink FT (2009) Systematics of the common Kingsnake (*Lampropeltis getula*; Serpentes: Colubridae) and the burden of heritage in taxonomy. Zootaxa 2241: 22-32.
- Hubbs B (2009) Common Kingsnakes. A Natural History of *Lampropeltis getula*. Tricolor books, 436 pp.

Ramon Gallo is a biologist specializing in Zoology and Environmental Impact Assessment. For over eight years he has been the Head of the Environmental Management, GESPLAN, SA. Canary Islands Government. During this period GESPLAN has participated in two LIFE + Project. He is currently Technical Director of the LIFE + *Lampropeltis* to control the alien invasive species California Kingsnake in Gran Canaria (Spain).



Life+ Return of rural wetlands



Waterfowl at Härmälä wetland only 10 months after flooding historically drained wet meadow. The area has been used for agriculture after drainage until it was re-created as wetland by landowner and Rural Wetlands project.

Photo: Mikko Koho

By Mikko Alhainen

The main objective is to create a new frame and good start for the future nationwide program for wildlife habitat conservation, restoration and re-creation that will operate on local level in a participatory manner, strongly recognizing the landowner point of view and utilizing the strong Finnish tradition for voluntary work at local level for common good. In this project a demonstrative wetland to increase biodiversity and to provide habitat for waterfowl will be created to every 15 regions in co-operation with local stakeholders and regional authorities in order to promote the interest for wetland restoration and re-creation and to develop the co-operation of public bodies.

Expected results of the project

- At least 30 wetland sites with combined surface area of more than 200 ha will be restored/re-created to provide biodiversity values and habitat for species, especially to waterfowl. There will be at least one demonstrative site in each of the regions.
- The co-operation between public authorities and NGO's has increased. This will create better than present services to help people, especially landowners, interested in the restoration and conservation of wetlands.
- There is more interest towards restoration and re-creation of wetlands, which will promote more wetland restorations/re-creations in the years following the Life project.
- The number of breeding waterfowl and the brood production has increased in the demonstrative sites due to the project, which will indicate that the wetland can provide habitat for a number of other species
- The funding instruments for the restoration/re-creation of wetland will develop to become more simple and land-owner friendly.

The wildlife habitat restorations and conservation carried out by landowners and local level associations to provide habitat mainly for huntable species is very valuable conservation work that benefits a number of other species and promotes biodiversity.

There are opportunities in every village for the restoration and re-creation of wetlands and waterfowl habitats. Wetlands are also vital for water protection, as they can bind nutrients and solid materials from the runoff waters of agriculture and forestry. Wetlands up in the watershed also prevent flooding by slowing down the waters.

Return of Rural Wetlands –project will support wetland restoration/re-creations that are proposed by local landowners and associations for the values that wetlands can provide for nature, water protection, landscape, and for wetlands recreational values.

Current progress

In the summer of 2013 the project has already achieved the original objective of 30 wetland sites and the objectives will be exceeded. The project is looking forward to accomplish close to 50 sites totaling close to 300 hectares thanks to the exceptional and valuable participation of landowners, corporations and associations.

Communications with stakeholders has been active and the information about the wetlands has been delivered in hundreds of different events to thousands of people. The project achievements and examples are also publicized in the Metsästäjä/Jägaren magazine that is sent to all 300 000 hunters in Finland. The webpage www.kosteikko.fi is continuously updated and useful information about wetland restoration and the experiences of project sites will be presented.

Waterfowl have welcomed the restored and re-created habitats well. Brood production has been high on many sites already in the first summer. For example the Härmälä wetland, a 2,1 hectare site, provided habitat for 43 waterfowl chicks only 10 months after concrete action.

Duration and funding

Project duration is from 1.9.2010 to 31.12.2015.

Total budget 2 061 310 €

- EU Life 1 028 905 €
- Finnish Wildlife Agency 682 405 €
- Ministry of Agriculture and Forestry 350 000 €

Mikko Alhainen has been working with wildlife habitat related projects for Finnish Wildlife Agency as Senior Planning Officer. The main work has been the coordination of nationwide Life+ project Return of Rural Wetlands. He has also responsibilities in international work and Flyway management of Taiga Bean Goose.

Management of the invasive raccoon dog (*Nyctereutes procyonoides*) in the north-European countries LIFE09/NAT/SE/344

By Per-Arne Åhlén

Fighting invasive alien species is difficult and it takes time. Often it is impossible to eradicate the species if the population is connected to other populations and then the focus has to be on containment rather than on eradication, trying to stop the species from dispersing to other areas or to other countries. In our case with the raccoon dog in Scandinavia we have come a long way during just a few years.

We have set up Early Warning Systems (EWS) in all countries. The EWS has delivered many early warnings of invading raccoon dogs. We have set up citizen science systems in Sweden and Denmark where the public report observations of raccoon dog to the project. This has been very successful and most of our culled animals are today due to reports from the public. It is however often difficult to identify an animal, especially for a layman and even within the project it is impossible to be sure sometimes, so the citizen science system has to be used with some care and be managed professionally. When observations have been confirmed by the project, animals are (optimally) captured using traps or dogs, or culled. All captured individuals in Sweden and Denmark (both males and females) are sterilized to prevent reproduction, fitted with ear tags (to minimize the risk of shooting valuable project animals), GPS/SMS transmitters and then released. Due to the social nature of the raccoon dog (they are strictly monogamous and stay with its mate until someone die, then the survivor start searching for a new mate) the animal will search for and lead us to other raccoon dogs of the opposite sex in the area (i.e. Judas animals). Animals found by the Judas animals are either culled or incorporated in the Judas animal population.

From the project start, 1 Sept 2010, to 30 Sept 2012, 1908 observations of raccoon dog was reported to the project (only Denmark and Sweden). Out of these, 404 were confirmed as raccoon dog by the project (only Denmark and Sweden). 834 Animals were captured and/or killed (culled by project, hunters, traffic, found dead) (in Finland, Denmark and Sweden). Of the captured animals 131 individuals have been used as Judas animals. No raccoon dog has so far been confirmed outside the area where they were present before the project started.

Our population estimates and models show that the populations have not increased and that without our efforts the populations would have been much larger today than what it is at present. The models further show that the situation in 10 to 20 years' time would be very serious if we stopped the management.

