Turning back the tide of American mink invasion in partnership with communities

Xavier Lambin
Matt Oliver
Rosalind Bryce, Jamie Urquhart, Llinos Davies, Helen Gray
Tackling the non-native invasive species crisis

NNIS threaten biodiversity

Progress with vertebrate invasive eradications on islands, but most mainland areas remain affected

Management interventions short of eradication must be sustained in perpetuity

Community involvement deemed valuable to achieve large spatial coverage but few guidelines, on harnessing volunteer manpower
Our aims

to eradicate American mink from a partial refuge for native prey species, by capitalising on the motivations and interests of local communities
to test a community-based approach to invasive management
to ensure ownership of the project by local communities to maximise sustainability
Mid/late stage invasion of Scotland

Introduced for fur farming

Escaped through intentional and non-intentional releases
The project

One of the largest-scale invasive control effort: 10,000 km² and growing

A functional approach to participation: used the motivations of local communities, facilitated their roles as volunteers within a coordinated partnership

An adaptive management approach: learning-by-doing-by learning... Science and conservation dialogue

Rolling carpet strategy: Continually increased controlled area, whilst maintaining vigilance and rapid reaction behind front
A cooperative community-based project:

Utilising and coordinating the existing skilled workforce, such as gamekeepers and fishing ghillies
Mink rafts: a low tech breakthrough and key component of coverage and participation
Mink raft spaced at 2 km interval throughout project area, N = 860
Extensive volunteer involvement: 80% of rafts are monitored by volunteers.
Mink captures over the project area
N > 650
70% of mink are caught and dispatched by volunteers
In 4 years, an area of 10,500 km\(^2\) has been cleared of breeding mink
Key stages in adaptive management approach

1. Control began in the headwater of catchments: poor habitat for mink, yet threatened refuge of native focal species
The uplands are marginal habitat for mink

No mink captures in 3500 km² of montane habitat
Mink caught above 300m are predominantly dispersing males.
Key stages in adaptive management approach

1. Control began in the headwater of catchments: demographic sink for mink yet threatened refuge of native focal species

2. Rapid expansion downstream, sub-catchment by sub-catchment
Capture rate decreased with decreasing connectivity to mink in other sub-catchments

\[ N \text{ mink/6 month} \sim S^M \text{ mink} + \text{distance to coast} + \text{distance} \times S^M \]
Key stages in adaptive management approach

1. Control began in the headwater of catchments: demographic sink for mink yet threatened refuge of native focal species

2. Rapid expansion downstream, sub-catchment by sub-catchment

3. Abandoned initial focus on Cairngorms National Park and instead aimed for catchment-scale control, while maintaining over-watch behind control front
Mink are stupendous dispersers

Genotyped culled mink at 15 microsatellite markers

fullsibs

Aged from tooth structure,
Key stages in adaptive management approach

1. Control began in the headwater of catchments: demographic sink for mink yet threatened refuge of native focal species

2. Rapid expansion downstream, sub-catchment by sub-catchment

3. Abandoned initial spatial focus on upland Cairngorms National Park within 2 years and instead aimed for catchment-scale control, while maintaining overwatch behind control front

4. Gradually shifted make up of pool volunteers
A changing volunteer community

- Game keepers
- Fishery bailifs and ghilies
- Wildlife professional (e.g. rangers)
- Land managers (e.g. farmers, land owners)
- Residents

Increased recruitment of salmon fishing staff as we moved away from grouse shooting moorland down rivers
Modelling volunteer’s continued participation in the project: survival analysis in MARK

189 volunteers, 8 census dates, “known fate models”

Does volunteer “survival” profession? length of involvement? time, cohort? intervention by project staff?
Volunteer survival: 3 categories and “age” effect, different motivations and selective drop out.

- Fishing staff: 95 %
- Local residents, land managers and wildlife professionals: improving with “age”, reflecting loss of less motivated subset
- Game keepers: 78 % constant
Summing up

Large scale mink control has been achieved by using common sense and science to inform a community based effort.

Better knowledge of mink biology demonstrated need to move trapping effort a large distance from the national park focal conservation area.

Continued expansion of large mink free areas is feasible as there is a large reduction in effort in areas cleared of mink.

An adaptive approach allowed changes in strategy in response to information as it was acquired; expansion took place more rapidly than planned.
Future long term sustainability

Handed over a university-based project (with high levels of designated funding) to a partnership led by a federation of fisheries interests

Empowering volunteers to tackle other invasives

Shortening time lag to ecosystem restoration through water vole translocations for volunteers benefit
Soon in a newsagent near you