



Biodiversity monitoring on urban university campuses

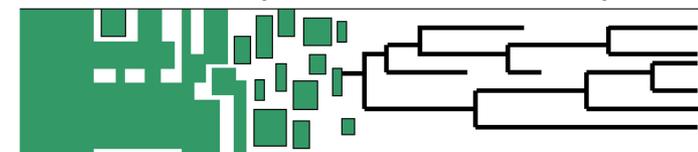
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Landscape and Biodiversity Research Group

EAUC - University of Worcester

March 2016

Landscape and Biodiversity



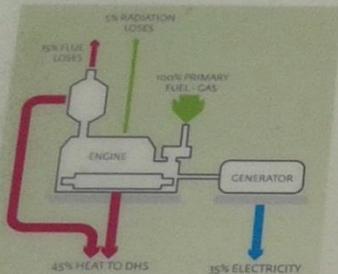
Research Group

Warwick and the Environment

Energy Efficiency and Carbon Management

CHP and District Heating System

The University of Warwick's long-term commitment to energy efficiency and carbon reduction has been firmly endorsed by the installation of combined heat and power (CHP) generation across the estate. CHP is the term used to describe the simultaneous on-site production of electricity and heat.



There are three large CHP engines in the central energy centre which generate electricity from natural gas. This satisfies the University electricity base load requirements. Unlike traditional power stations, the heat energy that is also produced is transferred via many kilometres of insulated underground pipe work. This district heating network provides heating, domestic hot water and cooling capacity for more than half of the central campus buildings.

Renewable Energy

The University is keen to pursue low carbon, renewable energy options to supply its activities. The introduction of small-scale wind turbines at strategic locations around the campus are currently supplying renewable electricity into the network. The growing of energy crops across the campus may also prove viable. Such renewable energy sources have additional benefits in supporting ongoing research activities across the campus and also attracting interest from an aesthetics' perspective.



(DHS) District Heating System

Renewable Energy

Woods

CHP Energy Centre

University House

Existing Estate

University House

University House was originally constructed in the early 1990's and was acquired by the University in 2003.

Since that time, much effort has been directed at measures to improve the building's energy performance. The measures have included connection to the University's district heating system, the installation of movement and daylight sensors to control lighting and the provision of solar film to reduce solar heat gain.



Existing Estate

A large part of the central campus supports buildings that were constructed in the 1960's and 1970's. These buildings were often not designed to today's high environmental standards and, as such, represent a legacy. Future work will concentrate on enhancing the energy, environmental and well-being aspects of these buildings through undertaking sustainable refurbishment projects.





Management

University House

University House is a modern building that has been designed to be a sustainable and energy-efficient structure. It features a range of green technologies, including solar panels, rainwater harvesting, and a green roof. The building is also designed to be a healthy and comfortable place to work and study.