Project animals in Sweden are mainly captured as a result of observations coming in to the project. The experience of the personnel is constantly increasing and due to their knowledge alone many animals have also been captured. Judas animals are very efficient in all countries, especially in areas where animals are difficult to spot. The methods for capturing animals are constantly improved. Traps are efficient in all countries but traps adapted for raccoon dog capture would make this category even more efficient. Dogs are almost always involved in the captures. In this project we have been able to demonstrate that our innovative methods are effective on raccoon dog, but also that at least some of them work on other species with similar behavior. In Denmark we got a raccoon (*Procyon lotor*) on one of our EWS cameras in southern Denmark. Within a few days we were also able to cull the newly invaded IAS.

Local hunters are invaluable for the project. In total there is almost 800 000 hunters in the project area and most of these are very interested in nature conservation. Few, if any, other groups in the society have the knowledge about hunting and about wild animals in general and about the areas where we work as the local hunters. They also

spend a lot of time outdoors in these areas which make them more likely to encounter raccoon dogs as well as other species. Especially in the areas where the project activities are the most intense, hunters are often more than willing to help out. Hunters help out with observations, trapping, guiding, capturing of animals in their areas, building of e.g. traps and artificial dens, dissemination of results, spreading the word about getting observations to the project and more. This co-operation, gaining both the project and the hunters by getting rid of raccoon dogs, is very valuable and could probably also be developed with success on a European level in the fight against IAS. Relying solely on local hunters however, is not possible since there is a need for a professional foundation in the system as described above.

It should be stressed that even though we have not been able to confirm any animal outside the present distribution area it is quite likely there will be found some single dispersers. As seen from our results, raccoon dogs can disperse very long distances and it is important that we follow up any observation also outside the distribution area.

Dissemination of project experiences and results, on the web page, in local communities, in relevant magazines, newspapers, radio and television as well as short courses for hunters and other nature organizations and education from kindergarten to university level are all very important parts of the project. All of these actions aims at a higher awareness and larger knowledge among the public about IAS in general and the raccoon dog in particular, and has led to more observations being reported, and a higher quality of the observations which will enable the project to put the efforts where most needed.

The project has in general been very appreciated by both the public and the authorities in the project countries. The project have put focus on the fight against IAS in the project countries and the fact that it is possible to meet the threat if we act fast and work together over the country borders.

P-A Åhlén is employed at the Swedish Association for Hunting and Wildlife Management. He is a wildlife Biologist and have considerable experience of game management. P-A is the original initiator of the Swedish Raccoon Dog project in 2005 and have since then been the head of management (first for the national project(s) and since 2010 for the ongoing international LIFE+ project).

“A needle in a haystack” – The challenges and lessons learnt in eradicating foxes in Tasmania

By Craig Elliott

The final stage of an eradication, the detection and destruction of the last individuals of the target species, can be similar to the search for a needle in a haystack in terms of the inherent level of difficulty it may involve. But what if the eradication started with the same degree of difficulty? How can the challenges of eradicating a widely dispersed low density population of invasive animals, eradicating a proverbial ‘needle in a haystack’, be overcome? The Fox Eradication Program (FEP) in the Australian island of Tasmania has faced this challenge and its experience provides many valuable lessons for organisations commencing eradications; especially when targeting a low density population in inhabited areas.

The European Red Fox (*Vulpes vulpes*) is regarded as one of the worst invasive animals affecting Australia. Introduced in the mid 1800’s for the purpose of recreational hunting it rapidly colonised much of Australia with devastating impacts on native species that were ill-prepared to deal with such a lethal and effective predator. The fox is regarded as one of the primary factors causing the rate of native species decline and extinction in Australia whilst also creating a significant economic impact on agricultural industries. Annually, foxes are estimated to cost the Australian agricultural sector over AUD \$227 million a year. The scale of the environmental impacts has seen ‘predation by the European Red Fox’ listed as a ‘key threatening process’ under the Environmental Protection and Biodiversity Conservation Act 1999 (C’wealth) and a Threat Abatement Plan created. All Australian States have the European Red Fox listed as a ‘pest animal’ or ‘vermin’ with varying requirements for control as well as restrictions on the keeping, import and movement of the species.

Tasmania, the island State of Australia located south of the mainland, is renowned for its rich biodiversity and natural values. It is widely recognised as a tourist destination due to its wilderness areas, unique wildlife, quality of life and a ‘clean green’ image. Its agricultural sector benefits from this image and has a focus on producing high quality goods with many small enterprises focusing on niche agricultural produce markets. Geographically separated from the remainder of Australia, Tasmania has been protected from the introduction of a number of the invasive alien species that have established elsewhere; with feral cats (*Felis catus*) and European rabbits (*Oryctolagus cuniculus*) the most prevalent invasive animals in Tasmania. Despite evidence of a number of attempted introductions since the mid-1800s the fox did not become established in Tasmania and the island’s wildlife and agricultural sector have been protected from the serious impacts experienced on mainland Australia. In the late 1990s however, there was a growing number of sightings and discovery of physical evidence of foxes in the State. This coincided with the emergence of a serious fatal disease in the Tasmanian Devil (*Sarcophilus harrisii*), an endemic marsupial, that was devastating the species and presenting an opportunity for foxes to occupy the ecological niche at risk of being vacated by the Tasmanian Devil.

Fortunately, the Tasmanian Government responded to this emerging threat before the impacts from foxes became evident. This response evolved into the current FEP, jointly funded by the Tasmanian and (Federal) Australian Governments, that is attempting to eradicate this invader from the State under an integrated baiting, monitoring and incursion response program. Sometimes a source of controversy and scepticism as to its need and its longevity, the FEP is one of the most important invasive species programs in Australia. Successful eradication will protect at least 78 native species, many listed as endangered or vulnerable and considered nationally and internationally significant, from competition or predation by foxes and prevent the expected impacts on Tasmania’s livestock and poultry production industries.

The FEP has deployed a range of innovative techniques as a part of the eradication attempt, including the use of DNA analysis of pred-

ator scats and deployment of fox Detector Dog teams to identify the presence and distribution of foxes clarify the scale of the task. It has relied on the use of 1080 (sodium fluoroacetate) baits as the primary eradication tool and must manage the perceived and actual risk inherent in the use of toxic baits in areas of human habitation and high densities of non-target species populations whilst also ensuring the baiting remains effective. By identifying and aligning with the critical factors (see Bomford and O’Brien (1995)) to achieve a successful eradication, the FEP has been designed to deal with the challenges of eradicating a low density population of foxes dispersed across a massive area. It must deal with the uncertainty and gaps in knowledge about the behaviour of the low density fox population it is facing as well as work with the community to manage a low understanding about eradication, a degree of scepticism as to the justification for the program and concern about the use of the 1080 toxin.

