

Scottish Wildlife Trust

Knowledge and Evidence



Scottish
Wildlife
Trust



Research Prospectus

May 2018

Reserves



Research topic

Taxa surveys/research in the Balnaguard area. This could be applied to larger species (i.e. pine marten & red squirrel) and also smaller species (i.e. mice, voles and shrews) as well as bats, invertebrates & botanical transects. Purpose is to provide species records for each site (including records of invasive non-native species where appropriate). A Black Grouse study also a possibility.

Project Champion

Rab Potter

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

Pine marten records suggest an increase in this species across Scotland but currently we have limited methods to provide scientific evidence of population densities on our reserves. Mice, voles and shrews are the most abundant mammals in Scotland and play a vital role in supporting key predators such as birds of prey. A study into the abundance of any of these species would be valuable in charting the progress of the ability of the landscape to support a variety of wildlife.

Method

A combination of tracking, camera trapping, hair tube trap analysis and scat analysis alongside data handling, analysis & reporting. Potential for an agent-based modelling approach to be taken to model the relationship between red squirrel, pine marten and their habitat.

Timing

Best time of year would be March - Sept for botanical; all year for mammal, though better spring/summer for most.

Location

Balnaguard

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data

Reserves



Research topic

An analysis of the current structure of the woodland. This will enable us to carry out the most appropriate management techniques to ensure we can maintain and enhance the existing woodland.

Project Champion

Rab Potter

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

Native woodlands are one of the most characteristic elements of the Scottish landscape. Woodlands have a vital contribution to make towards conserving Scotland's threatened habitats and species and increasing the variety of our wildlife.

Method

This would require extensive fieldwork involving diameter at breast height sampling and tree identification, along with herbivore impact assessments. This could be combined with a desk-based study of current Scottish Wildlife Trust management techniques/regimes with an opportunity to propose future management. GIS software could also be utilised providing an excellent opportunity to gain valuable experience of this method of analysis.

Timing

Any time of year

Location

Balnaguard

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data

Reserves



Research topic

Assess deer browsing Impact on regenerating Juniper in Balnaguard.

Project Champion

Rab Potter

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Level

Undergraduate/Masters

Aim

Excessive deer grazing/browsing has a devastating impact on tree regeneration and the Scottish Wildlife Trust are eager to calculate just how much of an impact they are having on regenerating Juniper in Balnaguard. Comparison of areas both inside and out of a recently constructed deer fence would allow us to measure the success of this enclosure.

Method

A combination of surveying, scat analysis, deer fence surveys and final proposals would be required.

Timing

This could be undertaken at any time of the year to fit in with student's studies. Could also run for an extended time over several months if there was interest for this.

Location

Balnaguard

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data

Reserves



Research topic

A survey to establish the viability of seed production of Juniper in Balnaguard.

Project Champion

Rab Potter

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Level

Undergraduate/Masters

Aim

In light of the pressure on Juniper in the area, a survey to assess if current adult Juniper bushes are providing sufficient viable male/female seeds to ensure regeneration of juniper within the reserve.

Method

Tree/sapling surveys, berry collection, analysis, and desk-based research.

Timing

Timing would need to be initially autumn for berry collection.

Location

Balnaguard

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data

Reserves



Research topic

To ascertain Red squirrel population density at Balnaguard Glen reserve, and in different habitat zones on the reserve.

Project Champion

Rab Potter

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Level

Undergraduate/Masters

Aim

A study is required to accurately establish the extent of the Red squirrel population in Balnaguard glen. A further conclusion that establishes the most effective survey methodology over this large area would be a useful outcome also.

Method

Field observations, camera trapping, hair tube trapping, hair analysis, data analysis.

Timing

Any time of year although field work best carried out between Spring and Autumn when squirrels are most active.

Location

Balnaguard

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature, historic survey data. An introduction to squirrel hair analysis.

Reserves



Research topic

A survey to quantify and map the extent of the wetlands and fen habitat in the Loch of the Lowes area and establish threats to this ecosystem, e.g., non-native invasive species and tree seedlings.

Project Champion

Rab Potter

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Level

Undergraduate/Masters

Aim

Scottish wetlands are protected areas and vital to the health of Scotland's ecosystems. They provide feeding and breeding habitats for a variety of species as well as supporting a wide range of plants.

Method

A variety of survey techniques could be applied including fieldwork, GIS analysis, lab-based studies, data handling, analysis & reporting. This would be an excellent chance to use GIS analysis and to practice this method of data collection.

