



- BIODIVERSITY IS THE VARIABILITY AMONG ALL LIVING ORGANISMS INCLUDING THE ECOLOGICAL COMPLEXES OF WHICH THEY ARE PART – IT ENCOMPASSES GENETIC, SPECIES AND ECOSYSTEM DIVERSITY
- BIODIVERSITY IS THE FOUNDATION OF ECOSYSTEM SERVICES TO WHICH HUMAN WELL-BEING IS INTIMATELY LINKED.

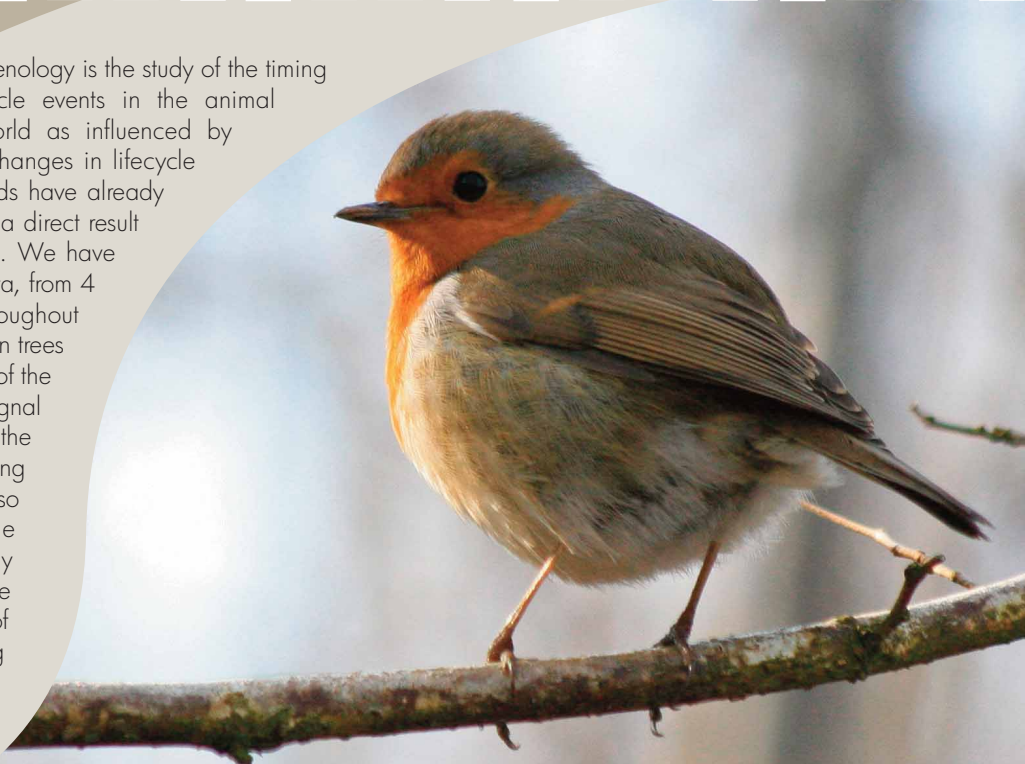
The Millennium Ecosystem Assessment (2005) concluded that: ‘By the end of the twenty-first century, climate change and its impacts may be the dominant direct driver of biodiversity loss and changes in ecosystem services globally’. Historically, habitat and land use change have had the biggest impact on biodiversity across biomes. However, climate change is increasingly affecting all aspects of biodiversity, from individual organisms, through populations and species, to ecosystem composition and function.

The IPCC Fourth Assessment Report, (2007) stated that. “Warming of the climate system is unequivocal “. But what exactly does this mean for Irish ecosystems, where predictions suggest that both winter and summer temperatures will increase and rainfall amounts and distribution patterns will change with the likelihood of drier summers and wetter winters. In addition, we expect to witness more extreme weather events in the form of severe storms.