As the FEP approaches its final stage, with an imminent shift to a program predominately focused on monitoring to confirm the success of the eradication effort, what has been learnt in trying to eradicate a low density population of a cryptic invasive animal from an island of over 68 000 square kilometres? This presentation outlines the history of the eradication effort and the challenges it has faced as well as reviewing its achievements and the lessons learnt during the program.



Craig Elliott is the Manager of the Invasive Species Branch in the Tasmanian Government with responsibility for invasive species management, assessment and eradication programs in Tasmania. He has led the design, delivery and review of a wide range of projects and programs for Australian governments involving the development, implementation and administration of new legislation, regulatory compliance and law enforcement, training and emergency incident management in areas such as animal welfare, animal and plant biosecurity, invasive species management and natural resource management. In Craig’s current role he is also the Program Manager of the Fox Eradication Program, a long term program of work aiming to ensure the eradication of the European Red Fox from Tasmania.

Mink control and eradication: Why nothing matters

By Jonathan Reynolds

When an invasive species is difficult to detect, and especially when it is at low population density, it is also difficult to determine the impact of removal efforts. But a good measure of impact is crucial because it indicates whether the current position is tenable and worthwhile; whether eradication is possible or has already been achieved; and therefore whether effort should be continued or abandoned (the ‘funder’s dilemma’).

During 2002–2012, GWCT developed and researched a low-tech (and therefore low cost) standardised detector for American mink: the mink raft. In itself the raft created an efficient method of locating and removing mink, with strong advantages at low mink density. The raft also provided continual monitoring for mink presence, with low manpower requirements. We used a combination of occupancy modelling and empirical development to determine operating rules for efficient raft use and to derive the probability of genuine absence from detection data. Crucial to this is the systematic monitoring effort in which both presence (detection on rafts) and apparent absence (no detection – the ‘nothing’ of my title) are recorded.

The mink raft has been used in many small and large mink control or eradication schemes in the UK and in continental Europe. Few if any of these have made full use of the monitoring data, apparently through lack of interest in zero data. GWCT’s own demonstration project on the River Monnow in western England illustrates the value of systematic monitoring, and is possibly unique in the literature of vertebrate population control.

Jonathan Reynolds is a senior scientist at the Game & Wildlife Conservation Trust (GWCT), where he is responsible for research on mammalian predators, and how they are managed in the practical conservation of game and other wildlife. The complex human dimensions of this subject area have led him to acquire expertise in predator biology, predator-prey relationships, practical techniques for lethal and non-lethal control, animal welfare, and the economics of conservation. During 2002-2012, Jonathan and his small team developed, researched and demonstrated a novel strategy for control of American mink.



Landscape scale grey squirrel control: Lessons from the UK

By Craig Shuttleworth

The introduced North American eastern grey squirrel *Sciurus carolinensis* is a major pest species in the United Kingdom (UK). This animal has replaced the smaller native red squirrel *Sciurus vulgaris* across most of England and Wales through resource competition and the spread of the squirrel pox virus which produces pathogenic infection in red squirrels. Grey squirrels also cause significant economic damage to many hardwood tree crops by bark stripping, and there is growing evidence that their predation of eggs and brood can have a detrimental impact upon fledging rates amongst woodland song-bird communities.

This presentation examines the broad impact of grey squirrels upon the British landscape, outlining relevant case studies and key pieces of academic research. The eradication of grey squirrels from Anglesey in North Wales is critically reviewed and the many challenges involved in the parallel restoration of native red squirrel populations are highlighted.

Successful landscape scale control of grey squirrels can be achieved through the use of comprehensive and systematic culling methods but requires dynamic regional partnerships to be established. Strong community support and participation is an essential ingredient and the importance of this cannot be overemphasised. The presentation

quantifies national public support for grey squirrel control and presents examples of community involvement in the removal of this alien invasive species.

The European Squirrel Initiative is a landowner based organisation seeking to raise awareness within the European Union and member states of the threat posed by the grey squirrel. ESI works with research scientists to evolve methods of grey squirrel control, with the ultimate aim of the complete eradication of the species from Europe.

Craig Shuttleworth is on the management committee of the European Squirrel Initiative (ESI). He has worked with landowners and communities across the UK to encourage the control of grey squirrels and restoration of native red squirrel populations. He manages a grey squirrel eradication project on the large island of Anglesey, North Wales, and lives in the mountains of the Snowdonia National Park with his wife and four children.



Eleri Devereux and Morgan Devereux, two primary grade school children who, like so many other kids, have made red squirrel feeding boxes for the project. The squirrel pushes up the hinged lid from the front and so it can get the hazel nuts which the children have placed inside.

Photo: Craig Shuttleworth

Investigations of infections in raccoon dogs (*Nyctereutes procyonoides*) from northern Sweden

Bernodt, K. & Gavier-Widen, D.

Department of Pathology and Wildlife Disease, National Veterinary Institute. Uppsala, Sweden

The raccoon dog (*Nyctereutes procyonoides*) is an invasive species in Sweden and enter the northern part of the country along the Finnish border. In 2008–2011, 101 carcasses of raccoon dogs from the eradication project were submitted to the National Veterinary Institute (SVA) for necropsy and examination for pathogenic agents. Additionally, 12 road-killed and 4 found dead raccoon dogs were examined.

117 animals underwent post mortem examination, samples for histopathology were collected from gross lesions. In six animals a complete post mortem examination was not possible because all or some of the internal organs were missing. Intestinal samples from 113 animals were submitted for culture of *Salmonella* spp. Samples from the cerebrum and medulla oblongata from 39 animals were investigated for rabies virus using immunofluorescence and 49 animals were testing with PCR-technique. The gastrointestinal tract and the lungs of 112 animals were examined for endoparasites. Muscle samples were analysed for *Trichinella* spp by the digestion method.