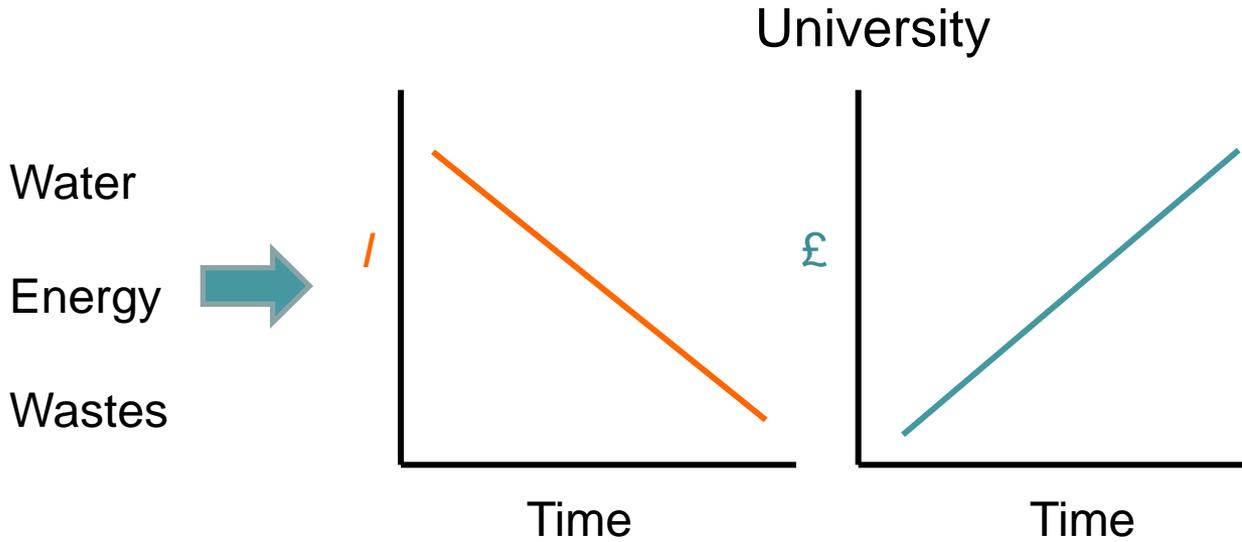
Existing Estate



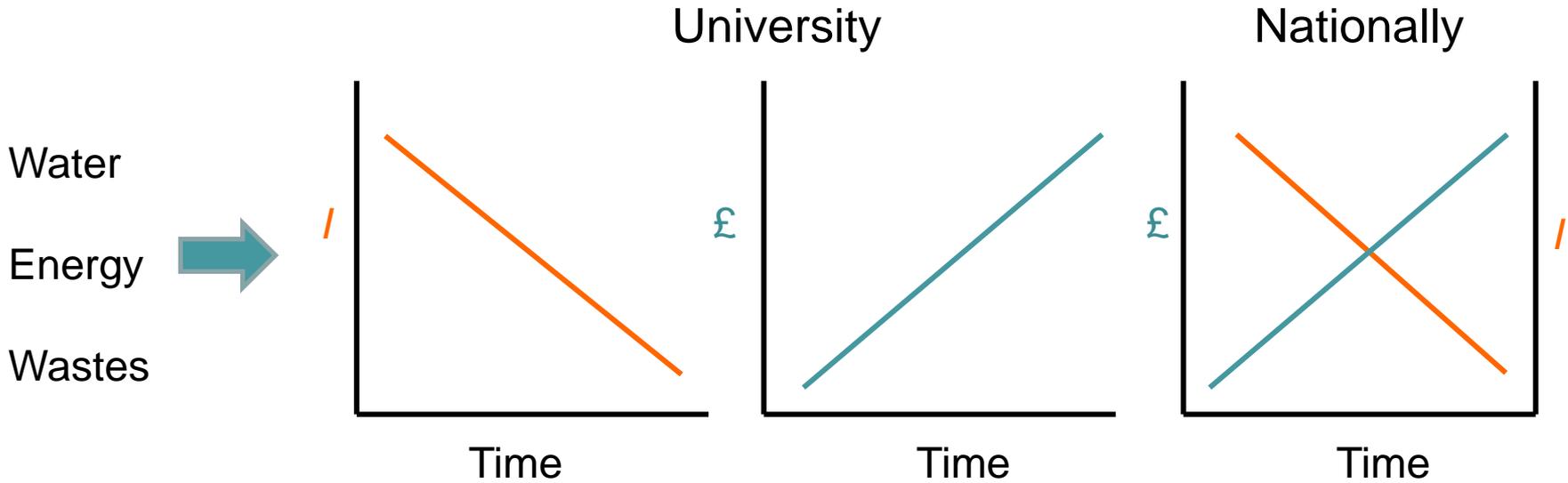
The existing estate consists of a range of buildings that have been designed to be sustainable and energy-efficient. These buildings feature a range of green technologies, including solar panels, rainwater harvesting, and energy-efficient lighting. The estate is also designed to be a healthy and comfortable place to work and study.

THE UNIVERSITY OF
WARWICK

There are good financial reasons for UK universities to engage with “environmental issues” at some level

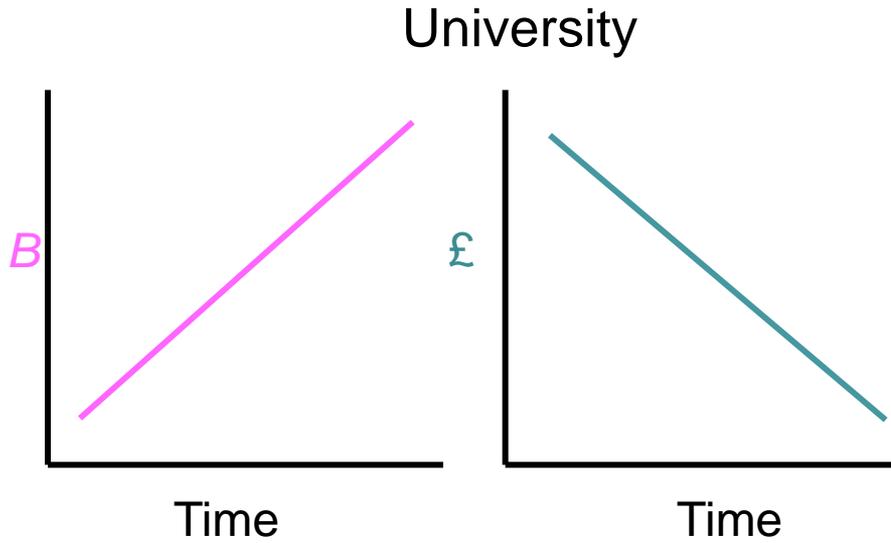


There are good financial reasons for UK universities to engage with “environmental issues” at some level

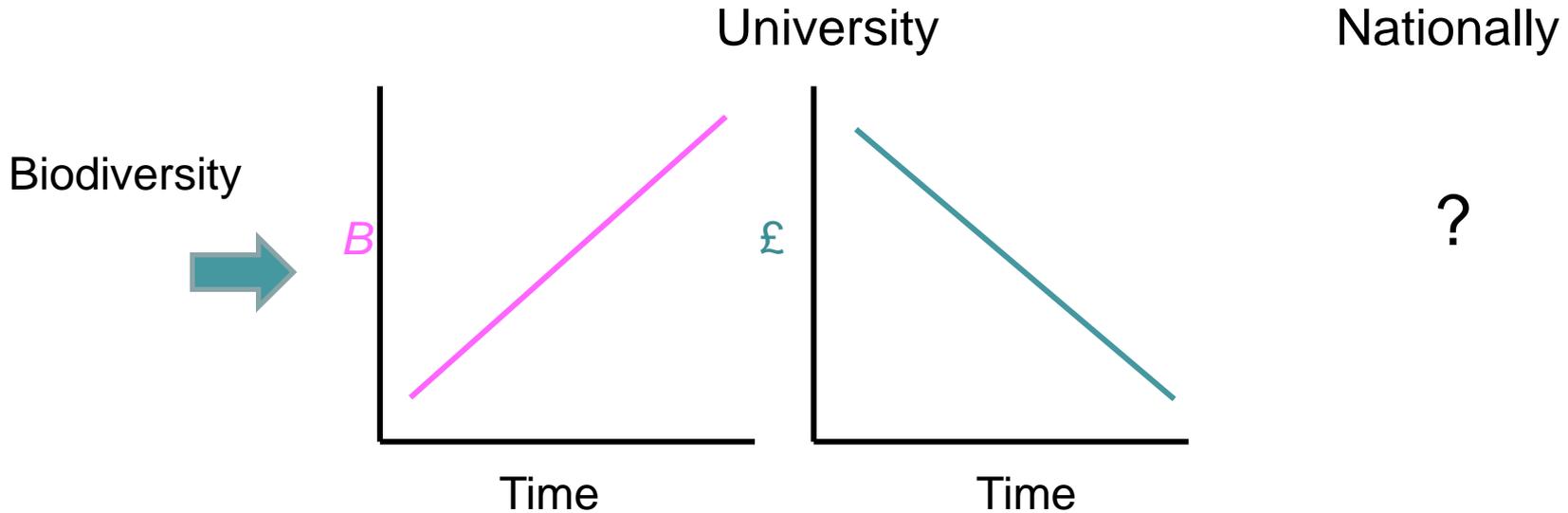


Biodiversity is different....