Timing

March - September

Location

Loch of Lowes

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature, historic survey data.

Reserves



Research topic

Taxa surveys/research in the Loch of the Lowes area. This could be applied to larger species (i.e. pine marten & red squirrel) and also smaller species (i.e. mice, voles and shrews) as well as bats, invertebrates & botanical transects. Purpose is to provide species records for each site/ records of invasive non-native species where appropriate.

Project Champion

Rab Potter

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

Pine marten records suggest an increase in this species across Scotland but currently we have limited methods to provide scientific evidence of population densities on our reserves. Mice, voles and shrews are the most abundant mammals in Scotland and play a vital role in supporting key predators such as birds of prey. A study into the abundance of any of these species would be valuable in charting the progress of the ability of the landscape to support a variety of wildlife.

Method

A combination of tracking, camera trapping, hair tube trap analysis and scat analysis alongside data handling, analysis & reporting. Potential for an agent-based modelling approach to be taken to model the relationship between red squirrel, pine marten and their habitat.

Timing

Best time of year would be March - Sept for botanical; all year for mammal, though better spring/summer for most.

Location

Loch of Lowes

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature, historic survey data. Accommodation at Loch of the Lowes Bothy would be available from September onwards although this is not guaranteed. Office facilities would also be available on site.

Reserves



Research topic

An analysis of the current structure of the woodland. This will enable us to carry out the most appropriate management techniques to ensure we can maintain and enhance the existing woodland.

Project Champion

Rab Potter

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

Native woodlands are one of the most characteristic elements of the Scottish landscape. Woodlands have a vital contribution to make towards conserving Scotland's threatened habitats and species and increasing the variety of our wildlife.

Method

This would require extensive fieldwork involving diameter at breast height sampling and tree identification, along with herbivore impact assessments. This could be combined with a desk-based study of current Scottish Wildlife Trust management techniques/regimes with an opportunity to propose future management. GIS software could also be utilised providing an excellent opportunity to gain valuable experience of this method of analysis.

Timing

Any time of year

Location

Loch of Lowes

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature, historic survey data. Accommodation at Loch of the Lowes Bothy would be available from September onwards although this is not guaranteed. Office facilities would also be available on site.



Visitor engagement/tourism

Research topic

An ecotourism assessment focussing on understanding the Scottish Wildlife Trust's visitor profile and their motivations for visiting. A further complementary study could be undertaken to quantify the benefit to the local community and business of the Scottish Wildlife Trust's nature-based tourism setup.

Project Champion

Caroline Hendry

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Level

Undergraduate/Masters

Aim

Outdoor recreation is one of the major leisure activities of the UK population. Having an understanding of the recreational value of ecosystems and the motivations of visitors allows for decisions to be made that accurately reflect the importance people place upon these areas. It is hoped that by gathering concrete data on these will allow for the work of the Scottish Wildlife Trust to be measured in relation to local and wider community values. There are many different forms of data collection this could take - an interesting part of the project would be creating a unique yet replicable method that could be used across all visitor centres to allow for comparison.

Method

Surveys of visitors, including questions on what other local services/businesses they are using. Behavioural studies using visitor counters for walking paths including the characteristics

of the outset location (including socioeconomic and demographic characteristics of the population and the availability of potential substitute sites), the characteristics of the

destination site (habitat type) and the travel time (and hence cost) of the journey. Note that a programme of visitor surveys is already in place at certain reserves and further studies should incorporate these.

Timing

Summer months - July in particular

Location

Visitor Centres

Scottish Wildlife Trust Contribution

Supervision in conjunction with our Visitor centre management team. Office facilities would also be available on site. Historic visitor survey data.



Reserves

Research topic

Data analysis of Osprey nesting and feeding habits.

Project Champion

Rab Potter

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

There are extensive data collected by the Scottish Wildlife Trust (such as numbers and species of fish brought to osprey nest). This project would entail looking to establish trends within these data which go back to the early 70's in diary form. This could be a fascinating insight into the lives of Osprey past.

Method

Extensive data analysis, data entry and producing a complete piece of authoritative research. The Scottish Wildlife Trust can provide a large data set in diary form.

Timing

Any time of year

Location

Loch of Lowes

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data

Reserves



Research topic

Taxa surveys/research in the Keltney Burn area. This could be applied to larger species (i.e. pine marten & red squirrel) and also smaller species (i.e., mice, voles and shrews) as well as bats, invertebrates & botanical transects. Purpose is to provide species records for each site/ records of invasive non-native species where appropriate.

