Conservation cultures, refugee habitats, and the comparative approach: Restoration in the NE Atlantic Region

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Strongly oceanic climates and similar landforms

All strongly deforested through human land use, cumulative since Neolithic/colonisation (Iceland); peaking in C19th

Much regeneration in Norway in C20th, mainly natural

Some in Scotland and Ireland, mainly commercial planted conifers

Some in Iceland, mix of planted, natural regeneration, and pioneer restoration work

Increasing interest in Scotland and Ireland in restoration

Dry stone/turf house, Jæren, Norway 1911  Peat cutting, Vikna, Norway 1950s
Scotland (& Ireland)

- EU system
- Designations— SACs, SPAs (Scotland: also SSSIs, NNRs, National Parks, NGO owned nature reserves overlapping EU framework designations)
- SACs, SPAs - Formal protection demands, maintain ‘qualifying features’
- Advantage: protection though clearly quantifiable metrics
- Disadvantage: can and does ‘freeze’ landscapes in the form of the ‘qualifying features’.
- Which sometimes impedes ecological restoration
Norway

• Not in EU system
• From 2009, framework is the Nature Diversity Act
• Section 1 States: “The purpose of this Act is to protect biological, geological and landscape diversity and ecological processes through conservation and sustainable use, and in such a way that the environment provides a basis for human activity, culture, health and well-being, now and in the future”
• Policy expressed as goals - http://www.environment.no/goals/
• Achievement measured through the Nature Index http://www.naturindeks.no/, which “measures the condition of biological diversity in Norway, and gives an oversight into the development of the ecosystems, for selected species groups and themes”; see also this 4 minute animation explaining the NI concept.
• Advantage: Framework is maintaining natural diversity, and explicitly protects ‘ecological processes’, ‘development of ecosystems’, and sustainability
• Disadvantage: Aims often not easy to make concrete in concrete cases; can lead to evasion of intent of law

www.nina.no
Designations - Norway

- ‘Nature reserves’ are areas whose management rights are owned by the government in perpetuity and managed primarily for nature conservation.

- ‘National Parks’ are similar to NPs in UK – subject to special regulation but mainly in private ownership and where conservation values are part of a wider ‘mix’

- ‘Protected landscapes’ are the lowest designation. They are generally more affected by human activities than national parks.

- Designation names are not acronyms, more easily understood by general public
'it appears very likely that woods would still have disappeared from acidic soils on the hillsides due to a combination of a long history of acidifying pine-heath vegetation cover, natural leaching and the almost inexorable spread of blanket peat due to natural pedogenic and climatic deterioration'.

-Scottish Woodland History Discussion Group document on West Affric, 1999

Blanket peat formation formerly frequently asserted in Scotland to be impossible for woodland to grow on, and probably to have been the non-anthropogenic agent of deforestation in the first instance (e.g. Tipping 2008)
Comparisons of mountain areas 300-900m asl

West Affric, Scotland (57°4′N)
- Geology mainly metamorphic gneisses
- Annual precipitation about ~3000mm
- Mean July temperatures 6-10.5°C
- Mean January temperatures 0-2°C, -4 to 0°C higher up
- Distance to open sea: 50km SW

Fidjadalen, Norway (58°51′N)
- Geology mainly metamorphic gneisses
- Annual precipitation ~3900mm lower down, > 4000mm higher up
- Mean July temperatures 5-10°C
- Mean January temperatures 0-1°C lower down, -1 to 0°C higher up
- Distance to open sea: 50km SW
Fidjadalen 1927

Fidjadalen 2007

https://ut.no/turforslag/1112567/eikeskog-blafjellenden
Recent regeneration on blanket peat, 250-600m asl, Sollia, Norway

**Peat bog forest**
VegetationType K1, Framstad 1997; Vegetation Type 8b, NIBIO classification (Norway)

“Forested bog on deep, nutrient-poor peat where the peat layer has built up so that vegetation has lost contact with groundwater”

West Affric (Strathglass) SAC ‘Priority Feature’: ‘7130 Blanket bogs’
SACs and restoration (2)

Caenlochan SAC

Pont map, 1590

Same location today
• Caenlochan SAC is designated for various types of open ground associations, all below c800m anthropogenic

• This prevents any woodland being regenerated there as it would ‘damage the SAC feature’

• Despite map data showing woodland quite recently present which itself would be SAC designated if it still existed

• And pollen and other data indicating that the natural vegetation was, and absent human influences would be, a much more biodiverse woodland sequence to c. 900m asl, including montane scrub associations.
Refugee habitats and the comparative approach: 2 examples

Alpine blue sow-thistle *Cicerbita alpina* is critically endangered in Britain. It is confined to four rock ledges in the extreme SE of the Highlands. A fifth patch went extinct in 1977.