Biodiversity



Biodiversity is different....



“The first analysis of the UK’s natural environment in terms of the **benefits it provides to society** and **our continuing prosperity**”



UK National Ecosystem Assessment

“Ecosystem Services”

Supporting services:

e.g. soil formation, photosynthesis, primary production, nutrient cycling and water cycling

Provisioning services:

e.g. food, fibre, fuel, genetic resources, biochemicals, natural medicines, ornamental resources and fresh water

Regulating services:

e.g. regulation of air quality, climate, water quality, soil erosion, pests and diseases, pollination, natural hazard regulation

Cultural services:

e.g. non-material benefits such as spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences

Worth at least £30 billion per year in UK – some examples:

Biodiversity of wetlands enhances water quality - £1.5 billion p.a.

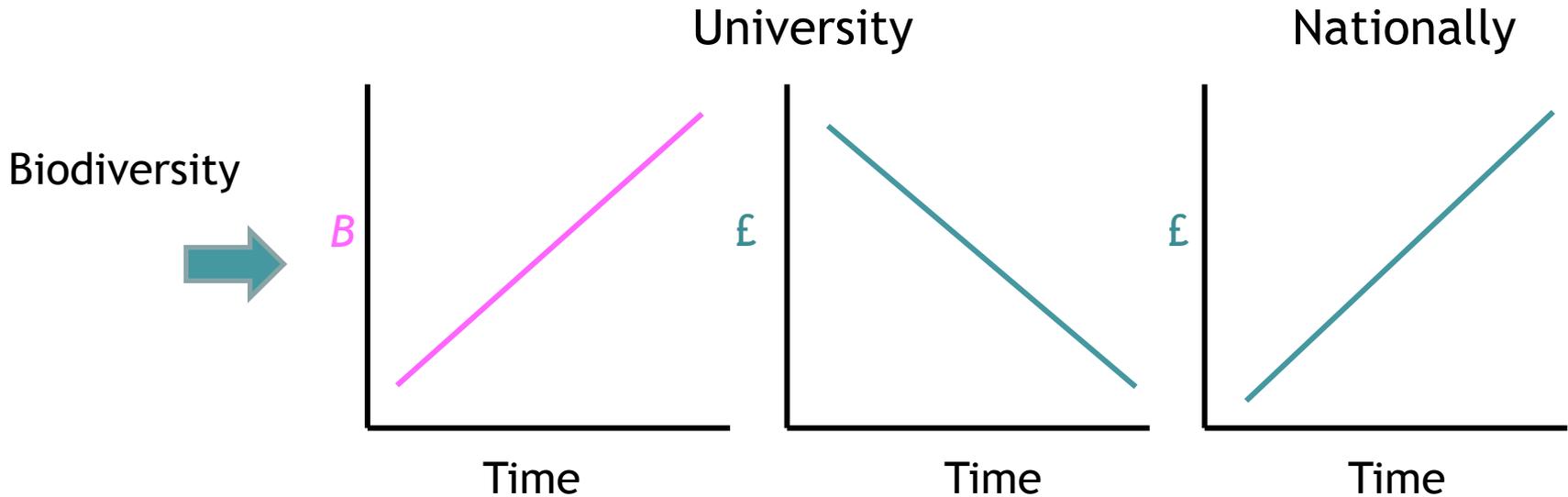
Health benefits of living with a view of a green space - up to £300 per person per year.

Amenity benefits of living close to rivers, coasts and other wetlands - £1.3 billion p.a.

Wild pollinators are worth £430 million p.a. to British agriculture.
[an underestimate...]

Source: UK National Ecosystem Assessment (2011)

Large organisations have a societal responsibility for conserving/enhancing biodiversity



“The first analysis of the UK’s natural environment in terms of the **benefits it provides to society** and **our continuing prosperity**”



UK National Ecosystem Assessment

Many universities manage and record biodiversity, but few assess the impact of their activities:

Whiteknights biodiversity

Monitoring biodiversity at Whiteknights



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Bees in the grass

Friday 10th October 2013 by @whiteknights

Every one loves bees these days and pretty much everyone loves bee orchids (*Ophrys sphegodes*) too!

The University of Reading campus is no exception and there is a small population flourishing in purposefully sown grass opposite the Hopton Building and outside the RSSC Building.

You can't miss it but step-tread carefully lest you trample a spike or two, as has already happened where eager plant hunters have stepped on the long grass (and a hidden bee orchid) in their eagerness to get a closer look at these fine and very beautiful wild flowers.

The Bee orchids are at their best in second half of June so please admire them, it may take your eyes a while to adjust and find these rather delicate plants amongst the grasses and

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UK Campus

The University of Nottingham

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Sustainability

Biodiversity

To ensure that the University is one of the greenest, we utilize a variety of organic gardening practices and manage our grounds and gardens to encourage biodiversity. These practices include:

- Horticultural green waste used to produce compost and mulching materials
- Using such materials, such as bark and gravel, rather than pebbles
- Avoiding the use of peat for soil amelioration
- Stumpage and felled timber left as habitat piles in woodland areas
- Dead or dying trees left standing as habitats
- Provision of bird and bat boxes
- Planting species that host invertebrates and insects - especially bees and butterflies
- Planting of short rotation coppice willow as an example of energy crops



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Biodiversity on campus

What is biodiversity?

Biodiversity is biological diversity in the variety of life. This includes variety in habitats (e.g. grassland and woodland) as well as diversity in species and the ecosystems in which they occur. Biodiversity is important because of the essential contribution that it makes to the functioning of our planet and because of all the benefits that it provides. From foods and medicines to climate regulation. Contact with biodiversity and the natural world has also been linked to improvements in health and emotional well-being.

Biodiversity on campus

Despite being just a mile and a half from the City of Manchester the main site of the University of Salford is a truly diverse campus adjacent to Peel Park and the River Mersey. The habitats on the University campus include lawned areas, informal gardens, wildflower areas and woodlands. Particularly on Peel Park campus there are a large variety of trees including Sycamore, Birch, Willow, Silver Birch and other British species; Cherry, Poplar, Norway Spruce, Crab Apple, Ash, Oak, Lime, Hawthorn, Southern Beech and Birch. Some of these trees are believed to date their species.