Project Champion

Rab Potter

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

Pine marten records suggest an increase in this species across Scotland but currently we have limited methods to provide scientific evidence of population densities on our reserves. Mice, voles and shrews are the most abundant mammals in Scotland and play a vital role in supporting key predators such as birds of prey. A study into the abundance of any of these species would be valuable in charting the progress of the ability of the landscape to support a variety of wildlife.

Method

A combination of tracking, camera trapping, hair tube trap analysis and scat analysis alongside data handling, analysis & reporting. Potential for an agent-based modelling approach to be taken to model the relationship between red squirrel, pine marten and their habitat.

Timing

Best time of year would be March - Sept for botanical; all year for mammal, though better spring/summer for most.

Location

Aberfeldy

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data

Reserves



Research topic

A study to analyse the current structure of the woodland. Results could suggest the most suitable management regime required to maintain semi-natural ancient woodland.

Project Champion

Rab Potter

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Level

Undergraduate/Masters

Aim

A more detailed understanding of the size and age of the trees within the woodland would be invaluable to the Trust's management of this reserve. Recent work at this reserve has included deer control and sycamore removal and further survey work to inform a herbivore impact assessment and/or to assess the level of sycamore regrowth would be of great use.

Method

This would require extensive fieldwork involving diameter at breast height sampling, tree identification, herbivore impact assessments and monitoring regeneration of felled trees. GIS software could also be utilised providing an excellent opportunity to practice this method of analysis.

Timing

Any time of year

Location

Gight wood, near Ellon

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data

Reserves



Research topic

A spatial analysis of Red squirrel distribution and abundance in Gight Wood near Ellon.

Project Champion

Rab Potter

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

To ascertain whether there is any evidence to support the current belief that red squirrels are using neighbouring Forestry Commission land to build dreys and the Scottish Wildlife Trust reserve to feed.

Method

Field observations, transects for sampling drey and feeding signs (distance sampling?), camera trapping, hair tube trapping, hair analysis, data analysis. Given the spatial component, GIS could also be utilised.

Timing

This would have to be undertaken in the summer months when the Red squirrel population is active.

Location

Gight wood, near Ellon

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Collect historical and up to date data on bryophytes, lichens and fungi around Balgavies loch.

Project Champion

Rab Potter

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Level

Undergraduate/Masters

Aim

Scottish woodlands support many lichen and bryophyte species that are largely confined to this habitat. Many of these species are absent in other parts of Britain and Europe, and some are globally rare. Furthermore, many of Scotland's wildlife depends on fungi including a variety of plants, beetles, slugs and red squirrel for food and shelter. Fungi also provide decomposing and recycling services, maintaining a healthy nutrient cycle in woodlands.

Method

Bryophyte, Lichen and Fungi surveys and identification. Digitising existing records for analysis.

Timing

Any time of year

Location

Balgavies

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Investigate management of water levels in Fonagh Bog compartments

Project Champion

Rab Potter

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Level

Undergraduate/Masters

Aim

Pollution, especially eutrophication is damaging to the flora and fauna in water courses and a real threat to valuable wetland habitats at Fonagh Bog. Fluctuating water levels (flooding and water shortages) could damage the delicate ecology in wetlands. The Scottish Wildlife Trust would be interested in supporting a student to assess the effects of changes in water levels.

Method

A variety of survey techniques could be applied including fieldwork, GIS analysis, lab-based studies, data handling, analysis & reporting.

Timing

Any time of year

Location

Balgavies

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Undertake botanical surveys to evaluate the grassland restoration to date of two areas where work has been undertaken to improve species diversity by both cutting/raking at Goose Green and by scrub removal and grazing with Cattle and Sheep at Murder Acre.

Project Champion

Julian Warman

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

A comparative study to evaluate which, if either, of the two above methods for improving species diversity is the most effective.

Method

A variety of survey techniques could be applied including fieldwork, GIS analysis, lab-based studies, data handling, analysis & reporting.

Timing

This project would be best suited to Summer i.e. May - August

Location

Bawsinch and Duddingston

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Analyse water table data collected by volunteers to track how the water table fluctuates on this Raised Bog over time and determine if the level of the water table is sufficiently close to the surface of the moss to support a healthy open raised bog vegetation type.

