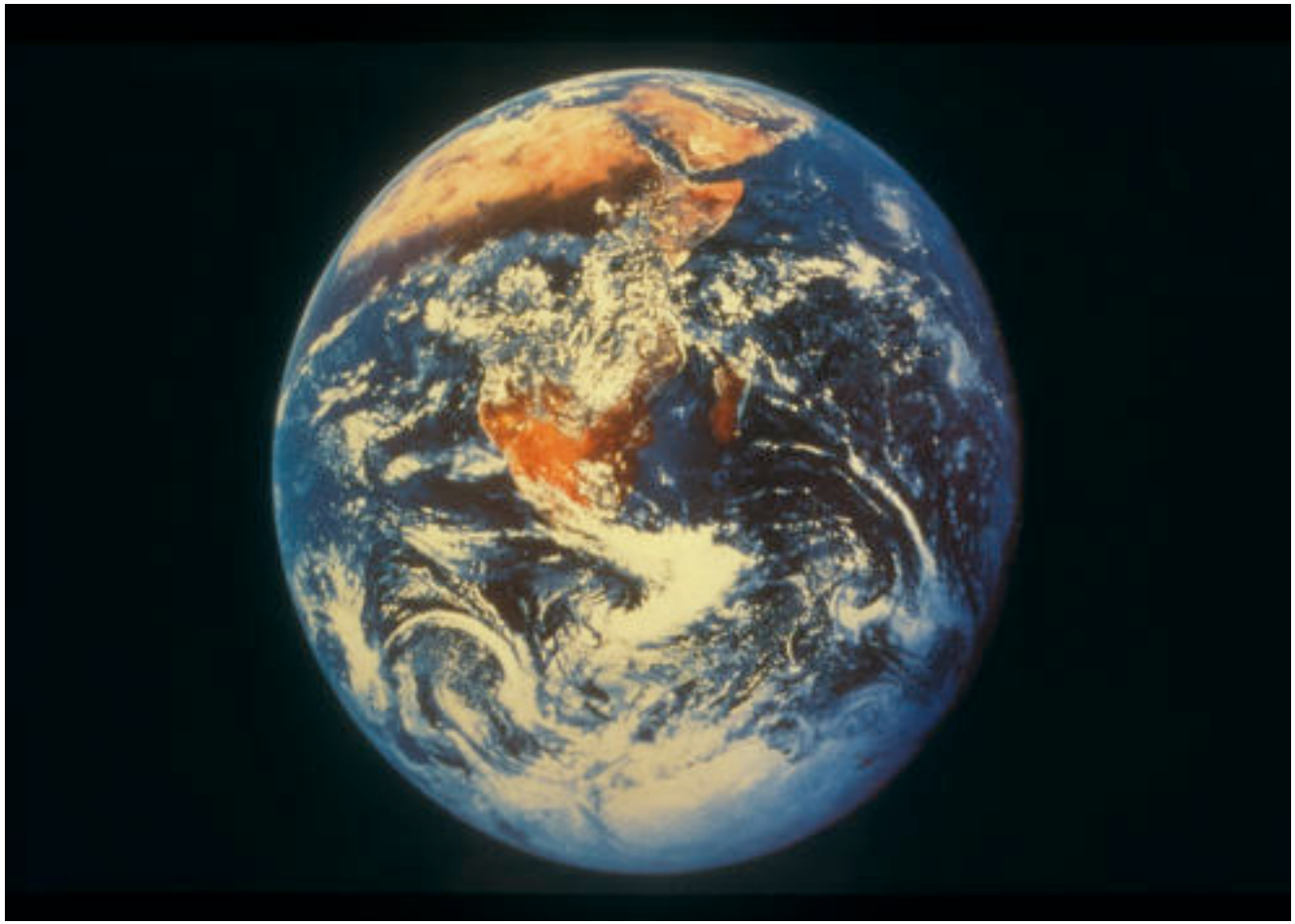
The restoration of Scotland's Caledonian Forest and its relevance for Ireland

Native Woodlands Conference Ireland 2018
Alan Watson Featherstone

The Need for Restoration



The Need for Restoration

The Highlands are a deforested, depleted landscape

The Highlands are a depleted landscape

Peat hags are wounds in the land in many places.