Many common British wildlife can be found on the campus and surrounding areas such as Peel Park and the River Mersey. An audit in 2006 led to a commitment to find out more of the wildlife that have been spotted around the University of Salford see the [Google map](#) set up by some of our students.

As part of our commitment to biodiversity across our estate we have been investigating further into exactly what biodiversity there the campus with us, and how we can enhance the environment to encourage habitats to increase and utilize how wildlife to the campus. We have been using the [Biodiversity Index](#) as developed by University of Northampton to create a baseline of habitat areas, see the summary of our [summary](#) and well represented in [Biodiversity Student Placement](#) (2014)

View our [Biodiversity Management Strategy](#) (2014)

THE UNIVERSITY OF NORTHAMPTON

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Sustainability

The University of Northampton recognises that the impact of our activities isn't just on the local environment, but on the global environment too. It is based on this recognition that we acknowledge a responsibility for, and a commitment to, lessening our impact through a variety of initiatives and schemes including:

- energy saving and carbon management
- sustainable travel and transport
- waste minimisation
- biodiversity
- sustainable construction and design
- sustainable procurement

Everyone studying, working or living at the University can make a difference and play a valuable part in creating greener campuses - helping work towards a sustainable future.

Environmental Management System

The University is participating in the EcoCampus and Investors in the Environment (IIE) schemes in order to help develop and implement an Environmental Management System (EMS). The University has achieved the EcoCampus Silver award for the initial development of its EMS, and has been awarded Investors in the Environment Green Level Accreditation.

The University has an [Environmental Policy](#), and environmental performance targets have been set by the Health, Safety, Welfare and Environment Committee.

Useful information

- The university's Environmental Policy
- EcoCampus scheme
- Investors in the Environment
- "Planet First" sustainability award
- Biodiversity Index
- Student Switch Off
- Green Impact
- Carbon Footprint Calculator
- Eco Environmental Innovation Centre
- Live Road, Auto-waste
- Making Inference a Service
- Freecycle
- Energy Saving Trust
- ISO14001 scheme

University of Northampton's new Waterside Campus:

- £330 million project
- 22 ha in extent
- due to open Spring 2018

How will a large, purpose-built urban campus impact on local biodiversity?

Can the campus be designed to increase biodiversity and mitigate negative impacts?





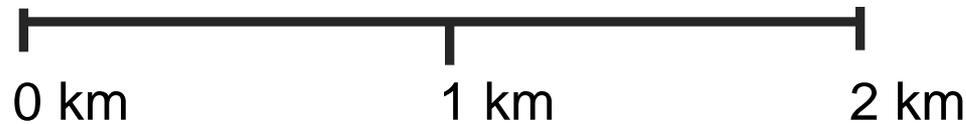
Source: Neil Rowley (Savills)

The national and international context for biodiversity at Waterside

Waterside
Campus

Wildlife Trust Local
Nature Reserve

Part of Upper Nene Special
Protection Area (+ Ramsar)



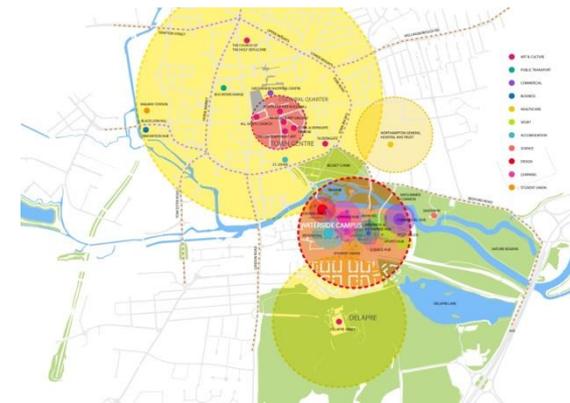
How to assess the impact of Waterside on biodiversity?

Standardised, baseline surveys of species on the site by Betts Ecology:

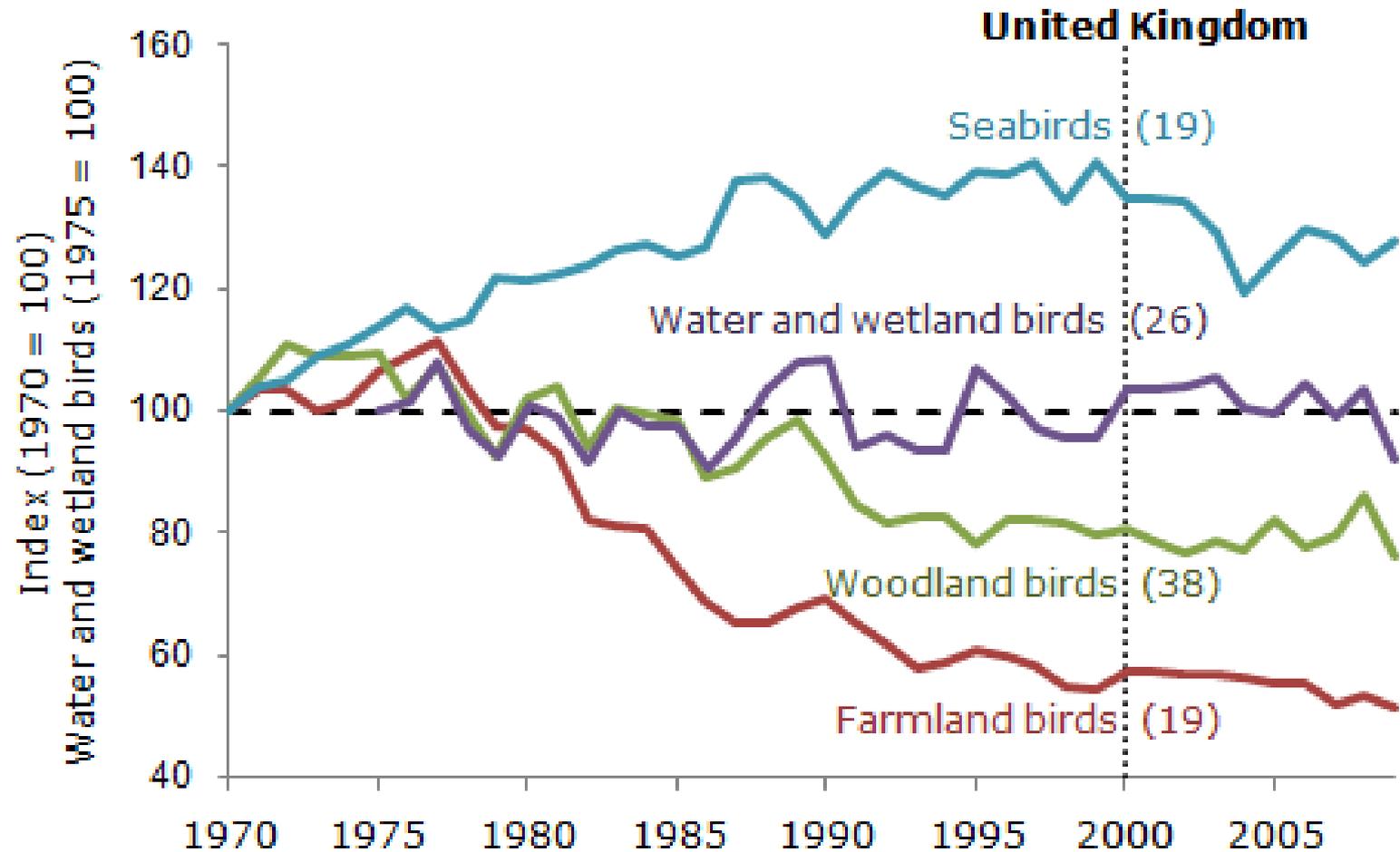
- 54 bird species
- mammals (including 4 bat species)
- plants
- invertebrates (including butterflies and bees)