Project Champion

Julian Warman

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

Red Moss of Balerno, on the edge of the Pentland Hills, is the only raised bog in the City of Edinburgh. The deep peat layer has accumulated over thousands of years. In summer and autumn, the peatland is covered in a blanket of pink-purple heather, sundews, ragged-robin and Sphagnum mosses. The Scottish Wildlife Trust wish to assess how likely the area is to be able to fully support an open raised bog vegetation type.

Method

Extensive data analysis and reporting.

Timing

Any time of year

Location

Red Moss of Balerno

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Map the extent of Common Rock-rose which is the food plant of Northern Brown Argus butterfly found on both reserves.

Project Champion

Julian Warman

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

The Common Rock-rose provides plenty of nectar for various bees and is also the food plant of several species of butterfly (such as the Brown Argus). It is characteristic of chalk and limestone grasslands. These areas of rare and unique wildlife have been likened to rainforest for the diversity of species they hold but are being lost at an alarming rate due to changes in land use. This has caused the decline of grazing and it's estimated that we've lost 80% of our chalk grassland over the last 60 years.

Method

Botanical and habitat surveys and follow up mapping including potential for use of GIS.

Timing

This project would be best suited to Summer i.e. May - August

Location

East Lammermuir Deans

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Map the current extent of open water on this wetland reserve and compare with aerial photos to determine how this has changed over time.

Project Champion

Julian Warman

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Level

Undergraduate/Masters

Aim

This reserve near the River Tweed is a long, narrow strip of marsh, willow scrub and open water that is home to large numbers of wintering wildfowl, including teal, shoveler, goldeneye and wigeon. By utilising historic aerial photos, changes in the water level can be tracked and potentially plotted to assess the capability of this area to continue to support a variety of avian wildlife.

Method

Extensive data analysis and reporting including the use of GIS

Timing

Any time of year

Location

Bemersyde Moss

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Undertake a Bumblebee survey in the summer to evaluate the diversity of these important pollinators in an urban setting at the Scottish Wildlife Trust's smallest reserve which is located in the centre of Edinburgh.

Project Champion

Julian Warman

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

Urban environments are growing across the UK, and perhaps surprisingly, flower rich oases in otherwise uninviting city habitats can support large numbers of pollinators. With bee colonies collapsing, it is vital to understand how urban locations can help support these bee communities.

Method

Bumblebees surveying and data analysis

Timing

Spring and Summer

Location

Johnston Terrace

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Habitat and species surveys on potential reserve extension

Project Champion

Rory Sandison

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

More information available on request

Method

More information available on request

Timing

Best time of year would be March - Sept for botanical; all year for mammal, though better spring/summer for most.

Location

Carron Glen

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Hydrological / geomorphological study of impact of flow of River Forth

Project Champion

Rory Sandison

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

More information available on request

Method

More information available on request

Timing

Any time of year

Location

Alloa Inches

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Assessment of collected data from vegetation monitoring in Fife and assessment of methodology.

Project Champion

Rory Sandison

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

More information available on request

Method

More information available on request

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.

Reserves



Research topic

Study of impact of management on habitats / species

Project Champion

Rory Sandison

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

More information available on request

Method

More information available on request

Timing

Best time of year would be March - Sept for botanical; all year for mammal, though better spring/summer for most.

Location

No fixed location

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, maps, background literature and historic survey data.



Environmental Education

Research topic

Assessment of impact of differing strategies of environmental education

Project Champion

Rory Sandison

enquiries@scottishwildlifetrust.org.uk

Level

Undergraduate/Masters

Aim

More information available on request

Method

More information available on request

Timing

Any time of year

Location

Jupiter Urban Wildlife Centre

Scottish Wildlife Trust Contribution

Basic Ranger guidance and site introduction, background literature.

Marine



Research topic

Blue carbon – assessment of stocks and how they are impacted by different management

Project Champion

Sam Collin

enquiries@scottishwildlifetrust.org.uk

Level

Doctorate/Masters

Aim

1. Determine causes for variation in blue carbon storage in Scottish coastlines with an emphasis on management regimes
2. Apply data to Scottish Marine Regions to identify how to improve blue carbon storage

Method

1. Establish areas under the same management regime in Scotland's coast and compare blue carbon stores (SNH blue carbon assessment) between areas. In the analysis, blue carbon storage is the dependent variable with explanatory variables including management regime, human development and use of area, fishing practices (e.g. trawling), climate, geological structure etc. Proximity to certain practices could also be taken into account e.g. proximity to intensive fishing or tourist activity, so that study sites are smaller and more continuous over the coastline - pixels in GIS rather than a whole marine reserve for example. 2. Split data by Scottish Marine Region to compare blue carbon stocks per region and establish if certain management regimes can be altered to increase blue carbon stocks. For example, if a particular management practice is associated with lower blue carbon, alternative management options can be suggested.