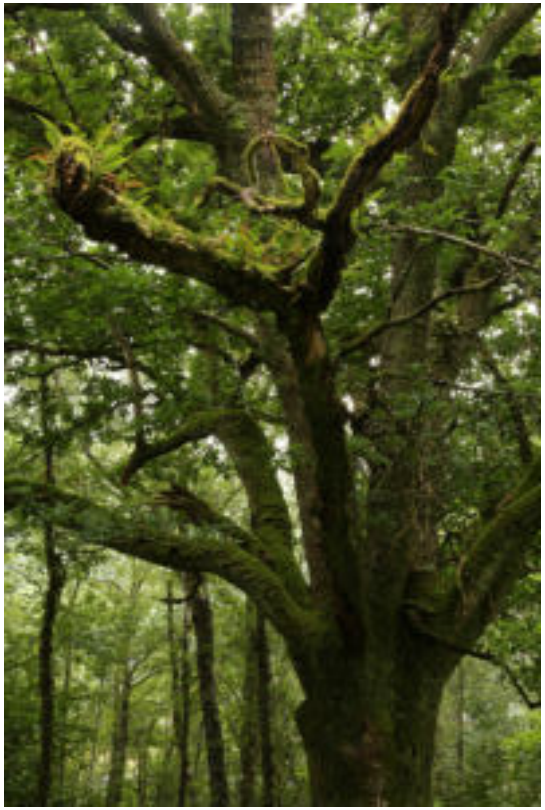
Ruins of a croft house & eroded peat stranded beside the Affric River.

Most of the Highlands should be like this

Scots pine and birches beside Loch Beinn a'Mheadhoin in Glen Affric.

Scots pine and heather in flower in Glen Affric.

Scotland & Ireland share a common forest heritage



Oak tree (*Quercus petraea*) in temperate rainforest, Glasdrum Wood NNR, Scotland.

Oak tree (*Quercus petraea*) in temperate rainforest, Killarney National Park, Ireland.

Scotland & Ireland share the same state of near total deforestation

Scotland

Remnant forest on islands in a small loch, Scourie Peninsula, Scotland, with deforested hills behind.

4% native forest remaining

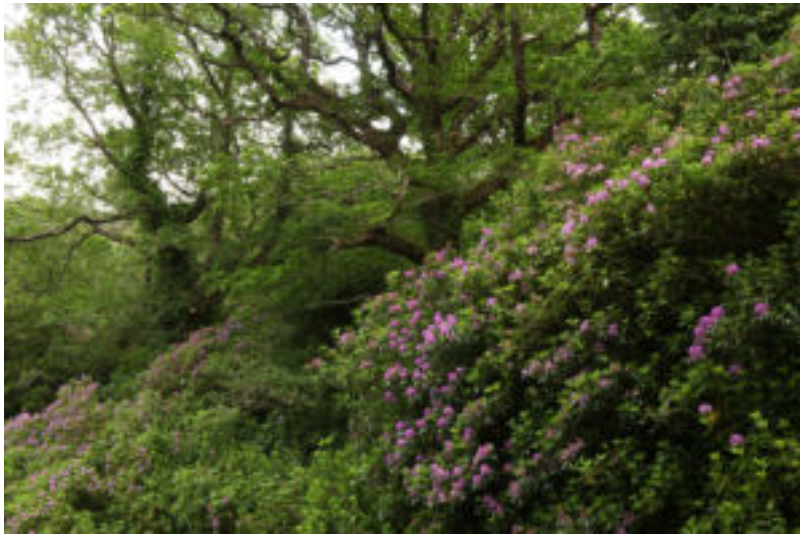
Ireland

Remnant oak forest on islands in Upper Lake, Killarney National Park, with deforested hills behind.

1% native forest remaining

Scotland & Ireland share the same problems of invasive non-native species

Invasive *Rhododendron ponticum* growing underneath native pinewood at Ben Damph, Scotland.

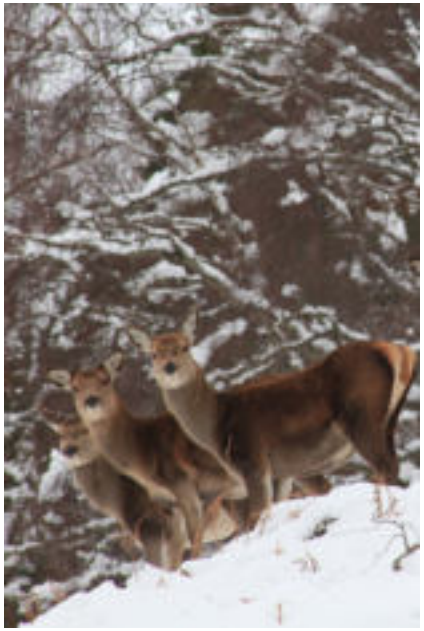


Invasive *Rhododendron ponticum* growing underneath oak trees, Killarney National Park.

Scotland has experienced massive deforestation

98% of the original native pinewoods are gone

Overgrazing by deer & sheep prevents forest recovery



Red deer are out of balance with their forest habitat, and every tree seedling that germinates gets eaten.

