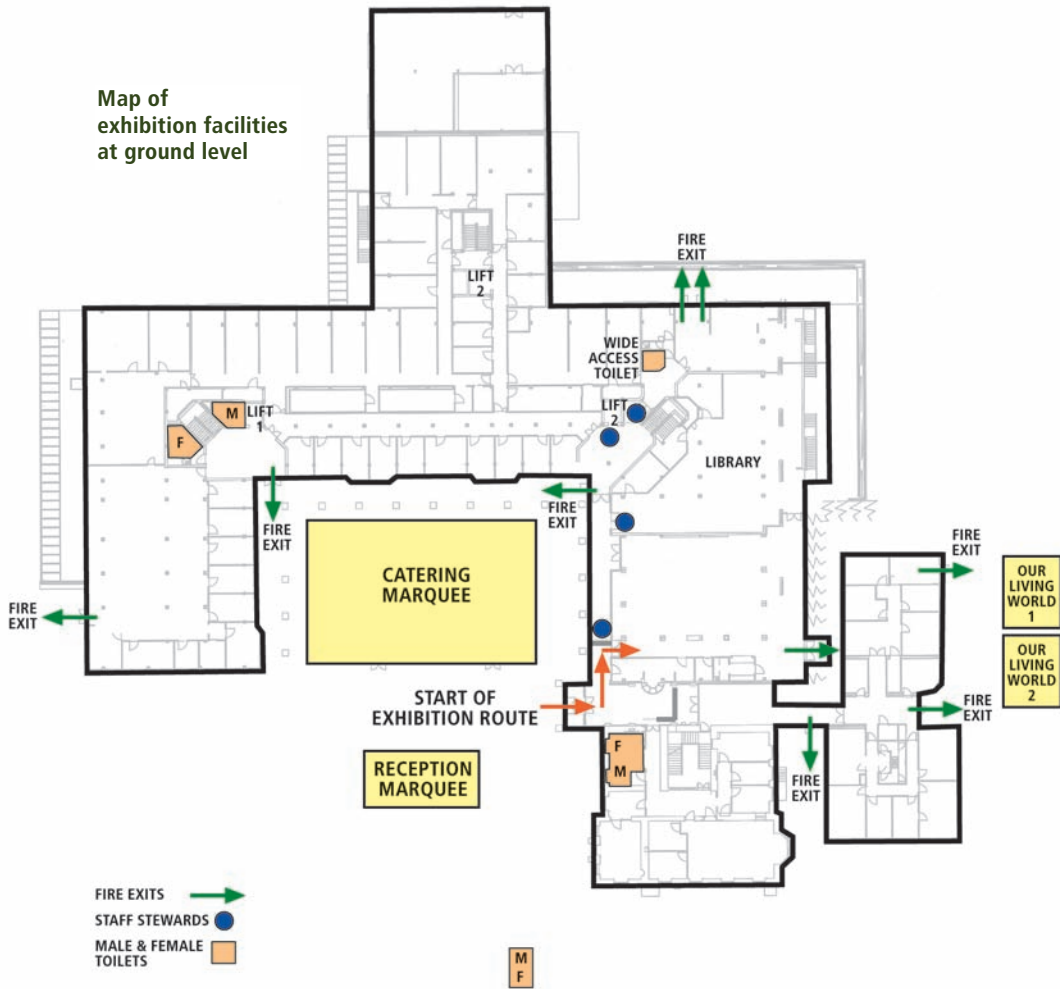


Map of exhibition facilities at ground level



The Macaulay Land Use Research Institute

Craigiebuckler Aberdeen AB15 8QH

Telephone 01224 395000

macaulay.ac.uk



Visitor's Guide



Soil Sleuths

Our soil characters are hidden around our Hubs and Marquees. Find them to collect stickers of Sandy and his seven friends.

What's in our backgarden?