Timing

Season not relevant, field work will mostly consist of liaising with management bodies on Scottish coastline to establish what they are doing and where.

Location

N/A - travel for interviews

Scottish Wildlife Trust Contribution

More information available on request

Marine



Research topic

Decommissioning – implications for OSPAR and how a 'marine wealth fund' might operate

Project Champion

Sam Collin

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Level

Doctorate/Masters

Aim

Assess the positives and negatives associated with partial, complete or no removal of off-shore oil and gas structures

Method

Study should focus around the social (perceived responsibility of oil companies), economic (cost, depends on size and location) and environmental (e.g. pollution from boats, loss of artificial reefs) of decommissioning as well as explore the potential of a marine wealth fund. Evaluation of existing programmes and their application in Scotland should be made, for example the 'Rigs to reef program' in California.

Timing

Methods not dependent on seasonality

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Living Landscapes



Research topic

EHIs and their application in Coigach-Assynt Living Landscape (CALL) programme area

Project Champion

Boyd Alexander

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Level

Doctorate

Aim

1. Identify and define ecosystem health indicators in Coigach-Assynt
2. Develop methods using EHI's to make rapid assessment of ecosystem health (in accordance with Living Landscapes Policy Priorities)
3. Implement methods in Coigach-Assynt area to assess ecosystem health and identify areas requiring attention or with potential for restoration

Method

1. Literature review to establish what an EHI is. Ground truthing and developing existing GIS layers for landcover in Coigach and Assynt.
2. Develop an efficient scoring system to assess EHI's based on species composition, community structure and fauna (deer, small mammals, otters, badgers, birds, raptors, amphibians, insects, bats) presence and abundance. Scat/pellet surveys would be most cost-effective way to assess occupancy and estimate density of fauna.
3. Use method developed in chapter 2 and apply to Coigach and Assynt. This should be done in the summer over 3 years. Different plots to survey vegetation should be used each year to maximise sampling and the order these plots are visited should vary between years to account for seasonality. Map the area in detail and highlight areas which need further attention (and recommendations for doing so), and areas with potential (this could be underutilised areas such as communal grazing, potential wildlife corridors or areas in the watershed that could play host to beavers). Mapping resource: EUNIS landscape layers.

Timing

Fieldwork should be carried out in the growing season (May to October) and carried out over 3 seasons. Camera traps can be deployed throughout the year to assess large fauna such as deer, small mammal trapping should be carried out at the same time across

Location

Field work Coigach & Assynt

Scottish Wildlife Trust Contribution

More information available on request

Living Landscapes



Research topic

Statutory deer management – how could / should it work in Scotland?

Project Champion

Mark Foxwell

enquiries@scottishwildlifetrust.org.uk

Level

Doctorate

Aim

1. Quantify deer populations and use of the landscape and key landscape features to predictively model the outcome of potential management strategies.
2. Use results of modelling to make recommendations for deer management.

Method

1. Quantify deer populations and landscape use - obtain data on structure of deer populations through ground and aerial surveys, determine distribution and density on landscape through pellet counts with plots as points on a grid and stratified based on habitat and obtain mortality data (roadkill, predator, gamekeeper, stalking).

Input data into a model which can be used to predict the outcomes of certain management strategies, variations on predator/prey models (Boyce 2000) or specific deer management models e.g. deerMOM (Xie et al. 1999). Modelling should consider (based on literature or if possible experimentation and retrospective harvest data, the functional response of management options, not just the numerical). Management options could also include the reintroduction of predators, particularly the European Lynx whose reintroduction is part of the Scottish Wildlife Trust's 50 for the future (similar modelling was successfully carried out prior to the reintroduction of wolves to Yellowstone by Mark Boyce).

2. Establish what the ideal/goal is for deer populations (potential honours or MSc project in ecology/social science) and explore what management options best fit this. This will depend on social acceptability and cost as well as ecological outcomes.