The plants are highly impoverished genetically. They very rarely produce any seeds.

Until recently, the main management publication (Plantlife 2010) correctly identified that it is highly palatable to grazing animals.

But it also included statements like:
“As the species has a continental distribution, this would suggest optimum conditions of hot summers and cold winters.”

“In western Norway, *Cicerbita alpina* seems to avoid the extreme oceanic areas and tends to be found in the more continental inner fjord areas. It avoids the west coast; like many boreal species, it tolerates or even needs high summer temperatures, occurs in areas of cold winters and tends to be absent from areas with mild winters”

“As a consistent feature of its European habitats, winter snow cover protects plants from winter frosts and provides additional moisture in early summer”

Leading to the first of the ‘key factors’ identified as “limiting the current and future distribution of *C. alpina*” as being:
“*C. alpina* appears to be at the western limit of its climatic tolerance....”
Cicerbita alpina
distribution, Norway

Source: www.artsdatabanken.no
C. alpina recorded in every decade since the 1950s on Stad by university botanists (UiO, NTNU, NMB)

Meteorological information: Meteorologisk institutt (www.senorge.no)
‘Highly prized browse for many animals... In our (i.e., coastal SW Norway) mountains it (C. alpina) must seek refuge in inaccessible places to avoid being eaten by sheep’


- Coastal SW Norway was almost completely deforested from the Bronze Age until the 1860s, and so lacked C. alpina habitat
- C. alpina is a shade plant of moist soils in woodland understory. Woodland is now regenerating rapidly following declines in grazing pressure, but the area remains the most heavily grazed in Norway
- Rogaland (‘Stavanger county’) sheep population, summer 2014: ~510,000 sheep or 59.4/km² or c.14x the Norwegian average. Most graze on the coast and on the foothills behind the coast
- This information has lead to changes in conservation management in Scotland. Since 2017 the species has been reintroduced to woodlands where grazing pressures are now under control.
New questions arising from the comparative approach: differing average growth in *Cicerbita alpina* of Scottish and Norwegian origin grown under identical conditions.
• *Cicerbita alpina* in recently regenerated montane birchwood, blanket peat over granite, Berdalen
Scotland: ring ouzel habitat stated to be “open heather clad moorland and mountains with only very sparse or stunted tree cover” (Rollie 2007).

SPA review for species stated: “Key conservation requirements: Maintain good moorland management and open moorland/pasture interface” (my italics).

Norway: “Prefers hilly areas with rocky terrain and mixed grass and shrub vegetation... It especially likes steep slopes with lots of rocks and plenty of juniper bushes, where at the same time there are mixed in more open areas with grass. It does not like barren areas with little vegetation, either on the coast or in the mountains” (Pedersen 1994).

The core habitat for the species, montane shrub mosaic associations as described above, are functionally extinct as habitats in Scotland. The ‘key conservation requirement’, if implemented as SPAs, would have prevented reestablishment of these associations.

Scotland: over 50% decline in the last 25 years, and a very marked contraction in range (Rollie 2007). Red listed and a priority species in the UK biodiversity action plan.

Norway: appears to be slowly increasing (Pedersen 1994). Red list status ‘LC’.

The same subspecies breeds in both countries and they appear to winter in the same regions of Morocco.

SPA status considered for current Scottish habitat (rejected only for technical reasons).

2010 UK BAP revision: “Encourage comparative breeding season studies in Norway/Sweden, where the population is apparently stable”.

Ring ouzel
*Turdus torquatus torquatus*
Grazing pressure is now low enough for *A. polifolia* to reestablish in some areas of the Highlands (see above), but a seed source is lacking.
• In Scotland, SACs with bearberry are being cleared of, or ‘zoned against’, natural regeneration/restoration of native open Scots pine woodland associations, to ‘protect’ bearberry ‘habitat’ (‘NVC H16 Calluna vulgaris-Arctostaphylos uva-ursi heath’)
• This is a plant assemblage created in the later C19th by frequent rotational burning (mainly for driven grouse shooting purposes). It is dependent on rotational burning to persist.
• In Norway, bearberry is LC status and abundant from sea level to the low alpine zone - largely as a woodland understory plant.
• Its usual habitat is described as "Bearberry grows in drier woodlands, most usually Scots pine woods, and drier heaths"

Source
• It is certain that open habitats are not a requirement for Arctostaphylos (among other species)
Netted mountain moth *Macaria carbonaria* is an upland bog species common in Norway (LC). It feeds as a larva primarily on bog rosemary *Andromeda polifolia*; but can also eat bearberry.

In the Highlands, where it is rare, current conservation guidance is to regularly burn moorland to preserve bearberry populations for *M. carbonaria* (Source).

