

A wide-angle photograph of a lush green mountain valley. A winding stream flows through the center of the valley, surrounded by vibrant green grass and patches of purple heather. In the foreground, two hikers are sitting on a grassy slope, looking out over the valley. One hiker is wearing a blue hat and a backpack, while the other is wearing a dark jacket. The background shows steep, green mountainsides under a soft, hazy sky.

# Threatened Plants in Britain and Ireland

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# Aims of the survey

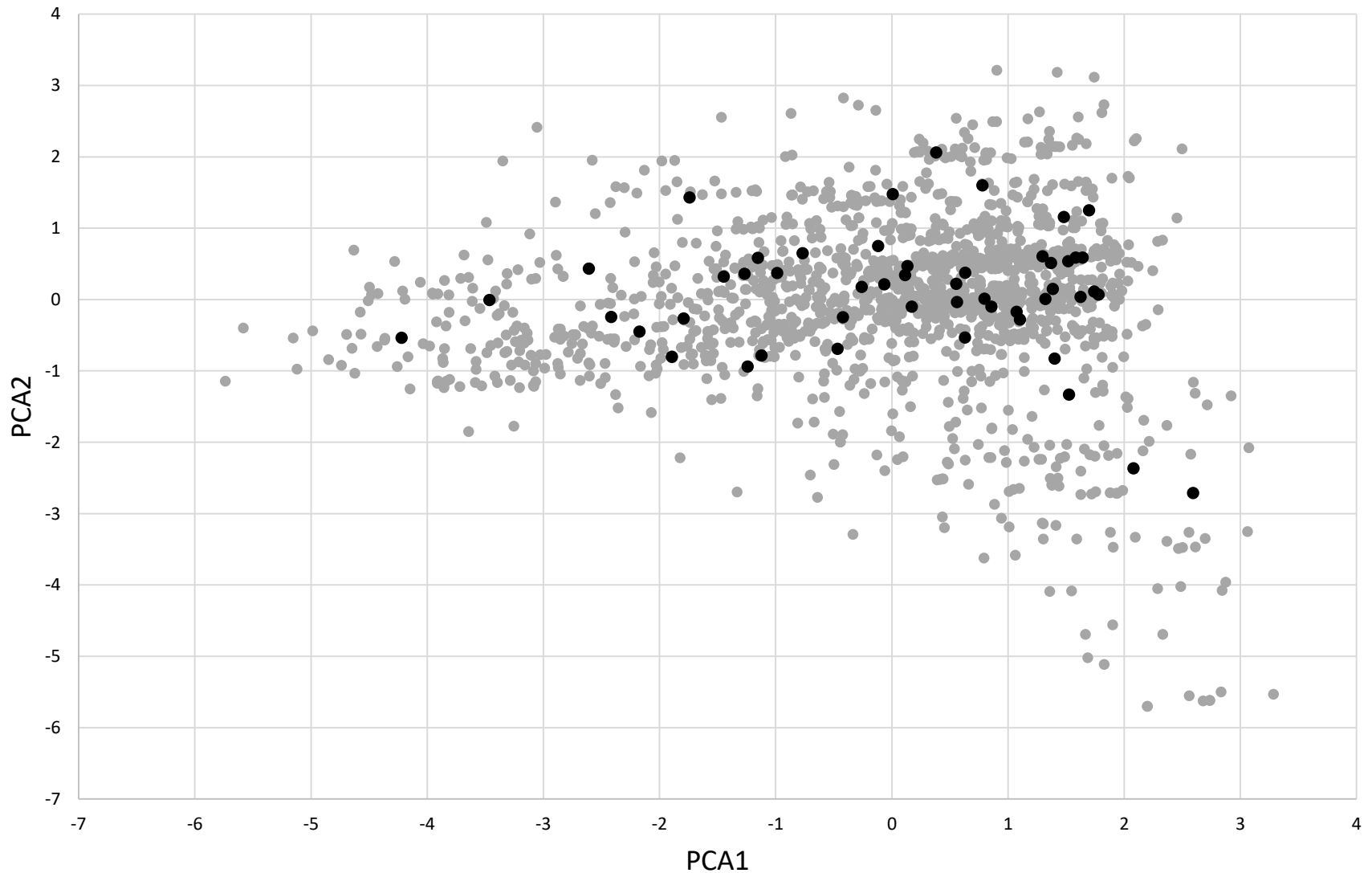
- Improve knowledge concerning abundance & ecological and management requirements of threatened species
- Quantify the extent of losses since 1970
- Improve understanding of the main threats
- Provide a baseline for future surveys
- Inform conservation activity