In our grounds we have lots of different animals, insects, flowers, trees and fungi. Find them to find out 'what's in our backgarden?'



Insect walks

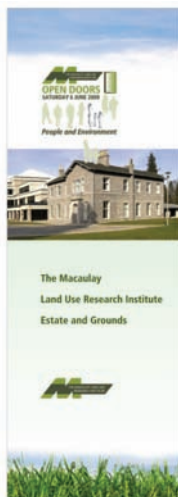
Join Macaulay scientists to find and identify insects from our gardens.

Story telling

Join staff from the Grampian Association of Storytellers as they share stories suitable for all age groups.

Arboretum guide

Take a self-guided tour to discover the history of the Institute and the trees that grow in our beautiful grounds, dating back to the 1800s.



Face painting

When you've discovered insects and animals, have your face painted to look like your favourite!

Creating songs

Graham Stephen is a local singer and songwriter who over the last two years has been involved in work with Burnsong's Burns and River Project. The project links environmental awareness and creative songwriting in schools.

Join him to create songs inspired by the wildlife displays and information in and around the Institute.

Competition prize draw

Find the answers to the questions posed as you move through the Hubs.

Return your completed form to the Catering Marquee to be entered into our free prize draw!

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Back cover





Welcome to Open Doors 2009

The Macaulay Land Use Research Institute has a long history of scientific developments and insights that focus on links between society and environment. This exhibition presents many examples of our work to understand land use, environmental systems, the use and management of land and environmental resources, and to promote sustainable relationships between society and resources in Scotland's varied environments.

Much of our science is developed in partnership with stakeholder groups, local communities, and organisations and individuals with specific interests in a particular place or issue, as well as with policy and other decision makers. We all benefit from these partnerships. As part of our efforts to develop links between stakeholders and the communities for whom our science is intended, we warmly welcome you here today. Whether you have a professional or general interest in the work we do, I'm sure that you will discover things we do that you were not aware of!

It is our aim to inform you about the importance of our work and its relevance to the future of land use in Scotland, UK, Europe and elsewhere. Do not hesitate to ask questions – we are here to help you and guide you through the exhibits and displays.

On behalf of my colleagues, the Board of Governors, the Trustees of the Macaulay Development Trust and the Board of Macaulay Scientific Consulting, thank you for coming. We hope your visit is as informative as it is enjoyable.

Professor Richard Aspinall
Chief Executive

Timetable

Activities for younger visitors take place in two 'Our Living World' Marquees.

Spaces on the activity workshops are limited, and must be reserved in advance at the Reception Marquee.

Enjoy your day

- The tour of the Institute building is clearly marked, plus many of the Institute's staff are acting as stewards along the way. Please don't hesitate to contact a member of staff (identified by ID badges) if you require any assistance. Please let stewards know if you would prefer to use the lift rather than the stairs
- Refreshments are available in the Catering Marquee
- Toilets, including those for disabled visitors, are located around the site. Please refer to the map on the back page, or ask a steward
- No smoking is allowed within the Institute building, the marquees, or within the Institute grounds
- In the unlikely event of the Fire Alarm being sounded, please follow the instructions of the nearest steward who will direct you to the appropriate fire exit
- Lost parents should make their way to the Catering Marquee to be reunited with their children

TIME	ACTIVITY
10:45 – 11:30	Face Painting
10:45 – 11:45	Creating Songs
11:15 – 12:15	Insect Trail
11:30 – 12:15	Story telling
12:15 – 13:00	Face Painting
12:15 – 13:15	Creating Songs
12:45 – 13:45	Insect Trail
13:00 – 13:45	Story telling
13:45 – 14:30	Face Painting
13:45 – 14:45	Creating Songs
14:15 – 15:00	Insect Trail
14:30 – 15:15	Story telling
15:00 – 16:00	Creating Songs
15:15 – 16:00	Face Painting
15:30 – 16:30	Insect Trail





Who we are

Welcome to the Macaulay Land Use Research Institute

Founded in 1930 through a benefaction from Dr T.B. Macaulay, of the Sun Life Assurance Company of Canada, the present Macaulay Land Use Research Institute was created through the merger of the Macaulay Institute for Soil Research and the Hill Farming Research Organisation in 1987.