Meetings between landscape architects (LUC), academics (JJ, JO) and the Wildlife Trust negotiated c.10.5 ha habitat creation, including tree planting, meadow, reed bed and recreated brownfield.

How will we know it has been successful?



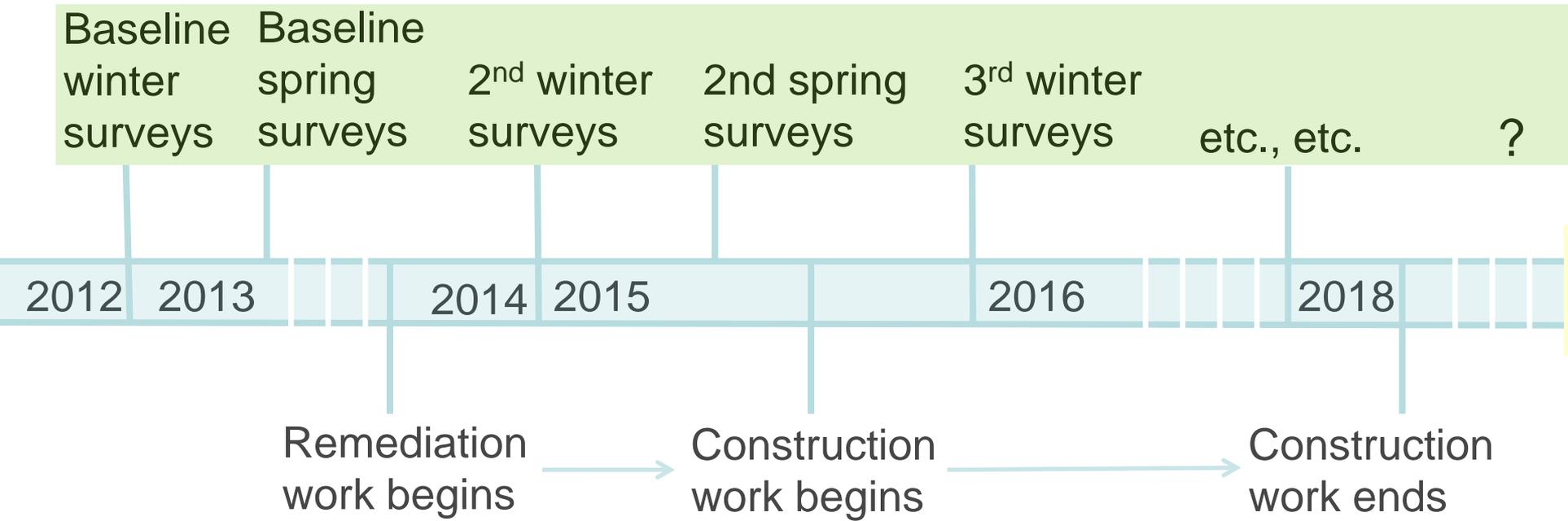
Birds are signifiers of broader environmental change