Timing

Pellet surveys should occur throughout the year so assess seasonal variation, aerial surveys are most effective in winter when there are no leaves on the trees and there's snow on the ground, ground surveys are best carried out outside of fawning season w

Location

Scotland - various different estates/management units for comparison.

Scottish Wildlife Trust Contribution

The Trust can provide contact time with the Head of Policy and the Reserves Manager for the Highlands and Islands. In addition, access to the following groups can be arranged: Morven Deer Management Group, Sutherland Deer Management Group; Coigach-Assynt Living Landscape (CALL, <http://coigach-assynt.org/>), landowners (this is a Scottish Wildlife Trust run project) and the CALL sustainable deer management project group (the student could critique the work done here). Introductions to other Scottish Wildlife Trust contacts on progressive deer management can be made and there will be opportunities to undertake stalking field trips. Office space available in the North office (Glakemore, North Kessock)

Social Sciences



Research topic

Assessing public acceptability for deer management options

Project Champion

Mark Foxwell

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Level

Undergraduate/Masters

Aim

1. Review deer management systems in Europe and North America to explore options viable in Scotland
2. Conduct opinion surveys across different demographics of the public (including landowners, gamekeepers etc.) to assess the acceptability of deer management systems that are viable in Scotland.

Method

1. Literature review, potential to interview deer/harvest management staff in other places
2. Devise a questionnaire and distribute to get a representative sample of the population, ensuring people in rural areas where deer populations are prominent are included. Analysis of results should include numbers of deer in the area surveyed, occupation of surveyee, age demographics etc.

Timing

Any time of year

Location

Across Scotland

Scottish Wildlife Trust Contribution

More information available on request

Ecosystem Health



Research topic

Is tree planting enough? Do our woodland restoration sites (20 years+) have expected species diversity, and are they moving towards functioning woodland ecosystems?

Project Champion

Bruce Wilson

enquiries@scottishwildlifetrust.org.uk

Level

Masters

Aim

1. Define criteria for functioning woodland ecosystems
2. Survey restoration sites to establish if they meet the criteria for functional woodland ecosystems
3. Use variables relating to restoration site to explain variance between sites, particularly if they do meet the criteria for functioning woodland ecosystem

Method

1. Literature review –criteria should be based off appropriate woodland type.
2. Surveys should look at vegetation community structure (height, age, canopy cover, basal diameter), species diversity and herbaceous layer composition/understory. Fauna occupancy and abundance can also be included using scat/pellet surveys, nest surveys, sound recording and trapping or inferences on habitat suitability made from vegetation survey and literature.
3. Explanatory variables for variation between sites including age of site, distance to and density of landscape features (roads, human development, water bodies, topography). Resources: EUNIS and Forestry Commission landscape GIS layers.

Timing

Spring, summer - period for vegetation surveys should be minimised to avoid seasonal bias - requires efficient field methodology. Fauna surveys Spring - Autumn.

Location

Across Scotland

Scottish Wildlife Trust Contribution

More information available on request

Agriculture



Research topic

Sustainable land stewardship - how we establish viable markets for ecosystem services

Project Champion

Bruce Wilson

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Level

Undergraduate/Masters

Aim

1. Evaluate potential options for establishing viable markets for ecosystem services in Scotland
2. Evaluate current system in Scotland and identify areas for improvement.

Method

1. Evaluate systems in other countries and assess their viability and potential success in Scotland (taking into account differences in social and land use structures).
2. Evaluate current system in Scotland and make suggestions for improvement referencing other country's systems. Working within the parameters of current regulations but also considering how the UK's departure from the EU may affect agricultural subsidies and regulations and how grant schemes can be maximised for optimal value for natural capital stocks and ecosystem service flows.

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Social Sciences



Research topic

West Highland Survey: changes from 1955 to 2018

Project Champion

Boyd Alexander

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Level

Undergraduate/Masters

Aim

Update or review of Frank Fraser Darlings West Highland Survey for Coigach and Assynt and determine (among other things):

- School Enrolment and school viability projections
- Working population
- Crofting and agricultural demographics
- Stock density on common grazings
- End destinations for high school graduates
- Fertility rates

Method

Comparison of data from the publication of Frank Fraser Darling's West Highland Survey with modern data. Requires review of current census data to establish who is living in the area, what their employment status and nature of employment is, age demographics, number of people and social structure per household. This data can then be used to explore shifts in human ecology and assess the impact of this on land use, wildlife, social dynamics and population sustainability.

