Reintroductions in Ireland: Restoring our Biodiversity

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Reintroductions look to restore a species, lost originally due to human action. This relatively new branch of ecology lies squarely at the cross roads between biology and sociology, with economics and law increasingly more involved. Reintroductions are increasing in popularity based on the acceptance that they are a valuable conservation tool. The reasons for reintroducing a species are often complex. They should be objective and well defined, but any discussion on the matter usually involves a subjective element, especially when charismatic or culturally important species are considered. Of course all reintroduction schemes should primarily and directly benefit the target species and take precedence over any human desire. This review will focus on reintroduction in an Irish context; extinct native and naturalised species, the legislation regarding the reintroduction of species and review three reintroduction programmes taking place in Ireland today. A review of their success and failures will help inform future reintroduction policy among the conservation and governmental bodies. Numerous future reintroduction projects are considered.

Introduction

The reintroduction of species is increasingly seen as an important conservation tool that helps in the restoration of an ecosystem (Wilson, 2004; Manning *et al.*, 2009). For a synopsis of this topic see Estes et al. (2011). However the reintroduction of species, especially large carnivores, can create human-wildlife conflict, through increased contact (O'Rourke, 2014). If all stakeholders aren't involved early

on in the programme, this may jeopardise the success of the reintroduction. Reintroductions also tend to involve the ethical rationale of correcting the errors of the past and creating benefits for the local economy from eco-tourism (O'Rourke 2014). This review paper will review the legislation regarding reintroductions in Ireland, consider the ongoing debate of what a native species is and summarise the ongoing reintroductions of the Golden Eagle (*Aquila chrysaetos*), White-tailed Sea-eagle (*Haliaeetus albicilla*) and Grey Partridge (*Perdix perdix*) in Ireland.

The International Union for Conservation of Nature, IUCN, define a reintroduction as 'an attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct' (IUCN/SSC 2013). It should also be noted that they state that a reintroduction of a species should only be considered as the last option to conservationists, must undergo strict justification, and adhere to all the guidelines outlined the IUCN (IUCN/SSC 2013).

When a reintroduction is considered, two things must be taken into account: the legislation regarding the reintroduction of species into the proposed country, and whether the species in question was a native to or ever naturalised in the country in question.

Legislation

There are two conventions and directives surrounding the reintroduction of species that apply to Ireland or which the Irish government has ratified. The UN Convention on Biological Diversity (UN Convention on Biological Diversity, 1992) creates an obligation to reintroduce threatened species, with Article 9 stating that each signed party shall 'adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats under appropriate conditions'. However, these obligations to reintroduce species are not replicated in European law. Article 22 of the Habitats Directive declares that Member states shall 'study the desirability of re-introducing species in Annex IV, that are native to their territory' (Council Directive, 1992). The obligation to reintroduce species was replaced by the obligation to study the desirability of reintroducing a species. The inconsistency in International and European law confuse the matter, however conservation organisations clearly do have some legal precedence for reintroduction.

The very word reintroduction implies that the species must have been present at some stage, but the specifics of what constitutes an applicable species are confusing. The distinction between native and historically naturalised becomes blurred in a temporal context. Is a species that arrived on the island alongside man introduced or native? Crees and Turvey (2015) define a native species as one that has been present continually since the late Pleistocene, or naturally colonised during the Holocene, roughly 12,000 years ago. By that definition, of the twenty nine species of fish to inhabit Irish freshwater only sixteen are considered native (Kelly *et al.*,

2007). This excludes the pike, perch, roach and bream, some of the commonest species without which our ecosystems would be radically different. Indeed by this definition, much of the species found in Ireland today would be considered non-native (Stokes *et al.*, 2006). Crees and Turvey (2015) propose a realistic solution to the dichotomy of native and non-native by providing a continuum between the two.

In their guidelines on reintroduction, the IUCN avoid using the word native, instead their phrase of choice is 'indigenous range' defined as 'the known or inferred distribution generated from historical (written or verbal) records, or physical evidence of the species' occurrence' (IUCN/SSC 2013). This a more satisfactory way of determining whether a species qualifies for reintroduction. The range of a species is ever changing based on biotic and abiotic factors (Chuangye *et al.*,. 2015), of which human influence, as the most dominant species on the planet, has the most effect (Chuangye *et al.*, 2015). The argument about whether a species was once native or not, in the context of a potential reintroduction, is not that useful and should be replaced by indigenous range as defined by the IUCN.