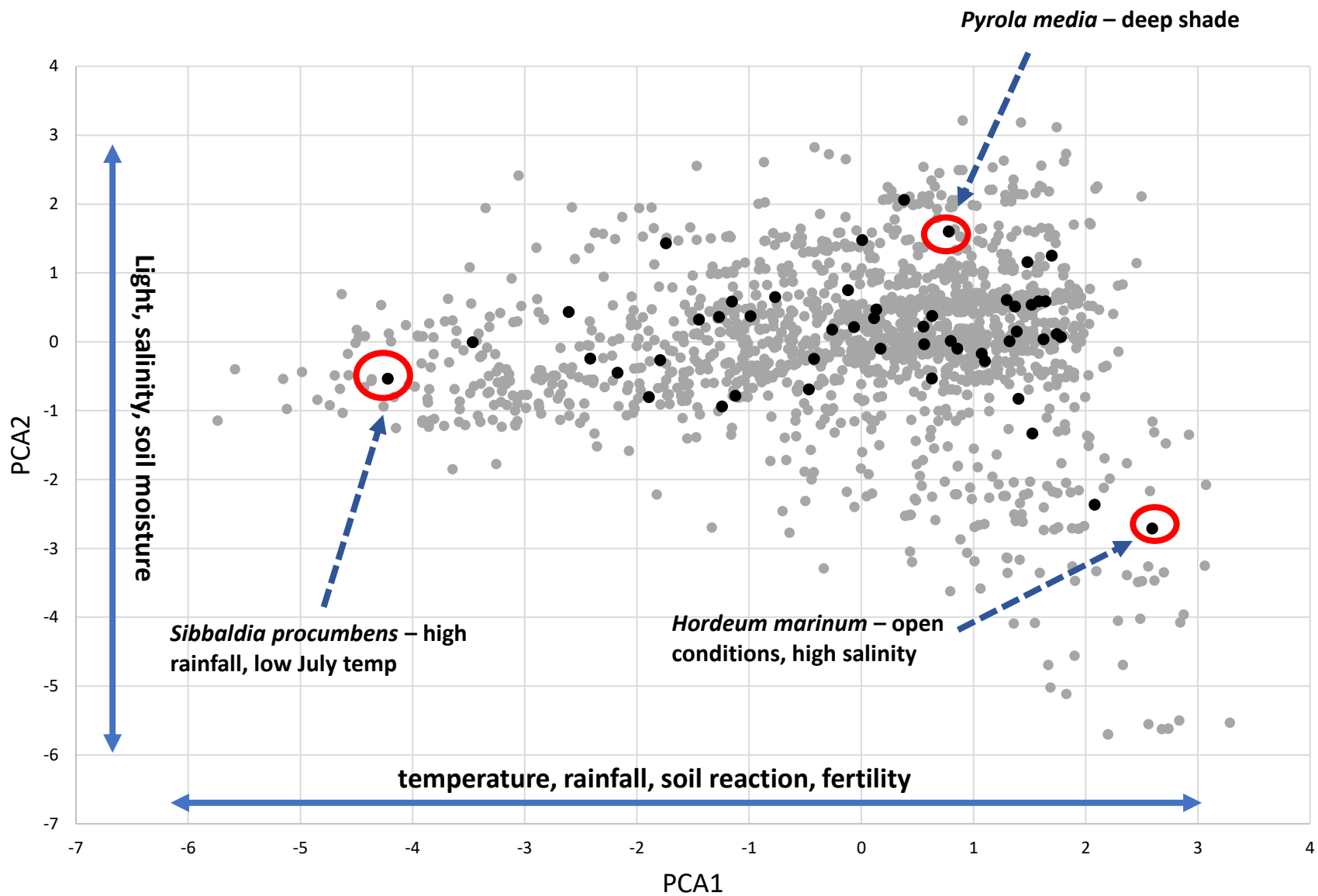
# Species selection

- 50 species: 42 threatened, seven NT, one LC (Juniper)
- 35 occur in Scotland; one (Sibbaldia) restricted to Scotland
- Broad range of habitats (14) and geographic areas
- Wide range of ecological and climatic conditions



# PCA of the key ecological and climatic requirements for all GB and Irish species (light, soil reaction, fertility, moisture, salinity, rainfall, July temp)

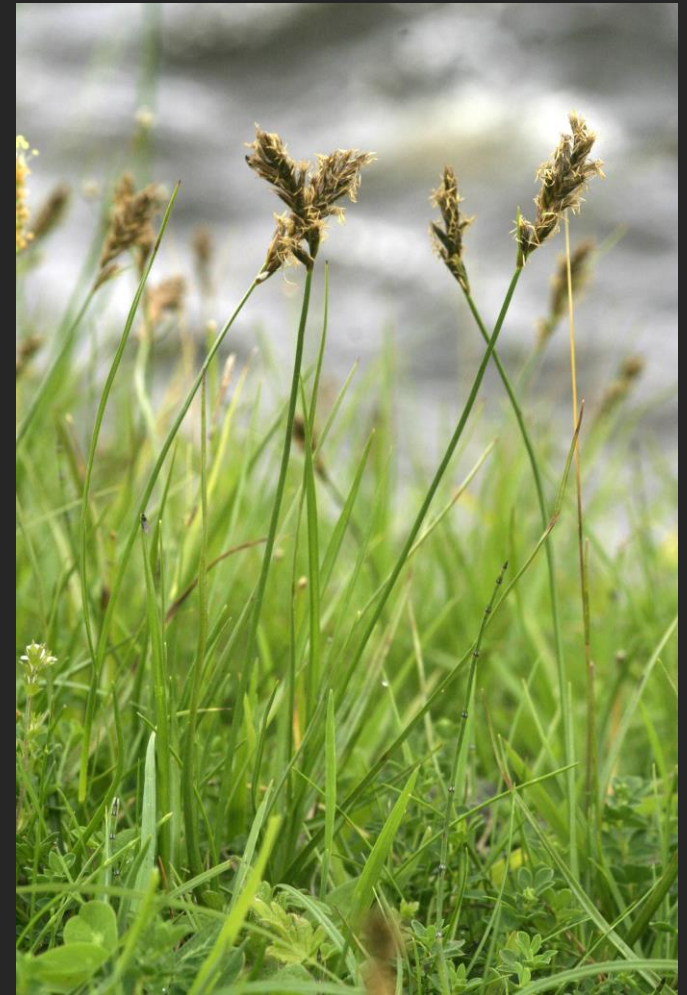






# Field survey

- Six field seasons (2008 – 2013)
- 4000 randomly pre-selected sites
- Standardised, repeatable, fun (?) methodology
- Slope, aspect, extent of population, sketch map, number of individuals, habitat, soil type, management, vegetation height, threats, NVC, associate species, etc.!
- If absent, probable reason for loss (inc. past errors) – and null returns registered

