

PROCEEDINGS OF THE CONFERENCE

Natives, Aliens and Re-introductions: Opening Remarks

Roger Downie

Glasgow Natural History Society and University of Glasgow

E-mail: roger.downie@glasgow.ac.uk

I would like to welcome delegates to our conference on behalf of all the organising team which included representatives from GNHS, Glasgow Science Festival, Glasgow City Council, Glasgow Museums, SWT, RSPB, Froglife and the University of Glasgow. I would like to thank all for their work in putting the meeting together, but especially Richard Weddle who bore the brunt of a huge amount of work with remarkable cheerfulness.

We started thinking about a theme for this conference back in the summer of 2011. It seemed a good idea to run a follow-up to our successful 2001 conference on 'Alien species: friends of foes?' which was the centrepiece of GNHS's 150th anniversary celebrations (full proceedings published as *The Glasgow Naturalist* 23 supplement 2001, 113 pp). We noticed that the British Ecological Society (BES) was planning to celebrate its centenary in the summer of 2013 by means of a nationwide Festival of Ecology and had announced a competition for organisations who wished to take part in the festival. It therefore seemed sensible to make a funding application to this competition and we broadened the theme to *Natives, Aliens and Re-introductions: how does ecology inform wildlife conservation in Scotland?* The main components of our contribution to the Festival were to be a two day conference, a schools poster event and themed excursions through the summer. Our application was submitted in December 2011 and success was notified in March 2012, along with two other Glasgow events, the Alexander Wilson bicentenary celebrations (in Glasgow and Paisley, his birth town) and a rainforest exhibition in Kelvingrove Museum and Art Gallery. Serious planning for our contribution began in April 2012 and included approximately monthly meetings with partners and a meeting in October with Julie Hodgkinson of the BES for an overview of all the Festival of Ecology events in Scotland.

An issue for us was the date. We were keen to be part of Glasgow Science Festival as well as the Festival of Ecology, but technically this ended just before the Festival of Ecology started. We wanted to include a schools event, which meant mid to late June at the

latest and even if this was separated in time from the conference, we did not want to have a conference in summer holiday time. Since the Alexander Wilson University of Glasgow event got fixed for 14th June, we decided on the following weekend for our conference, and Glasgow Science Festival kindly agreed to include us in their programme, despite being late. By happy coincidence Scottish Natural Heritage declared 2013 the Year of Natural Scotland, so our event fits under three headings.

The issues facing natives, aliens and re-introductions in the context of wildlife conservation are current, relevant and contentious, as I'm sure these two days of talks and workshops will demonstrate. As a taster, here are some recent research paper titles from conservation-related journals:

- Will extreme climate events facilitate biological invasions (*Frontiers in Ecology & Environment* 10, 2012).
- How successful are plant species re-introductions? (*Biological Conservation* 144, 2011).
- Dying for conservation: eradicating invasive alien species in the face of opposition (*Animal Conservation* 13, 2010).
- Assisted colonization: evaluating contrasting management actions (and values) in the face of uncertainty (*Trends in Ecology & Evolution* 24, 2009).
- Translocation or bust: a new acclimatization strategy for the 21st century (*Trends in Ecology & Evolution* 26, 2011).
- Impacts of biological invasions: what's the way forward? (*Trends in Ecology & Evolution* 28, 2013).
- Towards a more balanced view of non-native species (*Conservation Biology* 26, 2012).
- Do invasive species perform better in their new ranges? (*Ecology* 94, 2013).
- The elephant in the room: the role of failed invasions in understanding invasion biology (*Oikos* 122, 2013)
- Protected areas act as establishment centres for species colonizing the UK (*Proceedings of the Royal Society* 280B, 2013).

- The history of public participation in ecological research (*Frontiers in Ecology and Environment* 10, 2012).

I would like to thank all our funders who have made it possible to make this conference almost free entry, especially the British Ecological Society, the Glasgow Science Festival, Glasgow City Council and GNHS's Blodwen Lloyd Binns bequest.

Now, I have pleasure in introducing Julie Hodgkinson who will give us a brief account of the background to the BES Centenary Festival of Ecology.

Civic Reception Natives, Aliens and Reintroductions Conference: University of Glasgow, 22 June 2013

Bailie Nina Baker

Ladies, gentlemen and distinguished guests, it is my great pleasure to welcome you to Glasgow on behalf of the lord provost and people of Glasgow. And it is always a pleasure to come to this little haven of zoology that is one of the city's lesser-known secrets.