The Macaulay Land Use Research Institute is an international centre for research and consultancy on the economic, social and environmental consequences of rural land uses, and the sustainable management of land resources.

Our research provides new and impartial knowledge that contributes to environmental and rural-development policy, both in Scotland and internationally, and we are committed to ensuring that this knowledge is shared and effectively communicated to all interested parties.

The majority of our research is commissioned by the Scottish Government, but we also provide research and consultancy services to a wide range of organisations involved in natural resource management.

In addition to the purpose built offices and laboratories in Aberdeen, the Institute also operates two Research Stations at Glensaugh Farm in Aberdeenshire and at Hartwood Farm in Lanarkshire. We are members of a number of UK networks including the Environmental Change Network, and work frequently with many research partners across Europe and internationally. We also offer the opportunity for postgraduate research, and our postgraduate school currently has around 50 students drawn from over 30 countries around the world.

Within the Macaulay Land Use Research Institute we have soil, plant, water and animal behaviour scientists, geographers, socio-economists and IT specialists. Working together in multidisciplinary teams, this enables our researchers to address major land management and environmental issues more effectively. This multidisciplinary approach is unique to the Macaulay Land Use Research Institute.



What we do

Research

Our remit is to research:

- The economic, social, and environmental consequences of rural land uses
- The impacts of potential changes in policy, management, climate and pollution for the management of natural resources, and sustainable rural development

Our research programme is based around six major themes:

- Catchment management
- Changing landscapes
- Climate change
- Society and countryside
- Soil quality
- Understanding biodiversity

We aim to meet the needs of land managers and those formulating and implementing land use policy. Information is provided for government policy advisers, the heritage agencies, the water industry and the statutory environmental protection agencies at all scales, from the individual farm or river catchment, to regional and national levels.

Consultancy

We provide a wide range of research, data and consultancy services to public and private sector customers involved in land and environmental management both within the UK and internationally.

Our aim is to provide expert advice and information for land managers, scientists and policy makers, based on a wide range of advanced analytical techniques, laboratory and field studies, computer modelling, and expertise in the understanding of science, government policy and the regulation of industry.

Analytical Services

Our team of analytical staff work within extensive state-of-the-art laboratory facilities testing more than 40,000 samples a year, of varying complexity, to support our environmental research programmes as well as offer specialist commercial analytical services for the oil and gas, environmental and food sectors.

Facilities are available to undertake a wide range of analyses related to plants, soils, water, gas and sediments including electron microscopy, infrared spectroscopy and mass spectrometry.



Health and Environment

Find out about how the environment affects our health, from the minerals in the soil, to how our surroundings can just make us feel better



What influences your health?

Your lifestyle? Your diet? Your family history?

These factors certainly play a part, but have you considered how the environment might affect your health?

How does the environment – our surroundings – affect us?

- Healthy food comes from healthy and unpolluted soils
- We all depend on clean water
- The environment is where we take exercise
- The environment can contribute to a 'feel good' factor in a psychological sense
- There are also aspects of our environment that can have negative impacts such as pollution in rivers and seas, or litter in our towns and cities
- There are also lots of less obvious but everyday compounds that cause serious health impacts



Our current research focuses on understanding the environment and measuring and monitoring the health of our soils and water.



Health and Environment

Many of the nutrients we absorb from our food come from the soils where the plant has been grown, the water where the fish has lived or the food the animal has eaten.

Nutrient levels in water and soil can become too high or too low, so it is important that they are managed accordingly.

Soils and water can also contain chemicals that are harmful to our health.