The only gross lesion detected was dermatitis caused secondary to mange in nine animals. All animals were negative for rabies virus, *Salmonella* spp., *Trichinella* spp. and *Echinococcus* spp. The incidence of helminths in the gastrointestinal tract was 77%. These included nematodes; *Uncinaria* sp (61%), *Acantocephala* sp. (1%), *Toxocara* sp. (4%), *Ascaridae* sp. (8%), *Molineus* sp. (5%), *Capillaria* sp.(4%) and *Physaloptena* sp. (1%), two trematodes ; *Alaria* sp.(6%) and *Echinostoma* sp. (2%) and two cestodes: *Mesocostoides* sp. (1%) and *Taenia* sp. (5%). Two species of parasites were detected in the lungs; *Crenosoma* sp. (14%) and *Capillaria* sp. (3%).

The incidence of disease in raccoon dogs in Sweden appears to be low. The only pathological changes recorded were skin infection caused by *Sarcoptes* mange in nine individuals. None of the raccoon dogs showed obvious lesions associated with the other parasite infestations, but histopathology was not performed on all internal organs.

Social dispersal of raccoon dog at the edge of their distribution range in northern Europe

Dahl, F.^{1,2} & Åhlén, P-A.²

1. Department of Ecology, Swedish University of Agricultural Sciences, Sweden
2. Swedish Association for Hunting and Wildlife Management, Öster Malma, Sweden

Effective management of wildlife requires good knowledge about the biology and behavior of the species. In the period from 1935 to 1984 the raccoon dog colonised 1.4 million km² of Europe by secondary expansion. The raccoon dog is already established in Finland and is at the moment invading Sweden and Norway. There has already been done a substantial amount of research on the raccoon dog in Europe. However, there is a lack of knowledge connected to new establishments; dispersal in low density populations being one of the most urgent factors to learn more about to be able to support the successful management of the species.

In this study we wanted to find out if there is a difference in the

movements and dispersal between a dense population in southern Finland and a low density population in the expansion front in northern Sweden. We also compared home range sizes between south Finnish pairs and northern Swedish pairs, and between northern Swedish pairs and single males in Sweden.

From this study we have learnt that;

- Home ranges of established pairs are larger in northern Sweden than in southern Finland
- Presumed single males move over much larger territories than established pairs in the north
- When losing their mate, raccoon dogs in the expansion front in northern Sweden move over much larger territories and disperse further than in southern Finland

In a related study “Spatial and temporal variation in movement pattern of raccoon dog” we have previously found that;

- Males and females movement rate is similar
- The invasion front is likely to consist of both males and females
- This increases the chance of reproduction in new areas.

Hunting of raccoon dog is allowed all year around according to the project countries national legislations since it is an invasive species (an exception exists in Finland during the breeding period). Animals left behind will however move or disperse, sometimes very long distances, and try to find a new mate. Thus, general hunting may induce dispersal and hurry up the spread of the species. Due to the new knowledge from this study we have now implemented that when a raccoon dog is killed during hunting, hunters are encouraged to immediately report the kill and hand in the carcass to the project to confirm the animal. If it is likely that there are more animals in that area, and especially if the killed raccoon dog was one of a pair, the project places cameras and if necessary a Judas animal in that area to find other animals before they start moving. The combination between many local hunters and professional management has shown to be very successful.



Photo: Paulina Strömberg

Can social media mining support alien invasive species monitoring and management?

Daume, S.

Faculty of Forest Sciences, Georg-August-University Göttingen, Germany. Guest researcher, Stockholm Resilience Centre, Stockholm University, Sweden

Given the massive impact of invasive alien species (IAS) on ecosystems world-wide and the likely exacerbation of this threat through climate change, it is imperative to explore all means to obtain early warnings for invasions or support adaptive and remedial actions in the case of threatening or established invasions.

Existing monitoring efforts are often constrained by limited resources, and potentially large monitoring intervals influence the timeliness of the collected information. Many environmental monitoring projects alleviate this problem by augmenting professional monitoring programs with citizen science projects, where members of the general public assist in data collection, data categorisation or computational tasks. In addition, other domains, facing similar challenges, turned to informal online information sources such as blogs, online news or micro-blogs like Twitter to supplement existing monitoring networks. The health domain for example features several operational systems that aggregate online information sources to alert for outbreaks of infectious diseases and monitor the development of epidemics, often several weeks ahead of traditional monitoring networks. The Ecoveillance project explores the applicability of this approach to ecological monitoring with an initial focus on information relating to IAS posted on the micro-blogging service Twitter.

This contribution presents a brief introduction of the Ecoveillance software, a web-based data collection and analysis platform which implements an automatic, continuous retrieval of Twitter messages mentioning specific IAS. The system overview will be followed by an outline of the potential contributions of information mined from social media prior to or after an invasion. Extraction of weak signals, detection speed or novel information can be cited as potential contributions to early warnings, and stakeholder identification or insights into public perceptions of IAS as contributions to the adaptive and remedial phase.

The initial output of the Ecoveillance project are information topologies that provide an overview of the quantity and composition of Twitter messages relating to IAS; examples include communication frequencies, identification of emerging co-related topics as well as the extraction of communication and stakeholder networks.

This contribution will refer to a selection of early information topology results based on Twitter messages referring to the broad range of species that are currently covered by the Ecoveillance system, which for example includes Asian carp, grey squirrel, oak processionary moth, Asian long-horned beetle, racoon dog and several others.

Mobilisation and coordination: The role for stakeholders in managing IAS

Griffin, C.

FACE – Federation of Associations for Hunting and Conservation of the EU

The range of problems related to invasive alien species, not least their threat to biodiversity, has long been recognised within the European Union, yet we are far from tackling the issue in a coordinated manner. Now with the advent of a new legislative instrument it is paramount that it receives political and public support, and the implementation follows swiftly and effectively.

The extent of public understanding and stakeholder involvement

will play an important role in ensuring that the right management options are employed. Communication messages are also important to avoid unnecessary polarisation between stakeholder groups, e.g. IAS should not be “demonised”, and any priorities which are set should be done so using transparent criteria and based on sound scientific evidence so that they are easily justifiable in the eyes of doubt.

As stakeholders hunters and hunting have a positive role in identifying and managing invasive alien species. Hunters can be part of the solution mainly through early warning systems as is being demonstrated through the LIFE+ Project, coordinated by the Swedish Hunters’ Association, to manage the Raccoon Dog *Nyctereutes procyonoides*. It takes a lot of clear communication to try and get hunters to eradicate a species, as they naturally seek to conserve. FACE is committed to work with the Council of Europe to develop a Code of Conduct on Hunting and Invasive Species, to ensure this role is maintained.