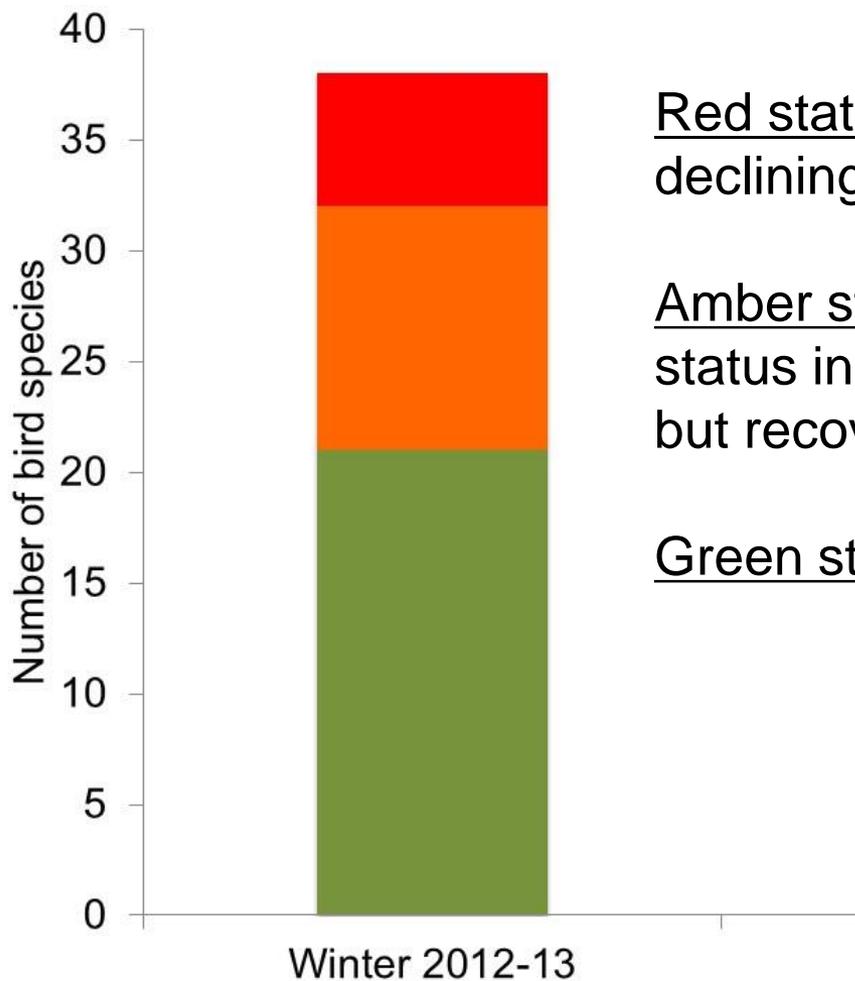


Notes: Figures in brackets show the number of species included in each measure.

Source: Royal Society for the Protection of Birds, British Trust for Ornithology, Defra, Joint Nature Conservation Committee.