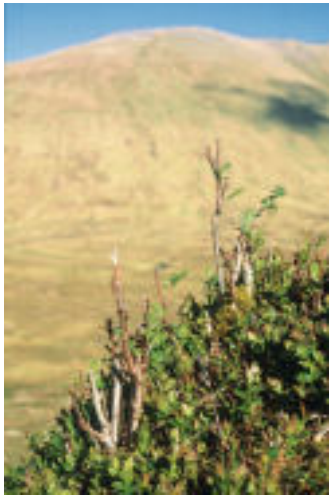
As a result, only a few old trees remain, as a ‘geriatric forest’, with no new ones growing to replace them as they die.

Overgrazing by deer prevents forest recovery

Heavily-overgrazed rowan,
West Affric, October 1992

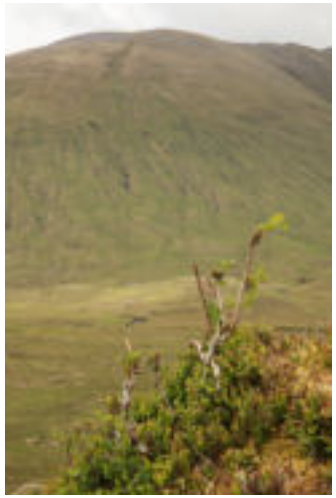
May 1996

May 1999

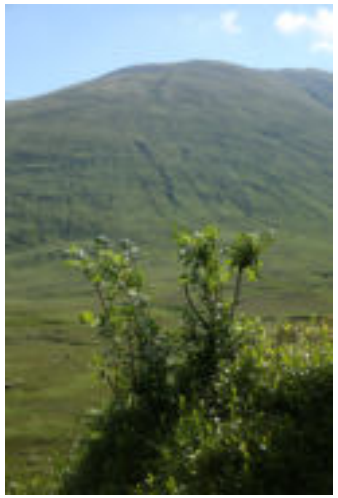


May 2004

July 2008



June 2012



August 2015

The natural regeneration of forests in southwest Norway shows what is possible in Scotland (& Ireland)

Latitude:
57.49 °N

Annual rainfall:
2,800 mm

Average annual temperature:
8.3 °C

Seana Mheallan, Ben Damph,
Wester Ross, Scotland

Latitude:
58.50 °N

Annual rainfall:
Over 4,000 mm

Average annual temperature:
4 – 5 °C

Fidjadalen, Rogaland,
Southwest Norway

3 main elements needed for restoration

* Restoration of healthy vegetation communities
* Re-instatement of key ecological processes (eg succession, nutrient cycling, natural disturbance, predator-prey dynamics etc)
* Reintroduction of missing species, including large mammals and apex predators

Together, these will re-create healthy, self-sustaining ecosystems

Reducing herbivore numbers enables tree regeneration

Natural regeneration of Scots pines in Glenfeshie, as a result of a substantial reduction in deer numbers.

Natural regeneration of birch woodland in Creag Meagaidh National Nature Reserve, as a result of greatly reducing the population of red deer.

Excluding deer and sheep enables natural regeneration to take place

Naturally-regenerating Scots pine inside a fenced exclosure, 2 years after the fence was erected in 1990.

The same tree in August 2017, after 27 years of protection from overgrazing.

Restoration of healthy vegetation communities

Dead Scots pines in a dying forest in 1989, before the area was fenced for regeneration in 1990.

The same area in September 2015, with naturally-regenerated Scots pines, after 25 years of protection.

Restoring healthy natural habitats

Left: Planting a pine in Glen Affric in April 1991.

Bottom left: The same scene in 2002.

Below: August 2016, after 25 years of no grazing.

Restoration entails the recovery of the whole ecosystem

Photo taken 23 years after fencing and planting.

Restoration entails the recovery of the whole ecosystem

Planted pines, regenerating birch and recovering ground vegetation inside the fence – only stumps and grass outside.

Bluebells flowering inside a small fence put up to protect an eared willow in the upper Affric watershed.

Restoration enables the crucial process of ecological succession to occur

Removal of grazing pressure by fencing allows succession from grassland to heath (left) and then from heath to pioneer (birch) woodland (right) to take place.

Wildlife returns when the vegetation is restored

Restoration entails the recovery of the whole ecosystem

Peat hags like this are open wounds or running sores on the land, that are unable to heal because of the grazing pressure.

When the grazing pressure is removed, as here by a fence, sphagnum mosses, cross-leaved heath and other plants successfully colonise the area.

Removal of non-native species

Volunteer felling *Rhododendron ponticum* that has been killed by stem injection, at Ben Damph, Scotland.