Extinct Species of Ireland

The Irish Red List lists ten angiosperm species, forty bryophytes, one mammal, three species of bee, one butterfly, two non-marine molluscs and eight species of water beetle, all of which are extinct (Marnell *et al.*, 2009; Foster *et al.*, 2009; Fitzpatrick *et al.*, 2006; Curtis & McGough, 1988; Byrne *et al.*, 2009; Regan *et al.*, 2010; Lockhart *et al.*, 2012). There were inconsistencies in the criteria necessary to declare a species 'extinct', with some authors satisfied if there had been no recordings in the last 100 years while the authors of the Terrestrial Mammals report excluded mammals extinct before 1500 (Lockhart *et al.*, 2012). They therefore excluded the Eurasian Brown Bear (*Ursus arctos arctos*) and Irish Elk (*Megaloceros giganteus*). The Wild Boar (*Sus scrofa*) was considered a post 1500 AD introduction and so was not taken as an extinct native (Marnell *et al.*, 2009).

The red list for Irish birds is published by Birdwatch Ireland. However this list does not include extinct species, so extinct birds in this review are based upon the book 'Ireland's Lost Birds' by Gordan D'Arcy (1999). This book states that, among others, Ireland has lost a type of grouse, the Capercaillie (*Tetrao urogallus*), and also six raptors including the Osprey (*Pandion haliaetus*), Marsh Harrier (*Circus aeruginosus*), Goshawk (*Accipiter gentilis*), Red Kite (*Milvus milvus*), White-tailed Sea-eagle and the Golden Eagle (D'Arcy, 1999). The latter three have been the subject of ongoing reintroductions in Ireland in Wicklow, Kerry and Donegal respectively, run by the Golden Eagle Trust, in partnership with National Parks and Wildlife Service (NWPS).

Golden Eagles Reintroduction

The Golden Eagle (GE) became extinct in Ireland at the beginning of the 20th century (Whilde, 1993). The two main reasons for extinction were persecution, consisting of poisoning, shooting, trapping and egg collecting, in addition to habitat change, due to the increasing rural population (O'Toole *et al.*, 2002). In 2001 the first chicks from Scotland were reintroduced to Glenveagh National Park by the Golden Eagle Trust. The first GE to fledge for over a century did so in Glenveagh, Donegal in 2007 (Sarr *et al.*, 2014). Eleven chicks reared in the wild have fledged since 2007. However in 2015, after two years, with only one chick fledging, the Golden Eagle Trust explained that the poor health of the upland habitat was reflected in the poor record of chicks fledging. With three to five chicks fledging a year being the estimated number to keep this small population viable, the current average of 0-3 is not sufficient. The Golden Eagle Trust called for a review of the management of the uplands of Donegal, in order to save the Golden Eagle population (L. O'Toole 2016 pers. comm. 7 January).

White-tailed Sea-eagle Reintroduction

White-tailed Sea-eagles (WTSE) were reintroduced to Killarney National Park in 2007 after an absence of over 100 years (D'Arcy, 1999). Over the next five years (2007-2012), one hundred chicks were reintroduced, the donor stock coming from Norway. In 2014 there were fourteen pairs and one chick fledged, changing to thirteen pairs and four fledged chicks in 2015 (Goldeneagletrust.org 2015). However this reintroduction programme, in contrast to the reintroduction of the GE, became a highly politicised conflict between the stakeholders involved; namely the hill famers in Kerry, the conservationists, and the tourist lobby in Killarney (O'Rourke, 2014). The danger posed to this reintroduction project does not seem to be the ecology of the habitats, but the stakeholders involved. This is reflected in the fact that there have been thirteen recorded cases where a WTSE has been killed by poisoning or shooting in Ireland, while only two GEs have been killed by human persecution (O'Donoghue, 2015). This is even more concerning given the fact that GEs have been reintroduced for approximately 50% longer, and the laying of poison for any animal other mice or rat is illegal. However, the WTSE is doing much better than the GE. Being an upland specialist, the GE feeds on hare and grouse, both of which are in short supply, after centuries of hill sheep farming having degraded the ecosystem. The WTSE is more of a generalist, taking fish, small mammals, birds and carrion. While the WTSE experiences more persecution, it is actually better suited to the current Irish landscape.

The Grey Partridge reintroduction

The Grey Partridge is a red listed game bird that has historically declined in Ireland with only one naturally occurring population confined to the Lough Boora peatlands in Co. Offaly (Lynas *et al.*, 2007). The Irish Grey Partridge Conservation Trust breeds wild partridge and releases them back into the Boora peatlands. Since

the trust started its breeding programme, the number of partridge has grown from a population of just 17 to 317, in 2010 (Buckley *et al*., 2011). A measure that will supplement a farmer's income if they provide a suitable habitat on their land for the Grey Partridge, has been included in the Green Low carbon Agri-environment Scheme, GLAS, part of the Rural Development Programme 2014 - 2020 (Martyn, 2014). This is a landmark project as it specifically awards farmers for helping to save an endangered species. A reintroduction of Grey Partridge from Boora to Fingal, North Co. Dublin is concluding this year (RTE 2011).This reintroduction scheme involved all stakeholders early, benefited each one, and is succeeding as a result.