The presentation will discuss the approach of FACE in creating a greater understanding of IAS amongst hunters – a major rural stakeholder – and how best to mobilise the public to take action.

Temporal variation in movement patterns of invasive raccoon dog

Herfindal, I.¹, Melis, C.¹, Åhlén, P.-A.² and Dahl, F.^{2,3}

1. *Centre for Biodiversity Dynamics, Department of Biology, Norwegian University of Science and Technology, Trondheim, Norway*
2. *Swedish Association for Hunting and Wildlife Management, Öster Malma, Sweden*
3. *Department of Ecology, Swedish University of Agricultural Sciences, Sweden*

Effective management of species demands knowledge about their pattern of movement through the landscape. This is particularly true when it comes to species where eradication is the main management goal, because actions must be aimed at optimal times and locations in order to be cost-effective. Such actions often involve avoiding reproduction and it is therefore important to know if movement patterns differ between males and females.

We used step lengths and turning angles from relocations of GPS-collared raccoon dog at its invasion front in Sweden to describe individual movement patterns, and assessed whether these characteristics varied in time. We focused on large-scale (between seasons) and fine-scale (diurnal) movement, and whether the temporal variation in movement varied among males and females.

Movement was fastest when raccoon dog moved in a straight direction (i.e. that the step between two relocations continued in the same direction as the previous step), suggesting that raccoon dog movement is faster when it is directional. There were large seasonal and diurnal differences in movement rate. Steps were longer during spring, summer and autumn, and short during winter. Moreover, steps were longest during around sunset, shorter during night and at sunrise, whereas during day the raccoon dog did not move much.

There were no significant sex-differences in movement patterns, suggesting that the invasion front will consist of both sexes which increase the likelihood of mating and reproduction in new areas.

Finally, by using a clustering algorithm on characteristics of daily steps, we could separate movement into three behavioral states; dispersal, settled state, and non-moving/winter sleep. We simulated random walks for 150 days, where individuals belonged either to the settled state, dispersal state, or fast dispersal state (step lengths > median of dispersal steps). The simulation showed that raccoon dog can reach far away from their starting point within 150 days, and that even with as few as 20 dispersing individuals, conspecific encounter quite frequently which may result in successful reproduction in previously unoccupied areas.

Habitat use of raccoon dogs at their invasion front

Herfindal, I.¹, Melis, C.¹, Åhlén, P.-A.² and Dahl, F.^{2,3}

1. *Centre for Biodiversity Dynamics, Department of Biology, Norwegian University of Science and Technology, Trondheim, Norway*
2. *Swedish Association for Hunting and Wildlife Management, Öster Malma, Sweden*
3. *Department of Ecology, Swedish University of Agricultural Sciences, Sweden*

We studied habitat use of 55 GPS-marked raccoon dogs (30 males, 25 females) at their invasion front in Northern Sweden. A clustering algorithm was used to group the daily movement pattern into different states (dispersing, settled and winter sleeping individuals). We then assessed whether habitat use varied seasonally, diurnally, between sexes, and between movement states. We used the following landscape characteristics: distance to roads, distance to water, elevation, slope and length of the growing season and the following six habitat types: open water, forest, wetland, open natural habitat, agriculture habitat, and artificial habitat.

Since we did not have any a priori knowledge about the best spatial scale for studying raccoon dog habitat use, we adopted a multi-scale approach, and we produced random points for eight different scales ranging from 100 to 20 000 m, to investigate whether our measure of use changed with the scale.

Most observations were in forest, followed by wetland and open natural habitat. The GPS-points were more often in agricultural and wetland habitat than random points, and less often in forest and open natural habitat. The GPS-points were also closer to water, at lower altitudes and in flatter terrain than random points. Males and females were very similar in their habitat use both during dispersal and when they were settled and differed in habitat use only for wetland areas. This increases the probability of encountering potential mates during dispersal and therefore the likelihood for reproduction in new areas.

There was a large seasonal variation in habitat use and winter and spring were most different. The seasonal differences in use of forest, wetland and altitude depended on the movement state. In summer and autumn, raccoon dogs were less in the forest, more in wetland, at higher altitudes and in areas with shorter growing season.

Finally, the use of habitat at night differed from that at twilight and during the day: at night they used more the agricultural areas, less the wetland, they held closer to the road and in steeper terrain. These results suggest that raccoon dogs show similar use of the habitat both while dispersing and settled, and that males and females have similar use of the landscape. The seasonal and diurnal pattern of habitat use may provide guidance for where and when to aim management efforts.

The “Wildtierinformationssystem“ and the increasing population of raccoon in Germany

Hoffmann, D.

Christian-Albrechts-Universität Kiel, Germany

The Wildtier-Informationssystem der Länder Deutschlands (WILD) is a nation-wide monitoring programme which collects data on the sightings, frequency and populations of wild animals. WILD is a project of the Deutsche Jagdverband (German Hunting Association, in short DJV) and its regional hunting associations, and, since 2001 has been a permanent part of the ecological environment study. The most important goal is to develop strategies for conservation, regulation and sustainable use of wild animals. Data collection in WILD is based on wild animal numbers in selected areas, the so-called reference areas, as well as on population estimates in as many of Germany's hunting grounds as possible.

In 2006, 2009 and 2011 data on sightings of invasive alien species (IAS) was collected nation-wide. Between 25 000 and 30 000 game tenants took part, corresponding to some 50% of districts nation-wide.

In the most northern country of Germany, Schleswig-Holstein, we collect data on game species since 1995 and amongst others we can document the increasing populations of IAS during the last decades. Schleswig-Holstein may be seen as the most important land bridge for terrestrial animals to Scandinavia, so the growth of populations in northern Germany such as Raccoon is a forerunner for the future trend in Denmark and other Scandinavian countries.

While sightings of the Raccoon in Hesse can be traced back to a specific settlement on Lake Eder in 1934, the population in Brandenburg grew as a result of a farm break-out near Strausberg in 1945. The current results area assessment show, however, that both these historic areas of concentration can no longer be clearly distinguished from each other. According to this, the current main sightings of raccoons are located in central and eastern Germany but the raccoon is today found almost all over Germany. During the last 5 years we assume an exponential increase in many regions corresponding with an area expansion and an increasing game bag. With a view to Scandinavia the colonization of Schleswig-Holstein today is highest in south-east but all parts of the country document an increasing population up the border of Denmark.

