SOE 13: Land Use

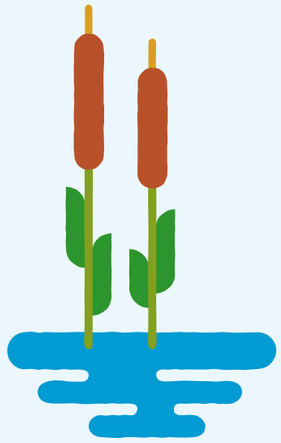
Promote integrated land-mapping approaches to support decision-making on sustainable land use.

ACTIONS – WHAT IS NEEDED?

The development of an integrated national approach to land mapping could support better decision-making on land use and management practices. It could contribute significantly to mapping land use change and managing competing pressures on the environment, such as agriculture, urbanisation, tourism and recreation, energy projects, carbon sinks, ecosystem services and space for nature.

National Land Cover in Ireland

Land provides the principal basis for human livelihoods and wellbeing including the supply of food, freshwater and other multiple ecosystem services. Sustainable land management can contribute to reducing the negative impacts of stressors on ecosystems and societies. This includes climate change where land acts as both a source and a sink of greenhouse gases.



Land Cover 2018

Water

Water consists of rivers and lakes and represents 1.7% of the national land area. Records since 1990 show the area of water remains consistent.

1.7% Trend

Artificial Surfaces

Artificial surfaces consist of sealed areas like housing, industry and transport. Artificial surfaces represent 2.4% of the national land area. Since 1990 a consistent upward trend in artificial surfaces is evident.

2.4% Trend ↑

Semi Natural Areas

Semi natural areas consist of heaths, natural grasslands, beaches, dunes, bare rock, sparse vegetation and burnt areas. They represent 3.8% of the national land area. Since 1990 a consistent upward trend in semi natural areas is evident.

3.8% Trend ↑

Forest

Forests consist of native broad leaf and coniferous trees at various stages of growth. They represent 9.6% of the national land area. Since 1990 a consistent upward trend in forests is evident.

9.5% Trend ↑

Wetlands

Wetlands consist of marshes, peat bogs and tidal mudflats. They represent 15.9% of the national land area. Since 1990 a consistent downward trend in wetland areas is evident.

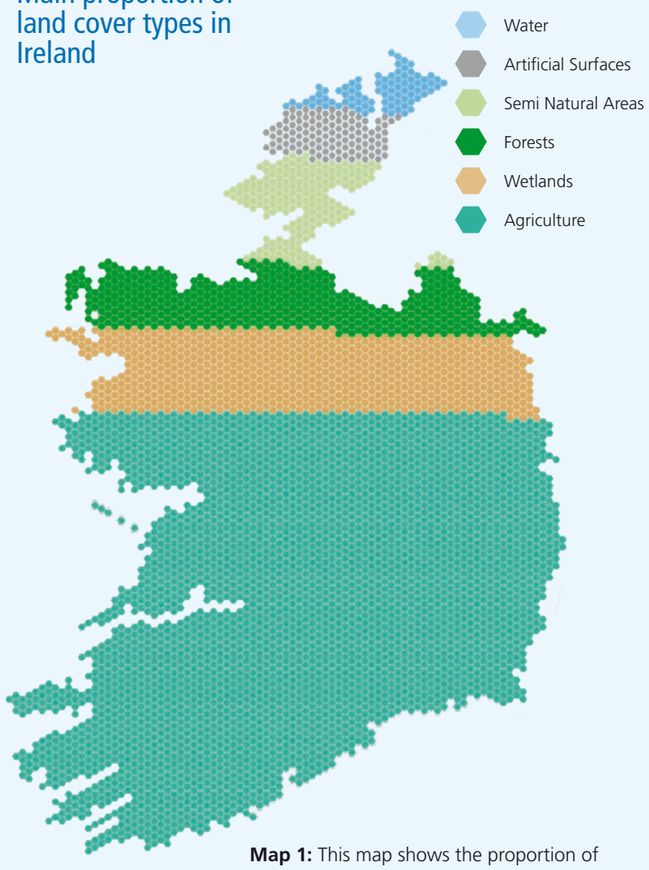
14.9% Trend ↓

Agriculture

Agriculture consists of pasture grasslands, arable croplands, and fruit plantations. It represents 67.6% of the national land area. Since 1990 a gradual but consistent downward trend in agriculture is evident.

67.6% Trend ↓

Main proportion of land cover types in Ireland



Map 1: This map shows the proportion of land cover types in Ireland by area. Using simplified hexagon shapes it is presented in a similar way to a stacked bar chart.

Trends in Land Cover Change

Artificial Surfaces ↑

Trend: There is a consistent long term upward trend in artificial areas in Ireland.

Statistics: 65% increase since 1990, the biggest changes were recorded in 2000 and 2006.