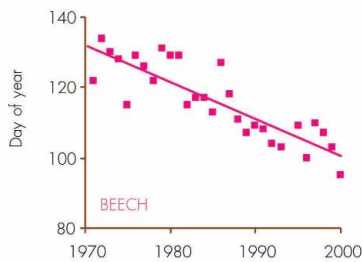
Phenology

Phenology is the study of the timing of lifecycle events in the animal and plant world as influenced by the environment. Changes in lifecycle events of plants and birds have already been observed in Ireland as a direct result of increasing spring temperatures. We have evidence from more than 30 years data, from 4 International Phenological Gardens throughout Ireland, that on average leaves are emerging on trees earlier each year. This indicates that the beginning of the growing season is starting earlier. In autumn, the signal is less clear. We would expect leaves to remain on the trees longer in autumn if temperature was the overriding driving force of leaf fall. However, as day-length also regulates when leaf fall occurs, we find that the majority of trees do not lose their leaves significantly later. Therefore, we can say that the length of the growing season, which is dependent on the length of time that leaves remain on the trees is increasing mainly due to their earlier appearance.



Studies in Ireland on the phenology of birds have found strong evidence that many long-distance transcontinental summer migrants are arriving up to one week earlier now than 35 years ago. In addition, we have observed a significant increase in the number of birds breeding in Ireland for the first time. The most notable of these are the little egret, the reed warbler and the Mediterranean gull, all of which have shown a significant expansion in their range in recent years and this is at least in part due to recent increases in spring temperature.

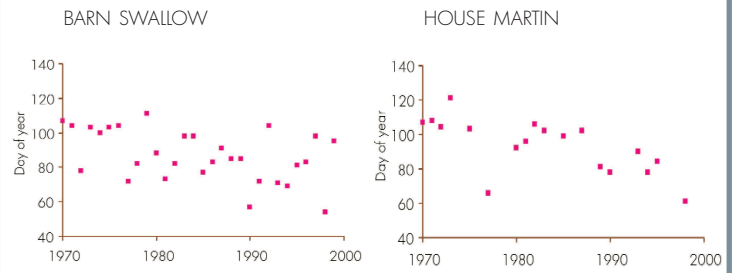
Spring Unfolding of Leaves



Species vulnerability to climate change:

In a recent survey of 850 native Irish plant species carried out by Dr Peter Wyse-Jackson at the National Botanic Gardens at Glasnevin, 171 (20%) appear to be particularly vulnerable to climate change up to 2050 and 52% of already threatened species are increasingly threatened by climate change.

Arrival dates of birds to east coast of Ireland



Changes in species and habitat distribution

Species and habitat locations are constrained by suitable climatic conditions. Climate 'envelopes' are used to represent the full spectrum of climates that can support the distribution of a species or habitat. These climate envelopes move northwards in the northern hemisphere as the climate warms. Climate 'envelope' models are used to predict the future extent and location of a species' potential distribution under various climate scenarios.

Peatlands are predicted to be particularly badly affected by climate change. The extent to which peatlands are affected

depends largely on the temporal characteristics of climate change. For example, changes in winter precipitation or temperature are unlikely to have a significant effect, whereas even small changes in the summer water balance may be enough to alter conditions for plant growth and peat decay such that they become a threat to their survival.

Recent assessments have predicted that by 2075 approximately 40% of the current suitable climatic area of Irish peatlands will be lost.

Predicted loss of peatlands in Ireland due to climate change

Year	Fen	Raised Bog	Atlantic Blanket Bog	Mountain Blanket Bog
2055	41%	31%	39%	31%
2075	42%	38%	40%	37%

(Jones et al. 2006.)

References: Millennium Ecosystem Assessment (2005) (<http://www.millenniumassessment.org/en/synthesis.aspx>). IPCC Fourth Assessment Report (2007) The physical science basis. Report from WG I, CUP, Jones, M.B, Donnelly, A. and Albanito, F. (2006) Biology and Environment: Proceedings of the Royal Irish Academy, 106B, 323-334.



6th Scientific Statement Impacts of Climate Change on Biodiversity



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This is the sixth in a series of scientific statements by the ICC. Previously published statements: A General Statement on Climate Change and Ireland • Climate Change and Irish Agriculture • Climate and Sea Level Change • Greenhouse Gases: An Irish Perspective • Climate Change and Water Resources in Ireland

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