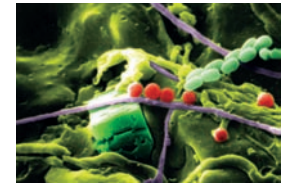
Meet Disrupted Don(na) and find out which of our organs are affected by Endocrine Disrupting Compounds (EDCs).

Ideas of Nature

At the Macaulay Land Use Research Institute, we conduct research on what Nature means to people.

We believe that better environmental policies require a better understanding of public views on the natural environment.

Relax with the 'sounds of nature' inside our hide. Tell us how natural surroundings make you feel.



Analysing our Environment

See what happens in a busy research laboratory and discover how samples are analysed



As you walk through our state-of-the-art laboratories you'll discover what analysis can reveal about our environment; from understanding how Scotland's soils may respond to climate change and the best conditions to grow vegetables in your garden, to fighting crime and searching for oil under the North Sea.

We'll give you a glimpse into the power of analysis and explain a little about some of the techniques we use from argon gas plasma to a stream of fast moving electrons.

Infrared Spectroscopy

can be used to produce a chemical fingerprint of a huge range of materials.

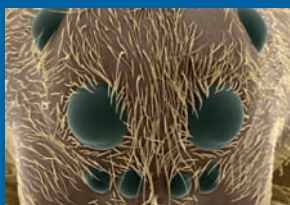
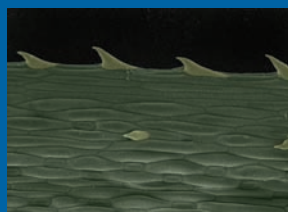
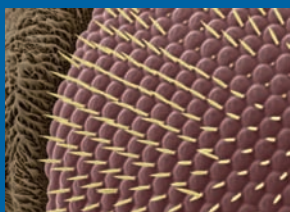
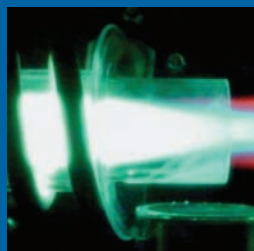
It can even be used to monitor the freshness of the mushrooms in your fridge!

It also has applications for forensic science and the commercial sector.

Soil analysis – your free pH analysis by the experts:

At the Macaulay Land Use Research Institute we have a long history of soil analysis stretching back over 75 years. We'll introduce you to cutting edge research into soil carbon stocks using isotopes and explain how, by using infrared spectra in our forensic work, we help tackle crime.

Give us a cupful of your garden soil and we'll tell you what the pH is and explain just what this means for your vegetable crop or your flower border!



COMPETITION: Match the big to the small

Water analysis:

Just what is in river water or rainfall? We'll show you how ion chromatography can be used to measure the nitrate present, and how by using mass spectrometry we can measure the elemental concentrations from parts per million to parts per trillion of everything from calcium to gold!

If you've brought along 50mls of your tap water, we'll tell you what elements are present.

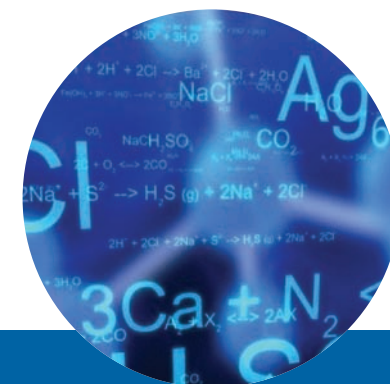


Bugs and invisible ink:

Come face to face with insects and enter a microscopic world as seen by a scanning electron microscope. Younger visitors can test their powers of observation and with some invisible ink, can find out how a little chemistry can be fun!

For more information about our analytical service, visit: macaulayscientific.co.uk

For more information about our dedicated soil analysis service, visit: macaulaysoils.com/





"Moments in Time" Landscapes/Cityscapes

*"Each period of time sets its mark on the landscape.
Landscape reflects our priorities and values"*

*"A photograph's unique feature is that it freezes
and reflects both moment and place"*

Tilbakebilikk – Norwegian Landscapes in Retrospect.
Tun Forlag

Over time, views and landscapes within the city and countryside change. What our grandparents and their grandparents saw from their town house or farm house is most likely to be very different from what we see from our windows in 2009.