Timing

Timing not dependent on seasonality

Location

Coigach and Assynt, if only partially

Scottish Wildlife Trust Contribution

Census office data at the post code level

Living Landscapes



Research topic

CALL vs CLL social ideas/reactions to community greenspace; relative biodiversity value of greenspace as "good" vs "good enough"

Project Champion

Ian Mackenzie

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Level

Undergraduate/Masters

Aim

More information available on request

Method

More information available on request

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Carbon Storage



Research topic

Estimate of carbon stored on reserves, which will by necessity also give us peat depths across the peatbog reserves

Project Champion

Alan Anderson

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Level

Undergraduate/Masters

Aim

1. Provide an estimate of the amount of carbon stored in select Scottish Wildlife Trust reserves

Ascertain volume, depth and age of peat reserves

2. Improve Scottish Wildlife Trust GIS data to provide current, accurate portrait of reserves

3. Develop concept of carbon capture as valuable eco-system service and key indicator of reserve quality to promote boundary expansion and consolidation.

Method

- Procure access to coring equipment.
- Initial review of the current state of GIS/mapping data for the selected reserves
- Develop coring plan for each reserve. Consider the deepest and highest points, homo/heterogeneous character of areas and surrounding geology to determine suitable resolution of sampling rate.
- If Russian corer and lab access can be obtained, analyse entire column: total organic carbon, variations in C storage, chronological sequence, radiometric dating
- Plot locations of cores and calculate peat area using ArcGIS
- Consider sources of error e.g. sediment erosion as major error in age-depth relationship

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Reserves



Research topic

Water flow and sediment loss from peatland reserves

Project Champion

Alan Anderson

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Level

Masters

Aim

1. To quantify the effectiveness of Scottish Wildlife Trust peat bog management.
2. To identify the main pathways and drivers of peat loss.
3. Develop a dynamic fluid/sediment flow model for implementation in GIS?

Method

Examine historical GIS/photographic data to identify 'most at risk' reserves

Procure access to lab. for water/sediment analysis

Develop fluid flow-model for each reserve

Determine sediment loss and soil erosion for each reserve (erosion pins)

Consider location (circa control measures), quantities, sampling rates, variables for each model

Quantify SOC/SIC e.g. Loss-on-ignition analysis to determine sediment loss over time

Pair with carbon storage project – implement post-completion?

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Living Landscapes



Research topic

EHI monitoring across the Living Landscape projects

Project Champion

Alan Anderson

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Level

Undergraduate/Masters

Aim

1. To develop qualitative indicators of the success of the Trust's Living Landscapes programs: Coigach & Assynt, Cumbernauld and Edinburgh via high-level and Environmental Health indicators

Indicators must be robust - reflecting the long-term aims of the program whilst acting as dynamic management tools for individual projects

2. To visualize the combined efforts of partnership organisations and Trust employees in realising the individual and long-term goals of the program

Method

- Review status of Living Landscape project and the use of large-scale, high-level ecological indicators
- Appraise individual projects and develop 'hierarchical' project tree
- Develop quality indicators for individual projects and high-level program progress indicators grouping indicators by management/monitoring method

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Natural Capital



Research topic

Natural Capital impact assessment pilot on CALL

Project Champion

Alan Anderson

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Level

Undergraduate/Masters

Aim

More information available on request

Method

More information available on request

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Living Landscapes



Research topic

Habitat Impact Assessment of deer browsing across selected reserves

Project Champion

Alan Anderson

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Level

Undergraduate

Aim

1. To examine the impact of deer grazing on selected Scottish Wildlife Trust reserves
2. To identify 'at risk' species
3. To develop guidelines for specific species protection and culling levels for red and/or roe deer
4. To quantify effectiveness of the Scottish Wildlife Trust conservation grazing program
5. To liaise with neighbours and land owners in accepting guidelines and sharing responsibility for conservation effort

Method

- To review historical endangered/monitored species present in reserve and current conservation grazing programs
- To set-up grazing examination plots considering freq. of monitoring, sampling rate within plot
- To liaise with landowners/personnel to estimate exposure: numbers and m movements of deer
- To identify and justify suitable control measures (fencing, sheaths, culling)
- To implement flora protection measures with Trust or extra-organization staff

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Grasslands



Research topic

Correlation between floristic and invertebrate diversity on our species rich grasslands

Project Champion

Alan Anderson

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Level

Masters

Aim

1. To verify or identify new unique invertebrates and their associated habitats within grassland reserves
2. To develop key indicator species for each habitat/reserve
3. To quantify effectiveness of current reserve management strategies and grazing schedules and implement new measures if required

Method

- Review relevant literature and historical Scottish Wildlife Trust data on grassland invertebrates and species specific habitats
- Perform baseline invertebrate survey to identify unique situational habitats
- Compare results to expected species pairings
- Develop key indicator species for individual reserves

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Invertebrates

Research topic

Invertebrate density on mudflats of Montrose Basin, something we can easily repeat as a monitoring project.