Photo: Paulina Strömberg



DNA barcoding

Spong, G. & Königsson, H.

Department of Wildlife, Fish and Environmental studies, Swedish University of Agricultural Sciences, Sweden

Genetic data can be used to quantify a wide range of cryptic biological processes. Samples can be collected non-invasively and trace amounts of DNA are typically sufficient for reliable analyses. DNA can hence be used to identify species and individuals (DNA barcoding), and associated processes such as dispersal and reproduction. These are critically important parameters for understanding population spatial dynamics.

For several reasons, the approach offers particular promise for tracking elusive species living at low, often poorly known, population densities. Here we present the results from a species diagnostic application that does not require prior knowledge about the studied mammal community.

By sequencing the cytochrome oxidase 1 gene (COX1 or COI) we identified to species 22 of 27 non-invasively collected samples (81%). All samples were suspected of being raccoon dog, but only two could be confirmed to be so (7%). Other species identified ranged from badger to human, and also included species likely originating from the diet (cow and invertebrate spp.). This method thus works well for DNA extracted from fecal samples, but not all samples contained DNA of sufficient quality. Some samples also contained the DNA of diet species, causing false positives. The results also suggest that species identification based on the appearance of droppings found in the field, is highly unreliable.

Control of the invasive alien species Californian king snake in Gran Canarias

Gallo-Barneto, R.

Environmental Management, GESPLAN (The Planning and Management of Sustainable Rural Development Research Group), SA. Canary Islands Government.

Genetic variation and differentiation among Nordic raccoon dogs

Åkesson, M & Hedmark, E.

Grimsö Wildlife Research Station, Department of Ecology, Swedish University of Agricultural Sciences, Sweden

The genetic variation among raccoon dogs sampled in Sweden, four (two mainland and two island) locations in Finland and Denmark was evaluated. Nine variable microsatellite loci indicated of high connectivity between the Swedish and Finnish mainland populations, with low or non-significant levels of differentiation ($0.006 < F_{ST} < 0.05$) and only slightly lower genetic variation among Swedish raccoon dogs. The possibility to detect first generation migrants (from Finland to Sweden) was limited and would require many more markers or better knowledge about the relatedness among Swedish raccoon dogs. The average relatedness among Swedish raccoon dogs was low ($r = 0.076$), even though a few individuals were potentially highly related.

Automatic humane traps

Bond, C.

Goodnature Limited, Wellington, New Zealand

Goodnature, with the support of the New Zealand Department of Conservation (DOC), has developed the A24 automatic humane trap for rats and stoats and the A12 automatic humane trap for possums, New Zealand's most ecologically and economically harmful pests. The new self-resting traps are powered by a CO₂ canister, which re-sets the trap 12 or 24 times and are easy to set and install. This means the trap is significantly less labour-intensive and more cost-effective than single-action traps and requires no animal handling. The Goodnature rat and stoat trap and possum trap have been designed to be lightweight, safe and easy to install.



Karin Bernodt from the National Veterinary Institute is preparing her showcase.

Photo: Paulina Strömberg

Session 4: From international policy to national management

Aims and objectives of the EU legislation on IAS – the perspective from a Member State viewpoint

By Melanie Josefsson

The European Commission and EU Member States are developing a dedicated legislative instrument on IAS, as well as revising other EU legislation that pertains to IAS – such as the plant health and animal health regimes and the Wildlife Trade Regulation. How will EU legislation influence management of IAS at the local, national and regional levels once these regulations are in place? What new opportunities will we have to prevent new invasions and control ongoing threats to biodiversity by IAS?

Melanie Josefsson is a Senior Administrative Officer for Invasive Alien Species at the Swedish Environmental Protection Agency, Stockholm Sweden. After receiving her Ph.d. from Uppsala University, Sweden she has worked at SEPA with IAS, GMO and freshwater research. In 2012 She was a national expert working with IAS at the European Environment Agency, Copenhagen. Melanie Josefsson is a member of the EPPO Expert Panel on IAS, the Bern Conventions Group of Experts and has actively been engaged in the working groups for the EU IAS Strategy since 2006. She is also a co-coordinators of NOBANIS (European Network on Invasive Alien Species).



Melanie Josefsson in conversation with Mikko Alhainen.

Photo: Paulina Strömberg

Participant survey and pictures from the conference

Two questions were asked:

1. *Has the conference covered what you thought it would, are some parts missing?*
2. *Have you learnt anything new? If so, what do you consider the most valuable new knowledge?*

Text and pictures: Paulina Strömberg



Anders Pettersson, The racoon dog project:

– Yes, the conference was good. It was high-level.
– I learned more about how they work in other countries. For me it has been interesting to learn more about how these species end up in environments where they're not supposed to be.



Melanie Josefsson, Swedish Environmental Protection Agency:

– More than just covered. It has been a great conference with both good and rare elements. For example the speed-presentations and that they invited the public to participate. I haven't seen much of this before. I didn't miss anything.
– Absolutely! Especially what other countries do and what we in Sweden can do.



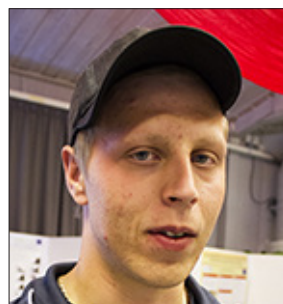
Juha Mäkimartti, The Finnish Wildlife Agency:

– It has been a very good conference and it covered what I have expected.
– I have learnt many things. It has been interesting to hear more about the similarities and how other people work with this problem.



Piero Genovesi, IUCN- International Union for Conservation of Nature:

– Definitely. It has been very well organized conference with experts from all over the world. An incredible group of people.
– I learned a lot about what has been done in Sweden and Scandinavia.



Viktor Medström, The racoon dog project:

– Sometimes it was difficult to understand all the English terms. But the conference covered what I expected.
– Yes, some of the information may come to use for me and my colleagues who work on the field.



Mette Lykke Nielsen, EFBA – The European Fur Breeder's Association:

– I think it covered most of what I expected but I still miss a more focused debate on a political level.
– It has been interesting to get to know all these people. I will need a week or so to think it over but the connections with new people is one of the things I take with me.