I am delighted to give the civic welcome to the Natives, Aliens and Re-introductions conference. Although your conference is part of the British Ecological Society's centenary programme across the country, it has been co-ordinated by Glasgow Natural History Society which is very much older than the BES, having celebrated its 150th birthday a dozen years back. I would also like to thank the work of the council's own staff from Glasgow Museums and Land and Environmental Services, as well as the support provided by the RSPB, SWT, Froglife and the University of Glasgow.

I understand you have had a fascinating range of talks today on a wide range of animals and plants from all three of your categories – badgers and knotweed, beavers, hoverflies and birds. All beautiful parts of nature in their own rights but not necessarily welcomed by everyone in every place. Your posters have covered an even wider range of species and families. And I see that tomorrow you venture out into the highly controlled environments of our local greenspaces and will even be discussing the untamed wilds of policy-making.

Although your conference covers areas well beyond the plant kingdom, it is very appropriate that it is being held at Glasgow University, as the Bower

building across the way commemorates one of the university's great professors of the past – Frederick Bower – who had it built and thus established Britain's first botanical institute and some of the most advanced research facilities of the time in the country.

The City very much values the benefits which conferences such as yours bring to the city, both directly through bringing more visitors to enjoy the sights and places of interest, but also indirectly through the development of links and relationships between academia and industry and indeed the general public, which ultimately lead to benefits for the whole of society. So I am pleased to join the organisers in thanking the British Ecological Society for their financial support which has enabled costs to be kept to a minimum so that the widest possible range of participants can attend. Thank you.

Natives, Aliens and Reintroductions Conference 22 – 23 June 2013

Saturday 22 June 2013

10:00 Welcome: Vice-President of GNHS (Roger Downie) & Keynote Statement: Julie Hodgkinson (BES)

Chair: Toby Wilson

10:15 Chris Smout (University of St Andrews): What's natural? A species history of Scotland in the last 10,000 years? The concept of natural is a matter of shifting definition, and what is considered native or alien also depends on definition, history and conjecture. Some groups of species are more likely than others to have a large percentage of aliens. Dealing with them demands not dogma but a sense of proportion.

11:00 Stan Whitaker (SNH): Moving species around – risks and benefits

The law in Scotland prevents the release and spread of all non-native species. However, only a proportion of non-native species become invasive and many contribute positively to our lives. We may also wish to re-introduce former natives. Which species do we let in and which to we want to keep out?

11:40 Colin Adams *et al* (SCENE): Introductions as a conservation tool; case studies from rare freshwater fishes in Scotland

With a wealth of supporting exemplars from around the world, it is almost self-evident that the introduction of a species into a habitat that is outside its normal range is likely to be at least negative, but very frequently disastrous, for the receiving ecosystem. Recently however, introductions of some species to new habitats have been used as a conservation management tool. In this talk, the authors explore how translocations are being used in conservation “Ark” sites and the potential benefits they might bring, using case studies from rare freshwater fish species in Scotland.

12:15 Jim Dickson (University of Glasgow): What We Should Do About Japanese Knotweed?

The demonisation of Japanese Knotweed has produced inappropriate control measures which stem more from a combination of emotion, scare-mongering journalism and vested interests than they do from good science. What is needed is a change of attitudes and a new pragmatism with rigorously applied, well thought out and narrow aims to replace the waging of spendthrift wars of attrition. Such wars are ultimately futile in that most or all of the invasive non-native plants are here to stay.

12:40 Lunch in the Zoology Museum and poster-viewing in the laboratory

Chair: Chris Smout

13:40 Toby Wilson (RSPB): The Clyde Valley Wader Initiative – how applied ecology is informing the conservation of farmland waders in S Lanarkshire

The Upper Clyde Valley (including the Duneaton, Medwin and Elvan Waters) continues to hold regionally important populations of farmland waders such as lapwing and redshank. The talk will focus on how the Clyde Valley Wader Initiative seeks to maintain and increase these populations through targeting funding to landowners to undertake ‘wader-friendly’ farming practices, which are informed by the latest research into wader ecology.

14:00 Ellen Rotheray (University of Sussex): Restoring endangered hoverflies: the pine *Blera fallax* and aspen *Hammerschmidtia ferruginea* hoverflies in Scotland

Conserving these endangered, saproxylic hoverflies requires a detailed understanding of their requirements, ecology and behaviour. Only based on such data can techniques to halt decline and instigate recovery be identified and promoted to landowners and managers. Detailed investigation into adult and larval requirements has uncovered critical new data for developing management protocols for these flagship species, which are

among the first hoverflies anywhere to be the target of tailored conservation action. These discoveries and prospects for their successful conservation will be discussed.