Future possible reintroduction projects in Ireland

In Ireland the main stakeholders are the farmers, conservationists, tourist lobby, and the general public (O'Rourke, 2014). In any new reintroduction programme, all stakeholders should be involved from an early stage, as exemplified by the partridge reintroduction. It should also be noted that the reintroduction of a species should have a clear and definable benefit to the species in question, and not all extirpated species should necessarily be reintroduced. However there is an obligation stemming from the Habitats Directive to study the desirability to do so.

The Grey Wolf (*Canis lupus*), a recently extirpated species is one candidate for future reintroduction. Contrary to the prevalent view that wolves need huge wild expanses with no human contact to survive, they are thriving in human dominated landscapes in Europe outside of protected areas (Chapron *et al*., 2014). The coexistence model, where humans live alongside large carnivores in heavily modified managed habitats, is possible (Linnell *et al*., 2001), which will hopefully continue the current stabilisation and expansion of large carnivores in Europe (Chapron *et al*., 2014).

But whether or not the people of Ireland are ready to see a return of large mammals is currently a largely moot point. A report to the Convention on Biological Diversity on the state of Irelands protected habitats showed that of 'the 58 habitats assessed, 5 habitats were assessed as favourable, 29 as inadequate and 24 as bad' (Dahg, 2014). The habitats in Ireland are not in good enough health to support a large apex predator such as the wolf, as highlighted by the Golden Eagle in Donegal. As the condition of Ireland's habitats improve, and education changes public opinion, the wolf, as well as the boar, should be reassessed for an experimental reintroduction.

Another long term reintroduction project could be the Capercaillie, an extirpated game bird (D'Arcy, 1999). The Cappercaillie is a habitat specialist and requires an open Scots Pine (*Pinus sylvestris*) and oak forest, similar to the ancient oak forest present in Killarney National Park. There is no such forest of sufficient size and structure present in Ireland today. However, the National Woodland Scheme aims to restore over 1900 hectares of native forest by 2020 (Department of Agriculture,

Food & the Marine 2015). If this were implemented in conjunction with the Wild Nephin project in Mayo, then a suitable habitat for Capparcaillie could be created in forty years. This should be a long term conservation objective.

A species that would benefit from the existing GLAS scheme is the Common Irish Quail (*Coturnix coturnix*). This is a red listed game bird (Colhoun & Cummins, 2013) that needs a survey of the breeding number. Their number is likely to be very small and should be an immediate reintroduction project.

Not confining reintroductions to the terrestrial environment, the European Sea Sturgeon (*Acipenser sturio*) is also a potential candidate. The extirpated fish (Kelly *et al.,* 2007) is listed as critically endangered throughout its range by the IUCN (Gesner *et al*., 2010). This fish lives most of its life in the Atlantic Ocean, returning to spawn in the rivers of Europe. There is an ongoing European Sea Sturgeon reintroduction programme in the Rhine estuary in the Netherlands (Houben, 2015). Although future reintroductions will be limited by the genetic diversity of donor stock (Houben, 2015), this should be a high priority reintroduction project if we are to see the survival of this species, with Ireland potentially having a leading role to play.

Conclusion

Considering the definitions provided by the IUCN, there are many species that could be potentially reintroduced into Ireland, with only a few high profile species having been highlighted here. Furthermore, Ireland has an obligation to study the desirability to reintroduce these extinct species. The restoration of a full diversity of habitats essential for reintroduction of species, will require long-term commitments to wildlife population management by Government, NGOs, farmers, and other stakeholders.

While we should continue to preserve our biodiversity - due to our dependence on it for food, medicine, building materials, fertile soil, flood control, breathable air, habitable climate and drinkable water - perhaps we should also strive to prevent the extinction of other species for ethical reasons. As the most intelligent and powerful species on Earth, and with the growing awareness of our interdependency with our environment, the imperative for the conservation and protection of wildlife becomes self evident, and critical to our survival. The reintroduction of species should be considered for their own sake, but also for the impact that the creation of their habitats could have. For example the creation of Scots Pine and oak forest for the reintroduction of the Cappercaillie, would act as a carbon sink and restore biodiversity. E.O Wilson states: 'Right now we're pushing the species of the world through a bottleneck. We've got to make it a major moral principle to get as many of them through as possible. It's a challenge for now and the next century. And there is one good thing about our species: We like a challenge!' (Wilson, in Campbell & Reece 2004)

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