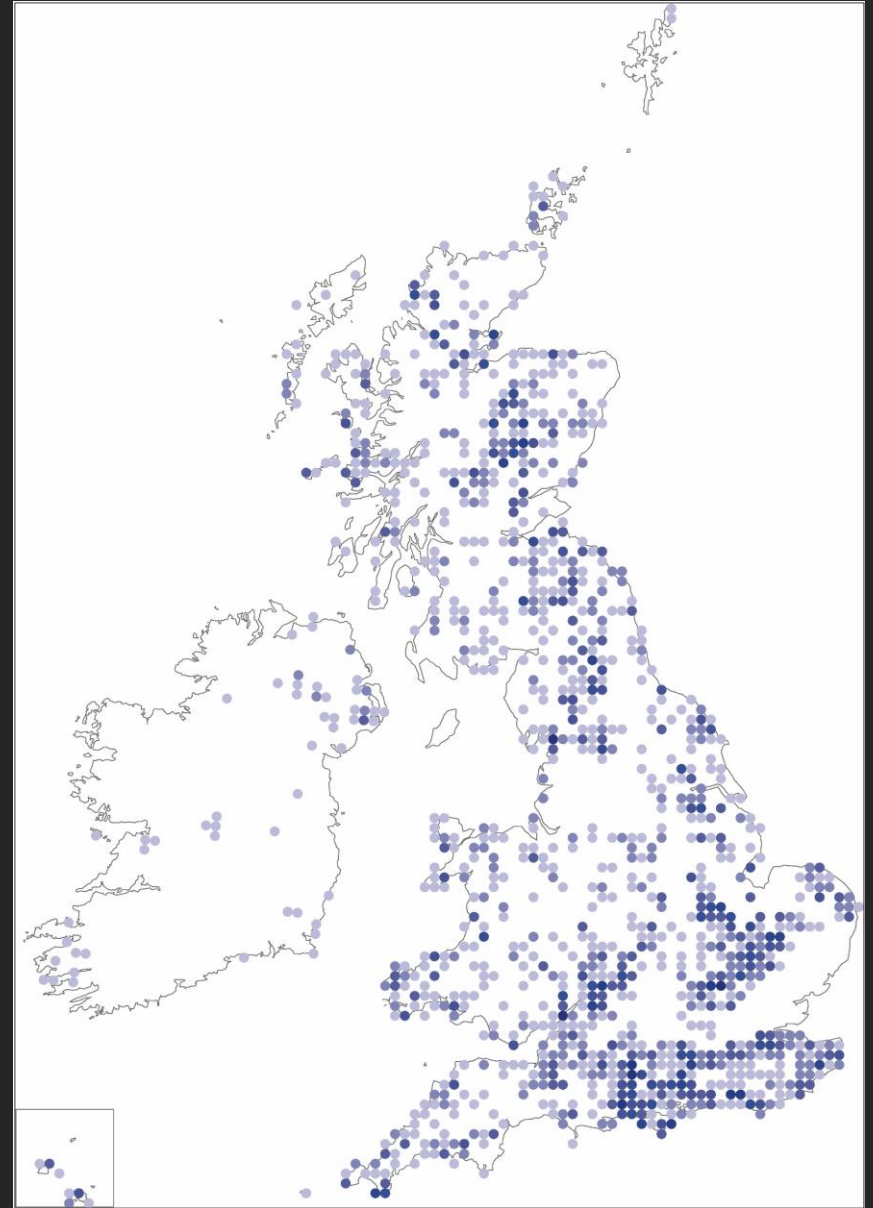


# Survey coverage

- Just over 2000 pre-selected sites surveyed by *ca* 800 surveyors
- In Scotland, 516 pre-selected sites visited by *ca* 120 surveyors



The number of pre-selected populations surveyed per hectad for the TPP, on a coloured scale from pale blue (one survey) to dark blue (nine or more surveys).



THANK YOU!