14:20 Lorna Cole *et al.* (SRUC): Wild pollinators: Safeguarding populations in intensive agricultural landscapes

There is mounting evidence that wild pollinators are in decline worldwide. With their decline threatening the stability of pollination in both commercial crops and wild plants, this decline has implications to global food security and biodiversity. SRUC are evaluating the importance of a range of farmland habitats for pollinators to identify how populations can be promoted in intensive agricultural landscapes.

14:40 Robert Coleman (RSPB): Giant Docks and Tiny Dinosaurs

RSPB Loch Lomond is set within the Loch Lomond NNR. This is a site with an amazing variety of wildlife, sitting on the edge of the Highlands. How do we manage for this variety and what challenges will there be along the way?

15:00 Roisin Campbell-Palmer (RZSS): Bringing Beavers Back

Reintroducing beavers to Britain is not a new concept. Although most progress has occurred in Scotland, the decision to fully restore this species has still been deferred. With the official scientific trial reintroduction entering its final year and a large, unlicensed population established, the future of beavers in Scotland will ultimately be a political decision and undoubtedly influence their restoration to Britain.

15:20 Break

Chair: Roisin Campbell-Palmer

15:40 Andy Riches (Scottish Badgers): The Badger, Vermin or Victim?

The Eurasian Badger (*Meles meles*) is a native species currently facing a number of threats. In England there are Government plans to allow a cull in an attempt to reduce the spread of Bovine tuberculosis, while the problem of criminal persecution remains a U.K. wide police priority. This presentation will provide an ecological perspective on the situation.

16:00 Richard Sutcliffe (Butterfly Conservation): Conserving the Chequered Skipper

Since its extinction in England in 1976, the Chequered Skipper butterfly now only occurs in the UK in western Scotland. Recent records are restricted to within a 30 mile radius of Fort William. However, recent research predicts that the current distribution of the butterfly may be underestimated by around 20% at a 10km square resolution and

possibly by as much as 400% at a 1km scale. Surveys carried out in 2012 revealed previously unknown colonies in some of the top 100 1km squares predicted by the research. Further targeted surveys will help to establish the true distribution of this species, which is a Conservation Priority Species. Similar research in the future could be applied to other species, such as the Pearl-bordered Fritillary.

16:20 Stephen Woodward (University of Aberdeen): Alien invasive pests and pathogens: threats to our native forest ecosystems

UK forests face unprecedented challenges from the influx of alien invasive pests and pathogens resulting from increased global trade. The threat posed by these organisms to individual tree species, to forest biodiversity and to human requirements of forests will be illustrated using examples from Europe and elsewhere in the world.

16:40 Stuart Brabbs (Ayrshire Rivers Trust): Invasive weed control in the Riparian Environment

Invasive non-native plant species in the riparian environment reduce water quality through erosion, restrict access, threaten native biodiversity and can pose significant health risks to human beings. Effective control and eradication relies on a strategic and sustained approach using best practice and the latest technologies available. Whilst not universally popular, the use of herbicide may be seen as an essential component of effective control, although alternatives are available for some species.

17:00 Zara Gladman (Clyde River Foundation): "A tale of two crayfish in Scotland"

There are two non-native crayfish species in Scotland: the white-clawed crayfish (*Austropotamobius pallipes*), which is endangered in its native European range; and the North American signal crayfish (*Pacifastacus leniusculus*), which is considered a serious threat to native biodiversity. Recent research has investigated the status and impact of these species in Scotland and will be presented here.

17:20 Summing-up: Roger Downie (GNHS), and Civic Reception in the Zoology Museum

Sunday 23 June 2013: Workshops (10:00, 11:00,

12:00)

Emma Downie (Froglife): Translocations for Conservation: Good, Bad or Both?

The practice of translocating rare or threatened species is increasingly being used in the conservation of our native flora and fauna. The technique is used to safeguard species against

development, help repopulate species' historical ranges, and establish 'ark' populations. There are both positives and negatives to this approach and this workshop will investigate and discuss the approach through examination of case studies from the UK and abroad.

Toby Wilson (RSPB): Ecological management of a (fictitious) reserve

Nearly all nature reserves in the UK require some form of management. The workshop will examine some of the issues faced by reserve managers, focussing on a fictitious reserve where native, alien and reintroduced species have to be considered.

Ken Neil (Scottish Squirrel Survey): Saving Scotland's Red Squirrels

Red squirrels in Scotland and the wider UK are under threat from a number of directions, not least the spread of invasive grey squirrels. Saving Scotland's Red Squirrels is a project that brings together expertise and experience from a range of individuals and organisations in a bid to safeguard their future. This workshop will discuss the practical work of the project and its strategies.