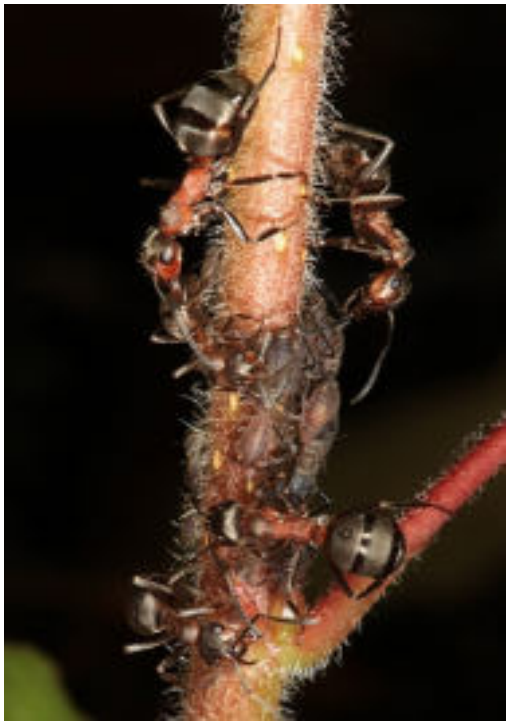
Burning the stems of dead *Rhododendron ponticum* cleared at Ben Damph, Scotland.

Restoration – the return of the missing mammals

Photo © Laurie Campbell

European beavers and wild boar are now re-established in the wild in Scotland.

Re-establishing ecological relationships & processes



Aphids being tended by wood ants on a young aspen tree protected from overgrazing.

Robin waiting to find food in ground disturbed by wild boar.

Re-establishing positive trophic cascades

Photo © Laurie Campbell

The presence of pine martens (*Martes martes*) has been shown in Ireland to lead to a reduction in non-native grey squirrels, and a subsequent expansion of the range of red squirrels.

Photo © Laurie Campbell

That study in Ireland by Emma Sheehy has now been replicated in Scotland, with the same result – a reduction in grey squirrels and an expansion of red squirrels (*Sciurus vulgaris*) when pine martens return.

Next steps for Restoration: Translocations and reintroductions

Trees for Life is currently translocating red squirrels to forest remnants in the NW Highlands where they are missing.

Photo © Peter Cairns

The Eurasian lynx is the carnivore most likely to be reintroduced to Scotland in the near future.

Some Principles of Restoration

Scots pines regenerating near mature trees in Glen Affric.

1. Work from areas of strength - the areas where the ecosystem is closest to its natural condition.

2. Pay particular attention to ‘keystone’ species - those on which many others depend.

3. Re-establish ecological processes such as the use of pioneer species, natural succession etc to facilitate the restoration process.

Some Principles of Restoration

Red ant (*Myrmica ruginodis*) tending aphids (*Aphis farinosa*) on an eared willow regenerating in a fenced exclosure.

4. Mimic Nature wherever possible.

5. Re-create ecological niches where they have been lost.

6. Re-establish ecological linkages - reconnect the threads in the web of life.

7. Control and/or remove introduced non-native species.

Some Principles of Restoration

Eurasian lynx
Photo © Peter Cairns

8. Remove or mitigate the limiting factors which prevent rewilding from taking place naturally.

9. Pay special attention to species with limited ability to disperse – eg aspen, wood ants, twinflower.

10. Reintroduce species that are unlikely or impossible to return by themselves.

Some Principles of Restoration

Volunteer planting a birch tree as part of rewilding at Dundreggan.

11. Re-establish essential ecological processes, such as predator-prey dynamics and natural disturbance, which are absent.

12. Let Nature do most of the work.

13. The ‘green thumb’ principle - love has a tangible, positive effect on all living things to which it is directed.

Restoration is the Work which Reconnects

Participating in Ecological Restoration projects can reconnect people with some of the most important things in life

* with the rest of Nature
* with place
* with life
* with each other

Volunteers from Madagascar planting trees in Scotland

* with their own power
* with healing
* with hope
* with spirit

Restoration provides an opportunity for each of us to make a positive difference in the world

We can draw inspiration from our connection with Nature, and bring the care of our hearts to a 'labour of love' that can accelerate the healing of the land and the restoration of healthy ecosystems.

The need for Restoration is global

The first shared task of all humanity must surely be to restore and rewild our wounded world.

People everywhere need to engage in rewilding and restoration.

The wellbeing and diversity of our planet, and all its species, is in our hands.

The need for Restoration is local

Scotland

Healthy young native woodland of Scots pines, planted by volunteers, flourishing in a formerly-deforested part of Glen Affric.

Ireland

Young rowan tree growing in Killarney National Park.

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