# Key results: refind rates and population size



- 1993 pre-selected populations visited
- Average of 40 pops searched for per species (range 13 – 126)
- 1011 populations refound (51%)
- Average refind rate for a species was 53% (range 18% for *Ranunculus arvensis*, to 87% for *Sibbaldia procumbens*)
- Significantly higher refind rate in uplands (disproportionate decline in lowlands)
- $\frac{3}{4}$  populations supported fewer than 100 individuals
- Eight species had median values of <10 individuals, inc. *Cephalanthera longifolia*, *Polystichum lonchitis*, *Pseudorchis albida*, *Vicia orobus*)

# Key results: associate species

- Huge amount of information regarding associate species and habitat for the 50 threatened plants surveyed
- For some, the survey has identified hitherto overlooked but important vegetation assemblages/habitat
- This not only improves our understanding of the ecological niche, but also assists in searching for potential 'new' populations



# (some) examples of good news!



- A stunning population (>10,000 plants) of Holly Fern was recorded on limestone pavement near Lochcarron, West Ross, by Angus Hannah and Jim McIntosh. Our findings suggest relative stability for this species in GB since the 1970s
- Impressive populations of Field Gentian (*ca* 5000 individuals) at three sites in Scotland (Orin Dam, East Ross; Kingston, Moray; Kilmory, Rum)
- *Cephalanthera longifolia* and *Astragalus danicus* comparatively stable distributions in Scotland since 1987



# (some) examples of good news!

- *Sibbaldia procumbens* was refound at 21 out of 22 sites visited in the Scottish Highlands, supporting the view that distribution is stable since 1970s and previously reported declines a result of under-recording.



Mossy snow-bed areas with damp, skeletal soils @ Ben MacDui, South Aberdeenshire

# But....



- The decline of *Sedum villosum* appears to be more pronounced and widespread than previously thought, due to overgrazing, disturbance by animals, eutrophication, drainage, burning
- *Gnaphalium sylvaticum* was absent from >half of all Scottish sites visited (16 out of 27)
- Significant losses of *Meum athamanticum* in core areas throughout lowland and upland regions of Scotland – lack of management *or* overgrazing (!)
- *Stellaria palustris* – not found at any of the eight locations visited in the central belt
- I could go on....



# Key results: threats

- **‘lack of (suitable) management’** reported at 36% of sites,
- Number of factors: abandonment of marginal land, lack of suitable stock type/numbers of stock, fragmentation of sites, redundant traditional practices, etc: wider countryside *and* SSSIs
- Other main threats = intensification (agricultural), overgrazing, (inferred) eutrophication, invasive species
- Invasive species most frequently reported = coarse grasses and scrub  
Native species were 13 times more likely to have been listed as a threat than non-natives
- Habitat ‘loss’ (i.e. destruction) ↓
- Conversion of arable to grass leys ↑
- N-dep



# Survival



- Very low levels of survival for short-lived species with limited dispersal/competitive abilities & short-lived seed banks (e.g. Field Gentian; Field Fleawort)
- Low survival for short-lived species with potentially long-lived seed banks (lack of disturbance, absence of traditional management activities, inappropriate cutting regimes, etc.) – marginal land; tracksides, wood margins, etc
- Probability of recovery diminishes over time

# Survival

- Populations were more likely to have been refound in SSSIs compared to unprotected sites (65% survival *vs* 48% survival). But....
- Perennials that reproduce vegetatively suffered fewer losses (probably because they can withstand fluctuations in management regimes & temporary suboptimal conditions) e.g. *Carex ericetorum* – but potential for extinction debt in suboptimal situations e.g. Juniper
- Relatively high survival rates for species that require little active management i.e. ‘self-sustaining’ (e.g. *Polystichum*, *Sibbaldia*)
- ‘natural’ disturbance (erosion, rabbits, drawdown)

# (brief) Conclusions

- Protection is not enough – for many species, the majority of populations occur(ed) outside of protected sites
- Targeted agri-env schemes; restoring lost links; Protect more sites? – ££
- Reinstatement of low-intensity traditional management
- (targeted) periodic disturbance is necessary for many species, and sometimes requires an interventionist approach
- better communication between data providers, conservation organisations, landowners, public