As new housing estates, industrial parks and road systems appear around our city and countryside, what our grandchildren and their grandchildren will see may be unrecognisable to us.

The Moments in Time photography competition challenged schoolchildren in Aberdeen and Aberdeenshire to photograph a view of their town, city or the countryside to record what our area looked like in 2009. This will allow future generations to see how we lived and worked today.

Entries were judged in three categories:

- Primary School class entry
- Individual attending Secondary School aged 13 years and under
- Individual attending Secondary School aged 14 – 18 years

The winners of the competition were decided by a panel of judges comprising Adam Henson from BBC's Countryfile, experienced landscape photographer Oskar Puschmann from the Norwegian Forest and Landscape Institute, Richard Aspinall from the Macaulay Land Use Research Institute and Rick Rhode from the University of Edinburgh.

Congratulations to



Primary Schools Winner
Saveme.com – a pillar box serving the community, but for how much longer?
Primary 1 – Easterfield School



Primary Schools Runner-up
Snow fall in February
Ordiquhill Primary



Secondary School under 13 Winner
Coming Home
Rosalind Watt – Inverurie Academy



Secondary School under 13 Runner-up
Fence
Andrew Mason – Robert Gordon's College Junior School



Secondary School 14+ Winner
View from St Nicholas House, Aberdeen
Lisa Gerrard – Bankhead Academy



Secondary School 14+ Runner-up
Dusk at Aberdeen Harbour –
Jonathan Dawson – Robert Gordon's College



Future Climate: Future Environment

Find out about climate change and the research we are doing to prepare for what the future may bring

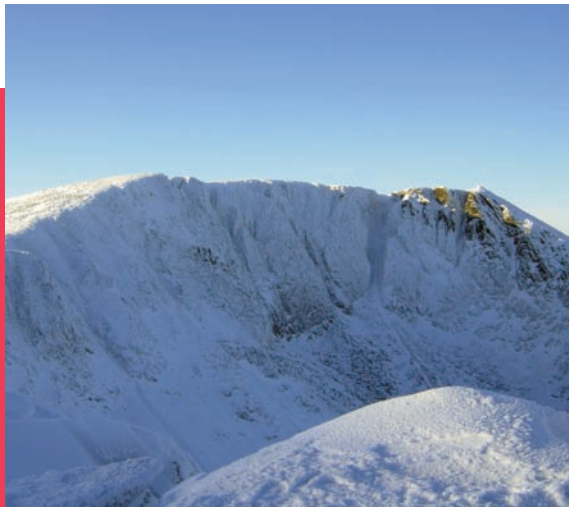
The Scottish Government has set a target of an 80% reduction in greenhouse gas emissions by 2050 in order to reduce our risk to dangerous climate change. This means our lifestyles will need to change and we will need to consider how we produce and use energy, and the choices we make in buying food, travel and the homes we live in.

Visit our Climate Controlled Growth Rooms where we can alter the heat, light and atmosphere to study how plants grow in different climates.

This is important as the trees, crops and plants we grow in Scotland might change in the future due to climate change.

The study of the impacts of climate change and how we can best adapt to it requires an integrated approach by many scientific disciplines. A shared understanding of the specific climate change challenges relative to a particular sector is a vital foundation to achieve support for changes to current policies and practices.

Current work at the Macaulay Land Use Research Institute looks at the relationships between climate change, people and the environment.



GILDED:

Governance, Infrastructure, Lifestyle Dynamics and Energy Demand: European Post-Carbon Communities

GILDED is a three year collaborative research project which aims to identify social, economic, cultural and political changes which could help rural and urban households in Europe consume less energy.