But the evidence suggests that *M. carbonaria* is in fact restricted in the Highlands to a secondary food plant, growing in a ‘survivor assemblage’ of very recent origin. Its rarity is a function of this.

It is likely that addressing the food plant issue would be more productive in conserving the species than maintaining an artificial and species-poor refugee habitat – on which bearberry, *M. carbonaria’s* secondary food plant, is not in fact dependent.
Invasive rhododendron

• Rhododendron, especially *R. ponticum*, are a serious invasive problem in western Britain and in Ireland

• The type is a hybrid developed in British nurseries in the 19th century for growth and fecundity in the British climate

• It was widely planted for amenity and shelter near game-shooting lodges in upland districts

• From where it became widely invasive in the 20th century

• Effective methods to kill rhododendron have been developed in Britain and Ireland

www.nina.no
• Rhododendron only became common in rural SW Norway from the 1960s

• Most gardens now contain rhododendron hybrids

• The climate is very similar to western Britain and Ireland

• In 2016, visiting Scottish biologists on an Archnetwork/Erasmus funded comparative tour noted this and prepared a memorandum, circulated within ‘official Norway’

• In part as a result, three ‘species’ (in effect, hybrids based on those species) were added to the list of potential invasives in 2018

• This has increased awareness, and opens up funding for combatting invasive escapes

• Such escapes have also now been documented, in a project funded as a result
• Effective techniques developed in Britain and Ireland have been transferred to Norway

• Escapes are now understood to be a threat

• Eradicating ‘outbreaks’ before they become large-scale appears to be easily practicable

• In the longer term eliminating potentially invasive hybrid types from sale in garden centres should reduce further the potential for Rhododendron to become invasive.
Mink extermination

- Widely escaped from fur farms in Norway, Scotland, Ireland, and Iceland
- Established in the wild in all four countries, and a serious management problem affecting populations of many native species, especially ground-nesting birds
- Considered ineradicable in Norway, except perhaps on some islands remote from others (e.g. Smøla archipelago)
- In Iceland, mink numbers are thought to be ‘growing following a slight decline’ (Source)
- In Ireland, it is considered that “Eradication of the American mink population in Ireland is now impossible due to its spread throughout the whole country” (Source)
• In Scotland, mink now eradicated in Outer Hebrides (last animal trapped in 2016)
• In over 10000km² of northern mainland now ‘no evidence of any breeding mink present’ (Bryce et al 2011); rolling programme to new areas, ‘watershed’ approach
• Populations reduced by over 80% in another 10000km² (Melero et al 2018)
• Techniques for extermination, and in particular for killing the last few breeding females in an area, now well proven and published
• Much enhanced control, with large-scale removal on a rolling front, demonstrated as practicable

• New, even more effective techniques becoming available, such as humane multiple-kill traps and dog/fibreoptic method

• Especially in countries with naturally ‘linear’ distributions along coasts or in river valleys, such as Norway

New Zealand scent lure multiple trap

1. Trained dog finds mink
2. Man investigates hole mink is hiding in
3. Sees mink by torchlight
4. Shoots it with 22 pistol
5. Last female in area killed

Smøla dog/fibreoptic technique
• These and other examples (there are many more) demonstrate the practical utility of better exchange of information within the region

• And the problem of conservation structures themselves hindering restoration when they focus overly on particular species, and/or are based on assumptions about species requirements which comparison with other areas shows to be incorrect

• Communication between Norway and Iceland is relatively good between researchers, NGOs, and government environmental regulators; in part through Nordic mechanisms

• Communication between Nordics, Scotland and Ireland is better than it was, but still not good, in researchers; less good between NGOs; and almost nonexistent between government bodies

• Some progress where comparative data brought to light – but not systematic engagement

• Which, given the strong commonalities in biophysical features and landscape histories, is odd
What to do?

• Institutionalise contact. For example, more meetings like this one, with a wider range of participants!

• Scotland and Brexit: a chance to overhaul land use/conservation framework? Membership of Nordic funding mechanisms? Bilateral deals? (All will be clearer next year?)

• Rare that Scottish/Irish NGO & govt. sector workers in our field know their Icelandic/Norwegian counterparts, or anything about practice in these other countries. Partly due to Scottish rules in effect preventing civil servants visiting counterparts, except those in England and Wales. Partly due to lack of recognition in Norway/Iceland that Scottish/Irish counterparts have knowledge (e.g. on invasives) of considerable utility. This should be fixed.

• NGOs set up better liaison/network mechanisms for the region?
Samarbeid og kunnskap for framtidas miljøløsninger
Cooperation and knowledge for the future’s environmental solutions

-let’s get to know what each other knows much better!

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