Keith Watson (Glasgow Museums): Alien Plants: what are they doing and what should we be doing?

Alien plants are widespread, particularly in urban floras, but there is little hard evidence as to their real impact on the local ecology or nature conservation. A few examples will be explored and discussion encouraged to find out more about the role alien plants are playing. Importantly can we, or should we, do anything about them?

Roger Downie (University of Glasgow): Can ethical analysis contribute to policy and practice development in wildlife conservation?

Wildlife conservation is partly a science, but as soon as we ask what should be conserved, how and why, our answers are influenced by ethics. In animal conservation, a major factor is welfare and a confounding variable can be human perceptions of the value of particular species. An obvious contrast is people's reactions to the culling of hedgehogs on the Western Isles compared to rats on Ailsa Craig, in both cases mainly to protect nesting birds. This workshop will introduce a method of ethical analysis and participants will then use it on cases relevant to aliens and reintroductions.

Lunch: bring your own, or go to nearby shops / cafés; (poster-viewing; teas coffees etc available).

Afternoon Excursions

Keith Watson: Kelvingrove Park to Botanic Gardens

Starting at the Kelvin by Partick Bridge and heading upstream (south/east bank) past Kelvingrove Museum and through the park; then under Kelvinbridge towards the Botanic Gardens along the mill lade.

Roger Downie & Bob Gray: GU Campus, Botanic Gardens Arboretum and Bingham's Pond

Glasgow West End eco-Walk: this will take us via the University Wildlife garden and the Botanic Gardens, then along the Kelvin walkway/arboretum, finishing at the naturalised Bingham's pond. Many chances to observe urban wildlife, natives and aliens.

Posters

Brian Boag: The New Zealand flatworm, Scotland's unwanted alien visitor

The New Zealand flatworm (*Arthurdendyus triangulatus*) was first recorded from Scotland in 1965 and is now widely distributed. It is an obligate predator of our native earthworms. In farmland this can result in poor drainage and reduced crop-yields; where moles were once plentiful now there are none, and the detrimental impact on other animals e.g. badgers, hedgehogs, shrews and birds is unknown.

Mike Davidson: Life in a Scotch Cemetery

The chance discovery of a colony of North American spiders at the Glasgow Necropolis, led to an investigation of the invertebrate fauna of this important green-space. Survey findings are presented and some non-native species are discussed in relation to the native fauna. The wildlife potential of Scottish burial-grounds is greatly undervalued and opportunities for improved management are considered.

Helen Downie: Water vole reintroduction in Ayrshire

After becoming locally extinct, Ayrshire Rivers Trust conducted a lowland reintroduction of water voles (*Arvicola amphibius*) to an area of prime habitat. Animals were sourced from upland Ayrshire and Lanarkshire and captive bred to produce a population of local genetic stock. This population was released in 2011 and supplemented in 2012; meanwhile mink were monitored and controlled in the area. Reproduction in the wild population has been confirmed and field sign surveys suggest continued success.

David Palmar: Murder in the Eyrie – a behaviour study of a native species

Golden Eagle Photographs by Charles Eric Palmar. CE Palmar was the Curator of Natural History in the Kelvingrove Art Gallery and Museum from 1949 to 1984; he was also a member of GNHS. His main interest was birds, and he concentrated on Golden Eagle study and photography. The display is a

selection of his photos, and show the older eaglet attacking and killing the younger one, taken in Argyllshire in 1956 and 1957.

Chris Cathrine: Grass Snakes in Scotland

Although Scottish grass snake (*Natrix natrix*) records are included in atlases and on NBN Gateway, the accepted view is that this species does not occur in Scotland. However collation and verification of existing data demonstrates that grass snakes occur in Scotland, and may have been present historically.

Katie Thomson: Maerl

The hard twig-like pink nodules of maerl can easily be mistaken as coral. These free-living red seaweeds are capable of incorporating calcium carbonate into their skeletal structure. Maerl grows on the sea bed and where ideal conditions prevail it can form extensive beds; those found in Scotland are amongst the most extensive in Europe. Maerl is extremely slow growing and forms a very fragile three-dimensional habitat and ecosystem associated with a wide variety of plants and animals. Being so delicate maerl is easily damaged by fishing methods such as bottom trawling and dredging.

James Thorburn et al.: Spatial ecology of Spurdog (*Squalus acanthias*) on the west coast of Scotland

Spurdog (*Squalus acanthias*) are small dogfish distributed worldwide. It's unclear if spurdog in the NE Atlantic form one large population or several smaller sub populations displaying regional residency as shown in other parts of the world. It's important that this spatial information is obtained for effective management of the species.