GILDED is led by the Macaulay Institute Land Use Research Institute in partnership with:

- The Potsdam Institute for Climate Impact Research (Germany)
- The Institute for Political Science of the Hungarian Academy of Sciences
- The University of Groningen (the Netherlands) and
- The Institute of Systems Biology and Ecology, Academy of Sciences of the Czech Republic

Each of these organisations are studying initiatives to reduce energy consumption in their own countries, and the different ways people respond to these initiatives, in order to make recommendations to government about how to best help households across the EU reduce their energy consumption.

GILDED is funded through European Union Framework Seven.

For more information, visit: gildedeu.org



Janeemo



Three tree species, Jatropa, Neem and Moringa, collectively known as JANEEMO, are being grown by farmers on marginal or unproductive land and as living fences around households and fields. The project provides villagers in Malawi with the resources to grow and process bio-fuels for household and village needs.

The trees all have multiple uses. Their oil-rich seeds can be processed to produce:

- Biofuels for lamps, stoves and generators
- Soap
- Biogas for cooking
- Agricultural fertiliser

In addition, extracts from the Neem and Moringa trees have important nutritional as well as medicinal uses

JANEEMO is funded by the Scottish Government's International Development Fund.

For more information, visit: janeemo.org



National Soil Archive

Marvel at Scotland's soil sample collection, maps and meet dirt doctor
Dr O.R.Ganic and his soil patient Sandy



The National Soils Archive contains a collection of representative soil samples from all over Scotland.



It includes:

- The Systematic Soil Survey of Scotland samples
- The National Soils Inventory (NSIS 1978-87) and NSIS 2 (2007-2010)
- Long term experiments
- New samples that are continually being added
- A Soil DNA archive

There are:

- 4.8 metric tonnes of soil samples on 2.4km of shelving
- More than 43,000 air-dried soil samples collected from 13,000 locations
- Soil samples collected from 1934 to the present day

The soil samples stored in the National Soils Archive are a reference to the state of the soils in the past. They are used to test new analyses and to monitor changes in soil.

It is important to avoid contamination or changes in conditions during storage so the samples are kept air-dried, cool and dark in either glass or plastic containers.

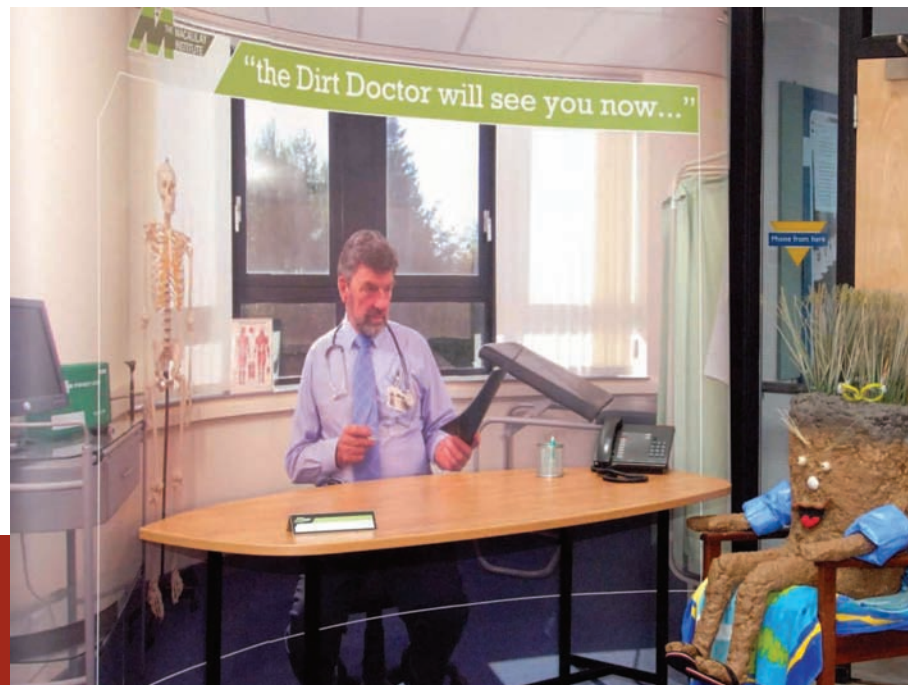


"The Dirt Doctor will see you now..."