Bird monitoring and campus construction timeline



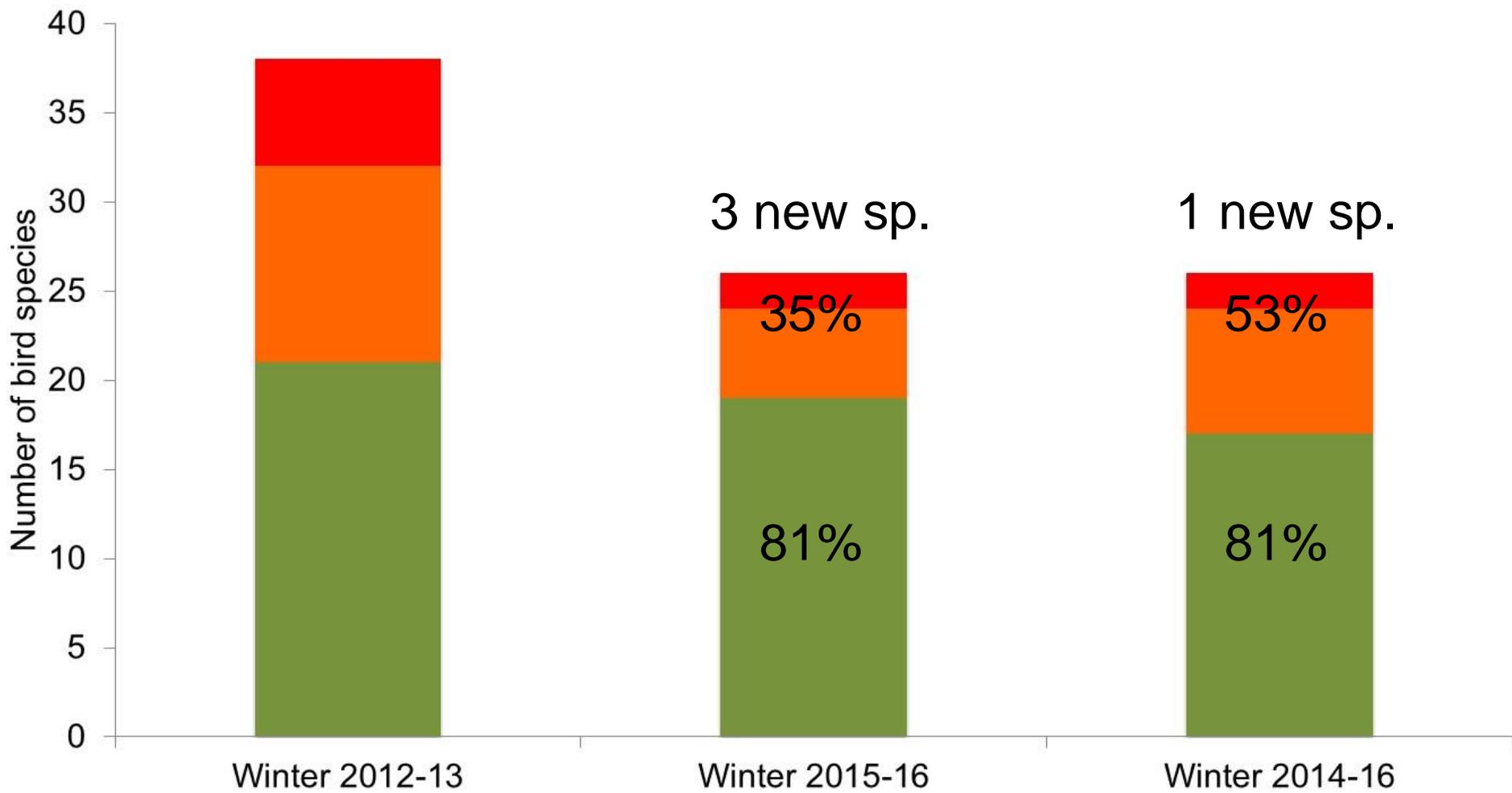


Red status = globally threatened or with declining population

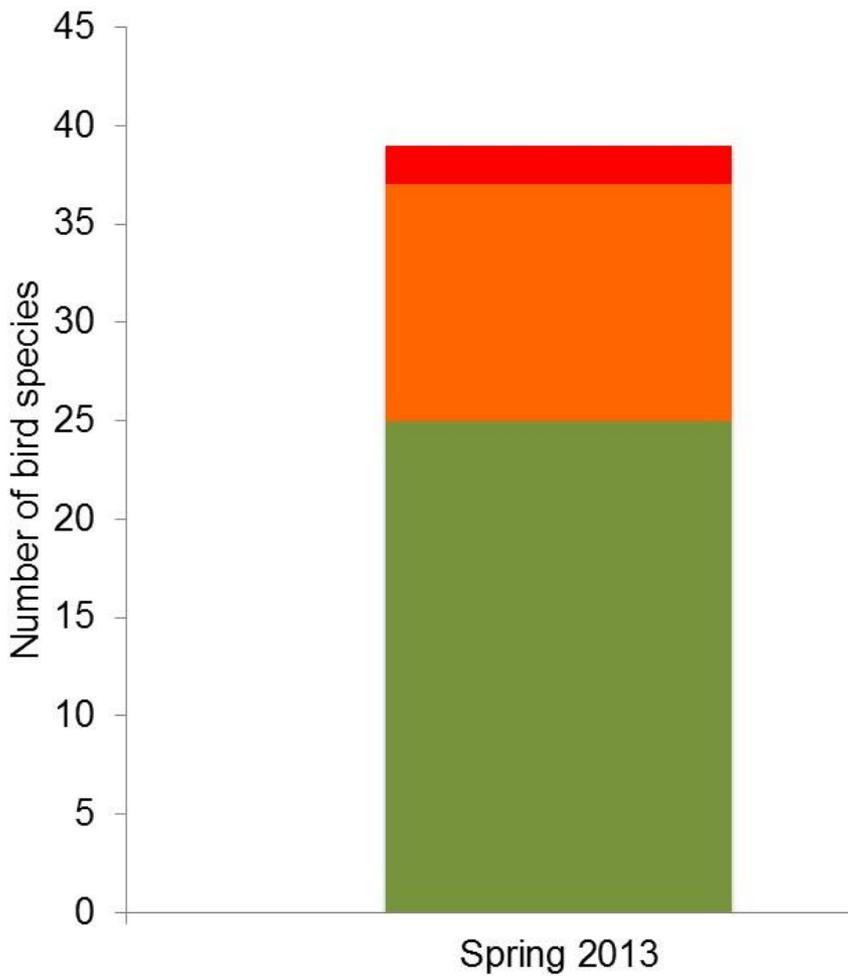
Amber status = unfavourable conservation status in Europe, or with historical declines but recovering

Green status = no conservation concern

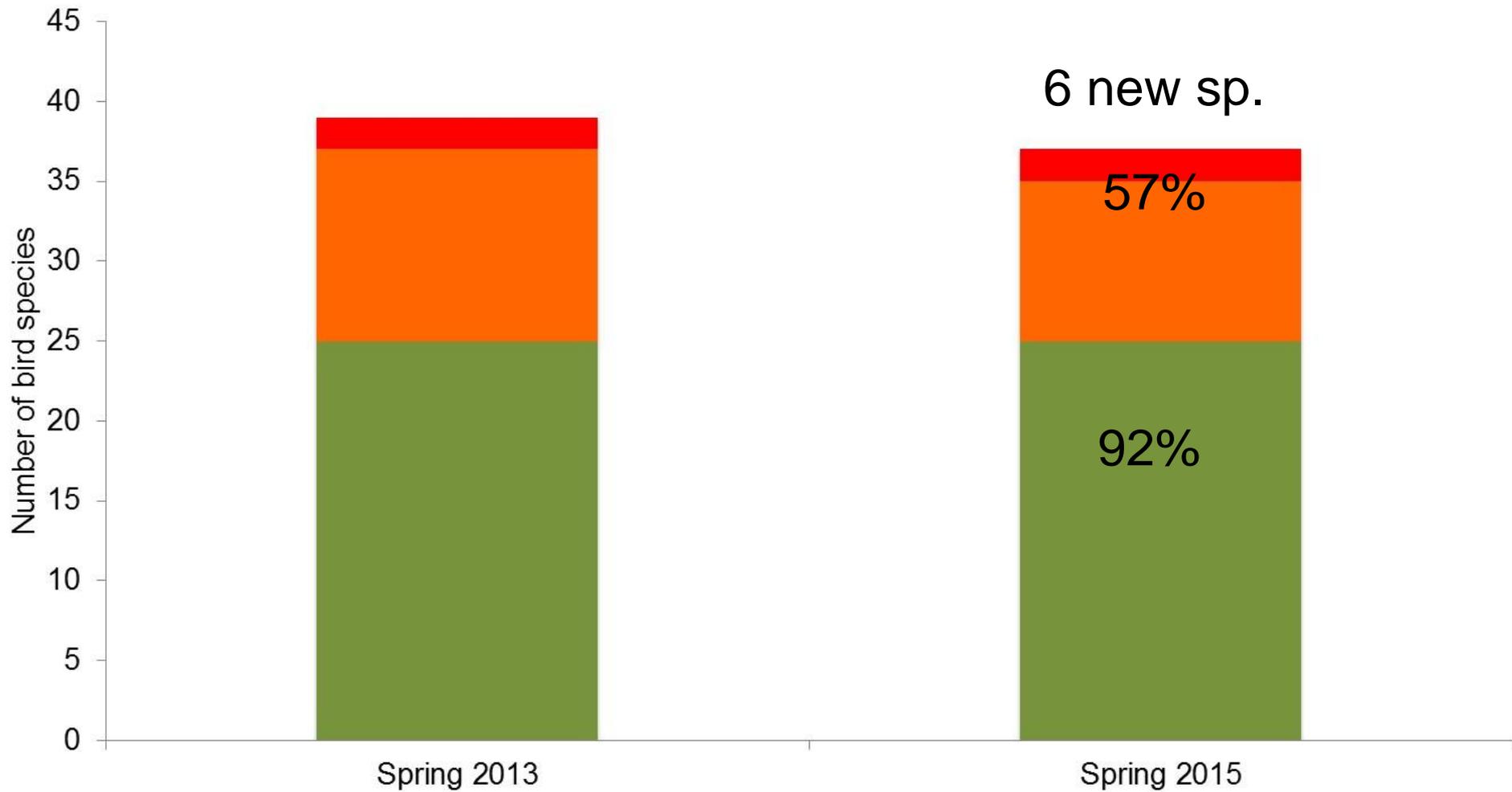
Baseline winter surveys identified 38 species of birds



%s are the proportion of baseline species that were re-recorded.