Project Champion

Alan Anderson

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Level

Masters (Good bird and invertebrate identification skills required. Conservation, Biology/Ecology, Zoology)

Aim

1. To gather baseline data on the quantity and mass of invertebrate life within the Basin
2. To identify the presence of key species and verify species specific insect-bird relations
3. To refine/develop reserve key species indicators
4. To demonstrate the importance of mud and the value of the reserve

Method

- Review all current knowledge/information relevant to the ecology of the Basin
- Review all safety information, practical site knowledge and GIS data
- Procure access to auger/corer, vessel and lab.
- Develop and implement coring plan (sampling rate, locations, frequency, depth)
- Generate invertebrate map: analyse mud for invertebrate type, quantity and expected predators
- Develop bird monitoring program and develop invertebrate relationships

Timing

Any time of year

Location

Montrose Basin

Scottish Wildlife Trust Contribution

More information available on request



Non-native invasive species

Research topic

Mapping (or collating existing data) of non-native invasive species on the Tummel, South Esk and Spey above the relevant Scottish Wildlife Trust reserve.

Project Champion

Alan Anderson

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Level

Undergraduate/Masters

Aim

1. To develop effective, long-term control methods for non-native species
2. To quantify effectiveness of Trust NNS control methods / management practices
3. To positively influence neighbouring land management practices

Method

- Review history of NNS control in selected reserves
- Review/update/develop NNS GIS data for reserve and invasion sources (rivers)
- Ascertain effectiveness of control measures and suggest new program based on improved data
- Use 'source' data to influence control measures in neighbouring land areas and examine requirement for reserve buffer zones.

Timing

Any time of year

Location

Reserves fed by Tummel, South Esk and Spey river systems

Scottish Wildlife Trust Contribution

More information available on request

GIS



Research topic

Habitat opportunity mapping (associated with the implementation of a National Ecological Network or potential Scottish Wildlife Trust "Riverwoods" project)

Project Champion

Susan Davies

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Level

Masters

Aim

1. To ascertain which riparian areas demonstrate greatest opportunity for habitat extension or creation and so influence Trust acquisition policy
2. To quantify the importance of riparian habitats and river systems and their role as effective reserve buffer zones

Method

Review Trust data concerning riparian habitats

Carry out field habitat mapping (NVC survey) and compare with historical GIS data

Examine and improve Trust definition of riparian habitat using collected data

Develop key quality indicators of riparian habitat

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

GIS



Research topic

Drone surveys to map habitats on reserves for assessing future change.

Project Champion

Susan Davies

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Level

Undergraduate/Masters

Aim

1. To appraise potential use of drone technology in Trust field mapping operations
2. To design, implement and assess a drone-based mapping program
3. To provide uniquely engaging imagery of Trust reserves to influence the public and partners

Method

- Review literature concerning drone-use in environmental/conservation sectors
- Review previous use of drones in Trust beaver re-introduction project
- Acquire access to drone (self-operation or contractor)
- Design NVC assessment procedure for drone imagery
- Design and implement drone mapping program
- Carry out manual field-mapping and compare with drone results

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request

Social Sciences



Research topic

Understanding use of peat in domestic and commercial horticulture

Project Champion

Susan Davies

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Level

Masters

Aim

The project will be designed to build the evidence base on the current use of peat in composts, the policy tools and incentives required to minimise peat in compost and to increase uptake of alternatives. The project focuses on use in Scotland and will address questions such as:

1. Who are the major suppliers (including online)?
2. What use is peat going to – domestic and commercial? Can this be quantified?
3. Who sells peat compost on?
4. What are the alternatives? How effective are these?
5. What are the barriers to switching to alternatives?
6. What are the policy or incentives required to switch?
7. How do you influence/change behaviours?

Method

It is likely to require social research skills for some aspects e.g. behaviour change

Timing

Any time of year

Location

No fixed location

Scottish Wildlife Trust Contribution

More information available on request