Many people are surprised to learn that soil is alive – in fact there are more living things in just one teaspoon of soil than there are people on the planet. Like all living things, soil can become unwell and even die if it is not looked after properly.

This would be bad news for us because soils play a crucial role in almost every aspect of our lives. If we didn't have healthy living soil we wouldn't have food to eat, or freshwater to drink.

To find out more about soil health, visit: macaulay.ac.uk/news/dirtdoctors/



ACTIVITY:
Have you collected your soil character stickers?



Future Landscapes

The Virtual Landscape Theatre, plus aerial photos of Aberdeen, a computerised game for planning land use, and experiences of mountain biking recorded by headcam



Transport, housing, energy and flood prevention are issues that affect us all, and imaginative solutions to these will need to come from a wide range of ideas. If we are to succeed, new planning and sustainable development policies require the full understanding and involvement of local people. The Virtual Landscape Theatre can help make this a reality.

The Virtual Landscape Theatre (VLT) is a mobile curved screen projection facility, in which people can be 'immersed' in computer models of their environment to explore landscapes of the past, present and future.

Small groups have the opportunity to experience landscapes by moving around the virtual world – and they can even provide feedback by means of a voting handset. That way the public can be directly involved in the planning decisions that affect them.

This facility is the first mobile unit of its kind in the United Kingdom, and is used for scientific research as well as engagement with the public on issues of landscape change. The theatre has been funded by the Scottish Government to improve our understanding of the complex issues surrounding land use and rural societies.

For more information, visit: macaulay.ac.uk/landscapes/ or e-mail: landscapes@macaulay.ac.uk



How should we use our land in the future?

Grow more food? Produce more bio-fuels? Provide areas for recreational activities? Protect biodiversity and provide a home for wildlife? More wind energy? More housing?

Many of these options compete and conflict, so what are the best options?

Here's your chance to decide if land should be used for crops, forestry, natural vegetation or livestock.

How hard can that be? Find out by playing Pipe Dreams.



Experience the outdoors in someone else's shoes

What does it feel like...
...to walk up a mountain?
...to travel down a mountain on two wheels?

Watch headcam footage of outdoor recreation in action and tell us what you think!



COMPETITION:
Can you recognise change in Aberdeen?



Biodiversity Nature's Network

Fun games and lively exhibits will show you how the way we live affects the plants and animals around us.



What is biodiversity?

Biodiversity is a term used to describe the variety of different organisms. It covers plants, animals and insects from ancient pine trees to the bacteria in the soil.

Some of this biodiversity is exploited for food, timber or for tourism; other parts of biodiversity regulate nutrient supply in our soils and purify our water.

Working for Scotland's Biodiversity

Scotland's natural heritage can be best protected and enhanced through the evidence provided by research. We need to understand what biodiversity is present, and what regulates interactions within and between species, as well as between species and their environment. We also need to determine how biodiversity might be impacted by climate change and how it can best be conserved and managed.



ACTIVITIES:

Explore how climate change could effect Scotland's birds

Find out about iconic species from the tiny Scottish primrose to the majestic Scot's Pine

Learn about how red deer use the landscape and what impact they have

Discover the alien species threatening our rivers and river banks

Take a look at the images from our nest camera

The aliens are coming...!

Alien species are invading our country at this very moment. Not the type of aliens that travel in spaceships, but alien plants and animals that have spread throughout the UK.

From producing chemicals that cause burns and blindness to causing the deaths of other native creatures, these alien species can be extremely harmful and are a threat to our ecological and economic well-being.