John Hume: Taxonomy, ecology & conservation of Scotland's lampreys

Lampreys are an ancient group of vertebrates consisting of just 43 currently recognised species globally. Scotland contains populations of three lamprey species, two of which (European river and brook lamprey) do not constitute discrete taxonomic entities; morphologically, genetically or behaviourally. However, populations of both currently enjoy very different levels of conservation protection. Scope exists though for protecting such intra-specific diversity within Scottish conservation legislature following designation as Evolutionarily Significant Units. An overview of lamprey diversity and current conservation legislation in Scotland is provided.

Chris McInerny: Observations on a colony of Adders, Slow-worms and Common Lizards on Loch Lomondside, Scotland

A colony of reptiles on the east shore of Loch Lomond, Scotland, was monitored intensively during 2012, to understand population numbers, distribution, movements and biology through the year. Large numbers of European Adders *Vipera*

berus, Slow-worms *Anguis fragilis* and Common Lizard *Zootoca vivipara* were detected. Animals were seen throughout the year, first emerging from hibernation in early March and watched until late October, with breeding biology and movements observed.

Julie Nati: Invasive versus native freshwater fish species: Who wins in a changing environment?

The introduction of exotic species into aquatic habitats is a world-wide problem which is predicted to worsen in response to global climate change. In the United Kingdom, for instance, 47% of the freshwater fish species are non-native. Invasive freshwater fish species in Scotland might have wider thermal optima for optimising their aerobic scope than native fish species and invasive fish species which have not invaded Scotland yet. Wider thermal limits will allow invasive species to outcompete native species at higher temperatures (foraging, habitat exclusion, predator avoidance). I will address these questions by studying the physiological and behavioural responses to temperature variation in several native and invasive species in freshwater bodies of the northern United Kingdom.

Hannah Watson et al.: The effects of human disturbance on a small cavity-nesting seabird

While there is wide evidence for adverse effects of human disturbance on animals living above the ground, it is often assumed that burrow-/cavity-dwelling species are less vulnerable to the presence of human activities above ground. We quantified the effects of human disturbance associated with tourism on reproductive behaviour and postnatal development in the European storm petrel *Hydrobates pelagicus* at a colony in the Shetland archipelago. Despite their nocturnal habits and nesting out of sight, we found that storm petrels breeding in areas of high visitor pressure suffered reduced reproductive success in both a 'good' and a 'poor' year for overall colony productivity. Different patterns of postnatal growth of surviving nestlings were shown between nests exposed to high and low disturbance. An integrated understanding of the effects of human disturbance is essential for informing visitor management at seabird colonies.

Ann-Marie MacMaster: Scottish Mink Initiative

The American mink, *Neovison vison*, is an invasive non-native species which was brought to the UK from North America for the fur-farming industry. Many animals escaped or were released by animal activists, and in 1938 the first mink living wild in the UK were recorded. American mink are a generalist predator and have a devastating effect on our native wildlife, such as ground nesting birds and watervoles.

Our aim is to secure multiple adjacent river catchments as areas free of breeding American mink by monitoring for, trapping and dispatching

American mink, thus protecting native wildlife as well as economically important populations of fish and game birds.

Caroline Millins: How does an introduced vertebrate host species affect the risk of Lyme disease? Characterising Grey squirrels (*Sciurus carolinensis*) as tick hosts and reservoir hosts of *Borrelia burgdorferi* s.l. in Scotland

The introduction of a competent reservoir species such as the grey squirrel may modify local disease dynamics and increase the risk of Lyme disease to humans, by increasing the number of infected ticks in an area. The objectives of this study are to quantify and characterise the tick parasite community of grey squirrels, characterise natural infections in grey squirrels and quantify the *Borrelia* prevalence by using organs and xenodiagnosis (pooled larvae from an individual host).

Lyn Dunachie et al.: Friends of the River Kelvin

The Kelvin provides a unique natural environment in the heart of the city. Friends of the River Kelvin was founded over 20 years ago to facilitate responsible enjoyment of the river. Invasive species have spread along the banks, overwhelming native species and damaging habitats and property. Attempts to gain approval to control this are often met with objections. FORK encourages people to learn about and play a part in the care and understanding of the river and its surroundings.

Valerie Semple et al.: Friends of Glasgow's Local Nature Reserves

Glasgow has 10 LNRs, two of which are shared with neighbouring Local Authorities; and several more are in the planning stage. The 'Friends' group exists to raise awareness of the City's LNRs and wildlife; lobby Glasgow City Council to ensure that this environmental resource is protected, managed and enhanced; engage with the Council and others to promote partnership working; organise and support practical conservation days or events in the City; and to raise funds for specific projects.