Sugoto Roy, AHVLA – Animal Health and Veterinary Laboratories Agency, UK:

– Very good. I got more than I thought I would and it has covered a lot. All the way from grass to the tree.
– You can't do one thing without doing the other.





Mikael Paavola, The racoon dog project:

– Yes, it covered what I expected.
 – It's great to meet the people you've only read about before and it is fun with so many own wills, for example how things are meant to be done. Their job is very important and for me it has been valuable to see how they work. And you can see that where they work hard it has also brought results.



Marie Louise Simmelsgaard Platz, The racoon dog project (Denmark):

– Yes, it is a very important topic. I hoped for more participants but other than that I didn't miss anything specific. The conference program has been good.
 – It is important that the cooperation continues. For me it's been valuable with the small ideas and the exchange of information.



Mathias Lindström, The Finnish Wildlife Agency:

– Yes, it has been interesting. But we need more politicians and other relevant organizations to take part in this debate.
 – I have got to learn more about the different work methods countries in between. And also how we could make our methods more efficient and from that get sustainable results.



Linnea Rosenlöf, Ministry of the Environment, Sweden:

– Yes, I think so and I didn't miss any parts.
 – I have learnt a lot. It's been interesting to listen and learn more about the racoon dog project. I sense it is a lot of commitment in this type of work and it's taken seriously. It seems that the issues with invasive predators are quite similar in other parts of the world. Cooperation between the people taking part is fundamental.



Karin Bernodt, National Veterinary Institute:

– I've been in the Swedish project since start and I must say that this conference fulfilled my expectations. I haven't missed anything in particular.
 – Very much, and it's the whole thing. For example, how the preventive work is being done in other countries and finding sustainable work models to rely on in the future.



Craig Bond, Good Nature:

– Absolutely, and much more. It been great information and I didn't miss anything for this conference.
 – A lot. We do things differently in New Zealand but I've come to realize that we all work for a common goal. I did get a better understanding over how the system work in different countries and it's been interesting to learn more about what is being done in the Scandinavian countries. Especially Sweden and Finland, which seems to work well together.



Ulrika Jakobsson, Swedish Association for Hunting and Wildlife Management:

– Almost covered. There where to few persons from relevant ministries. Politicians for example, are the one who can affect the future management around the projects concerning invasive alien predators.
 – It has been great to exchange experiences with the people here. We have been talking about the financial problems around different projects.



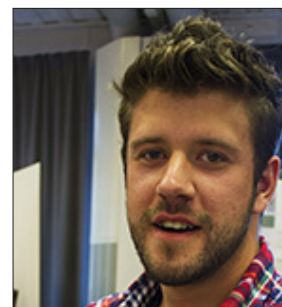
Göran Spong, Swedish University of Agricultural Science:

– Yes, I think so. The conference was a nice surprise. I didn't miss anything specific.
– Yes, that there are people who make the job more effectively. I have also learnt a lot of new things, for example about the problem with the snakes on the Canary Islands.



Cecilia Thyrell, Followit:

– I think the conference covered most of what I expected. I didn't miss anything in particular.
– Yes, that there are other species which don't belong in the environment. For me this conference has given me an increased awareness around the issue in whole. And all that is connected into a broader perspective.



Robert Lundström, The racoon dog project:

– It has been good. Maybe they could have included more pictures during the presentations. It hasn't been easy English all the time.
– Very fascinating to hear about how others do their job. Everyone are aiming towards the same goal and it's been interesting to hear about their work towards that.



Nils Carlsson, The Country Administrative Board of Skåne:

– Absolutely, it's been very good. But it could have been even better with politicians taking part during this conference.
– When learning how they do the work in other countries it strikes me that Sweden is left behind. We could be a lot better. And also that it is important to take action as early as possible. It is the most cost-effective solution.



Tony Christoffersson, The racoon dog project:

– It's been ok. I wished to see more practical demonstrations of the things they use on the field. Some of the presentations could have been more dynamic.
– Yes it's been rewarding to learn more about how other countries handle the issues with invasive alien species.



Zacharias Soudah, Followit:

– Yes. It is always difficult to predict what it will bring the company but I have met a lot of people.
– No, nothing specific. Maybe a smaller amendment to my ideas of what people need. Taking part and talking to people has been the most important thing for me and our company.



The conversations kept going around the tables when lunch was served.



Sugoto Roy, Stefan Daume, Mr Elliot and Pedro Geraldés are having a good time during coffee break.



Anders Esselin is making sure that the technique works for Melanie Josefsson representing the Swedish Environmental Protection Agency.

List of participants

Lastname	Firstname	Company	Country
Alhainen	Mikko	Finnish Wildlife Agency	Finland
Bernodt	Karin	The National Veterinary Institute	Sweden
Bond	Craig	Goodnature	New Zealand
Bondestad	Lena	The County Administrative Board of Norrbotten	Sweden
Carlsson	Nils	The County Administrative Board of Skåne	Sweden
Christoffersson	Tony	Swedish Association for Hunting and Wildlife Management	Sweden
Dahl	Fredrik	Swedish University for Agricultural Sciences / Swedish Association for Hunting and Wildlife Management	Sweden
Daugaard-Petersen	Ole	Danish Nature Agency	Denmark
Daume	Stefan	Georg-August-University/Stockholm University	Germany/Sweden
Elliott	Craig	Department of Primary Industries, Parks, Water and Environment	Australia
Esselin	Anders	Man & Nature	Sweden
Frisk	Göran	The County Administrative Board of Skåne	Sweden
Gallo	Ramón	Gesplan	Spain
Gardeström	Johanna	Umeå University	Sweden
Geibrink	Owe	Swedish Association for Hunting and Wildlife Management	Sweden
Genovesi	Piero	Institute for Environmental Protection and Research and Chair IUCN SSC Invasive Species Specialist Group	Italy
Geraldes	Pedro	Portuguese Society for the Study of Birds	Portugal
Granström	Åke	Swedish Association for Hunting and Wildlife Management	Sweden
Griffin	Alexander	Federation of Associations for Hunting and Conservation of the European Union	Belgium
Hoffmann	Daniel	Christian-Albrechts-Universität Kiel	Germany
Jakobsen	Jens Henrik	Danish Nature Agency	Denmark
Jakobsson	Ulrika	Swedish Association for Hunting and Wildlife Management	Sweden
Jensen	Trine	Danish Nature Agency	Denmark
Johansson	Hasse	Swedish Association for Hunting and Wildlife Management	Sweden
Josefsson	Melanie	Swedish Environmental Protection Agency	Sweden
Karlsson	Bernt	Svensk Jakt	Sweden
Korpela	Jari	Finnish Wildlife Agency	Finland
Ligné	Daniel	Swedish Association for Hunting and Wildlife Management	Sweden
Lindström	Mathias	Finnish Wildlife Agency	Finland
Lorenzen	Ulrik	Danish Nature Agency	Denmark
Lund	Erik	Norwegian Environment Agency	Norway
Lundström	Robert	Swedish Association for Hunting and Wildlife Management	Sweden
Lönnfors	Carola	Finnish Wildlife Agency	Finland
Medström	Viktor	Swedish Association for Hunting and Wildlife Management	Sweden
Mäkimartti	Juha	Finnish Wildlife Agency	Finland
Mäkimartti	Susanna	Finnish Wildlife Agency	Finland
Nielsen	Mette Lykke	The European Fur Breeder's Association	Belgium
Norén	Karl-Ludvig	Swedish Association for Hunting and Wildlife Management	Sweden
Nyman	Madeleine	Metsähallitus	Finland