Defined as a plant, animal or micro-organism that is not native to an area, invasive alien species are introduced to the ecosystem, either accidentally or deliberately, by humans and can act as carriers for new diseases, alter ecosystem processes, change biodiversity, disrupt landscapes and reduce the value of land and water for human use.

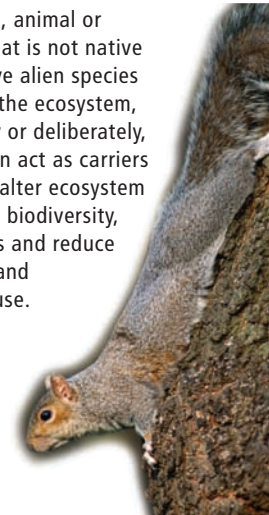


Image copyright Laurie Campbell



Find out how grazing animals affect birds.

The GRUB (Grazing and Upland Birds) collaboration is investigating the impacts that grazing animals have on birds.

In recent decades, the population of birds in the upland areas of Britain has significantly declined. Among factors implicated in this decline are grazing animals.

Our research varies the amount of grazing that takes place on a series of managed plots. By comparing the differences in the height of vegetation, the abundance of insects, and the egg weight of the birds that feed on those insects, we can see how grazing animals can disrupt the birds.

Play 'Pipit Run' and find out how grazing can affect your survival.



Our friends and local partners

The Macaulay Land Use Research Institute hosts staff from a number of different organisations and is a partner in many projects and initiatives.



Biomathematics & Statistics Scotland (BioSS)

BioSS provides mathematical and statistical research, consultancy and training to agricultural, biological and environmental research organisations. Its vision is to improve science and society through an understanding of variation, uncertainty and risk.

BioSS has a distributed staff structure to allow close contact with scientists throughout Scotland, and a team of BioSS staff is based at the Macaulay Land Use Research Institute.

For more information, visit: bioSS.ac.uk



East Grampian Coastal Partnership

The East Grampian Coastal Partnership (EGCP) is a voluntary group of individuals, with representatives from local authorities, industry, conservation bodies, recreation and tourism groups, local residents and many others who have an interest in the future wellbeing of the local coast.

The East Grampian Coastal Partnership was set up to aid in the delivery of Integrated Coastal Zone Management in the area between Kinnaird Head, Fraserburgh and the mouth of the River North Esk, by St Cyrus.

For more information, visit: egcp.org.uk/



Global Land Project

Profound changes in the Earth's land surface are underway – mainly due to the activities of people. The goal of the Global Land Project is to understand these changes, and how they affect humans and the environment.

For more information, visit: globallandproject.org/



The Ørskov Foundation

The Ørskov Foundation is a charity set up to promote sustainable development for the poorest rural communities in the world.

This is achieved through the integration of agricultural education with community projects. Sharing knowledge, experience and information are key factors to enable people and communities to find their own solutions to the complex problems they face and move towards self-sufficiency on their own terms.

For more information, visit: orskovfoundation.org/



NORTH-EAST SCOTLAND

BIODIVERSITY

The North East Scotland Local Biodiversity Action Plan

(LBAP) takes action to conserve important species and habitats for our benefit and for future generations.

LBAP is a partnership of local authorities, environmental, forestry, farming, land and education agencies, businesses and many individuals all with a common interest in conserving biodiversity in North East Scotland.

For more information, visit: nesbiodiversity.org.uk/



Dee Catchment Partnership

The River Dee is considered to be the best example of a large natural

highland river in Scotland. The catchment is relatively unusual in the UK in that it contains predominantly upland, semi-natural land use but has isolated areas of significant pressures on water and habitat quality related to agriculture and urbanisation.

The Dee Catchment Management Plan has been developed to guide the sustainable use of the catchment's river, tributaries and lochs, as well as the habitats and species associated with these waters.

For more information, visit: theriverdee.org/