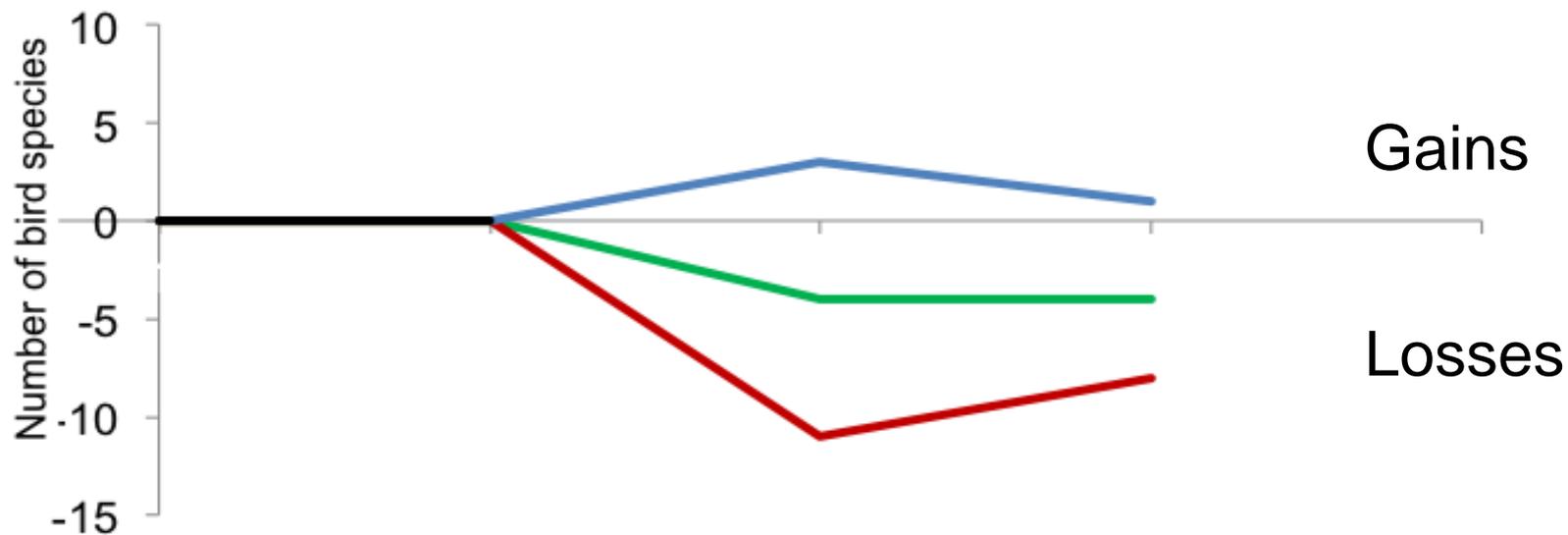


Baseline spring surveys identified 39 species of birds



%s are the proportion of baseline species that were re-recorded.

Current situation (winter 2015-16):



Baseline winter surveys Baseline spring surveys 2nd winter surveys 2nd spring surveys 3rd winter surveys etc., etc. ?

2012 2013 2014 2015 2016 2018

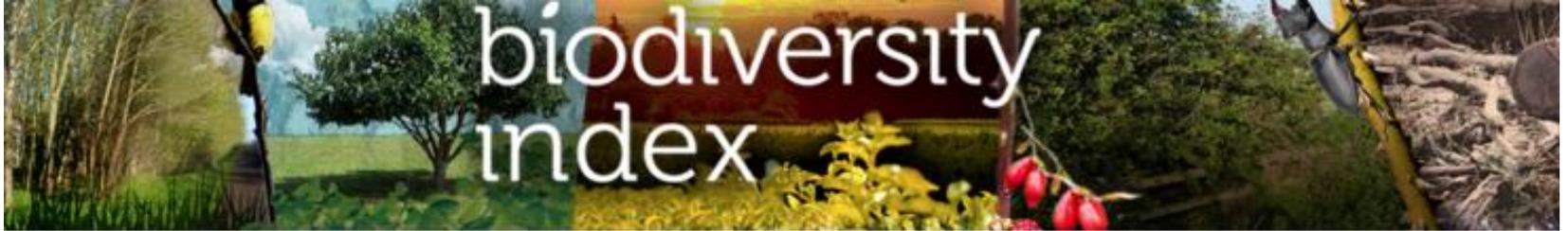
Remediation work begins

Construction work begins

Construction work ends

Conclusions:

- Biodiversity monitoring on large infrastructure developments is rarely done – no statutory requirement.
- On campuses it provides opportunities for research and student learning, frequently in combination.
- Universities and colleges have a societal role (obligation?) in managing and monitoring biodiversity on their campuses.
- Biodiversity Index – www.biodiversityindex.org



biodiversity index

"Biodiversity describes the number and variety of all forms of life - living organisms, the genetic differences between them and the ecosystems in which they occur."

THE BIODIVERSITY INDEX IS A TOOL WHICH WILL...

1

Help you to measure plant diversity on one or more sites.

2

Suggest ways you can improve biodiversity on your site.

3

Signpost you to more information should you need it.

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DID YOU KNOW?

According to UN Food and Agriculture Organisation estimates, 100 crop species supply 90 percent of the world's food and bees pollinate more than 70% of these crops!

[More >](#)



Developed by THE UNIVERSITY OF NORTHAMPTON

In partnership with



Website created by kinerc

Thanks!

Joanne Underwood & Charles Baker
University of Northampton

Betts Ecology

LUC

Neil Rowley (Savills)

Wildlife Trust

Jeff Ollerton's Biodiversity Blog



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