Paavola	Mikael	Swedish Association for Hunting and Wildlife Management	Sweden
Pettersson	Anders	Swedish Association for Hunting and Wildlife Management	Sweden
Reynolds	Jonathan	Game & Wildlife Conservation Trust	Sweden
Risberg	Per	Swedish Environmental Protection Agency	Sweden
Rosenlöf	Linnea	Ministry of the Environment	Sweden
Roy	Sugoto	Food and Environment Research Agency	United Kingdom
Shuttleworth	Craig	European Squirrel Initiative	United Kingdom
Simberloff	Daniel	University of Tennessee	USA
Simmelsgaard Platz	Marie Louise	Danish Nature Agency	Denmark
Smaerup	Peter	Danish Hunters' Association	Denmark
Soudah	Zacharias	Followit	Sweden
Spong	Göran	Swedish University for Agricultural Sciences	Sweden
Swartström	Jan	Swedish Association for Hunting and Wildlife Management	Sweden
Toland	Justin	Astrale	Belgium
Thynell	Cecilia	Followit	Sweden
Wackfelt	Christoffer	Fritid och Vildmarksliv	Sweden
Wennberg DiGasper	Sofia	Ministry for Rural Affairs	Sweden
Åhlén	P-A	Swedish Association for Hunting and Wildlife Management	Sweden

Twenty-eight conference participants joined the pre-excursion on Sunday to get an insight in the practical work of the LIFE+ raccoon dog project. Apart from the registered participants attending the whole conference approximately 40 local citizens joined the open session of the conference on Monday evening to learn more about invasive alien species around the world.

Sponsors and exhibitors



LULEÅ KOMMUN

Program

Day 2 – Monday the 17th of June

- 09:00 Arrival and registration
- 11.30 Lunch
- 12:30 Opening conference
Per Risberg, Swedish Environmental Protection Agency
- 12:50 Invasion biology – Where did it come from, where is it going, and why is it so controversial?
Daniel Simberloff, University of Tennessee

Session 1 Research, management and international cooperation

- 13:50 Toward a coordinated policy to prevent and manage biological invasions – an analysis of the global, European and national contexts
Piero Genovesi, Chair IUCN SSC Invasive Species Specialist Group
- 14:40 Coffee
- 15:10 Managing IAS
Sugoto Roy, National Wildlife Management Centre, Animal Health and Veterinary Laboratories Agency, UK
- 15:45 Adaptive management and international cooperation in IAS management
Fredrik Dahl, Swedish Association for Hunting and Wildlife Management/Swedish University of Agricultural Sciences (SLU)
- 16:20 Discussion
- 16:40 Dinner

Session 2 Practical examples of managing Invasive Alien Species

SESSION FREE OF CHARGE FOR THE PUBLIC!
Please register under Conference info. Session will be simultaneously translated to Swedish.

- 18:00 Management of the invasive raccoon dog (*Nyctereutes procyonoides*) in the north-European countries. LIFE09/NAT/SE/344
Per-Arne Åhlén, Swedish Association for Hunting and Wildlife Management
- 18:45 “A needle in a haystack” – the challenges and lessons learnt in eradicating foxes in Tasmania
Craig Elliot, Department of Primary Industries, Parks, Water and Environment, Tasmania
- 19:30 Mink control and eradication: Why nothing matters
Jonathan Reynolds, Game and Wildlife Conservation Trust, UK
- 20:15 Landscape scale grey squirrel control: Lessons from the UK
Craig Shuttleworth, European Squirrel Initiative
- 22:00 End of day

Day 1 – Sunday the 16th of June

Pre Excursion. Visit to the Raccoon Dog Project in Sweden and Finland

- 11:00 Departure with common bus from Nordkalotten hotel
- 18:30 Arrival back at Nordkalotten hotel

Day 3 – Tuesday the 18th of June

Session 1 Continued...

- 08:00 Strategies to improve landscape scale management of mink populations in the west coast of Scotland: lessons learned from the Uist mink eradication 2001–2006
Sugoto Roy, National Wildlife Management Centre, Animal Health and Veterinary Laboratories Agency, UK
- 08:35 Fighting invasive species – habitat recovery in the Atlantic islands
Pedro Geraldès, Portuguese Society for the Study of Birds (SPEA)
- 09:10 Control of the invasive alien species *Lampropeltis getula californiae* on the island of Gran Canaria. LIFE10NAT/ES/000565
Ramón Gallo Barneto, GESPLAN
- 09:45 Life+ Return of rural wetlands
Mikko Alhainen, Finnish Wildlife Agency

Session 3 Speed presentations

- 10:20 Speed presentations and Poster session
- 12:00 Lunch

Session 4 From international policy to national management

- 13:00 Aims and objectives of the EU legislation on IAS – the perspective from a Member State viewpoint
Melanie Josefsson, Swedish Environmental Protection Agency
- 13:30 National policies and goals with IAS management
- 14:30 Coffee
- 15:00 Panel discussion
- 16:30 Closing ceremony
Daniel Ligné, Swedish Association for Hunting and Wildlife Management
- 18:00 Conference Dinner

Day 4 – Wednesday the 19th of June

Post Excursion. Cultural excursions in the region