

Story Board 5: Biodiversity and Habitats

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SB5

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Biodiversity and habitat properties are important for climate-impact studies, but they are not defined as ECVs as only aspects of these complex properties can be measured. Biodiversity refers to the range of flora and fauna supported in an area and habitats to the environment in which these plants and animals live. Ireland is home to over 30,000 species of animals, plants and fungi. Many of these are under threat as a result of changes in land use, intensive management of agricultural land and forested areas, fragmentation of natural habitats by infrastructure and urbanisation, the influence of mass tourism and pollution and the introduction of invasive species. Climate change is an additional factor influencing biodiversity. Many native species are poorly equipped to adapt to a rapid change in climate whilst some new and invasive species can take advantage of it. Biodiversity is estimated to have a national annual benefit of €2.6 billion, and supports a wide range of ecosystem services, providing everything from insect pollination of human food plants to absorption and filtering of pollutants.

Data and Information Collection

Data and information on biodiversity has been collected by a range of organisations and individuals, but are still incomplete. There are large amounts of data on terrestrial plants and vertebrates but little knowledge on others such as marine algae and invertebrates (e.g. worms, marine animals). Biodiversity data being collected in Ireland specifically in relation to monitoring the effects of climate change come from the Irish Butterfly Monitoring Scheme, insect surveys as part of the Rothamsted Light-trap Network, and monitoring of a range of trees in the Phenological Gardens. Since the 1960s observations of phenological events (such as bud-burst, leaf out, leaf fall) have been made at four gardens (blue) that form part of the International Phenological Garden Network ([Fig. SB5.1](#)). Recently, additional gardens have been added to the network (red) to provide better coverage of the country.



Figure SB5.1. International Phenological Gardens in Ireland.

Monitoring Flora and Fauna

Phenological events are observed on up to 20 different tree species in these gardens. One such species is Birch (*Betula pubescens*). Observations at the Valentia phenological garden, Co. Kerry ([Fig. SB5.2](#)), indicate that the beginning of the growing season (BGS) for this species occurs approximately 10 days earlier now compared to the early 1970s, which has led to an extension of the growing season. Similar changes have also been observed in other species at the garden and have been linked to a rise in average spring air temperature.

Regular monitoring of the numbers, and timing of life-cycle events, of insects such as butterflies and moths helps in understanding the impacts of climate change on invertebrates and the wider ecosystem. The Rothamsted Insect Survey National Light-trap Network was set up during the early 1960s and is coordinated

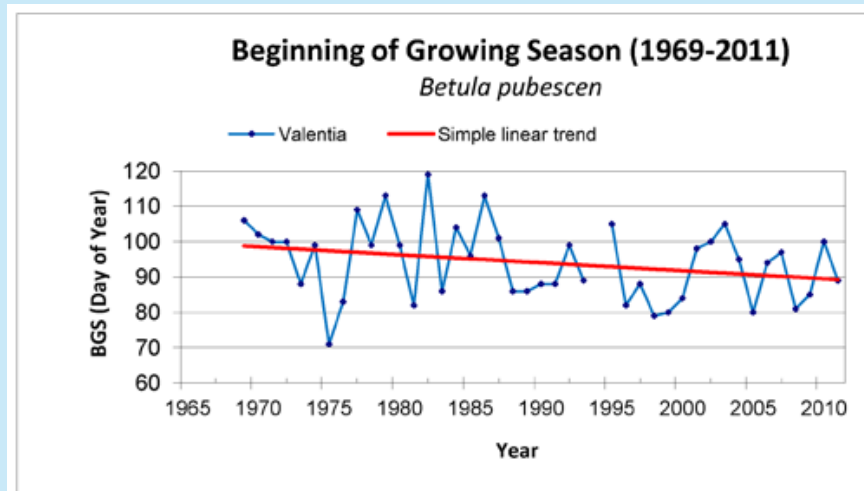


Figure SB5.2. Date of beginning of growing season for Birch as observed at Valentia phenological garden (1969–2011).