Converted from: *(listed from left by magnitude of lands changed)*

Agriculture · Forests · Wetlands

Semi Natural Areas ↑

Trend: Semi natural areas appear to be increasing but often this is only a temporary transition, a limitation of our landcover data. For example burnt bogs change to the semi-natural class, while a bog recovers then reverts.

Statistics: 32% increase since 1990, the biggest changes were recorded in 2012 and 2018 with temporary changes due to wildfires and burning.

Converted from: *(listed from left by magnitude of lands changed)*

Wetlands · Forests · Agriculture

Forests ↑

Trend: There is a consistent long term upward trend in forests in Ireland.

Statistics: 30% increase since 1990, the biggest changes were recorded in 2000.

Converted from: *(listed from left by magnitude of lands changed)*

Agriculture · Wetlands · Semi Natural Areas

Wetlands ↓

Trend: There is a consistent long term downward trend in wetland areas in Ireland.

Statistics: 20% decrease since 1990, the biggest changes were recorded in 2000 and 2006.

Converted to: *(listed from left by magnitude of lands changed)*

Forests · Semi Natural Areas · Agriculture

Agriculture ↓

Trend: There is evidence of a small downward trend in agriculture lands in Ireland.

Statistics: Although hidden by our landcover data's 25ha scale there is evidence of significant small scale changes.

Converted to: *(listed from left by magnitude of lands changed)*

Forests · Artificial Surfaces · Semi Natural Areas

* Data Source
Corine 2018 developed by the EPA for the European Environment Agency under the Copernicus Land Monitoring Programme.

The Impact of changing lands

Increases in Artificial Surfaces

Buildings: 2000-2018

Total Buildings

56% increase in buildings

1,260,597 2000 — 1,969,895 2018

Rural Buildings

69% more rural buildings

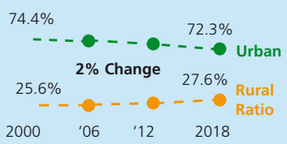
2000 — 2018

Urban Buildings

52% more urban buildings

2000 — 2018

Urban-Rural Buildings Ratio



This map shows the distribution of buildings in Ireland. It was created by relating the An Post address database to the Ordnance Survey Ireland settlements data.

Analysis of the data shows that a strong economy up to 2006 led to significant urban development. The economic downturn changed this dynamic with an increasing trend towards one-off development in more rural areas. This has resulted in an increase of 2% in the ratio of rural to urban buildings.

Data Source
An Post GeoDirectory 2018 and OSi Settlements. (Assumption: the majority of new entries to the GeoDirectory were new buildings completed in year of entry to the GeoDirectory database)

Sources
Ireland's Environment: An Integrated Assessment 2020.
* IPCC Report on Climate Change and Land (2019).
** IPBES Global Assessment Report on Biodiversity and Ecosystem Services (2019).

Reduction in Wetlands

Wetlands are in decline in Ireland with bogs particularly vulnerable. Analysis of the Corine time series (1990 to 2018) shows that wetland areas have decreased by 20% and now only represent 14.9% of lands in Ireland. Use as a fuel source and competing demands from forestry and agriculture are the primary reasons for the decline.

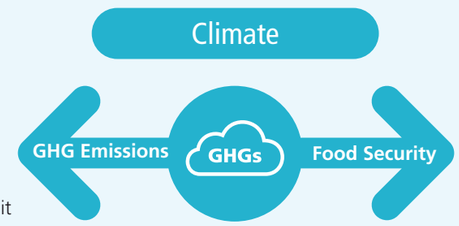
This is a detailed aerial photo of Knockananna Bog in Co. Wicklow. The image is from 2018 and is supplied by Ordnance Survey Ireland. In the centre of the image there is still intact raised bog. Analysis of 25 years of historical aerial images shows the area of bog has significantly reduced due to extraction and competing demands from other land use activities.

Drainage and extraction is evident in the areas surrounding the raised bog, this includes both current (northeast) and historical (south and southwest) extraction locations. Some historical extraction areas are showing signs of a transition to semi natural areas, while other areas have been fully converted to forestry or agriculture.

Forests — Extraction — Wetlands — Semi Natural Areas — Agriculture

Impacts of Land Changes

Land acts as both a source and sink of greenhouse gases (GHGs), which include carbon dioxide. Removing wetlands and sealing land releases GHGs, while also significantly reducing its capacity to act as a sink causing it to become a net source of GHGs.*

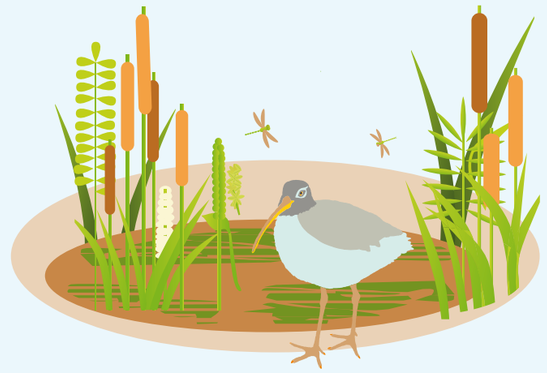


The evidence shows that we are using agricultural lands for building. This impacts on food security by reducing land available for sustainable agriculture.*

Removal of habitats and disruption of ecosystems leads to species decline. Recent reports highlight unprecedented species decline since 1900 driven primarily by land use change.**

Wetlands, grasslands, forests, hedgerows etc. are essential habitats for healthy ecosystems. Removal of habitats can disrupt finely balanced ecosystems.

Land management responses

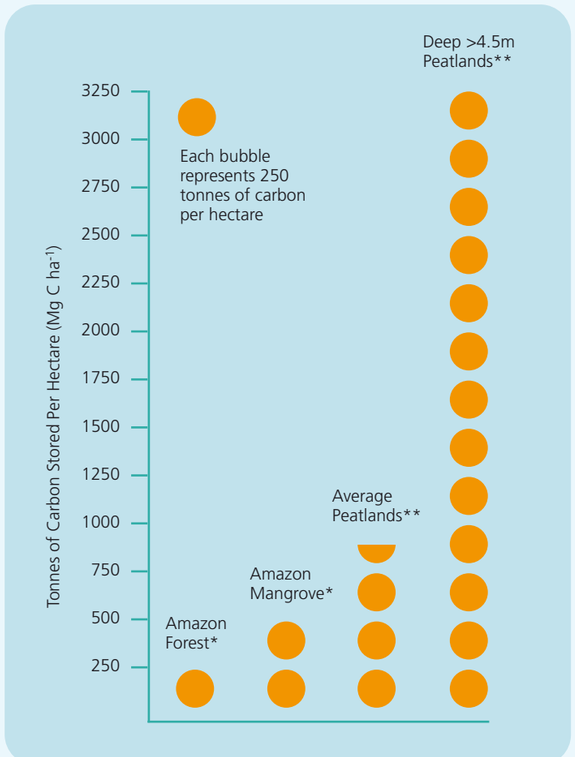


Land as a Carbon Store

Research shows that certain soils and land use practices have a greater capacity to store and release carbon. The carbon is stored as above-ground and below-ground biomass. Forestry is a good example of above-ground biomass and peatlands are a good example of below-ground biomass.

Removing forestry and peatlands releases significant amounts of carbon. Therefore, protecting and rehabilitating existing peatlands and planting forestry in the right areas is essential in limiting greenhouse gas emissions in Ireland.

Research by Holden and Connolly (2011) and Kauffman et al. (2018) has identified that deep Irish peatlands can store more carbon per metre than the Amazon forest. The graph illustrates the capacity of peatland areas in Ireland to store carbon compared to the Amazon forest and mangroves.



Sources
Ireland's Environment 2020: An Integrated Assessment
** Nicholas M. Holden, John Connolly, Estimating the carbon stock of a blanket peat region using a peat depth inference model, CATENA, Volume 86, Issue 2, 2011.
* J. Boone Kauffman, Angelo F. Bernardino, Tiago O. Ferreira, Leila R. Giovannoni, Luiz Eduardo de O. Gomes, Danilo Jefferson Romero, Laís Coutinho Zayas Jimenez, Francisco Ruiz. Carbon stocks of mangroves and salt marshes of the Amazon region, Brazil. Biology Letters, 2018; 14 (9): 20180208 DOI: 10.1098/rsbl.2018.0208

Restoring and Rehabilitating Wetland Areas

Restoring bogs in Ireland provides a huge opportunity to store carbon and improve ecosystem services. The National Parks and Wildlife Service is restoring raised bogs under several bog restoration programmes. Lisnageeragh Bog in Co. Galway is a Special Area of Conservation and is a good example of restoration works that have increased the area of active bog. Active bog sequesters and stores more carbon and has increased biodiversity.

Lisnageeragh Restoration Works by National Parks and Wildlife Service

In 1994 a survey of Lisnageeragh Bog established that there was 12.97 hectares of active bog.

Following restoration a survey in 2012 showed that active bog had increased to 24.5 hectares.

Restoration works in 2005-07 blocked drains (see green lines) to facilitate regeneration.

An example of blocking drains.

Increases in Species Abundance

Great Sundew

Woolly Fringe-moss

Feathery and Lustrous Bog-moss

Magellanic and Papillose Bog-moss

Thorn Lichen

Data Sources
Data and pictures from National Parks and Wildlife Service, Aerial Images © Ordnance Survey of Ireland.
Photos by Fernando Fernandez © NPWS.