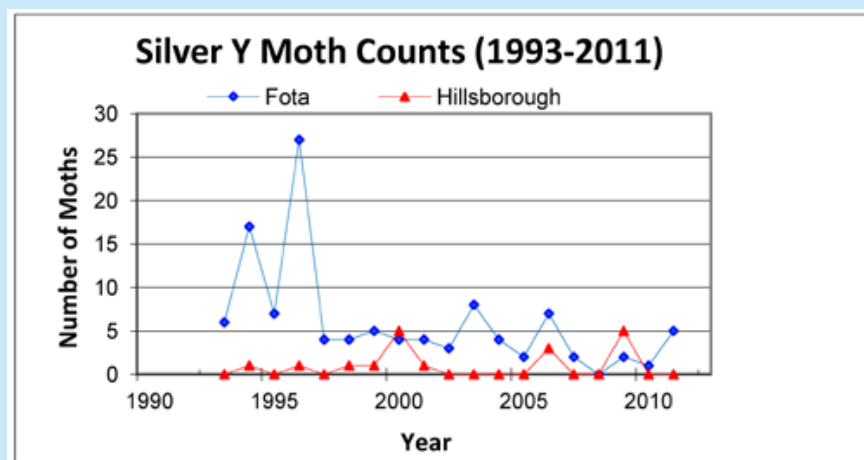


Figure SB5.3. Silver Y moth counts at Fota Wildlife Park, Co. Cork and Hillsborough, Co. Antrim (1993–2011).



Figure SB5.4. Location of designated and proposed natural heritage areas (NHAs), special protection areas (SPAs), and special areas of conservation (SACs).

by Rothamsted Research at Harpenden, England. In Ireland, there are eight light-traps which monitor the number of macro-moths. These traps provide important standardised long-term data on Ireland's moth fauna. The traps at Fota Wildlife Park Co. Cork and Hillsborough in Co. Antrim are the longest-running traps in Ireland and were established in 1993 (Fig. SB5.3).

Habitat Protection

Designated conservation areas help to preserve habitats and biodiversity for the long-term and regular monitoring of their condition is carried out by the National Parks and Wildlife Service. Natural Heritage Areas (NHAs), SACs and Special Protection Areas (SPAs) are three of the most important designations (Fig. SB5.4). SACs and SPAs are also part of the much wider European Natura 2000 network of protected areas.

The Future of Biodiversity Observations

The National Biodiversity Data Centre (NBDC), currently funded by the Department of Arts, Heritage, and the Gaeltacht, is dedicated to the collation, management, analysis and dissemination of data and information on Ireland's biological diversity. The Centre coordinates the Irish Butterfly Monitoring Scheme. The Rothamsted Light-trap catches are operated by each site and processed and analysed by Rothamsted in the UK who share the data with the NBDC. The network of International Phenological Gardens has recently been upgraded and a number of new native species gardens established as part of the EPA-funded Climate Change Impacts on Phenology (CCIP) project at Trinity College Dublin. The data generated by each garden is shared with the International Phenological Gardens of Europe. There are plans to establish the NBDC as the portal for all Irish phenological data.

SB5

Further Information

The National Biodiversity Data Centre:
www.biodiversityireland.ie

Ireland's Biodiversity in 2010 – *State of Knowledge*:
<http://biodiversity.biodiversityireland.ie>

Carroll, E., Sparks, T., Donnelly, A. and Cooney, T. (2009) Irish phenological observations from the early 20th century reveal a strong response to temperature, *Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 109B, No. 2, pp. 115–26.

Coll, J., Maguire, C., Sweeney, J. (2009) *Biodiversity and Climate Change in Ireland – Briefing Paper*.
http://www.comharsdc.ie/files/Biodiversity_ClimateBriefing%20Paper_Final_6thJan_2009.doc.pdf

Information and maps of protected sites:
<http://www.npws.ie/protectedsites/>

The impact of climate change on butterfly communities: http://www.bc-europe.org/upload/Impact_of_climate_change_on_butterfly_communities_1990-2009.pdf

Information on the Rothamsted insect survey:
<http://www.rothamsted.bbsrc.ac.uk/insect-survey/>

Irish Phenology Network: <http://www.tcd.ie/Botany/phenology/themes/plant/network.php>

Sweeney, J., Albanito, F., Brereton, A., Caffarra, A., Charlton, R., Donnelly, A., Fealy, R., Fitzgerald, J., Holden, N., Jones, M. and Murphy, C. (2008) *Climate Change – Refining the Impacts for Ireland (2001-CD-C3-M1)*, STRIVE Report 12. Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford, Ireland. <http://www.epa.ie/downloads/pubs/research/climate/name.26008.en.html>